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SCS ENGINEERS

DOC ID 15611

NOV 17 2011
SOLID WASTE SECTION

Construction Documentation Report

Landfill Gas Collection and Control System Expansion 2011

Johnston County Landfill (Permit# 51-03)

Presented to:

Johnston County Public Utilities Department

Johnston County Landfill
680 County Home Road
Smithfield, North Carolina 27577

Prepared by:

C21 Methane Partners
93 St. Marks Place, Suite 2
New York, NY 10009
(212) 804-6279

SCS ENGINEERS, PC
2520 Whitehall Drive, Suite 450
Charlotte, NC 28273
(704) 504-3107

November 17, 2011
File No. 02210301.00

Environmental Consultants
and Contractors

SCS Engineers, P.C.
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273-3557

704 504-3107
FAX 704 504-3174
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SCS ENGINEERS, PC

November 17, 2011
File No. 02210301.00

Mr. Tim Broome, Director
Johnston County Public Utilities Department
Post Office Box 2263
Smithfield, NC 27577-2633

Subject: Construction Documentation Report
Landfill Gas Collection and Control System
Johnston County Landfill

Dear Tim:

SCS Engineers is pleased to submit three copies of the above referenced report for Johnston County Landfill. If you have any questions or require any additional information, please contact Steve at 704-504-3701.

Sincerely,

Steven C. Lamb, PE
Vice President
SCS ENGINEERS, PC

Michael Cobb
Staff Professional
SCS ENGINEERS, PC

sl/mc

Enclosures

M:\PROJECT FILES\02210301.00 - BlueSource Johnston County\02210301.00 - Johnston County CQA\CQA Report Transmittal ltr-1.doc

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SCS ENGINEERS, PC

November 17, 2011
File No. 02210301.00

Mr. Ming Chao
North Carolina Department of Environment and Natural Resources
Division of Solid Waste
410 Oberlin Rd
Raleigh, North Carolina 27605

Subject: Construction Documentation Report
Landfill Gas Collection and Control System
Johnston County MSW and C&D Landfill Facility, SW Permit #51-03
Smithfield, North Carolina

Dear Mr. Chao:

On behalf of Johnston County MSW and C&D Landfill Facility (Landfill), SCS Engineers, PC (SCS) is hereby submitting the enclosed Construction Documentation Report for the initial landfill gas collection and control system (GCCS) at the Johnston County Landfill.

The initial GCCS is a voluntary project with the primary purpose to collect and control landfill gas (LFG). Johnston County has entered into an agreement with Blue Source to sell the greenhouse gas credits and to produce electricity from the LFG. The GCCS installation will facilitate the collection of LFG for the Green Energy Project and Carbon Credit Project. Please do not hesitate to contact either of the undersigned if you have any questions or comments at (704) 504-3107.

Sincerely,

Steven C. Lamb, PE
Vice President
SCS ENGINEERS, PC

Michael Cobb
Staff Professional
SCS ENGINEERS, PC

jm/scl
cc: Rick Proctor, Johnston County Solid Waste Manager
Annika Colston, Methane Power (letter only)
Guy Lewis, SCS Field Services (letter only)
Matt Wells, C2i Methane Partners (letter only)

Enclosures
M:\PROJECT FILES\02210301.00 - BlueSource Johnston County\02210301.00 - Johnston County CQA\letter to DENR.doc

Construction Documentation Report

Landfill Gas Collection and Control System Expansion 2011

Johnston County Landfill

Presented To:

Johnston County Landfill
680 County Home Road
Smithfield, North Carolina 27577

Prepared By:

C2I Methane Partners
93 St. Marks Place, Suite 2
New York, NY 10009
(212) 804-6279

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A Photographs
B SCS Engineers Daily Field Reports
C Landfill Gas Extraction Well Logs
D Record Drawings
E Flare Documentation and DAQ Information
F Leak Test Results
G Correspondence

O&M manual on-site

1 INTRODUCTION

This Construction Certification Report, prepared by SCS Engineers, PC (SCS), summarizes the initial Landfill Gas (LFG) Collection and Control System (GCCS) installed at the Johnston County Landfill (Site), located near the town of Smithfield, Johnston County, North Carolina. The Site is located at 680 County Home Road and is owned and operated by Johnston County.

The objectives of the 2011 GCCS project were to construct an active voluntary GCCS for the destruction of LFG in support of a greenhouse gas credit project and to support a future landfill gas to energy (LFGE) project.

The primary components of the GCCS included the following:

- Twenty-three new LFG wells. 23 gas well → As built
- LFG collection piping (header and laterals).
- Isolation valves.
- Condensate sumps and pumps – CS-H2, CS-3A, & CS-4B.
- Airline and forcemain piping for LFG condensate sumps and pumps.
- Blower flare station (1,250 SCFM utility flare).

The GCCS project was a design/build type project developed by C2I Methane Partners (formerly BlueSource), SCS Engineers, PC (SCS) and SCS Field Services (SCS FS). Construction began on the GCCS project in April 2011 and the piping was substantially completed in July 2011. The flare and air compressor were installed in September 2011. The remaining items were completed in early October 2011 and the complete GCCS startup occurred on October 13, 2011.

↳ air permit ?

1.1 BACKGROUND

The Johnston County MSW and C&D Landfill Facility (Landfill) is located near Smithfield, North Carolina. A Request for Proposal for a Landfill Gas to Energy Project at the Johnston County Landfill was issued by the Johnston County Department of Utilities. The Development Team of C2I Methane Partners and SCS Engineers proposed to develop a landfill gas collection and control system and a beneficial use project for the LFG at the Landfill. The Development Team will finance, design, permit, build, commission, own, operate, and maintain the GCCS and plans to implement a Landfill Gas Energy system

The Landfill includes several waste disposal areas designated as Phase 1, 2, 3, 4, 4A, and 5. No GCCS construction activities are planned in Phase 1 and 2. Drilling and pipe installation will take place in Phase 3, 4A and 5. For Phase 4, no drilling is planned and pipe installation will only occur within the existing soil cover.

phases
3, 4A, 5 → boring
4 → lateral piping to existing well

A solid waste permit modification (dated November 30, 2010) for the installation of a voluntary GCCS was prepared by SCS and submitted to the Division of Waste Management (DWM), Solid Waste Section on behalf of the Johnston County MSW and C&D Landfill Facility (Permit No. 51-03).

1.2 PROJECT DOCUMENTS

The following documents defined the design and technical aspects of the project and governed construction:

- "Construction Drawings for Johnston County Landfill Gas Project", prepared by SCS, dated November 2010 and revised February 2011.
- Solid Waste Permit Modification submittal, prepared by SCS, dated November 30, 2010, and subsequent correspondences with NCDENR.
- Minor Source Permit to Construct Application, prepared by SCS Engineers, dated August 16, 2010 (for flare).
- Surveying results, by M-III Engineering.

1.3 CONTACT LIST

The parties involved in construction of the GCCS project at the Johnston County Landfill are listed below:

Project Developer:
C2I Methane Partners
93 St. Marks Place, Suite 2
New York, NY 10009
(212) 804-6279

General Contractor:
SCS Field Services
11260 Roger Bacon Drive, Suite 300
Reston, Virginia 20190
(703) 709-0004

Design Engineer and CQA Firm:
SCS Engineers, P.C.
2520 Whitehall Park Drive, Suite 450
Charlotte, North Carolina 28273
(704) 504-3107

Surveyor:
M-III Engineering
970 Trinity Road
Raleigh, NC 27607
(919) 822-2222

Drilling Subcontractor:
B&H Drilling Services, Inc
7180 SW 18th St.
Plantation, FL 33317
(954) 614-0492

2 LANDFILL GAS COLLECTION AND CONTROL SYSTEM

Construction on the GCCS began in April 2011 and ended in July 2011. The construction and installation was performed by SCS Field Services with SCS providing construction inspection services. The project consisted of constructing/installing the following primary components:

- 943 vertical feet drilled
- 2,225 ft. of 12-inch diameter HDPE SDR 17 header pipe
- 2,447 ft of 10-inch diameter HDPE SDR 17 LFG header pipe
- 2,725 ft of 8-inch diameter HDPE SDR 17 LFG header pipe
- 475 ft of 6-inch diameter HDPE SDR 17 LFG lateral pipe
- 4,642 ft of 4-inch diameter HDPE SDR 17 LFG lateral pipe
- 5,645 ft of 2-inch diameter HDPE SDR 9 airline pipe
- 5,965 ft of 2-inch diameter HDPE SDR 11 forcemain pipe
- One 12-inch butterfly-type isolation valves
- Three 10-inch butterfly-type isolation valves with 5-foot valve extension
- Two 8-inch butterfly-type isolation valves with 5-foot valve extension
- 200 ft of 18-inch CMP for road crossings
- Three 12-inch HDPE condensate sumps and pumps

2.1 LANDFILL GAS COLLECTION PIPING

As stated above, 12-, 10-, and 8-inch diameter LFG header pipe and 8-, 6-, and 4-inch diameter lateral pipe were installed during this construction project. Previously installed header and lateral pipes for the passive collection system remain in place and were connected to the active collection system. The new GCCS piping consists of high density polyethylene (HDPE) pipe (PE 3408) with a Standard Dimension Ratio (SDR) of 17. Leak testing was conducted on the new LFG piping and the results can be found in ***Appendix F***.

The GCCS piping was sized to handle the maximum LFG design flow rate anticipated during the next several years, or until the piping is replaced. As landfilling operations progress and LFG production rates increase, the initial piping may be replaced with larger diameter piping or additional GCCS piping installed, as necessary.

To promote positive drainage of LFG condensate to collection points, the LFG collection piping inside the waste footprint was typically constructed at a minimum slope of three percent when possible.

At no time during trenching activities were portions of the permitted cap damaged.

Record drawings depicting the LFG piping are provided in ***Appendix D***.

2.2 LANDFILL GAS EXTRACTION WELLS

Well log
Said #4 washed Aggregate.
Bzirt Drilling
See p. 2

Vertical LFG extraction wells were constructed with a 6-inch diameter SCH 80 PVC pipe centered inside 36-inch diameter borings. The drilling contractor was Quality Drilling. The well borings were backfilled using a NC DOT No. 57 stone, a double bentonite seal, and soil. The length of solid pipe is typically one third of total well depth below grade and the remaining length of the well is slotted pipe. Well drilling logs prepared by SCS are provided in ***Appendix C***. As-built data pertaining to the extraction wells is provided in ***Appendix D***.

Each LFG extraction well was outfitted with a Lee Supply 2-inch Waste Management Style wellhead equipped with a valve to control LFG flow and vacuum, and monitoring ports on either side of the valve to measure LFG quality, pressure, and temperature. A removable end cap on top of the wellhead allows access to the interior of the well pipe for measurement of liquid levels and pumping of the liquid, if necessary. Flexible Cannoflex piping connects the wellhead with the GCCS lateral pipe and is intended to accommodate differential settlement in t2he vicinity of each well.

SCS submitted the required information to the Health Hazards Control Unit (HHCU) of the Division of Public Health that addressed the potential to disturb asbestos-containing materials (ACMs). A copy of the notification and the approval from HHCU is provided in ***Appendix G***. No ACMs were encountered during drilling activities.

Not available.

2.3 HDPE PIPE WELDING

All LFG header and lateral piping was constructed using fusion welding. The contractor used a variety of welding machines, determined by the diameter of the pipe in question. Fusion equipment was manufactured by McElroy and worked as intended during construction.

Welding temperatures were checked at the start of welding and following any extended breaks. Additionally, temperatures were monitored periodically during the welding process. Welding temperature was 425°F or greater per ISCO HDPE Fusion Manual.

In order to connect new LFG piping to the existing LFG piping, the contractor used electrofusion couplers. A coupler is fitted over the ends of the two pieces of pipe, and then an electrofusion machine runs electricity through wiring installed in the coupler to produce heat. The amount of time required to sufficiently melt the coupler and sections of pipe together is determined by the diameter of the pipe, with larger couplers requiring more time.

2.4 EXISTING SOLAR FLARES

Nine passive solar flares already existed at the site, labeled T-1 through T-9. The contractor attached wellheads to these passive wells and connected them to the new GCCS according to the construction drawings. These wells were given new names as seen in the Table on the record drawing in ***Appendix D.***

2.5 BLOWER FLARE STATION

A new 1,250 SCFM blower skid and utility flare were installed near Phase V to combust the collected LFG. The Landfill received an Air Permit to Construct from the NCDENR Division of Air Quality. The Permit to Construct issued by the DAQ is provided in ***Appendix E***.

Additional information for the flare is also included in ***Appendix E***.

3 CONSTRUCTION RECORDS

The following construction documentation is provided as appendices:

- Appendix A: Construction Photographs
- Appendix B: SCS Daily Field Reports (April 26, 2011 thru April 30, 2011)
- Appendix C: LFG Extraction Well Logs
- Appendix D: Record Drawings
- Appendix E: Flare Documentation and DAQ Information
- Appendix F: Leak Test Results
- Appendix G: Correspondence

3.1 CONSTRUCTION PHOTOGRAPHS

Photographs were taken by SCS on a regular basis during the drilling phase of the construction. SCS also took photographs of completed components of the GCCS during the flare startup. Photographs are included in ***Appendix A*** to provide a general representation of the drilling activities and methods and completed components of the GCCS.

3.2 SCS DAILY FIELD REPORTS

SCS maintained daily field reports during the drilling process. These reports, along with the contractor's record drawings, were used to prepare this Construction Certification Report and SCS's Record Drawings. The daily reports are included in ***Appendix B.***

3.3 LFG EXTRACTION WELL LOGS

The LFG extraction well logs are provided in ***Appendix C*** and include a description of the well construction and excavated material (type, degree of decomposition, moisture, and temperature). The well construction logs detail the depth and diameter of the borehole, length of solid and perforated pipe, thickness of stone and soil backfills, and location of bentonite plugs.

3.4 RECORD DRAWINGS

Record Drawings depicting the constructed components of the GCCS are provided in ***Appendix D***.

4 SUMMARY AND CONCLUSION

Based on the field observations of the SCS Senior CQA Technicians and periodic reviews by SCS' Senior Engineer, it is our professional opinion that the installation of the Landfill Gas Collection and Control System at the Johnston County Landfill described in this report was conducted in accordance with industry practice and the requirements of the Construction Drawings and applicable permit documents.

APPENDICIES

APPENDIX A

Photographs

Photo 1. Drilling EW-412

Photo 2. Drilling EW-405

Photo 3. Installing well casing in EW-415

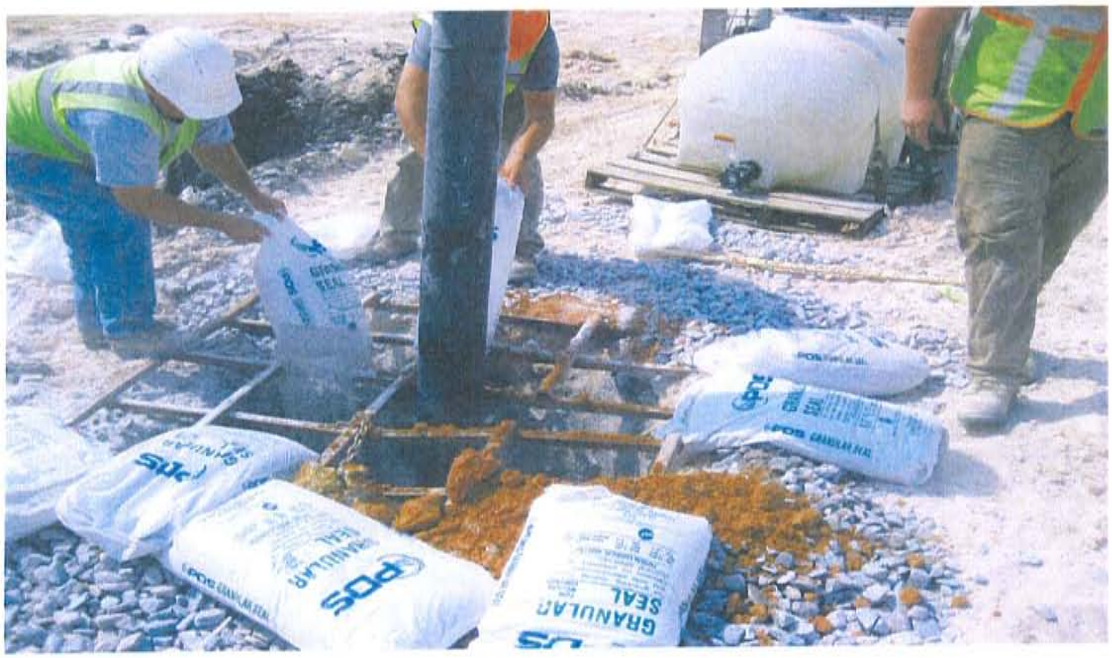


Photo 4. Installing bentonite seal in EW-507

Photo 5. Installed Valve V-301 and V-4A1

Photo 6. Installed Condensate Sump CS-3A

Photo 7. Completed well EW-511 with available airline and forrcemain

Photo 8. Completed valve V-403 with booted observation risers

Photo 9. Blower skid and flare stack in gated area

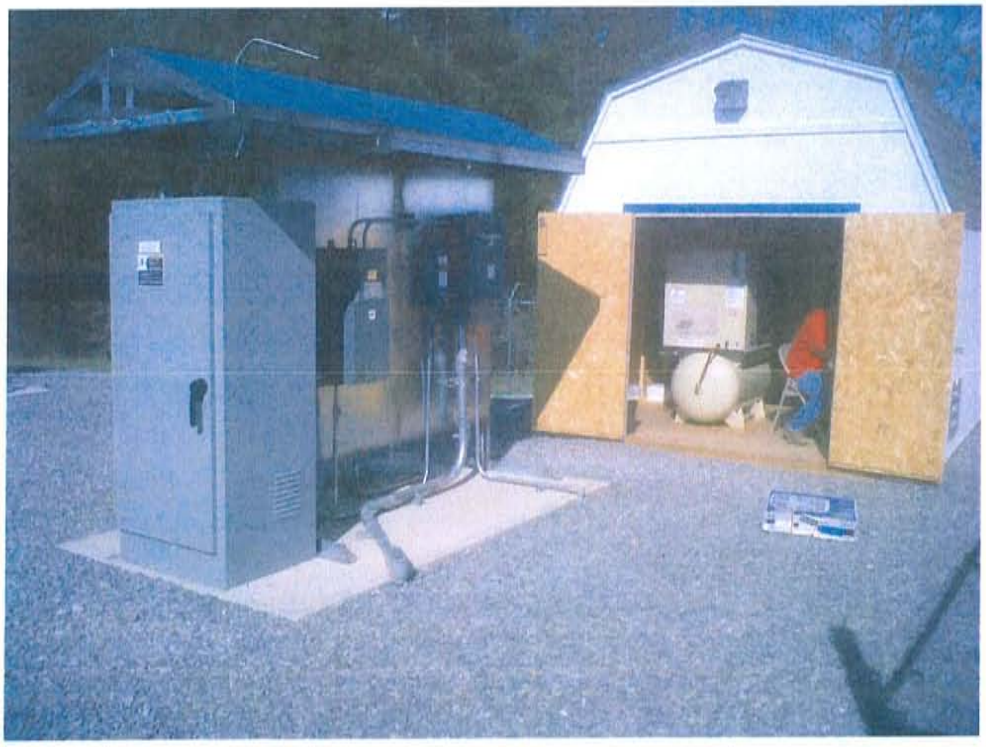


Photo 8. Control panel and air compressor in protective building

APPENDIX B

SCS Daily Field Reports

SCS ENGINEERS
DAILY FIELD REPORT

Project Name: Johnston County Landfill		**Project Number:** 02210301.00	
		Task: NA	**Labor Code:** 99000
Project Manager: Steve Lamb		**Field Personnel:** Michael Cobb	
Date: 4/26/11	**Vehicle:** fleet	**Miles Billed:** 0	**Travel Time:** 1 hr.
Weather: Clear, 85°			

Summary of Work:

On-site at 0650.

EW-405 – Elevation on stake matched well schedule. Drilling started at 0720 and completed at 0857. Asbestos inspector not on-site.

EW-406 – Elevation on stake was one foot higher than well schedule. Ted Blevins moved well 10' towards EW-407 to avoid existing tiki torch flare. Drilling started at 0921 and completed at 1036.

EW-407 – Elevation on stake matched well schedule. Drilling started at 1052 and completed at 1220.

EW-408 – Elevation on stake matched well schedule. Moved well downhill less than five feet to accommodate drill rig. Drilling started at 1235 and completed at 1345.

EW-409 – Elevation on stake matched well schedule. Drilling started at 1415 and completed at 1525.

Drilling stopped for the day due to weather.

Off-site at 1545.

Prepared by: Michael Cobb	**Reviewed by:**

SCS ENGINEERS
DAILY FIELD REPORT

Project Name: Johnston County Landfill		**Project Number:** 02210301.00	
		Task: NA	**Labor Code:** 99000
Project Manager: Steve Lamb		**Field Personnel:** Michael Cobb	
Date: 4/27/11	**Vehicle:** fleet	**Miles Billed:** 0	**Travel Time:** 1 hr.
Weather: Overcast, 85°			

Summary of Work:

On-site at 0650.

EW-410 – Elevation on stake matched well schedule. Moved downhill less than five feet to accommodate drill rig. Drilling started at 0728 and completed at 0855.

EW-411 – Elevation on stake matched well schedule. Moved uphill less than five feet to accommodate drill rig. Drilling started at 0918 and completed at 1033.

EW-412 – Elevation on stake matched well schedule. Drilling started at 1108 and completed at 1215.

EW-413 – Elevation on stake matched well schedule. Drilling started at 1248 and completed at 1355.

EW-415 – Stake marked as "EW-15". Spoke with J Morgan about this, he said to go ahead and drill well and he'd talk to Steve Lamb and Guy Lewis. Elevation on stake matched well schedule. Drilling started at 1440 and completed at 1712.

Off-site at 1745.

Prepared by: Michael Cobb	**Reviewed by:**

SCS ENGINEERS
DAILY FIELD REPORT

Project Name: Johnston County Landfill		**Project Number:** 02210301.00	
		Task: NA	**Labor Code:** 99000
Project Manager: Steve Lamb		**Field Personnel:** Michael Cobb	
Date: 4/28/11	**Vehicle:** fleet	**Miles Billed:** 0	**Travel Time:** 1 hr.
Weather: Overcast, raining, 85°			

Summary of Work:

On-site at 0650.

Work canceled for the day due to rain.

Off-site at 0745.

Prepared by: Michael Cobb	**Reviewed by:**

SCS ENGINEERS
DAILY FIELD REPORT

Project Name: Johnston County Landfill		**Project Number:** 02210301.00	
		Task: NA	**Labor Code:** 99000
Project Manager: Steve Lamb		**Field Personnel:** Michael Cobb	
Date: 4/29/11	**Vehicle:** fleet	**Miles Billed:** 0	**Travel Time:** 1 hr.
Weather: Overcast, 85°			

Summary of Work:

On-site at 0700.

EW-416 - Elevation on stake matched well schedule. Drilling started at 0719 and completed at 0943.

EW-414 – Original stake not there, new stake put in place by SCS FS. Cannot verify elevation. Spoke with Steve Lamb, he said to drill to 75% of waste depth (67'). Ted Blevins said he and Guy Lewis checked all stakes and is adamant that stake was put within 5' of original. I gave go-ahead to drill to original planned depth. Drilling started at 1020 and completed at 1245.

EW-501 - Elevation on stake matched well schedule. Drilling started at 1355 and completed at 1433.

EW-502 - Elevation on stake matched well schedule. Drilling started at 1620 and completed at 1655.

EW-503 - Elevation on stake matched well schedule. Well was moved approximately 30' uphill from stake. Drilling started at 1453 and completed at 1605.

Off-site at 1745.

EW-417 Not installed

7.0'

Prepared by: Michael Cobb	**Reviewed by:**

SCS ENGINEERS
DAILY FIELD REPORT

Project Name: Johnston County Landfill		**Project Number:** 02210301.00	
		Task: NA	**Labor Code:** 99000
Project Manager: Steve Lamb		**Field Personnel:** Michael Cobb	
Date: 4/30/11	**Vehicle:** fleet	**Miles Billed:** 0	**Travel Time:** 1 hr.
Weather: Overcast, 85°			

Summary of Work:

On-site at 0720.

move 20' in well log

EW-505 - Elevation on stake matched well schedule. Drilling started at 0715 and completed at 0745.

EW-507 - Elevation on stake matched well schedule. Drilling started at 0817 and completed at 0928.

EW-506 - Elevation on stake matched well schedule. Drilling started at 0946 and completed at 1032.

EW-504 - Elevation on stake matched well schedule. Drilling started at 1050 and completed at 1202.

EW-508 - Elevation on stake matched well schedule. Drilling started at 1223 and completed at 1318.

EW-509 - Elevation on stake matched well schedule. Drilling started at 1329 and completed at 1410.

Last two wells will be drilled Monday, 5/2/11, and logged by SCS FS personnel.

Off-site at 1500.

