



PAT MCCRORY  
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*Secretary*

MICHAEL SCOTT  
*Director*

September 16, 2016

*Transmittal via email*

Flora D'Souza  
Shield Engineering, Inc.  
4301 Taggart Creek Road  
Charlotte, NC 28208

**Ref: Request for Proposals – Investigation of Landfill Gas and Groundwater**  
Task Orders 7987DP-12 and 7987DP-13  
Swannanoa Landfill | Id.# NCD980557987  
Mountain Ridge Road, Swannanoa, Buncombe County

Dear Ms. D'Souza:

Please submit a task work plan and cost estimate to perform remedial investigation-contaminant delineation phase activities at the site referenced above. Conduct these activities in accordance with State Contract No. N15003i.

**Investigation Goals:** Further evaluate the potential for offsite migration of landfill gas and contaminated groundwater.

**Scope of Work for Task Order 7987DP-12:** Prepare a work plan in accordance with Shield Engineering, Inc.'s approved standard operating procedures dated July 1, 2016, and include a schedule of daily activities.

- Submit an itemized cost estimate that identifies personnel and materials involved.
- Reference the most recent Guidelines for Addressing Pre-Regulatory Landfills and Dumps for details regarding procedures.
- Ensure personnel in the field are qualified to identify contaminated material and landfill waste and comply with OSHA-required health and safety training. Before task activities begin, photograph areas or objects that may be disturbed. If needed, photograph affected areas and objects, restoration efforts, and noteworthy items encountered during task activities. Submit these photographs upon completion of the activities, and a review will determine if any need to be included in the report.
- Include background (light grey) topographic contour lines on figures detailing the Site and Site vicinity.
- For any invasive activities, provide a plan to properly manage investigation derived waste (IDW). If sampling results indicate non-hazardous IDW, spread within the waste disposal area. If sampling results indicate hazardous IDW, analyze containerized waste as required by waste hauler and include details of sampling and disposal of drums in the proposal. Remove all drummed waste and associated fencing from site within 90 days after field activities are concluded.

- For any field work, minimize the clearing of vegetative material to enable access to proposed sampling points. Using hand tools for clearing is the preferred method, otherwise an explanation must be provided for use of heavy equipment.
- Submit samples to a North Carolina-certified laboratory and analyze for the following parameters by the most current U.S. EPA Contract Laboratory Program Target Compound List:
  - volatile organic compounds (VOCs) by SW-846 method 8260,
  - 1,4-dioxane by Method 8260SIM,
  - semi-volatile organic compounds (SVOCs) by SW-846 method 8270,
  - 14 metals by SW-846 method 6020,
  - mercury by method 7471,
  - ammonia by SM 4500, and
  - nitrate and sulfate by EPA Method 300.
- Please note that any alternate method should be the U.S. EPA Method having the lowest detection limit and that at least achieves the detections equivalent to the 15A NCAC 02L standards or where these are not available, then federal maximum contaminant limits (MCLs).

#### Groundwater Investigations

##### **Include the following items for any groundwater well installation:**

- Log each boring in the field. Boring log information will include but is not limited to: top of ground elevation, detailed soil description and lithology at depths, depth of groundwater observed during drilling, notable reaction of drill rig during advancement, depth of competent rock encountered, detailed notes/remarks, and a well construction diagram.
- Determine ground water elevation for each well and collect water level measurements using all available groundwater wells.
- Collect one groundwater sample from each well, existing and new, to submit for laboratory analysis.
- Provide well construction details in a table and include installation date, top of casing elevation, ground surface elevation, total well depth, well screen interval, depth to groundwater, and groundwater elevation.

##### **Permanent groundwater monitoring wells:**

- Advance two soil borings to groundwater at the locations indicated on the attached map.
- Install a permanent 2-inch diameter groundwater monitoring well in each boring.
- Depth to groundwater is estimated to be 18 feet below land surface, based on observations in MW-11, and it is assumed that hollow stem augers will be required to advance the borings.
- Well installation must comply with the most current 15A NCAC 02C .0100 well construction standards.
- Construct wells with stick-up covers.

