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March 31, 2017

Mr. Eric Syftestad  
Wisconsin Department of Natural Resources  
Waste Management Engineer  
3911 Fish Hatchery Road  
Fitchburg, WI 53711

**Re: Marathon County Solid Waste Landfill – Area B Landfill  
2016 Annual Solid Waste Report  
WDNR License No. 3338, FID No. 737092730**

Dear Mr. Syftestad:

On behalf of the Marathon County Solid Waste Department (Marathon County) Cornerstone Environmental Group, LLC (Cornerstone) is herewith submitting a copy of the 2016 Annual Solid Waste Report for the Area B Landfill (Area B) of the Marathon County landfill. This Annual Solid Waste Report is being submitted in accordance with the approved plan of operation for Area B.

In accordance with your request, two (2) additional copies and the necessary electronic (CD burned) version are also being distributed to pertinent WDNR staff as noted below.

Should you have any questions or comments regarding this Annual Solid Waste Report do not hesitate to contact me at (262) 573-7012 or Ms. Meleesa Johnson at (715) 466-3101 ext 104.

Sincerely,

Cornerstone Environmental Group, LLC



Michael Melan  
Project Manager

Enclosure: As Noted

cc: Marathon County Solid Waste Landfill (File Copies)  
Nathan Collier – WDNR Spooner Service Center  
Sarah Sheil – WDNR Eau Claire Service Center



**Marathon County Solid Waste Department**

**Area B Landfill**

**2016 ANNUAL REPORT**

WDNR License No. 3338

FID 737092730

Marathon County Solid Waste Management Department

R18500 Highway 29

Ringle, WI 54471

Phone 715-446-3101

Director: X104

Operations Manager: 715-551-5864

Business Office: X100

Environmental Technician: X101

Scale: X103

Solid Waste & Recycling Information Line: 877-270-3989

[www.marathoncountysolidwaste.org](http://www.marathoncountysolidwaste.org)



marathoncountysolidwaste

## **Staff, Consultants & Contractors**

### **Marathon County Solid Waste Department Staff:**

- Meleesa Johnson-Director
- David Hagenbucher-Operations Manager
- Jessica Knaup-Scale Operator
- Ron Smith-Environmental Technician
- Julie Groshek-Accounting Specialist
- Chris Wickman-Equipment Maintenance Specialist
- Kevin Steinke-Equipment Operator
- Eric Olson-Equipment Operator
- Dave Vitt-Equipment Operator
- Paul Swanwell-Temporary Intern
- Lindsey Carlson- Temporary Intern
- Lydia Campbell- Temporary Intern

### **Engineering Consultants:**

- Mike Michels, P.E.  
Cornerstone Environmental Group, LLC  
8413 Excelsior Drive, Suite 160  
Madison, WI 53717
- Michael Melan  
Cornerstone Environmental Group, LLC  
435 E Mill Street, Suite 15  
Plymouth, WI 53073
- Cyndi Neitzel, P.E.  
Cornerstone Environmental Group, LLC  
435 E Mill Street, Suite 15  
Plymouth, WI 53073

### **Contractors:**

- CQM, Inc.  
2679 Continental Drive  
Green Bay, WI 54311
- Northern Lakes Service, Inc.  
400 North Lake Avenue  
Crandon, WI 54520
- Northern Pipe Equipment, Inc.  
1722 County Road QQ  
Green Bay, WI 54311
- Recycling Connections Corporation  
P.O. Box 91  
Stevens Point, WI 54481-0091
- Veolia ES-Technical Solutions  
W124 N9311 Boundary Road  
Menomonee Falls, WI 53051

- Terra Engineering & Construction Corp.  
2409 Vondron Road  
Madison, WI 53718
- Landfill Drilling & Piping Specialists, LLC  
1001 Arboretum Drive, Suite 3  
Waunakee, WI 53597

## **Introduction**

This report provides information about site conditions on, work conducted at and other activities related to the closed Area B Landfill (Area B). This report is intended to meet the intent and spirit of the annual reporting requirements found in approved documents for Area B. This document meets the annual reporting requirements of the Wisconsin Department of Natural Resources (WDNR) Plan of Operation Approval dated March 22, 2002, the 2006 plan modification for the expansion of Phase IV and the 2013 Modification to the Monitoring Plan (for Groundwater, Lysimeters and Leachate Collection).

## **Area B Background**

Marathon County Solid Waste Department (MCSWD) owns, operates and manages the Area B Landfill (Area B).. The 32 acre facility opened in 1993 and has an amended design capacity of 2,508,000 cubic yards. A total of 5 acres has final cover. The site is located along the north side of Hwy 29, in the town of Ringle, Wisconsin and north of the closed Area A Landfill.



### **Site of Landfill Activities in 2016**

As of December 2016, Area B has a remaining estimated site capacity of 8,502 cubic yards. From 1994 to early 2014, MCSWD retained an independent contractor to conduct operations. MCSWD began internal operations of the landfill with its own staff and equipment in May 2014. Operational duties typically include, but are not limited to full-time administrative management, active fill area management and scale operations (when accepting wastes), site operational oversight and trouble-shooting and other maintenance and conditionally regulated duties such as:

- Monthly visual inspections of the final cover surface
- Inspections of storm water management pathways
- Removal of obstructions or repair to storm water pathways
- Mowing pathways for surface emission monitoring work
- General mowing to control for woody herbaceous growth
- Snow plowing of access roads
- Grading and dust management of access roads using calcium chloride was applied to both interior landfill roads and gravel site roads
- Preventative maintenance on gas system and leachate pumping system
- Cover maintenance including repair of leachate seeps

As needed, MCSWD hired various contractors and/or consultants to perform specific tasks beyond the capabilities of the site staff such as air permit compliance and reporting, and contracted leachate hauling.

### **Waste Disposal Activities**

During 2016, Area B accepted no waste. Intermediate cover in the form of soils obtained from on-site stockpiles was placed on areas previously assigned to accept waste. MCSWD performed the intermediate covering duties.

### **Settlement Hubs**

The below tables summarize the Area B settlement hub monitoring for the period of June 22, 2015 to September 21, 2016.

