



Water and Waste Department  
Environmental Standards Division

# Biosolids Dewatering, Monitoring, and Disposal Programs



**Environment Act Licence #1089E RR**

**2018**



**Water and Waste Department • Service des eaux et des déchets**

*Environmental Standards Division • Division des Normes Environnementales*

January 31, 2019

Our File: 040-17-08-23-01

Manitoba Sustainable Development  
Environmental Compliance and Enforcement Branch  
1007 Century Street  
Winnipeg, MB R3H 04W

Attention: Mr. Don Labossiere, Regional Director

**RE: ANNUAL COMPLIANCE REPORT FOR ENVIRONMENT ACT LICENCE 1089E RR**

Enclosed you will find our annual compliance report which details the City of Winnipeg's Biosolids Dewatering and Disposal Program for 2018. Included in this report are:

- a) details of the 2018 biosolids distribution and monitoring programs
- b) details of the proposed 2019 biosolids distribution program

If you have any questions concerning the annual report, I may be reached by telephone at 204-986-8359 or by e-mail at [rgrosselle@winnipeg.ca](mailto:rgrosselle@winnipeg.ca).

Yours sincerely,

*Original signed by:*

R. Grosselle  
Manager of Environmental Standards

Enclosure

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# **2018 Biosolids Dewatering, Monitoring, and Disposal Programs**

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## 1.0 INTRODUCTION

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Clause 22 of Environment Act Licence #1089E RR, issued on June 14, 2000, requires that the City of Winnipeg monitor its biosolids dewatering and disposal operations and submit an annual report to the regulating authority and various municipalities on or before the 31st of January of each year. The City of Winnipeg's Biosolids Master Plan<sup>1</sup> (BMP) is a 30 year plan for dealing with biosolids. As outlined in the BMP, the City is exploring options for beneficial uses of biosolids including composting, agricultural land application, and soil fabrication.

This report summarizes the results of the City's 2018 Biosolids Dewatering, Monitoring, and Disposal Program, and outlines the proposed plans for the 2019 calendar year.

In 2018, the City produced 52,569 wet tonnes of anaerobically digested, mechanically-dewatered biosolids at its North End Water Pollution Control Centre (NEWPCC), with an average total solids concentration of 26.5%. Approximately 33,064 wet tonnes were disposed at the Brady Road Resource Management Facility (BRRMF), 1,568 wet tonnes were composted as part of the pilot biosolids composting program at BRRMF, 7,005 wet tonnes were mixed with wood chips and street sweepings as part of the Summit Landfill soil fabrication pilot project, and 10,932 wet tonnes were applied to agricultural land in the RM of Rosser as part of a land application program.

The City completed the pilot composting program in 2018. Due to inconsistency with meeting CCME's required pathogen reduction, the City recommends that biosolids composting continues on an as-needed basis to meet final cover needs within the City's landfills.

As the pilot projects under the BMP conclude and transition into operating programs, the City recommends that annual reporting on the BMP be incorporated into the annual biosolids report that is submitted to Manitoba Sustainable Development (MSD) every January.

## 2.0 DETAILS OF BIOSOLIDS DISTRIBUTION 2018

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### (a) Compost

In 2018, 1,568 wet tonnes of biosolids were diverted to the compost facility, with the final product being used as a soil amendment for landfill top cover at the BRRMF.

The City completed the pilot composting program in May 2018. The pilot program was able to produce a low odour, nutrient rich compost with low metals content, which was successfully used to grow vegetative cover. However, the upfront cost to compost biosolids is more than landfilling and land application, and it is difficult to meet CCME's required pathogen reduction consistently. Therefore, it is recommended that biosolids composting continue on an as-needed basis to meet final cover needs at the BRRMF.

A detailed description of the project is found in The City of Winnipeg Biosolids Compost Pilot Report<sup>2</sup>, which was submitted to MSD in Fall 2018.

### (b) In-Field Storage and Land Application

The City received regulatory approval for in-field storage and land application of biosolids in July 2018.

Between July and October 2018, approximately 10,932 wet (2,796 dry) tonnes of biosolids were stored in-field, and subsequently applied at a rate of 47 wet tonnes per hectare to agricultural land in the RM of Rosser.

A detailed description of the project is found in The City of Winnipeg Biosolids Land Application Program Summary Report<sup>3</sup>, which will be submitted to MSD in February 2019.

The temporary storage facility in the RM of West St. Paul was not used to provide interim storage for mechanically-dewatered biosolids in 2018, and we have no immediate plans to use the facility for this purpose.

**(c) Soil Fabrication**

In May 2018, the City received regulatory approval for a three year (2018-2020) soil fabrication pilot project at the Summit Landfill. In 2018, approximately 7,005 wet tonnes of biosolids were mixed with approximately 14,000 tonnes of wood chips and 20,000 tonnes of street sweepings. Based on drone surveys, a total of 30,000 m<sup>3</sup> of fabricated soil was produced. Approximately half of the fabricated soil was spread over 3.5 ha in the fall of 2018, the other half was windrowed and will be spread in spring of 2019.

A detailed description of the project and initial findings are found in the Summit Landfill Soil Fabrication Pilot Project Year One Annual Report<sup>4</sup>, which was submitted to MSD in January 2019.

**(d) Landfill**

Of the 52,569 wet tonnes of mechanically-dewatered biosolids produced at the NEWPCC from January 1, 2018 to December 31, 2018, approximately 33,064 wet tonnes were disposed at the BRRMF.

Appendix I contains the Monthly Hauling Summaries for 2018.

### 3.0 RESULTS OF ANALYSIS

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#### (a) Biosolids

From January 1, 2018 to December 31, 2018 the City produced 52,569 wet tonnes of mechanically-dewatered biosolids at its NEWPCC facility; the total solids in the biosolids averaged  $26.5 \pm 2.4\%$  ( $n = 264$ ). The dewatering equipment achieved total solids content in the biosolids of at least 20 percent by weight throughout 2018.

