SMITH+GARDNER
ENGINEERS

ADDRESS 14 N. Boylan Avenue, Raleigh NC 27603 TEL 919.828.0577 WEB www.smithgardnerinc.com

Permit No.	Date	Document ID No.
96-06	**September 04, 2012**	**17163**

Received via an email
Date: **September 04, 2012**
Solid Waste Section
Raleigh Central Office

September 4, 2012

Mr. Ming-Tai Chao, P.E., Engineer
North Carolina DENR, Division of Waste Management
217 West Jones Street
Raleigh, North Carolina 27603

RE: Construction Record– 2010-2012 LFG Collection System Installation
MP Wayne, LLC – Wayne County Landfill
Dudley, Wayne County, North Carolina

Dear Mr. Chao:

Smith + Gardner (S+G) would like to submit documentation of the construction activities performed during expansion of the landfill gas collection and control system (GCCS) at Units 1, 2 and 3 of the Wayne County Landfill, located in Dudley, North Carolina in accordance with the submitted Landfill Gas Collection & Control System Design Plan[1], dated July 2012. To provide appropriate documentation as required by the Letter of Authorization[2] received from Ming-Tai Chao, P.E. (NCDENR-DWM), the following are provided:

- The GCCS expansion construction completion documentations, including;
    1. Color photographs of major project features;
    2. A copy of all correspondence and approvals from the Dept. of Health and Human Services in relation to the asbestos work plan;
    3. Extraction well boring logs; and
    4. Pertinent field monitoring data;

- Cover verification/certification for Unit 2; and

- Pressure testing of landfill gas (LFG), air and condensate lines.

GCCS expansion installation was performed by Chandler Construction Services, Inc. (Chandler) under contract with Methane Power. The project consisted of:

- Drilling four (4) new landfill gas (LFG) extraction wells in Unit 2;

- Drilling two (2) new landfill gas (LFG) extraction wells in Unit 3;

- Connection of four (4) extraction wells to the collection system by installation of prefabricated wellheads connected to transmission piping in Unit 2;

[1] Landfill Gas Collection & Control System Design Plan – Wayne County MSW Landfill. Submitted by Smith + Gardner, Inc., July 2012.

[2] Authorization for the Expansion of the Existing Landfill Gas Collection and Control System (LFGCCs) and Construction of the New Piping to the Proposed Landfill Gas to Energy System (LFGTE) – Wayne County Landfill. By Ming-Tai Chao, P.E. (NCDENR-DWM), October 8, 2010.

- Installing new transmission piping to replace abandoned transmission piping in Unit 1;

- Installing new transmission piping to replace abandoned transmission piping in Unit 2;

- Installation and connection of four (4) one-stage (5 spokes) radial type LFG collectors, installation and connection of one (1) mini (3 spokes) radial type LFG collector, installation and connection of two (2) two-stage (10 spokes) radial type LFG collectors, installation and connection of one (1) two-stage (8 spokes) radial type LFG collector in Unit 3; and

- Condensate management system to prevent condensate from accumulating in transmission piping, and to convey it back to the leachate collection system;

LANDFILL GAS EXTRACTION WELLS

Kellets Well Boring, Inc. performed the boring and installation of four (4) LFG extraction wells at Unit 2 and two (2) LFG extraction wells at Unit 3 between December 13 and 15, 2010 which was observed by S+G. Prior to drilling, the location and elevation for each well was surveyed by Randy Ward. The survey information was verified and approved by Carlson Environmental Consultants, S+G, and Municipal Engineering (provided in **Attachment A**) to confirm the allowable well depth. The LFG extraction wells were drilled with a 36-inch diameter bucket auger as shown in **Photograph 1** of **Attachment B**. Wells were constructed using six (6) inch diameter slotted and solid schedule 80 PVC pipe. The top portion of well pipe is solid, including the four (4) feet stickup above ground. The solid pipe below ground was completed with two (2) bentonite seals and soil backfill. Typical well construction was as follows:

1. Approximately one (1) foot of stone was placed in the bottom of the well;

2. The pipe casing was then installed, with the bottom capped, and the perforated section ended approximately 9 to 19 feet below the ground surface;

3. The well was then backfilled with additional stone to approximately one (1) foot above the perforated section, at an approximate depth ranging from 8 to 18 feet below ground surface;

4. Approximately one (1) foot of soil backfill was added on top of the stone, followed by a two (2) feet bentonite plug, which was well hydrated during placement;

5. Soil was backfilled to approximately four (4) feet below ground surface;

6. Approximately two (2) feet of bentonite seal was added to approximately two (2) feet below ground surface, which was well hydrated during placement;

7. Soil backfill was added to the ground surface.

Upon completing the well section, an approximate three (3) to four (4) foot stickup of solid pipe was constructed. Wells were capped with Landtec 1.5 or 2-inch Accuflow 200 wellheads as shown in **Photograph 2** of **Attachment B**. Boring logs were recorded for each installation and are provided as **Attachment A** of this report. Spoils generated from drilling operations were inspected by an accredited asbestos inspector in accordance with the approved Asbestos Work Plan (**Attachment C**).

RADIAL LANDFILL GAS COLLECTORS

Chandler Construction Services, Inc. (Chandler) performed the installation of eight (8) radial collectors at Unit 3 which was observed by S+G. The radial collectors (hubs and spokes) were dug with excavators. Hubs were constructed with 36" DR 11 HDPE pipe. Spokes were constructed with 6" perforated DR 11 HDPE pipe. Typical radial collector construction was as follows:

1. The hub location was excavated as an approximate 20'x20' area and to a depth of approximately 20 feet with a stone bed placed at the bottom to provide a level surface to rest the hub as shown in **Photograph 4** of **Attachment B**;

2. The hub was then installed, with the bottom approximately 18 feet below the ground surface; stone was placed around the bottom of the hub to stabilize it during the spoke installation as shown in **Photograph 5**;

3. The spoke trenches were excavated to a depth of approximately 10-12 feet. Approximately three (3) feet of stone was placed at the bottom of the trench;

4. The spoke was then placed in the trench and connected to the hub. Approximately 3-5 feet of stone was placed on top of the spoke. Excavated waste was then placed on top of the stone up to an approximate depth of three (3) feet from the ground surface, and compacted. Soil backfill was added above the waste to the ground surface and compacted as shown in **Photograph 6**;

5. Additional stone was placed around the hub, up to the level of the stone around the spokes. Excavated waste was then placed on top of the stone up to an approximate depth of three (3) feet from the ground surface, and compacted; and

6. Soil backfill was added to the ground surface.

As active filling activities on Unit 3 progressed, three (3) of the radial collectors were subsequently fitted with a Stage 2, consisting of a hub extension and additional spokes (distance between Stage 1 and Stage 2 spokes was approximately 20 feet). Typical installation of Stage 2 extensions was as follows:

1. Waste was directed by Wayne County to be placed around the locations of the radial collectors 1, 2 and 8. When the surrounding waste fill was to an adequate level, the Stage 2 hub extension was connected to the existing Stage 1 hub as shown in **Photograph 7**;

2. Excavation of the trenches for the Stage 2 spokes was similar to the above process, except that in some locations, waste was built up to achieve trench depth;

3. Trenches were completed with stone and waste fill as above, but the depth of the spoke below ground is currently less than the typical Stage 1 depth at installation.

Upon completing the radial collector installation, Landtec 2-inch Accuflow 200 wellheads were connected to each spoke as shown in **Photograph 8**, and subsequently connected to the transmission piping. Since the length and perforation patterns of the spokes varied, characteristic breakdowns of each radial collector's spokes are included on the as-built drawings (provided by Chandler) included in

Attachment D. Spoils generated from excavations were inspected by an accredited asbestos inspector in accordance with the approved Asbestos Work Plan (**Attachment C**).

LANDFILL GAS TRANSMISSION PIPELINE

Chandler installed the HDPE transmission pipe in the following locations:

- Connection of four (4) extraction wells to the collection system by installation of prefabricated wellheads connected to the transmission piping in Unit 2;
- Installing new transmission piping to replace abandoned transmission piping along the perimeter of Unit 1;
- Installing new transmission piping to replace abandoned transmission piping in Unit 2;
- Connection of eight (8) radial collectors and associated piping to transmission piping at Unit 3; and
- Tying in the Units 1, 2, and 3 to the GCCS.

All of the piping installation was performed by Chandler beginning in November 2010 and concluding in January 2012. The installation of the transmission system at Unit 1 included approximately 1,500 feet of gas collection header piping. The installation of the transmission system at Unit 2 included approximately 9,200 feet of gas collection lateral and header piping, as shown in **Photograph 9 and 10**, and eleven (11) isolation valves as shown in **Photograph 9**. The pipe trenches were bedded and compacted prior to placement of pipe, and were backfilled and compacted in to the original elevation. At Unit 3, approximately 1400 feet of gas collection lateral was installed. Spoils generated from excavations were inspected by an accredited asbestos inspector in accordance with the approved Asbestos Work Plan (**Attachment C**).

Each section of permanent gas line installed was pressure tested, as shown in **Photograph 11**, by Chandler in accordance with ASTM F-1417 standards for low pressure lines. Similarly, condensate forcemain lines were tested in general conformance with ASTM F 2164 for high pressure lines, with the exception that in one section on Unit 2, air was substituted for water as the test fluid. Based on the fact that air is more likely to leak than water, S+G accepted the installer's test reports as equivalent to the specified standard. Copies of pressure test reports are included as **Attachment E**. Following the completion of the system, Chandler prepared "as-built" surveys of all installations, including gas lines, valves, radial collectors, and extraction wells in Unit 2. The as-built survey information is included in **Attachment D**. It is noted that due to differential settlement and lateral shifting of the landfill topography as waste degrades, the location of surveyed components may change significantly over time.

LANDFILL COVER CERTIFICATION

During installation of the GCCS, LFG, lateral and transmission piping in the closed Unit 2, the landfill cap was disturbed. This cap consists of a two (2) foot soil cover. Approximately 9,200 linear feet of trench excavation and replacement was performed. The material used for replacement was "best available soil" by Chandler. The material was placed in lifts to replace the existing minimum two (2) foot cover over waste, as observed visually by S+G personnel. In addition, soil probe measurements

confirmed that a minimum cover thickness of two (2) feet was placed during installation of the collection system piping. Based on this information, it is S+G's opinion that the cap has been repaired.

SUMMARY

The construction methods, materials, locations of components, and testing methods are in general agreement with the submitted Landfill Gas Collection & Control System Design Plan. Please note that S+G's acceptance of the landfill gas collection and control system is limited to the items addressed in this report. Beyond this acceptance, additional issues that arise during operations of the system shall be addressed by the system owner/operator and/or the manufacturer under system warranty.

Should you have any questions or require clarification, please contact us at (919) 828-0577 or by email below.

Sincerely,
SMITH GARDNER, INC.

Don M. Misenheimer
Project Scientist, ext. 224
don@smithgardnerinc.com

Stacey A. Smith, P.E.
Principal, President, ext. 1[illegible]
stacey@smithgardnerinc.com

NORTH CAROLINA PROFESSIONAL SEAL 023002 ENGINEER STACEY A. SMITH
9-4-12

CC: Tim Rogers, Wayne County
Simon Haworth, Methane Power
Rebecca Pedreira, Methane Power
Bob Gettys, Methane Power
Ryan Hennessy, Methane Power
Henry King, Methane Power
David Bird, Methane Power
Matt Lamb, Smith Gardner
File

H:\Projects\Methane Power\CHANDLER 11-1 (Wayne Co. CQA)\Record Report\Letter Report Wayne Co LFGGCCS_090412.docx

ATTACHMENT A
EXTRACTION WELL BORING LOGS

WELL SCHEDULE

LFG COLLECTION SYSTEM INSTALLATION - SEPTEMBER 2010
WAYNE COUNTY MSW LANDFILL - DUDLEY, NC

Well No	Northing	Easting	MESCO Surface Grade Elevation (ft-MSL) 08/21/2010	Chandler Surface Grade Elevation (ft-MSL) 09/23/2010	RSG Surface Grade Elevation (ft-MSL)	Actual Base Grade Elevation (ft-MSL)	MESCO Base Grade (ft-MSL)	RSG Base Grade (ft-MSL)	As-built Waste Depth (ft)	MESCO Waste Depth (ft)	RSG Wast Depth (ft)	Drill Depths (ft)	Liner Separation (ft)	Bottom of Well (ft-MSL)	Proposed Perf Pipe (ft)	Proposed Solid Pipe (ft)
3GCW-13	563,937.92	2,276,589.12	183.993	184.170	184.020	153.00	149.10	153.00	31.170	34.893	31.020	21.0	10	163.2	9.0	11.0
3GCW-14	564,178.36	2,276,686.79	182.615	182.990	182.810	149.00	146.16	150.00	33.990	36.455	32.810	23.0	11	159.8	9.0	13.0
3GCW-15	564,525.09	2,276,802.21	181.093	181.910	182.520	146.16	147.19	145.00	35.750	34.503	37.520	25.0	10	158.7	9.0	15.0
3GCW-17	564,753.60	2,276,978.88	181.082	181.290	181.850	144.70	146.41	144.00	36.590	34.672	37.850	25.0	10	158.1	9.0	15.0
3GCW-18	564,550.07	2,277,063.00	182.683	182.800	183.860	148.46	149.75	148.00	34.430	32.933	35.860	23.0	10	159.7	9.0	13.0
3GCW-19	564,931.08	2,277,008.18	178.255	178.480	179.360	143.80	145.48	144.00	34.680	32.775	35.360	23.0	10	155.3	9.0	13.0
3GCW-20	564,801.60	2,277,154.73	181.988	182.240	182.150	147.88	149.33	148.00	34.440	32.658	34.150	23.0	10	159.0	9.0	13.0
3GCW-21	564,613.86	2,277,250.31	184.253	184.480	183.940	150.70	152.70	151.00	33.780	31.553	32.940	22.0	10	162.3	9.0	12.0
3GCW-22	564,404.82	2,277,162.44	185.650	185.840	183.840	151.87	153.29	152.00	34.270	32.366	31.840	22.0	10	163.7	9.0	12.0
3GCW-24	564,533.68	2,277,380.03	NA	184.720	183.880	154.50	155.76	154.00	30.220	NA	29.880	20.0	10	164.7	9.0	10.0
3GCW-25	564,308.19	2,277,346.86	185.460	185.580	183.750	155.00	157.09	155.00	30.580	28.370	28.750	18.0	10	167.5	9.0	8.0
3GCW-28	564,153.23	2,277,487.70	185.354	185.220	183.790	159.00	163.00	159.00	26.220	22.354	24.790	12.0	10	173.4	6.0	5.0
3GCW-29	564,400.25	2,277,574.05	183.407	184.130	183.880	161.00	162.61	160.00	23.130	20.797	23.880	11.0	10	172.4	5.0	5.0
									TOTALS			268.0			110.0	145

