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Technical Memorandum

Date	13 August 2010
To	Robert Brock, USACE
From	Terry Heikkila, PE, PMP
Subject	Taku Gardens: Draft Installation of Deep Groundwater Monitoring Wells Work Plan Addendum

The purpose of this Work Plan Addendum is to describe the procedures that will be followed to install, develop, and sample two deep groundwater wells (DGW) at the northeastern boundary of Taku Gardens to a depth of approximately 100 feet. The work described in this Work Plan Addendum will be conducted in accordance with *Monitoring Well Guidance (ADEC 2009)* and all groundwater sampling procedures will adhere to the *2010 Fort Wainwright Post Wide Work Plan* including the Field Sampling Plan and the Quality Assurance Project Plan (USAED 2010), as well as the Site Safety and Health Plan of the *Former Communications Drum and Debris Remedial Investigation* (USAED 2008).

The project objective is to verify the absence of 1,2,3-trichloropropane (TCP) contamination within the groundwater production zone located approximately 40-70 feet below ground surface (bgs). Figure 1 presents the proposed locations for the 2010 wells, existing wells, and exceeding contaminant concentrations.

Previous Investigations

In 1988 two main water supply wells were installed on the northeastern corner of Taku Gardens to support the water treatment facility on Ft. Wainwright, Alaska. Both wells are 20-inch production wells installed to a depth of 100 feet and screened between 60 and 80 feet. Based on information from the Directorate of Public Works the average monthly pumping rates for the wells from 2005 through 2008 are between 1,112 and 1,691 gallons per minute.

Bi-annual sampling events at Taku Gardens have shown a continued presence of 1,2,3-TCP in the groundwater on the east side of the site at approximately 19 feet bgs. Analyses from

October 2009, the most recent sampling event, indicated contamination exceeding the Alaska Department of Environmental Conservation (ADEC) Table C cleanup criteria (0.00012 mg/L), with a maximum concentration of 0.0012 mg/L at monitoring well (MW)-79, which is located approximately 250 feet south of the proposed new wells.

Groundwater Monitoring Well Installation and Sampling Methodology

The proposed well locations are in an area designated as having a moderate to high probability of encountering buried munitions and explosives of concern (MEC). Based on this information, the well locations will be cleared of MEC prior to beginning drilling activities. Test pits will be advanced, under the direction of an unexploded ordnance (UXO) technician, to a depth of six feet below ground surface (bgs).

Once the areas have been cleared, boreholes will be drilled by auger for the installation of permanent 2-inch groundwater monitoring wells downgradient (north) of the current locations of MW-79 and MW-47. Based on previous drilling activities at the site, difficult drilling conditions are not anticipated. Soil will be logged 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 2006a, 2006b) with color matching to the nearest standard soil color.

Once the area has been cleared, the soil types will be logged and field screening and analytical soil samples will be collected.

Between the surface and the depth at which groundwater is encountered, field screening samples will be collected at a frequency of one per every 2.5 feet below ground surface (bgs). Three analytical soil samples will be collected between surface and groundwater: one from the surface, one from the middle of the vadose zone, and one from the smear zone. Once groundwater is reached, field screening frequency will decrease to one every 10 feet. Analytical soil samples will be collected from the two highest field screening locations. Soil sampling during drilling activities will utilize a split spoon sampler. Soil samples will be analyzed for gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO)

polychlorinated biphenyls (PCBs), Resource Conservation and Recovery Act (RCRA) metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and explosives.

Groundwater is anticipated to be encountered between 10 and 15 feet below ground surface. The casing of the wells will be approximately 100 feet long extending into the production zone of the aquifer. The 20-foot screened interval of each well will be between 40 and 60 feet bgs for D-MW1 and between 50 and 70 feet bgs for D-MW2.

Groundwater wells will be developed using a Waterra pump, or comparable equipment. Well development will be complete when the turbidity of purge water measures less than 5 Nephelometric Turbidity Units (NTU) or five sand pack volumes have been purged, whichever is greater.

Groundwater sampling will be conducted using either a Waterra pump or dedicated bladder pumps. Two samples will be collected and analyzed for VOCs by methods SW8260 and SW8260 SIM.

References

ADEC. 2009 (February). *Monitoring Well Guidance.*

American Society for Testing and Materials. 2006. *Standard Practice for Classification of Soils for Engineering Purposes*. D2487-06e1.

CH2M Hill. 2008 (January). *Revised Interim Draft Remedial Investigation Work Plan..* Ft. Wainwright, Alaska.

USAED (U.S. Army Engineer District, Alaska). 2010. *2010 Fort Wainwright Post Wide Work Plan.* Fort Wainwright, Alaska.

USAED 2008. *Former Communications Drum and Debris Remedial Investigation*. Fort Wainwright, Alaska.