Table 1 contains analytical results for biosolids samples in fulfillment of the monitoring requirements stipulated in Appendix B of Licence #1089E RR.

#### (b) Brady Road Resource Management Facility – Compost and Landfill

##### (i) Compost

Samples of finished compost were tested throughout the piloting period to determine if they met metals and pathogen content targets.

The finished compost can be categorized as having low metals, with 100% of the 75 samples meeting the CCME Category B restricted use requirement, and approximately 44% meeting the CCME Category A unrestricted use requirement for metals content.

Initially, samples of finished compost did not consistently meet the pathogen content targets due to cross contamination during sampling and incomplete mixing of biosolids with woodchips. Pathogen reduction was improved by implementing better mixing and modifying sampling techniques. Overall, 36% of the 27 samples tested met the target levels for fecal coliform and *Salmonella* sp., with the last 10 samples consistently meeting the target levels.

Analytical results are included in The City of Winnipeg Biosolids Compost Pilot Report<sup>2</sup>, which was submitted to MSD in Fall 2018.



**TABLE 1**  
**2018 Biosolids Quality**

Sample Number	Date Sampled *	Total Cd (mg/Kg-Cd)	Total Cr (mg/Kg-Cr)	Total Cu (mg/Kg-Cu)	Total Ni (mg/Kg-Ni)	Total Pb (mg/Kg-Pb)	Total Zn (mg/Kg-Zn)	Total P (mg/Kg-P)	NH3-N (mg/Kg-N)	TKN (mg/Kg-N)	pH (units)	Specific Conductance (uS/cm)	Moisture (%)
1	24-Dec-17	6.2	147	312	29.7	33.6	1600	23,600	10,600	48,900	5.92	10,400	74.3
2	7-Jan-18	5.0	127	334	30.8	33.0	1260	23,900	10,500	43,500	6.07	9,900	76.0
3	22-Jan-18	3.8	106	601	27.1	31.8	960	22,900	8,660	46,000	6.03	10,100	74.0
4	4-Feb-18	3.8	118	618	28.6	30.9	971	23,700	8,630	44,600	5.90	9,260	73.0
5	18-Feb-18	2.5	95	517	23.6	26.5	809	20,900	6,120	42,400	5.94	8,900	72.3
6	4-Mar-18	2.2	98	487	24.0	27.0	731	19,200	9,570	35,000	5.80	9,110	71.0
7	18-Mar-18	2.2	104	476	27.7	33.5	724	18,700	8,150	36,300	5.78	8,490	68.6
8	1-Apr-18	2.1	89	465	27.5	35.6	802	18,800	7,940	34,700	5.92	7,830	69.2
9	15-Apr-18	4.4	76	502	26.7	34.8	863	18,300	8,540	33,200	5.91	8,510	71.7
10	29-Apr-18	4.2	150	497	29.4	34.2	974	17,000	8,310	34,800	5.92	9,150	72.8
11	14-May-18	3.1	215	497	27.4	34.8	1770	17,000	9,860	39,800	5.86	10,700	73.7
12	27-May-18	2.8	237	483	28.2	44.3	2120	16,300	8,850	31,900	5.92	9,340	71.1
13	10-Jun-18	2.4	303	490	26.6	48.7	1490	17,900	8,130	34,600	6.01	10,800	72.0
14	25-Jun-18	1.7	205	475	28.6	51.1	1133	18,657	8,206	40,200	6.03	11,860	73.8
15	9-Jul-18	1.5	146	496	26.7	45.4	974	18,660	9,612	35,000	6.03	12,540	73.2
16	23-Jul-18	1.4	115	517	29.3	42.3	1661	18,586	9,187	35,600	5.88	10,110	74.3
17	7-Aug-18	1.5	409	525	27.5	46.6	1546	18,166	8,323	36,100	5.89	9,370	73.4
18	20-Aug-18	1.5	429	561	27.2	41.0	1300	19,396	8,217	41,600	6.14	9,960	75.6
19	4-Sep-18	1.3	230	573	29.8	46.8	1314	17,661	9,902	39,500	5.96	10,440	75.9
20	17-Sep-18	1.6	136	498	29.4	74.3	1045	16,029	8,680	35,300	5.98	10,250	74.9
21	1-Oct-18	1.5	91	488	32.8	63.0	853	16,455	8,437	36,700	5.88	9,850	75.0
22	15-Oct-18	3.2	85	504	32.6	46.5	760	15,815	7,702	43,000	6.17	8,990	75.5
23	29-Oct-18	5.8	87	539	39.9	47.0	826	16,885	9,644	43,700	5.91	9,900	75.0
24	13-Nov-18	4.2	83	552	36.5	46.3	853	18,846	10,270	43,600	6.07	10,460	75.9
25	26-Nov-18	3.5	75	549	37.2	40.1	880	18,741	10,160	43,500	6.10	10,420	76.1
26	10-Dec-18	3.2	65	463	20.3	29.8	723	18,393	9,410	45,400	5.79	10,870	76.2
<b>Average:</b>		2.9	155	501	29.0	41.1	1113	18,865	8,908	39,419	5.95	9,904.2	73.6
<b>Maximum:</b>		6.2	429	618	39.9	74.3	2120	23,900	10,600	48,900	6.17	12,540.0	76.2
<b>Minimum:</b>		1.3	65	312	20.3	26.5	723	15,815	6,120	31,900	5.78	7,830.0	68.6

\* Indicates starting date for year 2018 biweekly composite samples

## **(ii) Odours**

We continue to monitor odours at the BRRMF on a weekly basis and follow up with any odour complaints. Odour mitigation strategies for biosolids have largely been successful as none of the 21 odour complaints reported in 2018 were attributed specifically to biosolids. The City continues to use strategies to help mitigate odours including:

