HYDROMAX USA
Advanced Water, Wastewater and Gas Data Collection

Wellington Utilities Department

Valve Assessment Quotation

Prepared for Corey Robinson

Prepared by Mike Funk

November 19, 2020

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Corey Robinson
Utility Superintendent
Wellington Utilities Department
12300 Forest Hills Blvd.
Wellington, FL 33414

RE: Valve Assessment and Repair

Dear Corey:

Hydromax USA is extremely pleased to provide the enclosed Quote in response to your request.

Established in 2003, Hydromax USA is a professional services firm specializing in data collection in support of locating and assessing the condition of the country's aging water, wastewater and natural gas conveyance systems. HUSA's vast experience with new technologies and techniques empowers contractors, engineers and utility owners to make the best rehabilitation decisions regarding their buried infrastructure.

Based upon a strong record of performance, our customers have recognized that HUSA brings a unique ability to meet their needs for advanced data collection. We work from coast to coast covering the entire United States, without exception. Hydromax USA utilizes the largest array of technologies, within one company, to provide the broadest capability in the country to assess buried infrastructure.

Our in-house crews and project managers have first-hand experience working with buried infrastructure for water, wastewater, and gas systems.

We have 60 full-time GIS professionals in our data center that specialize in client information management, condition assessment program analytics, and customer reporting.

Our proven processes and best practices in the areas of progress reporting, risk management and quality assurance help us to plan for and deliver projects on-time and within budget.

Our team continues to be excited about this opportunity and looks forward to working with you and the other members of the Wellington Utilities Department team in the weeks and months ahead. Should you have any questions regarding the enclosed proposal, please do not hesitate to contact me directly at (585) 794-7010.

Thank you again for your time and consideration.

Sincerely,

Mike Funk

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INTRODUCTION

WELCOME TO HYDROMAX USA, A UNIQUE ORGANIZATION PROVIDING ESSENTIAL SERVICES FOR UTILITIES ACROSS AMERICA.

Our Solutions are designed to maximize the value of our customer's water products and services by optimizing water distribution system performance and reliability, minimizing delivery costs, controlling water loss, and enhancing water quality.

Our Team has performed infrastructure condition assessment programs that have evaluated *hundreds of thousands* of water distribution system assets, helped clients recover *millions of gallons* in lost water, and provided information management services for improvement of system models and development of GIS integrated solutions for utilities across the United States. Our customers consider us a part of their team and appreciate our genuine sense of accountability in meeting their goals. No matter how large or small your needs are, our professionals are ready to exceed your expectations.

VALVE ASSESSMENT AND MAINTENANCE PROGRAM

Hydromax USA's Water Distribution Services Team has built a reputation for the quality of our valve maintenance programs. Our capabilities have allowed us the opportunity to provide assessments and GIS services to utilities throughout the US ranging from a few thousand assets to tens of thousands of assets. Following is a summary of Hydromax USA's project understanding and approach.

Hydromax USA's valve assessment and maintenance program is designed to comply with AWWA standards (including publication M44 – Distribution Valves: Selection, Installation, Field Testing and Maintenance) and meet the requirements of oversight environmental agencies as well as all OSHA and confined space safety regulations. Hydromax USA works to develop a comprehensive valve assessment and maintenance program that meets the individual needs of each utility.

Planning and Implementation Tasks

1) **Client Gap Analysis and Data Model Alignment:** Prior to the start of the program, HUSA will hold a project meeting at the client offices to better understand the operational characteristics of the distribution system such as problem areas prone to poor fire flow, age of pipe, and pressure problems in the distribution system. This will allow for a greater understanding of how the distribution system is functioning, establish expectations for all parties, and allow priorities to be assigned to particular segments of the work. As a part of this gap analysis, Hydromax will conclude the interview process with a water data model alignment meeting, assimilating information gathered in the process from stakeholders

