SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) FEASIBILITY AND DESIGN MEMORANDUM AT THE MONPONSETT POND SYSTEM

Sustainable Water Management Initiative Grant
COMMBUYS Bid#: BD-15-1045-BRP00-BRP01-00000001256

Prepared for the:

Massachusetts Department of Environmental Protection

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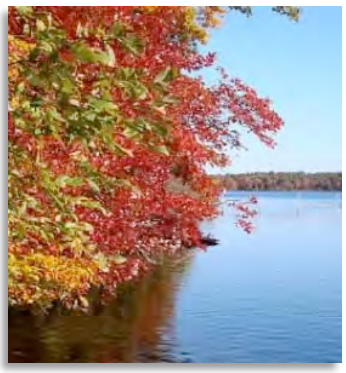

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SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) FEASIBILITY AND DESIGN MEMORANDUM AT THE MONPONSETT POND SYSTEM

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

FY2014 Sustainable Water Management Initiative Grant

Table of Contents

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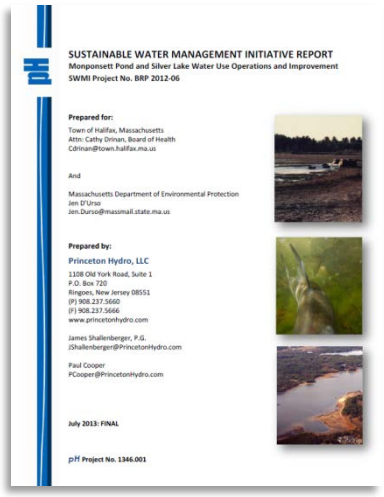
A. Concise Problem Statement & Narrative – Supervisory Control and Data Acquisition (SCADA) Feasibility and Design Memorandum at the Monponsett Pond System.

Introduction. The funding of the proposed project under this application for a feasibility and design memorandum under the Sustainable Water Management Initiative Grant will continue the on-going restoration efforts of the Jones River, Silver Lake, Monponsett Ponds and the Stump Brook. Currently, the City of Brockton draws water from Silver Lake as a drinking water supply. Both Furnace Pond (to the north of Silver Lake) and the Monponsett Ponds (to the west of Silver Lake) are connected via pipeline to supply Silver Lake with water to ensure availability to the City of Brockton's demand. Currently, the City of Brockton draws (diverts) water from the Monponsett Ponds approximately 9 months of the year.

Prior to the modifications for water supply, the Stump Brook drained West Monponsett Pond to the Taunton River. Similarly, the Jones River drained Silver Lake to Cape Cod Bay. Both streams were active migratory fish runs for river herring and the American eel and home of abundant wildlife. To provide water supply and past industrial improvements, the Stump Brook was dammed as well as the Jones River (in three areas).

A concern has grown for the residents surrounding the Monponsett Ponds. Recent algal blooms have grown to record levels. These blooms have forced closures to swimming, fishing and boating (and this water is being drawn into Silver Lake to serve as drinking water for the City of Brockton). Foul odors and the unaesthetic views of the neon green blooms have also plagued the shore front residents. It is believed that the hydraulic retreat, due to man-made modifications, of the natural relief formerly provided by the Stump Brook has idled the waters of West Monponsett Pond, resulting in stagnant, eutrophic waters – prime conditions for the record algal blooms. Additional concerns are that these blooms have contributed to the classification of the West Monponsett Basin as a Category 5 waterbody and it is hydraulically connected to a drinking water source. The once migratory fish run of the Stump Brook has been extinct of migratory fish passage due to the hydraulic manipulation of the ponds.


SUSTAINABLE WATER MANAGEMENT INITIATIVE REPORT
Monponsett Pond and Silver Lake Water Use Operations and Improvement
SWMI Project No. BRP 2012-06

Prepared for:
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July 2013: FINAL

pH Project No. 1346.001

2013 SWMI Report by Princeton Hydro, LLC

In the year 2013, the Monponsett Ponds have recorded the longest consecutive daily beach closures in Commonwealth History, based on Massachusetts Department of Public Health sampling results.

Prior SWMI and Other Grant Funded Work. The Department awarded the Town of Halifax a SWMI grant in 2012 in the amount of $79,346 to develop the Monponsett Pond and Silver Lake Water Use Operations and Improvements Report, SWMI Project No. BRP 2012-06, prepared by Princeton Hydro, LLC. The report goes into detail about management practices, but one of the most impactful statements regarding the current water state of operations reads:

"Overall, our evaluation of the primary BWS (Brockton Water Supply) sources demonstrates ***that existing water management practices are not sustainable****. The artificial movement of water across natural watersheds results in a suite of negative*

consequences for ecological and human communities that inhabit the setting. The primary negative impacts of water management practice include deviation from natural stream flow regime in Jones River, Stump Brook, and Herring Brook; accelerated cultural eutrophication of Monponsett Pond and Silver Lake; and, heightened concern for the long-term integrity of sensitive environmental settings such as the Stump Brook Wildlife Sanctuary and the Burrage Pond Wildlife Management Area."

As a recommendation of the previous work completed under the 2012 SWMI project for the Town of Halifax, the installation of automated controls will dramatically increase the manageability of the water system, promote maintained water elevations of East and West Monponsett Ponds, reduce flooding impacts, reduce excess water flushed down the Jones River and maintain constant stream flow and flushing of West Monponsett Pond, assisting with reduction in algal blooms. The first design step for the installation of these controls will be the project proposed in this application:

- *The feasibility and design assessment identifying mechanical infrastructure modifications and monitoring entities on the Stump Brook Dam.*
- *Review of any existing dam investigation reports and provide a site visit by an engineer to review proposed modifications in the context of prior dam evaluations.*
- *Review of the existing BWS (Brockton Water Supply) SCADA system and hardware.*
- *Modifications required to accept new controls and cost estimates for final design and implementation.*

In 2014, Monponsett Ponds and Stump Brook received priority project status as sponsored by the Massachusetts Division of Ecologic Restoration (DER). Their primary goal will be to establish stream flow volumes to maintain the health of the ecosystem, protect against flooding, and control surplus discharge through the Jones River. Their first assignment will be to perform a hydrologic study of the Stump Brook establishing the ideal stream flow values for the naturalistic flow and water quality (flushing) improvements. These flows will then be utilized, if awarded, by the SWMI program to assist with the evaluation of modifications to the Stump Brook Dam.

The Monponsett Ponds Watershed was also selected by the Environmental Protection Agency to run their Watershed Management Optimization Support Tool (WMOST) to better manage the watershed and to assist with the determination of suitable flows for Stump Brook.

The previous efforts from the 2012 SWMI, 2014 DEP and 2014 EPA will be a synergistic complement to this proposed project as the flows established will be the baseline for the automated equipment controls.

Project Description. Over the last 3 years, significant awareness has been brought to the current state of declined water quality at the Monponsett Ponds. Through the formation of the Monponsett Watershed Association, development of inter-municipal working group comprised of representatives from Halifax and Brockton and the support of such agencies such as the Taunton River Watershed Alliance, Jones River Watershed Association, Mass Audubon, Mass Fish and Game, Mass DPH and others, numerous management and operational concerns with the current state of the Monponsett Watershed have been identified. As recognized by both these groups and the previous SWMI funded

report, one of the drivers behind the mismanagement of the system is the water level of the Monponsett Ponds, especially the West Monponsett Pond, as it is closest to the impediment of the Stump Brook Dam.

Under the present conditions, the BWS uses the diversion to draw up to 23 MGD from the Monponsett Ponds to Silver Lake. However, the withdrawal allotment from Silver Lake to the BWS is approximately 11 MGD. This surplus 12 MGD is therefore deposited through the outlet of Silver Lake, into the Jones River. This practice has been identified as detrimental to the watershed for numerous reasons. The excess water creates velocities that impede Herring passage. While the Jones River is being flooded, the Stump Brook is in a state of drought. The man-made diversion creates a reversal of flows, over extenuating flood conditions on one end of the watershed (Jones River) and exacerbating draught conditions in the other (Stump Brook).

STUMP BROOK DAM

The current infrastructure on the Stump Brook Dam is located in the far corner of the Burrage Pond Conservation Area and time consuming to access. Additionally, the controls on the Stump Brook Dam are manually operated. It is a time consuming process to frequently visit the dam, monitor the health of the up-stream and down-stream conditions and operate the controls. Due to this, the dam is neglected and it is far easier to open and control the diversion from the Monponsett Ponds to Silver Lake, via pipeline at the East Monponsett Pond, rather than spending the time to visit the dam on a frequent basis to control the elevations of Monponsett Ponds.

The current set-up and operations plan undoubtedly promotes a non-sustainable condition for the Monponsett Ponds. Technology and infrastructure exist that can remotely operate and maintain constant water levels in the Monponsett Ponds, reduce flooding the Jones River and practice a sustainable management technique to serve the customers of Brockton and improve the water quality and habitat of Stump Brook and the Monponsett Ponds.

The technology proposed for this project and evaluation would be a series of automated valves and controls installed at strategic locations, such as the Stump Brook Dam, to monitor and operate, based on constant and controllable settings. This technology is frequently seen at water and wastewater treatment plans and other dams and reservoirs. These valves and controls would require modification to the existing infrastructure and implementation of a supervisory control and data acquisition system, or SCADA system.

Current technology allows users to control and monitor water treatment plants and other hydraulic management systems from an internet ready device (smartphone, tablet, etc.). These advancements have provided tremendous leaps in the operations and maintenance of all kinds of hydraulic processes and systems. And this would be the ultimate goal of this evaluation; to determine the feasibility of installing automated controls to remotely manage the water levels of Monponsett Ponds, greatly

reducing the man-hours needed to manually visit the dam, operate the aged infrastructure and monitor the health of the up-stream and down-stream ecosystem. This proposed project would serve as a template for the final design documents and identify critical final design items such as:

- *Recommended locations for automated controls (Stump Brook Dam, Diversion Stations etc.)*
- *Review of available SCADA technology and compatibility requirements with existing SCADA controls of the BWS.*
- *Review of structural modifications to fit new controls at selected infrastructure points.*
- *Recommendations of material and technology suppliers.*
- *Determine operational procedures to maintain constant water levels of Monponsett Pond.*
- *Reduce excess diversion flows into the Jones River.*
- *Conceptual design and construction cost estimates.*

The benefits of this evaluation would be significant. This assessment would serve as the basis for design, a needed step in the development process of a project in this nature. It would gather specific information required to develop essential design elements so that future SWMI or other funding opportunities may be used to develop the final design documents, and ultimately, construction.

This approach would allow the water levels of Monponsett Pond(s) to be regulated by the Stump Brook by providing the needed restoration of returning constant flow to the habitat, rather than the wasteful and harmful practice of regulating water levels by using the diversion of water from the Monponsett Ponds to Silver Lake, resulting in the excess flows to the Jones River.

In closing, watershed groups such as the Monponsett, Taunton River and Jones River organizations, along with MADEP, MADER, EPA, MADPH, NOAA, Mass Audubon, Massachusetts Fish and Game and others have recognized the concern of the decline in water quality of the Monponsett Ponds. Both habitat and humans have been and will continue to be impacted unless management practices are changed within the watershed. This project will serve as a critical first step to implement hard infrastructure solutions to benefit the environment and surrounding watershed.

We look forward to your consideration of this grant application on behalf of the Town of Halifax, partnering with the Monponsett Watershed Association.

B. Scope of Services – Supervisory Control and Data Acquisition (SCADA) Feasibility and Design Memorandum at the Monponsett Pond System.

Task 1. Project Kick-Off Meeting and Preliminary Evaluation. This task would start with the project kick-off of all parties including the Town's of Halifax and Brockton, MassDEP, Monponsett Watershed Association and other interested parties. This meeting will be held to discuss the work to date (most recently the previous SWMI funded report on Monponsett Pond, MADER efforts and WMOST results), collaboration and review of the existing hydrology of the area and review facilities considered for SCADA enhancements. These facilities may include the Stump Brook Dam, Monponsett Diversion Station, Silver Lake Treatment Facility and Brockton Water Department Offices.

