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February 14, 2014

Mr. Zi-Qiang Chen, PhD
Environmental Engineer
NCDENR- Superfund Section
Inactive Hazardous Sites Branch
Pre-Regulatory Landfill Unit
1646 Mail Service Center
Raleigh, North Carolina 27699

Re: Work Plan and Cost Proposal for Task Order 787DP-6 and 787DP-7
Rocky Knoll School Site (NONCD0000787)
Sampling and Analysis of Subsurface Landfill Gas and Hexavalent Chromium in Soil
Durham, Durham County, North Carolina
State Contract: N11001S
MM&A Project No.: NCUL210P6

Dear Chen:

Marshall Miller & Associates, Inc. (MM&A) is pleased to provide the **North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management, Superfund Section, Inactive Hazardous Sites Branch, Pre-Regulatory Landfill Unit (the Unit)** with this *Scope of Work* and *Cost Estimate* for performance of the Remedial Investigation - Delineation Phase activities at the Rocky Knoll School Site (NONCD0000787), hereinafter referred to as the site, located in Durham, Durham County, North Carolina. The *Work Plan* reflects the activities specified in the Request for Work Plan and Cost Proposal dated June 7, 2013.

SCOPE OF WORK

The following discussion outlines the proposed scope of work for the project.

Task Order 787DP-6

This task includes all activities associated with the field investigation and preparation of associated report components. All drilling and sampling locations are shown on the attached figure. All field investigation activities will be conducted in compliance with MM&A's Standard Operating Procedures and Quality Assurance Manual (SOPQAM) dated January 10, 2011. All field personnel, including subcontractors, will have obtained appropriate training and certification as specified in 29 CFR 1910.120, and will conduct activities in accordance with a site-specific Health and Safety Plan

Subtask 787DP-6A – Prepare Work Plan

MM&A will prepare a work plan outlining the scope of field assessment activities to be completed during the contaminant delineation phase as outlined in the Work Plan and Cost Proposal Request. This work plan will address the items in the Task Order request.

Subtask 787DP-6B – Sampling and Analysis of Subsurface Landfill Gas

Prior to initiating the drilling, MM&A will contact NC One Call (811) to identify and mark local utilities. Since the Site is undeveloped, it will not be necessary to contract with a utility location service to locate any other underground utilities. MM&A will subcontract with a drilling firm to advance borings using hollow-stem augers at the seven proposed landfill gas probe locations. (GP-21 through GP-26 and GP-10A) shown on *Figure 1*. The gas probes will be constructed with 1-inch PVC well casing with 5-foot screen intervals. A sand pack will be placed around the screen interval to a depth of 1 to 2 feet above the top of the screen. A minimum 2-foot bentonite seal will be placed on top of the sand pack. After hydration of the bentonite seal, the remainder of the annulus will be grouted to the surface and completed with an above-grade lockable cover and a 2' x 2' concrete pad. A cap with a sampling port will be placed over the well casing. The gas probes will be installed to a depth so that the bottom of the bentonite seal is at least five feet below ground surface (estimated screen interval 7 – 12 feet). Based on data from previous investigations, there appears to be sufficient separation from bedrock and/or groundwater at each of the proposed locations to allow placement of a five foot seal interval.

Within 24 hours of installation of all the landfill gas probes, measurements of methane (% lower explosive limit and % by volume), volatile organic compounds (VOCs), mercury, oxygen, carbon dioxide, and hydrogen sulfide will be collected at each landfill gas probe using field instrumentation. To meet the required minimum detection limits, the following equipment will be used for landfill gas measurements: methane, hydrogen sulfide ($\mu g/m^3$), oxygen, carbon dioxide, and temperature readings will be collected using a GEM 2000+ capable of detecting methane at 2,500 ppm (0.25% by volume, 5% LEL); VOC readings will be collected using a PID; mercury readings will be collected using a Jerome J405 Analyzer or equivalent meter. Humidity measurements will be collected periodically during the survey using a Thermo-Hygrometer. Barometric pressure readings will be recorded at least every hour during the survey using the GEM 2000+. Field instruments will meet the minimum requirements as defined by the Unit and quality assurance procedures (as defined by the Unit) will be followed. Field logs will be maintained to include all quality assurance and calibration information. In addition, those probes with detections will be re-screened prior to leaving the Site.

