

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

*MONITORING AND RESEARCH
DEPARTMENT*

REPORT NO. 20-28

**ANNUAL BIOSOLIDS MANAGEMENT REPORT FOR
2019**

October 2020

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FOR 2019**

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LIST OF ACRONYMS

Abbreviation/Acronym	Definition
CFR	Code of Federal Regulations
CSD	Controlled Solids Distribution
District	Metropolitan Water Reclamation District of Greater Chicago
DT	dry tons
Egan WRP	John E. Egan Water Reclamation Plant
EQ	Exceptional Quality Biosolids
IEPA	Illinois Environmental Protection Agency
Kirie WRP	James C. Kirie Water Reclamation Plant
MBM	Metropolitan Biosolids Management, LLC
MGD	million gallons per day
O'Brien WRP	Terrence J. O'Brien Water Reclamation Plant
Part 503	United States Environmental Protection Agency's Code of Federal Regulations Title 40 Part 503
PFRP	Process to Further Reduce Pathogens
SMA	Solids Management Area
USEPA	United States Environmental Protection Agency
VAR	Vector Attraction Reduction
WRP	Water Reclamation Plant

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Special thanks are given to Ms. Coleen Maurovich for typing and formatting this report.

DISCLAIMER

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the Metropolitan Water Reclamation District of Greater Chicago.

FOREWORD

This report serves as a record of the data and information that fulfills the frequency of monitoring and the reporting requirements for 2019 for biosolids management by the District, as specified in the United States Environmental Protection Agency's (USEPA's) Code of Federal Regulations (CFR) Title 40 Part 503 (Part 503). The Part 503 reporting was done as required through the USEPA's online reporting system in February 2019.

OVERVIEW OF METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO BIOSOLIDS PRODUCTS AND UTILIZATION PROGRAM

The District operates seven water reclamation plants (WRPs), namely the Stickney, Calumet, Terrence J. O'Brien (O'Brien), John E. Egan (Egan), Hanover Park, James C. Kirie (Kirie), and Lemont WRPs. Four WRPs, Stickney, Calumet, Egan, and Hanover Park, produce final biosolids products. Under normal operations, the untreated sludge generated at the Kirie WRP is sent to the Egan WRP, and sludge from the O'Brien and Lemont WRPs is sent to the Stickney WRP for processing into final products. The processing of biosolids at the four WRPs that generate final biosolids products includes anaerobic digestion for at least 15 days of detention time at 35°C to meet the Part 503 Class B pathogen reduction requirements. The metal concentrations in all biosolids produced at the District are well below the pollutant concentration limits established in Table 3 of Part 503.13(b)(3). The additional processing to achieve the final products varies between the four WRPs as indicated in the description of the biosolids products outlined below.

Biosolids Products at the Metropolitan Water Reclamation District of Greater Chicago

- **Dewatered Class B Biosolids:** These biosolids are produced primarily by centrifugation of anaerobically digested liquid biosolids (~5 percent solids content) to approximately 25 percent solids content (centrifuge cake). Alternatively, the anaerobically digested liquid biosolids are stored temporarily in lagoons, then placed on drying beds for partial (semi) drying (>20 percent solids content) through mechanical agitation before use. These dewatered biosolids meet the Class B pathogen and Vector Attraction Reduction (VAR) standards of the USEPA Part 503 biosolids rule. This product is produced at the Stickney, Calumet, and Egan (centrifuged biosolids only) WRPs and commonly applied to farmland as a fertilizer.
- **Air-dried Exceptional Quality Biosolids:** These biosolids are produced through the aging of centrifuge cake biosolids or digested sludge in lagoons for at least 1.5 years followed by air-drying to at least 65 percent solids content. This air-dried material meets the "Exceptional Quality" (EQ) standards of the USEPA Part 503 biosolids rule, which designates biosolids that meet the strictest trace metals, pathogen, and VAR requirements. This product is produced at the Stickney and Calumet WRPs, and since the early 1990's, it has been used under a Controlled Solids Distribution (CSD) program as a fertilizer or soil amendment on areas such as recreational fields and golf courses and for reclamation of urban soils. The material is currently voluntarily registered as a soil amendment with the Illinois Department of Agriculture.
- **Composted Exceptional Quality Biosolids:** The composted biosolids are produced at the Stickney WRP, Harlem Avenue and at the Calumet East Solids Management Areas (SMAs) under permits issued by the Illinois Environmental

Protection Agency (IEPA) Bureau of Land and according to operational standards of the Part 503 Process to Further Reduce Pathogens (PFRP) protocol (USEPA, 1993). The composting recipe consists of one part centrifuge cake biosolids and three parts woodchips. The composting process used is open windrow composting for a minimum of 23 days, a minimum of five turnings, temperature maintained at a minimum of 55°C, and then followed by 16 weeks of curing. The product produced is currently voluntarily registered as a soil amendment with the Illinois Department of Agriculture.

- **Liquid Class B Biosolids:** The digested biosolids produced at the Hanover Park WRP are stored and thickened (~5 percent solids content) in lagoons on the grounds of the Hanover Park WRP. This material meets the Part 503 Class B pathogen and vector attraction reduction requirements and is applied through subsurface injection at the on-site Fischer Farm as a fertilizer for crops, mainly corn. The Fisher Farm has an underdrain system that returns drainage from the fields back to the WRP.
- **Biosolids Pellets:** The product is produced by heat-drying at a pelletizer facility located at the Stickney WRP that is owned and operated by Metropolitan Biosolids Management, LLC (MBM), a subsidiary of Veolia Water North America. The operation generates fertilizer pellets that meet EQ biosolids standards with a solids content greater than 90 percent.

Metropolitan Water Reclamation District of Greater Chicago Site-Specific Designations and Adjusted Standards for Biosolids Quality and Utilization

- **Illinois Pollution Control Board Adjusted Standards (AS 95-4 and 02-03):** This adjusted standard, originally granted to the District in 1995 by the Illinois Pollution Control Board, allows the use of lagoon-aged (at least 1.5 years) air-dried (at least 65 percent solids content) biosolids for establishing the final vegetative layer on landfills as a landfill final cover. Class A status is not a requirement for this standard. Therefore, lagoon-aged air-dried biosolids used for landfill final cover are not tested to confirm Class A status.
- **United States Environmental Protection Agency Site-Specific Process to Further Reduce Pathogens Certification:** This site-specific certification of the Calumet and Stickney WRPs' biosolids processing trains was granted in 2002. The certification specifies that biosolids produced by these processing trains in accordance with all parameters specified in the certification are designated Class A. The codified operational parameters are related to digestion time and temperature, lagoon storage time, loading rates, and frequency of agitation on drying cells. Any biosolids which do not comply with any of the codified parameters for the biosolids processing trains are to be isolated from PFRP-compliant biosolids and must be tested to meet the Part 503 pathogen (virus and helminth) requirements to be designated Class A. Currently, this certification is renewable every five years. Over the past eight

years, due to operational efficiencies related to lagoon storage time and air-drying operations, biosolids processing at both the Calumet and Stickney WRPs have not been operated to follow the codified parameters; therefore, all air-dried EQ biosolids are tested for helminth ova and viruses.

Total Biosolids Produced at the District

A total of 135,032 dry tons (DT) of biosolids was produced at District WRPs in 2019 based on the total of amounts at the Stickney and Calumet WRPs (which received all solids produced at the Egan, O'Brien, Kirie, and Lemont WRPs) and Hanover Park WRP, which did not transport any solids to another WRP ([Table 1](#)). The Stickney WRP produced 110,752 DT of biosolids from processing of solids generated at the plant and transported from the Egan, O'Brien, Kirie, and Lemont WRPs, and 142 DT of centrifuge cake biosolids from the Egan WRP. The Calumet WRP produced 23,511 DT, including those processed at the plant and 2,554 DT of biosolids transported from the Egan WRP. The Hanover Park WRP produced 769 DT, all of which was retained or applied on-site. This brings the District's five- and ten-year biosolids production running averages to 134,415 and 139,021 DT/year, respectively.

Biosolids Utilization Outlets

The District's Biosolids Management Program is designed to manage all the biosolids for beneficial reuse. During 2019, less than 1 percent of biosolids (486 DT) was unsuitable for land application and was co-disposed with municipal solid wastes at Waste Management's Laraway Landfill site, Joliet, Illinois ([Figure 1](#)). The unsuitable materials generally contain gravel, wood debris, and dust from sweeping of roads at biosolids drying sites. There are five main outlets for the beneficial utilization of District biosolids: (1) farmland application, (2) urban utilization of air-dried and composted EQ biosolids, (3) Fischer Farm Utilization Program, (4) pelletizing at the MBM facility, and (5) landfill final cover. In 2019, a total of 93,281 DT of biosolids were utilized through these outlets ([Table 1](#)).

Farmland Application Program. In this program, dewatered Class B biosolids are utilized as a fertilizer for the production of row crops in nearby counties in northeastern Illinois. Under this program, land application companies are contracted by the District through the competitive bidding process. The contractor is responsible for enrolling farmers in the program and for hauling and applying the biosolids to the farm fields. The farmland application program is conducted under separate permits issued by the IEPA to the District and the contractor. The District provides oversight of the program to ensure that the land application of biosolids is conducted in accordance with regulations and permits and that the contractor's operations are consistent with the District's goal of improving the public's awareness of the benefits of the farmland application program to the farming community. This District oversight is done by requiring the land application contractor to comply with hauling and field operation specifications and to execute a Public Relations Program and by District staff who conduct additional activities to complement the activities of the contractors. The District continually evaluates and modifies the program as needed to improve public awareness, benefits, and long-term sustainability of the program. In 2019, a total of 48,925 DT of dewatered Class B biosolids

TABLE 1: PRODUCTION AND UTILIZATION OF SLUDGE AND BIOSOLIDS DURING 2019¹

Production and Utilization	Water Reclamation Plants						
	Stickney	Calumet	O'Brien	Egan	Hanover Park	Kirie	Lemont
	----- Dry Tons (Metric Tons) -----						
Production ²	110,752 (100,473)	23,511 (21,329)	39,754 (36,064)	6,485 (5,883)	769 (697)	6,605 (5,992)	294 (267)
Utilization	77,463 (70,273)	15,660 (14,207)	-	-	769 (698)	-	-
Agricultural land	36,126 (32,773)	12,799 (11,611)	-	-	769 (698)	-	-
Urban land (total)	5,303 (4,811)	2,736 (2,482)	-	-	-	-	-
air-dried	3,004 (2,725)	1,591 (1,443)	-	-	-	-	-
composted	2,299 (2,086)	1,145 (1,039)	-	-	-	-	-
Landfill (total)	486 (441)	125 (113)	-	-	-	-	-
Co-disposal	486 (441)	125 (113)	-	-	-	-	-
Daily cover	-	-	-	-	-	-	-
Final cover	-	-	-	-	-	-	-
To Other WRPs ³	-	-	39,754 (36,064)	6,485 ⁴ (5,883)	-	6,605 (5,992)	294 (267)
Pelletizing facility ⁵	35,548 (32,249)	-	-	-	-	-	-

¹Differences between biosolids production and total use or disposal in 2019 were due to a net withdrawal or storage in lagoons or drying areas and processing of biosolids imported from other WRPs.

