IMFD–SEE 23 September 2020

MEMORANDUM FOR RECORD

SUBJECT: Fort Detrick Restoration Advisory Board (RAB) Meeting Summary,
5 AUGUST 2020

1. Summary Contents

Items addressed at the meeting are listed below, with corresponding section numbers indicated in the column on the right.

Please note: PowerPoint presentations were utilized during the RAB meeting. A copy of the presentations is attached to these minutes and is incorporated into these minutes by this reference.

Text contained within brackets [] has been added for clarification purposes.

2. Attendees

Members Present:

Dr. Gary Pauly, Community RAB Member, Co-Chair
Mr. Joseph Gortva, Army Co-Chair, Fort Detrick, Chief, Environmental Program
Mr. Barry Glotfelty, Frederick County Health Department
Mr. Ira May, Maryland Department of the Environment
Ms. Jennifer Hahn, Community RAB Member
Mr. Cliff Harbaugh, Community RAB Member
Ms. Karen Harbaugh, Community RAB Member
Ms. Elizabeth Law, Community RAB Member
Mr. Rob Thomson, US Environmental Protection Agency

Others Present:

Ms. Shelly Morris, On-Site Contractor to Fort Detrick Environmental Restoration Program
Mr. Gary Zolyak, Fort Detrick, SJA
Mr. Paxton Wertz, US Army Corps of Engineers
Mr. Joseph Bieberich, US Army Corps of Engineers
Mr. John Cherry, Arcadis
Ms. Rosemarie Potocky, Arcadis
Mr. Matthew Pajerowski, USGS
Mr. Phillip Goodling, USGS
Ms. Emily Majcher, USGS
Ms. Rosie Stone, NAMATI
Ms. Virginia Borda, Clean Water Action
Ms. Jennifer Kunze, Clean Water Action
Ms. Indrayani Thakare, Clean Water Action Intern
Ms. Annika Leiby, Clean Water Action Intern
Ms. Lanessa Hill, Fort Detrick, Public Affairs Office
Ms. Katrina Harris, Bridge Consulting Corp.

Members Absent:

Mr. Rolan Clark, Community RAB Member
Mr. Eli DePaula, Community RAB Member
Dr. Henry Erbes, Community RAB Member
Mr. Barry Kissin, Community RAB Member

3. Meeting Opening / Remarks

Mr. Joseph Gortva, DoD Co-Chair, welcomed everyone to the first virtual meeting and invited any comments or suggestions on the use of MS Teams for future virtual meetings. Mr. Gortva announced who was present on the call and invited everyone to introduce themselves.

4. Meeting Minutes/Action Items presented by Mr. Joseph Gortva, Fort Detrick

Mr. Gortva noted minutes from the December 2019 meeting had been sent out and asked that any additional comments be submitted in the next week so the minutes can be finalized and posted on the web site.

Mr. Gortva stated Ms. Jennifer Hahn had suggested a list of action items be maintained and reviewed at the beginning of each meeting; he asked Ms. Shelly Morris to review the action items. Ms. Morris reviewed each action item; an updated list is attached at the end of these minutes.

5. USGS Area B Groundwater Investigation presented by Mr. Phillip Goodling and Ms. Emily Majcher, USGS

Mr. Phillip Goodling stated he would be giving an update on USGS' Area B Groundwater Investigation. He said no final results or interpretations are available to share in tonight's presentation but will be shared when they are available.

Mr. Goodling reviewed the background on USGS' involvement, noting USGS was brought in to provide an independent scientific review of the Conceptual Site Model (CSM) at the end of 2017. He said in 2017 and 2018 USGS reviewed previous work including geochemistry data back to 2000, geophysical logs, various reports and the CSM, and identified opportunities to improve understanding of the CSM and groundwater flow in the karst aquifer and knowledge about how contaminants are moving in the sub-surface and interacting with the microbial environment within the aquifer.

Mr. Goodling said USGS' project has four tasks that he will be reviewing: (1) Hydrologic Monitoring; (2) Water Budget Analysis; (3) Groundwater Age Dating/Geochemical Analysis; and, 4) Biogeochemical Analysis. Mr. Goodling stated the hydrologic monitoring involves collecting stream flow and groundwater flow information over a longer period of time to strengthen the understanding of the aquifer. Mr. Goodling explained this information feeds into a water budget analysis. He stated a synoptic groundwater age dating and geochemical analysis, as well as a biogeochemical analysis, was performed to add to the understanding of the CSM.

Mr. Goodling stated the hydrologic monitoring is ongoing across Area B with a goal of understanding the groundwater system's responsiveness to both short-term hydrologic events as well as longer term variability from events like floods and droughts. He said gages were installed along Carroll Creek and provide information every 15 minutes. Mr. Goodling display a map showing the locations of the gages and the watersheds. Ms. Hahn requested future maps have a legend.

Mr. Goodling displayed a graph showing the stream discharge at one of the stream gages; he pointed out the spikes which capture storm and flood events, as well as the seasonal variations in the stream flow. He showed a second graph and noted it is an example of the water level elevation data that is being collected at 12 locations. He pointed out late 2018 and early 2019 was a historically wet period for the region, and the water level was very high; in July 2020, the region started drying out as shown by the declining trend on the graph.

Mr. Goodling displayed a graph showing data from a single well nest; data from the deep well is shown by a blue line and the pink line shows the shallow well data.

Mr. Goodling explained two different dye tracer studies have been completed in the past (1995 and 2013), and USGS conducted additional monitoring in the springs with sensors to see if there is any evidence of observable dye that might still be leaving the system from the karst aquifer.

Mr. Goodling said the hydrologic data will be fed into a water budget analysis to determine how much water is going into and out of a watershed; he displayed a diagram of a watershed. He explained this analysis will help determine how much of the groundwater flow going to Carroll Creek is from precipitation in the watershed and to see if there is flow bypassing Carroll Creek in a more regional flow system. He noted data would be collected through October 1, 2020.

Mr. Goodling next discussed the groundwater age dating information collected from 20 groundwater samples in September and October 2019. He explained groundwater age is the time since the water fell as precipitation. He continued explaining that through geochemical analysis, age can be determined for water in different portions of the aquifer which helps to understand how the karst system is functioning between different sections of the aquifer. Mr. Goodling said the information would also help with evaluating the Conceptual Site Model. He stated the analysis of the data is ongoing.

Ms. Emily Majcher discussed USGS's fourth task—groundwater biogeochemical analysis. Ms. Majcher said USGS' initial review and analysis of the groundwater information was consistent with past reports and the Conceptual Site Model, with a few data gaps identified. She stated the gaps included characterizing the natural attenuation parameters across the site, looking at the potential contribution of matrix diffusion in addition to the discharge of the aquifer into Carroll Creek, and looking at the pore water concentrations in Carroll Creek.

Ms. Majcher said there are variable degrees of weathering observed in rock cores across Area B. She added that during the Arcadis pilot study drilling last summer and fall, USGS collected some of those cores to try and extract some of the potential volatile organic compounds (VOCs) that might be in those rock cores. Ms. Majcher explained a hydraulic rock crusher was used to break up the rocks into chips, and the chips were placed into methanol according to an EPA method for about six months. She stated there were some issues in the analysis of the extract, particularly in the quality control samples; the test was repeated with additional rock cores stored in the freezer and was recently completed. Ms. Majcher explained there were very few detections in the drilled cores, and there will be further assessment to determine what this means for potential storage in the cores. She added that the cores were from the primary source area.

Ms. Hahn asked if the original test showed detections, and Ms. Majcher said there were very low detections in the original cores which had been in storage for some time. Ms. Majcher said the tests were then repeated with cores extracted from closer to the primary source area, and the analysis of these cores also showed very low detections. Ms. Hahn asked for the levels, and Ms. Majcher said she would follow up with this information. She noted the analysis would not be able to discern between contaminants from being in storage versus site contaminants. She said

an example would be BTEX compounds detected because the cores were stored in a shed. Ms. Majcher said the concentrations were very low, but the data did not strongly point to the contaminants coming from the aquifer.

Ms. Majcher discussed USGS' focus on the transport of contaminants of Area B groundwater into Carroll Creek to supplement the work previously done. She stated USGS looked at a detailed temperature survey using thermal infrared and a very fine scale thermal profile below the surface; the thermal infrared camera shows surface temperature (image on far right) with colder discharging water appearing as the bluish/purple tones. She continued explaining that below the surface along the stream bed, thermal imaging does not work because only the first couple centimeters' temperature of the water can be seen. Ms. Majcher advised that in the summer/fall of 2019, USGS conducted an extensive temperature survey in the main discharge area, between Robinson Pond and above where the current stream restoration is occurring; the data was consistent with the previous seeps and streams study. She said USGS identified some additional temperature anomalies in the stream bed and conducted surface water sampling using several methods to identify Area B contaminants, evaluate any degradation that might be occurring, and analyze other parameters of interest. Ms. Majcher referenced the flow graphs in Mr. Goodling's presentation which showed a high amount of flow moving through the systems and then declining in the summer; another round of sampling was just recently completed so data exists for both high flow and low flow discharge conditions. She stated some differences have been noted through just visual observations.

Ms. Majcher said USGS sampled all of the USGS continuous monitoring wells, including the paired wells where USGS is measuring the water levels, as well as all the landfill semi-annual and quarterly monitoring wells and looked at the same set of parameters investigated in the porewater using the same passive methods. Ms. Majcher discussed a photo of a sampler used and explained it allows for evaluation within the well itself versus evaluation in a laboratory or doing larger pilot tests to assess potential treatments which might be considered for remediation. She stated the sampler allows for natural conditions, a biostimulation or an enhancement of the biodegradation condition, and bioaugmentation. She explained the sampler will stay in the well for six weeks.

Ms. Hahn noted the information is very complex for the audience of RAB community members, and asked for confirmation that what is being discussed is a piece of equipment placed in a well near the contamination that will evaluate the impact of potential additives to the groundwater; Ms. Majcher confirmed this was a correct statement. Ms. Hahn asked what additives were used. Ms. Majcher said the natural attenuation treatment has no amendments, the biostimulation treatment has lactate present as an enhancement to whatever microbial community might current exist, and the third treatment is a lactate with a microbial culture (WBC2) that is commercially available from Serum Laboratory and seeded onto the glass beads that helps promote degradation.

Mr. Goodling showed the timeline for their investigation. He noted the hydrologic monitoring is ongoing, the dye tracing investigation was completed in 2019, the water budget analysis is ongoing, and the groundwater age interpretations are ongoing. He added the interpretive reports will be submitted in 2021.

Ms. Majcher said what work remains is to complete the interpretation related to the porewater assessment and that data will undergo analysis and quality control review, as well as the natural attenuation data. She added that concurrent with the interpretive report, a report will highlight the hydrologic project results, so there will be a comprehensive picture.

Mr. Rob Thomson asked about the high flow/low flow conditions and whether USGS found the wells responded similarly across the site. Mr. Goodling said some wells are more or less responsive to individual flow events, such as an individual storm, and part of the analysis will be to highlight which parts of the aquifer seems to be more responsive to the hydrologic events and which ones are less responsive, as well as looking at the water elevations across the site and doing an analysis of the water level gradient.

Ms. Hahn said if some wells are found to have more water flowing across on a regular basis, or reacting to storms, would that also change the outcome of the rock sampling by how much water goes or does not go across them over time. Ms. Majcher said Ms. Hahn's statement is a fair statement in that one would expect higher areas would be retaining more contaminants and potentially be where contaminants have found their way into deeper fractures or sit at the bottom of some of the conduits, and the water might flush out some of those contaminants.

Ms. Betty Law asked if the interpretive report will be available for review by the RAB community members, and Mr. Goodling said it will be a public report and available to everyone. Mr. Matt Pajerowski said the two interpretive reports will be fairly lengthy, but USGS would be glad to discuss the results at a future RAB meeting after the reports are released.

6. Area B Groundwater/Surface Water Pilot Study presented by Mr. John Cherry, Arcadis

Mr. Cherry advised he would be providing an update on Arcadis' pilot study work.

Mr. Cherry explained the pilot study has three phases: two tests focus on groundwater treatment and one test focuses on surface water treatment. Mr. Cherry stated for the groundwater component the two remediation technologies to be tested are pump and treat and enhanced reductive dichlorination. He said the surface water component was completed at an off-post pond through pond aeration using several techniques to reduce VOC concentrations discharging to that pond.

Mr. Cherry displayed a graphic of the Conceptual Site Model and highlighted a few features corresponding to USGS' presentation. Mr. Cherry pointed out the source area at Area B, Area B-11, where a soil removal action was performed in 2004 and where the groundwater pilot study is being implemented. He said another aspect of the Conceptual Site Model has been that in the area where high concentrations of VOCs were released, some of the VOCs would have diffused into the rock matrix and could be providing a continuing source of VOCs. He continued explaining that USGS is attempting to quantify the extent, i.e., crush up the cores from that area and analyze to see if there are VOC concentrations and at what levels in the rock matrix. He said the cores used by USGS were from Arcadis' drilling this past summer to install pumping wells which are not right in the middle of where the known highest concentrations of groundwater contaminants are so it is not unexpected that the analysis is not showing much mass in the rock

matrix. Mr. Cherry said USGS' analysis will be helpful in knowing what is present in the rock matrix which will influence the eventual remediation at Area B. Mr. Cherry pointed out arrows which show the groundwater flow from left to right on the graphic and eventually discharged to Carroll Creek on the far right of the graphic. He reminded the RAB of the complex geology at the site, including the karst environment.