<b>Settlement Hubs 6-22-15</b>				
<b>Hub</b>	<b>North</b>	<b>East</b>	<b>Elevation</b>	
			<b>Ground</b>	<b>Top</b>
North	8000.80	15700.07	1402.13	1404.65
South	7598.11	15500.11	1400.80	1403.84

<b>Settlement Hubs 9-21-16</b>				
<b>Hub</b>	<b>North</b>	<b>East</b>	<b>Elevation</b>	
			<b>Ground</b>	<b>Top</b>
North	8000.80	15699.86	1402.28	1404.77
South	7598.07	15500.03	1400.69	1403.86

## **Landfill Maintenance**

During 2016, no major maintenance activities were required or performed.

## **Gas Collection System**

Area B, located on the northern portion of the entire 532 acre facility (and north of the closed Area A Landfill), has an active landfill gas extraction system consisting of gas collectors and transfer piping, blower to move the gas collected and end-use equipment (described below). The landfill gas extraction system has been operational since the late 1990s. Landfill gas emissions from Area B are regulated in accordance with renewed Air Pollution Control Operation Permit No. 737092730-P20 dated November 2, 2015.

The gas wells located in Area B consist of vertical and horizontal gas extraction wells, connected via a sub-header system within the footprint of the landfill. The landfill gas extracted from the landfill is transferred to the on-site landfill gas recovery building (located south of the Area A Landfill) via a header pipe to an landfill gas to energy plant or to a flare. Vacuum applied to the wellfield is regulated by the variable frequency drive (VFD) blower station that controls the gas collection and control system (GCCS).

Existing sensing devices measure gas flow rates, pressure, vacuum and methane and oxygen concentrations. Data is recorded and stored on a computerized data collection system. This data is used for operating and reporting purposes.

Data shown in the tables below indicate the landfill gas collection system operated 99.2% of the year and 8721.3 hours of operation (a leap year). The average aggregated flow rate, for both Area A and Area B, was 540.6 standard cubic feet per minute (scfm), of this Area B contributed an average of 484.9 scfm. Methane and oxygen concentrations of landfill gas averaged, by volume, 50.61% for methane and 0.55% oxygen. Total gas collected for at the site in 2016 was 284,794,518 standard cubic feet (scf) and of this total, Area B contributed 255,360,272 scf. From the total scf collected at the site, 280,264,285 scf was used for production of electricity and 4,530,233 scf was sent to the flare.

### **MARATHON COUNTY LANDFILL GAS COLLECTION DATA (INCLUDES AREA A AND AREA B)**

<b>2016</b>	<b>Average flow (SCFM)</b>	<b>Monthly total flow (SCFM)</b>	<b>To Electrical Production (SCFM)</b>	<b>To Flare (SCFM)</b>	<b>Average Vacuum to Wellfield (Inches SC)</b>
<b>Jan</b>	584.0	26,070,170.7	25,555,283.5	514,887.14	25.45
<b>Feb</b>	617.6	25,788,851.7	24,575,562.7	1,213,288.96	29.10
<b>March</b>	593.0	26,473,725.0	26,280,784.3	192,940.8	29.46
<b>April</b>	558.6	24,132,972.1	23,857,596.0	275,376.0	30.60
<b>May</b>	552.9	24,680,642.6	24,658,652.7	21,989.9	31.12
<b>June</b>	531.9	22,976,388.4	22,664,822.4	311,566.0	29.36
<b>July</b>	536.6	23,951,593.2	23,755,492.8	196,100.4	29.37
<b>August</b>	522.5	23,323,056.4	22,912,099.2	410,957.2	28.88
<b>Sept</b>	515.9	22,284,504.6	22,095,607.6	188,897.0	30.11
<b>Oct</b>	509.4	22,741,147.3	22,587,131.6	154,015.7	30.49
<b>Nov</b>	497.1	21,474,956.0	21,423,136.7	51,819.3	31.08
<b>Dec</b>	468.1	20,896,509.9	19,898,115.2	998,394.8	31.01
<b>Totals</b>	<b>540.6</b>	<b>284,794,517.9</b>	<b>280,264,284.5</b>	<b>4,530,233</b>	<b>29.67</b>

Below is a chart listing average monthly and annual methane (CH<sub>4</sub>) and oxygen (O<sub>2</sub>) concentrations.

2016	CH <sub>4</sub> %	O <sub>2</sub> %
Jan	52.32	0.42
Feb	51.24	0.42
March	51.53	0.56
April	51.79	0.89
May	50.02	0.54
June	50.68	0.42
July	50.85	0.48
August	50.22	0.46
Sept	50.11	0.49
Oct	49.65	0.56
Nov	48.74	0.59
Dec	50.14	0.72
Averages	50.61	0.55

### **Gas System Outages**

As indicated previously, the gas extraction system operated nearly continuously. Any shutdowns, whether for planned maintenance or unplanned events were reported to the WDNR Air Management staff. The January to June 2016 Semi-annual Report and July to December 2016 Semi-annual Report for the facility include descriptions of the startup, shutdown and malfunction events associated with the GCCS, single control device and the continuous monitoring system.

### **Surface Emission Monitoring**

Surface emission monitoring (SEM) of Area B was conducted on March 25, 2016, June 14, 2016, September 6, 2016, and December 12, 2016. One (1) exceedance was detected during the first and fourth quarter SEM's and no (0) exceedances were detected during the second and third quarter SEMs. MCSWD corrected the first and fourth quarter exceedance by placing additional soil cover over the areas of concern and re-monitoring the areas within 10 and 30 days of the initial exceedance, as required by the facility's Air Pollution Control Operating Permit. Both the 10 day and 30 day re-monitoring events indicate that after the 30-day re-monitoring event the surface emissions were below the required 500 parts per million (ppm) above background.

For all SEM events, a photoionization detector (PID) is used, with MCSWD's environmental technician walking a serpentine pattern across the surface of the landfill. Results of the monitoring are maintained in site files.



### **Soil Gas Monitoring**

During 2016 the soil gas probes were monitored quarterly for relative pressure, methane (CH<sub>4</sub>), oxygen (O<sub>2</sub>), and soil gas pressure. In 2016, these monitoring results indicated no gas migration.

