SECTION C

Proposed Work Plan

Proposed Work Plan

OUR PLAN OF ACTION

The City of Ann Arbor's Public Services Area (AAPSA) maintains a water distribution system dating back to the late 1800's that serves a unique customer base including the University of Michigan (U of M), Scio Township, and Ann Arbor Township. The City of Ann Arbor (City) draws its drinking water from both surface and groundwater sources and treats it at their Water Treatment Plant (WTP) facility. Downstream of the City's WTP there are four remote pumping stations, two elevated storage tanks, three underground storage tanks, and one ground storage tank.

The distribution system is supported by multiple City service units within the AAPSA, including the Water Treatment Services Unit, which is responsible for the City's vertical water assets, the Public Works Unit, which is responsible for the City's linear water assets, and the Systems Planning Unit, which supports the water system with capital planning and asset management. Together these units work to meet the City's Level of Service (LOS) goals originally developed in 2015 to ensure high quality drinking water is delivered to all customers.

As the City continues to attract residential and commercial development and support an expanding University it is critical for the City to maintain an updated Comprehensive Water Distribution Plan and hydraulic model. OHM Advisors (OHM) is pleased to submit our proposed work plan for the development of the City's water distribution plan and update to the hydraulic model. The following sections describe our overall project approach and understanding, and the resulting detailed project work plan to execute this large planning effort.

Project Approach

To meet the expectations of the City and the varied project goals outlined in this RFP, the selected consultant requires a strong foundational background of drinking water systems as well as an absolute commitment to teamwork, project management, coordination, and responsiveness. OHM is uniquely qualified for this project because we provide a highly qualified and motivated team of engineers and technicians under an organizational structure and culture that promotes innovation, efficiency, and exceptional service to our clients. This allows OHM to build longstanding relationships with our clients as partners in their ongoing efforts to provide a high level of public service to their community. We look forward to following this model of success and continue our positive relationship with the AAPSA Systems Planning Unit to execute this project.

OHM's deep understanding of the City and its operational dynamics, strategically positions our highly skilled team for the effective execution of this project. OHM not only possesses a comprehensive understanding of the applicable regulatory standards, but also a strong knowledge of City-specific standards, procedures, and key personnel necessary to proficiently carry out this project.

To further enhance our alignment with the City's RFP objectives, our management team for this project includes individuals with extensive experience tailored to meet the City's specific needs:

- **Robert Czachorski, PE**, a trusted advisor and project manager to the City of Ann Arbor for nearly a decade with a strong foundational understanding of working successfully with the City's Systems Planning Unit.

- **Susan Knepper, PE**, a great lakes region drinking water expert with a track record of assisting more than twenty communities on comparable projects. She has been instrumental in supporting the City with its Brightly Predictor projects over the years.

To further align with the City's objectives and enhance our access to essential resources, we also have the distinct advantage of **Chris Elenbaas, PE**. Chris' previous tenure with the City's Public Works Unit and track record with the City's WTP positions him not only as a key participant on this project, but also as a liaison capable of guiding us to the right individuals and resources, which will be invaluable for the success of this project.

The Comprehensive Water Distribution Plan and Model Update represents a compilation of historic and present studies, as well as Capital Improvement Plan (CIP) needs the City is seeking to address, which will require a sophisticated and coordinated approach with a diverse and talented team. We have assembled our proposal with project members that will deliver this project in a successful and meaningful way. Below are the main principles of our approach:

Create a Shared Vision

Project processes will incorporate flexibility, offering the latitude to think outside the box to reach the final and optimal methods of execution and delivery. We will work iteratively, examining potential alternatives to reach the most effective solutions and recommendations. We understand how to balance project desires with finite available resources, and our team will seek to efficiently leverage resources to deliver an exceptional project to the City.

Deliver Engineering & Water Resources Excellence

For over 50 years, OHM has served as trusted advisors to communities throughout the Midwest region. Our success comes from an unyielding passion for finding innovative solutions for our clients with the goal of advancing communities. Our team members are leaders in their respective fields and our strategy thoughtfully integrates our unique skills to successfully execute and deliver on this project.

As this is a drinking water project, our Water Resources team will assume the primary role. Our Water Resources team brings energy and a wealth of technical expertise in the reservoir of drinking water analytics. The passion of our drinking water experts is unmatched as we seek the most sustainable solutions for communities to harmonize innovation, affordability, and service excellence.

PROPOSED WORK PLAN **CONTINUED...**

As outlined in our past involvement with similar projects, our **DRINKING WATER TEAM LEADERS** (listed below) has successfully helped communities solve their most challenging drinking water challenges including, but not limited to:

- Water Master Planning
- Optimizing System Operations
- Contingency Planning for Emergencies
- Emergency Response
- Asset Management Planning
- Capital Planning

Susan Knepper, OHM's Drinking Water Expert, has not only spearheaded modeling, hydraulic analysis, and asset management planning within OHM but has made a significant impact on a national and international scale through her active involvement with the American Water Works Association (AWWA). With over a decade of experience, Susan's contributions to AWWA have led to the advancement of drinking water knowledge in Michigan and beyond. Her extensive involvement in delivering presentations, sharing expertise, and collaborating with professionals worldwide has bridged the gap between local and global best practices, benefiting both her local Michigan community and the broader industry. Susan has performed dozens of modeling analyses for communities of all sizes and system complexities. Susan was integral in leading the modeling effort for Michigan's largest water distribution network which involved a large team of professionals in the fields of engineering, law, policy, and operations. She was ultimately instrumental in developing a process to identify what water mains served a regional (transmission) vs. local (distribution) purpose.

Chris Elenbaas, is an experienced municipal engineer who has spent years working closely with all areas of the City's water supply system including the Water Treatment, Public Works, and Systems Planning Units. He brings a great understanding of all elements of the City's water system and will provide insight throughout the project on modeling, QA/QC, planning and asset management.

Seth Swanson, a seasoned hydraulic modeling specialist with an impressive track record of over 12 years of experience in drinking water analytics and modeling. He will oversee the Quality Assurance/Quality Control (QA/QC) aspects of this project.

Murat Ulasir, holds a Ph.D. in Environmental and Water Resources engineering and is an expert in asset management planning for above and below ground infrastructure assets. He will contribute to the QA/QC aspects of this project and provide forward-thinking recommendations for innovative project delivery.

Mackenzie Johnson, a hydraulic modeling expert well-acquainted with the City. She will assume a leading role as a modeler for this project. With more than 8 years of experience in drinking water and collection systems modeling and analysis, Mackenzie has made substantial contributions to numerous water resources initiatives within the City over the past several years.

Isabelle Bester, will serve as hydraulic modeling lead and asset management lead, having over 3 years of experience, predominantly focused on drinking water analytics and modeling at OHM.

Matthew Kennedy, a process engineer with 20 years of experience in construction management and engineering. He will serve as capital planning lead and cost estimator.

Public Engagement

The leadership for the Public Engagement task for this project will be entrusted in OHM's Christine Spitzley and Susan Knepper. Successful public engagement builds trust on two levels: 1) trust in the project team's technical competence and 2) the project team's ability to effectively convey this information to the stakeholders. Given the potentially sensitive nature of portions of this project, it is critical that the team understand how to properly convey this information in an easy-to-understand format.

The pairing of Christine, who serves as the Vice President of the American Water Works Association (AWWA), and Susan Knepper, an active member of MI-AWWA who currently holds the position of Chair of the MI-AWWA social media committee, forms a highly skilled and specialized team to lead the public engagement portion of this project. Together, they offer a uniquely qualified approach that stems from their technical expertise of drinking water systems and their extensive involvement in AWWA. Generational insights and extensive industry experience will contribute to the project's overall success.

Project Management

This project offers the opportunity to create an all-encompassing water distribution strategy, thus demanding a rigorous approach to team organization, communication, and project delivery. We will establish and implement sound project management strategies from the onset of the project and continuously employ them during the work.

Together, the management team of Robert Czachorski and Susan Knepper will oversee various facets, including analysis and hydraulic modeling, while ensuring seamless coordination and obtaining necessary approvals from the City. Effective project management will be central to our approach, enabling us to maintain open and effective communication through the project's lifecycle. This will encompass defining clear goals and objectives to steer project development, maintain and monitor schedule and milestones, and control project costs.

PROPOSED WORK PLAN **CONTINUED...**

Project Meetings

Consistent, clear, and effective communication amongst the Project Team members (City of Ann Arbor, OHM Advisors, and Stakeholders) is key to a successful project, while keeping in mind the City's goals and objectives for the project. This will be achieved through regularly scheduled meetings of the Project Team as coordinated by the OHM Project Manager.

Specific work sub-tasks will include the following:

- After the Notice to Proceed from the City, OHM will schedule a Project Kick-Off Meeting with the City's Project Manager and key project staff to review and confirm the project scope, review the project schedule, and to establish the Project Team's roles and responsibilities.

