Ordinance 073 - **2024**

Authorizing The Mayor, Finance Director, and Director of Public Service To Enter Into An Agreement With ARCADIS, U.S. Inc., One Seagate, Suite 700, Toledo, Ohio 43604 To Provide Professional Engineering Services For A Feasibility Study And Preliminary Design For The Oregon Water Treatment Plant Capacity Expansion Project In An Amount Not To Exceed Six Hundred Seventy Thousand and 00/100 Dollars ($670,000.00); And Declaring An Emergency

Summary And Background

The Director of Public Service advertised and requested qualification statements from qualified professional engineering firms to provide Professional Engineering Services to conduct various analyses for a feasibility study and preliminary design for the Water Treatment Plant (WTP) Capacity Expansion Project.

Letters of Interest and Qualification Statements were received from AECOM, ARCADIS, U.S., Inc.; and Kleinfelder.

ARCADIS, U.S., Inc. has been determined by the City Administration to be most qualified for the request for professional engineering services to conduct various analyses for a feasibility study and preliminary design for the Water Treatment Plant (WTP) Capacity Expansion Project.

The attached "Exhibit A" has been reviewed by the Director of Public Service and is determined to be fair and reasonable for the work required.

Oregon City Council has provided funding of $300,000.00 in the approved 2024 C.I.P. Municipal Budget in Account 364.7230.52540 for the said professional engineering services described above. **Now, Therefore,**

Be It Ordained By The Council Of The City Of Oregon, Ohio, That:

Section 1. The Mayor, Finance Director and Director of Public Service are hereby authorized to enter into an agreement with ARCADIS, U.S., Inc. One Seagate Center, Suite 700, Toledo, Ohio 43604 to provide professional engineering services to conduct various analyses for a feasibility study and preliminary design for the Water Treatment Plant (WTP) Capacity Expansion Project in amount not to exceed Six Hundred Seventy Thousand and 00/100 Dollars (670,000.00) in accordance with "Exhibit A", attached hereto and made a part hereof.

Section 2. Oregon City Council hereby appropriates and authorizes the transfer of $370,000.00 from Fund 320; and approves the necessary appropriation into Account 364.7230.52540 for the purpose of providing additional funds necessary for the said professional engineering work authorized by Section 1. above.

Section 3. It is hereby found and determined that all formal actions of this Council concerning and relating to the passage of this Ordinance were adopted in an open meeting of this Council and that all deliberations of this Council and any of its committees that resulted in such formal actions were in meetings open to the public in compliance with all legal requirements, including Section 121.22 of the Revised Code of Ohio and that the reading and adoption of this Ordinance complies with the provisions of Article III, Section 9 of the city Charter as amended.

Section 4. This Ordinance is hereby declared to be an emergency measure and shall take effect and be in force from and after its passage and signature by the Mayor. The reason for the emergency lies in the fact that this Ordinance is necessary in order to hire the consultant and proceed with the project in a timely manner.

Vote on passage as an emergency: Yeas 7 Nays 0 Abs 0

Passed as an emergency measure on: April 22nd 2024

President of Council

Approved:

Clerk of Council

Attest:

Mayor

"Exhibit A"

ARCADIS

Mr. Paul Roman, P.E.
Director of Public Service
5330 Seaman Road
Oregon, OH 43616

Arcadis U.S., Inc.
One SeaGate
Suite 700
Toledo
Ohio 43604
Phone: 419 473 1121
www.arcadis.com

Date: April 10, 2024
Our Ref: 30200621
Subject: Oregon Water Treatment Plant
Expansion Feasibility Study

Dear Mr. Roman,

Thank you for the opportunity to submit this proposal to perform a feasibility study to expand the Oregon Water Treatment Plant. The study will serve as a master plan for expanding the water supply, treatment and distribution to meet the growing needs of the City. This proposal is submitted in response to the City's request after reviewing Arcadis' letter of interest and meetings on February 22 and March 15, 2024.