Notes:

1. MESCO and Chandler actual surface grade elevation taken from pre-construction survey information provided by Municipal Engineering and Chandler Construction on 8/21/2010 and 9/23/2010, respectively.
2. RSG surface grade elevation taken from topography provided by Municipal Engineering on unknown dates.
3. MESCO and As-built base grade elevations taken from base grade data provided by Municipal Engineering and a survey taken by Owen Surveying Inc. dated November 19, 1998.
4. RSG base grade elevations in Unit 3, Phase 1 Cells 1-2 from drawing "Asbuilt of Leachate Collection System", prepared by Owen Surveying Inc. dated November 1998. Base elevations in Unit 3, Phase 2 from drawing prepared by Bateman Civil Survey Company, PC dated 6/10/2004.
5. The entities below have reviewed this well schedule, notified CEC of any discrepancies, and believe to the best of their knowledge that this well schedule is correct.
6. All wells were designed to have approximately 10 feet of separation between the top of liner and the bottom of the bore.
7. The solid pipe shown does not include the above grade "stick-up". This portion of pipe must be added to the total amount shown.
8. RSG and Municipal Engineering provided third party engineering review on well schedule.

Approved By:

CEC Engineer: _____ Date: 10/4/10

RSG: _____ Date: 10/4/10

Municipal: D. Wayne Sauer Date: 10/4/10

Contractor signed below has received a copy of this well schedule and agrees to install the vertical gas wells as indicated.
No changes to the well depths or locations may be made without signed approval from all parties noted here.

Chandler Construction: _____ Date: _____

WELL SCHEDULE 2

LFG COLLECTION SYSTEM INSTALLATION - OCTOBER 2010
WAYNE COUNTY MSW LANDFILL - DUDLEY, NC

Well No	Northing	Easting	Approximate Base Grade Elevation (ft-MSL)	Approximate Surface Grade (ft-MSL)	As-built Waste Depth (ft)	Drill Depths (ft)	Liner Seperation (ft)	Bottom of Well (ft-MSL)	Proposed Perf Pipe (ft)	Proposed Solid Pipe (ft)	Well Installation Date
~~3GCW-16~~	~~564,397.21~~	~~2,277,020.13~~	~~151.00~~	~~184.00~~	~~33.0~~	~~23~~	~~10~~	~~161.0~~	~~10~~	~~12~~	
~~3GCW-23~~	~~564,196.74~~	~~2,277,097.06~~	~~157.00~~	~~184.00~~	~~27.0~~	~~17~~	~~10~~	~~167.0~~	~~9~~	~~7~~	
~~3GCW-26~~	~~564,098.33~~	~~2,277,312.96~~	~~159.00~~	~~184.00~~	~~25.0~~	~~15~~	~~10~~	~~169.0~~	~~8~~	~~6~~	
~~3GCW-27~~	~~563,974.69~~	~~2,277,449.45~~	~~160.80~~	~~184.00~~	~~23.2~~	~~13~~	~~10~~	~~170.8~~	~~6~~	~~6~~	
2GCW-23	562,653.48	2,277,755.83	150.00	172.00	22.0	22	0	150.0	9	12	
2GCW-24	562,511.19	2,277,974.83	150.00	177.00	27.0	27	0	150.0	11	15	
2GCW-25	562,352.91	2,278,161.24	150.00	180.00	30.0	30	0	150.0	14	15	
2GCW-26	562,242.81	2,277,900.29	150.00	180.00	30.0	30	0	150.0	14	15	
					TOTALS	177.2			81.0	88.2	

Notes:

1. Actual surface grade elevation taken from aerial and ground topographic information provided by Municipal Engineering Services Company, PA, various dates.
2. Base grade elevations taken from base grade data provided by Municipal Engineering on 11/18/10 and a survey taken by Owen Surveying Inc. dated 11/19/98.
3. The entities below have reviewed this well schedule, notified CEC of any discrepancies, and believe to the best of their knowledge that this well schedule is correct.
4. All wells in Unit 3 are to have approximately 10 feet of seperation between the top of liner and the bottom of the bore.
5. Wells in Unit 2 will be drilled until driller stops seeing waste or driller encounters any subsurface water, whichever is shallowest.
6. The solid pipe shown does not include the above grade "stick-up". This portion of pipe must be added to the total amount shown.
7. Municipal Engineering provided third party engineering review on well schedule.

Approved By:

CEC Engineer: _____ Date: 11/18/10 Municipal: _____ Date: 11/19/10

Chandler Construction: _____ Date: _____ RSG: _____ Date: 11/19/10

Smith Gardner,Inc.
14 North Boylan Avenue, Raleigh NC 27603
(919) 828-0577

FIELD BOREHOLE LOG

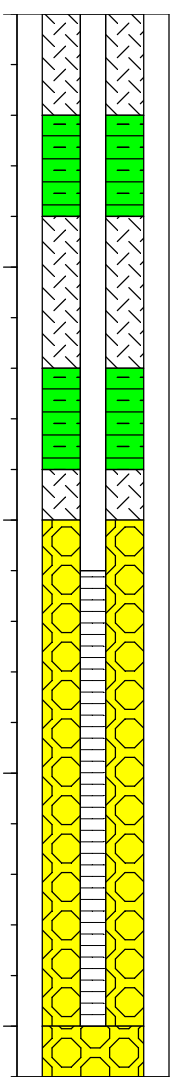
BOREHOLE NUMBER **3GCW-13** Page 1 of 1

PROJECT NAME: **LFG Expansion**
LOCATION: **Wayne County Landfill**
DRILLING CO: **Keller's Well Drilling**
DRILLING METHOD: **36" BUCKET AUGER**
FIELD PARTY: **Britt Ransom**
GEOLOGIST:
DATE BEGUN: **12/13/2010** COMPLETED: **12/13/2010**

TOTAL DEPTH: **21**
TOP OF CASING ELEV.: GROUND ELEV.:
NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (from TOC)		
Depth (ft)	Default Listing	Default Listing
Time	Default Listing	Default Listing
Date	Default Listing	Default Listing

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
0.0				Bucket Auger	COVER		0.0	
5.0					WASTE: residential, moderate decomposition, damp until15' bgs, wet from 15' - 21' bgs carpet (10' - 15' bgs) tires (15' - 20' bgs)		5.0	
10.0							10.0	
15.0							15.0	
20.0							20.0	



Smith Gardner,Inc.

14 North Boylan Avenue, Raleigh NC 27603

(919) 828-0577

FIELD BOREHOLE LOG

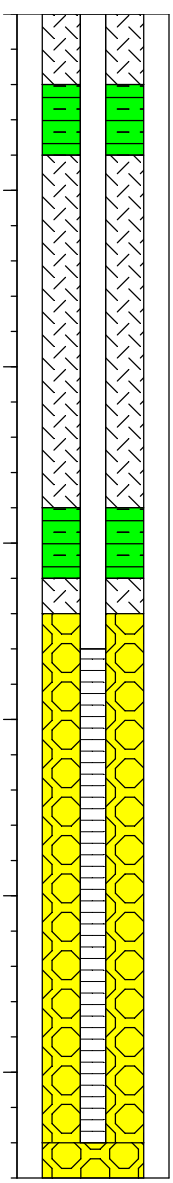
BOREHOLE NUMBER **2GCW-26** Page 1 of 1

PROJECT NAME: **LFG Expansion**
LOCATION: **Wayne County Landfill**
DRILLING CO: **Keller's Well Drilling**
DRILLING METHOD: **36" BUCKET AUGER**
FIELD PARTY: **Britt Ransom**
GEOLOGIST:
DATE BEGUN: **12/15/2010** COMPLETED: **12/15/2010**

TOTAL DEPTH: **33'**
TOP OF CASING ELEV.: GROUND ELEV.:
NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (from TOC)		
Depth (ft)	Default Listing	Default Listing
Time	Default Listing	Default Listing
Date	Default Listing	Default Listing

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
0.0				Bucket Auger	COVER		0.0	
5.0					WASTE: residential: moderate decomposition until 20 feet bgs, heavy decomposition from 20' - 33' bgs, dry until 25' bgs, damp from 25' - 33' bgs wood-clay (10' - 15' bgs) fabric (20' - 25' bgs) metal (25' -30' bgs)		5.0	
10.0							10.0	
15.0							15.0	
20.0							20.0	
25.0							25.0	
30.0							30.0	



Smith Gardner,Inc.

14 North Boylan Avenue, Raleigh NC 27603

(919) 828-0577

FIELD BOREHOLE LOG

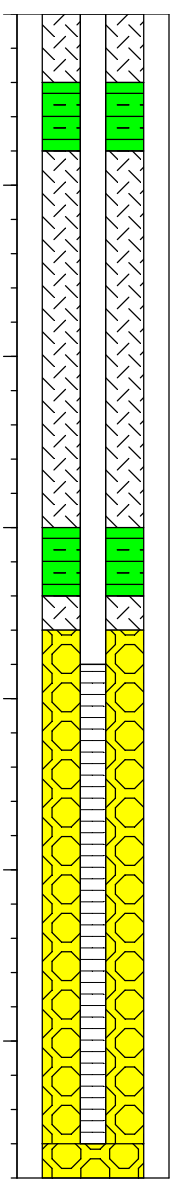
BOREHOLE NUMBER **2GCW-25** Page 1 of 1

PROJECT NAME: **LFG Expansion**
LOCATION: **Wayne County Landfill**
DRILLING CO: **Keller's Well Drilling**
DRILLING METHOD: **36" BUCKET AUGER**
FIELD PARTY: **Britt Ransom**
GEOLOGIST:
DATE BEGUN: **12/15/2010** COMPLETED: **12/15/2010**

TOTAL DEPTH: **34'**
TOP OF CASING ELEV.: GROUND ELEV.:
NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (from TOC)		
Depth (ft)	Default Listing	Default Listing
Time	Default Listing	Default Listing
Date	Default Listing	Default Listing

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
0.0				Bucket Auger	COVER		0.0	
5.0					WASTE: residential, slight decomposition until 20' bgs, moderate decomposition from 20' - 34' bgs, dry until 15' bgs, damp from 15' -34' bgs clay (15' - 20' bgs) plastic (20' -25' bgs)		5.0	
10.0							10.0	
15.0							15.0	
20.0							20.0	
25.0							25.0	
30.0							30.0	



Smith Gardner,Inc.

14 North Boylan Avenue, Raleigh NC 27603

(919) 828-0577

FIELD BOREHOLE LOG

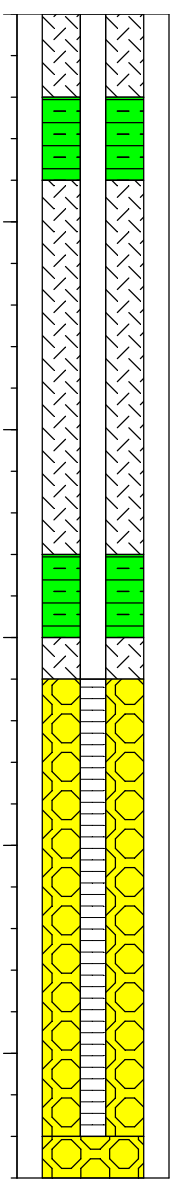
BOREHOLE NUMBER **2GCW-24** Page 1 of 1

PROJECT NAME: **LFG Expansion**
LOCATION: **Wayne County Landfill**
DRILLING CO: **Keller's Well Drilling**
DRILLING METHOD: **36" BUCKET AUGER**
FIELD PARTY: **Britt Ransom**
GEOLOGIST:
DATE BEGUN: **12/15/2010** COMPLETED: **12/15/2010**

TOTAL DEPTH: **28'**
TOP OF CASING ELEV.: GROUND ELEV.:
NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (from TOC)		
Depth (ft)	Default Listing	Default Listing
Time	Default Listing	Default Listing
Date	Default Listing	Default Listing

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
0.0				Bucket Auger	COVER		0.0	
5.0					WASTE: residential, moderate decomposition, tires from 15 - 20 feet bgs, dry until 15 feet bgs, damp 15' - 28' bgs		5.0	
10.0							10.0	
15.0							15.0	
20.0							20.0	
25.0							25.0	



Smith Gardner,Inc.