Agenda for data alignment meeting

1. Introduction
    - a. Participants
    - b. Roles
    - c. Communications
2. Determination of Existing Conditions
    - a. GeoDatabase schema
        - i. Assets in existing schema
        - ii. Fields in existing schema
        - iii. Data capture methodology
        - iv. Data QC procedures.
3. Determination of data to be captured under contract
    - a. Data capture workflow.
4. ArcGIS GeoDatabase deliverable.
    - a. HUSA data QA procedures.
    - b. Feature classes.
        - i. Valves
        - ii. Pipes
        - iii. Object classes
        - iv. VALVE_GPS Table
        - v. VALVE_INSPECTION Table.
        - vi. Geometric Network
    - c. Geodatabase delivery.
        - i. Tables
        - ii. Attributes
        - iii. Field relationships
        - iv. Primary/foreign keys.
5. Reports
    - a. Production reports
    - b. System status reports.
    - c. Work orders
    - d. System evaluation report.
    - e. Map-based reports.

2) **Program Execution Planning.** Hydromax will determine the Utility's desired geographical or hierarchical approach for initial implementation into areas of the distribution. This would include setting a schedule designed to maintain a level of field staffing that will ensure completion of the valve assessments within the schedule and budget allotted.

3) **Field Workflow Pilot Test Cycle.** Hydromax will develop and test pilot program area to validate fully functioning workflows from replicated data distribution through all field activities and test of data delivery to client.

4) **Initiate Full Program Implementation.** Hydromax will perform assessments on the distribution system and document all locations and assessments in a manner that will allow a prioritized list of maintenance items to be provided to the municipality.
    a. Locate all valves with GPS in a manner that will allow their positions to be known and readily re-creatable by Utility personnel upon demand.
    b. Document each asset maintained and collect individual asset data to such an extent as to provide information characteristic to each specific attribute as defined by the Utility.
    c. Provide constant communication with the Utility staff so that the program is proactively managed and permit issues to be addressed in a timely manner.
    d. Provide in the field training to Utility staff during the course of the assessments so once the program is concluded the Utility staff will have a complete understanding proper operation of valve operating devices.
    e. Provide periodic corroborative field survey to ensure the spatial accuracy of the data submitted

Project Management Support

Hydromax USA employs a critical path project approach utilizing PMI principles and philosophies. This is designed to ensure a continuum of the following:

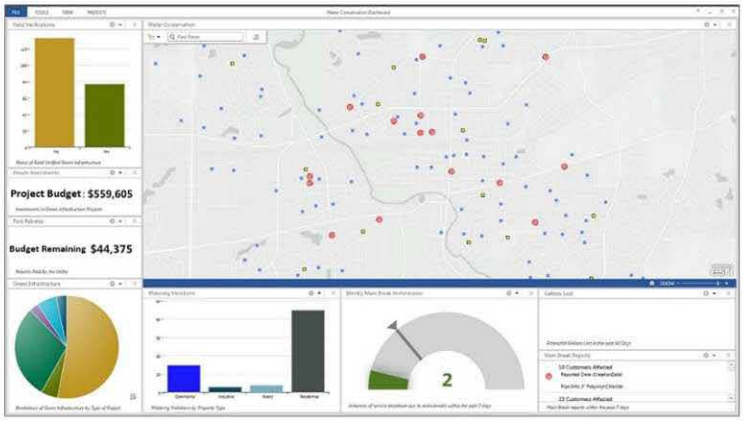
- Management of key decisions and milestones during this project.
- Preparation of initial project development plan (including the schedule of work tasks and key personnel to perform the work in the field to meet the milestones and objectives)
- Coordination of communications and meetings with the Utility as needed or requested to review technical concepts and alternatives, gathering staff feedback, and coordinating activities with the project team.
- Oversight of the execution and development of the project deliverables.

This comprehensive approach is not just employed by the project manager who owns it, but each member of the support team and field crew in order to provide superior valve assessment service.

Project Scheduling / Project Reporting

After completion of Tasks 1 and 2, Hydromax USA will prepare a formal project schedule for review and approval by the utility. Hydromax USA uses two primary methods to communicate project planning and project management. Project plans are formally prepared using MS Project and distributed to the project team for approval and coordination. If the project includes geographic assignments, the project schedule is updated to include this information for stakeholders inside and outside the municipality. Often this information is communicated to customer service to address customer questions regarding Hydromax staff field personnel performing assigned activities.