Deliverable: Meeting Minutes

Task 2. Alternatives Evaluation and Draft Report. This task will include the technical research, feasibility and logistics of SCADA control for the use of monitoring water level information. Since the BWS already has SCADA control for portions of their water system, it will be critical step to understand what operating platform they are using and what the compatible technologies are.

SCADA controls will be evaluated for two general types of sites being monitoring sites and control sites. Monitoring sites include workplaces where water levels can be monitored and manipulated. These sites would include Brockton Water Department and Halifax Water Department Offices. Control sites would be locations where hard infrastructure is located, such as the Stump Brook Dam and Diversion Station.

Once all of the monitoring and control sites have been evaluated, detailed investigations including radio or cellular communication testing would occur to determine signal strength, reliability and best option for each Town. Included in this task will be the review of web based and wireless control systems where online monitoring can be set up on wireless devises for increased convenience of operations. We will look to develop a realistic and reliable wireless communication platform that can be monitored by Town Staff and approved personnel.

The collection of the above information will provide the consultants with the required information to develop a feasible and financeable program to implement SCADA technology and control. A draft report will be presented summarizing the findings of this task for consideration to all parties.

Deliverable: Draft Report

Task 3. Final Report. This task will develop a final report on the information gathered in Task 2 and other information. Recommendation for modifications for control sites will be provided for final design documents. These recommendations would include modifications to the Stump Brook Dam fish ladder and sluice gate and potential modifications to the dam itself. For example, a new spill way and automated gate may need to be larger than the existing outlets on the dam. The recommendation would identify size, location, installation method and SCADA compatible equipment for installation.

An operations plan would be developed to recommend functional water levels and allow for flood waters to pass through Stump Brook, as nature intended, rather than artificially through the Jones River. This plan would also provide the BWS with optimal, but not excessive, water levels to meet their demand and minimize excess draw.

Conceptual design methodologies and cost estimates will also be presented for final design plans and construction.

Deliverable: Final report

C. Milestone Schedule (Given a December 22, 2014 Award Date).

Task 1. Project Kick-Off Meeting and Preliminary Evaluation	1/9/15 – 2/10/15
Task 2. Alternatives Evaluation and Draft Report	2/10/15 – 4/16/15
Task 3. Final Report	4/16/15 – 6/30/15

D. Proposed Project Team.

- **Contractor & Liaison** – Town of Halifax and Charles Seelig, Town Administrator
- **Contractor's Project Manager** – Cathleen Drinan, Town of Halifax Board of Health Agent
- **Consulting Engineer** – GHD, Inc., 1545 Iyannough Road, Hyannis, MA 02601
- **Consultant Project Manager** – Marc Drainville, P.E., BCEE, LEED AP
- **Key Staff Members –** Mr. Drainville will be supported by Dustin Sedlack and Lance Nelson of GHD, Inc. All members have an extensive background of SCADA related projects and have worked on several major SCADA installations on Cape Cod and Southeastern MA.
- **Project Review Committee** – Shall consist of representatives from the Monponsett and Jones River Watershed Associations, City of Brockton Water Department and other municipal staff. Participation from agencies such as MADER, DCR, Fish and Wildlife is encouraged as they have participated in previous relevant projects regarding the Jones River and Silver Lake

E. Estimated Effort. The proposed estimated effort for this project is $74,850.00. Please refer to Table 1 below for a breakdown of man-hours and related effort. ***The Town of Halifax has appropriated $15,000 to serve as a 20% match for this project.***

The following in-kind services will assist with the completion of his proposal and add to the $15,000 previously appropriated.

The Halifax health agent will dedicate 4 hours per week for the project schedule toward sharing the progress of the feasibility study, planning and attending related meetings and toward outreach efforts. Outreach will include social media, meeting attendance (Monponsett Watershed Association and Working Group Meetings) and public health columns in the local newspaper. This equals 80 hours.

At a value of $30/hour, this adds up to $2,400.00. Combined with the appropriation of $15,000, this the total match amount for this assignment is $17,400, which is 23.2% of the proposed project budget.

TABLE 1 – PRICING MATRIX

Personnel	MD	DS	LN	Admin	Total Hrs.	Cost
Rate	**$195**	**$195**	**$155**	**$40**		
Task 1	8	12	22	8	50	$7,630.00
Task 2	24	80	132	24	260	$41,700.00
Task 3	24	40	80	16	160	$25,520.00
Total	**52**	**124**	**218**	**48**	**470**	**$74,850.00**

ATTACHMENT A

RESUMES

Curriculum Vitae

Marc R. Drainville, P.E., BCEE, LEED AP

Wastewater Service Group Coordinator – GHD East Coast
Senior Project Manager – Wastewater Processes

Qualified. M.S. (1994), Environmental Engineering, Cornell University
B.S. (1991), Civil Engineering, Worcester Polytechnic Institute

Connected. Registered Professional Engineer: MA, MD
Board Certified Environmental Engineer (BCEE), American Academy of Environmental Engineers (water supply and wastewater, sustainability)
LEED Accredited Professional

Specialties. Mr. Drainville has over 19 years of experience in a variety of phases of environmental engineering with an emphasis on wastewater treatment. His specialties include nutrient removal and sludge and biosolids management.

Project Manager

Town of Uxbridge, Massachusetts

Wastewater Facilities Plan. Project included the planning for wastewater collection and treatment facilities for a design flow of 2.5 mgd. Treatment limits include a TN of 8 mg/L and TP of 0.2 mg/L.

Project Manager

Town of Falmouth, Massachusetts

Permit Negotiation Assistance. The Town has been given a monthly TN limit of 3 mg/L. This project will evaluate the ability of the facility to achieve this level.

Project Manager

Town of Barnstable, Massachusetts

Green Energy Projects. A three-part project that consisted of two 100 kW wind turbines, a 800 kW ground-mounted solar array, and various energy efficiency improvements to the Hyannis Water Pollution Control Plant. Oversaw SCADA system modifications.

Project Manager

Town of Chatham, Massachusetts

Evaluation and Design of a Solar Array. Evaluation and design of a roof-mounted solar array on a new Operations Building at the water pollution control facility.

Project Manager

Wastewater Treatment Facility Digester No. 1 | City of Norwich, Connecticut

Study and Design Upgrade. Project manager for the evaluation, which reviewed available cover and mixing system technologies and resulted in the design of a bubble-gun mixing system and a flexible membrane cover. The project also included the evaluation of microturbine technologies and the subsequent design of a microturbine system.

Project Manager

Town of Chatham, Massachusetts

Water Pollution Control Facility Design. Project Design of improvements to the 1.0 million gallons per day plant for a full facility upgrade. Project involved the implementation of recommendations from the wastewater facilities plan, and featured the installation of new oxidation ditches and denitrification filters designed to achieve average effluent total nitrogen of 3.0 mg/L. Oversaw SCADA implementation.

Project Manager

Town of Oak Bluffs, Massachusetts

Evaluation and Design of Total Organic Carbon Removal Facilities. Evaluation and design of a new effluent disposal facility (sand beds) and total

organic carbon removal facilities. Oversaw SCADA implementation.

Project Manager
Cecil County, Maryland
Evaluation of Regional Biosolids Disposal Options. Evaluation of various Class A technologies to serve the County and many of its municipal wastewater treatment facilities.

Project Manager
Northeast River Advanced Wastewater Treatment Facility | Cecil County, Maryland
Evaluation of Class A technologies to serve the facility.

Project Manager
Northeast River Advanced Wastewater Treatment Facility | Cecil County, Maryland
Preliminary Design. Project manager for the upgrade to the facility sludge processing facilities, including new storage pumping and centrifuge facilities.

Project Manager
City of Nashua, New Hampshire
Evaluation and Dewatering Systems Upgrade. Class A upgrade study of the 16 million gallons per day facility. The study consisted of a qualitative and quantitative analysis of dewatering and Class A biosolids technologies.

Project Manager
Massachusetts Department of Environmental Protection | Massachussetts
Engineering Feasibility and Cost Analyses of Nitrogen Reduction from Selected Publicly Owned Treatment Works. The study commissioned by the Department included 21 wastewater facilities in the Blackstone and Connecticut River watersheds evaluated the feasibility of reducing nitrogen levels to 8 to 10 mg/L and to 3 to 5 mg/L total nitrogen.

Project Manager
Town of Westport, Connecticut
Water Pollution Control Facility Upgrade. Design of improvements to the 3.3 million gallon per day plant. Project involved the implementation of recommendations from the wastewater facilities plan, and featured the installation of new oxidation ditches designed to achieve an average effluent total nitrogen of 3.2 mg/L, two new 100-foot diameter secondary clarifiers, ultraviolet disinfection, return sludge pumps, flow distribution structures, a new plant water pumping and distribution system, a new headworks screen with screenings compactor, new grit equipment, and sludge handling facility improvements consisting of conversion of existing digesters into storage tanks and installation of a new gravity belt thickener.

Project Manager
City of Danbury, Connecticut
Phosphorus Removal. Evaluation of low level phosphorus removal technologies. The study evaluated various treatment levels including 0.2 mg/L, 0.6 mg/L, and 1 mg/L.

Project Manager
City of Danbury, Connecticut
Study and Design of a Post-Anoxic Nitrogen Removal Process. The design featured fiberglass reinforced plastic baffle walls, a supplemental carbon system, and a methanol feed and aeration control system.

Project Manager
Upper Blackstone Water Pollution Abatement District | Millbury, Massachusetts
Preliminary Treatment Facilities. Design of improvements to the 160 million gallons per day facility. Project involved the design of a new 80 million gallon per day grit and screenings removal facility with influent screens, screenings compactors, grit tanks with chain and bucket grit removal systems, and aerated grit blowers. It also included the rehabilitation of the existing grit and screening facility with similar equipment as the new facility. All tanks and channels were covered

with low profile aluminum covers and the odorous air was sent to a new biofilter.

Project Manager

Town of Manchester, Connecticut

Water Pollution Control Facility. Design of an ultraviolet disinfection system for the 8.1 million gallon per day plant. Project involved the implementation with recommendations from a previous study and featured a new ultraviolet disinfection system and liquid hypochlorite system.

Project Manager

Town of Elkton, Maryland

Wastewater Treatment Facility. Design of the sludge processing component of the 3.8 million gallon per day facility. The project involved the design and implementation of converting existing primary clarifiers into aerated sludge holding tanks and a new Solids Processing and Chemical Feed Facility that included two belt filter presses, an indirect sludge dryer, a biofilter and a scrubber, chemical feed pumps and tanks, and a dry sludge conveying system and storage silo.

Project Manager

City of Winsted, Connecticut

Tank Conversion. Conversion of existing aeration tanks to Bardenpho reactors. The upgraded 1.4 million gallon per day facility will achieve an average annual total nitrogen of 5.3 mg/L and allow the plant to meet its effluent limits through the year 2014.

Project Manager

City of Winsted, Connecticut

Wastewater Treatment Facility Cost-Effective Analysis. Evaluation of the facility to determine cost-effective nitrogen removal alternatives. The study investigated a wide range of alternatives and included a detailed cost estimate for the three most promising alternatives – payment of nitrogen credits, convert to Modified Ludzack-Ettinger, convert to Bardenpho. Additional nitrogen removal-related and other improvements were also included in the analysis.

Project Manager

Town of Hyannis, Massachusetts

Water Pollution Control Facility Construction Phase Improvements. The upgrade consisted of a full rehabilitation of the pretreatment facility, various pump replacements, a new aeration system and a supervisory control and data acquisition system upgrade.

Project Manager

Town of Oak Bluffs, Massachusetts

Clarifier Project. design and construction of an influent screen and primary clarifier project.

