



City known as the Town of
GREENFIELD, MASSACHUSETTS

DEPARTMENT OF PUBLIC WORKS

Town Hall • 14 Court Square • Greenfield, MA 01301
Phone 413-772-1528 • Fax 413-773-9593
DPW@greenfield-ma.gov • www.greenfield-ma.gov

April 17, 2018

Subject: Point Paper discussing a Regional Wastewater Digester for Franklin County.

To: To all interested parties.

Problem Statement: Communities who operate a wastewater treatment plant are having increasing difficulties disposing of wastewater sludge. In the past there were multiple landfills and incinerators that would accept sludge. There were also several facilities that composted the sludge with other organics such as wood chips, leaves, and grass clippings. This produced compost that could be used for non-agricultural soil amendments. The losses of those facilities are forcing wastewater treatment plants to transport their bio-solids a great distance. As a result of these dwindling facilities, costs are increasing at unsustainable rates. As more landfills close and new and more restrictive air quality regulations are imposed on incinerators, these costs will continue to escalate. Appendix A is a copy of a journal from New England Water Environmental Association which highlights the dilemma.

Purpose of this paper: Develop a proposal, a schedule, a tentative agreement between several towns, and conceptual plans. This paper is a starting point for the development of a regional wastewater anaerobic digester. This paper will outline our need for financial and regulatory assistance in the form of grants, loans and guidance and illustrate why such a project would produce a multitude of benefits.

Agenda Outline/Major Factors:

1. Current participating communities and other possible communities.
2. The establishment of an inter-municipal agreement
3. The high cost of transportation and disposal fees. (Appendix B)
4. CEC grant application to conduct a feasibility study and to continue Professor Chul Parks' Pilot Study. (Appendix C)
5. Obtain DEP, EPA, DOER, FRCOG and local support both municipal and public. (Appendix D)
6. Develop a concept plan and develop some estimates of costs
7. Work on multiple grants to help lower the capital cost of this project. Our grant strategy is to sell this as a model program that can illustrate how this problem might be solved for other regions.
8. Hire an engineering firm to work with us and develop a low cost digester.

9. Construction TBD

Current participating communities and other possible communities. To date we have had several organizational meetings with representatives from Turners Falls, North and South Deerfield, Sunderland, Hadley, and Greenfield. We have invited Northfield, Hatfield and Shelburn Falls. During the month of December 2017 we have approached the selectmen in several of the above mentioned communities and we've had a discussion with the Mayor of Greenfield. All of the communities have expressed a strong interest and are generally excited. This topic was also approached at the recent FRCOG TIP meeting. FRCOG sent an E-mail to all 32 Franklin County communities stating what our intent is. Talking to the group we believe that we can handle approximately 7 to 10 communities. In appendix E, are nonbinding letters of support from the coalition of communities.

The establishment of an inter-municipal agreement: It is not the intent of Greenfield to develop this program as a revenue making enterprise. All of the costs for building and operation are to be equally shared based on each town's percentage of solids. We firmly believe that each town and the city of Greenfield will benefit greatly from a long term cost avoidance and a sustainable plan to dispose of wastewater sludge. The proposal will have an associated capital cost which shall be agreed upon prior to actual construction. The facility will be located in Greenfield and will be managed and run by the City of Greenfield water pollution control personnel. All costs; labor, energy, chemical, capital or regulatory will also be divided among the participating towns. Each town will contribute their percentage based on their tonnage of solids. We will also add a small percentage to go into a revolving account to pay for large capital upgrades. We would like to set this up similar to an enterprise fund. Robert Dean from FRCOG has agreed to assist in developing this inter-municipal agreement.

CEC grant application to conduct a feasibility study: The City of Greenfield has applied for a Mass CEC Water Innovation Grant. We are working with Commonwealth Resource Management Corporation and Research Professor Dr. Chul Park from the University of Massachusetts, Amherst, to conduct a Feasibility Study. Commonwealth Resource Management Corporation has been involved in multiple Landfill Gas Extraction Projects converting this gas to usable methane gas for production of electricity. They also run several anaerobic digesters and considered a leader in this industry in New England. Prof. Park has a proposal to develop a superior bacteria to enhance anaerobic digestion. His research may lead to a reduction in holding time. Sludge typically needs to stay within the container 28 to 30 days. His goal and objective is to reduce this to 18 to 20 days. This has worked in the lab but further testing is required. Should this process work we believe we can reduce the size of the digester by 25%. Both Commonwealth Resource Management Corporation and Dr. Park are approaching this as a multi-community effort. At the conclusion of this study we will have answered the feasibility of this project, completed Professor Parks' demonstration, and identified the key design issues facing this small coalition of communities. Appendix C is a complete copy of the CEC RFP submitted by the city of Greenfield.

Obtain DEP, EPA, DOER, FRCOG and local support: It is our intent to solicit local support as well as state and federal organizations. In appendix F we have copies of letters of support and recommendation to this project.