- Covering biosolids quickly with soil or other wastes that do not cause odours
- Scheduling the arrival of biosolids at specific times of day when wind conditions are not likely to cause concern for odour
- Collecting and burning landfill gas to help mitigate buried biosolid odours
- Controlling storm water runoff to prevent leachate generation and ponding of water that causes odour
- Using biofilters on the biosolids compost facility
- Using compost near odour point sources to help control odour
- Using woodchips in the biosolids trench to help mitigate odour when spreading biosolids
- Expanding the landfill gas collection system
- Continuing an odour monitoring program

## **(c) In-field Storage and Land Application**

### **(i) Soil**

As part of the Land Application Project, soil samples from the application areas were collected in summer and fall. Based on the summer results, it appears that the plant available nitrogen and phosphate-phosphorous from the biosolids continues to be available during the growing season and is not a crop production limitation. Analytical results from the fall sampling are consistent with anticipated post crop harvest soil residual results for nitrogen and phosphorus within heavy clay soils. Samples were also collected from below the in-field storage area to assess for nutrient leaching. Nutrient levels were within acceptable guidelines and were similar to those collected from the storage area prior to biosolids storage, which indicates that leaching of nutrients to the soil profile below the storage site was minimal. Analytical results are included in The City of Winnipeg Biosolids Land Application Program Summary Report<sup>3</sup>.

### **(ii) Plant Tissue**

Canola leaf tissue samples were collected on June 5<sup>th</sup> and July 12<sup>th</sup>. Trends in nutrient levels with the canola plant tissue were consistent with those expected in a maturing canola crop. Analytical results are included in The City of Winnipeg Biosolids Land Application Program Summary Report<sup>3</sup>.

### **(iii) Odours**

Biosolids stockpiles were covered with a layer of straw to minimize odour. The RM of Rosser Reeve and Council did not receive any complaints about the odour during the 2018 program and the City did not receive any odour concerns from the public through the project phone number or email address.

## **(d) Soil fabrication**

### **(i) Soil**

As part of the Summit Landfill Soil Fabrication project, soil samples were taken from two test plots that had been spread with fabricated soil at a depth of 0.6m. Soil sample results met the industrial standards for CCME Soil Quality Guidelines for the Protection of Environmental and Human Health. With the exception of zinc, the soil samples also met the British Columbia criteria for biosolids growing media, which was used as a guide in developing the soil mix ratio. Analytical results are included in Summit Landfill Soil Fabrication Pilot Project Year One Annual Report<sup>4</sup>.

### **(ii) Surface Water**

The soil fabrication project is located within the boundaries of the Summit Road Landfill leachate and surface water collection and containment system; samples will be taken in spring of 2019.

### **(iii) Odours**

Summit Landfill Soil Fabrication Pilot Project Year One Annual Report<sup>4</sup> noted that biosolids odour was detected in the operating area during receiving operations, but no odours were reported at the street sweepings area during mixing operations. On June 18th, a stronger ammonia odour was noted onsite during spreading.

No odours were detected offsite during the biosolids receiving or soil spreading operations, and no odour complaints were received through 311 or other public sources.

## **4.0 DETAILS OF PROPOSED BIOSOLIDS DISTRIBUTION FOR 2019**

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### **(a) Compost**

Pending regulatory approval, biosolids composting will continue on an as-needed basis to meet final cover needs at the BRRMF.

### **(b) In-Field Storage and Land Application**

In 2019, the land application project will include sourcing cooperating farm producer(s) and suitable land; storage area locations and configurations will be determined once the agricultural land has been selected. Storage area(s) set up and biosolids hauling will commence after road restrictions have been lifted. An Environmental Act Licence Proposal for in-field biosolids storage and a full-scale three-year land application program is currently under review by MSD.

The City of Winnipeg has no plans to use the temporary storage facility in the RM of West St. Paul in 2019.

### **(c) Soil Fabrication**

In 2019, the City will submit a final report on the Summit Landfill Soil Fabrication Pilot Project to MSD.

The windrowed soil produced in 2018 will be spread over approximately 5 ha of the Summit Landfill in the spring of 2019. Approximately 15,000 wet tonnes of biosolids are expected to be used for soil fabrication in 2019.

### **(d) Landfill**

In 2019, biosolids that are not composted, land applied, or used in the soil fabrication project will be disposed of at the BRRMF.

## 5.0 REFERENCES

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1. COW/Veolia. September 2014. City of Winnipeg Biosolids Master Plan
2. COW. October 2018. City of Winnipeg Biosolids Compost Pilot Report
3. WSP. February 2019. City of Winnipeg Biosolids Land Application Program Summary Report.
4. COW. January 2019. Summit Landfill Soil Fabrication Pilot Project Year One Annual Report

