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LETTER OUTLINING THE DRAFT FINAL WORK PLAN FOR FLOW CONTROL PILOT STUDY RECONNAISSANCE PHASE AT OPERABLE UNIT 1 NAS PENSACOLA FL
12/12/2007
TETRA TECH NUS

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PITT-12-7-013

Project Number 112G00702

December 12, 2007

Commander, Southeast
Naval Facilities Engineering Command
ATTN: Mr. Bill Hill, (OPGEVR)
Remedial Project Manager
2155 Eagle Drive
North Charleston, South Carolina 29406

Reference: CLEAN Contract No. N62467-04-D-0055
Contract Task Order No. 0067

Subject: Draft Final Work Plan for Flow Control Pilot Study Reconnaissance Phase
Naval Air Station Pensacola, Florida

Dear Mr. Hill:

INTRODUCTION

This Pilot Study Reconnaissance Work Plan outlines the tasks planned to collect data needed to design and implement the Flow Control Pilot Study for Wetland 3 at Naval Air Station (NAS), Pensacola, Florida (Figure 1). The Pilot Study is being conducted as specified in the revised Optimization Study for Operable Unit 1 (OU 1), which was prepared by Tetra Tech NUS, Inc. (TtNUS) and dated May, 2006. This report was prepared under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62467-04-D-0055, Contract Task Order (CTO) 0067.

BACKGROUND

OU 1, also referred to as Site 1 – the Sanitary Landfill, includes the former sanitary landfill and the surrounding area (Figure 2). The landfill ranges in elevation from 8 to 20 feet above mean sea level and is heavily wooded with trees and natural shrub vegetation. The site is bordered on the north by an estuary of Pensacola Bay named the Bayou Grande, by the Navy's A. C. Reed Golf Course to the east, by Navy property covered with vegetation to the west, and by the Barrancas Cemetery to the south. Shallow groundwater seeps and surface runoff at OU 1 is directed primarily into multiple wetlands located along the perimeter of the site – primarily to Wetland 3 and subsequently to Wetland 4D.

Wetland 3, located on the eastern side of OU 1, receives shallow groundwater and surface water runoff from the site and is primarily fed by a visible seep at the southeast end of the wetland. Wetland 3 is bordered by OU 1 to the north, south, and west, and by John Tower Road and the golf course to the east. As reported in the 2005 Site 41 Remedial Investigation (RI) by EnSafe, the narrow surface water channel in this wetland is approximately 4 inches deep and 1 to 2 feet wide. The remaining Wetland 3 area is from 3 to 500 feet wide, is relatively flat topographically, and consists of saturated sediment drained by a narrow and shallow stream. Sediment in most of the wetland is highly organic, with total organic carbon measured at up to 24 percent. The shallow, open water portion contains several freshwater vegetative species such as lizard tail and cattails. The area surrounding the wetland consists of pine trees, and some oaks and other species. The lower section of this wetland flows into a drainage culvert that runs east under John Tower Road and a golf course fairway prior to discharging into Wetland 4D.

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As reported in the Site 41 RI (EnSafe, 2005), estuarine Wetland 4D is an open water body fed by Wetland 3 from the west and by Wetland 4C from the south. Wetland 4D discharges north into Bayou Grande through a culvert beneath an unnamed dirt road. Wetland 4D is surrounded by the golf course. The open water portion of Wetland 4D ranges from 1 foot to approximately 8 feet deep and has a maximum width of approximately 700 feet. Sediment in Wetland 4D is sandy, with TOC measured at up to 7 percent. The steep topographic gradient surrounding the wetland makes the transition from upland to open water clearly visible. The vegetation surrounding Wetland 4D is both mowed grass and tall grasses, with a small stand of pine trees and a small area of spartina at its northwestern corner. The presence of mowed grass around a portion of this wetland limits its potential to provide habitat for most species.

An Optimization Study (TtNUS, pending final issue in November 2007) was prepared to evaluate system operation and determine if a modified action is appropriate for the Wetland 3 impacts from the OU 1 seep.

Proposed Pilot Study

In response to Partnering Team discussions on the status of the Optimization Study Report and remedy for OU 1, a Pilot Study was proposed to evaluate the effects of blocking the culvert that connects Wetland 3 and 4D. The intent of blocking the culvert would be to effectively isolate Wetland 3 from Wetland 4 and the waters of the state, thereby creating an infiltration area within the wetland. The primary purpose of the Pilot Study is to determine if the blockage of the culvert would be effective in creating this infiltration gallery in Wetland 3. In addition, the Pilot Study will also be used to determine if it would cause detrimental effects, such as localized flooding within Wetland 3 or the surrounding area.

