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**CPRG IMPLEMENTATION GRANTS COMPETITION
COVER PAGE FOR APPLICATION**

APPLICANT INFORMATION

Organization

Primary Contact Name

Phone Number

Email Address

TYPE OF APPLICATION

Individual Applicant

Lead Applicant for a Coalition

If lead applicant for a coalition, provide a list of the coalition members below.

FUNDING REQUESTED: *Provide total EPA CPRG Implementation Grant funding requested.*

APPLICATION TITLE: *Provide the title of your proposed project.*

BRIEF DESCRIPTION OF GHG MEASURES: *Describe each GHG reduction measure contained in the application (1-2 sentences each).*

SECTORS: *Identify the sector(s) associated with the GHG reduction measures included in the application.*

Industry	Commercial and Residential Buildings
Electricity Generation	Agriculture/Natural and Working Lands
Transportation	Waste and Materials Management
Other (please describe)	

EXPECTED TOTAL CUMULATIVE GHG EMISSION REDUCTIONS

For all proposed measures combined, provide the estimated cumulative GHG reductions:

Estimated cumulative GHG reductions for 2025-2030 (in metric tons)

Estimated cumulative GHG reductions from 2025-2050 (in metric tons)

LOCATIONS: *List the primary location(s) where the proposed measures will be implemented*

City

State; Territory; Federally recognized Tribe

APPLICABLE PRIORITY CLIMATE ACTION PLAN(S) (PCAP) ON WHICH MEASURES ARE BASED

PCAP Lead Organization(s):

PCAP Title(s):

PCAP Website link(s) (if applicable):

List of GHG reduction measures and PCAP page reference for each measure:

Great Lakes Water Authority and Renewable Energy Project

Application for Climate Pollution Reduction Grants – Implementation Grants

Section 1: Overall Project Summary and Approach

a. Description of GHG Reduction Measures

The Great Lakes Water Authority (GLWA), the largest water and sewer public utility in southeast Michigan, and one of the largest Water Resource Recovery Facilities (WRRF) in North America, currently uses fossil fuel natural gas in both of its existing biosolids treatment technologies: approximately 80 dry tons per day (dtpd) incineration and 240 (dtpd) biosolids drying followed by land application, respectively. ***GLWA proposes to construct a large Anaerobic Digestion Facility (ADF) to make renewable biogas to offset its use of natural gas used for biosolids drying and, concurrently, reduce the total volume of biosolids enough to decommission the biosolids incinerators.*** Not only will this decrease greenhouse gases by approximately 69,858 metric tons CO₂e annually, but this will also significantly reduce ambient air pollution by eliminating the existing incineration processes.

University of Michigan
Community Action to Promote
Healy Environment plan:

*“Southwest Detroit has the
highest levels of air pollution in
Michigan and ranks among the
top five percent in the County.”*

GLWA needs this grant to successfully elevate our spending beyond the basic, but expensive, maintenance of our existing incineration complex, and to allow this aspirational investment into anaerobic digestion and generation of renewable biogas. GLWA began operations as an independent regional water and wastewater authority, separate from the Detroit Water and Sewer Department (DWSD) in 2016 and has continued to grow and improve its methods and processes and in many aspects can be considered a world class organization. However, even the best management can't overcome the financial realities of running a system in one of the poorest regions of the country.

The technical and operational basis of our proposed anaerobic digestion system was developed through extensive collaboration with the communities we serve (customers) and thoroughly described in our GLWA Wastewater Master Plan (2020). However, the master plan also recognized our financial limitations and so described a potential implementation start of 2042, with even that start date being highly dependent upon the financial realities of our system.

GLWA is engaged and closely monitoring emerging pollutants, such as PFAS and microplastics, that could disrupt future biosolid's management efforts, specifically land application. GLWA's biosolids drying and land application contract (with NEFCO, recently purchased by Synagro) allows for broad range of distribution within United States and the Canadian province of Ontario. Furthermore, the State of Michigan EGLE model of first ever tiered PFAS concentration places GLWA in the lowest tier of regulation, with effluents close to or below source water limits of 11 ng/l. This project will integrate well into GLWA's adaptive management plan that reduces the total volume of sludge produced by the facility that will need to be ultimately disposed of, ideally through an environmentally beneficial (e.g., land application) approach, and not via incineration and landfill. Finally, we are intentionally proposing a modular design approach so as to be able to most effectively incorporate future process modifications and improvements, including those technologies capable of removing and concentrating targeted pollutants for subsequent destruction in cost effective manner.

We have a strong and capable team, with broad shoulders to handle the heavy lifting of the things we need to do, and the wisdom to partner with others to achieve the things we cannot. Our team can manage and oversee the procurement, design, construct, and operations of this facility. And, once it is built, our research team will continue to use this facility as a test bed for the development, verification, and validation of the new and emerging technologies to enable continuous improvement within this and the other roughly 1,500 anaerobic digesters used at municipal wastewater treatment facilities throughout North America. One of the sad truths of municipal utility anaerobic digestion is that almost exactly half of these facilities flare their biogas and concurrently use fossil fuel methane for onsite use, including digester heating. GLWA's general approach is to collaborate and team with others in the wastewater sector to help drive improvements in biogas generation and use to help move our country and our planet towards a more sustainable future, with net zero energy use and zero greenhouse gas emissions.

The estimated budget for the entire project is \$867,120,788, and we are requesting \$500,000,000 from the US EPA. GLWA is actively exploring and vetting other funding options to fill this funding gap. These funding options include sale of Public ("Green") Bonds, SRF funds, various combinations of public private partnerships, and other sources of federal funds. The design of this project will allow for adaptive alignment to meet the funding sources available. Other components of this project can be postponed, such as phosphorus recovery and scaling of the external feedstock delivery system, depending on available funding at the time of construction. In addition, GLWA will perform and value engineering of the design approach to verify design elements.

Anaerobic Digestion Facility (ADF). The proposed ADF has three main components, a thermal hydrolysis pre-treatment process, an anaerobic digestion process, and a digester gas cleaning and reuse process. To capture greenhouse gas reduction benefits (conforming with this grant application), the gas will be used on-site and the gas environmental attributes, such as RINs, will not be sold to external parties. The project will be located behind the existing biosolids dryer to facilitate use of existing yard piping and related facilities. GLWA owns the project site and all relevant right of ways.

ADF details. The ADF will be designed with three stages, hydrolysis, anaerobic digestion, and gas treatment and reuse, and the overall system will be integrated into current and ongoing treatment operations. Hydrolysis, the first stage, is necessary to optimize the digestion of the cellular and particulate biomass of the two primary feeds going to the anaerobic digester. Anaerobic digesters have traditionally had issues with both foaming and grit management and so the second stage of our ADF includes anaerobic digesters designed with surface wasting, integrated downflow mixing, sidewall feed, and continuous side stream grit capture within the heating recirculation loop. The third stage of our ADF is a robust biogas cleaning and reuse system to allow us to almost completely offset our entire use of fossil fuel natural gas for both digester heating and biosolids drying operations.

The GLWA team is proposing a flexible technology approach to allow the eventual incorporation of other organic carbon waste streams from Detroit and the southeast Michigan region. The GLWA research team is extremely active with other projects for developing and refining various anaerobic digestion technologies to allow a broader and more varied input of carbon feedstocks than is currently possible. The GLWA Research and Innovation team will partner with technology developers to use the ADF as a testbed for new and emerging technology development and validation. As these technologies are developed and validated, GLWA will implement them, as appropriate, to continually increase the volume of generated biogas. As the biogas generation moves beyond internal GLWA heating and drying needs, the excess gas will be sold to external parties to help decarbonize those niche uses, which, until now,

have been hard to decarbonize. This approach will promote new technology development, as well as provide a mechanism for rapid and effective technology transfer to other utilities and organizations.

Procurement. The GLWA project team understands the need for rapid bidding, procurement, construction, and commissioning of the anaerobic digesters to achieve greenhouse gas reduction goals. GLWA's procurement team is part of this overall project team and has developed a streamlined bidding and procurement process to facilitate effective and efficient construction process.

GLWA is an equal opportunity employer, that prohibits discrimination based on disability, race, color, religion, national origin, sex and or sexual identity, age, height, weight, disability, genetic information, veteran, familial or marital status. This applies to all areas of employment, including training and development programs.

b. Demonstration of Funding Need

GLWA is one of the largest water and wastewater utilities in the United States serving solely as a wholesale treatment service provider. GLWA assumed operational control of the city of Detroit Water & Sewerage Department's (DWSD) regional operating assets on January 1, 2016, pursuant to the terms outlined in a companion set of documents commonly referred to as the lease agreements and water and sewer services agreements. DWSD continues to operate and maintain the local system that serves the geographic boundaries of the city of Detroit. GLWA leases the regional water and sewage disposal facilities from the City for an allocation of \$50 million per year to fund capital improvements for the City's retail system and/or debt obligations associated with providing water and sewer service to the City.

As a public water and wastewater utility, GLWA is legally obligated to meet water and wastewater treatment permits and associated requirements. As such, GLWA maintains a five-year Capital Improvement Plan (CIP) incorporating over \$1 billion focused on wastewater system renewal and rehabilitation, as well as additional infrastructure to meet new and emerging permit requirements. A significant portion of the CIP supports reinvestment necessary due to decades of deferred maintenance due to limited financial resources while balancing affordability.