**APPENDIX I**  
**MONTHLY HAULING SUMMARIES**



## 2018 Biosolids Management Program

January 2018									
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Landuse
1									
2	252.70	25.40	64.19	10	0	10	0.00	252.70	0.00
3	226.23	25.66	58.05	9	0	9	0.00	226.23	0.00
4	176.88	25.41	44.95	7	0	7	0.00	176.88	0.00
5	227.62	25.41	57.84	9	0	9	0.00	227.62	0.00
6									
7									
8	176.93	25.41	44.96	7	0	7	0.00	176.93	0.00
9	201.84	22.16	44.73	8	0	8	0.00	201.84	0.00
10	201.54	25.21	50.81	5	3	8	74.16	127.38	0.00
11	226.90	24.95	56.61	9	0	9	0.00	226.90	0.00
12	201.28	25.71	51.75	8	0	8	0.00	201.28	0.00
13									
14									
15	201.93	25.32	51.13	8	0	8	0.00	201.93	0.00
16	150.47	24.92	37.50	6	0	6	0.00	150.47	0.00
17	226.21	23.80	53.84	9	0	9	0.00	226.21	0.00
18	125.43	25.33	31.77	2	3	5	74.16	51.27	0.00
19	226.63	25.18	57.07	9	0	9	0.00	226.63	0.00
20									
21									
22	253.76	25.02	63.49	7	4	11	98.88	154.88	0.00
23	226.31	24.38	55.17	9	0	9	0.00	226.31	0.00
24	250.70	25.39	63.65	10	0	10	0.00	250.70	0.00
25	200.03	26.22	52.45	8	0	8	0.00	200.03	0.00
26	124.71	26.76	33.37	5	0	5	0.00	124.71	0.00
27	50.06	26.12	13.08	2	0	2	0.00	50.06	0.00
28									
29	100.30	25.48	25.56	4	0	4	0.00	100.30	0.00
30	150.16	25.33	38.04	5	2	7	49.44	100.72	0.00
31	175.59	25.34	44.49	7	0	7	0.00	175.59	0.00
<b>TOTAL</b>	<b>4354.21</b>	<b>25.21</b>	<b>1094.48</b>	<b>163</b>	<b>12</b>	<b>175</b>	<b>296.65</b>	<b>4057.56</b>	<b>0.00</b>
NOTES: Split load Jan. 22 between landfill and compost									



## 2018 Biosolids Management Program

February 2018									
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Landuse
1	100.33	26.22	26.31	4	0	4	0.00	100.33	0.00
2	201.04	28.39	57.08	8	0	8	0.00	201.04	0.00
3	100.48	27.87	28.00	4	0	4	0.00	100.48	0.00
4									
5	201.16	27.35	55.02	8	0	8	0.00	201.16	0.00
6	200.74	25.48	51.15	8	0	8	0.00	200.74	0.00
7	201.18	26.88	54.08	8	0	8	0.00	201.18	0.00
8	201.33	26.40	53.15	8	0	8	0.00	201.33	0.00
9	175.81	27.22	47.86	7	0	7	0.00	175.81	0.00
10									
11									
12	50.39	26.99	13.60	0	0	0	0.00	50.39	0.00
13	151.39	28.01	42.40	8	0	8	0.00	151.39	0.00
14	252.16	26.62	67.12	10	0	10	0.00	252.16	0.00
15	201.48	27.16	54.72	8	0	8	0.00	201.48	0.00
16	247.63	27.69	68.57	10	0	10	0.00	247.63	0.00
17									
18									
19	125.51	27.68	34.74	5	0	5	0.00	125.51	0.00
20	225.99	27.66	62.51	9	0	9	0.00	225.99	0.00
21	200.99	27.38	55.03	8	0	8	0.00	200.99	0.00
22	199.56	27.98	55.84	8	0	8	0.00	199.56	0.00
23	138.88	28.03	38.93	6	0	6	0.00	138.88	0.00
24									
25									
26	176.30	28.07	49.49	7	0	7	0.00	176.30	0.00
27	250.54	25.52	63.94	8	2	10	50.28	200.26	0.00
28	226.06	27.90	63.07	9	0	9	0.00	226.06	0.00
<b>TOTAL</b>	<b>3828.95</b>	<b>27.3</b>	<b>1042.60</b>	<b>151</b>	<b>2</b>	<b>153</b>	<b>50.28</b>	<b>3778.67</b>	<b>0.00</b>
NOTES:									





## 2018 Biosolids Management Program

March		2018							
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Landuse
1	172.85	26.79	46.31	7	0	7	0.00	172.85	0.00
2	150.57	28.11	42.33	6	0	6	0.00	150.57	0.00
3									
4									
5	175.76	28.11	49.41	4	3	7	75.37	100.39	0.00
6	227.49	29.62	67.38	9	0	9	0.00	227.49	0.00
7	202.69	28.95	58.68	8	0	8	0.00	202.69	0.00
8	254.01	27.20	69.09	10	0	10	0.00	254.01	0.00
9	203.17	30.38	61.72	8	0	8	0.00	203.17	0.00
10									
11									
12	203.06	25.33	51.44	8	0	8	0.00	203.06	0.00
13	200.99	29.34	58.97	8	0	8	0.00	200.99	0.00
14	200.66	29.98	60.16	8	0	8	0.00	200.66	0.00
15	230.52	29.70	68.46	9	0	9	0.00	230.52	0.00
16	202.16	29.70	60.04	8	0	8	0.00	202.16	0.00
17									
18									
19	205.03	28.50	58.43	8	0	8	0.00	205.03	0.00
20	203.69	30.34	61.80	8	0	8	0.00	203.69	0.00
21	202.85	29.79	60.43	8	0	8	0.00	202.85	0.00
22	253.70	30.73	77.96	10	0	10	0.00	253.70	0.00
23	250.92	32.65	81.93	10	0	10	0.00	250.92	0.00
24									
25									
26	176.41	30.65	54.07	7	0	7	0.00	176.41	0.00
27	252.81	30.73	77.69	10	0	10	0.00	252.81	0.00
28	202.72	33.01	66.92	8	0	8	0.00	202.72	0.00
29	202.96	34.14	69.29	8	0	8	0.00	202.96	0.00
30	152.05	29.70	45.16	6	0	6	0.00	152.05	0.00
31	100.21	29.70	29.76	4	0	4	0.00	100.21	0.00
<b>TOTAL</b>	<b>4627.28</b>	<b>29.70</b>	<b>1377.42</b>	<b>180</b>	<b>3</b>	<b>183</b>	<b>75.37</b>	<b>4551.91</b>	<b>0.00</b>
<b>NOTES:</b>									



