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QUALITY ASSURANCE PROJECT PLAN ADDENDUM 3 FOR BUILDING 2721 INVESTIGATION (PHASE 4) POLYCHLORINATED BIPHENYLS (PCB) CAPACITOR BURIAL, POLE YARD SOLID WASTE MANAGEMENT UNIT 17 (SWMU 17) NSA CRANE IN
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TETRA TECH NUS INC

Comprehensive Long-term Environmental Action Navy

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM 3

FOR

BUILDING 2721 INVESTIGATION (PHASE 4) PCB CAPACITOR BURIAL/POLE YARD SWMU 17

Naval Surface Warfare Center Crane Crane, Indiana

Contract Task Order 0376

September 2006

NAVFAC
Naval Facilities Engineering Command
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QUALITY ASSURANCE PROJECT PLAN ADDENDUM 3

FOR

BUILDING 2721 INVESTIGATION (PHASE 4)
PCB CAPACITOR BURIAL/POLE YARD
SWMU 17
NAVAL SURFACE WARFARE CENTER CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM 3
FOR BUILDING 2721 INVESTIGATION (PHASE 4)
PCB CAPACITOR BURIAL/POLE YARD
SWMU 17
NAVAL SURFACE WARFARE CENTER CRANE, INDIANA

1.0 INTRODUCTION

This document has been prepared as an addendum (Phase 4) to the Quality Assurance Project Plan for PCB Capacitor Burial/Pole Yard Solid Waste Management Unit (SWMU) 17 at the Naval Surface Warfare Center Crane, Indiana, Tetra Tech NUS, December 2001 and two previous addenda to the Work Plan (TtNUS, June 2005 and April 2006). The purpose of this work plan addendum is to gather data that will allow the RCRA Facility Investigation (RFI) report to be completed, including the delineation of the nature and extent of contamination. The focus of the current investigation is primarily the area around Building 2721 and the tributary flowing west from Building 2721 to Boggs Creek.

2.0 SITE BACKGROUND AND HISTORY

The SWMU 17 PCB Capacitor Burial/Pole Yard has been in use since before 1966, with historical, environmentally-significant operations generally described as follows:

- Storage of capacitors, some of which contained PCBs.
- Storage of transformers, some of which contained PCBs.
- Reported burial of capacitors, some of which may have contained PCBs.
- Storage of creosote-impregnated utility poles, some of which may have contained PCBs as a result of burst transformers.

It is known that capacitors were buried at SWMU 17 in the early to mid-1970s, but it is not known whether any capacitors were buried before the early 1970s or after mid-1970.

It has recently been determined that transformers containing PCBs were serviced at Building 2721 which is located to the northeast of the previous SWMU 17 investigation area. Therefore the area encompassed by SWMU 17 has been expanded to include Building 2721.

Various investigations have been conducted at SWMU 17 and the activities have evolved through multiple field efforts. Between 2001 to 2004, three investigations were conducted including remedial activities of PCB-contaminated soil in the vicinity of the pole yard lay down area. From 2005 to 2006 additional sampling was conducted in three separate phases, with a fourth proposed in this work plan for

the purpose of delineating the nature and extent of PCB contamination in drainage ditches adjacent to Building 357 and at Building 2721. For ease of discussion, these recent activities are referred to herein as Phases 1, 2, 3 and 4. Field work was conducted for the first three phases as follows:

- Phase 1 October 2005
- Phase 2 April 2006
- Phase 3 May 2006

(Phase 4 is projected to commence in August 2006)

The objective of the proposed Phase 4 investigation is to fill data gaps from previous investigations and finalize data gathering for the RFI Report.

A note of clarification regarding surface drainage terminology associated with SWMU 17: Two primary buildings are discussed in this Work Plan; Building 357 (associated with the main pole yard lay-down area) and Building 2721 (transformer repair building) and a network of drainage features. These two buildings sit on top of a topographic ridge which is drained by a network of "drainage ditches". These drainage ditches are dry during most times of the year but serve to drain surface runoff into valley bottom tributaries during storm events. At the base of the hillsides leading from the two buildings, these tributaries contain water most of the year. The tributaries ultimately connect to Boggs Creek which is a small perennial stream in the area of SWMU17, but leaves the facility and supports some threatened species downstream.

3.0 PREVIOUS SAMPLING AND ANALYSIS

The following is a listing of the SWMU 17 environmental investigations and activities performed (and proposed) with regard to evaluating PCBs at the site.

(1) SAIC Soil Investigation, March 2001
(2) TtNUS RFI, March 2002
(3) TolTest IM, September 2004
(4) TtNUS RFI Addendum, October 2005 (Phase 1)
(5) TtNUS RFI Addendum, April 2006 (Phase 2)
(6) TtNUS RFI Addendum, May 2006 (Phase 3)
(7) TtNUS RFI Addendum, (Proposed) August 2006 (Phase 4)

A brief chronology of the above-listed activities is provided in the subsections that follow. Figure 1 also depicts the relative timing of these events over the past 5 years.

SAIC Soil Investigation, March 2001. SAIC conducted a soil investigation at the capacitor burial and pole storage areas for the collection of surface soils to 12 inches below ground surface (bgs). Results indicated elevated concentrations of PCBs – specifically Aroclor 1260.

TtNUS RFI, March 2002. Based on the results of the SAIC soil investigation, TtNUS conducted an investigation for preparing an RFI Report for SWMU 17. Field work consisted of collecting 44 surface and subsurface samples and performing a geophysical survey to identify the presence of reported possible historical dumping operations. Based on laboratory analysis, five areas of concern were identified immediately north and west of Building 357 and within the western drainageway. The geophysical survey identified several anomalies and many locations containing buried metal.

TolTest Interim Measure, September 2004. Using results from the TtNUS RFI, TolTest was contracted to excavate PCB-contaminated soils. This interim measure resulted in the excavation of 790 tons of soil with PCB concentrations greater than 25 mg/kg [25 ppm] and 2,140 tons of soil with PCB concentrations less than 25 milligrams per kilograms (mg/kg) [25 ppm]. Because of funding limitations, excavation operations ceased before all contaminated soils were removed. Post excavation sampling indicated PCBs remained in subsurface soils and within the drainageway downgradient of this disposal area. However, the sampling did not identify the full extent of this contamination at that time.