Meaningful reduction of incineration in wastewater operations is recognized as a key to long-term regional system affordability and sustainability and part of global need to reduce greenhouse gas emissions. GLWA engineering and financial teams estimate the cost to implement a solution to sufficiently replace current incineration processes for the region to be more than \$867 million, or 86.7% of GLWA's current wastewater, five-year CIP. Conversely, those same resources estimate that GLWA will need to invest approximately \$500 million worth of expenditures required to maintain operations of the current biosolids incinerator for the next 20 to 25 years.

GLWA actively monitors capital improvement needs and funding options. The financial services area engages a robust cash forecasting process to help ensure the most effective use of limited pay-go reserves, revenue bond funds, State Revolving Fund (SRF) loans, and limited grant awards.

1. Funding successes

- *Revenue Bonds:* Through the implementation of strong financial practices and sound investment strategies GLWA has improved its senior lien bond rating from A- in 2016 to AA- in October 2023 from Standard & Poor's steadily reducing the cost of borrowing for the authority, with similar levels of increases over this time period from Moody's and Fitch Ratings.

- *SRF Loans*: Since January 2016, GLWA has been awarded over \$400 million in Clean Water SRF loan funding as an active participant in the State of Michigan Clean Water State Revolving Fund loan program.
- *Grants*: GLWA has been able to secure nearly \$65 million in American Rescue Plan Act and Bipartisan Infrastructure Law funding to support wastewater system improvements through State Appropriation and the SRF program.
- *Energy Rebates*: GLWA has partnered with its local electrical energy provider to leverage energy, efficiency, and related programs. Since 2016, GLWA has received approximately \$523 thousand from these rebate programs.

The GLWA Master Bond Ordinance identifies minimum debt service coverage levels to help ensure the Authority's long-term fiscal health. This places limits on the funding available using revenue bonds and SRF loans, which are a form of debt. GLWA maximizes its use of SRF state funding, however, that funding is subject to limitation as no one entity can receive more than 30% of overall State SRF funding available. Additionally, GLWA wastewater system projects typically exceed the entire annual State of Michigan SRF program budget. Finally, as an authority and a non-entitlement unit (NEU), GLWA could not directly access to ARPA funding. Therefore, GLWA leadership actively engaged in discussion with State and Federal legislators to secure limited ARPA funding through State appropriation but has not realized the benefit of that funding source in a manner that many government entities have.

2. Possible future funding sources

GLWA will continue to utilize revenue bonds, State Revolving Funds, and new grant opportunities as they become available. However, this biosolid project represents the largest undertaking in GLWA history and its foreseeable future. Additional funding sources are being evaluated and are under full consideration. These include:

1. Water Infrastructure Finance & Innovation Act (WIFIA)
2. Inflation Reduction Act (IRA)
3. Private Public Partnership (P3)

Each of these sources present certain challenges and timing requirements that may limit GLWA in utilizing them. GLWA staff will continue to monitor these options, engage with outside experts to understand the opportunities available, and review internal procedures and processes to remove any potential barriers to entry.

The stark truth is that that GLWA supports one of the largest wastewater operations in North America, serving one of the most disadvantaged cities in the country, and are thus obligated by necessity to pursue and implement the most cost-effective solutions possible to deliver long-term, affordable wastewater treatment services to the region in a manner that will meet federal permit requirements and support global climate initiatives.

c. *Transformative Impact*

The implementation of large scale, anaerobic digestion within the GLWA facilities will have tremendous transformative impact within the region:

1. Decommissioning of existing biosolids incineration and associated fossil fuel emissions
2. Mitigation and repurpose of 14.69 acres of brownfields for the new process facilities.
3. Expansion of high-quality jobs collecting and processing existing organic carbon waste streams

4. Test bed for the research, development, and implementation of new and emerging technologies to enhance biogas generation using commonly available carbon waste streams
5. Third-party validation of waste to energy conversion technologies within a world class utility
6. Development of skilled workforce to collect and process these new organic carbon feedstocks
7. Improve operational resiliency by eliminating our currently dependency on natural gas for our biosolids handling processes.

The conversion of the GLWA WRRF biosolids system from the current “heavy use” natural gas facility to a renewable biogas-powered ADF will provide Michigan an opportunity to beneficially reuse these carbon resources, while diverting waste from landfills. Additionally, the use of digested biosolids within our existing biosolids drying facility will improve the quality of the dried biosolids as fertilizer, improving the stability of the distribution process and promoting the use of GLWA dried biosolids as fertilizer in place of traditional chemical fertilizers. This transformation will maintain GLWA revenue stability, and eventually expanding revenue sources to help offset operational and maintenance expenses, which will also help maintain long-term water and sewer rate affordability for the community.

The installation of the ADF will provide an opportunity to rehabilitate and repurpose approximately 15 acres of brownfield owned by GLWA that is adjacent to the WRRF. This will significantly improve the site’s condition, not only repurposing the brownfield, but also eliminating runoff potential from the field into the adjacent navigable waters.

GLWA’s research and innovation team is currently involved with and or directing multiple biosolids research efforts around North America. We have an extremely motivated and robust research team actively participating in or leading numerous biosolids research projects, including new and emerging contaminants, waste to energy efforts, including anaerobic digestion, pyrolysis, and hydrothermal liquefaction, and various beneficial reuse projects to capture the nutrient value of the solids. This team will continue to facilitate third-party development of technologies by using the aerobic digesters as a test bed for trialing, refining, and validating new and emerging technologies. There are considerable barriers to implementation of these new and emerging technologies and the GLWA research team is involved with numerous research efforts around the country to identify and work to address these barriers. There are only a few utilities around the country who have been as willing and able to fund research, as GLWA.

Inherent to the technology development process is the commercialization of said technology. GLWA has already demonstrated its leadership in developing and implementing public private partnerships, through its ongoing partnership, with NEFCO, (recently purchased by Synagro), for the construction, maintenance, and operation of its biosolids drying facility. This public private partnership is a great example of GLWA leadership and ability to complete complex and expensive project with aggressive schedules to ensure equipment operations and availability per its commitment. The private public partnership contract was executed in March 2013 with completion of construction in late 2016 and final project close out April of 2018. This project complexity is very similar to the proposed ADF project.

Not only does GLWA have the ability and interest to support the commercialization of these new technologies, but it also has the capability to do this well. The facility’s strategic location in Michigan’s largest metropolitan area, coupled with its access to navigable waters, enables freighter access for loading and unloading future carbon sources, such as waste organics, food wastes, and so forth, through low emission transportation. It is in our financial interests to develop these feed sources, to help maintain our financial stability and to reduce impacts to our rate payers.

GLWA is actively developing and implementing projects aligned with our mission of overall greenhouse gas (GHG) reduction. These projects include improving our biological phosphorus removal to reduce our reliance on chemical dosing, optimizing equipment through energy efficiency projects, and piloting electric vehicles as potential replacements for some of our fleet vehicles currently powered by gas engines. Although these projects are transformative and will contribute to the overall site GHG reduction they were not accounted for in our calculations for this project.

Section 2: Impact of GHG Reduction Measures

a. Magnitude of GHG Reductions from 2025 through 2030

The implementation of the ADF, and concurrent decommissioning of our incineration complex, will eliminate nearly 50% of the GHG emitted from one of the largest water resource recovery facilities in the country. This project will eliminate approximately 100% of the SEMCOG Greenhouse Gas Emissions Inventory “*waste and water*” category for Southeast Michigan. The funding opportunity, although not entirely sufficient for the proposed project, will augment existing funding sources to enable this project to be completed in Southeast Michigan. Without this funding, GLWA’s existing infrastructure spending requirements would not allow this aspirational project to proceed for at least several decades.

The cumulative CO₂eq GHG emissions reduction from 2025 through 2030 is 100,637 metric tons. The decrease in emissions is primarily accomplished by displacing natural gas use with digester gas at an estimated production rate of 1,121,500 MMBTU/yr once the digesters are operating at full capacity. Based on the construction schedule, digester gas is projected to begin production in 2029 at 50% capacity and achieve full production in 2031.

GHG emissions associated with electricity consumption is ignored as the existing 2MW incineration process is estimated to be displaced by an equivalent electric demand. The existing incineration process also consumes 709,800 MMBTU/yr of natural gas and is completely eliminated by retiring the process. The existing drying process consumes 845,000 MMBTU/yr of natural gas. Implementing the anaerobic digestion process is projected to reduce the solid loading to the drying system by achieving 60% volatile solids destruction, reducing the thermal demand to 776,136 MMBTU/yr. Additionally, the production of digester gas will be conditioned to displace natural gas use with a renewable fuel. For the purposes of this evaluation, the existing process emits 106,739 metric tons of CO₂eq GHG emissions, with 82,579 metric tons being non-biogenic from natural gas use, and 24,160 metric tons being biogenic from the incinerated biosolids. Transitioning to anaerobic digestion and drying reduces the total annual emissions to 58,684 metric tons of CO₂eq GHG emissions, with 288 metric tons being non-biogenic from the methane and nitrous oxide emissions associated with digester gas use, and 58,396 metric tons being biogenic from the CO₂ emissions associated with digester gas use. This project will achieve a 45% reduction of total CO₂eq emissions and reduce non-biogenic CO₂eq emissions by 99.7%.