14 North Boylan Avenue, Raleigh NC 27603

(919) 828-0577

FIELD BOREHOLE LOG

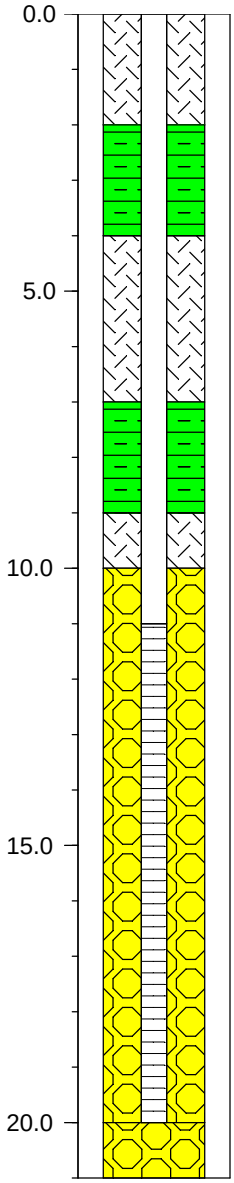
BOREHOLE NUMBER **2GCW-23** Page 1 of 1

PROJECT NAME: **LFG Expansion**
LOCATION: **Wayne County Landfill**
DRILLING CO: **Keller's Well Drilling**
DRILLING METHOD: **36" BUCKET AUGER**
FIELD PARTY: **Britt Ransom**
GEOLOGIST:
DATE BEGUN: **12/15/2010** COMPLETED: **12/15/2010**

TOTAL DEPTH: **20**
TOP OF CASING ELEV.: GROUND ELEV.:
NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (from TOC)		
Depth (ft)	Default Listing	Default Listing
Time	Default Listing	Default Listing
Date	Default Listing	Default Listing

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
0.0				Bucket Auger	COVER		0.0	
5.0					WASTE: residential; heavy decomposition, damp (5'-15' bgs), wet (15'-21' bgs)		5.0	
10.0							10.0	
15.0					CLAY		15.0	
20.0							20.0	



Smith Gardner,Inc.

14 North Boylan Avenue, Raleigh NC 27603

(919) 828-0577

FIELD BOREHOLE LOG

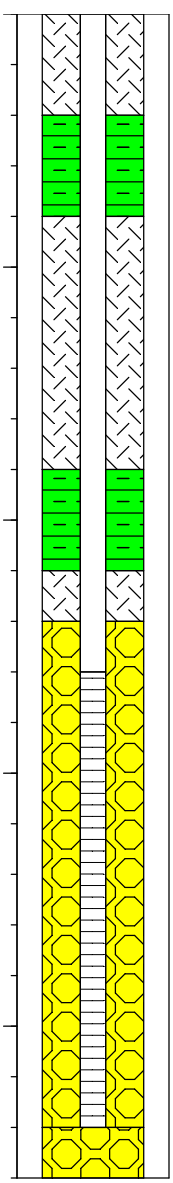
BOREHOLE NUMBER **3GCW-14** Page 1 of 1

PROJECT NAME: **LFG Expansion**
LOCATION: **Wayne County Landfill**
DRILLING CO: **Keller's Well Drilling**
DRILLING METHOD: **36" BUCKET AUGER**
FIELD PARTY: **Britt Ransom**
GEOLOGIST:
DATE BEGUN: **12/13/2010** COMPLETED: **12/13/2010**

TOTAL DEPTH: **23'**
TOP OF CASING ELEV.: GROUND ELEV.:
NORTHING: **0** EASTING: **0**

STATIC WATER LEVEL (from TOC)		
Depth (ft)	Default Listing	Default Listing
Time	Default Listing	Default Listing
Date	Default Listing	Default Listing

DEPTH Feet	BLOW COUNT Per 6"	SAMPLING METHOD	RECOVERY Inches	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH Feet	WELL INSTALLATION
0.0				Bucket Auger	COVER		0.0	
5.0					WASTE: moderate decomposition, damp from 0' - 15' bgs, wet from 15' - 23' bgs 5' - 10' bgs: wood 10' - 15' bgs: plastic/fabric		5.0	
10.0							10.0	
15.0							15.0	
20.0							20.0	



ATTACHMENT B
PHOTOGRAPHS

Photograph 1: View of 36-inch diameter bucket auger rig extraction well drilling at the Unit 2.

Photograph 2: Trench, header line, and completed LFG well on Unit 2.

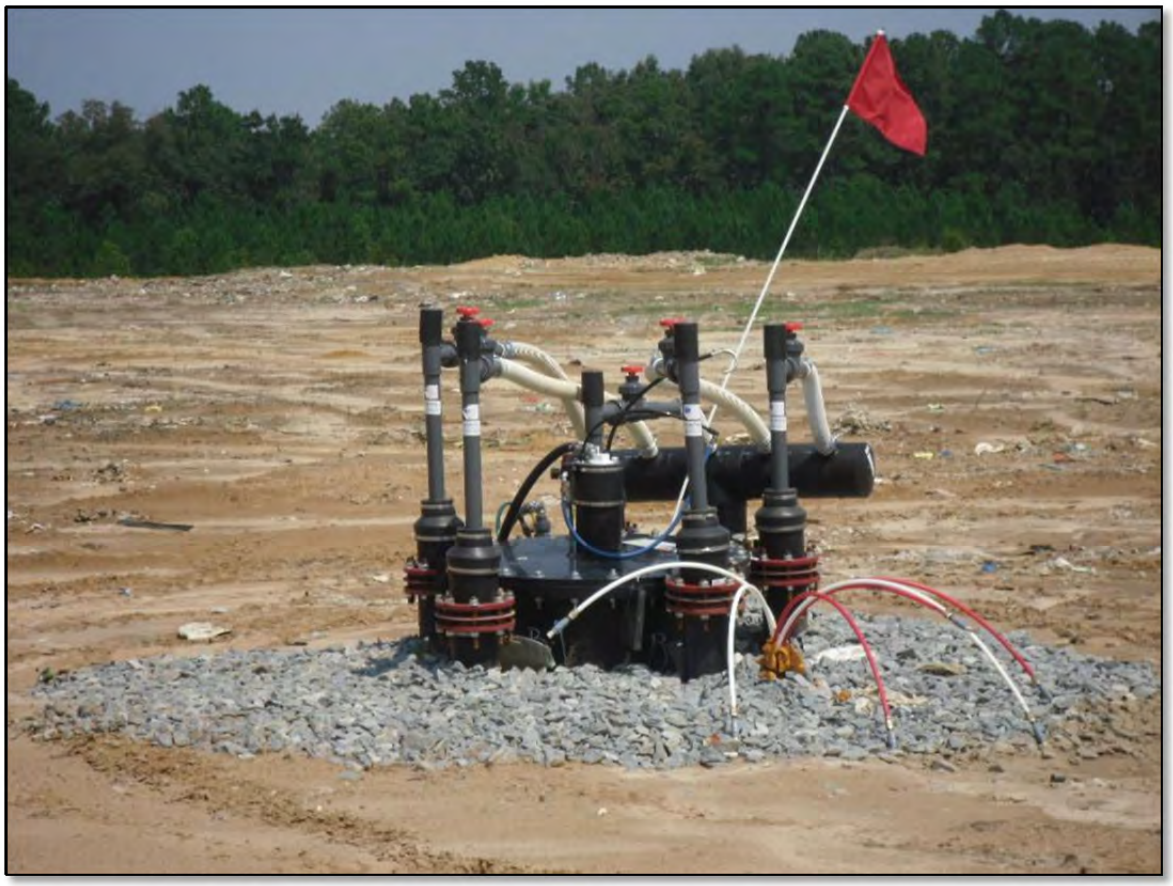
Photograph 3: View of Unit 2 header tie-in at engine/flare station.

Photograph 4: View radial collector hub and excavation pit with stone bed.

Photograph 5: View radial collector hub and trench for spoke.

Photograph 6: View of radial collector spoke backfill.

Photograph 7: View of Stage 2 hub extension being mounted to Stage 1 hub.



Photograph 8: View of completed radial collector with wellheads and connection to GCCS.

Photograph 9: View of header installation.

Photograph 10: View header, air and condensate forcemain in trench.

Photograph 11: View of valve installation.

Photograph 12: View of typical valve and pressure gauge arrangement for pressure testing HDPE pipe.

Photograph 13: View lateral connector to radial collector.

Photograph 14: View of Stage 2 radial collector spoke connection.

Photograph 15: View of Stage 2 radial collector hub being constructed.

Photograph 16: View of Stage 2 radial collector hub being transported.

ATTACHMENT C

ASBESTOS WORK PLAN CORRESPONDENCE AND APPROVAL

From: stacey [stacey@rsgengineers.com]
Sent: Thursday, October 21, 2010 8:48 PM
To: 'Bob Gettys'; tthompson@chandlerconstruction.com; amy@ratliffengineering.com
Cc: matt@rsgengineers.com
Subject: FW: Comments to Wayne County Landfill Gas Collection 10/17/10

All,

This is our approval of the work plan.

sas

From: Dellinger, Jeff [mailto:jeff.dellinger@dhhs.nc.gov]
Sent: Thursday, October 21, 2010 2:24 PM
To: Stacey A Smith
Subject: Comments to Wayne County Landfill Gas Collection 10/17/10

Hey Stacy:

I have read you revised operations plan regarding the Wayne County Landfill Gas Collection dated 10/17/10.

You have addressed all of our comments regarding this plan.

We have no further comments and ask that you have a copy of this plan on-site.

Should you revise the scope of work for this project, please submit any changes to our office for review.

Thanks

Jeff Dellinger

Please note my new email address. It has changed to jeff.dellinger@dhhs.nc.gov

Jeffery W. Dellinger
Industrial Hygiene Consultant
Health Hazards Control Unit
Division of Public Health, NC DHHS
1912 Mail Service Center
Raleigh, NC 27699-1912
Phone: (919) 707-5972 Fax (919) 870-4808

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties by an authorized State official. Unauthorized disclosure of juvenile, health, legally privileged, or otherwise confidential information, including confidential information relating to an ongoing State procurement effort, is prohibited by law. If you have received this e-mail in error, please notify the sender immediately and delete all records of this e-mail.

RICHARDSON SMITH GARDNER
& ASSOCIATES
ENGINEERING & GEOLOGICAL
SERVICES

October 17, 2010

Mr. Jeff Dellinger
Industrial Hygiene Consultant
Health Hazards Control Unit
NC DHHS/Division of Public Health
2nd Floor, Room D-1
5505 Six Forks Road
Raleigh, North Carolina 27609

RE: Potential Contact with Asbestos-Contaminated Waste during Construction of Wayne County Landfill Gas Collection and Control System - Response to Comments

Dear Jeff:

On Behalf of Methane Power, dba MP Developer, LLC, Richardson Smith Gardner and Associates, Inc. (RSG), has prepared this update to the Asbestos Work Plan for the above referenced project. This update follows the verbal revisions following our telephone conversation on Friday, October 15, 2010. All revisions were made during our conversation and have been incorporated in the **attached** plan included as a complete document.

We appreciate your assistance and please feel free to contact me at (919) 828-0577, ext. 127 or by email at stacey@rsgengineers.com with any questions or comments.

Cordially,

Richardson Smith Gardner and Associates, Inc.

Stacey A. Smith, P.E.
Project Manager

Att.
Cc: Amy Ratliff, P.E., Methane Power
Ming Chao, P.E., NCDENR
Wayne Sullivan, Municipal Engineers
File

h:\projects\methane power\mp wayne county, llc\asbestos work plan\notification letter10-12-10_update.doc

ASBESTOS WORK PLAN
Asbestos Containing Waste Material Management
(North Carolina)

1.0 OVERVIEW

Landfill sites permitted to accept asbestos waste or other sites where it is unknown if indiscriminate dumping of asbestos waste has taken place, should be approached with caution when planning an installation or expansion of a Landfill Gas Collection and Control System (GCCS). Encountering asbestos during landfill gas extraction drilling and digging/trenching should be anticipated.

Adequate records should be provided to demonstrate that no asbestos is present in the project areas. In absence of adequate records, this plan should be followed, and a copy of this plan kept in the active work area.

> *SAFETY NOTE:*
> *The Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. The Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.*

This document is intended to provide direction for the Contractor involved in waste disturbing activities in areas with known or suspected asbestos-contaminated waste, or where asbestos-contaminated waste is discovered. This document is meant to assist in compliance with Federal, State, and Local regulations. This document is not intended to take the place of any regulations or the Contractor's responsibility of his employees, subcontractors, or agents. It is critical that the Contractor realize the context of the subject matter by being familiar with the current regulations, as well as Article 48 of the General Conditions of the Contract.

This project (Landfill Gas Collection System Expansion 2010 at the Wayne County MSW Landfill) shall consist of 21 landfill gas wells installed, each approximately 25 feet deep. All bores will be approximately 36 inches in diameter. Associated trenching (approximately 8,000 to 10,000 feet) is also planned through the course of this project. Trenching will be approximately three (3) feet wide and up to four (4) feet deep in most locations. Approximate locations for individual wells, as well as, approximate trenching locations are shown on **Sheet 2 and 3, Landfill Collection System Site Plan (Units 2 and 3)**. This project is tentatively scheduled between October 2010 and January 2011.

2.0 DEFINITIONS

As used herein, the following terms are defined:

2.1 Adequately Wet (*40 CFR §61.141*)

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

2.2 Asbestos (*40 CFR §61.141*)

The asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite.

2.3 Asbestos Waste Disposal Area

Approved area for the disposal of asbestos waste at a solid waste facility.

2.4 Friable Asbestos-Containing Material (ACM)

Any material containing more than one percent (1%) asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR Part 763, Section 1, Polarized Light Microscopy (PLM), that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure. (Sec. 61.141). Friable ACM readily releases asbestos fibers into the air when damaged or disturbed.

2.5 Non-friable (*US EPA, Region 4 - Asbestos Enforcement Bulletin, June 2003*)

AMC which cannot be crumbled, pulverized or reduced to powder by hand pressure, Nonfriable ACM would NOT readily release fibers into the air unless the material was severely damaged.