BLDG 3559
POTABLE WATER
PRODUCTION WELL

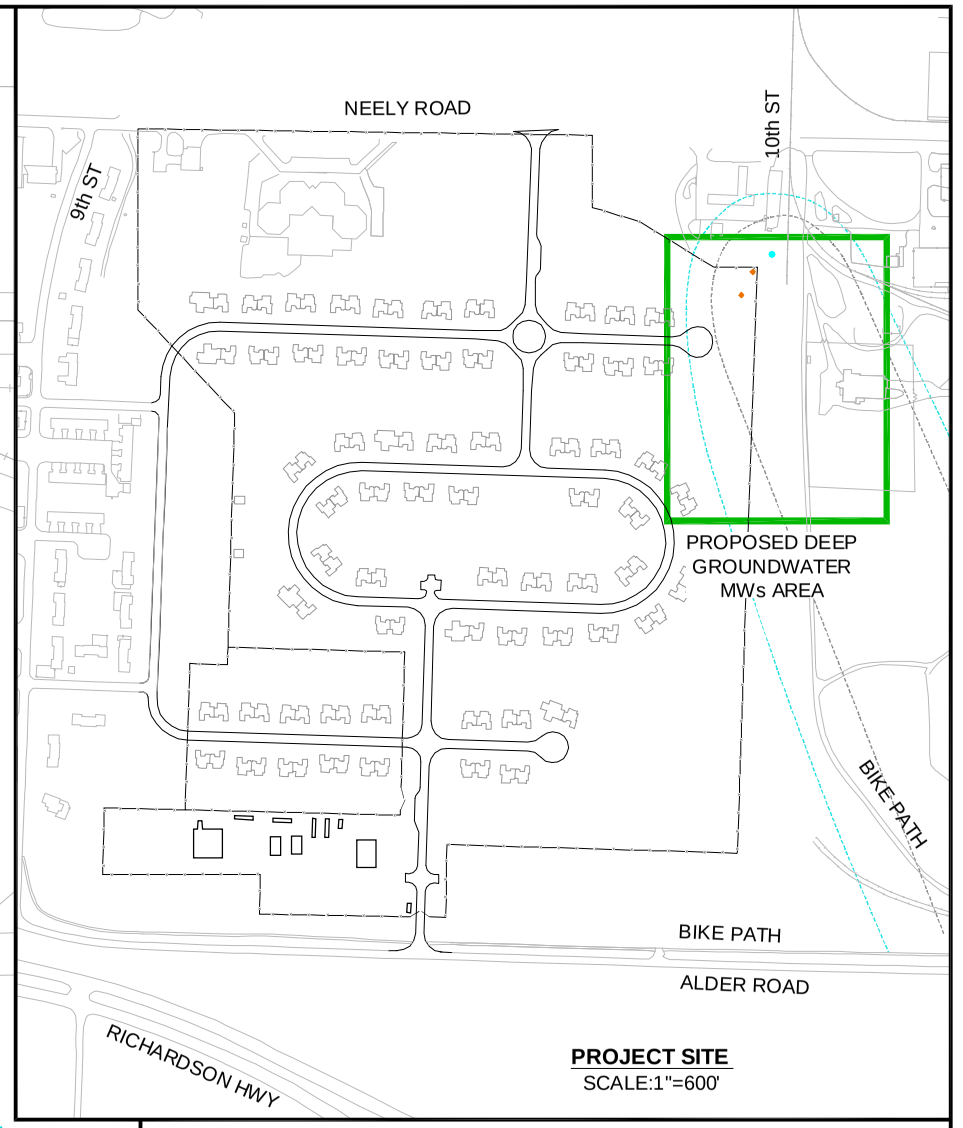
NORTH

MW07
MW39
DMW2
DMW1
MW78
MW46
MW85
MW86
MW87
MW89
MW88
MW08
MW68
MW48
MW50
MW69
MW49

MW47 OCTOBER 2009
1,2,3 TCP=0.65 ppb (µg/L)

MW79 OCTOBER 2009
1,2,3 TCP=1.2 ppb (µg/L)

ESTIMATED GROUNDWATER FLOW



PROJECT SITE
SCALE:1"=600'

LEGEND

- PROPOSED MW LOCATION
- EXISTING MW
- 1,000 gpm PUMPING RATE WATER SUPPLY CAPTURE ZONE
- 1,700 gpm PUMPING RATE WATER SUPPLY CAPTURE ZONE

NOTE
ONLY THE OCTOBER 2009 RESULTS EXCEEDING THE PSL ARE SHOWN.

0 50 100 200
SCALE IN FEET

FORMER COMMUNICATIONS SITE
PROPOSED DEEP GROUNDWATER MONITORING WELLS LOCATION MAP

FT. WAINWRIGHT, FAIRBANKS, ALASKA

JACOBS	DATE: 24 August 2010	PROJECT MANAGER: S. Belway	FIGURE NO.: 1

I:\ERS-UR\TO07-Taku Gardens RAICAD\2010 Taku\2010 GW TM\Fig 1 Proposed GW MWs.dwg Aug 24,2010 -avakarcs