

ENVIRONMENTAL SAMPLING CORPORATION

Dedicated to Environmental Monitoring, Science & Technology

June 15, 2018

Mr. Gerald DeMers, P.E.
Wisconsin Department of Natural Resources
2300 North Martin Luther King Drive
Milwaukee, WI

Dear Gerry:

RE: Delafield Sanitary Landfill Construction Documentation Report
December 2017-May 2018

On behalf of Sanitary and Transfer Landfill in Delafield, Environmental Sampling Corporation (ESC) is submitting the attached Construction Documentation Report for the improvements to the landfill gas collection system at Delafield Sanitary Landfill. In November 2017, ESC proposed to install a new Landfill Gas Header Pipe. WDNR approved the proposed remedial work and construction was initiated in December 2017.

If you have any questions or comments during your review, please do not hesitate to call Todd Watermolen, P.E. at 414-379-2897 or me at 414-427-5033.

Sincerely,



Frank Perugini
Director of Operations

cc: Jason Lowery, WDNR-Madison
Angela Carey, WDNR-Madison
Todd Watermolen, P.E.
ESC File Copy
Delafield File Copy

Delafield Sanitary Landfill

Delafield, WI

Construction Documentation Report

Active Landfill Gas Extraction System, North Header Bypass Pipe Construction, December 2017 – May 2018

**Prepared for: WDNR Solid Waste Management
101 S. Webster Ave
Madison, WI 53703**

**Prepared by: Environmental Sampling Corporation
W125S9808 North Cape Rd.
Muskego, WI 53150**

June 15, 2018

Construction Documentation Report
Active landfill gas extraction system, north header bypass
pipe construction, December, 2017 – May, 2018

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1. Introduction and Project Information

Project Overview: The Sanitary and Transfer Landfill in Delafield is an abandoned solid waste landfill that accepted approximately 2.2 million cubic yards of refuse, including municipal, commercial, and industrial wastes, between 1955 and 1979. The landfill area is approximately 42 acres. The landfill was not lined and has a vegetated soil cover. The site geology is permeable.

The landfill historically (1970's - 1980's) had significant subsurface landfill gas migration issues. The existing 42-acre landfill has an active gas extraction system that was originally installed in 1996. The system was modified and reconstructed in 2004 and 2005. Several subsequent remedial efforts have also been performed on the LFG collection infrastructure in order to provide improved performance of the system. The gas collection system has operated approximately 25% of the time over the last ten years.

Environmental monitoring performed in 2017 indicated subsurface gas migration along the northern portion of the facility and that the existing perimeter landfill gas (LFG) header piping was not functional. In November, 2017 Environmental Sampling Corporation proposed to install a new landfill gas header pipe. WDNR approved the proposed remedial work and construction was initiated in December 2017.

This report provides construction documentation of the new bypass header pipe and related connections to the existing landfill gas collection and extraction system located in the northern portion of the landfill site.

2. Project Description and Design

ESC provided a Remedial Engineering Design Memorandum to the WDNR in November 2017. The design memorandum proposed a new header pipe along the northern portion of the landfill. The new header pipe bypassed the watered out/nonfunctioning portion of the existing north perimeter landfill gas collection header system.

The ESC 2017 Remedial Design Memorandum – provided the location and details of the new proposed landfill gas collection north header pipe (6 inch diameter SDR 17 HDPE) and connection details to gas extraction wells G-2, EW-19 and EW-20. The proposed new header pipe was approximately 700 feet in length. Modifications to the layout and design would be modified in the field as needed. The slope of the pipe was maximized, but would be limited, due to existing topography and shallow waste depths.

See the attached drawings.

The new header piping would consist of 6 inch diameter HDPE SDR 17 piping. The new piping diagonals up and down the north landfill side slope. The slope of the new header pipe was designed to have the maximum slope available while servicing the three key gas extraction wells located in this portion of the landfill. The pipe trench was to be excavated with a mini-excavator. The pipe was to be placed and backfilled with pea gravel. A tracer wire and plastic caution tape were to be placed approximately six inches above the top of the pipe. Tracer wire would extend above the ground surface at the termination and angle points of the new pipe.

The header pipe burial depth would be established at a minimum depth of 2.5 feet and a maximum depth of 3.5 feet. The burial depth is measured to the top of the pipe. This burial depth was established so as to be below the frost line, minimize the excavation depth and also minimize the potential to encounter waste in the excavation process. If significant waste was encountered, the waste and contaminated soil would be segregated and stockpiled on site. Soil borings were proposed to be performed along the pipe alignment in order to establish the final pipe depth and location. Excavated waste and contaminated soil would be minimized to the extent possible.

3. Description of Construction Process

The following paragraphs provide a chronological description of the work performed and reference the construction documentation survey data, engineering drawings and photographs.

The construction of the active landfill gas extraction system, north header pipe construction began on November 28th 2017. The proposed alignment of the new header pipe was surveyed in the field. Fourteen soil borings were performed along the proposed alignment on an approximate 50-foot horizontal spacing. See the attached photos. Soil borings were performed using a Caterpillar 262B rubber tracked skid steer with a 6-foot-long, 12-inch diameter auger bit. Soil boring cuttings were observed and visually classified. The borings were advanced until solid waste was encountered. The soil cover was variable in composition and in depth. The new header pipe design criteria, was to maximize the proposed header pipe slope and maintain a consistent slope. The proposed pipe alignment was adjusted slightly in the field in some areas in order to maintain a more uniform pipe slope. The proposed slope of the pipe was established by the existing topography and the soil cover thickness. Fourteen soil borings were logged and are attached in Appendix C.

On November 29th, 2017 HDPE piping materials were delivered to the site. ESC welded several pipe lengths together in 200 to 250 foot lengths and staged the pipes on the landfill in advance of the proposed construction. The HDPE piping was butt fusion welded with a 6-inch hot plate McElroy welding unit. The welding unit is powered by 120 volt AC power. All HDPE pipe joints were butt fusion welded unless otherwise noted.