#### **First Quarter Probe Data (February 16, 2016):**

<b>Gas Probe</b>	<b>Location</b>	<b>Methane</b> (%CH <sub>4</sub> by Vol.)	<b>Oxygen</b> (%O <sub>2</sub> by Vol.)	<b>Pressure</b> (inch W.C.)	<b>Notes:</b>
[Depth in feet]					
Lic. 3338	WDNR Parm #	85547	85550	46389	WDNR ID No.
Area B Probes					
G-5 [26']	S Area B	0.0	21.3	-0.16	700
G-6 [30']	W Area B	0.0	21.0	-0.11	704
G-7 [20']	N Area B	0.0	21.9	0.00	709
G-8 [15']	E Area B	0.0	22.0	-0.04	720

#### **Second Quarter Probe Data (May 19, 2016):**

<b>Gas Probe</b>	<b>Location</b>	<b>Methane</b> (%CH <sub>4</sub> by Vol.)	<b>Oxygen</b> (%O <sub>2</sub> by Vol.)	<b>Pressure</b> (inch W.C.)	<b>Notes:</b>
[Depth in feet]					
Lic. 3338	WDNR Parm #	85547	85550	46389	WDNR ID No.
Area B Probes					
G-5 [26']	S Area B	0.0	19.7	0.0	700
G-6 [30']	W Area B	0.0	19.9	0.0	704
G-7 [20']	N Area B	0.0	19.5	0.0	709
G-8 [15']	E Area B	0.0	18.9	0.0	720

#### **Third Quarter Probe Data (August 16, 2016):**

<b>Gas Probe</b>	<b>Location</b>	<b>Methane</b> (%CH <sub>4</sub> by Vol.)	<b>Oxygen</b> (%O <sub>2</sub> by Vol.)	<b>Pressure</b> (inch W.C.)	<b>Notes:</b>
[Depth in feet]					
Lic. 3338	WDNR Parm #	85547	85550	46389	WDNR ID No.
Area B Probes					
G-5 [26']	S Area B	0.0	19.8	0.00	700
G-6 [30']	W Area B	0.0	18.6	-0.02	704
G-7 [20']	N Area B	0.0	17.6	0.00	709
G-8 [15']	E Area B	0.0	20.0	0.00	720

#### **Fourth Quarter Probe Data (November 1, 2016):**

<b>Gas Probe</b>	<b>Location</b>	<b>Methane</b> (%CH <sub>4</sub> by Vol.)	<b>Oxygen</b> (%O <sub>2</sub> by Vol.)	<b>Pressure</b> (inch W.C.)	<b>Notes:</b>
[Depth in feet]					
Lic. 3338	WDNR Parm #	85547	85550	46389	WDNR ID No.
Area B Probes					
G-5 [26']	S Area B	0.0	19.9	0.0	700
G-6 [30']	W Area B	0.0	19.3	0.0	704
G-7 [20']	N Area B	0.0	20.0	0.0	709
G-8 [15']	E Area B	0.0	19.8	0.0	720

### **Gas Condensate Sampling Data**

In accordance with the monitoring plan, gas condensate was sampled and analyzed in April and October 2016. The components tested are noted in the tables below and included volatile organic compounds (VOC's) tested in October.

<b>2016 Gas Condensate Sampling Results</b>		
	April	October
Field cond @ 25°C	7040 umho/cm	9980 umho/cm
Total Suspended Solids	ND mg/L	ND mg/L
COD	240 mg/L	200 mg/L
pH	7.69	8.05

<b>2016 Gas Condensate Sampling Results (VOC's)</b>	October
Acetone	1700 ug/L
Methyl Ethyl Ketone	160 ug/L
Tetrahydrofuran	640 ug/L
Toluene	ND ug/L
Naphthalene	ND

### **Gas Condensate Volumes**

Gas condensate volumes were monitored and tabulated on a monthly basis. The 2016 gas condensate volumes are noted below:

#### **2016 AREA B GAS CONDENSATE VOLUME PUMPED (GAL)**

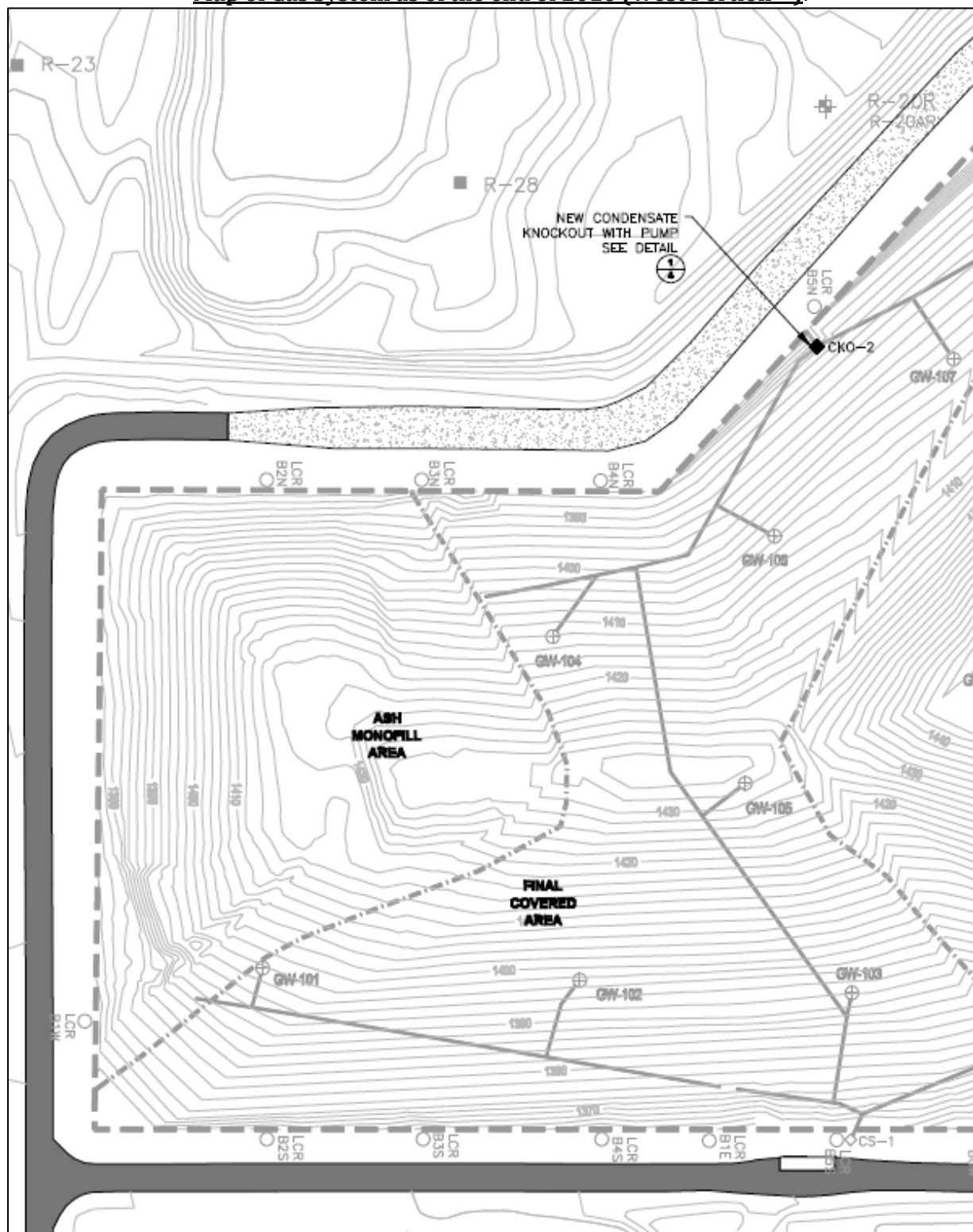
MONTH	CKO-1	CKO-2	GC MANHOLE	GC-1
JANUARY	9,240	7,560	2,520	0
FEBRUARY	13,440	10,920	2,520	0
MARCH	14,280	10,920	2,772	84
APRIL	13,440	10,920	2,268	0
MAY	10,080	7,560	1,680	0
JUNE	10,080	5,880	2,520	0
JULY	10,920	8,484	2,520	0
AUGUST	9,240	6,636	2,268	84
SEPTEMBER	9,240	7,560	2,184	0
OCTOBER	10,920	6,720	2,184	0
NOVEMBER	9,240	6,720	1,764	84
DECEMBER	10,920	6,636	2,436	0
<b>TOTALS</b>	<b>131,040</b>	<b>96,516</b>	<b>27,636</b>	<b>252</b>