Mr. Cherry reviewed the pilot study schedule. He said a baseline sampling event was completed with the new and existing wells in the area of the pilot study so current, comprehensive data would be used to design the treatment system. Mr. Cherry noted that since the fall of 2019 Arcadis has been working on completing the design of the treatment system and working with vendors to construct the system. Mr. Cherry advised the surface water component of the pilot study was started in the summer of 2019 and completed in January.

Mr. Cherry discussed the schedule of upcoming work, including the construction of the treatment building and initial testing over the next few months. He said the pilot study will be for eight months. He noted after the pump and treat study is completed, the enhanced reduction dichlorination technology test would be conducted. He explained this technology involves drilling shallow injection points, injecting carbon solution (food-grade molasses), and monitoring the ground water. He explained the carbon solution stimulates the growth of the microbial community which degrades the volatile organic compounds. Mr. Cherry reviewed a schedule at the bottom of the slide that was prepared in response to the RAB's request in May for a clearer schedule.

Mr. Cherry reviewed some of the activities that are part of the pump and treat technology construction. He advised the schedule is to start operation of the system in October.

Mr. Cherry displayed a schematic of the temporary but comprehensive treatment system. He said two new pumping wells have been installed close to and downgradient from the wells with the VOC concentrations in the 500 to 700 parts per billion range for trichloroethene (TCE); the wells will pump groundwater out of the ground, up to about 20 gallons per minute. He explained the water will go into the building and go through the treatment process; the process operates under a permit equivalency from MDE with criteria for both air and water. Mr. Cherry said there will be a complex sampling and monitoring program in place for both influent and effluent concentrations to be sure discharge requirements are met. He added the treated water will discharge to Stream 2 which is on Fort Detrick property along the southern boundary.

Ms. Hahn asked for larger versions of the schematic, including the chemical information at the bottom. She also requested a map with an "X" showing the discharge area at Stream 2. Ms. Hahn asked about the low levels of 1,4-dioxane. Mr. Cherry said 1,4-dioxane is an emerging contaminant and does not have any promulgated cleanup standards. He noted it can be difficult to treat; the concentrations at Area B are low and the system is being designed to be able to treat 1,4-dioxane.

Mr. Cherry summarized the results of the surface water aeration study which has been completed. He reminded the RAB the first pilot test involved the use of five aeration fountains in Robinson's Pond which operated for five months to volatilize the volatile organic compounds.

He said during the pilot study samples were collected from the pond, in the spring that feeds the pond, in the outfall that leaves the pond and flows toward Carroll Creek, and in Carroll Creek. Mr. Cherry said the second technology tested were air diffusers. He explained the diffusers are a system of aeration devices typically in the shape of a tube placed along the bottom of the pond, similar to what is used in fish tanks. He explained water would flow across the bubbling transects to strip out the VOCs.

Mr. Cherry said the results from the surface water pilot study are being reviewed, and a report is being prepared. He showed a bar chart which summarized the interim evaluation and advised groundwater concentrations coming into the pond compared to what is leaving the pond showed the greatest reduction with the fountains, although reductions were also seen with the air diffusers. Mr. Cherry reminded the RAB the TCE concentrations are very low, in the single-digit range. Mr. Cherry advised Arcadis has submitted a work plan to the Army for conducting an expanded test using the fountains which would begin in late summer.

7. New Seres-Arcadis Contract Overview presented by Mr. John Cherry, Arcadis

Mr. Cherry noted a new contract was awarded to Seres-Arcadis, a joint venture, for the Expanded Site Inspection (ESI) work that has been discussed at previous meetings. He noted there is no data to share yet as the project is in the work plan development stage.

Mr. Cherry advised the contract includes three main tasks: a background soil study, a comprehensive Area A groundwater investigation, and an ESI of 2016 SI Sites. Mr. Cherry reviewed the contract schedule and noted the tasks run through the fourth quarter of fiscal year 2022.

Mr. Cherry reminded the RAB that in 2016 a Site Inspection was conducted at Area A and Area B, and the soil and groundwater sampling revealed there were some inorganics above EPA's very low screening criteria; it raised the question of whether those sites have an inorganics issue, such as a release of arsenic, or if the levels are comparable to naturally-occurring levels in the soil. He noted there was not a good understanding of naturally-occurring or background levels so Arcadis has been tasked with conducting a background soil study. Mr. Cherry said other compounds will also be analyzed for including dioxins, herbicides and PAHs; he explained that while these compounds are not naturally occurring, in some urban areas they can be ubiquitous. He advised the work plan for the background study has been reviewed by EPA and MDE, and their comments are being addressed. He noted the tentative schedule is to complete the work before the end of the year.

Mr. Cherry explained the work plan outlines sampling being conducted in four distinct geologic formations/soil types across Fort Detrick, with 12 sample locations being identified in each of the four soil types at two depths for a total of 96 soil samples. He added that smaller background soil studies have been done in the past, but this will be the most comprehensive one done to date.

Mr. Cherry said the groundwater investigation at Area A will provide a better understanding of the groundwater and provide data on current conditions.

Mr. Cherry next discussed the Expanded Site Investigation. He referred to Archive Search Reports prepared by the U.S. Army Corps of Engineers in 2012-2014 which identified a list of sites for follow-up environmental testing under EPA/MDE oversight to assess actual impacts and current conditions.

Mr. Cherry said field work and reporting was completed in 2016 to assess several historical activities of potential concern which were divided into groups: herbicide test plots; incinerators; TCE sites (facilities where TCE was used for refrigeration purposes); petroleum, oil, and lubricant facilities; dispersion test areas (for testing dispersion of simulants); vehicle maintenance areas; and areas used for disposal, storage, or other purposes. He explained each of the sites had a tailored sampling and analysis plan based on the past activities. He further explained the outcome of the sampling was either no further action needed or a full Remedial Investigation was warranted; for a handful of sites, an Expanded Site Investigation was recommended.

Mr. Cherry displayed aerial photographs of the sites located at Area A and Area B, as well as the sampling locations.

Ms. Law asked if Area A was similar to Area B in terms of hydrogeologic conditions. Mr. Cherry said groundwater from Area A also flows towards Carroll Creek; it does not discharge to Robinson Pond, but there are seeps and streams along Carroll Creek where groundwater from Area A discharges. Mr. Gortva added there is a groundwater divide at Area A, approximately down the middle of Area A; on the eastern side, groundwater flows towards the east, and on the western side, it flows towards Carroll Creek.

Mr. Cherry displayed charts showing the results of the 2016 investigation and the planned scope under the new contract. He also showed a list of sites where Remedial Investigations will be conducted in the future.

Mr. Cherry noted there is a new site, Building 201, which was not included in the 2016 investigation, so a Preliminary Assessment will be conducted at this site followed by SI work.

Ms. Law expressed appreciation for the revised schedule graphics as they are easier to read.

8. PFAS Site Investigation presented by Ms. Rosemarie Potocky, Arcadis

Ms. Rosemarie Potocky advised the U.S. Army awarded Arcadis a large programmatic contract for almost 100 installations across the country to determine the amount of PFAS that might be present at these installations.

Ms. Potocky explained that PFAS stands for per- and polyfluoroalkyl substances which were man-made chemicals developed in the 1930s and widely used in industrial and commercial products starting in the 1950s, particularly heat-, stain-, grease-, and water-resistant products such as Teflon pans and Scotchguard. She displayed a list of products which may have PFAS used in their manufacturing process. She stated the Army used fire-fighting foam which

contained PFAS. Ms. Potocky explained the two most common PFAS chemicals are PFOA and PFOS; PFAS are also emerging contaminants of concern.

Ms. Potocky stated PFAS chemicals are persistent and resist degradation in the environment; they also bioaccumulate. She advised EPA has been studying PFAS for the past 15 years, and PFAS has been detected in drinking water worldwide as they have been used in so many products. She said in 2016 EPA developed a lifetime health advisory level of 70 parts per trillion for PFOS and PFOA combined for drinking water; some states or other countries have similar or equivalent health-based guidelines, but the guidelines are constantly changing as information evolves.

Ms. Potocky said the product containing PFAS most used by the Army was called Aqueous Film-Forming Foam (AFFF) which was used in firefighting operations, frequently at fire training areas at bases with large airfields. She noted Fort Detrick does not have those types of areas, but additional potential sources are metal plating operations, landfills, stormwater and sewer systems, wastewater treatment plants and wastewater soils, photo processing, soil application areas, and insecticides and herbicides application areas. She explained even though there are no promulgated standards for PFAS yet, just EPA's health advisory level, the Army is proactively addressing PFAS in drinking water in Army cleanup and 11290811restoration programs.

Ms. Potocky explained Arcadis has been tasked to perform Preliminary Assessments and Site Inspections at 97 Army installations nationwide. She said the main focus is to identify any drinking water receptors and any releases which might affect those receptors.

Ms. Potocky stated a Preliminary Assessment at Fort Detrick began in 2018 which included researching historical records and conducting interviews with former fire chiefs. She said the data indicated four areas of potential concern which will be further investigated. Ms. Potocky explained two are areas of AFFF releases on Area B between 2008 and 2015 during a certification exercise where less than a gallon of AFFF was released to ensure the fire truck hose was working properly. She continued explaining the other two areas on Area A are fire stations which are all automatically being investigated if they stored AFFF.

Ms. Potocky discussed the groundwater, soil and surface water (Robinson Box Spring) sampling that will be conducted at the two areas on Area B. She also discussed the groundwater, soil and surface water (Spearmint Spring) sampling that will be conducted at the two Area A fire stations.

Ms. Potocky reviewed the schedule for the project, noting the field work will be conducted towards the end of August and a PA/SI report will be distributed in late 2020/early 2021. She noted the report would document the presence or absence of PFAS and make recommendations for any further investigation.

Ms. Hahn asked if a potential Army source is landfills, why no samples are being collected near Area B landfills. Ms. Potocky advised an extensive study was done of drinking water receptors, and it was determined that sampling near the B-11 landfill would not be done; PFAS samples are being collected as part of the pilot study. Ms. Potocky said programmatically the Army is not yet sampling landfills. Ms. Potocky said any potential PFAS materials disposed into the landfill

would not show up in the surface soil as the soil placed over the landfill was clean fill material. Mr. Cherry added that PFAS groundwater sampling has been done at Area B as part of the baseline sampling conducted last fall that he had discussed earlier so some data is available; he said the concentrations were low, 7 to 9 parts per trillion, compared to the health advisory level of 70 parts per trillion. Mr. Gortva advised sampling had been conducted of the Monocacy River of the water coming into Fort Detrick's drinking water plant; he stated similar low levels were observed in these samples collected upgradient of the water treatment plant. Mr. Gortva said these low levels may be indicative of anthropogenic sources of PFAS seen everywhere.

Ms. Law asked if is known or how soon it would be known what the potential impacts of PFAS levels above EPA's health advisory level might be and what are the potential remediation technologies. Mr. Cherry stated PFAS can be treated with carbon, as well as other methods. He said PFAS is an emerging contaminant, and there is much industry and government activity addressing Ms. Law's questions. Mr. Thomson said EPA has not yet set a promulgated standard that would provide a maximum contaminant level for PFAS.

Ms. Jennifer Kunze asked about investigation of the herbicide application areas as a potential source. Ms. Potocky said Arcadis looked at the herbicide areas and found they were not a significant source of PFAS so no sampling was scheduled.

9. RAB Member Open Discussion and General Community Comments

Mr. Gortva invited open discussion from the RAB members.

Ms. Hahn inquired about Technical Assistance Grants and whether the RAB could obtain a grant to hire a consultant to provide community members with a review of the environmental assessment performed by the City of Frederick with respect to the proposed new road. Mr. Gortva said he would obtain more information to address Ms. Hahn's question. Mr. Pauly suggested the RAB request the City have Fox and Associates provide a detailed briefing at a future RAB meeting. Mr. Gortva noted that Fort Detrick has not been provided with any reports or information yet so it may be premature to have such a presentation. Ms. Hahn said approximately every 10 years the City of Frederick updates its Comprehensive Plan; currently they are voting on the final draft of the 2020 update. Ms. Hahn said the 2010 Plan included language about the impact of Fort Detrick being in the middle of the City, specifically the inter-jurisdictional coordination needed for building projects; the 2020 draft removed all language about Fort Detrick. Ms. Hahn stated that when she and Ms. Law questioned the removal of the language, an inaccurate paragraph was inserted regarding environmental investigations at Fort Detrick; she noted she had sent a copy of the language to Mr. Thomson at EPA. She noted the plan also includes language about moving forward with the proposed road near Area B. Ms. Hahn said she is concerned because the plan will be voted upon in a few weeks. Mr. Pauly stated that if Fort Detrick, EPA or MDE do not agree with the road proposal/design, the road across Area B will not happen. Mr. Pauly requested Ms. Hahn send him the language. Ms. Law said she will distribute the language and correspondence to all the RAB members. Ms. Kunze asked about the MOU and documents between the City and Fort Detrick which seem to change the road location, and Mr. Gortva responded the design of the road would be included in an official proposal/design from the City which has not been received yet. Mr. Gortva reiterated

that everyone has been informed that there will no road across Area B unless it has approval not just from Fort Detrick, but Army Command also, along with EPA and MDE.

Mr. Gortva invited comments for the community members in the audience, and none were offered.

10. Future Meeting Dates

Mr. Gortva said proposed future meeting dates are December 2, 2020 (likely a virtual meeting), April 7. 2021, and August 4, 2021. Mr. Gortva said all the dates are tentative and invited anyone who had conflicts to let him know.

Mr. Gortva invited Board members to let him know about topics of interest for future meetings.

The meeting adjourned at approximately 9:26 p.m.