The proposed method for blocking the culvert is a flow control device which will prevent the water from discharging into Wetland 4D utilizing a bladder control system. In the event of heavy rainfall and flooding of Wetland 3, the device will allow water to discharge through the pipe into Wetland 4D to prevent flooding over the road. Once the water level drops below flood stage, the bladder will automatically close and prevent water from discharging into Wetland 4D.

The objectives of the overall Pilot Study are to:

- Determine the effect of blocking the culvert that connects Wetland 3 discharge with Wetland 4D.
- Provide data to gain understanding of the connection between shallow groundwater and surface water in the Wetland 3 and 4D area.

Objective

In order to meet the objectives of the Pilot Study, preliminary reconnaissance data must be gathered in order to design and implement the Pilot Study. Information such as topography and water elevation data needs to be incorporated into the Pilot Study design to allow for proper implementation. This work plan addresses the methods to be used to obtain this reconnaissance data. Following completion of this scope, the Pilot Study Work Plan will be developed.

The initial reconnaissance tasks include:

- Mobilization
- Topographic data collection
- Surface water body elevation and fluctuation data collection
- Shallow groundwater elevation data
- Permeability testing on soil
- Rainfall and precipitation event data

All field procedures shall be conducted in accordance with TtNUS Standard Operating Procedures (SOPs) and the site-specific Health and Safety Plan (provided under separate cover). The required direct push technology (DPT) boring advancement will be performed in accordance with the methods identified in TtNUS SOP GH-1.3 "Soil and Rock Drilling Methods" and TtNUS SOP SA-2.5 "Direct Push Technology". Shelby tube soil samples will be collected from the surface soils in Wetland 3 and will be logged in the field for physical characteristics in accordance with SOP SA 1.3 "Soil Sampling." Equipment will not require decontamination between each drilling location. DPT equipment will be decontaminated in accordance with the procedures presented in TtNUS SOP SA-7.1 "Decontamination of Field Equipment", before leaving the site. Copies of the SOPs are presented in Attachment A.

Reconnaissance Phase Fieldwork

The initial phase of fieldwork and data collection includes the following tasks.

Permits

TtNUS will obtain applicable permits that are required by the FDEP prior to implementing the field activities. The permit application will address disturbances that will occur in the Wetland 3 due to the DPT activities for installation of the piezometers and any clearing that will be necessary for site access.

Mobilization

TtNUS will prepare specifications and obtain a subcontractor for the DPT work associated with this work plan. The field team will review the planned tasks and procure needed rental equipment and field supplies. Data, such as mapping and digital images of the project area, will be transferred to data collection software and equipment. All field team members will review this work plan and the Site Health and Safety Plan (provided under separate cover) prior to initiation of the field work, and a field team orientation meeting will be held to familiarize personnel with the scope of the field activities.

Topographic Data

Existing topographic data is limited in the area of Wetland 3 and 4D. Topography and elevation data is essential in the design of the culvert flow device in order to determine potential flooding in the Wetland 3 area and on the access road dividing Wetland 3 and 4D. The purpose of this task is to gather the data needed to generate site-wide topographic mapping of the OU 1 seep area, Wetland 3, Wetland 4D, and the surrounding area. This data will be used to determine the local watershed as well as the storage capacity of the area upgradient of the Wetland 3/4D connecting culvert.

Topographic data in Wetland 3 and 4D and surrounding areas will be collected with conventional total station and level equipment. It is anticipated that the topographic coverage will include the area around Wetland 3 and will extend into Wetland 4D (Figure 3). Topographic data collected will be processed and reviewed during field data collection to ensure that adequate coverage is obtained and that the topographic surface is suitable to perform the engineering design of the drainage area contributing to the Wetland 3 and 4D system.

It is anticipated that minimal clearing of vegetation will be necessary to perform the topographic survey task; however, clearing of select vegetation with hand tools may be necessary to obtain line-of-sight vantage points. Alternatively, various other methods or procedures may be used (i.e. Global Positioning System) if deemed effective based on site conditions.