TtNUS RFI Addendum Sampling, October 2005 (Phase 1). – Prior to the current phases of investigation, environmental investigations at SWMU 17 focused on the delineation and remediation of PCB-contaminated surface and subsurface soil within the area of a pole yard immediately to the north of Building 357. Because PCB-contaminated soils were discovered in a drainage ditch (referred to as the northwest drainage ditch on Figure 2) west of Building 357, additional soil and surface water samples were required to delineate the extent of this contamination. These activities began in 2005 and have continued through multiple phases to the present.

In October 2005, Phase 1 was initiated and TtNUS collected 7 sediment samples from within the northwest drainage channel, Boggs Creek, Ditch 8, and Ditch 3 (see Figure 2). Results indicated PCB concentrations ranging from 13 ug/kg to 37,000 ug/kg. (Figure 2 illustrates the PCB – Aroclor 1260 concentrations found within the drainage ditches identified during the first three phases of the investigation.) Because the full extent of PCB contamination was not determined during this sampling event, Phase 2 was planned and implemented as described in the next subsection.

TtNUS RFI Addendum Sampling, April 2006 (Phase 2). The April 2006 sampling event was designed to determine the full extent of PCB contamination, utilizing the analytical results of 34 sediment samples

from within the drainageways originating from sources at SWMU 17. Results indicated PCB concentrations ranging from non-detect to 4,600 ug/kg. The result of sample 17SD14 during this Phase identified PCBs at a concentration of 1,300 ug/kg at a location which was anticipated to be "clean". This indicated that the full extent of contamination had not yet been determined, resulting in the need for another phase of sampling further upstream to identify (presumably) another PCB source. It was subsequently determined that transformer repairs were historically conducted at Building 2721, which is located upstream of 17SD14. Phase 3 was planned and implemented as described in the next subsection, very soon after the results described above were obtained and evaluated.

TtNUS RFI Addendum Sampling, May 2006 (Phase 3). The May 2006 sampling event was designed to determine the extent of PCB contamination upstream of 17SD14, including the collection of 23 sediment samples from all remaining drainage ways contributing to those originating at SWMU 17. Phase 3 fully delineated the extent of PCB contamination in the ditches and demonstrated that Building 2721 was another source for PCB contamination in Ditch 3 and its' headwater tributaries. Further investigation of facilities documentation revealed that Building 2721 was historically used as a transformer maintenance facility, and that PCB contaminated oils were collected in an oil-water separator. The previous location of the oil-water separator (believed to have been removed) is uncertain. Based on the nature of operations conducted and contamination observed in nearby ditches, the Navy has initiated this Phase 4 investigation of Building 2721 as a separate source of PCB contamination.

TtNUS RFI Addendum Sampling, August 2006 (Phase 4). With PCB concentrations in sediments better delineated following Phase 3, Phase 4 will be undertaken to characterize the nature and extent of contamination (not just PCBs) at Building 2721. The investigation will be designed to:

- Determine if the UST(s?) used for "oil storage" leaked and where potential contamination may exist (possible borings through the concrete floor may be necessary);
- Characterize discharges to and from culverts and/or ditches around the building;
- Characterize possible outdoor storage areas;
- Determine the most likely previous location of the oil-water (O/W) separator with assistance from Crane personnel and then determine if it leaked; and finally,
- Determine potential PCB concentrations in overbank/floodplain areas along select portions of ditches.
- Determine extent of sediment PCB contamination at headwaters of Ditch 4.

- Determine extent of sediment PCB contamination in Boggs Creek where it exits SWMU 17.

Additional detailed discussions of proposed activities are covered in the next section of this Work Plan.

4.0 PROPOSED ACTIVITIES AND RATIONALE

The purpose of this Phase 4 effort is to collect analytical data from the area around and downgradient of Building 2721 including the tributary emanating from this building. The RFI will investigate areas that may have been used for storage or maintenance operations close to Building 2721, underground storage tanks (USTs), the oil-water separator, the overbank/floodplain of Ditch 3 and in Boggs Creek.

Surface and subsurface soil samples will be collected within the vicinity of Building 2721. Specifically these will be collected to define the nature and extent of contamination within the area of a former oil-water separator (location to be identified with assistance from Crane personnel) and potentially any underground storage tanks (USTs) around Building 2721. Because of the unknown nature of operational history in Building 2721, the samples will be analyzed for PCBs, VOCs, SVOCs, DRO, and GRO.

Sediment samples will be collected within Ditch 4 and where Boggs Creek exits SWMU 17. These sediment samples will be analyzed for PCBs.

Table 1 summarizes the samples to be collected, depths of samples, and the proposed analytical parameters to fill these data gaps. Table 2 describes the sample locations and rationale. Table 3 lists the sample analyses, container types and volumes, preservation requirements, and holding times.

5.0 FIELD ACTIVITIES

Field activities including methods of sample collection and analysis, IDW handling, decontamination procedures will be consistent with the approach and content described in Section 1.1 of the approved Building 106 Pond and Roads and Grounds Area QAPP (TtNUS, 2004) and the approved PCB Capacitor Burial/Pole Yard SWMU 17 QAPP (TtNUS, 2001b). The rationale for using the Building 106 Pond and Roads and Grounds Area QAPP (TtNUS, 2004) is because it was prepared for similar field activities by TtNUS at NSWC Crane and was approved by the IDEM which is also the lead regulatory agency for the SWMU 17 activities.

Unless noted differently in the following sections, the media and specific samples collected will be as described in the subsections that follow.

5.1 Soil Borings

Soil samples will be collected from two subareas within SWMU 17 during this field effort. These subareas include the area around Building 2721 and the overbank/floodplain along the tributary beginning at Building 2721 and ending at the intersection with Boggs Creek. Only limited information is available regarding the historical operations associated with Building 2721, therefore a site visit was conducted on May 25, 2006 wherein NSWC Crane personnel were interviewed and the grounds surrounding the building were inspected for possible sample locations. Additionally, the Navy is evaluating the possible future remedial actions that may be required because of the PCB contamination found in sediments within the tributary beginning at Building 2721. Therefore soil samples will be collected from the overbank/floodplain area on both sides of the tributary identified as Ditch 3 on Figure 3. This will help to determine if PCB contamination is contained within the tributary itself or if contamination has spread into soils within the overbank and floodplain.

It is anticipated that media sampling will be conducted over two, 10-day shifts. The first shift will include the sampling of soil at twelve locations along the overbank/floodplain (17SB75 to 17SB86) of the tributary between Building 2721 to the intersection of Boggs Creek. Samples will be collected from to a depth of six inches below ground surface using disposable trowels or hand augers.

