DIN 10673

Ritter, Christine

From: Maddie German [mgerman@mesco.com]
Sent: Monday, March 01, 2010 11:06 AM
To: Ritter, Christine
Subject: Lenoir County Phase 2 expansion
Attachments: text and plates.pdf; sampling and analysis.pdf; PlateA with existing methane.pdf

Ms. Ritter:

I have attached several PDF files for your review to ensure we have sufficiently answered your requests for additional information. The following documents are included:

1. Design Hydrogeologic Study (section 1.2.1 and section 6 of text)
2. Plate 5A (renamed from Plate 5)
3. Plate 5B (new plate)
4. Sampling and Analysis Plan (text)
5. Plate A

Below are your referenced comments, information requests (in bold), and our responses:

Wetlands

The April 29, 2002 wetlands determination issued by the US Army Corps of Engineers for the Lenoir County Landfill has expired. The determination states "any changes in the described work resulting in impacts to jurisdictional waters or wetlands or any new work in jurisdictional waters or wetlands outside the area described must be coordinated with Corps of Engineers prior to commencement." **Please provide information regarding the impact of landfill expansion activity on the wetlands located at the facility and include an updated wetland determination if necessary.**

Proposed landfill expansion activities (Phase 2) should not impact the currently delineated wetland areas on the Lenoir County Landfill facility property. Phase 2 is proposed to be constructed northwest of Phase 1, which has been constructed west of the delineated wetland areas. Therefore the Phase 1 unit provides a barrier between the proposed Phase 2 unit and the current wetland areas. Additionally, no permanent wells or structures are proposed to be installed in the wetland areas. A licensed environmental professional recently performed a site reconnaissance and determined the referenced wetlands should remain non-impacted. Additional information regarding this wetland area has been added to the Design Hydrogeologic report in Section 1.2.1 - Drainage.

Section 1.2.1. Drainage

This section includes a statement that "At the landfill facility, surface drainage flows northwesterly towards Fredericks Branch, which flows northeasterly into Falling Creek and subsequently into the Neuse River." There are no maps depicting locations of these drainage features at the landfill facility. **Please submit maps illustrating the location of these drainage features in relationship to the landfill property and include discussion regarding influence of these drainage features on surface water and groundwater flow at the site.**

The text has been amended to include a more comprehensive discussion of the drainage feature locations. Plate 5B has been created to better illustrate the drainage locations relative to the facility property boundary.

Section 6 Groundwater Quality Monitoring System

In order to detect the effects of the facility on surface water in the area, surface water samples need to be collected in upgradient and downgradient locations. The single proposed surface water sampling point, SW-3, located in the wetland area in the eastern corner of the property, is insufficient to determine surface water quality across the entire

landfill area. **Please identify additional surface water sampling locations to accurately depict surface water quality across the site.**

Section 6 has been amended to reflect changes made to Appendix E – Sampling and Analysis Report. The primary drainage features (Falling Creek and Fredricks Branch) are located outside the landfill property line. SW-3 is a small ephemeral drainage feature located in the wetland area. Due to the location of the landfill in proximity to drainage features and surface waters, additional surface water locations, within the property boundary are not feasible.

A Water Quality Monitoring Plan must be submitted which satisfies the rule requirements of 15A NCAC 13B .1623 (b)(3). **The Groundwater and Surface Water Sampling and Analysis Plan discussed in this section and included in Appendix E of the Design Hydrogeological Report needs to be updated to adhere to the Solid Waste Section Guidelines for Groundwater, soil and Surface Water Sampling located at http://www.wastenotnc.org/swhome/EnvMonitoring/SolidWasteSamplingGuidance**. This guidance document has been updated in the period of time since the last permit was issued for the site.

Appendix E has been re-written to accommodate the updated Solid Waste Section Guidelines for Groundwater, Soil and Surface Water Sampling. A methane plan has been included as part of Appendix E to adhere to the newest Guidance Document. Plate 9 has been updated to show the locations of the existing methane probes and Table E-2 has been added to provide summary details on the methane probes.

Upon final approval, a PDF copy of the report will be provided. Please contact us at (919) 772-5393,mgerman@mesco.com, or mbrown@mesco.com if you have any questions.

Madeline German
Municipal Engineering Services Company, P.A.
Garner, NC 27529
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1.2.1 Drainage

Lenoir County is located within the Neuse River drainage basin. The Neuse River flows through the center of the county and is primarily responsible for draining a large portion of eastern North Carolina. At the landfill facility, surface drainage flows northwesterly towards Fredricks Branch*. Fredricks Branch is a small creek that flows northeasterly into Falling Creek outside the northern side of the landfill facility property line. Falling Creek flows several miles through Lenoir County before joining the Neuse River. The Neuse River flows southeasterly where it eventually drains into Pamlico Sound. The property is generally bounded by Hodges Farm Road (NCSR 1524) on the west, Falling Creek on the east and Fredricks Branch on the north. Within the property boundary there are a limited number of man-made drainage features; most features are dry the majority of the year, providing poor access and inadequate quality for surface water location sampling points. Plate 5A shows the general site location near Falling Creek. Plate 5B illustrates the Falling Creek Topographic Quadrangle showing labeled drainage features of Falling Creek, Fredricks Branch and the Neuse River.

