



ORANGE WATER AND SEWER AUTHORITY

*A public, non-profit agency providing water, sewer and reclaimed water services
to the Carrboro-Chapel Hill community.*

MEMORANDUM

TO: Natural Resources and Technical Services (NRTS) Committee
John Young (Chair)
John Morris
Heather Payne
Ruchir Vora
Bob Morgan (*ex officio*)

THROUGH: Ed Kerwin 

FROM: Ruth Rouse

DATE: September 21, 2017

SUBJECT: September 26, 2017 NRTS Committee Meeting

The NRTS Committee will meet on Tuesday, September 26 at 4:00 pm in the OWASA Boardroom. The meeting will be a discussion on the following topics:

1. Update on Potential Biogas-to-Energy Project Partnership Opportunities (Attachment #1) – Mary Tiger, Sustainability Manager
2. Potential Options for Evaluating the Best Use of OWASA Land (Attachment #2) – Ruth Rouse, Planning and Development Manager
3. Next Steps

The enclosed documents provide additional background information on biogas-to-energy and potential options for evaluating use of OWASA lands.

We welcome the NRTS Committee members' questions and feedback on both topics.

We look forward to seeing you on September 26, 2017.



Ruth Rouse, AICP
Planning and Development Manager

c: OWASA Board of Directors
Robert Epting, OWASA General Counsel

Attachments

- Attachment 1: Update on Exploration of Potential Biogas-to-Energy Project Partnership Opportunities
- Attachment 2: Potential Methods to Evaluate OWASA's Land Assets

Attachment 1: Update on Exploration of Potential Biogas-to-Energy Project Partnership Opportunities

Purpose

This document provides the Natural Resources and Technical Systems (NRTS) Committee with an update on staff's recent efforts to further explore biogas-to-energy (B2E) project partnership opportunities with technical staff from our local governments, The University of North Carolina at Chapel Hill (UNC-Chapel Hill), and other parties in our area. It also presents some options for next steps.

Below is a summary of our approach to, and key take-aways from, our discussions with potential partners. It is not intended to be a detailed report, and we have not attributed any specific comments to any staff members. Those involved in our discussions were invited to review and comment on a draft of this memorandum, and we have incorporated many of their comments.

The Committee will discuss this update at its September 26, 2017 meeting. A few staff members from other agencies have expressed interest in attending the Committee meeting and may be available to answer questions.

Background

On April 13, 2017, the Board of Directors approved OWASA's Energy Management Plan, which includes the following goal: *"Beneficially use all Mason Farm Wastewater Treatment Plant (WWTP) biogas by 2022, provided the preferred strategy is projected to have a positive payback within the expected useful life of the required equipment."*

The Energy Management Plan included staff's comparative analysis of the benefits, costs, and potential risks of several options for achieving that goal. Those options are shown at the end of this document.

The draft Plan included a recommendation that OWASA retain a consultant to complete a more detailed evaluation of B2E options for an estimated cost of \$50,000. The Board requested that staff delete that recommendation from the Plan and further explore B2E partnership opportunities with local governments and others in the region, then work with the NRTS Committee to further consider our options with the benefit of that exploration. The Board would decide on the best course of action following completion of the staff's and Committee's work and recommendations.

Over the last several months, staff has met with energy, sustainability, transportation fleet, and other managers and staff from the following local governments and agencies to discuss potential B2E partnership opportunities related to the options discussed in the Plan:

- Town of Carrboro
- Town of Chapel Hill
- Chapel Hill-Carrboro City Schools
- Orange County
- Orange County Schools
- Duke Energy
- Duke University
- PSNC/Scana Energy
- UNC-Chapel Hill

We have also discussed B2E efforts with staff from the following wastewater utilities in North Carolina which have recently completed B2E studies and/or decided to implement projects: Charlotte Water; City of Durham; Raleigh; and Winston-Salem.

