

# Landfill Operations Plan

Duke Energy Carolinas, LLC—Marshall Steam Station  
Flue Gas Desulfurization (FGD) Residue Landfill Phase 1, Cell 1  
Catawba County, North Carolina

Permit No. 1809

April 10, 2012  
Revision 1

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Asheville Regional Office



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APPROVED DOCUMENT  
Division of Waste Management  
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Date May 18, 2012 By LY Frost

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## Description of Revisions

The following table provides a brief description of the revisions to the Operations Plan. The Operations Plan was originally submitted to the North Carolina Department of Environment and Natural Resources (DENR) on August 19, 2011. Comments from DENR on the submittal were provided in a *Completeness Determination and Technical Review* letter from Mr. Larry Frost, DENR, to Mr. Ed Sullivan, P.E., Duke Energy Carolinas, LLC, dated September 27, 2011 (see Appendix C).

<i>Revision</i>	<i>Date</i>	<i>Description of Revisions</i>
Initial Issue	August 19, 2011	Initial issuance of document.
Revision 1	April 10, 2012	<p>The following revisions were performed to respond to the Permit to Operate <i>Completeness Determination and Technical Review</i> performed by DENR and to provide consistent requirements for Operational and Intermediate Cover between this landfill and the Marshall Steam Station Industrial Landfill No. 1, Permit No. 1812 (MSS ILF#1). Editorial changes to the text are not noted.</p> <p><i>Landfill Operations Plan</i></p> <ul style="list-style-type: none"> <li>• Section 1.2—Revised Facility Contact.</li> <li>• Section 1.7—Revised title of contact.</li> <li>• Section 2.1.1—Revised acreage for landfill footprint to 17.9 acres to include stormwater basin.</li> <li>• Section 2.1.6.3—Revised to delete reference to cover requirements for asbestos from this section.</li> <li>• Section 2.1.8.1—Revised cover requirements for asbestos per DENR comments.</li> <li>• Section 2.1.8.3—Revised cover requirements to be consistent with MSS ILF#1 Operations Plan.</li> <li>• Section 2.1.8.4—Revised cover requirements to be consistent with MSS ILF#1 Operations Plan.</li> <li>• Section 2.1.8.5—Deleted section (Interim Cover) to be consistent with MSS ILF#1 Operations Plan. (Initial Issue Section 2.1.8.6 Final Cover becomes Section 2.1.8.5).</li> <li>• Section 2.1.4—Revised title of contact.</li> <li>• Section 2.7—Revised wording to state that monitoring of landfill gas is not required until the final cover system is installed.</li> <li>• Section 3.0—Relocated text for period of time required for surfaces to be non-erosive to Section 3.1 from Section 3.2.</li> <li>• Section 4.0—Added text for period of time required for surfaces to be non-erosive.</li> <li>• Section 6.0—Revised section for 10-Year Waste Management Plan to include annual submittal of implementation report per DENR comments.</li> </ul>

(Continued on next sheet)

<i>Revision</i>	<i>Date</i>	<i>Description of Revisions -Continued</i>
Revision 1	April 10, 2012	<p><i>Landfill Operations Plan</i></p> <p><i>Figures (Phasing Diagrams)</i></p> <ul style="list-style-type: none"> <li>• PD-1 to PD-8 Cell 1 Phasing Diagrams (developed and provided by WSP Sells, dated March 9, 2012) revised to show asbestos disposal areas and to modify notes.</li> </ul> <p><i>Appendix A Dust Control Plan</i></p> <ul style="list-style-type: none"> <li>• Section 1.0—Deleted acreage of landfill footprint.</li> <li>• Section 2.0—Revised section to delete reference to thickness of soil cover.</li> <li>• Section 4.0—Revised cover requirements for asbestos per DENR comments.</li> </ul> <p><i>Appendix C</i></p> <ul style="list-style-type: none"> <li>• Added Letter from Mr. Larry Frost, DENR to Mr. Ed Sullivan, P.E., Duke Energy Carolinas, LLC, dated September 27, 2011, Permit to Operate, Amendment, Five (5) Year Renewal, Completeness Determination and Technical Review, Marshall Steam Station Flue Gas Desulfurization (FGD) Residue Landfill, Permit No. 1809, Catawba County, DIN 15221</li> </ul>

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PD-1 to PD-8 Cell 1 Phasing Diagrams (developed and provided by WSP Sells, dated March 9, 2012)

#### Tables

1. 15A NCAC 13B .0505 Operational Requirement Cross-Reference Table
2. List of Design Drawings

#### Appendices

- A. Dust Control Plan
- B. Closure/Post-Closure Plan
- C. Letter from Mr. Larry Frost, DENR to Mr. Ed Sullivan, P.E., Duke Energy Carolinas, LLC, dated September 27, 2011, Permit to Operate, Amendment, Five (5) Year Renewal, Completeness Determination and Technical Review, Marshall Steam Station Flue Gas Desulfurization (FGD) Residue Landfill, Permit No. 1809, Catawba County, DIN 15221

## 1.0 General Facility Operations

### 1.1 Overview

The purpose of this Operations Plan is to provide a plan for the safe and efficient operations of the Marshall Steam Station (Marshall) Flue Gas Desulfurization (FGD) Residue Landfill (Marshall FGD Landfill). This Operations Plan presents the operational requirements for: 1) General Facility Operations, 2) Operations Management, 3) Erosion and Sedimentation Control, and 4) Vegetation Management, along with guidance for Landfill Closure and Required Regulatory Submittals. This Operations Plan was prepared consistent with 15A NCAC 13B .0505 Operational Requirements for Sanitary Landfills rules. Table 1 provides a cross-reference between the 15A NCAC 13B .0505 requirements and the applicable section in this Operations Plan.

The Marshall FGD Landfill is owned and operated by Duke Energy Carolinas, LLC (Duke). The landfill is located in Catawba County, North Carolina on Duke property, northwest of the Marshall plant and to the west of the Marshall Ash Basin.

### 1.2 Contact Information

Correspondence and questions concerning the operation of the Marshall FGD Landfill should be directed to the appropriate entity as follows:

#### Owner

Duke Energy Carolinas, LLC—Marshall Steam Station  
8320 East NC Highway 150, Terrell, North Carolina 28682  
(828) 478-7700  
Facility Contact: Materials Handling Coordinator or Environmental Professional

#### State Regulatory Agency

North Carolina Department of Environment and Natural Resources  
Division of Waste Management, Solid Waste Section  
Asheville Regional Office  
2090 US Highway 70, Swannanoa, North Carolina 28778  
(828) 296-4500  
Environmental Engineer: Larry Frost

### 1.3 Safety

Landfill operations at the Marshall FGD Landfill were developed considering the health and safety of the facility's operating staff. The operating staff is provided with site-specific safety training prior to landfill operations, and on-site activities are to be conducted according to the applicable sections of Duke's Safe Work Practices.

### 1.4 Access and Security Requirements

The Marshall FGD Landfill is located entirely within Duke property. Security for the site is currently in place, consisting of fencing, gates, berms, wooded buffers, and security check stations. Unauthorized vehicle access to the site is prevented around the landfill property by woods, fencing, gates, and stormwater conveyance features.

The access road to the site is of all-weather construction and will be maintained in good condition. Potholes, ruts, and debris on the road(s) will receive immediate attention in order to avoid damage to vehicles.

## 1.5 Operating Hours

The Marshall FGD Landfill is open seven days a week, as required.

## 1.6 Signs

A sign providing the landfill permit number, hours of operation, and a statement reading, “NO HAZARDOUS OR LIQUID WASTE PERMITTED,” is posted at the site entrance and shall be maintained in good condition.

Directional signs are placed along the access road to the landfill and shall be maintained in good condition at all times.

Edge-of-waste markers are installed to delineate the edge of waste. These markers shall be maintained in good condition and remain visible at all times.

## 1.7 Training

Due to the diversity and nature of job tasks required at the Marshall FGD Landfill, personnel shall be adequately trained to handle facility operations and maintenance.

The Materials Handling Coordinator shall have a general understanding of all the tasks required for site operations. Individuals performing the various tasks shall have adequate training for the site-specific tasks they are assigned. Duke shall provide a site-specific training program for facility personnel.

Noteworthy operations and maintenance tasks to be addressed in training include:

- Maintaining accurate records of waste loading (quantitative and qualitative)
- Operating requirements for stormwater segregation from exposed waste areas
- Operating and maintaining the leachate collection system (LCS)

All training will be documented and training records will be kept on-site. The Materials Handling Coordinator will complete operator training courses in accordance with the permit requirements.

## 1.8 Record Keeping

An operating record is to be maintained on-site and include the following records:

- Leachate Collection System (LCS)—Line Cleanout and Camera Monitoring Documentation
- Stormwater Maintenance and Inspection Logs
- Erosion and Sedimentation Control Inspection Logs
- Periodic Landfill Inspection Logs
- Dust Control Monitoring Logs
- Groundwater Monitoring (and Sampling) Documentation
- Operations Plan

The above records are to be kept in the operating record for the active life of the Marshall FGD Landfill and the post-closure care period. Information contained in the operating record must be furnished upon request to the North Carolina Department of Environment and Natural Resources Division of Waste Management, Solid Waste Section (Division) or be made available for inspection by the Division. Additional records kept on-site should include:

- Solid waste facility permits
- Record of the amount of solid waste received summarized on a monthly basis based on scale records
- Documentation of LCS system performance observations
- Documentation of erosion and sedimentation control observations
- Regulatory agency inspection reports
- Permit-to-Construct Application
- Employee training program and records
- Landfill drawings and specifications

## 1.9 Design Drawings

A list of the landfill design drawings is provided in Table 2. The design drawings provide the location of landfill features, landfill construction details, and technical design and construction notes.