2.6 Regulated Asbestos-Containing Material (RACM) (*US EPA, Region 4 - Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance*)

(a) friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (d) Category II non-friable 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 this subpart.

2.7 Trained Asbestos Supervisor (TAS)

A person who, **at a minimum**, has completed a five (5) day asbestos abatement contractor/supervisor training course as outlined in the EPA's Asbestos Model Accreditation Plan (40 CFR §763, Subpart E, App. C (B)(2)). Full accreditation

is not required for this position.

2.8 Accredited Asbestos Inspector (AAI)

A person who, **at a minimum**, is a NC Accredited Asbestos Inspector as outlined in the EPA's Asbestos Model Accreditation Plan (40 CFR §763, Subpart E, App. C (B)(3)). Full accreditation **is required** for this position.

3.0 REGULATIONS

3.1 Abbreviations

NESHAP	(National Emission Standards for Hazardous Air Pollutants)
OSHA	(Occupational Safety and Health Administration)

3.2 Potential Asbestos-Contaminated Waste

The following regulation shall be followed before digging/drilling begins on a project with **potential** for asbestos-contaminated waste:

Regulation	Citation
NESHAP	40 CFR §61.151 (d) and 40 CFR §61.154 (j)

- These requirements are listed in **Section 4.0**.

3.3 Identified Asbestos-Contaminated Waste

The following regulations, **at a minimum**, should be followed **if** asbestos-contaminated waste is identified, and should be covered under the site specific asbestos waste acceptance policy. Any asbestos-contaminated waste identified should be treated as if it were new asbestos waste entering the landfill and existing procedures for handling, transporting, and disposal in an asbestos waste disposal area should be followed, as required by the following rules:

Regulation	Citation
NESHAP	40 CFR §61
OSHA	29 CFR 1926.1101
OSHA	29 CFR 1910.1001
NC General Statutes	NC GS §130A, Article 19
NC Solid Waste Rules	15A NCAC 13B .0505 11(d)
NC Solid Waste Rules	15A NCAC 13B .1626 1(d)

3.4 Delegated Authority

The Health Hazards Control Unit, NC DHHS Division of Public Health has been delegated authority by the US Environmental Protection Agency to enforce the NESHAP regulations in all NC counties except the following counties. The following county agencies should be notified before digging/drilling begins on a project with **potential** for asbestos-contaminated waste:

Buncombe County

Western North Carolina Regional Air Pollution Control Agency
49 Mt. Carmel Road
Asheville, NC 28806
Mr. David Brigman, Director
Telephone: 828-250-6777

Forsyth County

Environmental Affairs Department
537 N. Spruce Street
Winston-Salem, NC 27101-1262
Mr. Robert R. Fulp, Director
Telephone: 336-703-2440

Mecklenburg County

Mecklenburg County Land Use and Environmental Services Agency
Mecklenburg Air Quality
Mr. Chuck Greco
Air Quality Supervisor
700 N. Tryon Street
Charlotte, NC 28202
Telephone: 704-336-5430

3.5 Administrative Agency

The following state agency should be notified, in accordance with 40 CFR §61.151 (d) and 40 CFR §61.154 (j), before digging/drilling begins on a project with **potential** for asbestos-contaminated waste:

Health Hazards Control Unit
NC DHHS/Division of Public Health
2nd Floor, Room D-1
5505 Six Forks Road
Raleigh, NC 27609-3806
Mr. Jeffery W. Dellinger, Industrial Hygiene Consultant
Telephone: 919-707-5950
Fax: 919-870-4808

4.0 PROJECT ACTIVITIES

Typically, landfill gas collection system installation/expansion projects may include well drilling and/or trenching. This project (Landfill Gas Collection System Expansion 2010 at the Wayne County MSW Landfill) shall consist of 21 landfill gas wells installed, each approximately 25 feet deep. All bores will be approximately 36 inches in diameter. Associated trenching is also planned through the course of this project. Approximate locations for individual wells, as well as, approximate trenching locations are shown on **Sheet 2 and 3, Landfill Collection System Site Plan (Units 2 and 3).**

Due to the nature of the site, there is potential to excavate asbestos-contaminated waste (friable or non-friable). No unnecessary waste disturbance will be planned and the following steps shall be followed:

4.1 NESHAP Regulations

In accordance with **40 CFR §61** of the NESHAP regulations, the following shall be followed:

- The NESHAP Administrator shall be notified of the **potential** of uncovering asbestos-contaminated waste *in writing at least 45 days prior to excavating or otherwise disturbing any asbestos containing material that has been deposited at a waste disposal site and is covered*.

  At a minimum, this notification shall include the following:

  1. Scheduled starting and completion date.
  2. Reason for disturbing the waste.
  3. Procedures to be used to control emissions during the excavation, storage, transport, and ultimate disposal of the excavated potential asbestos-containing material. If deemed necessary, the Administrator may require changes in the emission control procedures to be used.
  4. Location of any temporary storage site and the final disposal site.
  5. Site Plan

- It is required to have at least one (1) TAS in the immediate vicinity of the waste excavation to oversee the work area setup and maintenance (**Section 4.3**).

4.2 Involved Parties

This project is performed by a developer Methane Power. However, Wayne County is the owner and operator of the landfill. The parties involved are as follows:

Owner:

Wayne County Landfill
460 S. Landfill Road, Dudley, NC 28333
Contact: Mr. Tim Rogers
Phone: (919) 689-2994
Email: tim.rogers@waynegov.com

Developer:

Methane Power
4224 Lazyriver Drive, Durham, NC 27712
Contact: Ms. Amy Ratliff, P.E.
Phone: (919) 294-4770
Email: amy@methanepower.net

Engineer:

Carlson Environmental Consultants (c/o Municipal Engineering Services)
305 South Main Street, Monroe, NC 28112
Contact: Mr. Kristopher Carlson, P.E. (c/o Mr. Wayne Sullivan)
Phone: (704) 283-9765 (Municipal - (919) 772-5393)
Email: carlsonenv@gmail.com (wsullivan@mesco.com)

Construction Quality Assurance:

Richardson Smith Gardner & Associates, Inc.
14 N. Boylan Avenue, Raleigh, NC 27603
Contact: Mr. Stacey A. Smith, P.E.
Phone: (919) 828-0577, ext. 127
Email: stacey@rsgengineers.com

General Contractor:

Chandler Construction Services, Inc.
1511 Ninety Six Highway, Ninety Six, SC 29666
Contact: Mr. Ted Thompson
Phone: (864) 227-3221
Email: tthompson@chandlerconstruction.com

Drilling Subcontractor:

Kellet's Well Boring
3447 Fork Shoals Road, Simpsonville, SC 29680
Contact: Jason
Phone: (800) 524-1288
Email: kwellborin@aol.com

4.3 Work Area Setup and Maintenance

The TAS shall setup the work area such that the operator, his/her employees, and the public are protected while disturbing asbestos containing waste throughout the process until disposal of all asbestos waste has been completed, as follows:

- The work area shall include adequate fencing and signage to delineate the disturbance area. This fencing shall be orange safety fencing with signage stating "Potential Asbestos Containing Material Disturbance Area--Authorized Personnel Only." The fencing shall enclose enough area to adequately allow for project activities.

- The TAS is responsible for determining the locations of any covered containers, inside the fencing, that may be used to hold waste from potential asbestos containing materials. These containers should also have signage stating "Potential Asbestos Containing Material--Authorized Personnel Only."

- All waste from friable and all suspected asbestos materials must be maintained adequately wet by the contractor, properly contained and disposed of in either a designated cell or another location determined by the landfill operator/manager.

4.4 Inspection of Excavated Waste

If all excavated waste is to be treated as ACM, any excavated waste shall be placed in the covered containers as it is brought out of the bore hole or trench. The potential ACM shall be kept adequately wet in the container by the Contractor spraying the waste with water such that no particles become airborne. The container shall remain closed when active filling is not underway. It is the responsibility of the TAS to look for airborne dust from the excavated waste to ensure that the waste is adequately wet at all times.

If there is potential for ACM in the excavated waste and an AAI will be inspecting each load to determine if the waste is suspect, the following procedure shall be followed. As waste is excavated from the well or trench, it will be placed

adjacent to the excavation location. An AAI shall observe the waste for signs of asbestos containing material. If the excavated waste does not appear to be contaminated by asbestos, the waste will be promptly transported to the active face of the landfill for disposal.

If asbestos contaminated waste is identified or suspected by the AAI, the Landfill Manager shall be informed immediately and the waste shall be placed in a covered container or another TAS approved area, adjacent to the excavation location.

All excavated waste (suspect or not) shall be kept adequately wet by spraying water from an onsite tank until covered.

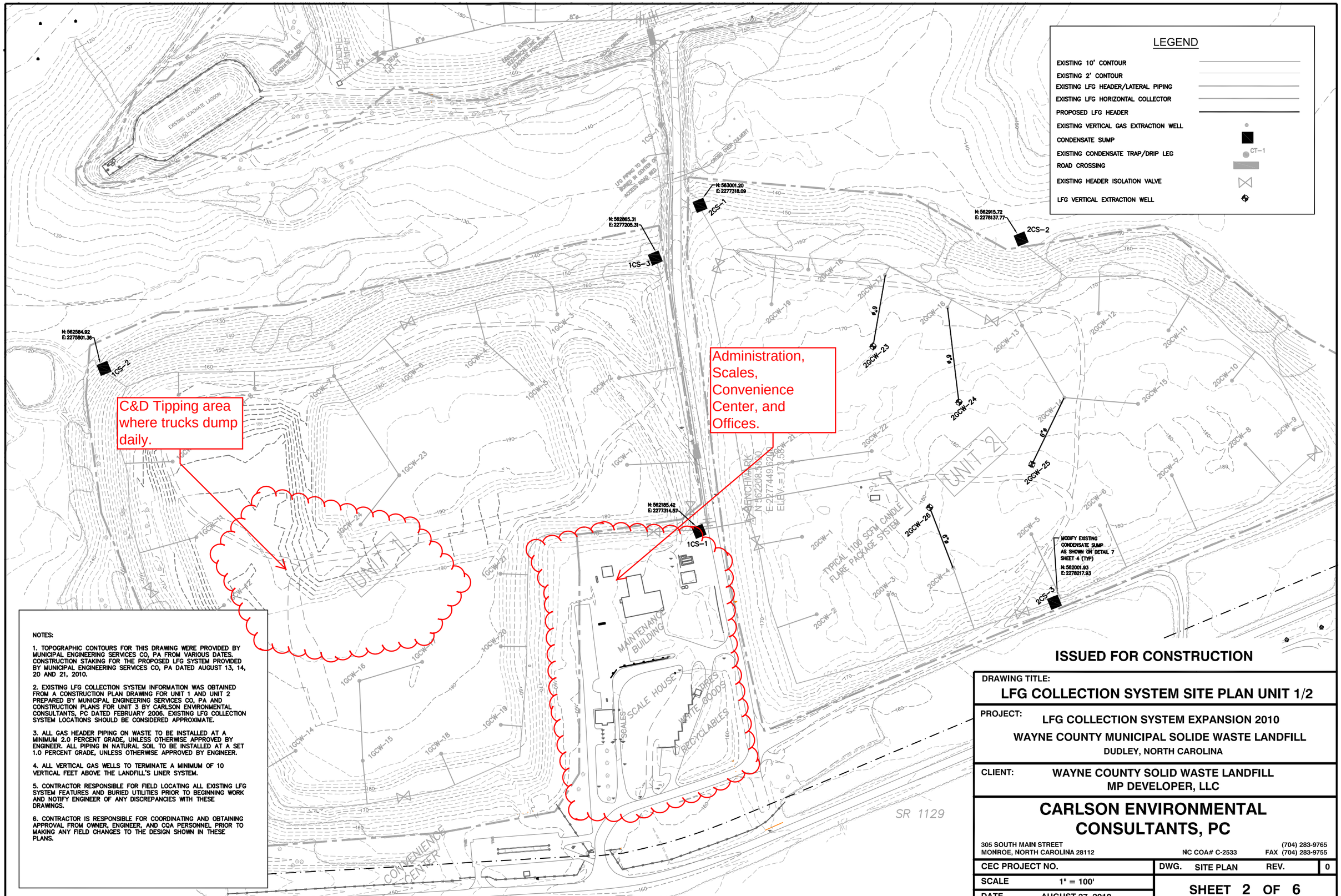
4.5 OSHA Regulations

If asbestos contaminated waste is found, the following OSHA regulations shall be followed by the contractor.

- OSHA 29 CFR 1926.1101 and
- OSHA 29 CFR 1910.1001

4.6 Disposal

All friable and all regulated asbestos containing material must be maintained adequately wet, properly contained and disposed of in either a designated cell or another location determined by the landfill operator/manager. Following the normal operating procedure for asbestos containing material waste disposal, landfill personnel should transport the waste to the asbestos containing material waste disposal area in accordance with the landfill's Operation Plan. Landfill personnel should immediately cover the relocated asbestos containing material waste with at least two (2) feet of soil, and record the location of the relocated waste. No asbestos containing waste shall leave the facility.



NOTES:

1. TOPOGRAPHIC CONTOURS FOR THIS DRAWING WERE PROVIDED BY MUNICIPAL ENGINEERING SERVICES CO, PA FROM VARIOUS DATES. CONSTRUCTION STAKING FOR THE PROPOSED LFG SYSTEM PROVIDED BY MUNICIPAL ENGINEERING SERVICES CO, PA DATED AUGUST 13, 14, 20 AND 21, 2010.