On August 31, 2016 MCSWD's environmental technician filled a summa canister to collect a sample of landfill gas from Area B. The canister was shipped via express mail services to Air Technology Labs, Inc. (ATL) located in City of Industry, California for analysis of volatile organic compounds. The test method used was United States Environmental Protection Agency (EPA) test method TO-15, Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed by Gas Chromatography/ Mass Spectrometry (GC/MS). Results of the sample tested by ATL are provided in Attachment A to this report.

[illegible]

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MCSWD Area B Annual Report  
March 2017

**Map of Gas System as of the end of 2016 (West Portion\*\*):**



*\*\*Image from 2011 wellfield construction documentation drawings*

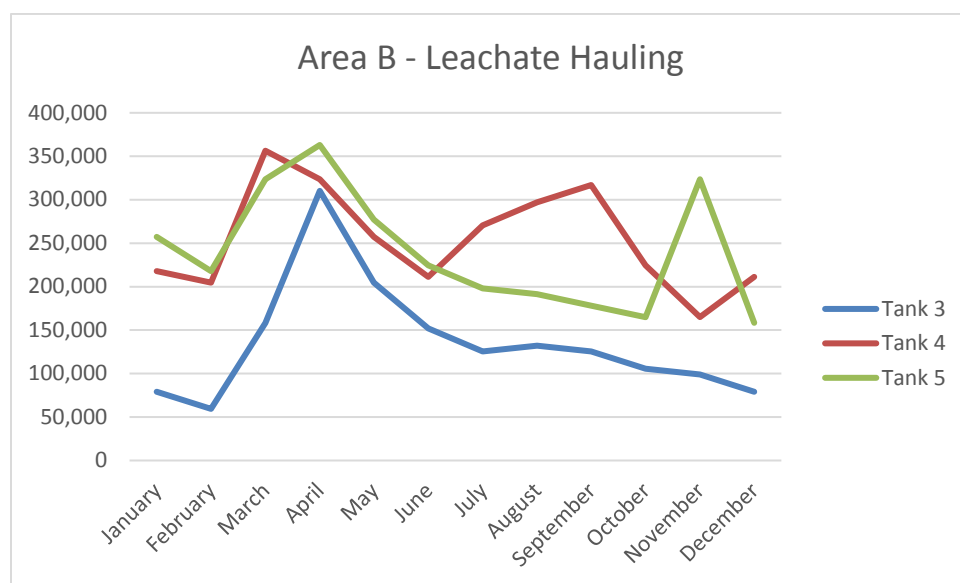
### **Leachate System Information**

Leachate is collected throughout the Area B leachate piping System. Leachate gathers in a side slope riser, where a pump delivers the liquid into storage tanks. There are three (3) such gathering, delivery, and storage devices. Pumping from the side slope risers stops when a sensor system inside the storage tank indicates the liquid has reached a certain level. When full, the contract hauler pumps stored leachate into a 6,600 gallon tanker truck and delivers the material to the waste water treatment facility (WWTF).

Leachate collected in 2016 was transported to the Domtar, Inc. WWTF in Rothschild, Wisconsin. Leachate is pumped into the WWTF and treated to ensure all effluent meet Wisconsin Pollutant Discharge Elimination System (WPDES) standards prior to discharge into the Wisconsin River.

