Subject: Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting
Longhorn Army Ammunition Plant (LHAAP)
Location of Meeting: Karnack Community Center
Date of Meeting: January 19, 2022, 6:00 PM Central Standard Time (CST)

Meeting Participants:

Army BRAC:	Rose M. Zeiler
USACE:	Aaron Williams, Chelsea Montoya
USAEC:	Ana C. Nieves, Lena Sierocinski
Bhate:	Kim Nemmers, Zack Beck (on the phone)
APTIM:	Bill Foss
HDR, Inc.	Philip Werner (on the phone)
TLI:	Kyra Donnell (on the phone), Brian Gentry
USEPA Region 6:	Brian Follin, Janetta Coats (on the phone)
TCEQ:	April Palmie (on the phone)
RAB:	Present: Deon Hall, John Fortune, Sharon McAvoy, Charles Dixon Richard LeTourneau, Nigel R. Shivers, Judy VanDeventer, Terry Britt, and Donna Burney (on the phone) Absent: Tom Walker
Public:	USEPA Technical Advisory Group: George Rice (Caddo Lake Institute [CLI]), Vickie Pace, Robert Speight, Dwayne and Bennie Meyers, Nicolette Ledbury, Carter Mize, Marilyn Winters

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A color copy of the slide presentation and handouts (see list at end of meeting minutes) were provided for meeting attendees.

Welcome and Introduction

Ms. Judy VanDeventer welcomed everyone to the RAB Meeting. Ms. Rose Zeiler explained that a website has been established for LHAAP which includes a schedule and administrative record of documents (www.longhornaap.com).

Membership Update

Ms. Zeiler stated that the RAB membership list has remained the same since the removal of Mr. John Pollard a couple of years ago due to his lack of participation. She explained that a letter had been sent to him certified mail but that no response was received.

Ms. Zeiler presented a suggestion to changing the frequency of meetings to three times a year. Ms. VanDeventer asked if another meeting could be scheduled should something come up. Ms. Zeiler confirmed that additional meetings could be scheduled. Ms. VanDeventer said she was not opposed if additional meetings could be requested. RAB members present accepted the change to meetings three times a year. The proposal is to meet February, June, and November on the

third Wednesday of the month. Ms. Zeiler explained that the reason for skipping to November instead of October is the difficulty in obtaining travel funding with the fiscal year ending in September for the Federal Government. She said that depending on when holidays fall in November that the meeting would be adjusted that month. Ms. Zeiler said that the next meeting will be Wednesday, 15 June, 2022, with this proposal acceptance. Ms. VanDeventer asked if anything is expected to come up between now and June to which Ms. Zeiler said she could not think of anything, but she would let her know if anything comes up.

Minutes (October 2021 RAB Meeting)

Ms. Zeiler verified that there were no comments or changes to the October meeting. Motion to approve the October 2021 RAB meeting minutes was provided by Mr. Deon Hall with Mr. Charles Dixon seconding the motion.

RAB Public Involvement

Ms. Kim Nemmers provided an overview of the process for joining the RAB. Anyone in the public can become a RAB member. She explained that there is an application to become a RAB member on the website for LHAAP. Potential members are voted on during the RAB meetings based on the applications received. She said that the purpose of a RAB member was to attend and participate in the RAB meetings regularly and communicate to the community what the RAB member learned at the RAB meetings. Ms. Nemmers encouraged participation of the public attending the RAB regardless of whether they are part of the board.

Documents in Progress

Ms. Nemmers introduced the three contractors performing work at LHAAP. She explained which sites each of the contractors were managing. Ms. Nemmers explained that the only site with overlap is LHAAP-18/24, which Bhate manages as an interim remedy and for which HDR, Inc. is developing a final remedial design. She then explained where the LHAAP sites are in the CERCLA process and pointed out how far along the sites are in that process.

Ms. Nemmers presented the documents and field work completed in the past three months. Ms. Nemmers explained that Remedial Action-Operation (RA-O) is predominantly groundwater monitoring at LHAAP. Sites with RA-O have remedies in place, such that the groundwater monitoring is completed to evaluate those remedies. An annual report is then produced to document the monitoring. Ms. Nemmers explained that when a remedy is first put into place that quarterly groundwater sampling is performed for two years, followed by semi-annual sampling for another two years and then annual groundwater sampling thereafter. She said that a quarterly report is prepared for the groundwater treatment plant (GWTP) and that the groundwater monitoring wells are sampled every six months at LHAAP-18/24. Ms. Nemmers pointed out that each of the reports are then posted on the Administrative Record (AR). Ms. Nemmers said that the surface water is sampled quarterly and an annual report is produced. She stated that the handout for the surface water sampling was provided and included that quarterly data also. Ms. Nemmers explained that each report is prepared by the contractor, then reviewed by the Army and Regulators. Following resolution of comments from Army and Regulators, the

reports are finalized and placed into the AR.

LHAAP-04

Mr. Bill Foss explained that LHAAP-04 was a pilot wastewater treatment plant. He presented the historic extent of the perchlorate plume prior to implementation of the remedial action. Mr. Foss pointed to the portion of the site excavated in 2010 for soil contamination. In November 2019, emulsified vegetable oil (EVO) was injected into the groundwater aquifer. He explained that the EVO injections targeted the higher perchlorate concentrations and the downgradient portion of the perchlorate plume. He explained that some detections of perchlorate were present above the cleanup goal, during the first sampling (February 2020) event after the remedial action implementation. However, perchlorate has not been detected above the cleanup goal in the following sampling events with the most recent quarterly sampling events not having any perchlorate detected in any of the monitoring wells sampled. Mr. Foss explained that seven quarters of groundwater sampling has been completed as of November 2022. Mr. Foss said that aquifer geochemistry is being observed going back to normal without detections in perchlorate. He explained that to treat the perchlorate, reducing conditions were created to allow the bacteria proper environment to degrade the perchlorate. Observations that the geochemistry is returning to natural conditions signifies that the remedy has worked. Mr. Foss pointed out that dissolved oxygen is increasing, and the oxidation reduction potential is going from negative (reducing) to positive. We are seeing the conditions returning to normal and perchlorate concentrations remain non-detect, which is a good sign.

GWTP Update

Ms. Nemmers then provided an overview of the Groundwater Treatment Plant (GWTP), which currently treats groundwater from LHAAP-18/24. She presented a handout with a graph of the amount of treated groundwater discharged each month. She explained that the amount of treated groundwater varies based on rainfall and where the groundwater can discharge to. Ms. Nemmers explained that, currently, there has not been much precipitation, so the treated groundwater is discharged to a holding pond. She explained that the water to be discharged to the holding pond receives additional treatment, which reduces the discharge rate from the GWTP. Higher volumes of discharged water means that the bayou has a lot of flow and treated groundwater is being discharged from both the GWTP and the holding pond.

Ms. Nemmers presented the surface water sampling and explained that a handout was provided for the meeting. Surface water is sampled for perchlorate quarterly when the bayous are flowing. Ms. Nemmers explained that the locations of the samples collected are presented in the handout.

LHAAP-18/24, -29 and -47 Status

Mr. Aaron Williams, with USACE, then provided an update on LHAAP-18/24, LHAAP-29 and LHAAP-47, which are the three remaining LHAAP sites that don't have final remedy in place. He explained that HDR, Inc. was the contractor working on these sites.

- LHAAP-18/24 was further investigated in support of active treatment, with focus on the

northeast corner and inside boundary of the site. The draft report from that investigation has been prepared and should be draft final in February 2022. The remedial design (RD) for the site is planned to be drafted by May 2022 using the additional investigation data.

- LHAAP-29 is following a similar path with additional investigation being completed to support the RD and eliminate any data gaps. After reviewing the additional data collected, an additional mobilization will be completed to address remaining data gaps. A draft report will then be prepared and is expected to be issued by June 2022. Mr. Williams explained that some re-analysis of sample data was also completed at LHAAP-29 to verify results and determine if additional sampling was required.
- LHAAP-47 has a Record of Decision (ROD) that was prepared with comments received by the Regulators. The revised, Draft Final ROD is being prepared, incorporating Regulatory input, by the end of January 2022.

LHAAP-17 Remedial Action

Mr. Brian Gentry, MMG-TLI Joint Venture, discussed the ongoing work being performed at LHAAP-17. Mr. Gentry showed the previous excavations completed by Bhate and APTIM, when munitions were encountered and work stopped. Mr. Gentry stated that the remedy selected in the 2016 ROD included; excavation and off-site disposal of soil; groundwater extraction; monitored natural attenuation; and land use controls to maintain the remedy and prohibit groundwater use, until chemical of concern (COC) concentrations are reduced to levels supportive of Unlimited Use/Unrestricted Exposure (UU/UE). A total of 13 excavation areas (A, B, C, D, E, F, G, H, J, K, L, M, and N) are identified in the ROD. Excavation began in August 2019 and a work stoppage occurred on 30 September 2019, due to the presence of munitions hazards not previously known to be present. Of the 13 excavation areas, seven areas (A, B, C, D, E, F, and G) were confirmed to be clean and backfilled in August 2020.

Munitions and Explosives of Concern (MEC) was determined to present an imminent and substantial threat, a Time Critical Removal Action (TCRA) was determined appropriate, and an Action Memorandum approved. Following work plan approvals, TCRA site work began in October 2021. Site work to date has included: boundary survey, vegetation removal, erosion control repair, identification and importing of backfill, draining of standing water, robotic sifting of existing soil piles to remove potential MEC, excavation and over-excavation (where needed) of remaining areas (H, J, K, L, M, and N), staging of excavated and sifted soils, backfilling in areas previously determined clean, and off-site disposal of sifted soils.

Mr. Gentry explained excavation and sifting of the soils is being completed robotically so that an exclusion zone (EZ) can be established where no people are allowed. He explained how the sifting plant works using magnets. The metal material removed is then evaluated by hand to determine if munitions are present. The material is separated into two different categories for metals debris; Metals without munitions are considered non-munitions debris. He then presented the portion of excavation required following the 2019-work stoppage. Mr. Gentry explained that approval of confirmation sample results is required prior to backfilling. Inspection and certification of all metallic debris removed from the ground is completed with determination that the material is

non-munitions debris, munition debris or a MEC items. Explosive disposal is required for MEC items. Mr. Gentry explained that material potentially presenting an explosives hazard (MPPEH) is stored temporarily on site, and that 52 items of MPPEH have been identified. Near the end of the project or when the allowed storage amount exceeds 9 pounds net explosive weight the MPPEH will be detonated. The buried explosion module (BEM) will be used for the explosion of the MPPEH. Mr. Gentry then showed a photo of the sift plant. Ms. Zeiler asked for Mr. Gentry to further explain the sift plant. Mr. Gentry then explained the photo on slide 27 stating that you can tell the excavator is robotic based on the two antennas. He said that the operators are in a container box to operate the excavator. The soil is then dumped into the sift plant. There are three belts on the sift plant. The first belt is the "overs" or the material that cannot go through the screens of the sift plant. Next is the mid belt which sifts material through a smaller screen but not as small as necessary. The last belt is the fines belt which has the soil that has gone through all of the screens and any material less than 1-inch in diameter.