Arcadis has been honored to serve the City of Oregon with its water infrastructure needs over the last 60-years. We designed the original water treatment plant (WTP), trunk water mains, elevated water tanks, the expansion from 8 to 16 mgd, and the recent raw water and ozone improvements. We are currently finalizing the design for the Water Treatment Plant Concrete Replacement Project that is expected to advertise in April 2024.

Scope of Services

Maximum water demands are approaching the design capacity of the WTP and the City wants to be proactive in planning an expansion to serve its current and future customers. The City requests a feasibility study to evaluate alternatives to increase raw water supply, storage, treatment capacity, and determine how to expand the plant over time. The City will use the feasibility study, recommended improvements and estimated construction costs for the phased expansion to apply for grants and loans to minimize the impacts on its customers. We will align our proposed services to match the City's needs.

Arcadis proposes to develop the tasks to a feasibility study level of detail. The alternatives summarized herein were conceptualized with input from City staff and will be based on a maximum day water supply capacity of 32 MGD. For each alternative below, Arcadis will develop the concept to a point sufficient to prepare planning level capital costs for each alternative (AACE Class 5 estimate). It is noted that if one or more alternative is selected for further analysis and design, additional engineering should be completed to further refine the selected concept and its capital cost, and also prepare operational and maintenance (O&M) costs.

Task 1 - Raw Water Supply

Raw water is currently withdrawn from Lake Erie in a submerged intake crib and then flows through 7,200-LF of 48-inch raw water piping to the Low Service Pump Station. Potassium permanganate is fed at the intake crib for zebra mussel control and for taste and odor benefits. At the station, there are two parallel channels where water is

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screened and flows into a divided wet well. There are four vertical turbine pumps, three rated at 12-MGD and one rated at 17-MGD. Powdered activated carbon is added at the discharge header. Raw water is pumped to the water treatment plant in a 36-inch diameter raw water pipeline that is approximately 4.5-miles long. At the plant, flow is split between the raw water storage pond and Plant #1 and Plant #2. If the water treatment plant is to be expanded to 32-MGD, the raw water supply capacity needs to be 38.7-MGD based on the City's agreement to sell up to 6.7-MGD of raw water to Oregon Clean Energy. Alternatives to be evaluated include:

1. Assess existing raw water facilities and determine necessary improvements to convey a total of 38.7-MGD of raw water through a new parallel raw water main to the water treatment plant. This will include: screening, chemical feed systems and recommended storage, pumping needs and whether larger pumps can be installed in the existing facility or if a building addition or new building is needed. A parallel raw water main of 36-inch diameter or 48-inch diameter will be considered. Pump discharge pressures will vary based on the pipe diameter and raw water flow rate, so the operating range of the pumps need to be carefully coordinated with operating conditions.
2. Purchase raw water from City of Toledo – The Toledo Low Service Pump Station withdraws raw water from an intake structure in Lake Erie and pumps to the Collins Park Water Treatment Plant. Two raw water mains, one 78-inch diameter and one 60-inch diameter, convey raw water approximately 9 miles to Collins Park WTP. Toledo raw water mains cross under North Curtice Road and are located immediately north of the Oregon WTP site. There is a cross-connection chamber between the two water mains on the east side of North Curtice Road. Toledo recently received proposals for the design of a new raw water main that is planned to be located between the existing 78-inch and 60-inch mains. As part of Toledo's upcoming design and construction project, a connection could be included. Oregon should discuss available capacity and the possibility of purchasing raw water from the City of Toledo. This could be considered for the additional 16-MGD needed for the expanded WTP or as a 38.7-MGD back-up raw water source. A meter pit will be included for billing purposes. The raw water main would likely be installed on the east side of North Curtice Road and head south before crossing under North Curtice Road and extending west toward the WTP.
3. Emergency interconnection to Toledo Raw Water Mains – The City of Oregon has one water intake, one Low Service Pump Station and one 36-inch diameter raw water main. Since there is no redundancy in the pipelines, Oregon should consider asking Toledo to include an emergency connection to Toledo's raw water piping. This connection and a minimal amount of piping would serve Oregon well in the event of an emergency interrupting Oregon's raw water supply.