2. EXISTING LFG COLLECTION SYSTEM INFORMATION WAS OBTAINED FROM A CONSTRUCTION PLAN DRAWING FOR UNIT 1 AND UNIT 2 PREPARED BY MUNICIPAL ENGINEERING SERVICES CO, PA AND CONSTRUCTION PLANS FOR UNIT 3 BY CARLSON ENVIRONMENTAL CONSULTANTS, PC DATED FEBRUARY 2006. EXISTING LFG COLLECTION SYSTEM LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.

3. ALL GAS HEADER PIPING ON WASTE TO BE INSTALLED AT A MINIMUM 2.0 PERCENT GRADE, UNLESS OTHERWISE APPROVED BY ENGINEER. ALL PIPING IN NATURAL SOIL TO BE INSTALLED AT A SET 1.0 PERCENT GRADE, UNLESS OTHERWISE APPROVED BY ENGINEER.

4. ALL VERTICAL GAS WELLS TO TERMINATE A MINIMUM OF 10 VERTICAL FEET ABOVE THE LANDFILL'S LINER SYSTEM.

5. CONTRACTOR RESPONSIBLE FOR FIELD LOCATING ALL EXISTING LFG SYSTEM FEATURES AND BURIED UTILITIES PRIOR TO BEGINNING WORK AND NOTIFY ENGINEER OF ANY DISCREPANCIES WITH THESE DRAWINGS.

6. CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND OBTAINING APPROVAL FROM OWNER, ENGINEER, AND CQA PERSONNEL PRIOR TO MAKING ANY FIELD CHANGES TO THE DESIGN SHOWN IN THESE PLANS.

ISSUED FOR CONSTRUCTION

DRAWING TITLE:
LFG COLLECTION SYSTEM SITE PLAN UNIT 1/2

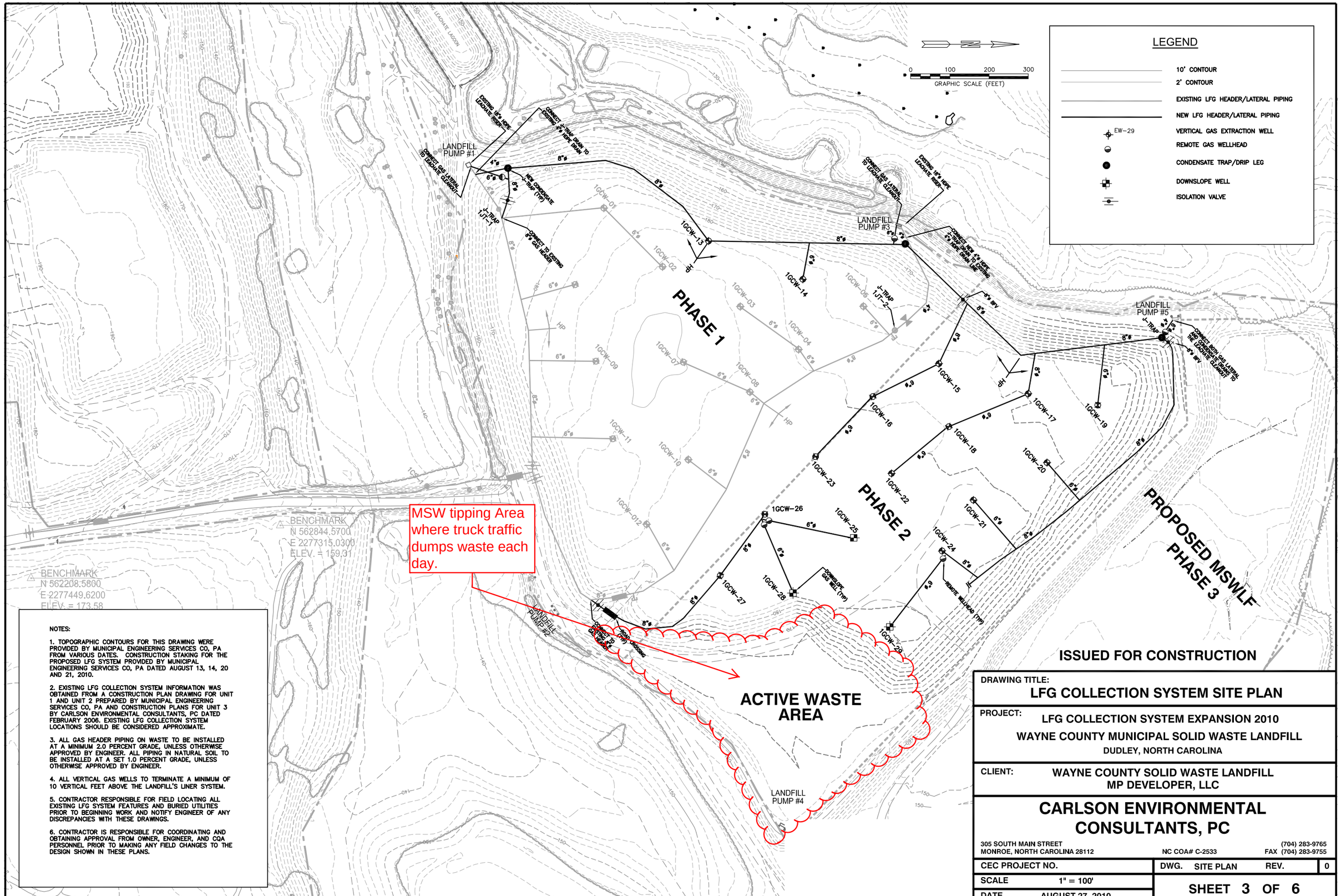
PROJECT:
LFG COLLECTION SYSTEM EXPANSION 2010
WAYNE COUNTY MUNICIPAL SOLIDE WASTE LANDFILL
DUDLEY, NORTH CAROLINA

CLIENT:
WAYNE COUNTY SOLID WASTE LANDFILL
MP DEVELOPER, LLC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

305 SOUTH MAIN STREET
MONROE, NORTH CAROLINA 28112
NC COA# C-2533
(704) 283-9765
FAX (704) 283-9755

CEC PROJECT NO.	DWG. SITE PLAN	REV.	0
SCALE 1" = 100'	SHEET 2 OF 6		
DATE AUGUST 27, 2010			



NOTES:

1. TOPOGRAPHIC CONTOURS FOR THIS DRAWING WERE PROVIDED BY MUNICIPAL ENGINEERING SERVICES CO, PA FROM VARIOUS DATES. CONSTRUCTION STAKING FOR THE PROPOSED LFG SYSTEM PROVIDED BY MUNICIPAL ENGINEERING SERVICES CO, PA DATED AUGUST 13, 14, 20 AND 21, 2010.

2. EXISTING LFG COLLECTION SYSTEM INFORMATION WAS OBTAINED FROM A CONSTRUCTION PLAN DRAWING FOR UNIT 1 AND UNIT 2 PREPARED BY MUNICIPAL ENGINEERING SERVICES CO, PA AND CONSTRUCTION PLANS FOR UNIT 3 BY CARLSON ENVIRONMENTAL CONSULTANTS, PC DATED FEBRUARY 2006. EXISTING LFG COLLECTION SYSTEM LOCATIONS SHOULD BE CONSIDERED APPROXIMATE.

3. ALL GAS HEADER PIPING ON WASTE TO BE INSTALLED AT A MINIMUM 2.0 PERCENT GRADE, UNLESS OTHERWISE APPROVED BY ENGINEER. ALL PIPING IN NATURAL SOIL TO BE INSTALLED AT A SET 1.0 PERCENT GRADE, UNLESS OTHERWISE APPROVED BY ENGINEER.

4. ALL VERTICAL GAS WELLS TO TERMINATE A MINIMUM OF 10 VERTICAL FEET ABOVE THE LANDFILL'S LINER SYSTEM.

5. CONTRACTOR RESPONSIBLE FOR FIELD LOCATING ALL EXISTING LFG SYSTEM FEATURES AND BURIED UTILITIES PRIOR TO BEGINNING WORK AND NOTIFY ENGINEER OF ANY DISCREPANCIES WITH THESE DRAWINGS.

6. CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND OBTAINING APPROVAL FROM OWNER, ENGINEER, AND CQA PERSONNEL PRIOR TO MAKING ANY FIELD CHANGES TO THE DESIGN SHOWN IN THESE PLANS.

ISSUED FOR CONSTRUCTION

DRAWING TITLE:
LFG COLLECTION SYSTEM SITE PLAN

PROJECT:
LFG COLLECTION SYSTEM EXPANSION 2010
WAYNE COUNTY MUNICIPAL SOLID WASTE LANDFILL
DUDLEY, NORTH CAROLINA

CLIENT:
WAYNE COUNTY SOLID WASTE LANDFILL
MP DEVELOPER, LLC

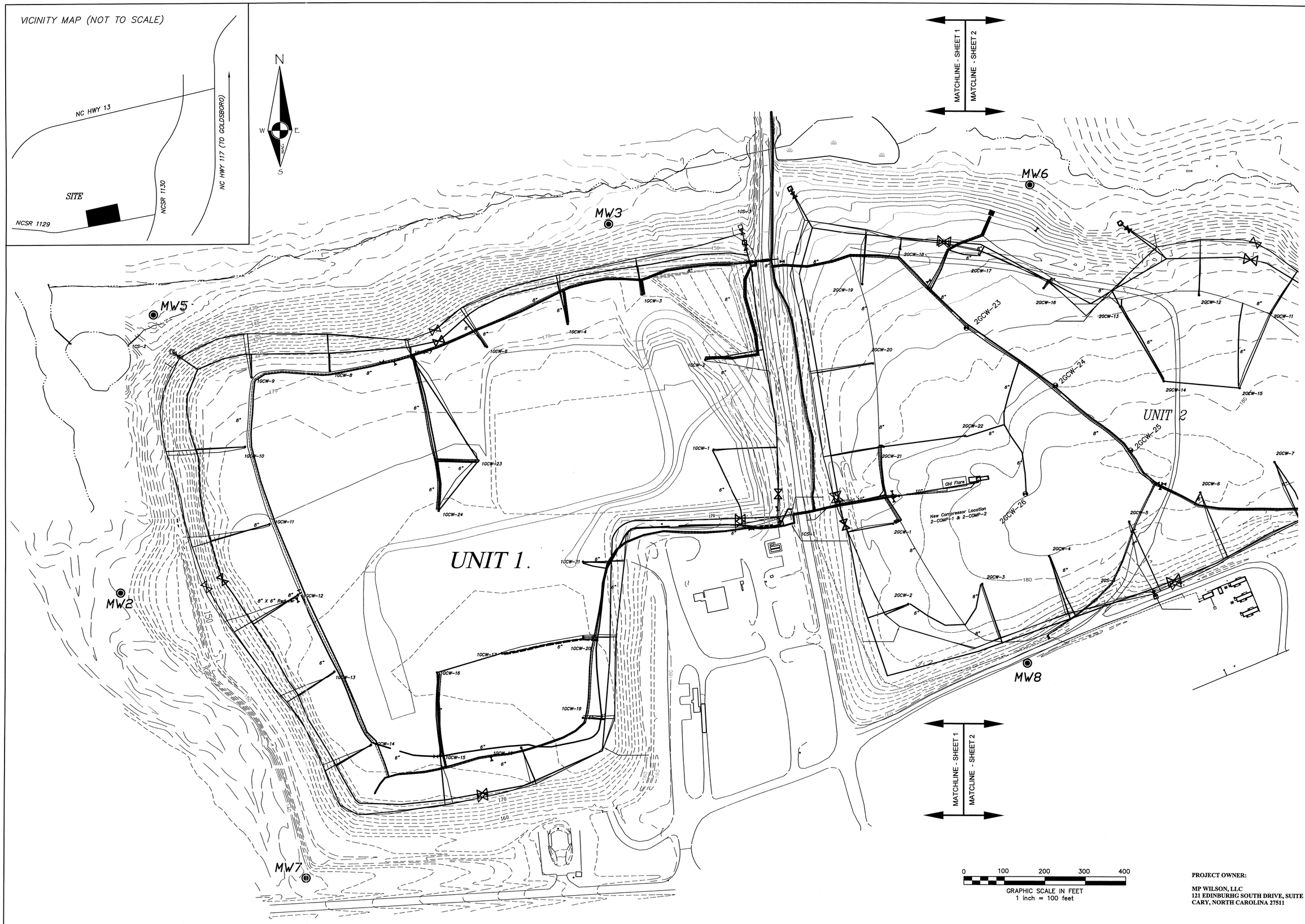
CARLSON ENVIRONMENTAL CONSULTANTS, PC

305 SOUTH MAIN STREET
MONROE, NORTH CAROLINA 28112
NC COA# C-2533
(704) 283-9765
FAX (704) 283-9755

CEC PROJECT NO.		DWG. SITE PLAN	REV. 0
SCALE	1" = 100'	SHEET 3 OF 6	
DATE	AUGUST 27, 2010		

ATTACHMENT D

AS-BUILT SURVEY DRAWINGS



I, Randy D. Ward, a Professional Land Surveyor, certify that the data of precision is 1:10,000+ and that this map meet s the minimum standards prescribed for land surveying in North Carolina.

Witness my hand and seal this 22nd day of August, 2012.