Hydromax utilizes our custom HUSA Operations Dashboard to provide client management real time access to field activity and program results. The dashboard will provide a vehicle for Hydromax to provide program metrics to the Utility on a daily basis and will form the foundation for monthly progress reporting. The Utility will be able to see detailed valve physical and operational condition as they are found by our field crews.



Responsiveness – Routine, Urgent, Emergency

The Hydromax team is fully poised to deliver and mobilize the necessary equipment for this program's operational needs. Most importantly our **Tampa Hydromax facility** holds the ability to quickly mobilize a vast array of equipment to support the needs of the Utility during conditions where the ability to serve the public is in jeopardy or has been compromised. The utility's operations teams will have access to Hydromax teams for unscheduled activities as the contract requires. Phone information will be available for the on-site Project Lead and Operations Manager as well as the Manager of National Water Distribution Services to ensure access to the full complement of resources that Hydromax can bring to bear if needed. Our field technicians will be based out of our Tampa, FL office for the term of the project and will be able to respond appropriately as needed.

VALVE ASSESSMENT AND MAINTENANCE PROGRAM

Hydromax will bring to the program a vast amount of experience and knowledge within the field of water infrastructure condition assessment. Valve assessment is an essential component of good distribution system management. Malfunctioning, closed, "frozen" and/or "lost" valves make isolating a specific area of the distribution system for emergency and/or routine repairs difficult, time consuming and on occasion, impossible. Such conditions inevitably lead to excessive overtime, excessive water loss and adverse public relations. Initial distribution system valve assessment followed by annual system wide valve maintenance enhances the utility operator's capability to effectively control the flow of water within the distribution system. Valve assessment and maintenance will prolong the life of the valves in the distribution system, ensure that the valves can be located, accessed and operated as needed and allows for the utility to better plan for and schedule system repairs/improvements.

The standard Hydromax USA approach to a valve assessment program are:

- Work in an orderly and safe manner to ensure protection of the local residents, Utility employees, and the Field Staff so that no avoidable accidents occur. Use confined space practices to ensure safe entries when required.
- Employ a combination of recorded information, manual and technical testing techniques as needed to establish the location of valves and hydrants.
- Find and document the location. Note the precise location using global positioning system (GPS) equipment and by traditional surveying

- Operate valves in accordance with the AWWA manual M-44, "Distribution Valves: Selection, Installation, Field Testing and Maintenance"
- Attempt to operate the valve or hydrant manually.
- Don't force the valve or hydrant or be in a hurry.
- During initial valve closure, the valve will be turned no more than five turns before turn direction is reversed to two turns, thus allowing the threads of the stem and gate to free themselves.
- If the valve cannot be operated manually by one person, then employ a hydraulic operator with torque control.
- The valves will then be exercised from full open to full closure until such time as this can be done without further turn range improvement or no further reduction in the required operating torque is noted, through *a minimum* of two consecutive ranges of operations.
- Use the lowest hydraulic torque (turning force or rational force) setting possible to allow valve operation.
- Turn valves and hydrants slowly to avoid water hammer or potential water main rupture.
- Listen closely as water flow changes can occur when operating a valve. This may help determine if the valve is operating correctly.
- Turns will be counted both down and up to insure they match. Valve sizes should match accepted turn ranges per size of valve. In cases where large valves are gear reduced, gear ratios should be noted if that determination can be made.
- If there is reasonable evidence that a valve or hydrant might break during the exercising process, the Utility will be notified immediately, and a decision will be made to attempt or not to attempt the process.
- Broken valves and hydrants will be reported immediately to the Utility so that notations can be made for future potential emergency situations.
- Keep and maintain detailed records for each hydrant and valve. This includes mapping locations taken from as-built drawings or road maps as well as field verification of locations, and possible interviews with staff regarding unrecorded installations of valves and hydrants. This data will then be maintained in both electronic and hard copies.
- Optionally, Hydromax can also schedule and perform needed repairs. Often, valve boxes are out of alignment, so a valve key cannot access the valve. Valves and hydrants are sometimes broken during the exercising program because they have not previously been used or previously incorrectly turned. Fixing the broken valves or hydrants in a timely manner is very important so the integrity of the distribution system is maintained, and safety of the public is insured.
- Repeat these steps on a routine basis. Experts recommend exercising all valves and operating hydrants annually if possible. Valves should at least be operated once every two to three years. Some valves will need to have a different schedule than others based on their location or unusual operating conditions such as large valves or those in critical areas. It's usually a good idea to perform the exercising program during moderate weather conditions although valves and hydrants should be able to be operated in any condition.