A small wetland area was delineated in an April 29, 2002 report issued by the U.S Army Corps of Engineers east of the Phase 1 unit. Proposed landfill expansion activities (Phase 2) should not impact the currently delineated wetland areas on the Lenoir County Landfill facility property. Phase 2 is proposed to be constructed northwest of Phase 1, which has been constructed west of the delineated wetland areas. Therefore the Phase 1 unit provides a barrier between the proposed Phase 2 unit and the current wetland areas. The wetland area will remain undisturbed; no permanent wells or structures will be constructed that could affect the wetland area. The general flow direction of groundwater and surface water poses no harm to existing wetlands or flora or faunal species residing within them. A licensed environmental professional has recently performed site reconnaissance and determined the referenced wetlands will remain non-impacted.

1.2.2 Facility History

Historically, this area has seen development in rural residential, farmland and forest areas. Site suitability analysis was performed in April 2002. The Phase 1 *Permit to Construct* was issued on August 28, 2001 and the *Permit to Operate* Phase 1 was issued on July 26, 2002. The MSW landfill, currently operating in Phase 1, is located adjacent to the closed unlined landfill and C&D landfill. A small portion of the unlined landfill was capped with a 24 inch soil cover and closed in October 1994. The remainder was closed in October 1998 using a cohesive cap of 18 inches of soil, with a permeability of 1 x 10^{-5} cm/sec, and 18 inches of erosive layer, as part of the *Transition Plan*.[18]

* The name of the creek was referenced as Fredricks Branch in the Transition Plan. The creek is not named on USGS Topographical Maps.

6 GROUNDWATER QUALITY MONITORING SYSTEM

The intention of the water quality monitoring system is to create a plan to effectively detect an early release of hazardous constituents to the uppermost aquifer. The Sampling and Analysis Plan is included as Appendix E, in this report. This section is an outline of that proposed plan.

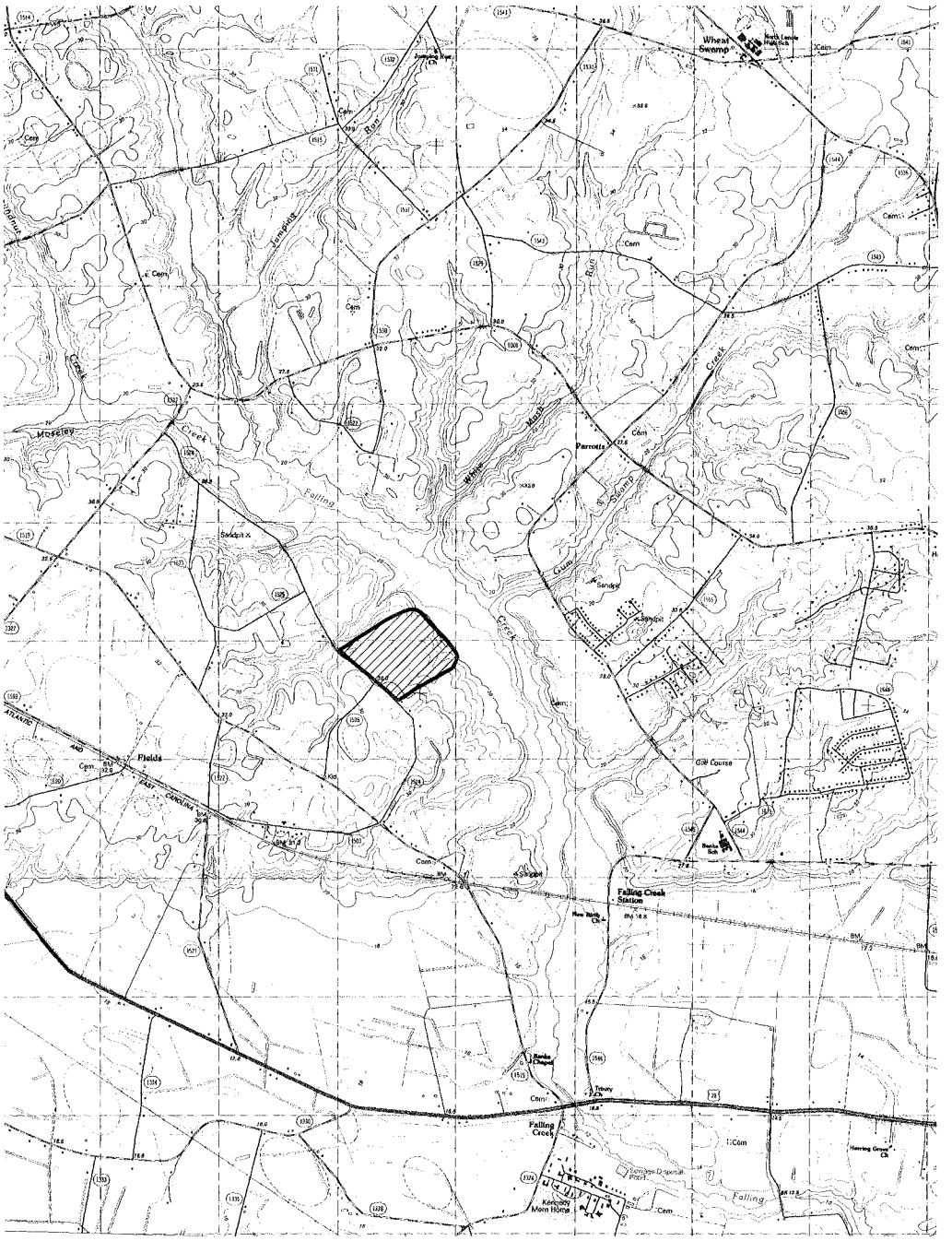
This monitoring plan consists of nine monitoring wells numbered MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19S, MW-19D and MW-20, one surface water monitoring point numbered SW-3, and two leachate collection points, LAGOON and LE2. Full details for all locations incorporated into the Sampling and Analysis Plan are presented in Appendix E.