Reviewed by:

Approved/Disapproved

Enclosures:

USGS Area B Groundwater Monitoring Investigation (Power Point Slides)
Area B Groundwater/Surface Water Pilot Study (Power Point Slides)
New Seres-Arcadis Contract Overview (Power Point Slides)
PFAS Site Investigation (Power Point Slides)
Meeting Attendance

DISTRIBUTION:
Each RAB Member (w/enclosure)
Each Meeting Attendee (w/o enclosure)

Agenda
Fort Detrick Restoration Advisory Board
Wednesday, August 5, 2020 6:30 p.m.
Virtual

Time	Subject	Person	Action
6:30-6:35	Welcome/ Greetings	Gary Pauly, RAB Co-Chair	Information
6:35-6:40	Ground Rules/Purpose of Meeting	Joseph Gortva, USAG	Information
6:40-6:50	RAB Business Meeting Minutes/Action Item Review	Shelly Morris, ERG LLC	Information
6:50-7:20	Status Update: Area B Groundwater Studies	Phillip Goodling, USGS	Presentation
7:20-7:40	Status Update: Area B Groundwater Pilot Study	John Cherry, Arcadis	Presentation
7:40-8:15	Project Introduction / Status Update: Expanded Site Inspection PFAS Preliminary Assessment / Site Inspection	Rosemarie Potocky, Arcadis	Presentation
8:15-8:30	RAB Member Open Discussion	RAB members	Discussion
8:30-8:40	General Community Comments	Open to Public	Information
8:40-8:50	Next Meeting/Adjourn Meeting	Gary Pauly, RAB Co-Chair	Closure

Proposed future RAB meeting dates: 12/2/2020
4/7/2021
8/4/2021

Fort Detrick Area B Groundwater Investigation

August 5, 2020

Phillip Goodling, Hydrologist
Emily Majcher, Hydrologist
USGS MD-DE-DC Water Science Center

U.S. Department of the Interior
U.S. Geological Survey

Background

- USGS brought in to provide an independent scientific review of Conceptual Site Model (CSM) at the end of 2017.
- In 2017-2018 we reviewed previous work including:
  - Geochemistry data back to 2000
  - Geophysical logs
  - Various reports and the CSM
- Identified opportunities to refine the understanding of CSM and contaminant fate and transport.

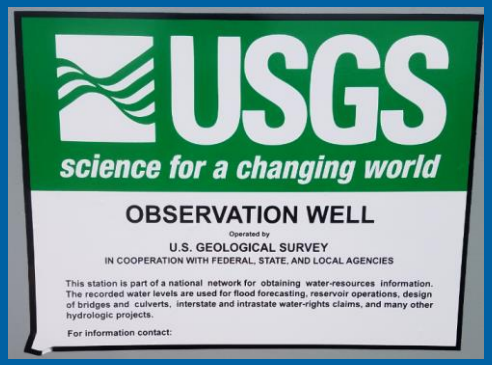
USGS Task Breakdown

1) Hydrologic Monitoring
2) Water Budget Analysis
3) Groundwater Age Dating / Geochemical Analysis
4) Biogeochemical Analysis
   - Natural Attenuation and Microbial Analysis
   - Matrix Diffusion Analysis
   - Carroll Creek Porewater Evaluation
   - Evaluation of Enhanced Reductive Dechlorination Pilot Test Microbial effects

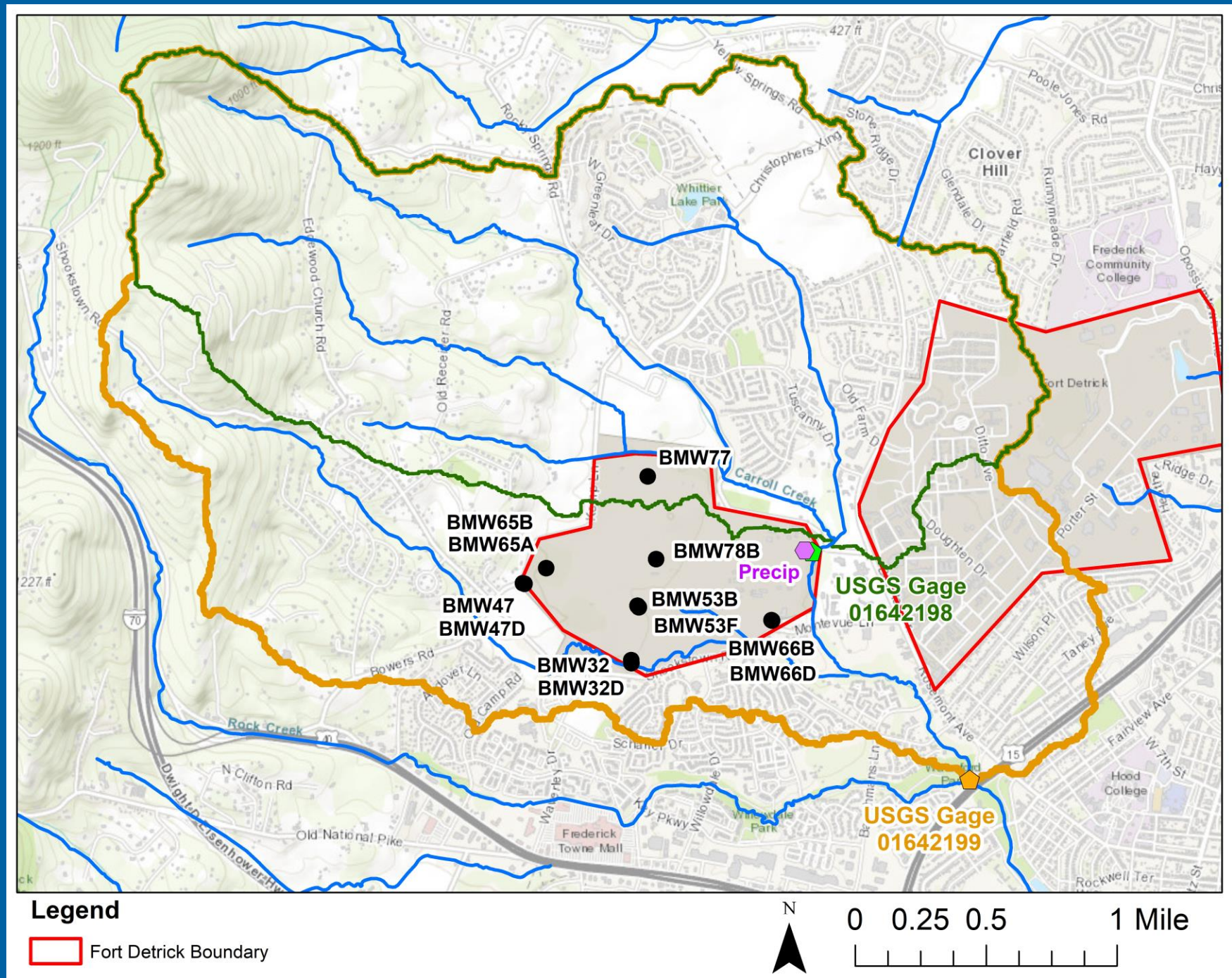
1) Hydrologic Monitoring

- **Goals:**
  - **Observe how the groundwater system responds to short-term and long-term events (floods, droughts, etc).**

2 Stream gages, 1 Precipitation Gage, and 12 Water Level Gages



USGS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USGS Gage
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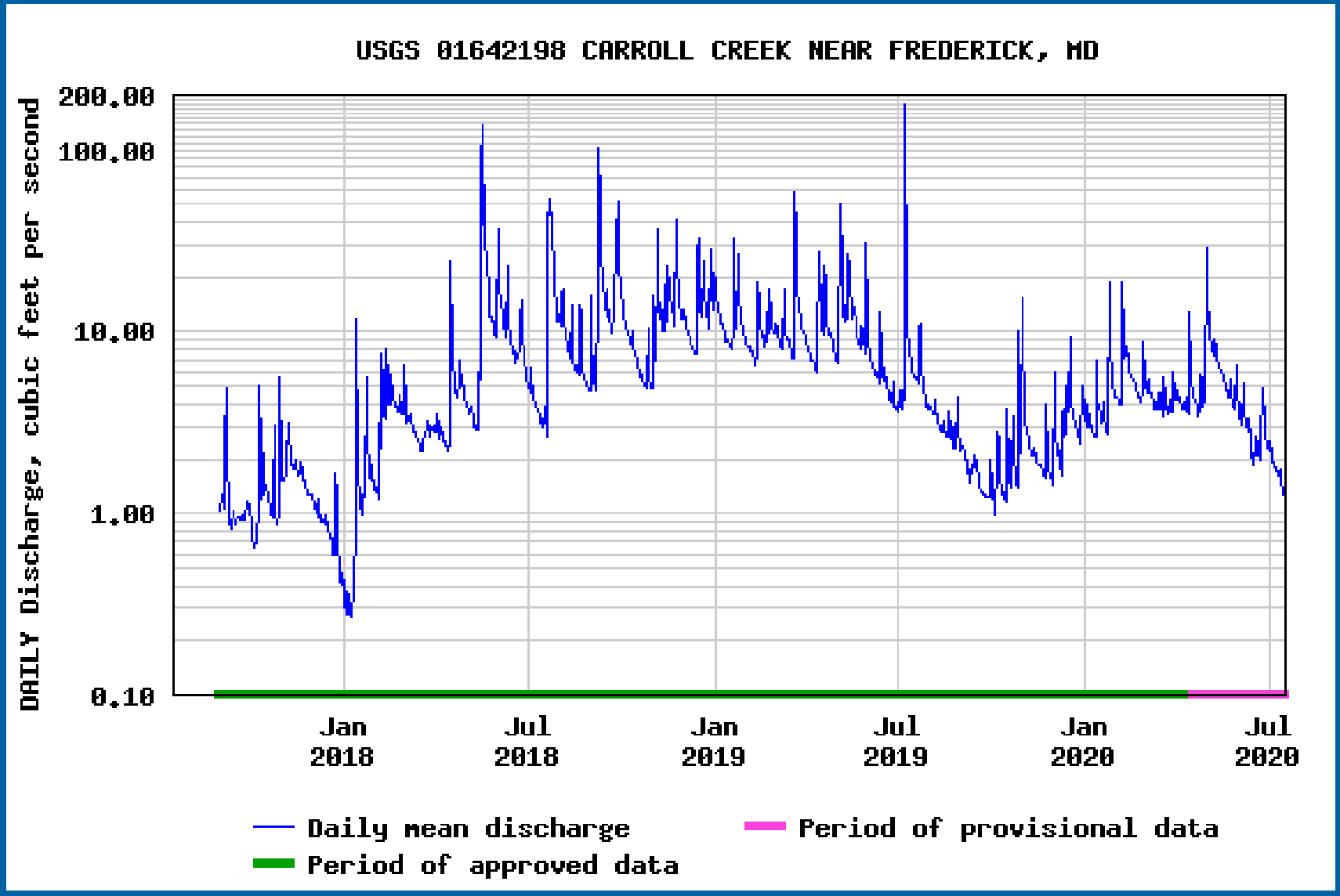
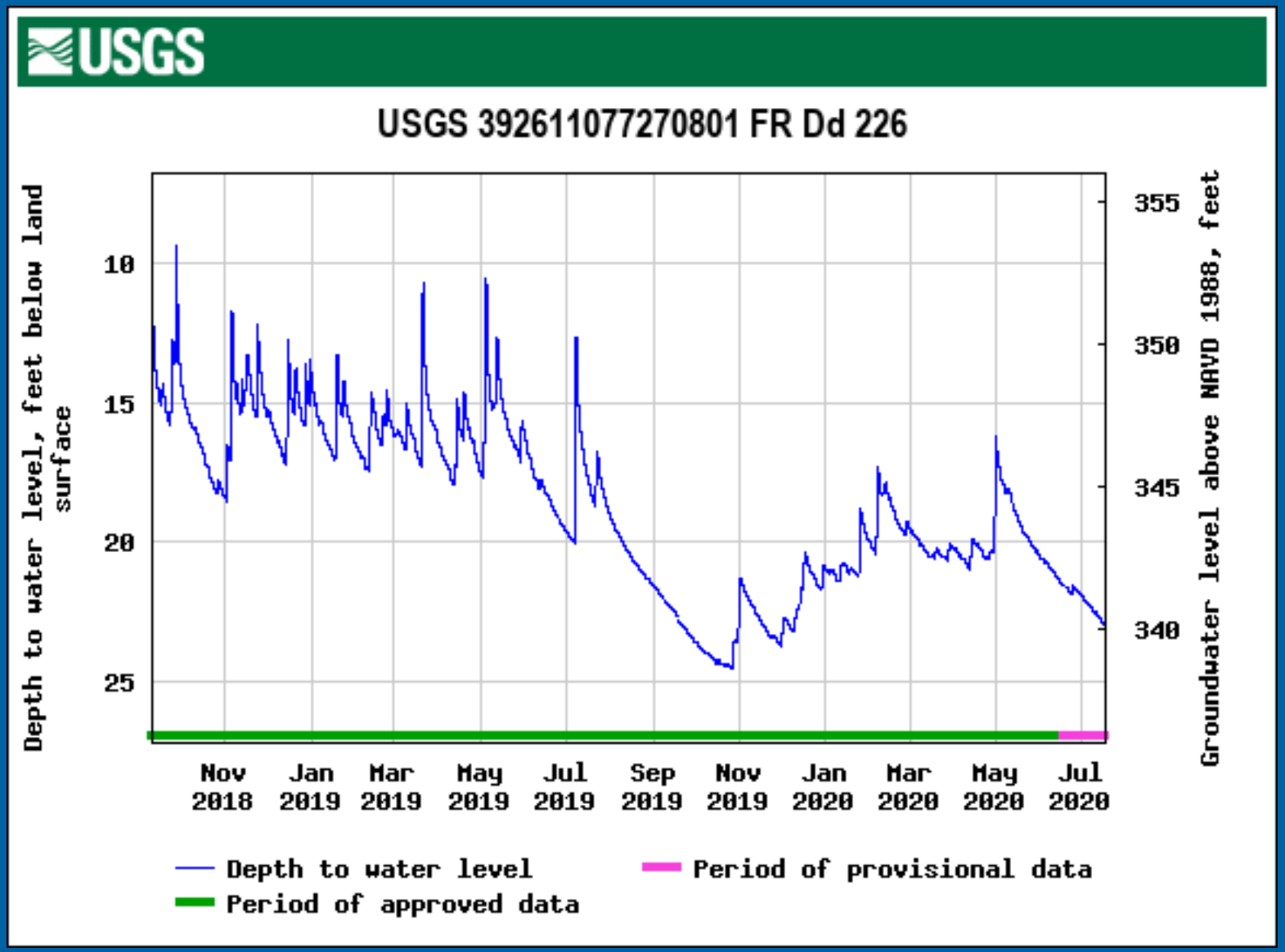
USGS Gage
01642199
Carroll Creek
Rock Creek
Clover Hill
Frederick Community College
Fort Detrick
Frederick Towne Mall
Hood College
Whittier Lake Park
Old National Pike
N Clifton Rd
Bowers Rd
Legend
Fort Detrick Boundary
N
0 0.25 0.5 1 Mile