Total volume of leachate collected/transported/treated in 2016 is as follows:

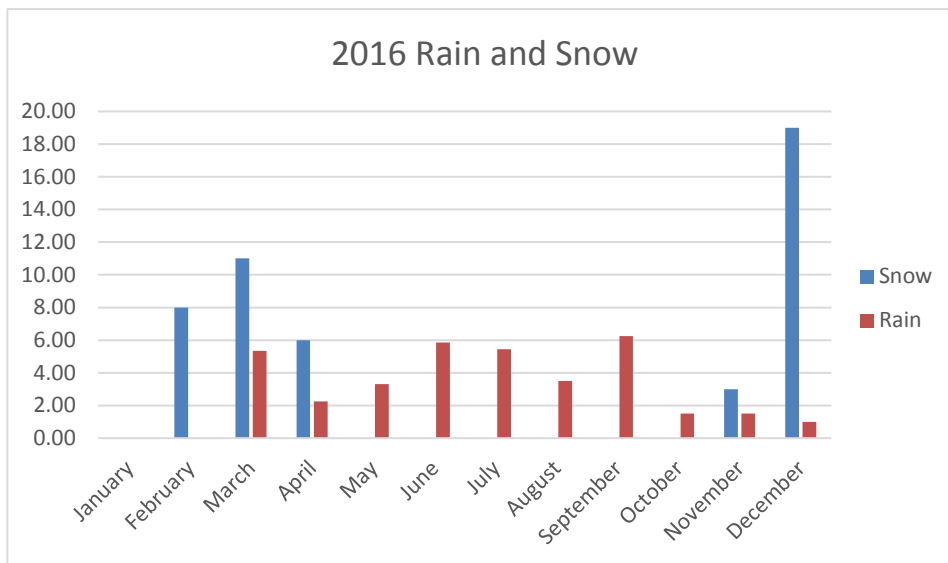
2016	Tank 3	Tank 4	Tank 5
January	79,200	217,800	257,400
February	59,400	204,600	217,800
March	158,400	356,400	323,400
April	310,200	323,400	363,000
May	204,600	257,400	277,200
June	151,800	211,200	224,400
July	125,400	270,600	198,000
August	132,000	297,000	191,400
September	125,400	316,800	178,200
October	105,600	224,400	165,000
November	99,000	165,000	323,400
December	79,200	211,200	158,400
Total	1,630,200	3,055,800	2,877,600

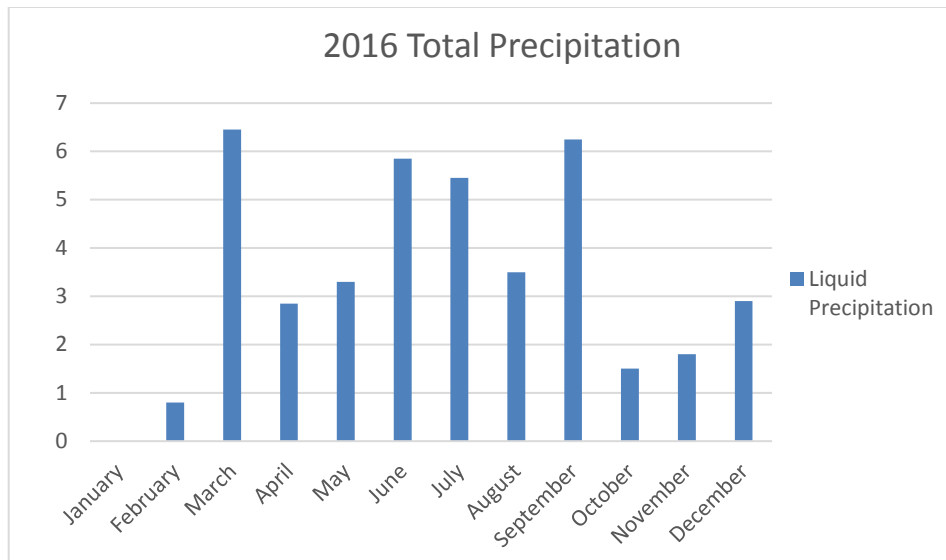


Precipitation:

2016 Precipitation Totals			
Month	Snow (inches)	Rain (inches)	Liquid Precipitation* (inches)
January			0.00
February	8.00		0.80
March	11.00	5.35	6.45
April	6.00	2.25	2.85
May		3.30	3.30
June		5.85	5.85
July		5.45	5.45
August		3.50	3.50
September		6.25	6.25
October		1.50	1.50
November	3.00	1.50	1.80
December	19.00	1.00	2.90
Total	47.00	35.95	40.65

\*Snow converted to liquid precipitation by dividing by 10





### **Leachate Line Jetting**

On July 18 and 19, 2016 Northern Pipe Equipment, Inc. of Green Bay, Wisconsin, water jetted the leachate lines of Area B. Jetting was accomplished by accessing each pipe at one end and jetting the full length of pipe. The jetting required the use of 5,000 gallons of water.



MARATHON COUNTY LANDFILL  
LEACHATE PIPE CLEANOUT RECORDS

**DATE:** July 18, 2016 & July 19, 2016

**CONTRACTOR NAME:** Northern Pipe Equipment, Inc.

**CONTRACTOR PHONE:** 920-468-7074

**EQUIPMENT USED:** #36 Vac-Con w/ 1,200 ft. 3/4" hose

AREA B					
CLEANOUT ACCESS POINT	PIPE SIZE	PIPE LENGTH (FT)	FT. JETTED EAST / SOUTH	FT. JETTED WEST / NORTH	COMMENTS
1	12"	660	660	-	Jetted from B1E all the way ; No Problems 7/18/2016
2	12"	500	500	-	Jetted from B2S all the way ; No Problems 7/19/2016
3	12"	505	505	-	Jetted from B3S all the way ; No Problems 7/19/2016
4	12"	510	510	-	Jetted from B4S all the way ; No Problems 7/19/2016
5	12"	660	660	-	Jetted from B5S all the way ; No Problems 7/18/2016
6	12"	280	280	-	Jetted from B6W all the way ; No Problems 7/18/2016
7	12"	850	850	-	Jetted from B7S all the way ; No Problems 7/18/2016
8	12"	875	875	-	Jetted from B8S all the way ; No Problems 7/18/2016
9	12"	305	305	-	Jetted from B9E all the way ; No Problems 7/19/2016
10	12"	840	840	-	Jetted from B10S all the way ; No Problems 7/20/2016
11	12"	795	795	-	Jetted from B11S all the way ; No Problems 7/21/2016
12	12"	270	270	-	Jetted from B12S all the way ; No Problems 7/18/2016
13	12"	750	750	-	Jetted from B13S all the way ; No Problems 7/18/2016
14	12"	725	725	-	Jetted from B14S all the way ; No Problems 7/18/2016

