

# 2017 Periodic Biosolids Program Performance Report

Issued: March 2018

***"It is the goal of the City to manage biosolids processing, handling, and final disposal in a manner which meets public acceptance and to produce a product that complies with all state and federal regulatory requirements."***

## Introduction

The Grand Rapids Water Resource Recovery Facility (GR-WRRF), located in Grand Rapids, MI, provides wastewater collection and treatment for the City of Grand Rapids and 11 surrounding communities totaling approximately 270,000 customers within a 200 square mile geographical area. The Wastewater plant treated 15866 million gallons in 2017. The GR-WRRF has a design capacity of 61.1 million gallons a day (MGD) and in 2017 had an average daily flow of 43 MGD. The facility was constructed in the 1920's and treatment consisted of primary clarification, anaerobic digestion, and drying beds. The Biosolids from the drying beds were bagged and sold to businesses and homeowners for fertilizer for many years. In the mid 1950's the plant was expanded to include secondary treatment capability utilizing activated sludge as the biological treatment process along with increased primary treatment capacity and disinfection. In the 1970's the facility was again expanded to increase flow capacity and solids handling processes. Solids handling converted from anaerobic digestion to thermal heat treatment using low pressure oxidation.



The GR-WRRF was part of a third round of agencies participating in the National Biosolids Partnership (NBP) Environmental Management System (EMS) for Biosolids. The GR-WRRF BMP was formally certified by the NBP in December of 2006. The title of the program changed in 2011 with Biosolids Management Program (BMP) replacing EMS. In October of 2016, ESD successfully completed the tenth year re-verification audit; retaining its platinum certification with the (NBP).

ESD's BMP has gone through many changes and improvements since its inception, and has matured into a productive and healthy program. Engaging employees in goal setting and critical control points keeps people in tune and keeps the BMP in the foreground.

During July of 2009, the Joint Biosolids Management Project Agreement was approved by the City of Grand Rapids and City of Wyoming. This finalized the creation of the Grand Valley Regional Biosolids Authority (GVRBA). On July 1, 2009 the GVRBA became responsible for processing 100% of the biosolids from the City of Grand Rapids Wastewater Plant and the City of Wyoming Clean Water Plant.

In 2017, modifications, improvements and studies were completed and/or undertaken at the WRRF and collection system support facilities including:

- Primodal Real Time Nitrogen Controller and Wasting Control Projects for the North and South aeration at the WRRF
- Primary Tank Upgrades (Sprockets, Chains, etc...)
- Griggs St SE (400 Block)  
While a contractor was working on a school site (expansion and improvements), one of the maintenance personnel mentioned that the school sanitary drains were always running slower than normal. After tracing the lateral out to the street side public main, they discovered that the 9" clay pipe was totally enveloped (both inside and out) with tree roots. The street surface in this block was also being redone at the time so the contractor went and replaced the damaged piece of 9" main. Cost \$9,000
- Jefferson Ave SE (extended) Easement between bakeries south of 28<sup>th</sup> St  
This section of 15" cement sewer was installed in 1947. The high strength waste that comes out of these bakeries has aggressively attacked the cement pipe over the years and our intent was to line this entire length. Complicating matters was a very close water main to the sewer and high voltage electrical lines above. There was also a ground mounted transformer directly above the sewer and a developing sink hole from the broken sewer pipe. Upon further Televising of the sewer in preparation to CIPP line, the crew foreman informed us that they were unable to line it because most of the bottom of the sewer was already deteriorated. Bottom line cost to replace 560' of 15" sewer, complete by-pass pumping, holding power poles, surface restoration: \$200,000
- Oak Hollow Lift Station Forcemain Break  
Asbestos forcemain pipe broke 10' outside of station. Crews were able to fix the problem with a repair clamp, however, this is only meant to be a temporary fix.

This entire 6" line is scheduled to be replaced in 2018 with new ductile iron. Cost of repair : \$4500

### **Outcomes Matter**

The NBP has identified key outcomes which serve as good indicators of successful and well managed Biosolids Management practices. Efforts undertaken by GR-WRRF during the past year in support of these outcomes are detailed below.

### **Quality Management Practices**

The City of Grand Rapids Environmental Services Department (ESD) has made several improvements in its goals and objectives over the past few years and has continued to modify its program through 2017.

2017 modified goals and objectives were developed recognizing the need to optimize performance of solids processing and improve operation and maintenance to reduce the financial burden on taxpayers. Overall the goals and objectives are anticipated to result in substantial gains in biosolids management and reduction in cost of operation.