ESC subcontracted Underground Power Corporation to provide earthwork services. A Caterpillar 303E rubber tracked mini-excavator was used for all of the pipe trenching and excavation work associated with the project. The mini-excavator had an approximate 12-inch wide bucket and a maximum depth of approximately 8 feet. A Caterpillar 262B rubber tracked skid steer was also used on site primarily for pea stone pipe bedding and soil backfill of the trench. A mini-excavator was utilized in order minimize the amount of excavation soils and solid waste encountered during the pipe trenching process. In addition the mini-excavator was more nimble in performing underground pipe tie in work to the existing piping systems.

On December 6th, 2017 excavation and exposure of the existing 6-inch diameter HDPE north perimeter gas collection header pipe was performed. This was located approximately 68 feet east of Head Monitoring Point Six (HMP-6) and the point of beginning, 0+00 for the construction project stationing. The existing perimeter 6-inch diameter header pipe, the one-inch diameter HDPE compressed air line and the one-inch diameter HDPE leachate force main were uncovered at this location. An approximate 3-foot section of the existing 6-inch header pipe was cut out and a new

3. Description of Construction Process (Continued)

spool piece with a 6X6 tee was installed. See photographs in Appendix B. Three six-inch diameter electro-fusion couplers were utilized at this pipe connection. The electro-fusion couplers, the associated Strongbridge electro-fusion controller and a high capacity 240 VAC generator were used to complete this aspect of the pipe installation. The controller automatically measures the coupling size and type and establishes the temperature and time required to complete the electric fusion weld process based on ambient site conditions.

Pipe connection details at the major connection points are presented and attached in Appendix A

The pipe trenching proceeded along the proposed design locations with some slight directional changes near stationing 1+60 due to shallow waste depths and non-uniform topography. The excavated trench width was approximately 12 to 18 inches and was enlarged in areas that required additional pipe fittings. The HDPE pipe was typically welded by the hot plate butt fusion welding process. If electro-fusion couplers were utilized these locations are specifically described. All pipe was bedded in clean pea stone, approximately 6 inches below, on the sides and 6 inches above the pipe. A warning ribbon and electrical trace wire were also installed approximately 6 inches above the top of pipe. Reference photo documentation and piping details. A wood 2x4 was placed vertically on the top of pipe during the backfilling process. The 2x4's were placed on approximate 50 intervals and were used to document top of pipe elevations and state plane as-built survey coordinates.

The existing 3-inch diameter HDPE lateral line for LFG well G-2 was unearthed at stationing 2+56. Two 3X6 tees were installed and connected at this pipe intersection. Two 3-inch diameter electro-fusion couplers were used to make the connection to the existing 3-inch diameter lateral line. See photo documentation and pipe details for this connection.

A 33 degree pipe bend and 6X6 Tee were installed at stationing 2+97, which is also the high point in the bypass header pipe. The Tee has an 8-foot high vertical pipe attached with a flanged end cap. The vertical pipe extends approximately 5 feet above the ground surfaces. The vertical pipe can be used as a future point of access.

At stationing 3+40 a 6X6 tee was installed and extended north for the new 6-inch diameter lateral for LFG well EW-19. The location of this Tee and lateral connection were revised to better fit, field conditions. The six-inch diameter lateral was reduced to a 3-inch diameter at LFG well EW-19. The lateral was then connected to the existing 3-inch diameter lateral, which extends north and down gradient to the existing perimeter LFG collection header. A 3-inch diameter tee was installed at this pipe transition point. A 3-inch vertical riser was installed with flange connections to the EW-19 gas well control valve.

3. Description of Construction Process (Continued)

Trench excavation through the wooded section at station 3+50 to 4+00 encountered waste at approximately 4 feet. Tree growth appeared to be doing fine under these shallow cover soil depth conditions. The trench was extended to LFG extraction well EW-20. Shallow waste depths less than 3 feet were observed between 5+30 and 7+00. As a result of the shallow waste, the depth of the trench was reduced to limit the amount of waste being excavated.

The existing 3-inch diameter lateral pipe for EW-20 was terminated and capped at the EW-20 location. See photo documentation. A 2X6 vertical tee was installed at the EW-20 location. A 2-inch diameter vertical HDPE pipe with a flanged fitting was installed at this location and connected to a control valve, flexible piping and to the EW-20 gas well.

The pipe trench excavation was extended to station 7+50. Excavation to uncover the existing header pipe was performed for several hours at approximate stationing 7+60. The existing header pipe was eventually located at a depth of approximately eight to nine feet below ground surface. This greater depth was near the maximum reach of the mini-excavator and additional health and safety steps were required to proceed with this proposed pipe connection. An old hot water heater was also unearthed at this location and set off to the side. Due to the large depth of the excavation, the measured presence of condensate (CS-3) in the existing header line, the likelihood of encountering significant quantities (greater than 100 gallons) of gas condensate liquids if a tie in were attempted, below freezing temperatures and increased health and safety issues associated with project conditions, the new by pass header pipe was temporarily terminated at station 7+32. A 90-degree elbow, vertical pipe and flanged cover, was installed at this location. The final connection to the existing perimeter LFG header pipe would be pursued in 2018.

On April 16th, 2018 CQM, Inc. performed as built survey documentation work. The survey work is summarized in Table 4. The as-built survey information was incorporated into the plan and cross section drawings. The header pipe location, burial depth and slope is in substantial conformance with the proposed design. The survey datum vertical control is based on NAVD 88. The horizontal control datum is based on USA NAD83 Wisconsin State plane coordinate system, Wisconsin south zone. These datum control systems are uniform, routinely referenced and utilized by the WDOT, local jurisdictions and regional surveying activities.

Frozen soil conditions were present on site until early to mid April 2018. On May 1, 2018 a rubber tracked skid steer was mobilized on site. The pipe excavation trench and surrounding area was graded to make the construction area uniform. The bare soil exposed during the construction project was very limited and no soil erosion was observed prior to the grading process. The trench surface soil backfill was lightly compacted during grading the process. Excess soils were placed in a slight

3. Description of Construction Process (Continued)

depression area located approximately 150 feet south of LFG well EW-20. This area was also uniformly graded. A limited amount of solid waste debris exhumed during the trench excavation process was hand picked during the soil grading process. On May 1, 2018 the disturbed soil areas were seeded. The seed mix used was a WDOT Highway mix #20. See the attached photographic documentation. Additional seeding, fertilizer and straw cover was performed on June 7, 2018 in bare areas along the trench area. The initial seed germination and green up has been established as of June 15th, 2018.