In summary the following actions are proposed to provide groundwater, surface water, methane and leachate monitoring for the Phase 2 unit of the Lenoir County Subtitle D Landfill.

1. Properly abandon eight wells in the Phase 2 footprint. (P2-2, P2-3, P2-5S, P2-5D, P2-6, P2-7, P2-8, P2-12)
2. Convert P2-11S and P2-11D to monitoring wells MW-19S and MW-19D, respectively.
3. Install new monitoring well MW-20.
4. Continue use of Phase 1 monitoring wells.
5. Utilize MW-17 and MW-18 to monitor lagoon.
6. Use existing surface water monitoring point SW-3.
7. Continue sampling methane probes quarterly and submit results to the solid waste section, in accordance with the updated Guidance Document.

PLATE 5A Regional Characterization Map

Design Hydrogeologic Study - Lenoir County Landfill, Phase 2



Date Completed	5/31/2007
Created By	M. German
Project Name	Design Hydrogeologic Study, Phase 2
Site Name	Lenoir County Sanitary Landfill
Project Number	G08095.6

N

QUADRANGLE LEGEND

ROAD CLASSIFICATION

Primary highway, hard surface

Secondary highway, hard surface

Light-duty road, hard or improved surface

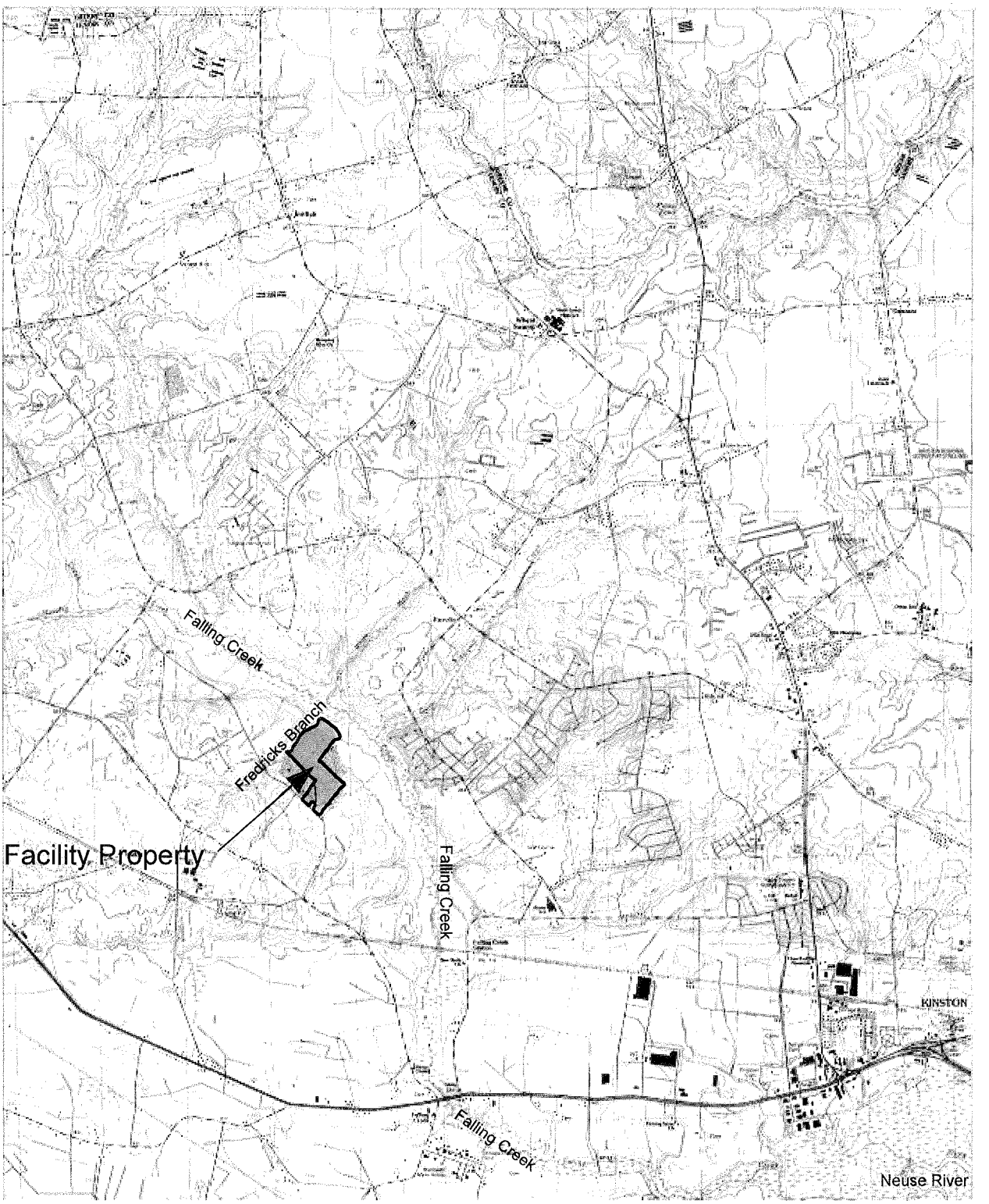
Unimproved road

Interstate Route U. S. Route State Route

Municipal Engineering Services Company, PA

PLATE 5B Drainage Feature Map

Design Hydrogeologic Study - Lenoir County Landfill, Phase 2



Date Completed	2/9/2010
Created By	M. German
Project Name	Design Hydrogeologic Study, Phase 2
Site Name	Lenoir County Sanitary Landfill
Project Number	G08095.6

Municipal Engineering Services Company, PA

N

ROAD CLASSIFICATION

Primary highway, hard surface

Secondary highway, hard surface

Light-duty road, hard or improved surface

Unimproved road

Interstate Route U. S. Route State Route

Sampling and Analysis Plan

Prepared for

Lenoir County Subtitle D Landfill
LaGrange, North Carolina

MESCO Project Number: G08095.6

This report is included as an Appendix E, part of the Design Hydrogeologic Study completed for the Lenoir County Subtitle D Landfill, Phase 2.

Completed: November 30, 2009
Revised: March 1, 2010

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Geoscientist

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1 INTRODUCTION AND OBJECTIVE

The objective of the Sampling and Analysis Plan is to provide clear guidelines and procedures for field and laboratory personnel when collecting and analyzing groundwater, methane and surface water samples. This plan applies to the Phase 1 and Phase 2 portions of the Lenoir County Subtitle D Landfill. The sampling procedures outlined in this analysis plan are guidelines by which sampling will be performed. Deviation from the procedures may be warranted depending on facility conditions or unforeseen sampling variables. Alternative sampling procedures must conform to the Solid Waste Section Guidelines for Groundwater, Soil and Surface Water Sampling (Guidance Document).