Project Manager

Town of Oak Bluffs, Massachusetts

Water Treatment Plant Study. Evaluation of a new septage receiving and sludge processing facility. The study evaluated various technologies available for septage receiving, treatment, and sludge thickening and dewatering.

Project Engineer

Town of Westport, Connecticut

Wastewater Facilities Plan. Preparation of the plan. The project identified the needs of the Town's 2.85 million gallons per day water pollution control facility and provided recommendations for a facility upgrade to meet current and future effluent limits and to modernize the operation of the facility.

Project Engineer

Town of Fairfield, Connecticut

Wastewater Facilities Plan. Preparation of the plan. The project identified the needs of the Town's 10 million gallons per day water pollution control facility and provided recommendations for a facility upgrade to meet current and future effluent limits and to modernize the operation of the facility (last upgraded in 1972).

Project Engineer

Town of Darien, Connecticut

Wastewater Facilities Plan and Infiltration and Inflow (I/I) Study. Preparation of the plan and study. The wastewater facilities plan identified the future needs of the Town's wastewater collection system and the areas which will likely require sewer extensions in the near future. The I/I study identified the areas of Town with excessive I/I and

developed a recommended sewer rehabilitation plan based upon a cost-effective analysis of the cost of treatment and the cost of sewer rehabilitation.

Project Engineer
Upper Blackstone Water Pollution Abatement District Facility | Millbury, Massachusetts
Wastewater Facilities Plan. The study evaluated the facility's ability to handle wet weather flow while maintaining treatment and also proposed modifications for biological nutrient removal. Existing unit processes evaluated in the study included headworks (screens), grit removal, flow measurement, primary clarifiers, secondary clarifiers, return activated sludge pumping and disinfection.

Project Engineer
Annapolis Water Reclamation Facility | Anne Arundel County, Maryland
Design and Expansion. Plant design and expansion from a 10 to a 13 million gallon per day facility. Project includes constructing new aeration tanks and reconfiguring the existing activated sludge basins into a Bardenpho process. Detailed design also includes new nitrate recycle pumps, submersible mixers, a new ferric chloride feed system for phosphorous removal, a new liquid chlorine disinfection and bisulfite dechlorination system, new primary sludge pumps, new raw sewage pumps, and a new emergency holding pond. Responsibilities include equipment sizing and selection as well as specification preparation.

Project Engineer
Annapolis Water Reclamation Facility | Anne Arundel County, Maryland
Odor Control System. New system design. The project includes the design of an activated sludge diffusion system, which treats odorous air by conveying it to the aeration blowers, which in turn pump the air into the aeration tanks where the odors are biologically removed. Project includes the design of a new odor control fan system, underground fiberglass reinforced plastic piping, and the covering of the primary clarifiers and sludge thickeners. Responsibilities include equipment sizing and selection as well as specification preparation.

Project Engineer
Upper Blackstone Water Pollution Abatement District Facility | Millbury, Massachusetts
Pilot Study. The project involved the piloting of the A/O and A2/O processes to determine the performance of these processes under cold weather conditions and a variety of loading conditions. The data collected during the study will be used to calibrate process models to allow for the development of the process model for the full-scale nitrogen and phosphorus removal facility.

Project Engineer
Cambridge Wastewater Treatment Plant | Dorchester County, Maryland
Odor Control Upgrade. Upgrade design of the 8.1 million gallons per day plant. Project includes the design of a new biofilter, odor control fans and associated building, underground fiberglass reinforced plastic piping, and the covering of the facility headworks, primary clarifiers, and sludge thickeners. Responsibilities include equipment sizing and selection as well as specification preparation.

Project Engineer
Cambridge Wastewater Treatment Plant | Dorchester County, Maryland
Biological Nutrient Removal Upgrade. Design of the 8.1 million gallon per day plant. Project includes reconfiguring the existing activated sludge basins into Modified Ludzack-Ettinger process, replacement of existing coarse bubble diffusers with full floor coverage fine bubble membrane diffuser system, and design of four new centrifugal blowers with an automated control system. Detailed design also includes new nitrate recycle pumps, submersible mixers, a new ferric chloride feed system for phosphorous removal, a new liquid chlorine disinfection and bisulfite dechlorination system, two new 100-foot diameter secondary clarifiers, new return and waste sludge pumps, and a new plant water pumping system. Responsibilities include equipment sizing and selection as well as specification preparation.

Project Engineer
Cambridge Wastewater Treatment Plant | Dorchester County, Maryland
Odor Control Study. Preparation of the study for the 8.1 million gallon per day plant. The emphasis of the study was to identify the most cost-effective means to reduce odors at the plant. Methods of odor treatment that were investigated included chemical treatment, chemical scrubbers, and biofilters. A life cycle cost analysis was performed for each process. The study provided recommended operation and maintenance improvements and capital improvements to reduce odors. The most cost-effective option for the City was determined to be biofilters.

Project Engineer
Town of Fairfield, Connecticut
Full Water Pollution Control Facility Upgrade. Design of improvements to the 10 million gallon per day facility. Project involved the implementation of recommendations from the wastewater facilities plan, and featured the installation of new aeration tanks, three new 100-foot diameter secondary clarifiers, ultraviolet disinfection, return sludge pumps, 33 million gallons per day of raw sewage and effluent pumping capacity, flow distribution structures, a new plant water pumping and distribution system, a new headworks screen with screenings compactor, new grit equipment, and a methanol chemical feed facility for biological nitrogen removal. Responsibilities included equipment sizing and selection, hydraulic analysis, specification preparation, and coordination with drafters and designers.

Project Engineer
Water Pollution Control Facility | Town of Fairfield, Connecticut
Nitrogen Removal. Design and construction of improvements to the 10 million gallon per day facility. Project involved a low cost retrofit using a high solids enhancement of an anoxic/oxic (Modified Ludzack-Ettinger) flow configuration to achieve ammonia and nitrogen removal. Modifications included converting from mechanical aerators to a fine bubble aeration system; adding submersible mixers in the anoxic zone; and installing baffle walls, internal recycle pumps, aeration control system, and fixed film media (high solids system) in the aerobic zone. Design responsibilities included equipment sizing and selection, as well as specification preparation and coordination with drafters and designers. Construction phase responsibilities included shop drawing review, field inspections, coordination of progress meetings, and review of payment requests.

Project Engineer
Water Pollution Control Facility | Town of Westport, Connecticut
Nitrogen Removal. Design and construction improvements to the 3.0 million gallon per day plant. The project involved the replacement of return activated sludge pumps, improvements to the waste sludge pumping, addition of Stamford-type baffles and full surface skimming to final clarifiers, and design of a new flow distribution box. Responsible for equipment sizing and selection, specification preparation, coordination with drafters and designers, shop drawing reviews, and on-site inspections.

Project Engineer
Water Pollution Control Facility | Town of Westport, Connecticut
Facility Improvements. Design and construction of improvements to the 2.85 million gallon per day facility. The project involved the replacement of a primary digester cover and other minor facility modifications. Responsibilities included equipment selection as well as specification preparation during design phase. Construction phase responsibilities include shop drawing review and review of payment requests.

Project Engineer
Wastewater Treatment Facility | Town of Ridgefield, Connecticut
Nitrogen Removal. Design and construction of improvements to the 2 million gallon per day plant. The project involved the replacement of mechanical aerators and other minor facility modifications. Responsibilities included equipment sizing and selection, as well as specification preparation during design phase. Construction

phase responsibilities included shop drawing review, field inspections, coordination of progress meetings, and review of payment requests.

Project Engineer
Private Wastewater Treatment Facility | Ohio
Design Improvements. Design of improvements to a privately owned 4 million gallon per day wastewater treatment facility. The project involved the design of a combined centrifugal and positive displacement aeration blower air delivery system, the replacement of existing coarse bubble diffusers with a fine bubble aeration system, the addition of two new rectangular final clarifiers, the addition of fixed-film media (high solids system) in the aeration tanks, and the addition of a new influent screening system. Responsibilities included equipment sizing and selection, as well as specification preparation.

Project Engineer
West Suburban Wastewater Treatment Facility No. 1 | Bolingbrook, Illinois
Design. Assisted in the design of a process upgrade and modifications to the 5.0 million gallon per day plant. Additions to the facility included new fine screens, primary and secondary settling tanks, final effluent filters, and a fixed-film high biomass system to enhance the plant's ability to nitrify. Responsibilities include assisting in the process design, plant hydraulics, specification preparation, and coordination with drafters and designers.

Project Engineer
Water Pollution Control Facility | Town of Fairfield, Connecticut
Denitrification Filter Pilot Study. The study was conducted to develop cold temperature design criteria for a full-scale denitrification filter and to determine the optimal methanol dosage for various hydraulic loadings rates in order to achieve an effluent total nitrogen of 4.0 mg/L. Study responsibilities included operation of the pilot unit.

Project Manager
Maryland City Water Reclamation Facility | Anne Arundel County, Maryland
Two Projects.
- Project manager for an evaluation of the severe corrosion of two Schreiber bioreactors at the facility. The study investigated the condition of the existing equipment and evaluated the life cycle costs of ten different alternatives for correcting the existing problems.
- Project manager for an evaluation of existing effluent filters at the facility. The study recommended replacement media.

Project Manager
Patuxent Water Reclamation Facility | Anne Arundel County, Maryland.
Preparation of design documents for the removal of grit and sludge from an existing oxidation ditch at the facility.

Project Engineer
Regional Water Pollution Control Plant | City of Roanoke, Virginia.
Evaluation of the 45 million gallon per day plant. The study evaluated the plant capacity and recommended improvements to ultimately upgrade the facility to capacities of 62 and 78 million gallons per day. Existing unit processes evaluated included headworks, grit removal, flow measurement, primary clarifiers, aeration tanks and biological nutrient removal process, secondary clarifiers, return activated sludge pumping, disinfection, and sludge treatment processes.

Project Engineer
General Chemical Facility
Evaluation. Evaluation of an industrial wastewater pretreatment facility. The pretreatment facility, which serves two major chemical industries, was in need of an upgrade in order to provide adequate treatment of future flows. This project followed a report that detailed options for upgrading the treatment facility. The purpose of this project was to determine how the cost of upgrading could be reduced. The evaluation focused on reducing flows within the industrial

complex and improving the efficiency of the treatment facility.

Project Engineer

Town of Winchester and City of Winsted, Connecticut

Heavy Metals Reduction Study. The study focused on identification of heavy metal sources, evaluation of the fate of heavy metals in the treatment plant, and providing recommendations for heavy metals reductions in the treatment plant effluent.

Project Engineer

Naval Air Station | South Weymouth, Massachusetts

Stormwater Pollution Prevention Plan. The project identified potential sources of pollution, which were expected to affect the quality of stormwater discharges associated with the industrial activity at the facility. The plan also described the implementation of practices, which are to be used to reduce the pollutants in stormwater discharges.

Project Manager

Phase I Environmental Site Assessments. Project manager for the preparation of over 50 Phase I environmental site assessments in Connecticut, New York, New Jersey, and Maryland. Specific tasks included document research, field investigations, and report preparation.

Project Manager

Phase II Environmental Site Assessments. Project manager for the preparation of Phase II environmental site investigations in Connecticut and New Jersey. Specific tasks included coordination of subsurface sampling and investigations as well as report preparation.

Project Manager

Marstons Mills Middle School | Barnstable, Massachusetts

Wastewater Treatment Plant Evaluation. Evaluation of the 32,000 gallons per day plant. The study involved the evaluation of each unit process to determine the overall capacity of the treatment plant. The evaluation included rotating biological contactors, final clarifiers, a denitrification filter, ultraviolet disinfection and chemical addition.

Project Engineer

Lincoln Sudbury Regional High School, | Barnstable, Massachusetts

Wastewater Treatment Facility Design. Design of the 20,000 gallons per day facility. In addition to securing a new discharge permit, the design includes a new sequencing batch reactor, sludge facilities, and chemical addition.