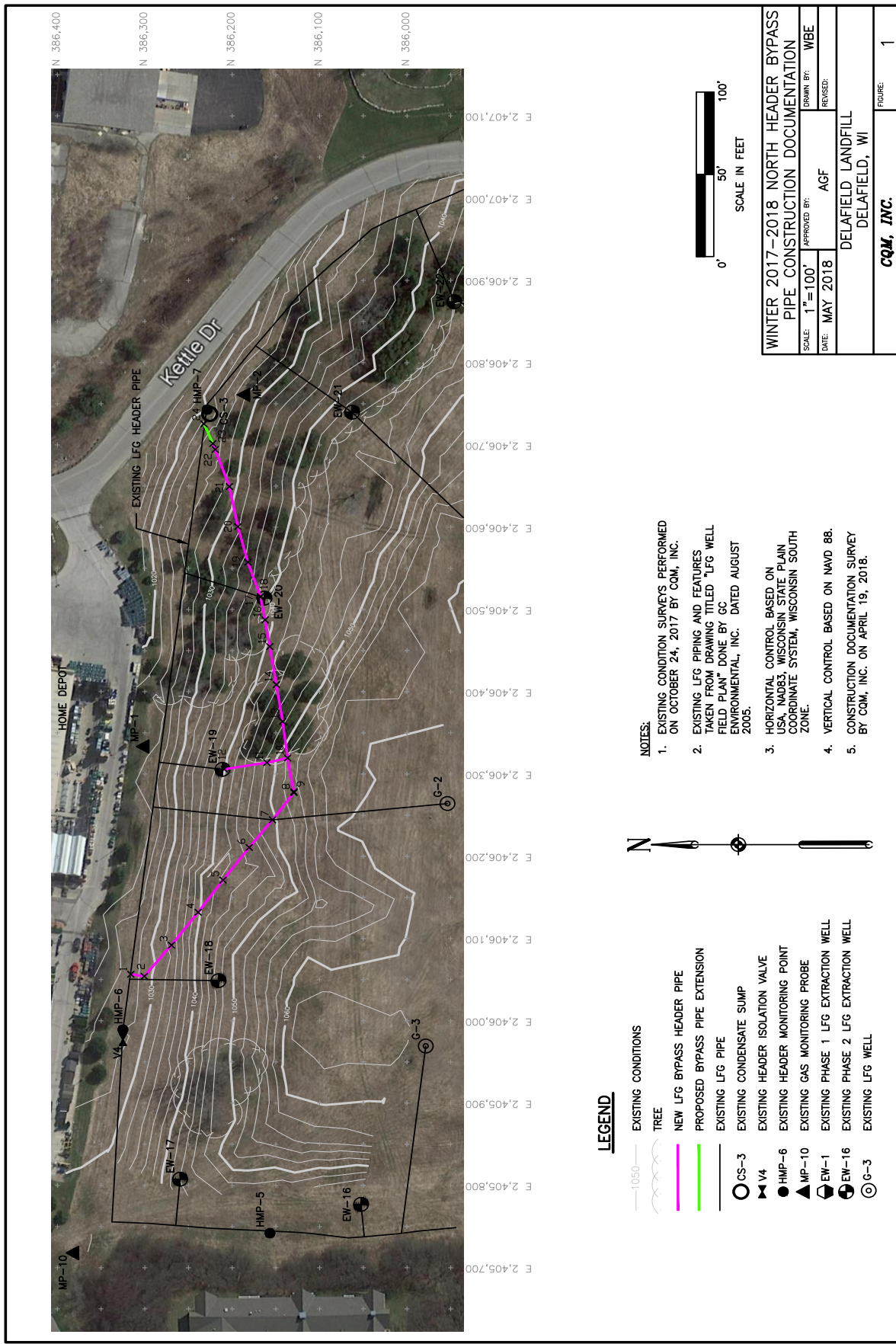
4. As-built Survey Tables

Delafield Sanitary Landfill CONSTRUCTION DOCUMENTATION TABLE 6" HDPE LFG HEADER BYPASS PIPE					
POINT NO.	STATIONING	NORTH	EAST	Top of Pipe ELEVATION	DESCRIPTION
1	0+00	386315.9	2406056.7	1024.4	0+00 TEE OFF MAIN HEADER
2	0+16	386300.5	2406054.2	1025.5	6" 45° Bend
3	0+65	386269.5	2406092.1	1029.1	6"
4	1+15	386238.9	2406132.0	1035.3	6"
5	1+63	386210.4	2406171.1	1039.4	6"
6	2+13	386180.5	2406210.8	1041.8	6"
7	2+56	386153.8	2406244.4	1046.2	3" LATERAL TO G-2
8	2+97	386129.4	2406277.3	1050.3	6" VERT TEE/33° Bend
9	2+98	386129.4	2406278.6	1058.8	6" BLIND FLANG
10	3+40	386136.6	2406319.6	1048.3	6" TEE to EW-19 Lateral
11		386160.2	2406313.9	1044.9	6" Lateral
12		386209.1	2406306.0	1037.5	END OF 6" EW-19 Lateral
13	3+84	386142.2	2406363.9	1043.9	6"
14	4+30	386149.4	2406408.7	1040.3	6"
15	4+76	386157.0	2406454.9	1037.5	6"
16	5+09	386162.3	2406487.3	1036.7	6"
17	5+38	386167.6	2406515.6	1036.2	2" VERT TEE EW-20
18		386167.7	2406515.5	1041.8	2" FLANG
19	5+83	386182.0	2406557.6	1032.2	6"
20	6+27	386193.5	2406600.7	1028.6	6"
21	6+77	386203.1	2406649.4	1026.5	6"
22	7+25	386219.3	2406694.5	1023.6	6"
23	7+32	386222.1	2406701.7	1023.3	6" TEMP VERT 90
24	7+58	386232.2	2406725.6	1022.7	APPROX TIE-IN to existing Header
25					Future Data
26					Future Data
27					Tee off Main Header tbd