Our Approach

The key objectives of our discussions were to update the staff of our potential partners with information about our Energy Management Plan and related goals and objectives; review with them our comparative analysis of the B2E options we have considered to date; seek their ideas as to any additional B2E options we might consider; understand their operations, prior evaluations, and plans that directly or indirectly relate to one or more of the B2E options; determine if they are interested in working with OWASA to further evaluate one or more B2E partnership opportunities; and if so, determine the potential scope, approach, timing and respective roles and responsibilities for that evaluation.

In our discussions, we emphasized the following key considerations regarding our approach to selection and implementation of a potential B2E project and our participation in any related partnerships:

- We are open to considering all B2E strategies that would enable us to achieve our goal.
- We will prioritize near-term strategies that can be up-scaled in the future to incorporate co-digestion of organic waste once questions and concerns regarding traffic, space availability, odors, operational and financial impacts, and risks have been addressed.
- We will prioritize near-term options whose design can begin in FY 2020 (Preliminary Engineering Report in FY 2019) so that we may be able to complete the project by 2022.

The main partnership opportunities discussed included the respective agency's potential interest in:

- purchasing and using the renewable energy generated by a B2E project, such as using renewable compressed biogas (*rCNG*) as a fuel for local vehicle fleets (currently, OWASA uses a fraction of the fuel that could be generated by the WWTP);
- supplying "clean" organic wastes to OWASA for co-digestion to increase biogas production;
- making any investments required on the partner agency's side (such as conversion of vehicles to *rCNG*);
- providing funding support for a B2E project in return for the right to own the renewable energy credits or other environmental attributes of the project; and/or
- providing funding support for more detailed feasibility studies of B2E options of specific interest.

Key Take-Aways

Key conclusions from our partnership opportunity discussions are summarized below:

- The cost, complexity, uncertainties, and risks associated with the various B2E options present major obstacles for many potential partners. As a result, there appears to be no immediate strategic opportunity for joint investment in a specific B2E option. On a more extended timeframe, there is the potential for strategic alignment on certain options with some regional agencies and limited interest in further evaluating partnership opportunities relating to our B2E options, including:
 - Town of Carrboro staff plans to evaluate alternative fleet fueling strategies for their entire fleet in the near-term and may be interested evaluating an rCNG option in parallel with OWASA. They will soon be working with the Carrboro Board of Aldermen to develop a scope and timetable for that evaluation. They do not yet have any estimates regarding the capital and life-cycle costs of fleet conversion.
 - Orange County is developing a 10-year solid waste plan, which may include an evaluation of organic waste collection, digestion, and energy recovery. We anticipate there will be an opportunity for OWASA to participate in this planning study; however, the scope and timing is not yet known.
 - Staff of the Chapel Hill-Carrboro City School System (CHCCS) is interested in our efforts, including potential co-digestion of food wastes generated by the schools and potential use of rCNG as a vehicle fuel activity buses and shuttle vans (for which the school system has decision-making authority). CHCCS does not currently have funds available to support a study, but would be willing to serve as a stakeholder in OWASA's study and conduct parallel analysis with their fleet.
 - Duke University is interested in purchasing natural gas offsets in the near-term. OWASA's B2E strategy would likely meet only a small fraction of the offsets that they hope to purchase on-the-whole. They are interested in participating in our alternatives evaluation as a potential stakeholder.
- None of our potential partner agencies have concrete plans to convert all or a portion of their vehicle fleets to run on compressed natural gas. Chapel Hill, Orange County Solid Waste, and UNC-Chapel Hill have advised that they do not intend to consider CNG and/or rCNG as a primary fleet fueling strategy.