The second shift will include soil sampling around the area of Building 2721. The proposed soil samples will be collected from twenty-five locations (17SB50 to 17SB74) within the area around Building 2721 as illustrated on Figure 4. Soil boring samples 17SB50 to 17SB72 will be collected in the same manner as for previous investigations using a DPT rig or HSA split spoons, as required. Samples will be collected at three depths (0-2', 2-4' and 2' above the top of bedrock (refusal), or at a depth based on elevated PID readings, visual staining, or field judgment). The only exception to this will be 17SB67 and 17SB68 where only surface soil samples will be collected to confirm that no surface spills have occurred at this gravel pad. It should be noted that in the event bedrock is encountered before reaching 4 feet bgs, two soil samples will still be collected. Soil samples will be collected and logged per previous QAPPs and SOPs.

Based on the results of samples collected during the second shift, additional samples may be collected to fill in data gaps including the collection of soil samples from within Building 2721. The samples collected within the building will be 17SB73 and 17SB74. If samples are collected from within the building, it will be necessary to core through the concrete floor to collect the samples.

5.2 Monitoring Wells

Groundwater samples will be collected from up to three locations via temporary polyvinyl chloride (PVC) wells installed in select borings. The locations of these temporary well points will be determined in the

field based on the presence of water encountered during soil sampling activities. Building 2721 is located in a similar geologic setting and topographic elevation as Building 357. In previous investigations at Building 357, the water table was not encountered prior to hitting bedrock and therefore only limited sampling of perched water was collected for laboratory analyses. Therefore it is not anticipated that groundwater will be encountered at Building 2721 before hitting bedrock (assumed to be less than 10 feet bgs) and therefore it is possible that no groundwater samples will be collected. If groundwater is encountered at more than three locations at Building 2721, three temporary wells will be installed and sampled at locations determined in the field by the Field Operations Leader (FOL).

5.3 Sediment Samples

Five follow-up sediment samples (17SD65 to 17SD69) will be collected to further delineate PCB concentrations. Two (2) will be obtained upgradient in Ditch 4 and three (3) will be obtained downstream in Boggs Creek. Proposed locations are shown in Figure 3. Sampling details and rationale are shown in Tables 1 and 2.

6.0 LABORATORY ANALYSES

The primary objective of the proposed field investigation is to collect field and laboratory data needed to evaluate the potential risks for those human health and ecological receptors identified in previous phases of this investigation and to finalize the RFI. Based on the results of previous analytical information and the historical operations conducted at SWMU 17, the Navy and the IDEM have agreed that the following fractions (parameters) will be analyzed in accordance with IDEM Guidance:

- Appendix IX VOCs, Appendix IX SVOCs, PCBs, TPH-DRO, and TPH-GRO.

As stated previously, Table 1 summarizes the samples to be collected and the proposed analytical parameters to fill these data gaps. Table 2 describes the sample locations and rationale. Table 3 lists the sample analyses, container types, and volume, preservation requirements, and holding times.

TABLE 1

SAMPLING SCHEME PROPOSED LOCATIONS AND PARAMETERS
CTO 376 SWMU 17 BUILDING 2721
WORK PLAN ADDENDUM PHASE 4

LOCATION	SUB-MATRIX	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS				
				PCBs	VOCs	SVOCs	DRO[1]	GRO[2]
17SB50	Surface Soil	0-2'	17SS500002	1	1	1	1	1
17SB50	Subsurface Soil	2-4'	17SB500204	1	1	1	1	1
17SB50	Subsurface Soil	2' above refusal	17SB50xxxx	1	1	1	1	1
17SB51	Surface Soil	0-2'	17SS510002	1	1	1	1	1
17SB51	Subsurface Soil	2-4'	17SB510204	1	1	1	1	1
17SB51	Subsurface Soil	2' above refusal	17SB51xxxx	1	1	1	1	1
17SB52	Surface Soil	0-2'	17SS520002	1	1	1	1	1
17SB52	Subsurface Soil	2-4'	17SB520204	1	1	1	1	1
17SB52	Subsurface Soil	2' above refusal	17SB52xxxx	1	1	1	1	1
17SB53	Surface Soil	0-2'	17SS530002	1	1	1	1	1
17SB53	Subsurface Soil	2-4'	17SB530204	1	1	1	1	1
17SB53	Subsurface Soil	2' above refusal	17SB53xxxx	1	1	1	1	1
17SB54	Surface Soil	0-2'	17SS540002	1	1	1	1	1
17SB55	Surface Soil	0-2'	17SS550002	1	1	1	1	1
17SB56	Surface Soil	0-2'	17SS560002	1	1	1	1	1
17SB57	Surface Soil	0-2'	17SS570002	1	1	1	1	1
17SB58	Surface Soil	0-2'	17SS580002	1	1	1	1	1
17SB59	Surface Soil	0-2'	17SS590002	1	1	1	1	1
17SB60	Surface Soil	0-2'	17SS600002	1	1	1	1	1
17SB60	Subsurface Soil	2-4'	17SB600204	1	1	1	1	1
17SB60	Subsurface Soil	2' above refusal	17SB60xxxx	1	1	1	1	1
17SB61	Surface Soil	0-2'	17SS610002	1	1	1	1	1
17SB61	Subsurface Soil	2-4'	17SB610204	1	1	1	1	1
17SB61	Subsurface Soil	2' above refusal	17SB61xxxx	1	1	1	1	1
17SB62	Surface Soil	0-6"	17SS610001	1		1	1	
17SB63	Surface Soil	0-2'	17SS630002	1	1	1	1	1
17SB63	Subsurface Soil	2-4'	17SB630204	1	1	1	1	1
17SB63	Subsurface Soil	2' above refusal	17SB63xxxx	1	1	1	1	1
17SB64	Surface Soil	0-2'	17SS640002	1	1	1	1	1
17SB64	Subsurface Soil	2-4'	17SB640204	1	1	1	1	1
17SB64	Subsurface Soil	2' above refusal	17SB64xxxx	1	1	1	1	1
17SB65	Surface Soil	0-2'	17SS650002	1	1	1	1	1
17SB65	Subsurface Soil	2-4'	17SB650204	1	1	1	1	1
17SB65	Subsurface Soil	2' above refusal	17SB65xxxx	1	1	1	1	1
17SB66	Surface Soil	0-2'	17SS660002	1	1	1	1	1
17SB66	Subsurface Soil	2-4'	17SB660204	1	1	1	1	1
17SB66	Subsurface Soil	2' above refusal	17SB66xxxx	1	1	1	1	1
17SB67	Surface Soil	0-2'	17SS670002	1	1	1	1	1
17SB68	Surface Soil	0-2'	17SS680002	1	1	1	1	1
17SB69	Surface Soil	0-2'	17SS690002	1	1	1	1	1