Mr. Gentry outlined what has been completed to date. Mr. Gentry explained that the only area that has not been over excavated is area J. Confirmation sampling is on-going. Soils that have gone through the screening process are starting to go offsite. Upon approval of the confirmation samples, backfilling will begin. Mr. Gentry showed Area J where soil has not yet been excavated. Mr. Dwayne Meyers asked what happens to the excavated and sifted soil. Mr. Gentry said that the soil is trucked out. Mr. Foss stated that the soils are being sent to East Texas Regional outside of Henderson, Texas. Mr. Meyers asked about the process of offsite disposal, as it seems that the issue is just being transferred from one location to another. Mr. Gentry explained that the soils sent off site do not have munition hazards but still have constituent hazards for perchlorate, DNT, trinitrotoluene (TNT). Mr. Meyers asked if the landfill is permitted to take the waste as it seems that one problem is being moved to another location. Ms. Zeiler said that the landfill is able to take the wastes. She said that the constituents are not high levels. Mr. Meyers asks why the soil could not be placed at LHAAP. Ms. Zeiler said that a permit would be needed and the Army would be responsible for life-long management of the landfill at LHAAP. Mr. Meyers asked for confirmation that the Army retains liability for the waste. Ms. Zeiler confirmed.

Mr. Meyers asked if there is onsite borrow fill. Ms. Zeiler said that onsite borrow material used to be used but is hard to find as the land is turned over to the US Fish and Wildlife. Ms. Nemmers explained that all the soil brought on site gets tested to make sure it meets criteria before it is used. She stated that the purpose of the remediation was to hand the land back to the US Fish and Wildlife.

Mr. Gentry stated that 3,955 cubic yards of soil have been excavated for screening and offsite disposal. To date, 2,742 cubic yards of soil has been exported offsite. A total of 6,026 cubic yards of soil have been imported from offsite. A total of 52 munitions items that potentially present an explosive hazard have been identified. Non-munitions debris (e.g. fence posts, rebar) removed to date is approximately 31,449 pounds. To date, 11,448 munition debris, with potential MEC characteristics have been found.

Mr. Gentry stated that backfill is being staged onsite for future backfilling. Mr. Gentry outlined

the project schedule. He explained that the next activity involves scanning the entire property for any subsurface metallic materials that need to be further investigated as they could be munitions. Any targets identified by the scan will be excavated and evaluated. Then a groundwater extraction system will be installed. Full site restoration/demobilization is anticipated around 20 April 2022.

Ms. Zeiler explained that there are three types of soil sampling being performed to verify the remediation meets acceptable criteria. She says that wall and floor samples are being collected to verify that the cleanup levels are met, excavated soil is sampled to characterize the waste prior to disposal and offsite backfill sources are sampled to make sure they are clean.

Mr. Meyers asked if the munitions were scattered on the ground or buried. Ms. Zeiler stated that the munitions were not scattered. Mr. Gentry stated that the munitions and munitions debris being discovered appeared to have been burned, which was a common way to dispose of these types of munitions in the past. When a munition item is discovered and it cannot be determined through visual observation whether the munition item contains energetic material or not, then the item is managed as MEC and is placed into on-site storage for disposal. There are currently 52 munition items being stored onsite for disposal. Mr. Terry Britt asked for clarification between explosives and munitions. Mr. Gentry clarified that munitions contain energetic fillers which may be explosives. The majority of the munitions being discovered at LHAAP -17, however, contain pyrotechnic or illumination type fillers and contain very little explosives.

Ms. Zeiler stated that although LHAAP produced bulk TNT that it was a short lived production that ended after World War II. Then, primary production at LHAAP shifted to pyrotechnics and illuminants. Mr. Meyers asked if the Army kept records on where these pits (at LHAAP-17) were located. Ms. Zeiler said that although LHAAP-17 was a known site, not all of the activities were known. She went on to state that the burning and burying of munitions was not known but the presence of explosives constituents in the soil was known. Ms. VanDeventer asked if anything was ever found from the rocket motors to which Ms. Zeiler said nothing was ever found.

Mr. Carter Mize from the Marshall News Messenger asked how old the materials are that are being removed and how old the plant is itself. Ms. Zeiler stated that the plant was constructed in 1942 for the World War II effort. She said that the plant produced TNT for the World War II efforts. Ms. VanDeventer said that Universal Match came in 1952 to produce pyrotechnics. Rocket motors were also produced. The plant operated until 1997. Ms. Zeiler said that what is interesting about LHAAP is that it was an Intermediate-range Nuclear Forces (INF) static firing site and that Russian officials visited Longhorn to witness the static firing. The INF buildings where these activities took place are historic site candidates.

Presentation on Metals at LHAAP by the USEPA Technical Advisory Group (TAG)

Ms. Zeiler introduced Mr. George Rice, who works for the USEPA TAG in support of helping the community understand technical issues. Mr. George Rice then provided a presentation of metals at LHAAP, explaining that he has also prepared a report that was printed as a handout. He indicated that the presentation is a highlight of that report. Mr. Rice explained the most common

way metals infiltrate into the soil, which is when a release occurs. Mr. Rice explained the difference between metal and nonmetal contamination. During the presentation, Mr. Rice presented his review of LHAAP metals data, including the quality of the data and the analysis. He identified arsenic as a metal of concern and noted that it is present in groundwater at eight sites. The evaluation by Mr. Rice included data from the 1990s to the present (LHAAP-03, LHAAP-16, LHAAP-18/24, LHAAP-29, LHAAP-47, LHAAP-49, LHAAP-54 and LHAAP-58). While Mr. Rice agreed with the focus of remediation of non-metals at LHAAP due the higher concentrations of non-metals, he expressed concerns regarding elevated metals at the site not being addressed.

Mr. Meyers asked if the nine contaminants listed are tested for drinking water. Mr. Robert Speight stated that if a contaminant has a maximum contaminate level (MCL), then it is sampled. Mr. Rice said that MCLs are established for most of the contaminants discussed. Based on Mr. Meyers' concerns about contaminants presented at LHAAP, Mr. Rice stated that groundwater contamination has not migrated offsite onto private property, to the best of his knowledge. Mr. Speight stated that the Army has tested wells at the Caddo Lake water supply wells over the years to make sure there is no migration of contamination. Mr. Rice said that there were concerns regarding private wells pumping up gradient of LHAAP that may draw contamination towards the wells, but there is no evidence of that. Ms. Zeiler explained that the Army has done modeling also and used different pumping rates to assess and didn't see any impacts or significant radius of influence.

Next RAB Meeting Schedule and Closing Remarks

Mrs. Zeiler thanked the RAB, and since the schedule regarding the next meeting was already discussed asked if everyone was ready to adjourn.

Adjourn

Mr. Hall made a motion to adjourn, which was seconded by Mr. John Fortune. The meeting adjourned at 7:18 pm CST.

January 2022 Meeting Attachments and Handouts:

- Color copy of Bhate presentation slides
- GWTP – Processed Groundwater Volumes Handout
- Surface Water Sampling Handout

Longhorn Army Ammunition Plant Quarterly Restoration Advisory Board Meeting

January 19, 2022
6:00 PM CST

APTIM

bhate

Abbreviations and Acronyms

#	Number
lbs	pounds
µg/L	Micrograms per liter
COC	Chemical of concern
DERP	Defense Environmental Restoration Program
DPT	Direct push technology
GPW	Goose Prairie Creek Water Sample
GWP-Ind	Industrial Groundwater Use Protection
GWGW Ing	Residential groundwater use
GWTP	Groundwater Treatment Plant
HBW	Harrison Bayou Water Sample
J	Estimated laboratory value
LHAAP	Longhorn Army Ammunition Plant

MDAS	Material documented as safe
MEC	Munitions and explosives of concern
mg/L	Milligrams per liter
MPPEH	Material Potentially Presenting an Explosive Hazard
MSC	Medium-Specific Concentration
mV	Millivolt
NEW	Net Explosives Weight
PCL	Protective Concentration Level
RAB	Restoration Advisory Board
PDI	Pre-Design Investigation
RA(O)	Remedial Action Operation
TCRA	Time Critical Removal Action
TRRP	Texas Risk Reduction Program
UU/UE	Unlimited Use/Unrestricted Exposure

Restoration Advisory Board Meeting

Agenda

06:00 Welcome and Introduction

06:05 Open Items {RMZ}
- Ongoing Outreach/Website
- Restoration Advisory Board (RAB) Administrative Issues
    - o Membership Update
    - o Change in Meeting Frequency
    - o Minutes (October 2021 RAB Meeting)

06:15 Defense Environmental Restoration Program (DERP) Update {Bhate}
- Documents and Field Work Completed since last RAB
- Three Month Look ahead
- LHAAP-04
- Groundwater Treatment Plant (GWTP) Update

06:25 Other DERP Update
- LHAAP-18/24, -29, and -47 Status {HDR}
- LHAAP-17 Status {MMG-TLI Joint Venture}

06:40 Caddo Lake Institute Metals Presentation (George Rice)

06:55 Next RAB Meeting Schedule and Closing Remarks {RMZ}

RAB Administrative Issues

- Membership Update
  - Persons interested in being new members
- Change in Meeting Frequency
- Minutes (October 2021 RAB Meeting)

