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FISC WILLIAMSBURG
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LETTER AND ATTACHED U S NAVY RESPONSE TO THE U S EPA REGION III COMMENTS
ON THE REMEDIAL INVESTIGATION SAMPLING AND ANALYSIS PLAN YOUTH POND
WILLIAMSBURG FISC VA
9/10/2012
CH2M HILL

From: Sawyer, Stephanie/VBO
Sent: Monday, September 10, 2012 8:00 AM
To: Haug.Susanne@epamail.epa.gov; Smith, Wade (DEQ)
Cc: Park, Scott R CIV NAVFAC MIDLANT, EV; Ivester, Marlene/VBO; Sawyer, Stephanie/VBO
Subject: Response to EPA Comments on the Draft Youth Pond RI UFP-SAP
Attachments: Draft Youth Pond RI SAP EPA RTCs_Aug 12.pdf; Draft Youth Pond RI SAP DEQ RTCs_Aug 12.pdf; Figure 3 - Surface Features Locations.pdf; Figure 4 - Proposed and Previous Sampling Locations.pdf; Appendix D.pdf; Draft Final UFP-SAP_CAX Youth Pond_redline_rev.docx

Sue and Wade,

Attached are the Navy's responses to both the EPA's and DEQ's comments on the Draft Youth Pond RI UFP-SAP. The USEPA comments were received via email on August 1, 2012 and the DEQ's comments were received via email on July 17, 2012. We will be discussing these RTCs at our partnering meeting next week so we can get consensus on the responses and mobilize to the field at the beginning of October.

In addition, in order to expedite finalizing this document, I've attached the draft final redline word version of the UFP-SAP, the revised Figures 3 and 4 (revised as a result of the RTCs), and the revised Appendix D (also revised as a result of the RTCs). If you have any questions prior to the meeting please let us know.

Thanks,
Stephanie



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Response to Comments

Remedial Investigation

Sampling and Analysis Plan

Youth Pond

Naval Weapons Station Yorktown Cheatham Annex
Williamsburg, VA
September 7, 2012

Comments received by email on August 1, 2012 from Sue Haug, Environmental Protection Agency, Region 3.

EPA Comment 1: On page 6, the objectives of the RI are listed. The fourth bullet in this paragraph should be clarified to indicate that potential risks associated with fish consumption will be assessed.

Response: Agreed. The fourth bullet under the objectives of the RI was revised (as shown below) to include fish (and frogs as discussed in the response to EPA Comment 5 below) as a medium being used to assess potential human health and ecological risks:

- Assess potential human health and ecological risks associated with fish/frog tissue, surface water, sediment, and soil.

EPA Comment 2: Groundwater flow has been estimated to be north-northeast towards Upstream Pond. If correct, Youth Pond which is north east of Upstream Pond lies in the direct path of the groundwater flow. It is unclear to the reviewer why ground water sampling is not a part of this SAP. The six proposed ground water monitoring wells, mentioned in the Tier II Sampling and Analysis Plan Site 4 - Remediation Investigation, should be drilled and sampled during this investigation. Groundwater contamination can be a good indicator of buried contamination. Considering the size of the area with its heavily wooded surroundings, groundwater sampling and analysis would be a key component in the complete characterization of the site and would provide a more comprehensive approach to identifying the source of contamination at Youth Pond. It is recommended that ground water be analyzed for the full suite of contaminants during this investigation.

Response: Groundwater sampling is not included as part of this SAP because, as stated in the SAP, the primary objective of this project is to determine the source of VOCs, SVOCs, pesticides, PCBs, explosives, and metals detected in the surface water and sediment samples during the 2000 Pond Study (SAP Project Statement and Objectives; Worksheet #10). The evidence to date indicates that Youth Pond itself is not the source area of contamination within the pond, but rather the body of water that received contaminants from another source or sources. Depending on the nature of the source or sources that are ultimately determined to have impacted Youth Pond, groundwater sampling may be necessary to complete the characterization of the source area(s). However, given that at the present time the source or sources of these contaminants have not been identified, groundwater sampling is premature. It should be noted, the Partnering Team has agreed that Site 4 is one potential source of contamination into Youth Pond, and groundwater samples will be collected and analyzed as part of the Site 4 investigation.