**AMOUNT OF WATER USED:** 5,000 Gallons of water

### **Leachate Level Monitoring**

Leachate level monitors were evaluated on a monthly basis by the MCSWD's environmental technician. Data from those monitoring events is as follows:

<b>Area B - 2016</b>		<b>LLM-2</b>	<b>LLM-3</b>	<b>LLM-4</b>	<b>LLM-5</b>	<b>LLM-6</b>	<b>LLM-7</b>	<b>LLM-8</b>
Pipe Length to Elbow (feet)		100	102	95	100	119	115.9	116.8
1/12/2016	Depth to Liquid	N/A	Dry	Dry	Dry	118.9	115.7	116.6
	Leachate Head	Obstructed	0	0	0	0.1	0.2	0.2
2/22/2016	Depth to Liquid	N/A	Dry	Dry	Dry	118.9	115.7	116.6
	Leachate Head	Obstructed	0	0	0	0.1	0.2	0.2
3/25/2016	Depth to Liquid	N/A	Dry	Dry	Dry	118.9	115.6	116.5
	Leachate Head	Obstructed	0	0	0	0.1	0.3	0.3
4/4/2016	Depth to Liquid	N/A	Dry	Dry	Dry	118.9	115.6	116.5
	Leachate Head	Obstructed	0	0	0	0.1	0.3	0.3
5/28/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	115.7	116.6
	Leachate Head	Obstructed	0	0	0	0	0.2	0.2
6/14/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	115.7	116.6
	Leachate Head	Obstructed	0	0	0	0	0.2	0.2
7/28/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	115.7	116.6
	Leachate Head	Obstructed	0	0	0	0	0.2	0.2
8/15/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	Dry	Dry
	Leachate Head	Obstructed	0	0	0	0	0	0
9/27/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	Dry	Dry
	Leachate Head	Obstructed	0	0	0	0	0	0
10/21/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	Dry	Dry
	Leachate Head	Obstructed	0	0	0	0	0	0
11/10/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	Dry	Dry
	Leachate Head	Obstructed	0	0	0	0	0	0
12/22/2016	Depth to Liquid	N/A	Dry	Dry	Dry	Dry	Dry	Dry
	Leachate Head	Obstructed	0	0	0	0	0	0
LLM - Leachate Level Monitor								
Notes: If dry at landfill base, reported as "Dry" with 0 feet of head and nothing for leachate elevation								

### **Leachate Sampling**

Leachate sampling and analytical analysis was conducted semi-annually in April and October 2016. Sampling results for volatile organic compounds show a wide variety of compounds present. Semi-volatile organics are sampled for and tested in October. Full results are available on the WDNR Groundwater and Environmental Monitoring System (GEMS) database and are maintained in site files.

Leachate tank sampling conductivity results are as follows;

#### **Tank 3**

April	8070 umho/cm
October	10200 umho/cm



Tank 4  
 April 8780 umho/cm  
 October 9120 umho/cm

Tank 5  
 April 10300 umho/cm  
 October 11000 umho/cm

Analyses show leachate presents as slightly basic to neutral.

Tank 3  
 April 7.10 ph  
 October 7.28 ph

Tank 4  
 April 7.08 ph  
 October 7.18 ph

Tank 5  
 April 7.54 ph  
 October 7.65 ph

### **Lysimeters**

Northern Lakes Services, Inc. monitored lysimeters in April and October 2016 with additional monitoring for VOCs taking place in October. There no detects for VOC's so no results are shown. Results of the sampling is provided below:

ID/Date	Conductivity	pH	Gal. Pumped	Alkalinity (as CaCO <sub>3</sub> )	COD	Chloride (as Cl)	Hardness	Nitrite plus Nitrate	Sodium (as Na)	Sulfate (as SO <sub>4</sub> )	Boron
Lysimeter 7											
Apr-16	931 umh	7.4	1	360 mg/L	16 mg/L	57 mg/L	290 mg/L	1.6 mg/L	68 mg/L	36 mg/L	0.19 mg/L
Oct-16	894 umh	7.12	2	330 mg/L	4.2 mg/L	49 mg/L	270 mg/L	1.1 mg/L	62 mg/L	33 mg/L	0.1 mg/L

### **Final Cover**

There are approximately six acres of final cover constructed at the Area B Landfill. The existing final cover areas remain in excellent condition. As required by the site's plan of operation, and to ensure the investment in final cover is not compromised, the following activities are conducted throughout the year:

- Monthly visual inspections of the final cap surface
- Inspections of storm water management pathways
- Removal of obstructions or repair to storm water pathways
- Mowing pathways for surface emission monitoring work
- General mowing to control for woody herbaceous growth
- Snow plowing of access roads
- Grading and dust management of access roads
- Preventative maintenance of gas system and leachate pumping system

### **Storm Water Management**

There are four storm water management diversion and collection areas associated with Area B. Storm water is channeled away from the closed and intermediate cover areas of the landfill and away from exterior roads and flows to one of the sedimentation and retention ponds identified as SR-1 through SR-4. Storm water and retention pond SR-3 is used as a source of water for operational dust control; a tanker truck is filled with water and then applied to the various roadways.

The basins are observed as a general course of site inspections by MCSWD. Water height, clarity, and turbidity are noted. There has been no need to conduct maintenance on the basins. Storm water grates are also observed with this routine and cleared of materials that may impede the proper flow of storm water.

### **Groundwater Monitoring & Analysis**

At the beginning of 2016, MCSWD had a total of 91 groundwater monitoring wells, with twenty-five designated for Area B. The groundwater monitoring regimen was conducted according to the February 7, 2013 approved modification to the groundwater and leachate monitoring plan.

Per the approved monitoring plan, the groundwater wells within the plan were sampled semi-annually in April and October. Sampling and laboratory analysis was conducted by qualified personnel from Northern Lake Service (NLS) of Crandon, Wisconsin. Results revealed that the majority of monitoring wells have very good water quality and most meet safe drinking water standards. The groundwater samples were analyzed to very low chemical concentrations with many found to be below the laboratory's limit of quantification (LOQ). The groundwater quality measurements were compared to NR 140 Groundwater Preventive Action Limits (PALs) and Enforcement Standards (ESs) and site specific indicator PALs and Alternate Concentration Limits (ACLs) provided in the approved monitoring plan.