Prepared by: Michael Cobb	**Reviewed by:**

APPENDIX C

Landfill Gas Extraction Well Logs

SCS ENGINEERS
Environmental Consultants
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273
704 504-3107 FAX 704 504-3174

JOHNSTON COUNTY LANDFILL

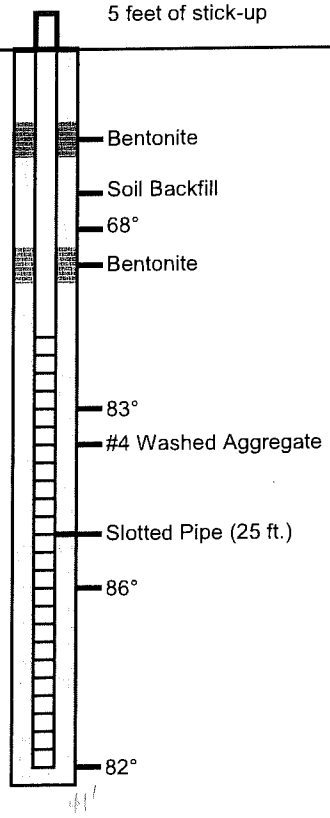
Project No. 02210301.00

LFG EXTRACTION WELL EW-405

Northing 643,652.8
Easting 2,170,938.3

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3' - Liner 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/26/11	Time Started:	0720
		Date Ended:	4/26/11	Time Ended:	0857
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	256'
		Well Diameter:	6.0-inch	Total Depth:	42'
Logged By:	M. Cobb	Casing Material:	PVC		

SCS ENGINEERS

Environmental Consultants
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273
704 504-3107 FAX 704 504-3174

JOHNSTON COUNTY LANDFILL

Project No. 02210301.00

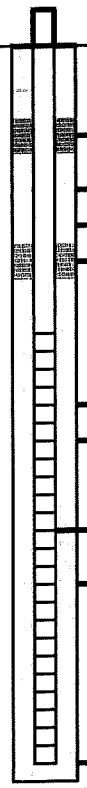
LFG EXTRACTION WELL EW-406

Northing 643,749.9
Easting 2,170,951.2

BORING LOG

Depth in Feet

5 feet of stick-up



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/26/11	Time Started:	0921
Drilling Method:	Landfill Bucket Auger	Date Ended:	4/26/11	Time Ended:	1036
Logged By:	M. Cobb	Boring Diameter:	36-inch	Surface Elevation:	256'
		Well Diameter:	6.0-inch	Total Depth:	42'
		Casing Material:	PVC		

SCS ENGINEERS
Environmental Consultants
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273
704 504-3107 FAX 704 504-3174

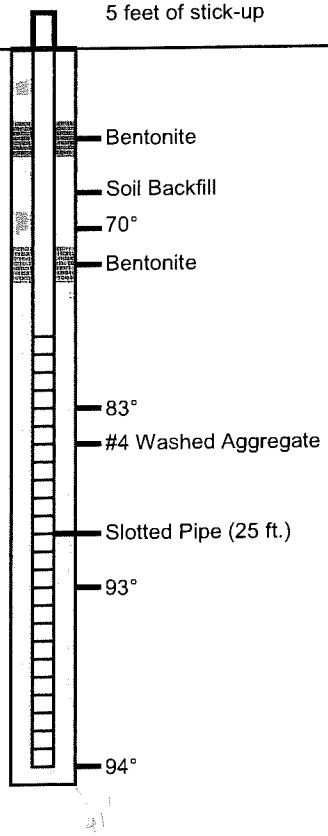
JOHNSTON COUNTY LANDFILL

Project No. 02210301.00

LFG EXTRACTION WELL EW-407

Northing 643,872.4
Easting 2,170,977.4

BORING LOG



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/26/11	Time Started:	1052
		Date Ended:	4/26/11	Time Ended:	1220
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	248'
		Well Diameter:	6.0-inch	Total Depth:	42'
Logged By:	M. Cobb	Casing Material:	PVC		

SCS ENGINEERS

Environmental Consultants
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273
704 504-3107 FAX 704 504-3174

JOHNSTON COUNTY LANDFILL

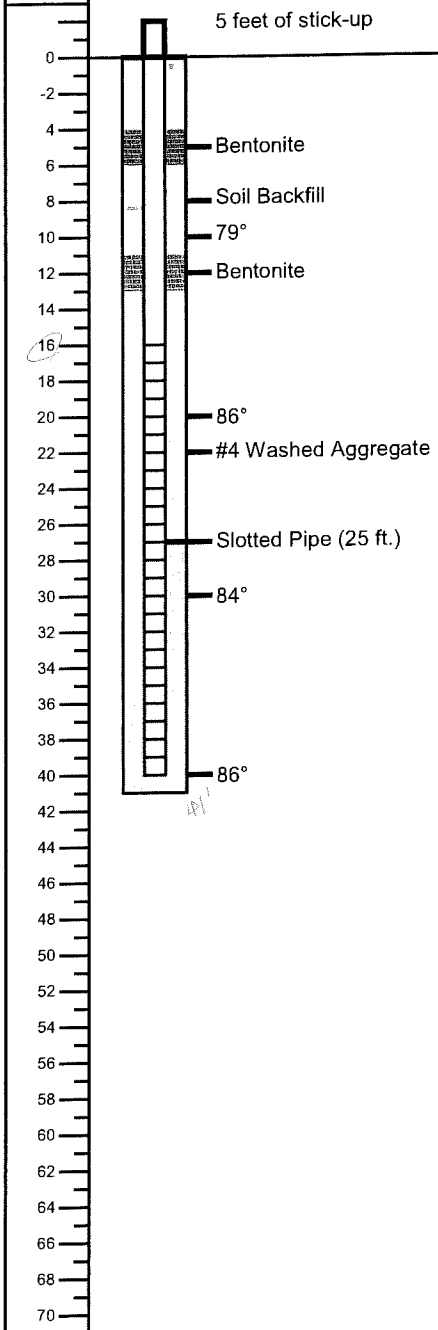
Project No. 02210301.00

LFG EXTRACTION WELL
EW-408

Northing 644,077.4

Easting 2,170,983.3

BORING LOG



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth. moved 5'

Drilling Company:

Drilling Method: Landfill Bucket Auger

Logged By: M. Cobb

Date Started:	4/26/11	Time Started:	1235
Date Ended:	4/26/11	Time Ended:	1345
Boring Diameter:	36-inch	Surface Elevation:	248'
Well Diameter:	6.0-inch	Total Depth:	42'
Casing Material:	PVC		

SCS ENGINEERS

Environmental Consultants
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273
704 504-3107 FAX 704 504-3174

JOHNSTON COUNTY LANDFILL

Project No. 02210301.00

LFG EXTRACTION WELL

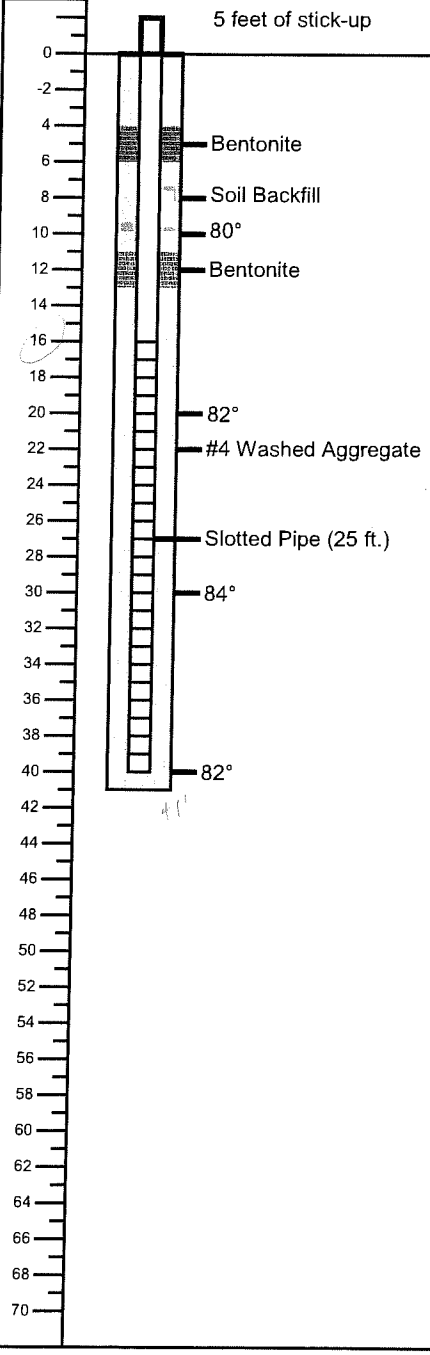
EW-409

Northing 644,422.1

Easting 2,170,955.8

BORING LOG

Depth in Feet	SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
0						0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.



Drilling Company:		Date Started:	4/26/11	Time Started:	1235
		Date Ended:	4/26/11	Time Ended:	1345
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	236'
		Well Diameter:	6.0-inch	Total Depth:	42'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

Project No. 02210301.00

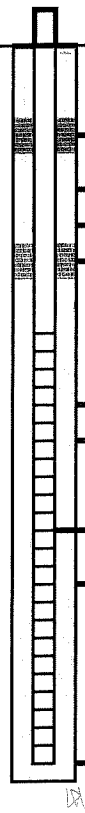
LFG EXTRACTION WELL
EW-410

Northing 644,584.6
Easting 2,170,926.3

BORING LOG

Depth in Feet

5 feet of stick-up



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/27/11	Time Started:	0728
		Date Ended:	4/27/11	Time Ended:	0855
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	233'
		Well Diameter:	6.0-inch	Total Depth:	42'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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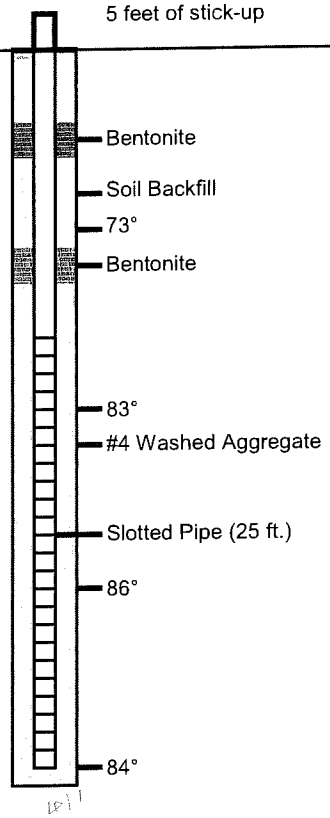
LFG EXTRACTION WELL
EW-411

Northing 644,724.7
Easting 2,170,991.0

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/27/11	Time Started:	0918
Drilling Method:	Landfill Bucket Auger	Date Ended:	4/27/11	Time Ended:	1033
Logged By:	M. Cobb	Boring Diameter:	36-inch	Surface Elevation:	221'
		Well Diameter:	6.0-inch	Total Depth:	42'
		Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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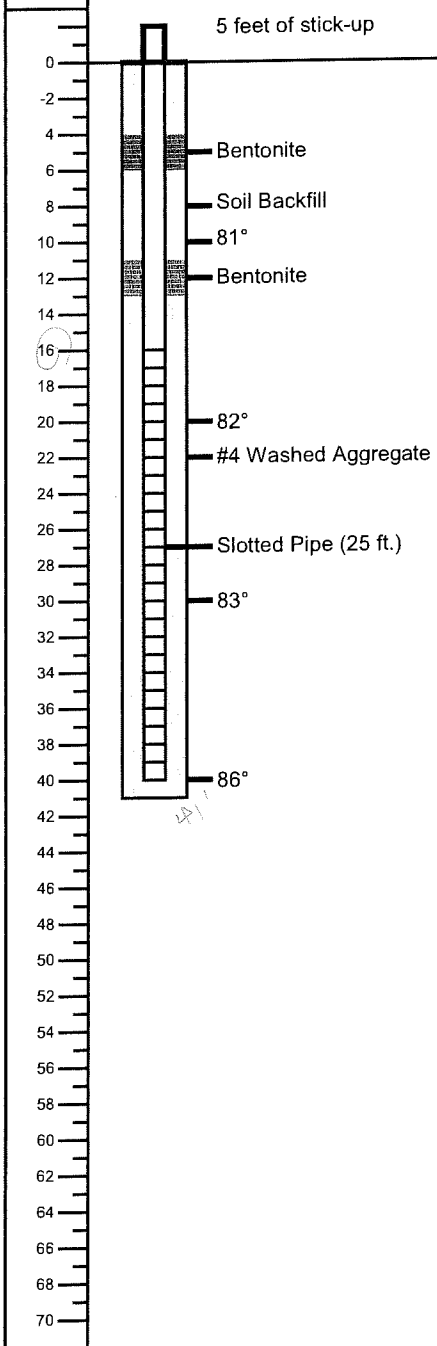
LFG EXTRACTION WELL EW-412

Northing 644,792.1
Easting 2,170,817.0

BORING LOG



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/27/11	Time Started:	1108
		Date Ended:	4/27/11	Time Ended:	1215
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	218'
		Well Diameter:	6.0-inch	Total Depth:	42'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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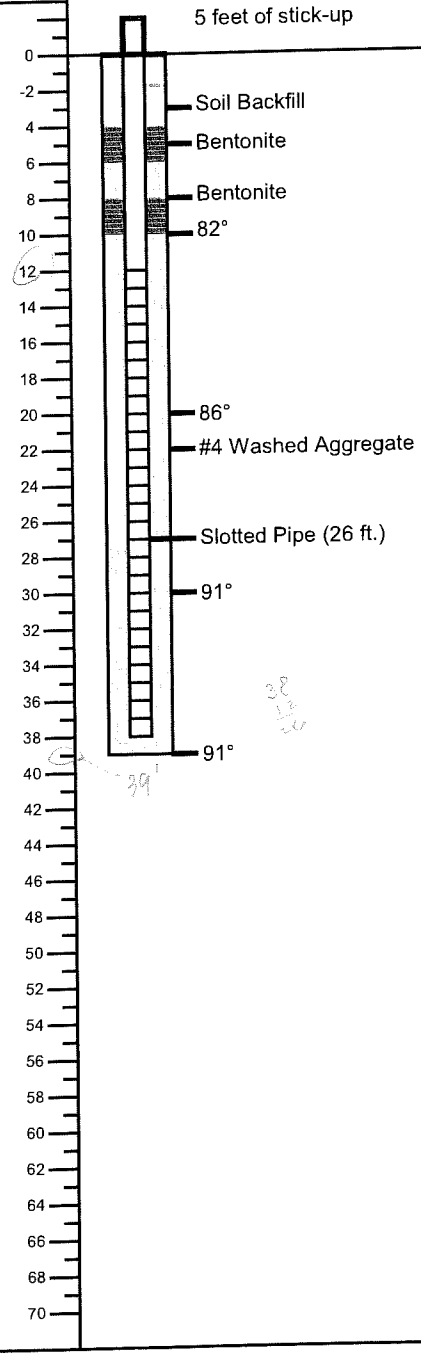
LFG EXTRACTION WELL EW-413

Northing 644,655.4
Easting 2,170,579.7

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-39' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/27/11	Time Started:	1248
		Date Ended:	4/27/11	Time Ended:	1355
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	218'
		Well Diameter:	6.0-inch	Total Depth:	39'
Logged By:	M. Cobb	Casing Material:	PVC		

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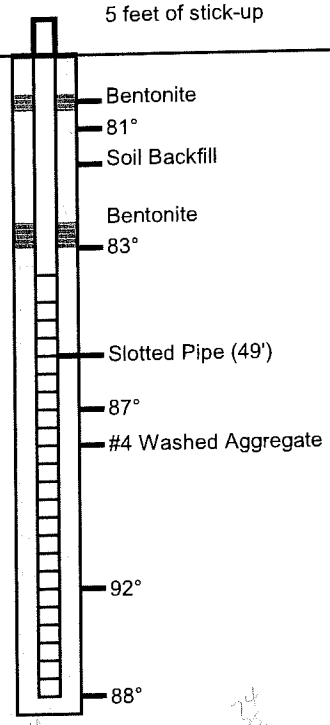
LFG EXTRACTION WELL EW-414

Northing 644,427.5
Easting 2,170,659.2

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-5' - Top cover 5-22' - Household waste, carpet 22-23' - Day cover 23-45' - Household waste, metal, wood, carpet, cables 45-47' - Day cover 47-65' - Household waste, metal 65-67' - Day Cover 67-74' - Household waste, metal, plastics	Well was constructed at surveyed location and terminated at the specified depth. Stake more ?

Drilling Company:		Date Started:	4/29/11	Time Started:	1020
Drilling Method:	Landfill Bucket Auger	Date Ended:	4/29/11	Time Ended:	1245
Logged By:	M. Cobb	Boring Diameter:	36-inch	Surface Elevation:	264'
		Well Diameter:	8.0-inch	Total Depth:	74'
		Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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LFG EXTRACTION WELL

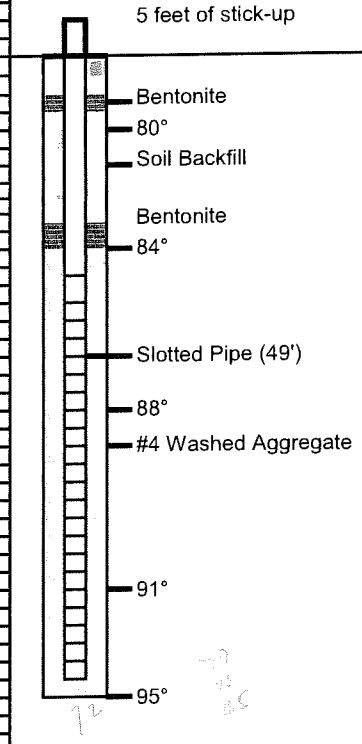
EW-415

Northing 644,135.9

Easting 2,170,685.5

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-5' - Top cover 5-22' - Household waste, carpet 22-23' - Day cover 23-45' - Household waste, metal, wood, carpet, cables 45-47' - Day cover 47-65' - Household waste, metal 65-67' - Day Cover 67-73' - Household waste, metal, plastics	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/27/11	Time Started:	1440
		Date Ended:	4/27/11	Time Ended:	1712
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	270'
		Well Diameter:	8.0-inch	Total Depth:	73'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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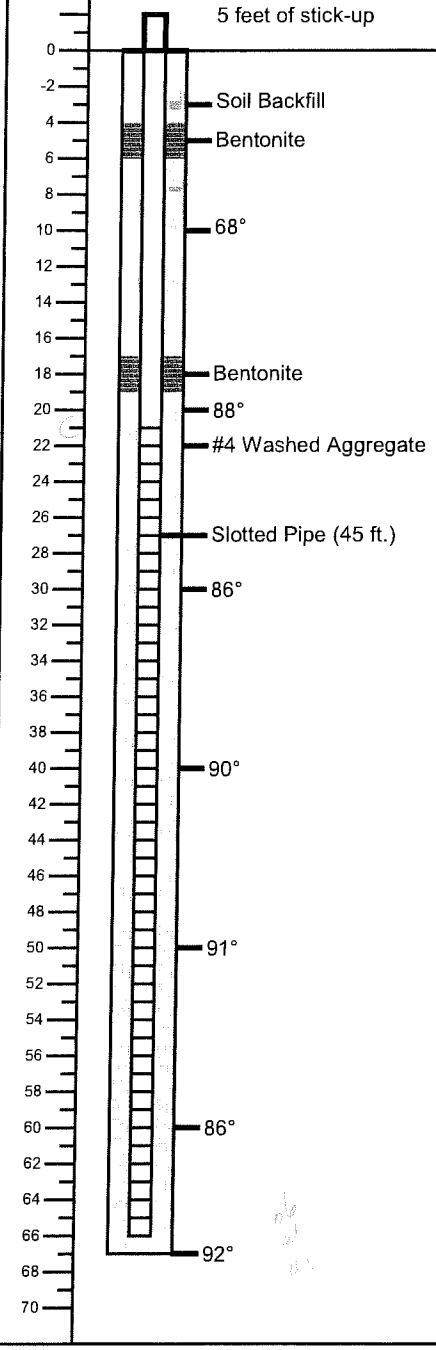
LFG EXTRACTION WELL
EW-416

Northing 643,841.0
Easting 2,170,639.6

BORING LOG



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-5' - Top cover 5-22' - Household waste, carpet 22-23' - Day cover 23-45' - Household waste, metal, wood, carpet, cables 45-47' - Day cover 47-67' - Household waste, metal	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/29/11	Time Started:	0719
		Date Ended:	4/29/11	Time Ended:	0943
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	270'
		Well Diameter:	6.0-inch	Total Depth:	67'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

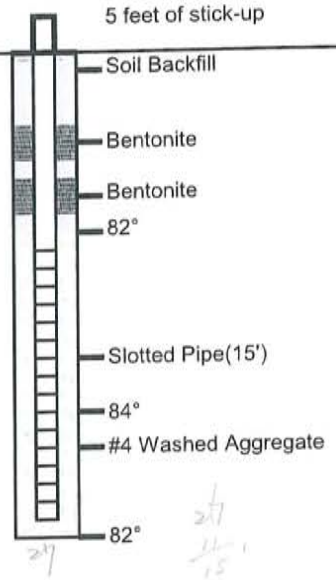
Project No. 02210301.00

LFG EXTRACTION WELL EW-501

Northing 642,388.0
Easting 2,169,340.8

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-27' - Household waste, metal, wood, carpet, cables	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/27/11	Time Started:	1355
		Date Ended:	4/27/11	Time Ended:	1433
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	272
		Well Diameter:	6.0-inch	Total Depth:	27'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

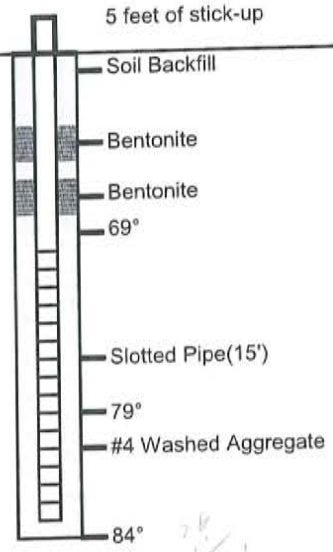
Project No. 02210301.00

LFG EXTRACTION WELL
EW-502

Northing 642,508.9
Easting 2,169,373.4

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-27' - Household waste, metal, wood, carpet, cables	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:
Drilling Method: Landfill Bucket Auger
Logged By: M. Cobb

Date Started: 4/27/11
Date Ended: 4/27/11
Boring Diameter: 36-inch
Well Diameter: 6.0-inch
Casing Material: PVC

Time Started: 1620
Time Ended: 1655
Surface Elevation: 270'
Total Depth: 27'

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JOHNSTON COUNTY LANDFILL

Project No. 02210301.00

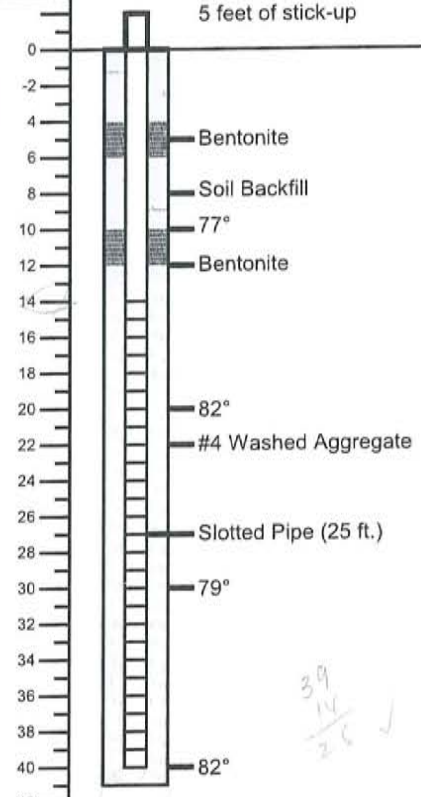
LFG EXTRACTION WELL EW-503

Northing 642,457.8

Easting 2,169,138.0

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-40' - Household waste	Well was constructed 30' uphill from surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/29/11	Time Started:	1453
		Date Ended:	4/29/11	Time Ended:	1605
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	279'
		Well Diameter:	6.0-inch	Total Depth:	40'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

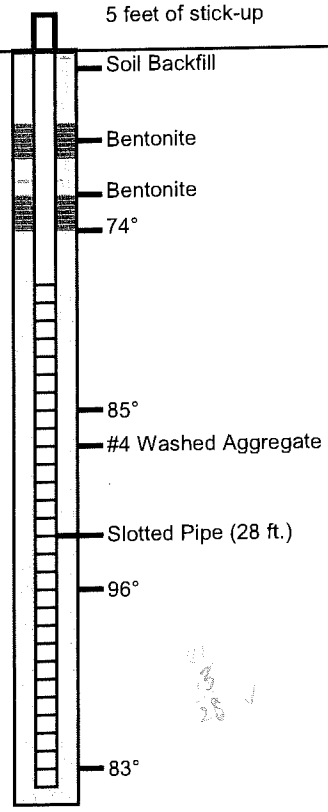
Project No. 02210301.00

LFG EXTRACTION WELL EW-504

Northing 642,640.0
Easting 2,169,219.5

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-42' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/30/11	Time Started:	1050
		Date Ended:	4/30/11	Time Ended:	1202
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	283'
		Well Diameter:	6.0-inch	Total Depth:	42'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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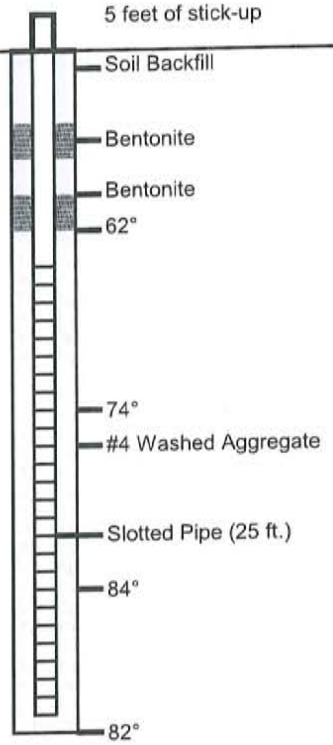
LFG EXTRACTION WELL EW-505

Northing 642,610.2
Easting 2,169,059.5

BORING LOG

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-38' - Household waste	Well was constructed 20' uphill from surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/30/11	Time Started:	0715
		Date Ended:	4/30/11	Time Ended:	0745
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	275'
		Well Diameter:	6.0-inch	Total Depth:	38'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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LFG EXTRACTION WELL

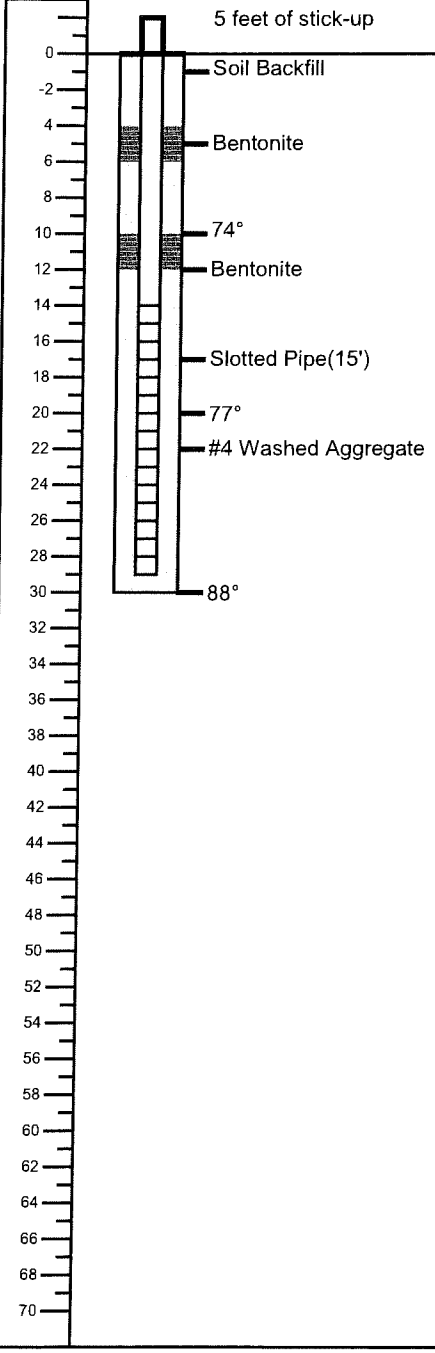
EW-506

BORING LOG

Northing 642,784.4

Easting 2,168,995.4

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/30/11	Time Started:	0946
		Date Ended:	4/30/11	Time Ended:	1032
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	272'
		Well Diameter:	6.0-inch	Total Depth:	30'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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LFG EXTRACTION WELL

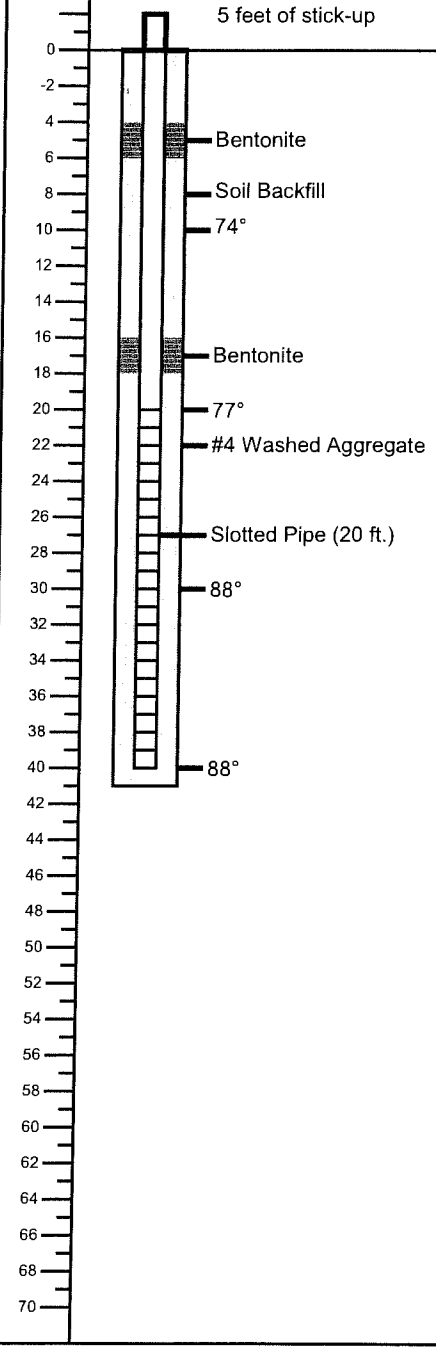
EW-507

BORING LOG

Northing 642,940.9

Easting 2,168,929.3

Depth in Feet



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-41' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/30/11	Time Started:	0817
		Date Ended:	4/30/11	Time Ended:	0928
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	269'
		Well Diameter:	6.0-inch	Total Depth:	41'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

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LFG EXTRACTION WELL

EW-508

BORING LOG

Northing 643,077.9

Easting 2,168,859.2

Depth in Feet	SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
5 feet of stick-up; 0, -2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70; Bentonite; Soil Backfill; 72°; Bentonite; 79°; #4 Washed Aggregate; Slotted Pipe (12 ft.); 84°; 84°						0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-30' - Household waste, metal, wood, carpet, cables 30-31' - Day cover 31-35' - Household waste	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/30/11	Time Started:	1223
		Date Ended:	4/30/11	Time Ended:	1318
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	261'
		Well Diameter:	6.0-inch	Total Depth:	35'
Logged By:	M. Cobb	Casing Material:	PVC		

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JOHNSTON COUNTY LANDFILL

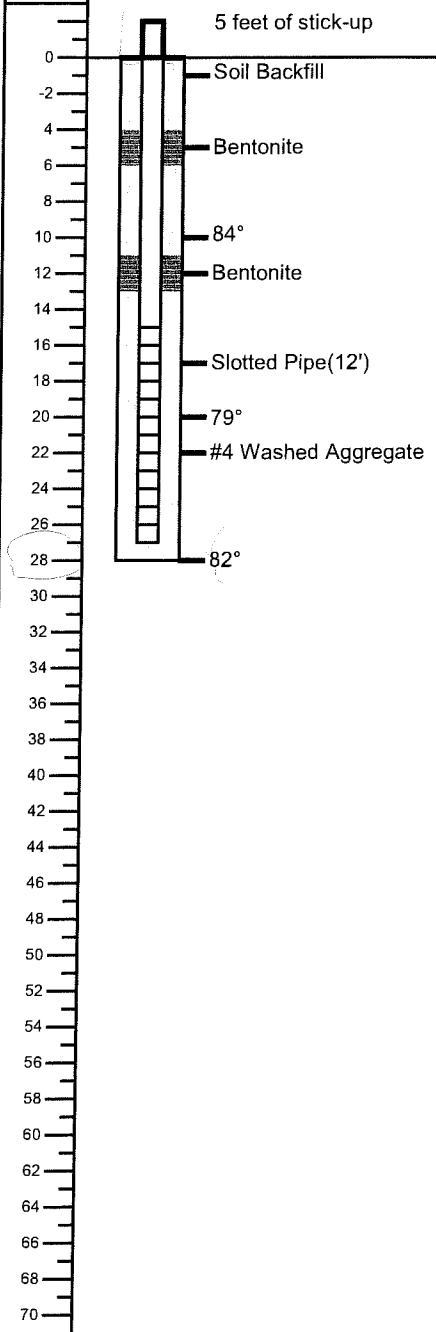
Project No. 02210301.00

LFG EXTRACTION WELL
EW-509

Northing 643,324.2

Easting 2,168,757.1

BORING LOG



SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
					0-3' - Top cover 3-10' - Household waste, carpet 10-12' - Day cover 12-28' - Household waste, metal, wood, carpet, cables	Well was constructed at surveyed location and terminated at the specified depth.