- At the Kick-Off Meeting a schedule of Project Check-In/Status Meetings will be set at recurring intervals along with identifying key milestones and delivery dates. For this project, OHM has anticipated bi-weekly Project Check-In/Status Meetings with the City's Project Manager. This standing meeting will occasionally be used for more extensive discussions with other City stakeholders.

OHM Advisors' Deliverables
Meeting Presentations
Meeting Agendas
Meeting Minutes

Quality Assurance & Quality Control (QA/QC) Plan

Quality is a fundamental project goal of OHM Advisors. Project quality begins with a team commitment to produce the best possible work product consistent with our clients' goals and expectations. Sound project management and effective communication are critical components. OHM's commitment to excellence is what we strive for and is demonstrated as part of our comprehensive QA/QC program.

QA/QC reviews will be performed at all critical milestones in the project. Time for project reviews is included in the project schedule. Reviews are tracked and documented by each team member to certify completion of the review.

The results of our robust QA/QC program benefit our team and the City by delivering on-time, within-budget projects.

Project & Task Understanding

The following section details OHM's understanding of this project, our approach to execution, and details of how OHM plans to meet and exceed the City's requirements for this project. This is followed by our detailed ***Scope of Work*** identifying the individual steps that OHM will take to deliver on each required task.

The details in this section support their corresponding Scope of Work items to assist the City in gaining a deep understanding of OHM's vision within the broader context of the project.

The City is seeking an update to their water distribution plan and hydraulic model. Although the previous comprehensive plan and hydraulic model calibration was completed in 2010, the City has proactively continued to update the model with system improvements since this effort.

A Comprehensive Water Distribution Plan goes beyond assessing the hydraulic capacity to meet present and future needs; it also evaluates risk of existing assets, considering factors like probability of failure (POF) and consequence of failure (COF). The City has been proactive in recognizing the importance of asset management planning with a detailed review of their system completed in 2015, which established level of service (LOS) goals for their system and a Prioritization Action Number (PAN) for their assets. OHM is currently working on bringing this information into the Brightly Predictor software.

Between 2010 and present day, the City has successfully executed multiple projects linked to their water system, with ongoing advancements currently underway. As part of this project, OHM will develop a Comprehensive Water Distribution Plan that adeptly captures the requested scope of services and integrates the previous studies that are related to these services. Considering that many of these earlier studies exist independently of each other, it is OHM's goal to create one complete and Comprehensive Water Distribution Plan that captures the institutional knowledge of the water system and can serve as an invaluable resource for the City.

PROJECT INITIATION & INFORMATION GATHERING

SEE SCOPE OF WORK TASK 1

While the RFP references supporting information dating back to 2010, it's important to acknowledge that the water system has a rich history dating back to the late 1800s. Understanding the historical context is pivotal when developing a comprehensive distribution plan. Discussions with City staff, operators, and applicable stakeholders can reveal invaluable insights that may not be documented, underscoring the importance of collaboration throughout this project. While the commencement of this project will begin with a thorough initial information gathering, through both document review and discussions, it is likely that throughout the project new insights will arise that will require further conversations with the key stakeholders. This evolving task is essential to capture the entirety of the system narrative and ensure the success of the project's ultimate deliverable.

PROPOSED WORK PLAN **CONTINUED...**

SEE SCOPE OF WORK SUBTASK 1A

Information Request
OHM will compile a data request letter outlining information needed and the appropriate channels to send information through prior to the project kick-off meeting. This will allow OHM to review the available data and be prepared to discuss next steps at the kick-off meeting.

The comprehensive drinking water plan should incorporate previous studies and analysis including:

- 2010 – Drinking Water Distribution Master Plan/Water Model (CDM)
- 2015 – Water Distribution Level of Service & Capital Reinvestment Study (AECOM)
- 2017 – Water Distribution Modeling Scenarios (FTCH)
- 2017 – Water Asset Management Program Report (FTCH)
- 2021 – City of Ann Arbor/University of Michigan Water Connectivity Analysis (CDM)
- Present – Water Treatment Plant Facility Plan (AECOM)
- Present – Comprehensive Land Use Plan (City of Ann Arbor Planning Department)
- Present – Capital Predictor Reinvestment Strategy (OHM)

In addition, the following information shall be collected, reviewed, and assessed:

- InfoWater Hydraulic Model
- Water System Geographical Information System (GIS)
    - *Water Main, Hydrants, Valves, Leads, Customer Meters (linked to billing data), Zoning, Pressure District, Vertical Assets, Break Data*
- Wholesale Customer Supply Agreements
- City's Water Meter Billing Data
- Water Main Consolidation Practice
- Supervisory Control and Data Acquisition (SCADA)
- Monthly Operating Reports (MOR)
- Bacteriological Sampling Data
- Operation and Maintenance Manuals
- United States (US) Census and Southeast Michigan Council of Governments (SEMCOG) Population Data
- City's Water Pressure Policy
- Historical hydrant flow testing data
- Capital Improvement Plan
- City's current water system emergency programs
- City's current valve turning and hydrant flushing program
- Public Services Standard Specifications

SEE SCOPE OF WORK SUBTASK 1B

Interviews & Workgroups

Once the requested information is reviewed and verified, OHM will arrange meetings involving essential City personnel and relevant stakeholders to address any inquires in information required for the effective completion of the study. OHM will proactively establish workgroups comprising of essential City personnel and relevant stakeholders. This includes, but is not limited to, the following stakeholders:

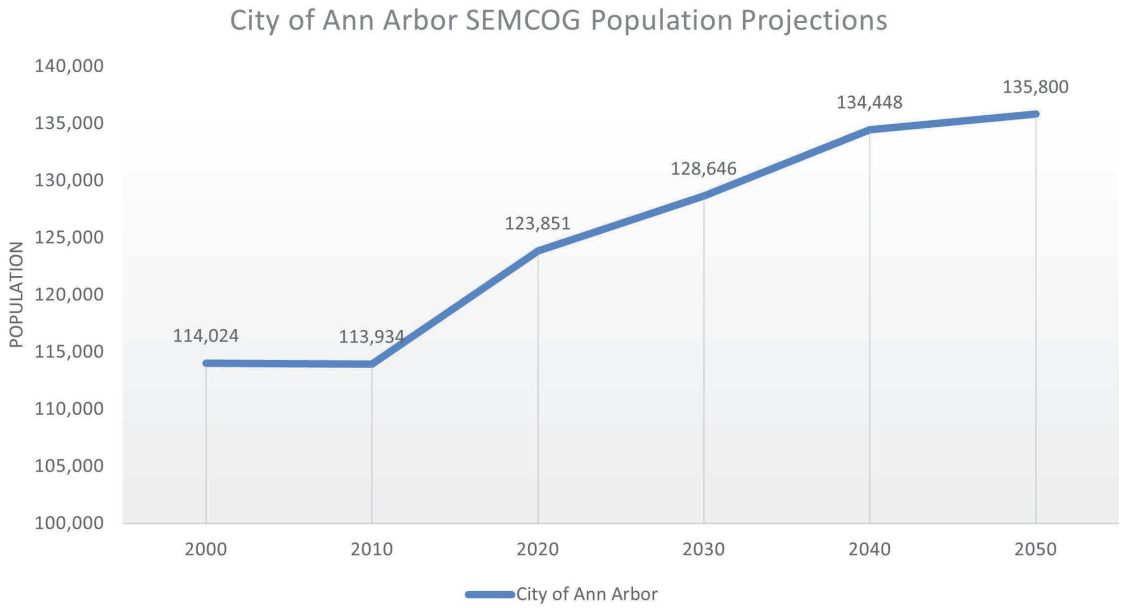
City of Ann Arbor Stakeholders

Internal Stakeholders

- **Planning**
  - Office of Sustainability & Innovations (OSI)
  - Planning Department
- **Emergency Services**
  - Fire Department
  - Public Works Unit
  - Emergency Management Tear.
  - Communication Office
- **Water Systems Operations**
  - Public Works Unit
  - Fire Department
  - Water Treatment Plant Operations

External Stakeholders

- **Planning**
  - University of Michigan
  - City of Ann Arbor Public Schools
  - Scio Township
  - Ann Arbor Township



PROPOSED WORK PLAN **CONTINUED...**

Key information from the interviews will be documented and utilized as applicable in the Comprehensive Water Distribution Plan. Institutional knowledge, especially from City field staff and operators, will be incorporated and a hub will be created to store this information based on what category of the drinking water system it falls under.

External Stakeholders are essential to engage with during this large-scale planning effort as their internal plans can impact the City's system and outcomes of this project. OHM has trusted relationships with all non-city stakeholders that would relate to this effort, simplifying the coordination of this initiative.