Reporting values higher than these limits are reported as exceedances. As in past monitoring events at the Area B site, results of some wells exceeded the PAL and ES standards. The exceedances noted in the tables below are largely attributed to the runoff from erosion control efforts that included seeding, fertilizing and mulching. No corrective action is planned or required at this time. Groundwater monitoring results and any exceedances were submitted electronically by NLS to the WDNR's GEMS database. Below is a summary of the exceedances from each semi-annual monitoring period. The exceedance reports submitted to the WDNR for the April and October 2016 monitoring event are provided in Attachment B.

### **Private Well Water Sampling**

The private wells identified in the monitoring plan identifies nine wells monitored semi-annually (April and October) and seven monitored annually (October) for specified parameters. Analytical results and explanations, where necessary, were reported to the private well owners. Results of the down-gradient wells having WDNR well ID numbers were submitted electronically to the WDNR GEMS database. The private water supply well samples analyzed in 2016 met the parameters identified in the site's monitoring plan for safe drinking water standards and no exceedances were recorded.

Since 1993, MCSWD has monitored private wells adjacent to and generally within about one mile to the southeast of the landfill property limits. MCSWD annually sends letters to approximately fifty landowners and nearby residents, offering to monitor their private water supply wells in autumn of each year. The Solid Waste Department notifies all eligible residents in advance of the monitoring event and schedules private well testing based on owner requests on a first come, first served basis. Not all residents accept the offer.

MCSWD's July 2004 "Private Well Monitoring Program and Contingency Plan for Alternative Water Supplies" explained that water supply wells located south to southeast of Area A will be sampled and tested for VOCs. MCSWD outlined a plan to take precautionary measures and to ensure safe drinking water is provided to homeowners in this group if, in the future, impacted groundwater from the landfill would cause a well's water to have total contaminants at a concentration half of the allowable drinking water maximum contaminant level. The maximum contaminant levels are allowed in drinking water for public water supply systems, so the county's contingency plan is even more protective of human health.

#### **Landfill Gas Monitoring**

Landfill Gas monitoring was conducted on a monthly basis in accordance with the sites Air Pollution Control Operation Permit 737092730-P20. The results of each monthly monitoring event is provided to both the solid waste and air departments of the WDNR on a monthly basis.

## ATTACHMENT A

### TO-15 RESULTS

September 26, 2016

Marathon County Solid Waste  
ATTN: Ron Smith  
R18500 E. Highway 29  
Ringle, WI 54471



ADE-1461  
EPA Methods TO3,  
TO14A, TO15 SIM & SCAN  
ASTM D1948



LA Cert #04140  
EPA Methods TO3, TO14A, TO15, 25C/3C  
RSK-175

TX Cert T104704450-14-6  
EPA Methods TO14A, TO15

UT Cert CA0133332015-3  
EPA Methods TO3, TO14A, TO15, RSK-175

### LABORATORY TEST RESULTS

Project Reference: Marathon Co. Mainline VOC Sample; 1  
Lab Number: H090706-01/02

Enclosed are results for sample(s) received 9/07/16 by Air Technology Laboratories. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

#### Report Narrative:

- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the NELAC Standards.
- The enclosed results relate only to the sample(s).

Preliminary results were e-mailed to Ron Smith on 9/23/16.

ATI appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Johnson".

Mark Johnson  
Operations Manager  
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

**Client:** Marathon County Solid Waste  
**Attn:** Ron Smith  
**Project Name:** Marathon Co. Mainline VOC Sample  
**Project No.:** 1  
**Date Received:** 09/07/16  
**Matrix:** Air  
**Reporting Units:** ug/L

Page 3 of 7  
 H090706

EPA Method TO15								
Lab No.:	H090706-02							
Client Sample I.D.:	Mainline VOC 1							
Date/Time Sampled:	8/31/16 8:00							
Date/Time Analyzed:	9/9/16 2:25							
QC Batch No.:	160908MS2A1							
Analyst Initials:	VM							
Dilution Factor:	16							
ANALYTE	Result ug/L	RL ug/L						
Dichlorodifluoromethane (12)	0.77	0.078						
Chloromethane	ND	0.065						
1,2-Di-1,1,2,2-F ethane (114)	0.12	0.11						
Vinyl Chloride	0.37	0.040						
Bromomethane	ND	0.15						
Chloroethane	0.073	0.042						
Trichlorofluoromethane (11)	0.12	0.089						
1,1-Dichloroethene	ND	0.063						
Carbon Disulfide	0.73	0.25						
1,1,2-Di 1,2,2-F ethane (113)	ND	0.12						
Acetone	4.7	0.19						
Methylene Chloride	ND	0.055						
c-1,2-Dichloroethene	ND	0.063						
1,1-Dichloroethane	ND	0.064						
Vinyl Acetate	ND	0.28						
c-1,2-Dichloroethene	0.40	0.063						
2-Butanone	2.9	0.047						
t-Butyl Methyl Ether (MTBE)	0.065	0.057						
Chloroform	ND	0.077						
1,1,1-Trichloroethane	ND	0.086						
Carbon Tetrachloride	ND	0.099						
Benzene	1.1	0.050						
1,2-Dichloroethane	0.11	0.064						
Trichloroethene	0.100	0.085						
1,2-Dichloropropane	ND	0.073						
Bromodichloromethane	ND	0.11						
c-1,3-Dichloropropene	ND	0.072						
4-Methyl-2-Pentanone	1.4	0.065						
Toluene	6.8	0.060						
t-1,3-Dichloropropene	ND	0.072						



**Client:** Marathon County Solid Waste  
**Attn:** Ron Smith  
**Project Name:** Marathon Co. Mainline VOC Sample  
**Project No.:** 1  
**Date Received:** 09/07/16  
**Matrix:** Air  
**Reporting Units:** ug/L