The GHG emissions reductions is dependent upon the total energy use and the reliability of the digester gas conditioning and use process. The total energy use is projected to decrease from the existing conditions by 778,600 MMBTU/yr, reducing the total potential emissions that can be emitted by 41,355 metric tons CO₂eq emissions *even if digester gas is not available*. The digester gas conditioning and use process is conservatively estimated to be at least 95% reliable as it will use well established compression, dehydration, and hydrogen sulfide removal technologies to meet the dryer and air permit specifications. Digester gas production is directly proportional to the quantity of solids process, as is thermal energy demand at the dryers, creating a correlated production and consumption relationship.

b. Magnitude of GHG Reductions from 2025 through 2050

The extrapolation of the previous discussion culminates in a cumulative non-biogenic CO₂eq GHG emissions reduction of 1,746,462 metric tons by 2050, as depicted in Figure 1, below. Displacing the

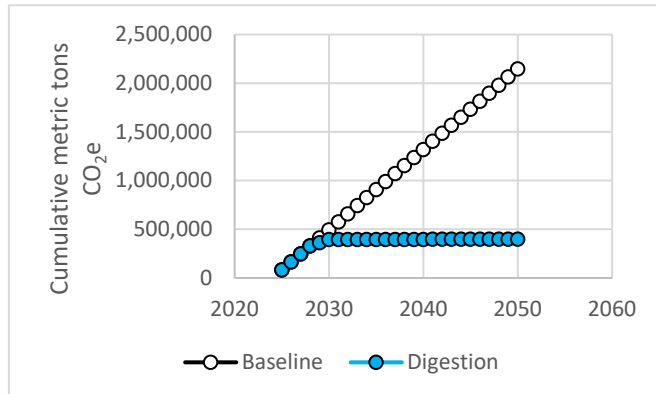


Figure 1. Cumulative non-biogenic CO₂eq emissions, baseline versus proposed ADF.

reliance on natural gas with digester gas essentially eliminates new non-biogenic emissions once the digesters are operational. The successful use of the digester gas will accomplish a 81% reduction in non biogenic CO₂eq emissions by 2050, and the emissions are sustainable as the digester gas production and thermal energy demand are both directly correlated to the mass of biosolids treated.

c. Cost Effectiveness of GHG Reductions

The use of anaerobic digesters for renewable energy is a proven technology that has been implemented at many wastewater and recovery treatment facilities throughout the world, including over 1,500 operating municipal facilities here in the US. Our proposed ADF, and corresponding GHG outcomes, are based on well-established science of solids treatment and corresponding biogas generation and GHG reduction. Additionally, the effectiveness of the removal for this project will be immediate upon commissioning and startup of the facility. The elimination of annual 69,858 ton CO₂eq will be achieved within the two years based on commissioning and startup and stabilization of operations. The change in process for solids handling at the facility will be permanent and the projected elimination CO₂eq will be permanent indefinitely to the facility.

GLWA's request for the CPRG funding for the anaerobic digester and energy recovery is \$500 million. Although the 2025–2030-time frame will be dependent on construction and implementation of the anerobic digesters, the anticipated removal from 2025-2050 is over 1,746,462 MT CO₂eq. Based on the requested CPRG funding, and the anticipated removal, the cost effectiveness of GHG reduction over the 25 year period will be \$286.29 per MT CO₂eq. The unique opportunity for this project, compared to others, is that this is a proven technology and the elimination of GHG is both achievable and verifiable.

The ADF will also provide for future opportunities for incorporating other regional organic carbon waste streams, not yet identified or accounted for, to continually reduce the elimination of GHG.

Finally, this project will enhance GLWA's role as the regional wastewater treatment provider for southeast Michigan, with over 2.8 million service population, to provide reliable and sustainable biosolids treatment and disposal. The status of our incineration facility will require a considerable (\$450-550 million) investment to ensure ongoing operational reliability. The CPRG funding will allow us to invest in an anaerobic digester facility and thus allow us to switch to the much more environmentally-friendly anaerobic digestion treatment approach.

d. Documentation of GHG Reduction Assumptions

Please refer to Appendix C for detail description of our calculations and assumptions. In brief, the GHG reduction assumptions for this evaluation were associated with the displacement of natural gas with digester gas and the reduction of overall solids volume. Energy balances were evaluated in MMBTUs. Incineration energy use and emissions were based on 2016-2022 data. Existing dryer energy use was based on 2016-2022 data. Anaerobic digestion performance was based on manufacturer and industry standard methods for the digestion of waste activated sludge and primary sludge by relating solids retention time to volatile solids destruction with pre-digestion thermal hydrolysis, and estimating a conservative 64% volatile destruction rate at 25 days solids retention time with 18 cuft/lb volatile solid destroyed, as reflected in the attached anaerobic digestion spreadsheet. The mass of volatile solids was based on actual data and is consistent with the GLWA Wastewater Master Plan (2020). Energy use for new processes were determined from manufacturer data or based on unit rates from existing data, these values are consistent with the GLWA Wastewater Master Plan (2020). Natural gas and digester gas emissions were estimated using IPCC AR5 Fifth Assessment Report (2013) global warming potentials.

Section 3: Environmental Results – Outputs, Outcomes, and Performance Measures

a. Expected Outputs and Outcomes

GLWA proposes to design, build, and commission the ADF by 2029. These units would not emit particulate emissions into the atmosphere as we are not using floating cover gas storage. From 2029 to 2031, we estimate incineration usage would be reduced by 50% while the anaerobic digesters are brought up to full capacity. The decrease in incineration would significantly decrease emissions of criteria air pollutants (CAP), hazardous air pollutants (HAP), and GHG emissions from wastewater operations (See Tables 1 and 2 below). By 2031, the anaerobic digesters and biosolids dryers would be fully operational and so the sewage sludge incinerators would be fully decommissioned. It should be noted that the surrounding communities are in the 93rd percentile for asthma, and so could certainly benefit from improving the regional air quality.

The grant funding will allow GLWA to accomplish these benefits, which would greatly improve the air quality of the surrounding disadvantaged and low –income communities. Without grant funding, the transition from incineration to anaerobic digesters, if it did occur, would not be accomplished earlier than 2042.

Table 1- Estimated Criteria Air Pollutant (CAP) and Hazardous Air Pollutant (HAP) reductions

<u>Pollutant</u>	<u>2025-2030</u> <u>% Reduction</u>	<u>2030-2050</u> <u>% Reduction</u>
PM 10	14.7%	25.7%
PM 2.5	12.2%	21.8%
CO	84.6%	91.7%
NO_x	57.2%	72.8%
SO₂	17.1%	29.2%
Lead	97.6%	98.8%
VOC	12.0%	21.4%

Table 2- Estimated Non-biogenic Greenhouse Gas (GHG) emission reductions

<u>GHG</u>	<u>2025-2030</u> <u>% Reduction</u>	<u>2030-2050</u> <u>% Reduction</u>
CO2	31.4%	47.8%
CH4	31.5%	47.9%
N2O	31.3%	47.7%

b. Performance Measures and Plan

As a regulated utility, GLWA tracks and reports Criteria Air Pollutant (CAP) and Hazardous Air Pollutant (HAP) to Michigan Department of Environment, Great Lakes, and Energy (EGLE), its member partners (GLWA's term for its utility customers), and other state and local entities. Each of these stakeholders receive the data at specific frequencies, depending on their requirements. In addition, all these processes are highly measured and tracked beyond regulatory requirements to maintain effective process control. For example, natural gas consumption within the existing biosolids dryers is measured, monitored, and verified using multiple methods, including multiple redundant air flow meters, gas line meters, internal combustion temperature, flu gas and exhaust gas sensors, gas company flow meters, and gas billing records.

For this project, GLWA proposes to revise our existing monthly operational and process reports and adding in the new GHG components arising from implementation of this project.

GLWA will measure expected outputs and outcomes by:

- HAPs and CAPs emissions and evaluating reductions:
 - Conducting Compliance emissions testing on emission units on a regular basis using EPA approved methods and procedures.
 - Calculating emissions by using emission factors established during compliance emissions testing.
 - Considering that the emission factors are measured as a pounds per hour average, know the number of hours of operations for each unit will let us know what is going out into the atmosphere.
- Greenhouse Gas emissions and evaluating reductions:
 - Monitor and record natural gas usage for each emissions unit.
 - Calculate GHG emissions using established EPA GHG spreadsheets and formulas.

As a governmental operated and permitted wastewater treatment utility, GLWA/DWSD has a long history of providing information about plant emissions. Many of the regulatory reports for Michigan Air Emissions Reporting System (MAERS) (*Part 503, ROP, Opacity Monitoring, Mercury Audits, Greenhouse Gas, and THC Monitoring Certification*) document current emissions rate and provides years of historical emissions data. This information sets an established benchmark to evaluate future emissions against past emissions to determine net reduction amounts. Key Performance Indicators (KPIs) will be developed to monitor progress towards achieving reduction levels.