Restoration Advisory Board Meeting

The Army Wants You to be Informed

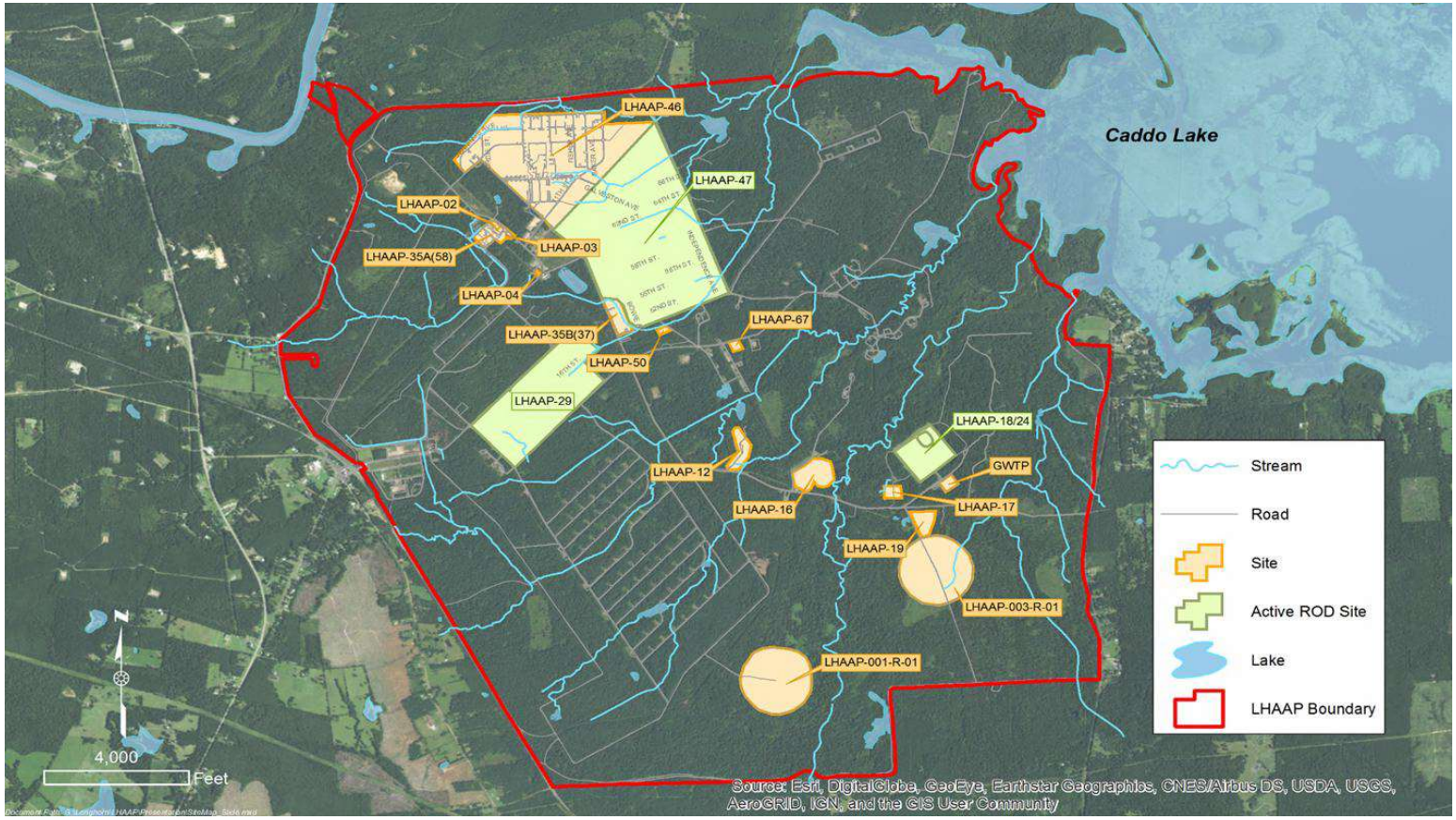
- The Army is committed to protecting human health and the environment; key to that commitment is engaging the community and increasing public participation in environmental restoration at the Longhorn Army Ammunition Plant (LHAAP)
- You are encouraged to:
  - Attend RAB Meetings and/or become a member of the RAB
  - Visit the Longhorn environmental website at www.longhornaap.com.
- The website is regularly updated to indicate the upcoming field events at each site including groundwater sampling, monitoring well installations, soil sampling, or remediation activities.
  - Make suggestions for improving communication – the Army welcomes and appreciates community feedback
- There are three contractors working at LHAAP: Bhate/APTIM; HDR, Inc.; and MMG-TLI Joint Venture. The work conducted by these contractors will be presented in the following slides in that order.

LHAAP Environmental Contractors

- Bhate/APTIM: LHAAP-02, -03, -04, -12, -16, -37, -46, -50, -58, -67, -001-R-01, -001-R-03, and -18/24 (interim remedy)
- HDR: LHAAP-18/24, -29, and -47
- MMG-TLI Joint Venture: LHAAP-17

Restoration Advisory Board Meeting

Bhate/APTIM



Restoration Advisory Board Meeting

Documents in Process

Site	Document
LHAAP-16	Annual Remedial Action Operation (RA[O]) Report - with Regulators
LHAAP-37	Annual RA(O) Report – resolving Regulator comments
LHAAP-46	Annual RA(O) Report – with Regulators
LHAAP-50	Annual RA(O) Report – with Regulators
LHAAP-58	Annual RA(O) Report – resolving Regulator comments
GWTP	Quarterly Evaluation Report: Third Quarter (July-September 2021) – with Regulators Quarterly Evaluation Report: Fourth Quarter (October – December 2021) – In Process
Surface Water	Annual Report – In Process

Restoration Advisory Board Meeting

Completed Field Work Since Last RAB Meeting

Site	Activity
LHAAP-04	Year 2 Quarter 4 Performance Monitoring (November)
LHAAP-12	2021 Annual Groundwater Monitoring (December)
LHAAP-18/24	Semi-Annual RA(O) Groundwater Monitoring (December)
LHAAP-37	Year 5 Semi-Annual Event Number (#) 1 (November)
LHAAP-58	Year 8 of RA(O) Groundwater Monitoring; Western Plume (December)
LHAAP-67	Year 8 Annual Groundwater Monitoring (November)
Surface Water	Surface Water Sampling (December)

Restoration Advisory Board Meeting

3 Month Look Ahead – Documents by Bhate Team

Site	Document
LHAAP-04	Draft RA(O) Report to regulators
LHAAP-12	Draft RA(O) Report to regulators
LHAAP-67	Draft RA(O) Report to regulators
Surface Water	Technical Memorandum Summarizing 2021 Sampling
GWTP and LHAAP-18/24	Quarterly Evaluation Report Fourth Quarter (October – December 2021)

Restoration Advisory Board Meeting

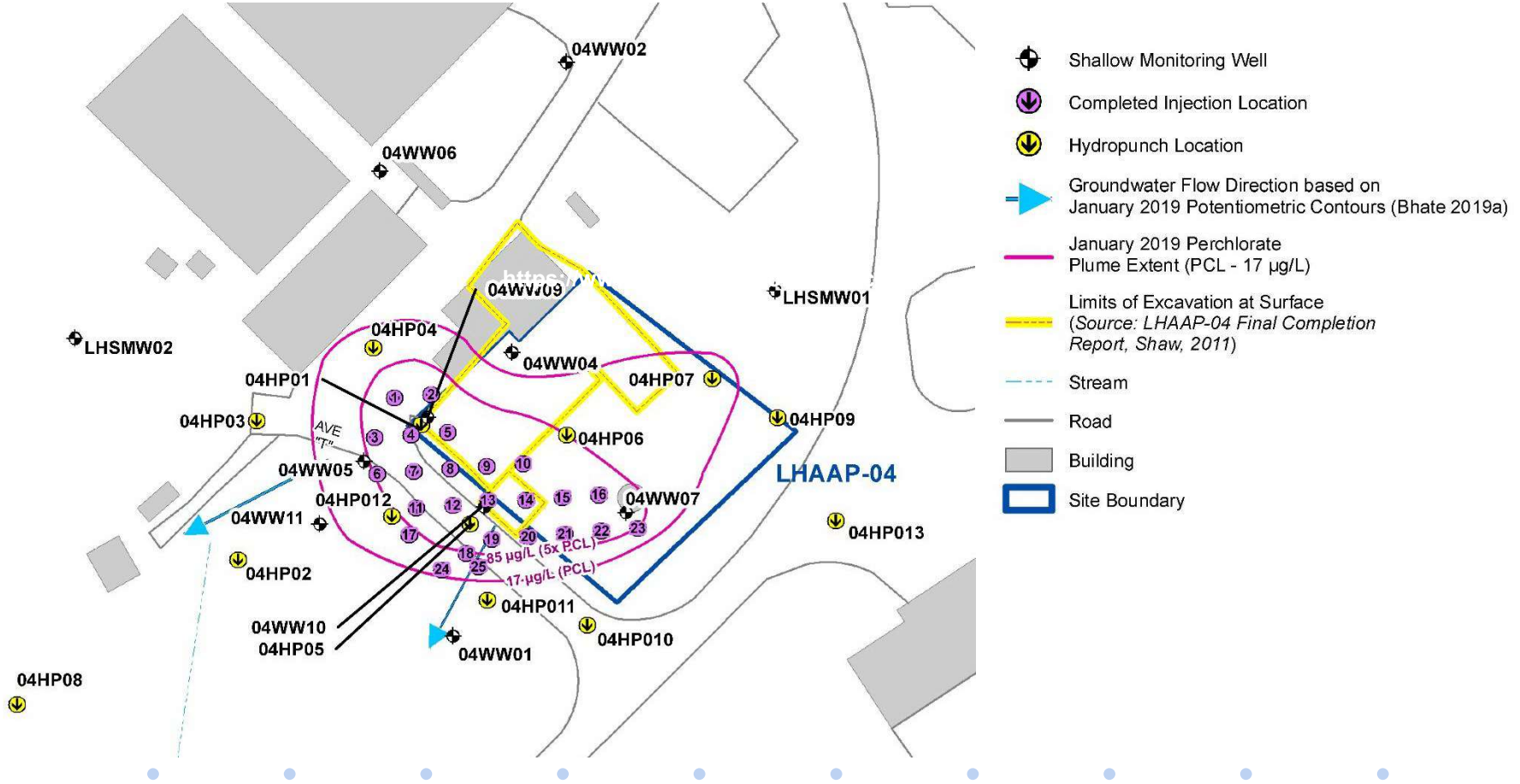
3 Month Look Ahead - Field Work by Bhate Team

Site	Activity
LHAAP-04	Year 3 Semi-Annual Sampling Event #1 (February)
LHAAP-16	Year 2 Quarter 4 Performance Monitoring (January)
LHAAP-46	Annual RA(O) Sampling (February)
LHAAP-50	Year 2 Quarter 3 Performance Monitoring (January)
Surface Water	1st Quarter Sampling