Drilling Company:		Date Started:	4/30/11	Time Started:	1329
		Date Ended:	4/30/11	Time Ended:	1410
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	249'
		Well Diameter:	6.0-inch	Total Depth:	28'
Logged By:	M. Cobb	Casing Material:	PVC		

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LFG EXTRACTION WELL

EW-510

BORING LOG

Northing 643,442.7

Easting 2,168,722.4

Depth in Feet	SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
0							Well was constructed at surveyed location and terminated at the specified depth.

Depth in Feet: 0, -2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70

Drilling Company:		Date Started:	5/2/11	Time Started:	
		Date Ended:	5/2/11	Time Ended:	
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	245'
		Well Diameter:	6.0-inch	Total Depth:	28'
Logged By:	T. Blevins	Casing Material:	PVC		

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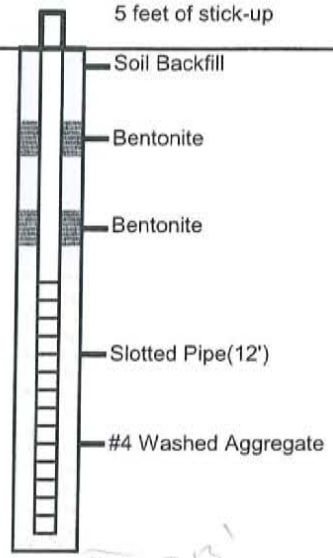
LFG EXTRACTION WELL EW-511

Northing 643,602.7

Easting 2,168,669.8

BORING LOG

Depth in Feet	SAMPLES	RECOVERED	PID	GROUNDWATER	USCS	DESCRIPTION	REMARKS
0							Well was constructed at surveyed location and terminated at the specified depth.

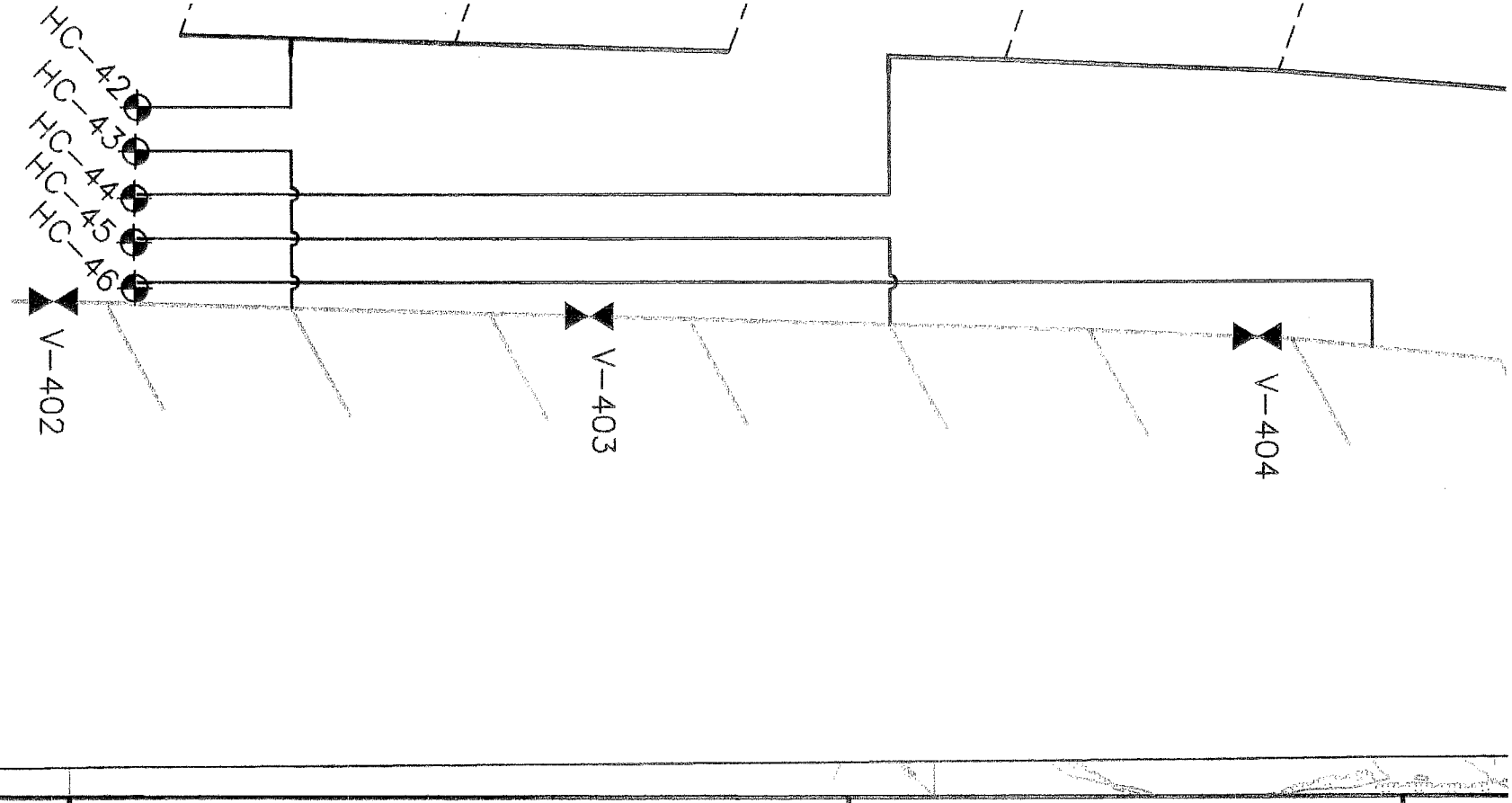


Drilling Company:		Date Started:	5/2/11	Time Started:	
		Date Ended:	5/2/11	Time Ended:	
Drilling Method:	Landfill Bucket Auger	Boring Diameter:	36-inch	Surface Elevation:	239'
		Well Diameter:	6.0-inch	Total Depth:	26'
Logged By:	T. Blevins	Casing Material:	PVC		

APPENDIX D

Record Drawings

Final well schedule
w/ updated coordinates

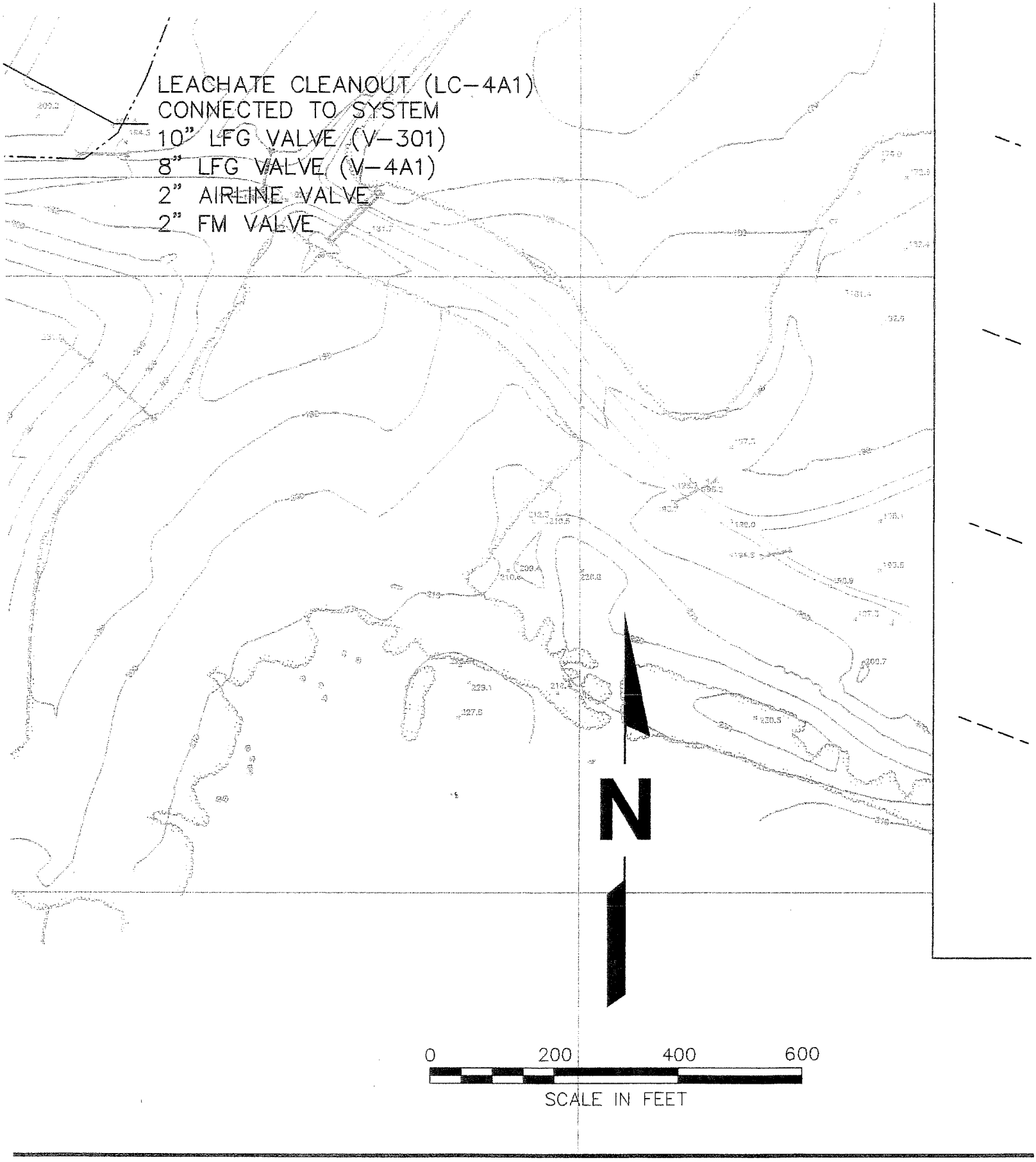


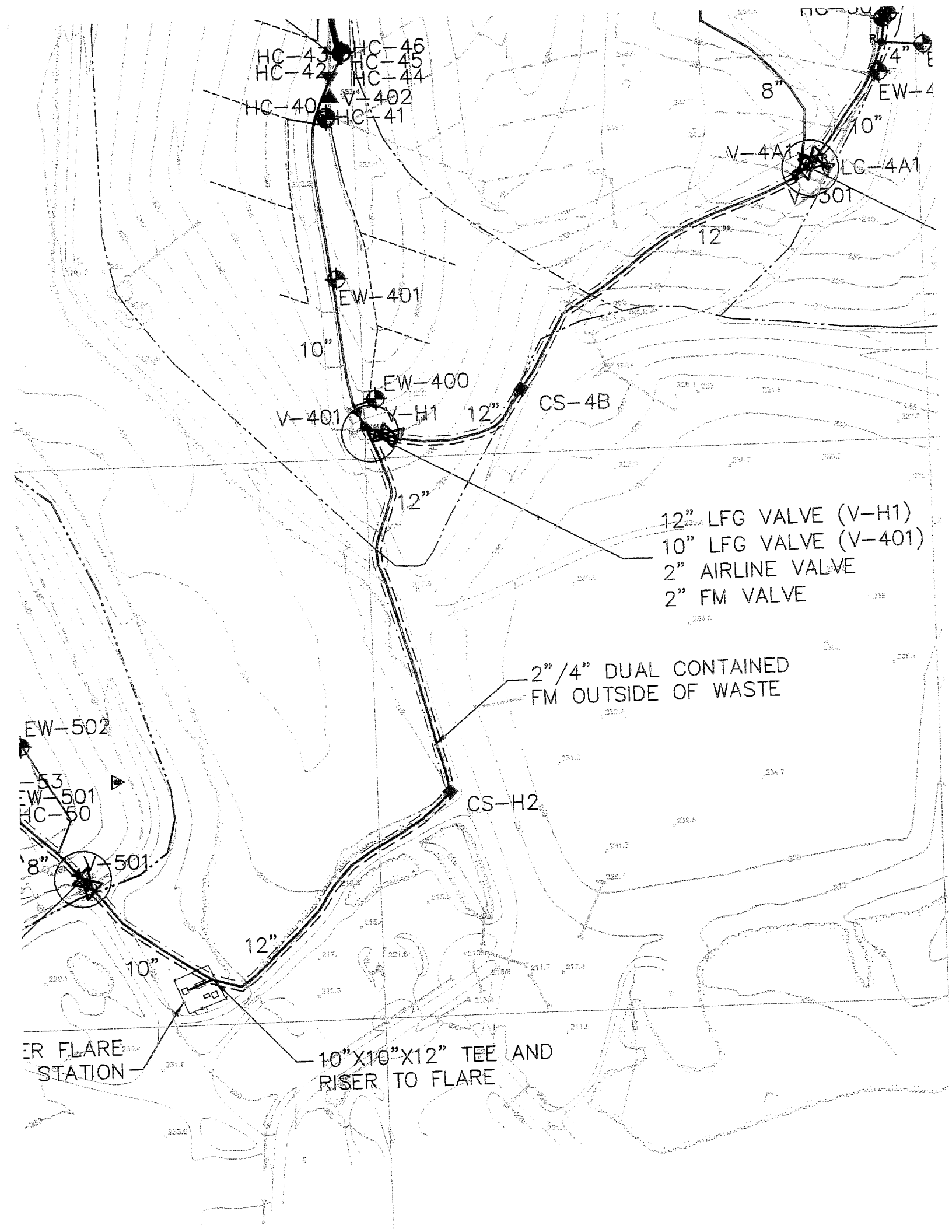
DRAWING NO. 1 of 1	SCALE: AS SHOWN	DATE: OCTOBER 2011	**SCS ENGINEERS, PC** 2520 WHITEHALL PARK DRIVE, SUITE 450 CHARLOTTE, NORTH CAROLINA 28273 PHONE: (704) 504-3107 FAX: (704) 504-3174	CLIENT **BLUE SOURCE LLC** 26 W 17TH STREET, SUITE 504 NEW YORK, NY 10011
			PROJ. NO. 02210301.00 / DWN. BY: TAS / Q/A RVW BY: CL	
			DSN. BY: JLM / CHK. BY: SCL / APP. BY: CL	

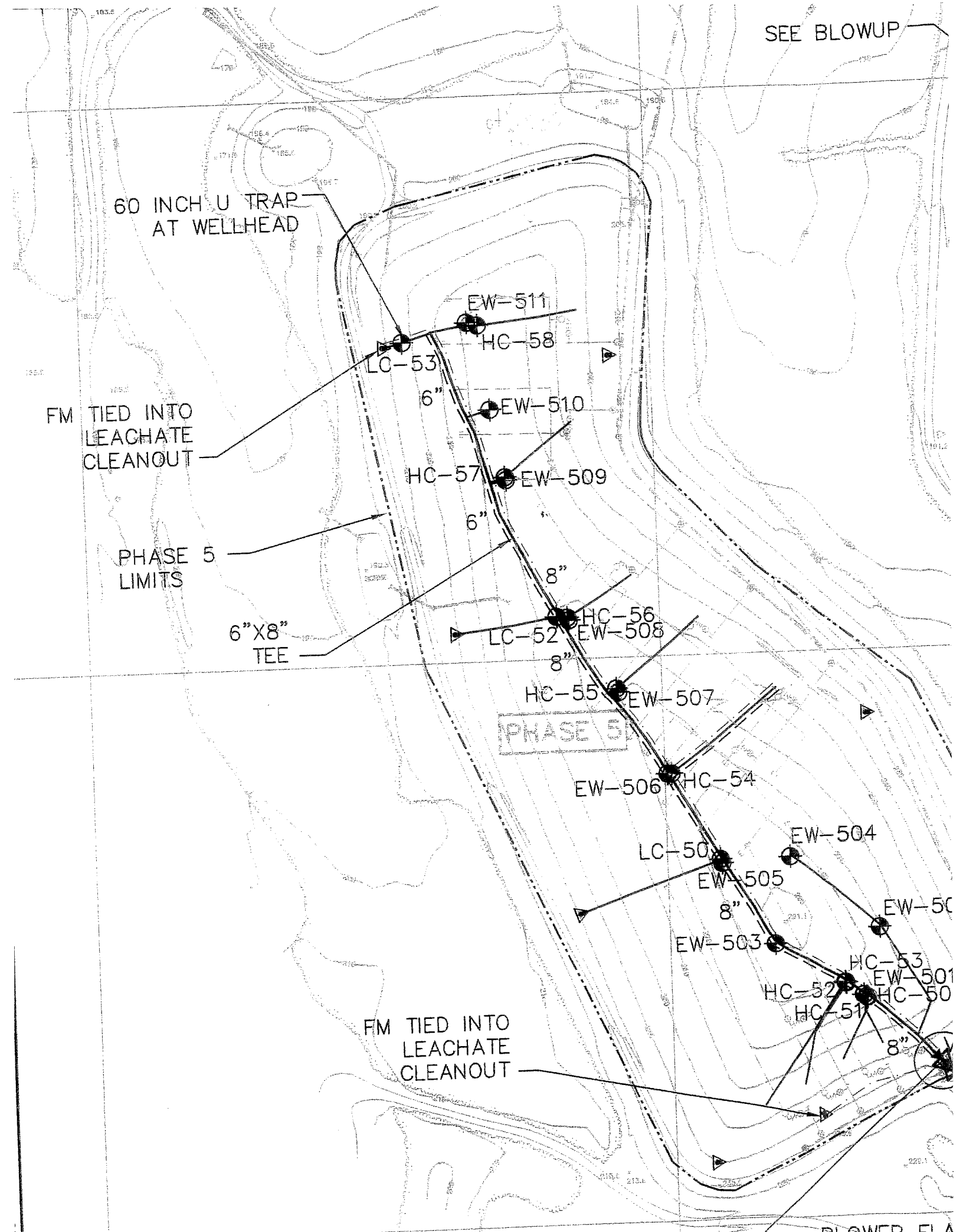
SHEET

PROJE

JC


LEACHATE CLEANOUT (LC-4A1)
CONNECTED TO SYSTEM
10" LFG VALVE (V-301)
8" LFG VALVE (V-4A1)
2" AIRLINE VALVE
2" FM VALVE
N
0
200
400
600
SCALE IN FEET


HC-46
HC-43
HC-45
HC-42
HC-44
V-402
HC-40
HC-41
8"
4"
EW-4
10"
V-4A1
LC-4A1
V-301
12"
EW-401
10"
EW-400
V-401
V-H1
12"
CS-4B
12"
12" LFG VALVE (V-H1)
10" LFG VALVE (V-401)
2" AIRLINE VALVE
2" FM VALVE
2"/4" DUAL CONTAINED
FM OUTSIDE OF WASTE
EW-502
-53
EW-501
HC-50
8"
V-501
CS-H2
12"
10"
ER FLARE
STATION
10"X10"X12" TEE AND
RISER TO FLARE


SEE BLOWUP
60 INCH U TRAP
AT WELLHEAD
EW-511
HC-58
LC-53
6"
EW-510
FM TIED INTO
LEACHATE
CLEANOUT
HC-57
EW-509
6"
PHASE 5
LIMITS
8"
HC-56
6"X8"
TEE
LC-52
EW-508
8"
HC-55
EW-507
PHASE 5
EW-506
HC-54
EW-504
LC-50
EW-505
8"
EW-503
HC-53
EW-501
HC-52
HC-50
HC-51
8"
FM TIED INTO
LEACHATE
CLEANOUT

LEGEND

	EXISTING CONTOUR
	PHASE LIMITS
	LFG HORIZONTAL COLLECTOR
	LEACHATE CLEANOUT
	LFG HEADER PIPING
	LFG LATERAL PIPING
	2" AIRLINE
	2" CONDENSATE FORCEMAIN
EW-402	LFG EXTRACTION WELLHEAD
HC-30	HORIZONTAL COLLECTOR WELLHEAD
CS-H1	CONDENSATE SUMP
	LFG HEADER VALVE
	AIRLINE/FORCEMAIN VALVES

BLOWUP

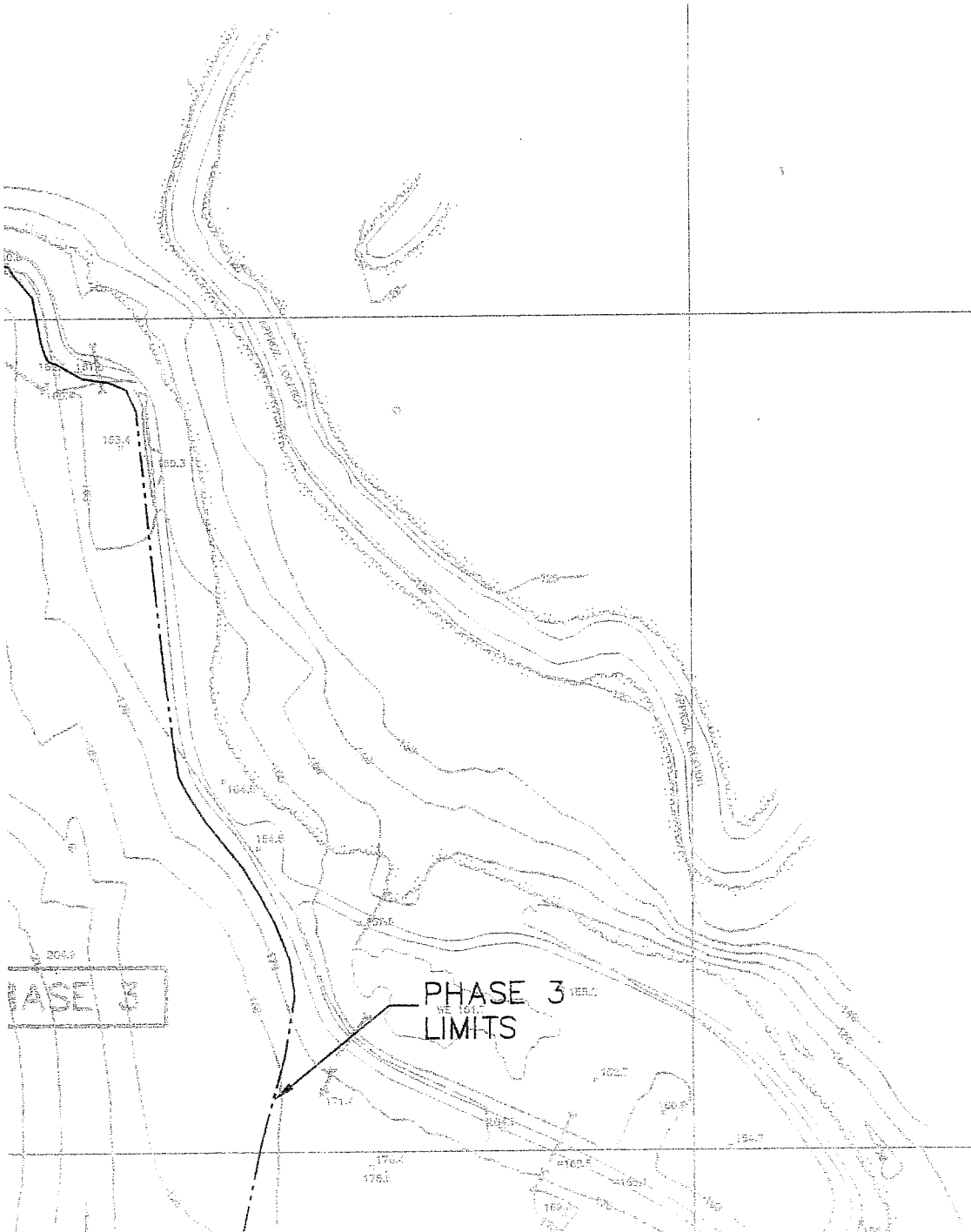
NORTH CAROLINA LICENSE NO. C-1837

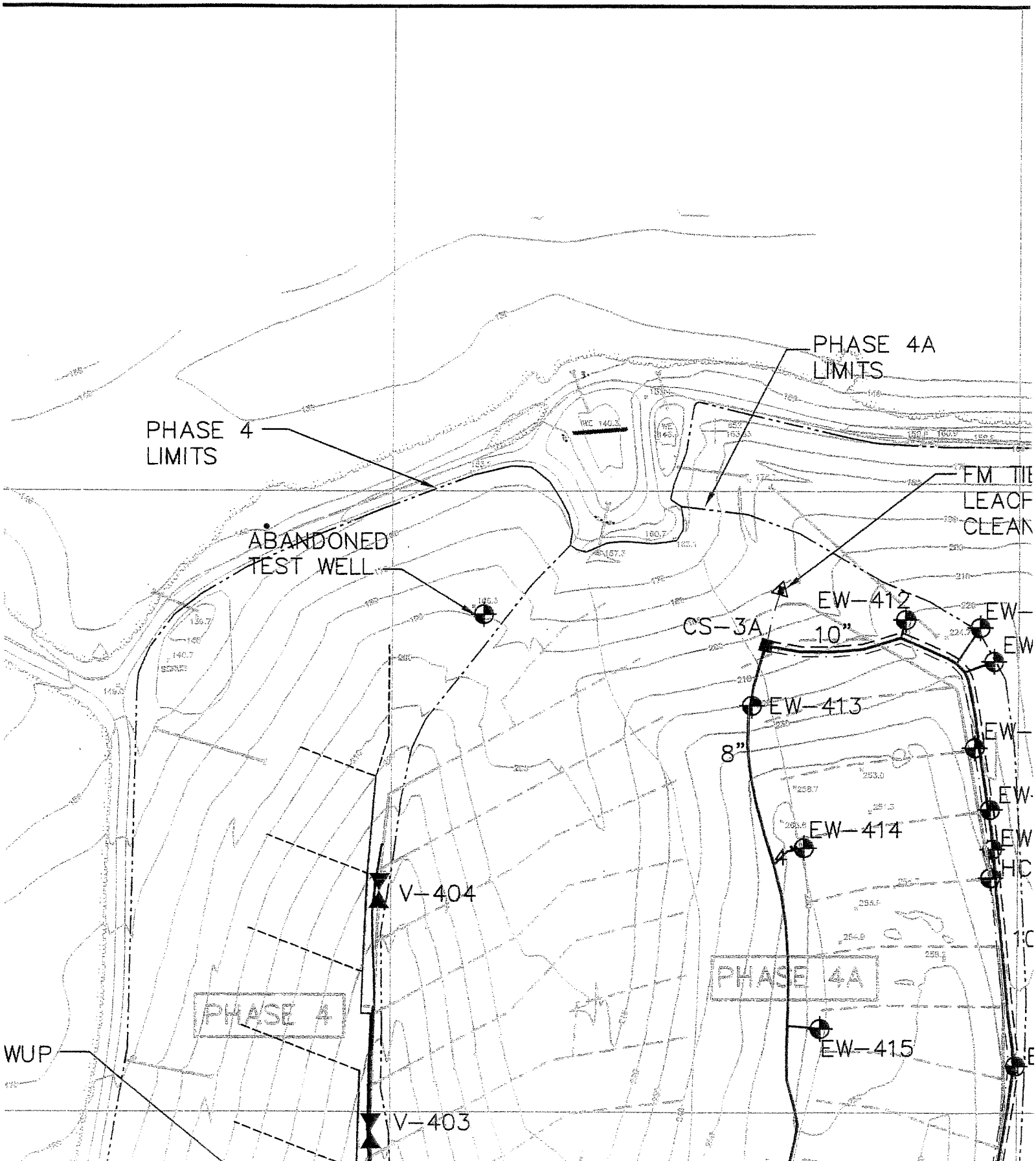
NO.	REVISION	DATE

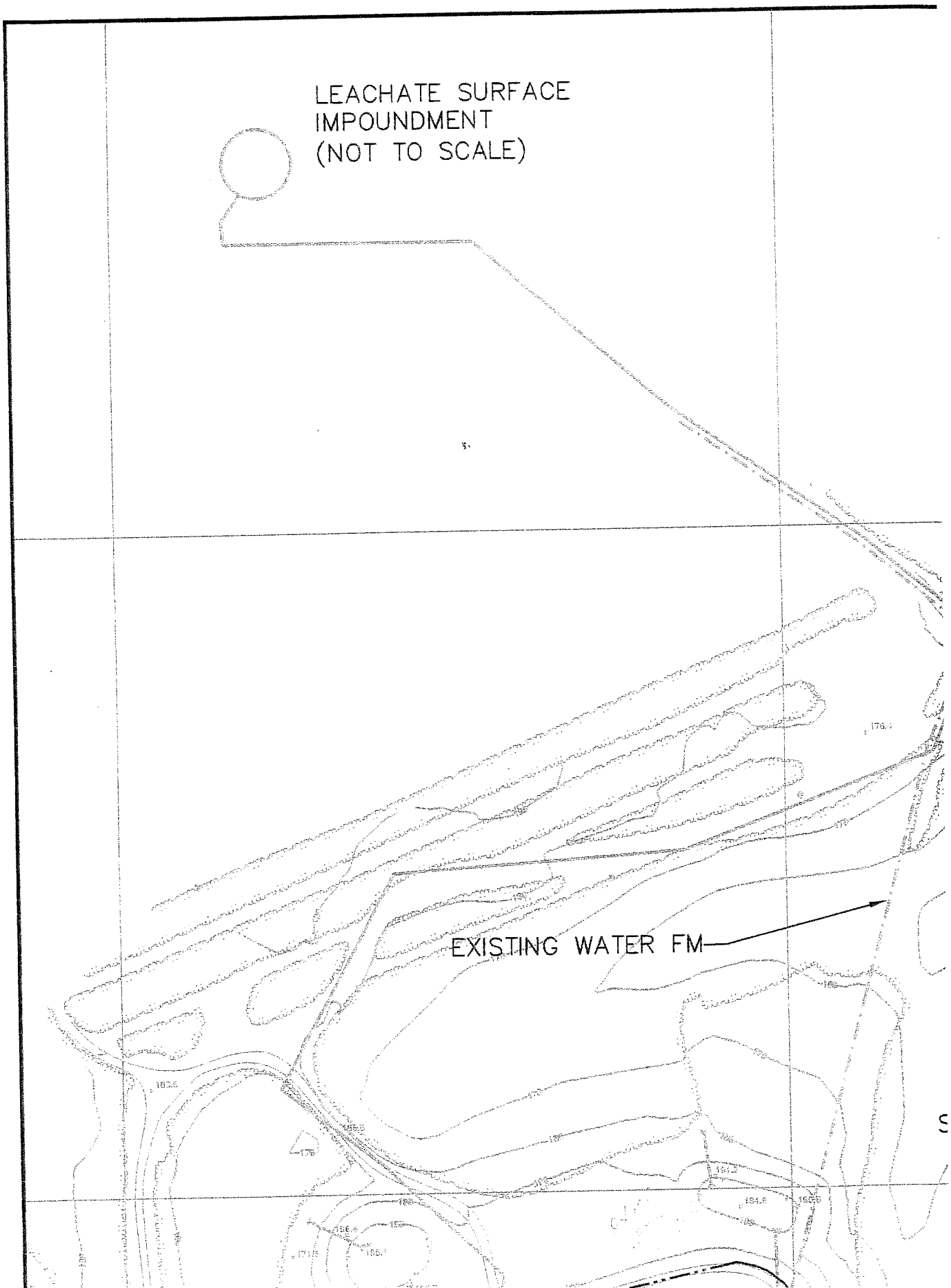
AS-BUILT SITE PLAN

ROCKINGHAM COUNTY LANDFILL LANDFILL GAS PROJECT

Ex. Torch	Wellhead
T-1	EW-402
T-2	HC-31
T-3	EW-403
T-4	EW-404
T-5	HC-30
T-6	HC-33
T-7	HC-41
T-8	HC-42
T-9	HC-44




PHASE 4A
LIMITS
PHASE 4
LIMITS
ABANDONED
TEST WELL
EW-412
CS-3A
10"
EW-413
8"
EW-414
4"
V-404
PHASE 4A
PHASE 4
EW-415
WUP
V-403


LEACHATE SURFACE
IMPOUNDMENT
(NOT TO SCALE)
EXISTING WATER FM

APPENDIX E

Flare Documentation

Utility Flare Dimensions

Gas Flow:	1250	scfm
	1339.6	acfm
	22.33	cf/sec
Maximum Exit Velocity:	60.0	f/s
Required Stack Area:	0.3721	sq ft
Stack Diameter:	0.69	ft
Flare Tip Size:	8.26	inches
Stack Size:	10" SCH 40	
Minimum Gas Flow:	334.89	cfm
Maximum Turndown	4	:1

Operating at lower flow rates and higher turndowns will require flare tip size reduction.