- We will stay up-to-date of potential grant opportunities, including the following. Currently, Duke Energy does not consider topping-cycle¹ CHP systems (as would be developed at the WWTP) to fall under its Smart Saver energy efficiency program, although there is a legal effort underway to change that. Additionally, the State of North Carolina has been allocated \$92 million from the Volkswagen Settlement Fund. About \$14 million (15% of the allocation) is eligible to be awarded for “non-mobile” assets, although the State has not announced if and how they will compete the funds. In the past and likely in the future, there are other funding opportunities associated with reducing vehicle emissions, such as the Clean Fuel Advanced Technology Project. Some alternatives may be eligible for a 0% interest loan from the North Carolina State Revolving Fund.
- PSNC/Scana Energy does not currently have established standards, rate structures, etc. applicable to the injection of alternative gas (such as biogas) into its pipeline system. However, we have received communication from PSNC that they are willing to work with OWASA (and other biogas producers) to identify a mutually agreeable strategy to do so. This strategy would then need to be filed with the North Carolina Utilities Commission.

Key take-aways from our discussions with other wastewater utilities are:

- Charlotte Water has implemented a 1,000 Kilowatt biogas and natural gas-fueled combined heat and power project at the McAlpine Wastewater Treatment Plant, and Winston-Salem is nearing completion of a 1,100 Kilowatt biogas/natural gas CHP system at its Muddy Creek Wastewater Treatment Plant. Both utilities received 20-year, no-interest loans from the State of North Carolina for their projects.
- The City of Raleigh plans to soon construct anaerobic digesters, high-strength waste receiving facilities, and biogas treatment systems to enable biogas to be injected into the PSNC/Scana Energy natural gas pipeline system running directly through their site. The City’s transit system is committing to using the gas, thereby enabling the City to benefit from sale of the carbon credits associated with such a project. The pipeline injection standards, treatment and monitoring requirements, interconnection requirements, and applicable rates and fees are yet to be determined for this project.
- At its South Plant, Durham uses biogas as fuel for direct-drive blowers that provide air for the aeration process. At its North Plant, Durham burns biogas to heat boilers that heat their digesters (much like OWASA currently does) and plans to evaluate CHP in 5-10 years.

¹ In topping-cycle cogeneration, fuel is first used to generate electricity or mechanical energy at a facility and a portion of the waste heat from power generation is then used to provide thermal energy. Currently, Duke Energy only provides Smart Saver Incentives to bottom cycling cogeneration, where the waste heat is used to generate power. Duke Energy currently only provides incentives for the electricity generated from the waste heat.

Next Steps

At this time, there are no immediate or near-term opportunities to partner with local governments or UNC-Chapel Hill on actual design and implementation of one or more specific B2E options we have considered.

However, as discussed above, there is interest in the coordination of any OWASA-led evaluation with planned studies by the Town of Carrboro, Chapel Hill-Carrboro City Schools, Orange County Solid Waste, and PSNC/Scana Energy. Additionally, there are potential supplemental funding opportunities for potential projects (although not for evaluations) from Duke University and Duke Energy.

The consideration of these potential technical and financial partnerships is important, as they have the potential to make certain options more or less technically and economically viable.

In consideration of our recent discussions with potential partners, below are some options for the path forward for our efforts to meet our biogas to energy goal:

1. Reconsider the existing B2E goal in the Energy Management Plan, and revise or eliminate that goal. Staff does not recommend this option at this time, as we have not yet concluded that the existing goal is unattainable.
2. Defer additional feasibility analyses until others (such as Carrboro, Orange County, CHCCS, and/or PSNC/Scana Energy) are further along in their evaluations and consideration of their potential participation in our future efforts.

The disadvantage of this approach is that extended delays in these efforts could result in our inability to meet the 2022 target date. However, that is not a regulatory requirement and the Board has discretionary authority to revise the target date as it deems appropriate.

3. Retain an expert consulting engineer to complete a more detailed feasibility evaluation of certain B2E options, in order to reduce uncertainty surrounding those options and identify the preferred option for OWASA.

If this option is selected, staff recommends that such a study focus specifically on a strategy that can be implemented in the near-term with consideration to up-scale in the future to potentially incorporate the co-digestion of locally-collected organic waste. Staff recommends that the alternatives evaluated include (a) the biogas combined heat and power project options at the WWTP; (b) the biogas to rCNG option, provided at least one entity (Carrboro or CHCCS) is willing to conduct a concurrent evaluation for alternative fueling options for their fleet; and (c) a biogas-to-pipeline strategy, provided PSNC moves forward with the development of fuel injection standards.

