August 2011 Surface Water Sampling Work Plan
Dump Road Area, Frog Mortar Creek, Martin State Airport
701 Wilson Point Road, Middle River, Maryland

The objective of this interim surface water sampling event is to collect representative surface water chemical data in the month of August which will be evaluated along with prior surface water data to assess potential human health risks for summertime recreational users of Frog Mortar Creek. The objective will be achieved by conducting discrete-depth surface-water sampling to measure variations in volatile organic compound (VOC) concentrations between shallow and deeper surface waters, and evaluating the possible effects of low and high tide on concentrations of VOCs released to surface water. Prior to initiating the field tasks, on-site Tetra Tech Inc. (Tetra Tech) personnel will become familiar with the site-specific health and safety plan (HASP) and respective Safe Work Permits and Emergency Response Plan included in the HASP, included as Appendix A in the *2011 Groundwater Monitoring Work Plan, Martin State Airport.*

Surface Water Sampling

Sixty (60) surface water samples and one duplicate will be collected from Frog Mortar Creek near the Dump Road Area (DRA) site on or around August 16, 2011 (Figure 1). Thirty (30) samples will be collected at high-tide, starting 2 hours before and extending 2 hours past the projected high-tide peak at 9:46 AM. An additional 30 samples will be collected at low-tide, starting 2 hours before and extending 2 hours past the nadir of the low-tide projected at 4:14 PM. Six samples will be collected from three locations along five transects. The transects will be spaced approximately 350 feet apart along the western shoreline of Frog Mortar Creek (Figure 1). Along each transect, one sample will be collected near the shoreline ("A" sample) at 1-foot below the surface, two samples will be collected approximately 50 feet from the shoreline ("B" samples) at 1-foot below the surface and 1-foot above the creek bed, if the water depth is at least three feet deep, and three samples will be collected approximately 100 feet from the shoreline ("C" samples) at 1-foot below the surface, at the mid-point of the water column and at

1-foot above the creek bed if the water depth is at least four feet deep (e.g., for a total water depth of four feet, samples would be collected at depths of one, two, and three feet).

Prior to sampling at each sample location, the total water depth from the water surface to the creek bed (i.e., water column height) will be measured to the nearest 0.1 foot using a weighted measuring device. The sampling device will be lowered to the target depths based on this measurement. Additionally, the depth of each sample will be measured and recorded to the nearest 0.1 foot using the weighted measuring device. To obtain horizontal coordinates, each surface water sampling location will be surveyed using a hand-held global positioning system receiver. Sampling locations will be surveyed in the Maryland State Plane North American Datum of 1983 and recorded in units of feet.

Surface water samples will be collected using a stainless-steel, discrete-interval sampler (e.g., Kemmerer sampler, Van Dorn sampler, or Sample Thief [Bacon Bomb]). The samples will be collected at the depths described above, brought to the surface, and the water removed through a valve to fill three laboratory-cleaned, hydrochloric-acid preserved 40-milliliter (mL) sample vials. With multiple depth samples, care will be taken not to disturb the bottom sediments. The sampling equipment will be cleaned after each use by rinsing with distilled water. Equipment cleaning will take place after each sample is collected. No decontamination fluids will be containerized during this sampling event.

The stage of the tide will be recorded at the time of sampling using the staff gage located on the Strawberry Point pier for the Baltimore County Marine Police Unit at Martin State Airport. Surface-water quality parameters including temperature, pH, specific conductance, turbidity, dissolved oxygen, and oxidation-reduction potential will be collected from each location using a portable water-quality meter. All information will be documented on a surface-water sample form and in the site field logbook.

Chemical Analysis

Samples will be analyzed for VOCs by SW846 Method 8260B. Samples will be analyzed by TestAmerica, Inc. located in North Canton, Ohio. The samples will be analyzed on a 5 business day expedited turnaround time.

One duplicate will be collected during this investigation. A trip blank (one per cooler) will be submitted for VOC analysis for quality assurance/quality control purposes. A temperature blank will also be included with each cooler.

Sample Nomenclature and Handling

Surface water samples will be identified with a unique sample identification tag. Surface water samples will be labeled with a "MSA-SW" prefix followed by the sample number (e.g., 37, 38, etc.), the profile location ("A", "B", or "C"), the depth, and a six digit sampling date. For example, a surface water sample collected on August 16, 2011 from MSA-SW38C at two feet below the surface will be labeled as MSA-SW38C-02-081611. The trip blanks will be labeled with a "TB" prefix followed by the sample's six digit submittal date (e.g., TB-081611).