EPA Comment 3: If any samples are to be split between laboratories, then it is recommended that the procedure for split sample comparability on page 49 of the Uniform Federal Policy for Quality Assurance Project Plans (UFP) be followed with the exception of having each laboratory use the same method, not equivalent methods.

Response: Split sampling is not proposed as part of the Youth Pond investigation. As outlined in Worksheet #27, all surface water, sediment, and soil samples will be shipped to ENCO Labs in Orlando, FL, with the exception of hexavalent chromium samples. ENCO will send samples for explosives analysis to GEL Labs in Charleston, SC and will send samples for AVS/SEM to CAS-Rochester. All hexavalent chromium samples will be shipped directly to CAS-Rochester due to the short hold time. All tissue samples will be shipped to Katahdin in Scarborough, ME. Katahdin will fillet fish tissue samples (if applicable) and homogenize samples. Katahdin will send homogenized aliquots for PCB congener analysis to TestAmerica in West Sacramento, CA. There will be no duplication of analytical results between the respective laboratories. No changes were made to the SAP.

EPA Comment 4: Worksheet #10 on page 38 states that if the data collected to fulfill the objectives of this RI indicate that additional sampling (i.e., York River surface water/sediment samples) is needed, a SAP addendum to collect and evaluate the additional data will be submitted under a separate cover. This document does not adequately address why the York River is

not being sampled along with Youth Pond as part of the current investigation. Given the distribution of contaminants throughout the pond based on historical sampling, there is sufficient information available to support that sampling is needed in the York River. At a minimum, sampling should occur in depositional areas of the river where the pipe discharges. Sampling can be deferred to a later investigation, however, the recommendation to sample in the river is unlikely to change based on the existing data.

Response: As described in the response to EPA Comment 2, the primary objective of this project is to determine the source of VOCs, SVOCs, pesticides, PCBs, explosives, and metals detected in the surface water and sediment samples within Youth Pond during the 2000 Pond Study. While the results of the 2000 Pond Study indicate that VOCs, SVOCs, pesticides, PCBs, explosives, and metals are present in Youth Pond, the results are from only two samples. Thus, there is no information at this time to support the premise that these contaminants are located throughout the pond or are potentially discharging to the York River. Sampling is proposed from the depositional area at the outlet of Youth Pond (SD14). The SAP was revised to clarify that proposed sediment sample SD14 will be collected from this depositional area. During the June 2012 Partnering Meeting, the Team was informed that the investigation of Youth Pond will likely be conducted in two phases. During this phase (Phase 1), the focus of the project (and SAP) is on identifying all potential sources of contamination (including Site 4 and surface features identified during the October 2011 site visit) and what the current constituent concentrations and risks are in Youth Pond.

The Navy understands the EPA's request to sample the York River is unlikely to change; however, the potential clearly exists for non-site-related and non-Navy sources of similar contamination to have impacted the York River. As a result, it would be extremely difficult to determine if any identified York River contamination originated at Site 4 and/or the surface features identified during the October 2011 site visit and was transported through Youth Pond. The Navy is preparing a Watershed Contaminated Source Document (WCSD) to help identify other potential sources of contamination in the York River, which will be completed before any sampling of the York River occurs and may assist with future risk management decisions.

EPA Comment 5: Worksheet #10 on page 38 states that in addition to the collection of sediment and surface water samples, fish tissue will also be collected to support the ecological and human health risk assessments. Because of the shallow nature of the pond, frogs should also be collected from the pond for tissue analysis, as they are likely an important food resource for birds and mammals that feed in the pond and may accumulate higher levels of contaminants than small fish based on their trophic position.