SEE SCOPE OF WORK TASK 2

PLANNING & DEMAND PROJECTIONS

OHM will evaluate and analyze existing population and consumption data. This component of the hydraulic model refresh will require collaboration between City planning, public works, operations, OSI, and external stakeholders to ensure future conditions are accurately incorporated into the City's Comprehensive Water Distribution Plan. The 2022 and 2023 average daily demand, minimum daily demand, maximum daily demand, and peak/max hourly demand data will be calculated by utilizing the WTP production data and the City meter billing data. A mass balance will be completed to ensure water that is either entering or leaving internal system storage is accurately considered when determining system demands. OHM proposes to review and vet the 2019 (pre-COVID-19) demand data currently in the City's model and the anticipated demand analysis completed by AECOM as part of the Water Treatment Plant Plan.

In addition to establishing a University of Michigan summer month demand scenario, OHM will review monthly average demand data to determine the City's overall lowest average demand month to assess potential water age/quality conditions. This demand data will be utilized to build water age scenarios to assist in operational recommendations as part of ***Task 4: Hydraulic Analysis***. OHM will provide a final recommendation to the City for the following existing demand scenarios which will serve as the basis for future projections:

- Average Day
- Minimum Day
- Maximum Day
- Peak Hour
- Water Quality (University of Michigan Summer & Lowest Average Demand Month)

Once the baseline demand scenarios are agreed upon by the City, hourly average diurnals will be calculated based on customer type. It is anticipated hourly average diurnals for the following customer types will be developed with more specific classes identified once data is assessed:

- Residential
- Commercial
- Irrigation
- Large Unique Users (University of Michigan, Public Schools, etc.)
- Wholesale Customers (Scio Township, Ann Arbor Township)

It's understood that the City Planning Department is in the process of developing a Comprehensive Land Use Plan identifying anticipated areas of densification. This effort will incorporate known developments including the University of Michigan dorm expansions and future growth of the West Stadium Boulevard corridor. OHM is currently working with these growth projections for mater planning efforts within the sanitary sewer system and will working closely with the City to incorporate this same information into the water system future demand scenarios.

OHM proposes to calculate 5-year, 10-year, and 20-year population and demand projections, which will not only incorporate US Census and SEMCOG population data but, most importantly, the results from stakeholder discussions and planning projections. While the City requested only 10-year and 20-year projections in the Water Distribution Plan and Model Update request for proposal (RFP), OHM recommends performing 5-year projections to satisfy EGLE ACT 399 requirements.

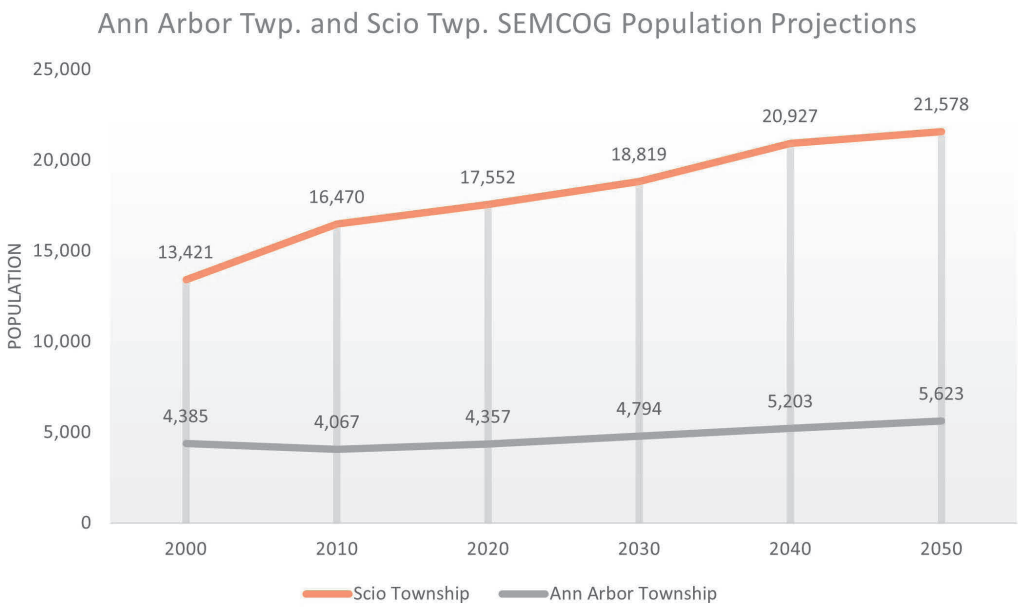
SEE SCOPE OF WORK TASK 3

HYDRAULIC MODEL REFRESH

A hydraulic model can prove to be a very valuable asset to a community with its capability to assess the health of a water system under different planning, operational, and emergency scenarios. A hydraulic model update includes the following four (4) key elements:

- Infrastructure Updates
- Operational Updates
- Model Calibration
- Baseline Demand Scenarios

Each one of these unique components interconnects to create a confident model. Therefore, having trust in each of these elements will result in a valuable model which can be used for system planning.



PROPOSED WORK PLAN **CONTINUED...**

SEE SCOPE OF WORK SUBTASK 3A

Infrastructure & Operational Updates

Ideally, a water system model has a unique identifier that can establish a direct connection between the model and the community's GIS, ensuring a one-to-one link between the two. Having a model built this way allows for more efficient review, update, and analysis. It is OHM's understanding that the City has invested heavily in their GIS and it is considered the 'master' database as information here can link to CityWorks, Capital Planning, and other critical asset management tools. It is also OHM's understanding that the City has been able to proactively update their model as infrastructure improvements have been completed, but the model and GIS do not have a unique ID link. OHM has provided time and cost in the ***Scope of Work*** for a quality assurance and quality control (QA/QC) review, comparing the City GIS with the existing model to verify model's accuracy as a representation of the water system.

Additionally, we've created Subtask ***3D: Comprehensive Model (Optional)*** for a comprehensive model rebuild to establish a seamless one-to-one alignment between the City's GIS and the model.

OHM proposes to provide a QA/QC of the vertical assets currently in the model with information gathered during ***Task 1: Project Initiation & Information Gathering*** to ensure they are accurately represented in the model. This includes the City's pressure reducing valves (PRVs), booster stations, and storage tanks.

One of the most important elements of a model update is capturing the unique operations of a system, including, but not limited to, closed valves, pump curves, control settings, operational logic, and winter vs. summer set-points. This information will be utilized to assign boundary conditions in the model. It is often the misunderstanding of system operations that lead to excessive troubleshooting during model calibration.

Through interviews with key personnel and review of information, OHM plans to collect all pertinent information for successful execution of this project and to create a knowledge hub that is pertinent for succession planning. Having a strong understanding of operations allows for the opportunity to understand areas where optimization of the system can be realized. Information that shall be collected, understood, and incorporated includes, but is not limited to, the following:

- Pump Controls & Operations
- Storage Tank Operating Levels (Summer vs. Winter) & Emergency Levels
- WTP Capacity & Firm Capacity
- PRV Settings
- Closed Valve Locations
- By-Pass Valve Locations & Status

SEE SCOPE OF WORK SUBTASK 3B

Model Calibration

Once the model is populated with the updated infrastructure data, operational data, and demand data OHM will begin the model calibration task. The City last calibrated their model as part of their 2010 Drinking Water Distribution Master Plan. Model calibration is a key component of a ***Task 3: Hydraulic Model Refresh*** because, once accomplished, it enables a confident evaluation of system hydraulics under different scenarios. Calibration will consist of the following subtasks:

- Field Testing – Hydrant Flow Testing & Pressure Monitoring
- Demand & Operational Analysis/Boundary Conditions (during hydrant testing)
- Model Troubleshooting

Hydrant and pressure monitoring field testing will be conducted as part of this task with support of City staff to operate hydrants. OHM will identify approximately 25 locations for hydrant testing. If a hydrant is identified as in-operable upon visit, OHM will provide approximately 5 additional locations which can be substituted. Water main age, diameter, material, and location will be considered when identifying testing locations. Historical hydrant testing data and operator input will be considered when determining the flow test locations to assess how the system has performed over time and to pinpoint areas of concern within the system.

PROPOSED WORK PLAN **CONTINUED...**

Approximately 50 tests from the City's previous two (2) years of fire department hydrant flow tests will be reviewed. Ultimately, the hydrant test plan will provide a representative sample of the entire water system so that inferences can be made throughout. Pressure monitors will be placed at strategic locations throughout the system during hydrant testing. The data from the pressure monitors will be utilized during model calibration to ensure the model is accurately portraying the system, not just from a static snapshot, but also representative of the system over an extended timeframe.