## 2.0 Operations Management

The primary objective of operations management at the Marshall FGD Landfill is to dispose of waste material in compliance with permit conditions while operating in a safe manner. Landfilling operations will generally proceed from the northwest toward the southeast. In general, landfilling operations in the cell will be limited to an exposed surface area of approximately 2 acres or less, at the operator's discretion, with waste in other areas covered with operational or intermediate cover as appropriate.

### 2.1 Waste Handling and Landfill Sequencing

#### 2.1.1 Landfill Capacity

The Marshall FGD Landfill Phase 1, Cell 1 was permitted to operate on November 21, 2006. The Cell 1 footprint consists of approximately 17.9 acres. The landfill began receiving waste in February 2007. The total available airspace volume of Cell 1, as shown on drawing MM6451.00-0005.001, Revision 1, is approximately 1.17 million cubic yards. This volume corresponds to 1,326,780 tons of capacity based on an average unit weight of 84.0 pounds per cubic foot. The expected annual quantity of waste to be placed in the landfill is 288,800 tons per year. This is based on design waste receipts of 950 tons per day for 304 operating days per year. The expected annual quantity of waste placement is from the Permit to Operate dated November 21, 2006.

Included below are the Actual Annual Quantities placed in the landfill for the first five years of operation (2006-2011).

The yearly periods listed below correspond to the period July 1 through June 30 for the respective year.

Year	Period	Actual Annual Quantity
Year 1	2006-2007	2,548 tons (Actual)
Year 2	2007-2008	22,273.96 tons (Actual)
Year 3	2008-2009	30,937.12 tons (Actual)
Year 4	2009-2010	125,032.39 tons (Actual)
Year 5	2010-2011	93,784.63 tons (Actual)

The remaining capacity of the landfill is 1,052,204 tons. Landfill sequencing is further described in Section 2.1.5.

#### 2.1.2 Waste Acceptance, Disposal, and Screening Requirements

The Marshall FGD Landfill can accept the following waste types:

- Marshall-generated gypsum
- Marshall-generated clarifier sludge
- Marshall-generated fly ash
- Marshall-generated bottom ash
- Marshall-generated construction and demolition (C&D) debris
- Duke Energy Carolinas-generated asbestos
- Allen Steam Station (Allen)-generated gypsum

- Allen-generated clarifier sludge
- Cliffside Steam Station (CSS)-generated gypsum
- CSS-generated clarifier sludge
- Marshall Mill Rejects (pyrites)

The landfill owner or operator shall notify the Division within 24 hours of attempted disposal of any wastes the landfill is not permitted to receive.

At a minimum, hazardous waste, yard trash, liquid wastes, regulated medical waste, sharps not properly packaged, polychlorinated biphenyls (PCB) waste as defined in 40 Code of Federal Regulations (CFR) 761, and wastes banned from disposal in North Carolina by General Statute 130A-309.10(f), must not be accepted at the landfill.

The removal of waste from the landfill is prohibited unless the owner or operator approves and the removal is not performed on the working face. Waste will be hauled and disposed of by dedicated and consistent operators from the waste source to the landfill.

#### 2.1.3 Dust, Litter, Odor, and Vector Control

Litter, odors, and vectors are not anticipated to be concerns at the Marshall FGD Landfill. The waste placed in the landfill does not attract vectors, and windblown material is not anticipated to be a problem. Odors are typically not a problem at FGD residue landfills.

Dust control is addressed in the *Dust Control Plan* included as Appendix A. Generally, dust control measures will be implemented when necessary and will include at a minimum watering of dusty roads and exposed work areas. The gypsum surface typically generates a crust, which reduces the dust potential for the gypsum. Additionally, final cover will be vegetated as soon as is practical in order to minimize the blowing of dust on-site.

#### 2.1.4 Fire Control

No open burning shall be permitted at the Marshall FGD Landfill. There are no explosive gas concerns with gypsum, ash waste, mill rejects, or asbestos waste; therefore, the threat of fire is considered to be minimal.

Although it is unlikely, if a fire occurs at the landfill, the Station Control Room (phone number: 828-478-7521) shall be notified and equipment and stockpiled soil shall be provided to control accidental fires. Marshall Steam Station (MSS) will notify the local fire department, which will be immediately dispatched to assist with fire control. Any fire that occurs at the landfill shall be reported to the Division within 24 hours and a written notification will be submitted within 15 days by the Materials Handling Coordinator.

#### 2.1.5 Landfill Sequencing

The Marshall FGD Landfill will be developed within the area shown on the Phasing Diagrams (Figures PD-1 through PD-8 [Cell 1 Phasing Diagrams]). A 200-foot buffer will be maintained around the entire perimeter of the landfill. A 500-foot buffer will be maintained from existing residences and water supply wells. The majority of the areas within the buffer will remain in its current condition.

## 2.1.6 Waste Placement

### 2.1.6.1 Gypsum, Ash, and Mill Rejects

A conveyor system transports the gypsum from the FGD facility and stockpiles it adjacent to the Marshall FGD Landfill. The gypsum is then loaded onto dump trucks and hauled to the landfill active face. The ash (fly ash and bottom ash) and mill rejects are transported to the landfill in dump trucks. The waste is dumped from trucks and placed on the smallest active face practical. The waste is then spread and compacted using compactors and dozers in lifts no greater than 12 inches thick. Gypsum and fly ash shall be placed and compacted in accordance with requirements outlined in Section 2.1.7. Bottom ash and mill rejects shall be placed and compacted as densely as practical. In-place density testing is not required for bottom ash and mill rejects.

Waste will generally be placed from upslope to downslope, but as higher waste elevations are achieved, waste may be placed from downslope to upslope on the active face slopes as long as landfill surfaces are graded to allow for proper drainage and segregation. The waste placement surface will be graded to promote surface water runoff. Soil berms are to be constructed as necessary to divert run-on from entering the working face or allowing runoff to drain from active areas.

Loads of bottom ash and mill reject waste that exhibit higher moisture content than anticipated will be placed no closer than 50 feet from the active face in thin lifts and dozed into place. No waste shall be placed in areas of accumulated water.

Waste will be covered with intermediate and final cover as applicable, in accordance with the following cover sections in this plan. Operational soil cover is not required provided the *Dust Control Plan*, included as Appendix A, is followed.

### 2.1.6.2 Clarifier Sludge

Clarifier sludge will be loaded onto dump trucks and hauled to the landfill active face. The waste will be end-dumped on the active face and allowed to dry, and mixed as necessary to expedite the drying process, before it is spread with a dozer. The clarifier sludge will be mixed in with ash or gypsum during the spreading operations in lifts no greater than 12 inches thick. The waste will be compacted in thin lifts as densely as practical with a dozer. Specific monitoring and in-place density testing for clarifier sludge is not required.

Loads of clarifier sludge waste that exhibit higher moisture content than anticipated will be placed no closer than 50 feet from the active face in thin lifts and dozed into place. No waste shall be placed in areas of accumulated water.

Waste will be covered with intermediate and final cover as applicable, in accordance with the following cover sections in this plan. Operational soil cover is not required provided the *Dust Control Plan*, included as Appendix A, is followed.

### 2.1.6.3 Asbestos

Asbestos waste shall be packaged in accordance with 40 CFR 61, and it shall be disposed of away from the working face or in an area not contiguous with other disposal areas. Separate areas shall be clearly marked so that asbestos is not exposed by future land-disturbing activities. From lift to lift, asbestos disposal areas can be relocated, provided that records of the areas are maintained.

Asbestos material shall not be placed within 25 feet of the exterior slopes. Asbestos material shall be placed in relatively thin lifts limited to only a few feet thick. Asbestos material shall be compacted as densely as practical and specific monitoring and in-place density testing for asbestos materials is not required. Asbestos material shall be covered as described in Section 2.1.8.1.

#### 2.1.6.4 C&D Waste

C&D waste will be brought in dump trucks and dumped on the active face of the landfill. Waste will be placed on the smallest active face as practical and compacted with a dozer as densely as practical. Specific monitoring and in-place density testing of C&D waste is not required. The location of the C&D waste will be noted in the operating record.

Compacted C&D waste will be covered as described in Section 2.1.8.2.

#### 2.1.7 Compaction Requirements

Generally, waste and soil cover will be spread with a dozer in lifts no greater than 12 inches thick and compacted with a dozer.

Gypsum and fly ash are fine-grained materials that compact well during waste placement and resemble characteristics of natural soil placed in an engineered fill. Field testing of in-place density and moisture content shall be performed to monitor the compaction and moisture conditioning during waste placement. Waste shall be compacted to a minimum 95 percent of its Standard Proctor (ASTM D 698) maximum dry density. Compacted moisture content shall be plus or minus ( $\pm$ ) 5 percent of optimum moisture content.