TABLE 1

SAMPLING SCHEME PROPOSED LOCATIONS AND PARAMETERS
CTO 376 SWMU 17 BUILDING 2721
WORK PLAN ADDENDUM PHASE 4

LOCATION	SUB-MATRIX	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS				
				PCBs	VOCs	SVOCs	DRO[1]	GRO[2]
17SB69	Subsurface Soil	2-4'	17SB690406	1	1	1	1	1
17SB69	Subsurface Soil	2' above refusal	17SB69xxxx	1	1	1	1	1
17SB70	Surface Soil	0-2'	17SS700002	1	1	1	1	1
17SB70	Subsurface Soil	2-4'	17SB700204	1	1	1	1	1
17SB70	Subsurface Soil	2' above refusal	17SB70xxxx	1	1	1	1	1
17SB71	Surface Soil	0-2'	17SS710002	1	1	1	1	1
17SB71	Subsurface Soil	2-4'	17SB710204	1	1	1	1	1
17SB71	Subsurface Soil	2' above refusal	17SB71xxxx	1	1	1	1	1
17SB72	Surface Soil	0-2'	17SS720002	1	1	1	1	1
17SB72	Subsurface Soil	2-4'	17SB720204	1	1	1	1	1
17SB72	Subsurface Soil	2' above refusal	17SB72xxxx	1	1	1	1	1
17SB73	Surface Soil	0-2'	17SS730002	1	1	1	1	1
17SB73	Subsurface Soil	2-4'	17SB730204	1	1	1	1	1
17SB73	Subsurface Soil	2' above refusal	17SB73xxxx	1	1	1	1	1
17SB74	Surface Soil	0-2'	17SS740002	1	1	1	1	1
17SB74	Subsurface Soil	2-4'	17SB740204	1	1	1	1	1
17SB74	Subsurface Soil	2' above refusal	17SB74xxxx	1	1	1	1	1
17SB75	Surface Soil	0-6"	17SS750001	1				
17SB76	Surface Soil	0-6"	17SS760001	1				
17SB77	Surface Soil	0-6"	17SS770001	1				
17SB78	Surface Soil	0-6"	17SS780001	1				
17SB79	Surface Soil	0-6"	17SS790001	1				
17SB80	Surface Soil	0-6"	17SS800001	1				
17SB81	Surface Soil	0-6"	17SS810001	1				
17SB82	Surface Soil	0-6"	17SS820001	1				
17SB83	Surface Soil	0-6"	17SS830001	1				
17SB84	Surface Soil	0-6"	17SS840001	1				
17SB85	Surface Soil	0-6"	17SS850001	1				
17SB86	Surface Soil	0-6"	17SS860001	1				
17GW02	Groundwater	field determination	17GWxxxx	1	1	1	1	1
17GW03	Groundwater	field determination	17GWxxxx	1	1	1	1	1
17GW04	Groundwater	field determination	17GWxxxx	1	1	1	1	1
17SD65	Sediment	0-6"	175065001	1				
17SD66	Sediment	0-6"	175066001	1				
17SD67	Sediment	0-6"	175067001	1				
17SD68	Sediment	0-6"	175068001	1				
17SD69	Sediment	0-6"	175069001	1				
		Totals (no QA included) >>		**77**	**59**	**60**	**60**	**59**

TABLE 1

SAMPLING SCHEME PROPOSED LOCATIONS AND PARAMETERS
CTO 376 SWMU 17 BUILDING 2721
WORK PLAN ADDENDUM PHASE 4

LOCATION	SUB-MATRIX	DEPTH	SAMPLE ID	ANALYTICAL PARAMETERS				
				PCBs	VOCs	SVOCs	DRO[1]	GRO[2]

[1] DRO-specific COCs per IDEM (CAS number and parameter)

91-57-6	2-Methylnaphthalene
83-32-9	Acenaphthene
208-96-8	Acenaphthylene
120-12-7	Anthracene
56-55-3	Benzo(a)anthracene
50-32-8	Benzo(a)pyrene
205-99-2	Benzo(b)fluoranthene
191-24-2	Benzo(g,h,i)perylene
207-08-9	Benzo(k)fluoranthene
218-01-9	Chrysene
53-70-3	Dibenzo(a,h)anthracene
206-44-0	Fluoranthene
86-73-7	Fluorene
193-39-5	Indeno(1,2,3-cd)pyrene
91-20-3	Naphthalene
85-01-8	Phenanthrene
129-00-0	Pyrene

[2] GRO-specific COCs per IDEM (CAS number and parameter)

1634-04-4	MTBE
71-43-2	Benzene
100-41-4	Ethylbenzene
108-88-3	Toluene
1330-20-7	Total Xylenes