Staff supports this course of action, as it will provide us the best information upon which to proceed at this time and keep us on track to design, construct, and implement a B2E project by the end of 2022, provided it can be integrated into OWASA's overall capital program and prioritized alongside other capital needs. We do not have specific quotes for an alternatives evaluation, but estimate it would cost about \$50-\$60,000.

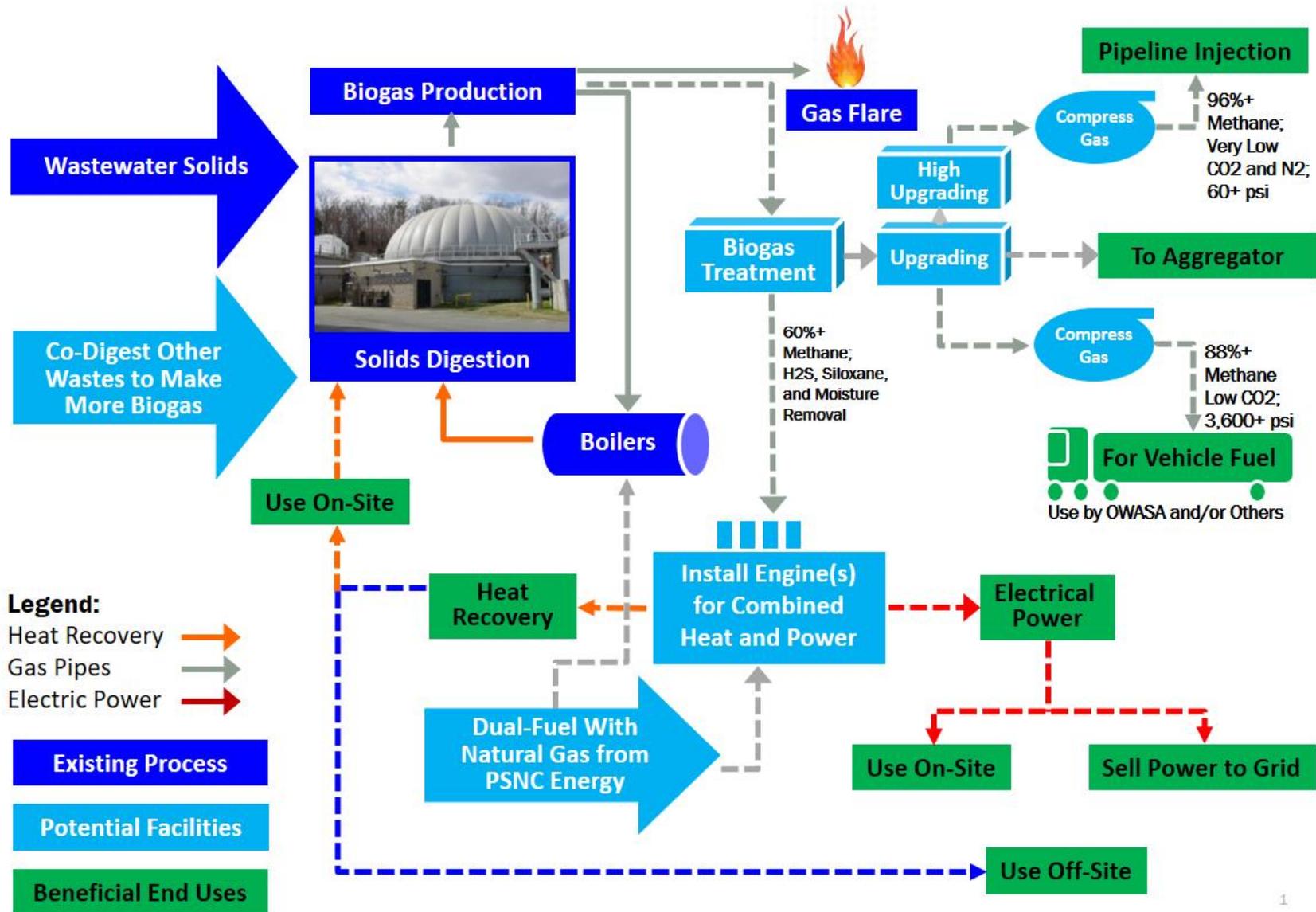
Action Requested

Staff seeks the Committee's questions, comments, and guidance regarding this update and potential next steps. We can assist in the collection of additional information and analysis needed by the Committee as it seeks to develop recommendations for the Board, subject to Board concurrence depending on the level of effort required.

We will revise the format and content of this update as required to address the Committee's feedback. After the Committee completes its discussions regarding this matter, this update and the Committee's recommendations will be scheduled for discussion at a future Work Session of the Board of Directors.

Thank you very much. Please let me know if you have any questions or want to discuss this report in advance of your September 26th Committee meeting.

Attachment 1: Schematic of Biogas-to-Energy Options at the Mason Farm Wastewater Treatment Plant



Attachment 2: Potential Methods to Evaluate OWASA's Land Assets

Background

Strategic Initiative 6 of OWASA's Strategic Plan is to develop a plan and policy framework for the long-term management and disposition of OWASA lands. One of the actions included in that initiative is to evaluate land assets to determine if the asset is needed, what degree of ownership is needed, and if the asset should be sold. On [May 25, 2017](#), staff presented information to the Board of Directors on OWASA's land management activities. In that presentation, staff recommended that OWASA retain its land assets. After discussion, the Board passed a motion requesting that the Natural Resources and Technical Services Committee develop a recommendation of what analysis, if any, should be done to evaluate the long-term use of OWASA property.