##### **Alteration of existing well:**

- Convert the casing cover of MW-11 from stick-up to flush-mount.

#### Landfill Gas Probe Installation and Screening

- Repair damaged gas probes GP-3 and GP-5. Convert GP-5 to have a flush-mount well cover.
- Install two permanent landfill gas probes located as presented in the attached map to monitor subsurface landfill gas.
- If landfill gas probes cannot be constructed according to minimum requirements in the Guidelines, contact the Unit Project Manager and be prepared to conduct Flux Chamber installation and screening.
- Screen all existing and new landfill gas probes for volatile organic compounds (VOCs), methane, oxygen, carbon dioxide, barometric pressure and hydrogen sulfide.
- Screen new landfill gas probes at least 24 hours after installation.

- Compare landfill gas probe screening results with the IHSB Residential Vapor Intrusion Screening levels.
- Do not abandon the gas probes following screening. A review of the field testing results will determine subsequent sample collection.

**Scope of Work for Task Order 7987DP-13:** Prepare a report of the sampling activities conducted under Task Order 7987DP-12.

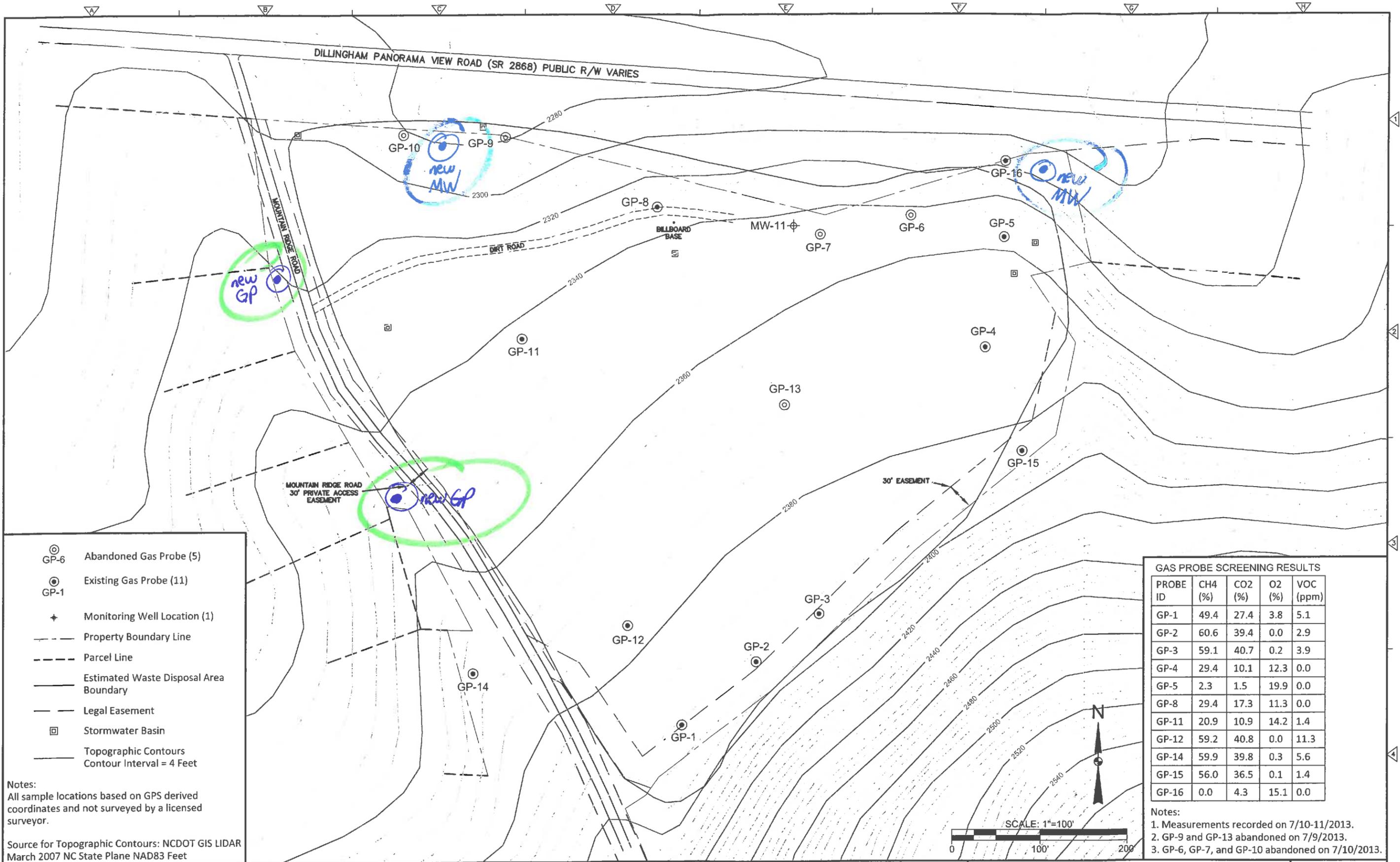
- Title the report “Remedial Investigation – Landfill Gas and Groundwater Sampling”.
- The report is to contain the following items:
  - Text, tables, and figures to adequately summarize task activities.
  - A section concerning any variations from the work plan or your SOPs.