Randy D. Ward

RANDY D. WARD
PROFESSIONAL LAND SURVEYOR
9696 RALPH WARD TRAIL
ASH, NC 28420
910-287-6556

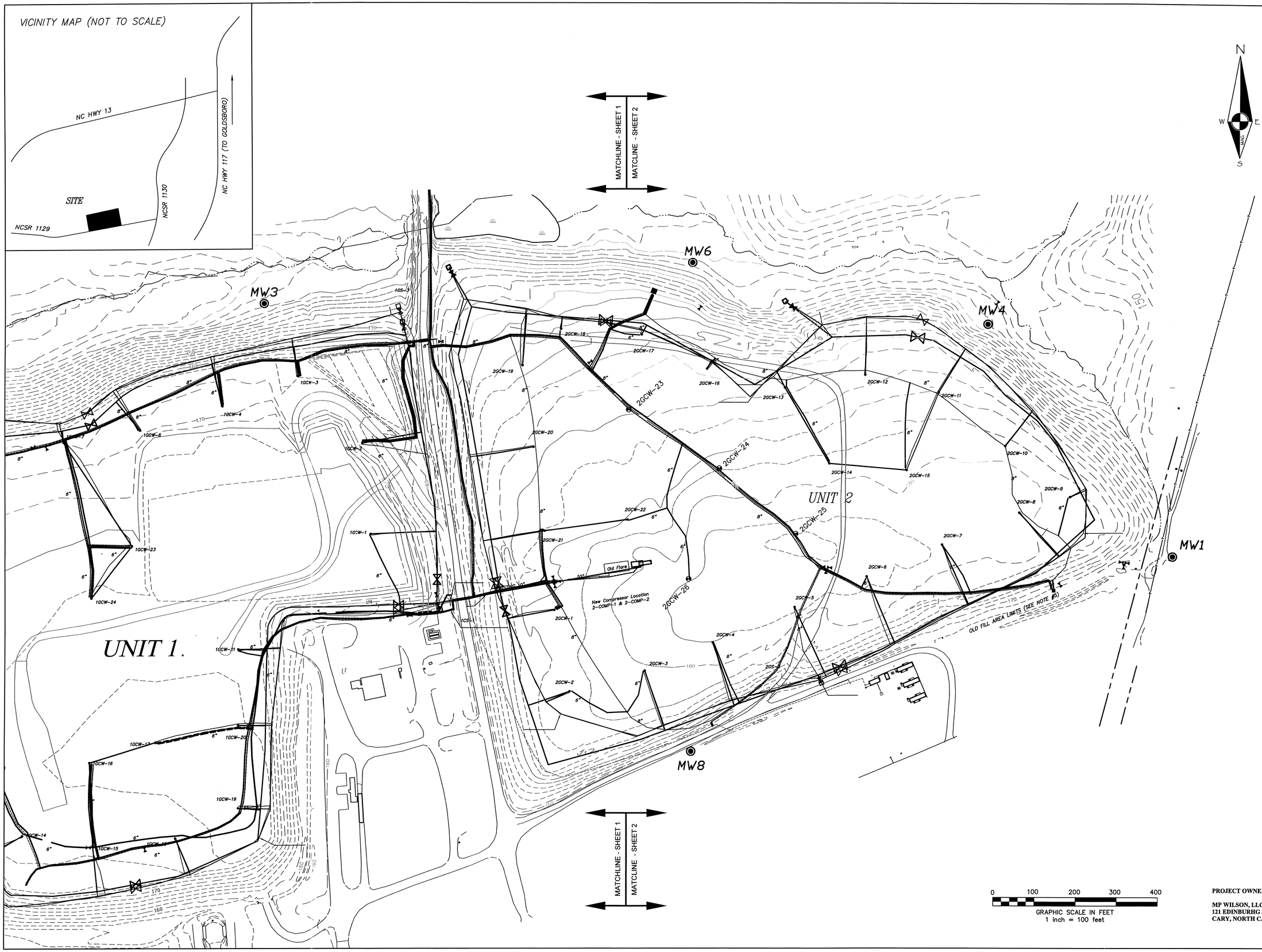
An As-Built Drawing of
WAYNE COUNTY LFG EXPANSION
Wayne County, North Carolina

PROJECT OWNER:

MP WILSON, LLC
121 EDINBURHG SOUTH DRIVE, SUITE 207
CARY, NORTH CAROLINA 27511

FIELDWORK: JBB
DRAWN BY: JBB
CHECKED BY: JBB
DRAWING DATE: 08/22/2012
DRAWING SCALE: 1" = 100'

SHEEET 1 0F 2



I, Randy D. Ward, a Professional Land Surveyor, certify that the data of elevation in 1.0 feet and that the survey meets the minimum standards practice for land surveying in North Carolina.

Witness my hand and seal this 16 day of August, 2012.

Randy D. Ward

RANDY D. WARD
PROFESSIONAL LAND SURVEYOR
9696 RALPH WARD TRAIL
ASH, NC 28420
910-287-6556

An As-Built Drawing of
WAYNE COUNTY LFG EXPANSION
Wayne County, North Carolina

PROJECT OWNER:

MP WILSON, LLC
121 EDINBURHG SOUTH DRIVE, SUITE 207
CARY, NORTH CAROLINA 27511

FIELDWORK: JBB
DRAWN BY: JBB
CHECKED BY: JBB
DRAWING DATE: 08/22/2012
DRAWING SCALE: 1 = 100

SHEEET 2 0F 2

Spider #1, Stage I
Hole Pattern - Single Hole Pattern Starting At Sump
Number Of Collection Lines Installed - 5
Length of Each Collector Line - 150 Feet
% of Grade For Each Line - 3%

Spider #1, Stage II
Hole Pattern - Two Hole Pattern Starting At Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 84 feet
Line #2 - 102 feet
Line #3 - 154 feet
Line #4 - 150 feet
Line #5 - 148 feet
% of Grade For Each Line 3%

Spider #2, Stage I
Hole Pattern - Two Hole Pattern Starting At Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 84 feet
Line #2 - 102 feet
Line #3 - 154 feet
Line #4 - 150 feet
Line #5 - 148 feet
% of Grade For Each Line - 3%

Spider #2, Stage II
Hole Pattern - Two Hole Pattern Starting 20 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 145 feet
Line #2 - 155 feet
Line #3 - 157 feet
Line #4 - Not Installed Yet
Line #5 - Not Installed Yet
% of Grade For Each Line 3%

Spider #3, Stage I
Hole Pattern - Two Hole Pattern Starting 10 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 150 feet
Line #2 - 149 feet
Line #3 - 149 feet
Line #4 - 151 feet
Line #5 - 154 feet
% of Grade For Each Line - 3%

Spider #4, Stage I
Hole Pattern - Two Hole Pattern Starting 10 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 145 feet
Line #2 - 152 feet
Line #3 - 154 feet
Line #4 - 154 feet
Line #5 - 146 feet
% of Grade For Each Line - 3%

Mini Spider, Stage I
Hole Pattern - Two Hole Pattern Starting 10 Feet From Sump
Number Of Collection Lines Installed - 3
Length Of Each Collector Line - Variable - See Below
Line #1 - 74 feet
Line #2 - 157 feet
Line #3 - 145 feet
% of Grade For Each Line - 3%

Spider #5, Stage I
Hole Pattern - Two Hole Pattern Starting 20 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 40 feet to Tee, Plus 22 Feet, 11 Feet On Each Side Of Tee, Total Of 62 Feet
Line #2 - 160 feet
Line #3 - 160 feet
Line #4 - 155 feet
Line #5 - 140 feet
% of Grade For Each Line - See Below
Line #1 - 3%
Line #2 - 3%
Line #3 - 3%
Line #4 - 3%
Line #5 - 3%

Spider #6, Stage I
Hole Pattern - Two Hole Pattern Starting 20 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 157 feet
Line #2 - 157 feet
Line #3 - 159 feet
Line #4 - 157 feet
Line #5 - 147 feet
% of Grade For Each Line - See Below
Line #1 - 3%
Line #2 - 3%
Line #3 - 3%
Line #4 - 65 feet @ 4.5%, 92 Feet @ 2.25%
Line #5 - 3%

Spider #7, Stage I
Hole Pattern - Two Hole Pattern Starting 20 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 158 feet
Line #2 - 157 feet
Line #3 - 157 feet
Line #4 - 158 feet
Line #5 - 170 feet
% of Grade For Each Line - See Below
Line #1 - 3%
Line #2 - 3%
Line #3 - 3%
Line #4 - 3%
Line #5 - 3%

Spider #8, Stage I
Hole Pattern - Two Hole Pattern Starting 20 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 151 feet
Line #2 - 104 feet
Line #3 - 151 feet
Line #4 - 140 feet
Line #5 - 150 feet
% of Grade For Each Line - See Below
Line #1 - 3%
Line #2 - 3%
Line #3 - 3%
Line #4 - 3%
Line #5 - 3%

Spider #8, Stage II
Hole Pattern - Two Hole Pattern Starting 20 Feet From Sump
Number Of Collection Lines Installed - 5
Length Of Each Collector Line - Variable - See Below
Line #1 - 150 feet
Line #2 - 150 feet
Line #3 - 159 feet
Line #4 - 150 feet
Line #5 - 153 feet
% of Grade For Each Line - See Below
Line #1 - 3%
Line #2 - 3%
Line #3 - 3%
Line #4 - 3%
Line #5 - 3%

SPIDER SUMP DATA

SP-1
Base Elev. 163.87
Invert Elev. 168.20

SP-1-Stage II
Invert Elev. 186.60

SP-2
Base Elev. 165.32
Invert Elev. 169.65

SP-2-Stage II
Invert Elev. 187.03

SP-3
Base Elev. 166.26
Invert Elev. 171.09

SP-4
Base Elev. 163.85
Invert Elev. 167.90

Mini SP
Base Elev. 160.32
Invert Elev.164.30

SP-5
Base Elev. 160.72
Invert Elev. 164.80

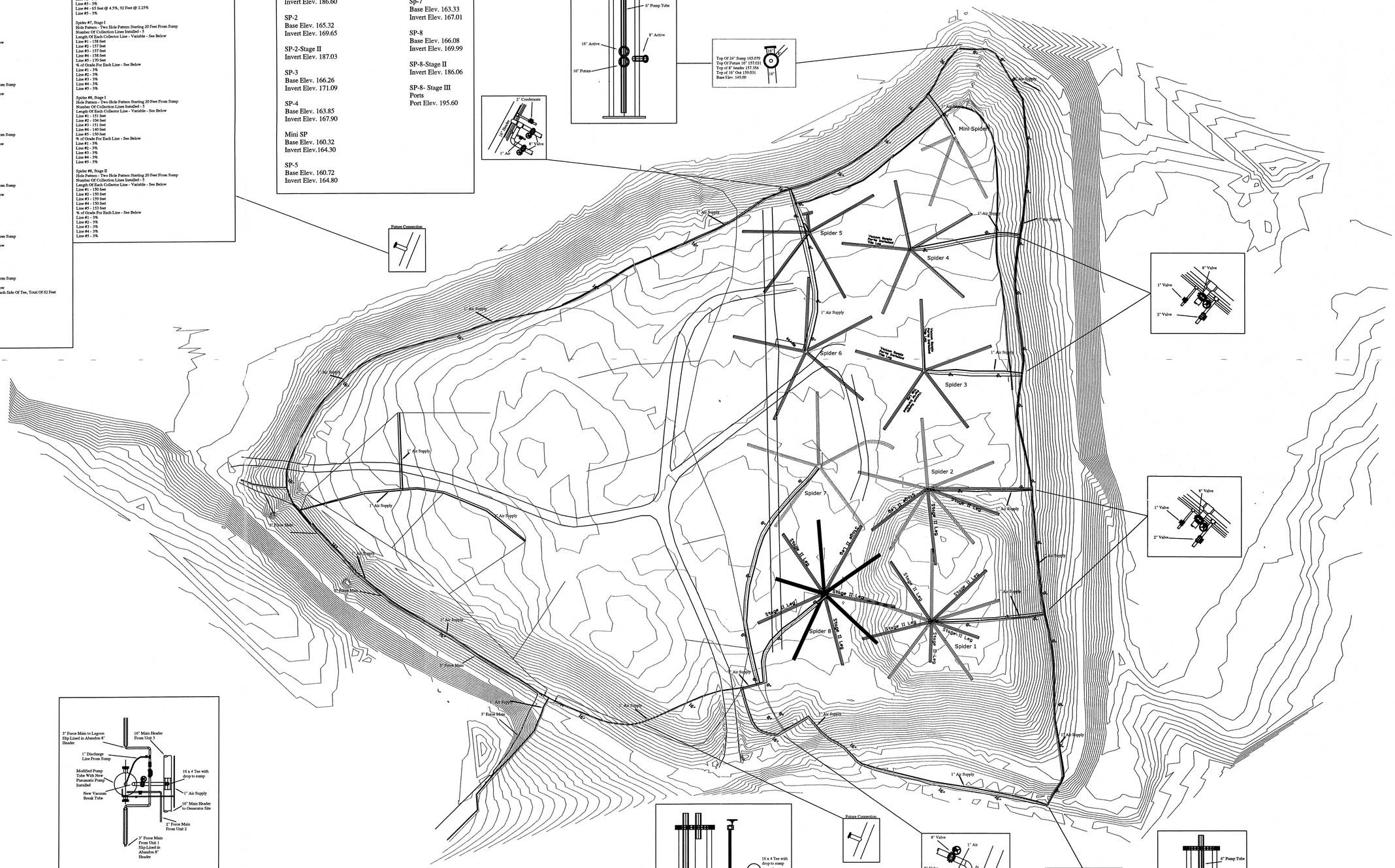
SP-6
Base Elev. 162.80
Invert Elev. 166.88

Sp-7
Base Elev. 163.33
Invert Elev. 167.01

SP-8
Base Elev. 166.08
Invert Elev. 169.99

SP-8-Stage II
Invert Elev. 186.06

SP-8- Stage III
Ports
Port Elev. 195.60



I, Randy D. Ward, a Professional Land Surveyor, certify that the ratio of precision is 1:10,000+ and that this survey meets the minimum standards practice for land surveying in North Carolina.

Witness my hand and seal this 22nd day of August, 2012.