Restoration Advisory Board Meeting

LHAAP-04 Remedy Update

2019 Plume and Injection Locations



Restoration Advisory Board Meeting

LHAAP-04 Performance Sampling (2019-2021)

Sampling Results at Key Monitoring Locations

	Location Code		04WW01								
	Sample Date		1/22/2019	2/4/2020	5/4/2020	8/10/2020	11/4/2020	3/10/2021	5/24/2021	8/4/2021	11/4/2021
Analyte	Units	PCL	Result	Result	Result	Result	Result	Result	Result	Result	Result
Perchlorate											
Perchlorate	µg/L	17	< 2	19	< 0.05	0.561 J	0.246 J	< 0.05	< 0.05	< 0.5	< 0.2
Field Parameters											
Dissolved Oxygen	mg/L	NV	0.15	0.03	0.04	0.05	0.03	0.02	0.03	0.41	0.38
Oxidation-Reduction Potential	mV	NV	327	-52	-135	-191	-115	-219	-152	-100	-50

	Location Code		04WW07								
	Sample Date		1/22/2019	2/4/2020	5/5/2020	8/11/2020	11/4/2020	3/11/2021	5/25/2021	8/5/2021	11/9/2021
Analyte	Units	PCL	Result	Result	Result	Result	Result	Result	Result	Result	Result
Perchlorate											
Perchlorate	µg/L	17	110	86	3.51	0.557 J	< 0.05	0.169	< 0.05	< 0.5	< 0.2
Field Parameters											
Dissolved Oxygen	mg/L	NV	1.83	0.05	2.12	0.04	0.03	0.04	0.02	0.46	3.46
Oxidation-Reduction Potential	mV	NV	338	-260	-314	-112	-105	-436	-311	-158	-34

	Location Code		04WW10								
	Sample Date		1/22/2019	2/4/2020	5/5/2020	8/11/2020	11/4/2020	3/11/2021	5/25/2021	8/5/2021	11/9/2021
Analyte	Units	PCL	Result	Result	Result	Result	Result	Result	Result	Result	Result
Perchlorate											
Perchlorate	µg/L	17	10,000	< 2	< 0.05	0.339 J+	0.0888 J	< 0.05	< 0.05	< 0.05	< 0.2
Field Parameters											
Dissolved Oxygen	mg/L	NV	3.59	5.54	2.72	1.03	0.11	0.04	0.15	0.7	1.64
Oxidation-Reduction Potential	mV	NV	333	-79	-286	-47	-62	-159	-77	-38	-35

Restoration Advisory Board Meeting

LHAAP-04 Performance Sampling (2019-2021)

Sampling Results at Key Monitoring Locations

			Location Code	04WW05								
			Sample Date	1/22/2019	2/4/2020	5/5/2020	8/11/2020	11/4/2020	3/10/2021	5/25/2021	8/5/2021	11/9/2021
Analyte	Units	PCL		Result	Result	Result	Result	Result	Result	Result	Result	Result
Perchlorate												
Perchlorate	µg/L	17		78	< 2	< 0.05	0.399 J	< 0.05	< 0.05	< 0.05	< 0.5	< 0.2
Field Parameters												
Dissolved Oxygen	mg/L	NV		1.62	0.09	0.22	0.14	0.15	0.08	0.08	0.48	0.52
Oxidation-Reduction Potential	mV	NV		163	-88	-90	-66	-36	-320	-60	-16	-4
			Location Code	04WW09								
			Sample Date	1/22/2019	2/4/2020	5/5/2020	8/11/2020	11/4/2020	3/11/2021	5/25/2021	8/5/2021	11/9/2021
Analyte	Units	PCL		Result	Result	Result	Result	Result	Result	Result	Result	Result
Perchlorate												
Perchlorate	µg/L	17		2,100	18	11.1	3.92	2.02	< 0.05	< 0.5	< 0.5	< 0.2
Field Parameters												
Dissolved Oxygen	mg/L	NV		5.78	0.08	0.04	0.03	0.02	0.09	0.04	0.33	0.22
Oxidation-Reduction Potential	mV	NV		326	-74	-16	-87	-91	-21	-246	-127	-85

Notes:

Blue highlighting indicates concentrations above the PCL.

< The analyte was not detected above the laboratory reporting limit shown.

J - Estimated: The concentration shown is estimated

J+ - The concentration shown is an estimate with a high bias

µg/L - micrograms per liter

mg/L - milligrams per liter

NV - No PCL value has been established for the analyte.

PCL - Texas Risk Reduction Program Tier 1 Groundwater Residential Protective Concentration Level.

mV - millivolts

Restoration Advisory Board Meeting

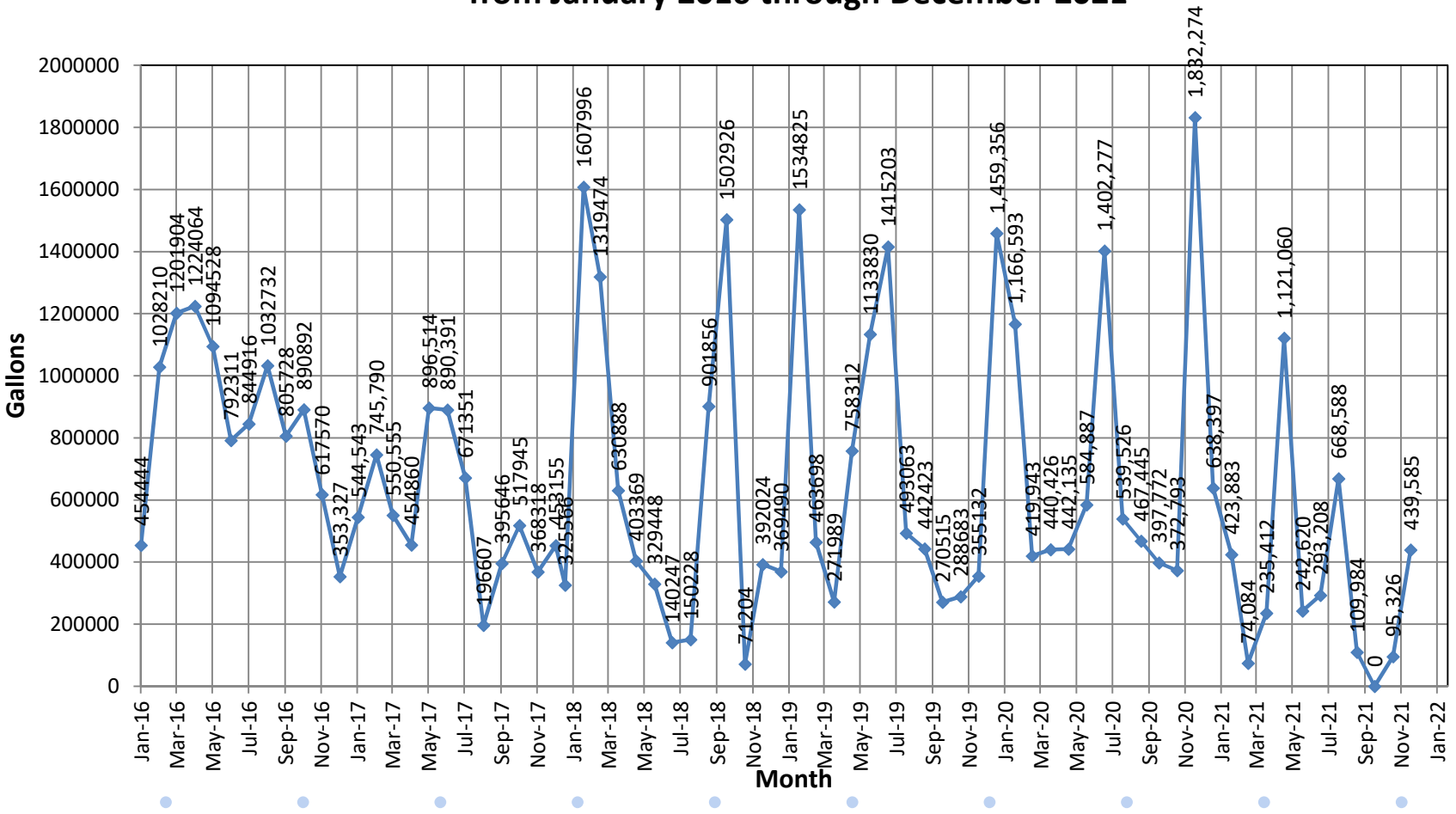
LHAAP-04 Performance Sampling Summary

- Perchlorate in all wells below the cleanup goal for seven consecutive quarters
- Dissolved oxygen remains well below 1 milligram per liter (mg/L) in three of the five key locations, rising in all five locations
- Oxidation-reduction potential values remain negative, but are rising in all previously contaminated wells
- Semi-annual monitoring for Year 3 beginning in February 2022