Please provide the work plan and cost estimates by September 26, 2016. A task authorization to begin work will be issued based on the approved proposal. Do not proceed with tasks prior to receiving this authorization. Please contact me at [thomas.slusser@ncdenr.gov](mailto:thomas.slusser@ncdenr.gov) or 919-707-8331 if you have any questions.

Best regards,



Thomas Slusser, L.G., C.E.E.  
Pre-Regulatory Landfill Unit  
Division of Waste Management



- ⊙ GP-6 Abandoned Gas Probe (5)
- ⊙ GP-1 Existing Gas Probe (11)
- + Monitoring Well Location (1)
- - - Property Boundary Line
- - - Parcel Line
- - - Estimated Waste Disposal Area Boundary
- - - Legal Easement
- Stormwater Basin
- - - Topographic Contours  
Contour Interval = 4 Feet

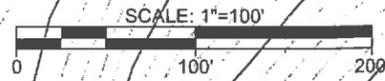
Notes:  
All sample locations based on GPS derived coordinates and not surveyed by a licensed surveyor.

Source for Topographic Contours: NCDOT GIS LIDAR  
March 2007 NC State Plane NAD83 Feet

**GAS PROBE SCREENING RESULTS**

PROBE ID	CH4 (%)	CO2 (%)	O2 (%)	VOC (ppm)
GP-1	49.4	27.4	3.8	5.1
GP-2	60.6	39.4	0.0	2.9
GP-3	59.1	40.7	0.2	3.9
GP-4	29.4	10.1	12.3	0.0
GP-5	2.3	1.5	19.9	0.0
GP-8	29.4	17.3	11.3	0.0
GP-11	20.9	10.9	14.2	1.4
GP-12	59.2	40.8	0.0	11.3
GP-14	59.9	39.8	0.3	5.6
GP-15	56.0	36.5	0.1	1.4
GP-16	0.0	4.3	15.1	0.0

- Notes:
- Measurements recorded on 7/10-11/2013.
  - GP-9 and GP-13 abandoned on 7/9/2013.
  - GP-6, GP-7, and GP-10 abandoned on 7/10/2013.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. WEISPFENNING  
 DRAWN BY: A. WEISPFENNING  
 SHEET CHK'D BY: M. COLONE  
 CROSS CHK'D BY: M. COLONE  
 APPROVED BY: M. COLONE  
 DATE: JULY 2013

**CDM Smith**  
 Camp Dresser McKee & Smith  
 5400 Glenwood Avenue, Suite 300  
 Raleigh, NC 27612 | Tel: (919) 787-5620  
 NC F-0412

SWANNANOVA, BUNCOMBE COUNTY, NORTH CAROLINA  
**SWANNANOVA LANDFILL**  
 (NCD980557987)

**SITE MAP WITH GAS PROBE SCREENING RESULTS**

PROJECT NO. 127844-97867  
 FILE NAME: GP 7-13.DWG  
 FIGURE  
**1**