Methane Conc.	50%	
Heat Rate:	34	mmBtu/hr LHV
Lower Heating Value: @ 14.696 psia and 60 deg.F		
Actual Velocity	40.77	ft/s
Gas Temperature:	100	deg F

Flare Stack Height:	25	ft

Wind Screen Dimensions

Diameter	18" SCH 40	
Length	36	inches
Length above flare tip:	25	inches
Length below flare tip:	11	inches

Blower - Flare Interconnect :

Pipe Diameter:	See blower arrangement	
Orifice Plate Size:	6	inches

Knockout Vessel Sizing:

Diameter:	28" SDR 21 PE	
Vertical distance between gas inlet and outlet:	24	inches

North Carolina Department of Environment and Natural Resources
Division of Air Quality

Beverly Eaves Perdue
Governor

Sheila C. Holman
Director

Dee Freeman
Secretary

October 18, 2010

Mr. Rick Hester
County Manager
Johnston County MSW Landfill
P.O. Box 1049
Smithfield, NC 27577

Subject: Air Permit No. 08844R05
Johnston County MSW Landfill
Smithfield, Johnston County, North Carolina
Permit Class: Small
Facility ID# 5100188

Dear Mr. Hester:

In accordance with your completed application received August 19, 2010, we are forwarding herewith Permit No. 08844R05 to Johnston County MSW Landfill, Smithfield, Johnston County, North Carolina for the construction and operation of air emissions sources or air cleaning devices and appurtenances. Additionally, any emissions activities determined from your air permit application as meeting the exemption requirements contained in 15A NCAC 2Q .0102 have been listed for information purposes as an "ATTACHMENT" to the enclosed air permit. Please note the records retention requirements are contained in General Condition 2 of the General Conditions and Limitations.

If any parts, requirements, or limitations contained in this permit are unacceptable to you, you have the right to request a formal adjudicatory hearing within 30 days following receipt of this permit, identifying the specific issues to be contested. Such a request will stay the effectiveness of the entire permit. This hearing request must be in the form of a written petition, conforming to G.S. 150B-23 of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27699-6714. The form for requesting a formal adjudicatory hearing may be obtained upon request from the Office of Administrative Hearings. Unless a request for a hearing is made pursuant to G.S. 150B-23, this air permit shall be final and binding.

You may request modification of your air permit through informal means pursuant to G.S. 150B-22. This request must be submitted in writing to the Director and must identify the specific

provisions or issues for which the modification is sought. Please note that the permit will become final and binding regardless of a request for informal modification unless a request for a hearing is also made under G.S. 150B-23.

Unless exempted by a condition of this permit or the regulations, construction of new air pollution sources or air cleaning devices, or modifications to the sources or air cleaning devices described in this permit must be covered under a permit issued by the Division of Air Quality prior to construction. Failure to do so is a violation of G.S. 143-215.108 and may subject the Permittee to civil or criminal penalties as described in G.S. 143-215.114A and 143-215.114B.

This permit shall be effective from October 18, 2010 until November 30, 2014, is nontransferable to future owners and operators, and shall be subject to the conditions and limitations as specified therein.

Changes have been made to the permit stipulations. The Permittee is responsible for carefully reading the entire permit and evaluating the requirements of each permit stipulation. The Permittee shall comply with all terms, conditions, requirements, limitations and restrictions set forth in this permit. Noncompliance with any permit condition is grounds for enforcement action, for permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application. Specific changes and additions are summarized below (note: this list may not include all changes and additions):

- Removed Emission Sources ES-1 through ES-15 from the permit.
- Added Control Device CD-1 – landfill gas-fired flare - to the permit.
- Added IES-1 – Leachate Storage – to the insignificant/exempt equipment list.
- Added a stipulation for NSPS Subpart WWW to the permit.
- Revised 2Q .0711 to reflect the most current list of HAPs/TAPs for the facility.
- Added the stipulation for 2D .1100, Toxic Air Pollutant Emissions Limitation, to the permit.

Should you have any questions concerning this matter, please contact Lori Ann Phillips at (919) 791-4200.

Sincerely,

Patrick Butler, P.E.
Regional Air Quality Supervisor

LAP
Enclosures

c: Central Files
Raleigh Regional Office

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF AIR QUALITY

AIR PERMIT NO. 08844R05

Issue Date: October 18, 2010
Expiration Date: November 30, 2014

Effective Date: October 18, 2010
Replaces Permit: 08844R04

To construct and operate air emission source(s) and/or air cleaning device(s), and for the discharge of the associated air contaminants into the atmosphere in accordance with the provisions of Article 21B of Chapter 143, General Statutes of North Carolina (NCGS) as amended, and other applicable Laws, Rules and Regulations,

Johnston County MSW Landfill
680 County Home Road
Smithfield, Johnston County, North Carolina
Permit Class: Small
Facility ID# 5100188

(the Permittee) is hereby authorized to construct and operate the air emissions sources and/or air cleaning devices and appurtenances described below:

Emission Source ID	Emission Source Description	Control System ID	Control System Description
ES-01 (NSPS)	Municipal Solid Waste Landfill	CD-1	landfill gas-fired flare (38 million Btu per hour maximum heat input)

in accordance with the completed application 5100188.10A received August 19, 2010 including any plans, specifications, previous applications, and other supporting data, all of which are filed with the Department of Environment and Natural Resources, Division of Air Quality (DAQ) and are incorporated as part of this permit.

This permit is subject to the following specified conditions and limitations including any TESTING, REPORTING, OR MONITORING REQUIREMENTS:

A. SPECIFIC CONDITIONS AND LIMITATIONS

1. Any air emission sources or control devices authorized to construct and operate above must be operated and maintained in accordance with the provisions contained herein. The Permittee shall comply with applicable Environmental Management Commission Regulations, including Title 15A North Carolina Administrative Code (NCAC), Subchapter 2D .0202, 2D .0516, 2D .0521, 2D .0524 (NSPS Subpart WWW), 2D .0535, 2D .0540, 2D .1100, 2D .1806 and 2Q .0711.

2. PERMIT RENEWAL AND EMISSION INVENTORY REQUIREMENT - The Permittee, at least 90 days prior to the expiration date of this permit, shall request permit renewal by letter in accordance with 15A NCAC 2Q .0304(d) and (f). Pursuant to 15A NCAC 2Q .0203(i), no permit application fee is required for renewal of an existing air permit (without a modification request). The renewal request (with AA application form) should be submitted to the Regional Supervisor, DAQ. Also, at least 90 days prior to the expiration date of this permit, the Permittee shall submit the air pollution emission inventory report (with Certification Sheet) in accordance with 15A NCAC 2D .0202, pursuant to N.C. General Statute 143 215.65. The report shall be submitted to the Regional Supervisor, DAQ and shall document air pollutants emitted for the 2013 calendar year.

3. SULFUR DIOXIDE CONTROL REQUIREMENT - As required by 15A NCAC 2D .0516 "Sulfur Dioxide Emissions from Combustion Sources," sulfur dioxide emissions from the combustion sources shall not exceed 2.3 pounds per million Btu heat input.

4. VISIBLE EMISSIONS CONTROL REQUIREMENT - As required by 15A NCAC 2D .0521 "Control of Visible Emissions," visible emissions from the emission sources, manufactured after July 1, 1971, shall not be more than 20 percent opacity when averaged over a six-minute period, except that six-minute periods averaging not more than 87 percent opacity may occur not more than once in any hour nor more than four times in any 24-hour period. However, sources which must comply with 15A NCAC 2D .0524 "New Source Performance Standards" or .1110 "National Emission Standards for Hazardous Air Pollutants" must comply with applicable visible emissions requirements contained therein.

5. 15A NCAC 2D .0524 "NEW SOURCE PERFORMANCE STANDARDS" - For the municipal solid waste landfill (ID No. ES-1), the Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements contained in Environmental Management Commission Standard 15A NCAC 2D .0524 "New Source Performance Standards" (NSPS) as promulgated in 40 CFR 60, Subpart WWW and including Subpart A "General Provisions."

    a. When an increase in the maximum design capacity of the landfill results in a revised maximum design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, the owner or operator shall comply with the provision of paragraph 60.752(b) of Subpart WWW. The facility must also submit a Title V permit application within 90 days of receiving the permit to increase the maximum design capacity.

6. NOTIFICATION REQUIREMENT - As required by 15A NCAC 2D .0535, the Permittee of a source of excess emissions that last for more than four hours and that results from a malfunction, a breakdown of process or control equipment or any other abnormal conditions, shall:

   a. Notify the Director or his designee of any such occurrence by 9:00 a.m. Eastern time of the Division's next business day of becoming aware of the occurrence and describe:

      i. the name and location of the facility,

      ii. the nature and cause of the malfunction or breakdown,

      iii. the time when the malfunction or breakdown is first observed,

      iv. the expected duration, and

      v. an estimated rate of emissions.

   b. Notify the Director or his designee immediately when the corrective measures have been accomplished.

   This reporting requirement does not allow the operation of the facility in excess of Environmental Management Commission Regulations.

7. FUGITIVE DUST CONTROL REQUIREMENT - As required by 15A NCAC 2D .0540 "Particulates from Fugitive Dust Emission Sources," the Permittee shall not cause or allow fugitive dust emissions to cause or contribute to substantive complaints or excess visible emissions beyond the property boundary. If substantive complaints or excessive fugitive dust emissions from the facility are observed beyond the property boundaries for six minutes in any one hour (using Reference Method 22 in 40 CFR, Appendix A), the owner or operator may be required to submit a fugitive dust plan as described in 2D .0540(f).

   "Fugitive dust emissions" means particulate matter from process operations that does not pass through a process stack or vent and that is generated within plant property boundaries from activities such as: unloading and loading areas, process areas stockpiles, stock pile working, plant parking lots, and plant roads (including access roads and haul roads).

8. TOXIC AIR POLLUTANT EMISSIONS LIMITATION AND REPORTING REQUIREMENT - Pursuant to 15A NCAC 2D .1100 "Control of Toxic Air Pollutants," and in accordance with the approved application for an air toxic compliance demonstration, the following permit limits shall not be exceeded:

Affected Source(s)	Toxic Air Pollutant	Emission Limit
Municipal Solid Waste Landfill (ES-01)	Hydrogen chloride (hydrochloric acid) (7647-01-0)	0.294 pounds per hour

9. CONTROL AND PROHIBITION OF ODOROUS EMISSIONS - As required by 15A NCAC 2D .1806 "Control and Prohibition of Odorous Emissions" the Permittee shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary.

10. TOXIC AIR POLLUTANT EMISSIONS LIMITATION REQUIREMENT - Pursuant to 15A NCAC 2Q .0711 "Emission Rates Requiring a Permit," for each of the below listed toxic air pollutants (TAPs), the Permittee has made a demonstration that facility-wide actual emissions do not exceed the Toxic Permit Emission Rates (TPERs) listed in 15A NCAC 2Q .0711. The facility shall be operated and maintained in such a manner that emissions of any listed TAPs from the facility, including fugitive emissions, will not exceed TPERs listed in 15A NCAC 2Q .0711.

    a. A permit to emit any of the below listed TAPs shall be required for this facility if actual emissions from all sources will become greater than the corresponding TPERs.

    b. PRIOR to exceeding any of these listed TPERs, the Permittee shall be responsible for obtaining a permit to emit TAPs and for demonstrating compliance with the requirements of 15A NCAC 2D .1100 "Control of Toxic Air Pollutants".

    c. In accordance with the approved application, the Permittee shall maintain records of operational information demonstrating that the TAP emissions do not exceed the TPERs as listed below:

Pollutant	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
Acrylonitrile (107-13-1)	10			
Benzene (71-43-2)	8.1			
CFC-12 (Dichlorodifluoromethane) (75-71-8)		5200		
Carbon disulfide (75-15-0)		3.9		
Carbon tetrachloride (56-23-5)	460			
Chlorobenzene (108-90-7)		46		
Chloroform (67-66-3)	290			
Dichlorobenzene(p), 1,4- (106-46-7)				16.8
Ethyl mercaptan (75-08-1)			0.025	
Ethylene dibromide (dibromoethane) (106-93-4)	27			

Ethylene dichloride (1,2-dichloroethane) (107-06-2)	260			
Hexane, n- (110-54-3)		23		
Hydrogen chloride (hydrochloric acid) (7647-01-0)				0.18
Hydrogen sulfide (7783-06-4)		1.7		
MEK (methyl ethyl ketone, 2-butanone) (78-93-3)		78		22.4
MIBK (methyl isobutyl ketone) (108-10-1)		52		7.6
Mercury, aryl and inorganic compounds (Component of HGC) (MERCARYL)		0.013		
Methyl mercaptan (74-93-1)			0.013	
Methylene chloride (75-09-2)	1600		0.39	
Perchloroethylene (tetrachloroethylene) (127-18-4)	13000			
TCE (trichloroethylene) (79-01-6)	4000			
Tetrachloroethane, 1,1,2,2- (79-34-5)	430			
Toluene (108-88-3)		98		14.4
Vinyl chloride (75-01-4)	26			
Xylene (mixed isomers) (1330-20-7)		57		16.4

B. GENERAL CONDITIONS AND LIMITATIONS

1. TWO COPIES OF ALL DOCUMENTS, REPORTS, TEST DATA, MONITORING DATA, NOTIFICATIONS, REQUESTS FOR RENEWAL, AND ANY OTHER INFORMATION REQUIRED BY THIS PERMIT shall be submitted to the:

   Regional Air Quality Supervisor
   North Carolina Division of Air Quality
   Raleigh Regional Office
   3800 Barrett Drive
   Raleigh, NC 27609
   (919) 791-4200

   For identification purposes, each submittal should include the facility name as listed on the permit, the facility identification number, and the permit number.

2. RECORDS RETENTION REQUIREMENT - Any records required by the conditions of this permit shall be kept on site and made available to DAQ personnel for inspection upon request. These records shall be maintained in a form suitable and readily available for expeditious inspection and review. These records must be kept on site for a minimum of 2 years, unless another time period is otherwise specified.

3. ANNUAL FEE PAYMENT - Pursuant to 15A NCAC 2Q .0203(a), the Permittee shall pay the annual permit fee within 30 days of being billed by the DAQ. Failure to pay the fee in a timely manner will cause the DAQ to initiate action to revoke the permit.

4. EQUIPMENT RELOCATION - A new air permit shall be obtained by the Permittee prior to establishing, building, erecting, using, or operating the emission sources or air cleaning equipment at a site or location not specified in this permit.

5. REPORTING REQUIREMENT - Any of the following that would result in previously unpermitted, new, or increased emissions must be reported to the Regional Supervisor, DAQ:

   a. changes in the information submitted in the application regarding facility emissions;

   b. changes that modify equipment or processes of existing permitted facilities; or

   c. changes in the quantity or quality of materials processed.

   If appropriate, modifications to the permit may then be made by the DAQ to reflect any necessary changes in the permit conditions. In no case are any new or increased emissions allowed that will cause a violation of the emission limitations specified herein.

6. This permit is subject to revocation or modification by the DAQ upon a determination that information contained in the application or presented in the support thereof is incorrect, conditions under which this permit was granted have changed, or violations of conditions contained in this permit have occurred. The facility shall be properly operated and maintained at all times in a manner that will effect an overall reduction in air pollution.

Unless otherwise specified by this permit, no emission source may be operated without the concurrent operation of its associated air cleaning device(s) and appurtenances.

7. This permit is nontransferable by the Permittee. Future owners and operators must obtain a new air permit from the DAQ.

8. This issuance of this permit in no way absolves the Permittee of liability for any potential civil penalties which may be assessed for violations of State law which have occurred prior to the effective date of this permit.

9. This permit does not relieve the Permittee of the responsibility of complying with all applicable requirements of any Federal, State, or Local water quality or land quality control authority.

10. Reports on the operation and maintenance of the facility shall be submitted by the Permittee to the Regional Supervisor, DAQ at such intervals and in such form and detail as may be required by the DAQ. Information required in such reports may include, but is not limited to, process weight rates, firing rates, hours of operation, and preventive maintenance schedules.

11. A violation of any term or condition of this permit shall subject the Permittee to enforcement pursuant to G.S. 143-215.114A, 143-215.114B, and 143-215.114C, including assessment of civil and/or criminal penalties.

12. Pursuant to North Carolina General Statute 143-215.3(a)(2), no person shall refuse entry or access to any authorized representative of the DAQ who requests entry or access for purposes of inspection, and who presents appropriate credentials, nor shall any person obstruct, hamper, or interfere with any such representative while in the process of carrying out his official duties. Refusal of entry or access may constitute grounds for permit revocation and assessment of civil penalties.

13. The Permittee must comply with any applicable Federal, State, or Local requirements governing the handling, disposal, or incineration of hazardous, solid, or medical wastes, including the Resource Conservation and Recovery Act (RCRA) administered by the Division of Waste Management.

14. PERMIT RETENTION REQUIREMENT - The Permittee shall retain a current copy of the air permit at the site. The Permittee must make available to personnel of the DAQ, upon request, the current copy of the air permit for the site.

15. CLEAN AIR ACT SECTION 112(r) REQUIREMENTS - Pursuant to 40 CFR Part 68 "Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act, Section 112(r)," if the Permittee is required to develop and register a risk management plan pursuant to Section 112(r) of the Federal Clean Air Act, then the Permittee is required to register this plan in accordance with 40 CFR Part 68.

16. PREVENTION OF ACCIDENTAL RELEASES - GENERAL DUTY - Pursuant to Title I Part A Section 112(r)(1) of the Clean Air Act "Hazardous Air Pollutants - Prevention of Accidental Releases - Purpose and General Duty," although a risk management plan may not

be required, if the Permittee produces, processes, handles, or stores any amount of a listed hazardous substance, the Permittee has a general duty to take such steps as are necessary to prevent the accidental release of such substance and to minimize the consequences of any release. **This condition is federally-enforceable only.**

17. GENERAL EMISSIONS TESTING AND REPORTING REQUIREMENTS - If emissions testing is required by this permit, or the DAQ, or if the Permittee submits emissions testing to the DAQ in support of a permit application or to demonstrate compliance, the Permittee shall perform such testing in accordance with 15A NCAC 2D .2600 and follow all DAQ procedures including protocol approval, regional notification, report submittal, and test results approval.

Permit issued this the 18th of October, 2010.
NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

Patrick Butler, P.E.
Regional Air Quality Supervisor
By Authority of the Environmental Management Commission

Air Permit No. 08844R05

ATTACHMENT to Permit No. 08844R05, October 18, 2010

Insignificant / Exempt Activities

Source	Exemption Regulation	Source of TAPs?	Source of Title V Pollutants?
IES-1 - Leachate Storage (maximum capacity 5.7 million gallons)	2Q .0102 (c)(2)(E)(i)	Yes	Yes

1. Because an activity is exempted from being required to have a permit or permit modification does not mean that the activity is exempted from an applicable requirement or that the owner or operator of the source is exempted from demonstrating compliance with any applicable requirement.

2. When applicable, emissions from stationary source activities identified above shall be included in determining compliance with the permit requirements for toxic air pollutants under 15A NCAC 2D .1100 "Control of Toxic Air Pollutants" or 2Q .0711 "Emission Rates Requiring a Permit."

APPENDIX F

Leak Test Results

SCS FIELD SERVICES

Air Testing Log

Job Number: 12211010.00
Location: Johnston CO LF
Date: 6/25/11

Type of Test	**Air**	X		
	Hydrostatic			
PSI Required	10 psi ✓			
Time Required	4HR ✓			
Time Test Started	1230			
Time Test Stopped	1730		X	**Test Passed**
Air Loss	0			**Test Failed**

Location of Test all header piping including valves laterals and sump on this job tested from inspection port at toe of phase 5

Testing Technician [signature]

Superintendent Teddy Blevins

SCS FIELD SERVICES

Air Testing Log

Job Number: 1221010.00
Location: Johnston CO LF
Date: 6/25/10

Type of Test	**Air**	X		
	Hydrostatic			
PSI Required	100PSI			
Time Required	4HR			
Time Test Started	0730			
Time Test Stopped	1130	✓	X	**Test Passed**
Air Loss	0			**Test Failed**

Location of Test all 2" air line installed on job including valves

Testing Technician Teddy L Blevins

Superintendent Teddy Blevins

SCS FIELD SERVICES

Air Testing Log

Job Number: 12211010.00
Location: Johnston CO LF
Date: 6/25/11

Type of Test	**Air**	X		
	Hydrostatic			
PSI Required	10 psi ✓			
Time Required	4HR			
Time Test Started	1400	6/25		
Time Test Stopped	0700	6/26	X	**Test Passed**
Air Loss	1 lb	?		**Test Failed**

Location of Test tested all 2" FM and 2x4 DC for entire job from valve station at toe of phase 5 including all valves

Testing Technician Teddy L Blevins

Superintendent Teddy Blevins

APPENDIX G

Correspondence

Environmental Consultants
and Contractors

SCS Engineers, P.C.
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273-3557

704 504-3107
FAX 704 504-3174
www.scsengineers.com

SCS ENGINEERS, PC

November 30, 2010
Revised: January 26, 2011
File No. 02210301.00

Mr. Ming Chao
North Carolina Department of Environment and Natural Resources
Division of Solid Waste
410 Oberlin Rd
Raleigh, North Carolina 27605

Subject: Solid Waste Permit Modification
Landfill Gas Collection and Control System
Johnston County MSW and C&D Landfill Facility
SW Permit #51-03
Smithfield, North Carolina

Dear Mr. Chao:

On behalf of Johnston County MSW and C&D Landfill Facility (Landfill), SCS Engineers, PC (SCS) is submitting an application for a permit modification to SW Permit #51-03. The application has been revised to reflect items contained in a comments letter from the SWS dated December 9, 2010 and a response letter from SCS dated January 14, 2011. The permit modification is for the installation of a voluntary landfill gas collection and control system (GCCS) at the Landfill. The primary purpose of the voluntary GCCS is to collect and control landfill gas (LFG). Johnston County has entered into an agreement with Blue Source to sell the greenhouse gas credits and to produce electricity from the LFG.

INTRODUCTION AND BACKGROUND

The Johnston County MSW and C&D Landfill Facility (Landfill) is located near Smithfield, North Carolina. A Request for Proposal for a Landfill Gas to Energy Project at the Johnston County Landfill was issued by the Johnston County Department of Utilities. The Development Team of Blue Source and SCS Engineers proposes to develop a landfill gas collection and control system and a beneficial use project for the LFG at the Landfill. The Development Team will finance, design, permit, build, commission, own, operate, and maintain the GCCS and plans to implement a Landfill Gas Energy system

The Landfill includes several waste disposal areas designated as Phase 1, 2, 3, 4, 4A, and 5. No GCCS construction activities are planned in Phase 1 and 2. Drilling and pipe installation will take place in Phase 3, 4A and 5. For Phase 4, no drilling is planned and pipe installation will only occur within the existing soil cover.

LANDFILL GAS COLLECTION AND CONTROL SYSTEM

The primary components of the GCCS include the following:

- Landfill gas extraction wells
- Landfill gas header and lateral piping
- Landfill gas condensate controls (sumps, air line, and force main)
- Connecting to existing passive LFG trenches and vents
- Blower flare station (blower and utility flare)
- Air compressor
- Landfill gas-fueled generator and associated landfill gas treatment and compression systems (in future)

The GCCS will be installed in portions of Phase 3, Phase 4A, Phase 4, and Phase 5. Construction Drawings for the GCCS are provided Attachment A. The remainder of this permit application describes the GCCS in more detail.

LFG Extraction Wells

LFG extraction wells will be drilled into the existing waste mass at the depths depicted on the Well Completion Schedule, Sheet 4 of 6 (Attachment A). The well depths were established following industry standards and based on our engineering judgment and experience. The bottom of the wells was set at least 15 feet above the landfill's base liner system.

To insure the wells do not penetrate the bottom liner system, as-built drawings were obtained from Johnston County and reviewed by SCS. All lined areas (Phases 4A and 5) have survey records that include the northing, easting, and elevation of the base liner system. This survey information was used to maintain a minimum distance of 15 feet above the base liner system when drilling. In areas where there is less than 30 feet of waste the minimum distance above the base liner may be shortened to 10 feet. The base of the landfill phases that do not have a synthetic base liner (Phase 3) will also be avoided by finding available survey information or assuming that the base grades are equal to the native topography outside the limit of waste. The design for a soil base liner system will again include a minimum of 15 feet from the assumed base liner.

Proposed wells have been overlaid on the surveyed baseliner system to insure that at the specific point a well will be installed the minimum buffer is present. The well locations will be surveyed by a professional surveyor prior to drilling. The survey results will be reviewed by a professional engineer and the well schedule revised if necessary.

Refer to Attachment B for SCS's CQA Guidelines for drilling LFG extraction wells. These CQA guidelines are part of a larger SCS program related to standard procedures and quality assurance.

SCS will submit the required information to the Health Hazards Control Unit (HHCU) of the Division of Public Health that addresses disturbing asbestos containing materials (ACMs). No

drilling will occur until an approval letter has been received. A copy of the notification from SCS and approval from the HHCU will be provided in the Construction Documentation Report.

All LFG extraction wells will be surveyed.

LFG Header and Lateral Piping

The GCCS will have various pipes that connect the gas wells to the flare. There will be lateral lines 4-in in diameter connected to main header pipes 8-in, 10-in, and 12-in in diameter. All piping will be HDPE SDR 17 pipe. These pipes are sized using industry standards to carry existing and projected LFG flow. A LFG projection model prepared by SCS was used to estimate expected current and future LFG collection. A pipe sizing calculation is provided in Attachment C. LFG header/lateral piping will be installed with a typical slope of 3% and a minimum slope at 1%.