Project Manager

Franklin Pierce College | Rindge, New Hampshire

Wastewater Treatment Facility Evaluation. Evaluation of the 50,000 gallons per day facility. The study involved the evaluation of each unit process to determine the condition and overall capacity of each treatment unit. The evaluation included screening, rotating biological contactors, final clarifiers, an effluent filter, ultraviolet disinfection, chemical addition, and sludge handling.

Other related areas of interest

- **Visiting Lecturer**

  "Where Discharge Permits are Heading with Regard to Nutrients and CECs in New England," University of Massachusetts, Amherst, MA; Environmental and Water Resources Seminar, February 2012.

- **Papers/Presentations/Posters**

  Sustainable Design/Renewable Energy Presentations

  Drainville, Marc R., "Steps Toward Becoming a Net Zero Energy Facility," presented at the New England Water Environment Association Annual Meeting, January 2012

  Drainville, Marc R., "Barnstable WPCF – A discussion of net energy reduction" presented at MassDEP sponsored Energy Roundtable, March 2012.

  Drainville, Marc R., "Reducing the Carbon Footprint of the Hyannis WPCF through Renewable Energy Production and Energy Efficiency Measures." Presented at Water Environment Association of Ontario Annual Meeting in April 2012.

  Drainville, Marc R and A. Rudenko, "Reducing the Carbon Footprint of the Hyannis WPCF through Renewable Energy and Energy Efficiency Measures" presented at Water Environment Association Annual Meeting, Los Angeles, CA October 2011;

  Drainville, Marc R., "Reducing the net energy consumption at an Energy Intensive Public Works Facility" presented at American Public Works Association Sustainability Specialty Conference, June, 2011.

  Drainville, Marc R. and A. Rudenko, "Reduce, Recover and Renewables: Three R's to Minimize a WPCFs Net Energy Consumption" presented at the joint NYWEA/ NEWEA spring conference in Bolton, NY, June 2011.

  Drainville, Marc R. and A. Rudenko,, "Reducing the Carbon Footprint at the Hyannis WPCF" presented at the New England Water Environment Association, Inc. Annual Meeting, January 2011

  Drainville, Marc R and A. Rudenko, "Reducing the Carbon Footprint at the Hyannis WPCF" Poster at the New England Water Environment Association, Inc. Annual Meeting, January 2011

  Drainville, Marc R and A. Rudenko, "Implementing Renewable Energy at WPCFs: Three Case Studies" presented at the New England Water Environment Association, Inc. Annual Meeting, January 2011

  Drainville, Marc R., "Incorporating LEED Principals at a Wastewater Treatment Facility – Chatham, Massachusetts Water Pollution Control Facility Case Study," presented at the New England Water Environment Association 2010 Energy and Sustainability Conference, October 2010.

  Drainville, Marc R., "For Norwich Public Utilities Microturbines Make Dollars and Sense," presented at the New England Water Environment Association meeting, June 2010.

Other related areas of interest

Wastewater Presentations

Drainville, Marc R., "Achieving low level effluent nitrogen without filtration or supplemental carbon; Westport, CT" presented at the New England Water Environment Association Summer Meeting, June 2012

Drainville, Marc R., et al, "Innovative Strategies for Removing Total Organic Carbon in an Indirect Water Reuse Application," presented at AWWA National Conference in Dallas, Texas, June, 2012.

Drainville, Marc R.and A. Rudenko, "Applying Drinking Water Technologies to Wastewater Applications – Cape Cod Case Studies" presented at the New England Water Environment Association 2011 Microconstituents Specialty Seminar, September, 2011

Drainville and K. Wong, Marc R., "Low Cost, Low Level Effluent Nitrogen Removal Upgrades That Pay For Themselves" presented at the joint NYWEA/ NEWEA spring conference in Bolton, NY, June 2011

Drainville, Marc R. "Meeting Non-Point Source Watershed Based TMDLs in the Coastal Estuaries around Chatham, MA on Cape Cod" presented at Lake Simcoe Science Symposium, Barrie, Ontario, May, 2011.

Drainville, Marc R. and A. Rudenko, "Total Organic Carbon Removal at a Municipal Wastewater Treatment Facility in Oak Bluffs, MA" presented at the New England Water Environment Association, Inc. Annual Meeting, January 2011

Drainville, Marc R.and K. Wong, "Design and Construction of the First WWTF Permitted in MA to Remove Nitrogen to the Limit of Technology" presented at the New England Water Environment Association, Inc. Annual Meeting, January 2011

Drainville, Marc R. and K. Wong, "Elkton, Maryland Wastewater Treatment Plant Sludge Dryer – Design Features, Safety Issues, and Lessons Learned," poster presentation at the New England Water Environment Association meeting, January 2010

Drainville, Marc R., "Achieving Low Level Effluent Nitrogen without Filtration and Supplemental Carbon," presented at Water Environment Association Annual Meeting, Orlando, Florida October 2009; and Water Environment Nutrient Removal Specialty Conference, Washington, DC, June 2009.

Drainville, Marc R., "Achieving Low Level Nitrogen Removal without Sophisticated Controls," presented at the New England Water Environment Association, Inc. Annual Meeting, January 2009.

Drainville, Marc R., "Nitrogen Removal," presented at Green Mountain Water Environment Association Annual Meeting, May 2009.

Other related areas of interest

- Drainville, Marc R., "Low Level Phosphorus Case Studies – Ithaca and Syracuse, NY" presented at the New England Water Environment Association, Inc. Nutrient Removal Specialty Seminar, October 29, 2008.
- Drainville, Marc R., "Engineering Feasibility and Cost Analyses of Nitrogen Reduction from Selected POTWs in Massachusetts," presented at the New England Water Environment Association, Inc. Annual Meeting, January 28, 2008.
- Drainville, Marc R., "Design, Construction and Startup of the First Enhanced Nutrient Removal Plant in Maryland," presented at the New England Water Environment Association, Inc. Annual Meeting, January 22, 2007.
- Drainville, Marc R., "Anaerobic Digester Foaming – Causes and Case Studies," presented at the New England Water Environment Association, Inc. Annual Meeting, January 25, 2006.
- Drainville, Marc R., Paul Moffet, Kelvin George, Jeff Sturdevant, Greg Farren, Bob Bowker, "Pilot Test of Waste Sludge Odor Control by Activated Sludge Diffusion," presented at the New England Water Environment Association, Inc. Annual Meeting, January 29, 2003.
- Drainville, Marc R., Dipankar Sen, and William P. Brink, "Developing Cold Temperature Design Criteria from Pilot Test of Upflow Static Bed Filter for Denitrification," presented at the New York Water Environment Association, Inc. 70th Annual Meeting, February 3, 1998.
- Drainville, Marc R., "An Investigation of the Effect of Polymer Dosage on the Bound Water Content of Sewage Sludge," Master of Science Thesis, Cornell University, Ithaca, NY, 1994.

Other related areas of interest

- **Peer Reviewed Journal Article Publications**

  Drainville, Marc R., et al., "Innovative Strategies for Removing Total Organic Carbon in an Indirect Water Reuse Application," published in NEWEA Summer Journal, 2012

  Drainville, Marc R,, "Achieving Low Level Effluent Nitrogen without Filtration and Supplemental Carbon," published in NEWEA Summer Journal, 2011.

- **Technical Publications**

  Member of Technical Report No. 16 (TR-16) Guides for the Design of Wastewater Treatment Works Steering Committee and overall document reviewer.

  One of the primary authors of 2011 Update of Technical Report No. 16 (TR-16) Guides for the Design of Wastewater Treatment Works for the following chapters: Wastewater Treatment Works, Biological Treatment, and Physical and Chemical Process for Advanced Treatment and Disinfection.

  Member of Technical Report No. 16 Guides for the Design of Wastewater Treatment Works Sustainability Issues Review Committee.

- **Operator Training**

  Presenter at Nutrient Management Workshop in Portsmouth, New Hampshire, September 2009.

  Presenter at Nutrient Management Works in Devens, Massachusetts, May 2009.

  Presenter at Phosphorus Removal Seminar in Rocky Hill, Connecticut, May 2008.

- **Team Awards**

  American Council of Engineering Companies Connecticut Section Award for Engineering Excellence for the Danbury Water Pollution Control Plant Nitrogen Removal Upgrade Project, 2012.

  American Council of Engineering Companies Connecticut Section Award for Engineering Excellence for the Westport Water Pollution Control Facility Upgrade Project, 2009.

  American Academy of Environmental Engineers National Honor Award for Environmental Engineering Excellence for Fairfield Water Pollution Control Facility Nitrogen Removal Project, 1998.

  American Council of Engineering Companies National Honor Award for Engineering Excellence for the Fairfield WPCF Nitrogen Removal Project, 1997.

  Connecticut Engineers in Private Practice (Connecticut Section ACEC) Engineering Excellence Awards for the Town of Westport Interim Nitrogen Removal Assessment, 1993, and for the Fairfield WPCF Nitrogen Removal Project, 1993.

Curriculum Vitae

C Dustin Sedlack

Service Group Manager – Instrumentation & Control System

Qualified. BS (1998), Electrical Engineering, University at Buffalo

Connected. Instrument Society of America

Relevance to project. Dustin has more than 13 years' experience with the planning, design, construction, commissioning, and management of instrumentation and control systems for water, wastewater, and industrial manufacturing facilities. His principal area of expertise is the integration of supervisory control and data acquisition (SCADA) systems, or process control systems (PCS), design.

Design Engineer

Cornell University | Ithaca, New York, USA

Water Filtration Plant Upgrade. Planning, schematic design, construction, and integration of a SCADA system for the plant. Project includes one plant PLC monitoring over 300 physical I/O points, two Modbus turbid meter networks, and a Modbus valve actuator network exceeding 40 valves. Owner pre-purchased all major equipment, including PLCs and instrumentation, which required modified Contract Documents. GE iFIX will serve as the supervisory software. Ethernet-based, spread-spectrum radio facilities with one remote pumping station.

Design Engineer

City of Hudson | Hudson, New York, USA

Water Treatment Facilities Upgrade. Design, construction, and integration of a SCADA system for the plant. Project included a complete treatment system overhaul including new chemical feed, pumpage, and four U.S. Filter Trident filtration systems. Completed system automates the entire treatment facility. System included two plant PLCs and one remote site monitoring and controlling over 200 physical I/O points. Communication with the remote raw water pumping station will be facilitated via dial-up telephone.

Design Engineer

City of Binghamton | Binghamton, New York, USA

Water Treatment Plan Improvements. Task management, planning, design, construction, and integration of a SCADA system for the plant. Project included a new plant-wide Ethernet network that facilitates communication between 7 PCs, 4 main PLCs, 10 filter PLCs, 2 master telemetry units (PLCs), and allows for interplant networking of the administration staff's computers. Plant PLCs monitor and control over 800 physical I/O points to fully automate chemical feed, raw and finished water pumping, and filter operation. Using leased-frequency radio, two redundant master telemetry units share another 254 physical I/O points between 29 remote sites including storage tanks, pumping stations, and pressure reducing vaults. Project includes a Modbus valve actuator network exceeding 70 valves and 2 Modbus turbid meter networks. Operators may monitor and control plant and remote sites via two SCADA nodes and four client nodes. GE iFIX serves as the supervisory software and facilitates real-time monitoring, control, customized reporting, historical trending, extensive security architecture, remote access by authorized personnel, and interfaces with computerized maintenance management and computerized operation and maintenance systems.

Design Engineer
City of Syracuse Water Distribution System | Syracuse, New York, USA
Corrosion Control Upgrades. Planning, design, and construction of a SCADA system for the system. Project included two reservoirs separated by 10 miles and multiple pumping stations that maintain reservoir level, user pressure, and facilitate chlorination and corrosion control. Following the client's standardization on Bristol-Babcock RTUs, a network of five Bristol-Babcock RTUs are monitored from central headquarters, offering supervision of all new and existing instrumentation, and providing dial-out for building security systems. RTUs communicate via spread-spectrum radio.