Within six months of issuing the Phase 2 Permit to Operate, four independent sampling events of monitoring wells MW-19S, MW-19D and MW-20 will be collected with at least one sampling event occurring prior to receiving waste. The results of these sampling events will be used to establish a baseline for water quality information for the subsequent sampling events of Phase 2. Groundwater and surface water monitoring points will be sampled semi-annually thereafter for the Appendix I list of constituents. Methane probe readings will be collected quarterly in accordance with Rule 15A NCAC 13B and results will be submitted to the Solid Waste Section.

2 GROUNDWATER AND SURFACE WATER

2.1 ON LOCATION

2.1.1 Existing Conditions

This monitoring plan consists of six monitoring wells numbered MW-13, MW-14, MW-15, MW-16, MW-17 and MW-18, one (1) surface water monitoring point numbered SW-3 and one (1) leachate collection point referred to as LAGOON. Monitoring points included in this plan are summarized on Table E-1.

MW-13 is located approximately 500 feet west of the western corner of the Phase 1 unit, and serves as the background well for the MSW facility. Monitoring Well MW-14 is located approximately 250 feet north of the northeastern corner of the berm and monitors groundwater migration through the northern third of the Phase 1 area and the middle of the Phase 2 area. MW-15 is located on the eastern side of the sump area, monitoring groundwater migrating through the middle third of the Phase 1 area and the bottom of the Phase 2 unit. MW-15 will detect a sump leak should one occur. MW-16 is located near the southeastern berm and monitors groundwater migrating through the southern third of the Phase 1.

Monitoring Wells MW-17 and MW-18 are located in the immediate vicinity of the leachate lagoon, approximately 1000 feet southwest of Phase 1. These two monitoring wells serve as early detection of potential leachate lagoon leakage, should an event take place. MW-17 is approximately 200 feet northwest of the lagoon and serves as a down-gradient compliance well. MW-18 is located approximately 200 feet southwest of the lagoon and serves as a background well.

Surface water monitoring point SW-3 is located on the northeastern margin of the wetland alongside the access road.

2.1.2 Additions for Phase 2

Three (3) monitoring wells, MW-19S, MW-19D and MW-20 have been incorporated into the monitoring plan for inclusion of Phase 2. MW-19S and MW-19D will be converted from piezometers P2-11S and MW-11D respectively. MW-20 will be installed approximately 300 feet southeast of MW-19S and MW-19D.

MW-19S will be converted from piezometer P2-11S to be used as a down-gradient monitoring well for the northern portion of the Phase 2 area. MW-19D will be converted from piezometer P2-11D to be used as a deep, down-gradient well for the Phase 2 area.