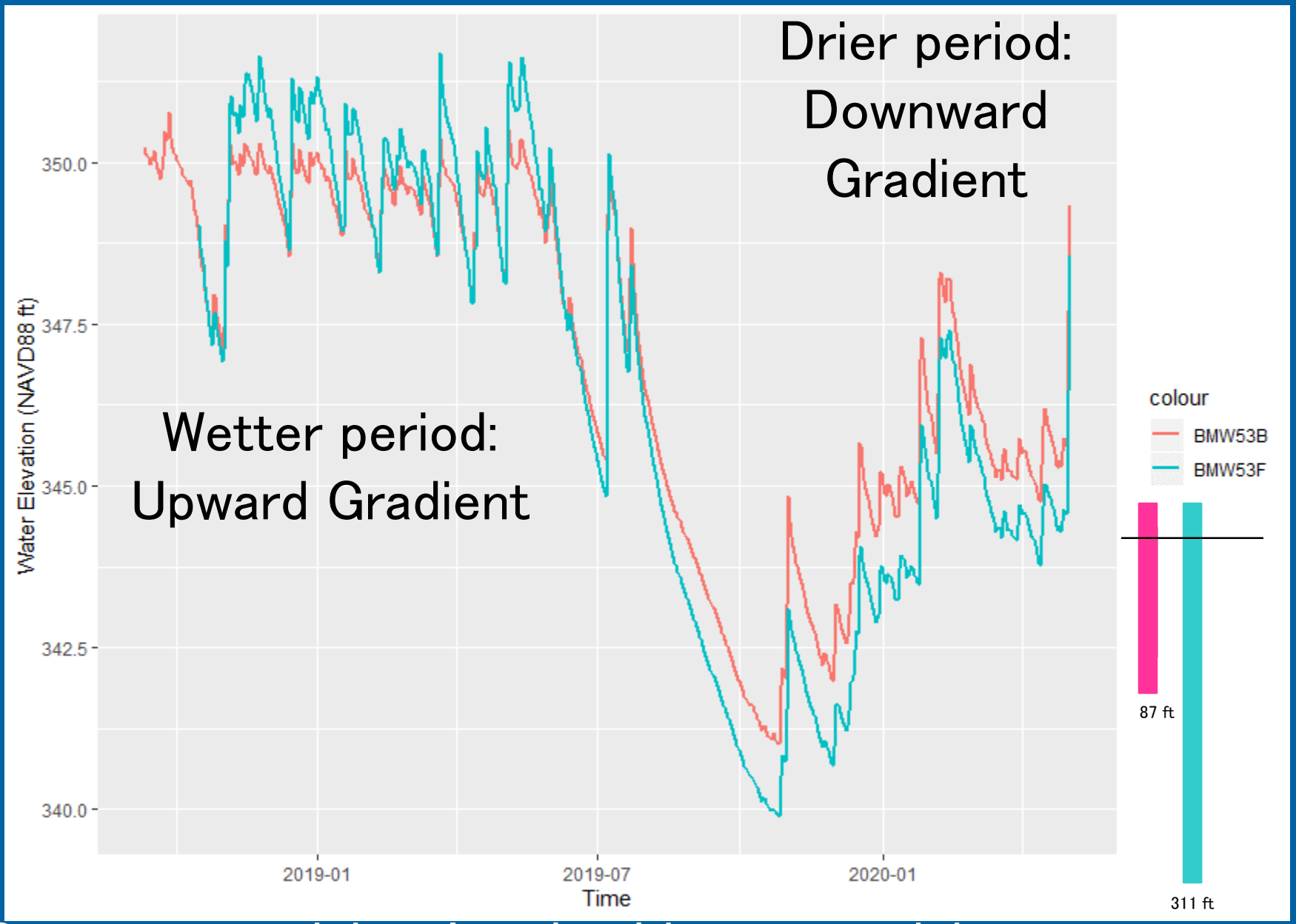
Phase 1 Hydrologic Characterization




USGS
USGS 392611077270801 FR Dd 226
Depth to water level, feet below land surface
10
15
20
25
355
350
345
340
Groundwater level above NAVD 1988, feet
Nov 2018
Jan 2019
Mar 2019
May 2019
Jul 2019
Sep 2019
Nov 2019
Jan 2020
Mar 2020
May 2020
Jul 2020
Depth to water level
Period of approved data
Period of provisional data

USGS

BMW53B and BMW53F



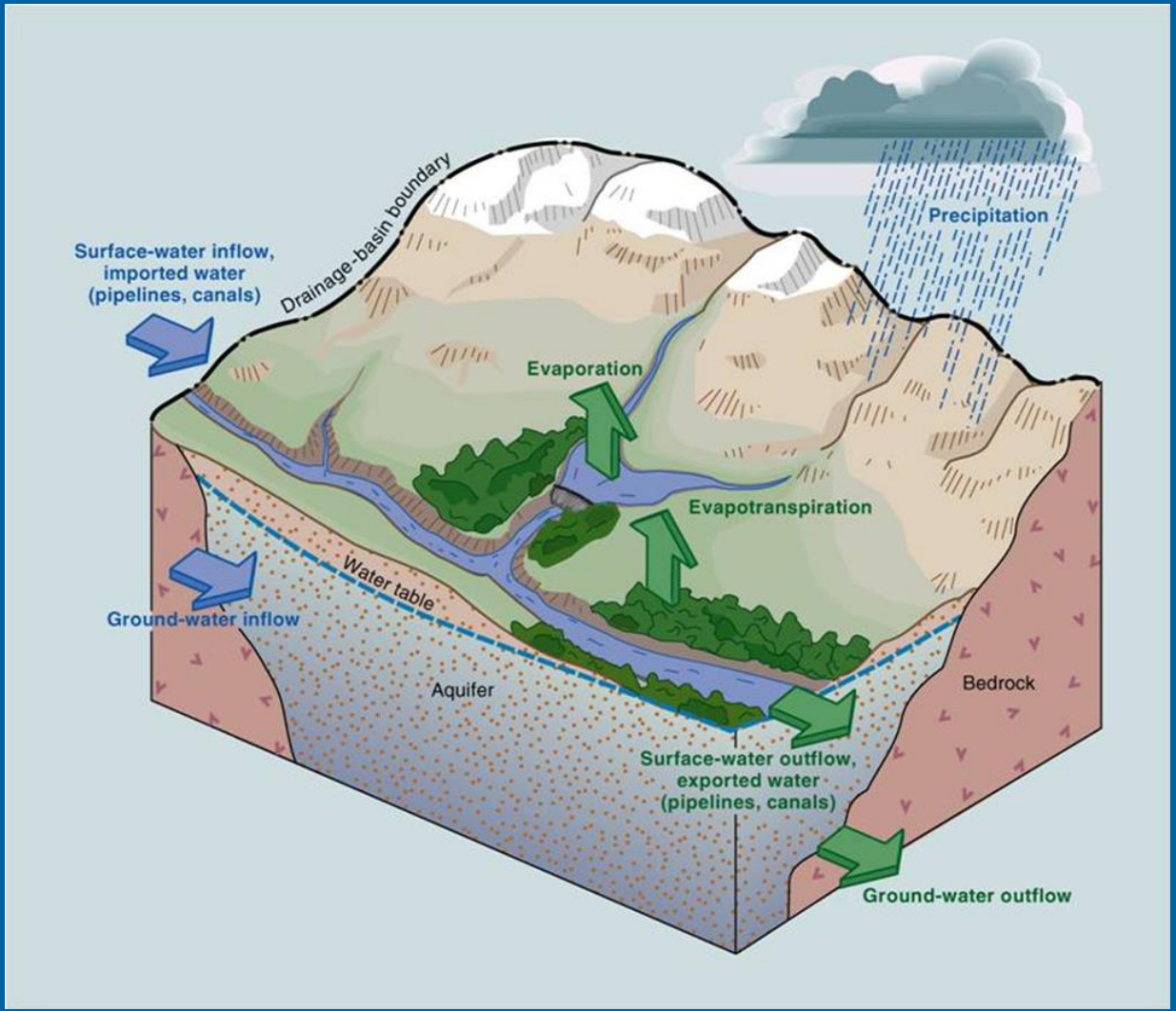
Data are provisional and subject to revision

Dye Monitoring

USGS

2) Water Budget

Using the information collected during hydrologic monitoring, we are quantifying the water budget components.



USGS

Healy, R.W., Winter, T.C., LaBaugh, J.W., and Franke, O.L., 2007,
Water budgets: Foundations for effective water–resources and environmental management: U.S. Geological Survey Circular 1308.

Regional vs Local flow system.

- Water budget analysis used to better understand the potential for underflow of groundwater from Area B beyond Carroll Creek.
- We will apply multiple methods.
  - Hydrograph Separation Analysis (Barlow et al, 2017, Raffensperger, 2018, Healy, 2010)
  - Water Table Fluctuations with Precipitation (Nimmo et al, 2015, Healy, 2010)
  - Analytical methods such as Soil Water Balance model (Westenbrook et al, 2018)

- Analysis will include data currently being collected (through end of 2020 Water Year (Oct 1.).

USGS

3) Groundwater Age Dating

- Groundwater “age” is the time since the water fell as precipitation.

- Through geochemical analysis, we can estimate this age, which informs how fast the water is flowing and how the groundwater system functions on long timescales. This information can be used to evaluate the CSM.

- 20 groundwater and spring samples were collected in September- October 2019 and analyzed for constituents needed for age date analysis.

- This analysis is still ongoing.

USGS

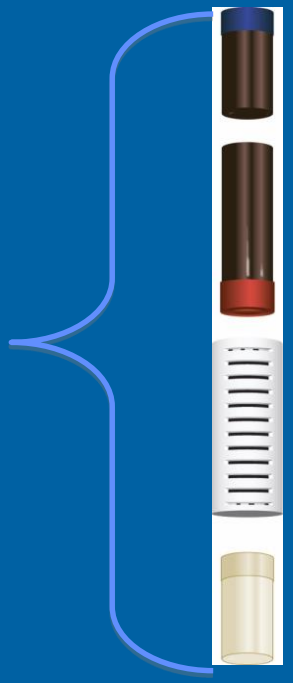
4) Characterize groundwater biogeochemistry

- Compiled and reviewed existing geochemical data
- Identified and summarized data gaps
- Completed sampling efforts to fill in data gaps, supplement CSM refinement
  - MNA parameters site wide, in situ microcosm
  - Evaluate matrix diffusion potential near source
  - Porewater sampling to evaluate conduit flow vs diffuse discharge to Carroll Creek

USGS

Biodegradation- Natural Attenuation

- Limited historical data (2005) suggests some potential for biodegradation of contaminants in groundwater
  - Sampled select, existing wells for parameters throughout Area B to inform likelihood of biodegradation (Fall 2019, Summer 2020)
  - Split sampling in Summer 2020 allows for comparison of methods
  - Evaluation of NA and biodegradation rates outside the bioremediation pilot test area using in-situ microcosm (*currently deployed*)
  - Supplemental microbial community sampling of groundwater (*dependent on ERD pilot test schedule*)



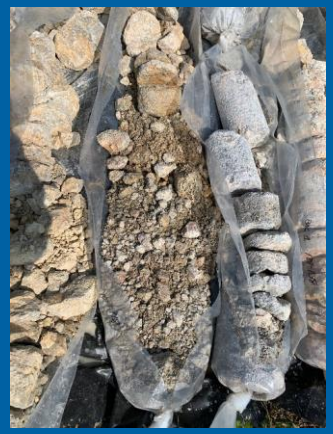
In situ microcosm

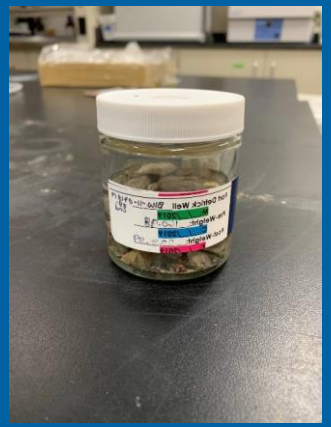
Dialysis samplers

USGS

Matrix Storage

- Contaminants moving from groundwater to springs is known, but the storage of contaminants in the rock matrix itself is not well understood
  - We can estimate this using rock chips from the newly drilled wells for pilot tests and historical cores (in long-term storage)
  - Collection, crushing Summer 2019, Analysis Winter 2020
  - Repeated analysis due to some blank contamination (ending now, porosity analysis was delayed)