It is important to understand the boundary conditions, including system demands, when establishing the calibration scenario in the hydraulic model. Prior to hydrant flow testing, the system PRV settings should be assessed, and information that is not trending in City SCADA data that would aide in model calibration should be identified. OHM anticipates that trending SCADA data is available to use as part of this task at the WTP, pump stations, and storage tanks. If trending data is not available to benefit the calibration process, OHM will strategically place the pressure monitors in locations to assist in troubleshooting conditions. If possible, it is recommended that the City calibrate their equipment, including flow meters and pressure gauges prior to this task.

Once the field data is collected, OHM will begin the calibration process. A calibration scenario will be created in the model that reflets the boundary and demand conditions during the field testing. The model will be analyzed and compared to the static and residual pressure at the measured flow rate recorded in the field. In addition, OHM will utilize the City's historic hydrant flow test data and static pressure data to assist in the calibration effort. OHM will reasonably adjust system conditions, such as pipe roughness factor (C-Factor), water loss demand, and valve positions to satisfy calibration requirements. If calibration suggests a boundary condition, such as a closed valve or pressure setting is causing a calibration error, then OHM will coordinate with City staff to field verify conditions. As there are no universally accepted standards for hydraulic modeling calibration, and the degree of calibration depends on the anticipated use of the model. OHM will provide recommendations to the City for degree of calibration based on available guidelines.

SEE SCOPE OF WORK SUBTASK 3C

Baseline Model Scenarios

Following model calibration, OHM will build the following model scenarios:

- Existing Average Day, Minimum Day, Maximum Day, and Peak Hour Demand Scenarios
- Future: 5-Year, 10-Year, and 20-Year Average Day, Minimum Day, Maximum Day, and Peak Hour Demand
- Existing Water Quality and Future Water Quality Scenarios

The future modeling conditions scenario will include full water distribution build out of Township island areas within the City limits, the proposed University of Michigan isolation vaults, and key stakeholders planning information. These scenarios will incorporate the demands calculated as part of ***Task 2: Planning & Demand Projections***. Future demands will be allocated based on discussions with City stakeholders.

OHM will utilize the Demand Allocation Manager in InfoWater Pro to allocate demands based on customer meter location. Diurnal patterns will be assigned to each location based on their customer type. Non-Revenue water will first be equally distributed throughout the model but will be refined during the model calibration phase as system hydraulics and operator input suggest. This will assist the City in areas to focus on for leak detection and potential replacement.

These scenarios will ultimately be used in ***Task 4: Hydraulic Analysis*** to assess the system's performance as it relates to EGLE regulatory requirements, the City's LOS goals, and internal requirements to determine if existing or future CIPs or operational changes are necessary.

Prior to assessing the water quality model in ***Task 4: Hydraulic Analysis***, OHM will review the modeling results with City staff and utilize the City's bacteriological sampling data to validate the modeling results.

SEE SCOPE OF WORK TASK 4

HYDRAULIC ANALYSIS

Upon successful completion of ***Task 3: Hydraulic Model Refresh*** task, OHM will proceed with ***Task 4: Hydraulic Analysis***. This critical task encompasses a comprehensive evaluation of the City's water distribution system, assessing its ability to meet both current regulatory requirements and future compliance expectations, as well as aligning with the City's internal LOS goals and standards. The analysis will assess the City's system and its response under both the existing and anticipated future demand scenarios. The following tasks will be completed:

- Hydraulic Performance Existing & Future
- Operational Optimization
- System Resiliency & Emergency Preparedness
- Hydraulic Model Training

The findings from ***Task 4: Hydraulic Analysis*** will directly inform the City's CIP. If deficiencies are identified in the existing and future hydraulic analysis, then CIP items or operational recommendations will be developed to counteract the deficiencies. Planned and proposed CIP items will be incorporated into the future conditions modeling and validated. This includes the following projects

- Proposed Isolation Vaults (2021 City of Ann Arbor/University of Michigan Water Connectivity Analysis)
- Full Township Island Build-Out
- UT-WS-14-04: Geddes Road Water Main Replacement
- UT-WS-18-33 and UT-WS-14-16: N Main St Water Main Replacement
- UT-WS-06-08: WTP: Pressure District Improvements
- UT-WS-18-05: Washington Heights/Arboretum Transmission Main Replacement

This is further discussed in ***Task 6: Capital Improvement Planning*** task.

PROPOSED WORK PLAN **CONTINUED...**

SEE SCOPE OF WORK SUBTASK 4A

Hydraulic Performance Existing & Future

The City's hydraulic model will be analyzed for its hydraulic performance and ability to satisfy regulatory requirements and internal LOS goals and standards under the existing and future demand and planning scenarios. The following regulatory and internal requirements will be referenced as it relates to this project:

- Act 399 and Recommended Standards for Water Works/10 State Standards (pressure and capacity of water works system)
- City of Ann Arbor Water Pressure Policy
- City of Ann Arbor 2015 Level of Service Goals
- City of Ann Arbor Fire Department Fire Flow Criteria

The City's rated capacity of the waterworks system, including capacity of the water source, treatment, storage tanks, pumping facilities, and equipment to maintain system reliability will be evaluated on its ability to satisfy both existing and future demands. The City's wholesale customers will be considered as part of this analysis and available system capacity will be estimated to assist the City in future customer agreement opportunities. It is anticipated that a detailed review of system source and treatment capacity was completed as part of the AECOM Water Treatment Plant Facility Plan which OHM proposes to reference and source as part of this Comprehensive Water Distribution Plan.

The City of Ann Arbor's updated hydraulic model will be utilized to assess and provide recommendations for the following:

- System Pressure
- System Fire Protection Capability
- City's Comprehensive Land Use Plan
- Water Main Consolidation Effort
- Public Services Standards Specifications Water Main Sizing
- City's Water Pressure Policy

The City's hydraulic model will be used to assess the system's ability to meet regulatory and internal pressure and fire protection requirements under each existing and future planning scenario. In addition, water age, which can be considered a surrogate for water quality, will be reviewed. If a deficiency is identified, OHM will document the deficiency and provide capital or operational recommendations that can be implemented to improve the system.

SEE SCOPE OF WORK SUBTASK 4B

Operational Optimization

Through hydraulic modeling and conversations with stakeholders, opportunities for operational optimization can be identified such as pressure zone redistricting, storage tank operational changes, and control setting changes. OHM proposes to first determine if an operational improvement can be made to improve any pressure, fire protection, or water age deficiencies that are identified during this task before identifying capital projects to do so. Operational improvements will be analyzed and vetted as part of this subtask. The following specific components will be assessed as part of this subtask:

- Water Age/Quality and Water Age Reduction Opportunities
    - Reservoir Turnover Improvements
- Uni-Direction Flushing Program Evaluation
- Pressure District Consolidation Evaluation (including reduced pressure zones)
- Permanent System Pressure Monitoring and District Metering
- Non-Revenue Water

SEE SCOPE OF WORK SUBTASK 4C

System Resiliency & Emergency Preparedness

OHM has not only succeeded in guiding numerous communities through emergency water system situations but also in creating user-friendly and interactive operational contingency plans. These plans have proven to be an invaluable resource to communities to capture the operational steps necessary to counteract emergency scenarios and prevent long-term boil water advisories. The tool successfully captures system institutional knowledge and is easily updated as new information is available. As part of this sub-task, OHM proposes to complete the following:

- Review & Update the 2010 Emergency Planning Operations Recommendations
- Valve Criticality Analysis
- Single Point of Failure Analysis
- Develop Boil Water Advisory Guidance Material/Tools

OHM will assess the City's model and meet with City staff and the City's emergency management team to discuss critical valve locations, large-scale failure scenarios, and improvements to the 2010 emergency planning operations recommendations.

Our experts deliver proven water supply, treatment and distribution engineering services, applying new technologies at every turn. We're passionate about water quality and help communities navigate contaminants and the issues that come with them—from understanding what they are and where they come from, to interpreting and implementing governmental regulations, to communicating with residents and stakeholders about treatment, safety and other mitigating efforts.

PROPOSED WORK PLAN **CONTINUED...**

OHM proposes to develop an online interactive tool that integrates the components of the system resiliency and emergency preparedness within this project. The tool will be available for use by City staff to proactively manage large system emergencies and identify customers within the system that will require boil water advisories. OHM anticipates approximately ten (10) scenarios will be assessed on an Average Day and Maximum Day Demand scenario, including the following:

- Loss of Barton Pump Station
- Gravity Reservoir Failure
- East HS/WS HS Failure
- Loss of Libert Pump Station
- Loss of North Campus Pump Station
- Loss of Fuller Glen Pup Station
- Loss of South Industrial Pump Station
- Key Transmission Main Failure

Additionally, this tool can serve as a hub that captures system institutional knowledge to aid in succession planning and can easily be updated as system information changes or more scenarios are identified by the City. OHM will prepare instructional materials and training to familiarize City staff on use of this tool.