Randy D. Ward

RANDY D. WARD
PROFESSIONAL LAND SURVEYOR
9696 RALPH WARD TRAIL
ASH, NC 28420
910-287-6556

An As-Built Drawing of
WAYNE COUNTY LFG EXPANSION
Wayne County, North Carolina

PROJECT OWNER:

MP WAYNE, LLC
121 EDINBURHG SOUTH DRIVE, SUITE 207
CARY, NORTH CAROLINA 27511

FIELDWORK : JBB
DRAWN BY : RBT
CHECKED BY : RDW
DRAWING DATE: 08/22/2012
DRAWING SCALE: 1" = 100'

ATTACHMENT E

PRESSURE TEST RESULTS

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

DATE: 10/28/2010 13:27
RECORDED BY: Matt Lamb
JOB NO: MPW-10-3
PAGE: _____of_____

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	1.5	nominal pipe size, inches
L =	1275	length of test section, feet
K =	1	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**42.50**	**seconds**
	0.71	**minutes**
	0.01	**hours**

Pressure Test Field Log

Contractor or Company: Gaines Construction

Pipe Line Description: 2" HDPE air line
(*material, thickness rating, etc.*)

Section Tested: From: Condensate knockout sump at trreatment skid to stub outs across road

To: Tie-ins to existing units 1, 2, and 3

Test Section: Diameter: 2" OD Length: 1275

Test Start Time/Date: 12:50 PM Maximum Start Pressure (psig): 106

Test End Time/Date: 12:55 PM Maximum End Pressure (psig): 106

Total Test Time: 0:05 Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

DATE: ##############
RECORDED BY: Matt Lamb
JOB NO: MPW-10-3
PAGE: _____of_____

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	14	nominal pipe size, inches
L =	75	length of test section, feet
K =	1	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**396.67**	**seconds**
	6.61	**minutes**
	0.11	**hours**

Pressure Test Field Log

Contractor or Company: Gaines Construction

Pipe Line Description: 16" SDR 17 HDPE, 75 feet
(*material, thickness rating, etc.*)

Section Tested: From: Valve at asphalt road crossing

To: Tie-ins to existing units 1, 2, and 3

Test Section: Diameter: 14" nom. ID Length: 75

Test Start Time/Date: 2:20 PM Maximum Start Pressure (psig): 4.95

Test End Time/Date: 2:28 PM Maximum End Pressure (psig): 4.9

Total Test Time: 0:08 Total Pressure Drop (psig): 0.05

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

DATE: 10/27/2010 8:59
RECORDED BY: Matt Lamb
JOB NO: MPW-10-3
PAGE: _____of_____

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	14	nominal pipe size, inches
L =	1600	length of test section, feet
K =	9.3856	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**3722.95**	**seconds**
	62.05	**minutes**
	1.03	**hours**

Pressure Test Field Log

Contractor or Company: Gaines Construction

Pipe Line Description: 16" SDR 17 HDPE, 1600 feet
(*material, thickness rating, etc.*)

Section Tested: From: Ball in condensate knockout sump

To: Valve at asphalt road crossing

Test Section: Diameter: 14" nom. ID Length: 1600

Test Start Time/Date: 7:48 AM Maximum Start Pressure (psig): 4.95

Test End Time/Date: 8:55 AM Maximum End Pressure (psig): 4.95

Total Test Time: 1:07 Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES
14 N BOLYAN AVENUE
RALEIGH, NORTH CAROLINA 27603

SHEET: 1 of 1
JOB #: MPW-10-3
DATE: 1/24/11
BY: MSL
CHKD BY: JKB

MP Wayne, LLC - Wayne County Landfill
Hydrostatic Pressure Test Documentation (ASTM F 2164)

Test Procedure: ASTM F 2164

Date: 1/14/2011

Contractor: Crowder Construction

Test Observed by: Matt Lamb, RSG

Description: Testing approx. 230 linear feet of 2" SDR 11 HDPE condenstate drain line from the flare station condensate knockout sump under South Landfill Road to the sewer force main tap point. Line was pressurized to 62 psig at 6:45 am. At 11:54 am, pressure was released to 52 psig and observed for 1 hour. Pressure was released at 1:00 pm after test completion

Calculations:

Pressure Correction: $$Pc = \frac{(Pt + 14.7)(Tt + 273)}{(Ti + 273)}$$

% Pressure Drop: $$\frac{Pc - Pi}{Pc} \times 100\%$$

where:

T_t = Temperature in ^oC at time "t"
T_i = Initial temperature in ^oC
P_t = Test pressure in psig at time "t"
P_i = Initial test pressure in psig =
P_c = Pressure in psig corrected for temperature (Tt) at time "t"
t = Time in minutes from start of the test

Pressure Test Results (See Notes 1 and 2):

Time (min)	**Tt** Temp. (^oC)	**Pt** Guage Pressure (psig)	**Pc** Corrected Pressure (psi)	**% Pressure Drop**
0	1.6	52.0	52.4	0.0%
10	1.6	52.0	52.4	0.0%
20	1.6	52.0	52.4	0.0%
30	2.2	52.0	52.5	0.3%
40	2.2	52.0	52.5	0.3%
50	2.2	52.0	52.5	0.3%
60	2.2	52.0	52.5	0.3%

Notes:

1 Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.

2 Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): **PASS**

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 12/21/2010

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	6	nominal pipe size, inches
L =	680	length of test section, feet
K =	1.70952	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**290.62**	**seconds**
	4.84	**minutes**
	0.08	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 6" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: North CPS

To: 8" valve between wells 2GCW-5 & 6

Test Section: Diameter: 6 Length: 2150

Test Start Time/Date: 12/21/2010 12:30 Maximum Start Pressure (psig): 5

Test End Time/Date: 12/21/2010 1:30 Maximum End Pressure (psig): 5

Total Test Time: 60 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes: The pressure test was performed on the 8" header & 6" laterals lines simultaneously.

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 12/21/2010

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	8	nominal pipe size, inches
L =	2150	length of test section, feet
K =	7.2068	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**1633.54**	**seconds**
	27.23	**minutes**
	0.45	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 8" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: North CPS

To: 8" valve between wells 2GCW-5 & 6

Test Section: Diameter: 8 Length: 2150

Test Start Time/Date: 12/21/2010 12:30 Maximum Start Pressure (psig): 5

Test End Time/Date: 12/21/2010 1:30 Maximum End Pressure (psig): 5

Total Test Time: 60 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes: The pressure test was performed on the 8" header & 6" laterals lines simultaneously.

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 1/8/2011

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	6	nominal pipe size, inches
L =	500	length of test section, feet
K =	1.257	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**213.69**	**seconds**
	3.56	**minutes**
	0.06	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 6" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: 8" valve between wells 2GCW-5 & 6

To: 8" valve at 16" main header near 2GCWA-19

Test Section: Diameter: 6 Length: 500

Test Start Time/Date: 1/8/2011 3:20 Maximum Start Pressure (psig): 5

Test End Time/Date: 1/8/2011 3:50 Maximum End Pressure (psig): 5

Total Test Time: 30 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes: The pressure test was performed on the 8" header & 6" laterals lines simultaneously.

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 1/8/2011

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	8	nominal pipe size, inches
L =	1500	length of test section, feet
K =	5.028	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**1139.68**	**seconds**
	18.99	**minutes**
	0.32	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 8" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: 8" valve between wells 2GCW-5 & 6

To: 8" valve at 16" main header near 2GCWA-19

Test Section: Diameter: 8 Length: 1500

Test Start Time/Date: 1/8/2011 3:20 Maximum Start Pressure (psig): 5

Test End Time/Date: 1/8/2011 3:50 Maximum End Pressure (psig): 5

Total Test Time: 30 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes: The pressure test was performed on the 8" header & 6" laterals lines simultaneously.

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 1/25/2011

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	16	nominal pipe size, inches
L =	1300	length of test section, feet
K =	8.7152	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**3950.89**	**seconds**
	65.85	**minutes**
	1.10	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 16" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: Unit 3, South Side

To: Unit 2 @ County Flare

Test Section: Diameter: 16 Length: 1300

Test Start Time/Date: 1/25/2011 Maximum Start Pressure (psig): 5

Test End Time/Date: 1/25/2011 Maximum End Pressure (psig): 5

Total Test Time: 66 minutes Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes: The pressure test was performed on the 8" header & 6" laterals lines simultaneously.

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 3/28/2011

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	16	nominal pipe size, inches
L =	1200	length of test section, feet
K =	8.0448	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**3646.98**	**seconds**
	60.78	**minutes**
	1.01	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 16" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: 16" Main Valve Location, South Side

To: Wayne County Leachate Pump # 4

Test Section: Diameter: 16 Length: 1200

Test Start Time/Date: 1/30/2011 10:30 Maximum Start Pressure (psig): 5

Test End Time/Date: 1/30/2011 11:31 Maximum End Pressure (psig): 5

Total Test Time: 61 minutes Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 3/28/2011

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	8	nominal pipe size, inches
L =	950	length of test section, feet
K =	3.1844	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**721.80**	**seconds**
	12.03	**minutes**
	0.20	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 8" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: Unit 3, Spider Collectors 1 and 2 to

To: Wayne County Leachate Pump # 4

Test Section: Diameter: 8 Length: 950

Test Start Time/Date: 1/28/2011 1:45 Maximum Start Pressure (psig): 5

Test End Time/Date: 1/28/2011 1:58 Maximum End Pressure (psig): 5

Total Test Time: 13 minutes Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 2/3/2011

RECORDED BY: Britt Ransom

JOB NO: MPW 10-3

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	2	nominal pipe size, inches
L =	2000	length of test section, feet
K =	1.676	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**94.97**	**seconds**
	1.58	**minutes**
	0.03	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 2" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: 16" Main Header at Unit 2, West Side

To: 2" Tie-in with Crowder Line

Test Section: Diameter: 2 Length: 2000

Test Start Time/Date: 2/3/2011 1:13 Maximum Start Pressure (psig): 90

Test End Time/Date: 2/3/2011 3:13 Maximum End Pressure (psig): 90

Total Test Time: 120 minutes Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes: The high pressure test was allowed in lieu of Hydrostatic Test per Stacey Smith

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 12/6/2011

RECORDED BY: Britt Ransom

JOB NO: Chandler 11-1

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	8	nominal pipe size, inches
L =	613	length of test section, feet
K =	2.054776	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**465.75**	**seconds**
	7.76	**minutes**
	0.13	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 8" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: Header on South Side of Unit 3

To: RC - 7

Test Section: Diameter: 8" Length: 800'

Test Start Time/Date: 12/6/2011 Maximum Start Pressure (psig): 5

Test End Time/Date: 12/6/2011 Maximum End Pressure (psig): 5

Total Test Time: 8 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 12/6/2011

RECORDED BY: Britt Ransom

JOB NO: Chandler 11-1

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	8	nominal pipe size, inches
L =	358	length of test section, feet
K =	1.200016	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**272.00**	**seconds**
	4.53	**minutes**
	0.08	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 8" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: Header on South Side of Unit 3

To: RC - 8

Test Section: Diameter: 8" Length: 358

Test Start Time/Date: 12/6/2011 Maximum Start Pressure (psig): 5

Test End Time/Date: 12/6/2011 Maximum End Pressure (psig): 5

Total Test Time: 8 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES
14 N BOLYAN AVENUE
RALEIGH, NORTH CAROLINA 27603

SHEET:	1
JOB #:	Chandler 11-1
DATE:	12/13/11
BY:	BPR
CHKD BY:	

Wayne County Landfill
Hydrostatic Pressure Test Documentation (ASTM F 2164)

Test Procedure: ASTM F 2164

Date: 12/13/2011

Contractor: Chandler Construction

Test Observed by: Britt Ransom

Description: 2" Condensate Line from RC-7 & 8 to Pump Station # ???

Calculations:

Pressure Correction: $$Pc = \frac{(Pt + 14.7)(Tt + 273)}{(Ti + 273)}$$

% Pressure Drop: $$\frac{Pc - Pi}{Pc} \times 100\%$$

where:

T_t = Temperature in ^oC at time "t"
T_i = Initial temperature in ^oC
P_t = Test pressure in psig at time "t"
P_i = Initial test pressure in psig =
P_c = Pressure in psig corrected for temperature (Tt) at time "t"
t = Time in minutes from start of the test

Pressure Test Results (See Notes 1 and 2):

Time (min)	**Tt** Temp. (^oC)	**Pt** Guage Pressure (psig)	**Pc** Corrected Pressure (psi)	**% Pressure Drop**
0	9	66.0	68.7	0.0%
10	9	66.0	68.7	0.0%
20	10	66.0	68.9	0.2%
30	10	66.0	69.0	0.5%
40	11	66.0	69.3	0.8%
50	11	66.0	69.2	0.7%
60	11	66.0	69.3	0.8%

Notes:

1 Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.