Design Engineer
Town of Norwalk | Norwalk, Connecticut, USA
Supervisory Control and Data Acquisition (SCADA) System. Construction of a SCADA system for the Town's facility. Project included over 400 I/O points through 10 PLCs and 3 Window NT-based supervisory computers running Wonderware InTouch as the supervisory software. Communications among the PLCs and supervisory computers is done through redundant, fiber optic Ethernet.

Design Engineer
Lehigh Valley Distribution System | New York, USA
Instrumentation and Controls. Design and construction of instrumentation and controls. The Lehigh Valley train derailment site was designed to extend Monroe County's water service to approximately 60 residents drawing from contaminated wells. The design entailed sending real-time data from a new pumping station and storage tank to the existing SCADA system at the Shoremont Water Treatment Facility. The design included specific manufacturer and workmanship requirements set forth by the owner. As such, an allowance was specified to allow Monroe County Water Authority employees to implement panel fabrication, programming, and start up services according to their own standards.

Design Engineer
City of Syracuse | Syracuse, New York, USA
Water Department Vulnerability Assessment. . Assisted with a vulnerability assessment for the Department.

Design Engineer
Anne Arundel County | Anne Arundel, Maryland, USA
Water Treatment Plant Expansion. .Manage the integration of plant wide improvements. Project included PLC programming with supervisory programming by the Owner. Highlights: Accommodated Owner's existing standards; close coordination with Owner's programmers; site representation by third party.

Design Engineer
Onondaga County Water Authority | Otisco, New York, USA
Improvements to the Otisco Lake Water Treatment Plant. . Planning and design for a plant wide control system upgrade. Project included doubling of filter capacity through the addition of six new conventional multimedia filters and supporting process improvements. Highlight: Decommission existing Main Instrument Panel and integrate into new control system without interruption of existing plant controls.

Design Engineer
City of Havre de Grace | Havre de Grace, Maryland, USA
Control System Study. Managed a study for control system upgrades to an old water filtration plant with very limited space for improvements and concurrent projects.

Design Engineer
Town of Newburgh | Delaware Aqueduct Tap (DAT), New York, USA
Water Filtration Plant Controls Design and Integration. Instrumentation and controls design of a new, fully-automated membrane filtration plant. Project included a video surveillance system and advanced SCADA system. Integration will be by

GHD (2012). Highlights: Facilitate unstaffed operation of the DAT WTP by interconnecting the DAT SCADA system with the Town's existing Chadwick WTP SCADA system using a site-to-site VPN.

Project Manager

Town of Newburgh | Newburgh, New York, USA

Chadwick Lake Water Treatment Plant. Project manager for the evaluation and presentation of multiple software options for upgrading supervisory software and SCADA computer hardware. Upgrade will be integrated by GHD (2011).

Wastewater

Discipline Leader

Onondaga County | Syracuse, New York, USA

Clinton Combined Sewer Overflow (CSO) Storage Facility Project. Discipline leader for the design of a new, fully automated control system for this unstaffed CSO storage facility. Project included connection to the County's existing regional control system network via frame relay. Integration of these improvements will be performed by GHD in spring 2012.

Design Engineer

City of Scranton Sewer Authority | Scranton, Pennsylvania, USA

Biological Nutrient, Chemical Phosphorus Removal, and Related Improvements. Design engineer for the construction of automated primary and secondary scum collections systems, a new return activated sludge pumping station, primary sludge collection, conversion of existing aeration tanks to a highly automated biological nutrient removal step feed process, and a carbon source feed system. Project includes the construction of a fault-tolerant fiber optic ring network to support major supervisory control and data acquisition system improvements under this project. Highlights: Automated step feed aeration and scum tipping troughs.

Design Engineer

Indian Head Wastewater Treatment Plant | Indian Head, Maryland, USA

Integration of the Indian Head Wastewater Treatment Plant. Project entails the construction of a new treatment facility that includes a supervisory control and data acquisition (SCADA) system comprised of three new Allen-Bradley ControlLogix PLCs and three SCADA computers that utilize GE's IFIX for visualization. Dialer and reporting programs utilized. Highlights: Automated aeration system.

Design Engineer

Chesapeake Beach Wastewater Plant | Chesapeake Beach, Maryland, USA

Integration of the Chesapeake Beach Wastewater Treatment Plant. Project entails the automation of a shellfish protection tank and related improvements including a supervisory control and data acquisition (SCADA) system comprised of three Siemens PLCs, one vendor PLC, and three SCADA computers that utilize GE's iFIX for visualization.

Design Engineer

Town of Elkton | Elkton, Maryland, USA

Wastewater Treatment Plant Integration Project entails the construction of a new treatment facility that includes a supervisory control and data acquisition (SCADA) system comprised of eight Allen-Bradley ControlLogix PLCs, four vendor PLCs, and eight SCADA computers that utilize Wonderware InTouch (for visualization), Industrial Application Server/System Platform, and InSQL (Wonderware's data historian). Highlights: extensive use of Ethernet networked variable frequency drives.

Design Engineer

City of Havre de Grace | Havre de Grace, Maryland, USA

Main Pumping Station Rehabilitation. The project entails the integration of an 8.0 MGD wastewater pumping station. Project included PLC-based controls with Ethernet communication to each pump's VFD. Monitoring and control was

facilitated through a flat panel PC running GE Fanuc iFIX.

Discipline Leader/Control System Programmer
Town of Westport | Westport, Connecticut, USA
Evaluation and Integration of a Supervisory Control and Data Acquisition (SCADA) System. Discipline leader and control system programmer for a three phase construction project. System is comprised of four PLCs, two vendor PLCs, and two redundant SCADA computers that utilize GE iFIX as the supervisory software.

Design Engineer
Easton Utilities Commission | Easton, Maryland, USA
Wastewater Treatment Facility Integration. Project entails the construction of a new treatment facility that includes a supervisory control and data acquisition (SCADA) system comprised of seven new PLCs, three vendor PLCs, and four SCADA computers that utilize Wonderware InTouch (for visualization), Industrial Application Server, and InSQL (Wonderware's data historian).

Design Engineer
City of Westminster | Westminster, Maryland, USA
Westminster Wastewater Treatment Facility. . Integration of a Rockwell Software RSView32-based supervisory control and data acquisition system for the facility. System is comprised of three Modicon Quantum PLCs communicating via Modbus Plans over fiber. Project included implementation of WIN911, a software-based auto dialer program.

Design Engineer
City of Fairfield | Fairfield, Connecticut, USA
Wastewater Treatment Plant Construction and Integration of a Supervisory Control and Data Acquisition (SCADA) System. . Project included a network of five PLCs and four Windows NT supervisory computers that monitor and control the wastewater treatment plant and six remote pumping stations. All communication among the PLCs and supervisory computers is done through redundant fiber optic Ethernet.

Design Engineer
City of Oswego | Oswego, New York, USA
Wastewater Treatment Plant Supervisory Control and Data Acquisition (SCADA) System. .Project management, planning, design, construction, and integration for the plant. Construction of a complete SCADA system whose sole purpose was to decrease operational costs by reducing manned shifts from three to one, thereby saving the City over $700,000 annually and returning the total project cost within two years. The system spanned two independent wastewater treatment facilities and three remote pumping and treatment stations for a total of over 700 physical I/O points. Spread-spectrum radio was utilized to facilitate communication between remote sites and each plant. GE iFIX serves as the supervisory software and facilitates real-time monitoring, control of the wasting process, custom reporting, historical trending, and interface with automatic telephone dialers, PLC-based intrusion system, and remote access by authorized personnel.

Design Engineer
City of Binghamton | Binghamton, New York, USA
Water Treatment Plant Supervisory Control and Data Acquisition (SCADA) System. .Task management, design, construction, and integration of an expansion to the plant's system, which includes monitoring and control of an additional six combined sewer overflow sites. One master telemetry unit has been seamlessly integrated into the existing water treatment plant Ethernet network to monitor over 150 physical I/O points from seven remote sites via leased-frequency radio. Combined sewer overflow sites are comprised of one pumping station and five overflow structures. Variable speed stormwater pumps and direct drive sanitary pumps are fully PLC-automated. Sluice gates and overflow screens are fully automated at each overflow structure with the provision of remote control from the sewer department. Combined sewer overflow and water treatment plant SCADA systems are

seamlessly integrated using the same GE iFIX licenses provided under the plant project. Extensive user-based security configurations are implemented to limit personnel access to only systems for which they are responsible for.

Design Engineer

Village of Lake Placid | Lake Placid, New York, USA

Planning, Design, Construction, and Integration of a Wastewater Treatment Facility Supervisory Control and Data Acquisition (SCADA) System. The completed SCADA system will consist of four PLCs at the plant communicating via Ethernet that monitor and control over 500 physical I/O points. System is comprised of a multi-vendor PLC network.

Design Engineer

City of Roanoke | Roanoke, Virginia, USA

Integration of the Pullen Park Pumping Station Upgrade, Wastewater Treatment Plant. Project included appending their existing Wonderware InTouch supervisory control and data acquisition system to include the pumping station modifications made to the pumping station. Software changes were integrated without interrupting existing plant monitoring or control.

Design Engineer

Onondaga County | Syracuse, New York, USA

Franklin Street Floatables Facility. This project included the design and construction for two floatables facilities that remove floatables from a 6-foot main feeding the Syracuse Metropolitan (Metro) Wastewater Treatment Plant (WWTP). These facilities now provide real-time data input via modem to the Syracuse WWTP's SCADA system. Design included seamless integration with the WWTP's existing SCADA system with strict adherence to Onondaga County's current standards for PLC programming and supervisory software graphic development. The County currently utilizes GE Cimplicity as their supervisory software.

Design Engineer

City of Corning | Corning, New York, USA

Construction and Supervisory Program Modifications, Wastewater Treatment Facility Trickling Filter Upgrade. Project included performing a year 2000 compliance study and appending an existing Wonderware InTouch-based supervisory control and data acquisition system to include monitoring and control of a new trickling filter. InTouch was upgraded to version 7.0 as part of the Y2K compliance study.

Design Engineer

Engelhard Corporation/BASF Paint Pigment Manufacturing Facility | Peekskill, New York, USA

Supervisory Control and Data Acquisition (SCADA) System Design and Integration. Project included the design of a new, plant-wide bulk chemical delivery system (NaOH, HCL, FeCL3, and TiOCL3) serving 30 batch reactors thereby replacing distributed day tank storage and eliminating hazardous exposure. Designed a new plant data network comprised of three Allen-Bradley ControLogix PLCs communication over fiber optic Ethernet to monitor and controls over 500 physical I/O points. Wonderware InTouch served as the supervisory software.

Design Engineer

Carrier Corporation | Stone Mountain, Georgia, USA

Task management, Design, Construction, and Integration of a new pH Neutralization Process. Provided design-build construction of this system to comply with United States Environmental Protection Agency regulations in response to a violation. Project utilized an Allen-Bradley ControlLogix PLC and Rockwell Software's RSView32 to fully-automate the pH neutralization process consisting of a varying 2.0 acid and 12 base.

Design Engineer

Dow Chemical Company | Waterloo, New York, USA

Design and Construction of PLC-Based Automation for Sequential Batch Reactors. The supervisory control and data acquisition system

utilizes two PLCs and seven Remote I/O racks to monitor and control the industrial wastewater process, which includes sequential batch reactor monitoring, temperature control of cooling water and sludge dewatering, and monitoring of seven well locations. All communication among the PLCs and Remote I/O is accomplished through redundant fiber optic Ethernet network. System architecture allows seamless integration with existing control networks as well as a project currently under construction.

Other related areas of interest

- Proficient with Wonderware's InTouch, Industrial Application Server (IAS), InSQL; GE's iFIX, FIX32 and iHistorian; Rockwell Software's RSView32; Modicon, Allen-Bradley, and Siemens PLCs; SyTech XLReporter; and software-based autodialer programs Specter Instrument's WIN911 and Wonderware's SCADAlarm. Factory trained in InTouch, Industrial Application Server, iFIX, RSView32, and Modicon Concept.