Response: This comment was discussed during the August 21, 2012 Partnering Team and technical support conference call, with agreement by all participating parties to add three whole-body frog tissue samples. The frog tissue samples will be analyzed for the same analytes as those proposed for the whole-body fish tissue samples (metals, the 12 dioxin-like congeners, PCB homologues, percent moisture, and percent lipids). The SAP was revised to add the frog samples and include the conference call as an additional scoping session.

EPA Comment 6: Worksheet #10 on page 39 states that twelve surface sediment (0-4 inches), five subsurface sediment (4-8 inches) and five surface water samples will be collected from within Youth Pond. It is unclear why subsurface sediment and surface water samples are not proposed at all locations. The variability among samples can be high and 12 samples would give a better estimate of both the mean and range of contaminant concentrations. Because of the historical nature of the potential release, subsurface sediment may have higher concentrations of contaminants. Therefore, surface and subsurface sediment and surface water should be collected at all twelve sediment locations shown in Figure 4.

Response: During the August 21, 2012 conference call, the CAX Partnering Team discussed this issue and agreed to collect subsurface sediment samples at all 12 locations, co-located with the proposed surface sediment samples. In addition, the one Youth Pond sample location originally proposed as part of the Site 4 RI was removed from the Site 4 SAP and added to the Youth Pond SAP. Therefore, a total of 13 surface sediment and 13 subsurface sediment samples will be collected from within Youth Pond.

Surface water samples will not be collected from all sediment locations because the size of the pond does not warrant a similar sampling density to that used for sediments, as the water column will mix throughout the pond on a regular basis. Thus, as discussed during the August 21, 2012 conference call, surface water samples are proposed at five of the sediment locations, placed at all known inflow and outflow locations, plus within the deeper portions of the pond. One surface water sample will also be collected from the one Youth Pond sample location originally proposed as part of the Site 4 RI (see above). Therefore, a total of six surface water samples will be collected from within Youth Pond.

The SAP was revised to add these samples and include the conference call as an additional scoping session.

EPA Comment 7: Worksheet #10 on page 39 states that two of the five co-located surface and subsurface sediment/surface water locations (SD/SW-09 and SD/SW-11) will be collected at the approximate locations of the 2000 Pond Study samples (00-Pond-SD/SW08 and 00-Pond-SD/SW09). These samples will be used to compare current constituent concentrations with historical concentrations at these approximate locations. Given the limited historical data set and the potentially high variability in some medium, it is not clear if comparison of current data with historical data will be meaningful. Given the limited historical data, a specific explanation for this comparison should be provided.

Response: The two historical samples from the Pond Study were placed at logical locations within the pond to characterize potential contamination. Thus, these two locations also warrant sampling as part of this larger and more recent sampling effort due simply to their location within the pond and would also, incidentally, allow for a comparison of current with historical concentrations. Given the small Youth Pond sample size in the Pond Study (n = 2) and the difficulty in sampling the exact same location, the comparison will be qualitative in nature and will be included in the discussion of nature and extent. The earlier Pond Study data will not be used in the risk assessments.

*EPA Comment 8: Worksheet #10 on page 40 states that following a biological survey, three fish tissue samples, of the most appropriate species for human exposures, will be collected. The human health fish tissue samples will be filleted and analyzed for contaminants. The offal of these fish should also be analyzed so that a whole body concentration of large fish can be estimated and risk to birds (e.g., bald eagle [*Haliaeetus leucocephalus*] and osprey [*Pandion haliaetus*]) that eat larger fish can be evaluated.*

Response: The main purpose of the Phase 1 biological survey and fish tissue sampling is to characterize the fishery that is present within the pond and to obtain an initial estimate of chemical concentrations within key components of this fishery that may be utilized by key human and ecological receptors. Larger bird species such as the bald eagle and osprey are less likely to regularly use smaller ponds such as Youth Pond relative to larger water bodies such as Penniman Lake, Cheatham Pond, and the York River. Thus, while the Navy does not object to the approach proposed in the comment in principle, the collection of these samples is of lesser importance for a Phase 1 study at Youth Pond given the lower exposure potential of these potential receptors. The limited resources available in Phase 1 are better spent characterizing other receptors, such as the addition of three frog tissue samples to the Phase 1 sampling (please see the response to EPA Comment 5).