## 2018 Biosolids Management Program

April 2018									
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Landuse
1									
2	253.39	33.39	84.61	10	0	10	0.00	253.39	0.00
3	201.89	33.39	67.41	8	0	8	0.00	201.89	0.00
4	202.27	29.79	60.26	8	0	8	0.00	202.27	0.00
5	202.15	32.51	65.72	8	0	8	0.00	202.15	0.00
6	247.95	32.19	79.82	10	0	10	0.00	247.95	0.00
7									
8									
9	250.35	31.87	79.79	10	0	10	0.00	250.35	0.00
10	201.22	30.37	61.11	8	0	8	0.00	201.22	0.00
11	150.26	31.21	46.90	6	0	6	0.00	150.26	0.00
12	201.34	31.08	62.58	8	0	8	0.00	201.34	0.00
13	200.23	29.84	59.75	8	0	8	0.00	200.23	0.00
14									
15									
16	175.60	29.91	52.52	7	0	7	0.00	175.60	0.00
17	301.59	26.94	81.25	12	0	12	0.00	301.59	0.00
18	225.93	29.35	66.31	9	0	9	0.00	225.93	0.00
19	150.05	28.62	42.94	6	0	6	0.00	150.05	0.00
20	150.36	27.06	40.69	6	0	6	0.00	150.36	0.00
21	126.52	27.32	34.57	5	0	5	0.00	126.52	0.00
22	156.95	27.32	42.88	6	0	6	0.00	156.95	0.00
23	181.39	27.57	50.01	7	0	7	0.00	181.39	0.00
24	226.29	28.15	63.70	9	0	9	0.00	226.29	0.00
25	177.61	28.99	51.49	7	0	7	0.00	177.61	0.00
26	204.12	28.16	57.48	8	0	8	0.00	204.12	0.00
27	254.37	28.50	72.50	10	0	10	0.00	254.37	0.00
28									
29									
30	230.80	29.71	68.57	9	0	9	0.00	230.80	0.00
<b>TOTAL</b>	<b>4672.63</b>	<b>29.71</b>	<b>1392.83</b>	<b>185</b>	<b>0</b>	<b>185</b>	<b>0.00</b>	<b>4672.63</b>	<b>0.00</b>
<b>NOTES:</b>									



## 2018 Biosolids Management Program

May 2018											
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1	227.84	27.34	62.29	9	0	0	9	0.00	227.84	0.00	0.00
2	254.64	28.24	71.91	10	0	0	10	0.00	254.64	0.00	0.00
3	254.40	26.04	66.25	10	0	0	10	0.00	254.40	0.00	0.00
4	254.67	26.04	66.32	10	0	0	10	0.00	254.67	0.00	0.00
5											
6											
7	254.69	26.03	66.30	10	0	0	10	0.00	254.69	0.00	0.00
8	203.43	26.01	52.91	8	0	0	8	0.00	203.43	0.00	0.00
9	73.57	27.53	20.25	3	0	0	3	0.00	73.57	0.00	0.00
10	50.02	26.26	13.14	0	0	2	2	50.02	0.00	0.00	0.00
11	74.38	26.25	19.52	0	0	3	3	74.38	0.00	0.00	0.00
12											
13											
14	253.41	26.23	66.47	6	0	4	10	101.22	152.19	0.00	0.00
15	201.18	24.87	50.03	3	0	5	8	124.91	76.27	0.00	0.00
16	200.91	24.89	50.01	5	0	3	8	74.36	126.55	0.00	0.00
17	199.57	26.17	52.23	8	0	0	8	0.00	199.57	0.00	0.00
18	175.00	27.12	47.46	7	0	0	7	0.00	175.00	0.00	0.00
19											
20											
21	252.46	27.81	70.21	10	0	0	10	0.00	252.46	0.00	0.00
22	202.08	28.49	57.57	8	0	0	8	0.00	202.08	0.00	0.00
23	202.08	27.60	55.77	8	0	0	8	0.00	202.08	0.00	0.00
24	201.91	29.86	60.29	8	0	0	8	0.00	201.91	0.00	0.00
25	152.57	27.76	42.35	6	0	0	6	0.00	152.57	0.00	0.00
26											
27											
28	251.38	27.61	69.41	8	2	0	10	0.00	201.35	50.03	0.00
29	174.89	27.61	48.29	0	7	0	7	0.00	0.00	174.89	0.00
30	174.90	26.82	46.91	0	7	0	7	0.00	0.00	174.90	0.00
31	250.90	28.71	72.03	6	4	0	10	0.00	151.03	99.87	0.00
<b>TOTAL</b>	<b>4540.88</b>	<b>27.01</b>	<b>1227.92</b>	<b>143</b>	<b>20</b>	<b>17</b>	<b>180</b>	<b>424.89</b>	<b>3616.30</b>	<b>499.69</b>	<b>0.00</b>
<b>NOTES:</b>											