Curriculum Vitae

Lance M Nelson

Control Systems Engineer

Qualified. B.S. (2008), Electrical Engineering Technology, SUNY IT
Connected. GE Fanuc iFIX, Instrument Society of America
Relevance to project. Lance has more than four years of experience in electrical engineering with a focus on the design of Instrumentation and Control Systems, installation of SCADA systems, and integration.

Control System Integration
City of Hudson | Hudson, New York, USA

Integration of a Redundant SCADA System for the City of Hudson Water Treatment Facility. Project includes a complete treatment system overhaul including new chemical feed, pumpage, and four US Filter Trident filtration systems. Completed system is a fully-automated enables the client to meet regulations with single-shift operation. System includes two plant PLCs and one remote site monitoring and controlling over 200 physical I/O points. Communication with a single remote raw water pumping station is via dial-up telephone.

Control System Integration
Village of Skaneateles | Skaneateles, New York, USA

Water Treatment Plant. Integration of SCADA for a new 2.0 mgd UV disinfection, chlorination and pumping system.

Instrumentation & Control System Design
Town of Chatham | Chatham, Massachusetts, USA

Wastewater Treatment Plant. Currently under construction, this project entailed the design of a new treatment facility that includes a redundant SCADA system comprised of five new PLCs, three vendor PLCs, and six SCADA computers that utilize GE Fanuc iFIX (for visualization) and Historian (for data logging). Network design utilizes two fiber optic, self-healing rings to allow for separation of the SCADA Local Area Network (LAN) and the Town's business LAN.

Control System Integration
City of Havre de Grace | Havre de Grace, Maryland, USA

*Integration of the Havre de Grace Wastewater Treatment Plant.*Project entailed the construction of a new treatment facility that includes a redundant SCADA system comprised of eight Allen-Bradley ControlLogix PLCs, three vendor PLCs, and eight SCADA computers that utilize GE Fanuc's iFIX (for visualization) and Proficy Historian (GE Fanuc's data historian). Project highlights include extensive use of Ethernet networked variable frequency drives and complex communication between vendor-supplied PLCs and plant PLCs programmed by GHD.

Control System Integration
Town of Elkton | Elkton, Maryland, USA

Integration of the Elkton Wastewater Treatment Plant. Project entailed the construction of a new treatment facility that includes a redundant SCADA system comprised of eight Allen-Bradley ControlLogix PLCs, four vendor PLCs, and eight SCADA computers that utilize Wonderware InTouch (for visualization), Application Server/System Platform, and InSQL (Wonderware's data historian). Project highlights include extensive use of Ethernet networked variable frequency drives.

Control System Integration
Town of Barnstable | Barnstable, Massachusetts, USA
Integration of the Barnstable Wastewater Treatment Plant. Integration for an extensive plant upgrade. SCADA system is comprised of three new PLCs, three vendor PLCs, and two SCADA computers that utilize GE Fanuc iFIX as the supervisory software. Project highlight is an alarm dialer enabled single shift operation with an on-call operator.

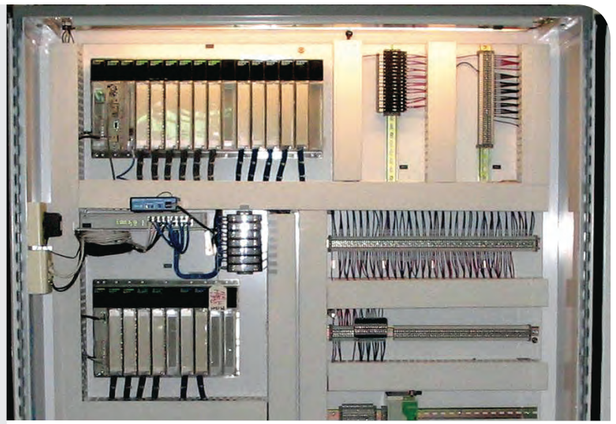
Control System Integration
Town of Indian Head | Indian Head, Maryland, USA
Integration of the Indian Head Wastewater Treatment Plant (WWTP). Project entailed the construction of a new treatment facility that included a SCADA system comprised of three new Allen-Bradley ControlLogix PLCs and three SCADA computers that utilize GE Fanuc's IFIX for visualization. Dialer and reporting programs utilized. Project highlight is a fully-automated aeration control system and Ethernet networked variable frequency drives.

ATTACHMENT B

SIMILAR PROJECT PROFILES

REPRESENTATIVE PROJECTS

Aberdeen WWTF ENR Upgrade	Aberdeen, MD
Arnold WTF Hypochlorite Project	Anne Arundel County, MD
Arnold WTF Plant Upgrade	Anne Arundel County, MD
Barnstable WWTF	Hyannis, MA
Binghamton CSO Upgrade	Binghamton, NY
Binghamton WTP Improvements Project	Binghamton, NY
Broome County Landfill	Broome County, NY
Chatham WWTF Plant Upgrade	Chatham, MA
Chesapeake Beach WWTP Shellfish Protection Project	Chesapeake Beach, MD
Colonie WWTF	Colonie, NY
Cornell University WFP Upgrade	Ithaca, NY
Danbury Aeration and Methanol System	Danbury, CT
Easton WWTF ENR Upgrade	Easton, MD
Elkton WWTF ENR Upgrade	Elkton, MD
Engelhard/BASF Process Simplification Project	Peekskill, NY
Fairfield WWTF	Fairfield, CT
Havre de Grace WTF	Havre de Grace, MD
Havre de Grace WWTF	Havre de Grace, MD
Hudson WTF	Hudson, NY
Indian Head WWTF	Indian Head, MD
International Paper Landfill Leachate Project	Deferiet, NY
Lake Placid WWTF	Lake Placid, NY
Malone WTF SCADA Project	Malone, NY
Manchester Screening Project	Manchester, CT
Maury Service Authority WWTF	Lexington, VA
Ossining WWTF	Ossining, NY
Oswego Plant Automation Project	Oswego, NY
Patterson WWTF	Patterson, NY
Peach Lake WWTF Upgrade	Peach Lake, CT
Pullen Park Pumping Station Upgrade	Raleigh, NC
Southtowns AWTF SCADA Upgrade	Southtowns, NY
Westminster WWTF Upgrade	Westminster, MD
Westport WWTF	Westport, CT
Yorktown WWTF	Yorktown Heights, NY



ABOUT GHD

GHD is one of the world's leading engineering, architecture and environmental consulting firms.

Established in 1928, GHD employs more than 6000 people across five continents and serves clients in the global markets of water, energy and resources, environment, property and buildings, and transportation.

Wholly-owned by its people, GHD is focused on client success. Our global network of engineers, architects, planners, scientists, project managers and economists collaborate to deliver sustainable outcomes for our clients and the community. Our core values of Teamwork, Respect and Integrity help create enduring relationships that deliver exceptional results.

GHD is recognized for its commitment to innovation, safety and sustainable development. We care for the wellbeing of our people, communities and the environments in which we operate.

A member of the World Business Council for Sustainable Development, GHD operates under a Practice Quality Management System, ISO 9001:2008 and an Environmental Management System, ISO 14001:2004 which are certified by Lloyds Register Quality Assurance.

For more information, visit **www.ghd.com**

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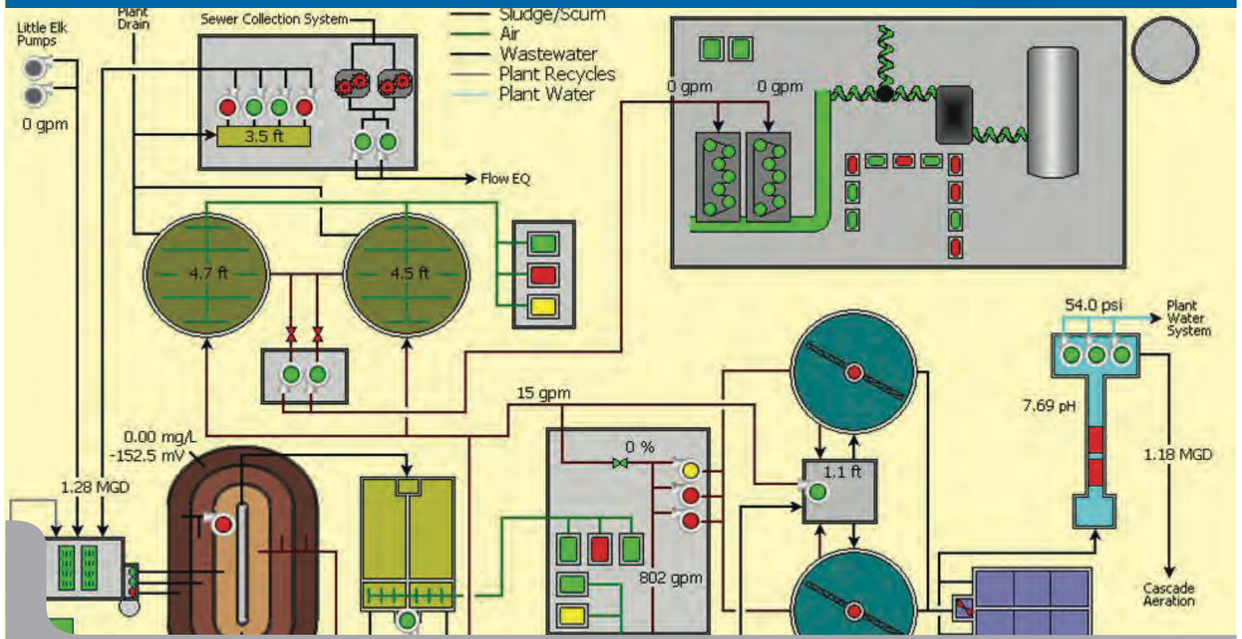
SUPERVISORY CONTROL & DATA ACQUISITION **(SCADA)** INTEGRATION



Accomplish More Together

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

OVER THE LAST TWO DECADES, THE NEED FOR SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEMS HAS EXPLODED TO MEET THE INCREASING DEMANDS OF THE WATER AND WASTEWATER INDUSTRY. THESE MARKETS ARE UNDER INCREASING PRESSURE TO IMPROVE ENERGY AND OPERATIONAL EFFICIENCY, CHALLENGED WITH TIGHTER REGULATORY REQUIREMENTS, AND ARE IN NEED OF INCREASINGLY ROBUST CONTROL SYSTEMS TO MEET THESE CHALLENGES.

Through many years of planning, designing, and supervising the construction of SCADA systems for our clients, GHD has learned the importance of proper SCADA system implementation We have developed a client-focused approach to developing programmable logic controller (PLC) and supervisory programs, that jointly comprise a SCADA system. For more than 10 years, GHD has maintained an internal group of controls specialists who provide programming services for many of the projects we engineer.

We understand our clients have unique goals and that every control system requires special configurations to meet customer-specific control and monitoring objectives. Our goal is to make complex systems simple to operate through the use of intuitive interfaces that are well coordinated with the client. In addition, our multidisciplinary resources provide a broad range of services that can be integrated with SCADA implementation including, Geographic Information Systems, Maintenance Management Systems, Asset Management, Water, Energy, Sustainability, and Management Consulting.