TABLE 2

SAMPLING SCHEME LOCATIONS AND RATIONALE
CTO 376 SWMU 17 BUILDING 2721
WORK PLAN ADDENDUM PHASE 4

LOCATION	MATRIX	LOCATION	RATIONALE	ANALYTICAL PARAMETERS				
				PCBs	VOCs	SVOCs	DRO[1]	GRO[2]
17SB50 & 51	Soil	East side of Building 2721 (UST)	Determine if UST leaked (side gradient) at up to 3 depths	x	x	x	x	x
17SB52	Soil	East side of Building 2721 (UST)	Upgradient of UST at up to 3 depths	x	x	x	x	x
17SB53	Soil	West side of Building 2721 (UST)	Determine if UST leaked (downgradient) at up to 3 depths	x	x	x	x	x
17SB54	Soil	Northwest side of Building 2721(culvert)	Characterize discharge from culvert	x	x	x	x	x
17SB55	Soil	Southwest side of Building 2721(culvert)	Characterize discharge from culvert	x	x	x	x	x
17SB56	Soil	Southwest side of Building 2721	Gravel area (possible outside storage area)	x	x	x	x	x
17SB57	Soil	Downgradient of concrete pad	Gravel area (possible outside storage area)	x	x	x	x	x
17SB58 & 59	Soil	Gravel area	Area of no vegetation (possible outside storage area)	x	x	x	x	x
17SB60	Soil	Northwest side of Building 2721	Characterize potential contamination from VCT drain	x	x	x	x	x
17SB61	Soil	North side of Building 2721	Characterize potential contamination from VCT drain	x	x	x	x	x
17SB62	Soil	Inside concrete electrical equipment box	determine if any soil in the bottom of the box presents potential hazards to personnel entering it	x		x	x	
17SB63	Soil	West of concrete electrical equipment box	determine if contaminants have migrated from the electrical utilities box	x	x	x	x	x
17SB64	Soil	North side of oil-water separator	Determine if oil-water separator leaked (downgradient) at up to 3 depths	x	x	x	x	x
17SB65	Soil	South side of oil-water separator	Determine if oil-water separator leaked (downgradient) at up to 3 depths	x	x	x	x	x
17SB66	Soil	mid-way between concrete box and concrete pad	will fill a potential data gap should anything be detected at 17SB63 and/or 17SB57	x	x	x	x	x
17SB67 & 68	Soil	Gravel area southwest of Building 2721	Characterize storage area	x	x	x	x	x
17SB69	Soil	Upgradient from 17SD056	Characterize potential contamination from RR tracks north of the road	x	x	x	x	x
17SB70	Soil	Upgradient from 17SD056	Characterize potential contamination from RR tracks south of the road	x	x	x	x	x
17SB71	Soil	Upgradient from 17SD056	Characterize potential contamination from RR tracks south of the road at the western corner of 0354	x	x	x	x	x
17SB72	Soil	Upgradient from 17SD056	Characterize potential contamination from RR tracks (field determination)	x	x	x	x	x
17SB73	Soil	Floor (concrete) of Building 2721	Optional boring to determine if UST leaked (downgradient) at up to 3 depths	x	x	x	x	x
17SB74	Soil	Floor (concrete) of Building 2721	Optional boring to determine if UST leaked (downgradient) at up to 3 depths	x	x	x	x	x
17SB75 through 86	Soil	Overbank/Floodplain	Determine PCB concentrations in overbank areas	x				
17GW02 through 04	Groundwater	To Be detrmined in the field	Evaluate potential groundwater contamination	x	x	x	x	x
17SD65 & 66	Sediment	Upgradient of 17SD020	Determine upgradient concentrations in ditch	x				
17SD67 through 69	Sediment	Downstream of 17SD038	Determine downstream concentrations in Boggs Creek	x				

[1] DRO-specific COCs per IDEM (CAS number and parameter)
91-57-6 2-Methylnaphthalene
83-32-9 Acenaphthene
208-96-8 Acenaphthylene
120-12-7 Anthracene
56-55-3 Benzo(a)anthracene
50-32-8 Benzo(a)pyrene
205-99-2 Benzo(b)fluoranthene
191-24-2 Benzo(g,h,i)perylene
207-08-9 Benzo(k)fluoranthene
218-01-9 Chrysene
53-70-3 Dibenzo(a,h)anthracene
206-44-0 Fluoranthene
86-73-7 Fluorene
193-39-5 Indeno(1,2,3-cd)pyrene
91-20-3 Naphthalene
85-01-8 Phenanthrene
129-00-0 Pyrene

[2] GRO-specific COCs per IDEM (CAS number and parameter)
1634-04-4 MTBE
71-43-2 Benzene
100-41-4 Ethylbenzene
108-88-3 Toluene
1330-20-7 Total Xylenes

TABLE 3

SUMMARY OF SAMPLE ANALYSES, CONTAINER TYPES AND VOLUMES, PRESERVATION REQUIREMENTS, AND HOLDING TIMES FOR SOILS AND SEDIMENTS SWMU 17 BUILDING 2721 SAMPLING SCHEME WORK PLAN ADDENDUM PHASE 4 NSWC CRANE, CRANE, INDIANA

Parameter	Analyte/Methodology	Sample Container (Solid)	Container Volume	Preservation	Maximum Holding Time[1]
Appendix IX VOCs	SW-846 8260B	3 Encore™ samplers	Three 5-gram	Cool to 4 °C	48 hours to preservation[2]; 14 days to analysis.
GRO – Specific COCs[5]	SW-846 8260B	3 Encore™ samplers	Three 5-gram	Cool to 4 °C	48 hours to preservation[2]; 14 days to analysis.
TPH - GRO	SW-846 8015B	2 Encore™ samplers	Two 5-gram	Cool to 4 °C	48 hours to preservation[3]; 14 days to analysis.
Appendix IX SVOCs	SW-846 8270C	Wide-mouth jar, Teflon-lined plastic cap	8 ounce[4]	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
PCBs	SW-846 8082	Wide-mouth jar, Teflon-lined plastic cap	8 ounce[4]	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
DRO – Specific COCs[5]	SW-846 8270C	Wide-mouth jar, Teflon-lined plastic cap	8 ounce[4]	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.
TPH – DRO	SW-846 8015B	Wide-mouth jar, Teflon-lined plastic cap	8 ounce[4]	Cool to 4 °C	Extraction within 14 days; analysis within 40 days of extraction.

1 All holding times are from date of collection.
2 One Encore™ extruded into 5 mL H_2O and frozen. Second Encore™ frozen as received. Third Encore™ preserved with methanol for medium level analysis.
3 One Encore™ preserved with methanol for medium level analysis. Second Encore™ frozen as received.
4 A minimum of 16 ounces is required to do the Appendix IX SVOCs, PCBs, DRO – Specific COCs and TPH-DRO.
5 See Table 1 for specific list of compounds.

°C — Degrees Centigrade.
mL — Milliliters.
VOCs – Volatile Organic Compounds
SVOCs – Semivolatile Organic Compounds
PCBs — Polychlorinated Biphenyls.
PAHs – Polynuclear Aromatic Hydrocarbons.
GRO – Gasoline Range Organics.
DRO – Diesel Range Organics.
TPH – Total Petroleum Hydrocarbons
™ - Trade mark.