MW-20 will be installed approximately 150 feet outside the Phase 1 and Phase 2 disposal areas. It will be used as additional coverage for Phase 2 and will help determine the origin of contamination, should a leak or breakout occur.

Leachate pumps will be installed at both low ends of the Phase 2. One pipe will run directly from the Phase 2 along the access road around future Phase 3 into the lagoon. A second leachate collection pipe will be run along Phase 1 and connect with the existing Phase 1 pipe. Should detection occur, two sampling locations provide more reliable data to determine the source.

No additional surface water sampling points will be included due to the lack of drainage features and ephemeral streams located within the property boundary.

2.2 SAMPLING

Wells will be sampled in order from least to greatest contamination unless no information is available; then they will be sampled in order working down gradient. In both cases, background well samples will be collected prior to collecting monitoring well samples.

2.2.1 Set-Up

A clean sheet of plastic should be placed around the well to provide a clean surface for sampling equipment. The total well depth read from the well tag and the measured depth to water, determined using the water level indicator, will be used to compute the depth of water in the well. The total well depth will be measured and compared to the depth indicated on the well tag as a check for siltation or blockage at depth, using the chart on Plate C. For example, if a two-inch well is 29 feet deep and has a measured depth to water of 10 feet, there are 19 feet of standing water or 3.3 gallons in the well.

The EPA recommends the indicator parameters: pH, specific conductance and temperature be measured on purged and recovered monitoring wells before collecting samples. When three consecutive measurements are within a 10% range, temperature and specific conductance are considered stable; pH is considered stable when three consecutive measurements are within a range of 0.2 units. All information, including the depth to water, pH, temperature and specific conductivity of the sample measured in the field at each well sampled will be recorded on a field data sheet or in a field logbook with copies submitted to the Division of Waste Management with the analytical results.

All meters will be calibrated immediately prior to purging and sampling and those readings recorded in a field logbook. The meters should be recalibrated at the end of each sampling event and those readings recorded in the log also. Entries will always include pre- and post- calibration readings as well as the model and serial

number of the equipment and the date, time, and person performing the calibration(s). Two standards, which bracket the average or suspected measurements for pH and specific conductance, will be used at the site. Additionally, if an equipment blank needs to be run, it should be done before any sampling is started.

2.2.2 Equipment

Groundwater purging and sampling will be performed using a submersible pump and disposable polyethylene bailers. Each location will be sampled with a new bailer to prevent cross-contamination issues. The following procedure will be used decontaminate the submersible pump:

1. Phosphate-free detergent & de-ionized or distilled water rinse.
2. De-ionized or distilled water rinse.
3. Isopropyl alcohol (isopropanol) rinse.
4. De-ionized or distilled water rinse.

Alternative sampling equipment may be warranted, depending on variable field conditions; all alternative equipment and procedures must conform to the Guidance Document. The standard equipment necessary to conduct sampling for each well consists of sample containers (including trip blanks and equipment blanks), one wide-mouth container, at least two 600-ft spools of 1/4-inch nylon rope, at least two boxes of unpowdered, disposable gloves, one box of large plastic bags, temperature indicator, pH indicator, conductivity indicator, water level indicator, storage coolers and ice. If the total depth of all wells to be sampled exceeds 1,200 feet, additional spools of rope will be required to complete the sampling. If the number of wells to be sampled exceeds one third of the number of pairs of gloves in stock, additional boxes of gloves will be necessary. All equipment subject to damage and contamination will be transported in sealed, plastic bags or storage containers.

Each sample container will be clearly labeled providing the site name, county location, well identification number, parameters to be analyzed, preservative added, date and time of sampling and initials of the sampler. Samples to be analyzed for organic content will be collected in four 40-ml glass vials with Teflon caps. The sample vials will be completely filled with no air left in the vials. Samples to be analyzed for inorganic contamination will be collected in a -quart/1-liter polyethylene container with ½ inch space for air permitted.

All sample containers will be obtained from an independent North Carolina certified laboratory in a sterilized condition. Some of the containers will have a pre-measured amount of preservative in them as necessary. In this event, care will be taken not to rinse the container or allow the preservative to wash out during sampling.

2.2.3 Purging

Purging is done prior to sampling to remove stagnant water from the well and to introduce fresh groundwater for sampling. Each well will be purged three to five well volumes (quantity of water in the well), or until dry. In the previous example, 10 gallons would be adequate.

After determining the amount of water to be purged from a well, the equipment necessary will be assembled including rope, a 5-gallon bucket, bailer and gloves. Pull the top portion of wrapping away exposing the eyelet, keeping the bailer in a stable upright position. Using gloved hands: secure rope to the bailer via the eyelet hole and suspend to remove the remaining wrapping. These gloves are now contaminated and cannot touch the bailer or the rope. Clean, gloved hands will slowly lower the suspended bailer into the well until the bailer contacts groundwater. Cut the rope to length and secure it, to prevent loss of the bailer, again replace contaminated gloves. During purging, the rope cannot touch the ground or contaminated surfaces including, dirtied plastics, gloves, boots, etc. Many methods are available and it is to the sampler's discretion which method they prefer. The wind-mill method, looping the rope between thumbs, bucket method, where rope is lowered into a clean plastic bag lining a bucket, or simply placing plastic onto the ground near the well covering shoes, are all commonly used.