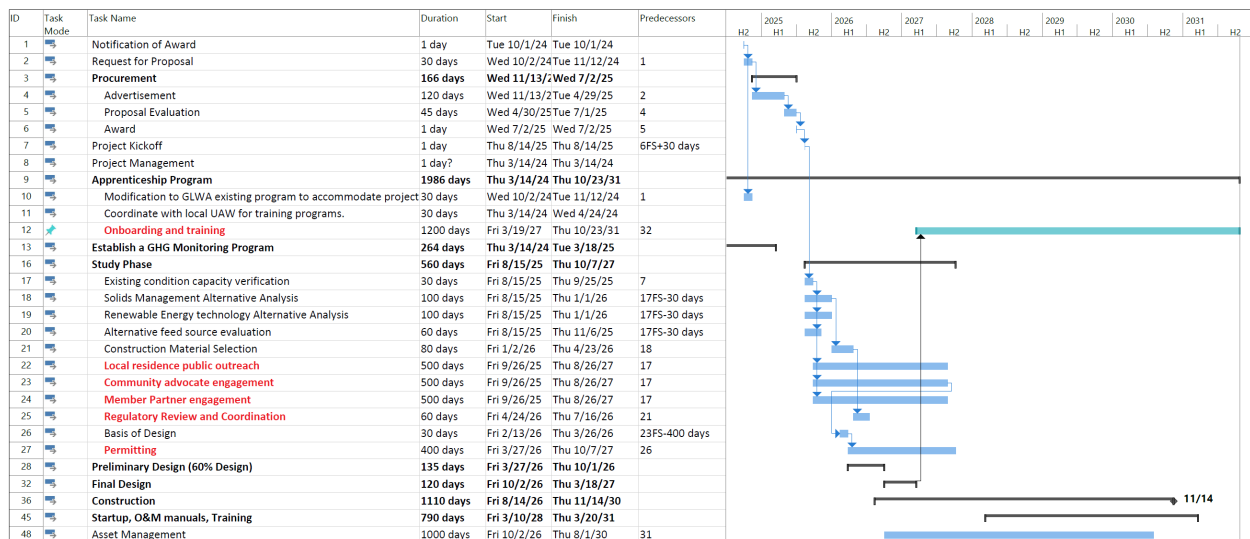
Process/performance information (such as fuel feed rates and gas emission analyzers) will be aggregated and archived using the facility's existing Ovation Distributed Control System (DCS). The robust system continues to provide monitoring and control function for the facility and has well over ten years of historical data.

Pollution performance measures include CAPs (PM10, PM2.5, CO, NOX, and SO2), and HAPs (D/F, HCl, Cd, Hg, Pd, and VOC) and will be directly measured and correlated to unit in operation (correlation verified periodically per regulation). These correlation factors establish the emission factors used to estimate emissions per hours of operation.

Pollution performance measures for GHG (CO2, CH4, and N2O) will be developed based on established EPA guidelines that correlate natural gas usage to emission rates. Natural gas usage from each process area is currently being checked and recorded on a monthly basis. Natural gas rates are measured by individual flow meters. GHG emission reductions will be verified by comparing the existing baseline use of natural gas, emissions from incinerated biosolids, fugitive emissions, and electricity purchases, to these same data, post project implementation. GLWA will report measured biogas generation and use within the biosolids drying facilities. The reduction in HAPs and CAPs will also be measured, verified, and reported, as currently performed to meet state and federal regulatory requirements.

c. Authorities, Implementation Timeline, and Milestones

We propose an aggressive timeline for this project to comply with EPA request for project completion within four years of project notice to proceed. The summary milestone schedule outline in the figure below. GLWA has regulatory authority to perform all these tasks, pending Michigan EGLE approval of relevant air permits.



Our project has eight primary phases, each one with relevant sub tasks, as follows, 1) procurement, 2) apprentice program, 3) GHG monitoring program, 4) study phase, 5) preliminary design, 6) final design, 7) construction, and 8) startup/commissioning. Both the procurement phase and the apprenticeship program phase include significant preliminary efforts we are immediately initiating after submission of this grant proposal. The reason is that both tasks will require significant preliminary efforts to be fully operational in time for the grant award.

Phase 1: Procurement. Our 166-day procurement phase includes the generation, advertising, and evaluation of project proposals from our subcontractors, as requested in the EPA NOFO, and includes two different milestones: project kick off and project management. The project will be advertised for 120 days and then, once project proposals have been submitted, there is a 45 day project evaluation and selection period. It should be noted that we will be undertaking considerable preliminary efforts to streamline our project procurement efforts so as to both comply with US EPA bidding requirements

while also maintaining a rapid procurement pace to comply with US EPA requirements for project completion deadline.

GLWA's Procurement Business Inclusion and Diversity (B.I.D) Plan is committed to providing business opportunities to vendors who honor the values of inclusion and diversity in selecting their business partners. To foster these values, the solicitation selection requires all vendors to submit, for solicitations budgeted at \$1 million or more, a Business Inclusion & Diversity Plan that addresses their efforts to include Minority-owned Business Enterprise (MBE), Woman-owned Business Enterprise (WBE), Small Business Enterprise (SBE), and Socially and Economically Disadvantaged Business Enterprise (DBE) subcontractors. ***To date, GLWA has awarded 70 contracts under the B.I.D. Program requirements totaling \$859.8 million.*** GLWA has also received and reviewed 245 vendor Diversity Plans detailing efforts to maximize the participation of small, minority-owned, and disadvantaged business enterprises.

Phase 2: Apprenticeship program. The apprenticeship program phase includes two sub tasks. First, modifying GLWA's existing apprentice program to add new competencies for on the on-the-job learning (OJL) surrounding biosolids, and secondly, incorporating new biosolids training into the related training instruction (RTI). GLWA has an extremely well-designed and managed apprentice program that focuses on our ongoing and future operational and maintenance needs. Due to our experience with the apprentice program, we understand the lengthy timeframe needed for developing each apprentice category, and so will be initiating efforts to expand the apprenticeship program to meet the project training needs. Additionally, GLWA will work with the Design-builder to ensure that the workforce necessary to complete the project will have the required percentage of apprentices to support the design-builder work force for the project. This will ultimately expand Southeast Michigan talent pool for skill labor work force.

Phase 3: GHG monitoring. The 264 day GHG monitoring program phase includes two primary sub tasks, drafting, and then procuring, GHG, monitoring software, and integrating it with our existing supervisory Control and Data Acquisition (SCADA) system. Before this point, GLWA's GHG monitoring efforts were very straightforward and thus did not require the sensors, monitors, and software required for monitoring anaerobic digestion biogas generation, cleaning, and use.

Phase 4: Study phase. The study phase occurs over 560 working days and includes verifying existing site conditions, solids management, alternatives analysis, renewable energy technologies analysis, feed source evaluation, construction material selection, outreach with local residences and the general public, engagement with community advocates, engagement with member partners, regulatory review and coordination, developing basis of design, and permitting. The three community-related engagement tasks, (local resident and public outreach, engagement with community advocates, and engagement with member partners) are each projected to occur over 500 days, almost the entire duration of the project design, to fully incorporate the needs and concerns of the broader stakeholders. Permitting has also been assigned 400 days, due to the lengthy project evaluation anticipated for a project this size.

Phase 5: Preliminary design. The preliminary design phase includes development of a 60% design package, GLWA review, and design review workshop, and is projected over a 135 day period.

Phase 6: Final design. The final design phase, projected to occur for 120 days, includes a 90% design package, final site and civil package, and foundation package.

Phase 7: Construction. The construction phase lasts 1,110 days, and includes mobilization, shop drawing, submittals, brownfield cleanup and mitigation, construction of foundation, digesters, process buildings, and gas system, and modification to existing facilities.

Phase 8: Start up and commissioning. Start up and commissioning includes the development of system operations and maintenance manuals, system training, and start up and commissioning of the ADF. We have estimated a two-year start up process to fully account for the commissioning and operation of the digesters and the decommissioning of the incineration complex.

Section 4: Low-Income and Disadvantaged Communities

a. Community Benefits

Southwest Detroit (zip code 48209 and surrounding areas) is a disadvantaged community with an *air toxics respiratory hazard index* in the 95th percentile, a *toxics release to the air* in the 95th percentile, and an *air toxics cancer risk* in the 90th percentile. Air quality is a health issue for our community. The significant decrease in CAP, HAP, and greenhouse gas emissions resulting from this project will positively impact our community's quality of life. We describe two major areas of benefit: **Pollution reduction** and **Workforce development**.

Pollution reduction: Air pollution poses a major global risk to human health and its reduction can substantially improve quality of life. In addition to myriad long-term benefits of improved air quality, public health benefits can be realized nearly immediately within the surrounding population following mitigating actions. Furthermore, interventions addressing the source of the pollution are cost-effective when compared to the financial burden of dealing with the consequences of inaction. This is particularly true in communities with relatively high rates of air pollution, such as the City of Detroit. The transition from incineration to anaerobic digesters is an effective means of improving air quality and improving public health for the city and surrounding communities. This project will lead to reductions in co-pollutants such as NO_x, ozone, PM_{2.5}, and HAPs. These pollutants can contribute to health risks such as asthma cases and subsequent costly hospital admissions and emergency department visits.