Piping will be installed according to details in the attached set of construction plans. These plans illustrate the network of pipes to be installed. The details also illustrate how the piping, and other associated aspects of the GCCS will be constructed. An excavator with a two foot wide bucket will be used to dig the trenches two to three feet deep for installation of the various pipes. In areas that are closed with a synthetic liner, the trench depth will be approximately 12" to avoid damaging the synthetic liner. Also as seen in the details, the HDPE GCCS pipe will be run through corrugated metal pipe at all road crossings to protect the pipe from crushing. Refer to the drawings for additional information.

All GCCS piping will be leak tested. A copy of the leak testing protocol is provided in Attachment D.

The maximum length of trench open at one time will be limited to 1,000 feet. All trenches within the waste mass footprint will be backfilled at the end of the day.

Condensate Management

Condensate is formed within the GCCS piping network as LFG cools. Condensate is collected at the low points of the piping network in condensate sumps. Multiple condensate sumps are incorporated into the GCCS. Each condensate sump is equipped with a pneumatic pump which transfers the condensate into a force main. The locations of the sumps and force mains are illustrated on the Construction Drawings (Attachment A). Condensate is eventually transferred into the Landfill's leachate management system where it is properly disposed. Force mains not located within the waste limits will be dual-contained.

Blower/Flare Station

The blower/flare station will utilize a candlestick flare to combust the collected LFG. The Landfill has already received an Air Permit from the NC Department of Environment and Natural Resources' Division of Air Quality for the construction and operation of this system. The blowers located at the blower/flare station will be used to pull the gas from the Landfill and send it through the candlestick flare or to the planned Landfill Gas Energy Project.

The blower/flare station planned for this landfill will have a safety interlock system that will automatically shutdown the blower if no flame is present in the flare. Providing the complete system design and emergency shutdown procedures in this response would be extensive. When the blower/flare station is installed, a copy of the operation and maintenance manual, which includes emergency shut-down procedures, will be kept on-site.

The construction and operation of the flare is permitted through the NCDENR, Division of Air Quality. A copy of the Permit-to-Construct application and DAQ approvals will be included in the Construction Documentation Report.

Landfill Gas Energy Project

After the GCCS is installed and becomes operational, the Project Team plans to install a Cummins C2000 N6C Engine, or equivalent, to convert LFG into electricity. The electricity produced will them be placed on the grid. This specific engine has the capability to produce up to 2 MW of electricity. Electricity will depend on the amount of LFG that is recovered from the Landfill and collected by the GCCS.

Disposal of Excavated Waste

During drilling and pipe trenching, MSW will be generated. All MSW generated during the installation of the GCCS will be hauled to the Landfill's working face in accordance with the Landfill's operating permit.

No MSW will be left on top of the Landfill or exposed overnight. During normal operations the construction crew and the site will communicate so excavation and drilling cease for the day prior to closing the active disposal area. This will allow for proper disposal and daily cover of excavated waste.

Existing Permitted Cap

Phase 4 is the only area with a permitted cap and no drilling will take place in Phase 4. Some excavation will be required to install piping to existing LFG horizontal collectors. In areas with a synthetic cap, the LFG collection pipes will be installed above the synthetic liner within the vegetative soil layer. Excavated soils will be placed back around the installed pipe and used as backfill for the trench.

Construction Documentation Report

A construction documentation report will be prepared at the completion of the project to document the installation of the primary GCCS components. In general the report will include the following information:

- Brief descriptions of the project activities, scheduled and all involved parties.
- Descriptions of variances or deviations from the proposed plan
- Copies of approval letters and/or permit documents
- As-built drawings including survey coordinates of gas wells, valves, sumps and piping gradient.

- Well completion logs and final well completion schedule.
- Leak test results.
- QA/QC testing report for the cover restoration, if required.
- A series of color photographs to document the major project features.

The final construction documentation report will be submitted to the SWS within 30 days of system construction.

CLOSING

The installation of the GCCS will be conducted by SCS Field Services under a design-build contract between Blue Source and SCS. We anticipate the start of construction in February 2010. Following the installation of the GCCS, Johnston County will revise or update (if needed) the landfill's Operations Plan, Closure Plan, Post-Closure Plan, and financial assurance documents in accordance with the solid waste regulations.

The GCCS installation will facilitate the collection of LFG for the Green Energy Project and Carbon Credit Project. Please do not hesitate to contact either of the undersigned if you have any questions or comments at (704) 504-3107.

Sincerely,

J Morgan, PE
Senior Project Professional
SCS ENGINEERS, PC

Steven C. Lamb, PE
Vice President
SCS ENGINEERS, PC

jm/scl

cc: Rick Proctor, Johnston County Solid Waste Manager
Annika Colston, Blue Source
Matt Wells, Blue Source
Guy Lewis, SCS Field Services

Attachment A – Construction Drawings
Attachment B – SCS CQA Guidelines
Attachment C – Pipe Sizing Calculation
Attachment D – Leak Testing Guidelines

ATTACHMENT A

Construction Drawings

RAWINGS

UNTY LANDFILL
PERMIT #51-03
AS PROJECT

JRCE LLC
EET, SUITE 503
, NY 10011

NEERS, PC
RK DRIVE, SUITE 450
1 CAROLINA 28273
04-3107

210301.00
ER 2010

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	EXISTING CONDITIONS PLAN
3	SITE PLAN
4	WELL DETAILS
5	PIPING DETAILS
6	GENERAL DETAILS

ON MAP
AS SHOWN

PERMIT DRAWINGS
DO NOT USE FOR CONSTRUCTION
DATE 11/30/10

NO	REVISION	DATE
1	REVISED SHEETS 3, 4, and 6	3/1/11
2		
3		
4		

TITLE SHEET

JOHNSTON COUNTY LANDFILL
LANDFILL GAS PROJECT

BLUE SOURCE LLC
NEW YORK, NY 10011

SCS ENGINEERS, PC
2530 WHITEHALL PARK DRIVE, SUITE 450
CHARLOTTE, NORTH CAROLINA 28273
PHONE: (704) 504-3107 FAX: (704) 504-3172

DATE
NOVEMBER 2010

SCALE
AS SHOWN

DRAWING NO.
1 6

PERMIT D

JOHNSTON CO
SOLID WASTE
LANDFILL G

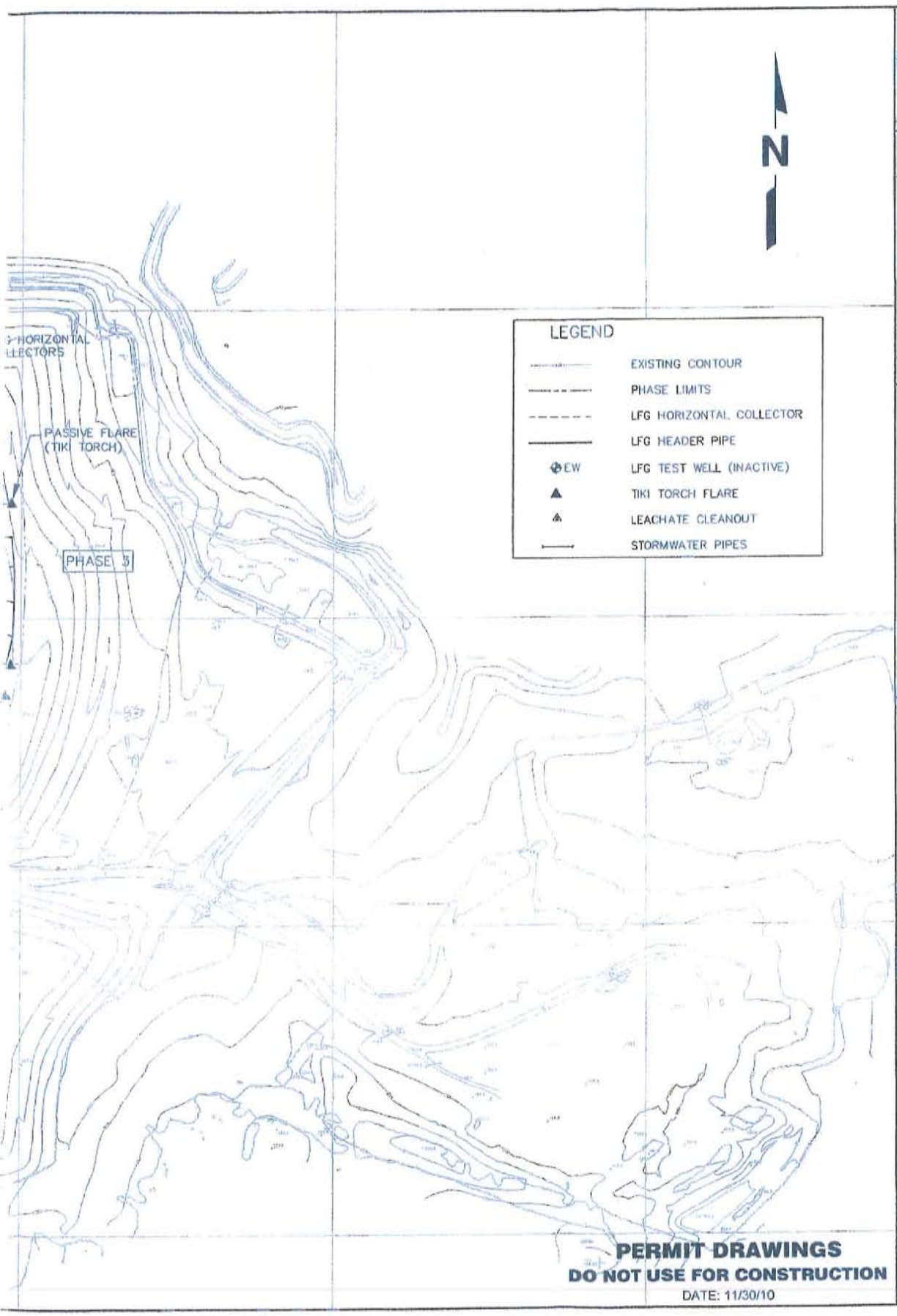
BLUE SO
26 W. 17TH ST
NEW YOR

SCS ENGI
2520 WHITEHALL PA
CHARLOTTE, NORT
(704) 5

JOB NO. 0
NOVEM

AREA MAP
SCALE AS SHOWN

LOCA
SCAL



PERMIT DRAWINGS
DO NOT USE FOR CONSTRUCTION
DATE: 11/30/10

NORTH CAROLINA PROFESSIONAL SEAL 033608 ENGINEER LAWRENCE MORGAN

NORTH CAROLINA LICENSE NO. E-1837

NO.	REVISION	DATE

SHEET TITLE
EXISTING CONDITIONS

PROJECT TITLE
JOHNSTON COUNTY LANDFILL
LANDFILL GAS PROJECT

CLIENT
BLUE SOURCE LLC
26 W 17TH STREET, SUITE 504
NEW YORK, NY 10011

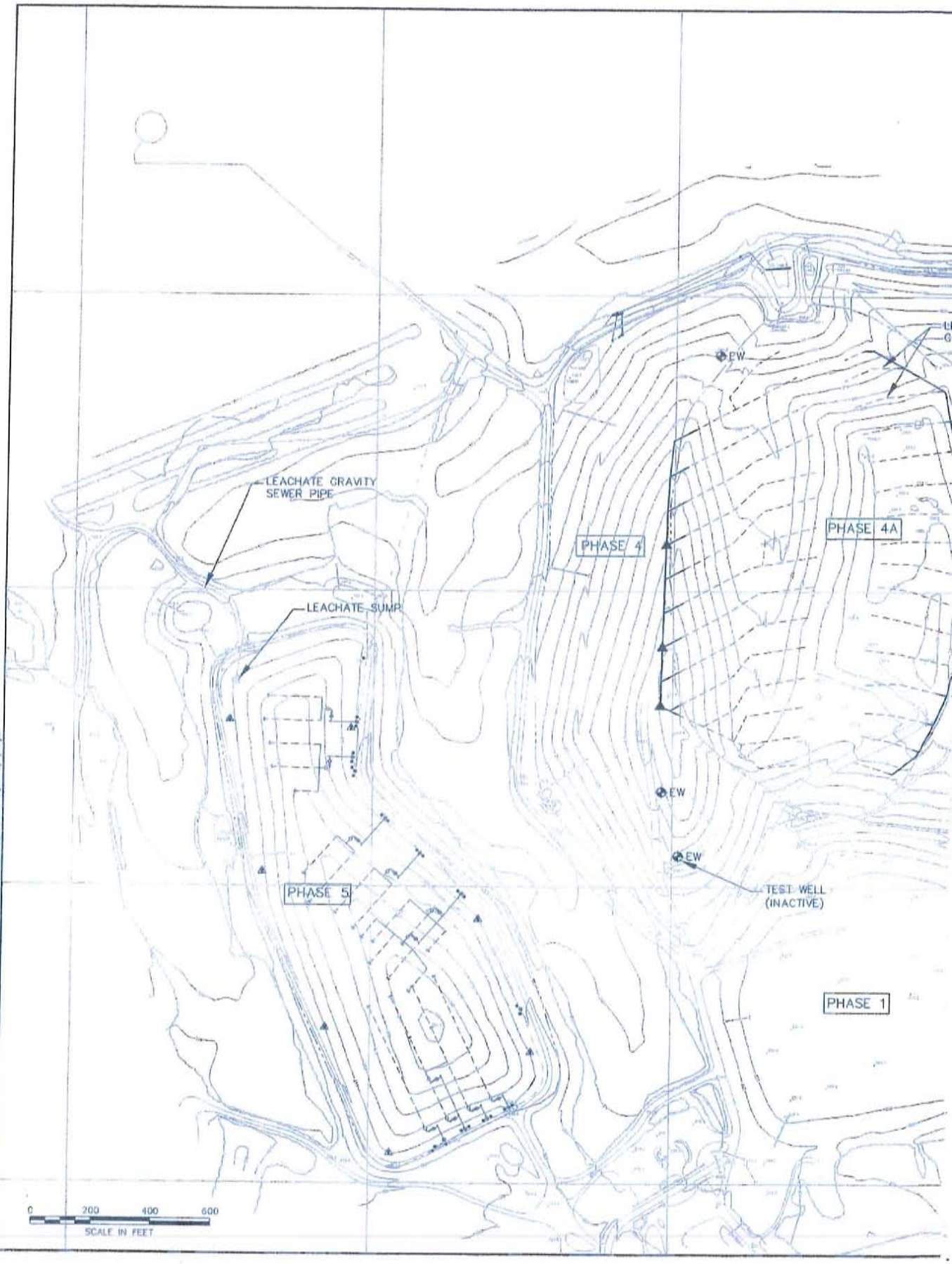
SCS ENGINEERS, PC
2520 WHITEHALL PARK DRIVE, SUITE 450
CHARLOTTE, NORTH CAROLINA 28273
PHONE: (704) 504-3107 FAX: (704) 504-3174

PROJ. NO. 02210301.00 | DSN. BY: JLM | DWN. BY: TAS | CHK. BY: SCL | QA RVW BY: CL | APP. BY: CL

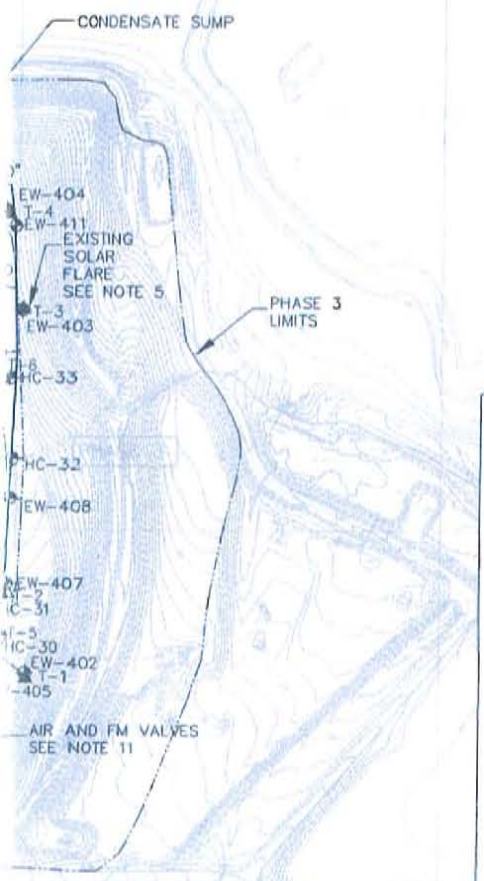
DATE: NOVEMBER 2010

SCALE: AS SHOWN

DRAWING NO. 2 of 6


LEACHATE GRAVITY SEWER PIPE
LEACHATE SUMP
PHASE 4
PHASE 4A
PHASE 5
PHASE 1
EW
EW
EW
TEST WELL (INACTIVE)
0
200
400
600
SCALE IN FEET

Ex. Torch	Wellhead
T-1	EW-402
T-2	HC-31
T-3	EW-403
T-4	EW-404
T-5	HC-30
T-6	HC-33
T-7	HC-41
T-8	HC-42
T-9	HC-44



N

LEGEND

	EXISTING CONTOUR
	PHASE LIMITS
	LFG HORIZONTAL COLLECTOR
	LFG HEADER PIPE
EW	LFG EXTRACTION WELL
T-1	EXISTING PASSIVE SOLAR FLARE (TORCH)
HC	WELL HEAD ON EXISTING HORIZONTAL COLLECTOR
CS-H1	CONDENSATE SUMP
	LEACHATE CLEANOUT
	LFG HEADER VALVE
	AIRLINE/FORCEMAIN VALVES

NOTES:

1. INCLUDE 2-IN AIR AND 2-IN FM IN TRENCH WITH ALL PIPING IN PHASE 5.
2. AIR COMPRESSOR SHALL BE AN INGERSOL RAND UP5 15-8. CONTRACTOR SHALL ALSO PROVIDE ENCLOSURE FOR AIR COMPRESSOR.
3. INSTALL 8-IN VALVE IN EXISTING 8-IN HEADER AND ONE ADDITIONAL STUB-UP FROM THE 8-IN HEADER IN ORDER TO ISOLATE EXISTING HORIZONTAL COLLECTORS IN PHASE 4 (SEPARATE COST).
4. THERE ARE 3 EXISTING LFG TEST WELLS IN PHASE 4. CONTRACTOR SHALL INSTALL WELLHEAD ON TWO OF THESE. (EW-400 and EW-401)
5. EXISTING TORCHES ARE MARKED AS T-X. CONTRACTOR SHALL INSTALL WELLHEAD ON ALL OF THESE. DRAWING DEPICTS SOME AS HC WELLS THAT ARE CONNECTED TO A HORIZONTAL NETWORK
6. THERE IS AN EXISTING LEACHATE SUMP IN THE NORTH CORNER OF PHASE 5. LEACHATE FLOWS BY GRAVITY FROM THE SUMP TO THE SURFACE IMPOUNDMENT
7. REMOTE WELLS ARE CONNECTED TO THE NEW STUB-UP, THE EXISTING TORCH (T-9), AND THE NORTH BANK OF NEW HORIZONTAL COLLECTORS IN PHASE 4
8. WELL NUMBERS ARE GROUPED ACCORDING TO PHASE
9. CONTRACTOR WILL RUN 4-IN LATERALS TO THE NEW STUB-UP, THE EXISTING TORCH (T-9), AND THE NORTH BANK OF NEW HORIZONTAL COLLECTORS IN PHASE 4 FOR A TOTAL OF THREE REMOTE WELLHEADS
10. INCLUDE 2-IN AIR AND FORCEMAIN IN THE 12-IN PIPING FROM THE FLARE TO PHASE 3 AND ALSO ALONG THE 10-IN PIPING TO CS-3A
11. CONTRACTOR TO INSTALL AIR AND FORCEMAIN VALVES AS SHOWN ON DRAWING AND IN DETAILS 1-4 ON SHEET 6
12. ALL PIPING WILL BE PRESSURE TESTED TO 5 PSI FOR 4 HOURS
13. ALL FORCEMAINS THAT ARE NOT ON LINED AREAS OF THE LANDFILL WILL BE DUAL-CONTAINED

PERMIT DRAWINGS

DO NOT USE FOR CONSTRUCTION

DATE: 11/30/10

NORTH CAROLINA PROFESSIONAL SEAL 033608 ENGINEER JAMES LAWRENCE MORGAN

NORTH CAROLINA LICENSE NO. C-1837

NO.	REVISION	DATE
1	ADDED NOTES 12 and 13	2/1/11

SHEET TITLE: SITE PLAN

PROJECT TITLE: JOHNSTON COUNTY LANDFILL LANDFILL GAS PROJECT

CLIENT: BLUE SOURCE LLC
26 W 17TH STREET, SUITE 504
NEW YORK, NY 10011

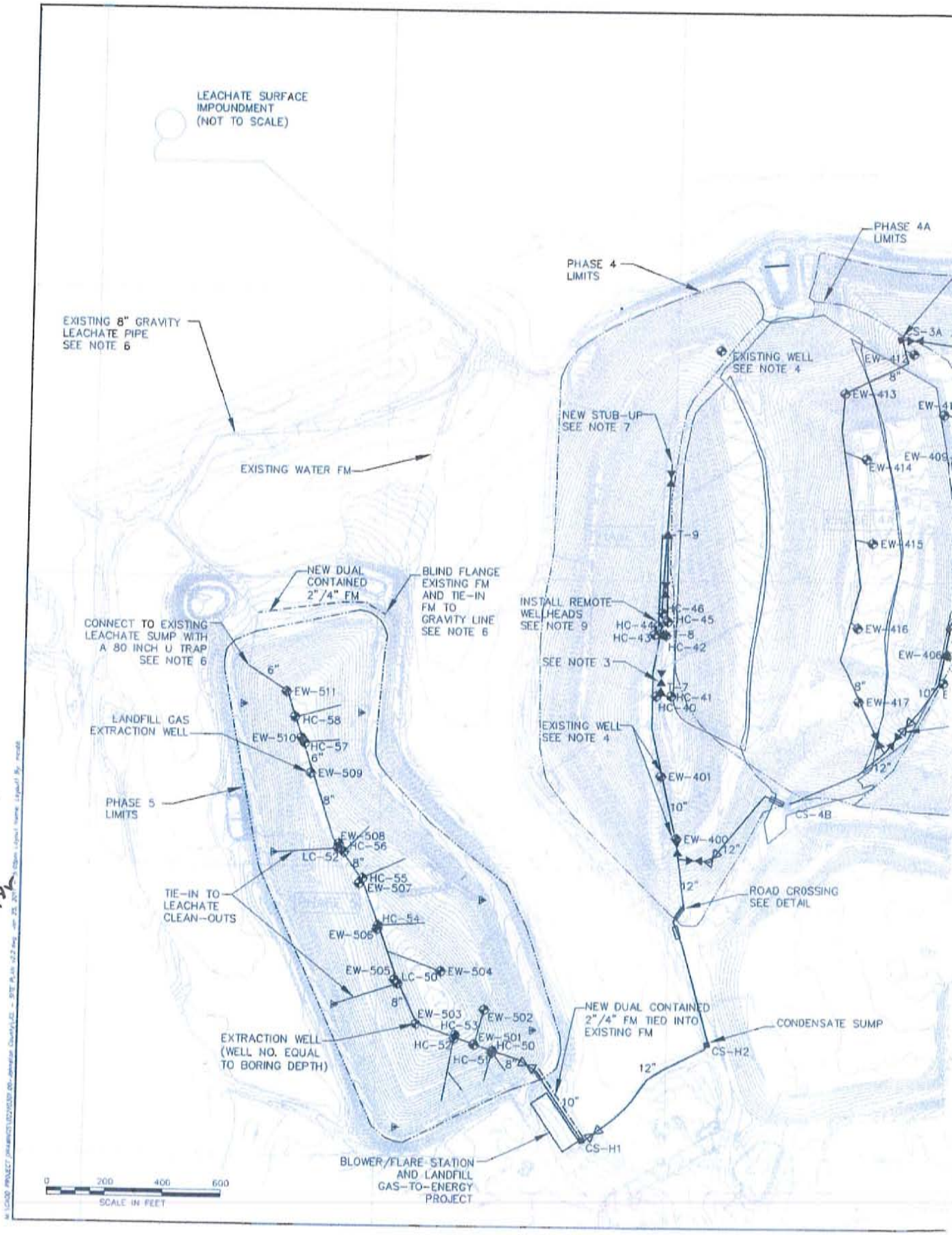
SCS ENGINEERS, PC
2520 WHITEHALL PARK DRIVE, SUITE 450
CHARLOTTE, NORTH CAROLINA 28273
PHONE: (704) 504-3107 FAX: (704) 504-3174

PROJ. NO. 02210301.00 | DSN. BY: JLM | DWN. BY: TAS | CHK. BY: SCL | QA/RVW BY: CL | APP. BY: CL

DATE: JANUARY 2011

SCALE: AS SHOWN

DRAWING NO. 3 of 6



r sized air compressor

+ get water level indicator

-15 HP

11

WELL SCHEDULE

WELL ID	NORTHING	EASTING	ANTICIPATED GROUND SURFACE ELEVATION	FINAL GROUND SURFACE ELEVATION	BASELINER ELEVATION (Note 2)	LANDFILL DEPTH	WELL DEPTH	6" SOLID PIPE LENGTH (Note 8)	6" PERFORATED PIPE LENGTH
EW-405	643,653	2,170,938	260				41	20	25
EW-406	643,756	2,170,951	256				41	20	25
EW-407	643,872	2,170,977	250				41	20	25
EW-408	644,077	2,170,983	260				41	20	25
EW-409	644,422	2,170,956	238				41	20	25
EW-410	644,585	2,170,920	238				41	20	25
EW-411	644,725	2,170,991	220				41	20	25
EW-412	644,792	2,170,817	218				41	20	26
EW-413	644,656	2,170,580	220		164	56	41	18	27
EW-414	644,428	2,170,659	260		185	75	60	24	40
EW-415	644,136	2,170,686	262		192	70	55	22	37
EW-416	643,841	2,170,640	263		193	70	55	22	37
EW-417	643,586	2,170,647	245		194	51	36	15	25
EW-501	642,388	2,169,341	272		232	40	26	14	15
EW-502	642,509	2,169,373	270		224	46	31	14	21
EW-503	642,458	2,169,138	280		224	56	41	20	25
EW-504	642,640	2,169,219	284		224	60	45	19	30
EW-505	642,810	2,169,060	276		228	48	33	15	22
EW-506	642,784	2,168,905	272		227	45	30	14	28
EW-507	642,941	2,168,929	270		224	46	31	15	20
EW-508	643,078	2,168,859	262		224	38	23	15	12
EW-509	643,324	2,168,757	250		223	27	17	14	7
EW-510	643,443	2,168,722	246		221	25	15	14	5
EW-511	643,603	2,168,670	246		221	25	15	14	5
TOTAL							881	430	547

NOTES:

1. THIS DRAFT WELL COMPLETION SCHEDULE IS NOT INTENDED FOR CONSTRUCTION UNTIL ACTUAL SURVEY DATA IS OBTAINED BY CONTRACTOR AND THE WELL COMPLETION SCHEDULE IS REVISED BY THE DESIGN ENGINEER.
2. BASE GRADE DATA BY RSC.
3. EXISTING LANDFILL SURFACE TOPOGRAPHY SHOWN ON SITE PLANS IS FROM 2009 AERIAL FLYOVER.
4. CONTRACTOR AND ENGINEER SHALL VERIFY ALL FIELD CONDITIONS INCLUDING PRE-CONSTRUCTION WELL SURVEY STAKES AND NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND CONDITIONS DEPICTED IN THESE PLANS PRIOR TO DRILLING.
5. FOLLOWING REVIEW OF SURVEY DATA, CONTRACTOR SHALL GET AUTHORIZATION FROM OWNER AND ENGINEER PRIOR TO DRILLING.
6. NO DRILLING SHALL PROCEED WITHOUT AUTHORIZATION AND ACCEPTANCE INDICATED BY SIGNATURE BELOW.
7. WELLS DEPTHS WILL VARY ACCORDING TO CONDITIONS ENCOUNTERED.
8. SOLID PIPE LENGTHS INCLUDE A 5 FEET OF SOLID PIPE ABOVE GRADE.
9. BASED ON NATURAL GRADE SURROUNDING THE LANDFILL AND ANTICIPATED GROUND SURFACE ELEVATION, A WELL DEPTH OF 41' IS SHOWN FOR WELLS IN PHASE 3. IT IS ASSUMED THIS DEPTH WILL NOT PENETRATE THE SOIL BASE OF THE LANDFILL.
10. GRAIN SIZE ANALYSIS WILL BE PERFORMED ON GRAVEL BACKFILL AT A FREQUENCY OF 1 PER 250 CUBIC YARDS, OR AS DIRECTED BY ENGINEER (ASTM D421).