If purging and sampling of a well are performed at separate times, the bailer will be left suspended in the well, above the water table, with the rope secured. The remaining rope will be removed, in order to prevent contamination issues. The rope may be doubled and grasped in a tight loop in one hand then covered by pulling the corresponding hand's glove on top, inside out. The procedure can be repeated using the other hand if necessary. The glove-encased rope will be set on top of the well head until time to sample. Alternatively, the rope remaining after securing may be gathered in a tight loop and pushed into the 2-inch PVC well pipe and left. Even when sampling immediately follows purging, new gloves will be necessary.

Based on the number of wells to be sampled and their proximity to each other, all the wells may be purged one after another with sampling to follow. In this manner, if a well is purged dry, it may be allowed to recharge prior to sampling.

2.2.4 Groundwater

Bottles should be filled in the following order, in accordance with the Guidance Document:

1. Organics and Volatile Inorganics
2. Organics, Petroleum Hydrocarbons, Aggregate Organics and Oil and Grease
3. Total Metals
4. Inorganic Nonmetallics, Physical and Aggregate Properties and Biologicals
5. Micobiological

To collect a sample, lower the bailer into the well slowly, with gloved hands, to avoid releasing any volatiles from the groundwater; the bailer should not splash or smack the water surface. Once full, the bailer will be retrieved and containers filled by emptying the water through the hole at the bottom of the bailer. To top off the VOC's, collect some of the groundwater in the cap and pour it onto the sample's contents to acquire the needed meniscus to eliminate air bubbles. The polyethylene containers will be filled and sealed with the cap, leaving about 1/2 inch of airspace at the top. In addition to collecting the samples, water will be collected in the wide-mouth container for pH, temperature, and conductivity measurements. Upon completion of sampling, sample containers will be placed in labeled and sealed plastic bags, including equipment and trip blanks, and stored on ice in coolers. The contaminated gloves and rope will be properly discarded.

2.2.5 Surface Water

Surface water sampling will be taken with consideration to minimize turbulence and aeration. Surface water sample containers will be handled with gloves on, keeping one hand near the base. Containers will be dipped at location points with extreme caution in order to avoid contamination at the mouth of the container, pushing rapidly at an angle into the water, mouth up and tilted towards the stream current to fill, so as not to lose any of the preservative into the surrounding water. If there is little current movement, the container will be moved slowly through the water laterally. During times of drought, if the water is not deep enough to allow filling of the container, a pool may be scooped out of the bottom of the stream to obtain a sample. The pool will be allowed to clear before sampling. All containers will be filled in the same manner and treated as the ground water samples; sealed in labeled, plastic bags, stored and transported in coolers on ice. In addition to collecting the samples, water will be collected in the wide-mouth container for pH, temperature and conductivity measurements.

2.2.6 Leachate Sampling

The Phase 2 leachate will be pumped from two locations. The Phase 2 pipe will run along the waste boundary to connect with the Phase 1 leachate and they will be sampled together for a composite sample at the current Phase 1 leachate sampling site (LAGOON). A second pipe will be run along the access road adjacent to future Phase 3 into the lagoon (LE-2). In both cases, leachate will be obtained from the invert at the lagoon. When collecting leachate samples, sample containers will be handled with extreme caution in order to avoid contamination at the mouth of the container. All containers will be filled in the same manner and treated the same as the ground water samples. The samples will be sealed in labeled, plastic bags, stored and transported on ice. In addition to the Appendix I list of constituents, leachate samples will also be tested for biochemical oxygen demand (BOD), chemical oxygen demand (COD), nitrate, nitrite, sulfate and total phosphorus. Water will also be collected in a wide-mouth container for pH, temperature and conductivity measurements.

2.2.7 Investigation Derived Waste

All investigation derived waste (IDW) will be properly managed and disposed of to prevent contamination of previously uncontaminated areas. Water, soil, drilling mud, decontamination waste, discarded personal protective equipment and any other substance possibly contaminated during site investigations, drilling activities or daily operation procedure need to be properly discarded. Any IDW that is determined to be RCRA-hazardous will be managed according to local, state and federal regulation. Any containers for storage of IDW will be periodically inspected to ensure they are properly labeled and in good condition.

2.2.8 Chain of Custody

Trip blanks, equipment blanks and sample containers will all travel and be stored on ice in coolers for transport to a North Carolina-certified laboratory. Trip blanks will remain in the condition they are received from the laboratory and will not be opened or tampered with during the sampling. Samples will be carefully packed to protect the integrity of the sample and maintain a temperature of approximately 4 degrees Celsius. A chain-of-custody record will be completed for each day's samples, describing each sample (including QA/QC samples), the number of containers, the sample location, the date and time, the sample matrix (soil, water, etc.), the laboratory analyses to be conducted, the signature of the sampler, the regulatory agency and the signatures of everyone through whom the samples change hands and the dates and times of the transfers.

2.3 Analysis

When the water samples reach the laboratory, they will be transferred to a sample custodian who will sign the chain of custody documentation as receipt of the samples. Internal control of the water samples in the laboratory will be in accordance with QA/QC procedures for the laboratory. Copies of QA/QC manuals for approved laboratories are on file at the Division of Solid Waste.