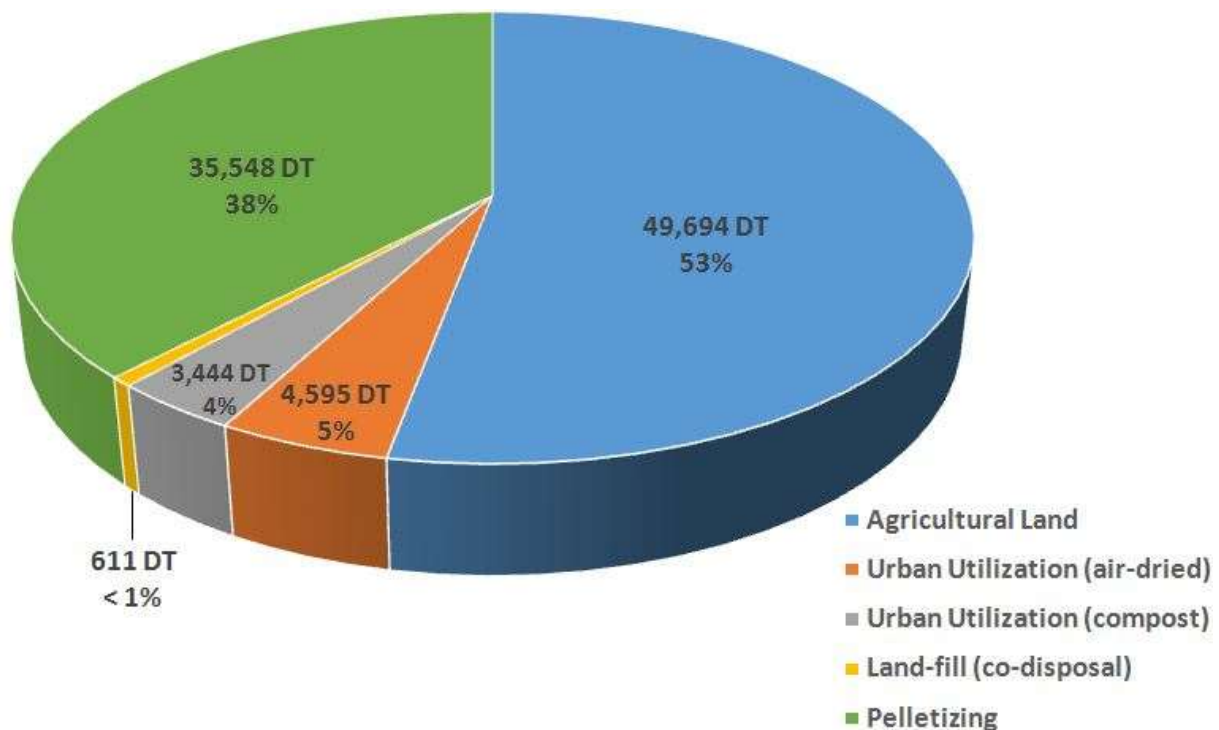
²Stickney, Calumet, and Hanover Park WRPs produced biosolids, while O'Brien, Kirie, and Lemont produced undigested or partially digested sludge, and Egan produced both. Figures represent total solids generated at the end of each plant's processing train plus those imported from other plants for further processing.

³For further processing or distribution.

⁴Includes centrate and solids pumped to the O'Brien WRP for further processing and centrifuge cake trucked to the Lawndale Avenue and Calumet Solids Management Areas for air-drying, composting, or application to farmland.

⁵Sent to Stickney WRP pelletizing facility owned and operated by Metropolitan Biosolids Management, LLC, 6001 W. Pershing Road, Cicero, IL 60804 (Contract No. 98-RFP-10).

FIGURE 1: OUTLETS OF BIOSOLIDS UTILIZATION AND DISPOSAL AT THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO IN 2019



from the Stickney and Calumet WRPs and 769 DT of liquid biosolids and lagoon supernatant from the Hanover Park WRP were applied to farmland as fertilizer ([Figure 1](#)).

Urban Utilization Program. The air-dried and composted EQ biosolids are applied to recreational areas (e.g., parks, golf courses, and athletic fields) and residential properties within the Chicago metropolitan area. The air-dried biosolids are typically used as topdressing on established turfgrass or blended into topsoil as a soil amendment. The composted biosolids are typically applied to land as a soil amendment or as mulch on planter beds. This program has traditionally been done under a CSD Permit issued by the IEPA Bureau of Water. In 2015, the Illinois General Assembly amended the Illinois Environmental Protection Act to adopt the USEPA EQ standard in the state and recognize biosolids as a safe, beneficial, and renewable resource. This legislative change eased state regulations that were stricter than federal restrictions on the use of EQ biosolids, and the CSD permit is no longer relevant for utilization of EQ biosolids. In 2019, 4,595 DT of air-dried biosolids and 3,444 DT of composted biosolids from the Stickney and Calumet WRPs were used in the metropolitan Chicago area ([Figure 1](#)).

Fischer Farm Utilization Program. The liquid Class B biosolids produced at the Hanover Park WRP are stored and thickened in lagoons and are utilized as fertilizer for application to farmland by a subsurface injection at the Fischer Farm located at the WRP. The supernatant from the settling of the biosolids and the settled biosolids are applied separately. In 2019, a total of 769 DT of biosolids as liquid biosolids and lagoon supernatant was applied to the farm (part of biosolids applied to agricultural land in [Figure 1](#)). The application of the biosolids

and production of the row crops at that site are done by a contractor under separate contracts awarded through the competitive bidding process.

Pelletizing Facility. Anaerobically digested centrifuge-dewatered biosolids are delivered to the MBM facility located at the Stickney WRP, where they are dried to at least 90 percent solids, pelletized, and sold as a fertilizer product by the MBM. In 2019, 35,548 DT of anaerobically digested biosolids produced at the Stickney WRP were pelletized (Figure 1).

Landfill Final Cover. No biosolids were applied as landfill final cover in 2019.

The following sections provide a short description of the sludge processing and biosolids management operations at each of the District's seven WRPs. In addition, we discuss the utilization of the biosolids, outline the data-reporting requirements under Part 503, and present the required monitoring data in summary tables. The production and utilization of sludge and biosolids by the District in 2019 are summarized in Table 1. All utilization of biosolids in 2019 complied with the management practices specified in Section 503.14. It should be noted that the total biosolids production in any given year may not equal the amount of the final biosolids product utilized, since biosolids may be utilized from production inventory for a previous year or biosolids produced in a given year may be stored or aged for utilization in subsequent years.

This report documents the production and utilization of the District's biosolids in 2019 records required under Part 503 at Section 503.18.

The District has four IEPA permitted biosolids management programs that must comply with Part 503 requirements. These programs are:

1. Fulton County Dedicated Biosolids Application to Land (IEPA Permit No. 2018-SC-63477).
2. Hanover Park Fischer Farm Biosolids Application to Land (IEPA Permit No. 2016-61315).
3. Controlled Solids Distribution Program (Biosolids Application to Land in the Chicago Area under IEPA Permit No. 2015-SC-59620).
4. Farmland Application Program (Biosolids Application to Farmland from the Calumet, Stickney, and the Egan WRPs under IEPA Permit No. 2018-SC-63703).

In addition, the District has two IEPA permits for composting biosolids at the Calumet East SMA (Permit No. 2017-017-DE/OP) and the Harlem Avenue SMA (Permit No. 2017-017-DE/OP). The biosolids compost is distributed for use as a soil amendment under Illinois Department of Agriculture registration (License No. 100181).

STICKNEY WATER RECLAMATION PLANT

Treatment Plant and Biosolids Process Train Description

The Stickney WRP, located in Stickney, Illinois, has a design average flow of 1,200 million gallons per day (MGD). The annual average treated flow in 2019 was 817 MGD. Wastewater reclamation processes include primary (Imhoff and primary settling) and secondary (activated sludge process) treatments. All solids produced at this WRP, solids directly transported from the Lemont WRP, and solids pipelined from the O'Brien WRP, which received processed solids generated at the Egan and Kirie WRPs, are anaerobically digested at the Stickney WRP. Stickney WRP biosolids are then handled as follows:

1. Placed in lagoons for dewatering, aging, and stabilization and then transported to paved cells and air-dried prior to:
 - a. Application to urban land as EQ biosolids.
 - b. Application to farmland as dewatered Class B biosolids.
 - c. Use at local municipal solid waste landfills as final landfill cover. No biosolids were utilized through this outlet in 2019 (Table 1).
2. Dewatered by centrifuging to approximately 25 percent solids content and then applied to farmland as Class B biosolids by a private contractor.
3. Dewatered by centrifuging to approximately 25 percent solids content, transported to paved cells, and air-dried prior to use as daily landfill cover. No biosolids were utilized this way in 2019 (Table 1).
4. Dewatered by centrifuging to approximately 25 percent solids content and transported to the Harlem Avenue SMA for co-composting with woodchips and yard waste prior to application to urban land as composted EQ biosolids. Class A pathogen reduction was achieved using the open windrow composting process through which all the requirements were met. The temperature of the compost piles in 2019 was maintained at $\geq 55^{\circ}\text{C}$ for at least 15 days, and the piles were turned five times during this period (Table 2). The VAR requirement was achieved through the same open windrow composting process and met the established standards of Section 503.33(b)(5) by fulfilling the temperature and time requirements ($\geq 45^{\circ}\text{C}$ for at least 14 days) in the open windrows (Table 2).
5. Dewatered by centrifuging to approximately 25 percent solids content, placed in lagoons for aging and stabilization, and transported to paved cells and air-dried prior to:
 - a. Application to urban land as EQ biosolids.
 - b. Use at local municipal solid waste landfills as final landfill cover. No biosolids were utilized through this outlet in 2019 (Table 1).