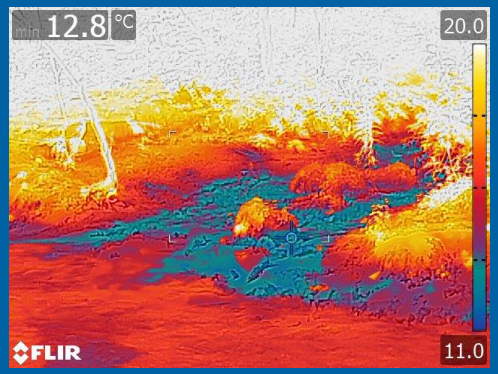


USGS

Carroll Creek Porewater Characterization

- Assess fate and transport of contaminants from Area B groundwater into Carroll Creek
  - Temperature surveys of stream bed and banks to estimate input of groundwater into Carroll Creek (August 2019, July 2020)
  - Targeted, co-located multi-depth porewater and surface water sampling (Summer 2019, July 2020), including seeps
  - Analysis for VOCs and other parameters to help understand the possible degradation along the flowpath from the groundwater to Carroll Creek



USGS

Biogeochemistry Tasks - timeline

Task	FY18	FY19 - Q3	FY19-Q4	FY20-Q1	FY20-Q2	FY20-Q3	FY20-Q4	FY21
Retrospective data analysis	x							
1. Matrix Assessment (w/pilot drilling)		x	x	x	x			
2. Porewater Assessment		x	x				x	
3. NA Assessment + In Situ Microcosm			x			x	x	
4. Microbial sampling with ERD pilot								x
Interpretive report								x

USGS

Hydrologic Investigation - timeline

Task	FY18	FY19 - Q3	FY19-Q4	FY20-Q1	FY20-Q2	FY20-Q3	FY20-Q4	FY21
Retrospective data analysis	x							
1. Hydrologic Monitoring	x	x	x	x	x	x	x	x
2. Groundwater Age Tracer sampling			x					
3. Preliminary Water Budget analysis					x	x	x	
4. Groundwater Age Interpretations						x	x	
Interpretive report								x

USGS

ENVIRONMENTAL RESTORATION SERVICES FORT DETRICK, FREDERICK MD

Progress of the Pilot Study for Three Potential Remedial Technologies

August 5, 2020

John Cherry
Arcadis

Three Pilot Study Technologies in Two Areas

Groundwater Pilot Study Area (source area)

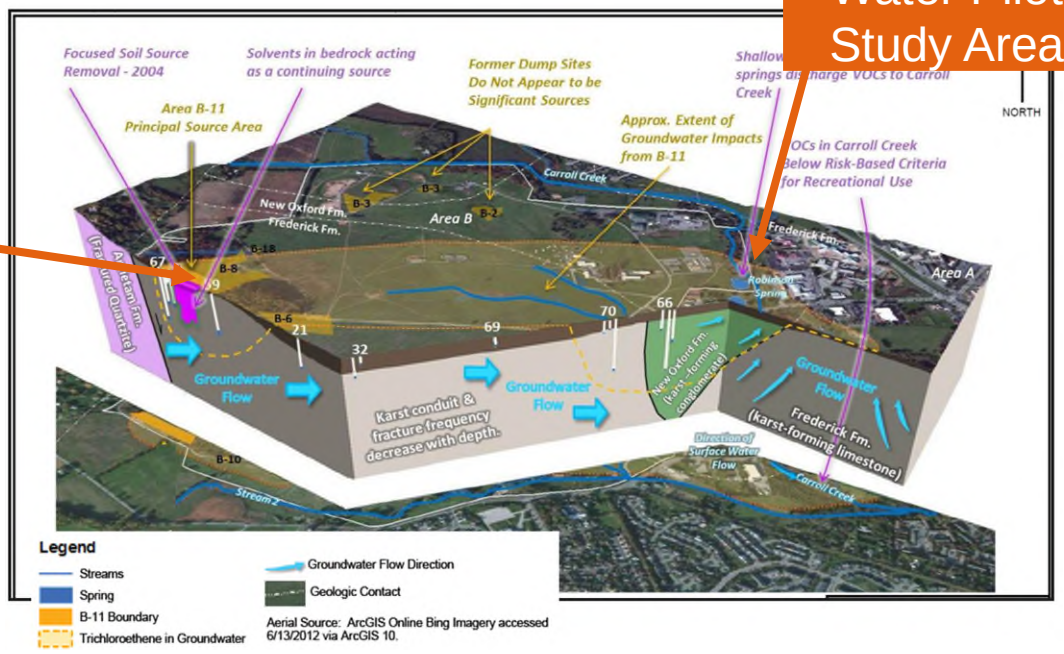
1. Pump and Treat *(Work on-going)*
2. Enhanced Reductive Dechlorination (ERD) *(Future Work)*

Surface Water Pilot Study Area (downgradient)

3. Pond Aeration *(Complete, additional field work planned)*

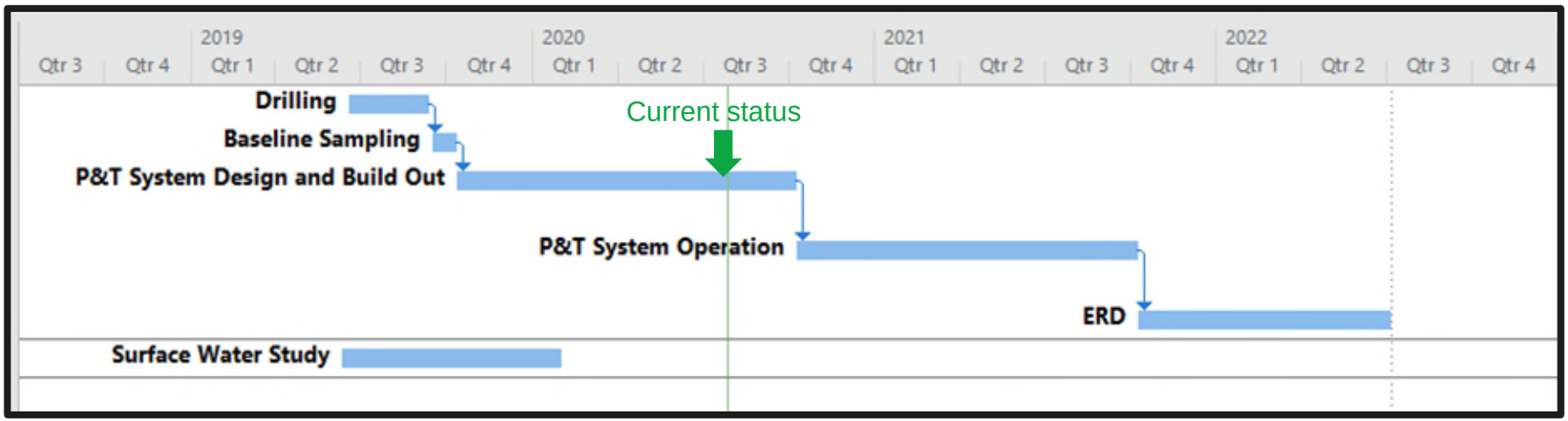
Surface Water Pilot Study Area

Groundwater Pilot Study Area



General Pilot Study Schedule

- ✓ Drilling work completed September 10, 2019
- ✓ Baseline Sampling conducted September 16-October 10, 2019
- ✓ Surface water aeration conducted June 10, 2019 through January 30, 2020.
- Phased build out of P&T system planned through fall 2020
- ERD will be conducted after completion of P&T
- Implementation of all options will take an additional 2 years



Pump and Treat Pilot Study (Groundwater)

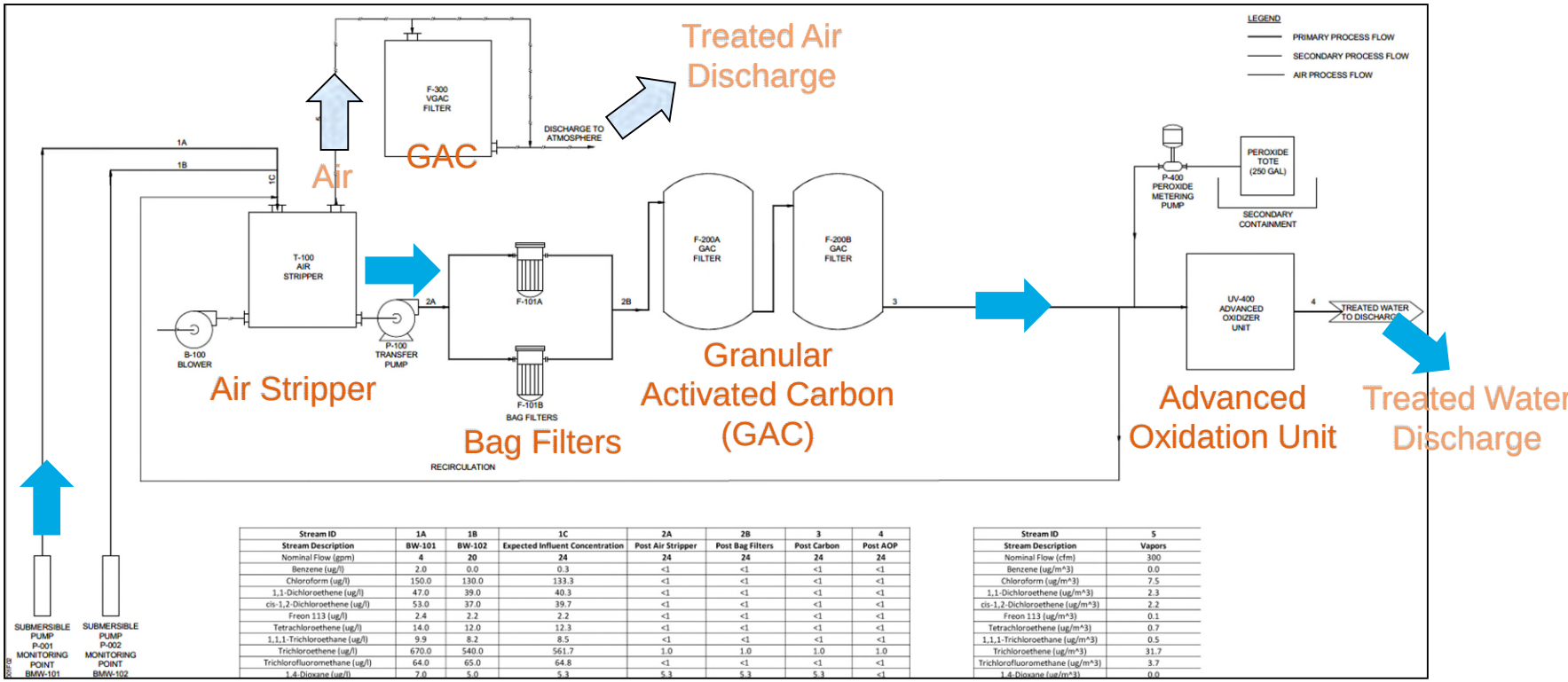
- ✓ Trenching and installation of an electric conduit to bring electricity from Kemp Lane to the planned P&T system completed in early May.
- ✓ Installation of power poles on Kemp Lane in late July (*First Energy*)
- Installation of concrete foundation for treatment building– mid-August
- Delivery of treatment building and installation of discharge line – mid-September
- Installation of groundwater treatment system components – mid- to late-September
- System startup – October

Excavation of line

Back-filled area

Pump and Treat System

- The system will be temporary. The pumping test, water treatment, and sampling study will operate for 8 months.
- Treated clean water will be discharged to a nearby Area B stream with regular confirmatory testing. MDE and EPA will approve the discharge criteria and system effectiveness before system operation.