In-place density and moisture content testing shall be performed at a frequency of one test per 10,000 cubic yards of gypsum and/or fly ash placed. In-place density testing shall be performed using the Sand-Cone Method (ASTM D 1556), Nuclear Methods (ASTM D 6938), or the Drive-Cylinder Method (ASTM D 2937). Moisture content testing shall be performed using the Direct Heating Method (ASTM D 4959) or Nuclear Methods (ASTM D 6938).

In the event that an in-place density and moisture content test fails, the area of waste placement shall be reworked, reconditioned, and retested until the minimum compaction requirement is met. Density test locations shall be documented on a referenced grid system. Waste placement testing records shall be maintained with the on-site operations records.

Laboratory testing shall be performed at a frequency of one Standard Proctor test (ASTM D 698) for every 50,000 cubic yards of gypsum or ash waste placed. Laboratory testing records shall be maintained with the on-site operations records.

Specific monitoring and in-place density testing is not required for wastes other than gypsum and fly ash.

#### 2.1.8 Cover Requirements

##### 2.1.8.1 Operational Cover—Asbestos Material

Asbestos waste material that has been deposited in the Marshall FGD Landfill will be covered within eight hours of placement with at least 6 inches of soil, ash, and/or gypsum material and compacted by a dozer.

##### 2.1.8.2 Operational Cover—C&D Waste

When the C&D waste disposal area exceeds one-half acre, and at least weekly, the compacted C&D waste will be covered with a minimum of 6 inches of earthen material (i.e., soil, ash and/or gypsum material).

### 2.1.8.3 Operational Cover—Other Wastes

For wastes other than asbestos waste and C&D waste, operational cover consisting of soil, will be applied as needed for dust control and stormwater management. The operational cover may be applied at a thickness suited to its purpose. For example, the operational soil cover may be applied in thinner layers to provide dust control and it may be applied in thicker layers where protection from surface erosion is desired.

Refer to Appendix A—*Dust Control Plan* for dust control requirements.

### 2.1.8.4 Intermediate Cover

A 12-inch-thick intermediate cover layer will be placed on areas where final grades have been reached or where placement will be inactive for 12 months or more.

### 2.1.8.5 Final Cover

The final cover system for the Marshall FGD Landfill will be completed within 180 days following the beginning of closure activities unless otherwise approved by the Division.

The final cover will consist of a compacted intermediate soil cover (on top of the waste), 40-mil textured linear low density polyethylene (LLDPE) geomembrane liner, a geocomposite drainage layer, and minimum 2 feet of vegetative cover soil. The vegetative layer will consist of on-site soil suitable for maintaining grass cover and controlling erosion. Surface water that percolates through the vegetative layer and 18-inch thick compacted soil layer will drain through the geocomposite drainage layer. The final cover will be vegetated with native grasses within six months following closure.

See *Closure/Post-Closure Plan* in Appendix B for final cover specifications and maintenance and operations requirements.

## 2.2 Leachate and Stormwater Management

A leachate collection system (LCS) is in place to drain the leachate within the active cell to the downgradient stormwater storage basin. A 12-inch thick layer of operational cover is over the geomembrane liner and leachate collection and removal system.

Leachate and stormwater are collected in the stormwater storage basin and routed to the Marshall Ash Basin, which discharges in accordance with the MSS plant's National Pollutant Discharge Elimination System (NPDES) permit.

## 2.3 Leachate Collection System (LCS)

The leachate collection system consists of a geonet/geotextile with a perforated collection/header piping system that drains to the stormwater storage basin. The slope on the geomembrane is positive to promote leachate transport from the collection system to the stormwater storage basin. The geonet is a polyethylene synthetic mesh that transmits leachate to the leachate collection pipe. The leachate collection header pipes drain directly to the stormwater storage basin where the stormwater riser pipe routes leachate and stormwater to the Marshall Ash Basin.

As waste placement proceeds, the leachate collection system will be modified as shown on the design drawings.

### 2.3.1 LCS Maintenance

The maintenance of the leachate management system's physical facilities (consisting of high-density polyethylene [HDPE] piping and the stormwater storage basin) and records will be performed by or under the direct supervision of Duke. Visual observations of proper LCS system performance will be made monthly by Duke staff.

Clean-out pipes are located on the LCS leachate header pipes. LCS header pipes will be cleaned out by the use of a clean-out snake or high-pressure water flushing at least once a year and will be remote-camera monitored at least once every 5 years.

### 2.3.2 LCS Record Keeping and Sampling

Records will be maintained at MSS documenting the leachate line cleanout and camera monitoring.

Leachate from the LCS system is not sampled on a routine basis.

### 2.3.3 Contingency Plan

In the unlikely event that leachate cannot be drained to the active Marshall Ash Basin, leachate will be temporarily stored within the landfill until such time that draining operations to the active ash basin can be restored. In such an event, the Division shall be notified in writing, within 30 days, about the events and corrective actions taken.

## 2.4 Stormwater Collection and Conveyance

Non-contact stormwater runoff onto the landfill is prevented by diversion ditches around the landfill.

To improve operations, surface water should be diverted from the operational area. Excessive surface water at the working face creates difficulties for maneuvering equipment and prevents the operator from achieving maximum compaction of waste. To divert surface water runoff away from the working face, temporary diversion berms will be installed on the current lift, upslope of the working face and in other locations as dictated by the direction of grade. The area between the temporary berm and the working face should be limited to prevent excessive ponding. The soil cover in the areas beyond the diversion berms will be uniformly graded and compacted to prevent the formation of erosion channels. In the event that channels do form, the cover should be promptly repaired.

Stormwater collection and conveyance measures will be checked regularly and maintained such that necessary repairs can be made as early as practical.

#### **2.4.1 Stormwater Discharge**

The stormwater system at the landfill was designed to prevent the discharge of pollutants. Landfill operation shall not cause a discharge of pollutants into waters of the United States, including wetlands, that violates any requirement of the Clean Water Act, including, but not limited to NPDES requirements, pursuant to Section 402. In addition, under the requirements of Section 404 of the Clean Water Act, the discharge of dredged or fill material into waters of the state that would be in violation of the requirements shall not be allowed by landfill operations.

Operations at the landfill shall not cause the discharge of a non-point source of pollution to waters of the United States, including wetlands, that violates any requirement of an area-wide or statewide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act, as amended.

A jurisdictional wetland and stream are located to the west of the landfill. Maintenance of the stormwater system shall be performed to ensure these areas are not impacted by stormwater or sediment.

### **2.5 Stormwater Basin Maintenance Requirements**

All stormwater features (i.e., diversion ditches, berms, riser, discharge pipe, etc.) associated with Cell 1 until final closure will be inspected and documented monthly for signs of damage, settlement, clogging, silt buildup, or washouts. If necessary, repairs to stormwater control features will be made as early as practical.

### **2.6 Groundwater Monitoring Well Access Requirements**

Groundwater monitoring wells are located around the landfill perimeter. A readily accessible, unobstructed, path shall be maintained so that monitoring wells may be accessed using four-wheel drive vehicles. Care must be taken around the wells to prevent any damage to the wells.

### **2.7 Landfill Gas Management**

Marshall FGD Landfill waste consists of gypsum and ash waste, clarifier sludge, asbestos, C&D, and coal mill reject wastes. The majority of the waste stream will consist of FGD gypsum and ash. The remaining small portion of the waste stream will consist of the other aforementioned waste products. Duke does not anticipate that methane or hydrogen sulfide gas will be generated or that odor will be an issue during operations.

Landfill gas monitoring is not required until the final cover is installed. A landfill gas venting system is provided as part of the engineered cover system.

## 3.0 Erosion and Sedimentation Control

Erosion and sedimentation control (E&SC) during landfill operations consists of installing E&SC measures, monitoring and maintaining E&SC measures, and monitoring for surface erosion.

### 3.1 E&SC Measures, Monitoring and Maintenance

Adequate measures are to be practiced to prevent erosion in general accordance with E&SC measures included on Drawing No. MM6451.00-0005.001 (Cell 1 Final Configuration) and Drawing No. MM6451.01-0004.001 (Gypsum Landfill Erosion Control Details) both dated August 19, 2011.

Erosion control measures include:

- Disturbing as little area as practical at any one time for landfilling operations.
- Seeding/mulching of all disturbed areas commencing as soon as practically possible. North Carolina Erosion and Sedimentation Control regulations require that surfaces be non-erosive and stable within 15 working days or 90 calendar days, whichever is shorter, after the completion of activities at a disturbed area.
- Employing erosion netting or sod on steep slopes and other erosion prone areas.
- Use of earthen berms, hay bales, silt fences, riprap, or equivalent devices downgradient of disturbed areas, stockpiles, drainage pipe inlets and outlets, and at intervals along grassed waterways, until such time as permanent vegetation is established.
- Placement of riprap at the inlets and outlets of stormwater piping.

Prior to landfill closure, E&SC features will be checked monthly or at a minimum after every significant rainfall event. Sediment will be removed from structures to their original dimensions when conditions are warranted. Necessary repairs shall be made as soon as practical. Riprap-lined channel sections and outlet-protection aprons will be checked for washouts periodically. Riprap will be added to these areas as needed to maintain the integrity of the structure.