TABLE 2: SUMMARY OF TEMPERATURE READINGS AND TURNING DATES OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2019

Pile ID Number ¹	Composting Date (Range) ²	Turning Date ²					Composting Temperature °C (Range)
19-1	05/08 - 06/05	05/11	05/14	05/18	05/21	05/28	56 - 78
19-2	05/08 - 06/11	05/11	05/14	05/18	05/28	06/07	59 - 79
19-3	05/08 - 07/06	05/11	05/14	05/21	05/28	06/03	58 - 79
19-4	05/11 - 06/11	05/18	05/21	05/28	06/03	06/07	56 - 76
19-5	05/11 - 06/25	06/03	06/07	06/11	06/17	06/21	61 - 73
19-6	06/17 - 07/09	06/21	06/25	06/28	07/01	07/05	59 - 75
19-7	06/17 - 07/13	06/21	06/25	06/28	07/01	07/05	58 - 75
19-8	06/21 - 07/19	06/25	06/28	07/01	07/05	07/09	57 - 76
19-9	06/28 - 07/23	07/01	07/05	07/09	07/15	07/19	56 - 78
19-10	07/05 - 08/02	07/09	07/15	07/19	07/22	07/25	61 - 77
19-11	07/15 - 08/08	07/19	07/22	07/25	07/30	08/02	59 - 74
19-12	07/25 - 08/16	07/30	08/02	08/05	08/09	08/12	57 - 80
19-13	07/30 - 08/19	08/02	08/05	08/09	08/12	08/15	61 - 75
19-14	08/02 - 08/22	08/05	08/09	08/12	08/15	08/19	63 - 75
19-15	08/05 - 08/27	08/09	08/12	08/15	08/19	08/22	59 - 72
19-16	08/09 - 08/31	08/12	08/15	08/19	08/22	08/27	59 - 75
19-17	08/12 - 09/05	08/15	08/19	08/22	08/27	08/30	56 - 78
19-18	08/16 - 09/12	08/19	08/22	08/27	08/30	09/04	59 - 79
19-19	08/23 - 09/16	08/27	08/30	09/04	09/09	09/12	58 - 79
19-20	08/23 - 09/16	08/27	08/30	09/04	09/09	09/12	56 - 76
19-21	08/23 - 09/16	08/27	08/30	09/04	09/09	09/12	61 - 73
19-24	09/23 - 10/29	09/26	10/01	10/10	10/15	10/22	59 - 75
19-25	09/27 - 10/22	10/01	10/04	10/07	10/10	10/15	58 - 75
19-26	09/17 - 10/22	10/01	10/04	10/07	10/10	10/15	57 - 76
19-27	10/07 - 11/02	10/10	10/15	10/18	10/22	10/25	56 - 78
19-28	10/10 - 11/02	10/15	10/18	10/22	10/25	10/28	61 - 77

¹All piles reported are certified to fulfill the temperature and turning time requirements.

²Dates are month/day in 2019.

6. Dewatered by centrifuging to approximately 25 percent solids content and conveyed to MBM to produce heat-dried biosolids pellets under Contract 98-RFP-10. The biosolids pellets were marketed to users by MBM. The analysis of these biosolids (provided by MBM) is presented in [Table 3](#).

In 2019, the Stickney WRP produced a total of 110,752 DT of biosolids ([Table 1](#)). This total includes biosolids generated by processing sludge originating at the Stickney WRP as well as the sludge imported from the Egan, O'Brien, Kirie, and Lemont WRPs for further processing, and 142 DT of centrifuge cake biosolids from the Egan WRP sent to the Lawndale Avenue SMA. The quantity of biosolids used and disposed of (77,463 DT) was lower than the total 2019 production (110,752 DT) for the Stickney WRP. Hence, 33,289 DT were stored in lagoons and/or on drying cells for further processing or later use.

Biosolids Disposal at Landfills

In 2019, a total of 486 DT of biosolids produced at the Stickney WRP was co-disposed with municipal solid wastes at the Laraway Landfill, Joliet, Illinois. No biosolids were used as final cover.

Application of Class B Biosolids to Farmland

In 2019, a total of 36,126 DT of dewatered Class B biosolids (centrifuge cake and semi-dried biosolids) generated at the Stickney WRP was applied to agricultural land under IEPA Permit No. 2018-SC-63703. Application to agricultural land was done through contracts with Synagro Midwest, Inc. and Stewart Environmental, Inc. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is 12 times per year.

All Stickney WRP dewatered Class B biosolids land applied in 2019 met the pollutant concentration limits in Table 3 of Section 503.13 ([Table 4](#)), the VAR requirements of Section 503.33(b)(10) (by incorporation in soil within six hours after application), and the anaerobic digestion time and temperature requirements of the Class B pathogen standard of Section 503.32(b)(3) ([Table 5](#)). The biosolids nitrogen concentrations ([Table 4](#)) were used to compute the agronomic rates for farmland application.

Application of Exceptional Quality Biosolids to Urban Land

In 2019, a total of 5,303 DT of Stickney WRP air-dried EQ (3,004 DT) and composted EQ (2,299 DT) biosolids were applied to urban land for various uses such as the construction and maintenance of golf courses, recreation fields, and parks. The sites and methods of utilization of these biosolids under the program are listed in [Table 6](#).

Air-Dried Exceptional Quality Biosolids. In 2019, a total of 3,004 DT of Stickney WRP air-dried EQ biosolids was applied to urban land. All Stickney air-dried biosolids applied to urban land in 2019 met the pollutant concentration limits in Table 3 of Section 503.13 and the VAR requirements of Section 503.33(b)(1) ([Table 7](#)).

TABLE 3: CONCENTRATIONS OF NITROGEN AND METALS IN HEAT-DRIED BIOSOLIDS PELLETS GENERATED BY METROPOLITAN BIOSOLIDS MANAGEMENT FACILITIES AT THE STICKNEY WATER RECLAMATION PLANT IN 2019¹

Date	Total N	NO ₃ -N	NH ₄ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
-----mg/dry kg-----												
01/08/19	48,100	<100	1,700	12	2.2	416	0.51	12	38	76	6.2	708
02/12/19	50,000	2,000	1,300	12	2.4	398	0.28	12	40	69	4.8	699
03/12/19	48,900	<100	100	10	2.1	411	0.04	12	42	66	6.4	743
04/09/19	53,400	<100	<100	10	2.3	382	0.38	13	36	65	6.0	699
05/14/19	50,000	<100	300	13	2.4	388	0.41	14	38	80	5.9	725
06/11/19	46,000	<100	1,700	13	2.5	381	0.48	12	36	88	5.4	711
07/09/19	40,600	600	<100	10	2.9	393	0.69	15	35	114	<4.4	786
08/15/19	34,600	<100	100	9.4	2.7	465	0.61	15	39	115	6.6	893
09/12/19	37,100	<100	800	7.4	3.5	444	0.85	16	39	106	5.0	808
10/08/19	36,200	<100	1,200	6.7	3.4	465	0.76	15	43	115	5.8	786
11/12/19	42,400	600	1,000	11	3.3	515	0.72	18	47	103	6.2	836
12/10/19	43,800	600	1,300	8.3	2.6	460	0.68	16	44	89	6.1	736
Minimum	34,600	<100	<100	6.7	2.1	381	0.04	12	35	65	<4.4	699
Mean ²	44,258	383	808	10	2.7	427	0.53	14	40	90	5.7	761
Maximum	53,400	2,000	1,700	13	3.5	515	0.85	18	47	115	6.6	893
503 Limit	NL ³	NL	NL	41	39	1,500	17	75	420	300	100	2,800

¹Data provided by MBM.

²In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit.

³No limit.

TABLE 4: CONCENTRATIONS OF NITROGEN AND METALS IN DEWATERED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2019

Date	TKN	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
-----mg/dry kg-----											
04/04/19	45,010	16,628	12	2.7	410	0.53	12	41	95	<5.0	870
04/04/19	50,476	14,861	13	2.4	410	0.62	12	39	91	<5.0	866
04/04/19	30,687	5,807	12	4.3	468	0.50	12	48	100	<5.0	916
05/13/19	41,304	8,396	11	2.9	412	0.81	13	42	97	<5.0	885
05/13/19	25,286	5,827	9.2	4.7	488	1.2	13	50	105	<5.0	936
05/13/19	25,524	4,485	11	5.5	492	0.58	13	48	115	<5.0	965
06/12/19	29,836	5,602	6.7	4.8	442	0.89	11	44	101	<5.0	849
06/12/19	29,282	6,364	7.3	4.6	435	0.48	11	43	96	<5.0	821
07/08/19	31,045	7,359	11	5.8	484	0.96	13	49	114	<5.0	1,215
07/08/19	27,944	5,903	12	5.5	493	0.52	14	49	119	<5.0	986
07/08/19	28,789	5,736	13	4.9	469	0.59	12	46	105	<5.0	892
08/01/19	27,945	4,611	16	2.8	421	0.47	12	45	84	<5.0	856
08/02/19	41,887	11,160	15	3.1	423	0.56	13	41	109	<5.0	913
08/07/19	46,154	10,365	12	3.3	424	NRR ¹	13	38	114	<5.0	891
08/08/19	35,967	8,523	15	4.4	490	NRR	14	48	106	<5.0	963
08/08/19	32,443	7,229	14	5.6	488	NRR	15	50	119	<5.0	989
08/14/19	27,402	5,402	9.5	5.0	444	0.66	13	45	103	<5.0	855
09/13/19	51,145	15,840	14	2.4	391	0.68	11	39	73	<5.0	758
09/13/19	34,242	7,418	12	3.7	463	0.81	13	45	101	<5.0	867
09/13/19	36,627	4,996	10	2.8	413	0.69	12	37	103	<5.0	867
09/19/19	46,940	15,471	13	3.0	433	0.56	12	43	99	<5.0	881
10/10/19	12,350	6,495	12	3.8	472	0.56	13	46	103	<5.0	916
10/10/19	42,362	8,718	13	2.8	443	0.51	12	42	99	<5.0	901
10/10/19	31,731	11,081	13	3.1	453	0.43	12	46	88	<5.0	883
10/22/19	17,962	3,330	9.6	3.3	448	0.48	13	44	99	<5.0	887
11/08/19	33,758	6,728	14	4.0	478	0.57	13	46	108	<5.0	920
11/08/19	41,844	9,543	12	3.1	426	0.45	12	41	93	<5.0	825
11/15/19	46,284	12,013	9.8	3.2	438	0.48	13	43	105	<5.0	897
Minimum	12,350	3,330	6.7	2.4	391	0.43	11	37	73	<5.0	758
Mean	34,722	8,425	12	3.8	448	0.63	13	44	102	<5.0	902
Maximum	51,145	16,628	16	5.8	493	1.2	15	50	119	<5.0	1,215
503 Limit	NL ²	NL	41	39	1,500	17	75	420	300	100	2,800

¹No reportable result. The analysis was canceled by the analytical laboratory because the laboratory control sample did not meet QA/QC requirements.

²No limit.

TABLE 5: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2019

Month	Average Temperature ---- °F ----	Average Detention Time --- days ---	Minimum Detention Time Required by 503.32(b)(3) ¹ ----- days -----	Meets Part 503 Class B Requirements
January	97.2	33.3	15.0	Yes
February	97.4	30.5	15.0	Yes
March	98.0	36.0	15.0	Yes
April	93.6	30.0	17.3	Yes
May	99.0	23.4	15.0	Yes
June	97.4	20.7	15.0	Yes
July	98.9	19.4	15.0	Yes
August	98.1	33.1	15.0	Yes
September	97.9	28.7	15.0	Yes
October	97.9	29.9	15.0	Yes
November	97.0	25.3	15.0	Yes
December	98.6	26.9	15.0	Yes

¹For anaerobic digestion at average temperature achieved.