CQA CONSULTANT | CONTRACTOR | OWNER

PERMIT DRAWINGS
DO NOT USE FOR CONSTRUCTION
DATE: 11/30/10

NO. | REVISION | DATE
A | ADDED NOTES 9 & 10 | 2/11

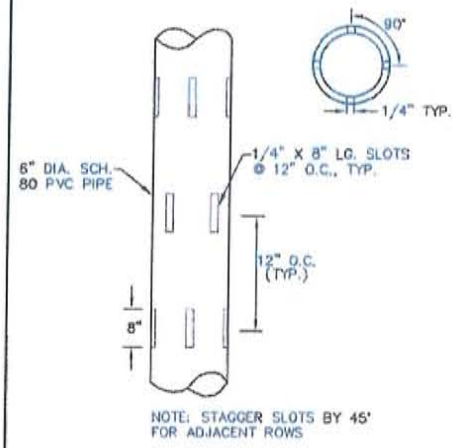
SHEET TITLE: WELL DETAILS
PROJECT TITLE: JOHNSTON COUNTY LANDFILL LANDFILL GAS PROJECT

CLIENT: BLUE SOURCE LLC
26 W 17TH STREET, SUITE 504
NEW YORK, NY 10011

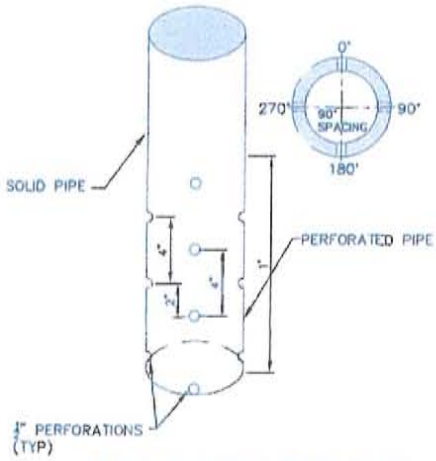
SCS ENGINEERS, PC
2620 WHITEHALL PARK DRIVE, SUITE 450
CHARLOTTE, NORTH CAROLINA 28273
PHONE: (704) 504-3107 FAX: (704) 504-3174

PROJ. NO. 02210281.00 | DWN. BY TAS | QA REVIEW BY CDH | SCALE AS SHOWN
DSN. BY JLM | CHK. BY JLM | APP. BY SCL

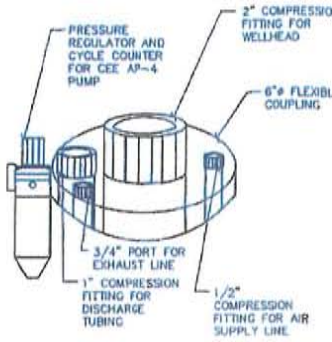
DATE: JANUARY 2011
SCALE: AS SHOWN
DRAWING NO. 4 of 6



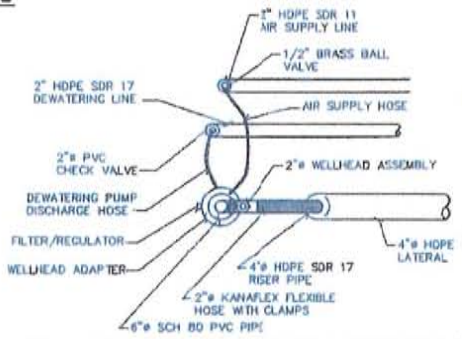
SLOTTED PIPE (PVC) FOR VERTICAL WELLS
NTS



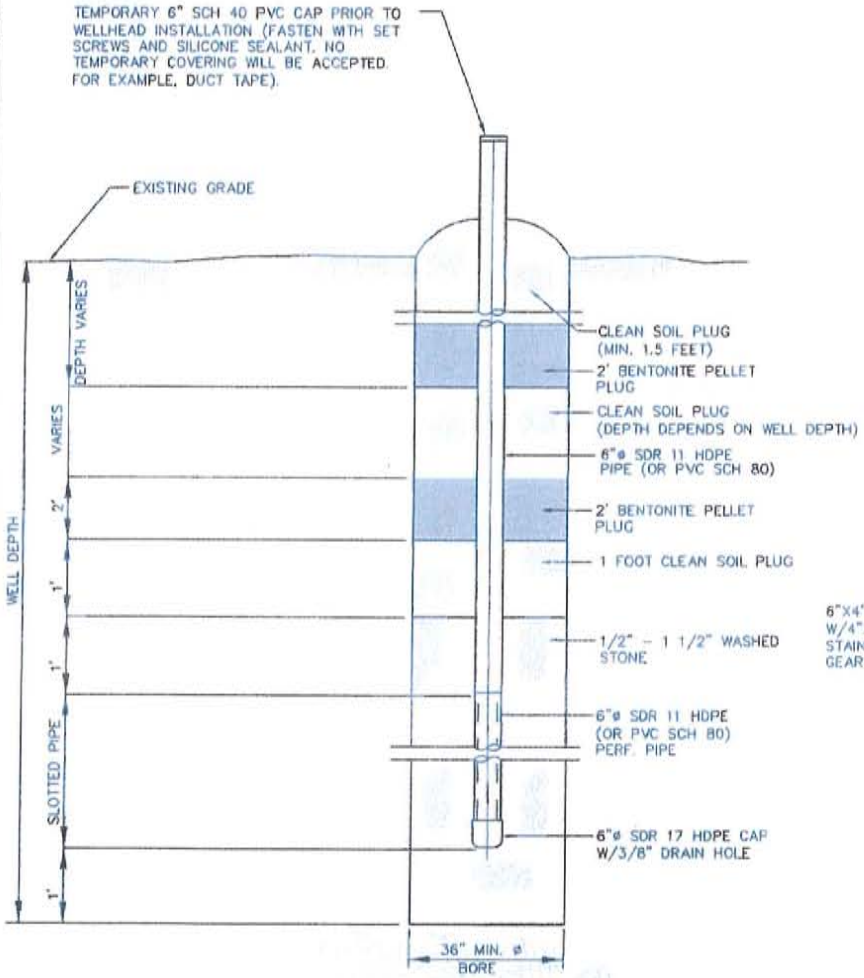
PERFORATED PIPE (HDPE) DETAIL
NTS



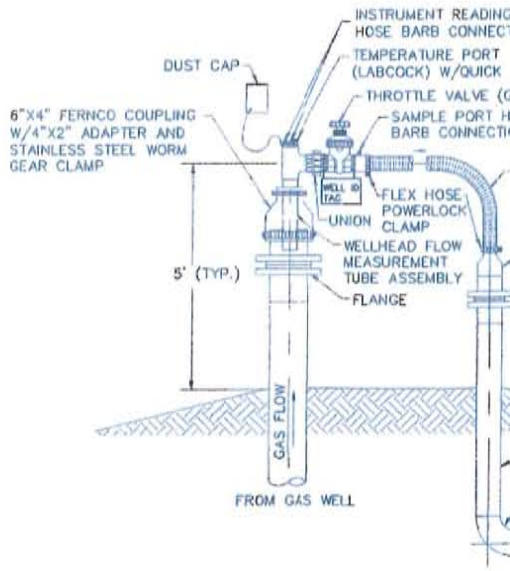
WELLHEAD ADAPTER FOR AP-4 PUMP
NTS



PLAN VIEW FOR DEWATERING PUMP INSTALL
NTS



VERTICAL EXTRACTION WELL DETAIL
NTS



WELLHEAD DETAIL
NTS

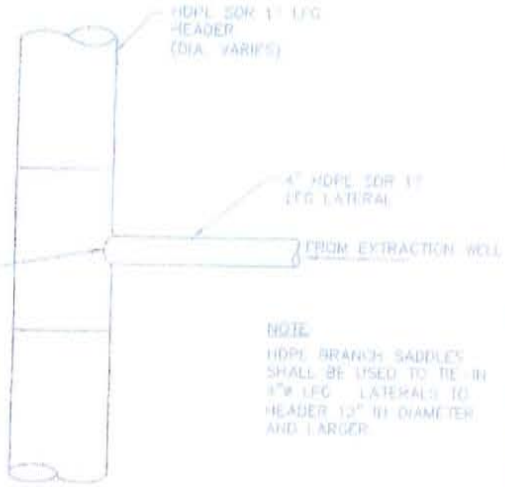
HDPE LFG HEADER (SIZES VARIES)

HDPE SDR 11 MOLDED TEE

HDPE REDUCERS AS REQUIRED

HDPE LFG LATERAL (6" IN OR HIGHER)

FROM EXTRACTION WELL



NOTE:
HDPE BRANCH SADDLES SHALL BE USED TO TIE IN 4"Ø LFG LATERALS TO HEADER 12" IN DIAMETER AND LARGER

LFG LATERAL TIE-IN WITH BRANCH SADDLE DETAIL

NTS

0 - 150 PSI ANY HOSE

304 STEEL HOSE CLAMP

HOSE ID = 1/4" PIPE SIZE
BRASS HOSE BARB FITTING

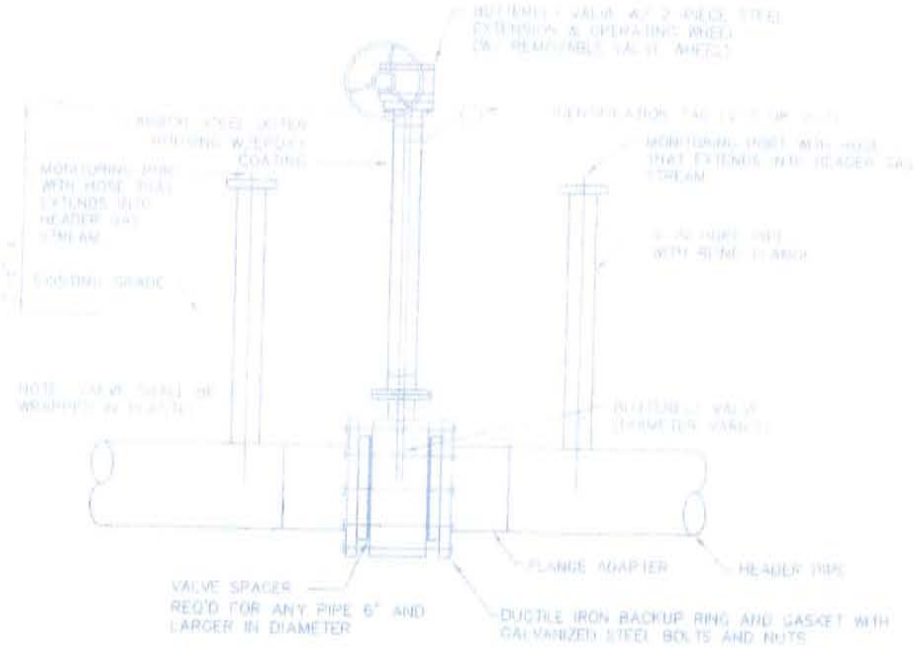
4" BODY SIZE
CHY COUPLER

1/4" BODY SIZE MAX. PSID

FEMALE - FEMALE THREADED
STAINLESS STEEL BALL VALVE
LEVER HANDLE AND RATED
500 PSI MAX. PRESSURE

SPELZ

BRONZE BIGHMC



ISOLATION VALVE DETAIL

NTS

PERMIT DRAWINGS
DO NOT USE FOR CONSTRUCTION
DATE 11/08/10

NO.	REVISION	DATE

PIPING DETAILS

JOHNSTON COUNTY LANDFILL
LANDFILL GAS PROJECT

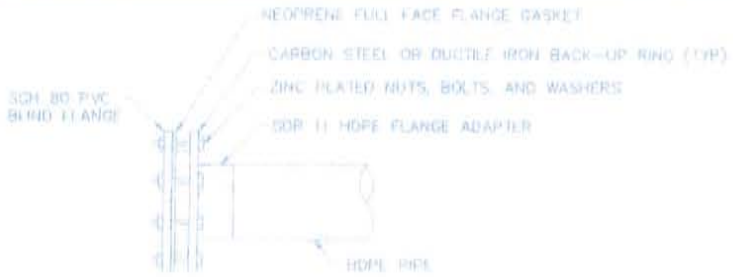
BLUE SOURCE LLC
36 WEST 44TH STREET, SUITE 634
NEW YORK, NY 10036

SCS ENGINEERS, PC
2520 WHITEHALL PARK DRIVE, SUITE 450
CHARLOTTE, NORTH CAROLINA 28273
PHONE: (704) 504-3107 FAX: (704) 504-2124

DATE
NOVEMBER 2010

SCALE
AS SHOWN

DRAWING NO.
5

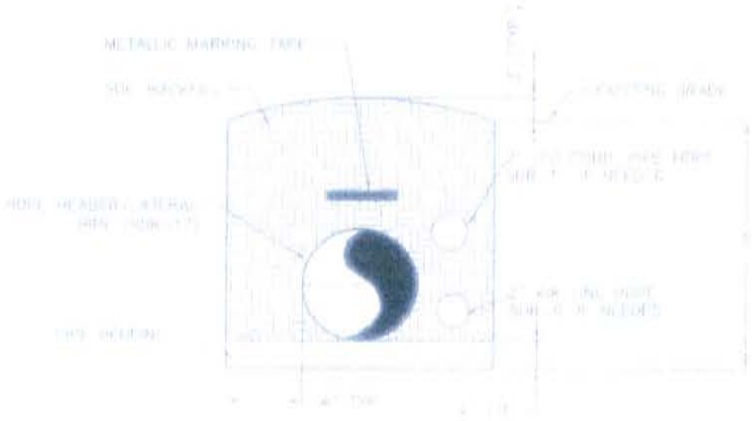


BLIND FLANGE DETAIL
NTS

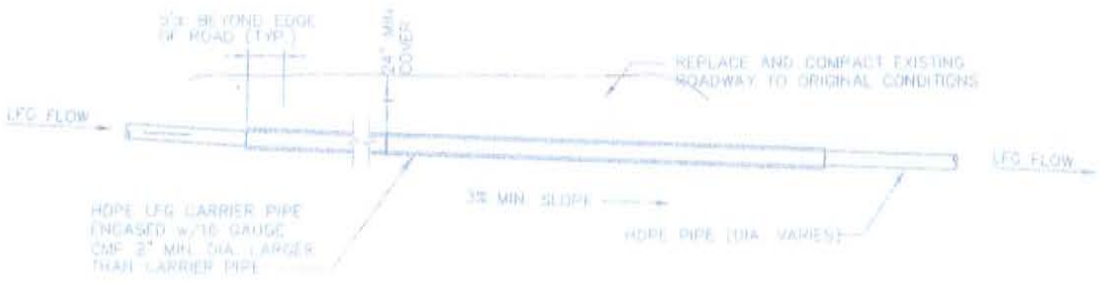
LATERAL TIE-IN W/TEE DETA
NTS

FLANGE DETAIL
NTS

AIR SUPPLY LINE VALVE DE



PIPE TRENCH DETAIL



ROAD CROSSING DETAIL
NTS

RT POST

/2" FEMALE x FEMALE
HREADED 316 STAINLESS
TEEL BALL VALVE WITH
EVER HANDLE AND RATED
OR 250 PSI MAX.
RESSURE

S. BUSHING

E X S.S.
N FITTING

SDR 11 PIPE

POST

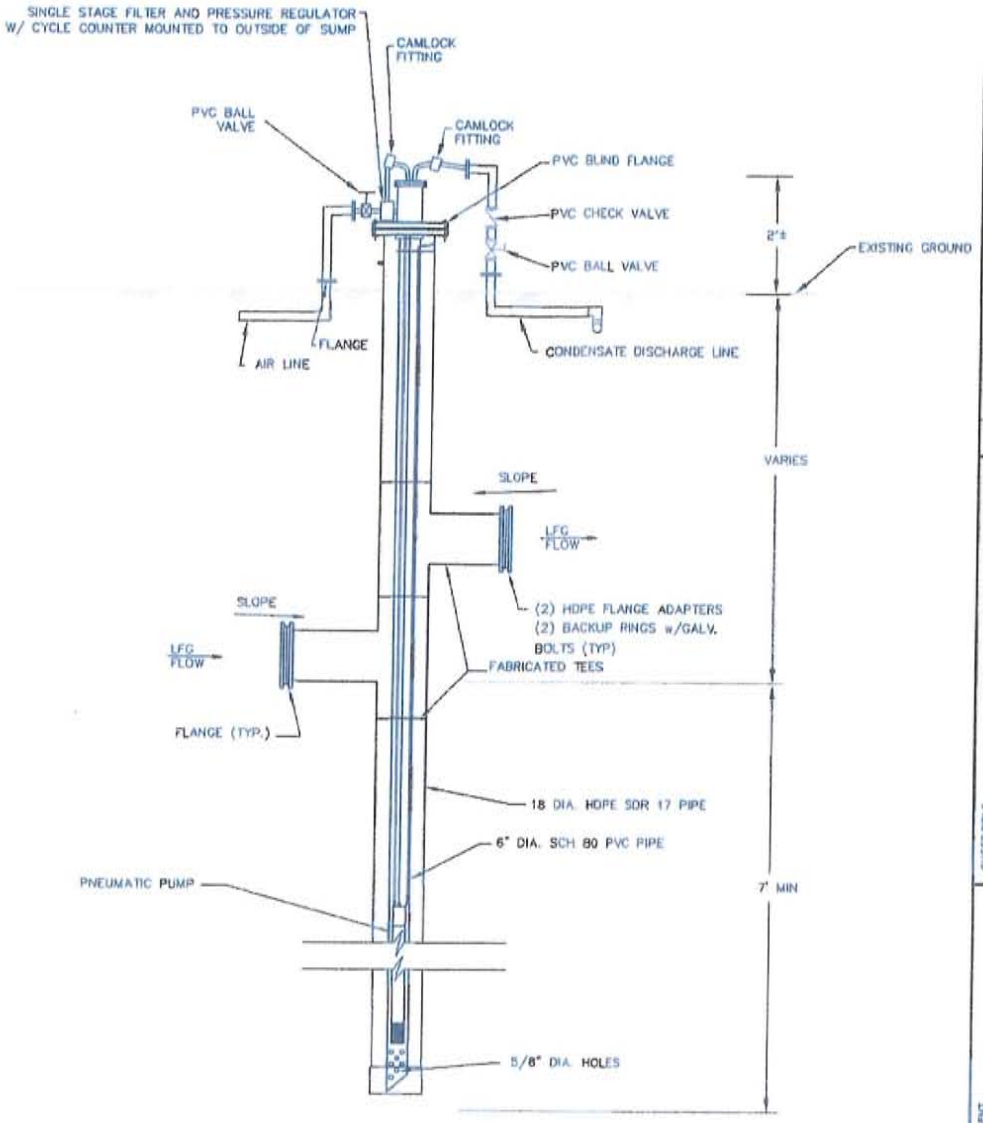
EMALE x FEMALE
ED 316 STAINLESS
BALL VALVE WITH
HANDLE AND RATED
0 PSI MAX.
RE

USHING

S.S.
TING

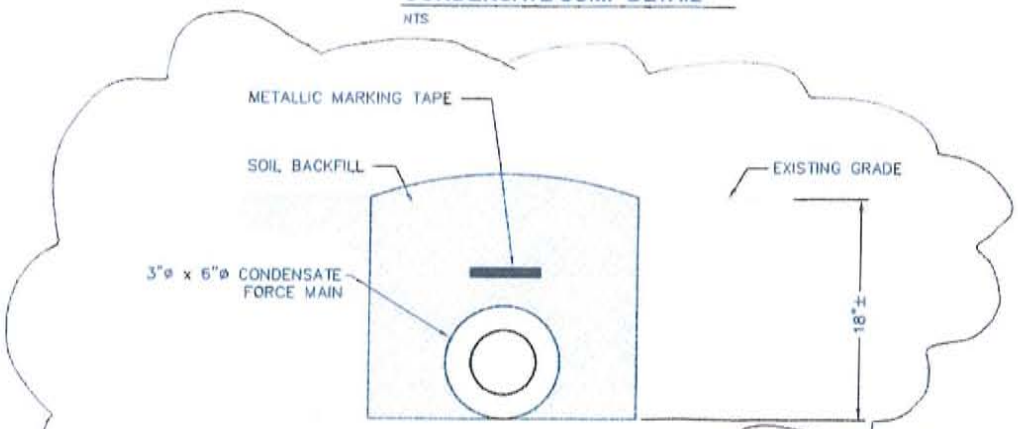
9 PIPE

IR
SOR



CONDENSATE SUMP DETAIL

NTS



DUAL-CONTAINED PIPE IN TRENCH DETAIL

NTS

PERMIT DRAWINGS
DO NOT USE FOR CONSTRUCTION
DATE: 11/30/10

NORTH CAROLINA PROFESSIONAL SEAL 033000 ENGINEER JASON LAWRENCE MORGAN

NC CORP. LICENSE NO. C-1617

NO.	REVISION	DATE
1	ADDED DUAL-CONTAINED DETAIL 2/11/11	
2		
3		
4		
5		

SHEET TITLE: GENERAL DETAILS

PROJECT TITLE: JOHNSTON COUNTY LANDFILL LANDFILL GAS PROJECT

CLIENT: BLUE SOURCE LLC
26 W 17TH STREET, SUITE 504
NEW YORK, NY 10011

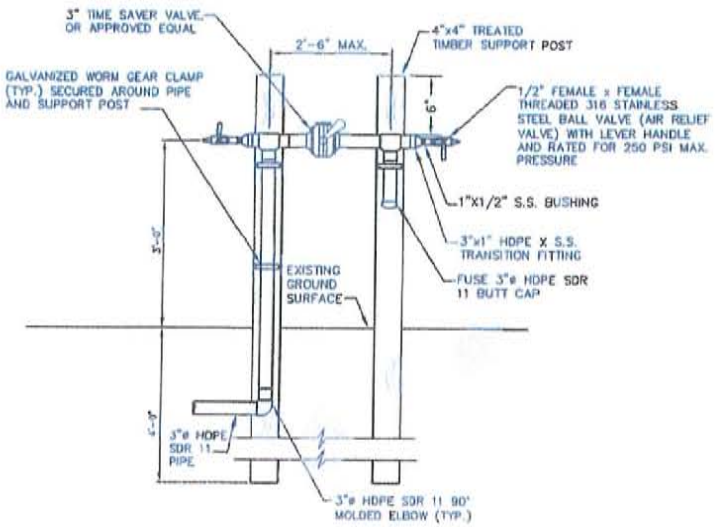
SCS ENGINEERS, PC
2520 WHITEHALL PARK DRIVE, SUITE 450
CHARLOTTE, NORTH CAROLINA 28273
PHONE: (704) 504-3107 FAX: (704) 504-3174

PROJ. NO. 02210201.00 | DSN. BY: TAS | DWN. BY: CDH | CHK. BY: JLM | APP. BY: SCL

DATE: JANUARY 2011

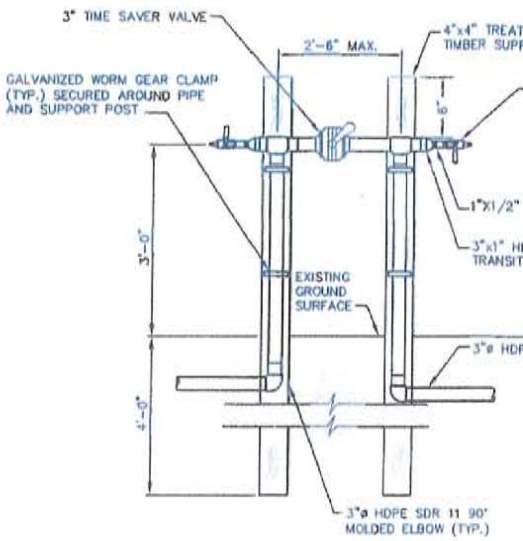
SCALE: AS SHOWN

DRAWING NO. 6 of 6

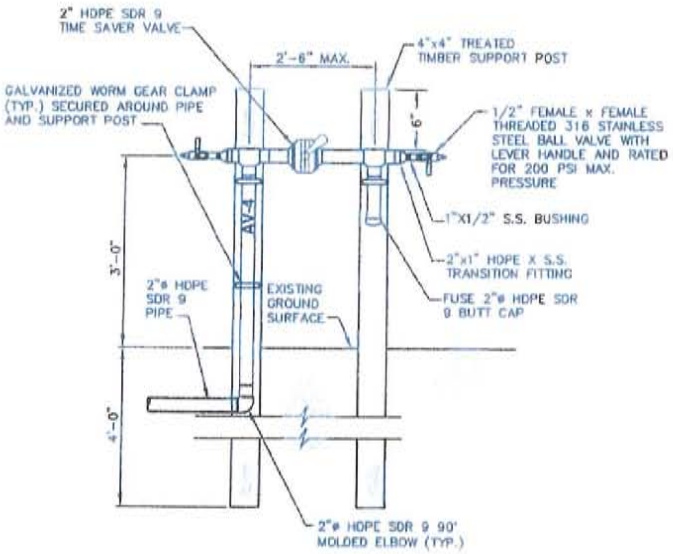


NOTE: CAN BE USED FOR FUTURE CONNECTION

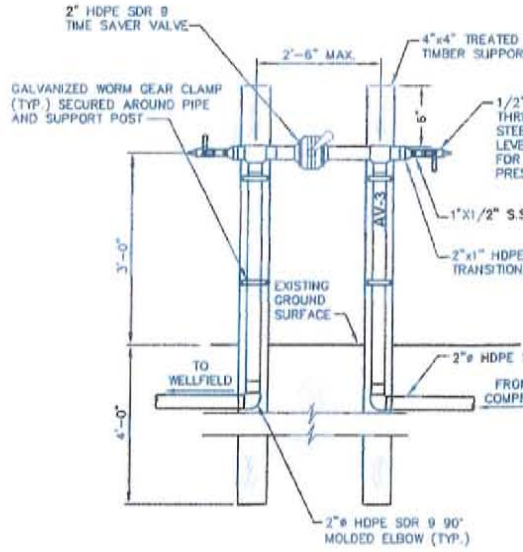
FORCEMAIN ISOLATION VALVE AND TERMINATION DETAIL
NTS



FORCEMAIN ISOLATION AND BLOWOFF VALVES DETAIL
NTS



AIR LINE ISOLATION VALVE AND TERMINATION DETAIL
NTS



AIR LINE ISOLATION AND BLOWOFF VALVES DETAIL
NTS

ATTACHMENT B

SCS CQA Guidelines

Standard Procedure
Construction Quality Assurance for Installation of LFG Extraction Wells

PURPOSE

The purpose of this Standard is to describe the procedures and activities to be performed by SCS personnel in the field and office in support of drilling and installation of LFG extraction wells. This Standard supplements SCS's Quality Assurance Program, which also should be reviewed with respect to review and approval procedures for engineering drawings and documents.

This Standard addresses the following:

- Procedures used by SCS designers and engineers during the development of Construction Drawings and the Well Completion Schedule.
- Procedures used by SCS CQA personnel, both field and project engineer.

DESIGN ACTIVITIES

1. Obtain the most recent topographic map for the area where construction will occur.
2. Obtain the As-Built drawings for the bottom liner system. If As-Built drawings of the bottom liner system are not available, use the permit drawings. However, when using permit drawings, SCS should note this on the Construction Drawings or Well Completion Schedule. The Client should also be made aware that the As-Built drawings could not be located.
3. Establish the "depth of waste" for a given well, then calculate the well depth accordingly (e.g., 75% of waste depth, 15 feet off the bottom, maximum depth approx. 90 to 100 feet).
4. The Draft Well Completion Schedule provided on the Construction Drawings should be used for estimating drilling depths and pipe quantities <u>only</u>. Include a note under the Draft Well Completion Schedule.

   This draft well completion schedule is not intended for construction, until actual survey data is obtained and the well completion schedule is revised by the design engineer.

5. Have second person review the well completion schedule, including checking coordinates, elevations, and calculations.
6. Never plan to drill through a landfill bottom into soil below (with or without a liner).

CONSTRUCTION QUALITY ASSURANCE ACTIVITIES

1. Obtain the services of a professional land surveyor to stake the well field and to obtain the actual ground elevation at each well location. [Note: The surveyor may be hired by SCS during the design-phase or as part of our CQA services. In some cases, the Contractor or Owner may procure the services of the surveyor.]. Do not rely on GPS survey information.

2. The surveyed elevations should be written on the stakes in the field by the surveyor along with the well ID. The surveyor should provide the survey data (northing, easting, and elevation) to the Design Engineer and CQA Consultant.

3. The surveyed ground elevations should be reviewed by the Design Engineer and the Well Completion Schedule should be revised and re-issued to the Contractor. The Final Well Completion Schedule should be "signed off" by the Design Engineer.

4. The CQA Monitor should walk the site and verify the well stakes and elevations.

5. The CQA Monitor should "sign off" on the Final Well Completion Schedule" indicating that the actual ground elevations have been incorporated into the Schedule, and the drilling depths have been reviewed.

6. The CQA Monitor should verify the math on the Well Completion Schedule to make sure it makes sense!

7. The CQA Monitor must review the Final Well Completion Schedule with the Driller and General Contractor. The Driller and General Contractor should "sign off" on the Final Well Completion Schedule" indicating that the actual ground elevations have been incorporated into the Schedule, and the drilling depths have been reviewed. If there is any question or confusion regarding the information on the Well Completion Schedule, sequencing of well construction, or any other construction details, the Design Engineer should be contacted immediately for clarification. In no case should drilling proceed until all parties are in concurrence regarding the well drilling details.

8. Once the drill rig is set up on the well, the CQA Monitor must again verify the elevation on the stake is the same as on the Final Well Completion Schedule.