### 3.2 Surface Erosion Monitoring

Adequate erosion control measures shall be practiced to prevent silt from leaving the site. Channels will be inspected monthly or at a minimum after every significant rainfall event for sediment buildup.

Slopes will be periodically checked for erosion and vegetative quality, fertilized, and mowed. A slope or portion thereof shall be identified as needing maintenance if it meets any one of the following conditions:

- Exposed waste on exterior slopes
- Areas of cracking, sliding, or sloughing
- Areas of seepage

Slopes identified as needing maintenance shall be repaired as soon as practical and as appropriate to correct deficiencies. Repair activities may include re-dressing the slope, filling in low areas, and/or seeding.

## 4.0 Vegetation Management

North Carolina Erosion and Sedimentation Control regulations require that surfaces be non-erosive and stable within 15 working days or 90 calendar days, whichever is shorter, after the completion of activities at a disturbed area. As stated in Section 3.1, seeding/mulching of all disturbed areas shall commence as soon as practically possible.

Seedbed preparation, seeding, soil amendments, and mulching for the establishment of vegetative ground cover will be applied in accordance with Drawing No. MM6451.01-0004.001 (Gypsum Landfill Erosion Control Details).

Within six months after final termination of disposal operations at the site, the area shall be stabilized with the final cover system as required by design drawings and *Closure/Post-Closure Plan* (Appendix B). Temporary seeding will be applied to the landfill slopes, where intermediate cover has been applied, in accordance with the requirements stated above.

Riprap, haybales, or other acceptable temporary methods of erosion control may be required until permanent cover is established. Mulching, until a vegetative cover is established, can stabilize areas where final grade has been reached. Soil mulching can be achieved using wood chips, straw, hay, asphalt emulsion, jute matting, and synthetic fibers. Mulches allow for greater water retention; reduce the amount of runoff; retain seeds, fertilizer, and lime in place; and improve soil moisture and temperature conditions.

### 4.1 Temporary Seeding

Temporary seeding will be applied as follows (source: *NC Erosion and Sediment Control Planning and Design Manual* [June 2006, Revised March 2009]):

#### LATE WINTER TO EARLY SPRING

Seeds	Pounds Per Acre	Dates of Planting
Rye (grain)	120	January 1 to May 1
Annual lespedeza (kobe)	50	January 1 to May 1

Note: Omit lespedeza when duration of temporary cover is not to extend beyond June.

#### SUMMER

Seeds	Pounds Per Acre	Dates of Planting
German millet	40	May 1 to August 15

#### FALL

Seeds	Pounds Per Acre	Dates of Planting
Rye (grain)	50	August 15 to December 31

Soil Amendments	Pounds Per Acre
Agricultural limestone	2,000
Fertilizer (10-10-10)	1,000
Mulch	4,000

Note: Soil amendments are for all-season temporary seeding applications.

## 4.2 Permanent Seeding

Permanent seeding will be applied as follows (source: NC *Erosion and Sediment Control Planning and Design Manual* [June 2006, Revised March 2009]):

Seeds	Pounds Per Acre	Dates of Planting
Tall fescue	100	September 1 to April 15
Sericea lespedeza	15	September 1 to May 1
Kobe lespedeza	10	May 1 to September 1
Rye	40	August 15 to April 15

Soil Amendments	Pounds Per Acre
Agricultural limestone	4,000
Fertilizer (10-10-10)	1,000
Mulch	4,000

Note: Perform soil test to determine proper soil amendments; if not available, use the quantities above.

## 5.0 Landfill Closure

The Marshall FGD Landfill will be closed in accordance with the design drawings and *Closure/Post-Closure Plan* (Appendix B). The *Closure/Post-Closure Plan* outlines the sequence for closing the landfill and the post-closure maintenance activities. Closure is designed to minimize the need for long-term maintenance and to control the post-closure release of contaminants. Closure activities may be revised as appropriate for materials, specifications, technology advancements, or changes in regulations at the time the landfill is closed or in post-closure

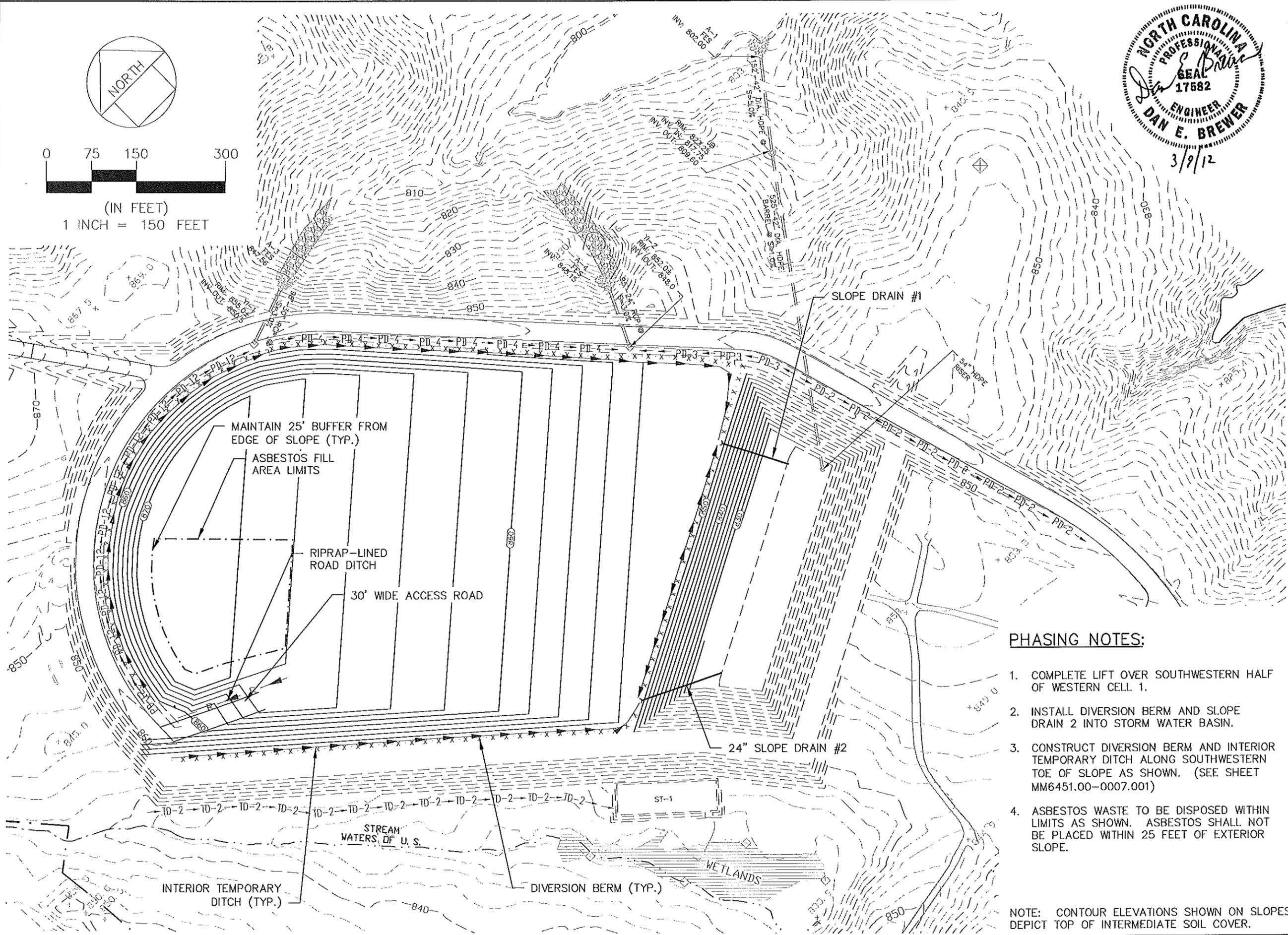
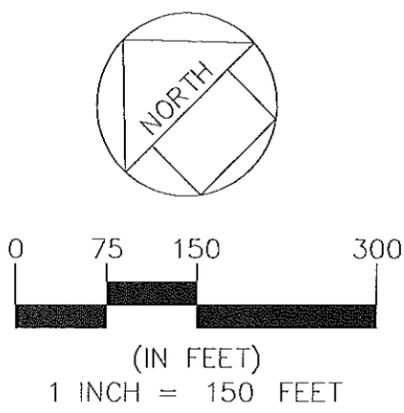
## 6.0 Required Regulatory Submittals

Submittal	Requirement	Reporting/Action Frequency
Groundwater Monitoring Reports	Maintain a record of all monitoring events and analytical data in accordance with the Groundwater Monitoring Plan. Reports of the analytical data for each water quality monitoring sampling event shall be submitted to DENR Division of Waste Management (DWM) in a timely manner.	Semiannually
Annual Tonnage Reports	Tons of waste received and disposed of in the landfill shall be reported to the DWM and to all counties from which waste was accepted on forms prescribed by the DWM. Refer to the Permit to Operate for annual reporting requirement information.	Annually Must submit no later than August 1 each year
10-Year Waste Management Plan	Per North Carolina G.S. 130A-309.09D (c): <ul style="list-style-type: none"> <li>• A 10-year waste management plan shall be developed for this landfill and submitted to DWM.</li> <li>• The plan shall be updated and submitted to DWM at least every three years.</li> <li>• A report on the implementation of the plan is required to be submitted to DWM by August 1 of each year.</li> </ul>	10-year plan prepared every 10 years 10-year plan updated every 3 years Implementation report annually

**FIGURES (PHASING DIAGRAMS)**

**PD-1 – PD-8 – CELL 1 PHASING DIAGRAMS  
(DEVELOPED AND PROVIDED BY WSP SELLS,  
DATED MARCH 9, 2012)**

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**PHASING NOTES:**

1. COMPLETE LIFT OVER SOUTHWESTERN HALF OF WESTERN CELL 1.
2. INSTALL DIVERSION BERM AND SLOPE DRAIN 2 INTO STORM WATER BASIN.
3. CONSTRUCT DIVERSION BERM AND INTERIOR TEMPORARY DITCH ALONG SOUTHWESTERN TOE OF SLOPE AS SHOWN. (SEE SHEET MM6451.00-0007.001)
4. ASBESTOS WASTE TO BE DISPOSED WITHIN LIMITS AS SHOWN. ASBESTOS SHALL NOT BE PLACED WITHIN 25 FEET OF EXTERIOR SLOPE.