Example of some of the data collected during a Valve Maintenance and Assessment Project

- Locate and access each valve.
- Operate valve from open to close and back to open position for two (2) complete cycles.
- Paint valve box blue.
- Mark curb with a "V" marking.
- Obtain and record GPS coordinates of valve (if applicable).
- Raise valve box to grade (if applicable). – Separate line item charge
- Align valve box to vertical position (if applicable). – Separate line item charge
- Clean debris and standing water from valve box (if applicable).
- Document all pertinent data including:
    - Location
    - Type
    - Size of valve
    - Direction of rotation to open position
    - Number of turns to fully open position
    - Degree of operating difficulty
    - Deficiencies
    - Valve position (e.g. open, closed, unknown)
        - **Note the standard Hydromax program collects over 50 features on each asset collected and beyond those listed above.
- All data shall be formatted to match existing client data system and/or forms. Data shall be delivered to the client in an electronic format compatible with client ESRI ArcGIS system.

GEOSPATIAL DATA MANAGEMENT

All the water distribution hydrants encountered in this contract are to be GPS mapped within sub-foot accuracy and the data delivered in a spatially accurate file compatible with The Client's existing enterprise system software. Coordinate data shall be field collected with autonomous GPS readings and subsequently differentially corrected via post-processing. HUSA shall further refine positions through filtering and inspection to eliminate noise, problematic satellite geometry and multi-path degradation. Point features will be collected at an epoch of 1 second with a minimum occupation of 30 seconds. Differential Post-processing of raw field collection data will be performed to achieve the desired positional accuracy described above. A minimum of (4) qualified GPS Base stations, within 100Km and as equally dispersed around the project site, will be identified, utilized, and recorded in the GIS Meta-data.

Data Attribution – Hydrant Feature Class

Documentation data will be collected on each distribution hydrant and will be agreed upon with The Client in advance of work startup. Data documentation will include, at a minimum:

Location data - Mapping grade GPS coordinate data parameters as noted in the GPS mapping section.

Discrepancies - Details on discrepancies so that a work order (as described below) can be concisely created.

Physical data - Hydrant:

A Unique Identification Number	Date of Operation
Fire Hydrant source main size	Fire Hydrant Manufacturer
Fire Hydrant Year	Boolean indicting whether drained
Boolean indicating whether operated	Close Direction
Number of Turns	Fire Hydrant Condition (operable/inoperable)

Boolean indicating whether adequate flow observed

Address information submitted will conform to NENA standards

Deliverable Database – Hydrant Inventory Feature Classes

Hydromax USA will provide applicable hydrant data in a spatially accurate format compliant with the Utility's existing data structure in a format that will fully integrate into ESRI systems. Before field operations commence, a meeting to be attended by HUSA and The Client will be held to reach alignment on specific data schemas to be employed. It is at this juncture that HUSA and The Client will reach agreement on which specific features will be collected, the format this feature data will conform to, and the final resting place for all collected information within the Client data infrastructure so that it can be appropriately mapped and accessed by the utility staff.

Deliverable Database – Hydrant inspection Object Tables

Hydrant Inspection attributes will be provided in an Object Table to be related to the Inventory Feature classes by a Relationship Class built on a unique Feature ID. This relationship class will be built on a 1 to many basis to account for additional future inspections. HUSA will maintains an understanding of building and maintaining GIS Relationship Class objects and will provide recommendations for inspection data attributes to be collected.