Task 2 - Water Treatment

Work under this task will be to develop conceptual plans and associated capital costs for selected alternatives for the expansion of the existing water treatment plant from its current capacity of 16 MGD to a finished water production capacity of 32 MGD. The expanded water treatment plant will be at the same location of the existing water treatment plant. The treatment processes selected for the expanded facility will consider current water quality and recent, successful treatment protocols. Arcadis will develop concepts for the following water treatment systems.

Based on the original plant design, expansion alternatives include constructing two separate 8-MGD expansions or a single 16-MGD expansion, both constructed in parallel to the existing treatment facility. The phased expansion approach allows incremental expansions based on projected water needs. The phased approach also allows the City to maximize outside funding (such as Ohio Public Works Commission [OPWC] Issue 2) and reduce the financial burdens on its customers.

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The feasibility study will evaluate the capacities of the unit processes, determine needs, and identify preliminary design criteria for the expansion. Interviews with plant staff will be valuable for identifying any operational difficulties so that any existing design opportunities are capitalized on in the new improvements.

The feasibility study will also include the following elements:

Hydraulic Capacity of Conduits and Basins: A hydraulic model of the entire plant will be developed using commercially available hydraulic modeling software or internal Arcadis modeling programs. This model will be used to determine tank levels, verify capacity of hydraulic conduits, check for bottleneck conditions, and determine the hydraulic grade line along the various flow paths. The model will be used to construct the hydraulic profile for the proposed expansion.

Parallel Treatment Trains: Once raw water piping enters the WTP site, flow is split between the existing treatment facility and the onsite raw water pond for OCE. Flow is then split between two parallel treatment trains (Plant 1 and Plant 2). Each treatment train includes coagulation, flocculation, sedimentation and then a second stage of flocculation, lime softening, and recarbonation. Recarbonated water is then ozonated, filtered through biologically active filters, disinfected, and stored in clearwells for final disinfection. Chemical feed systems include alum, lime, soda ash, carbon dioxide, sodium hexametaphosphate, ozone, and chlorine gas.

For the proposed expansion project, it is likely that the Plant 1 and 2 treatment trains will remain as-is. While there are other technologies available for the plant expansion, it is likely that the implementation of those technologies will fail to meet the finished water quality goals of the City. For example, membrane filtration, whether submerged or pressurized, polymeric or ceramic, generally makes economic sense when expanding a media filtration system. However, these systems do not provide any reliable or discernible removal of DBP precursors, which is currently provided by the existing biologically active filtration system. If the removal of DBP precursors is of no concern, then the implementation of membrane filtration can be a cost-effective alternative. This should be a point of discussion early in the project.

With regard to the lime softening system, Reverse Osmosis can be an effective replacement. In addition, reverse osmosis is very effective for the removal of PFAS and related compounds, DBP precursors, MIB, Geosmin, and all other algal toxins. Upon discussion with and authorization by the City, Arcadis can explore the integration of this technology into the planned upgrades. Integrating reverse osmosis can eliminate the need for lime softening and ozonation, thereby eliminating the operating and maintenance costs associated with these systems.

Chemical Storage Requirements: Historically the Ten States Standards requirement for 30-days storage has been based on the design average day water production at average chemical dosage. We will review the existing chemical storage volumes to determine the appropriate storage volume and determine the storage needed for the expanded WTP.

Carbon Dioxide Feed System: Although each plant has its own recarbonation basins, carbon dioxide is fed from two storage tanks capable of holding 18-tons of liquid carbon dioxide. Feed rates are manually adjusted based on the pH of the treated water. As an alternative to conventional recarbonation basins that require 20-minutes of detention time, Arcadis will evaluate pressurized solution feed (PSF) which uses sidestream injection of dissolved carbon dioxide into a pipeline, obviating the need for large concrete basins.