NOTE: CONTOUR ELEVATIONS SHOWN ON SLOPES DEPICT TOP OF INTERMEDIATE SOIL COVER.

**MARSHALL STEAM STATION  
FGD RESIDUE LANDFILL**

REVISIONS	
3.9.12	REVISED PER DUKE CONVERTS
2.29.12	REVISED ASBESTOS AREA
2.3.12	ADDED ASBESTOS AREA
8.19.11	UPDATED FOR CELL 1
PROJECT # 10-601-4	DATE: 8-12-11
DRAWN BY: JAC	CHECKED BY: DEB
TITLE PHASING PLAN	
SHEET <b>PD-1</b>	

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DUKE ENERGY CAROLINAS, LLC  
 CATAWBA COUNTY, NC PERMIT NO. 18-09  
 526 SOUTH CHURCH STREET  
 CHARLOTTE, NC, 28202

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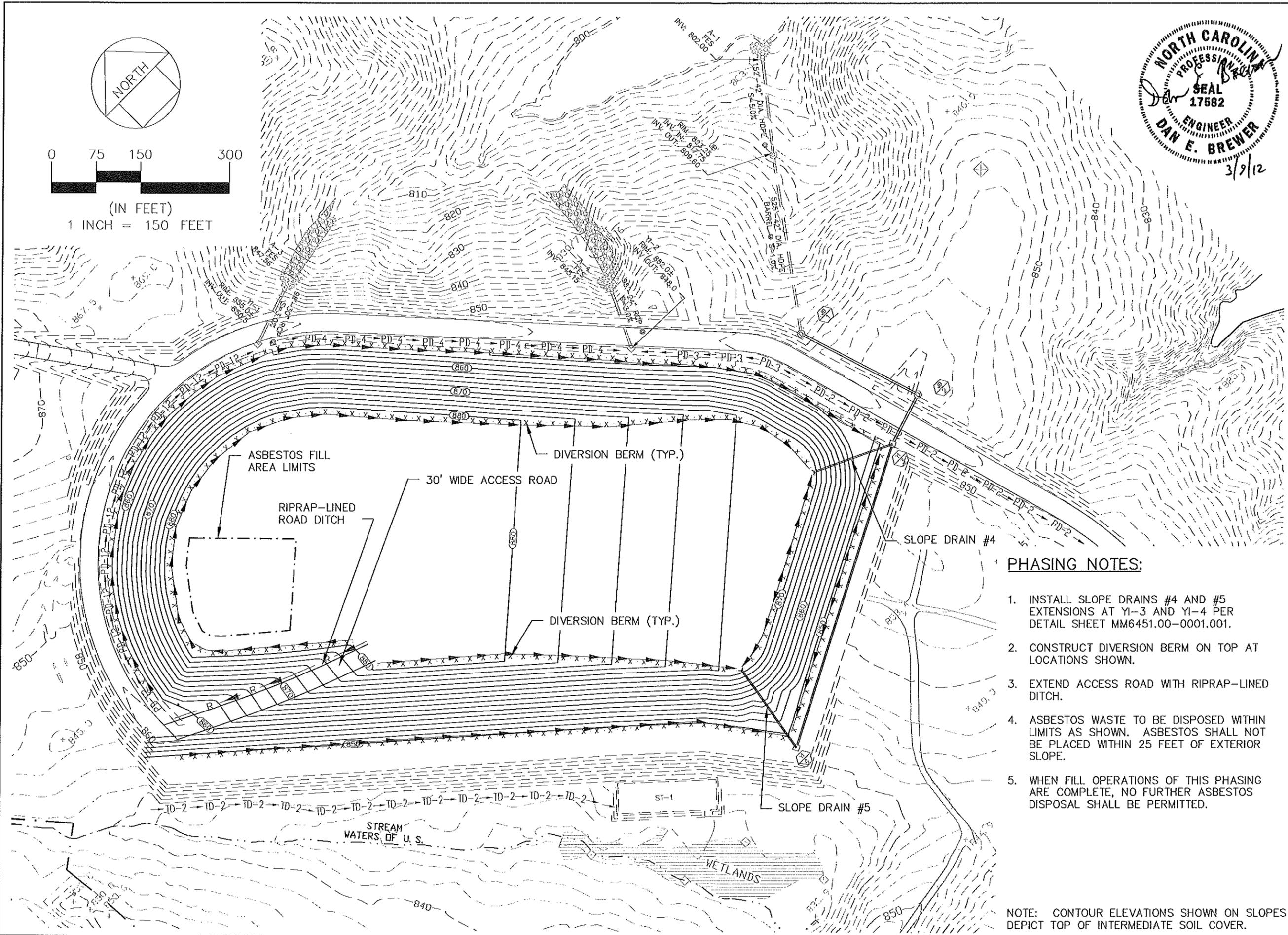




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0 75 150 300  
 (IN FEET)  
 1 INCH = 150 FEET



**PHASING NOTES:**

1. INSTALL SLOPE DRAINS #4 AND #5 EXTENSIONS AT YI-3 AND YI-4 PER DETAIL SHEET MM6451.00-0001.001.
2. CONSTRUCT DIVERSION BERM ON TOP AT LOCATIONS SHOWN.
3. EXTEND ACCESS ROAD WITH RIPRAP-LINED DITCH.
4. ASBESTOS WASTE TO BE DISPOSED WITHIN LIMITS AS SHOWN. ASBESTOS SHALL NOT BE PLACED WITHIN 25 FEET OF EXTERIOR SLOPE.
5. WHEN FILL OPERATIONS OF THIS PHASING ARE COMPLETE, NO FURTHER ASBESTOS DISPOSAL SHALL BE PERMITTED.

NOTE: CONTOUR ELEVATIONS SHOWN ON SLOPES DEPICT TOP OF INTERMEDIATE SOIL COVER.