Page 4 of 7  
 H090706

EPA Method TO15								
Lab No.:	H090706-02							
Client Sample I.D.:	Mainline VOC 1							
Date/Time Sampled:	8/31/16 8:00							
Date/Time Analyzed:	9/9/16 2:25							
QC Batch No.:	160908MS2A1							
Analyst Initials:	VM							
Dilution Factor:	16							
ANALYTE	Result ug/L	RL ug/L						
1,1,2-Trichloroethane	ND	0.086						
Tetrachloroethene	0.57	0.11						
2-Hexanone	ND	0.065						
Dibromochloromethane	ND	0.13						
1,2-Dibromoethane	ND	0.12						
Chlorobenzene	ND	0.073						
Ethylbenzene	1.7	0.069						
p.&m-Xylene	2.9	0.069						
o-Xylene	0.91	0.069						
Styrene	ND	0.067						
Bromoform	ND	0.82						
1,1,2,2-Tetrachloroethane	ND	0.22						
Benzyl Chloride	ND	0.082						
4-Ethyl Toluene	0.14	0.078						
1,3,5-Trimethylbenzene	ND	0.16						
1,2,4-Trimethylbenzene	ND	0.16						
1,3-Dichlorobenzene	ND	0.095						
1,4-Dichlorobenzene	ND	0.095						
1,2-Dichlorobenzene	ND	0.095						
1,2,4-Trichlorobenzene	ND	0.23						
Hexachlorobutadiene	ND	0.17						

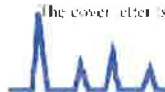
ND = Not Detected (below RL)

RL = Reporting Limit

Reviewed/Approved By: Mark Johnson  
 Mark Johnson  
 Operations Manager

Date 9/12/16

The cover letter is an integral part of this analytical report.



**AIR TECHNOLOGY Laboratories, Inc.**

page 2 of 2

18501 E. Gale Avenue, Suite 130 • City of Industry, CA 91748 • Ph. (626) 964-4032 • Fx. (626) 964-5832

## ATTACHMENT B

### GROUNDWATER EXCEEDNACE REPORTS FOR AREA B APRIL AND OCTOBER 2016 MONITORING EVENTS





## Marathon County Solid Waste Department

R18500 E. Hwy 29  
Ringle, WI 54471

Director:	715-446-3101 X104
Site Supervisor:	715-446-3101 X102
Administrative Office:	715-446-3101 X100
Scale Master	715-446-3101 X103

Solid Waste & Recycling Info Line

877-270-3989 toll-free

[marathoncountysolidwaste.org](http://marathoncountysolidwaste.org)

[marathoncountysolidwaste](https://www.facebook.com/marathoncountysolidwaste)

June 14, 2016

Wisconsin Department of Natural Resources  
Bureau of Solid Waste Management  
GEMS Data Submittal Contact, WA/3  
P.O. Box 7921  
Madison, WI 53707-7921

RE: Exceedance of Groundwater Standards for Marathon County Landfill, License No. 3338 Area B.

In accordance with NR 140, please accept this notification of groundwater monitoring results for the reporting period of April 2016. An exceedance table has been attached for the Area B landfill and can be found on the following page.

If you have any questions, please contact me.

Thank you,

David Hagenbucher  
Operations Manager  
Marathon County Solid Waste

C.c: Nathan Coller, Sarah Shiel, Eric Syftestad, Meleesa Johnson, Michael Michels, Michael Melan


**Area B Groundwater Well Exceedance Table April 2016**

Marathon County Solid Waste Department: Area B Groundwater Monitoring Wells								
	Area B	Facility #02892	Exceedances					
Project #	Date	Well #	Parameter	Units	Result	PAL	ES	Comments
258584	04/14/2016	R27	Nitrate+Nitrite	mg/L	4.60	2.00	10.00	NR140

The Area B Nitrate/Nitrite levels at well R27 can be a result of improper farming practices. Throughout the past year, Area B has had ongoing vegetation management to establish growth on slopes. Seed, fertilizer, and mulch have all been applied in an effort to control erosion. This well will continue to be monitored to evaluate the source of the contaminant.



[marathoncountysolidwaste.org](http://marathoncountysolidwaste.org)

 [marathoncountysolidwaste](https://www.facebook.com/marathoncountysolidwaste)

## **Marathon County Solid Waste Department**

**R18500 E. Hwy 29**

**Ringle, WI 54471**

Director:	715-446-3101 X104
Site Supervisor:	715-446-3101 X102
Administrative Office:	715-446-3101 X100
Scale Master	715-446-3101 X103
Solid Waste & Recycling Info Line	877-270-3989 toll-free

November 10, 2016

Wisconsin Department of Natural Resources  
Bureau of Solid Waste Management  
GEMS Data Submittal Contact, WA/3  
P.O. Box 7921  
Madison, WI 53707-7921

RE: Exceedance of Groundwater Standards for Marathon County Landfill, License No.  
3338 Area B.

In accordance with NR 140, please accept this notification of groundwater monitoring results for the reporting period of October 2016. An exceedance table has been attached for the Area B landfill and can be found on the following page.

If you have any questions, please contact me.

Thank you,

David Hagenbucher  
Operations Manager  
Marathon County Solid Waste

C.c: Nathan Coller, Sarah Shiel, Eric Syftestad, Meleesa Johnson, Michael Michels,  
Michael Melan

### Area B Groundwater Well Exceedance Table October 2016

Marathon County Solid Waste Department: Area B Groundwater Monitoring Wells									
	Area B	Facility #3338	Exceedances						
Project #	Date	Well #	Parameter	Units	Result	PAL	ES	ACL	Comments
268764	10/01/2016	R27	Nitrate+Nitrite	mg/L	2.20	2.00	10.00		NR140
268764	10/01/2016	R52	Conductivity	umho@25C	560			540	ACL well
268764	10/01/2016	R52	Hardness	mg/L	290			290	ACL well

The Area B Nitrate/Nitrite levels at well R27 can be a result of improper farming practices. Throughout the past year, Area B has had ongoing vegetation management to establish growth on slopes. Seed, fertilizer, and mulch have all been applied in an effort to control erosion. This well has shown a decrease in concentration since the previous sampling event. The well will continue to be monitored closely to ensure that levels continue to decrease.

Conductivity and hardness were detected in well R52. This particular well is located southeast of the Area B landfill. During 2016, Area B had a large amount of intermediate cover applied in the form of clean site soil. During the process of establishing full vegetation on the sloped areas, the landfill received some heavy rain events which caused soil erosion and sediment flow towards this well. The location of the construction on Area B may have contributed to the spike in conductivity and hardness. The well will continue to be monitored to evaluate the source of the increased levels.