The ESD Biosolids Management Program (BMP) established goals and objectives consistent with the required NBP outcome areas. The 2017 goals were developed using Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) criteria through input from the internal BMP Team and consideration of public concerns. The goals were established cognizant of each of the four outcome focal points of the NBP program as identified below:

1. Environmental Performance,
2. Regulatory Compliance,
3. Relations with Interested Parties, and
4. Quality Biosolids Management Practices.

### **Laboratory Information System**

Proper laboratory data management is essential for industrial monitoring required for clean biosolids. This goal was to be completed by November of 2017 and the LIMS was to be in use by January of 2018. Due to staffing challenges as well as procedural changes to laboratory methods this goal was not met and will continue into next year.

### **Install Real time nitrogen controller the WRRF north plant aeration**

This type of controller throttles the blowers in secondary treatment allowing just enough oxygen to our biomass for proper treatment and control of nitrogen (ammonia). This will allow the use of less oxygen which is less cost to the WRRF and ESD's customers. This goal was continued into 2017 with a modification to

add the south plant secondary treatment to nitrogen control. It was determined that modifications to the south plant air valving controls was required to complete this goal. The system is now operational.

### Relations with Interested Parties

In 2017, staff focused on the many educational opportunities that were afforded to us in the Grand Rapids metropolitan area and within the Environmental Services Department (ESD).

- For the eighth time, several staff members volunteered at an informational booth at the upcoming March “Home and Garden Show”. This event is the largest of this type of event in West Michigan with attendance in excess of 30,000. This was the Home and Garden Show’s 38<sup>th</sup> season and was held at the De Vos Center in downtown Grand Rapids. Staff from a variety of workgroups have volunteered for this event in the past.
- The City required customer service training also relates to the maintaining of relations with interested parties. Good customer service skills helps to build trust with citizens and maintains good working relationships with the public. All City employees have taken this mandatory training required by the City Manager.
- 1242 people toured the wastewater plant in 47 tours in 2017. Plant staff is optimistic about our field of work and encourages students to consider Wastewater Treatment as a career path.
- Citizens can explore various areas of the wastewater treatment process and the Biosolids Management Program on our Environmental Services Departments updated website at the City of Grand Rapids website [www.grandrapidsmi.gov](http://www.grandrapidsmi.gov)
- There are quarter page hand-outs that the City uses as an insert in all of the water/wastewater invoices that are mailed out. These types of handouts help ESD maintain relations with interested parties. This is also a good public outreach tool.
- The City’s ESD Facebook page had 8,738,777 impressions, and ESD has 772 followers on Instagram.

### Regulatory Compliance

- ESD WRRF received a violation on the NPDES permit for failure to submit one daily fecal coliform analysis. Notice of violations were also received for improper records retention, and improper test methods discovered during the annual MDEQ compliance inspection.
- Achieved 100% compliance with regulatory requirements as related to Biosolids in 2017.
- The WRRF received a new National Pollution Discharge Elimination System (NPDES) permit effective November 1, 2017 which will be in effect till October1, 2021.

## Environmental Performance

- A motivated staff striving to achieve 100% compliance with all regulatory requirements is focused on protecting the environment. The City of Grand Rapids Environmental Services Department staff operates in a highly effective and professional manner and consistently achieves regulatory compliance.
- The City is constructing Bio-digesters that when in operation will reduce the energy footprint of the facility by production of biogas for use in generation electricity and providing heat for the process.

## Biosolids Value Chain - Monitoring and Measurement Report and Progress

Monitoring and measurement provides critical input to the organization relative to the effectiveness of its operational controls and related SOP's in relation to the critical control points. Critical control points are checked annually in July and operational controls are checked annually in October. The information obtained from these annual checks helps us to identify any weaknesses, missing information, new information or any other ways in which the BMP can be improved. As new SOP's are made, they are incorporated into the BMP. This annual check of operational controls assures any relevant monitoring and measurement is done and that the correct SOP's are in place. The department continues to develop and utilize more accurate and easily maintained monitoring equipment.

## Wastewater Collection and Pretreatment

*Significant Industrial Users (SIU)* – In 2017, the industrial Pretreatment Program, (IPP), staff worked with industrial users and State regulators to maintain compliance with local, state and federal discharge laws. There are eighty four (80) Significant Industrial Users monitored by the Industrial Pretreatment Program. IPP utilizes Linko Data System for tracking compliance for Industrial Users. IPP continues to expand the utilization of functionality of Linko and both the EPA and the State of Michigan have approved the use of the electronic reporting, called CROMERR.