**MARSHALL STEAM STATION  
 FGD RESIDUE LANDFILL**

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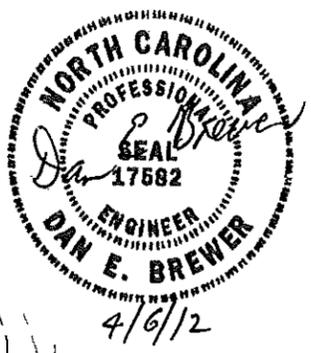
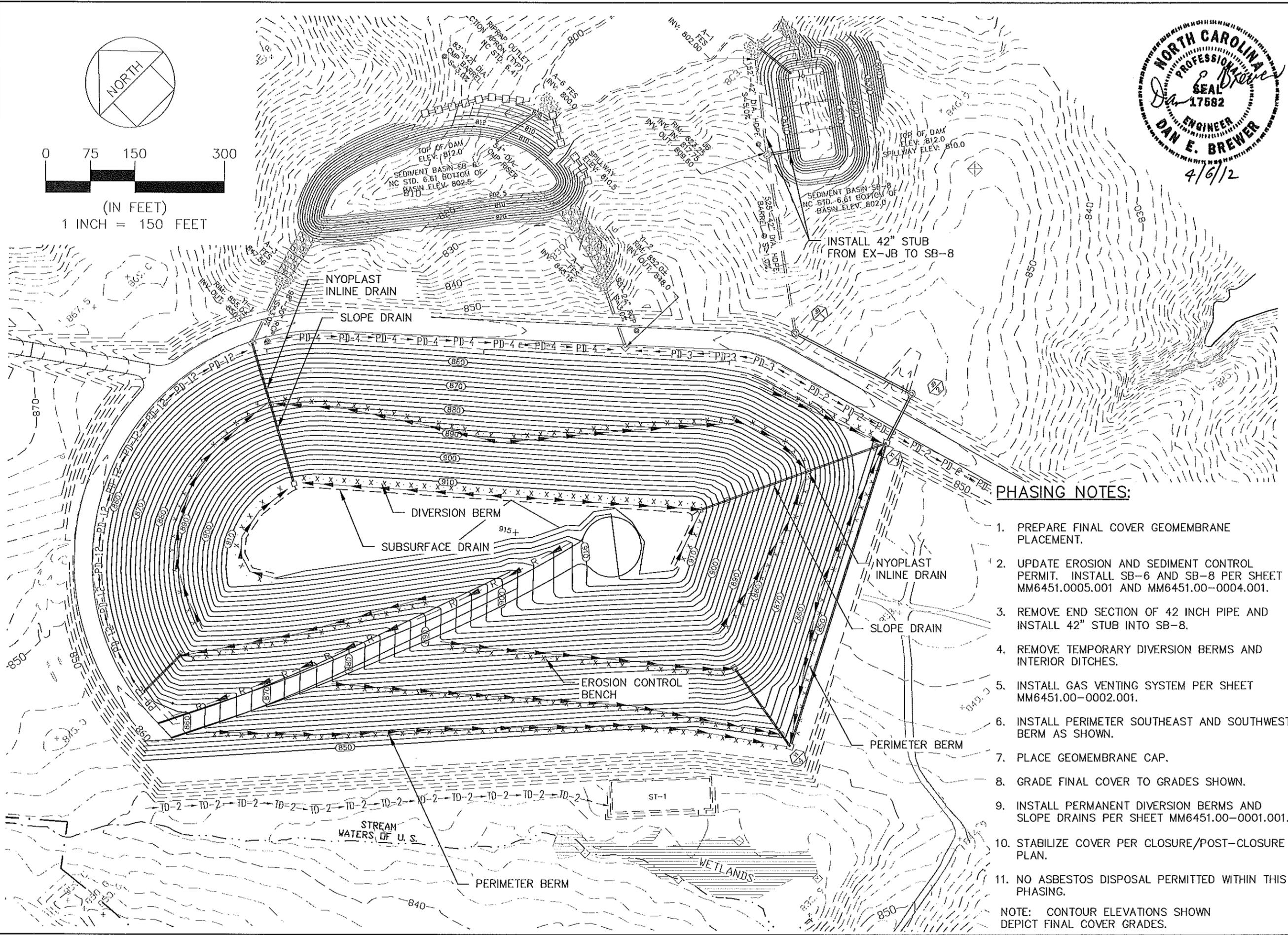
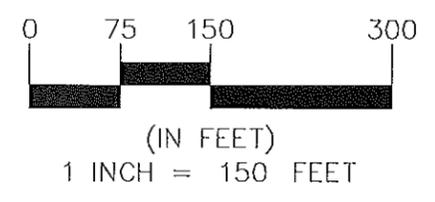
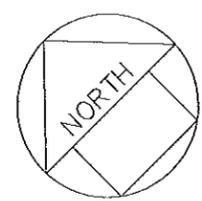
REVISIONS	
3.9.12	REVISED PER DUKE COMMENTS
2.29.12	REVISED ASBESTOS AREA
2.3.12	ADDED ASBESTOS AREA
8.19.11	UPDATED FOR CELL 1
PROJECT # 10-6014 DATE 8-12-11	
DRAWN BY: JAC CHECKED BY: DEB	
TITLE PHASING PLAN	
SHEET <b>PD-5</b>	

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**PHASING NOTES:**

1. PREPARE FINAL COVER GEOMEMBRANE PLACEMENT.
2. UPDATE EROSION AND SEDIMENT CONTROL PERMIT. INSTALL SB-6 AND SB-8 PER SHEET MM6451.0005.001 AND MM6451.00-0004.001.
3. REMOVE END SECTION OF 42 INCH PIPE AND INSTALL 42" STUB INTO SB-8.
4. REMOVE TEMPORARY DIVERSION BERMS AND INTERIOR DITCHES.
5. INSTALL GAS VENTING SYSTEM PER SHEET MM6451.00-0002.001.
6. INSTALL PERIMETER SOUTHEAST AND SOUTHWEST BERM AS SHOWN.
7. PLACE GEOMEMBRANE CAP.
8. GRADE FINAL COVER TO GRADES SHOWN.
9. INSTALL PERMANENT DIVERSION BERMS AND SLOPE DRAINS PER SHEET MM6451.00-0001.001.
10. STABILIZE COVER PER CLOSURE/POST-CLOSURE PLAN.
11. NO ASBESTOS DISPOSAL PERMITTED WITHIN THIS PHASING.

NOTE: CONTOUR ELEVATIONS SHOWN DEPICT FINAL COVER GRADES.

**MARSHALL STEAM STATION  
FGD RESIDUE LANDFILL**

CATAWBA COUNTY, NC PERMIT NO. 18-09  
DUKE ENERGY CAROLINAS, LLC  
928 SOUTH CHURCH STREET  
CHARLOTTE, NC, 28202

REVISIONS	
4.6.12	UPDATED PER DUKE COMMENTS
3.21.12	ADDED SLOPE DRAIN NW NEAR ACCESS ROAD
5.9.12	REVISED PER DUKE COMMENTS
2.29.12	REVISED ASBESTOS AREA
2.3.12	ADDED ASBESTOS AREA
8.19.11	UPDATED FOR CELL 1
PROJECT # 10-6014	DATE 8-13-11
DRAWN BY: JAG	CHECKED BY: DEB
TITLE	
CELL 1	
FINAL CLOSURE	
SHEET	
<b>PD-8</b>	

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## TABLES

**Table 1**  
**15A NCAC 13B .0505 Operational Requirement Cross-Reference Table**

15A NCAC 13B .0505 - Operational Requirements for Sanitary Landfills		Section Reference in Landfill Operations Plan
1. Plan and Permit Requirements		
a.	Construction plans shall be approved and followed.	Original Permit to Construct issued April 12, 2006. Attachment 1 - Permit to Operate: Phase 1, Cell 1 issued November 21, 2006
b.	Specified monitoring and reporting requirements shall be met.	1.8 - Record Keeping 2.6 - Groundwater Monitoring Well Access Requirements 3.1 - E&SC Measures Monitoring and Maintenance 3.2 - Surface Erosion Monitoring
2. Spreading and Compacting Requirements		
a.	Solid waste shall be restricted into the smallest area feasible.	2.1.6 - Waste Placement
b.	Solid waste shall be compacted as densely as practical into cells.	2.1.7 - Compaction Requirements
3. Cover Requirements		
a.	Solid waste shall be covered after each day of operation, with a compacted layer of at least six inches of suitable cover or as specified by the Division.	2.1.8.1 - Operational Cover - Asbestos-Containing Material 2.1.8.2 - Operational Cover - C&D Waste 2.1.8.3 - Operational Cover - Other Wastes
b.	Areas which will not have additional wastes placed on them for 12 months or more, but where final termination of disposal operations has not occurred, shall be covered with a minimum of one foot of intermediate cover.	2.1.8.5 - Interim Cover
c.	After final termination of disposal operations at the site or a major part thereof, or upon revocation of a permit, the area shall be covered with at least two feet of suitable compacted earth.	2.1.8.6 - Final Cover
4. Erosion Control Requirements		
a.	Adequate erosion control measures shall be practiced to prevent silt from leaving the site.	3.2 - Surface Erosion Monitoring
b.	Adequate erosion control measures shall be practiced to prevent excessive on-site erosion.	3.1 - E&SC Measures Monitoring and Maintenance
5. Drainage Control Requirements		
a.	Surface water shall be diverted from the operational area.	2.4 - Storm Water Collection and Conveyance
b.	Surface water shall not be impounded over or in waste.	2.4 - Storm Water Collection and Conveyance
c.	Completed areas shall be adequately sloped to allow surface water runoff in a controlled manner.	2.4 - Storm Water Collection and Conveyance

**Table 1**  
**15A NCAC 13B .0505 Operational Requirement Cross-Reference Table**

15A NCAC 13B .0505 - Operational Requirements for Sanitary Landfills		Section Reference in Landfill Operations Plan
6. Vegetation Requirements		
a.	Within six months after final termination of disposal operations at the site or a major part thereof or upon revocation of a permit, the area shall be stabilized with native grasses.	2.1.8.6 - Final Cover 4.0 - Vegetation Management
b.	Temporary seeding will be utilized as necessary to stabilize the site.	4.1 - Temporary Seeding
7. Water Protection Requirements		
a.	The separation distance of four feet between waste and water table shall be maintained unless otherwise specified by the Division in the permit.	NA - separation from water table addressed during construction phase.
b.	Solid waste shall not be disposed of in water.	2.4 - Storm Water Collection and Conveyance
c.	Leachate shall be contained on site or properly treated prior to discharge. An NPDES permit may be required prior to the discharge of leachate to surface waters.	2.2 - Leachate and Stormwater Management 2.3 - Leachate Collection System (LCS)
8. Access and Security Requirements		
a.	The site shall be adequately secured by means of gates, chains, berms, fences, and other security measures approved by the Division, to prevent unauthorized entry.	1.4 - Access and Security Requirements
b.	An attendant shall be on duty at the site at all times while it is open for public use to ensure compliance with operational requirements.	1.4 - Access and Security Requirements
c.	The access road to the site shall be of all-weather construction and maintained in good condition.	1.4 - Access and Security Requirements
d.	Dust control measures shall be implemented where necessary.	2.1.3 - Dust, Litter, Odor and Vector Control
9. Sign Requirements		
a.	Signs providing information on dumping procedures, the hours during which the site is open for public use, the permit number and other pertinent information shall be posted at the site entrance.	1.6 - Signs
b.	Signs shall be posted stating that no hazardous or liquid waste can be received without written permission from the Division.	1.6 - Signs
c.	Traffic signs or markers shall be provided as necessary to promote an orderly traffic pattern to and from the discharge area and to maintain efficient operating conditions.	1.6 - Signs