Detroit qualifies as a low-income and disadvantaged community based on multiple criteria as demonstrated by its classification in the US EPA's Climate and Economic Justice Screening Tool (CEJST) and data housed on the Environmental Justice Screening Tool (EJScreen)¹. EJScreen Community Reports for the City of Detroit and the City of River Rouge (directly adjacent to the WRRF) are included as an appendix to this proposal. In addition to the reports, the appendix includes a series of maps which highlight the relevant indices, as well as a list of EPA's EJScreen Census block group IDs for qualifying block groups. A disadvantaged community is defined as one that includes census block groups that are at or above the 90th percentile for any of EJScreen's thirteen Supplemental Indexes when compared to the nation or state. The City of Detroit contains nearly 400 census block group IDs exceeding this threshold in one or more of the following eleven categories:

- Particulate Matter 2.5
- Ozone
- Diesel Particulate Matter
- Air Toxics Cancer Risk
- Toxic Releases to Air
- Traffic Proximity
- Lead Paint

¹ <https://ejscreen.epa.gov/mapper/>

- Superfund Proximity
- Risk Management Plan (RMP) Facility Proximity
- Hazardous Waste Proximity
- Underground Storage Tanks (USTs)

The decommissioning of solid waste incinerators at GLWA's wastewater recovery facility is projected to yield a 50% reduction in greenhouse gas emissions, and a 30% reduction in natural gas emissions. Furthermore, the processing of waste onsite will lead to a 10% decrease in the volume of material that requires hauling offsite. These outcomes will deliver multiple benefits that directly mitigate against several of EJScreen's thirteen supplemental Indexes factors. These benefits will include:

Particulate Matter 2.5: Reducing incineration will lead to decreased emissions of PM2.5 from smokestack emissions. In addition, reductions in hauling will lead to less truck traffic, whose engines can be an additional source of both PM2.5 and GHGs. Furthermore, reduced traffic of solid waste near residential areas will reduce the odor nuisance impacting the local population.

Ozone: Solid waste incineration can be a cause of atmospheric ozone issues. Reduced incineration will directly mitigate against this hazard.

Diesel Particulate Matter: Reductions in the need for offsite waste hauling will lead to less truck traffic, whose engines are a major source of diesel particulate matter.

Air Toxics Cancer Risk: Reduced incineration means a reduction in emissions which can be a source of carcinogenic air pollutants.

Toxic Releases to Air: Reductions in incineration whose associated emissions can be a source of toxic air pollutants. Furthermore, reduced traffic of solid waste near residential areas will reduce the risks of toxic airborne particulates impacting the local population.

Traffic Proximity: Reductions in the need for offsite waste hauling will lead to less truck traffic, which will lead to a reduction in overall traffic, and resident's proximity to it. This has the additional co-benefits of reduced GHG emissions, reduced exposure to noise pollution, and reduced wear and tear on regional roadways.

GLWA will continue to track and report out on these and other key metrics following the installation of the ADF.

Although this project won't have a direct impact on other two indices, including Detroit's ongoing issues with lead paint, and residents' proximity to superfund sites, RMP facilities, hazardous waste sites, and USTs, the City's classifications across the majority of these indices speaks to its extreme need for assistance. By supporting the general economic growth and environmental health of the region, all environmental justice indices may benefit.

As a disadvantaged community located adjacent to a major river system and built on formerly drained swampland, Detroit is particularly vulnerable to climate impacts. This became clear during multiple recent record-breaking storm events that led to massive regional flooding and thousands of basement backups, leading to millions of dollars in claims for damaged property. The most recent of these events was the June 26, 2021 1,000-year storm event where the most intense areas of rainfall received over 8 inches of rainfall with 24-hour period, leading to a federal disaster declaration. Furthermore, climate change associated variability in the level of the Detroit River and the entire Great Lakes system threatens regional infrastructure and property. The reductions in GHG emissions that will be achieved by

this project will help mitigate against the drivers of climate change, which has been identified as a causal factor of these increasingly frequent extreme weather events.

GLWA's Wastewater Resource Recovery Facility is the second largest single-site wastewater treatment facility in the country with a service area of more than 946 square miles. The multiple benefits of this project would be realized not only in Detroit, but across the many regional communities served by GLWA, and impacted by these emissions. In addition to the public health and environmental outcomes, this project will position Detroit as a leader in the field of anaerobic digestion of wastewater biosolids. Such a title brings both community pride and a generally enhanced ability to attract business and top talent to our region.

Workforce development: Since GLWA was formed in January 1, 2016, our Organizational Development team has been actively developing community partnerships to recruit apprentices from underserved low-income and disadvantaged communities, including urban and rural markets, and to provide them with support services to remove barriers to successful employment. In 2017, GLWA launched its first registered apprenticeship program and currently has four active apprenticeships, with a fifth program in development. GLWA has graduated 21 apprentices and has 41 active apprentices. In the past three years, GLWA's apprenticeship program's success has been recognized regionally and nationally by the state of Michigan and the US Department of Labor's (DOL) *Race to Talent with Registered Apprenticeship Champion Award* (2023), the US Environmental Protection Agency's (EPA) *Making Water a Career of Choice Case Study and Webinar* (2022), the Michigan Apprenticeship and Training Association's (MEATA) *Apprentice Sponsor of the Year Award* (2022), and the National Association of Clean Water Agencies (NACWA) *National Environmental Achievement Award for Workforce Development* (2020).

Working with our community partners such as Detroit Employment Solutions Corporation (DESC) and Focus: HOPE, GLWA will leverage existing funds, such as The Workforce Innovation and Opportunity Act (WIOA), to augment and support this initiative. GLWA and its community partners are actively working together to prepare participants with occupational and soft skills training, along with supportive services, to create pathways for employment success. As part of this GHG reduction project, GLWA will launch new apprenticeship programs, including a wastewater treatment operator apprenticeship, that will be modified to include education on management of biosolids and operations of anaerobic digestion processes. As with previous apprenticeship efforts, GLWA will target outreach and recruiting efforts to the disadvantaged community of Southwest Detroit.

In 2022, GLWA launched a summer internship program to attract young adults into the water sector. GLWA recently received the National Association of Clean Water Agencies (NACWA) *National Environmental Achievement Award for Workforce Development* (2024) for the summer internship program. If awarded, GLWA will use \$200,000 to expand GLWA's "Tap In" outreach initiative to support the recruitment of apprentices and interns, including the promotion of diversity within that recruitment, to careers in the water sector, and to expand public awareness about job opportunities in these sectors, particularly in disadvantaged communities.

A Benchmark Analysis for Community Impact, Financial Capability, & Environmental Justice

A comparative measure of community impact and financial capability comes from the EPA's Clean Water Act *Financial Capability Assessment* (FCA) Guidance released in March 2024. The FCA Guidance sets provides metrics that measure the financial impact of the current and proposed capital project investment on residential users, the financial capability of the community, and the lowest quintile income and poverty prevalence within the community's service area.

First, the *Residential Indicator* (RI) is the community's average cost per household (CPH) for wastewater treatment (WWT) and Clean Water Action (CWA) controls as a percentage of the local median household income ("MHI"). It reflects the residential share of current and planned controls needed to meet the requirements of the CWA. The value range for this indicator characterizes whether the costs impose a "low," "mid-range," or "high" financial impact on residential users. The city of Detroit's Residential Indicator metric is considered to be mid-range.

Second, the *Financial Capability Indicators* (FCI) utilizes six data points to evaluate the debt, socioeconomic, and financial conditions that affect a community's financial capability to implement the CWA controls. These indicators help characterize the community's financial capability as "weak," "midrange," or "strong." The city of Detroit's Financial Capability Indicator metric is considered to be weak.

The third metric is the *Lowest Quintile Poverty Indicator* (LQPI) Score. As stated in the guidance, EPA recognizes that considering lowest quintile income is an important measure to supplement the Residential Indicator and Financial Capability Indicators, as MHI does not account for the variability of income distribution from community to community. The calculation of the Lowest Quintile Poverty Indicator aids in assessing the severity and prevalence of poverty in a community's service area. The indicators are low, medium, or high impact. The EPA strongly encourages additional subsidy or grant consideration from governmental funding sources for entities that show a "medium" or "high" impact LQPI Score. The city of Detroit's Lowest Quintile Poverty Indicator is considered to be high.

It should be noted that the City of Detroit customer base is responsible for \$206 million of the \$508 million, or 40.5% of the FY 2025 regional wholesale system revenue requirement of \$508 million. This is in addition to the \$83 million of the local system revenue requirements. The GLWA and DWSD have worked earnestly to keep system-wide revenue requirement annual increases to well under 4% per year, with the GLWA systemwide adjustment at an eight-year average of 1.2%. The appropriate focus of operating within a large portion of the GLWA service area's financial capability must also be viewed through the lens of environmental justice. This is another reason why this requested federal grant is vital to the GLWA service area as it is needed to balance the environmental justice concerns with this project's objectives of public health, safety, and transformative benefits.

b. Community Engagement

GLWA is the largest water and wastewater utility in the state of Michigan. We provide drinking water to nearly 40% of the population, and wastewater conveyance and treatment services to over 80 southeast Michigan communities, including the City of Detroit, comprising approximately 2.8 million people. As a relatively new entity with such a large and diverse service area, GLWA has much to benefit from regional collaboration. When GLWA was established in 2016, the City of Detroit, the counties of Wayne, Oakland, and Macomb, and the state of Michigan united in creating an independent regional water authority that ensures customers have a powerful collaborative voice in its operations and management. GLWA is led by a Board of Directors that includes representatives from each of these entities. Adherence to collaborative processes and a shared commitment to a multi-jurisdictional, multi-agency approach to infrastructure renewal and investment is the foundation of our successes as a regional service provider.