Ozonation Facilities: Recarbonated effluent from Plant 1 and 2 combine in the Pre-Ozone Junction Chamber where sodium hexametaphosphate is added. Flow is then conveyed to the Ozone Building with two ozone contactors. Each contactor is designed for 12-MGD with an 8-minute hydraulic residence time for ozone decay. Each contactor has eight cells with over/under baffles using side stream injection. The ozone system includes a

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6,000-gallon liquid oxygen storage, vaporization, nitrogen boost, cooling water systems, ozone destruct system, ozone diffusion contacting facilities, and ozone quenching chemical feed (calcium thiosulfate). Three low lift vertical turbine pumps (two duty, one standby) convey ozonated water to the Filter Building. An 8-mgd and a 16-mgd expansion of the ozone system will be evaluated. Evaluation will determine the additional liquid oxygen storage, ozone contactors, ozone generators, ancillary systems (nitrogen boost, cooling water, ozone destruct, etc.) and the low lift pumping to the filters. The evaluation will consider utilizing the existing infrastructure intended for an 8-mgd expansion as planned or constructing a second Ozone Building for either a second 8-mgd expansion or a 16-mgd expansion.

Filters: There are eight dual cell filters rated at 2.0 GPM/SF. Low profile underdrains include air scour provisions to optimize backwash performance. The existing filter media profile includes 6-inches of silica sand and 33-inches of granular activated carbon and are operated as biologically active filters. Alternatives to consider during the study include constructing eight more identical filters or possibly performing a demonstration study to increase the rating of the existing filters, which would reduce the additional filters needed. Since Ohio Environmental Protection Agency (EPA) has previously questioned the low filter loading rates and suggested filters be taken offline, increasing the filter rating above 2.0 GPM/SF should be considered. Hydraulic capacities of the conduits need to be verified for the increased flow rates.

Disinfection: Chlorine gas from one-ton containers is currently used to disinfect drinking water. Chlorine contact time is provided in the 1.5-MG and 6.0-MG clearwells. Additional chlorine needs and contact time requirements will be determined, and recommendations for additional clearwell storage will be provided. As an alternative to chlorine gas, the City may want to consider a life cycle cost analysis comparing the delivery of high-strength, liquid sodium hypochlorite vs onsite generation of low-strength, liquid sodium hypochlorite. The selected alternative will be based on the system layout/footprint, construction sequencing, complexity of operation and maintenance, safety, and cost.

High Service Pumping: There are currently six vertical turbine constant speed high service pumps. Pump capacities are 2-MGD, 2-MGD, 4-MGD, 6-MGD, 8-MGD and 8-MGD. Using the historical maximum pumping rates during maximum day demand events and the Ohio EPA Approved Capacity document as guidance, we will determine the appropriate high-service pumping capacity to support the plant upgrade.

Residuals Management: Lime sludge and filter backwash are currently pumped to the sludge lagoons. Surface water discharges to Wolf Creek and is regulated by the City's National Pollutant Discharge Elimination System (NPDES) Permit. Sludge is periodically removed from the lagoons and is currently windrowed for further dewatering and ultimate disposal offsite. Doubling the plant capacity will effectively double the residuals that need to be ultimately removed from the sludge lagoons based on the current treatment processes. An evaluation will be performed to consider continuing the current operation, providing land is available, or look at other options to handle and ultimately dispose of residuals. Solid and liquid waste production rates can be estimated to identify necessary solids storage and handling requirements.

Site considerations: A general site plan will be developed showing the approximate locations of the proposed improvements. Depending on the proposed improvements, the proposed expansion may be the ultimate build-out for the existing site.

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Mr. Paul Roman, PE
City of Oregon
April 10, 2024

Task 3 – Water Distribution

The City of Oregon hydraulic model was developed using Bentley's WaterGEMS software by Arcadis and was most recently used in 2019 for water main and emergency connection evaluations. This update used the model developed in 2006 using WaterCAD by Haestad Methods. The City desires to use modeling to evaluate water distribution system improvements necessary to support expansions of the treatment plant. Given the age of the hydraulic model, an update and calibration are necessary such that model results are reliable and can be used for system planning.