4. As-built Survey Tables (Continued)

Delafield Sanitary Landfill Existing 6" HDPE header pipe				
POINT NO.	NORTH	EAST	Ground Surface ELEVATION	DESCRIPTION
C	386225.9	2406737.5	1020.4	CS-3
D	386225.8	2406743.3	1020.4	HMP-7
A	386324.7	2405984.3	1027.5	V4-Header Valve
B	386324.9	2405989.1	1027.25	HMP-6

5. As Built Engineering Plans (Figures 1 and 2)



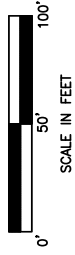
LEGEND

- EXISTING CONDITIONS
- TREE
- NEW LFG BYPASS HEADER PIPE
- PROPOSED BYPASS PIPE EXTENSION
- EXISTING LFG PIPE
- EXISTING CONDENSATE SUMP
- EXISTING HEADER ISOLATION VALVE
- EXISTING HEADER MONITORING POINT
- EXISTING GAS MONITORING PROBE
- EXISTING PHASE 1 LFG EXTRACTION WELL
- EXISTING PHASE 2 LFG EXTRACTION WELL
- EXISTING LFG WELL

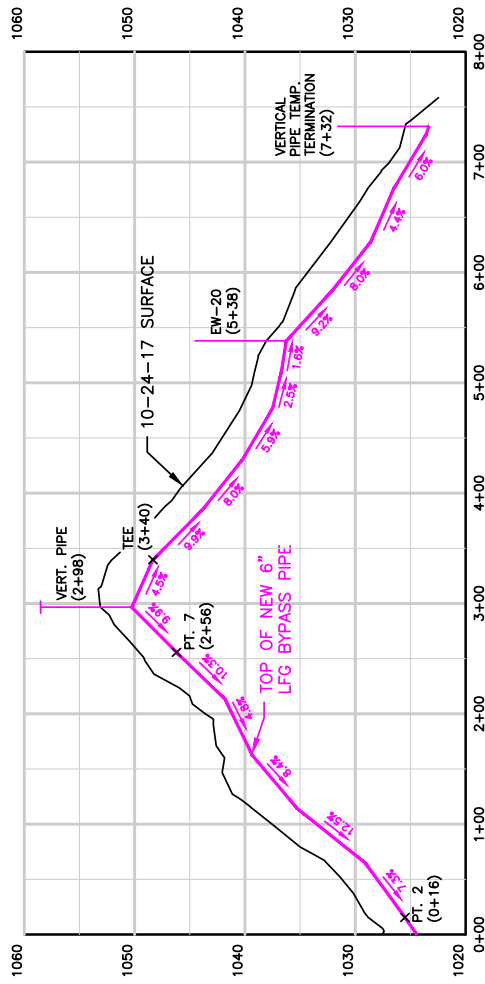


NOTES:

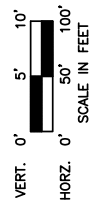
1. EXISTING CONDITION SURVEYS PERFORMED ON OCTOBER 24, 2017 BY COM, INC.
2. EXISTING LFG PIPING AND FEATURES TAKEN FROM DRAWING TITLED "LFG WELL FIELD PLAN" DONE BY GC ENVIRONMENTAL, INC. DATED AUGUST 2005.
3. HORIZONTAL CONTROL BASED ON USA, NAD83, WISCONSIN STATE PLAIN COORDINATE SYSTEM, WISCONSIN SOUTH ZONE.
4. VERTICAL CONTROL BASED ON NAVD 88.
5. CONSTRUCTION DOCUMENTATION SURVEY BY COM, INC. ON APRIL 19, 2018.



SCALE: 1" = 100'		APPROVED BY: AGF	DRAWN BY: WBE
DATE: MAY 2018		REVISIONS:	
DELAFIELD LANDFILL DELAFIELD, WI			
COM, INC.			FIGURE: 1



LFG PIPE



WINTER 2017-2018 NORTH HEADER BYPASS PIPE CONSTRUCTION DOCUMENTATION	
SCALE: 1"=100'	DRAWN BY: WBE
DATE: MAY 2018	APPROVED BY: AGF
REVISIONS:	
DELAFIELD LANDFILL DELAFIELD, WI	
CQM, INC.	
FIGURE:	2

6. Certification

This Delafield Sanitary Landfill construction documentation report for the north gas header remediation construction project, dated December 2017 through May, 2018, documents that the construction work performed by ESC was completed in substantial conformance with the proposed **Delafield Sanitary Landfill - ESC 2017 Phase 2 Remediation Engineering Design Memorandum** regarding the proposed landfill gas system, north bypass header, dated November, 2017.

I certify to the best of my knowledge, information and belief that the construction was accomplished in conformance with the approved plans and all applicable solid waste administrative code requirements. This certification may not be construed to be either an implied or express guarantee or warranty regarding the performance of the construction documented in this report.

This construction documentation report was prepared in compliance with the following certification.

I, B. Todd Watermolen, hereby certify that I am a licensed professional engineer in the State of Wisconsin in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 500 to 538, Wis. Adm. Code.