Stream ID	1A	1B	1C	2A	2B	3	4
Stream Description	BW-101	BW-102	Expected Influent Concentration	Post Air Stripper	Post Bag Filters	Post Carbon	Post AOP
Nominal Flow (gpm)	4	20	24	24	24	24	24
Benzene (ug/l)	2.0	0.0	0.3	<1	<1	<1	<1
Chloroform (ug/l)	150.0	130.0	133.3	<1	<1	<1	<1
1,1-Dichloroethene (ug/l)	47.0	39.0	40.3	<1	<1	<1	<1
cis-1,2-Dichloroethene (ug/l)	53.0	37.0	39.7	<1	<1	<1	<1
Freon 113 (ug/l)	2.4	2.2	2.2	<1	<1	<1	<1
Tetrachloroethene (ug/l)	14.0	12.0	12.3	<1	<1	<1	<1
1,1,1-Trichloroethane (ug/l)	9.9	8.2	8.5	<1	<1	<1	<1
Trichloroethene (ug/l)	670.0	540.0	561.7	1.0	1.0	1.0	1.0
Trichlorofluoromethane (ug/l)	64.0	65.0	64.8	<1	<1	<1	<1
1,4-Dioxane (ug/l)	7.0	5.0	5.3	5.3	5.3	5.3	<1

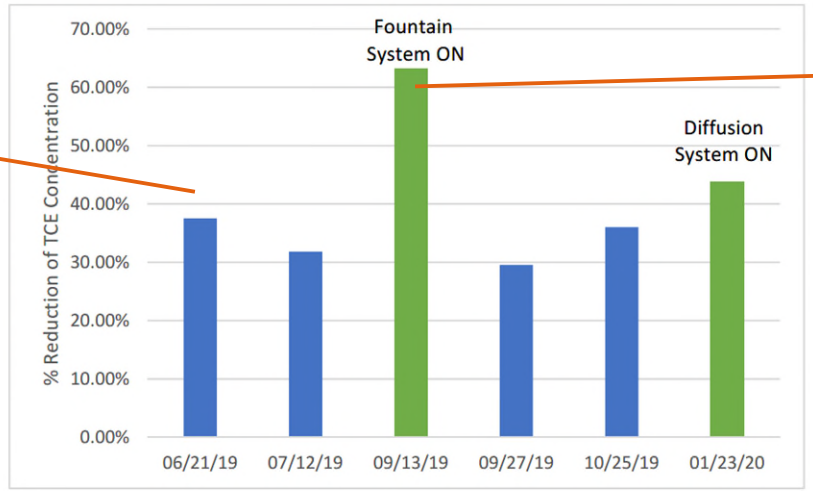
Stream ID	5
Stream Description	Vapors
Nominal Flow (cfm)	300
Benzene (ug/m^3)	0.0
Chloroform (ug/m^3)	7.5
1,1-Dichloroethene (ug/m^3)	2.3
cis-1,2-Dichloroethene (ug/m^3)	2.2
Freon 113 (ug/m^3)	0.1
Tetrachloroethene (ug/m^3)	0.7
1,1,1-Trichloroethane (ug/m^3)	0.5
Trichloroethene (ug/m^3)	31.7
Trichlorofluoromethane (ug/m^3)	3.7
1,4-Dioxane (ug/m^3)	0.0

Pond Aeration Pilot Study (Surface Water)

- Two aerations systems (fountains and diffusers) have been tested at Robinson Pond.
- Results were presented in the Third Quarterly Report and discussed during the May 13, 2020 virtual meeting with RAB members.
- Detectable reductions of VOC concentrations have been observed in surface water during operation of the aeration devices.
- Extended surface water pilot study is under consideration to gather additional data over an extended period of time.

Blue bars show percent reduction under ambient conditions in the pond (e.g., natural conditions including dilution)

Percent Reduction of TCE Concentration – Surface Water (June 2019 through January 2020)



★

Green bars show higher percent reduction during pond aeration testing phases.

Questions/Discussion

FORT DETRICK EXPANDED SITE INVESTIGATION (SI)

For Herbicide, Incinerator, Vehicle Maintenance, and General Disposal, Storage, and Other Sites for Fort Detrick

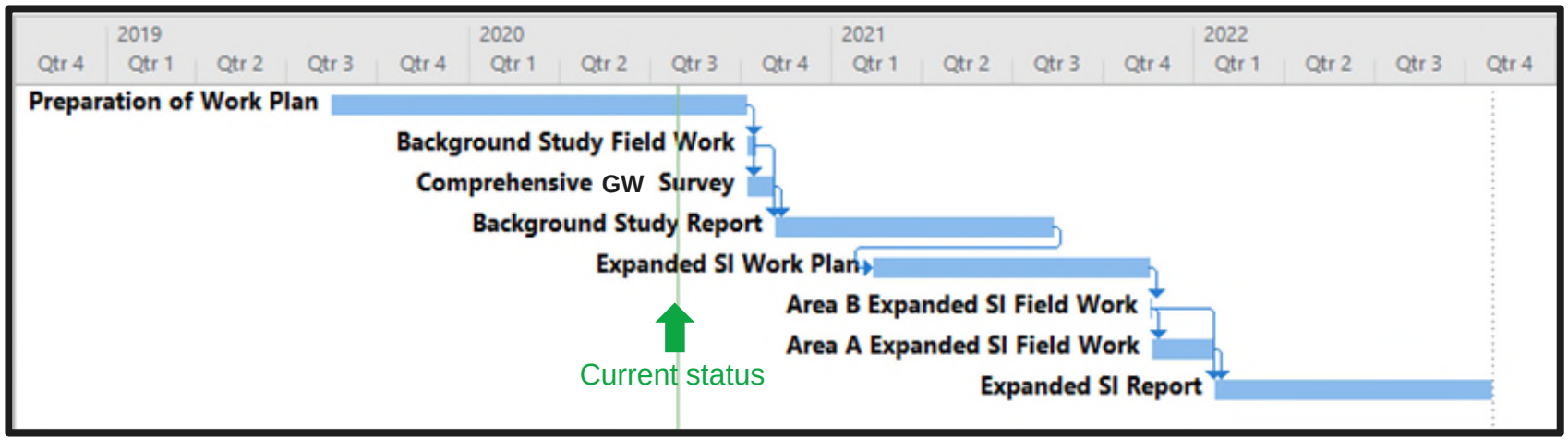
5 August 2020

John Cherry

Contract Overview

- Contract awarded in 2019 to Seres-Arcadis JV
  - Joint-Venture mentor-protégé

- Contract includes the following tasks:
  - Background soil study
  - Comprehensive Area A Groundwater Investigation
  - Expanded Site Investigation of 2016 SI Sites



Soil Background Study

- Goal of the study: perform a background study for metals and a baseline study for dioxins, herbicides, and PAHs
  - Secondary goal: use this data to reassess whether additional sampling (e.g., Expanded SI) is recommended at the 2016 SI sites.

- Work Plan is currently under USEPA and MDE review. Army is addressing regulatory comments on the plan.

- Soil testing is planned in four distinct geologic formations/soil types across Fort Detrick.
  - 12 sample locations will be identified in each of the four soil types with 2 sample intervals (0-2 ft bgs and 2-4 ft bgs) collected at each location (96 soil samples)

- Background Study Report
  - Will present a statistical evaluation of the results
  - Background info will be used to assess whether SI sites will require further investigation.

- The field work will be conducted following USEPA and MDE's approval of the work plan. The tentative schedule for the field work is for fall 2020 with the report distributed during first quarter 2021.

Comprehensive Area A Groundwater Survey

- Goal: Collection of groundwater samples for VOCs at all groundwater monitoring points across Area A.
  - In recent years, groundwater sampling has been limited to a subset of groundwater monitoring points and many locations have not been inspected or sampled in a long time.

- Field Work
  - Sampling, inspection, and gauging will be completed at approximately 76 groundwater monitoring points on Area A.

- The results will be presented in Comprehensive Area A Groundwater Sampling Results Report.

- The field work will be conducted following MDE's approval of the work plan. The tentative schedule for the field work is for fall 2020 with the report distributed during first quarter 2021.

ARCADIS Design & Consultancy for natural and built assets

Expanded Site Investigation

Recap: Archive Records Review

2010: US Army Corps of Engineers (USACE) completed a review of archive records for Fort Detrick (including Areas A, B, and C)

Objective:

Identification of any past activities that had the potential to impact the environment

2012 – 2014: Findings detailed in two separate Archive Search Reports (ASRs)

Outcome:

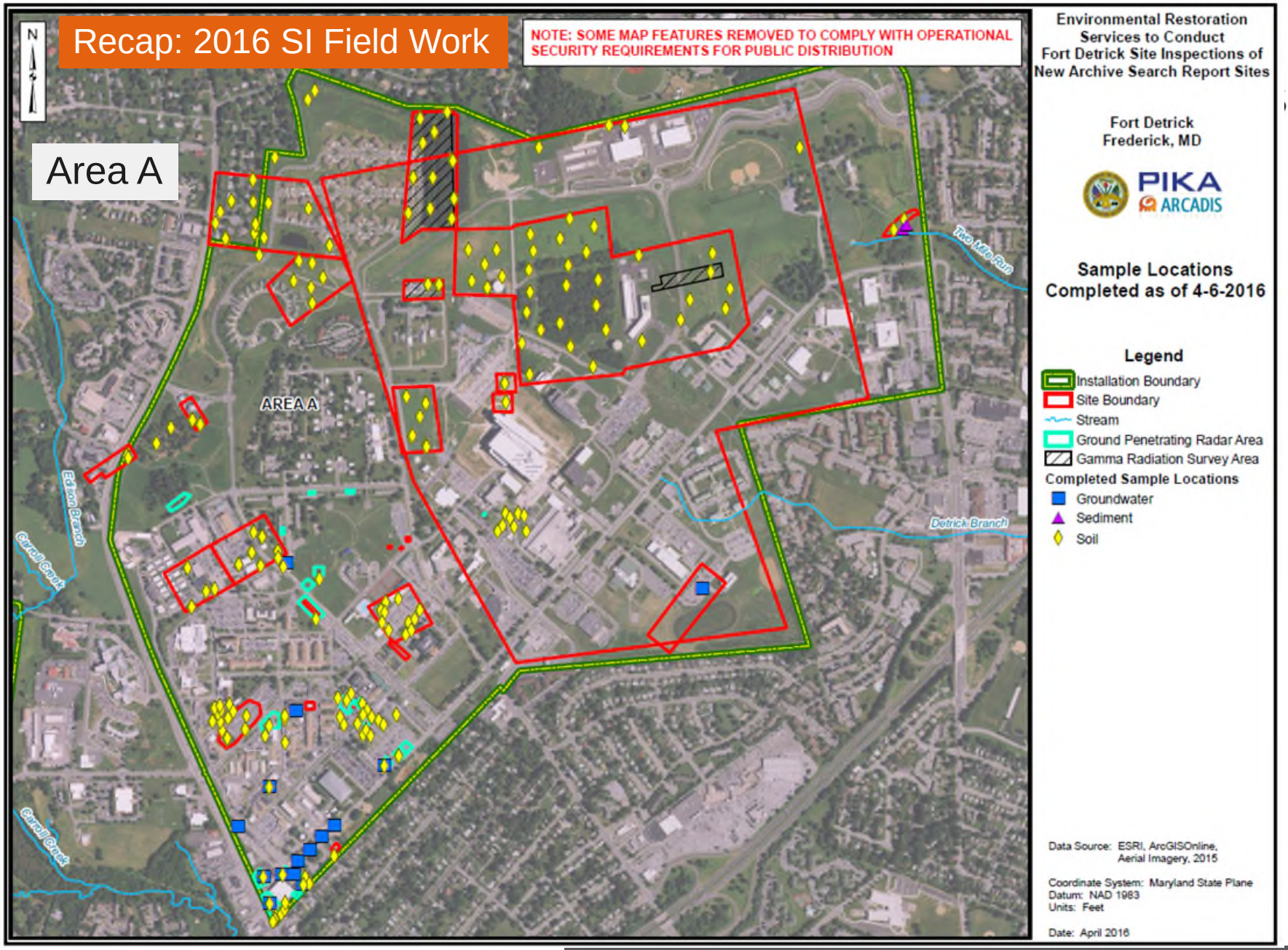
Army identified a list of sites for follow-up environmental testing under EPA/MDE oversight to assess actual impacts and current conditions

See US Army Corps of Engineers (USACE) February 2015 RAB update for more information on ASR

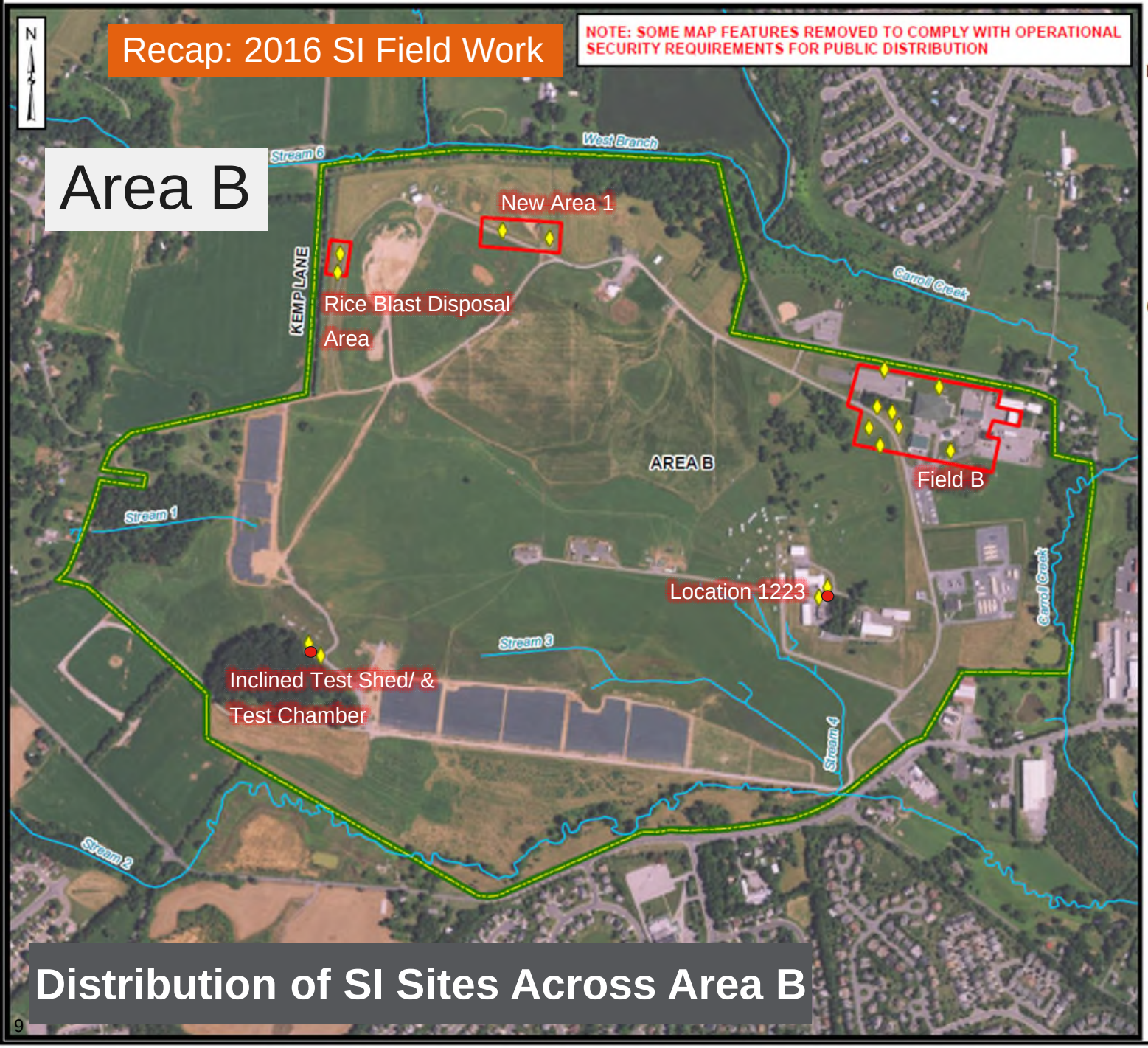
Recap: Field work and reporting completed in 2016 to assess several historical activities of Potential Concern