*Industrial/Commercial User Discharges* –A business requesting new water service or to transfer a water service requires submittal of a completed survey prior to activation of water service. This completed survey is scanned by the Utility Billing Office into Cayenta Utilities Software. IPP then reviews the completed survey and determines if the user requires an industrial user permit.

*Discharge Authorizations* –. Discharge requests are for one-time or short-term discharges, or for discharges that do not meet the criteria for a Significant Industrial User. A discharge request containing Material Safety Data Sheets (MSDS), waste characterization, flow volumes, discharge rates and location is submitted by potential dischargers. The proposed discharge is reviewed by IPP staff to determine potential impacts to the WRRF. The user then receives an approval or denial letter for the discharge.

*Pollutant Minimization* – Toxic metals, including mercury, are the main focus for pollutant minimization for IPP staff. Permitted industries are sampled annually by IPP while



individual user self-monitoring is performed a minimum of semi-annually. WRRF influent mercury is sampled and analyzed monthly, with low level influent and final effluent sampling performed quarterly.

### **Wastewater Treatment and Solids Generation**

*Solids screening and Grit Collection* – ¼” bar screens that were installed in 2004-2005 at the GR wastewater plant headworks area continue to significantly reduce screening type debris in the biosolids. The screenings compactor at the end of the screen conveyor washes the screenings with final effluent water; then compresses the screenings removing much of the water. This saves the WRRF from hauling the screening bin as often as we used to. Much less water weight is being hauled to landfill.

*Scum* – This product consists of greases and oils which enter the wastewater plant through the collection system. A proactive program to capture and remove grease and oil at lift stations by cleaning the wet wells on a routine basis continues to help reduce grease and oils contained in the biosolids. Schedules for cleaning wet wells are continually adjusted according to condition of the well at last cleaning. The captured grease and oil is collected and transported to local landfills for disposal. We continue to educate the public about grease in the sewers during WRRF tours.

*Primary Treatment* – We have been very proactive in maintaining our primary tank mechanisms and associated equipment during “fair weather” months so that repairs during the winter months are minimized and/or not necessary. The newer Kaizer compressed air system along with air driers continue to work well. Eight of the twelve Primary tanks have completed preventative maintenance to replace chains, sprockets and various mounts and bushings. These main components had reached the end of their life cycle after approximately twenty years of service.

*Raw Solids Storage* – Biosolids are stored in the GVRBA primary storage tank. The WAS tank is being leased to Grand Rapids for use as a Concentrated Waste storage tank.

*Secondary Treatment* – Biological phosphorus facilities in the North and South aeration plant continue to be exceptionally effective. Ferrous chloride is no longer used for phosphorous removal, but is still available on site for dewatering odor control and backup phosphorous removal.

The Grand Rapids plant continues to thicken its (WAS) waste activated solids from secondary treatment. Optimization of the new process continues. New SOP’s and operational controls were being developed and implemented for this critical control point.

### **Solids Stabilization, Conditioning, and Handling**

*Centrifuge Dewatering* –The Biosolids Program Manager and Operations & Maintenance Supervisors monitor the performance of the units. Operations staff strives for 25% cake solids, polymer dosage less than 20 lbs per dry ton, and a 95% capture rate. Various SOP’s have been developed since 2009 when the GR-WRRF O&M staff were awarded the opportunity to run the GVRBA dewatering facility.

*WAS (Waste Activated Sludge) Thickening* – The Improvements to the Waste Activated Sludge (WAS) Thickening System project was substantially completed in 2014 and

operational during 2015. The thickened sludge is pumped to the GVRBA reducing the phosphorous load to the plant when the WAS was co-settled.

*Odor Control* – There are three carbon adsorption units at the Grand Rapids (GVRBA) facilities. Odor control is of primary concern for proper operation of the facility. These are maintained by regular checking of the units through preventive maintenance and through our Odor Minimization Plant (OMP) and Malfunction Abatement Plan (MAP). This plan (GVRBA SOP #12) was set up to minimize the potential for unreasonable odors to migration beyond the property line; to provide for proper operation and maintenance of the odor control units, and satisfy the Nuisance Minimization and Malfunction Abatement Plan requirements of our air quality permit with the Michigan Department of Environmental Quality.

*Concentrated Waste* – The City has leased the WAS tank from GVRBA and has installed a waste line from Founder's Brewery to the tank. This line will also be able to transport additional high strength waste to the plant for storage. The stored waste will then be feed to the treatment system during low loading periods to the plant, helping to reduce aeration costs. This operation should be on-line in spring of 2018.

*Digestion* – The City has broken ground on a bio-digester process that should be commissioned in the fall of 2019. This will reduce the amount of biosolids being dewatered and landfilled as well as produce biogas which can be used reduce the facilities purchased energy requirements.