Deliverable Database – GPS Location Object Table

Locational data, including GPS related attributes and coordinate data is to be delivered in a related GIS Object Table. This data is to be related using a GIS Relationship Class using a 1 to 1 relationship using the unique Feature ID. No orphaned records will be accepted.

Work Order Data – Hydrants

HUSA will create a report documenting repairs completed in order to bring the hydrants in the system up to 100% operability.

GIS Meta-Data

HUSA will complete and provide Meta-Data built on the ESRI platform, for delivered GIS product. This Meta-Data will include: complete provider contact information, a detailed citation describing field data collection practices; equipment settings; post processing procedures; base stations used for differential correction; spatial coordinate reference and expected accuracy

VALVE ASSESSMENT AND REMEDIATION QUOTATION

*****Per Pricing Terms and Condition of Palm Beach County specification IFB 19-027R/CC*****

ITEM NUMBER	UNIT OF MEASURE	ITEM DESCRIPTION	QTY	UNIT PRICE	EXTENSION
#36	Each	Valve Maintenance Services (Includes sub-foot GPS)	3500	$40.00	$140,000.00
#45	Each	Raise Valve Box to Grade in dirt, grass, sand, or gravel 0 - 4 ft.	0	$31.00	$0.00
#51	Each	Hourly Rate - Exploritory Investigation/Digging 0-4 ft. deep. Used to Raise/Realign Isolation Valve Box to Grade in asphalt.	0	$185.00	$0.00
				Subtotal	$140,000.00

APPENDIX A - VALVE TECHNICAL SPECIFICATIONS

Torque Limits for Each Valve

The following information is compiled from AWWA references and various resilient wedge, double disc, and butterfly valve manufacturer specifications. Specific manufacturer requirements will supersede below information if applicable.

- (4" through 12" valves have an opening torque that is approximately 30% of the closing torque)

- (14" through 60" valves have an opening torque that is equal to or less than the closing torque during normal operation)

  - 6" non-geared resilient wedge (RW) or double disc gate valve -50 to 110 ft #
  - 6" bevel geared RW or DD gate valve - 30 to 64.7 ft # (Rotork) or 25 to 56.3 ft # (MasterGear)
  - 6" spur geared RW or DD gate valve- 30 to 60.1 ft # (Rotork)
  - 8" non-geared RW or DD gate valve- 75to 150 ft #
  - 8" bevel geared R W or DD gate valve - 4 5 to 88.2 ft# (Rotork) or 40 to 76.7 ft # (MasterGear)
  - 8" spur geared RW or DD gate valve- 40 to 82 ft #(Rotork)
  - 10" non-geared RW or DD gate valve-90tol85 ft #
  - 10" bevel geared RW or DD gate valve- SO to 108 .8 ft # (Rotork) or 45 to 94.6 ft #(MasterGear)
  - 10" spur geared RW or DD gate valve - SO to lOLl ft # (Rotork)
  - 12" non-geared RW or DD gate valve - 100 to 225 ft #
  - 12" spur geared RW or DD gate valve - 60 to 123 ft # (Rotork)
  - 14" non-geared RW or DD gate valve - 110 to 225 ft #
  - 14" bevel geared RW or DD gate valve - 30 to 75 ft # (Rotork) or 25 to 58.8 ft # (MasterGear)
  - 14" spur geared RW or DD gate valve - 25 to 61ft # (Rotork 4.1:1), or 55 to 117.9 ft # (Rotork 2.12:1)
  - 16" non-geared RW or DD gate valve - 110 to 225 ft #
  - 16" bevel geared R W or DD gate valve - 130 to 161.8 ft # (Rotork 2:1), 45 to 91.7 ft # (Rotork 4:1) or 35 to 71.9 ft # (MasterGear)
  - 16" spur geared RW or DD gate valve - 30 to 61 ft # (Rotork 4.1:1), or 55 to 117.9 ft # (Rotork 2.12:1)
  - 18" non-geared RW or DD gate valve - 110 to 225 ft #
  - 18" bevel geared RW or DD gate valve -80 to 161.8 ft # (Rotork 2:1),90 to 91.7 ft # (Rotork 4:1) or 35 to
  - 71.9 ft # (MasterGear 4.5:1)
  - 18" spur geared RW or DD gate valve- 35 to 74.5 ft # (Rotork 4.1:1), or 70 to 144.1 ft # (Rotork 2.12:1)
  - 20" non-geared RW or DD gate valve- 100 - 300 ft #
  - 20" bevel geared RW or DD gate valve - 65 to 176.5 ft # (Rotork 2:1), 50 to 100 ft # (Rotork 4:1) or 35 to 78.4 ft # (MasterGear 4.5:1)
  - 20" spur geared R W or DD gate valve - 40 to 81.3 ft # (Rotork 4.1:1), or 75 to 157.2 ft # (Rotork 2.12:1)
  - 20" butterfly valve - 100 to 300 ft #
  - 24" non-geared RW or DD gate valve - 160 to 325 ft #
  - 24" bevel geared RW or DD gate valve - 60 to 127.5 ft # (Rotork 3:1)
  - 24" spur geared RW or DD gate valve- 40 to 88.1 ft # (Rotork 4.1:1), or 60 to 120.4 ft # (Rotork 3:1)