GLWA maintains a robust Member Outreach Program, focused on stakeholder engagement, that hosts nearly 100 collaborative meetings a year and draws from a database of over 1,300 regional stakeholders. Presentations and other handout materials from these meetings are stored and available online on our Members Outreach Portal, with access links mailed out along with meeting summaries to all invitees.

These meetings comprise customer community and water system representatives, regulators, watershed and environmental groups, academic and research institutions, foundations with an interest in environmental sustainability, regional governmental and planning organizations, and other stakeholders. This robust and ongoing community engagement program would be used, as one of several tools, to facilitate engagement with relevant GLWA stakeholders during all phases of this project.

GLWA continually leads and/or participates in community engagement efforts to align and refine project goals. For example, we routinely convene and facilitate meetings for focused interest work groups (e.g., water quality, collection system management, and so forth) in virtual, in-person, and hybrid formats. We attend local meetings with our customer communities upon request and we work with communities and other stakeholders to coordinate our construction projects with other entities who manage regional infrastructure and utility assets. In addition, GLWA team members regularly meet one-on-one with stakeholders to discuss construction efforts and other projects that may impact them. We leverage myriad resources including mailers, monthly CEO Reports, internet videos, local television commercials, and a bevy of social media platforms to convey information to the millions of residents in our service area. GLWA strives to understand what our communities value most, and to consider the diverse linguistic, cultural, institutional, and other factors in southeast Michigan when engaging with the public.

Recognizing the complexity of this project GLWA intends to increase its capacity for public outreach upon award of this grant. GLWA will add a Community Outreach professional to its Public Affairs Group. This individual will engage with the community on the project and its positive impact on the community; listen to community concerns and facilitate the involvement of those potentially affected; lead and perform the planning and scheduling for community events and other activities; cultivate community relationships; and serve as the bridge between GLWA and the community. These activities will be initiated during the Study Phase and will continue throughout the duration of the project.

GLWA's commitment to stakeholder outreach and engagement is demonstrated through its dedicated internal staff and through its engagement of a neutral third-party consultant to facilitate outreach and engagement. Updates on both technical and administrative aspects of the regional system's status, as well as information related to key projects and initiatives, are shared with multiple Member Outreach Program work groups as a regular course of business. Presentations are tailored to focus on the specific interests of diverse established work groups and always include group discussions, led by our third-party facilitators, to allow GLWA, project partners, and any technical sub-contractors to gain iterative feedback and ensure the project optimization and success. At multiple stages across the course of the grant period, various elements and updates from the project will be presented to relevant work groups for feedback. These groups include the following:

The **Wastewater Analytics Task Force (WATF)** work group addresses technical issues relating to the regional wastewater system, including metering, level of service, asset management, and system operations and planning. There are currently seven WATF meetings scheduled for the 2024 calendar year, with a mailing list of over 130 stakeholders.

The **Communication and Education Work Group** serves to raise awareness and facilitates the development of educational materials on topics related to the regional wastewater system. This work group generates feedback from attendees regarding improvements to communications with member partners and other stakeholders within the service area. There are currently four communication and education work group meetings scheduled for the 2024 calendar year, with a mailing list of over 185 stakeholders.

The **One Water Partnership** is GLWA's "big tent" work group that brings diverse stakeholders into a unified forum to ensure a *One Water* approach to our regional water and wastewater systems to ensure ongoing sustainable, economical, and environmentally and socially responsible operations. There are currently four One Water Partnership meetings scheduled for the 2024 calendar year, with a mailing list of over 500 stakeholders.

The relationship with GLWA and the communities in our service area is beyond a transactional one. Just as pipes do not begin nor end at municipal boundaries, the relationship with our members looks beyond individual needs and toward mutually acceptable regional solutions. GLWA's Member Outreach program has evolved over the years from a basis for sharing information to a platform capable of addressing important issues such as budget and charge development, model contracts for service and system planning, as well as delivery of value-added services to member communities.

Section 5: Job Quality

Good Jobs Initiative: Good jobs are the foundation of an equitable economy that lifts up workers and families and makes businesses more competitive. The construction and operations of the ADF facility is a complex multi-faceted project. This project will require involvement and skills from all trades including, site civil, carpentry, concrete, electrical, mechanical, instrumentation and controls. GLWA is focused on improving job quality for workers and promotes a diverse, equitable, and inclusive workplace through:

Collective Bargaining: Approximately half (49.6%) of GLWA's team members are represented by collective bargaining agreements with five labor organizations: AFSCME Local 2920, Michigan Building and Construction Trades Council (BTC), Association of Municipal Engineers, Association of Professional Construction Inspectors, and Senior Water Systems Chemist Association. GLWA's partners with AFSCME and BTC for their registered apprenticeship programs and collaborates with the unions on team member safety.

GLWA's **Comprehensive Benefit Plan** includes medical, dental, vision, life insurance, tuition assistance, paid time off, and retirement benefits including a six (6) percent contribution to team member's base wage and a 3% match up to the annual IRS limit. GLWA's One Water Wellness Team supports team members overall health and wellbeing through four key areas of wellness: **Preventive Care, Healthy Living, Movement and Financial Wellness** with targeted programs and services.

Skills and Career Advancement: GLWA is focused on skills and career development through registered apprenticeships, continuous education training, and GLWA's progression career development program. The establishment of the **One Water Institute (OWI)**, which delivers exceptional operational safety and anti-harassment training, as well as a leadership academy that empowers water warriors and member partners with the knowledge and skills needed to provide high-quality service to customers throughout southeastern Michigan, and the **registered apprenticeship program**, stand as a testament to the GLWA's dedication to team member development. OWI leads the onboarding and continuing training of team members. These initiatives have not only equipped team members and community member partners with essential skills and knowledge but also have been recognized by the Environmental Protection Agency (EPA) as exemplary models for workforce development in the utilities sector. OWI and the apprenticeship program were the subject of a case study and webinar as part of the EPA's *Making Water a Career of Choice, a Compendium of Water Workforce Case Studies Across the Country*.

GLWA will gauge the new skills needed to successfully operate and maintain the new biosolids process and develop the training to upskill its existing operational teams including maintenance technicians and wastewater treatment operators.

DEIA, Recruiting, Hiring, and Community Partnerships: GLWA works closely with community partners such as Focus: HOPE, Michigan Works! Agencies, community colleges, International Brotherhood of Electrical Workers' (IBEW) Trade School – Metro Detroit Electrical Industry Training Center (DEITC), and Wayne State University, a minority serving institution (MSI) of higher education, to recruit and hire individuals from disadvantaged communities, by meeting candidates in the classroom and community events, conducting on-site interviews and actively promoting registered apprenticeships and internships in the water sector.

Section 6: Programmatic Capability and Past Performance

a. Past Performance

GLWA is committed to continue to work with our federal partners to secure all opportunities available for GLWA to move the water sector forward while minimizing the financial burden on our communities we serve. Since its standup, GLWA has established a dedicated grants team to handle all coordination, monitoring of applications, progress documentation, and closeout necessary for successful completion of GLWA's commitment to the awarded grants. Since then, GLWA has secured several federal funded grants through its office of Research and Innovation and has successfully initiated or completed several State of Michigan Clean Water *State Revolving Fund* (SRF) projects. The projects currently underway include funding received through different federal grants include:

1. Hydrothermal Liquification to Convert Organic Wet Wastes to Transportation Fuels
 - a. Award number DE-EE0010307
 - b. Awarding Agency: Energy Efficiency & Renewable Energy U.S. Department of Energy. Assistance Listing Number: 81.087
 - c. This project will perform a feasibility study to determine best business case models for the treatment of sewage sludge and other organic wastes through hydrothermal liquification.
 - d. Department of Energy Contact: Beau Hoffman (DOE Technical Project Officer)
2. GLWA PA 53 ARPA Grant (Funded by the U.S. Department of Treasury)
 - a. Award number: PA53-2024-001
 - b. Awarding Agency: Michigan Department of Environment, Great Lakes, and Energy. Assistance Listing Number: 21.027
 - c. This funding was used for the following projects:
 - i. - Fairview Pumping Station – Replace four sanitary pumps
 - ii. WRRF Yard Piping & Utility Rehab
 - iii. Pump Station #1 Improvements (Engineering)
 - iv. Pump Station #1 Improvement (Construction)
 - v. Pump Station #2 – Rack & Grit (Engineering)
 - d. Freud Pump Station Improvements (Engineering Michigan EGLE Contact: Phil Argiroff (Acting Director, Water Resources Division)

GLWA is currently managing the Department of Energy grant and is ensuring successful delivery of the project as required by the grant agreement. GLWA ensures that all technical and financial reporting (e.g., quarterly progress reports) are completed in a timely manner.