All meters will be field calibrated and, if necessary, recalibrated in the field as recommended by the manufacturer. Additionally, all meters will be recalibrated in the field if questionable readings (inconsistent readings or readings don't stabilize) are observed. For all equipment used, the following calibration information will be noted in the field logs and included in an appendix of the report:

- Manufacturer.
- Model number.
- Serial number.
- Date of factory calibration and maintenance.
- Set-up parameters.
- Detection limit.
- Field calibration details and/or bump tests before, during, and after evaluation, including type(s) of calibration gas with expiration date and additional field calibration as needed for changing field conditions.

During sample collection the following will be noted in the field logs:

- Sample location.
- The name(s) of MM&A field personnel conducting the above ground landfill gas survey.
- A brief description of the weather including items that would impact data.
- Date and time began/ended.
- Ambient temperature, humidity, and barometric pressure readings at least hourly.
- Verification of field calibration and additional field calibration as needed for changing conditions.
- Detection limit of each instrument used.
- Other notes that may affect results (water traps, filters, and change in barometric pressure or temperature).

Drill cuttings will be collected at each location for the purpose of visual inspection to log waste and/or soil characteristics and identify overt evidence of contamination (odor, staining). Soil will be screened for volatile organic vapors with a PID only if contamination is suspected. The locations of the landfill gas probes will be surveyed using a Trimble GeoXT 3000 GPS meter that will record coordinates in decimal degrees to the fifth order using the NAD 83 datum.

After the field readings have been collected, an air sample will be collected from GP-10A and GP-26 using an individually certified Summa canister for subsequent analysis of VOCs by EPA Method TO-15. Each canister will be ported to collect the sample over an 8-hour time period. A Helium-Leak Tightness Test will be performed prior to sample collection by injecting helium into the sample train, then monitoring the fittings, valves and gauges using a calibrated helium detection meter. If leaks are detected, the sampling train will be re-assembled and re-sampled until no leaks are detected. For the purpose of this cost estimate, two air samples and one duplicate sample are assumed (three (3) analyses total). The duplicate sample will be collected simultaneously with the original sample by using a dual sampling port that allows two canisters to be connected.

Subtask 787DP-6C – Sampling and Analysis of Soils for Hexavalent Chromium at Selected Locations

Soil samples will be collected at the following locations and depths – B-5B (1 to 2 feet), B-8C (6.5 to 7.5 feet), and B-11A (0.5 to 1.5 feet). Soil samples will be collected using direct-push technology (DPT) methods. A Teflon liner will be placed in the macro-core and advanced through the sample intervals. The samples will be submitted for laboratory analysis of hexavalent chromium by EPA Method 7196. For the purpose of this cost estimate, three soil samples and one duplicate sample are assumed (four (4) analyses total). Since samples are being collected during gas probe installation and sampling, drilling costs, field labor, and other field expenses are included under Subtask 787DP-6B.

Sediment samples for hexavalent chromium analysis will be collected at the SED-1, SED-2, and SED-3 locations. The samples will be submitted for laboratory analysis of hexavalent chromium by EPA Method 7196. For the purpose of this cost estimate, three sediment samples and one duplicate sample are assumed (four (4) analyses total).

Project Management

MM&A will perform management activities throughout the project including:

- Planning and preparation for field activities;
- Site visit during project start-up;
- Scheduling internal personnel and subcontractors;
- General project management tasks including tracking progress of various subtasks and assuring compliance with requirements set forth in the scope of work; and
- Coordination with the Unit personnel and field staff throughout the project on sample collection and analysis.