- 24” butterfly valve - 100 to 300 ft #
- 30” non-geared RW or DD gate valve -150 to 450 ft #
- 30” bevel geared RW or DD gate valve - 80 to 176.5 ft # (Rotork 3:1), 65 to 132.4 ft # (Rotork 4:1) or 60 to 125 ft # (Limitorque 4:1)
- 30” spur geared R W or DD gate valve - 60 to 127.8 ft # (Rotork 4:1), or 80 to 166.7 ft # (Rotork 3:1)
- 30” butterfly valve -100 to 300 ft #
- 36” non-geared RW or DD gate valve-200 to 550 ft #
- 36” bevel geared RW or DD gate valve - 80 to 161.8 ft # (Rotork 4:1) or 75 to 152.8 ft # (Limitorque 4:1)
- 36” spur geared R W or DD gate valve - 75 to 156.3 ft # (Rotork 4:1) +
- 36” butterfly valve - 100 to 300 ft #
- 42” non-geared RW or DD gate valve-200to700 ft #
- 42” bevel geared RW or DD gate valve - 100 to 205.9 ft # (Rotork 4:1) or 90 to 194.4 ft # (Limitorque 4:1)
- 42” spur geared RW or DD gate valve - 90 to 198.9 ft #(Rotork 4:1) +
- 42” butterfly valve - 100 to 300 ft #
- 48” non-geared RW or DD gate valve - 300 to 800 ft #
- 48” bevel geared RW or DD gate valve - 115 to 235.3 ft #. (Rotork 4:1) or 110 to 222.2 ft # (Limitorque 4:1)
- 48” spur geared RW or DD gate valve - 110 to 227.3 ft # (Rotork 4:1)
- 48” butterfly valve - 100 to 300 ft #
- 54” non-geared RW or DD gate valve - 300 to 850ft ft #
- 54” bevel geared R W or DD gate valve - 120 to 240ft ft #
- 54” spur geared RW or DD gate valve- ll0to227 ft #
- 54” butterfly valve - 100 to 300 ft #
- 60” non-geared RW or DD gate valve- 350to900 ft #
- 60” bevel geared double disc valve - 125to 250 ft #
- 60” butterfly valve - 100 - 300 ft #

Hydromax adheres to strict guidelines for the operation and exercising of valves as indicated in the torque limit chart provided within these technical specifications. At no time will HUSA exceed the suggested maximum torque limits without authorization from the utility thereby releasing Hydromax USA from obligations that exceed the published torque specifications. HUSA is aware that exceeding the maximum torque may release pressure and increase operability but will not proceed beyond the recommended torque specification without authorization and witnesses form the utility to verify the operational ability and possibility of operation beyond the specified limits.