GLWA performed extensive research to ensure that the selected projects would be eligible based on the requirements of the grant documentation. This initial research enabled GLWA to ensure compliance with

the grant agreement terms when signed. GLWA is currently completing the closeout documents for the completed projects.

With the ongoing funding challenges that we continue to experience, GLWA makes all efforts to leverage low interest loans through the State of Michigan Clean Water State Revolving Fund (SRF) to maximize our investment with the monies available in the system. GLWA's past performance of successful completion of many SRF projects is evidence of our successful management and documentation of project deliverables to meet federal requirements. GLWA, on average, annually pursues two or three SRF loans to support its comprehensive Capital improvement plan. GLWA anticipates over \$250M of low interest loan to be awarded through the SRF program in FY 2024. Below is a short list of wastewater system projects that GLWA has secured in the last three years:

3. Rouge River Outfall Project
 - a. Award number SRF Project # 5651-01 (loan)
 - b. Awarding Agency: State of Michigan Department of Environment, Great Lakes, and Energy.
 - c. This project constructed a new disinfection facility for the partially treated Wastewater through the WRRF. The project cost \$38,450,000 awarded 2017 was completed April 2021.
 - d. Department of Environment, Great Lakes, and Energy, Water Infrastructure Funding & Financing Section.
 4. Rehabilitation of the Ferric Chloride System and associated transfer pipeline at the WRRF
 - a. Award number SRF Project # 5651-01 (loan)
 - b. Awarding Agency: State of Michigan Department of Environment, Great Lakes, and Energy.
 - c. This project consolidated the use of Ferric Chloride at the WRRF while improving and replacement of the associated piping for injection into the process water. The project cost \$12,940,000 awarded May 2023.
 - d. Department of Environment, Great Lakes, and Energy, Water Infrastructure Funding & Financing Section.
 5. Detroit River Interceptor Rehabilitation
 - a. Award number SRF Project #5655-02 & 5655-03 (loan)
 - b. Awarding Agency: State of Michigan Department of Environment, Great Lakes, and Energy.
 - c. This project is to rehabilitate over 50 miles of interceptor sewer ranging from 3 ft -16 ft in diameter. The project cost \$62,545,000 awarded March and May 2023.
 - d. Department of Environment, Great Lakes, and Energy, Water Infrastructure Funding & Financing Section.
- b. *Reporting Requirements*

GLWA has met all reporting requirements for the following agreements:

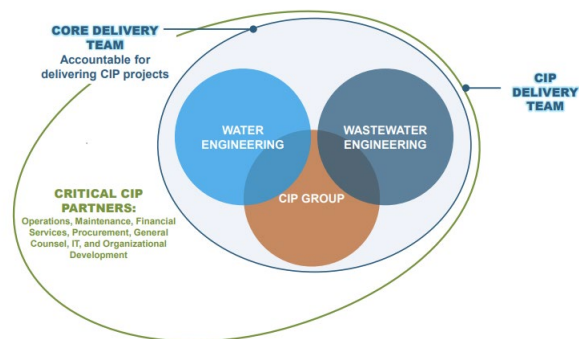
- a) The Department of Energy grant has significant reporting requirements. These requirements include quarterly reporting of Research Performance Progress and Financial Reporting. For this particular award a financial quarterly report that tracks the financial expenditures spent in a specific time period is required for on time submission. The Research Performance Progress report lets us tell the grantor that the project is on time as related to outputs and outcomes are reported on the submitted project/milestone plans. In addition to the required financial reports,

there are Technical and Scientific reports documenting project progress that must be submitted on time with a quarterly and annual financial report. GLWA has timely and accurately completed all reporting requirements to date.

- b) The Michigan EGLE PA-53 ARPA Grant involved significant research to ensure compliance to come to an agreement on the projects with the State of Michigan. This grant is near the end of completion and GLWA is completing the Closeout documents with the State of Michigan. The expected outputs and outcomes have been accomplished. In regard to the above grant funding, certain forms must be submitted, such as the Financial Status Report (FSR), that provide the required payment verification documentation to confirm compliance with reporting requirements. In preparing the closeout reporting requirements for the PA-53 funds, FRF 2869 Form must be completed, and this document requires GLWA to submit a project overview and closeout documents needed from the State of Michigan EGLE. GLWA has completed all reports timely and accurately for this award.
- c) The projects that are funded by the State of Michigan State Revolving fund program require several administrative monitoring and documentation reports that are ongoing from the inception of the project to its final completion. The preliminary documentation include application for the loan, financial guidance, project planning, clearances, and cross cutters. As the project progresses into construction, additional reports documenting compliance with Davis-Bacon wage requirements, green project reserve, and American Iron and Steel Requirements, progress payments with certified payroll are generated and submitted in accordance with the requirements of the SRF loan.

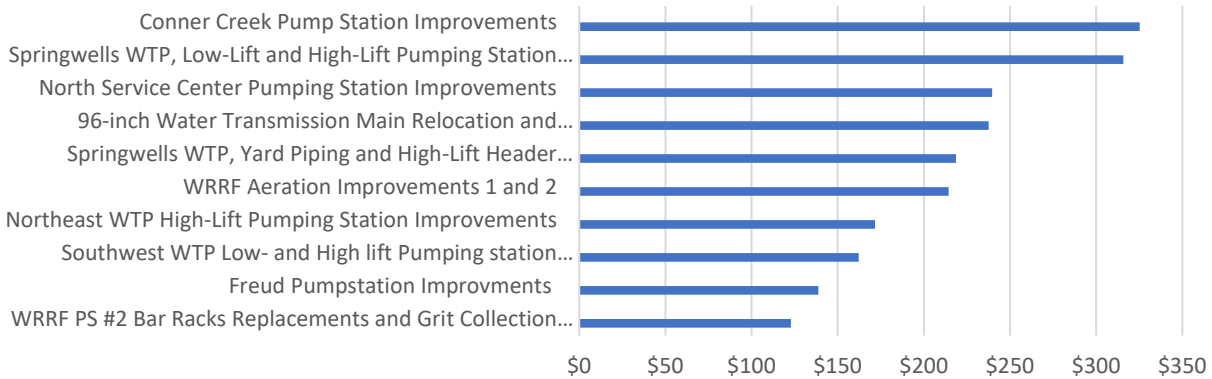
c. Staff Expertise

GLWA since its stand up has stood up a capital program delivery team that include project controls project managers, financial reporting, procurement. This delivery team has been proven multiple times in delivering successful jobs for GLWA. The project team that will support this project total have over 200 years of cumulative experience. The GLWA leadership team members that will support this project have a vast background in all the components necessary for the successful delivery of this project, including 100+ years of operations and maintenance, 150+ year of research, design and construction, and +100 years of public financing and procurement.



GLWA owns and operates the infrastructure required for source water treatment, potable water distribution, wastewater collection, wastewater treatment, and biosolids management. Since forming in 2016, GLWA has spent roughly \$622 million on water operations capital investments, \$407 million on wastewater operations capital investments, and has invested just over \$1 billion dollars in other infrastructure renewal and rehabilitation projects. Some of the larger capital projects GLWA currently has in progress include the following. It's important to recognize that a significant portion of GLWA's investments is directed toward asset renewals and implementing new facilities and technology remains a challenge due to the high capital requirements and affordability constraints.

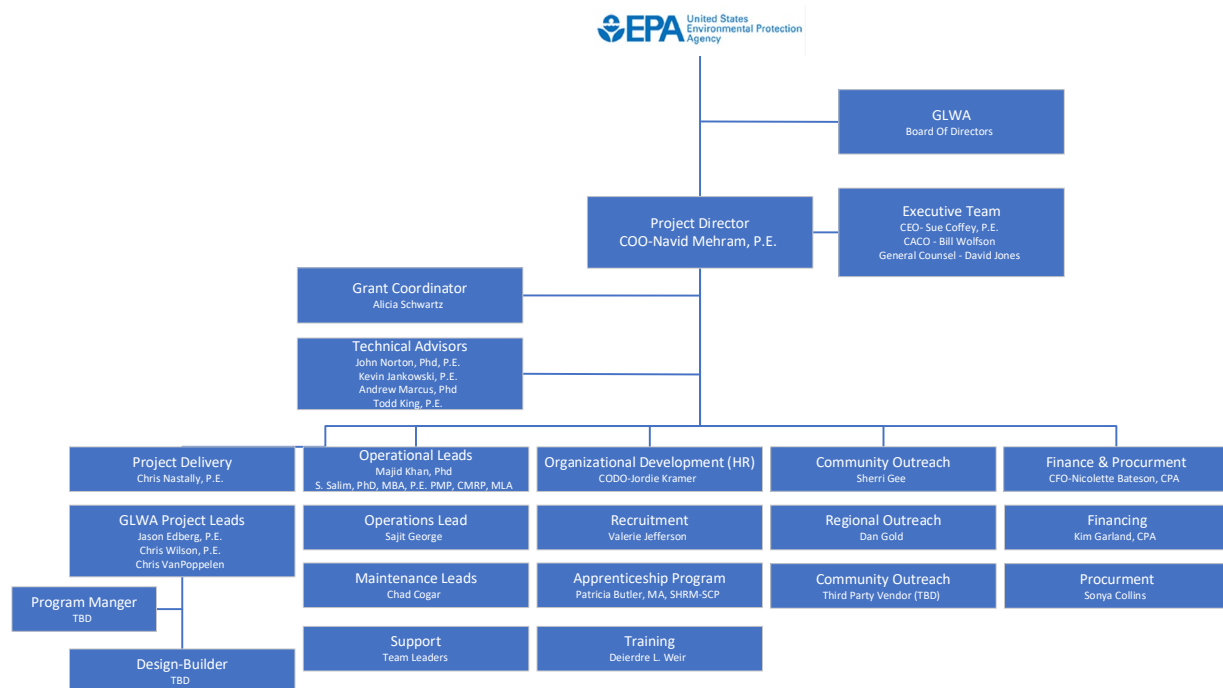
GLWA Top 10 Projects (Millions)



Although this \$867,120,788 anaerobic digestion project would be the single largest project in GLWA history, its annual spend rate would be smaller than the annual capital reinvestment typically managed by GLWA staff.