Restoration Advisory Board Meeting

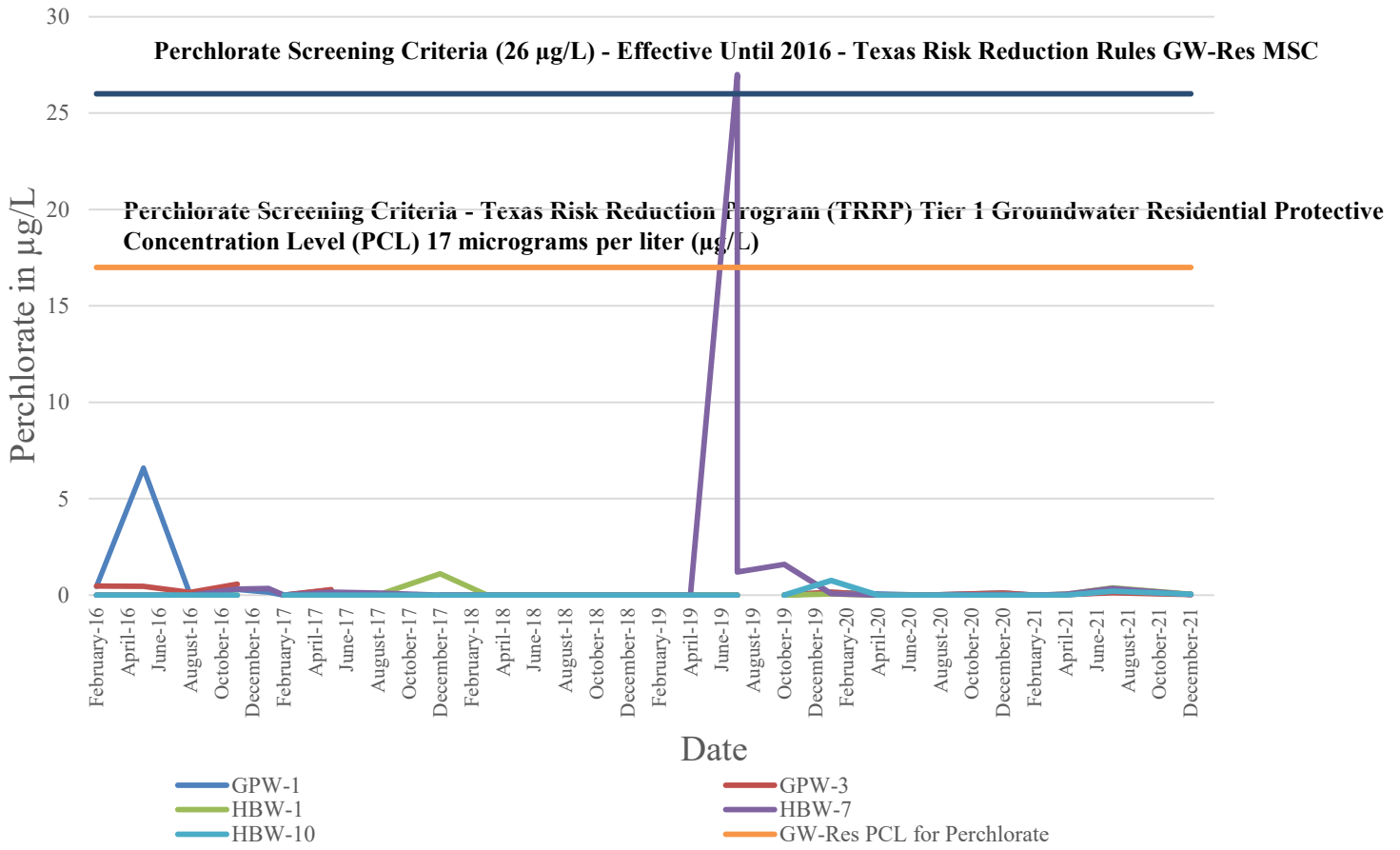
GWTP Update

Treated Groundwater Discharged Monthly from January 2016 through December 2021



Restoration Advisory Board Meeting

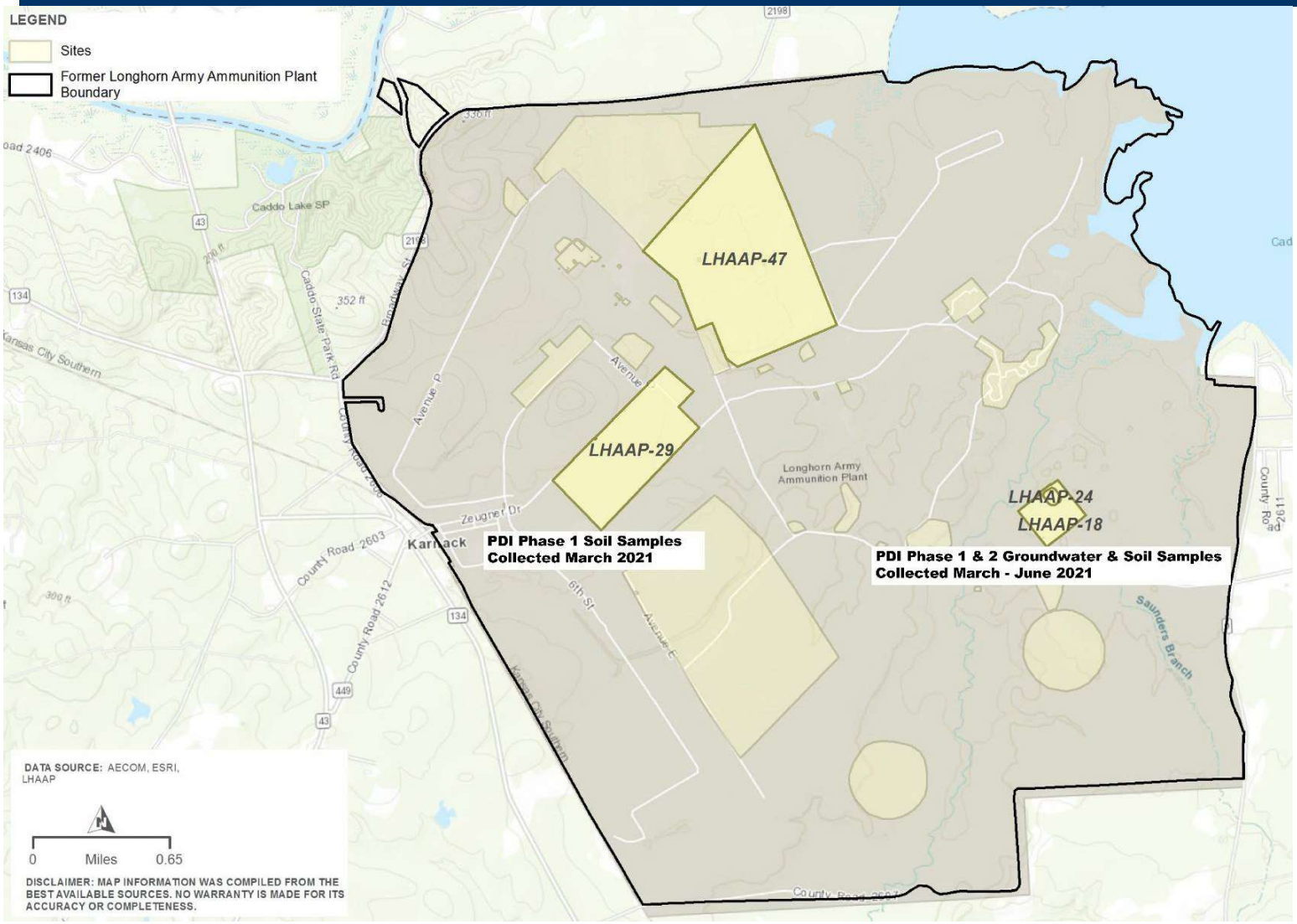
Surface Water Sample Results



Note: Surface water at HBW-7 had a detection of 27 µg/L from a sample collected on 11 July 2019. Surface water at HBW-7 was resampled 19 days later (30 July 2019) with a detection of 1.2 J µg/L.

Restoration Advisory Board Meeting

HDR Update



Restoration Advisory Board Meeting

LHAAP-18/24, -29, and -47 Document Status, HDR

Site	Document
LHAAP-18/24	Draft Final Pre-Design Investigation (PDI) Report, January 2022
LHAAP-18/24	Draft Remedial Design, May 2022
LHAAP-29	Draft PDI Report, June 2022
LHAAP-29	Draft Remedial Design, September 2022
LHAAP-47	Draft Final Record of Decision (ROD), January 2022

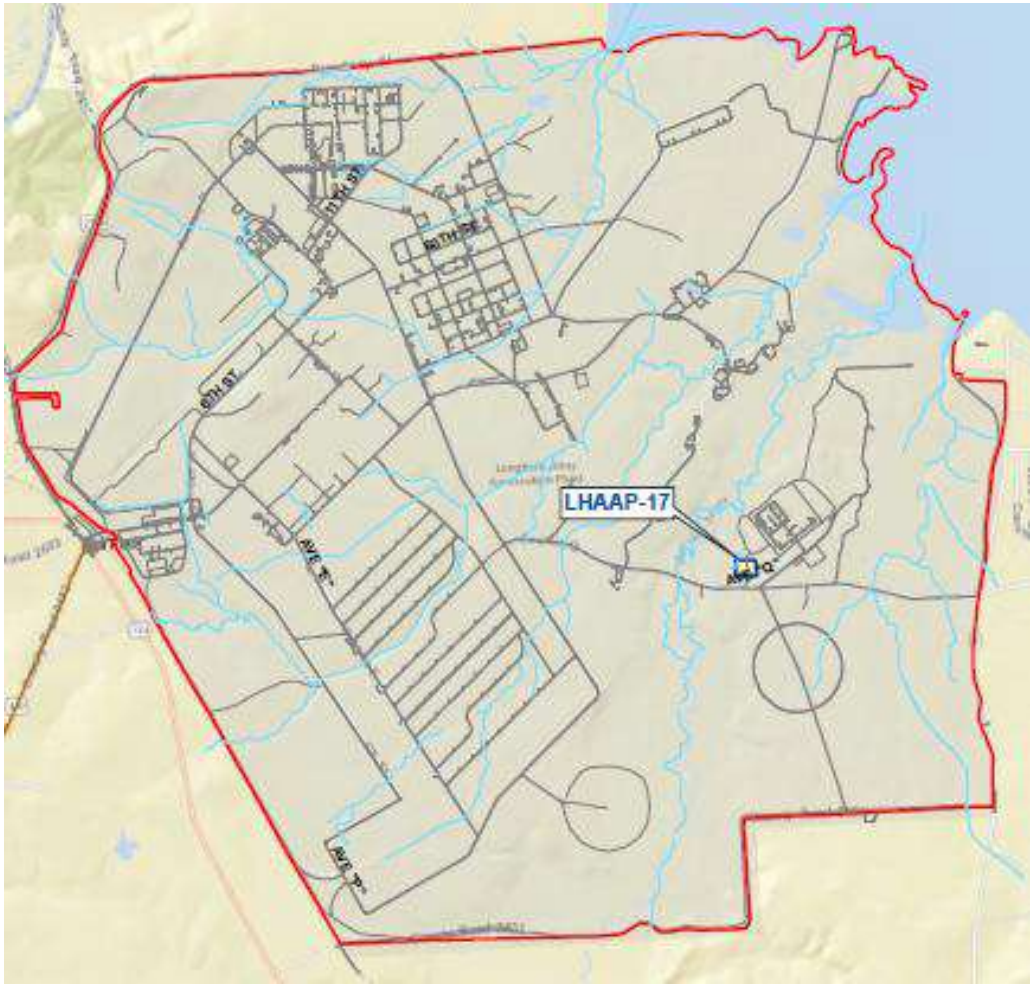
Restoration Advisory Board Meeting

Status of LHAAP-29 PDI Investigation

- ✓ Sample re-analysis results have been received and validated. Results are generally comparable.
- ✓ Proposed path forward is being developed for presentation to regulators for review and input.
- ✓ Proposed path forward will include additional field work to install more direct push technology (DPT) borings, sample collection, and analysis.