TABLE 6: SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2019

User	Use
<u>Composted Biosolids</u>	
A&B Tree Services	Landscaping
Alexander Graham Bell School	Landscaping
Angela Barrera	Landscaping
Beary Landscaping, Inc.	Landscaping
City of Chicago	Landscaping
City of Evanston -Ecology Center	Landscaping
Cog Hill Golf & Country Club	Landscaping
Cook County Forest Preserves	Landscaping
Elmhurst College	Landscaping
Illinois Tollway	Landscaping
Jamie Miller /Lutheran Church Charities	Landscaping
Koppers, Inc.	Landscaping
Landscaping Services - Medina	Landscaping
Matt Van Acker	Landscaping
Northeastern Illinois University	Landscaping
Olympia Fields Park District	Landscaping
Our Lady of Charity Church	Landscaping
Park Ridge-Niles School District 64	Landscaping
Reavis High School	Landscaping
RR Landscape Supply	Landscaping
St. Nicholas of Tolentine School	Landscaping
Stone Temple Church	Landscaping
Thornwood High School	Landscaping
Tinley Park Park District	Landscaping
Urban Growers Collective	Landscaping
Village Greens of Woodridge	Landscaping
Village of Arlington Heights	Landscaping
Village of Franklin Park	Landscaping
Village of Oak Lawn	Landscaping
Village of Oak Park	Landscaping
Village of Park Forest	Landscaping
Village of Riverside	Landscaping
Westmont Park District (Twin Lakes)	Landscaping
Westmoreland Golf Club	Landscaping

TABLE 6 (Continued): SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2019

User	Use
<u>Composted Biosolids</u>	
Buffalo Grove Park District	Landscaping and Trees
Chicago Park District ¹	Landscaping and Trees
Manav Seva Mandir Temple	Landscaping and Trees
Annamaria Leon - Homan Grown Community Garden	Gardening
Chicago Urban Farms	Gardening
Christ The King Church	Gardening
Courtney Hug - Sweetwater Foundation	Gardening
Dunning Community Garden	Gardening
North Shore Country Club	Gardening
Oak Lawn Park District - Community Garden	Gardening
Sikh Religious Society - Palatine Gurudwara	Gardening
St. Paul Lutheran Church	Gardening
West Woodlawn Botanical Garden	Gardening
Village of La Grange	Gardening
Village of Lyons	Gardening
Village of Richton Park	Gardening
District Water Reclamation Plants ²	Pick-up by residents
Aasia Mohammad	Private residential use
Barbara Beronski	Private residential use
Bartosz Wronka	Private residential use
Brett Vassallo	Private residential use
Cheryl Hill	Private residential use
Colleen Grimm	Private residential use
Diane Michelson	Private residential use
Douglas Crespo	Private residential use
Eve Barrs	Private residential use
Fawn Pochel	Private residential use
Forrest McDonald	Private residential use
Friday Savathphone	Private residential use
Garrett Stone	Private residential use
George Osako	Private residential use
Hameed Hussaini	Private residential use
Hongxian Shi	Private residential use
Iryna Kovalchuk	Private residential use

TABLE 6 (Continued): SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2019

User	Use
<u>Composted Biosolids</u>	
Isabel Rivera	Private residential use
Izabella Redlinski	Private residential use
James Thompson	Private residential use
Jeff Hall	Private residential use
Jeremy Forney	Private residential use
Jim Bracken	Private residential use
Joe Miller	Private residential use
John Zheng	Private residential use
Jonathan Amir	Private residential use
Katie Willey	Private residential use
Lahkwinder Hundal	Private residential use
Laura Doane	Private residential use
Lavette Jones	Private residential use
Malgorzata Pawlak	Private residential use
Manish Patel	Private residential use
Mark Hittle	Private residential use
Martin Perez	Private residential use
Michelle Fei	Private residential use
Minli Huang	Private residential use
Omar Acosta	Private residential use
Oscar Chavez	Private residential use
Patrick O'Connor	Private residential use
Patti Lynch	Private residential use
Paul Judd	Private residential use
Rachelle Tench	Private residential use
Rafal Turek	Private residential use
Randy Brockway	Private residential use
Shaylin McNamara	Private residential use
Siobhan Greene	Private residential use
Sue Gartzman	Private residential use
Terri Shonder	Private residential use
Terry Redmond	Private residential use
Tom Miller	Private residential use
Vasudev Patel	Private residential use
Vipul Patel	Private residential use

TABLE 6 (Continued): SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2019

User	Use
<u>Air-Dried Biosolids</u>	
Joe Cooling & Sons Inc.	Landscaping
Koppers, Inc.	Landscaping
Larry's Lawn Care	Landscaping
Twin Oaks Landscaping	Landscaping
Twin Orchard Country Club	Landscaping
Chicago Park District ³	Topdressing
Morton West High School	Topdressing
North Shore Country Club	Topdressing
Park Ridge Recreation and Park District	Topdressing
Park Ridge-Niles School District 64	Topdressing
University of Illinois at Chicago	Topdressing
Village Greens of Woodridge	Topdressing
Village of Glenview	Topdressing
Village of La Grange	Topdressing
Wilmette Park District	Topdressing

¹Burnham, Douglas, Grant, Humboldt, Lincoln, McKinley, Northerly Island, Skinner, Ping Tom, and Washington Parks.

²Egan, Hanover Park, Kirie, Lemont, O'Brien, and Stickney Water Reclamation Plants.

³Diversey Harbor, Garfield, Harrison, Horner, Humboldt, La Villita, Lincolnwood Centennial, Marquette, McKinley, Olympia, Oriole, Pottawattomie, Union, Warren, and Washington Parks.

TABLE 7: CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2019

Date	TVS ¹	TVS ² Reduction	TKN	NO ₃ +NO ₂ -N	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	%	%	-----mg/dry kg-----											
06/11/19	35.6	66.0	12,544	239	376	6.3	4.3	480	0.75	11	46	95	<5.0	879
06/24/19	35.9	65.6	17,164	627	31	14	5.2	537	1.1	14	56	113	<5.0	1,051
07/11/19	34.6	67.5	19,160	521	117	11	4.6	513	1.8	12	48	101	<5.0	924
07/12/19	33.3	69.3	14,147	348	90	11	4.8	514	0.74	13	50	106	<5.0	958
07/17/19	36.2	65.1	10,054	349	72	10	4.4	486	0.91	12	48	97	<5.0	907
08/14/19	38.8	55.0	20,788	433	3,557	13	5.7	486	0.76	14	48	112	<5.0	960
08/28/19	38.8	55.1	17,194	2,615	1,781	12	5.9	519	1.0	15	52	122	<5.0	1,029
Minimum	33.3	55.0	10,054	239	31	6.3	4.3	480	0.74	11	46	95	<5.0	879
Mean	36.2	63.4	15,864	733	860	11	5.0	505	1.0	13	50	107	<5.0	958
Maximum	38.8	69.3	20,788	2,615	3,557	14	5.9	537	1.8	15	56	122	<5.0	1,051
503 Limit	NL ³	38	NL	NL	NL	41	39	1,500	17	75	420	300	100	2,800

¹Total volatile solids as percentage of total solids.

²Total volatile solids for digester feed during months when lagoons were loaded from 2015 to 2017 was used to calculate TVS reduction.

³No limit.

All of the air-dried EQ biosolids met the Class A pathogen limits of Section 503.32(a)(5) (Tables 8 and 9). Enteric viruses and helminth ova were analyzed before biosolids were dried (Table 8). The fecal coliform analyses were performed after the biosolids were dried and prior to utilization on urban land (Table 9). Management practices complied with Section 503.14. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is six times per year. However, only five monitoring events for inorganic parameters and fecal coliform bacteria (Table 9) were conducted in 2019 because of weather-related operational constraints at the Stickney WRP drying areas. The sixth monitoring event scheduled for late October/early November was suspended due to frozen conditions, snowfall, and re-wetting of air-dried EQ biosolids, and no further distribution or sampling occurred in 2019.

Composted Exceptional Quality Biosolids. In 2019, a total of 2,299 DT of composted EQ biosolids generated at the Stickney WRP during 2018 was applied to urban land. The composted EQ biosolids applied to urban land in 2019 met composting temperature and time requirements in 2018, and they met the pollutant concentration limits in Table 3 of Section 503.13 (Table 10). The fecal coliform analyses were performed after the composted EQ biosolids were cured and prior to utilization on urban land (Table 11). In accordance with Table 1 of Section 503.16, the frequency of monitoring for the biosolids is six times per year.

Site-Specific Process to Further Reduce Pathogens

For the Calumet and Stickney WRPs, the USEPA Region 5 designated, on a site-specific basis, the District's two biosolids processing trains as equivalent to PFRP, according to Section 503.32(a)(8). The PFRP equivalency commenced on August 1, 2002 (Appendix). The current renewable certification of the PFRP designation is valid from August 1, 2017, through July 31, 2022, and requires the analysis of six samples annually for helminth ova and enteric viruses during this period and the submittal of the data together with the annual Part 503 report.

None of the Stickney WRP air-dried EQ biosolids generated or utilized in 2019 were PFRP-compliant with respect to the minimum required duration of lagoon aging (18 months) due to operational constraints. Therefore, all air-dried biosolids utilized as EQ material in 2019 were tested for pathogen compliance in August, September, and October 2018 and April, May, and June 2019 (Tables 8 and 9), according to Section 503.32(a)(5).

TABLE 8: PATHOGEN ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2019

Sample Date	Lagoon No.	Enteric Virus	Helminth Ova
		---PFU ¹ /4g---	---Viable Ova/4g---
08/15/18	23	<0.8000	<0.0800
09/12/18	23	<0.8000	<0.0800
10/09/18	23	<0.8000	<0.0800
04/18/19	23	<0.8000	<0.0800
05/20/19	23	<0.8000	<0.0800
06/11/19	23	<0.8000	<0.0800

¹Plaque-forming unit.

TABLE 9: FECAL COLIFORM ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2019

Sample Date	Lagoon No.	Total Solids	Fecal Coliform
		---- % ----	----- MPN ¹ /g -----
06/11/19	23	76.4	37
07/11/19	23	68.0	86
07/17/19	23	74.5	47
08/14/19	25	63.5	110
10/02/19	25	58.4	13

¹Most probable number.

TABLE 10: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2018 AND APPLIED TO URBAN LAND IN 2019

Date ¹	TKN	NO ₃ +NO ₂ -N	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
-----mg/dry kg-----												
05/23/19	11,610	398	34	7.7	1.9	241	0.35	5.5	28	75	<5.0	507
05/23/19	14,749	373	32	12	1.8	257	0.40	5.0	26	95	<5.0	511
05/23/19	12,383	284	41	6.0	2.1	252	0.36	4.8	28	79	<5.0	542
06/06/19	18,528	19	27	17	2.2	268	0.38	6.5	26	88	<5.0	519
06/10/19	12,876	117	22	9.4	2.3	299	0.27	9.9	28	73	<5.0	609
06/10/19	14,211	102	25	13	1.7	212	0.27	5.2	25	74	<5.0	466
06/10/19	15,005	111	32	8.8	1.9	252	0.34	6.1	27	78	<5.0	549
06/10/19	11,456	256	25	17	2.0	247	0.30	6.2	31	100	<5.0	538
06/17/19	21,189	759	36	21	2.3	303	0.37	7.4	32	119	<5.0	652
06/17/19	17,402	1,035	38	22	2.4	308	0.41	8.7	42	115	<5.0	647
06/17/19	13,271	848	37	15	2.3	293	0.37	7.7	34	91	<5.0	648
06/17/19	16,466	413	38	28	2.0	263	NRR ²	7.1	32	85	<5.0	524
07/12/19	18,517	62	NRR ³	13	1.4	224	0.29	6.8	21	68	<5.0	421
08/12/19	15,859	18	NRR ³	26	2.7	326	NRR ⁴	7.1	32	110	<5.0	660
09/10/19	18,544	106	23	13	2.1	299	0.51	5.9	29	76	<5.0	589
10/31/19	11,349	18	37	11	1.5	209	0.29	4.0	21	70	<5.0	443
Minimum	11,349	18	22	6.0	1.4	209	0.27	4.0	21	68	<5.0	421
Mean	15,214	307	32	15	2.0	266	0.35	6.5	29	87	<5.0	552
Maximum	21,189	1,035	41	28	2.7	326	0.51	9.9	42	119	<5.0	660
503 Limit	NL ⁵	NL	NL	41	39	1,500	17	75	420	300	100	2,800

¹Materials produced in 2018 and tested in 2019 prior to utilization.