We propose to update the hydraulic model of the City's water distribution system to represent existing conditions. The model will then be used for future system evaluations to identify and propose improvements. The project will include the following:

1. Update the hydraulic model of the distribution system which includes physical pipes based on GIS, facility physical and hydraulic information, and system demands that represent current water use.
2. The model should be calibrated to verify hydraulic representations are accurate before using it for any analysis or decision making. The measure of model calibration is the primary tool to communicate the level of confidence and representativeness of the model computer simulations to the actual system. Depending on the level of accuracy required and amount of distribution system data available, an optional field data collection task should also be considered to support calibration efforts.
3. The hydraulic model will be used to simulate existing and future conditions with anticipated future demands and expansion of the treatment plant accounted for. These results will be used to identify hydraulic challenges, and subsequently to identify potential infrastructure solutions like new or upsized transmission mains.

The Hydraulic Modeling Support project will be performed as follows:

1. Model Update:
    a. A kickoff meeting will be held to discuss modeling scope, data sources, and additional details about the study area. A data request list, other information needed by Arcadis to complete this Project, and anticipated dates the information will be made available will also be discussed.
    b. Review received data including the City GIS to understand attributes, connectivity, and completeness of piping infrastructure to be used for modeling.
    c. Update the existing hydraulic model of the distribution system utilizing the latest data available. This includes refreshing the piping network from the City's GIS and resolving any connectivity issues or missing attribute information.
    d. Establish hydraulic information for piping network including ground elevation, initial pipe C-factor, and closed isolation valves (for pressure zone boundaries).
    e. Facility piping and infrastructure (pumps, valving, tanks) will be imported from the existing model and reviewed with as-built drawings and hydraulic information for completeness. Any changes (new facilities, pump upgrades, etc.) will be added to the model based on the City's records (pump curves, storage volume, tank mixing information, etc.).
    f. Arcadis will review billing data provided by the City, post-process the data based on discussions with the project team, and calculate an average annual consumption for each meter. Final demand information will be spatially allocated to each meter address using model tools. This will result in the actual typical water use represented at each customer location within the model.

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g. Any available information on non-revenue water (NRW) will be reviewed, including latest water audits and any non-revenue water studies, to understand and best apply differences between pumping records and billing records as NRW demands.
h. Diurnal demand pattern will be developed based on available pump station flow information or industry standard values for residential and commercial users.

2. Model Calibration:
   a. During the project kickoff meeting, model calibration goals and approach will be discussed. The data request list provided previously will also include calibration data like SCADA and hydrant flow test data, and data availability will also be discussed. We will also collaboratively develop a set of criteria for macro and micro calibration. For example, one criterium may specify that the pressure at a location is within four pounds per square inch (psi) of the measured data.
   b. One 24-hour extended period simulation scenario and up to one steady-state scenario (for hydrant flow tests) will be calibrated against.
   c. We will work closely with City staff during the calibration process to understand any anomalies and develop solutions. During macro calibration, parameters such as diurnal curves and pump operational controls at a node may be adjusted to match model pressures to field observed data. Alternatively, during micro calibration, parameters such as pipe roughness factors may need adjusted to match model results to observed data.
3. Field Data Collection:
   a. The best model calibration typically comes from time series data of flow and pressure alongside hydrant flow test results throughout the area. Depending on what SCADA data is available in the study area, additional field data collection may be necessary to collect the information necessary to perform model calibration.
   b. The Arcadis team will closely coordinate with the City to develop a proposed field data collection plan and will determine roles and responsibilities for all aspects of data collection.
   c. Install and operate up to 10 hydrant pressure recorders for a one week time period. This data will supplement available SCADA data and provide more detailed information within the distribution system to calibrate the model against.
   d. Perform up to 5 hydrant flow tests, with some sites including pipe roughness tests to identify pipe condition. This will be used to adjust C-factors in the model and will result in a more accurate representation of system capacity.
   e. Arcadis staff will coordinate and support the field testing (with City staff operating valves and hydrants), information will be collected within ESRI Collector regarding the test details, equipment IDs, and locations.
   f. Testing results will be processed, presented to the City, and incorporated into the hydraulic model calibration.
4. System Evaluation:
   a. Using the hydraulic model of the distribution system, perform an extended period simulation to estimate hydraulics during a maximum day for existing system conditions.
   b. Additions will be made to the hydraulic model to setup future condition scenarios which will include:
      i. Future demands which will include anticipated large industrial developments and future system expansions (location and demands for these areas will be provided by the City) WTP Expansions which include a phased upgrade (+8 MGD and +16 MGD) and single upgrade (+16 MGD) scenario. Expansions will be represented by changes to the high service pump capacity.