Horizontal and vertical accuracy will be within 0.01 feet and will be tied into the datum and coordinate system consistent with existing Geographic Information System (GIS) data for the site. The field team will assemble existing data for the area and coordinate with the TtNUS GIS department prior to the reconnaissance field event.

Surface Water Level Data

Surface water data is needed in order to design the flow control device. Staff gauges will be installed in both Wetland 3 and 4D to aide in the monitoring of surface water levels over time. Contributions to the fluctuations of surface water levels include runoff from storm events and recharge from the primary OU 1 Wetland 3 seep (and possibly other seeps in Wetland 3). The relationship between precipitation, seep recharge, flow rates through the culvert between Wetland 3 and 4D, and surface water levels is a critical element needed for the Pilot Study design. The locations of the staff gauges will be determined during the fieldwork, but are initially planned to be located at the primary OU 1 seep, at the headwall to the Wetland 3/4D culvert (i.e. inlet side in Wetland 3), and within Wetland 4D (Figure 4).

The staff gauges will be 2-inch polyvinyl chloride (PVC) risers driven into the sediment to provide a stable and vertical monitoring point. The riser will be slotted or screened along the entire length (with the exception of the top as needed for strength) to allow for large and quick fluctuations of the water surface. The gauges will be fixed to a permanent structure if possible or stabilized with a driven post or similar feature. Visible staff gauge graduations or markings for manual reading are not needed, but may be incorporated into the gauges as determined during the fieldwork.

Each staff gauge will be located for horizontal position and the top of each staff gauge riser will be measured for elevation to the nearest 0.01 foot and will be tied into the existing site datum.

The staff gauges will be equipped with automated data loggers set to record continuous levels. Data readings will be taken every 10 minutes. Depending on the storage capacity of the data loggers and frequency of precipitation events, the recording period may be adjusted. The data loggers will be installed and calibrated to record accurate water levels based on pressure and atmospheric corrections. The data loggers are expected to be visited on 1-month cycles during the Pilot Study reconnaissance phase, which will continue for 3 to 6 months in order to get data through one rainy season. The primary

data needed during this initial reconnaissance phase is the general elevation of the surface water at the three planned locations.

Shallow Groundwater Elevation Data

Historic monitoring well data for OU 1 indicates that shallow groundwater in the vicinity of Wetland 3 and 4D has elevated concentrations of iron, including locations that are not apparently associated with the seep at the headwaters of Wetland 3. To determine the relationship between shallow groundwater and surface water in the Wetland 3 and 4D area, piezometers with data loggers will be installed in three locations and will form three transects, with a piezometer on each side of the stream at each location.

The approximate locations of the piezometers are shown on Figure 4. The exact piezometer locations will be determined in the field based on available access. The proposed locations include two piezometers adjacent to the main channel in Wetland 3, two piezometers near the upgradient side of Wetland 3 and the culvert to Wetland 4D, two downgradient of the culvert, and two piezometers near the upgradient side near the inlet of the culvert adjacent to the Wetland 4D pond. The piezometer pairs will be located to create transects perpendicular to the main surface water flow from the primary OU 1 seep to the Wetland 4D pond.

The piezometers are planned to be installed with DPT methods using 3.25 inch drive casing. All piezometer borings will be advanced to ten feet below ground surface. Adjustments to the total depths and/or screened intervals will be made by the field team based on the specific lithology and groundwater table observed during advancement and installation. The 1.5 inch piezometers will each consist of 5-foot pre-packed screen and a 5-foot riser section to ensure long-term reliability during the data collection period. The piezometer screens will be backfilled with sand and piezometers will be completed with bentonite grout to the surface. Additional length of riser (i.e. 5-foot extensions) are planned to allow for stick-up completions that will extend the risers above the anticipated high-water elevation once the culvert is blocked and water may pond within Wetland 3. The piezometers near Wetland 4D will be extended to the ground surface and will be protected with flush-mount protective covers.

Automated data loggers will also be installed in the piezometers (as outlined for the staff gauges) in order to obtain date and time specific data to compare with staff gauge and precipitation data. Similar to the staff gauges, the data collection is primarily needed during the Pilot Study implementation phase after the culvert flow control device is installed. The data during the reconnaissance phase will be the initial water levels at each piezometer and the general fluctuations during this phase of fieldwork. Data collected during the period of time between the reconnaissance phase and the design and planning tasks will be incorporated into the Pilot Study Work Plan and design. It is anticipated that the reconnaissance phase will last a minimum of 3 months and may extend up to 6 months, depending on the information collected and the number of precipitation events. Data will be obtained through at least one rainy season.