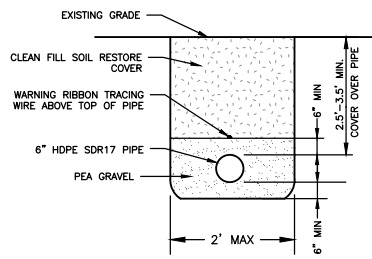
 6/15/18

B. Todd Watermolen, PE
WI Professional Engineer Certification Number E-24744



7. Appendices

Appendix A - Piping Details

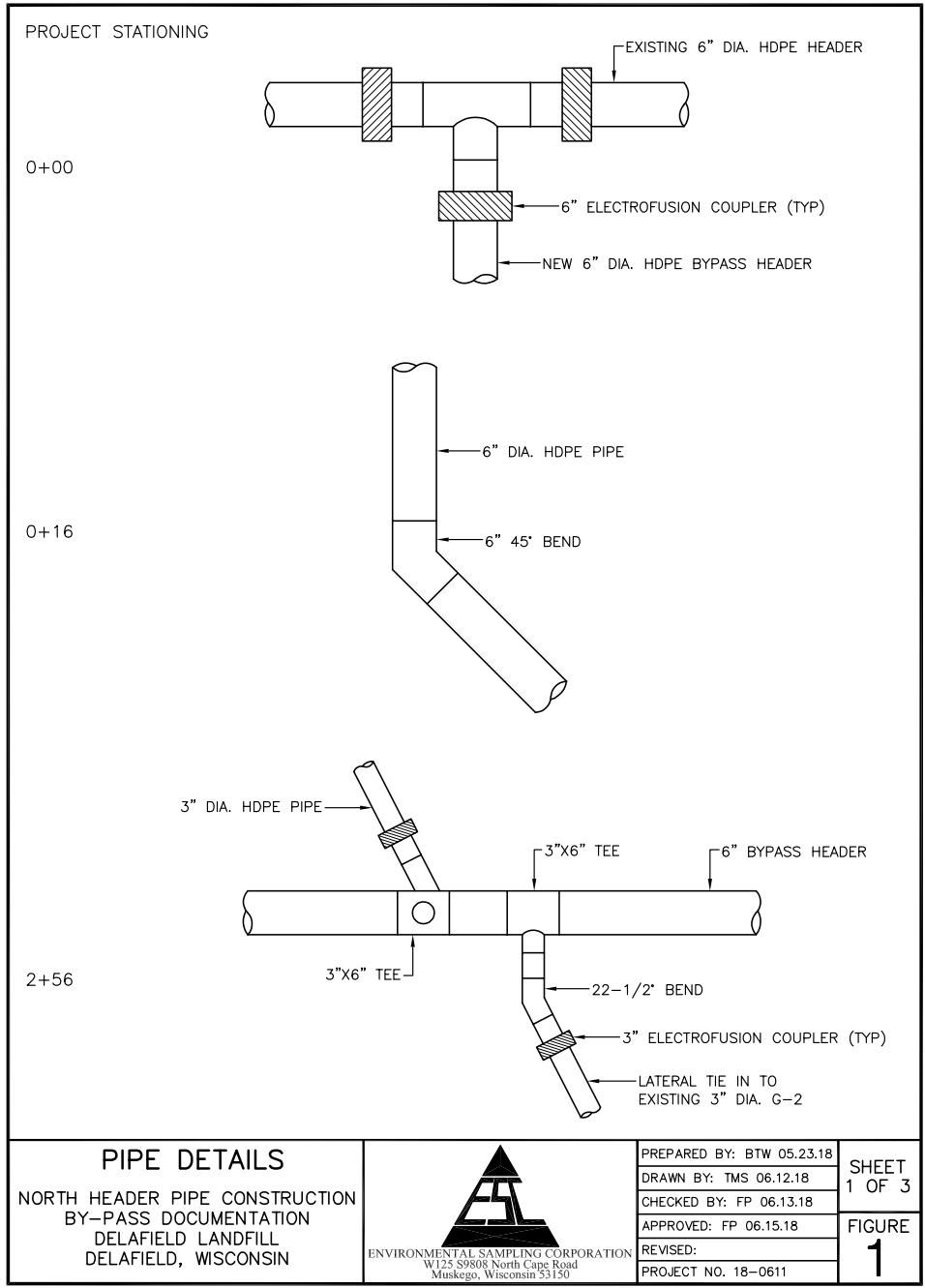


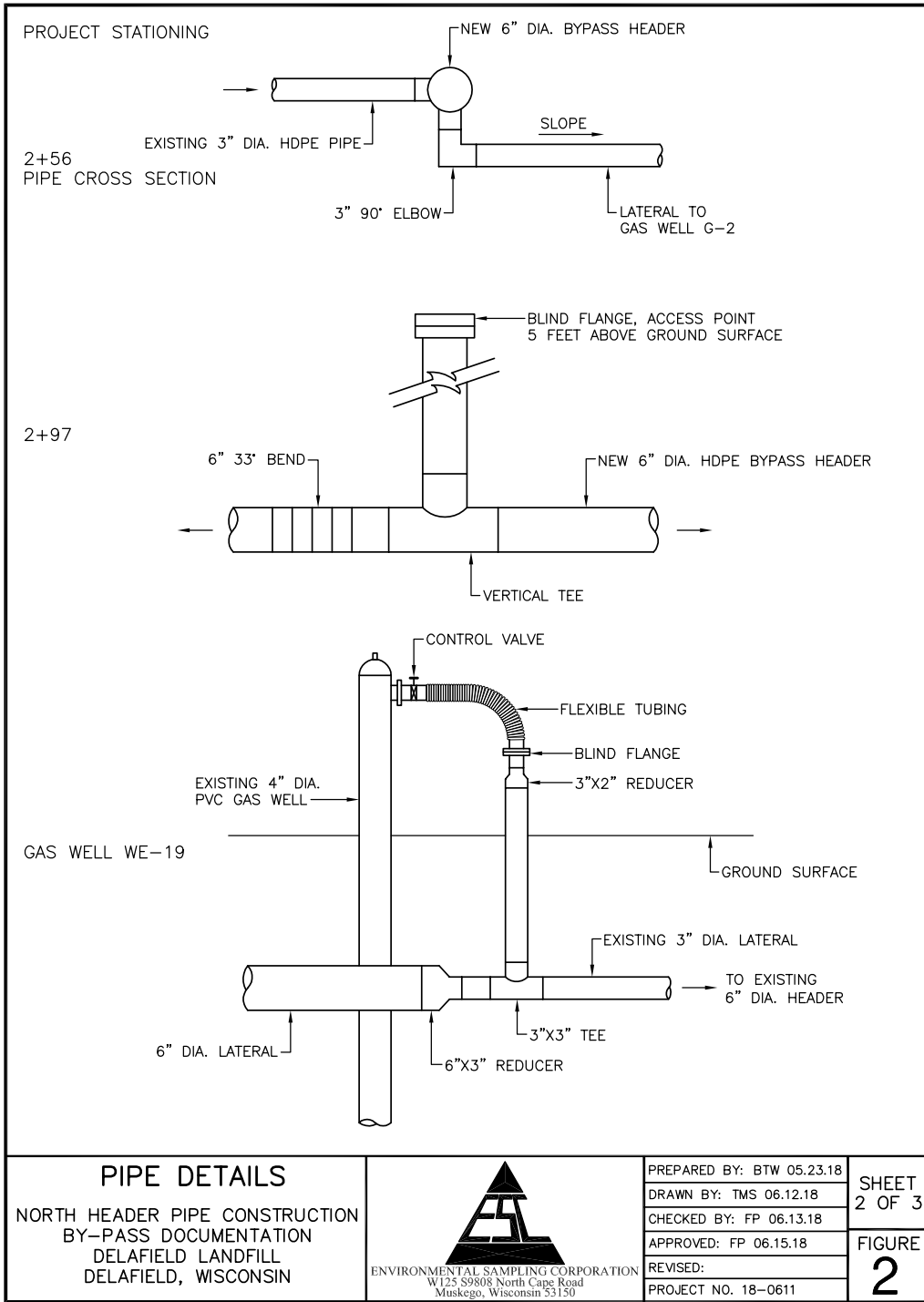
NOTES:
1. COMPACTED BACKFILL

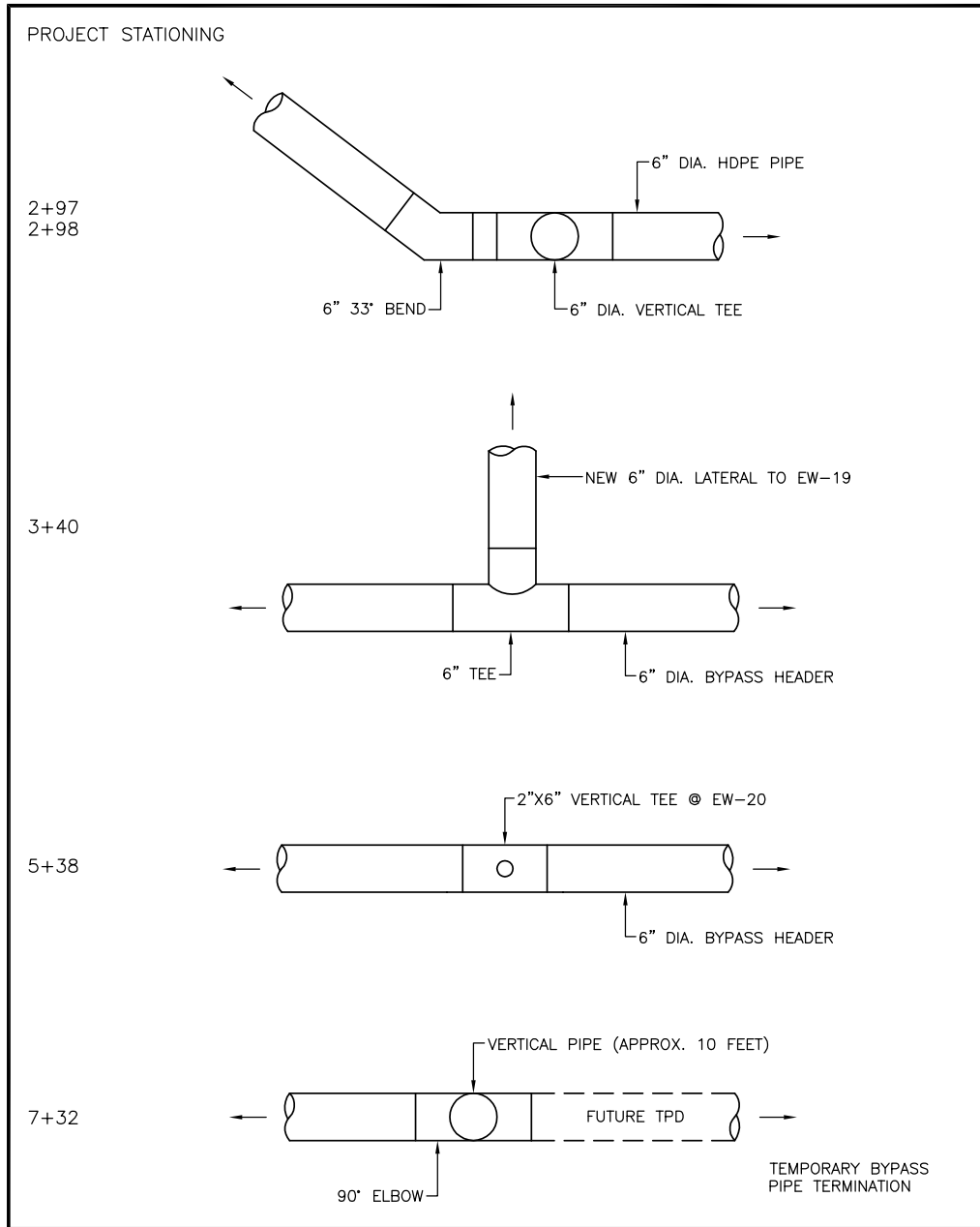
1
3 LFG PIPE TRENCH

DETAILS		
SCALE: N.T.S.	APPROVED BY: AGF	DRAWN BY: WBE
DATE: MAY 2018		REVISED:
DELAFIELD LANDFILL DELAFIELD, WI		
CQM, INC.		FIGURE: 3

G:\Project Data\Main-IP\Delafield Landfill\IP\Delafield Landfill 2018 Doc\Reg 5/22/2018 7:44 AM BJ Blach







<p>PIPE DETAILS</p> <p>NORTH HEADER PIPE CONSTRUCTION BY-PASS DOCUMENTATION DELAFIELD LANDFILL DELAFIELD, WISCONSIN</p>	 <p>ENVIRONMENTAL SAMPLING CORPORATION W125 S9808 North Cape Road Muskego, Wisconsin 53150</p>	<p>PREPARED BY: BTW 05.23.18</p>	<p>SHEET 3 OF 3</p>
		<p>DRAWN BY: TMS 06.12.18</p>	<p>FIGURE 3</p>
		<p>CHECKED BY: FP 06.13.18</p>	
		<p>APPROVED: FP 06.15.18</p>	
		<p>REVISED:</p>	
		<p>PROJECT NO. 18-0611</p>	

Appendix B – Photographs



11/28/17 soil boring, stationing 2+50,
looking east.



