ENVIRO-PRO
PROFESSIONAL CORPORATION

August 5, 2013

Ms. Jaclynne Drummond
North Carolina DENR
Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: Proposed Assessment Monitoring Work Plan
North Mecklenburg C&D Landfill
19300 Holbrooks Road
Huntersville, North Carolina
Permit #60-13
Job No. EP-1217(A)

Dear Ms. Drummond:

On behalf of our client, Greenway Waste Solutions, LLC, Enviro-Pro, P.C. (EP) is submitting this proposed Assessment Monitoring Work Plan for the subject facility. This Plan is in response to the requirements of 15A NCAC 13B.0545(b) and our telephone discussions regarding VOCs detected in several groundwater monitor wells during the first 2013 semi-annual sampling event for this landfill.

Please contact me if you have any questions or wish to discuss this proposed Plan during your review.

Sincerely,
ENVIRO-PRO, P.C.

Thomas H. Bolyard

Thomas H. Bolyard, P.G.
Senior Hydrogeologist

2646 Farmlake Lane • Fort Mill, SC 29708 • (803) 547-4955 • Fax (803) 548-2233

PROPOSED ASSESSMENT MONITORING WORK PLAN

North Mecklenburg Landfill
15300 Holbrooks Road
Huntersville, North Carolina
Permit #60-13

Prepared for:
Mr. Mike Griffin
Greenway Waste Solutions, LLC
19109 West Catawba Avenue, Suite 200
Cornelius, North Carolina 28031-5613

Prepared by:
Enviro-Pro, P.C.
2646 Farmlake Lane
Fort Mill, South Carolina 29708

Project Number EP-1217

August 5, 2013

NORTH CAROLINA LICENSED 492 GEOLOGIST THOMAS H. BOLYARD

Background Information

The North Mecklenburg C&D Landfill was closed in October 2002. Semi-Annual sampling of six perimeter groundwater monitor wells has been conducted since that time with reports submitted to the North Carolina DENR Solid Waste Section. Approximate well locations are indicated on Figure 1. The first 2013 semi-annual sampling event conducted by Enviro-Pro, P.C. (EP) personnel on April 25, 2013 indicated the presence of the compound vinyl chloride in four (MW-4, MW-5, MW-10, and MW-11) of the six monitor wells sampled at levels exceeding its 2L Standard of 0.03 parts per billion (ppb). A resampling event conducted by EP personnel on May 30, 2013 confirmed the presence of this volatile organic compound (VOC) at similar concentrations in the same four monitor wells, as well as in one additional monitor well (MW-6).

On July 24, 2013, EP personnel purged and sampled three existing monitor wells (MW-7, MW-8, and MW-9) located along the southwest property line of the landfill. Approximate well locations are indicated on Figure 1. These monitor wells had been installed at the same time as the other six monitor wells previously described but were never included as part of the semi-annual sampling program for this facility. Analytical results indicated that vinyl chloride was detected in MW-8 above its 2L Standard.

Groundwater flows radially out from this landfill facility as evidenced by the placement of monitor wells around its perimeter and the detection of VOCs in these wells in all directions. Potential receptors include Cane Creek along its northern boundary, the Joseph Wright and William Hammill water supply wells to the east, and the Ron Gilkerson and Michael Tinsley water supply wells to the south (Figure 1). The following is a discussion of proposed assessment activities to determine the likelihood that any of these potential receptors may be adversely impacted.

Proposed Assessment Activities

Additional groundwater monitor wells will be installed at the landfill to characterize the nature and extent of vinyl chloride levels exceeding its 2L Standard (Figure 1). These additional wells will aid in determining the lithology and hydraulic conductivity of the bedrock aquifer and saprolite, groundwater flow rates, estimated travel distances/times to potential receptors, the resource value of the aquifer, and the nature, fate and transport of any detected constituents.

Shallow Monitor Well Installation

In accordance with 15A NCAC 13B .0545(a), additional shallow downgradient groundwater monitor wells will be installed at the compliance boundary (i.e., 50 feet inside the landfill property boundary) in the vicinity of impacted monitor wells MW-4, MW-6, and MW-11 as indicated on Figure 1. Due to their topographic setting in close proximity to Cane Creek, there is insufficient space to install additional assessment wells downgradient from MW-5 and MW-10. The hydrogeologic position of MW-11 dictates that two additional shallow monitor wells will need to be installed to the southeast and to the east-northeast. Groundwater flow likely occurs from this area of the landfill in both directions towards Cane Creek across tracts owned by Joseph Wright and Mecklenburg County (Figure 1).

These additional monitor wells will be completed approximately 10 feet below the current water table and constructed of 2-inch diameter schedule 40 PVC with a 15-foot screen. A sandpack will be installed two feet above the screen top and a minimum 2-foot bentonite seal will be placed on top of the sand. The remainder of the annular space will be filled with cement grout to near the ground surface and a lockable metal protective cover and 2-foot x 2-foot cement pad will complete the well installation. Well tags displaying relevant well construction information will be fastened to the outside of each protective cover.