Groundwater Sampling

In order to evaluate iron concentrations in the shallow groundwater and to determine if there is a groundwater component to the stream in Wetland 3, the piezometers will be developed and sampled prior to installation of the data loggers. The groundwater samples will be immediately placed in iced coolers and submitted to the laboratory under Chain-of-Custody to be analyzed for total iron. If the groundwater

samples are turbid or if solid state iron is observed, samples will also be collected for dissolved iron. The samples for dissolved iron will be filtered in the field. The dissolved samples will be used to evaluate if the elevated concentrations of iron are due to particulates in the groundwater. The groundwater samples will be collected and handled in accordance with SOP SA-1-1 "Groundwater Sample Acquisition and Onsite Water Quality Testing."

Precipitation and Flow Data

Localized precipitation data must be collected in order to evaluate the relationship of precipitation, other input sources (i.e. seeps), and flow at the Wetland 3 outlet culvert. A rain gauge station with automated data collection will be installed at a location to be determined during the fieldwork. The location will be in a secure and stable area but representative of the general area (i.e. not obscured with tree cover). In addition, data will be obtained from the National Weather Service and from the base, if available, and compared to the site recorded data.

Flow gauges will be placed in the main portions of the channel in Wetland 3 and in the discharge area of any visible seeps within Wetland 3. Depending on the characteristics of the channel and the seeps, a weir or flume may be installed to get the flow readings. A flow gauge will also be placed and data recorded at the Wetland 3/4D culvert inlet and/or outlet. The purpose of this task is to gather basic data related to flow rates in the overall surface water system with respect to precipitation events.

Soil Permeability Testing

Shallow soil samples will be collected at four locations within Wetland 3 (Figure 4) to evaluate the potential for infiltration of ponded water once the culvert to Wetland 4D is blocked. The soil samples will be collected from the soil horizon directly below the upper most organic layer. Using the drilling rig, 3-inch Shelby tubes will be advanced and a sample collected from each location. Upon retrieval, the ends of the tubes will be capped and sealed and the samples will be shipped to a geotechnical laboratory for permeability testing. If significant changes in the soil horizons are noted above the uppermost groundwater table during drilling for the shallow wells, additional tubes may be collected from the various soil horizons. The Shelby tube samples will be collected in accordance with SOP SA 1.3 "Soil Sampling." The permeability data will be used to evaluate the potential for the wetland to infiltrate the ponded water into the shallow aquifer. The infiltration rate of Wetland 3 and the surrounding area will be dependent on the permeability of the soils and the applied head (depth of the water).

Data Evaluation

The data from the reconnaissance study will be compiled and evaluated to determine if blockage of the culvert is feasible. The results of the evaluation will be used in the preparation of the Pilot Study Work Plan, which will detail the procedures for implementation of the study. The Pilot Study Work Plan will also present additional data needs, if necessary, to satisfy Florida Department of Environmental Protection and United States Environmental Protection Agency requirements.

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Field Documentation

All data collected during the reconnaissance phase of the Pilot Study will be recorded in daily logs or project notes. Groundwater sampling information will be recorded on data sheets. All data recorded will be available during the Pilot Study planning phase and will be included in the Pilot Study Work Plan. Information obtained in survey data collectors and automated water level/flow devices, piezometer construction logs, etc. will be compiled by the field team and transmitted to the project files upon completion of the fieldwork.

If you have any questions, please call me at (850) 385-9899.

Sincerely,

Gerald Walker

Gerald Walker, P.G.
Project Manager

GAW/ld

Enclosure

c: Patty Whittemore, SOUTHNAVFACENGCOM (1 copy, 2 CDs)
Greg Campbell, NAS Pensacola PWC (1 copy, 1 CD)
Greg Fraley, US Environmental Protection Agency (2 CDs)
Tracie Bolanos, FDEP (1 copy, 1 CD)
Allison Harris, Ensafe Inc. (1 CD)
Brian Caldwell, Tetra Tech, Inc. (1 CD)
Greg Wilfley, CH2M Hill (1 CD)
Debra Humbert, TtNUS (1 copy)
Mark Perry/file, TtNUS (1 copy)
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