Restoration Advisory Board Meeting

MMG-TLI Joint Venture Update



Restoration Advisory Board Meeting

LHAAP-17

Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action

- The remedy selected in the 2016 ROD included excavation and off-site disposal of soil, groundwater extraction, monitored natural attenuation, and land use controls to maintain the remedy and prohibit groundwater use until chemical of concern (COC) concentrations are reduced to levels supportive of Unlimited Use/Unrestricted Exposure (UU/UE)
- 13 excavation areas (A, B, C, D, E, F, G, H, J, K, L, M, and N) are identified in the ROD
- Excavation began in August 2019 and a work stoppage occurred on 30 September 2019, due to the presence of munitions hazards not previously known to be present
- Of the 13 excavation areas, 7 (A, B, C, D, E, F, and G) were confirmed to be clean and backfilled in August 2020

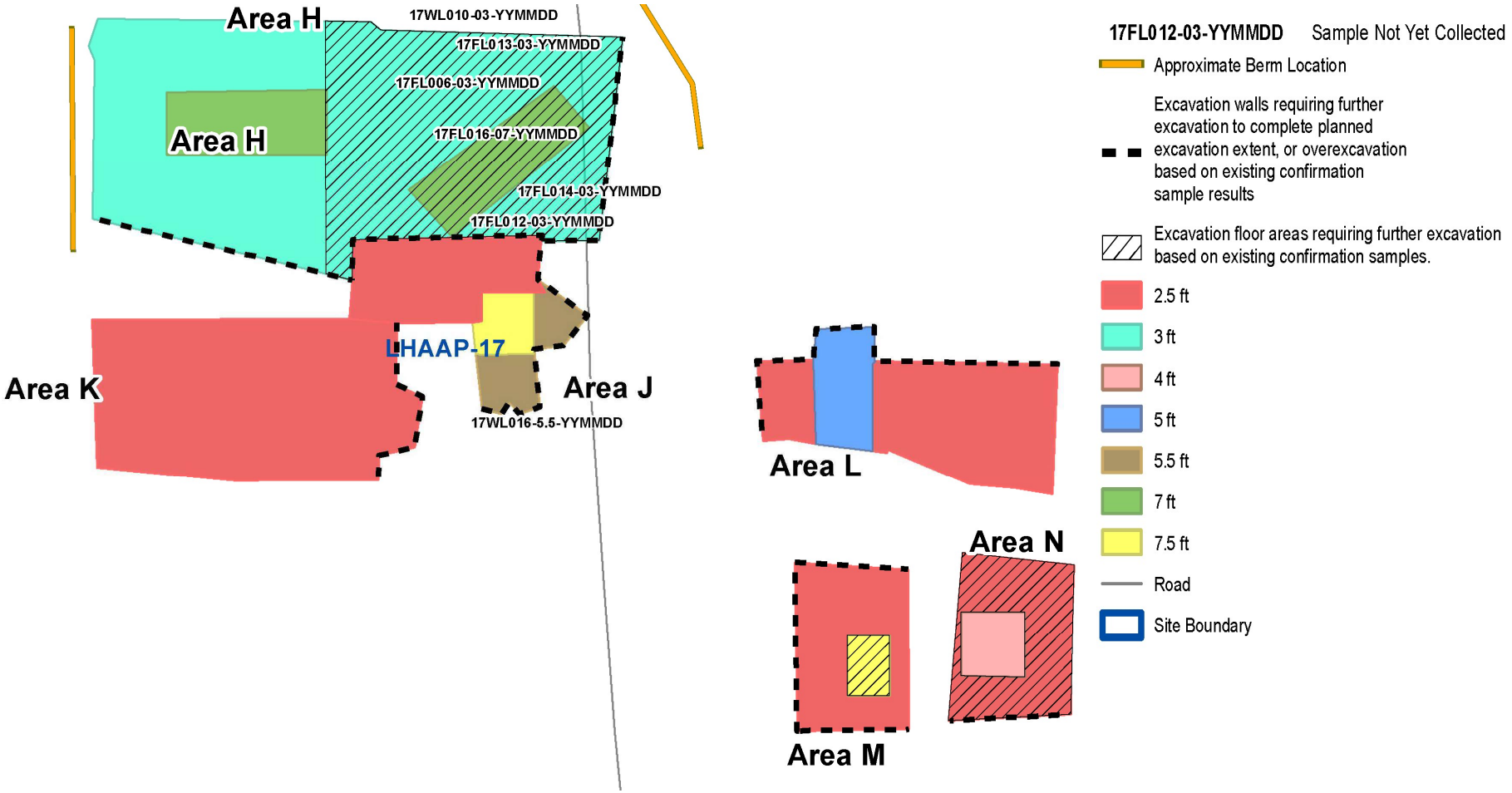
Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action

- Munitions and Explosives of Concern (MEC) presents an imminent and substantial threat, a Time Critical Removal Action (TCRA) was determined appropriate, and an Action Memorandum approved
- Following work plan approvals, TCRA site work began in October 2021
- Site work to date has included: boundary survey, vegetation removal, erosion control repair, identification and importing of backfill, draining of standing water, robotic sifting of existing soil piles to remove potential MEC, excavation and over-excavation (where needed) of remaining areas (H, J, K, L, M, and N), staging of excavated and sifted soils, backfilling in areas previously determined clean, and export of sifted soils

Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action



Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action

- **Key Design Elements Include:**
  - Remotely operated robotic equipment for excavation, soil movement, and sifting
  - Exclusion zones established to prohibit non-essential personnel from entering explosives safety arcs
  - Regulatory approval of validated sample results before backfilling newly excavated areas
  - Inspection and certification of all metallic debris to segregate material potentially presenting an explosives hazard (MPPEH), from material documented as safe (MDAS) and non-munitions related debris
  - Temporary storage of MPPEH for later disposal by detonation on-site
  - Soil/sandbag mitigation to reduce the potential for noise/vibration during detonations

Restoration Advisory Board Meeting

LHAAP-17 Screening/Sifting

Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action

- **Major Work Elements Completed or Started to Date:**
  - Boundary survey
  - Vegetation removal
  - Erosion control repair
  - Identification and importing of backfill
  - Draining of standing water in open excavations
  - Robotic sifting of all pre-existing soil piles to remove potential MEC
  - Excavation and over-excavation (where needed) of remaining areas (H, J, K, L, M, and N)
  - Confirmation sampling and analysis to confirm excavation extents
  - Staging of excavated and sifted soils
  - Backfilling in areas previously determined clean
  - Export of sifted soils

Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action

- **Major work elements yet to be completed:**
  - Complete excavations and receive regulatory approval to backfill all areas
  - When soils piles removed and excavated areas are backfilled, clear the soil surface of any potential munitions and any metal or debris that may interfere with digital geophysical mapping of the subsurface
  - Complete geophysical survey across the site to identify any remaining subsurface anomalies (i.e., targets) that may be MEC
  - Dig/remove identified targets
  - Conduct detonations of accumulated MEC
  - Install the groundwater extraction system components, when it is safe to do so
  - Site restoration

Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action

- **Status:**
  - All pre-existing soil piles have been sifted and soils staged for export
  - Over 3,000 cubic yards of soil have been excavated and approximately 2,500 cubic yards of this material has been sifted and staged for export
  - Portions of all areas, except Area J, have been excavated and confirmation samples are pending laboratory analysis and validation before backfill
  - 30 MEC items totaling 2.95 pounds (lbs) Net Explosives Weight (NEW) are in storage pending on-site detonation
  - An estimated 29,000 lbs of Non-Munitions Related debris and 10,000 lbs of Munitions Debris have been inspected and segregated for off-site recycling/disposal
  - Fieldwork is anticipated to be completed in April 2022

Restoration Advisory Board Meeting

LHAAP-17 Time Critical Removal Action

- **Estimated Schedule:**

Activity	Anticipated Completion
Over-excavation	February 9
Backfilling	February 25
Export	February 25
Surface Clearance	February 28
Geophysical Survey	March 4
Reacquisition & Digging of Anomalies	March 22
Groundwater Extraction System Install	April 15
Site Restoration/Demobilization	April 2

Restoration Advisory Board Meeting

LHAAP-17 Remote Excavation

Next RAB Meeting Schedule & Closing Remarks

- Schedule Next RAB Meeting
- Other Issues/Remarks
- Thank you for coming

Groundwater Treatment Plant - Processed Groundwater Volumes

The amount of groundwater treated is determined by measuring the number of gallons of processed water discharged.

Processed Water Discharged Data (in gallons)

Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08
1,041,491	848,356	804,822	792,148	665,883	818,872	791,306	568,812	776,904	748,377	690,052	617,199

Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09
655,059	619,274	726,118	552,299	598,144	433,800	488,807	526,958	387,644	0	414,853	735,716

Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10
808,322	636,306	727,492	391,898	695,343	802,656	894,731	962,121	1,257,977	1,314,924	1,041,495	1,136,547

Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11
956,567	705,805	849,712	811,679	668,281	1,090,348	817,325	900,338	916,552	784,369	652,524	733,456

Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12
748,102	658,250	684,903	865,453	725,000*	730,000*	980,000*	630,000*	0	0	0	349,012

Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
617,037	607,610	560,436	869,710	751,213	641,708	699,776	746,885	392,719	962,890	843,913	716,057

Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14
813,974	727,442	706,416	552,657	738,691	844,095	811,346	972,913	611,505	626,253	573,601	575,376

Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15
440,877	572,479	634,890	614,073	516,592	1,111,859	1,108,336	822,637	1,020,313	1,002,887	951,758	306,467

Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16
128,586	209,088	120,234	454,444	1,028,210	1,201,904	1,224,064	1,094,528	792,311	844,916	1,032,732	805,728

Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17
890,892	617,570	353,327	544,543	745,790	550,555	454,860	896,514	890,391	528,538	195,198	961,324

Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul - 18	Aug-18	Sep-18
517,945	368,318	453,155	325,566	1,607,996	1,319,474	630,888	403,369	329,448	140,247	150,228	901,856