2 Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): PASS

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 12/20/2011

RECORDED BY: Britt Ransom

JOB NO: Chandler 11-1

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	8	nominal pipe size, inches
L =	85	length of test section, feet
K =	1	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**226.67**	**seconds**
	3.78	**minutes**
	0.06	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 8" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: Valve on Header on NW Side of Unit 3

To: RC - 5

Test Section: Diameter: 8" Length: 85

Test Start Time/Date: 12/20/2011 12:56 Maximum Start Pressure (psig): 5

Test End Time/Date: 12/20/2011 1:01 Maximum End Pressure (psig): 5

Total Test Time: 5 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 12/20/2011

RECORDED BY: Britt Ransom

JOB NO: Chandler 11-1

PAGE: 1 of 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	8	nominal pipe size, inches
L =	325	length of test section, feet
K =	1.0894	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**246.93**	**seconds**
	4.12	**minutes**
	0.07	**hours**

Pressure Test Field Log

Contractor or Company: Chandler Construction

Pipe Line Description: 8" DR 17 HDPE
(*material, thickness rating, etc.*)

Section Tested: From: Valve on Header on NW Side of Unit 3

To: RC - 6

Test Section: Diameter: 8" Length: 325

Test Start Time/Date: 12/20/2011 1:22 Maximum Start Pressure (psig): 5

Test End Time/Date: 12/20/2011 1:28 Maximum End Pressure (psig): 5

Total Test Time: 5 mins Total Pressure Drop (psig): 0

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES
14 N BOLYAN AVENUE
RALEIGH, NORTH CAROLINA 27603

SHEET:	1
JOB #:	Chandler 11-1
DATE:	12/20/11
BY:	BPR
CHKD BY:	

Wayne County Landfill
Hydrostatic Pressure Test Documentation (ASTM F 2164)

Test Procedure: ASTM F 2164

Date: 12/20/2011

Contractor: Chandler Construction

Test Observed by: Britt Ransom

Description: 2" Condensate Line from RC-6 & 5 to existing 2" Condensate line at NW header

Calculations:

Pressure Correction: $$Pc = \frac{(Pt + 14.7)(Tt + 273)}{(Ti + 273)}$$

% Pressure Drop: $$\frac{Pc - Pi}{Pc} \times 100\%$$

where:

T_t = Temperature in ^oC at time "t"
T_i = Initial temperature in ^oC
P_t = Test pressure in psig at time "t"
P_i = Initial test pressure in psig =
P_c = Pressure in psig corrected for temperature (Tt) at time "t"
t = Time in minutes from start of the test

Pressure Test Results (See Notes 1 and 2):

Time (min)	**Tt** Temp. (^oC)	**Pt** Guage Pressure (psig)	**Pc** Corrected Pressure (psi)	**% Pressure Drop**
0	18	56.0	60.7	0.0%
10	18	56.0	60.6	-0.2%
20	18	56.0	60.7	-0.1%
30	19	56.0	60.8	0.1%
40	19	56.0	60.8	0.1%
50	18	56.0	60.7	-0.1%
60	18	56.0	60.6	-0.3%

Notes:

1 Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.

2 Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): PASS

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES
14 N BOLYAN AVENUE
RALEIGH, NORTH CAROLINA 27603

SHEET:	1
JOB #:	MPW 10-3
DATE:	3/28/11
BY:	BPR
CHKD BY:	

ABC Landfill - Phase 1
Hydrostatic Pressure Test Documentation (ASTM F 2164)

Test Procedure: ASTM F 2164

Date: 3/28/2011

Contractor: Chandler Construction

Test Observed by: Britt Ransom

Description: 1" and 2" condensate line from radial collectors # 1 and # 2 to East corner.

Calculations:

Pressure Correction: $$Pc = \frac{(Pt + 14.7)(Tt + 273)}{(Ti + 273)}$$

% Pressure Drop: $$\frac{Pc - Pi}{Pc} \times 100\%$$

where:

T_t = Temperature in ^oC at time "t"
T_i = Initial temperature in ^oC
P_t = Test pressure in psig at time "t"
P_i = Initial test pressure in psig =
P_c = Pressure in psig corrected for temperature (Tt) at time "t"
t = Time in minutes from start of the test

Pressure Test Results (See Notes 1 and 2):

Time (min)	**Tt** Temp. (^oC)	**Pt** Guage Pressure (psig)	**Pc** Corrected Pressure (psi)	**% Pressure Drop**
0	7	50.0	51.7	0.0%
10	7	50.0	51.7	-0.1%
20	7	50.0	51.7	-0.1%
30	7	50.0	51.7	-0.1%
40	8	50.0	51.9	0.3%
50	8	50.0	51.9	0.3%
60	7	50.0	51.7	-0.1%

Notes:

1 Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.

2 Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): PASS

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 6/7/2011

RECORDED BY: F.TERRY

JOB NO: MPW-10-3

PAGE: 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	6	nominal pipe size, inches
L =	1280	length of test section, feet
K =	3.21792	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**547.05**	**seconds**
	9.12	**minutes**
	0.15	**hours**

Pressure Test Field Log

Contractor or Company: CHANDLER CONSTRUCTION

Pipe Line Description: 6" HDPE SDR 17
(*material, thickness rating, etc.*)

Section Tested: From: Unit 1 header - south slope valve near 1GCW-18

To: Unit 1 header - north slope valve near 6"-8" transition

Test Section: Diameter: 6" Length: 1280

Test Start Time/Date: 9:35 6/7/2011 Maximum Start Pressure (psig): 4.75

Test End Time/Date: 9:57 6/7/2011 Maximum End Pressure (psig): 4.50

Total Test Time: 22 minutes Total Pressure Drop (psig): 0.25

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

Richardson Smith Gardner & Associates

ENGINEERING AND GEOLOGICAL SERVICES

DATE: 6/9/2011

RECORDED BY: F.TERRY

JOB NO: MPW-10-3

PAGE: 1

Pressure Test Report

Test Time Calculator: *NOTE - This formula should be used for pipes with nominal diameters from 4" to 30". Consult with pipe/fitting manufacturer if pipe size is outside of this range.*

Time test (*T*) is determined using the following formula from **Section 9.2** of **ASTM standard F 1417 - 92,** and modified for **0.5 psig**, as directed in **Section 9.5** of the standard. Input 1) pipe diameter and 2) length for the section tested in the shaded cells below. For multiple diameters, perform this calculation for each pipe diameter being tested, and take the sum total T.

$$T = (0.085\ DK/Q)/2$$

where:

D =	6	nominal pipe size, inches
L =	340	length of test section, feet
K =	1	0.000419 DL (not less than 1.0)
Q =	0.0015	leak rate in cfm/square feet of internal surface = 0.0015 CFM/SF
T =	**170.00**	**seconds**
	2.83	**minutes**
	0.05	**hours**

Pressure Test Field Log

Contractor or Company: CHANDLER CONSTRUCTION

Pipe Line Description: 6" HDPE SDR 17
(*material, thickness rating, etc.*)

Section Tested: From: Unit 1-north 8" header from Unit 2 tie-in (8"-16")

To: Unit 1-north slope valve near 6"-8" transition

Test Section: Diameter: 6" Length: 340

Test Start Time/Date: 16:10 6/9/2011 Maximum Start Pressure (psig): 5.00

Test End Time/Date: 16:25 6/9/2011 Maximum End Pressure (psig): 5.00

Total Test Time: 15 minutes Total Pressure Drop (psig): 0.00

Test Result (circle one): Pass (pressure drop less than 0.5 psig)
Fail (pressure drop greater than 0.5 psig)

Leak Location (if Fail):

Notes:

RICHARDSON SMITH GARDNER & ASSOCIATES
Engineering and Geological Services
14 N. Boylan Avenue Tel: 919-828-0577
Raleigh, NC 27603 Fax: 919-828-3899

JOB #: Chandler 12-1
DATE: 5/15/12
BY: BSH
CHKD BY:

Wayne County Landfill
Hydrostatic Pressure Test Documentation (ASTM F 2164)

Test Procedure: ASTM F 2164

Date: 5/15/2012

Contractor: Chandler Construction / Bob Gettys

Test Observed by: Byron Hackney

Description: Test Section one (1) - 2 inch HDPE forcemain(Unit 1 & Unit 2) pressurized to 63psi for 4hrs starting at 12:30pm. 3psi of pressure drop during equalization. 50psi was then maintained for 1hr.

Calculations:

Pressure Correction: $$Pc = \frac{(Pt + 14.7)(Tt + 273)}{(Ti + 273)}$$

% Pressure Drop: $$\frac{Pc - Pi}{Pc} \times 100\%$$

where:

T_t = Temperature in ^oC at time "t"
T_i = Initial temperature in ^oC
P_t = Test pressure in psig at time "t"
P_i = Initial test pressure in psig =
P_c = Pressure in psig corrected for temperature (Tt) at time "t"
t = Time in minutes from start of the test

Pressure Test Results (See Notes 1 and 2):

Time (min)	**Tt** Temp. (^oC)	**Tt** Temp. (^oF)	**Pt** Guage Pressure (psig)	**Pc** Corrected Pressure (psi)	**% Pressure Drop**
0	22	**72**	50.0	55.3	0.0%
10	22	**72**	50.0	55.3	0.0%
20	22	**72**	50.0	55.3	0.0%
30	22	**72**	50.0	55.3	0.0%
40	22	**72**	50.0	55.3	0.0%
50	21	**70**	50.0	55.0	-0.5%
60	20	**68**	50.0	54.7	-1.0%

Notes:

1. Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.
2. Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): Pass

RICHARDSON SMITH GARDNER & ASSOCIATES
Engineering and Geological Services
14 N. Boylan Avenue Tel: 919-828-0577
Raleigh, NC 27603 Fax: 919-828-3899

SHEET:	1 of 1
JOB #:	Chandler 12-1
DATE:	4/15/12
BY:	BSH
CHKD BY:	

Wayne County Landfill
Hydrostatic Pressure Test Documentation (ASTM F 2164)

Test Procedure: ASTM F 2164

Date: 4/15/2012

Contractor: Chandler Construction / Bob Gettys

Test Observed by: Byron Hackney

Description: Test section (2) - 2 inch HDPE forcemain(Unit 3) pressurized to 67psi for 4hrs starting at 2:00pm. No pressure drop during equalization. 57psi was then maintained for 1hr.

Calculations:

Pressure Correction: $$Pc = \frac{(Pt + 14.7)(Tt + 273)}{(Ti + 273)}$$

% Pressure Drop: $$\frac{Pc - Pi}{Pc} \times 100\%$$

where:

T_t = Temperature in ^oC at time "t"
T_i = Initial temperature in ^oC
P_t = Test pressure in psig at time "t"
P_i = Initial test pressure in psig =
P_c = Pressure in psig corrected for temperature (Tt) at time "t"
t = Time in minutes from start of the test

Pressure Test Results (See Notes 1 and 2):

Time (min)	**Tt** Temp. (^oC)	**Tt** Temp. (^oF)	**Pt** Guage Pressure (psig)	**Pc** Corrected Pressure (psi)	**% Pressure Drop**
0	20	**68**	57.0	62.3	0.0%
10	20	**68**	57.0	62.3	0.0%
20	20	**68**	57.0	62.3	0.0%
30	20	**68**	57.0	62.3	0.0%
40	19	**67**	57.0	62.1	-0.2%
50	19	**67**	57.0	62.1	-0.2%
60	19	**67**	57.0	62.1	-0.2%

Notes:

1. Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.
2. Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): Pass

RICHARDSON SMITH GARDNER & ASSOCIATES
Engineering and Geological Services
14 N. Boylan Avenue Tel: 919-828-0577
Raleigh, NC 27603 Fax: 919-828-3899

SHEET:	1 of 1
JOB #:	Chandler 12-1
DATE:	5/16/12
BY:	BSH
CHKD BY:	

Wayne County Landfill
Hydrostatic Pressure Test Documentation (ASTM F 2164)

Test Procedure: ASTM F 2164

Date: 5/16/2012

Contractor: Chandler Construction / Bob Gettys

Test Observed by: Byron Hackney

Description: Test section three(3) - 2 inch HDPE forcemain pressurized to 60psi for 4hrs starting at 9:30am. 5psi pressure drop during equalization. 45psi was then maintained for 1hr.

Calculations:

Pressure Correction: $$Pc = \frac{(Pt + 14.7)(Tt + 273)}{(Ti + 273)}$$

% Pressure Drop: $$\frac{Pc - Pi}{Pc} \times 100\%$$

where:

T_t = Temperature in ^oC at time "t"
T_i = Initial temperature in ^oC
P_t = Test pressure in psig at time "t"
P_i = Initial test pressure in psig =
P_c = Pressure in psig corrected for temperature (Tt) at time "t"
t = Time in minutes from start of the test

Pressure Test Results (See Notes 1 and 2):

Time (min)	**Tt** Temp. (^oC)	**Tt** Temp. (^oF)	**Pt** Guage Pressure (psig)	**Pc** Corrected Pressure (psi)	**% Pressure Drop**
0	28	**83**	45.0	51.2	0.0%
10	28	**83**	45.0	51.2	0.0%
20	28	**83**	45.0	51.2	0.0%
30	29	**84**	45.0	51.3	0.2%
40	29	**84**	45.0	51.3	0.2%
50	29	**85**	45.0	51.4	0.5%
60	29	**85**	45.0	51.4	0.5%

Notes:

1. Per ASTM F 2164, pressurize pipe for 4 hours, reduce pressure by 10 psi, and then begin the 1 hour test period.
2. Per ASTM F 2164, a passing test is indicated by no visual leakage and the test pressure remaining steady (within 5% of the pressure at the start of the test) for the 1 hour test period.

Test Result (Pass/Fail): Pass

Chao, Ming-tai

From: Stacey Smith <stacey@smithgardnerinc.com>
Sent: Tuesday, September 04, 2012 11:50 AM
To: Chao, Ming-tai
Cc: Haworth, Simon; Pedreira, Rebecca; Bob Gettys; 'Ryan Hennessy'; 'King, Henry'; 'Bird, David'; Matt Lamb; Tim.Rogers@waynegov.com
Subject: Wayne County Landfill Gas System Expansion Record Report
Attachments: FINAL_PDF_with attachments_ Letter Report Wayne Co LFGGCCS_090412.pdf

Ming,

Please find the construction report for all of the landfill gas system expansion work to date per the Landfill Gas Management Plan at the Wayne County Landfill. Please feel free to contact me with any questions. I will drop a hard copy of this document by this afternoon as I have a meeting with Brian Wootton mid-afternoon at your place.

Thanks,

Sas

Stacey A. Smith, P.E.
President, Senior Engineer

SMITH + GARDNER

14 N. Boylan Avenue
Raleigh, NC 27603

P (919) **828.0577**
F (919) **828.3899**
C (919) **815.0803**

www.smithgardnerinc.com