GLWA directly manages all its permitted operations with its own staffing and has entered into third-party public private partnerships to operate its biosolids drying facility. GLWA also completely manages its capital reinvestment program with its own team of professional engineers, accountants, professional project managers, and associated team members.

GLWA has skilled and experienced project teams to perform the bidding, procurement, project management, and final commissioning and operation of new wastewater infrastructure, including this project. However, due to the size and rapid pace of Construction, GLWA will form a special team, as shown in the project organizational chart, and as described below, to ensure effective delivery of this project within the specified four-year timeline.



Section 7: Budget

a) Budget Detail

The budget detail is detailed in the Appendix B. The details of the budget build on the Great Lakes Water Authority Published Wastewater Master Plan in June of 2020. (Available on our website at: <https://www.glwater.org/our-system/wastewater-system/>) The Master Plan was developed through three years of heavy collaboration with our member partners, and the communities we serve, to ensure alignment of alternatives to the needs of the region. Through this effort several alternatives were evaluated for the management of biosolid at the Water Resource Recovery Facility. The selected alternative (alternative 3a in the masterplan) integrates three stages, hydrolysis, anaerobic digestion, and gas treatment and reuse, into the existing solids handling process that then convey the digested sludge to the existing drying treatment process. Additionally, as an added insurance to protect the treatment process, a phosphorus recovery system is included to protect the existing treatment processes from accumulation of vivianite while also allow generating high concentration fertilizer. This alternative served as the basis for the proposed project.

The budget for this project has been developed similar to many projects GLWA delivers in its capital improvement plan. The itemized budget and details can be found in the Appendix B. The high-level cost items for the project include:

GLWA Project Management: As depicted in the section above, we have described the personal required to administer and manage a project with this complexity and abbreviated timeline. The management team will develop requirements and procure the additional key staff necessary for successful delivery of this project. The team will procure contracts for the design-builder, program manager, third party community outreach, and software for GHG monitoring and reporting. Upon placement of key contracts, GLWA efforts will focus on the following: design development and alignment to the existing facility, constructability, permitting, grant reporting and documentation management, financing, apprenticeship program compliance, and community outreach.

Apprenticeship and Community Outreach: As part of the project, an Apprenticeship Program will be implemented in collaboration with the awarded contractor. The program will be designed to recruit individuals from disadvantaged communities and will provide training and hands-on experience in skilled trades such as electricians, plumbers, millwrights, and carpenters. Additionally, due to the project's technical complexity, skills related to control systems, STEM-oriented engineering, and analytical opportunities will be emphasized. The direct cost of this program covers training, administration, and wages.

GLWA will enhance its already robust **Community Outreach Program** to ensure connection with the communities, municipal leaders, civic, religious, and cultural organizations, and aimed to ensure all users of the system, and in general vicinity of the facility, are informed and consulted regarding the details of the project. The engagement will provide opportunity for input during the development of the project while also informing on the benefit to the communities by reducing greenhouse gases and controlling service costs. The collaboration with experienced experts, through blue ribbon panels, will help ensure project success and integration of lessons learned. The outreach facilitators and internal staff will provide regular project updates.

Engineering and Construction: Most of the cost for the project is in the study, design, and construction of the anaerobic digestion project. The cost for this project includes design and construction of the anaerobic digestion facilities near the water resource recovery facility. This includes brown field

mitigation and site preparation, installation of deep pile foundation, underground utilities, modifications to the existing WRRF to convey the sludge to the anaerobic digesters. The construction on the brownfield will include the preliminary process building that will house six (6) sludge screens, six (6) pre-dewatering centrifuges, pre-dewatering sludge storage bins, phosphorus release tanks and the associated ancillary process. Adjacent to the preliminary treatment building will be the thermal hydrolysis units that will be constructed in an 80 ft x 120 ft 2 story precast building, that will also house the gas treatment system and boilers. Several tanks will be constructed on site including five (5) anaerobic digesters, two (2) digested sludge tanks, one (1) gas storage tank, and two (2) high strength feedstock tanks. Finally, included on site will be a 100 ft x 100 ft building that will house the phosphorus recovery system and an additional high strength feedstock processing building that will supply supplemental sludge to the above preliminary process building, depending on obtaining project financing for this project option. The modular design will enable subsequent modification if financing is not initially obtained.

b) Expenditure of Awarded Funds

The benefit of this project is multifaceted for GLWA. The value of this grant will allow GLWA to eliminate existing incineration and move to an environmentally friendly process for long-term sustainability. GLWA is committed to completing this project in the time commitment required, so as to secure the benefits of this project for Southeast Michigan, over 40% of population of the State of Michigan. GLWA has a proven history of delivering capital projects, having delivered over 80% of its capital plan over the last three years, despite the staggering challenges faced by the country, including the pandemic, supply chain disruptions, and extraordinary inflation.

Successful Completion: GLWA has been successful in managing grant agreements and requirements by having the proper processes and policies in place to receive and manage funds. GLWA has a dedicated Grants Management team to ensure compliance on all levels of a grant award, from inception to close out. This team includes our Grants Manager, grant specialists, legal counsel, and procurement specialists. The primary functions of the Grants Management team are to ensure that applications have the required components and documents, that all parties know the allowable versus unallowable costs, understand state and federal reporting requirements, and to ensure compliance with GLWA's Procurement policy and procedures.

The Grants Management team performs subrecipient monitoring and ensures that subawards are provided with detailed information and they are in compliance with federal statutes and regulations. The Grants Management team ensures that the Financial Management requirements of federal dollars is followed within the organization, and that funds can be accurately tracked both internally and for audit purposes, with the proper alignment of revenue and expense accounts. GLWA also uses its financial management team to review grant application budgets to ensure sure they are plausible and justified.

Successful Reporting: All grant agreements are thoroughly reviewed by GLWA's Office of the General Counsel and procurement teams so that all deliverables, state and federal requirements, federal contractual provisions, federal procurement procedures, and other requirements are met. GLWA has successfully submitted quarterly progress reports on both the state and federal level; those reports list the activities with accurate completion dates of specific milestones of the project. For grants requiring a cost share, GLWA begins the grant activity by fully spending down the required cost share.

Contract Clauses: Many grant applications have contract clauses that must be included in those contracts. With the help of our General Counsel and our group's procurement specialist we ensure that major clauses, such as the Davis Bacon Act, Build American Buy America (BABA), American Iron and Steel

(AIS), and Disadvantaged Business Enterprises (DBE), are written in these contracts that would be funded by federal dollars. With these contract clauses properly in place GLWA would be able to stay in compliance and effectively drawdown funds without any delays.

GLWA understands that the project must accurately follow the proposed milestone and timeline schedules to efficiently expend the funds. Having those schedules in place will ultimately help us monitor deadlines with project managers. In this case, because the project involves construction, payments to vendors and contractors are based on milestone schedule completions and, as such, we have procedures and policies in place to ensure those deadlines are met. Our team relies on project management tools, such as Gantt charts, project visuals, and interactive project timelines, to monitor and track project progress and more importantly, to harmonize team (GLWA, subcontractor, design, etc) efforts across multiple project phases, and utilize monthly and quarterly meeting updates.

c) Reasonableness of Costs

The starting point for the estimate of the proposed ADF project is from the GLWA 2020 Wastewater Master Plan. In developing this masterplan, GLWA established preliminary estimates for the technologies included in the ADF project via a three-year process of collaboration with its member partners and through engagement of its consultants with similar experience in design and construction of the ADF project elements. Using the Wastewater Master Plan as a starting point, GLWA applied several factors to update the project estimates to current anticipated cost. These factors include inflation, multiple meetings and interviews with external experts, and quotes from manufacturers that supply similar equipment. Furthermore, GLWA engaged several national design build firms to gauge the scale of the project, review the development of costs, and confirm alignment of current market labor and material rates. GLWA has confidence in the cost of the project if the inflation for labor and material remains near 3% percent. GLWA further reviewed the development cost compared to other similar projects in the country and believes the overall estimate for the project is reasonable for study, design, and construction of the anaerobic digestion process for the Water Resource Recovery Facility. The details for development of the overall project cost is detailed in Appendix B.