SEE SCOPE OF WORK SUBTASK 4D

InfoWater Pro Training

OHM's proficiency in InfoWater Pro and hydraulic modeling, complemented by our internal training initiatives and participation in external training programs for InfoWater Pro, uniquely positions us to deliver high quality training to City staff. Our expertise not only ensures a comprehensive understanding of the software but also guarantees a wealth of knowledge regarding the location of publicly available training material (example via QR code). Our training would be catered to the individual staff members that are identified and the goals that are discussed during pre-training meetings.

SCAN ME

SEE SCOPE OF WORK TASK 5

ASSET MANAGEMENT PLAN (AMP)/PRIORITIZATION ACTION NUMBER (PAN)

As part of the City's 2015 Water Distribution Level of Service & Capital Reinvestment Study project, the City developed LOS goals and a risk model that included the development of the Priority Action Number/PAN for their water system assets. OHM is currently integrating the City's asset management data into Brightly Predictor and successfully assisted with this effort as part of the City's storm and sanitary sewer asset management projects. These efforts have identified opportunities to refine and build on the PAN framework. Specifically, this project presents the opportunity to develop a risk model that can be degraded over time to simulate future risk and budget planning in addition to identifying current high-risk assets.

Using information and insights from ***Task 1: Project Initiation & Information Gathering***, ***Task 2: Demand Analysis***, and ***Task 4: Hydraulic Analysis***, OHM will review and update the City's large and critical user information. In addition, through ***Subtask 4C: System Resiliency & Emergency Preparedness***, OHM will determine critical assets in terms of their hydraulic system benefits to be incorporated into the City's risk matrix.

In the Scope of Services, OHM has included ***Task 5B: PAN Software Replacement (Optional)*** to evaluate three (3) software applications to replace the current PAN model. As OHM is working through this integration with Brightly Predictor and identifying the limitations in the current PAN model as it relates to long-term system planning, we are well positioned to offer valuable recommendations to the City.

As part of this task conclusion, OHM will provide recommendations for a future LOS update effort. It is logical to perform this after the hydraulic analysis and towards the end of the project, as insights gained during this analysis can be factored into the recommendations.

SEE SCOPE OF WORK TASK 6

CAPITAL IMPROVEMENTS PLAN (CIP)

Water system CIP projects will consider hydraulic deficiencies identified during ***Task 4: Hydraulic Analysis***, insights from Task 5 - AMP/PAN, and City-directed desired projects for 5-year, 10-year, and 20-year planning horizons. In addition, the planned water distribution projects in the City's existing CIP, which will be vetted as part of ***Task 4: Hydraulic Analysis*** will be incorporated as necessary. Capital projects will be prioritized according to their importance to the system, and when possible, alternative solutions will be explored. Planning level cost estimates will be provided for these projects. The City's CIP update will encompass and validate the following:

- Current CIP
- Pressure Deficiencies
- Fire Protection Deficiencies
- Water Quality Deficiencies
- Capacity Deficiencies
- Resilience Deficiencies
- *PAN Software (Optional)*
- Permanent Pressure Monitoring & District Metering

The City's CIP task also includes optional as-needed modeling support for a three (3) year period upon completion of this project.

PROPOSED WORK PLAN **CONTINUED...**

SEE SCOPE OF WORK TASK 7

#PUBLICENGAGEMENT

The City continues to lead the way in transparency with its customers, prioritizing public engagement to enhance stakeholder comprehension and involvement in decision making. Since the City is not requesting an update to their 2015 LOS goals at this time, which necessitates in-depth stakeholder involvement, OHM's engagement strategy will be primarily revolve around educating the public on the importance of this project. OHM, with their expertise in drinking water systems and active involvement with AWWA on both the international and local levels, is well-equipped to adeptly convey public information safely and effectively.

OHM will collaborate with City staff to develop a Community Engagement Toolkit, a comprehensive resource that will provide information and tools to inform and educate stakeholders about this project. The development of a stakeholder list will be a collaborative effort with the City, enabling us to collectively strategize on the most effective means of delivering project information, recognizing the individual needs of each stakeholder. The results of this effort will serve as a guiding framework for the creation of educational and outreach materials. As previously mentioned, the materials generated will be focused on public education of this project, with the aim of ensuring that a diverse audience comprehends its significance. The materials generated will include language for the City's website, social media posts with images, and video. The content will address the projects process, outcomes, conclusions, recommendations, and potential impacts.

SEE SCOPE OF WORK TASK 8

FINAL DELIVERABLES

OHM has provided two (2) options for the City of Ann Arbor to consider for final deliverable in the Scope of Work:

- *Subtask 8A: Updated Comprehensive Plan Report*
- *Subtask 8B: Updated Comprehensive Plan Dashboard*

With the ongoing advancements of technology and the increasing reliance on online platforms for information access through various software solutions, OHM is proposing the option to deliver the results and recommendations of this Comprehensive Water Distribution Plan via an online dashboard in lieu of a report.

Ultimately, the choice between an updated comprehensive plan report and a comprehensive plan dashboard hinge on the City's specific goals, the preferences to its stakeholders, and its broader technological and communication strategies.

Scope of Work

TASK 1: PROJECT INITIATION & INFORMATION GATHERING

Subtask 1A: Information Request & Review

OHM will perform a detailed desktop review of available background information associated with the City's water distribution system prior to initiating stakeholder interviews. Information that will be reviewed includes the following:

- Historical & Present City of Ann Arbor Drinking Water Studies (as detailed in Project Understanding)
- Relevant Drinking Water System Information/Data (as detailed in Project Understanding)
- Previous two (2) years of fire department hydrant flow test data.

Subtask 1B: Stakeholder Interviews & Workgroups

OHM anticipates organizing work groups with stakeholders, including staff from Public Works and the WTP as they are interconnected to certain aspects of this project. Interviews and workgroups will cover the following:

Internal Stakeholders

Interviews: Water Treatment Plant Operators, Fire Department, Public Works Unit, OSI, Planning Department, Emergency Management Team

Planning Workgroup: OSI, Planning Department, Public Works Unit, and Water Treatment Plant Operators

Emergency Services Workgroup: Emergency Management Team, Communication Office, Fire Department, Public Works Unit, and Water Treatment Plant Operators

External Stakeholders

Stakeholders: University of Michigan, Ann Arbor Public Schools, Scio Township, Ann Arbor Township — Early in the project, initial interviews will be conducted to ensure that relevant discussion points are incorporated into their respective work efforts. Additionally, OHM anticipates ongoing communication with stakeholders throughout the project, as the successful outcome of this project will take a collaborative effort.

OHM Advisors' Deliverables
Operations Summary
Fire Protection Rate Criteria
Summary of Interviews & Workgroup Meeting

PROPOSED WORK PLAN **CONTINUED...**

TASK 2: PLANNING & DEMAND PROJECTIONS

Under this phase, OHM will establish the City's existing average day, minimum day, maximum day, and peak hour demands for current and future planning scenarios. In addition, University of Michigan summer demand scenarios and the City's minimum monthly demand scenario will be analyzed. This will include existing, 5-year (as required by Act 399), 10-year, and 20-year planning scenarios.

Task 2A: Planning Projections

Specific work efforts include:

- Incorporate internal stakeholders plans in the existing and future planning scenarios, including, but not limited to:
    - City of Ann Arbor Office of Sustainability & Innovations (OSI)
    - WTP Facility Plan
    - City of Ann Arbor's Comprehensive Land Use Plan
    - City of Ann Arbor Planning Department
- Utilize and validate existing City Planning Department efforts related to the University of Michigan dorm expansions and West Stadium Boulevard growth for future planning scenarios.
- Incorporate external stakeholders' plans in the existing and future planning scenarios, including, but not limited to:
    - University of Michigan
    - Ann Arbor Public Schools
    - Surrounding Townships (Scio Township & Ann Arbor Township)

- Utilize US Census and SEMCOG population data to estimate existing, 5-year, 10-year, and 20-year populations to be serviced by the City's water system.
- Finalize existing and future planning scenarios with the City to be used as a basis for demand projections.

Subtask 2B: Demand Projections

- Compile and summarize the following data to assist in existing and future demand projections:
  - WTP Production Data
  - Customer Meter Billing Data
  - 2019 (pre-covid) Model Data
  - Water Treatment Plant Facility Plan Data (AECOM)
  - SCADA Data
- Establish existing and future demand scenarios:
  - Average Day Demand
  - Maximum Day Demand
  - Minimum Day Demand
  - Peak Hour Deman
  - Water Quality Demand
    - University of Michigan Summer Demand
    - Low System Average Monthly Demand
- Identify large system users and their demands and unique hourly average diurnals.
- Develop hourly average diurnal patterns based on customer type.
- Calculate non-revenue water.