Bedrock Monitor Well Installation

Due to the geochemical characteristics of the compound vinyl chloride, it must be determined whether it has migrated vertically into the fractured bedrock at this site. In order to accomplish this, the installation of Type III bedrock monitor wells is proposed at all locations of documented groundwater impact in the existing monitor wells (i.e., MW-4, MW-5, MW-6, MW-8, MW-10, and MW-11. Two Type III wells will be installed downgradient from MW-11 paired with the two shallow monitor wells previously discussed to determine whether contamination has migrated off site in these directions. An additional Type III well will be paired with a proposed shallow monitor well at the very southern compliance boundary to determine whether contaminant migration onto the Tinsley property has occurred. The approximate locations of these proposed bedrock wells are indicated on Figure 1.

These additional bedrock monitor wells will be completed utilizing 6-inch schedule 40 PVC casing set to depths of approximately 15 to 20 feet below the bottom of the nearest shallow monitor well. This casing will be grouted into place and allowed to set up for 24 hours. At that time a 5.5-inch rotary air hammer bit will be used to drill to the depth of the next water-bearing fracture. A 2-inch Schedule 40 PVC well with a 5-foot screen will

then be constructed as previously described for the shallow wells to intercept this fracture.

All wells will be constructed in accordance with the Standards of Well Construction specified in 15A NCAC 02C.0108 and will be developed via surging and pumping after their completion.

Aquifer Characteristics

In-situ permeability testing will be performed by EP personnel on selected shallow and bedrock monitor wells to determine the hydrogeologic characteristics of the saprolite and bedrock aquifers. Parameters including vertical and horizontal hydraulic gradients, hydraulic conductivities, and groundwater flow rates will be calculated. The calculation of vertical gradients from paired shallow/deep monitor wells on both sides of Cane Creek should enable the identification of the source of groundwater impact along the Creek. This data will also help confirm that Cane Creek is a discharge feature for both this closed landfill facility and the active North Mecklenburg C&D Landfill Infill facility located on the opposite side of the Creek.

Based on the results of proposed assessment activities, the resource value of the bedrock aquifer will be determined. Available construction information from the four existing water supply wells located to the east and south of the landfill facility will also be incorporated in this aquifer evaluation.

Well Sampling Analysis

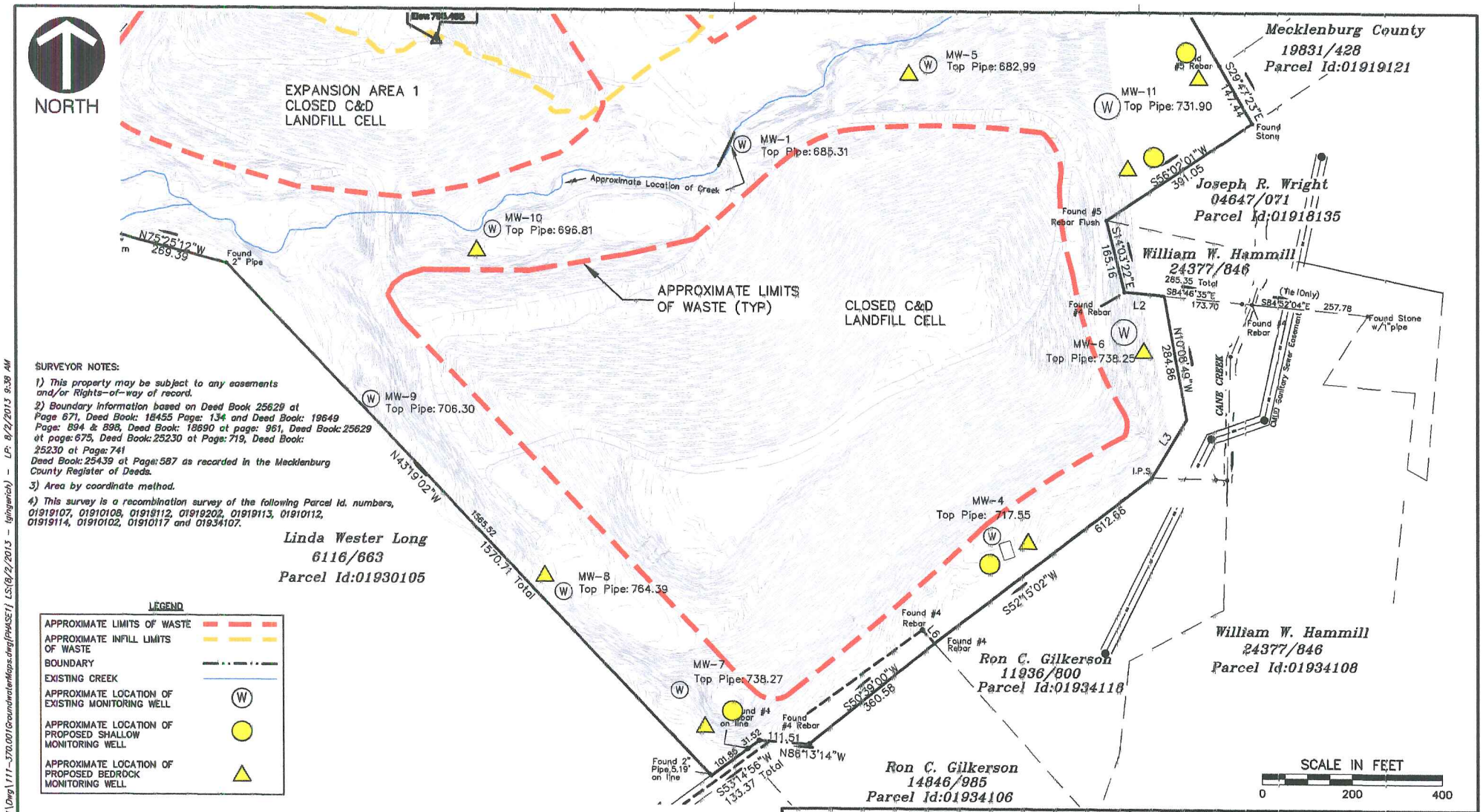
EP personnel will utilize either dedicated bailers or submersible pumps to collect groundwater samples from the existing and newly installed monitor wells. During the initial sampling event after the additional assessment wells have been installed, all wells will be analyzed for Appendix I constituents in accordance with DENR requirements under the .0500 regulations. QA/QC procedures will include changing disposable gloves between sampling locations and analyzing a laboratory supplied trip blank for VOCs for each sampling event.