Potential Options to Evaluate Lands

Based on feedback from the Board of Directors at their May 25, 2017 meeting, staff developed four options to evaluate OWASA lands:

1. **Do Nothing** – OWASA would retain its land assets. With direction from the Board, lands may be managed, but staff time and related expenses would not be spent on an evaluation of whether the land should be sold, sold with easements, or held as an asset.
2. **Evaluate potential to sell a portion of the forested biosolids land** – Staff would evaluate whether to sell any of its forested biosolids land. No other lands would be included in the analysis. This option was included based on comments provided by the Board of Directors at their May 25, 2017 meeting.
3. **Evaluate all OWASA lands for potential sale using readily available data** – Staff would conduct an evaluation of all OWASA land holdings to determine whether they should be retained, sold, or sold with protective easements. Potential revenue would be estimated based on County land values and estimating diminution in value of conservation easements based on information provided by land conservancy groups and past appraisals for OWASA's conservation easements. (Note: A watershed protection plan for Cane Creek Reservoir based on water quality modeling and stakeholder feedback was developed in 1996. That plan recommended that OWASA protect an additional 1265 acres of land. OWASA has protected 1075 acres, and Orange County has protected 678 acres and together, meet the goal).
4. **Evaluate all OWASA lands for potential sale using third party appraisals** – This is similar to option 3, but would use formal appraisals to estimate land values and the diminution in value of conservation easements.

Table 1 summarizes the pros and cons of each of these options.