All project management costs for the task order are included in Subtask 787DP-6C.

Investigative Derived Waste Management Plan

Investigative Derived Waste (IDW) will be managed in accordance with the Unit guidelines. Any IDW that cannot be disposed on-site (used to backfill borings or spread on the ground

surface) will be contained in 55-gallon drums and stored on-site within a secured temporary fenced area. Cost for disposal is not included.

Report Components

Following completion of all field activities, MM&A will prepare report components for each Subtask including:

- Soil boring logs
- Tables providing GPS waypoints, field screening results, and analytical results compared to appropriate standards
- Figures with boring locations and contaminant concentrations
- Photologs of any significant clearing or land disturbance
- Text describing the activities, observations and results
- Field notes and instrument calibration information

Task Order 787DP-7 – Report Compilation

After completion of Task Orders 787DP-6, MM&A will compile the report components into a comprehensive *Remedial Investigation Report: Sampling and Analysis of Subsurface Landfill Gas (VOCs, H_2S, and Mercury) and Hexavalent Chromium in Soil and Sediment.*

SCHEDULE

MM&A will begin coordination of all work within 5 working days of the approval of this proposal. It is estimated that field work will be initiated by the third week after the work plan is approved contingent upon subcontractor and equipment availability. MM&A estimates that the field investigation can be completed within five working days inclusive of mobilization/demobilization. The following table summarizes the schedule and staffing for completion of the field work. A final report will be submitted to NCDENR within two weeks once Task Order 787DP-6 is approved for implementation. Invoices for work performed under this Task Order will be issued upon completion of the work.

Field Schedule	Subtask	Staff Level		
		Project	Staff	Technician
Week 1 Day 1	DP-6B	1	1	
Week 1 Days 2-3	DP-6B & 6C		1	
Week 1 Days 4-5	DP-6B &6C		1	1

A cost estimate for the proposed work is attached. Proposals from two qualified drilling firms were obtained and are attached for reference.

MM&A appreciates the opportunity to provide this proposal. Should you have any questions or require additional information, please do not hesitate to call.

Sincerely,

MARSHALL MILLER & ASSOCIATES, INC.