OHM Advisors' Deliverables
Future Growth Plans (Internal and External)
Up To Three (3) Land Use Planning Scenarios
Existing & Future Population Projections
Existing & Future Demand Projections
Large System Users Demand Summary
Hourly Average Diurnals Based on Customer Type
Non-Revenue Water Summary

PROPOSED WORK PLAN **CONTINUED...**

TASK 3: HYDRAULIC MODEL REFRESH

As part of this phase of work, the City's hydraulic model will be updated and recalibrated in InfoWater Pro for enhanced analysis and to assist in confident planning-level decisions. Specific work efforts include the following:

Subtask 3A: Infrastructure & Operational Updates

- Migrate current model from InfoWater 12.4 to InfoWater Pro.
- QA/QC existing model with City GIS Data.
- Update existing model with water system changes that were identified in the QA/QC review
- Assign elevation data to new locations in the model.
- Review and update vertical infrastructure in the model per findings from ***Project Initiation & Information Gathering*** task.
- Create GIS customer meter layer for demand distribution.
- Input operational criteria and control settings in the model per findings from the ***Project Initiation & Information Gathering*** task.

Subtask 3B: Model Calibration

- Develop a hydrant flow testing plan that identifies twenty-five (25) primary testing locations and five (5) alternate sites that provide a representative cross-section of the City's water system.
    - Assess the City's water system characteristics including factors such as pipe diameter, material, age, and geographical distribution.
    - Incorporate review of previous two (2) years of historical flow testing data for reference and analysis.
- Develop a pressure monitoring plan to be installed prior to hydrant flow testing.
- Assist City staff with collecting boundary condition data prior to field testing.
- Coordinate field testing schedule with City staff. It is anticipated that 5 to 7 days of field work will be required.
- Model calibration and troubleshooting through hydrant flow testing and pressure monitoring results.
- Water quality model validation through conversations with water treatment plant and public works unit staff and review of bacteriological sampling results.

Subtask 3C: Baseline Model Scenarios

- Develop model scenarios for existing and future planning periods (5-year, 10-year, and 20-year planning periods):
  - Average day, minimum day, maximum day, and peak hour demands
  - Water Quality Scenarios:
    - University of Michigan summer demand scenario
    - City of Ann Arbor low monthly average demand scenario
- Incorporate City CIP items in future scenarios (proposed and planned) including:
  - Comprehensive land use plan for up to three land use scenarios
  - Proposed/future isolation vaults – 2021 City of Ann Arbor/U of M Water Connectivity Analysis
  - Full surrounding township island areas build-out, primarily Ann Arbor Township
  - City of Ann Arbor Water System CIPs
- Develop a model "read me" guide for internal City staff to utilize when running model.

OHM Advisors' Deliverables

Calibrated Updated InfoWater Pro Model W/Existing & Future Scenarios
Model Read-Me Guide
GIS Customer Meter/Demand Layer
Hydrant Flow Testing & Pressure Monitoring Plan

Subtask 3D: Comprehensive Model Rebuild (Optional)
It is OHM's understanding that a unique identifier does not exist between the City's model and their GIS data. If a one-to-one connection can't be identified during the model QA/QC process as part of ***Subtask 1A****, then OHM will notify the City and potentially suggest a complete model rebuild.*

OHM Advisors' Deliverables

Calibrated InfoWater Pro Model W/ Existing & Future Scenarios
Model Read-Me Guide
GIS Customer Meter/Demand Layer
Hydrant Flow Testing & Pressure Monitoring Plan

PROPOSED WORK PLAN **CONTINUED...**

TASK 4: HYDRAULIC ANALYSIS

Subtask 4A: Hydraulic Performance Existing & Future

- Clearly define distribution system goals to be utilized when identifying deficiencies.
- Perform up to three (3) land-use scenario assessments to be utilized by City Planning Department for the City's Comprehensive Land Use Plan effort and build-out timeline.
- Identify hydraulic deficiencies under existing and future demand planning scenarios as it relates to regulatory and internal standards.
    - Capacity of water source, treatment, storage tank, pumping facilities, and equipment.
    - Pressure
    - Fire Protection
- Assess and provide alternative improvement recommendations as necessary for the following existing planning items:
    - City's dual water main consolidation practice.
    - City's Public Services Standards Specifications water main sizing requirements.
    - City's Water Pressure Policy
    - City's current capital improvement plan for water distribution system projects.
- Incorporate and assess the following future planning items:
    - Full water distribution build-out for Township Island areas and future pressure zones
- Perform alternatives analysis for system pressure reduced valve(s) vs. individual house PRVs.
    - Proposed/future University of Michigan Isolation Vaults
- Conduct an evaluation of current wholesale customer agreements and future plans to assess the City's available capacity for future agreement opportunities.
- Develop an online/interactive fire protection map under the different demand scenarios to serve as guidance material for staff to efficiently identify abnormal flow tests and assist in system troubleshooting.

OHM Advisors' Deliverables
Distribution System Defined Goals Summary
Land-Use Scenario Analysis Summary
Water System Deficiency Summary
Water Main Consolidation Practice Recommendation
Water Main Sizing Specification Recommendation & Alternatives
Water System Pressure Policy Update Recommendations
Existing Planned & Proposed CIP Validation
Full Township Island Area Build-Out Alternatives Analysis
Wholesale Customer Capacity Analysis
Interactive Fire Protection Guidance Map

Subtask 4B: Operational Optimization

- Evaluate existing pressure districts (including reduced pressure zones) and develop alternative(s) for consolidation of pressure districts.
- Assess water age scenarios to evaluate potential quality concerns and opportunities to reduce water age.
    - Engage with WTP staff to identify areas of known water quality concerns.
    - Assess reservoir turnover and operational improvement opportunities.
- Provide recommendations for permanent system pressure monitoring and district metering.
- Evaluate the need and areas of focus for a uni-directional flushing program from the water age analysis.
    - Develop an action plan for implementing a City program.

OHM Advisors' Deliverables
Pressure District Consolidation Summary
Water Age/Quality Analysis & Heat Map
Permanent Pressure Monitoring & District Metering Plans
Uni-Directional Focus Areas & Program Recommendations

PROPOSED WORK PLAN **CONTINUED...**

Subtask 4C: System Resiliency & Emergency Preparedness

- Review and update the 2010 Emergency Planning Operations Recommendations.
- Perform a valve criticality analysis through modeling and historical flow testing data to be utilized for future condition assessment.
- Perform a single point of failure analysis which identifies critical system assets that should be considered in system criticality analysis.
- Develop boil water advisory guidance material.
- Develop an online interactive emergency planning/contingency planning tool to guide City staff through large failure scenarios, including boil water advisory notices, for up to ten (10) scenarios.
    - Initial Suggested Scenarios: Loss of Barton Pump Station, Gravity Reservoir failure, East HS/West HS Failure, Loss of Liberty Pump Station, North Campus Pump Station failure, Fuller Glen Pump Station failure, South Industrial Pump Station failure, key transmission main failure.

OHM Advisors' Deliverables
System Resiliency & Emergency Preparedness Plan
Valve Criticality Analysis Summary
Single-Point Failure Hydraulic Analysis
Boil Water Advisory Guidance
Emergency Planning/Contingency Planning Tool

Subtask 4D: InfoWater Pro Training

- Organize an InfoWater Pro training event for up to four (4) City staff members.
- Develop a short training users-manual specific to the City's hydraulic model.
- Provide a resources sheet for City to utilize for hydraulic modeling.

OHM Advisors' Deliverables
City of Ann Arbor Hydraulic Model Users-Manual
InfoWater Pro Hydraulic Modeling Resources document

TASK 5: ASSET MANAGEMENT PLAN (AMP) & PRIORITIZATION ACTION NUMBER (PAN)

Subtask 5A: Risk Model Recommendations

- Review and update large user and critical users/assets as identified during the demand analysis and System Resiliency and Emergency Preparedness tasks.
- Provide recommendations on incorporation valve criticality analysis into future condition scores.
- Review overall pipe risk methodology and provide recommendations for updates.
- Provide recommendations for future level of service update effort based on outcomes of the hydraulic analysis task to determine feasibility.

Subtask 5B: PAN Software Replacement (Optional)

- *Evaluate three (3) software applications to replace the current PAN model.*
- *Develop a ranking system that discusses the pros/cons of each software application to allow for informed decisions making.*

PROPOSED WORK PLAN **CONTINUED...**

OHM Advisors' Deliverables
Roadmap for PAN Improvements
Critical Users/Large Users List
Future Level of Service Update Recommendations
Optional: Software Application Recommendations & Ranking System

TASK 6: CAPITAL IMPROVEMENT PLAN

A comprehensive CIP will be developed that incorporates recommendations from OHM's Hydraulic Analysis and AMP/PAN analysis and consolidates findings from prior distribution studies following a thorough validation process. This plan will encompass both short-term and long-term projects, prioritizing them based on their significance to system reliability. Alternatives will be vetted as appropriate. Planning level cost estimates will be provided for each CIP Item. Specific capital projects that will be considered include the following:

- Current Water Distribution Capital Improvement Plan Projects (as summarized in ***Project & Task Understanding***)
- CIP Projects to address identified existing and future pressure, fire protection, capacity, and/or water quality deficiencies.
- Permanent System Pressure Monitoring and District Metering
- System PRVs vs. Individual House PRVs Island Area Buildout Analysis
- Reliability Improvements

OHM Advisors' Deliverables
Capital Improvement Plan (prioritization, alternatives, cost estimates)
Capital Improvement Plan GIS Map
Interactive Capital Improvement Plan Dashboard

TASK 7: PUBLIC ENGAGEMENT

Recognizing that information assessed and derived from this project may be considered sensitive and could potentially pose risks to the City's system, OHM's engagement strategy primarily focuses on educating the public on the necessity and purpose of a water distribution plan. Additionally, this approach is reinforced by the City's current focus on not requiring an extensive level of service update.