TABLE 3

SUMMARY OF SAMPLE ANALYSES, CONTAINER TYPES AND VOLUMES, PRESERVATION REQUIREMENTS, AND HOLDING TIMES FOR SOILS AND SEDIMENTS SWMU 17 BUILDING 2721 SAMPLING SCHEME WORK PLAN ADDENDUM PHASE 4 NSWC CRANE, CRANE, INDIANA

Parameter	Analyte/Methodology	Sample Container (Aqueous)	Container Volume[1]	Preservation[2]	Maximum Holding Time[3]
Appendix IX VOCs	SW-846 8260B	Glass, black phenolic plastic screw cap, Teflon-lined septum	(3) 40 mL	Cool to 4 °C, dark, zero headspace, HCl to pH <2	14 days to analysis.
GRO – Specific COCs	SW-846 8260B	Glass, black phenolic plastic screw cap, Teflon-lined septum	(3) 40 mL	Cool to 4 °C, dark, zero headspace, HCl to pH <2	14 days to analysis.
TPH – GRO	SW-846 8015B	Glass, black phenolic plastic screw cap, Teflon-lined septum	(2) 40 mL	Cool to 4 °C, dark, zero headspace, HCl to pH <2	14 days to analysis.
Appendix IX SVOCs	SW-846 8270C	Amber glass, Teflon-lined cap	(2) 1000 mL	Cool to 4 °C, dark	Extraction within 7 days; analysis within 40 days of extraction.
PCBs	SW-846 8082	Amber glass, Teflon-lined cap	(2) 1000 mL	Cool to 4 °C, dark	Extraction within 7 days; analysis within 40 days of extraction.
DRO – Specific COCs	SW-846 8270C	Amber glass, Teflon-lined cap	(2) 1000 mL	Cool to 4 °C, dark	Extraction within 7 days; analysis within 40 days of extraction.
TPH – DRO	SW-846 8015B	Amber glass, Teflon-lined cap	(2) 1000 mL	Cool to 4 °C, dark	Extraction within 7 days; analysis within 40 days of extraction.

Note: Aqueous samples include ground water and surface water.