For any constituent detected in the proposed additional downgradient shallow or bedrock monitor wells, a minimum of four independent samples from both background and

downgradient wells will be collected and analyzed in order to establish background concentrations for the newly detected constituents. EP will coordinate with the DENR to establish groundwater protection standards for any newly detected constituents that do not have an established 2L Standard.

Groundwater sampling will be performed on a semi-annual frequency unless otherwise directed by the DENR. All analytical work will be conducted by Shealy Environmental Services located in West Columbia, South Carolina, a North Carolina certified laboratory. An Assessment Monitoring Report, certified by a Licensed NC Geologist, will be submitted to the DENR summarizing the results of each semi-annual sampling event.

The groundwater analytical results along with the calculated aquifer characteristics will be utilized to determine the need for any additional site assessment activities, including the installation of additional monitor wells that may be necessary to fully delineate the extent of groundwater impact or to protect existing receptors. Upon completion of proposed Work Plan activities, adjacent property owners will be notified if it appears that contaminants have migrated or are likely to migrate onto their property.



SURVEYOR NOTES:

1) This property may be subject to any easements and/or Rights-of-way of record.

2) Boundary information based on Deed Book 25629 at Page 671, Deed Book: 18455 Page: 134 and Deed Book: 19649 Page: 894 & 898, Deed Book: 18690 at page: 961, Deed Book: 25629 at page: 675, Deed Book: 25230 at Page: 719, Deed Book: 25230 at Page: 741
Deed Book: 25439 at Page: 587 as recorded in the Mecklenburg County Register of Deeds.

3) Area by coordinate method.

4) This survey is a recombination survey of the following Parcel Id. numbers, 01919107, 01910108, 01919112, 01919202, 01919113, 01910112, 01919114, 01910102, 01910117 and 01934107.

LEGEND

APPROXIMATE LIMITS OF WASTE	
APPROXIMATE INFILL LIMITS OF WASTE	
BOUNDARY	
EXISTING CREEK	
APPROXIMATE LOCATION OF EXISTING MONITORING WELL	W
APPROXIMATE LOCATION OF PROPOSED SHALLOW MONITORING WELL	
APPROXIMATE LOCATION OF PROPOSED BEDROCK MONITORING WELL	

REFERENCE

1. 2013 TOPOGRAPHIC INFORMATION PROVIDED BY PATTERSON LAND SURVEYING, PA – DATE OF AERIAL PHOTOGRAPHY JUNE 1, 2013
2. EXISTING TOPOGRAPHIC CONTOUR INFORMATION PROVIDED BY INDEPENDENT MAPPING CONSULTANTS – FEBRUARY 7, 2008
3. EXISTING AND PROPOSED WELL LOCATIONS PROVIDED BY PATTERSON LAND SURVEYING AND TOM BOLYARD, P.G. FROM ENVIRO-PRO, P.C.

CEC
Civil & Environmental Consultants, Inc.
2030 S. Tryon Street · Suite 3E · Charlotte, NC 28203
Ph: 980.224.8104 · Fax: 980.224.8172
www.ceainc.com

GREENWAY WASTE SOLUTIONS OF NORTH MECK, LLC.
NORTH MECKLENBURG LANDFILL
HUNTERSVILLE, NC

PHASE 1
MONITORING WELL LOCATION MAP

DRAWN BY:	TMG	CHECKED BY:	SLB	APPROVED BY:	TMG	FIGURE NO.:	1
DATE:	AUG. 2013	DWG SCALE:	1"=200'	PROJECT NO:	111-370.0001		

P:\2011\111-370\-CADD\001\Dwg\111-370.001GroundwaterMaps.dwg{PHASE1} LS:(8/2/2013 - tgingerich) - LP: 8/2/2013 9:38 AM