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c. Using the hydraulic model of the distribution system, perform an extended period simulation to estimate hydraulics during a maximum day for future system conditions.
d. Evaluate existing and future hydraulic results to identify areas of the system below typical level of service goals including pressure, headloss, velocity, and fire flow.
e. Develop and model potential system changes that could help to improve hydraulic conditions in the distribution system. This may include new transmission mains, pipe upsizing and looping, other infrastructure improvements, or operational changes.
f. Prepare and submit a report summarizing the model update, results, and recommendations.

Assumptions:

1. The hydraulic model update will be based on the existing model but with the latest information available. It's assumed that the existing models' facility information is still relatively representative of existing conditions and limited facility updates will be necessary to represent current conditions.
2. Demand patterns will be estimated based on available flow information or using standard values, and updates will be made only if warranted during calibration. AMI data analysis and processing to support demand pattern development is not included.
3. Future scenarios will include two sub-scenarios for partial expansion and a full expansion to identify differences in hydraulics or recommendations. No additional sub-scenarios or time horizons are anticipated for future conditions.
4. It's anticipated that the City will provide any potential future demand flow rates. Full system demand forecasting is not included in the project, and only existing demands from a representative, recent year will be allocated in the model.
5. Any asset failure, and associated or resulting damage of any type, as a result of normal hydrant operation and while complying with established standard operating procedures is assumed to be due to age and deteriorated state the of infrastructure and shall be repaired by the City at no cost, no risk, and no liability to the Arcadis team.

Meetings and Deliverables

We anticipate one or possibly two kick-off meetings for the overall project. It may be beneficial to have a kickoff meeting for the Raw Water and Water Treatment Plant Tasks and then have a separate kickoff meeting for Water Distribution Task. Key team members will meet in-person and others will join remotely. We will establish a schedule for regular progress meetings. Following submittal of the draft feasibility study, we will conduct an in-person workshop to review the report, solicit City comments and input, and to gain consensus on the preferred alternative implementation.

Deliverables include a draft feasibility study provided in electronic format and hard copy. Following the City's review and completion of the Alternatives Review Workshop, we will complete revisions to the report and submit the final report to the City.

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Mr. Paul Roman, PE
City of Oregon
April 10, 2024

Schedule and Fee

We understand the City plans to authorize design services in late April 2024 and would like to complete the study by the end of 2024. Based on the scope of work, we do not believe this feasibility study can be finalized in 2024. We propose to submit a draft feasibility study in mid-January 2025 for review. We anticipate conducting a workshop in early February 2025 and will then finalize the report based on the review comments.

We propose to perform engineering services on a cost reimbursement multiplier fee basis plus other direct costs or reimbursable expenses. Work would be performed in accordance with an Agreement for Engineering Services that will be forwarded upon request. The estimated not-to-exceed fee is $670,000. The estimated cost breakdown per task is $137,000 for Raw Water Supply Task, $406,000 for the Water Treatment Task and $127,000 for the Water Distribution Task.

We appreciate your trust in Arcadis and will work closely with the City throughout this study to make sure we are aligned in expectations, effort and budget.

Sincerely,
Arcadis U.S., Inc.