1 The number in parenthesis indictes the sample container quantity.

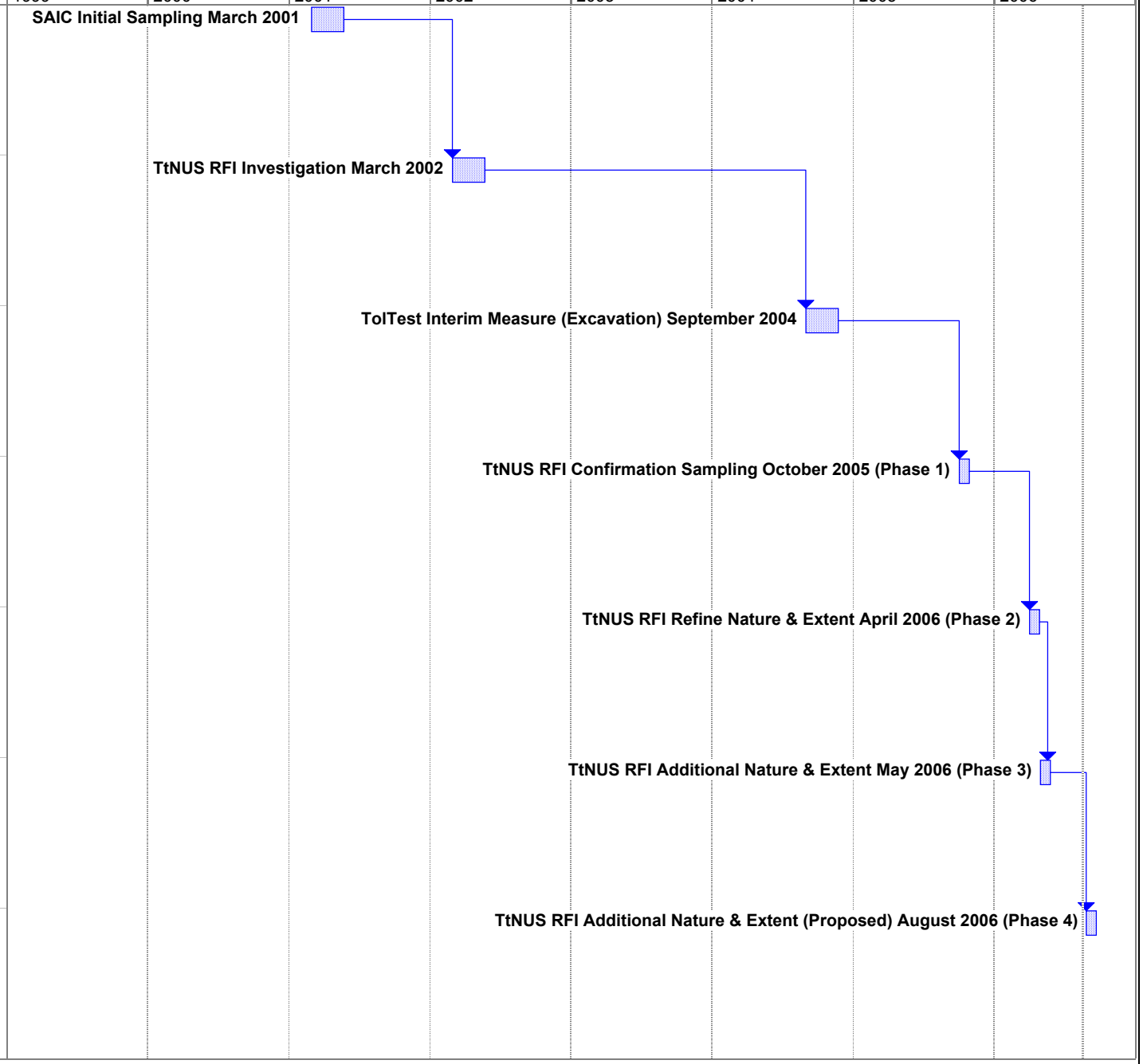
2 HCL = Hydrochloric acid

3 All holding times are from date of collection.

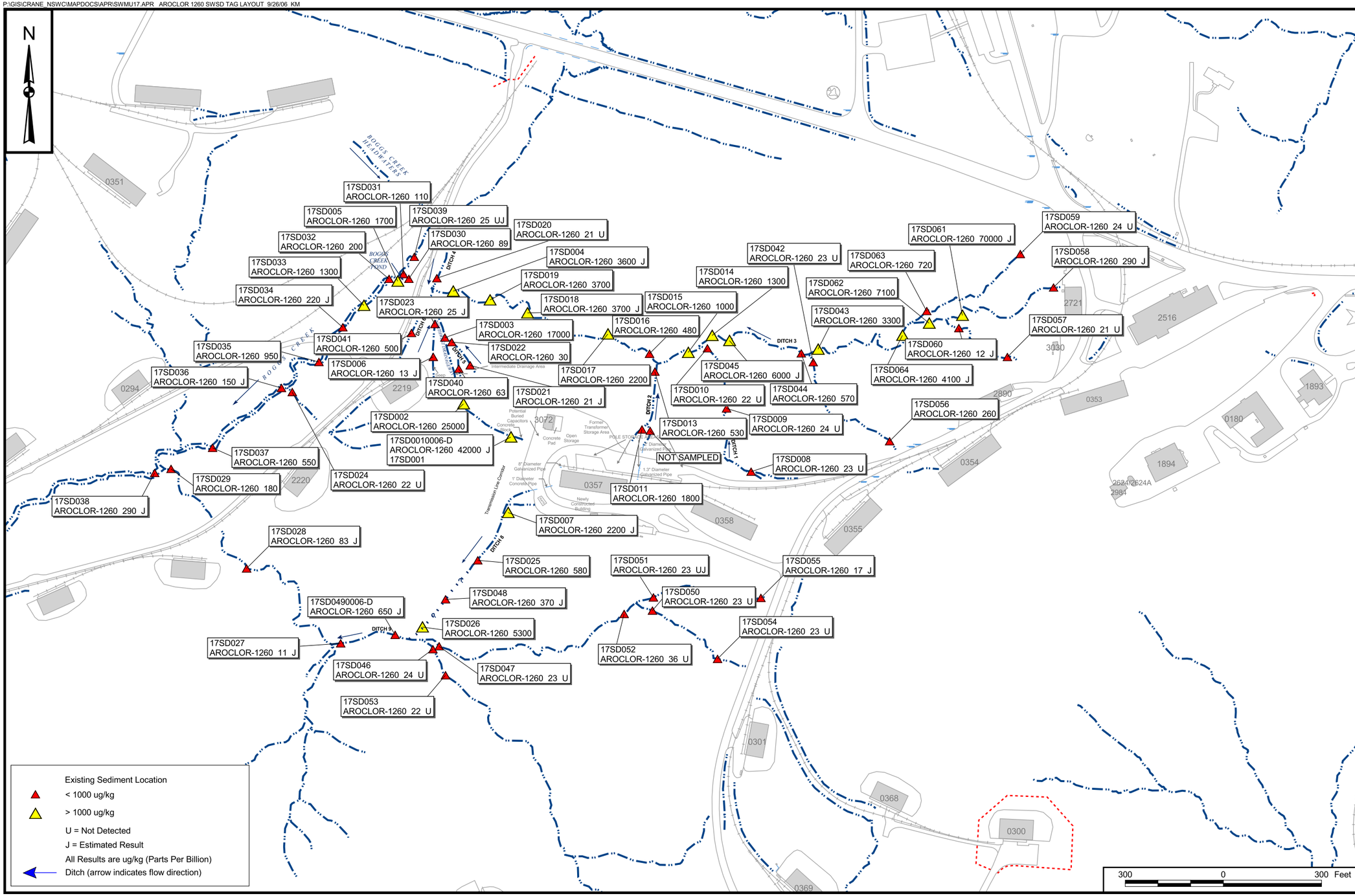
°C – Degrees centigrade.
mL – Milliliters.
VOCs – Volatile Organic Compounds
SVOCs – Semivolatile Organic Compounds
PCBs – Polychlorinated biphenyls.
PAHs – Polynuclear Aromatic Hydrocarbons.
GRO – Gasoline Range Organics.
DRO – Diesel Range Organics.
TPH – Total Petroleum Hydrocarbons

Figure 1 - SWMU 17 Chronology

ID	Task Name
1	**SAIC Soil Investigation March 2001**
2	**TtNUS RFI March 2002**
3	**TolTest Interim Measure September 2004**
4	**TtNUS RFI Addendum October 2005 (Phase 1)**
5	**TtNUS RFI Addendum April 2006 (Phase 2)**
6	**TtNUS RFI Addendum May 2006 (Phase 3)**
7	**TtNUS RFI Addendum August 2006 (Phase 4)**



P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU17.APR AROCLOR 1260 SWSD TAG LAYOUT 9/26/06 KM