9. The CQA Monitor and Driller should verify the drill depth before drilling begins.

10. If drilling accidently goes through the bottom of a landfill (with or without a liner), the boring hole should be grouted back to at least to the refuse bottom The SCS Client Manager should be immediately contacted in order to coordinate with the Client and regulatory agencies if necessary regarding any further remedial measures.

ATTACHMENT C

Pipe sizing Calculations

SCS ENGINEERS

SHEET 1 of 1

CLIENT	PROJECT	JOB NO.
Blue Source	Johnston County Landfill	02210301.00

SUBJECT	BY	DATE
Pipe Sizing	J Morgan	1/31/2011
	CHECKED	DATE
	S Lamb	2/1/2011

OBJECTIVE: Calculate the appropriate pipe size for various sections of header pipe

APPROACH: Pipe sizing guideline: less than one inch of pressure drop per 100 linear feet.
The piping network is divided into four sections of pipe for pipe sizing as seen below.
The current or maximum Landfill Gas Recovery Estimate Tables (attached) were used to estimate the flow that would travel through each section and Table 1 was constructed to illustrate the results. Each section has been illustrated on the map with the letters shown below.

SOLUTION:

(Section 1) Phase 3/4A to EW-400 (A to B)

Using a distance of 900 linear feet and the flow from the recovery model for these sections, the pressure drop is calculated using the Spitzglass equation as seen in Table 1.
Only the 12 inch pipe has less than one inch of pressure drop per 100 ft.

12 in pipe

(Section 2) Phase 4 to EW-400 (C to B)

Using a distance of 800 linear feet and the flow from the recovery model from Phase 4, the pressure drop is calculated using the Spitzglass equation as seen in Table 1.
The 8, 10, and 12 inch pipe sizes all have a pressure drop of less than one inch. However to provide future capacity for flow from phase 4A and a more structurally robust pipe a 10 inch pipe was chosen.

10 in pipe

(Section 3) EW-400 to the Flare (B to D)

Using a distance of 1,250 linear feet and the combined flow for sections 1 and 2, the pressure drop is calculated using the Spitzglass equation as seen in Table 1.
Only the 12 inch pipe has less than one inch of pressure drop per 100 ft.

12 in pipe

(Section 4) Phase 5 to the Flare (E to D)

Using a distance of 900 linear feet and the flow from the recovery model for Phase 5 the pressure drop is calculated using the Spitzglass equation as seen in Table 1.
The 10 inch pipe has less than one inch of pressure drop per 100 ft.

10 in pipe

TABLE 1
LANDFILL GAS COLLECTION SYSTEM
HEADER LINE SIZING
Johnston County Landfill Pipeline

Assumptions:

Pipe sizing guideline - pressure drop/100 feet should be less than 1 inch of water column (wc)

	Flow Points From	Flow Points To	Design Flow (cfm)	Factor of Safety	Adjusted Design Flow (cfm)	Pipe Inside Diameter (in.) [2]	Nominal Pipe Size (in.) [2]	Total L (ft)	Delta P (in. wc)	Cumulative Delta P (in. wc)	Pressure Drop per 100 ft (in. wc)
A to B	Phase 3/4A	EW-400	1,093	1.5	1,640	7.55	8	900	35.02	35.02	3.89
	Phase 3/4A	EW-400	1,093	1.5	1,640	9.41	10	900	11.38	11.38	1.26
	Phase 3/4A	EW-400	1,093	1.5	1,640	11.16	12	900	4.83	4.83	0.54
C to B	Phase 4	EW-400	63	3	189	7.55	8	800	0.41	0.41	0.05
	Phase 4	EW-400	63	3	189	9.41	10	800	0.13	0.13	0.02
	Phase 4	EW-400	63	3	189	11.16	12	800	0.06	0.06	0.01
B to D	EW-400	Flare	1,156	1.5	1,734	7.55	8	1250	54.41	54.41	4.35
	EW-400	Flare	1,156	1.5	1,734	9.41	10	1250	17.68	17.68	1.41
	EW-400	Flare	1,156	1.5	1,734	11.16	12	1250	7.50	7.50	0.60
E to D	Phase 5	Flare	226	1.5	339	7.55	8	300	0.50	0.50	0.17
	Phase 5	Flare	226	1.5	339	9.41	10	300	0.16	0.16	0.05
	Phase 5	Flare	226	1.5	339	11.16	12	300	0.07	0.07	0.02

[2]

SDR 17

IPS Pipe Size (in.)	ID (in.)
4	4
6	6
8	7.550
10	9.410
12	11.160
14	12
16	14
18	16
20	18
22	19
24	21

ID Measurements are Plexco Piping Standard ID's
From Plexco Piping Systems Manual

Specific Gravity LFG 0.65

Spitzglass Equation

$$Q_h = \frac{3350}{S_g^{0.5}}\left(\frac{h_1 - h_2}{L}\right)^{0.5}\left(\frac{d^5}{1 + \frac{3.6}{d} + 0.03\,d}\right)^{0.5} \qquad (4\text{-}44)$$

where terms are as defined above, and

h_1 = inlet pressure, in H_2O
h_2 = outlet pressure, in H_2O

Q_h = flow, standard ft^3/hour
S_g = gas specific gravity
p_1 = inlet pressure, lb/in^2 absolute
p_2 = outlet pressure, lb/in^2 absolute
L = length, ft
d = pipe bore, in

Johnston County, NC Phase III
Preliminary Gas Recovery Estimates

	Disposal Rate	Refuse In-Place	LFG Recovery Potential			LFG System Coverage	LFG Recovery from Existing and Planned System			
Year	(tons/yr)	(tons)	(scfm)	(mmcf/day)	(mmBtu/yr)	(%)	(scfm)	(MMBtu/hr)	(MW)	(MTCO2e/yr)
1979	47,800	47,800	0	0.00	0	0%	0	0	0	0
1980	52,000	99,800	48	0.07	12,840	0%	0	0	0	0
1981	55,000	154,800	97	0.14	25,679	0%	0	0	0	0
1982	58,000	212,800	144	0.21	38,196	0%	0	0	0	0
1983	61,000	273,800	190	0.27	50,419	0%	0	0	0	0
1984	64,000	337,800	235	0.34	62,373	0%	0	0	0	0
1985	0	337,800	279	0.40	74,082	0%	0	0	0	0
1986	0	337,800	254	0.37	67,571	0%	0	0	0	0
1987	0	337,800	232	0.33	61,632	0%	0	0	0	0
1988	0	337,800	211	0.30	56,214	0%	0	0	0	0
1989	0	337,800	193	0.28	51,274	0%	0	0	0	0
1990	0	337,800	176	0.25	46,767	0%	0	0	0	0
1991	0	337,800	160	0.23	42,656	0%	0	0	0	0
1992	68,578	406,378	146	0.21	38,907	0%	0	0	0	0
1993	74,151	480,529	203	0.29	53,908	0%	0	0	0	0
1994	72,961	553,490	260	0.37	69,088	0%	0	0	0	0
1995	78,095	631,585	311	0.45	82,614	0%	0	0	0	0
1996	95,004	726,589	362	0.52	96,331	0%	0	0	0	0
1997	91,004	817,593	426	0.61	113,383	0%	0	0	0	0
1998	0	817,593	481	0.69	127,863	0%	0	0	0	0
1999	0	817,593	439	0.63	116,624	0%	0	0	0	0
2000	0	817,593	400	0.58	106,374	0%	0	0	0	0
2001	0	817,593	365	0.53	97,024	0%	0	0	0	0
2002	0	817,593	333	0.48	88,496	0%	0	0	0	0
2003	0	817,593	304	0.44	80,718	0%	0	0	0	0
2004	0	817,593	277	0.40	73,623	0%	0	0.0	0.0	0
2005	0	817,593	252	0.36	67,152	0%	0	0.0	0.0	0
2006	0	817,593	230	0.33	61,250	0%	0	0.0	0.0	0
2007	0	817,593	210	0.30	55,866	0%	0	0.0	0.0	0
2008	0	817,593	192	0.28	50,956	0%	0	0.0	0.0	0
2009	0	817,593	175	0.25	46,477	0%	0	0.0	0.0	0
2010	0	817,593	159	0.23	42,392	0%	0	0.0	0.0	0
2011	0	817,593	145	0.21	38,666	85%	124	3.8	0.4	11,316
2012	0	817,593	133	0.19	35,267	85%	113	3.4	0.3	10,321
2013	0	817,593	121	0.17	32,168	85%	103	3.1	0.3	9,414
2014	0	817,593	110	0.16	29,340	85%	94	2.8	0.3	8,587
2015	0	817,593	101	0.14	26,761	85%	86	2.6	0.3	7,832
2016	0	817,593	92	0.13	24,409	85%	78	2.4	0.2	7,144

Johnston County, NC Phase IVA
Preliminary Gas Recovery Estimates

	Disposal Rate	Refuse In-Place	LFG Recovery Potential			LFG System Coverage	LFG Recovery from Existing and Planned System			
Year	(tons/yr)	(tons)	(scfm)	mmcf/day	(mmBtu/yr)	(%)	(scfm)	MMBtu/hr	(MW)	(MTCO2e/yr)
2003	50,274	50,274	0	0.00	0	0%	0	0.0	0.0	0
2004	106,126	156,400	51	0.07	13,504	0%	0	0.0	0.0	0
2005	109,287	265,686	154	0.22	40,825	0%	0	0.0	0.0	0
2006	111,753	377,439	250	0.36	66,593	0%	0	0.0	0.0	0
2007	113,489	490,928	341	0.49	90,758	0%	0	0.0	0.0	0
2008	103,501	594,429	426	0.61	113,266	0%	0	0.0	0.0	0
2009	108,759	703,188	493	0.71	131,113	0%	0	0.0	0.0	0
2010	108,760	811,948	560	0.81	148,803	0%	0	0.0	0.0	0
2011	108,760	920,708	620	0.89	164,939	75%	465	14.1	1.4	42,592
2012	108,760	1,029,468	676	0.97	179,656	63%	424	12.9	1.3	38,849
2013	108,760	1,138,228	726	1.05	193,080	53%	387	11.7	1.2	35,434
2014	108,760	1,246,988	772	1.11	205,324	75%	579	17.6	1.7	53,021
2015	108,760	1,355,748	814	1.17	216,492	65%	528	16.0	1.6	48,361
2016	108,760	1,464,508	852	1.23	226,678	57%	482	14.6	1.4	44,110
2017	108,760	1,573,268	887	1.28	235,969	75%	665	20.2	2.0	60,935
2018	108,760	1,682,028	919	1.32	244,444	66%	607	18.4	1.8	55,579
2019	11,070	1,693,098	948	1.37	252,173	58%	554	16.8	1.6	50,693
2020	0	1,693,098	876	1.26	232,982	85%	745	22.6	2.2	68,185
2021	0	1,693,098	799	1.15	212,504	85%	679	20.6	2.0	62,192
2022	0	1,693,098	729	1.05	193,826	85%	619	18.8	1.8	56,726
2023	0	1,693,098	665	0.96	176,790	85%	565	17.2	1.7	51,740
2024	0	1,693,098	606	0.87	161,251	85%	515	15.6	1.5	47,192
2025	0	1,693,098	553	0.80	147,078	85%	470	14.3	1.4	43,044
2026	0	1,693,098	504	0.73	134,150	85%	429	13.0	1.3	39,261
2027	0	1,693,098	460	0.66	122,359	85%	391	11.9	1.2	35,810
2028	0	1,693,098	420	0.60	111,604	85%	357	10.8	1.1	32,662
2029	0	1,693,098	383	0.55	101,795	85%	325	9.9	1.0	29,792
2030	0	1,693,098	349	0.50	92,848	85%	297	9.0	0.9	27,173

948 + 145 = 1093 cfm

A to B

FOR C-B

Johnston County, NC Phase IV
Preliminary Gas Recovery Estimates

	Disposal Rate	Refuse In-Place	LFG Recovery Potential			LFG System Coverage	LFG Recovery from Existing and Planned System			
Year	(tons/yr)	(tons)	(scfm)	mmcf/day	mmBtu/yr	(%)	(scfm)	(MMBtu/hr)	(MW)	MTCO2e/yr
1985	33,000	33,000	0	0.00	0	0%	0	0	0	0
1986	68,000	101,000	33	0.05	8,864	0%	0	0	0	0
1987	69,000	170,000	99	0.14	26,351	0%	0	0	0	0
1988	70,000	240,000	160	0.23	42,570	0%	0	0	0	0
1989	70,940	310,940	217	0.31	57,631	0%	0	0	0	0
1990	72,050	382,990	269	0.39	71,621	0%	0	0	0	0
1991	70,050	453,040	318	0.46	84,680	0%	0	0	0	0
1992	0	453,040	361	0.52	96,054	0%	0	0	0	0
1993	0	453,040	329	0.47	87,611	0%	0	0	0	0
1994	0	453,040	300	0.43	79,911	0%	0	0	0	0
1995	0	453,040	274	0.39	72,887	0%	0	0	0	0
1996	0	453,040	250	0.36	66,480	0%	0	0	0	0
1997	0	453,040	228	0.33	60,637	0%	0	0	0	0
1998	0	453,040	208	0.30	55,307	0%	0	0	0	0
1999	0	453,040	190	0.27	50,446	0%	0	0	0	0
2000	0	453,040	173	0.25	46,012	0%	0	0	0	0
2001	0	453,040	158	0.23	41,968	0%	0	0	0	0
2002	0	453,040	144	0.21	38,279	0%	0	0	0	0
2003	0	453,040	131	0.19	34,915	0%	0	0	0	0
2004	0	453,040	120	0.17	31,846	0%	0	0	0	0
2005	0	453,040	109	0.16	29,047	0%	0	0	0	0
2006	0	453,040	100	0.14	26,494	0%	0	0	0	0
2007	0	453,040	91	0.13	24,165	0%	0	0	0	0
2008	0	453,040	83	0.12	22,041	0%	0	0	0	0
2009	0	453,040	76	0.11	20,104	0%	0	0	0	0
2010	0	453,040	69	0.10	18,337	70%	48	1.5	0.1	0
2011	0	453,040	63	0.09	16,725	70%	44	1.3	0.1	4,031
2012	0	453,040	57	0.08	15,255	70%	40	1.2	0.1	3,677
2013	0	453,040	52	0.08	13,914	70%	37	1.1	0.1	3,354
2014	0	453,040	48	0.07	12,691	70%	33	1.0	0.1	3,059
2015	0	453,040	44	0.06	11,576	70%	30	0.9	0.1	2,790
2016	0	453,040	40	0.06	10,558	70%	28	0.8	0.1	2,545
2017	0	453,040	36	0.05	9,630	70%	25	0.8	0.1	2,321
2018	0	453,040	33	0.05	8,784	70%	23	0.7	0.1	2,117
2019	0	453,040	30	0.04	8,012	70%	21	0.6	0.1	1,931
2020	0	453,040	27	0.04	7,308	70%	19	0.6	0.1	1,761
2021	0	453,040	25	0.04	6,665	70%	18	0.5	0.1	1,606
2022	0	453,040	23	0.03	6,079	70%	16	0.5	0.0	1,465
2023	0	453,040	21	0.03	5,545	70%	15	0.4	0.0	1,336
2024	0	453,040	19	0.03	5,058	70%	13	0.4	0.0	1,219
2025	0	453,040	17	0.02	4,613	70%	12	0.4	0.0	1,112
2026	0	453,040	16	0.02	4,208	70%	11	0.3	0.0	1,014
2027	0	453,040	14	0.02	3,838	70%	10	0.3	0.0	925
2028	0	453,040	13	0.02	3,501	70%	9	0.3	0.0	844
2029	0	453,040	12	0.02	3,193	70%	8	0.3	0.0	770
2030	0	453,040	11	0.02	2,912	70%	8	0.2	0.0	702

Fork E to D

Johnston County, NC Phase V
Preliminary Gas Recovery Estimates

	Disposal Rate	Refuse In-Place	LFG Recovery Potential			LFG System Coverage	LFG Recovery from Existing and Planned System			
Year	(tons/yr)	(tons)	(scfm)	(mmcf/day)	(mmBtu/yr)	(%)	(scfm)	(MMBtu/hr)	(MW)	(MTCO2e/yr)
1997	45,502	45,502	0	0.00	0	0%	0	0	0	0
1998	79,428	124,930	46	0.07	12,223	0%	0	0	0	0
1999	95,761	220,691	122	0.18	32,484	0%	0	0	0	0
2000	92,141	312,832	208	0.30	55,352	0%	0	0	0	0
2001	91,475	404,307	283	0.41	75,237	0%	0	0	0	0
2002	95,430	499,737	350	0.50	93,196	0%	0	0	0	0
2003	50,274	550,010	416	0.60	110,639	0%	0	0	0	0
2004	0	550,010	430	0.62	114,418	0%	0	0	0	0
2005	0	550,010	392	0.57	104,362	0%	0	0	0	0
2006	0	550,010	358	0.52	95,189	0%	0	0	0	0
2007	0	550,010	326	0.47	86,822	0%	0	0	0	0
2008	0	550,010	298	0.43	79,191	0%	0	0	0	0
2009	0	550,010	272	0.39	72,230	0%	0	0	0	0
2010	0	550,010	248	0.36	65,882	0%	0	0	0	0
2011	0	550,010	226	0.33	60,091	85%	192	6	0.6	17,586
2012	0	550,010	206	0.30	54,809	85%	175	5	0.5	16,041
2013	0	550,010	188	0.27	49,992	85%	160	5	0.5	14,631
2014	0	550,010	171	0.25	45,598	85%	146	4	0.4	13,345
2015	0	550,010	156	0.23	41,590	85%	133	4	0.4	12,172
2016	0	550,010	143	0.21	37,935	85%	121	4	0.4	11,102
2017	0	550,010	130	0.19	34,600	85%	111	3	0.3	10,126
2018	0	550,010	119	0.17	31,559	85%	101	3	0.3	9,236
2019	0	550,010	108	0.16	28,785	85%	92	3	0.3	8,424
2020	0	550,010	99	0.14	26,255	85%	84	3	0.2	7,684
2021	0	550,010	90	0.13	23,947	85%	77	2	0.2	7,009
2022	0	550,010	82	0.12	21,843	85%	70	2.1	0.2	6,393
2023	0	550,010	75	0.11	19,923	85%	64	1.9	0.2	5,831
2024	0	550,010	68	0.10	18,172	85%	58	1.8	0.2	5,318
2025	0	550,010	62	0.09	16,574	85%	53	1.6	0.2	4,851
2026	0	550,010	57	0.08	15,118	85%	48	1.5	0.1	4,424
2027	0	550,010	52	0.07	13,789	85%	44	1.3	0.1	4,035
2028	0	550,010	47	0.07	12,577	85%	40	1.2	0.1	3,681
2029	0	550,010	43	0.06	11,471	85%	37	1.1	0.1	3,357
2030	0	550,010	39	0.06	10,463	85%	33	1.0	0.1	3,062

ATTACHMENT D

Leak Testing Guidelines

PIPE LEAK TESTING GUIDELINES

PIPE TESTING

A. All PE pipes shall be subjected to an air test as described herein to detect any leaks in the piping. Testing shall be performed below grade (inside the trench). The CONTRACTOR shall be responsible for locating, uncovering (if previously backfilled), and repairing any leaks detected during testing.

B. The pipe segment to be tested shall be allowed time to reach constant and/or ambient temperature before initiating the test.

C. Tests shall be performed during periods when the pipe segments will be out of direct sunlight when possible; i.e., early morning, late evening, or cloudy days. This will reduce the pressure changes that will occur due to temperature fluctuations.

D. The test pressure shall be 4 psig (110.8 inches, w.c.) and the CONTRACTOR shall use a digital gauge.

E. Pressure drop during the test shall not exceed one percent of the testing gauge pressure over a period of one hour. This pressure drop shall be corrected for temperature changes before determining pass or failure. (See Section 3.10 for test failures). The ENGINEER shall sign off on the test form to indicate test compliance.

F. The ENGINEER shall be notified prior to commencement of the testing procedure and shall be present during the test.

G. Equipment for this testing procedure shall be furnished by the CONTRACTOR. This shall consist of a polyethylene flange adapter with a blind flange. Tapped and threaded into the blind flange will be a temperature gauge 0 to 100 degrees C: a Schraeder tire valve to facilitate pressurization with an air compressor hose; a ball valve to release pipe pressure upon completion of the test; and a pressure measuring device. The pressure measuring device shall be a digital manometer capable of measuring positive or differential pressures of air and other non-corrosive gasses over a range of 0 to 199.9 in-w.c., Model No. 475-3 (manufactured by Dwyer Instruments, Inc., 219-879-8000), or approved equal.

TEST FAILURE

A. The following steps shall be performed when a pipe segment fails the one percent - one-hour test described in Section 3.9 F above.

1. The pipe and all fusions shall be inspected for cracks, pinholes, or perforations.

2. All blocked risers and capped ends shall be inspected for leaks.

3. Leaks shall be located and/or verified by applying a soapy water solution and observing soap bubble formation.

A. All pipe and fused joint leaks shall be repaired by cutting out the leaking area and re-fusing the pipe.

B. After all leaks are repaired, a retest shall be performed in accordance with Section 3.9.

END OF SECTION

From: Mussler, Ed
To: Lamb, Steve;
Subject: RE: LFGCCS project, Johnston County Landfill, Permit # 51-03
Date: Monday, February 28, 2011 11:11:50 AM

That is acceptable. Interim operation of the landfill gas system and flare has never been a question, and you have been the first to raise the issue. In the future we will make it clear that interim operation is acceptable pending submittal of the final documentation. Let us know if we can be of further assistance.
Ed Mussler

From: Lamb, Steve [mailto:SLamb@scsengineers.com]
Sent: Wednesday, February 23, 2011 5:45 PM
To: Mussler, Ed
Subject: LFGCCS project, Johnston County Landfill, Permit # 51-03

Ed:

Thanks for talking to me yesterday about the GCCS at Johnston County. As I mentioned on the phone, we take exception to some of the items in Ming's letter (attached).

As stated in Ming's letter..."Upon completion of the construction of LFGCCs, the SWS may grant the Landfill a final authorization to operate the constructed LFGCC system. This operating authorization will be issued pending receipt and approval of the following"

Although we are in agreement that all 6 of the items in his letter are important and will be submitted to the SWS, we feel the timely of said submittals is too restrictive, will add undue cost, and should not be required before operations. The primary concern with any GCCS is the operation of the flare, and the flare has a permit from the BAQ. For several reason, including safety, it is critical to operate the flare as soon as possible following completion of the GCCS.

What we propose is to submit items 1-6 within 4 weeks after system start up. We propose to operate the flare in accordance with its air permit as soon as construction is complete.

The project parties (Blue Source, Johnston County and SCS) are eager to begin construction on this voluntary GCCS. We hope you will consider our approach presented herein as reasonable and grant approval soon.

Thanks,

Steven C. Lamb, PE
Vice President
SCS Engineers
2520 Whitehall Park Drive, Suite 450
Charlotte, NC 28273

704-504-3107 - office
704-576-4731 - mobile

From: Morgan, J
Sent: Friday, February 18, 2011 11:16 AM
To: Lamb, Steve
Subject: Fw: approval of constructing LFGCCS project, Johnston County Landfill, Permit # 51-03

From: Chao, Ming-tai
To: Morgan, J
Cc: Whaley, Mary
Sent: Fri Feb 18 08:06:20 2011
Subject: approval of constructing LFGCCS project, Johnston County Landfill, Permit # 51-03
Dear Mr. Morgan:

Attached is the approval letter to permit Johnston County to construct the proposed landfill gas collection and control system (LFGCCs) at Johnston County Landfill Facility. The hard copy of the letter will be mailed to Mr. Broome today.

By the way, I am still waiting to receive the hard copy of revised permit modification application and full-size drawings of this LFGCCs project, which you planned to send to me two weeks ago. Have you sent them out yet?

Should have any questions of the permitting processes, please feel free to contact me.

Best regards,

Ming-Tai Chao, P.E.
Environmental Engineer II
Permitting Branch, Solid Waste Section
Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699-1646
401 Oberlin Road, Suite 150, NC 27605
Tel: 919.508.8507, Fax 919.733.4810
ming.chao@ncdenr.gov
http://portal.ncdenr.org/web/wm/sw

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

Environmental Consultants
and Contractors

SCS Engineers, P.C.
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273-3557

704 504-3107
FAX 704 504-3174
www.scsengineers.com

SCS ENGINEERS, PC

January 14, 2011
File No. 02210304.00

Mr. Ming-Tai Chao
NCDENR, Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699

Subject: Response to comments, Permit Modification
Johnson County Landfill Gas Collection and Control System Project

Dear Ming-Tai Chao:

A solid waste permit modification for the installation of a voluntary landfill gas collection and control system (GCCS) was submitted to the Division of Waste Management (DWM), Solid Waste Section (SWS) on behalf of the Johnson County MSW and C&D Landfill Facility (Landfill). The parties involved in the voluntary GCCS project include Blue Source and SCS Engineers (the "Development Team"). The Development Team will finance, design, permit, build, commission, own, operate, and maintain the voluntary GCCS. This project is a "design-build" project.

Previously in North Carolina similar voluntary GCCS projects have been developed with minimal comments from the SWS. Past projects only required the applicable air permit for the construction and operation of the flare in accordance with the Division of Air Quality (DAQ), and a straight forward notification to the SWS. Based on our experience with the previous similar projects, the response letter from the SWS for the Johnston County project indicates a more active and enhanced role by the SWS for voluntary GCCS projects. Several comments in your letter we take exception with and do not know the regulatory basis for such comments.

This is a voluntary greenhouse gas emission reduction project and the proper operation of the gas collection system is needed for it to be successful. Therefore, the County and the Development Team have an inherent interest in keeping the system operating properly.

This response letter has been reviewed and approved by Johnston County. We are planning to begin construction in January and trust our responses herein will allow this project to move forward in a timely manner.

Your comments (contained in a letter dated December 9, 2010) are provided below in *italics* followed by our responses in **bold**.

1. *(LFG Extraction Wells, on page 2) Please address the following comments:*

   i. *Provide the construction project specifications as appendices of the permit application. The specifications include, but not limited to, gas well installation (safety, provisions to handle obstruction while drilling, etc.) and completion (well logs and decontamination), the gas well abandonment/capping.*

   As stated above this project is a design-build project and as such, written specifications were not prepared. SCS will construct this system in accordance with their internal safety procedures that have been developed through SCS's experience in the design and construction of these systems at hundreds of landfills nationwide.

   ii. *The wells located in the active filling area are expected to encounter leachate due to the vertical expansions at the existing phases in the future. Therefore, the coarse aggregates backfilled between the borehole and well casing must be tested of the calcium carbonate content and the grain size analysis to confirm the aggregate gradations. The maximum amount of the calcium carbonate content must be specified in the specification. The specification shall also include test methods and frequencies of the grain size analysis and measurement of calcium content.*

   A grain size analysis is routinely performed by SCS on design-build projects. Grain-size testing may be performed as deemed necessary by the Certifying Engineer. A note that addresses grain size testing will be added to Drawing No. 4. not available

   1 test (ASTM D421) / 350 yd³ ?

   SCS is unaware of any LFG extraction well that was properly designed, installed, and maintained that has been impacted by leachate reacting with the well aggregate backfill. Based on review of the local aggregate supply, there is no concern with calcium carbonate content in the well backfill materials planned to be used. In our professional opinion, we do not feel testing the aggregate backfill for calcium carbonate content is needed.

   This project is voluntary and only benefits the parties involved if it maximizes the safe recovery of LFG.

   iii. *Prior to installing extraction wells, if JCL is accepting and has accepted asbestos containing materials....report.*

   The Health Hazards Control Unit of the Division of Public Health has been contacted and provided the required documentation. A copy of the documentation and approval will be included in the construction documentation report. not available

   ?

iv. *In addition to the extraction gas wells, the coordinates of the other LFGCCs components including the alignment of the header pipe, buried control valves, and sumps must be surveyed by a surveyor licensed in the State of North Carolina; and the final locations must be presented in the as-built drawings. Please add these requirements to this section.*

Although we are unaware of any solid waste regulation that requires this survey, SCS will survey pertinent components of the GCCS. The components will be shown on the as-built drawings. GCCS components may be field located using GPS and/or the services of a licensed surveyor.

2. *(LFG Header and Lateral Piping on Page 3) Please address the following concerns:*

i. *Please describe the estimated gas flow rates and capacities of the current and future LFGCCs based on the described SCS model.*

A calculation for sizing the proposed current primary header pipes has been added to the permit modification submittal. Calculations for future pipes are not available.

ii. *Please describe the existing closure cover system at Phase 3 and 4 –clay liner, synthetic composite liner, or two-foot thick soil layer.*

Phase 3 was closed in accordance with the pre-1998 regulations with a 2-ft thick soil cover and a small top portion which includes a GCL.

