

## Technical Memorandum

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**Date** 23 July 2009

**To** Bob Brock, USAED COR

**From** Terry Heikkila, PE, PMP

**Subject** Taku Gardens: Delineation of Northern Groundwater Plumes

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The objective of this technical memorandum is to describe the procedures that will be followed to support the groundwater investigation of the northern boundary of the Taku Gardens site. In order to achieve this, approximately eight soil borings are proposed (see attached Figure 1 for approximate locations). The objective of the investigation is to more clearly establish groundwater movement and contaminant concentrations at the northern boundary of Taku Gardens and within the Former Hoppe's Slough.

### **Methodology**

Boreholes for soil sampling will be drilled via direct-push using dual-tube tooling (Geoprobe® DT325 or similar) to permit continuous coring with no sloughing. This tooling consists of an outer casing with cutting shoe and an inner core barrel. As the combined assembly is driven into the soil, the cutting shoe extrudes the core into the barrel. At intervals of 4 or 5 feet, drilling is stopped and the full core barrel withdrawn and replaced with an empty barrel. Because the outer casing remains in place, the borehole walls can not slough to the bottom of the hole. DT325 tooling employs outer casing with an outside diameter of 3.25 inches and cuts core with a diameter of 1.80 inches, providing sufficient material for sampling (including duplicates and QA samples) and lithologic logging. Difficult drilling conditions are not anticipated based on previous drilling at the site; however should it be necessary, single-tube tooling may be required.

Boreholes will be logged continuously from the surface to final depth. Lithologic logging will be based on the unified soil classification system and standard description procedures (American Society for Testing and Materials [ASTM] 2006a, 2006b) with color matching to the nearest standard soil color. Field screening, using visual, olfactory and a photoionization detector (PID), will be conducted approximately every 2.5 feet along the core. Groundwater is anticipated between 11- 13 ft bg.

Analytical soil samples will be collected from within the vadose zone at the location of the highest PID screen, and within the smear zone, approximately 11-13 feet below ground surface. Soil samples will be analyzed for AK102 (Diesel Range organics) and low level SW8260B (volatile organic compounds). Sample procedures as outlined in Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP) appendices of the Draft RI Management Plan (CH2M HILL, 2007) will be followed.

**Memorandum***(Continued)*

Page 2 of 3

Following drilling of the boreholes, groundwater grab samples will be collected. This will be accomplished using the direct push SP-16 method. SP16 uses a protective screen, direct-push groundwater grab sampler that is sealed during drilling activities. Development of these temporary sampling ports will not be required; however, fines will be allowed to settle out prior to sampling activities or samples will be filtered prior to analysis. A peristaltic pump will be used to collect the sample from the sampling port installed. The depth and borehole identification from which the sample was collected, the time drilling stopped, and the sample time will be recorded in the field logbook. Other sample procedures as outlined in FSP and the QAPP appendices of the Draft RI Management Plan (CH2M HILL, 2007) will be followed.

Groundwater grab samples will be recovered from all wells immediately following drilling, however samples from SB04 to SB07 (the more northerly soil borings) will be placed on hold pending the results from SB01 to SB03 (the more southerly soil borings). The held samples will be analyzed at the Army's discretion pending results of the up-gradient samples.

GROUNDWATER EXCEEDANCE RESULTS ABOVE PROJECT SCREENING LEVELS			
MONITORING WELL	DATE	ANALYTE	RESULT (µg/L)
MMW03	5/17/2008	Vinyl Chloride	0.022 J
	10/17/2007	DRO	8.200
	5/20/2008	DRO	5.500 J-
MMW06A	10/8/2008	DRO	4.500
	5/20/2008	TCE	0.055
	10/8/2008	TCE	0.029 J
MMW12	5/20/2008	Vinyl Chloride	0.035 J
	5/20/2008	DRO	6.100 J-
	10/5/2008	DRO	1.100
MMW14	5/20/2008	Vinyl Chloride	0.039 J
	10/20/2007	RRO	130 J-
	10/20/2007	RRO	130 J
MMW15	10/20/2007	RRO	130 J
	10/12/2007	RRO	160 J
	5/17/2008	Vinyl Chloride	0.024 J
MMW26	10/12/2007	DRO	28.000
	5/20/2008	DRO	10,000 J-
	10/7/2008	DRO	29.000
MMW37	5/21/2008	DRO	360 J-
	10/13/2007	RRO	120 J
	5/18/2008	TCE	0.22
MMW38	10/7/2008	TCE	0.17 J-
	10/15/2007	RRO	170 J
	10/4/2008	RRO	120 J
MMW39	10/15/2007	RRO	120 J
	10/4/2008	RRO	270 J
	10/4/2008	RRO	150 J
MMW40	5/18/2008	TCE	0.044 J
	10/4/2008	Vinyl Chloride	0.019+ J
	10/4/2008	Vinyl Chloride	0.035 J
MMW41	10/14/2007	RRO	130 J
	10/19/2007	TCE	1.3 J-
	5/19/2008	TCE	2.1
MMW43	10/6/2008	TCE	1
	10/17/2007	TCE	0.37 J
	10/17/2007	RRO	150 J
MMW48	10/17/2007	TCE	0.081 J-
	5/15/2008	TCE	0.12
	10/3/2008	TCE	0.035 J
MMW53	5/15/2008	Vinyl Chloride	0.018 J
	10/7/2008	RRO	140 J
	10/16/2007	PCE	0.13 J
MMW56	10/7/2008	PCE	1
	10/16/2007	TCE	1.5 J+
	5/19/2008	TCE	0.6 J+
MMW56	10/7/2008	TCE	12
	10/7/2008	Vinyl Chloride	0.84 J
	5/15/2008	TCE	0.035 J
MMW57	5/15/2008	TCE	0.035 J
	10/3/2008	TCE	0.032 J
	10/13/2007	DRO	3.200 J+
MMW58	5/17/2008	DRO	2.200
	10/5/2008	DRO	1.000
	10/13/2007	RRO	200 J+
MMW61	5/17/2008	Vinyl Chloride	0.025 J
	10/2/2007	RRO	120 J
	10/7/2008	RRO	140 J
MMW62	10/2/2007	PCE	0.16 J
	10/7/2008	PCE	0.13 J
	10/21/2007	TCE	14
MMW63	5/19/2008	TCE	10
	10/6/2008	Vinyl Chloride	0.12
	10/22/2007	DRO	7.700
MMW64	10/22/2007	TCE	1.4
	5/19/2008	TCE	1.2
	10/6/2008	Vinyl Chloride	0.1
MMW65	10/6/2008	Vinyl Chloride	0.046 J
	10/19/2007	DRO	8.700
	10/19/2007	DRO	760
MMW67	10/19/2007	RRO	140 J
	10/5/2008	DRO	2.700 J+
	10/5/2008	TCE	1.3 J-

NOTES  
 INFORMATION FOR THIS TABLE IS FROM FIGURES 5-12 AND 5-14 OF THE DRAFT REMEDIAL INVESTIGATION FWA REPORT FOR THE FORMER COMMUNICATIONS SITE, FORT WAINWRIGHT, ALASKA BY CH2MHILL AND DATED MAY 2009.  
 SEE TEXT FOR ACRONYMS AND ABBREVIATIONS