CONTRACT NO. 0042

APPROVED BY ____ DATE ____

APPROVED BY ____ DATE ____

DRAWING NO. FIGURE 2

REV 0

EXISTING SEDIMENT SAMPLE LOCATIONS - PHASES 1 THROUGH 3
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

NAVFAC

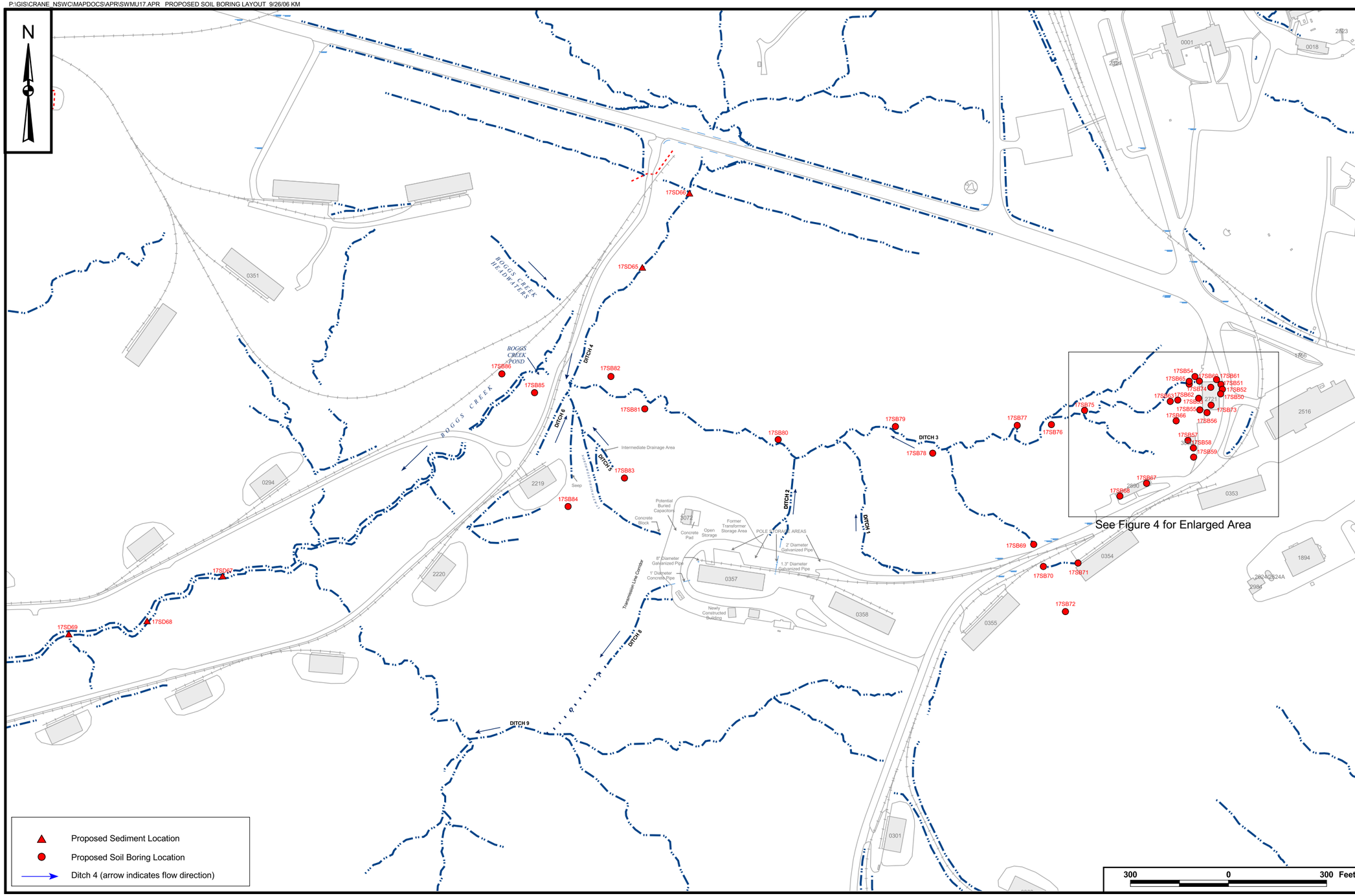
DRAWN BY K. MOORE DATE 8/04/06

CHECKED BY M. FRANCIS DATE 9/26/06

COST/SCHED-AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU17.APR PROPOSED SOIL BORING LAYOUT 9/26/06 KM



CONTRACT NO. 0042

APPROVED BY ____ DATE ____

APPROVED BY ____ DATE ____

DRAWING NO. FIGURE 3

REV 0

PROPOSED SOIL BORING AND SEDIMENT SAMPLE LOCATIONS - PHASE 4
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

NAVFAC

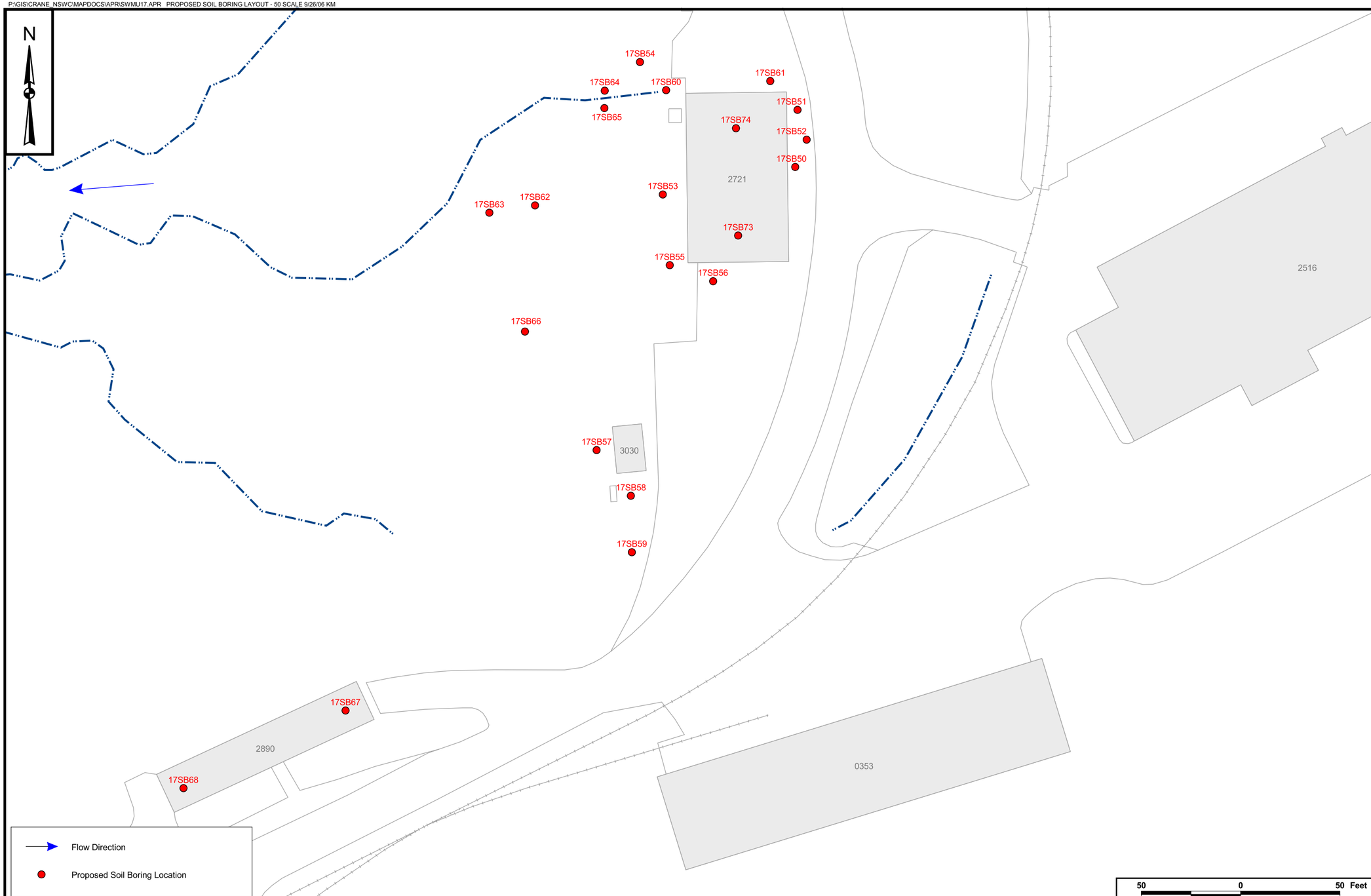
DRAWN BY K. MOORE DATE 8/04/06

CHECKED BY R. CLARK DATE 9/26/06

COST/SCHED-AREA

SCALE AS NOTED

P:\GIS\CRANE_NSWC\MAPDOCS\APR\SWMU17.APR PROPOSED SOIL BORING LAYOUT - 50 SCALE 9/26/06 KM



CONTRACT NO. 0042

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

DRAWING NO. FIGURE 4

REV 0

PROPOSED SOIL BORING SAMPLE LOCATIONS
PHASE 4 (BUILDING 2721)
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

NAVFAC

DRAWN BY K. MOORE DATE 8/04/06

CHECKED BY M. FRANCIS DATE 9/26/06

COST/SCHED-AREA

SCALE AS NOTED