Jeffry J. Swartz, PE
Project Manager

Email: jeffry.swartz@arcadis.com
Direct Line: 419.213.1648
Mobile: 419.450.4316

CC. Mr. Doug Wagner, WTP Superintendent

This proposal and its contents shall not be duplicated, used or disclosed — in whole or in part — for any purpose other than to evaluate the proposal. This proposal is not intended to be binding or form the terms of a contract. The scope and price of this proposal will be superseded by the contract. If this proposal is accepted and a contract is awarded to Arcadis as a result of — or in connection with — the submission of this proposal, Arcadis and/or the client shall have the right to make appropriate revisions of its terms, including scope and price, for purposes of the contract. Further, client shall have the right to duplicate, use or disclose the data contained in this proposal only to the extent provided in the resulting contract.

CITY OF OREGON
PROJECT PLANNING DOCUMENTATION
FOR THE OREGON WATER TREATMENT PLANT EXPANSION PROJECT

Introduction and Purpose:

The City of Oregon Water Treatment Plant and Distribution System is a regional public water system that serves several communities and counties including; City of Oregon, City of Northwood, Lake Township (Wood County), Jerusalem Township (Lucas County), Village of Millbury (Wood County), Village of Harborview (Lucas County), and the Village of Genoa (Ottawa County).

The purpose of the project is to expand the Oregon Water Treatment Plant from 16 million gallons per day (MGD) to 32 MGD. A Feasibility Study is needed to evaluate various alternatives to increase raw water supply, storage, treatment capacity, and determine the degree of expansion over time (a phased approach), all subject to future industrial development and funding opportunities. Once the Feasibility Study is approved, a Preliminary Design is necessary to further develop cost estimates and design details to submit grant and loan applications.

Existing Situation:

The City of Oregon withdraws water from the western basin of Lake Erie. The submerged timber frame crib is located approximately 1.5 miles offshore from the Low Service Pumping Station near Reno Beach. Water is conveyed to the Low Service Pumping Station in a 48-inch diameter intake conduit beneath the bottom of Lake Erie. Potassium permanganate is currently added at the intake bell below the crib to control zebra mussels and for taste and odor benefits. The Low Service Pumping Station includes two travelling water screens and four vertical turbine pumps with nominal rated capacities of 8 mgd, 10 mgd, 17 mgd and 17 mgd. Powdered activated carbon is added just downstream of the pumps at the station. Water is pumped through a 36-inch diameter raw water pipeline approximately 4.5 miles to the Water Treatment Plant at 935 North Curtice Road.

The Oregon Water Treatment Plant is a conventional lime-soda ash softening plant that is rated at 16 mgd with two 8 mgd treatment trains. Treatment trains provide rapid mixing, flocculation, sedimentation, softening and recarbonation. The treatment trains discharge into a common 16 mgd filter area. There are eight dual cell filters rated at 2.0 gpm per square foot with support gravel, sand and anthracite. The original 8-mgd treatment plant was constructed in 1964 and the plant was expanded to 16-mgd in 2004.

In 2015, the City increased raw water pumping capacity to 24 MGD and provides up to 6 MGD of raw water to the Oregon Clean Energy Power Plant on a continual basis.

In 2018, the City of Oregon added ozone treatment between the existing sedimentation basins and the gravity filters. The ozone system equipment includes ozone generator and power supply unit, liquid oxygen storage, vaporization, nitrogen boost, cooling water systems, ozone destruct system, and ozone diffusion contacting facilities, and ozone quenching chemical feed. The current ozone system can treat up to 24 MGD capacity.

The City has 7.5 million gallons of underground finished water storage at the water treatment plant. The City's distribution system includes two elevated tanks with a total storage of 3.0 million gallons. The Coy Road Elevated Tank stores 1.0 million gallons and the Lallendorf Road Elevated Tank stores 2.0 million gallons.

Future Conditions:

The city plans for local waterline replacement projects as shown in the following table. These projects will address pressure and breakage issues in localized areas.