Lawrence M. George, P.G.
Senior Geologist

Timothy D. Grant, P.G.
Project Geologist

cc: File NCDENR/NCUL210P6

Attachments

LEGEND

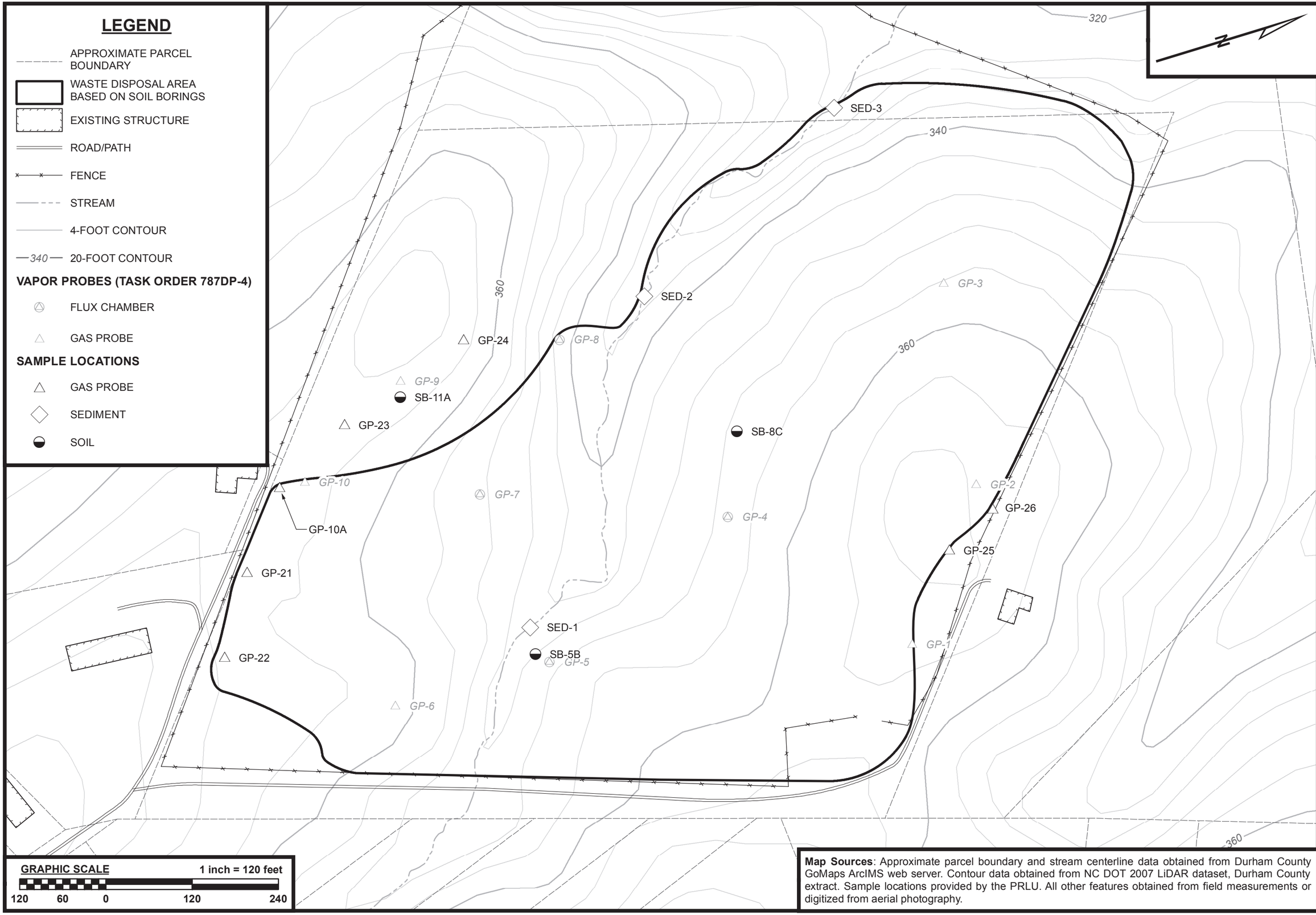
- APPROXIMATE PARCEL BOUNDARY
- WASTE DISPOSAL AREA BASED ON SOIL BORINGS
- EXISTING STRUCTURE
- ROAD/PATH
- FENCE
- STREAM
- 4-FOOT CONTOUR
- 340 — 20-FOOT CONTOUR

VAPOR PROBES (TASK ORDER 787DP-4)

- FLUX CHAMBER
- GAS PROBE

SAMPLE LOCATIONS

- GAS PROBE
- SEDIMENT
- SOIL



GRAPHIC SCALE 1 inch = 120 feet

120 60 0 120 240

Map Sources: Approximate parcel boundary and stream centerline data obtained from Durham County GoMaps ArcIMS web server. Contour data obtained from NC DOT 2007 LiDAR dataset, Durham County extract. Sample locations provided by the PRLU. All other features obtained from field measurements or digitized from aerial photography.

Marshall Miller & Associates, Inc.
Geology, Environmental Sciences & Engineering, Geophysics

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Prepared By:

FILE NO.: NCUL210P6 Fig 1 - Sample Location Map.mxd

DESIGNED:	EMC
DRAWN:	EMC
CHECKED:	TG
DATE:	2/11/2014
SCALE:	1 " = 120 '
PROJECT NO.:	NCUL210P6

REMEDIAL INVESTIGATION - DELINEATION PHASE
ROCKY KNOLL SCHOOL SITE
NONCD0000787
DURHAM COUNTY, NORTH CAROLINA

SAMPLE LOCATION MAP

FIGURE
1