EPA Comment 9: Worksheet #10 on page 40 states that following a biological survey, three composite fish tissue samples will be collected for evaluation of ecological risk. Depending on the number of fish species found in the pond, their size range, and life history, it is not clear that three fish tissue samples will be adequate to assess risk to the fish and upper trophic levels in Youth Pond. Justification for this low sample size should be provided.

Response: Please see the responses to EPA Comments 5 and 8. Three additional tissue samples (frogs) were added to the Phase 1 sampling to support the ecological evaluation.

EPA Comment 10: Worksheet #11 on page 43 states that contaminant concentrations in surface soil, sediment, subsurface sediment, and surface water will be compared to literature based ecological screening values. These literature based ecological screening values need to be identified along with their sources and provided to BTAG for review. Obviously Region 3 BTAG screening values need to be used when available, as should the EPA Eco-SSLs. The guidance on screening values on EPA Region 3's website should be followed.

Response: The numerical literature-based screening values are listed in Worksheet #15 which is also referenced on Worksheet #11 (page 43). The source of each of these values has been included as an appendix to the SAP.

EPA Comment 11: Worksheet #11 on page 43 states that fish PALs will also consider literature based tissue effect levels. These literature based tissue effect levels need to be identified along with their sources and provided to BTAG for review.

Response: The numerical values are listed in Worksheet #15, which is also referenced on Worksheet #11 (page 43). The source of these values (other than the values derived from back-calculating using the food web models from the Site 4 SI) are Jarvinen and Ankley (1999; *linkage of effects to tissue residues: development of a comprehensive database for aquatic organisms exposed to inorganic and organic chemicals*) and the Army Corp of Engineers *Residue-Effects Database*. These references have been added the Project Action Limits section of Worksheet #11.

EPA Comment 12: Worksheet #11 on page 43 states that site concentrations for fish tissue will also be compared with concentrations from reference areas (to be collected separately as part of the Site 4 RI). Specific information should be provided on the reference tissue samples including the quantity and locations of reference samples and how they will be used. This information is needed to ensure that these reference tissue samples are applicable to the site.

Response: For planning purposes, the addition of three filet fish tissue, three whole body fish tissue, and three frog tissue samples from the reference pond was added to the SAP. However, the specific number and type of reference tissue samples that will be collected and used for the Youth Pond evaluation will depend upon the results of the biological survey since reference tissue samples will be collected to as closely as possible match the type of tissue samples that will be collected in Youth Pond (e.g., type of organism, species, etc.).

Cheatham Pond is the preferred choice for the reference area since it is more likely to provide areas with similar habitats for all of the site evaluations (Site 4, Youth Pond, and Penniman Lake). The results of the 2000 Pond Study indicate that very few organic constituents were detected in Cheatham Pond sediments (eight samples); a comparison of detected organic constituent concentrations with ecological sediment screening values indicate that none of the existing screening values were exceeded (see attached table). While several detected metals (e.g., arsenic, barium, and iron) exceeded ecological sediment screening values in one or more samples, the relatively small range in the detected concentrations do not suggest that they are the result of a release. It is the Navy's position that the Pond Study sediment data do not preclude the use of Cheatham Pond as a potential reference area, particularly since the Pond Study sampling was biased toward portions of the pond nearest known source areas (sites); there are large, un-sampled areas within the pond that are not near any known Navy source areas.

EPA Comment 13: Worksheet #11 on page 46 states that fish tissue will be analyzed for metals and PCBs only. It is unclear why analysis is being limited at this point in the investigation with such limited historical sampling. Any other bioaccumulative chemicals detected in sediment must also be analyzed in fish tissue to assess the potential for ecological risk.