²No reportable result. The holding time expired before the sample could be analyzed.

³No reportable result. The analysis was canceled by the analytical laboratory because sample duplicates did not meet QA/QC requirements.

⁴No reportable result. The analysis was canceled by the analytical laboratory because the laboratory control sample did not meet QA/QC requirements.

⁵No limit.

TABLE 11: FECAL COLIFORM ANALYSIS OF CURED COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2018 AND SAMPLED PRIOR TO UTILIZATION ON URBAN LAND IN 2019

Sample Date ¹	Total Solids	Fecal Coliform
	----- % -----	----- MPN ² /g -----
03/27/19	43.7	16
03/27/19	40.5	270
04/10/19	39.2	11
04/10/19	44.2	0
04/11/19	40.3	17
04/16/19	37.7	130
04/16/19	37.1	31
04/16/19	38.4	75
05/28/19	38.5	1
05/28/19	37.8	18
06/18/19	30.2	95
06/18/19	38.7	29
10/31/19	39.8	29

¹Materials produced in 2018 and tested in 2019 prior to utilization.

²Most probable number.

CALUMET WATER RECLAMATION PLANT

Treatment Plant and Biosolids Process Train Description

The Calumet WRP, located in Chicago, Illinois, has a design average flow of 354 MGD. The annual average treated flow in 2019 was 308 MGD. Wastewater reclamation processes at this WRP include primary settling and secondary activated sludge processes. All solids produced at the Calumet WRP are anaerobically digested. The Calumet WRP biosolids are then:

1. Placed in lagoons for dewatering, aging, and stabilization and then transported to paved cells and air-dried prior to:
 - a. Application to urban land as EQ biosolids.
 - b. Use at local municipal solid waste landfills as final cover. No biosolids were utilized through this outlet in 2019 ([Table 1](#)).
2. Placed in lagoons for dewatering and transported to paved cells for air-drying, then applied to farmland as dewatered Class B biosolids by a private contractor or used as daily landfill cover.

Composted EQ biosolids are also produced at the Calumet SMA by co-composting biosolids with woodchips and curing. Class A pathogen reduction was achieved using the open windrow composting process through which all the requirements of Section 503.32(a)(7) were met. The temperature of the compost piles in 2019 was maintained at $\geq 55^{\circ}\text{C}$ for at least 15 days, and the piles were turned five times during this period ([Table 12](#)). The VAR requirement was achieved through the same open windrow composting process and met the established standards of Section 503.33(b)(5) by achieving the temperature and time requirements ($\geq 45^{\circ}\text{C}$ for at least 14 days) in the open windrows ([Table 12](#)). Centrifuge cake from the Egan WRP was used as feedstock for composting at the Calumet SMA during 2019.

In 2019, a total of 23,511 DT of biosolids was produced at the Calumet WRP ([Table 1](#)), which includes 2,554 DT of the Egan WRP biosolids. The total quantity of 15,660 DT of biosolids utilized and disposed (15,535 DT land-applied and 125 DT disposed of at landfills), was less than the total 2019 production for the Calumet WRP. Hence, a total of 7,851 DT was stored in lagoons or on drying cells for further processing and/or later use.

Biosolids Disposal at Landfills

In 2019, a total of 125 DT of unsuitable biosolids was co-disposed with municipal solid wastes at the Waste Management's Laraway Landfill site, Joliet, Illinois. No biosolids were used as daily cover or final cover at landfill sites in 2019.

Application of Class B Biosolids to Farmland

In 2019, the Calumet WRP land-applied 12,799 DT of dewatered (semi-dried) Class B biosolids to farmland ([Table 1](#)) under IEPA Permit No. 2018-SC-63703 through contracts with

TABLE 12: SUMMARY OF TEMPERATURE READINGS AND TURNING DATES
OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED EXCEPTIONAL
QUALITY BIOSOLIDS AT THE CALUMET EAST SOLIDS MANAGEMENT AREA
IN 2019

Pile ID Number ¹	Composting Date (Range) ²	Turning Date ²					Composting Temperature, °C (range)
19-1	06/16 - 07/27	06/19	06/26	07/01	07/16	07/22	68 - 78
19-2	06/21 - 08/17	06/26	07/01	07/16	07/26	08/02	58 - 78

¹All piles reported are certified to fulfill the temperature and turning-time requirements.

²Dates are month/day in 2019.

Synagro Midwest, Inc. (Contract No. 18-692-11) and Stewart Environmental, Inc. (Contract No. 14-690-11). In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is six times per year.

All Calumet WRP dewatered Class B biosolids land-applied in 2019 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 13), the vector attraction reduction requirements of Section 503.33(b)(10) (by incorporation in soil within six hours after application), and the anaerobic digestion time and temperature requirements of the Class B pathogen standard of Section 503.32(b)(3) (Table 14). The biosolids nitrogen concentrations (Table 13) were used to compute the agronomic rates for farmland application.

Application of Exceptional Quality Biosolids to Urban Land

In 2019, a total of 2,736 DT of air-dried and composted EQ biosolids generated at the Calumet WRP was applied to urban land and District property for various uses such as for maintenance of golf courses and recreation fields, landscaping, and for the construction of new recreation fields. The sites and method of utilization of these biosolids are listed in Table 15.

Air-Dried Exceptional Quality Biosolids. In 2019, a total of 1,591 DT of air-dried EQ biosolids generated at the Calumet WRP was applied to urban land. All Calumet WRP air-dried EQ biosolids land-applied in 2019 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 16), the vector attraction reduction requirements of Section 503.33(b)(1) (Table 16), and the Class A pathogen limits of Section 503.32(a)(5) (Tables 17 and 18). Enteric viruses and helminth ova (Table 17) were analyzed before biosolids were dried. The fecal coliform analyses (Table 18) were performed after the biosolids were dried and prior to utilization on urban land. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is four times per year.

Composted Exceptional Quality Biosolids. In 2019, a total of 1,145 DT of composted EQ biosolids generated at the Calumet WRP during 2018 was applied to urban land. No composted EQ biosolids generated during 2019 was land applied in 2019. All composted biosolids land-applied in 2019 met composting temperature and time requirements in 2018, and they met the pollutant concentration limits in Table 3 of Section 503.13 (Table 19). The fecal coliform analyses were performed after the composted EQ biosolids were cured and prior to utilization on urban land (Table 20). In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is four times per year.

TABLE 13: CONCENTRATIONS OF NITROGEN AND METALS IN DEWATERED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2019

Date	TKN	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
-----mg/dry kg-----											
04/05/19	16,972	1,622	9.4	1.3	238	0.34	5.7	19	46	<5.0	729
04/09/19	40,925	5,771	17	1.9	410	0.41	13	31	71	<5.0	1,125
04/09/19	29,724	1,736	16	2.2	411	<0.25	13	33	76	<5.0	1,212
05/22/19	62,936	14,041	<5.0	3.9	717	0.57	8.2	64	27	<5.0	767
06/12/19	30,616	4,218	13	2.8	416	0.89	15	32	83	<5.0	1,218
07/18/19	30,372	3,999	15	2.3	390	0.65	14	31	76	<5.0	1,215
07/22/19	29,019	4,034	16	2.3	397	0.67	13	31	75	<5.0	1,222
07/31/19	32,410	4,111	18	2.5	409	0.69	15	34	83	<5.0	1,382
08/16/19	30,724	4,608	18	2.3	406	NRR ¹	13	34	82	<5.0	1,257
09/23/19	48,283	10,058	5.8	4.1	786	0.69	9.9	59	30	<5.0	900
Minimum	16,972	1,622	<5.0	1.3	238	<0.25	5.7	19	27	<5.0	729
Mean ²	35,198	5,420	13	2.6	458	0.57	12	37	65	<5.0	1,103
Maximum	62,936	14,041	18	4.1	786	0.89	15	64	83	<5.0	1,382
503 Limit	NL ³	NL	41	39	1,500	17	75	420	300	100	2,800

¹No reportable result. The analysis was canceled by the analytical laboratory because the laboratory control sample did not meet QA/QC requirements.

²In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit.

³No limit.

TABLE 14: DIGESTER¹ TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2019

Month	Average Temperature	Average Detention Time	Minimum Detention Time Required by 503.32(b)(3) ²	Meets Part 503 Class B Requirements
	---- °F ----	----- days ----	----- days -----	
January	96.8	48.8	15.0	Yes
February	95.6	53.5	15.0	Yes
March	97.0	42.6	15.0	Yes
April	96.4	40.5	15.0	Yes
May	97.1	49.0	15.0	Yes
June	96.6	54.0	15.0	Yes
July	97.4	45.2	15.0	Yes
August	97.3	45.6	15.0	Yes
September	96.9	41.4	15.0	Yes
October	96.2	48.4	15.0	Yes
November	95.1	52.6	15.0	Yes
December	95.4	46.7	15.0	Yes

¹Temperatures and detention times are for primary digesters 1 through 12 at the Calumet WRP.

²For anaerobic digestion at average temperature achieved.

TABLE 15: SITES THAT UTILIZED CALUMET WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2019

User	Use
<u>Composted Biosolids</u>	
Annunciata Church	Landscaping
Bluff City Materials	Landscaping
Chicago Park District ¹	Landscaping
Chicago Public Schools	Landscaping
CoderSpace	Landscaping
Lansing Environmental Committee	Landscaping
MWRDGC - Calumet WRP	Landscaping
Riverdale Park District - Franson Park	Landscaping
Thornton Equipment Services, Inc.	Landscaping
Village of Blue Island	Landscaping
Village of Lansing	Landscaping
Village of Robbins	Landscaping
Coyote Run Golf Course	Landscaping and Trees
East View Park Condominium	Landscaping and Trees
First United Methodist Church	Landscaping and Trees
Village of Park Forest	Landscaping and Trees
Village of Richton Park	Landscaping and Trees
Chicago Public Library - Jeffery Manor Branch	Gardening
Come-Unity Joy Garden	Gardening
Sunflower City	Gardening
Thornton Community Garden	Gardening
Urban Growers Collective	Gardening
Harvey Park District ²	Pick up by residents
District Water Reclamation Plant - Calumet	Pick up by residents
South Suburban College	Pick up by residents
Village of Lansing	Pick up by residents
Village of Midlothian	Pick up by residents
Village of Robbins	Pick up by residents
Adolphe Vaughn	Private residential use
Bev Hightower	Private residential use
Billy Middendorf	Private residential use
Donna Buckley	Private residential use
Donna Stec	Private residential use

TABLE 15 (Continued): SITES THAT UTILIZED CALUMET WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2019

User	Use
<u>Composted Biosolids</u>	
Dorothy Weddington	Private residential use
Joe Porter	Private residential use
John Ludwig	Private residential use
Joseph Gyarmathy	Private residential use
Katteria Doty	Private residential use
Mary Ellen Kelleher	Private residential use
Mary Mulry	Private residential use
Matthew Ross	Private residential use
Michelle Browne	Private residential use
Patrick O'Connor	Private residential use
Phil Torres	Private residential use
Roger Guzlas	Private residential use
Roger Ruger	Private residential use
Shani Chaplin	Private residential use
Shaylin McNamara	Private residential use
Smilie Harris	Private residential use
Sokoni Karanja	Private residential use
Soledad Sosa	Private residential use
South Austin Neighborhood Association	Private residential use
Susana Uddman-Evans	Private residential use
Others ³	Private residential use
<u>Air Dried Biosolids</u>	
Chicago Park District ⁴	Topdressing
Mansell Farms, Hayfield	Topdressing
University of Illinois, Chicago	Topdressing
Village of Orland Park	Topdressing

¹Northerly Island and Pulaski Park.