It is anticipated that the strategy will be primarily focused on digital and social media materials that can effectively convey the project's process, outcomes, and impacts. To effectively engage interested stakeholders and communicate progress throughout the project, the key components of the public engagement strategy should include:

- Complete the City's Community Engagement Toolkit with City staff.
- Create Target Audience Lists: Develop a list of stakeholders, City staff, and media.
- Message Model: Identify the messages that must be communicated to ensure stakeholder participation, introduction to the project team's competencies, and project merits.
- Digital Media: Coordinate with the City to develop a project website that will provide a summary of the project and includes educational materials, updates, brief dashboards, and a summary video.
- Project Video: Produce a video that provides a high-level overview of the project and its results.
- Develop and assist with up to one (1) presentation to City Council.

OHM Advisors' Deliverables
Community Engagement Toolkit
Target Audience List
Message Model
Digital Media
Project Video (1)
City Council Presentation (1)

TASK 8: FINAL DELIVERABLES

As technology continues to advance, it opens a range of options for project deliverables, allowing OHM to create a resource that can be tailored uniquely to the owner's specific needs and preferences. OHM has proposed two deliverable options for the City's consideration: a traditional report deliverable and a digital dashboard deliverable. Each deliverable will effectively discuss the findings, results, and conclusions from the above outlined tasks.

PROPOSED WORK PLAN **CONTINUED...**

Subtask 8A: Updated Comprehensive Plan (Report)
As part of this task, a Comprehensive Water Distribution Plan will be developed to satisfy EGLE requirements and the requests from the City's RFP. OHM will meet with the City to review the findings and recommendations from the report and incorporate their comments. The report will consolidate the outcomes and recommendations from each task item, providing a comprehensive resource for the City.

- Project Initiation & Information Gathering
- Planning & Demand Projections
- Hydraulic Model Refresh
- Hydraulic Analysis
- AMP & PAN
- Capital Improvement Plan
- Public Engagement

OHM Advisors' Deliverables

Comprehensive Water Distribution Plan Report

Subtask 8B: Updated Comprehensive Plan Dashboard (Optional)
Like its report counterpart, the optional dashboard will contain chapters associated with the unique items from this study. It will be designed to be a centralized resource for the City, enabling easy access to critical information about the water distribution system. This interactive and visually engaging tool can be easily customized and provide immediate insights that are invaluable for effective succession planning. Given the dynamic nature of the City's drinking water system and its continuous improvements, the dashboard ensures efficient and effortless updates. The dashboard will summarize the findings and recommendations from each task:

- *Project Initiation & Information Gathering*
- *Planning & Demand Projections*
- *Hydraulic Model Refresh*
- *Hydraulic Analysis*
- *AMP and PAN*
- *Capital Improvement Plan*
- *Public Engagement*

It should be noted that OHM has been in contact with EGLE and has received approval on providing Water Reliability Study and General Plan Updates for communities via a dashboard.

OHM Advisors' Deliverables

Comprehensive Water Distribution Plan Dashboard

Dashboard Executive Summary

TASK 9: AS-NEEDED MODELING SUPPORT (3) YEARS

This additional as-needed task will be used for as-needed modeling to support the City within its routine planning and model updating efforts. These may include items such as additional hydraulic model iterations and model updates to support capital planning and private development within the City. It is anticipated that this project will be completed toward the end 2025. OHM's estimated rate schedule is included within the Fee Proposal for 2025 – 2028 during the course of the as-needed support timeline.

Resource Summary Table

Task & Area	OHM Advisors				City of Ann Arbor Staff								OHM Advisors' Key Staff
	Project Management	Water Resources and Asset Management	Capital Planning	Public Engagement	Systems Planning Eng.	Public Works Unit Staff	Water Treatment Unit Staff	Fire Department	Office of Sustainability & Innovations	Planning Department	Emergency Mgmt. Team	Communications Office	
A.	204	20	20	—	60	—	—	—	—	—	—	—	Susan Knepper, Robert Czachorski, George Tsakoff
B.	53	92	8	—	29	9	6	7	6	12	7	2	Susan Knepper, Isabelle Bester, Chris Elenbaas
C.	69	188	11	—	10	—	—	—	—	6	—	—	Susan Knepper, Isabelle Bester, Mackenzie Johnson
D.	72	368	8	—	11	38	6	1	—	—	—	—	Susan Knepper, Isabelle Bester, Mackenzie Johnson
E.	161	560	82	2	18	35	10	—	—	—	4	2	Susan Knepper, Isabelle Bester, Chris Elenbaas
F.	9	32	8	—	2	—	—	—	—	—	—	—	Isabelle Bester, Murat Ulasir, Chris Elenbaas
G.	25	84	44	—	10	—	—	—	—	—	—	—	Mackenzie Johnson, Matthew Kennedy, Chris Elenbaas
H.	37	—	—	70	11	—	—	—	—	—	—	4	Christine Spitzley, Susan Knepper
I.	76	196	40	—	2	2	—	—	—	—	—	—	Susan Knepper, Isabelle Bester, Chris Elenbaas

A. Project Management **B.** Project Initiation & Information Gathering
C. Planning & Demand Projections **D.** Hydraulic Model Refresh **E.** Hydraulic Analysis
F. AMP & PAN **G.** Capital Improvement Plan **H.** Public Engagement **I.** Final Deliverable