## 2018 Biosolids Management Program

June		2018										
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Land App	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1	251.26	30.51	76.66	6	4	0	0	10	0.00	151.57	99.69	0.00
2												
3												
4	199.74	30.97	61.86	0	8	0	0	8	0.00	0.00	199.74	0.00
5	149.93	30.33	45.47	0	6	0	0	6	0.00	0.00	149.93	0.00
6	224.66	30.42	68.34	0	9	0	0	9	0.00	0.00	224.66	0.00
7	273.10	29.88	81.60	0	11	0	0	11	0.00	0.00	273.10	0.00
8	149.69	29.16	43.65	0	6	0	0	6	0.00	0.00	149.69	0.00
9												
10												
11	300.01	29.00	87.00	0	12	0	0	12	0.00	0.00	300.01	0.00
12	224.74	28.60	64.28	0	9	0	0	9	0.00	0.00	224.74	0.00
13	149.81	29.40	44.04	0	6	0	0	6	0.00	0.00	149.81	0.00
14	199.74	28.08	56.09	0	8	0	0	8	0.00	0.00	199.74	0.00
15	124.96	28.84	36.04	0	5	0	0	5	0.00	0.00	124.96	0.00
16												
17												
18	225.28	30.05	0.00	0	5	0	4	9	100.03	0.00	125.25	0.00
19	199.98	25.50	50.99	0	8	0	0	8	0.00	0.00	199.98	0.00
20	250.00	26.95	67.38	0	10	0	0	10	0.00	0.00	250.00	0.00
21	199.66	27.85	55.61	0	8	0	0	8	0.00	0.00	199.66	0.00
22	148.95	27.75	41.33	0	6	0	0	6	0.00	0.00	148.95	0.00
23												
24												
25	200.46	28.95	58.03	8	0	0	0	8	0.00	200.46	0.00	0.00
26	199.56	28.15	56.18	8	0	0	0	8	0.00	199.56	0.00	0.00
27	198.42	27.75	55.06	8	0	0	0	8	0.00	198.42	0.00	0.00
28	247.22	24.85	61.43	10	0	0	0	10	0.00	247.22	0.00	0.00
29	204.70	28.96	59.28	8	0	0	0	8	0.00	204.70	0.00	0.00
30												
<b>TOTAL</b>	<b>4321.87</b>	<b>28.66</b>	<b>1170.33</b>	<b>48</b>	<b>121</b>	<b>0</b>	<b>4</b>	<b>173</b>	<b>100.03</b>	<b>1201.93</b>	<b>3019.91</b>	<b>0.00</b>
<b>NOTES:</b>												



## 2018 Biosolids Management Program

July 2018												
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Land App	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1												
2												
3	171.91	25.35	43.58	7	0	0	0	7	0.00	171.91	0.00	0.00
4	220.69	26.51	58.50	9	0	0	0	9	0.00	220.69	0.00	0.00
5	268.94	27.91	75.06	11	0	0	0	11	0.00	268.94	0.00	0.00
6	293.25	27.78	81.46	12	0	0	0	12	0.00	293.25	0.00	0.00
7												
8												
9	146.81	28.34	41.61	6	0	0	0	6	0.00	146.81	0.00	0.00
10	122.26	25.70	31.42	5	0	0	0	5	0.00	122.26	0.00	0.00
11	244.45	28.22	68.98	10	0	0	0	10	0.00	244.45	0.00	0.00
12	242.98	28.34	68.86	10	0	0	0	10	0.00	242.98	0.00	0.00
13	199.57	28.24	56.36	8	0	0	0	8	0.00	199.57	0.00	0.00
14												
15												
16	200.65	27.07	54.32	0	0	8	0	8	0.00	0.00	0.00	200.65
17	350.37	26.75	93.72	0	0	14	0	14	0.00	0.00	0.00	350.37
18	122.05	26.43	32.26	0	0	5	0	5	0.00	0.00	0.00	122.05
19	125.08	25.07	31.36	0	0	5	0	5	0.00	0.00	0.00	125.08
20	174.39	26.38	46.00	0	0	7	0	7	0.00	0.00	0.00	174.39
21												
22												
23	308.42	26.76	82.53	0	0	12	0	12	0.00	0.00	0.00	308.42
24	257.08	27.97	71.91	0	0	10	0	10	0.00	0.00	0.00	257.08
25	101.73	23.90	24.31	0	0	4	0	4	0.00	0.00	0.00	101.73
26	199.38	25.33	50.50	0	0	8	0	8	0.00	0.00	0.00	199.38
27	102.46	26.63	27.29	0	0	4	0	4	0.00	0.00	0.00	102.46
28												
29												
30	338.28	25.56	86.46	0	0	13	0	13	0.00	0.00	0.00	338.28
31	99.76	25.33	25.27	0	0	4	0	4	0.00	0.00	0.00	99.76
<b>TOTAL</b>	<b>4290.51</b>	<b>26.65</b>	<b>1151.77</b>	<b>78</b>	<b>0</b>	<b>94</b>	<b>0</b>	<b>172</b>	<b>0.00</b>	<b>1910.86</b>	<b>0.00</b>	<b>2379.65</b>
<b>NOTES:</b>												



## 2018 Biosolids Management Program

August 2018												
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Land App	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1	174.45	25.57	44.61	0	0	3	4	7	99.66	0.00	0.00	74.79
2	188.96	26.07	49.26	0	0	8	0	8	0.00	0.00	0.00	188.96
3	119.99	25.42	30.50	0	0	5	0	5	0.00	0.00	0.00	119.99
4												
5												
6												
7	249.80	27.85	69.57	0	0	10	0	10	0.00	0.00	0.00	249.80
8	224.41	26.45	59.36	0	0	9	0	9	0.00	0.00	0.00	224.41
9	298.44	24.94	74.43	0	0	12	0	12	0.00	0.00	0.00	298.44
10	149.71	25.60	38.33	0	0	6	0	6	0.00	0.00	0.00	149.71
11												
12												
13	174.91	33.20	58.07	0	0	7	0	7	0.00	0.00	0.00	174.91
14	99.96	27.20	27.19	0	0	4	0	4	0.00	0.00	0.00	99.96
15	149.72	25.70	38.48	0	0	6	0	6	0.00	0.00	0.00	149.72
16	224.07	25.70	57.59	0	0	9	0	9	0.00	0.00	0.00	224.07
17	373.55	24.10	90.03	0	0	6	0	6	0.00	0.00	0.00	373.55
18												
19												
20	199.87	24.10	48.17	0	0	8	0	8	0.00	0.00	0.00	199.87
21	199.40	22.50	44.87	0	0	8	0	8	0.00	0.00	0.00	199.40
22	199.49	24.65	49.17	0	0	8	0	8	0.00	0.00	0.00	199.49
23	99.67	24.85	24.77	0	0	4	0	4	0.00	0.00	0.00	99.67
24	139.64	24.85	34.70	0	0	6	0	6	0.00	0.00	0.00	139.64
25												
26												
27	149.81	25.05	37.53	0	0	6	0	6	0.00	0.00	0.00	149.81
28	124.71	23.70	29.56	0	0	5	0	5	0.00	0.00	0.00	124.71
29	249.42	25.85	64.48	0	0	10	0	10	0.00	0.00	0.00	249.42
30	249.30	25.85	64.44	0	0	10	0	10	0.00	0.00	0.00	249.30
31	158.37	23.70	37.53	0	0	6	0	6	0.00	0.00	0.00	158.37
<b>TOTAL</b>	<b>4197.65</b>	<b>25.59</b>	<b>1072.62</b>	<b>0</b>	<b>0</b>	<b>156</b>	<b>4</b>	<b>160</b>	<b>99.66</b>	<b>0.00</b>	<b>0.00</b>	<b>4097.99</b>
<b>NOTES:</b>												