Groundwater and surface water will be analyzed for the Appendix I list of chemical constituents. In addition, practical quantitation limits (PQLs) for each of the constituents will be determined in accordance with the equipment that is used for laboratory testing. QA/QC procedures utilized during the testing will be in conformance with laboratory QA/QC manual.

3 METHANE MONITORING

3.1 ON LOCATION

3.1.1 Existing Conditions

This methane monitoring plan consists of fourteen methane probes numbered MP-1, MP-2, MP-3, MP-4, MP-5, MP-6, MP-7, MP-8, MP-9, MP-10, MP-11, MP-12 MP-13 and MP-14. Methane probes included in this plan are summarized on Table E-2.

Probes are located outside the phase limits. MP-1 is located west of the phase three; MP-2 is located between Phase 2 and Phase 4. MP-3 is located east of phase2, along the access road. MP-4 is located on the northeastern side of phase 2 near proposed MW-19S/D. MP-5 is located east of phase 1, approximately midway between MW-20 and MW-14. MP-6 is located east of Phase 1 near MW-15. MP-7 is located on the southeastern side of Phase 1, near MW-16. MP-8, MP-9 and MP-10 are located along the access road on the southern side of Phase 1 and future phase 3. MP-11 is located on the northern side of the lagoon. MP-12 and MP-13 are located west of the future phase 3 area. MP-14 is located west of the proposed phase 2 near MW-13.

3.1.2 Additions for Phase 2

Existing methane probe locations provide coverage of the Lenoir County Lined Landfill currently active and future units; therefore additional probes will not be installed for the proposed phase 2 unit.

3.2 SAMPLING

Wells will be sampled quarterly to ensure methane levels do not exceed the lower explosive limit at the property boundary or 25% of the explosive limit in facility structures. Methane probes will be fitted with a stopcock-type valve cap that can be opened or closed to control flow. Valves will have barb connections to fill gas meters inlet probe tube, and will be closed between monitoring events. In the event methane readings exceed their designated limits for 2 consecutive sampling events additional passive methane probes will be installed into the cells to reduce the potential for landfill gas contamination.

3.2.1 Procedure

Portable methane filed instruments will be calibrated in accordance with manufactures instructions. The type of equipment used, calibration procedure and results for each sampling event will be included on the methane probe sampling data sheet and will be included in the sampling report. Calibration will occur prior to each sampling event.

Following calibration the gas analyzer will be attached to the probe tubing using the stopcock on the probe cap. Once the analyzer is attached the valve will be opened and reading recorded. After noting methane gas concentration, turn off the valve and disconnect the tubing. If deviation from the prescribed plan is warranted care will be taken to ensure the integrity of the samples and adherence to the Guidance Document. Any differences will be noted on the sampling log.

4 CONCLUSION

This report, included as part of the Design Hydrogeologic Report for the proposed Lenoir County Subtitle D Landfill Phase 2, completes the requirements as described in Rule 15A NCAC 13B .1623(b)(3). The groundwater and surface water monitoring plan is designed to be effective in the early detection of any possible release of hazardous constituents or the leachate surface impoundment to the uppermost aquifer.