**Table 1**  
**15A NCAC 13B .0505 Operational Requirement Cross-Reference Table**

15A NCAC 13B .0505 - Operational Requirements for Sanitary Landfills		Section Reference in Landfill Operations Plan
10. Safety Requirements		
a.	Open burning of solid waste is prohibited.	2.1.4 - Fire Control
b.	Equipment shall be provided to control accidental fires or arrangements shall be made with the local fire protection agency to immediately provide fire-fighting services when needed.	2.1.4 - Fire Control
c.	Fires that occur at a sanitary landfill shall be reported to the Division within 24 hours and a written notification shall be submitted within 15 days.	2.1.4 - Fire Control
d.	The removal of solid waste from a sanitary landfill is prohibited unless the owner/operator approves and the removal is not performed on the working face.	2.1.2 - Waste Acceptance, Disposal and Screening Requirements
e.	Barrels and drums shall not be disposed of unless they are empty and perforated sufficiently to ensure that no liquid or hazardous waste is contained therein.	2.1.2 - Waste Acceptance, Disposal and Screening Requirements
11. Waste Acceptance and Disposal Requirements		
a.	A site shall only accept those solid wastes which it is permitted to receive. The landfill operator shall notify the Division within 24 hours of attempted disposal of any waste the landfill is not permitted to receive, including waste from outside the area the landfill is permitted to serve.	2.1.2 - Waste Acceptance, Disposal and Screening Requirements
b.	No hazardous or liquid waste shall be accepted or disposed of in a sanitary landfill.	2.1.2 - Waste Acceptance, Disposal and Screening Requirements
c.	Spoiled foods, animal carcasses, abattoir waste, hatchery waste, and other animal waste delivered to the disposal site shall be covered immediately.	2.1.2 - Waste Acceptance, Disposal and Screening Requirements
d.	Asbestos waste that is packaged in accordance with 40 CFR 61, which is adopted by reference in accordance with G.S. 150B-14(c), may be disposed of separate and apart from other solid wastes at the bottom of the working face or in an area not contiguous with other disposal areas, in either case, in virgin soil. Separate areas shall be clearly marked so that asbestos is not exposed by future land-disturbing activities. The waste shall be covered immediately with soil in a manner that will not cause airborne conditions. Copies of 40 CFR 61 may be obtained and inspected at the Division.	2.1.2 - Waste Acceptance, Disposal and Screening Requirements 2.1.6.3 - Asbestos (Waste Placement)
e.	Wastewater treatment sludges may only be used as a soil conditioner and incorporated into the final two feet of cover. Sludges shall be examined for acceptance by Waste Determination procedures in Rule .0103(e) of this Subchapter.	2.1.6.2 Clarifier Sludge
12. Miscellaneous Requirements		
a.	Effective vector control measures shall be applied to control flies, rodents, and other insects or vermin when necessary.	2.1.3 - Dust, Litter, Odor and Vector Control
b.	Appropriate methods such as fencing and diking shall be provided within the area to confine solid waste subject to be blown by the wind. At the conclusion of each day of operation, all windblown material resulting from the operation shall be collected and returned to the area by the owner or operator.	1.4 - Access and Security Requirements

Table 2  
List of Design Drawings

Duke Drawing #	Title
M-6024-02.00	Cell 1 Excavation
M-6024-03.00	Cell 1 Profile and Sections
M-6024-04.00	Cell 1 Perimeter Road Realignment
M-6024-08.00	Cell 1 and Cell 2 Perimeter Road Sections
M-6024-09.00	Cell 1 and Cell 2 Perimeter Road Profile
MM6451.00-0002.001*	Gas Venting System Plan
MM6451.01-0001.001	Cell 1 Erosion and Sediment Control Plan
MM6451.01-0002.001	Cell 2 Erosion and Sediment Control Plan
MM6451.01-0003.001	Final Closure Erosion and Sediment Control Plan
MM6451.01-0004.001*	Gypsum Landfill Erosion Control Details
MM6451.00-0001.001*	Final Closure Details
MM6451.00-0003.001*	Cell 1 Leachate Collection and Removal System
MM6451.00-0004.001	Cell 1 Operational Cover Grading Plan
MM6451.00-0005.001*	Cell 1 Final Configuration
MM6451.00-0006.001	Cell 1 Stormwater Basin
MM6451.00-0007.001*	Cell 1 and Cell 2 Details
MM6451.00-0008.001	Cell 1 and Cell 2 Leachate Collection and Removal System
MM6451.00-0009.001	Cell 2 Landfill Excavation
MM6451.00-0010.001	Cell 2 Leachate Collection and Removal System
MM6451.00-0011.001	Cell 2 Operational Cover Grading Plan
MM6451.00-0012.001	Cell 2 Stormwater Basin
MM6451.00-0013.001	Cell 1 and Cell 2 Final Configuration
MM6451.00-0014.001	Cell 1 and Cell 2 Sections

Notes:

1. Unless otherwise note, the design drawing is from the *Construction Plan Application* dated December 15, 2005.
2. \* indicates design drawing revised August 19, 2011 and April 6, 2012.

**APPENDIX A**  
**DUST CONTROL PLAN**

# Dust Control Plan

Duke Energy Carolinas, LLC—Marshall Steam Station  
Flue Gas Desulfurization (FGD) Residue Landfill Phase 1, Cell 1  
Catawba County, North Carolina

Permit No. 1809

April 10, 2012  
Revision 1



Prepared for:  
Duke Energy Carolinas, LLC  
526 South Church Street  
Charlotte, North Carolina 28202



Prepared by:  
Altamont Environmental, Inc.  
231 Haywood Street  
Asheville, North Carolina 28801

## Description of Revisions

The following table provides a brief description of the revisions to the Dust Control Plan.

The *Operations Plan* was originally submitted to the North Carolina Department of Environment and Natural Resources (DENR) on August 19, 2011. Comments from DENR on the submittal were provided in a *Completeness Determination and Technical Review* letter from Mr. Larry Frost, DENR, to Mr. Ed Sullivan, P.E., Duke Energy Carolinas, LLC, dated September 27, 2011 (see Attachment C).

<i>Revision</i>	<i>Date of Document</i>	<i>Description of Revision</i>
Initial Issue	August 19, 2011	Initial issuance of document.
Revision 1	April 10, 2012	<p>The following revisions were performed to respond to the Permit to Operate <i>Completeness Determination and Technical Review</i> performed by DENR and to provide consistent requirements for Operational and Intermediate Cover between this landfill and the Marshall Steam Station Industrial Landfill No. 1, Permit No. 1812 (MSS ILF#1). Editorial changes are not noted.</p> <p><i>Appendix A Dust Control Plan</i></p> <ul style="list-style-type: none"><li>• Section 1.0—Deleted acreage of landfill footprint.</li><li>• Section 2.0—Revised section to delete reference to thickness of soil cover.</li><li>• Section 4.0—Revised cover requirements for asbestos per DENR comments.</li></ul>

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### Figure

1. Landfill Operations Grid

### Appendices

- A. Monitoring Worksheet

## 1.0 Introduction and Site Description

This Dust Control Plan is for the Marshall Steam Station (Marshall) Flue Gas Desulfurization (FGD) Residue Landfill (Marshall FGD Landfill). This Plan provides dust control methods for managing dust emissions at the Marshall FGD landfill in addition to a monitoring program and corrective action response to contain coal combustion products (CCPs) to prevent dust nuisances to employees and the public. The monitoring program will aid Duke and the landfill operator in evaluating the dust control methods, or combination of dust control methods, that prove effective with site-specific conditions.

The Marshall FGD landfill, Phase 1, Cell 1 is used primarily for CCP management. CCPs managed by the landfill primarily consist of FGD residue (i.e., gypsum, clarifier sludge), fly ash, bottom ash, and mill rejects. The landfill is also used for asbestos and construction and demolition debris (C&D) waste management.

This Plan is Appendix A to the *Operations Plan* for the Marshall FGD landfill.

## 2.0 Dust Control Methods

The primary potential source of dust emissions in the landfill is the active area of waste placement. These areas are at a higher risk for producing dust due to vehicular and equipment traffic and earthwork construction. Exterior landfill slopes are less of a dust control concern as they have operational and intermediate soil covers, which are vegetated as required in the *Operations Plan*. Operational and intermediate soil covers are defined in the *Operations Plan*.

Dust emissions from the landfill can be controlled through a variety of dust control methods. Possible dust control methods are identified herein. Dust control methods may be characterized as products and/or applications, structural wind breaks and/or covers, and operational methods.