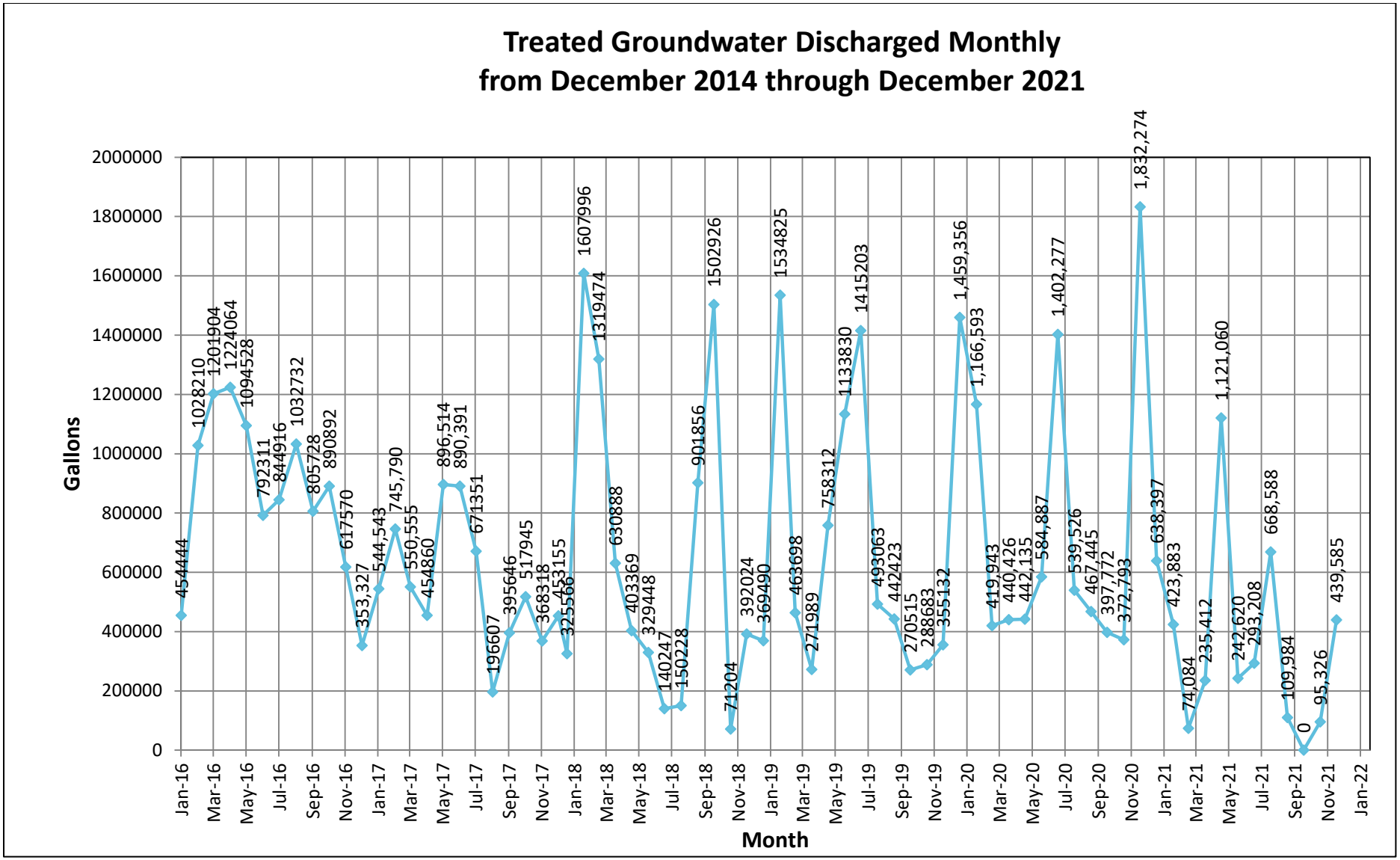
Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul - 19	Aug-19	Sep-19
1,502,926	71,204	392,024	369,490	1,534,825	463,698	271,989	758,312	1,133,830	1,415,203	493,063	442,423

Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20
270,515	288,683	355,132	1,459,356	1,166,593	419,943	440,426	442,135	584,887	1,402,277	539,526	467,445

Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21
397,772	372,793	1,832,274	638,397	423,883	74,084	235,412	1,121,060	242,620	293,208	668,588	109,984

Oct-21	Nov-21	Dec-21
0	95,326	439,585

*Indicates Estimate


Treated Groundwater Discharged Monthly
from December 2014 through December 2021
Gallons
Month
2000000
1800000
1600000
1400000
1200000
1000000
800000
600000
400000
200000
0
Jan-16
Mar-16
May-16
Jul-16
Sep-16
Nov-16
Jan-17
Mar-17
May-17
Jul-17
Sep-17
Nov-17
Jan-18
Mar-18
May-18
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Nov-19
Jan-20
Mar-20
May-20
Jul-20
Sep-20
Nov-20
Jan-21
Mar-21
May-21
Jul-21
Sep-21
Nov-21
Jan-22
454444
1028210
1201904
1224064
1094528
792311
844916
1032732
805728
890892
617570
353,327
544,543
745,790
550,555
454860
896,514
890,391
671351
196607
395646
517945
368318
453155
325566
1607996
1319474
630888
403369
329448
140247
150228
901856
1502926
71204
392024
369490
1534825
463698
271989
758312
1133830
1415203
493063
442423
270515
288683
355132
1,459,356
1,166,593
419,943
440,426
442,135
584,887
1,402,277
539,526
467,445
397,772
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638,397
423,883
74,084
235,412
1,121,060
242,620
293,208
668,588
109,984
0
95,326
439,585

Water Discharge Location and Volume (Gallons)

Month	Total Combined to Harrison Bayou	LHAAP-18/24 Sprinklers	GWTP To INF Pond	INF Pond to Harrison Bayou	Contract Hauled Off-Site
Dec-16	0	236,688	0	0	0
Jan-17	0	0	0	0	0
Feb-17	0	0	0	0	14,355
Mar-17	127,242	0	0	0	14,400
Apr-17	113,038	0	236,821	0	0
May-17	0	0	534,155	0	0
Jun-17	958,404	0	294,550	490,574	0
Jul-17	0	0	528,538	0	0
Aug-17	0	0	195,197	0	0
Sep-17	651,434	0	309,980	651,434	0
Oct-17	0	0	517,945	0	0
Nov-17	0	0	368,318	0	0
Dec-17	560,350	0	453,155	560,350	0
Jan-18	325,566	0	253,177	325,566	0
Feb-18	1,607,996	0	62,017	1,430,634	0
Mar-18	1,319,474	0	0	870,816	0
Apr-18	630,888	0	0	630,888	0
May-18	403,369	0	0	403,369	0
Jun-18	193,669	0	135,779	0	0
Jul -18	0	0	140,247	0	0
Aug -18	49,409	0	100,819	0	0
Sep-18	585,397	0	316,459	524,484	0
Oct-18	1,409,106	0	93,820	1,016,285	0
Nov-18	71,204	0	0	0	0
Dec-18	392,024	0	0	0	0
Jan-19	369,490	0	0	369,490	0
Feb-19	1,534,825	0	0	1,326,485	0
Mar-19	463,698	0	0	83,250	0
Apr-19	271,989	0	0	0	0
May-19	758,312	0	0	253,817	0
Jun-19	1,133,830	0	0	847,918	0
Jul-19	1,415,203	0	0	903,001	0
Aug-19	374,629	0	118,434	0	0

Month	Total Combined to Harrison Bayou	LHAAP-18/24 Sprinklers	GWTP To INF Pond	INF Pond to Harrison Bayou	Contract Hauled Off-Site
Sep-19	0	0	442,423	0	0
Oct-19	0	0	270,515	0	0
Nov-19	115,503	0	173,180	0	0
Dec-19	318,248	0	36,884	0	0
Jan-20	1,459,396	0	0	1,115,183	0
Feb-20	1,166,593	0	0	741,954	0
Mar-20	419,943	0	0	0	0
Apr-20	440,426	0	0	0	0
May-20	442,135	0	0	0	0
June-20	584,887	0	0	0	0
July-20	1,402,277	0	0	984,393	0
Aug-20	216,197	0	323,359	0	0
Sep-20	0	0	467,445	0	0
Oct-20	0	0	397,772	0	0
Nov-20	0	0	372,793	0	0
Dec-20	1,832,274	0	60,199	1,571,432	0
Jan-21	638,397	0	0	383,318	0
Feb-21	423,883	0	0	259,875	0
Mar-21	74,084	0	0	74,084	0
Apr-21	235,412	0	0	0	0
May-21	1,121,060	0	0	900,000	0
Jun-21	242,620	0	0	0	0
Jul-21	293,208	0	0	243,675	0
Aug-21	668,588	0	0	561,527	0
Sep-21	0	0	109,984	0	0
Oct-21	0	0	0	0	0
Nov-21	0	0	95,326	0	0
Dec-21	271,500	0	168,085	271,500	0

Harrison Bayou and Goose Prairie Creek – Perchlorate Data

Surface water samples are collected quarterly from each location in Harrison Bayou and Goose Prairie Creek, unless the sampling location is dry.