²Briggs-Ellis and Gloria Taylor Hall Park.

³Three other community residents.

⁴Archer, Calumet, Douglas, Dunbar, Garfield, Harrison, La Villita, McKinley, Union, and Washington Park.

TABLE 16: CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2019

Date	TVS ²		TKN	NO ₃ +NO ₂ -N	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	TVS ¹	Reduction												
	%	%	-----mg/dry kg-----											
04/09/19	44.6	66.0	26,886	1,120	1,055	17	2.1	418	0.40	14	33	77	<5.0	1,253
07/16/19	38.7	76.0	9,157	967	115	17	2.4	451	0.68	14	34	79	<5.0	1,306
08/14/19	42.3	67.5	11,706	1,165	574	16	2.3	447	0.60	13	34	79	<5.0	1,269
08/22/19	44.0	65.2	12,164	NRR ³	1,049	16	2.4	426	0.49	12	34	80	<5.0	1,279
09/23/19	49.4	68.4	32,686	23	3,337	17	2.4	439	0.56	15	36	81	<5.0	1,380
10/15/19	44.2	64.8	9,750	318	100	17	2.5	473	0.62	14	38	89	<5.0	1,421
Minimum	38.7	64.8	9,157	23	100	16	2.1	418	0.40	12	33	77	<5.0	1,253
Mean ⁴	43.8	68.0	17,058	719	1,038	17	2.3	442	0.56	14	35	81	<5.0	1,318
Maximum	49.4	76.0	32,686	1,165	3,337	17	2.5	473	0.68	15	38	89	<5.0	1,421
503 Limit	NL ⁵	38	NL	NL	NL	41	39	1,500	17	75	420	300	100	2,800

¹Total Volatile Solids as percentage of total solids.

²Total volatile solids for digester feed from 2016 to 2018 during months that lagoons were loaded was used to calculate TVS reduction.

³No reportable result. The analysis was canceled because the result was below the limit of quantitation due to dilution.

⁴In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit.

⁵No limit.

TABLE 17: PATHOGEN ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2019

Sample Date	Lagoon No.	Enteric Virus	Helminth Ova
		-- PFU ¹ /4g --	-- Viable Ova/4g --
08/28/18	17	<0.8000	<0.0800
09/26/18	18	<0.8000	<0.0800
10/10/18	1	<0.8000	<0.0800
04/22/19	17	<0.8000	<0.0800
05/16/19	6	<0.8000	<0.0800
06/12/19	18	<0.8000	<0.0800

¹Plaque-forming unit.

TABLE 18: FECAL COLIFORM ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2019

Sample Date	Lagoon No.	Total Solids	Fecal Coliform
		--- % ---	--- MPN ¹ /dry g ---
06/11/19	17	67.0	150
06/11/19	48	76.8	130
06/12/19	3	59.6	61
06/12/19	3	85.3	34
06/19/19	18	66.1	57
07/16/19	1	66.2	150
07/16/19	18	67.6	100
07/17/19	17	76.1	9
07/17/19	18	81.0	8
08/07/19	6	80.6	84
08/14/19	18	66.3	430
09/05/19	18	73.6	39
10/15/19	6	76.2	13
10/15/19	18	79.1	6
10/16/19	18	61.9	46
11/19/19	18	59.0	12
11/19/19	1	53.9	5
11/20/19	2	50.9	56

¹Most probable number.

TABLE 19: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE CALUMET EAST SOLIDS MANAGEMENT AREA IN 2018 AND APPLIED TO URBAN LAND IN 2019

Sample Date ¹	TKN	NO ₃ ⁻ +NO ₂ ⁻ -N	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
-----mg/dry kg-----												
4/11/2019	14,088	113	28	8.8	1.8	259	<0.25	6.1	21	48	<5.0	545
4/12/2019	10,685	133	23	8.3	1.9	265	0.29	3.4	22	50	<5.0	567
5/10/2019	18,904	233	17	7.6	2.2	292	0.35	NRR ²	26	57	<5.0	616
5/15/2019	18,377	61	9.5	9.2	2.0	249	0.31	NRR ²	24	59	<5.0	503
5/16/2019	14,870	216	58	7.0	2.8	326	0.40	NRR ²	31	43	<5.0	1,498
5/22/2019	17,236	250	22	5.6	3.2	385	0.36	NRR ²	37	45	<5.0	584
6/5/2019	20,846	173	18	<5.0	3.2	390	NRR ³	5.6	37	46	<5.0	576
6/12/2019	18,718	131	25	5.7	3.6	413	0.70	5.7	39	51	<5.0	644
6/13/2019	19,644	162	40	5.2	3.5	408	0.50	5.7	39	48	<5.0	620
6/28/2019	15,757	109	15	5.4	3.3	382	NRR ³	5.2	36	42	<5.0	558
7/10/2019	19,069	136	8.4	6.1	3.3	391	0.49	5.5	36	45	<5.0	581
7/23/2019	20,344	142	60	5.9	3.2	382	0.42	7.9	35	45	<5.0	588
7/26/2019	18,942	95	19	8.7	3.5	870	0.56	4.8	37	47	<5.0	596
8/2/2019	18,258	299	20	10	2.2	256	0.30	4.9	25	61	<5.0	548
8/7/2019	20,883	132	18	6.3	3.7	432	NRR ³	5.9	41	51	<5.0	661
8/9/2019	20,946	154	16	5.8	3.7	437	NRR ³	5.4	41	47	<5.0	636
8/13/2019	19,805	175	5.7	8.0	3.5	411	NRR ³	5.7	38	45	<5.0	600
8/22/2019	17,707	148	9.0	5.9	3.4	416	NRR ³	5.7	40	43	<5.0	601
8/29/2019	15,620	175	12	5.9	3.6	420	NRR ³	5.7	40	44	<5.0	638
09/5/2019	21,089	50	14	7.1	1.9	263	0.41	4.9	22	57	<5.0	518
09/12/2019	20,340	162	9.5	5.8	3.0	363	0.50	4.8	33	48	<5.0	544
09/19/2019	12,158	26	1.6	7.5	3.1	357	NRR ³	5.3	32	60	<5.0	694
09/26/2019	17,309	208	8.5	7.8	3.2	379	NRR ³	4.5	35	63	<5.0	640
10/9/2019	18,258	299	20	8.3	2.3	287	0.34	4.4	25	64	<5.0	594
10/10/2019	20,883	132	18	6.8	3.3	376	0.44	6.3	36	59	<5.0	653
10/17/2019	20,946	154	16	5.9	2.5	304	0.33	5.3	28	53	<5.0	554

TABLE 19 (Continued): CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE CALUMET EAST SOLIDS MANAGEMENT AREA IN 2018 AND APPLIED TO URBAN LAND IN 2019

Sample Date ¹	TKN	NO ₃ +NO ₂ -N	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	-----mg/dry kg-----											
Minimum	10,685	26	1.6	<5.0	1.8	249	<0.25	3.4	21	42	<5.0	503
Mean ⁴	18,137	156	20	6.9	3.0	374	0.41	5.4	33	51	<5.0	629
Maximum	21,089	299	60	10	3.7	870	0.70	7.9	41	64	<5.0	1,498
503 Limit	NL ⁵	NL	NL	41	39	1,500	17	75	420	300	100	2,800

¹Materials produced in 2018 and tested in 2019 prior to utilization.

²No reportable result. Molybdenum analysis was inadvertently not requested for these samples.

³No reportable result. The analysis was canceled because the check sample did not meet QA/QC requirements.

⁴In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit.

⁵No limit.

TABLE 20: FECAL COLIFORM ANALYSIS OF CURED COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE CALUMET EAST SOLIDS MANAGEMENT AREA IN 2018 AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2019

Sample Date ¹	Total Solids	Fecal Coliform
	-- % --	--MPN ² /dry g--
03/28/19	35.3	28
04/11/19	40.3	110
06/05/19	32.4	24
12/05/19	44.6	9

¹Materials produced in 2018 and tested in 2019 prior to utilization.

²Most probable number.

Site-Specific Process to Further Reduce Pathogens

For the Calumet and Stickney WRPs, the USEPA Region 5 designated, on the site-specific basis, the District's two biosolids processing trains as equivalent to PFRP, according to Section 503.32(a)(8). The PFRP equivalency commenced on August 1, 2002 (Appendix). The current renewable certification of the PFRP designation is valid from August 1, 2017, through July 31, 2022, and requires the analysis of six samples annually for helminth ova and enteric viruses during this period and the submittal of the data together with the annual Part 503 report.

None of the Calumet WRP air-dried EQ biosolids generated or utilized in 2019 were PFRP-compliant with respect to the minimum required duration of lagoon aging (18 months) due to operational constraints. Therefore, all air-dried biosolids utilized as EQ material in 2019 were tested for pathogen compliance in August, September, and October 2018, and April, May, and June 2019 (Tables 17 and 18), according to Section 503.32(a)(5).

HANOVER PARK WATER RECLAMATION PLANT

Treatment Plant and Biosolids Process Train Description

The Hanover Park WRP, located in Hanover Park, Illinois, has a design average flow of 12 MGD. The annual average treated flow in 2019 was 8.90 MGD. Wastewater reclamation processes at this WRP include primary (primary settling), secondary (activated sludge process), and tertiary (sand filtration) treatments. All solids produced at the Hanover Park WRP are anaerobically digested and stored in lagoons and later land-applied by injection at the on-site Fischer Farm.

In 2019, the total biosolids production at this WRP was 769 DT (Table 1).

Land Application of Class B Liquid Biosolids

In 2019, the Hanover Park WRP land applied a total of 769 DT of lagooned biosolids and lagoon supernatant at the on-site Fischer Farm under IEPA Permit No. 2016-61315. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is four times per year.

All Hanover Park WRP lagoon biosolids land applied in 2019 met the pollutant concentration limits in Table 3 of Section 503.13 for all metals (Table 21), the anaerobic digestion time and temperature requirements of the Class B pathogen standards of Section 503.32(b)(3) (Table 22), and the vector attraction reduction requirements of Section 503.33(b)(1) (Table 23). Management practices at this land-application site complied with Section 503.14.