Table 1: Summary of Potential Options to Evaluate OWASA Lands

| Option | Pros | Cons |
|--|---|--|
| <p>Option 1 OWASA retains all of its property</p> | <p>Provides greatest level of control over source water protection</p> <p>Serves as a diversified investment of OWASA funds; no immediate need for liquid assets</p> <p>Retains potential to generate revenue from forest management and/or energy generation</p> | <p>Provides no one-time revenue</p> <p>Lower tax revenue for County</p> <p>Continued costs for maintenance to mark boundaries, secure access points, and patrol for trespassers</p> |
| <p>Option 2 Evaluate only biosolids land for potential sale</p> | <p>Identifies land that could potentially be sold to generate one-time revenue</p> <p>Tax revenue for County</p> <p>Reduces ongoing maintenance costs to mark boundaries, secure access points, and patrol for trespassers</p> | <p>Lose potential to generate revenue from forest management and/or energy generation on biosolids land</p> <p>The Board has recommended that we stay in touch with our utility neighbors should there be regional biosolids management opportunities. Selling some of our biosolids land may limit these regional options</p> <p>If farmers drop out of our program, we may need additional land to beneficially reuse our biosolids</p> <p>May not have adequate land if McGill facility (where OWASA beneficially reuses portion of our biosolids) taken offline for any reason</p> |
| <p>Option 3 Evaluate all lands for potential sale based on readily available data</p> | <p>Could potentially identify some land that may have lower water quality protective value that could be sold to obtain easements on land in watershed that has higher water quality protective value</p> <p>Tax revenue for County</p> <p>Reduces ongoing maintenance costs to mark boundaries, secure access points, and patrol for trespassers</p> | <p>Public may not support selling watershed land</p> <p>Lose potential to generate revenue from forest management and/or energy generation</p> <p>Less control over watershed land</p> <p>Some development would likely occur on any land sold even with easements reducing its water quality protective value</p> |

| Option | Pros | Cons |
|--|--|--|
| <p>Option 3 (cont.)</p> | <p>Identifies land that could potentially be sold to generate one-time revenue - note there is a Board policy that any revenue from selling lands in a watershed, must be used for watershed protection</p> | <p>Uncertainty in future nutrient criteria, watershed protection requirements, and programs for Jordan Lake watershed</p> <p>If Board decided to move forward and sell a piece of property with protective easements, may need to complete an appraisal</p> |
| <p>Option 4 Evaluate all lands for potential sale based on appraisals</p> | <p>Could potentially identify some land that may have lower water quality protective value that could be sold to obtain easements on land in watershed that has higher water quality value</p> <p>Tax revenue for County</p> <p>Reduces ongoing maintenance costs to mark boundaries, secure access points, and patrol for trespassers</p> <p>Identifies land that could potentially be sold to generate one-time revenue - note there is a Board policy that any revenue from selling lands in watershed, must be used for watershed protection</p> <p>As opposed to Option 3, will provide a more defensible assessment of land value which could be used as basis for selling price if Board decided to move forward and sell any parcels</p> | <p>Public may not support selling watershed land</p> <p>Lose potential to generate revenue from forest management and/or energy generation</p> <p>Less control over watershed land</p> <p>Some development would likely occur on any land sold even with easements reducing its water quality protective value</p> <p>Uncertainty in future nutrient criteria, watershed protection requirements, and programs for Jordan Lake watershed</p> <p>Cost to hire appraiser to evaluate potential revenues from properties that could be sold</p> |

Discussion

Watershed protection is the first line of defense in providing quality drinking water that meets all drinking water criteria. An important component of watershed protection is protecting land. The Cities of Raleigh and Durham are currently collecting fees with their utility bills to generate a source of revenue for obtaining conservation easements in their water supply watersheds (Falls Lake, Lake Michie, and Little River Reservoir). In addition, Town of Chapel Hill Mayor

Hemminger is leading a grass roots effort to protect Jordan Lake, partially through watershed land protection (note: all OWASA-owned land is in the Jordan Lake watershed).

The NC Division of Water Resources is developing nutrient criteria that may include new criteria for phosphorus and nitrogen or a more stringent criteria than the current chlorophyll a standard of 40 micrograms per liter. New or revised standards could result in the need for further controls in our watershed; these could include additional protected watershed lands or wider riparian buffers.

The Board has requested that OWASA develop a plan for the use of solar photovoltaic on OWASA property; evaluating land for potential sale prior to this plan being completed limits options.

Staff Recommendations

Staff recommends that OWASA retain all of its land holdings. While selling a portion of our land would generate short-term revenue, retaining our land provides us the most control and flexibility concerning watershed protection and biosolids management.