## 2018 Biosolids Management Program

September 2018												
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Land App	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1												
2												
3												
4	199.80	25.10	50.15	0	0	4	4	8	99.85	0.00	0.00	99.95
5	249.40	24.40	60.85	0	0	9	1	10	24.95	0.00	0.00	224.46
6	224.46	24.40	54.77	0	0	6	3	9	74.79	0.00	0.00	149.67
7	174.45	24.28	42.36	0	0	7	0	7	0.00	0.00	0.00	174.45
8												
9												
10	244.53	24.15	59.05	0	0	3	4	7	172.42	0.00	0.00	72.11
11	269.83	24.93	67.27	0	0	8	3	11	74.99	0.00	0.00	194.84
12	296.53	25.70	76.21	0	0	12	0	12	0.00	0.00	0.00	296.53
13	272.04	25.90	70.46	0	0	11	0	11	0.00	0.00	0.00	272.04
14	246.08	25.35	62.38	0	0	10	0	10	0.00	0.00	0.00	246.08
15												
16												
17	223.53	24.80	55.44	0	0	8	1	9	24.48	0.00	0.00	199.05
18	271.10	24.65	66.83	0	0	11	0	11	0.00	0.00	0.00	271.10
19	248.40	24.65	61.23	0	0	10	0	10	0.00	0.00	0.00	248.40
20	273.32	26.20	71.61	0	0	11	0	11	0.00	0.00	0.00	273.32
21	98.64	24.70	24.36	0	0	4	0	4	0.00	0.00	0.00	98.64
22												
23												
24	198.71	25.60	50.87	0	0	8	0	8	0.00	0.00	0.00	198.71
25	272.46	24.90	67.84	0	0	9	2	11	49.07	0.00	0.00	223.39
26	222.34	25.00	55.59	0	0	9	0	9	0.00	0.00	0.00	222.34
27	222.02	24.90	55.28	0	0	9	0	9	0.00	0.00	0.00	222.02
28	271.58	26.00	70.61	0	0	11	0	11	0.00	0.00	0.00	271.58
29												
30												
<b>TOTAL</b>	<b>4479.22</b>	<b>25.03</b>	<b>1123.16</b>	<b>0</b>	<b>0</b>	<b>160</b>	<b>18</b>	<b>178</b>	<b>520.55</b>	<b>0.00</b>	<b>0.00</b>	<b>3958.68</b>
<b>NOTES:</b>												



## 2018 Biosolids Management Program

October 2018												
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Land App	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1	248.36	27.35	67.93	0	0	10	0	10	0.00	0.00	0.00	248.36
2	247.62	25.65	63.51	0	0	10	0	10	0.00	0.00	0.00	247.62
3	223.01	24.30	54.19	9	0	0	0	9	0.00	223.01	0.00	0.00
4	271.78	23.30	63.32	11	0	0	0	11	0.00	271.78	0.00	0.00
5	293.53	23.95	70.30	12	0	0	0	12	0.00	293.53	0.00	0.00
6	195.50	24.73	48.35	8	0	0	0	8	0.00	195.50	0.00	0.00
7												
8	98.37	24.73	24.33	4	0	0	0	4	0.00	98.37	0.00	0.00
9	247.37	25.50	63.08	10	0	0	0	10	0.00	247.37	0.00	0.00
10	247.18	23.70	58.58	10	0	0	0	10	0.00	247.18	0.00	0.00
11	246.52	26.00	64.10	10	0	0	0	10	0.00	246.52	0.00	0.00
12	191.95	24.95	47.89	8	0	0	0	8	0.00	191.95	0.00	0.00
13												
14												
15	247.72	25.15	62.30	10	0	0	0	10	0.00	247.72	0.00	0.00
16	247.42	25.40	62.84	10	0	0	0	10	0.00	247.42	0.00	0.00
17	247.04	24.90	61.51	10	0	0	0	10	0.00	247.04	0.00	0.00
18	195.06	25.05	48.86	8	0	0	0	8	0.00	195.06	0.00	0.00
19	122.00	25.30	30.87	5	0	0	0	5	0.00	122.00	0.00	0.00
20												
21												
22	246.24	23.85	58.73	10	0	0	0	10	0.00	246.24	0.00	0.00
23	246.48	22.85	56.32	10	0	0	0	10	0.00	246.48	0.00	0.00
24	242.65	24.25	58.84	10	0	0	0	10	0.00	242.65	0.00	0.00
25	195.52	24.50	47.90	8	0	0	0	8	0.00	195.52	0.00	0.00
26	167.38	24.85	41.59	7	0	0	0	7	0.00	167.38	0.00	0.00
27												
28												
29	244.65	25.35	62.02	10	0	0	0	10	0.00	244.65	0.00	0.00
30	195.69	20.90	40.90	8	0	0	0	8	0.00	195.69	0.00	0.00
31	195.60	24.63	48.18	8	0	0	0	8	0.00	195.60	0.00	0.00
<b>TOTAL</b>	<b>5304.64</b>	<b>24.63</b>	<b>1306.45</b>	<b>196</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>216</b>	<b>0.00</b>	<b>4808.66</b>	<b>0.00</b>	<b>495.98</b>
<b>NOTES:</b>												