Table E-1: Summary of Ground and Surface Water Monitoring Points

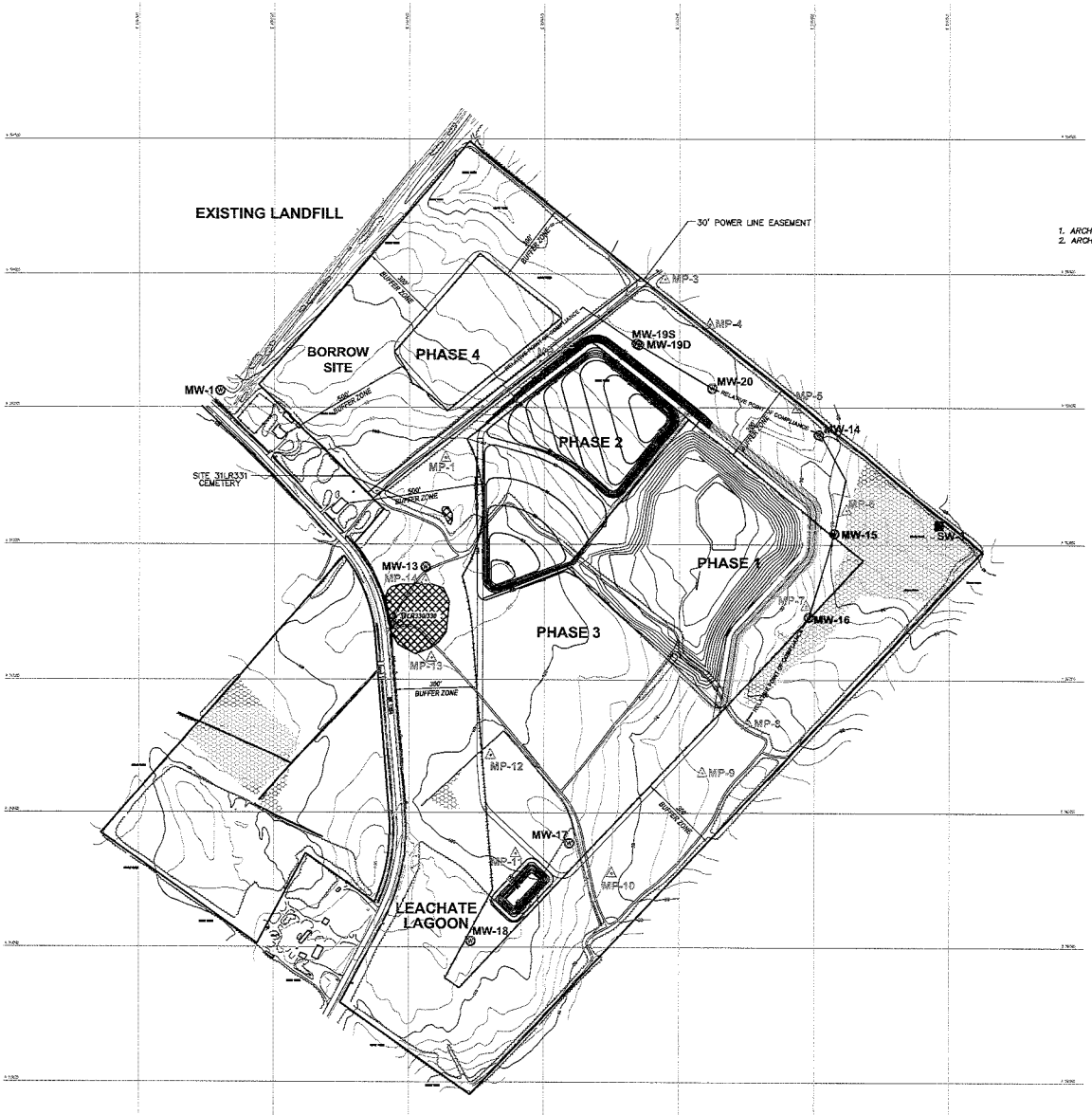
Sampling Point	Type	Gradient	Total Depth (ft)	Designation
MW-13	Monitoring Well	Up	29.4	Background
MW-14	Monitoring Well	Down	21	Phase 1 Monitoring Well
MW-15	Monitoring Well	Down	15.13	Phase 1 Monitoring Well
MW-16	Monitoring Well	Down	21	Phase 1 Monitoring Well
MW-17	Monitoring Well	Down	28	Leachate Monitoring Well
MW-18	Monitoring Well	Down	30.85	Leachate Monitoring Well
MW-19S	Monitoring Well	Down	29.66	Phase 2 Monitoring Well
MW-19D	Monitoring Well	Down	44.62	Phase 2 Monitoring Well
MW-20	Monitoring Well	Down	25	Phase 2 Monitoring Well
SW-3	Surface Water	Down Stream		Along Wetlands

Table E-2: Summary of Methane Monitoring Points

Sampling Point	Type	Gradient	Location Description
MP-1	Methane Probe	Up	Phase 2 Monitoring
MP-2	Methane Probe	Down	Phase 2 Monitoring
MP-3	Methane Probe	Down	Phase 2 Monitoring
MP-4	Methane Probe	Down	Phase 2 Monitoring
MP-5	Methane Probe	Down	Phase 1 Monitoring
MP-6	Methane Probe	Down	Phase 1 Monitoring
MP-7	Methane Probe	Down	Phase 1 Monitoring
MP-8	Methane Probe	Down	Phase 1 Monitoring
MP-9	Methane Probe	Down	Future Phase 3 Monitoring
MP-10	Methane Probe	Up	Future Phase 3 Monitoring
MP-11	Methane Probe	Up	Leachate Monitoring
MP-12	Methane Probe	Up	Future Phase 3 Monitoring
MP-13	Methane Probe	Up	Future Phase 3 Monitoring
MP-14	Methane Probe	Up	Future Phase 3 Monitoring

LEGEND

- EXISTING CONTOURS
- 90 PROPOSED BASE GRADE
- PROPERTY LINE
- EXISITING PATH
- BUFFER ZONE
- PHASES OF OPERATION
- SUBGRADE
- REF. # ARCHAEOLOGICAL SITES
- WETLANDS
- MW-20 MONITORING WELL
- SW-3 SURFACE WATER
- MP-5 EXISTING METHANE PROBE



NOTES

1. ARCHAEOLOGICAL SITE 31LR311 (CEMETERY) WILL NOT BE DISTURBED.
2. ARCHAEOLOGICAL SITE 31LR330 WILL BE DISTURBED.

PLATE A

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MUNICIPAL SOLID WASTE LANDFILL FACILITY
LENOIR COUNTY
NORTH CAROLINA

PROPOSED SAMPLING LOCATIONS

DATE	BY	REV.	DESCRIPTION

SCALE:	1"=200'
DATE:	02/22/2010
DRWN. BY:	M. GERMAN
CHKD. BY:	M. BROWN
PROJECT NUMBER	G08095.6
DRAWING NO.	PLATE A
SHEET NO.	1 OF 1