City of Oregon
Master plan of Waterline Projects

Project Area	LF of Replacement	Design	Construction	Estimate
Waterline Replacement Program (2026) - Stadium (Navarre to Stadium)	18407	2025	2026	$ 3,107,586.10
Waterline Replacement Program (2029) - Southshore - Phase 4	15753	2028	2029	$ 2,906,130.45
Waterline Replacement Program (2032) - Starr, Mountainbrook, Brynhaven, Eastmoreland 2nd, Wheeling	14299	2031	2032	$ 2,882,499.05
Waterline Replacement Program (2035) - Oregon Park Subdivision, East Highland Subdivision, Schmidlin and Athens	14094	2034	2035	$ 3,104,627.12
Waterline Replacement Program (2038) - Starr Avenue Addition	10206	2037	2038	$ 2,456,645.09
Waterline Replacement Program (2041) - Euclid Park and Starr Avenue	13080	2040	2041	$ 3,215,663.94
Waterline Replacement Program (2044) - Eastwyck	7703	2043	2044	$ 2,213,961.68

The following table shows population information for Oregon and surrounding jurisdictions. Population data is from the Toledo Metropolitan Area Council of Governments (TMACOG) Area-wide Water Quality Management 208 Plan dated December 2021. This does not accurately represent the population served since not all residents within these jurisdictions receive water from Oregon. The estimated population currently served by the Oregon WTP is 30,000.

Oregon Area Population		
	2020	2030
Oregon, entire jurisdiction	19,950	21,535
Harbor View, entire jurisdiction	89	76
Millbury, entire jurisdiction	1,193	1,351
Northwood, entire jurisdiction	5,160	5,207
Jerusalem Township, entire	2,895	2,815
Lake Township, entire jurisdiction	11,160	7,450
Genoa, entire jurisdiction	2,262	1,870

Based on the City's Water Distribution System Study in 2006 current water demands, and planned industrial development, projected water demands are summarized below:

Projected Potable Water Demands		
Year	Average	Maximum Day (mgd)
2020	9.41	13.48
2025	9.69	14.54
*2030	14	23
2035	16	25

In addition to the above potable water demands, up to 6 MGD of additional raw water is pumped to the OCE Power Plant currently.

* A second power plant is planned to be built between 2026 and 2030 and will use potable water in lieu of raw water. The maximum water demand will be 6 MGD with an average demand of 3MGD. Other industrial developments will occur in the same time frame with additional demand of 1 to 2 MGD.

Until the WTP is expanded, the power plant and any other large industrial development may be served with Toledo Water, subject to City of Oregon approval and Toledo's available water capacity, for any water demand beyond Oregon's Treatment capacity.

Funding:

The project will be funded with a combination of income tax dedicated for capital improvements, water revenue for operation, OPWC grant and loan, and a new capital improvement charge to finance or pay project loans.

Compliance Schedule:

The system is not out of compliance therefore a compliance schedule is not necessary.

Consultant Scope of Services:

The basic scope of services is to assist the City in conducting various analyses for the Feasibility Study and Preliminary Design. A detailed scope of services will be developed once the top consultant is determined.

1. The Engineer shall conduct various analyses to determine the best option to increase raw water supply with the City of Oregon's current system versus purchasing raw water from City of Toledo through their low service pump station. The analyses shall also include an emergency interconnect with Toledo's raw supply as a minimum.

2. The Engineer shall conduct various analyses to determine size and best location for finished water storage per phase or degree of expansion.

3. The Engineer shall conduct various analyses to determine minimum requirements to expand the trunk water distribution to accommodate each phase or degree of expansion.

4. The Engineer shall conduct various analyses to determine all requirements to expand the current water treatment plant, including the continual supply of raw water to the OCE Power Plant and meeting all current EPA regulations and recommendations or best practices for future treatment.

City Services:

1. City staff will be responsible for administering the project and overseeing the consultant's work on this project. Representatives of the City's Department of Public Service and Water Treatment Plant will review plans and other documents prepared by the consultant.

2. Make available any data from City records, such as previous studies and reports, plans, specifications, shop drawings, etc.

3. Provide access to and make all provisions for the CONSULTANT to enter upon public and private property as required.

Schedule:

	Start Date	**End Date**
Feasibility Study	**12-12-23**	**9-13-24**
Preliminary Design	**9-16-24**	**6-13-25**