## 2018 Biosolids Management Program

November 2018												
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Land App	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1	185.75	25.50	47.37	7	0	0	0	7	0.00	185.75	0.00	0.00
2	89.32	24.45	21.84	4	0	0	0	4	0.00	89.32	0.00	0.00
3												
4												
5	122.00	25.10	30.62	0	5	0	0	5	0.00	0.00	122.00	0.00
6	48.55	25.70	12.48	0	2	0	0	2	0.00	0.00	48.55	0.00
7	97.69	25.50	24.91	0	4	0	0	4	0.00	0.00	97.69	0.00
8	193.46	25.00	48.37	0	8	0	0	8	0.00	0.00	193.46	0.00
9	140.29	24.40	34.23	0	6	0	0	6	0.00	0.00	140.29	0.00
10												
11												
12	241.99	24.40	59.05	0	10	0	0	10	0.00	0.00	241.99	0.00
13	192.91	24.40	47.07	0	8	0	0	8	0.00	0.00	192.91	0.00
14	240.66	24.25	58.36	0	10	0	0	10	0.00	0.00	240.66	0.00
15	121.96	23.95	29.21	0	5	0	0	5	0.00	0.00	121.96	0.00
16	170.03	24.15	41.06	0	7	0	0	7	0.00	0.00	170.03	0.00
17												
18												
19	289.64	23.65	68.50	0	12	0	0	12	0.00	0.00	289.64	0.00
20	145.05	24.45	35.46	0	6	0	0	6	0.00	0.00	145.05	0.00
21	123.61	24.60	30.41	0	5	0	0	5	0.00	0.00	123.61	0.00
22	147.80	22.80	33.70	0	6	0	0	6	0.00	0.00	147.80	0.00
23	125.18	24.40	30.54	0	5	0	0	5	0.00	0.00	125.18	0.00
24												
25												
26	219.40	24.30	53.31	0	9	0	0	9	0.00	0.00	219.40	0.00
27	239.64	24.24	58.09	0	10	0	0	10	0.00	0.00	239.64	0.00
28	191.62	23.74	45.49	0	8	0	0	8	0.00	0.00	191.62	0.00
29	95.78	24.47	23.44	0	4	0	0	4	0.00	0.00	95.78	0.00
30	288.22	24.41	70.35	0	12	0	0	12	0.00	0.00	288.22	0.00
<b>TOTAL</b>	<b>3710.55</b>	<b>24.45</b>	<b>903.86</b>	<b>11</b>	<b>142</b>	<b>0</b>	<b>0</b>	<b>153</b>	<b>0.00</b>	<b>275.07</b>	<b>3435.48</b>	<b>0.00</b>
<b>NOTES:</b>												



## 2018 Biosolids Management Program

December 2018												
Date	Wet Cake	% Total Solids	Dry Cake	Loads to Landfill	Loads for Soil Fab	Loads to Land App	Loads to Compost	Loads Total	Wet Cake Compost	Wet Cake Landfill	Wet Cake Soil Fab	Wet Cake Landuse
1												
2												
3	191.89	22.99	44.12	8	0	0	0	8	0.00	191.89	0.00	0.00
4	196.93	24.16	47.58	8	0	0	0	8	0.00	196.93	0.00	0.00
5	195.42	24.25	47.39	8	0	0	0	8	0.00	195.42	0.00	0.00
6	97.74	23.01	22.49	4	0	0	0	4	0.00	97.74	0.00	0.00
7	223.05	24.17	53.91	9	0	0	0	9	0.00	223.05	0.00	0.00
8												
9												
10	249.82	21.75	54.34	10	0	0	0	10	0.00	249.82	0.00	0.00
11	198.70	23.00	45.70	8	0	0	0	8	0.00	198.70	0.00	0.00
12	174.72	22.50	39.31	7	0	0	0	7	0.00	174.72	0.00	0.00
13	199.37	24.50	48.85	8	0	0	0	8	0.00	199.37	0.00	0.00
14	198.92	24.15	48.04	8	0	0	0	8	0.00	198.92	0.00	0.00
15												
16												
17	199.96	25.15	50.29	8	0	0	0	8	0.00	199.96	0.00	0.00
18	199.66	24.53	48.98	8	0	0	0	8	0.00	199.66	0.00	0.00
19	174.71	23.90	41.76	7	0	0	0	7	0.00	174.71	0.00	0.00
20	174.63	24.90	43.48	5	2	0	0	7	0.00	124.69	49.94	0.00
21	248.83	24.70	61.46	10	0	0	0	10	0.00	248.83	0.00	0.00
22												
23												
24	250.29	24.18	60.52	10	0	0	0	10	0.00	250.29	0.00	0.00
25												
26	149.21	24.18	36.08	6	0	0	0	6	0.00	149.21	0.00	0.00
27	223.39	23.65	52.83	9	0	0	0	9	0.00	223.39	0.00	0.00
28	198.82	23.55	46.82	8	0	0	0	8	0.00	198.82	0.00	0.00
29	148.24	23.65	35.06	6	0	0	0	6	0.00	148.24	0.00	0.00
30	148.65	23.65	35.16	6	0	0	0	6	0.00	148.65	0.00	0.00
31	197.86	23.75	46.99	8	0	0	0	8	0.00	197.86	0.00	0.00
<b>TOTAL</b>	<b>4240.81</b>	<b>23.83</b>	<b>1011.14</b>	<b>169</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>171</b>	<b>0.00</b>	<b>4190.87</b>	<b>49.94</b>	<b>0.00</b>
<b>NOTES:</b>												