11/28/17 soil boring, stationing 5+00
looking west.



11/28/17 soil boring, stationing 5+00,
looking south.



11/29/17 new 6 inch diameter by-
pass header pipe, butt fusion welded.



11/29/17 new 6 inch diameter by-pass header pipe, butt fusion welded.



11/29/17 new 6 inch diameter by-pass header pipe, butt fusion welded. Final compression process.



11/29/17 new 6 inch diameter by-pass header pipe, butt fusion welded. 200 to 250 foot lengths pulled into position.



12/6/17 Project Stationing 0+00, exposed existing 6 inch diameter header. 6X6 Tee and new by-pass header installed with three electro-fusion couplers.



12/6/17 electro-fusion controller used with electro-fusion couplers.



12/6/17 electro-fusion controller used with electro-fusion couplers. Screen indicates timing and successful weld.



12/7/17 Stationing 0+00, Wood 2x4 marking location, pea gravel back fill, warning ribbon and electrical tracer wire in place, just prior to soil backfilling.



12/6/17 Near stationing 2+00 looking northwest. 6 inch by-pass pipe being placed in trench.



12/7/17 Stationing 2+56, Existing 3 inch diameter lateral to gas well G-2, connected to 6 inch by-pass header. Two 3x6 tees with electro-fusion couplers utilized to make the connection.



12/7/17 Stationing 2+56, pea gravel backfill, caution tape and electrical tracing wire in place just prior to soil backfill.



12/8/17 Stationing 2+98, 33 degree bend and vertical standpipe at high point.



12/8/17 Stationing 2+98, 33 degree bend and standpipe. Pea gravel backfill, wood 2x4, warning ribbon and electrical tracer wire.



12/11/17 Gas well EW-19, 6 inch lateral connected to existing 3 inch lateral and vertical 3 inch riser, looking north.



12/11/17 Stationing 5+38 at gas well EW-20. Existing 3 inch diameter lateral terminated and capped with HDPE butt fusion weld, looking southwest.



12/11/17 stationing 5+38, 2x6 tee, with 2 inch diameter vertical riser at EW-20, looking west.



12/11/17 stationing 5+30, by-pass header pipe backfilled with pea gravel looking west.



12/12/17 Stationing 7+58, Proposed by-pass header pipe connection to existing 6 inch diameter header pipe, trench excavation approximately 8 feet below grade, looking southwest.



May 1, 2018 Grading of
bypass trench near stationing
2+50, looking northwest.



June 7, 2018 re-seeded,
fertilized and straw mulch by-
pass trench, near station
3+00, looking northwest

Appendix C -Soil Borings

ENVIRONMENTAL SAMPLING CORPORATION

Dedicated to Environmental Monitoring, Science & Technology

Project: <u>Delafield Landfill</u>	Log of Boring <u>#1</u>
Project Location:	Sheet 1 of 14
Project Number: <u>Phase 2 Remediation</u>	

Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By: <u>[Signature]</u>
Drilling Method: <u>Auger</u>	Drill Bit Size/Type: <u>12" Auger</u>	Total Depth of Borehole: <u>-6.0</u>
Drill Rig Type: <u>SKid Steer</u>	Drilling Contractor: <u>Underground Power</u>	Approximate Surface Elevation: <u>-</u>
Groundwater Level and Date Measured: <u>-</u>	Sampling Method(s): <u>visual/hand</u>	Hammer Data: <u>-</u>
Borehole Backfill: <u>Drill Cuttings</u>	Location: <u>0+20' Project Stationing</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0						6" Topsoil	
	5						glacial till, Brown color silty/clayey sands and gravel w/ cobbles 2"-6"	
	10						T.D. - 6.0'	
	15						- no waste -	
	20							
	25							
	30							

→ See plans Construction documentation
 → November 2017 Phase 2 Remediation Design memorandum
 Jan, 2018

E:\idlog\101

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Project: <u>DeLafried Landfill</u> Project Location: Project Number:	Log of Boring # <u>2</u> Sheet <u>2</u> of 14
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Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By: <u>—</u>
Drilling Method: <u>SAME</u>	Drill Bit Size/Type: <u>—</u>	Total Depth of Borehole: <u>6.0</u>
Drill Rig Type: <u>SAME</u>	Drilling Contractor: <u>—</u>	Approximate Surface Elevation: <u>—</u>
Groundwater Level and Date Measured: <u>—</u>	Sampling Method(s): <u>—</u>	Hammer Data: <u>—</u>
Borehole Backfill: <u>—</u>	Location: <u>0+70</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0							<p>6" Topsoil</p> <p>1" ϕ Boulder @ 2' - refusal went around</p> <p>silty clayey loam w/ - Brown color sand and gravel</p> <p>grey color @ 4.5'</p> <p>T.O. 6.0'</p> <p>- no waste</p>	
5								
10								
15								
20								
25								
30								

fieldlog1.rtf

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Project: <u>DeLafield Landfill</u>	Log of Boring # <u>3</u> Sheet 1 of 1 3 of 14
Project Location:	
Project Number:	

Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By:
Drilling Method: <u>SAME</u>	Drill Bit Size/Type:	Total Depth of Borehole: <u>6.3</u>
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <u>1 + 20</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0								
							Brown silty clayey loam Grey silty sands + Gravel very wet @ 4.5'	w/ cobbles
	5						--- Trash @ 6.0'	
							└ T.D. 6.3'	
	10							
	15							
	20							
	25							
	30							

filedlog.pdf

ENVIRONMENTAL SAMPLING CORPORATION

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Project: <u>Delafield Landfill</u> Project Location: Project Number:	Log of Boring <u>5</u> Sheet 1 of 1 <u>5 of 14</u>
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Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole: <u>4.0</u>
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <u>1490</u>	

	Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0									
5								grey silty sand & gravel w/ cobbles	
10								Boulders trash @ 4.0'	LFG Odor @ 4'
15									
20									
25									
30									

fieldlog.pdf

ENVIRONMENTAL SAMPLING CORPORATION

Dedicated to Environmental Monitoring, Science & Technology

Project: <i>Deletfield Landfill</i> Project Location: Project Number:	Log of Boring # <i>6</i> Sheet <i>1 of 1</i> <i>6 of 14</i>
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Date(s) Drilled <i>11/29/17</i>	Logged By <i>BTW</i>	Checked By _____
Drilling Method	Drill Bit Size/Type	Total Depth of Borehole <i>5.5</i>
Drill Rig Type	Drilling Contractor	Approximate Surface Elevation
Groundwater Level and Date Measured	Sampling Method(s)	Hammer Data
Borehole Backfill	Location <i>2+30</i>	

	Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0							Brown sandy silty loam w/ gravel + cobbles	
	5							5.5 T.D. Trash	odor @ 5'
	10								
	15								
	20								
	25								
	30								

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Project: <u>Delafield Landfill</u>	Log of Boring # <u>7</u>
Project Location:	Sheet <u>1</u> of <u>14</u>
Project Number:	

Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <u>Z+80</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0							Brown sandy silty loam w/ cobbles	
5							grey silty S+G	
10							T.O 5.5' Trash	
15								
20								
25								
30							Approx. 3+07 angle point	

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Project: <u>Delafield LP</u>	Log of Boring # <u>8</u>
Project Location:	Sheet <u>4</u> of <u>14</u>
Project Number:	

Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <u>3+30</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0								
							<ul style="list-style-type: none"> - Brown - Grey silty sand + gravel w/ cobbles - Trash @ 5' 	
5								
10								
15								
20								
25								
30								

4+50

ENVIRONMENTAL SAMPLING CORPORATION

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Project: <i>Delaware LF</i>	Log of Boring <i>#9</i>
Project Location:	Sheet 1 of 14 <i>9 of 14</i>
Project Number:	

Date(s) Drilled: <i>11/29/17</i>	Logged By: <i>BTW</i>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <i>4+50</i>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0							
	5						<i>Brown gray silty sand gravel w/ cobbles sand & gravels Trash @ 4.7'</i>	<i>LFG odor @ 3' Trash is wet</i>
	10							
	15							
	20							
	25							
	30							

E:\ndlog.upd

ENVIRONMENTAL SAMPLING CORPORATION

Dedicated to Environmental Monitoring, Science & Technology

Project: <i>Deletfield LF</i>	Log of Boring #10
Project Location:	Sheet 1 of 1 <i>10 of 14</i>
Project Number:	

Date(s) Drilled: <i>11/29/17</i>	Logged By: <i>BTW</i>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:		Location: <i>5+00</i>

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0							<i>Brown silty clay loam</i> <i>Grey silty sands + gravels</i> <i>clables 1"-6"</i> <i>Trash @ 4.0'</i> <i>T.D. @ 5.0'</i>	<i>LFG odor @ 2'</i> <i>strong odor @ 3.5'</i> <i>difficult to auger due to large boulders 6"-12"</i>
5								
10								
15								
20								
25								
30							<i>EW-20 @ 5+94</i>	

6+10

ENVIRONMENTAL SAMPLING CORPORATION

Dedicated to Environmental Monitoring, Science & Technology

Project: <i>Relief LF</i>	Log of Boring # <i>11</i>
Project Location:	Sheet 1 of 1 <i>11 of 14</i>
Project Number:	

Date(s) Drilled: <i>11/29/17</i>	Logged By: <i>BTW</i>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <i>6+10</i>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0	0						<i>Brown clayey sand + gravel wet</i>	<i>odors @ 2'</i>
	5						<i>gray trash @ 5'</i>	
							<i>6'0" T.O.</i>	
10								
15								
20								
25								
30								

6+60

ENVIRONMENTAL SAMPLING CORPORATION

Dedicated to Environmental Monitoring, Science & Technology

Project: <u>Relkfield LP</u>	Log of Boring <u>12</u>
Project Location:	Sheet <u>1 of 1</u> <u>12 of 14</u>
Project Number:	

Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <u>6+60</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
0								
							Brown + grey clay Trash @ 2.5' T.D. 3.5'	odor @ 2'
5								
10								
15								
20								
25								
30								

7+10

7+60

8+20 @ connection

ENVIRONMENTAL SAMPLING CORPORATION

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Project: <u>Delafield LF</u>	Log of Boring <u>13</u>
Project Location:	Sheet <u>1</u> of <u>13</u> of <u>14</u>
Project Number:	

Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <u>7+10</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0						0.5 Topsoil Brown clayey sand + gravel	
	5						Trash @ 3.5'	
	10						T.D. @ 40'	
	15							
	20							
	25							
	30							

ENVIRONMENTAL SAMPLING CORPORATION

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Project: <u>Dated Field LF</u>	Log of Boring <u>14</u>
Project Location:	Sheet 1 of 1 <u>14 of 14</u>
Project Number:	

Date(s) Drilled: <u>11/29/17</u>	Logged By: <u>BTW</u>	Checked By:
Drilling Method:	Drill Bit Size/Type:	Total Depth of Borehole:
Drill Rig Type:	Drilling Contractor:	Approximate Surface Elevation:
Groundwater Level and Date Measured:	Sampling Method(s):	Hammer Data:
Borehole Backfill:	Location: <u>7+60</u>	

Elevation (feet)	Depth (feet)	Sample Type	Sample Number	Sampling Resistance, blows/ft	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0						Brown clayey sands w cobbles Trash @ 2.3'	
	5							
	10							
	15							
	20							
	25							
	30							

Borehole Log