Phase 4 does have a final cover system which consists of a flexible membrane liner (FML) covered by 18" of vegetative soil. No drilling will be performed in Phase 4. Pipe installation will only occur within the 18" soil layer.

iii. *If the prescribed cover system (clay liner or synthetic composite liner) should be damaged while excavation of trench, what provisions (repair approaches, QC testing methods and frequencies, etc.) are there to ensure the final cover system can be properly restored? Please clarify.*

In the unlikely event the prescribed cover system is damaged in Phase 4, the final cover will be prepared in like and kind in accordance with the original design plans and CQA plans.

iv. *Will the condensate flow by gravity in the header/lateral piping? If so, please specify the minimum pipe slope/gradient (post settlement).*

Yes, condensate will flow by gravity within the header/lateral piping. The typical slope is 3 percent. The minimum slope is 1 percent. A note has been added to Drawing 3 to clarify slope/gradient requirements.

Calculating potential settlement for purposes of LFG header/lateral design is cumbersome, burdensome, and does not guarantee future settlement will not impact condensate movement. If future settlement impacts the operation of the header/lateral pipe, the watered-in pipes will be repaired or replaced.

v. *Please provide the specification for testing leakage and air-tightness of the solid piping (header and leachate/condensate piping).*

As previously stated technical specifications were not prepared for this project since it was structured to be a design/build project. The standard pressure testing guideline we use at SCS (and will use on this project also) is pressurizing gas and leachate piping to 5 psi for 4 hour. This procedure will be added as a note to Drawing 3.

vi. *To mitigate nuisances (such as vector, odor, etc..) and maintain dry condition of the open trench, please specify (a) the maximum length of trench (such as 200 feet) may be opened in advance of pipe installation in the landfill units and (b) the open trench shall be backfilled at the end of each workday.*

The maximum length of trench open at one time will be limited to 1,000 feet. All trenches must be backfilled at the end of the day. Both of these guidelines are standards in the industry and will be followed by SCS during construction.

3. *(Condensate Management, on Page 3) Please address the following concerns:*

i. *Does the sump pump have overfill alarm/prevention and auto shut off devices, which can't be found in the Condensate Sump Detail on Drawing No. 6 of 6?*

No.

ii. *If the answer in the comment i in the subparagraph is "No". Please describe the spill prevention plan. The Phases 3 & 4 are unlined landfills; therefore, the condensate can's be drained back to the wastes in these two areas in compliance the requirement stated in Rule .1626(9)(a)(2).*

There is no spill prevention plan and in our professional opinion a spill prevention plan is not necessary because of the design of the sump. If the pump should fail, condensate will collect in the sump and eventually cause a "blockage" in the header pipe. The blockage will essentially prohibit landfill gas from moving through the sump; thereby stopping the production of condensate. The sump is deep enough to prevent the possibility to over flow with condensate.

iii. *Pursuant to Rule .1626(9)(a)(2), the force mains inside the unlined landfill footprint must be dual contained. Please revise the context accordingly.*

We agree. A note was added to Drawing No. 3.

iv. *Will there be scheduled or routine inspection of the condensate sump? This inspection plan can be incorporated into the existing Operations Plan.*

Prior to operating the GCCS, Johnston County will modify their existing Operations Plan to cover routine inspection activities for components of the GCCS in accordance with the solid waste regulations.

4. *(Blower/Flare Station, on page 3) Please describe the LFG control system and emergency shutdown of the system.*

   SCS is not aware of this request from SWS on any previous GCCS installed in North Carolina. The flare manufacturer provides a comprehensive Operations and Maintenance Manual that contains information of the control systems, emergency shutdowns, and maintenance requirements. These manuals are extensive and specific to the system installed at the landfill.

   The blower/flare station planned for this landfill will have a safety interlock system that will automatically shutdown the blower if no flame is present in the flare. Providing the complete system design and emergency shutdown procedures in this response would be extensive. When the blower/flare station is installed, a copy of the operation and maintenance manual, which includes emergency shut-down procedures, will be kept on-site.

   The construction and operation of the flare is permitted through the NCDENR, Division of Air Quality. A copy of the Permit-to-Construct application and DAQ approvals will be included in the Construction Documentation Report.

5. *(Existing Permitted Cap, on page 4) The DWM records show the Phases 3 and 4 were originally proposed to close by constructed two-feet-thick soil. On August 4, 1998 DWM approved the alternative final cap design for Phases 3 and 4 which included for Phase 4, on top portions of the landfill, a geomembrane will be installed; for Phase 3, on the top portion, a GCL will be installed. Soil will be used on the side slopes. In 1999 the construction completed; and the deck portion of the Phase 3 cover system consisted of a GCL and drainage composite layer overlain by 18-inch thick top soil. Phase 4 cap consisted of 12-mil geomembrane overlain by 18-inch thick top soil. Based on the findings the SWS requests County address the following concerns:*

   i. *The plan proposes that the header pipe trench will be 2 to 3 feet deep and installed above the synthetic liner with the vegetative soil layer as described in this section, LFG Header and Lateral Piping" and on the "Pipe Trench Detail" – Drawing no. 5 of 6. Since the vegetation layer is approximately 18-inch thick, please explain how the proposal can be implemented in the field without damaging the liners?*

      Where header pipe is installed over areas with final cover, the pipe will be installed above the FML or GCL, regardless of soil depth. Additional grading may be necessary in areas where the soil layer is approximately 18 inches to ensure proper storm water runoff and management.

   ii. *Since gas extraction wells will be installed in the Phase 3 & 4 areas, the synthetic cover systems (FML and GCL) will likely be penetrated, if wells are not located on side slope areas. Therefore, please provide details of the connections (boots) and seals around the well casing and liners on Drawing 4 of 6.*

No extraction wells are proposed in Phase 4. There are existing wells in this phase that will be used for LFG extraction. In addition, there are existing horizontal collectors installed underneath the Phase 4A bottom liner system that will be used for LFG extraction.

All wells installed in 3 will be located outside the final cover limits and no GCL will be penetrated.

iii. *If the portions of the liners are expected to be damaged or removed during the trench excavation, please provide specifications for restoration of cap (final cover) including material, construction procedures, & QA/QC testing (methods and frequency) which are consistent with the previously approved closure plans.*

No portion of the liners is expected to be damaged or removed during any activities associated with this project. If damage does occur, the liners will be repaired according to the design plans provided by RSG Engineers.

6. *Please provide a section that describes how the operating LFGCCs and LFGTE project will properly be coordinated with the active fill operations. The section needs to include, but not limited to the following information:*

We do not feel adding a "section" to the permit modification submittal to address this comment should be required. We offer the following responses to provide clarity to the SWS:

i. *Restricted access and security to the blower/flare station, engines, and apparatus.*

The landfill is restricted to the public; therefore the GCCS will be restricted to the public.

A fence will be installed around the blower/flare station.

ii. *A detailed emergency response plan for a landfill fire and/or natural disaster. The plan should include provisions to train landfill employees in the proper response to a fire or inclement weather, specifically step to be taken concerning the LFGCCs and LFGTE.*

The blower/flare station is designed with an automatic safety interlock system that will shut the system down in case of irregular operation. Additionally, the blower/flare station will incorporate a system to alert the County, SCS field personnel, and BlueSource if a malfunction occurs. County Management personnel are trained in emergency response and crisis management.

iii. *Descriptions of how the presence of the gas collection system will be coordinated with the operation of the landfill units. For example, will gas well be vertical extended in the active cell in coordination with the fill operation in the future vertical expansion? Protection measures to be implemented to protect the wells from filing operation.*

The wells proposed for this project are at or near final grade. In the event a well needs to be raised, the well will be raised in accordance with industry standards and future well expansions will be coordinated with landfill operations.

iv. *Descriptions of the routine maintenance requirements of the LFGCCs and LFGTE project.*

SCS is not aware of any regulation that requires the County to provide this information. Routine maintenance requirements are not available at this time.

The LFGTE project is still in the planning process, therefore no information is available at this time.

v. *Descriptions of the party (County or the contractor) will be in charge of the operations of the LFGCCs and LFGTE and operator's credentials. If County will contact third party to operate & manage the LFGCCs and LFGTE, please describe the contractor responsibilities and contact information. it is advised that the SWS will hold the County responsible, as permittee of the landfill, for any problems or violations at the landfill, even if the problems or violations are performed by a contractor on the property.*

This information is not available at this time. Once the systems are constructed and operational, they will be operated by a qualified company. The County is aware of their responsibility as the permit holder for the Landfill.

vi. *Record keeping requirements pertain to LFGCCs and LFGTE; records and reports must be placed in the facility operating records ready for agencies' audit.*

Record keeping requirements for the flare are stipulated in the Permit to Construct provided by NCDENR Division of Air Quality and will also be provided in the facility's Title V Air Operating Permit. All record keeping requirements contained in these documents will be maintained in accordance with the regulations.

SCS is not aware of any other regulation that requires record keeping for voluntary GCCS. Once the facility is under the jurisdiction of the NSPS, the NSPS record keeping requirements will be followed.

It should be noted that a sophisticated system control and data acquisition system is planned for this system to record numerous data in order to qualify for a greenhouse gas emission reduction project and for the Federal greenhouse gas monitoring requirements.

7. *Provide a section describe how the installation and presence of the LFGCCS will be coordinated with the closure of the existing units. Or, should the operating of LFGCCs be extended to the post-closure period of the landfill, the existing Post Closure Plan for JCL must be modified by adding a new plan defining the steps necessary to*

decommissioning the wells, piping (..), sumps, and the blower/flare station at the end of their useful life. The costs associated with the decommissioning activities must be added to the cost estimates for either closure or the post-closure cares. JC must rectify the final cost amounts in the annual financial assurance.

We do not feel adding a "section" to the permit modification submittal to address this comment should be required. We offer the following responses to provide clarity to the SWS:

When portions of the landfill are closed, the presence of the wells will be considered and proper engineering performed. At this time, it is not practical to address landfill closures for a GCCS installation.

Costs associated with the gas system will be added to the closure and the post closure financial assurance estimates by Johnston County, as needed, and in accordance with the solid waste regulations.

8. *Please describe the construction completion report which will be signed, sealed, and certified by a professional engineer registered in the State of North Carolina and submitted to the DWM after the project is completed. In a minimum the report must include:*

   i. *Brief descriptions of the project activities, scheduled and all involved parties.* ✓

   ii. *Descriptions of variances or deviations from the proposed plan*

   iii. *Copies of approval letters (including the one described in Comment No. 1.iii) and/or permit documents*

   iv. *As-built drawings including survey coordinates of gas wells, valves, sumps and piping gradient.*

   v. *Well completion logs and final well completion schedule.* ✓

   vi. *Certified pipe test results.* ✓

   vii. *QA/QC testing report for the cover restoration, if required.* ✓

   viii. *A series of color photographs to document the major project features.* ✓

   ix. *Operation, Maintenance, and Inspection Plan for LFGCCs and LFGTE.*

   x. *Provide a schedule for submitting the construction completion report. The SWS suggests a 30-day after the construction is complete.* ✓

A Construction Documentation Report will be prepared to include the above referenced items with the exception of comment ix. A Plan will be kept on site that includes information related to operation, maintenance, and inspection of the GCCS. As stated previously, nothing is available for the LFGTE yet.

Upon approval of the construction completion report, the SWS will grant County an authorization to operate LFGCCs and/or LFGTE.

The blower/flare station will be installed, constructed, and operated in accordance with the DAQ regulations and the facility's Title V Permit. We are not aware of any specific solid waste regulation that requires authorization by the SWS for operation of a voluntary GCCS.

From a practical standpoint, as soon as the GCCS is completed, it needs to be operated. The SWS cannot expect all of the contractors (electrical, flare, general) to leave the site, wait on approval from SWS to operate, and then re-mobilize back to the site weeks later to turn the system on.

It is our position that the flare can operated as soon as it is installed in accordance with the terms and conditions contained in the Permit to Construct issued by the NCDENR DAQ and waiting for "approval" of the Construction Documentation Report by the SWS is not needed.

9. *During the course of the project, what provision are there to prevent the disturbed soil cover from erosion due to stormwater runoff and to restore vegetation covers? Please clarify.*

   SCS will prepare an Erosion & Sediment Control Plan prior to the construction of the project in accordance with local and State requirements. Standard E&S practices such as silt fencing will be used where needed. The Landfill has an E&S plan and has already implemented this plan for the entire Landfill facility.

10. *(Drawing No. 4 of 6) Please address the following concerns:*

    i. *Provide the proposed gas extraction wells – EW402, EW403, and EW404 data to the "Well Schedule" Table.*

       EW402, EW403, and EW404 are existing wells, so adding data to the Well Schedule is not needed.

    ii. *In the "Well Schedule" Table, the data of "baseliner elevation" for the gas extraction wells – EW405 through EW412 are not provided (or not available) but the well depth of 41 feet is pre-selected for each above –mentioned well. It is advised that the assumption for selection the proposed well depth is noted on the drawing.*

       Noted.

A revised permit modification submittal with the permit drawings will be submitted following your review on our responses. If additional information is still needed by the SWS, maybe a meeting to discuss these items would be more efficient. If there are any questions, please contact either of the undersigned at 704-504-3107.

Sincerely,

Steven C. Lamb, PE
Vice President
SCS ENGINEERS, PC

J Morgan, PE
Senior Project Professional
SCS ENGINEERS, PC

scl/jm

cc: Ed Mussler, DWM, SWS
Tim Broome, Johnston County
Rick Proctor, Johnston County
Annika Colston, Blue Source
Matt Wells, Blue Source
Guy Lewis, SCS Field Services

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MATRIX
Health & Safety Consultants, L.L.C.

April 27, 2011

Pierce Wu
SCS Field Services
11260 Roger Bacon Drive, Suite 300
Reston , VA 20190

RE: Johnston County Landfill

Dear Mr. Wu,

Please find enclosed, the laboratory results for the asbestos air samples collected for analysis. Samples were analyzed in accordance with NIOSH method 7400, Fourth Edition, Issue 2. A visual inspection of the work area was performed prior to the collection of clearance samples.

Sample concentrations at or below 0.01 fibers per cubic centimeter are considered to be "clean air" according to current EPA standards. The current OSHA permissible exposure limit is 0.1 fibers per cubic centimeter for an eight-hour time weighted exposure.

Matrix Health & Safety Consultants, L.L.C. is pleased to have provided our services for this project. If you have any questions, please do not hesitate to call (919) 833-2520.

Sincerely,

C. Britt Wester, CIH
Principal

Enclosures

Iatrix Health & Safety Consultants, L.L.C.
.900 Yonkers Road, Raleigh, NC 27604
'hone - (919) 833-2520 Fax - (919) 882-9926

HA Proficiency Analytical Testing (PAT) Laboratory ID #164217.

LABORATORY REPORT

ASBESTOS AIR SAMPLING DATA

SAMPLES ANALYZED IN ACCORDANCE WITH NIOSH METHOD 7400, FOURTH EDITION.

Client: SCS Field Services
11260 Roger Bacon Drive, Suite 300
Reston, VA 20190

'oject : Johnston County Landfill

Date Collected: 4-26-2011
Date Analyzed: 4-26-2011
Collected By: John Pearson (#80735)
Lab Code: A11180
Project Code: 110459

FIELD ID.:	LAB. ID.:	VOLUME (liters)	COUNT (Fibers/Field)	DETECTION LIMIT	CONCENTRATION (Fibers/cc)
ll Operator nbient	111252	1386	9.0/ 100	0.002	**0.003**
id Steer ibient	111253	1398	11.5/ 100	0.002	**0.004**
3 wnwind of Drill Sites bient	111254	1386	6.0/ 100	0.002	**0.002**
1 ld Blank	111255	BLANK	0.0/ 100		

John Pearson (#80735)
Analyst

C. Britt Wester, CIH (#90131)
Supervising Air Monitor

MATRIX HEALTH AND SAFETY CONSULTANTS

RECORD OF DAILY ACTIVITY

PROJECT: Johnston County Landfill PAGE: 1 of 1
PROJECT NUMBER: DATE: 4-26-11
CLIENT: SCS Field Services CONTRACTOR:

WORK IN PROGRESS:
Landfill drilling
Debris removal

PRESENT AT SITE:
John Pearson - Matrix

TIME:	OBSERVATIONS:
8:00	Arrive to work area. Drilling is in progress. A skid steer is being used to remove debris from drilling process. Samples set in drill rig, skid steer and downwind.
3:45	Downwind and drill rig samples collected.
3:49	Skid steer sample collected.
4:00	Matrix leaves site.

Notes are preliminary and subject to final review.

REPORT BY: John Pearson 80735

atrix Health & Safety Consultants, L.L.C.
)00 Yonkers Road, Raleigh, NC 27604
'hone - (919) 833-2520 Fax - (919) 882-9926
HA Proficiency Analytical Testing (PAT) Laboratory ID #164217.

LABORATORY REPORT

ASBESTOS AIR SAMPLING DATA

SAMPLES ANALYZED IN ACCORDANCE WITH NIOSH METHOD 7400, FOURTH EDITION.

Client: SCS Field Services
11260 Roger Bacon Drive, Suite 300
Reston, VA 20190

oject : Johnston County Landfill

Date Collected: 4-27-2011
Date Analyzed: 4-27-2011
Collected By: Matt Dickens (#80695)
Lab Code: A11179
Project Code: 110459

FIELD ID.:	LAB. ID.:	VOLUME (liters)	COUNT (Fibers/Field)	DETECTION LIMIT	CONCENTRATION (Fibers/cc)
._-01 ..l Operator nbient	111248	876	4.5/ 100	0.003	**< 0.003**
.-02)wnwind of Drill Sites bient	111249	876	6.0/ 100	0.003	**0.003**
L-03 d Steer bient	111250	870	5.0/ 100	0.003	**< 0.003**
'.-04 d Blank	1112501	BLANK	0.0/ 100		

Matt Dickens (#80695)
Analyst

C. Britt Wester, CIH (#90131)
Supervising Air Monitor

MATRIX HEALTH AND SAFETY CONSULTANTS

RECORD OF DAILY ACTIVITY

PROJECT: Johnston Co. Landfill PAGE: 1 of 1
PROJECT NUMBER: DATE: 4/27/2011
CLIENT: SCS Field Services CONTRACTOR: SCS Field Services

WORK IN PROGRESS: Drilling to install methane pipes PRESENT AT SITE:

TIME:	OBSERVATIONS:
7:20	Arrive on site. Begin to calibrate and set pumps.
11:30	Leave site for lunch.
12:10	Return to site.
12:30	Drilling is complete in areas that may have asbestos. Collect samples and leave site.

Notes are preliminary and subject to final review.

REPORT BY:

Environmental Consultants
and Contractors

SCS Engineers, P.C.
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273-3557

704 504-3107
FAX 704 504-3174
www.scsengineers.com

SCS ENGINEERS, PC

File No. 02210301.00
November 30, 2010

Mr. Jeff Dellinger
Industrial Hygiene Consultant
Health Hazards Control Unit
Division of Public Health – NCDHHS
1912 Mail Service Center
Raleigh, NC 27699

Re: Notification of Waste Disturbance
Johnson County Landfill
Air Permit No. 08844R04

Dear Mr. Dellinger:

Johnson County Landfill (Landfill) will be constructing a landfill gas collection and control system (GCCS) which will include the installation of up to 24 extraction wells, associated piping and a blower flare station. The Landfill is a MSW landfill located near Smithfield, NC.

The Landfill includes several waste disposal areas designated as Phase 1, 2, 3, 4, 4A, and 5. No activities are planned in Phases 1 and 2. Work in Phase 3 (drilling) may potentially encounter ACMs; therefore this notification. Work activities in Phase 4, 4A, and 5 will not encounter ACMs. For Phase 4 only pipe installation will occur within the existing soil cover. No waste will be encountered. In Phase 5 ACMs were only landfilled in the initial 10 feet of waste and the proposed wells will not encounter this waste (wells stop 15-feet from the bottom).

Therefore based on the above and in accordance with 40 CFR 61.154(j), Johnson County Landfill is providing this notification that waste disturbance which may encounter asbestos-containing material (ACM) will occur in Phase 3 at the Johnson County Landfill.

40CFR 61.154(j)(1) - *We anticipate drilling to start the week of January 17, 2011 and be completed by the week of January 31, 2011.*

40CFR 61.154(j)(2) - *The disturbance is a result of the upcoming drilling of boreholes associated with the installation of landfill gas extraction wells in Phase 3 of the landfill which is the only area where potential ASMs could be encountered.*

Each gas extraction well borehole will consist of a minimum 36-inch diameter well bore, each drilled to varying depths depending on the placement of refuse at that location. The well depths will range from 15 feet to 65 feet deep. These wells are needed facilitate the voluntary collection of landfill gas for a green energy project

40CFR 61.154(j)(3) – *Emissions will be controlled by keeping any suspected ACMs wet and moist during the excavation, storage, transport, and disposal.*

40CFR 61.154(j)(4) – *If ACMs are encountered in the drill cuttings, they will be loaded into a dump truck by the Contractor and hauled to the designated area about 100 feet away from the working face*

in accordance with the landfill's solid waste permit and operating plan. There will be no temporary storage areas for ACM used during drilling activities. The disposal location will be recorded by the County using a GPS, consistent with their current ACM tracking procedures.

The above items satisfy the requirements of 40 CFR 61.154(j). In addition to these items, the North Carolina Department of Health and Human Services (NCDHHS), Health Hazards Control unit has requested the following additional information:

- The delegated authority will be the Health Hazards Control Unit, 1912 Mail Service Center, Raleigh, NC 27699. Attention: Jeff Dellinger (919) 707-5950.

- No ACMs will be removed from the site.

- There will also be some trenching on the landfill surface for the installation of landfill gas piping. Based on site records, regulated ACMs will <u>not be encountered</u> during pipe installation activities. Approximately 4,000 linear feet of pipe installation will occur in areas where there is no potential to encounter regulated ACMs. The approximate depth and width for trenching for pipe installation is 3 feet and 2 feet, respectively.

- This Plan will be kept on site throughout the duration of the project.

- Any regulated ACMs identified should be treated as if it was new regulated ACMs entering the landfill and existing procedures for handling, transporting, and disposal should be followed, as required by the following.

  - NESHAP – 40CFR 61
  - OSHA – 29CFR 1926.1101 and 29CFR 1910.1101
  - NC General Statutes – NC GS 130A, Article 19
  - NC Solid Waste Rules 15A NCAC 13B .1626 1(d)

- Both non-asbestos containing waste and suspect or known asbestos-containing waste will be disposed of at the landfill, at the direction of landfill personnel. The disposal locations will be decided during the pre-construction meeting with the contractor, owner and engineer.

- A Trained Asbestos Supervisor (TAS) will be onsite in the immediate vicinity of the drilling to oversee the work setup and maintenance. The TAS will setup the work area such that the Contractor and technicians are protected. The public does not have access to the work areas.

- The TAS will be a North Carolina accredited asbestos supervisor and will have completed the contractor/supervisor training course as outlined in EPA's Asbestos Model Accreditation Plan (40 CFR 763)

- An Accredited Asbestos Inspector (AAI) will be observing/inspecting excavated drill cuttings (i.e., waste) during drilling activities. If suspect material is observed, it will be placed adjacent to the borehole. The suspect waste will be loaded into a dump truck and properly landfilled as stated above.

- The AAI is a person who, at a minimum, is a NC Accredited Asbestos Inspector as outlined in the EPA's Asbestos Model Accreditation Plan.

- The following definitions contained in 40 CFR 61 were requested by NCDHHS to be included in this notification:

  - *Friable asbestos materials* means any material containing more than 1 percent asbestos as determined using the method specified in appendix E, subpart E, 40 CFR part 763, section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less that 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

  - *Regulated asbestos-containing material (RACM)* means (a) Friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by the subpart.

  - *Adequately wet* means sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then the materials has not been adequately wetted. However, the absence of visible emissions in not sufficient of being adequately wet.

If you have questions, please do not hesitate to contact either of the undersigned at (704) 504-3107.

Sincerely,

J Morgan, PE
Senior Project Engineer
SCS ENGINEERS, PC

Steven C. Lamb, PE
Vice President
SCS ENGINEERS, PC

Enclosures

cc: Steven Vozzo, NCDENR (Fayetteville Regional Office)
Rick Proctor, Johnson County

North Carolina Department of Health and Human Services
Division of Public Health • Epidemiology Section
Occupational and Environmental Epidemiology Branch
1912 Mail Service Center • Raleigh, North Carolina 27699-1912
Tel 919-707-5950 • Fax 919-870-4808

RECEIVED
DEC - 8 2010

Beverly Eaves Perdue, Governor
Lanier M. Cansler, Secretary

Jeffrey P. Engel, M.D.
State Health Director

December 6, 2010

Mr. J. Morgan, PE
SCS Engineers, PC
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273-3557

Subject: Landfill Gas Collection at Johnson County Landfill

Dear Mr. Morgan:

We have reviewed your asbestos plan dated December 1, 2010, regarding the subject landfill. It is our understanding that the scope of work for this project is to expand the existing gas collection system by drilling in Phase 3. After reviewing your asbestos plan, we have the following comments that will need clarification before completing our review of the plan.

1. Provide the point of contact, company name, physical mailing address and telephone number for the actual landfill and landfill owner, general contractor, drilling contractor and other associated parties involved with this project.

2. Explain how the public will be protected from potential exposure during the activities which may disturb asbestos waste.

3. Clarify the need for barrier tape or signs needed in the regulated work area, where asbestos waste may be disturbed, to keep individuals who are not asbestos trained out of the regulated work area.

4. Clarify what level of asbestos training individuals inside the regulated work area will have.

In closing, we look forward to working with your industry regarding the recycling of landfill gas while at the same time protecting the environment and the public from potential exposure to asbestos. If you have any questions about our comments, feel free to contact myself or Pat Wylie at (919) 707-5950.

Sincerely,

Jeffery W. Dellinger
Industrial Hygiene Consultant
Health Hazards Control Unit

Ed Mussler, NC DSWM
David Lipton, CIH, Interim Manager
Pat Wylie, IH Consultant

Environmental Consultants
and Contractors

SCS Engineers, P.C.
2520 Whitehall Park Drive
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Charlotte, NC 28273-3557

704 504-3107
FAX 704 504-3174
www.scsengineers.com

SCS ENGINEERS, PC

File No. 02210301.00
February 1, 2011

FILE COPY

Mr. Jeff Dellinger
Industrial Hygiene Consultant
Health Hazards Control Unit
Division of Public Health – NCDHHS
1912 Mail Service Center
Raleigh, NC 27699

Re: Notification of Waste Disturbance - Response to Comments
Johnston County Landfill
Air Permit No. 08844R04

Dear Mr. Dellinger:

Johnston County Landfill (Landfill) will be constructing a landfill gas collection and control system (GCCS) which will include the installation of up to 24 extraction wells, associated piping and a blower flare station. The Landfill is a MSW landfill located near Smithfield, NC.

In accordance with 40 CFR 61.154(j), Johnson County Landfill provided notification that waste disturbance which may encounter asbestos-containing material (ACM) will occur in Phase 3 at the Johnston County Landfill (SCS Letter to NCDHHS dated December 1, 2010). The NCDHHS had the following comments listed in italics below. The response to these comments is provided below in bold.

1. *Provide the point of contact, company name, physical mailing address and telephone number for the actual landfill and landfill owner, general contractor, drilling contractor and other associated parties involved with this project.*

   <u>Site</u> - Johnston County Landfill, Landfill Manger
   Rick Proctor - (919) 938-4750
   680 County Home Road, Smithfield, NC 27577

   <u>Landfill Owner</u> - Johnston County, Director of Utilities and Engineering
   Timothy G. Broome, P.E. - (919) 209-8333
   309 E. Market Street, Smithfield, NC 27577

   <u>General Contractor</u> – SCS Field Services, Project Manager
   Guy Lewis - (703) 517-5594
   11260 Roger Bacon Drive Suite 300, Reston VA, 20190

   <u>Driller</u> - B&H Drilling Services, Project Manager
   Bill Barter - (954) 614.0492
   7180 SW 18th St., Plantation, FL 33317

2. *Explain how the public will be protected from potential exposure during the activities which may disturb asbestos waste.*

   The landfill is a restricted access area which prevents the public access to the landfill and working area within the landfill. Further emissions will be controlled by keeping any suspected ACMs wet and moist during the excavation, storage, transport, and disposal.

3. *Clarify the need for barrier tape or signs needed in the regulated work area, where asbestos waste may be disturbed, to keep individuals who are not asbestos trained out of the regulated work area.*

   A Trained Asbestos Supervisor (TAS) will be onsite in the immediate vicinity of the drilling to oversee the work setup and maintenance. The TAS will setup the work area such that the Contractor and technicians are protected. Individuals who are not asbestos trained will not be allowed within 50-feet of the drilling activities.

4. *Clarify what level of asbestos training individuals inside the regulated work area will have.*

   The Contractor's onsite personnel will have OSHA class III asbestos training. The Contractor's supervisor onsite will have 40 hour asbestos supervisor training. Further a Trained Asbestos Supervisor (TAS) will be onsite in the immediate vicinity of the drilling to oversee the work setup and maintenance. The TAS will setup the work area such that the Contractor and technicians are protected

If you have questions, please do not hesitate to contact either of the undersigned at (704) 504-3107.

Sincerely,

J Morgan, PE
Senior Project Engineer
SCS ENGINEERS, PC

Steven C. Lamb, PE
Vice President
SCS ENGINEERS, PC

Enclosures

cc: Steven Vozzo, NCDENR (Fayetteville Regional Office)
Rick Proctor, Johnson County
Guy Lewis, SCS Field Services