Response: These constituent groups were the risk drivers from the Site 4 SI for aquatic habitats. Since Site 4 is the most likely source area to Youth Pond, these were the most logical groups to include in the Phase 1 sampling for Youth Pond. If any other bioaccumulative chemicals are detected in sediment, they will be evaluated through food web modeling. This comment was discussed during the August 21, 2012 Partnering Team and technical support conference call, and the Team agreed this approach was acceptable.

EPA Comment 14: Worksheet #11 on page 47 states that if organic constituent concentrations are below method detection limits, it will be assumed that soil and sediment from the sampled locations are not a source of contamination to Youth Pond. The Navy needs to discuss the result if the method detection limits are greater than the screening criteria.

Response: Should this occur, it will be discussed in the uncertainty section of the risk assessments.

EPA Comment 15: Worksheet #11 on page 49 provides the process for evaluating risk to ecological receptors. Because of their limited mobility, maximum contaminant concentrations need to be used to assess risk to plants and invertebrates.

Response: Maximum concentrations will be included as one of the exposure point concentrations used to characterize the range of potential ecological risks at the site. The Ecological Risk Decision Logic section of Worksheet #11 was revised to include this information.

EPA Comment 16: Worksheet #14 on page 60 states that a reconnaissance-level biological survey of fish will be conducted in Youth Pond to determine the presence and type of aquatic community that exists within this water body. The results of this survey will be used to characterize the ecological receptors that are present and to guide the collection of fish tissue samples. Specific information on how the results of the aquatic biological survey will be used to determine which fish species will be collected for tissue analysis should be provided. The presence and relative abundance of frogs should also be noted. As stated previously, if they are present in sufficient numbers to constitute an important food source for birds and mammals, frogs should also be collected for tissue analysis.

Response: The decision to sample frog tissue, which will be made in the field, will be based on the professional judgment of the senior aquatic field biologist conducting the sampling, in consultation with the risk assessors and Partnering Team, and will be based upon such factors as relative abundance, size range available, and trophic level. Frog tissue samples have been added to the SAP for possible collection (please see the response to EPA Comment 5).

EPA Comment 17: Worksheet #14 on page 61 states that whole-body fish tissue samples of an appropriate size range for piscivorous wildlife (4 to 12 cm based upon the size range of possible receptors such as great blue heron, belted kingfisher, and mink) will be collected from Youth Pond. Larger and older fish will generally have higher concentrations of contaminants. Fish species from all age/size classes need to be included in tissue sampling to ensure ecological exposure is fully characterized.

Response: Please see the response to EPA Comment 8.

EPA Comment 18: Worksheet #14 on page 61 discusses the decontamination procedure for equipment. The specific procedure is in Appendix A. For equipment where sampling for metal analysis will be performed, the procedure should include a step to rinse equipment with a nitric acid solution to prevent cross contamination of samples.

Response: The EPA's concern regarding cross-contamination among samples is noted. There are some circumstances in which a nitric acid rinse would be of greater importance, such as analysis for trace metals or mercury speciation; however, those circumstances don't apply to the work being proposed in these SAPs. The proposed work includes the standard metals analysis, not trace metals analysis or any type of mercury speciation. Most cross-contamination would typically come from poor scrubbing procedures during decontamination, not a lack of nitric acid rinsing. Equipment blanks will be collected each day which would identify any possible cross-contamination from poor or inadequate decontamination procedures. In addition, when possible, disposable equipment will be used and sample collection will proceed from areas of suspected lowest concentrations to areas of suspected highest concentrations. This comment was discussed during the August 21, 2012 Partnering Team and technical support conference call, and all participating parties agreed the nitric rinse was not necessary for this investigation.

EPA Comment 19: Worksheet #17 on page 91 states that surface water samples will be collected just below the water surface. Depending on the depth of the pond, it is unlikely that this single sample will be sufficient. Provide support for selecting this sampling depth.