### **Solids Storage and Transportation**

*Truck Loading* – The contractor (Cordes Trucking Inc.) maintains log-sheets and inspects each truck before departure from the site to ensure that there is no leakage or trucking issues. The contractor maintains their SOP's and spill plans at their main location and all the drivers are familiar with the SOP's. At least two employees of the contractor are audited each quarter during the year to assure that current SOP's are in each truck driver's possession; and that the copies in the trucks are the current versions of those SOP's.

*Truck Cover* – All trucks are covered during transport to the landfill site in accordance with state law.

*Truck Transport to Landfill* – The contractor maintains records of dates, driver(s) and landfill destination site(s) for each load leaving the site.

*Truck Washing Procedures* – The contractor maintains procedures to wash and inspect trucks to minimize odors and biosolids tracking issues.

### **Biosolids End Use or Disposal**

*Landfill* – The contractor works with the three landfills to properly incorporate the biosolids into the municipal trash. This augments the decomposition process and maximizes the potential for methane gas which is recovered and beneficially used.

## Internal Audit

An internal audit of the City's BMP was conducted during the first quarter of 2018 and completed March 30, 2018. Four (4) nonconformances were noted. Element 5: Quarterly report forms for goals not completed. Element 8: Some new staff missed training. Names of staff trained were missing. Element 10: 2nd quarter contractor inspection was not found. Element 15: Program report not reviewed with Director until April.

Corrective action plans are in place to address these issues.

## Third Party Re-verification Audit

The interim audit (11<sup>th</sup> audit) was performed by William Hancuff. The Environmental Services Department appreciates the input received from the external auditor in keeping our BMP program healthy. The main objective of the audit was to ensure our program's health with review of our progress toward goals and objectives, corrective and preventive action requests and responses, actions to correct minor nonconformances and review of key outcome areas. This external audit keeps us in check and makes sure we stay within the guidelines necessary to maintain our platinum certification with the National Biosolids Partnership. The feedback we receive through this process is of great assistance in our commitment of continual improvement as well as our four key outcomes of the program... (Quality Management Practices, Credibility with Interested Parties, Regulatory Compliance and Protection of the Environment). As our BMP continues to mature, we strive to encourage the public, educators, representatives of local and state agencies, ESD staff and other interested parties to become more knowledgeable and involved in our BMP. The audit was successful and Grand Rapids received a platinum level certification letter and award for our tier 4 Platinum level achievement in our Biosolids Management Program. The audit's positive observations, nonconformances and opportunities for improvement are listed below.

## Positive Observations

The Environmental Protection Services Department's Water Resource Recovery Facility personnel involved in biosolids management should be recognized for their outstanding achievements, and the exceptional features of their Biosolids Management Program. The following was found to be noteworthy during this audit.

- The Water Resource Recovery BMP management team has developed an excellent set of program document folders, which contain the accomplishments of the Biosolids Management Program (BMP) from year to year.
- The BMP management team demonstrated its commitment to the Code of Good Practice, specifically "continuous improvement," by participating in the West Michigan Take Back Medicine Program. The facility ensures that uncontrolled medicines that are collected in the program are appropriately destroyed through incineration. This eliminates the possibility of pharmaceutical wastes accumulating in biosolids.



- The BMP also demonstrated its commitment to the Code of Good Practice, specifically “compliance”, by establishing a benchmark pretreatment program, which is the first in the US to implement electronic reporting.

Additionally, the continuous hard work and dedication of the BMP management team must be acknowledged. While maintaining the BMP certification recognition is obviously a team effort the leadership provided by the Environmental Services Water Resource Recovery Manager assured maintenance of this common goal.

### **Minor Nonconformances**

Requirement 5.2 – Grand Rapids has an excellent track record of goal and objective accomplishments, but has not initiated sufficiently detailed goals and objectives for the future. Some BMP potential goals that have been identified but not adopted include: 1) Enacting a new sewer use ordinance (measurability to possibly include the number of ordinance sections to be revised) ; 2) Design and construction of digesters (measurability to include reduction in tons of dry solids produced and quantity of potential energy produced (BTUs or kWhrs); 3) Recover phosphorus as a beneficial resource from waste streams (measurability to include pounds of phosphorus recovered).

Requirement 5.7 – The NBP standard establishes a minimum conformance requirement of establishing an action plan that describes those improvement activities it is pursuing to achieve biosolids program goals and objectives. The action plan must designate schedules, milestones, resources and responsibilities for achieving program goals and objectives. The Grand Rapids Goals and Objectives procedure references the use of Table 13.2 – Action Plan to be used for planning activities for goals and objectives. While the table (form) identifies all of the required criteria contained in the minimum conformance requirements the completed forms have not contained adequate details on the step by step actions needed to accomplish each goal and objective. (Similar to an engineering or construction project plan.)