Surface Water Sample Data (in micrograms per liter)

Quarter	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
Creek Sample ID	**Jul 1999**	**Sep 1999**	**Feb 2000**	**Apr 2000**	**Aug 2000**	**Dec 2000**	**Feb 2001**	**Apr 2001**	**July 2001**	**Oct 2001**	**Jan 2002**
GPW-1	<1.0 U	-	4	<4.0 U	<4.0 U	<4.0 U	-	2.65	<4.0 U	<4.0 U	<4.0 U
GPW-3	<1.0 U	<4.0 U	17	8	<4.0 U	<4.0 U	-	2.28	<4.0 U	<4.0 U	<4.0 U
HBW-1	-	<8.0 U	310	23	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-7	-	<8.0 U	370	110	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-10	-	<8.0 U	905	650	<4.0 U	-	<4.0 U	-	<4.0 U	-	-

Quarter	2nd	3rd	4th	1st	2nd	3rd	3rd	4th	2nd	3rd	4th
Creek Sample ID	**June 2002**	**Sept 2002**	**Dec 2002**	**Feb 2003**	**June 2003**	**Aug 2003**	**July 2004**	**Dec 2006**	**May 2007**	**Aug 2007**	**Dec 2007**
GPW-1	<4.0 U	<4.0 U	18.3	18.6	59.9	-	2.25	-	<1.0 U	<1.0 U	10.7
GPW-3	<4.0 U	<4.0 U	5.49	12.6	14.7	-	2.2	-	<1.0 U	<1.0 U	7.48
HBW-1	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	99.3	<0.2 U	<1.0 U	<1.0 U	122	<1.0 U
HBW-7	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	<4.0 U	<0.2 U	<1.0 U	<1.0 U	1.02	<1.0 U
HBW-10	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	-	<0.2 U	<1.0 U	<1.0 U	<1.0 U	<1.0 U

Quarter	1st	2nd	3rd	4th	2nd	3rd	3rd	3rd	4th	1st	2nd
Creek Sample ID	**Mar 2008**	**Jun 2008**	**Sep 2008**	**Dec 2008**	**May 2009**	**Jul 2009**	**Aug 2009**	**Sep 2009**	**Dec 2009**	**Mar 2010**	**Jun 2010**
GPW-1	27	<0.5 U	<0.5 U	<0.22 U	16	<4 U	NS	<1.2 U	3.7	1.3 J	<0.6 U
GPW-3	21.9	9.42	1.1	<0.22 U	8.9	<4 U	NS	<0.6 U	2.8	1.8 J	<0.6 U
HBW-1	<0.5 U	<0.5 U	<0.5 U	<0.22 U	<0.55 U	<4 U	NS	<1.5 U	<0.275 U	1.5 U	<0.6 U
HBW-7	<0.5 U	<0.5 U	<0.5 U	<0.22 U	<0.55 U	<4 U	24	<1.2 U	<0.275 U	1.5 U	<0.6 U
HBW-10	<0.5 U	<0.5 U	<0.5 U	<0.22 U	<0.55 U	<4 U	NS	<1.5 U	<0.275 U	1.2 U	<0.6 U

Quarter	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
Creek Sample ID	**Sep 2010**	**Dec 2010**	**Mar 2011**	**Jun 2011**	**Sep 2011**	**Dec 2011**	**Mar 2012**	**Jun 2012**	**Not Applicable**	**Jan & Feb 2013**	**Mar 2013**
GPW-1	Dry	<0.1 U	8.7	Dry	Dry	1.76	0.163 J	Dry	NS	1.65	0.735
GPW-3	Dry	0.199 J	0.673	Dry	Dry	1.31	0.261	Dry	NS	1.74	0.754
HBW-1	Dry	<0.1 U	<0.2 U	Dry	Dry	<0.1 U	<0.1 U	Dry	NS	<0.2 U	<0.2 U
HBW-7	Dry	<0.1 U	<0.2 U	Dry	Dry	0.171 J	<0.1 U	Dry	NS	<0.2 U	<0.2 U
HBW-10	Dry	<0.1 U	<0.2 U	Dry	Dry	<0.1 U	<0.1 U	Dry	NS	<0.2 U	<0.2 U

Quarter	2nd	3rd	4th	1st	2nd	3nd	4th	1st	2nd	3rd	4th
Creek Sample ID	**Jun 2013**	**Sept 2013**	**Dec 2013**	**Feb 2014**	**May 2014**	**Aug 2014**	**Nov 2014**	**Feb 2015**	**May 2015**	**Aug 2015**	**Nov 2015**
GPW-1	Dry	<0.2 U	Dry	0.766	Dry	Dry	0.244 J	0.311 J	0.156 J	Dry	0.142 J
GPW-3	Dry	<0.2 U	Dry	1.15	Dry	Dry	0.276 J	0.344 J	Dry	Dry	0.311 J
HBW-1	<0.2 U	<0.2 U	Dry	<0.2 U	Dry	Dry	<0.2 U	<0.2 U	Dry	Dry	<0.2 U
HBW-7	<0.2 U	<0.2 U	Dry	0.201 J	Dry	Dry	<0.2 U	0.124 J	Dry	Dry	<0.2 U
HBW-10	<0.2 U	<0.2 U	Dry	<0.2 U	Dry	Dry	<0.2 U	<0.2 U	Dry	Dry	<0.2 U

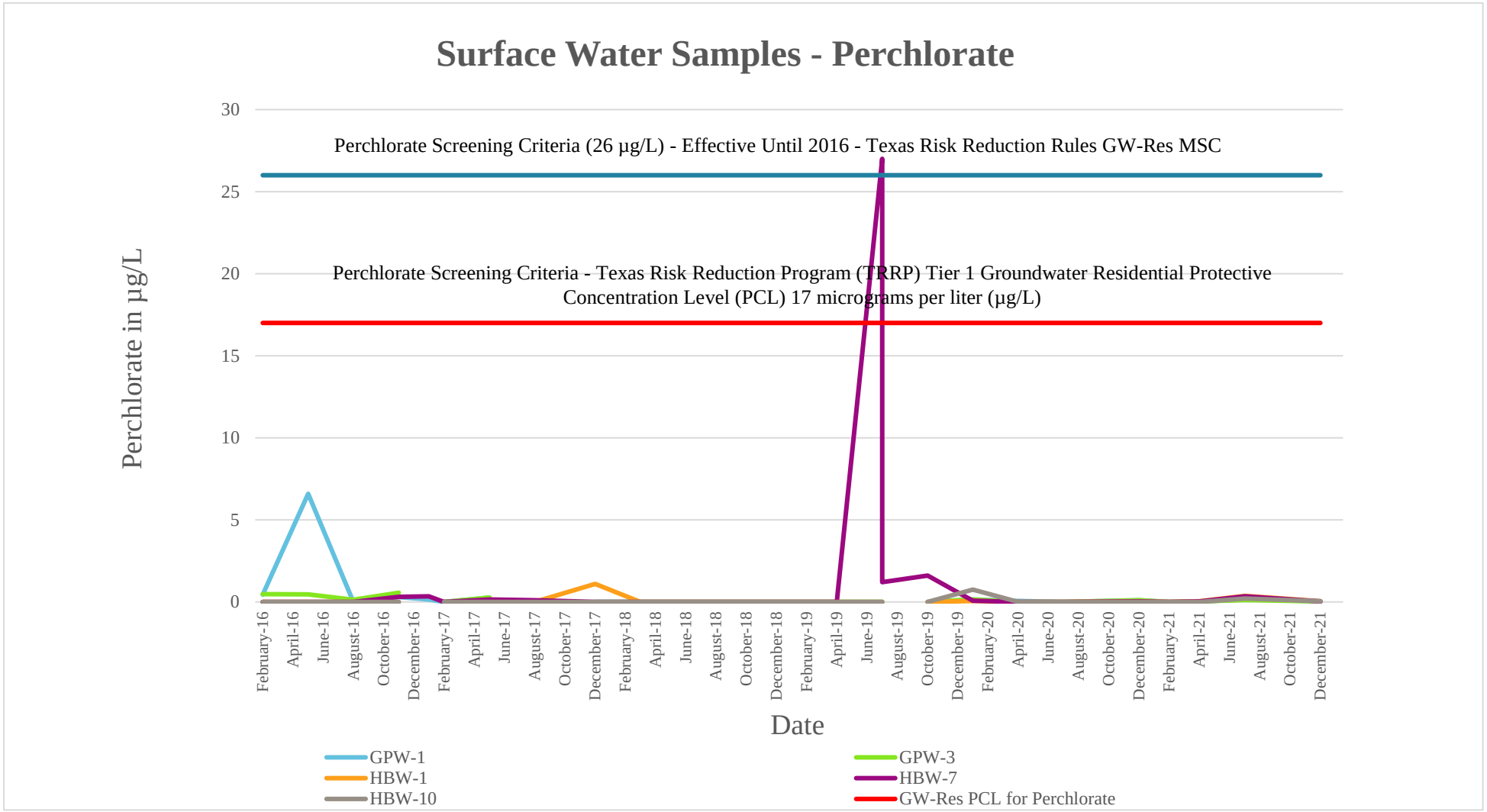
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd
Creek Sample ID	**Feb 2016**	**May 2016**	**Aug 2016**	**Nov 2016**	**Feb 2017**	**May 2017**	**Aug 2017**	**Dec 2017**	**Mar 2018**	**Jun 2018**	**Aug 2018**
GPW-1	0.447	6.59	<0.2 U	0.301 J	<1 U	0.263	Dry	<2.0 U	<2.0 U	Dry	<2.0 U
GPW-3	0.474	0.457	0.141	0.563	<1 U	0.274	Dry	<2.0 U	<2.0 U	Dry	<2.0 U
HBW-1	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<0.2 U	<0.2 U	1.1 J	<2.0 U	Dry	<2.0 U
HBW-7	<0.2 U	<0.2 U	<0.2 U	0.318 J	<1 U	0.155	<0.2 U	<2.0 U	<2.0 U	Dry	<2.0 U
HBW-10	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<0.2 U	0.111 J	<2.0 U	<2.0 U	Dry	<2.0 U

NS – not sampled U – non-detect J – Estimated Dry – no surface water

Quarter	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd
Creek Sample ID	Oct 2018	Jan 2019	Apr 2019	Jul 2019	Oct 2019	Jan 2020	Apr 2020	Jul 2020	Dec 2020	Feb 2021	Apr 2021	Jul 2021
GPW-1	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.163	0.0589 J	<0.05 U	0.110	<0.05 U	0.0268 J	0.154
GPW-3	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.156	0.0662 J	0.0326 J	0.108	<0.05 U	0.0321 J	0.122
HBW-1	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.0600 J	<0.05 U	<0.05 U	0.0374 J	<0.05 U	0.0410 J	0.369
HBW-7	<2.0 U	<2.0 U	<2.0 U	27 (initial)/ 1.2 J (resample)	1.6 J	0.0761 J	<0.05 U	0.0318 J	0.0265 J	<0.05 U	0.0373 J	0.348
HBW-10	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.0782 J	<0.05 U	<0.05 U	<0.05 U	<0.05 U	<0.05 U	0.207

Quarter	4th
Creek Sample ID	Dec 2021
GPW-1	0.0394 J
GPW-3	0.0344 J
HBW-1	0.050 U
HBW-7	0.0359 J
HBW-10	0.0464 J

NS – not sampled U – non-detect J – Estimated Dry – no surface water



Note: Surface water at HBW-7 had a detection of 27 µg/L from a sample collected on 11 July 2019. Surface water at HBW-7 was resampled 19 days later (30 July 2019) with a detection of 1.2 J µg/L.

Longhorn Army Ammuntion Plant Creek Sampling Locations