PROPOSED WORK PLAN **CONTINUED...**

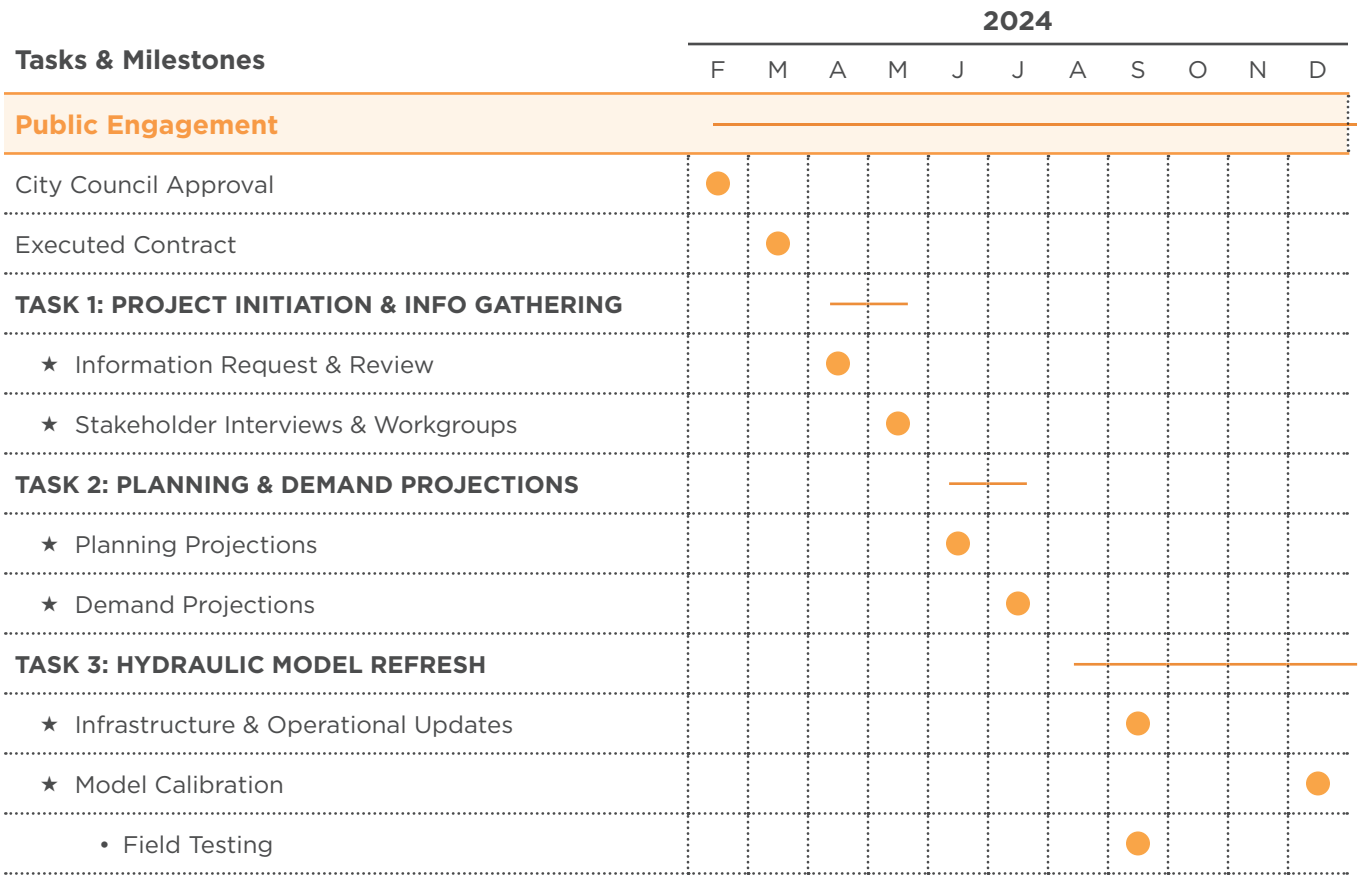
Assumptions

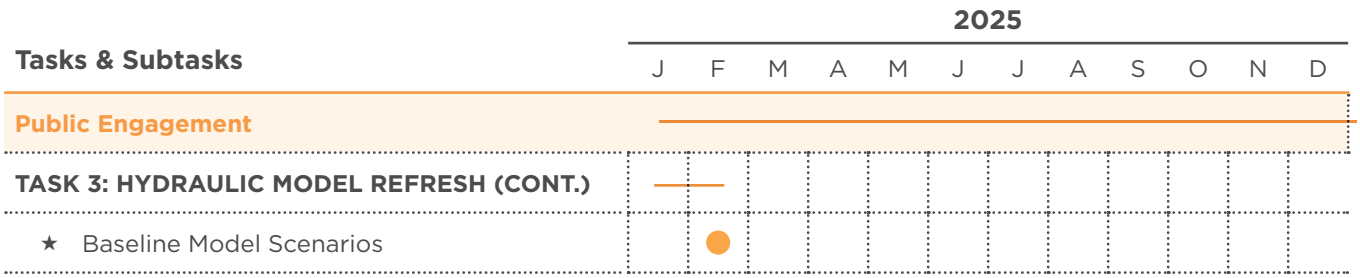
- It is assumed that the City's GIS is updated and accurate and no updates are necessary by OHM.
- OHM did not include time for extensive model troubleshooting resulting from master database errors. In event such issues occur, OHM will promptly notify the City.
- The City can provide personnel to operate hydrants and valves during field testing.
- The City can provide OHM SCADA access and has trending data at key assets.

Schedule

Assuming City Council authorization in February 2024 and contact execution in March 2024, OHM is prepared to begin the Project Initiation and Information Gathering task beginning in April 2024. OHM proposes to submit the final deliverable to the City in November 2025 assuming timely responses and participation from connected stakeholders. It should be noted that this timeline may alter slightly if the City elects to proceed with the optional items OHM has provided. A more detailed schedule highlighting project milestones is summarized below.

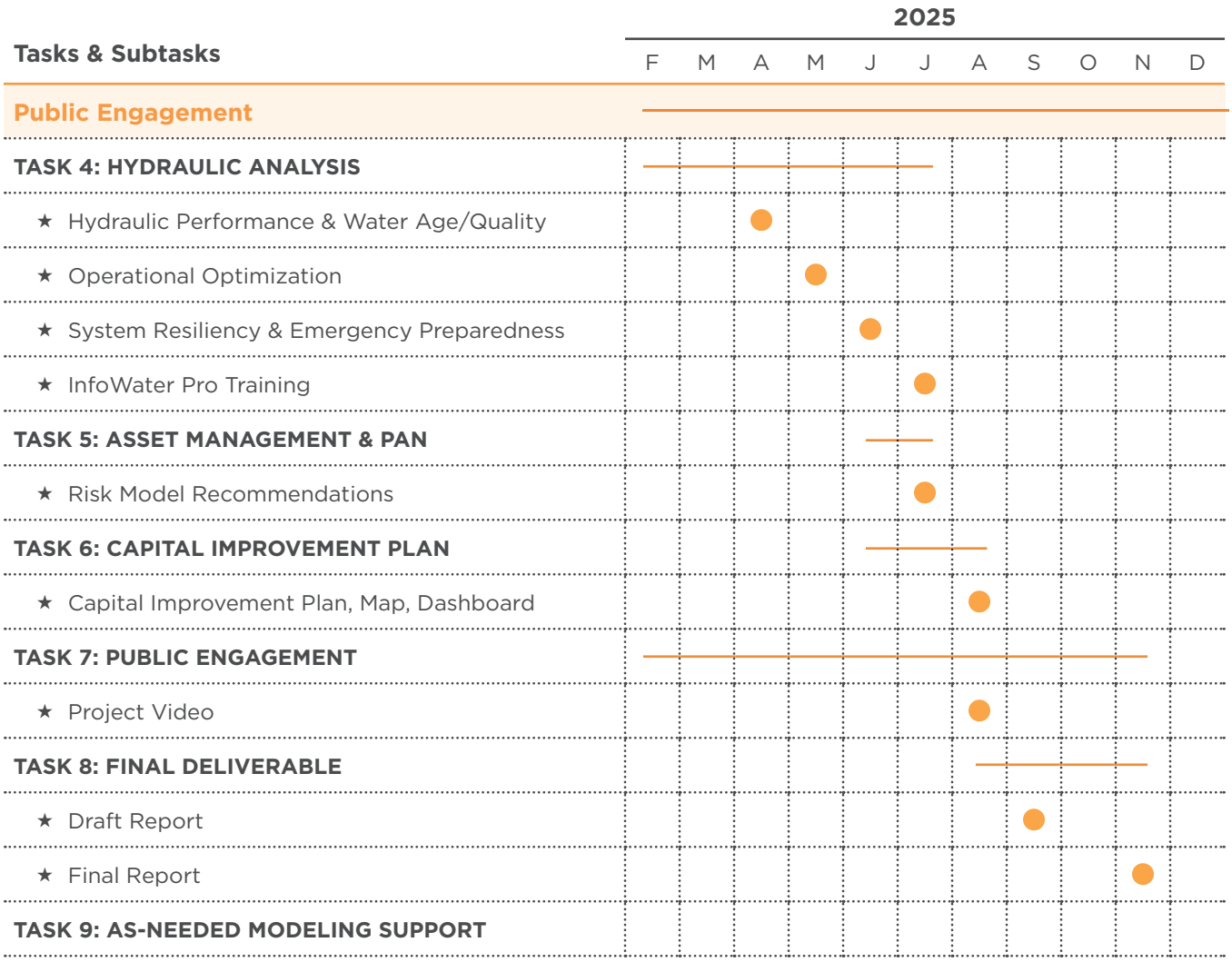
Schedule (Cont.)





PROPOSED WORK PLAN **CONTINUED...**

Schedule (Cont.)



Schedule (Cont.)

Tasks & Subtasks	2025	2026	2027	2028
Public Engagement				
TASK 9: AS-NEEDED MODELING SUPPORT				

Expedited Completion of Project Opportunities

If expedited completion of the project is desired, there are several potential steps that could be taken to condense the overall schedule. Potential steps that could be taken include:

- Coordinate early with the City to confirm vertical asset configuration within the model in lieu of waiting until after the model migration process.
- Coordinate with Customer Service to export water meter data to avoid time delays that may occur when pulling this data from the City's AMI system.
- Given that 2024 will be a full Capital Improvement Plan refresh for the City, benefit could be gained by coordinating the risk model updates in advance of these CIP Planning efforts in the Fall of 2024. However, it is unlikely that the hydraulic modeling information would be available in advance of this effort.
- Have City perform master database updates to ensure no delays occur prior to project kickoff.
- If model rebuild option is not elected, OHM recommends that the City conduct an internal QA/QC on their hydraulic model to ensure it is updated prior to delivering it to OHM for this project.
- Have City perform calibration on their control and monitoring equipment prior to hydrant flow testing to ensure equipment is reporting accurately to reduce model/field troubleshooting time.
- Initiate early coordination with the City for gathering updated GIS information and historical hydrant flow testing information to design the hydrant flow and pressure monitoring plan. This may expedite the hydrant flow testing schedule and ultimate project timeline.

It should be noted, with ***Chis Elenbaas'*** institutional knowledge of the City system, our estimated City effort is reduced from what we would otherwise anticipate being necessary without him on our project team. This, in turn, has contributed to a more expedited baseline project schedule.