Response: The proposed sampling methodology for these samples followed the same procedures used for the Site 4 SI sampling. However, for the Youth Pond investigation, if the water depth exceeds 4 feet at a sampling location, the sample will be collected at mid-depth in the water column. Worksheet #11, Worksheet #14, and Worksheet #17 were revised to include this information.

EPA Comment 20: Figure 4 shows the proposed and previous sampling locations at Youth Pond. Sample locations SD08 and SD09 are shown as proposed sediment locations (orange circles). However, results for these locations are shown, which seems to indicate that they were previous sample locations and should be shown as red circles. The figure also shows that SD-14 would be collected in the storm water line between the pond and the river. The document should clarify if this is an open ditch or closed pipe, and if an outfall pipe extends all the way to the river. It also appears that SD-13 is not in the water and is on the land between the pond and river. These issues should be clarified.

Response: During the June 2012 Partnering Meeting, the CAX Partnering Team identified and discussed the SD08 and SD09 symbol errors listed above. As a result, Figure 4 was revised and resubmitted to the team on July 2, 2012 with a request that the revised figure be used to replace the one included in the draft SAP. The revised figure is also attached here. Regarding the SD14 sediment location, the text in Worksheet #10 (Conceptual Site Model; Physical Characteristics) was revised to clarify that the culvert is an underground pipe that leads to a depositional area just short of the York River shoreline. While SD13 appears to be located on land between the pond and the river, it only appears this way because of the nature of the aerial photograph used. The actual perimeter of the pond is indicated by the blue boundary, labeled Youth Pond Study Area; therefore, SD13 is located in the water and not on open land between the pond and river.

Table 1
Exceedances - Cheatham Pond Surface Sediment - Pond Study
Naval Weapons Station Yorktown Cheatham Annex, Williamsburg, Virginia

Station ID	Sediment ESV	Cheatham Pond-SD02		Cheatham Pond-SD03	Cheatham Pond-SD04	Cheatham Pond-SD05	Cheatham Pond-SD06	Cheatham Pond-SD07	Cheatham Pond-SD18	Cheatham Pond-SD19
		CP-00-POND-SD02-0300	CP-00-POND-SD02D-0300	CP-00-POND-SD03-0300	CP-00-POND-SD04-0300	CP-00-POND-SD05-0300	CP-00-POND-SD06-0300	CP-00-POND-SD07-0300	CP-00-POND-SD18-0300	CP-00-POND-SD19-0300
Sample ID		03/30/00	03/30/00	03/30/00	03/30/00	03/31/00	03/31/00	03/31/00	03/30/00	03/30/00
Sample Date										
Volatile Organic Compounds (UG/KG)										
Acetone	NSV	210 B	110 U	310 B	180 B	65 U	780	1,500	320 B	540 B
Toluene	4,194	110 U	110 U	85 U	11 J	65 U	79 U	32 J	82 U	60 U
Semivolatile Organic Compounds (UG/KG)										
bis(2-Ethylhexyl)phthalate	750	220 B	3,600 U	260 J	2,600 U	120 B	2,600 U	180 B	2,700 U	2,000 U
Diethylphthalate	630	3,600 U	3,600 U	2,900 U	370 J	2,100 U	2,600 U	2,900 U	2,700 U	2,000 U
Nitrobenzene	11,137	3,600 U	3,600 U	2,900 U	2,600 U	2,100 U	2,600 U	69 J	2,700 U	2,000 U
Pesticide/Polychlorinated Biphenyls (UG/KG)										
No Detections	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Herbicides (UG/KG)										
Diquat	NSV	NA	NA	NA	NA	NA	NA	NA	110,000	48,000
Explosives (UG/KG)										
4-Amino-2,6-dinitrotoluene	145	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	250 UJ	96 J	250 UJ
Inorganics (MG/KG)										
Aluminum	25,500	8,710	9,400	10,100	12,400	10,900	12,200	7,990	10,300	4,880
Arsenic	9.79	63.6	65.3	75.2	58.5	50.3	45.4	51.1	61.6	36.5
Barium	20	59	56.9	69.9	61.8	67.8	66	57.6	56.7	46.2
Beryllium	NSV	1.2	1.15 U	0.53	0.851 U	0.4	0.54	0.29	1.2	1.1
Calcium	--	177,000	172,000	65,700	79,600	180,000	66,700	150,000	128,000	189,000
Chromium	43.4	22.9	31.3	25.7	38	21.2	26.5	17.2	29.1	9
Cobalt	50	8	12.7	4.5	9.4	2.7	3.8	3.4	6.3	5.4
Copper	31.6	19.5	19.1	15.6	20.2	11.6	13.3	12.5	20.8	10
Iron	20,000	24,100	23,800	35,800	32,800	20,300	28,600	16,300	22,600	11,000
Lead	35.8	27	27.4	31.3	29.6	23.6	29.1	26.2	29.2	13.8
Magnesium	--	1,660	1,780	2,300	2,650	2,340	1,950	1,730	2,110	1,450
Manganese	460	221	222	300	292	186	179	129	244	141
Mercury	0.18	0.15	0.13	0.18	0.18	0.12	0.17	0.13	0.24	0.08
Nickel	22.7	22.2 U	24.4 U	13.2	18.1 U	9.5	10.3	7.1	16.3 U	11.7 U
Potassium	--	1,600	2,090	2,080	2,440	1,510	1,870	1,490	1,670	1,020
Sodium	--	308	329	343	349	344	344	341	519	212
Thallium	NSV	5.90 U	6.72 U	5.61 U	6.5	4.02 U	4.95 U	5.34 U	4.51 U	3.23 U
Vanadium	57	27	33	36.9	41.1	30.9	39.1	28.2	35.2	17.5
Zinc	121	76.9	79.2	77.1	91.1	51.4	58.3	45.6	61.1	30.4
Other Parameters (various units)										
pH (PH)	--	7.6	7.7	8	7.8	7.7	7.9	7.3	7.7	7.8
Total organic carbon (TOC) (MG/KG)	--	43,200	60,800	108,000	29,500	46,700	78,300	12,700	96,500	68,500