TABLE 21: CONCENTRATIONS OF NITROGEN AND METALS IN BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2019

Sample Date	TKN	NO ₂ +NO ₃ -N	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
Supernatant												
-----mg/L-----												
05/11/19	525	<0.25	468	0.007	<0.001	0.142	<0.0005	0.007	0.023	0.003	0.005	0.241
06/01/19	526	0.33	461	0.008	<0.001	0.133	<0.0005	0.006	0.023	0.003	0.005	0.234
06/22/19	631	0.51	549	0.010	<0.001	0.134	<0.0005	0.002	0.023	0.003	0.002	0.233
07/20/19	571	1.59	52	0.011	<0.001	0.092	NRR ¹	0.006	0.025	0.002	0.004	0.164
08/10/19	235	<0.25	228	0.017	0.001	0.117	NRR ²	0.005	0.022	0.009	0.003	0.223
Liquid Biosolids												
-----mg/kg-----												
07/27/19	99,419	68	44,684	5.5	1.4	949	0.86	12	35	27	<5.0	963
08/03/19	NRR ³	NRR ⁴	35,113	6.9	1.5	812	0.99	15	34	23	<5.0	945
08/10/19	82,015	NRR ⁴	28,553	<5.0	1.5	880	NRR ²	15	41	24	<5.0	953
Minimum ⁵	82,015	68	28,553	<5.0	1.4	812	0.86	12	34	23	<5.0	945
Mean ⁶	90,717	68	36,117	5.8	1.5	880	0.92	14	37	24	<5.0	954
Maximum	99,419	68	44,684	6.9	1.5	949	0.99	15	41	27	<5.0	963
503 Limit	NL ⁷	NL	NL	41	39	1,500	17	75	420	300	100	2,800

¹No reportable result. The analysis was canceled because instrument was not calibrated, and the sample could not be reanalyzed before holding time expired.

²No reportable result. The analysis was canceled because the laboratory control sample did not meet QA/QC requirements.

³No reportable result. The analysis was canceled because of a probable digestion error during sample preparation for analysis.

⁴No reportable result. The analysis was canceled because the result was below the limit of quantitation due to dilution.

⁵Minimum, mean, and maximum values are applicable only to the liquid biosolids.

⁶In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit.

⁷No limit.

TABLE 22: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2019

Month	Average Temperature	Average Detention Time	Minimum Detention Time Required by 503.32(b)(3) ¹	Meets Part 503 Class B Requirements
	----- °F -----	----- days-----	----- days-----	
January	95.0	20.6	15.0	Yes
February	95.0	24.4	15.0	Yes
March	95.0	19.6	15.0	Yes
April	95.2	21.0	15.0	Yes
May	95.0	19.8	15.0	Yes
June	98.0	20.9	15.0	Yes
July	98.0	28.2	15.0	Yes
August	98.0	30.6	15.0	Yes
September	98.0	27.9	15.0	Yes
October	98.0	30.4	15.0	Yes
November	98.0	28.6	15.0	Yes
December	98.0	27.1	15.0	Yes

¹For anaerobic digestion at average temperature achieved.

TABLE 23: VOLATILE SOLIDS REDUCTION IN BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2019

Month	Digester Feed	Digester Draw	Applied Biosolids	Volatile Solids Reduction ¹
	----- % Total Volatile Solids -----			----- % -----
May ²	83.3	71.1	52.6	77.8
June ²	84.8	70.2	51.8	80.7
July ²	85.6	71.9	57.2	77.5
July ³	85.6	71.9	67.3	65.3
August ²	86.6	74.5	20.5	96.0
August ³	86.6	74.5	68.0	67.2

¹Volatile solids reduction computed using total volatile solids data for digester feed and applied biosolids.

²Biosolids applied as lagoon supernatant.

³Biosolids applied as liquid biosolids.

JOHN E. EGAN WATER RECLAMATION PLANT

Treatment Plant and Biosolids Process Train Description

The Egan WRP, located in Schaumburg, Illinois, has a design average flow of 30 MGD. The annual average treated flow in 2019 was 27.2 MGD. Wastewater reclamation processes include primary (primary settling), secondary (activated sludge process), and tertiary (sand filtration) treatments. Under normal operations, all solids generated at the Egan WRP, including solids conveyed from the Kirie WRP, are anaerobically digested. During some winters or when the centrifuges are not operating, liquid digested biosolids are sent via sewers to the O'Brien WRP. Centrifuge centrate is also sent via sewers to the O'Brien WRP.

In 2019, the total biosolids production at the Egan WRP was 6,485 DT, all of which was conveyed to other WRPs for further processing and storage (Table 1). Anaerobic digestion at the Egan WRP in 2019 met the time and temperature requirements of the Class B pathogen standards of Section 503.32(b)(3) (Table 24). An additional 10 DT of centrate were recycled to the Egan WRP for use in the ANITA™ MOX ammonia removal process.

Biosolids Disposal at Landfills

In 2019, no Egan biosolids were co-disposed in landfills.

Biosolids Conveyed to Other Water Reclamation Plants for Further Processing

In 2019, 3,788 DT of biosolids were pumped to the O'Brien WRP for further processing, 3,497 DT as liquid biosolids/sludge and 291 DT as centrifuge centrate. In addition, a total of 2,697 DT of centrifuge cake biosolids was trucked from the Egan WRP to the Lawndale Area SMA and the Calumet Area SMA sites for composting and temporary storage prior to farmland utilization.

TABLE 24: DIGESTER¹ TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2019

Month	Average Temperature	Average Detention Time	Minimum Detention Time Required by 503.32(b)(3) ²	Meets Part 503 Class B Requirements
	----- °F -----	----- days-----	----- days-----	
January	96.1	28.3	15.0	Yes
February	95.5	26.6	15.0	Yes
March	96.8	27.5	15.0	Yes
April	95.3	26.9	15.0	Yes
May	96.4	28.8	15.0	Yes
June	96.5	30.3	15.0	Yes
July	96.7	35.0	15.0	Yes
August	96.8	34.1	15.0	Yes
September	96.7	28.4	15.0	Yes
October	97.3	31.9	15.0	Yes
November	97.5	32.1	15.0	Yes
December	97.6	32.3	15.0	Yes

¹Temperatures and detention times are for primary digesters A and C at the Egan WRP.

²For anaerobic digestion at average temperature achieved.

TERRENCE J. O'BRIEN WATER RECLAMATION PLANT

The O'Brien WRP, located in Skokie, Illinois, has a design average flow of 333 MGD. The annual average treated flow in 2019 was 257 MGD. Wastewater reclamation processes at the O'Brien WRP include primary (primary settling) and secondary (activated sludge process) treatments. In 2019, the O'Brien WRP produced 39,754 DT of solids (Table 1), which were sent via pipeline to the Stickney WRP where they were commingled with the solids from that WRP for further processing. This total includes solids generated from water reclamation at the O'Brien WRP and solids conveyed from the Egan WRP to the O'Brien WRP via sewer, which includes solids generated at the Kirie WRP, as described in the next section.

No final biosolids product is generated at this WRP.

JAMES C. KIRIE WATER RECLAMATION PLANT

The Kirie WRP, located in Des Plaines, Illinois, has a design average flow of 52 MGD. The annual average treated flow in 2019 was 47.78 MGD. Wastewater reclamation processes include grit tanks, secondary (activated sludge process), and tertiary (sand filtration) treatments. In 2019, the Kirie WRP produced 6,605 DT of solids (Table 1), which were sent via force main to the Egan WRP, then to the O'Brien WRP, and finally to the Stickney WRP and were commingled with the solids from these WRPs for further processing.

No final biosolids product is generated at this WRP.

LEMONT WATER RECLAMATION PLANT

The Lemont WRP, located in Lemont, Illinois, has a design average flow of 2.3 million MGD. The annual average treated flow in 2019 was 2.95 MGD. Wastewater reclamation processes include both primary (primary settling) and secondary (activated sludge process) treatments. In 2019, the Lemont WRP produced 294 DT of solids (Table 1), which were gravity concentrated and transported to the Stickney WRP where they were commingled with the solids from that WRP for further processing.

No final biosolids product is generated at this WRP.

**BIOSOLIDS SENT TO LANDFILLS FOR CO-DISPOSAL UNDER 40 CODE OF
FEDERAL REGULATIONS PARTS 258 AND 261**

In 2019, a total of 611 DT of the District's biosolids (486 DT from the Stickney WRP and 125 DT from the Calumet WRP) was classified as unsuitable for land application because they contained gravel, wood debris, and dust from the sweeping of roads at biosolids processing sites. These materials were co-disposed with municipal solid wastes at a nonhazardous waste landfill, Laraway in Joliet, Illinois. All biosolids sent to landfills are usually analyzed as specified in 40 CFR Part 261 to establish the nonhazardous nature of these biosolids for co-disposal. Analytical results, including toxic characteristic leaching procedure constituents, polychlorinated biphenyls, cyanide, sulfide, and paint filter tests, were submitted in August 2018 to the landfill company to satisfy the requirements of their IEPA permit. The analytical data generated in 2018 should be valid until 2021. District sludge has always met the requirements of 40 CFR Parts 258 and 261 and the Illinois nonhazardous waste landfill regulations (Title 35, Subtitle G, Chapter I, Subchapter H, Part 810).

APPENDIX

DESIGNATION OF SITE-SPECIFIC EQUIVALENCY TO PROCESS TO FURTHER
REDUCE PATHOGENS FOR METROPOLITAN WATER RECLAMATION DISTRICT OF
GREATER CHICAGO BIOSOLIDS PROCESSING TRAINS



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUN 20 2002

REPLY TO THE ATTENTION OF:

WN-16J

Mr. Jack Farnan
General Superintendent
Metropolitan Water Reclamation
District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611

REF: Mr. Richard Lanyon's November 30, 2001, Letter Request for Site-specific Equivalency Certification for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Biosolids Processing Trains at the Stickney and Calumet Waste Water Treatment Plants.

Dear Mr. Farnan:

We acknowledge receipt of the referenced letter request along with attachments A through I. This request conforms with the requirements of the Federal rules for the use and disposal of biosolids codified at 40 CFR part 503. These rules designate the Regional permitting authority to be responsible for determining equivalency, and require generators of biosolids to formally seek an equivalency certification of their process to further reduce pathogens (PFRP) from the permitting authority. To be equivalent, a treatment process must be able to consistently reduce pathogens to levels comparable to the other PFRP processes listed in part 503, Appendix B.

The granting of a site-specific equivalency designation by the Regional permitting authority—based on a thorough review of the adequacy of the process trains to consistently reduce pathogens in biosolids as indicated by the pathogen data, and in consultation with the Pathogen equivalency Committee (PEC)—certifies the biosolids generated by using a PFRP equivalent process is Class A with respect to pathogens. The pathogen standards are specified in section 503.32(a)(7)(i). However, the granting of a site-specific equivalency is limited to the set of process and operating conditions in use at the Stickney and Calumet waste water treatment plants at the time of the application for equivalency designation (Appendix B of the November 30, 2001, Letter Request), and as described by MWRDGC in its application for equivalency submitted to the PEC. The PEC is an US Environmental Protection Agency resource to provide technical assistance and recommendations to Regional permitting authorities regarding pathogen reduction equivalency in implementing the part 503 standards for use and disposal of biosolids.