Our controls professionals are experienced in applying appropriate technology systems to help our clients better manage their processes. Our team members have extensive experience with assessing existing SCADA systems, recommending system improvements, designing SCADA upgrades, and implementing the final solution. Our SCADA programming and implementation capabilities include a variety of software components, including:

SUPERVISORY SOFTWARE/GRAPHICAL USER INTERFACE SOFTWARE

- Wonderware InTouch and System Platform
- GE Fanuc iFIX and Cimplicity
- Rockwell Software RSView

PLC PLATFORMS

- Allen-Bradley SLC and Logix-platform PLCs
- Modicon Concept and Unity-based PLCs
- Siemens PLCs
- GE Fanuc 90-30 and RX3i-platform PLCs
- Bristol-Babcock/Emerson ControlWave-based PLCs

ANCILLARY SOFTWARE COMPONENTS

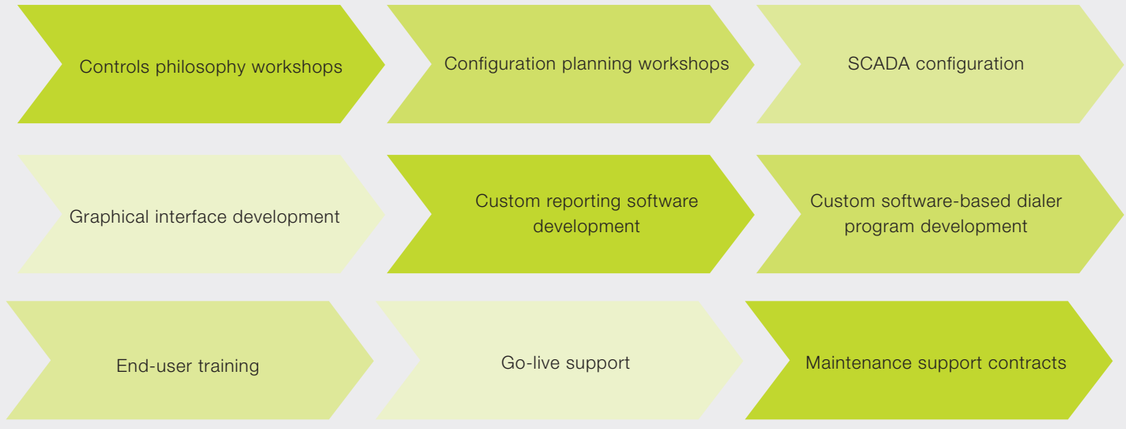
- Specter Instruments WIN-911
- Wonderware SCADAlarm
- SyTech XLReporter

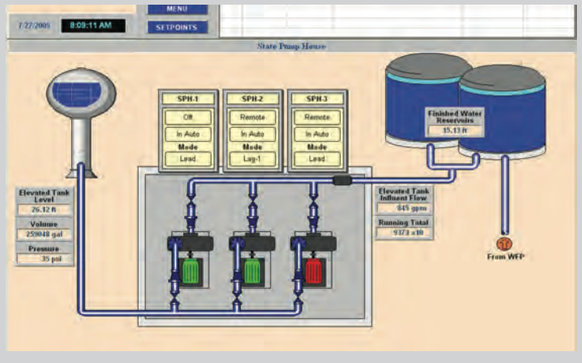
BENEFITS

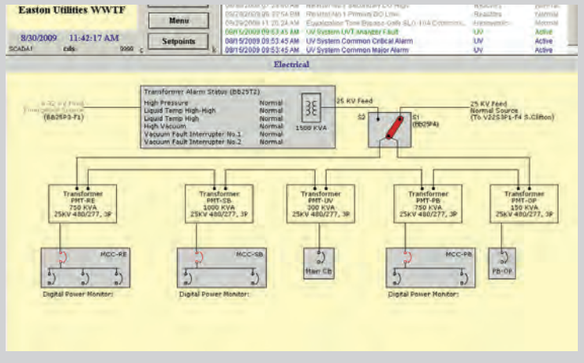
- Multidisciplinary internal resources
- SCADA system function and interface tailored to your needs
- Programming is a priority, not a line item on a contract
- Programmed by familiar members from the design team

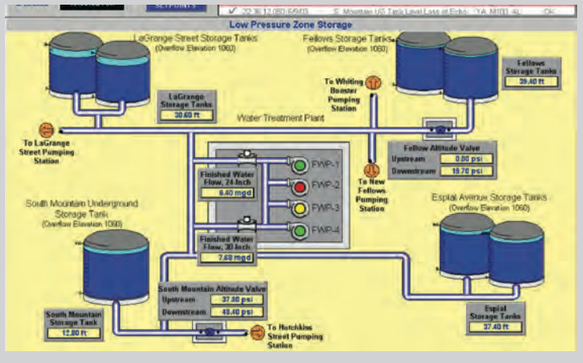
OUR APPROACH

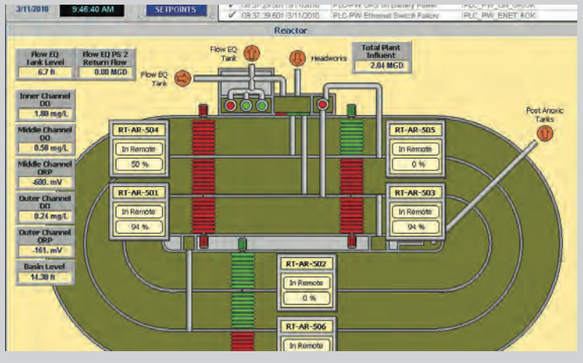
1. Controls philosophy workshops
2. Configuration planning workshops
3. SCADA configuration
4. Graphical interface development
5. Custom reporting software development
6. Custom software-based dialer program development
7. End-user training
8. Go-live support
9. Maintenance support contracts









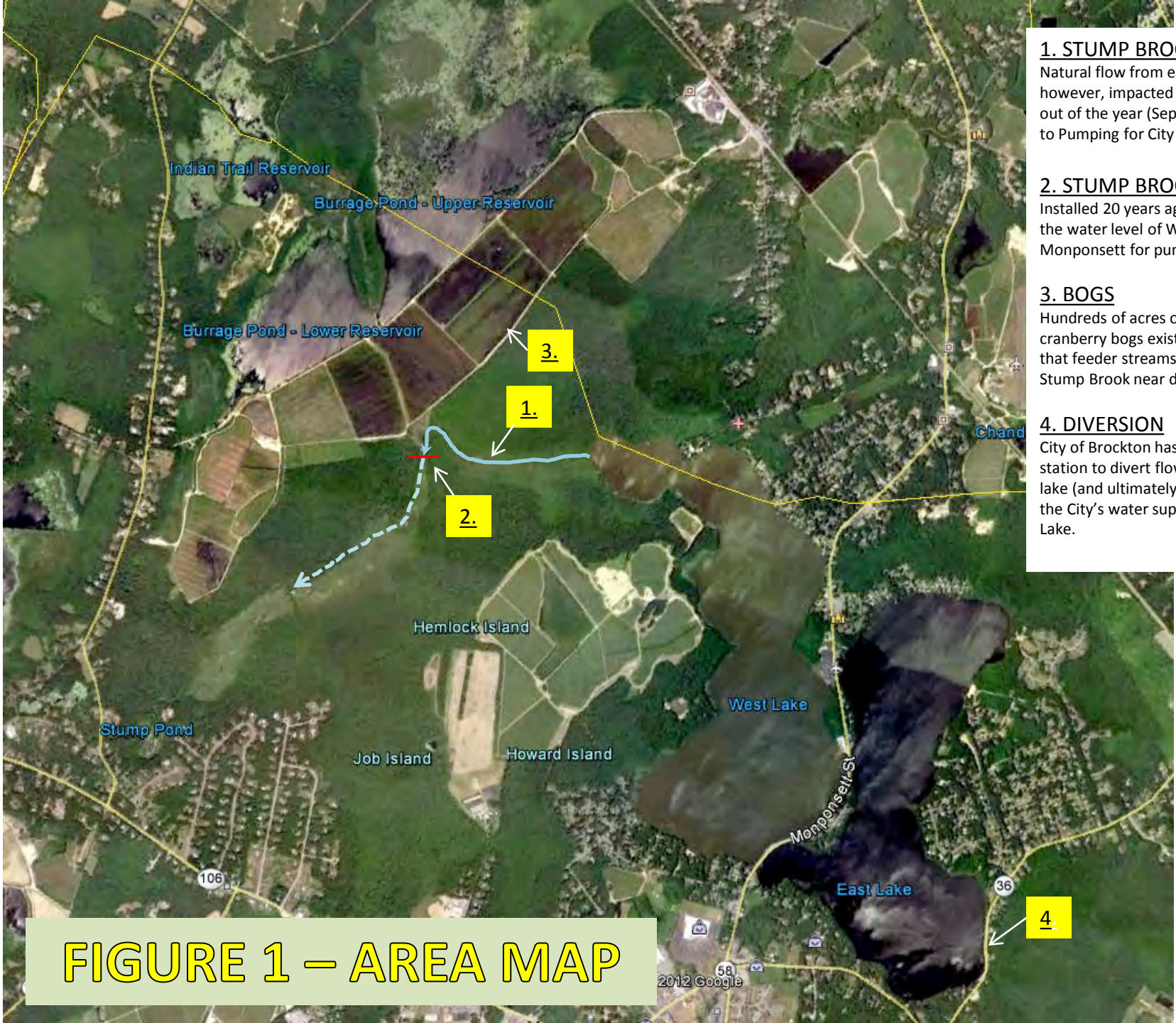


ATTACHMENT C

LETTERS OF SUPPORT

ATTACHMENT D

SUPPORTING INFORMATION



1. STUMP BROOK

Natural flow from east-west, however, impacted 9 months out of the year (Sep to May) due to Pumping for City of Brockton

2. STUMP BROOK DAM

Installed 20 years ago to raise the water level of West Monponsett for pumping

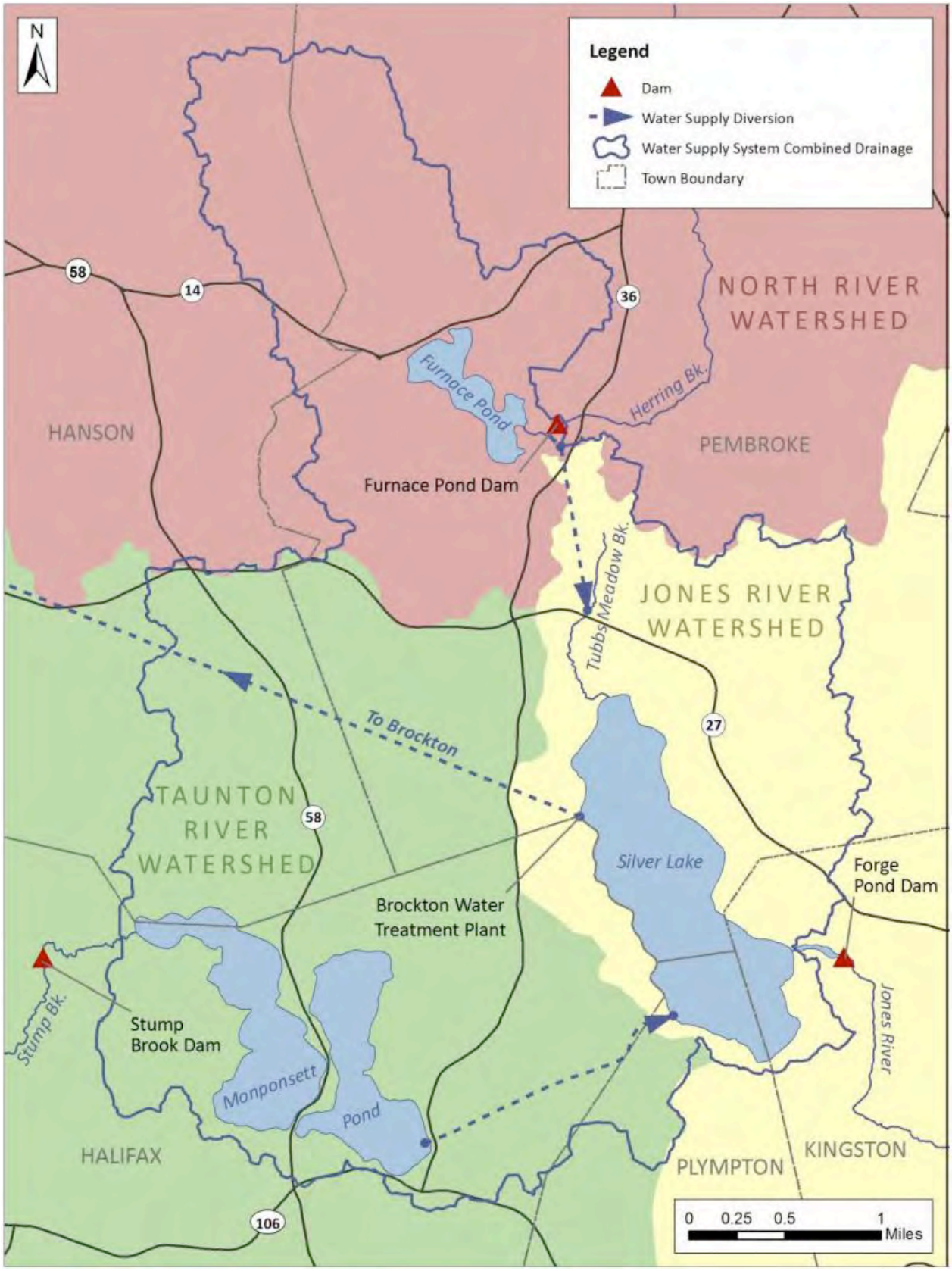
3. BOGS

Hundreds of acres of abandoned cranberry bogs exist, suspected that feeder streams enter Stump Brook near dam