Dust control methods for the landfill area include, but are not limited to:

- Watering
- Establishing vegetative cover
- Mulching
- Structural controls consisting of:
  - Wind breaks (i.e., fencing and/or berms)
  - Temporary coverings (i.e., tarps)
- Spray-applied dust suppressants consisting of, and not limited to:
  - Anionic asphalt emulsion
  - Latex emulsion
  - Resin in water
  - Polymer-based emulsion
  - Mineral mortar coatings (i.e., posi-shell)
- Calcium chloride
- Soil stabilizers (i.e., soil cements)
- Operational soil cover
- Modifying the active working area
- Modifying operations during dry and windy conditions

The operator may use, and is not limited to, combinations of these dust control methods or any method that is technically sound and environmentally acceptable to control dust for the specific site conditions. If the operator intends to use a dust control method not presented above, the proposed dust control method will be evaluated by Duke on a case-by-case basis to assess the effectiveness with specific site conditions. For the purposes of this Plan, operational soil cover will be defined as soil material applied at a suitable thickness to provide dust control. The effectiveness of the dust control methods implemented should be evaluated through a dust monitoring program outlined in Section 3.0.

Operational equipment generally consists of dump trucks, vibratory smooth drum roller, bulldozer, water truck, spray trailer, track hoe, and service truck. Operational equipment will be used to construct, install, apply, and/or repair dust control methods. The operator will make provisions to alleviate any on-site issues that arise when primary equipment is being maintained or is inoperable. Marshall contains multiple landfill

facilities, and the landfill operator will make provisions to have the necessary equipment to control multiple fugitive CCP dusting emission events.

## 3.0 Monitoring and Corrective Action Response

This section describes a dust monitoring program and suggests corrective action responses in case fugitive emissions are observed.

### 3.1 Monitoring

During landfill operations, a dust monitoring program will be implemented to evaluate the dust control measure performance and observe the areas for dust emissions. The dust monitoring program consists of performing visual observations of dust-prone areas, implementing dust-control measures, and monitoring existing and forecasted weather conditions.

Dust emissions can occur under many conditions. For the purposes of this Plan, dust emissions are characterized as fugitive emissions, where CCP dust is located outside the limit of landfill waste. This is most likely to occur during windy, dry, and hot weather conditions. Therefore, the operator will monitor both existing and forecasted weather conditions and use dust-control measures suited to the weather conditions. The dust-control measures shall be implemented prior to the forecasted weather conditions.

Equipment operators shall continuously observe the active face and other areas within the landfill limit for dust emissions. In addition, preventive dust-control measures should be observed and documented at least twice daily (morning and afternoon) when the landfill is in operation, to evaluate the dust control measure performance. Additional observations may be necessary as site and weather conditions dictate. Observations will be documented using the attached "Monitoring Worksheet," or online database/worksheet, etc. To minimize continual maintenance of moisture-conditioned and spray-applied areas, the operator shall pay particular attention to these areas. Structural controls shall be observed to monitor the performance of the controls. Observations in the landfill area may be made with reference to the grid system shown in the attached Figure 1.

Monitoring will be conducted during times when the landfill is in operation. The operator shall continue to provide necessary dust-control measures during periods when operations are inactive (i.e., outages, weekends, and holidays). Operators are to establish appropriate measures so that dust emissions are not reasonably likely to occur during inactive operations periods when monitoring is not being conducted.

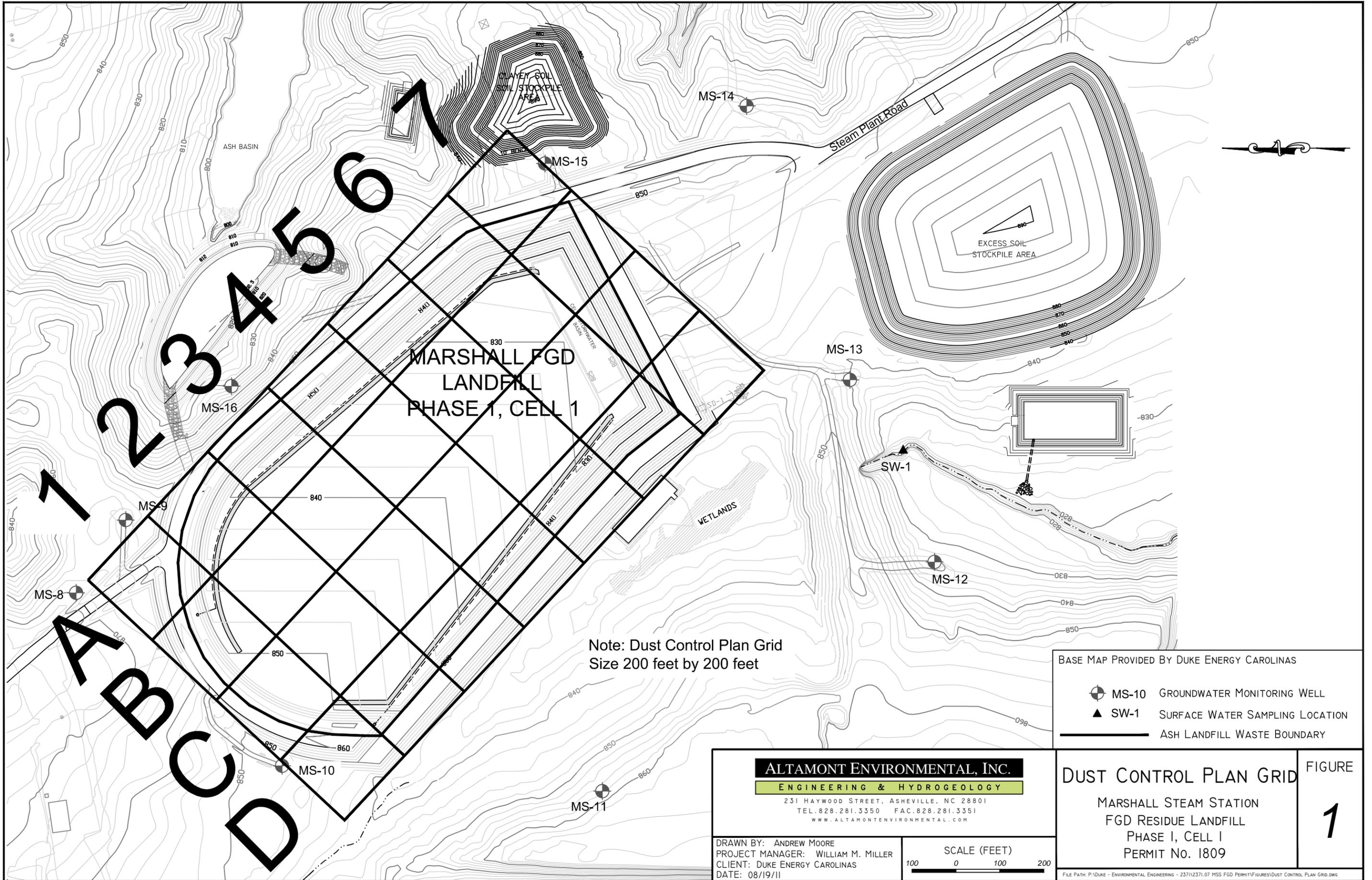
### 3.2 Corrective Action

If fugitive dust emissions are observed and observations indicate dust-control measures are not achieving their intended purpose, then appropriate corrective actions will be taken. Dust-control measures should be reapplied, repaired, or added, as necessary, to control dust emissions. The operator will construct, install, apply, and/or repair dust-control measures prior to the end of the work day to control dust emissions during non-operating hours. The operator will implement dust-control measures as preventive controls rather than in response to fugitive dust emissions.

## 4.0 Regulated Cover Requirements

The Marshall FGD landfill is permitted to accept non-CCP wastes including asbestos-containing material and C&D waste. Asbestos-containing material and C&D waste shall be placed in accordance with the approved *Operations Plan* and regulated cover requirements. In accordance with Solid Waste Rules Section 15A NCAC 13B.0505 (11)(d), asbestos material shall be covered within eight hours of placement. The material will be covered with 6 inches of soil, ash, and/or gypsum material and compacted by a dozer.

C&D waste shall be covered with 6 inches of earthen material (i.e., soil, ash, and/or gypsum material) whenever the disposal area exceeds one-half acre and at least once weekly.



Note: Dust Control Plan Grid Size 200 feet by 200 feet

BASE MAP PROVIDED BY DUKE ENERGY CAROLINAS

- ⊕ MS-10 GROUNDWATER MONITORING WELL
- ▲ SW-1 SURFACE WATER SAMPLING LOCATION
- ASH LANDFILL WASTE BOUNDARY

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 DATE: 08/19/11

SCALE (FEET)  
 0 100 200

**DUST CONTROL PLAN GRID** FIGURE  
 MARSHALL STEAM STATION  
 FGD RESIDUE LANDFILL  
 PHASE I, CELL I  
 PERMIT NO. 1809  
 1

FILE PATH: P:\DUKE - ENVIRONMENTAL ENGINEERING - 2371\2371.07 MSS FGD PERMITS\FIGURES\DUST CONTROL PLAN GRID.DWG

**APPENDIX 1**  
**DUST CONTROL PLAN MONITORING WORKSHEET**



**APPENDIX B**

**CLOSURE/POST CLOSURE PLAN**