Develop a conceptual plan and estimates of costs: Our preliminary plan for this project is to construct two anaerobic digesters within three or four years. Our key milestones are listed below:

1. **December 2017** Reached out to member communities. Conducted meetings with the leadership of several participating communities, and also reached out to FRCOG, Connecticut River Conservatory and DEP.
2. **December 2017** Visited a couple of in use digesters, one in Clinton Massachusetts and Dartmouth Massachusetts. A couple more may be scheduled in March 2018. The goal being to see several designs and to evaluate different operational procedures. We are trying to build a simple yet efficient digester. We are not looking for an expensive building and after visiting Dartmouth; their digester control building is set in a Butler style building and appears to be very energy-efficient and cost-efficient.
3. **December 2017 and January 2018** Develop this white paper. This will require several rewrites as the information gets continually updated and should be considered a working document.
4. **March 2018** Obtain the grant from CEC and begin the feasibility study and preliminary design.
5. **April 2018** Begin to explore and submit grant requests. We hope to be able to work with DEP, EPA, and DOER. Because this is a program designed to help several smaller communities we also intend to show USDA how this approach qualifies us for a wastewater grant/loan. This anaerobic digester will be a significant energy-saving program and is very innovative which should, therefore qualify us for several possible grant opportunities.
6. **April 2018** Do a very preliminary design and develop a working estimate. This is important for the grant programs and to develop the inter-municipal agreements.
7. **August 2018** We hope to have a preliminary report from Commonwealth Resource Management Corporation and the University of Massachusetts so that we can consider going into a preliminary design.
8. **November 2018** We will need a preliminary estimate, and inter-municipal agreement, and hopefully some grant/loan agreements. This is the point where all the communities have to come to an agreement on how to fund and operate this regional anaerobic digestion system. The capital funds will need to be requested at each town for final design to be completed in 2019 and construction to begin in 2020.

Work on multiple grants to help lower the capital cost of this project. This project is beneficial to multiple communities and is better for the environment. This project should be eligible for a large variety of grants. There are significant energy savings from the reduction of hauling sludge to incinerators and landfills that are over 100 miles away and the production of

methane gas to be used to generate electricity. We should be able to obtain some Innovation Grants from DEP and EPA as this process will be utilizing some new technology being developed at the University of Massachusetts and we are developing a Sludge Disposal District. This project will result in a significant reduction in air pollution. There will be a significant decrease in trucking and therefore exhaust. CMOG grants may be a possibility. If done correctly, this regional solution can be an example for others on how to solve their own sludge disposal issues. Because this is a regional solution we hope to be able to obtain a USDA grant and loan. Currently the USDA does not provide grants to communities over 10,000. Greenfield population is roughly 17,000 and therefore we do not qualify for their Water or Wastewater Grants. However, Montague, Sunderland, Deerfield, Hatfield, Hadley and Northfield all are under 10,000 in population. It is our intent to include these six communities. So we will be approaching the USDA to see if a waiver or a one-time exception can be completed because it will help five low population communities.

Higher an engineering firm to work with us to develop a low cost digester:

Our group will need an engineering firm to design a simple cost-effective anaerobic digester facility. We believe as a group of communities we can impact the design substantially. We are looking for energy-efficient cost-effective design however we do not believe that we need a high-end masonry building. We have performed two site visits and plan at least another two so that we can evaluate what works in the field and what doesn't. We do not believe this is an engineering heavy project. I also believe that the process development may be more important. It is important that we hire an engineer that is willing to work with all of the participating communities to develop a program that best suits the region.

Construction TBA

Conclusions:

Depending on how much assistance we receive from various grants or other sources, it is estimated this project can be completed around \$8 million at the high end. At 2% for 30 years the annual cost would be $.0447 \times 8,000,000 = \$357,600$. We would also have an annual operating cost which we think would be approximately \$100,000 per year. Should we get a zero % loan from USDA or DEP State Revolving Fund the annual cost would drop to \$267,000 plus the \$100,000 operating cost for a total of \$367,000. Our current costs in Greenfield are approaching \$400,000.

The current system is unsustainable. The cost of trucking and the availability of incinerators or landfills is far from certain. Unfortunately wastewater treatment plants are going to continue to produce sludge. The process that we are proposing should reduce that sludge by 75% to 85% and we should be able to compost the remaining digestate. That compost should be a type 1 sludge mixed with organic such as wood chips leaves and grass clippings suitable to be utilized on parks, school grounds and lawns. This is an environmentally friendly process. By building one digester for several communities we are saving a tremendous amount of capital funding.

We sincerely hope that we can get several agencies to invest in this novel idea that will save energy and promote several cool technical ideas. We also believe that the cost can be reduced. This paper will be a work in progress and will be a working paper which means that it will change periodically as this process changes.

If you have any questions you can contact me at 978-302-4276 or e-mail me at donald.ouellette@greenfield-ma.gov

Sincerely



Donald Ouellette P. E.
Director of Public Works
Town of Greenfield, MA.



*The Town of Greenfield is an Affirmative Action/Equal Opportunity Employer,
a designated Green Community and a recipient of the "Leading by Example" Award*