- Herbicide test plots
- Incinerators
- TCE sites (facilities where TCE was used for refrigeration purposes)
- Petroleum, oil, and lubricant facilities
- Dispersion test areas (for testing dispersion of simulants)
- Vehicle maintenance areas
- Areas used for disposal, storage, or other purposes

SI Scope included sampling for soil and/or groundwater with analyses tailored to historical activities and uses in these areas



Distribution of SI Sites Across Area A


Recap: 2016 SI Field Work
NOTE: SOME MAP FEATURES REMOVED TO COMPLY WITH OPERATIONAL SECURITY REQUIREMENTS FOR PUBLIC DISTRIBUTION
N
Area B
Stream 6
West Branch
New Area 1
KEMP LANE
Rice Blast Disposal Area
Carroll Creek
AREA B
Field B
Stream 1
Location 1223
Carroll Creek
Stream 3
Inclined Test Shed/ & Test Chamber
Stream 4
Stream 2
Distribution of SI Sites Across Area B
Environmental Restoration Services to Conduct Fort Detrick Site Inspections of New Archive Search Report Sites
Fort Detrick
Frederick, MD
PIKA
ARCADIS
Sample Locations Completed as of Aug. 2016
Legend
Installation Boundary
Site Boundary
Site Location (Point)
Stream
Completed Soil Sample Location (2016)
Data Source: ESRI, ArcGIS Online, Aerial Imagery, 2013
Coordinate System: Maryland State Plane
Datum: NAD 1983
Units: Feet
Date: August 2016

SI Sites

Site Grouping	2016 SI Results	2020-2022 Expanded SI Planned Scope
Herbicide Sites (7 on Area A, 2 on Area B)	Soil exceedances for arsenic, thallium, and/or dioxin	• Reassess based on pending background study results • Conduct soil sampling as part of an Expanded SI
Incinerator Sites (4 on Area A)	Soil exceedances for arsenic, PAH, and/or dioxin	
Vehicle Maintenance Sites (2 on Area A)	Soil exceedances for arsenic	

SI Sites

Site Grouping	2016 SI Results	2020-2022 Expanded SI Planned Scope
Photo Labs (Buildings 11 and 817 on Area A)	Soil exceedances for arsenic Groundwater could not be sampled	• Expanded SI soil and groundwater sampling
Paint Shops (Bldg. B918 and B941 on Area A)		
Outdoor Drum Storage Shed (Area A)	Groundwater exceedances for total metals	• Expanded SI groundwater sampling

Note that Remedial Investigation was recommended for groundwater at Incinerator Cluster 2, Incinerator Building 141, all 3 TCE sites, Building 900, both Vehicle Maintenance Areas, and Locomotive Shed.

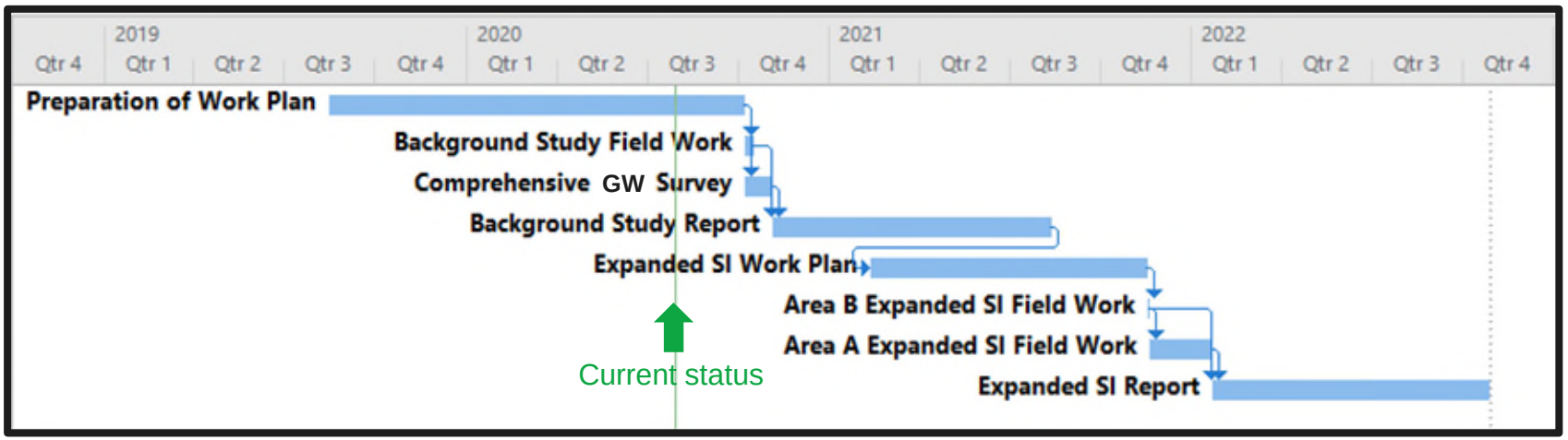
New SI Site:

Bldg. 201 and 568-15 A/B

- No work has been previously been conducted by the JV specifically at this site.
- Preliminary Assessment (PA) / SI will need to be conducted at this site to determine the source of the plume at AMW568-15A/B.
- PA activities will include:
  - File review (ASR, other reports from Fort Detrick file vault
  - EDR search
  - Manual generation of any data tables
  - Site visit with interviews
- SI activities will include:
  - Installation, development, and sampling of 5 additional groundwater sampling points
  - Average depth ~30 ft bgs

Schedule Recap

- Work plan for Background Study and Comprehensive Groundwater Sampling is underway currently under revision based on regulatory review.
- Field work for these two tasks scheduled for later this year.
- Field work of the expanded SI tasks scheduled for late 2021
- Progress updates will be provided during future RAB meetings.



Questions/Discussion

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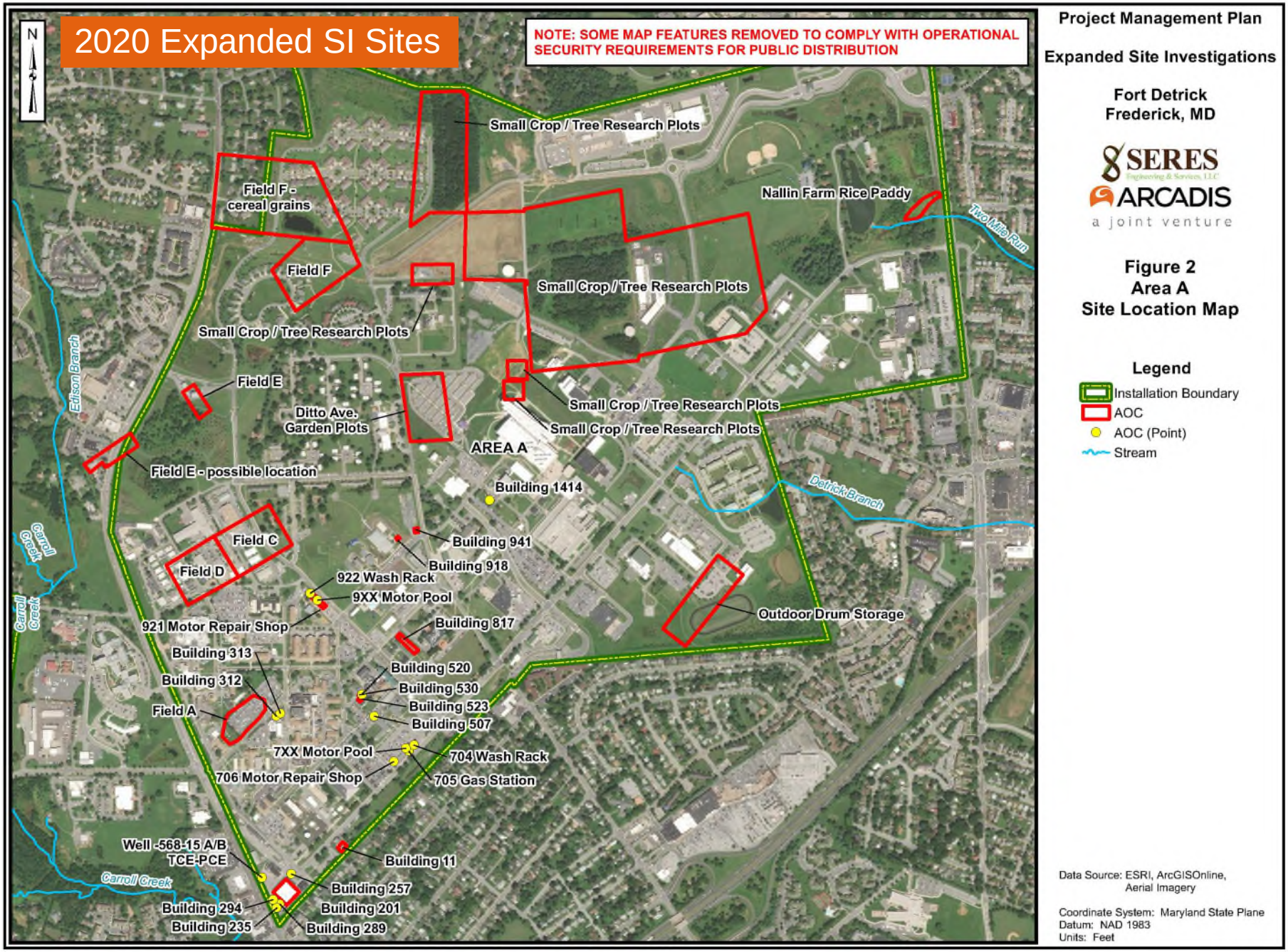
Additional slides