Notes:

Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value

Bold indicates detections

- NA - Not analyzed
- B - Analyte not detected above the level reported in blanks
- BJ
- J - Analyte present, value may or may not be accurate or precise
- U - The material was analyzed for, but not detected
- UJ - Analyte not detected, quantitation limit may be inaccurate
- MG/KG - Milligrams per kilogram
- PH - pH units
- UG/KG - Micrograms per kilogram



YP-00-POND-SD08	
PCBs (µg/kg)	0-4"
Aroclor - 1260	1,900 K
Metals (µg/kg)	
Total Arsenic	27.2
Total Barium	68.6
Total Cadmium	6
Total Chromium	35
Total Copper	163
Total Iron	28800
Total Lead	200
Total Zinc	200

YP-00-POND-SW08	
No exceedances	

YP-00-POND-SW09	
No exceedances	

YP-00-POND-SD09	
SVOCs (µg/kg)	0-4"
Fluoranthene	1,100
PCBs (µg/kg)	
Aroclor - 1260	6,400 L
Metals (µg/kg)	
Total Arsenic	56.2
Total Barium	65
Total Cadmium	4
Total Chromium	33
Total Copper	68
Total Iron	34800
Total Lead	103
Total Mercury	0.2
Total Zinc	537

Legend

- Proposed Sediment Sample Location
- Proposed Sediment/Surface Water Sample Location
- Proposed Surface Soil Sample Location
- Previous Sample Locations
- Culvert
- Storm Water Line
- ▭ Site 4 Boundary
- ▭ Youth Pond Study Area Boundary

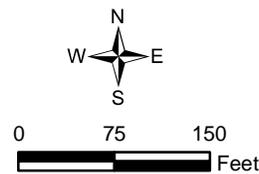


Figure 4
Proposed and Previous Sampling Locations
Youth Pond UFP-SAP
Cheatham Annex
Williamsburg, Virginia