### **Opportunities for Improvement**

Requirement 5.1 – Consider increasing the flexibility of the goals and objectives procedure to allow for the addition of new goals and objective on a more frequent basis than annually, such as from time to time, as necessary.

Requirement 14.5 – Consider including the preparation of corrective action plans to address “Opportunities for Improvement” in the Corrective Action procedure to enhance the continuous improvement of the BMP.

Requirement 16.1 – Consider commencing the internal audit at the beginning of the second month of the first quarter to ensure completion of the audit by the end of the quarter.

Requirement 16.1 – Consider including/adding 1 or 2 auditor trainees to the internal audit team.

Requirement 16.1 – Include in the scope of the internal audits an assessment of the extent of implementation of the Code of Good Practice.

In order to address the above minor non-conformances, the City of Grand Rapids, Michigan Environmental Services Water Resource Recovery BMP team has prepared a non-conformance investigation report and will implement corrective actions according to their procedures to provide continual improvement to their BMP.

#### Interested Parties Input/Participation

During the first quarter of each year the City develops a list of goals and objectives for the next year. As part of this process we seek input from our interested parties regarding concerns and issues they may have. The City appreciates all responses it receives back from the public in regards to our goals and objectives.

The City will continue to keep interested parties apprised of our efforts to seek input as part of our continuous improvement process. The City has also incorporated our customer service goal into element 9 and made that part of our BMP.

The surcharges assessed to Industrial Customers were adjusted to include a new rate for participants in our upcoming High Strength Waste treatment.

#### 2018 - Current Year Goals & Objectives

An important component of our Biosolids BMP is continual improvement. Annually, goals are identified based on key outcomes, the Biosolids value chain, or BMP improvements. To address an opportunity for improvement a list of possible future goals will be kept and added to annually. The yearly goals will be chosen from the compiled list. In 2018 staff will evaluate the following goals:

##### ENACT A NEW SEWER USE ORDINANCE (SUO):

An updated ordinance can provide for further assurances that the incoming waste is acceptable for our biosolids stream.

#### ADD REAL-TIME CONTROL FOR THE MIXED LIQUOR WASTING:

With the addition of automated wasting the sludge age and mass can be optimized for the least sludge production.

#### UPDATE REAL-TIME CONTROL FOR ULTRAVIOLET DISINFECTION:

There is potential for additional reduction in energy use with a real-time controller.

#### EVALUATE ODOR CONTROL AT DEWATERING BUILDING:

Increased usage of Carbon for odor control of the dewatering process is resulting increased processing costs. Determine cause of increased usage and evaluate alternate technologies.

#### USE HIGH STRENGTH WASTE TO EVEN LOADS TO AERATION TANKS.

Separate high strength waste flows and feed to facility during diurnal periods when excess capacity exists.

#### UTILIZE A LABORATORY INFORMATION MANAGEMENT SYSTEM (LIMS) FOR THE ENVIRONMENTAL ASSESSMENT LABORATORY.

Utilizing a LIMS system can document the proper handling and methods for the analysis performed in the laboratory, reducing paper and time spent.

#### DESIGN AND BUILD DIGESTERS

Great potential for reduced solids handling and energy recovery.

#### PHOSPHOROUS RECOVERY

Will be required so struvite does not build up in digestion and dewatering processes.

#### OPERATOR ONBOARD TRAINING

Develop new training tools and methods to satisfy training needs for higher turnover of plant personnel

### Summary

In 2017 the City of Grand Rapids was again certified Platinum by the National Biosolids Partnership for dedication to continued improvement, and for supporting excellence in biosolids management practices, augmenting regulatory compliance obligations, environmental performance and providing meaningful opportunities for public participation.

In 2017 The City of Grand Rapids Water Resource Recovery Facility Biosolids Management Program continued to evolve and improve. Dedication of staff to the processes involved in the BMP not only allows for the continued Platinum Level Certification from the National Biosolids Partnership, it also provides the satisfaction of documenting the successes we achieve.

As GR-WRRF moves into the future, updating and adding processes as well as personnel, we will continue to utilize the principles of BMP to guide our transformation, not only with regards to biosolids but all plant management.

GR-WRRF looks forward to working with our interested parties this coming year, exploring additional opportunities to achieve and enhance the four NBP focal points.

William R. Kaiser  
City of Grand Rapids BMP Coordinator