Sample handling includes field-related considerations concerning the selection of sample containers, preservatives, allowable holding times, and analyses requested. Proper custody procedures will be followed throughout all phases of sample collection and handling. COC protocols will be used throughout sample handling to assure the evidentiary integrity of sample containers. These protocols will demonstrate that the samples were handled and transferred in a manner that would prevent or detect possible tampering. Sample containers will be released under signature from the laboratory and accepted under signature by the sampler(s) or individual responsible for maintaining custody until the sample containers are transferred to the sampler(s). Transport containers returning to the laboratory will be sealed with strapping tape and a tamper resistant custody seal. The custody seal will contain the signature of the individual releasing the transport container, along with the date and time.

Documentation

A master site-logbook will be maintained as an overall record of field activities for the site. Sample documentation will include completed chain of custody (COC) forms and surface-water-specific sample log-sheets. COC forms will be standardized to summarize and document pertinent sample information such as sample identification and type, matrix, date and time of collection, preservation, and analysis requested. Sample custody procedures will document sample acquisition and integrity.

Data from field measurements will be recorded using appropriate sample log sheets and summarized in tabular form, as will the raw instrument data from the laboratory. The field operations leader will verify field data daily; laboratory data will be verified by the group supervisor and then by the laboratory's Quality Control/Documentation Department.

Data Tracking and Control

A "cradle to grave" sample tracking system will be used from the beginning to the end of the sampling event. The field operations leader will begin and coordinate sample tracking before mobilizing to the field. Sample container labels will be handwritten in the field and reviewed to assure that they are accurate and adhere to work plan requirements. The project manager will coordinate with the analytical laboratory to ensure that the laboratory is aware of the number and type of samples and analyses that will be submitted that day.

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\Maps\MSA Surface Water Samples August2011.mxd)
7/29/2011 -- 9:19:41 AM

SW-42-C
SW-42-B
SW-42-A
SW-40-C
SW-40-B
SW-40-A
SW-38-C
SW-38-B
SW-38-A
SW-41-C
SW-41-B
SW-41-A
SW-43-C
SW-43-B
SW-43-A

MARYLAND AIR NATIONAL GUARD
Parkside Marina
Conrad's Ruth Ville
Frog Mortar Creek
POND #1
POND #2
Gate
TAXIWAY J
TAXIWAY TANGO
AIRPORT RUNWAY
TAXIWAY F
TAXIWAY D

FIGURE 1

AUGUST 2011 SURFACE WATER SAMPLE LOCATIONS

LEGEND

- AUGUST 2011 SURFACE WATER SAMPLE LOCATION
- GROUNDWATER MONITORING WELL
- ABANDONED WELL
- MARYLAND AIR NATIONAL GUARD BOUNDARY

Lockheed Martin Martin State Airport
Middle River, Maryland

0 75 150 300 Feet

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DATE MODIFIED: 7/29/11

CREATED BY: MP

TETRA TECH

Table 1
Lockheed Martin - Martin State Airport
Frog Mortar Creek
Proposed Surface Water Sampling in August 2011

Sample Location	Approximate Water Depth	Approximate Sample Depths (below surface)	Field Parameters	Laboratory Analysis
SW38A	1.0 - 1.5 ft	1 ft below surface	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW38B	3.0 - 4.0 ft	1 ft. below surface; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW38C	4.0 - 5.0 ft	1 ft. below surface; mid-point of water column; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW40A	1.0 - 1.5 ft	1 ft below surface	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW40B	3.0 - 4.0 ft	1 ft. below surface; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW40C	4.0 - 5.0 ft	1 ft. below surface; mid-point of water column; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW41A	1.0 - 1.5 ft	1 ft below surface	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW41B	3.0 - 4.0 ft	1 ft. below surface; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW41C	4.0 - 5.0 ft	1 ft. below surface; mid-point of water column; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW42A	1.0 - 1.5 ft	1 ft below surface	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW42B	3.0 - 4.0 ft	1 ft. below surface; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW42C	4.0 - 5.0 ft	1 ft. below surface; mid-point of water column; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW43A	1.0 - 1.5 ft	1 ft below surface	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW43B	3.0 - 4.0 ft	1 ft. below surface; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B
SW43C	4.0 - 5.0 ft	1 ft. below surface; mid-point of water column; 1 ft. above bottom	temp., pH, specific conductance, salinity, turbidity, DO, ORP, water depth, water color (Forel-Ule)	VOCs by EPA Method 8260B

NOTE:
Samples to be collected within approximate 1.5-hour window each side of low tide and each side of high tide