We are familiar with the MWRDGC's request for equivalency because our biosolids team members participated in numerous phone conversations and meetings with the PEC and Dr. Prakasam Tata of your staff, and both were extremely helpful in explaining and clarifying various issues related to the subject.

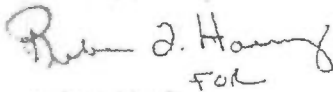
Our review of the MWRDGC's biosolids data submitted for 1994 to 2001 indicates Class A biosolids were produced at the Stickney and Calumet plants as they operated their respective low-and high-solids sludge processing trains (SPTs) according to codified protocols delineated in Attachment B of Mr. Lanyon's letter request, dated November 30, 2001. The part 503 rules for PFRP equivalency require that enteric viruses and viable helminth ova are reduced to below detection level. The pathogen data obtained from actual measurements and the statistical treatment of that data by MWRDGC indicated reductions of greater than two logs. We appreciate the MWRDGC's effort in analyzing 1,400 discrete samples of biosolids for pathogens, and the professionalism and patience displayed by Dr. Prakasam Tata of your staff in responding to our queries pertaining to this matter.

In consideration of the quality of data provided for our review, the consistent achievement of a Class A product, we are pleased to grant a conditional site-specific certification of equivalency to the MWRDGC's SPTs at Stickney and Calumet waste water treatment plants for a period of two years effective August 1, 2002 to July 30, 2004, provided the following conditions are met.

- 1) The Stickney and Calumet plants must operate at all times according to the codified process and operating protocols referred to in the letter request dated November 30, 2001.
- 2) Monitor biosolids (treated sludge) at Stickney and Calumet plants once per month for the first year and subsequently, once every other month for enteric viruses and helminth ova, and certify the MWRDGC is in compliance with Class A standards and report the results semi-annually to the attention of Mr. Valdis Aistars, Mail Drop WC-15J, 77 West Jackson, Chicago, Illinois 60604.

We appreciate MWRDGC's ongoing efforts to improve the quality of its biosolids. If you have any further questions about this matter, please contact Ash Sajjad of my staff at 312-886-6112.

Sincerely yours,


 Jo Lynn Traub
 FOL

Jo Lynn Traub
 Director, Water Division

cc: Dick Lanyon, MWRDGC
 Dr. Prakasam Tata, MWRDGC ✓
 Dr. James Smith Jr., ORD, Cincinnati



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 30 2012

REPLY TO THE ATTENTION OF:

WN-16J

Thomas C. Granato, Ph.D.
Director of Monitoring and Research
Metropolitan Water Reclamation
District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611-3154

Re: June 1, 2012, Request for Renewal of Site-Specific Equivalency Determination for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Biosolids Processing Trains at the Stickney and Calumet Wastewater Treatment Plants

Dear Dr. Granato:

We have received the above-referenced request on June 6, 2012, along with microbiological analyses of biosolids generated by MWRDGC between August 2002 and December 2011. We appreciate your interest in seeking renewal of MWRDGC's equivalency certification. You have also requested that data reporting be reduced and the sampling frequency for enteric viruses and helminth ova be retained at six times per year if your equivalency certification is renewed. The following discussion highlights the regulatory requirements of establishing equivalency, memorializes past Agency decisions, and provides Region 5's decision on your requests.

Biosolids are a product of wastewater treatment and are suitable for beneficial reuse in agriculture and other applications, subject to conformance with the Federal biosolids rules at 40 Code of Federal Regulations Part 503 (503 Rules) addressing disease-causing organisms (pathogens) in biosolids. The 503 Rules establish requirements for classifying biosolids as either a Class A or Class B product with respect to pathogens. Class A requirements are met by treating the sewage sludge to reduce pathogens below detection levels, while the Class B requirements rely on a combination of treatment and site restrictions to reduce pathogens and potential exposure to pathogens. The 503 Rules provide a series of options for meeting the specific requirements for the two classes of biosolids.

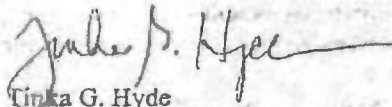
One of the Class A options is to treat the sewage sludge by a process equivalent to a process listed in the 503 Rules, Appendix B. To be equivalent, a sewage sludge treatment process must be able to consistently reduce pathogens to levels comparable with the processes listed in Appendix B. Under the 503 Rules, the permitting authority (in this case, EPA Region 5) is responsible for determining equivalency.

MWRDGC's sewage sludge processing trains differ from those listed in Appendix B. In March 1998, MWRDGC submitted an equivalency application to EPA's Pathogen Equivalency Committee (PEC) and the Region for approval. The Region and the PEC reviewed MWRDGC's initial request and granted a site-specific and conditional equivalency in June 2002, for a period of 2 years. Subsequently, the Region granted four 2-year extensions, in effect until August 1, 2012.

We have reviewed your most recent renewal request and request for reporting and sampling frequency reduction. Based on the microbiological data provided to us, I am approving your equivalency renewal request for a period of five years, until August 1, 2017. This approval is subject to all conditions that were included in the initial approval and all subsequent extensions except as it relates to reporting. As part of your equivalency approval, you were required to submit semi-annual reports to EPA. Based on your past performance, we agree that annual reporting as required by the Part 503 rules is sufficient and therefore, approve the reduction to annual reporting. Regarding the retention of the reduction in sampling frequency for enteric viruses and helminth ova to six times per year, we would like to provide some clarification. This reduction is only allowed when MWRDGC's sewage sludge processing trains are not meeting the approved conditions for equivalency and you are analyzing the sewage sludge in accordance with 40 CFR 503.32(a)(5)(ii) and (a)(5)(iii) to meet Class A. Monthly sampling for enteric viruses and helminth ova is still required as part of your equivalency approval.

If you have any further questions about this matter, please contact Mr. John Colletti of my staff, at (312) 886-6106.

Sincerely,



Tinka G. Hyde
Director, Water Division

cc: Albert Cox, MWRDGC
Al Keller, IEPA

Protecting Our Water Environment

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THOMAS C. GRANATO, Ph.D.
Director of Monitoring and Research Department
thomas.granato@mwrdd.org

September 14, 2012

Ms. Tinka Hyde
Director, Water Division
United States Environmental
Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Ms. Hyde:

Subject: Clarification on July 30, 2012, Letter: Renewal of Site-Specific Equivalency to Process to Further Reduce Pathogens Designation of the Metropolitan Water Reclamation District of Greater Chicago's Biosolids Processing Trains at the Stickney and Calumet Water Reclamation Plants

In a letter dated July 30, 2012 (attached), the United States Environmental Protection Agency (USEPA) notified the Metropolitan Water Reclamation District of Greater Chicago (District) that the site-specific equivalency to process to further reduce pathogens (PFRP) designation of the District's low- and high-solids biosolids processing trains at the Stickney and Calumet Water Reclamation Plants was renewed for a period of five years, until August 1, 2017. Based on a discussion with Mr. John Colletti of your staff, the District will operate as specified in this renewal letter and with the following clarifications:

- Sampling for enteric viruses and helminth ova will be done six times per year as part of the PFRP equivalency as approved in the 2010 renewal (attached) of the two-year certification.
- Since the reporting frequency is changed from semi-annual to annual, and monitoring data will be included in the annual USEPA 40 Code of Federal Regulations Part 503 Rule (Part 503) report to the USEPA, the annual reporting begins with the 2012 calendar year. As such, no more semi-annual reports will be submitted from now onwards. The monitoring data for the period January through July 2012 of the previous certification period (August 2010 to July 2012) will be reported in the 2012 Part 503 report.

Ms. Tinka Hyde

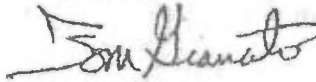
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September 14, 2012

Subject: Clarification on July 30, 2012, Letter: Renewal of Site-Specific Equivalency to Process to Further Reduce Pathogens Designation of the Metropolitan Water Reclamation District of Greater Chicago's Biosolids Processing Trains at the Stickney and Calumet Water Reclamation Plants

For additional information, please contact Dr. Albert Cox, Supervising Environmental Soil Scientist, at 708.588.4063.

Very truly yours,



Thomas C. Granato, Ph.D.
Director
Monitoring and Research

TCG:AC:cm
Attachment
cc w/att: S. A. Keller, IEPA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3500

JUL 20 2010

REPLY TO THE ATTENTION OF: WN-16J

Mr. Louis Kollias
Director of Monitoring and Research
Metropolitan Water Reclamation
District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611-3154

Re: May 17 2010, Request for Renewal of Site-specific Equivalency Determination for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Biosolids Processing Trains at the Stickney and Calumet Wastewater Treatment Plants.

Dear Mr. Kollias:

We have received the above-referenced request on May 20, 2010, along with microbiological analyses of biosolids generated by MWRDGC between August 2002 and December 2009. We appreciate your interest in seeking renewal of MWRDGC's equivalency certification. You have also requested the sampling frequency for enteric viruses and helminth ova be reduced if your equivalency certification is renewed. The following discussion highlights the regulatory requirements of establishing equivalency, memorializes past Agency decisions, and provides Region 5's decision on your requests.

Biosolids are a product of wastewater treatment and are suitable for beneficial reuse in agriculture and other applications, subject to conformance with the Federal biosolids rules at 40 Code of Federal Regulations Part 503 (503 Rules) addressing disease-causing organisms (pathogens) in biosolids. The 503 Rules establish requirements for classifying biosolids as either a Class A or Class B product with respect to pathogens. Class A requirements are met by treating the sewage sludge to reduce pathogens below detection levels, while the Class B requirements rely on a combination of treatment and site restrictions to reduce pathogens and potential exposure to pathogens. The 503 Rules provide a series of options for meeting the specific requirements for the two classes of biosolids.

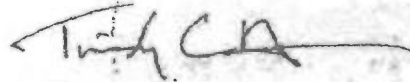
One of the Class A options is to treat the sewage sludge by a process equivalent to a process listed in the 503 Rules, Appendix B. To be equivalent, a sewage sludge treatment process must be able to consistently reduce pathogens to levels comparable with the processes listed in Appendix B. Under the 503 Rules, the permitting authority

(in this case, EPA Region 5) is responsible for determining equivalency. MWRDGC's sewage sludge processing trains differ from those listed in Appendix B. In March 1998, MWRDGC submitted an equivalency application to EPA's Pathogen Equivalency Committee (PEC) and the Region for approval. The Region and the PEC reviewed MWRDGC's initial request and granted a site-specific and conditional equivalency in June 2002, for a period of 2 years. Subsequently, the Region granted three 2-year extensions, in effect until July 31, 2010.

We have reviewed your most recent renewal request and request for sampling frequency reduction. Based on the microbiological data provided to us, I am approving your equivalency renewal request for a period of two years, until August 1, 2012. This approval is subject to all conditions that were included in the initial approval and all subsequent extensions except as it relates to sampling frequency. With this approval, the sampling frequency for enteric viruses and helminth ova is reduced to six times per year.

If you have any further questions about this matter, please contact Mr. John Colletti of my staff, at (312) 886-6106.

Sincerely,



for Tinka G. Hyde
Director, Water Division