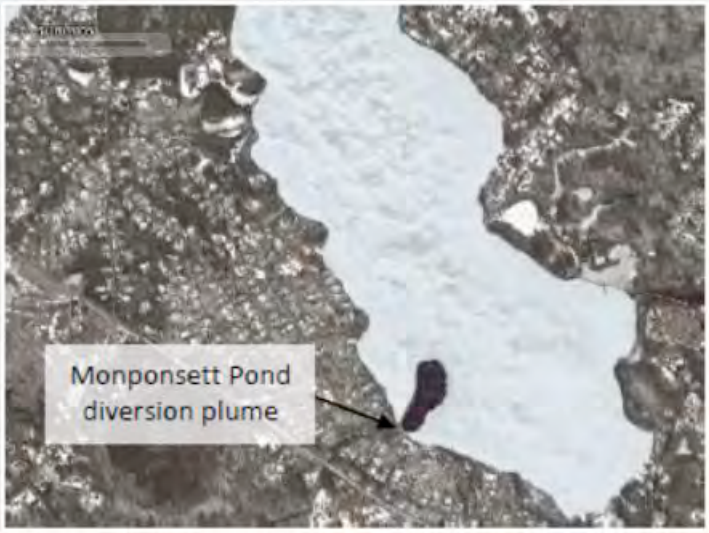
4. DIVERSION

City of Brockton has a pump station to divert flow from east lake (and ultimately the west) to the City's water supply of Silver Lake.

FIGURE 1 – AREA MAP


N
Legend
Dam
Water Supply Diversion
Water Supply System Combined Drainage
Town Boundary
58
14
36
NORTH RIVER WATERSHED
Furnace Pond
Herring Bk.
HANSON
PEMBROKE
Furnace Pond Dam
Tubbs Meadow Bk.
JONES RIVER WATERSHED
To Brockton
27
TAUNTON RIVER WATERSHED
58
Silver Lake
Forge Pond Dam
Brockton Water Treatment Plant
Stump Bk.
Stump Brook Dam
Monponsett Pond
Jones River
HALIFAX
PLYMPTON
KINGSTON
106
0 0.25 0.5 1 Miles

Monponsett Pond Diversion Pipe Outlet



Google Earth image from 3/18/05 showing the Monponsett Pond plume entering Silver Lake

Stump Brook Dam

Stump Brook Dam

Example of flooding and water “loss”. Culvert at Lake Street, Kingston on the Jones River immediately downstream from Forge Pond Dam on April 18, 2007. Flooding exacerbated by Monposett water being diverted into Silver Lake, over Forge Pond Dam, and down the Jones River at >27MGD.

Example of flooding and water “loss”. March 15, 2010 on the Jones River at Elm Street, Kingston, MA. Fish ladder is overwhelmed, Water Department building is flooded. Naturally high precipitation resulted in high flows. In addition the natural flows, at this time Brockton was diverting water from Monponsett Pond, into Silver Lake, over Forge Pond Dam, and down the Jones River at >22MGD

Attachment D – Supporting Information

The following are links to media coverage found online:

BOSTON.COM

- http://www.boston.com/news/local/massachusetts/articles/2012/07/08/halifaxs_west_monponsett_pond_declared_off_limits_due_to_blooming_blue_green_algae/

- http://www.boston.com/news/local/massachusetts/articles/2012/07/15/meeting_on_monponsett_ponds_water_quality/

WICKED LOCAL / TOWN OF HALIFAX

- http://www.wickedlocal.com/plympton/news/x1547506524/Monponsett-ponds-battle-algae-levels-West-finally-open#axzz2EseuXikd

- http://www.wickedlocal.com/halifax/features/x1233653475/Monponsett-Watershed-Association-gets-ball-rolling-in-Halifax#axzz2EseuXikd

- http://www.wickedlocal.com/halifax/news/x911400669/WHAT-S-GOING-ON-Monponsett-Ponds-closed#axzz2EseuXikd

- http://www.wickedlocal.com/halifax/newsnow/x1233652705/Halifax-to-start-up-communication-with-Brockton-again-over-pond-issues#axzz2EseuXikd

- http://www.wickedlocal.com/halifax/news/x1153508495/Monponsett-Ponds-closed#axzz2EseuXikd

- http://www.wickedlocal.com/halifax/news/x223011915/West-Monponsett-Pond-closed#axzz2EseuXikd

- http://www.wickedlocal.com/halifax/topstories/x485800174/PUBLIC-HEALTH-Something-s-fishy?zc_p=0#axzz2EseuXikd

BOSTONGLOBE.COM

- http://www.bostonglobe.com/metro/regionals/south/2012/07/14/meeting-monponsett-ponds-water-quality/CQKPV2sw4acGK9btOZxQHL/story.html

Attachment D – Supporting Information

The following are links to supporting information on-line:

- Town of Halifax Board of Health letter of concern, dated December 2011. http://www.town.halifax.ma.us/Pages/HalifaxMA_Health/Algae.pdf

- Town of Halifax Board of Health Public Beaches Advisory. http://www.town.halifax.ma.us/Pages/HalifaxMA_Health/Beach

- Monponsett Watershed Information (including numerous downloads. http://www.town.halifax.ma.us/Pages/HalifaxMA_Health/MWA

- DRAFT Forge Pond Dam Fish Passage Improvement Feasibility Study and Preliminary Design (2012). Gomez and Sullivan Engineers P.C. http://www.jonesriver.org/getfile/forgepond/2012-11-14_DRAFT-ForgePondDam-FeasibilityReport.pdf

- City of Brockton, MA DRAFT Comprehensive Water Management Plan (City of Brockton, 2009) – Prepared by the City of Brockton to address the requirements of their modified Water Management Act (WMA) permit issued by the Massachusetts Department of Environmental Protection (DEP). Still in draft stage; not yet approved by the DEP. https://www.dropbox.com/s/iyvubi1wc6mizhz/CWMP%20Report.pdf

- South Coastal Watershed Action Plan (Watershed Action Alliance (WAA) of Southeastern Massachusetts, 2006) –Studied several Massachusetts watersheds with input from nonprofit groups, public agencies, and private individuals. It made recommendations to protect and restore the south coast's natural resources, including the Jones River. http://www.jonesriver.org/projects-events/legal-action/78-south-coastal-watershed-action-plan

- South Shore Coastal Watersheds 2001 Water Quality Assessment Report. (DEP, 2005). http://www.mass.gov/dep/water/resources/94wqar1.pdf

- Silver Lake Water Supply System Overview Report (Hanson, Murphy & Associates (HMA), 2006). Prepared for the City of Brockton to assess the components of the Silver Lake water supply system and determine whether modifications to infrastructure and/or operating procedures should be considered, with the overall intent of maintaining the high water quality of SilverLake. https://www.dropbox.com/s/4u0osnx7ioohtf7/HMA_SilverLakeSupply_Jan06.pdf

- Silver Lake Water Quality Assessment: A Silver Lake Community Awareness Project (ESS Group, 2004) – Prepared for the JRWA and the Town of Kingston under benefit of Department of Environmental Management (DEM) Lakes and Ponds Grant Program to study water and sediment quality of Silver Lake for the purposes of understanding nutrient loading dynamics. https://www.dropbox.com/s/zthrk9nefg5ad94/FINAL%20silver%20lake%20report.pdf

- Jones River Watershed Study (GZA, 2003) – Prepared for the DEM to conduct a water use

inventory and an inflow/outflow analysis of the Jones River watershed and its subbasins. https://www.dropbox.com/s/uabrqit3xmaukeg/GZA_final%20report.pdf

- Bathymetric Mapping of Silver Lake and Forge Pond (Coler & Colantonio (C&C), 2003) – Prepared for the JRWA Silver Lake Stewardship Project with funding by the Massachusetts Watershed Initiative through the Executive Office of Environmental Affairs. https://www.dropbox.com/s/9iyvvkrxdhmflzp/Silver_lake_bathy_2003.zip

- Silver Lake and Jones River Watershed Study (Teal, 2000) – Teal, Ltd. conducted studies of the Jones River in 1989 and 2000. The 2000 study, conducted with the assistance of and for the JRWA, provided a historic framework for some of the important developments within the watershed. A variety of indices were studied whereby flows, water quality, vegetation, fish, and macroinvertebrate sampling occurred. https://www.dropbox.com/s/cjcljte079k94cu/JonesRiverStudy2000_Teal.pdf

ATTACHMENT E

REQUIRED FORMS

ATTACHMENT F

WMA PERMIT

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST REGIONAL OFFICE
20 RIVERSIDE DRIVE, LAKEVILLE, MA 02347 508-946-2700

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

February 26, 2010

Richard Clark
Halifax Water Department
Town Hall
Plymouth Street
Halifax, MA 02338

RE: HALIFAX - BRP\WMA
Interim Water Management Act
Permit #I9P42511801

INTERIM WATER MANAGEMENT ACT PERMIT

Dear Mr. Clark:

This letter will serve as your interim permit for water withdrawal under the Water Management Act, MGL c. 21G, pursuant to 310 CMR 36.34(6) and shall become effective on February 28, 2010.

This interim permit #I9P42511801 authorizes the continued withdrawal of the previously permitted volume on the condition that you complete the process for permit renewal and otherwise comply with 310 CMR 36.00 and all permit conditions in Permit #9P42511801, which is scheduled to expire on February 28, 2010. The interim permit may be terminated by your failure to comply with the provisions of MGL c. 21G and the regulations adopted thereunder by the Massachusetts Department of Environmental Protection (MassDEP) at 310 CMR 36.00, or by failure to comply with the conditions of Permit #9P42511801.

The interim permit shall be valid until MassDEP approves or denies your request for a permit renewal but in no case shall it be valid for more than one (1) year from the date of issuance. Interim permits may be renewed by MassDEP if a permit renewal application has not been either approved or denied at the time of expiration of the interim permit. This interim permit may be terminated by MassDEP pursuant to 310 CMR 36.21(4)(a) and will terminate automatically on approval or denial of your application for water withdrawal by MassDEP.

If you have any questions regarding the interim permit or the WMA permit renewal process, please contact George Zoto at (508) 771-6055.

Very truly yours,

Richard J. Rondeau, Chief
Drinking Water Program
Bureau of Resource Protection

Y:\DWP Archive\SERO\Halifax-WMA–Interim Permit #I9P42511801-2010-02-26
ecc: Duane LeVangie, DEP

This information is available in alternate format. Call Donald M. Gomes, ADA Coordinator at 617-556-1057. TDD# 866-539-7622 or 617-574-6868.

DEP on the World Wide Web: http://www.mass.gov/dep
Printed on Recycled Paper

ATTACHMENT G

PROOF OF RECYCLED PAPER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