Project Management Plan

Expanded Site Investigations

Fort Detrick
Frederick, MD

SERES Engineering & Services, LLC
ARCADIS
a joint venture

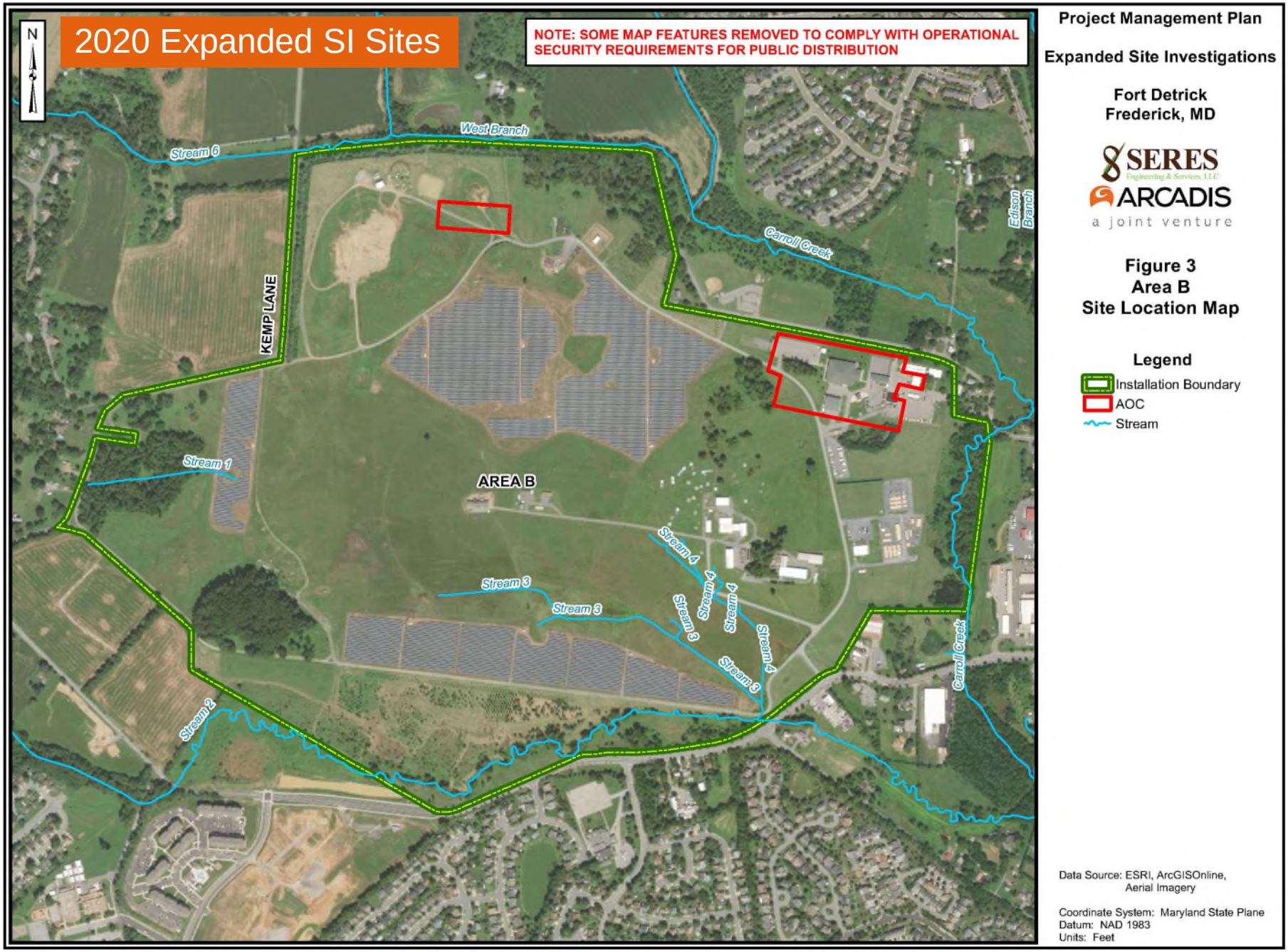
Figure 2
Area A
Site Location Map

Legend

- Installation Boundary
- AOC
- AOC (Point)
- Stream

Data Source: ESRI, ArcGISOnline, Aerial Imagery

Coordinate System: Maryland State Plane
Datum: NAD 1983
Units: Feet



Project Management Plan

Expanded Site Investigations

Fort Detrick
Frederick, MD

SERES Engineering & Services, LLC
ARCADIS
a joint venture

Figure 3
Area B
Site Location Map

Legend

- Installation Boundary
- AOC
- Stream

Data Source: ESRI, ArcGISOnline, Aerial Imagery

Coordinate System: Maryland State Plane
Datum: NAD 1983
Units: Feet

FORT DETRICK PFAS SITE INVESTIGATION

August 5, 2020

Rosemarie Potocky, PE

Arcadis

OVERVIEW

Army PFAS Program Overview

Fort Detrick PFAS Overview

Army PFAS Program Overview

ARCADIS Design & Consultancy for natural and built assets

What are PFAS?

PFAS stands for per- and polyfluoroalkyl substances

- Developed in 1938
- Has been used in hundreds of industrial applications and consumer products such as:
  - Fire-fighting foams
  - Carpeting and upholstery (e.g., Scotchgard™)
  - Apparel (e.g., GORE-TEX)
  - Non-stick cookware (e.g., Teflon™)
  - Food paper wrappings
  - Metal plating

A Closer Look

- Used in numerous heat-, stain-, grease-, and water-resistant products
- Sometimes called perfluorinated chemicals (PFCs)
- Comprises a group of man-made fluorinated organic chemical compounds
- Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are the two most extensively studied PFAS
- Emerging contaminants of concern

Regulatory Background

- PFAS chemicals are persistent, resist degradation in the environment, and bioaccumulate.

- Since 2006,the United States Environmental Protection Agency (USEPA) has been taking steps to eliminate the production of PFOA and reduce the health impacts of PFOS and PFOA in drinking water.

- In 2016, USEPA developed a lifetime health advisory for PFOS and PFOA for drinking water.
- PFOS and PFOA have a combined USEPA health advisory level of 70 parts per trillion.

- Some states and foreign countries have similar or equivalent health-based guidelines.
- Guidelines are constantly evolving as the science changes.

PFAS have been detected in drinking water worldwide.

Army Uses for PFAS

Aqueous Film-Forming Foam (AFFF) Used in Firefighting Operations:

- Most common military use
- Used predominantly at installations with airfields to extinguish petroleum-based fires

Other Potential Army Sources of PFAS:

- Metal plating operations
- Landfills
- Stormwater and sewer systems
- Wastewater treatment plants and wastewater soils
- Photo processing
- Soil application areas
- Insecticides and herbicides

The U.S. Army is proactively addressing these contaminants in drinking water and in Army cleanup and restoration programs.

Army PFAS Program Scope

CERCLA Based Nationwide Preliminary Assessments (PAs) and Site Inspections (SIs) for Army Installations

- 97 Installations nationwide
- Focus is to assess the inventory of potential releases while being protective of drinking water receptors
- Army has voluntarily implemented this program

Fort Detrick PFAS Sampling Overview

Design & Consultancy for natural and built assets

Preliminary Assessment Summary

- Records search completed in 2018.
- 5 interviews conducted during the site visit.

Since the site visit, data have been reviewed and evaluated to determine which of the areas meet the criteria for categorization as Areas of Potential Concern (AOPIs).

As a result of this evaluation, **4 AOPIs** will be included in the PA/SI Report for Fort Detrick.

AOPIs will be evaluated to identify perfluorooctane sulfonate (PFOS)/perfluorooctanoic acid (PFOA) presence or absence based on past use and potential or documented release to the environment.

Areas of Potential Interest Identified

- 2 AFFF Release Areas – Area B
  - Two areas where a single release of National Universal Gold 1-3% AFFF was identified as part of a unit certification exercise conducted some time between 2008 and 2015. Less than 1-gallon total of diluted (0.1%) AFFF was sprayed at each area.
- 2 Fire Stations – Area A
  - All fire stations are programmatically tested if AFFF was stored at the location.

Planned Activities - Area B AFFF Release Sites

Locations

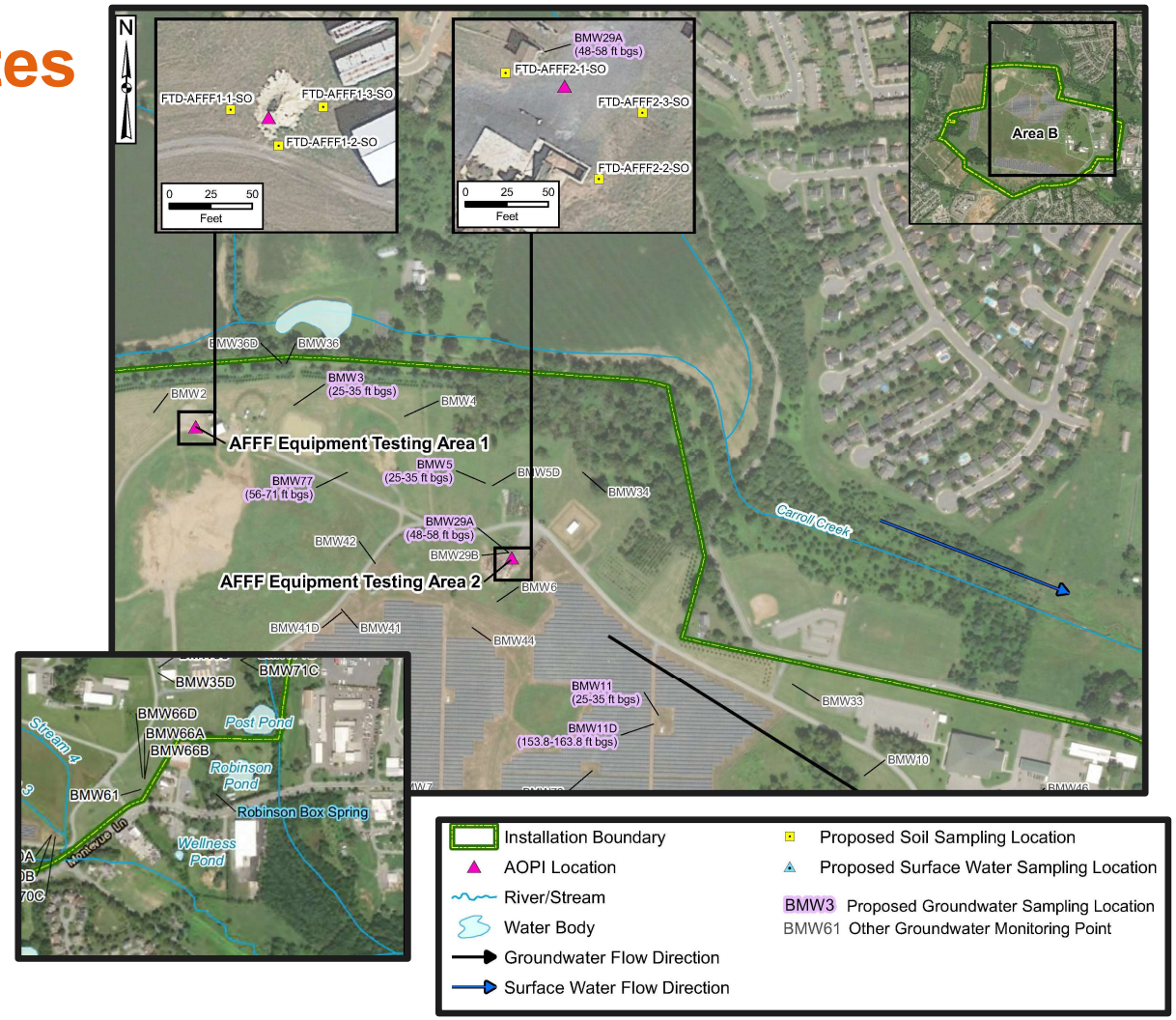
- AFFF Release Area 1
- AFFF Release Area 2

Sampling Design and Rationale

- Confirmed Release to Soil of AFFF

Sampling Scope Summary

- Groundwater – 6 samples (3 shallow MW, 3 deep MW)
- Surface soil – 6 samples (3 at each location)
- Surface Water – 1 sample (Robinson Box Spring)



Planned Activities - Area A Fire Stations

Locations

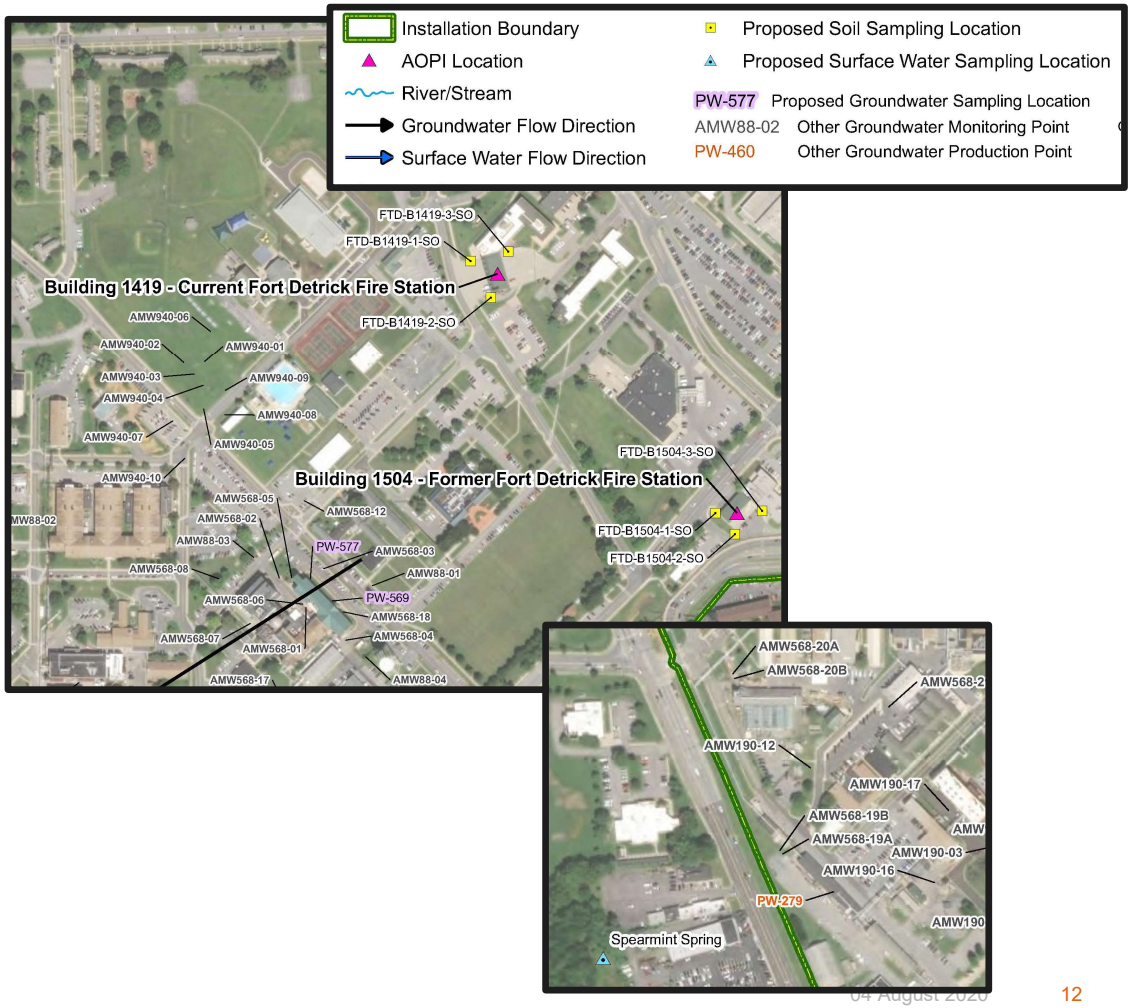
- Building 1419 – Current Fire Station
- Building 1504 – Former Fire Station

Sampling Design and Rationale

- Fire Stations

Sampling Scope Summary

- Groundwater – 2 samples (at Building 568 pumping wells)
- Surface soil – 6 samples (3 at each location)
- Surface Water – 1 sample (Spearmint Spring)



Upcoming Activities

- Field work is expected for mid- to late-August.
- Final results and recommendations will be provided in the future PA/SI Report
  - Final report expected in late 2019 / early 2020.
  - Recommendations for future investigations will be evaluated.