BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE

PETITION OF TENNESSEE AMERICAN WATER COMPANY TO CHANGE AND INCREASE CERTAIN RATES AND CHARGES SO FAR AS TO PERMIT IT TO EARN A FAIR AND ADEQUATE RATE OF RETURN ON ITS PROPERTY USED AND USEFUL IN FURNISHING WATER SERVICE TO ITS CUSTOMERS	)	**DOCKET NO. 12-00049**

AFFIDAVIT

STATE OF KENTUCKY

COUNTY OF FAYETTE

I, LINDA C. BRIDWELL, Manager of Rates and Regulation for Tennessee American Water Company, do hereby certify that the foregoing supplemental responses to: (1) City of Chattanooga's First Discovery Requests to Petitioner Tennessee American Water Company and (2) TRA Data Request No. 1 were prepared by me or under my supervision and are true and accurate to the best of my knowledge and information.

DATED this 2nd day of August, 2012.

Linda C. Bridwell
Signature

LINDA C. BRIDWELL
Printed Name

Sworn to and subscribed before me this 2nd day of August, 2012.

Lisa Hensinger
Notary Public

My Commission Expires: June 1, 2015

TENNESSEE AMERICAN WATER COMPANY
DOCKET NO. 12-00049
FIRST DISCOVERY REQUEST OF THE
CITY OF CHATTANOOGA

Responsible Witness: Gary M. VerDouw/Deron Allen
Other Participating Employees: Linda C. Bridwell

Question:

73. Provide all ***Documents*** constituting, containing, referring to, or relating to recommendations contained in the ***Schumaker Report***.

Response:

Several recommendations in the Schumaker report will be addressed by the BT program. Because the BT efforts are ongoing and have not been fully implemented, the level of documentation available to support ongoing efforts that address the recommendations is limited. However, in response to the recommendations in the Schumaker Report listed under "Internal Controls Review,"

> Recommendation III-1 Continue to reduce the use of outside contractors for SOX compliance tasks. (Refer to Finding III-2)
>
> Recommendation III-4 Improve documentation for purchase card transactions in order for a third party to determine the business purpose of the transaction and to evaluate if the appropriate formula was used to allocate the cost. (Refer to Finding III-6)

TAWC states as follows. American Water currently maintains a control environment in which the majority of internal controls are manual due to limitations of systems and processes. The manually intensive nature of internal controls and processes requires the increased need for compensating activities to achieve process objectives. Through its BT program, American Water is updating and modernizing its business processes, upgrading its information technology systems, and automating manual tasks. The increased capabilities of BT systems to enable our processes, when considered with the abilities of internal control, will improve the operation and effectiveness controls.

As we improve our processes, clean up our data, upgrade our technology through the implementation of SAP Enterprise Resource Planning (ERP), Enterprise Asset Management (EAM), and Customer Information System (CIS), American Water is optimizing its control environment to support more effective and efficient processes. Process and system enhancements enabled a significant redesign of the Company's financial (including Sarbanes-Oxley related controls), operational and regulatory controls. By leveraging American Water internal resources with control experience and external resources with specialized knowledge of the complexities of SAP and other related systems, we are optimizing our control environment and related activities and increasing the automation of many internal controls.

In response to the recommendation in the Schumaker Report listed under "Organizational & Operations Assessment Review,"

> Recommendation IV-1 Place greater emphasis on measuring internal business processes that could foretell customer satisfaction issues. (Refer to Finding IV-2, Finding IV-4, Finding IV-7, and Finding IV-8)

TAWC states as follows. The BT program aims to improve workflow throughout our field, back-office, and customer service operations, as well as to enhance our field, back office, and customer service capabilities. SAP CIS will provide a companywide software application that assists in the management of every aspect of the customer relationship – from customer inquiry to billing and collecting for services provided. Customer information will be captured and stored in a centralized database that is integrated with other systems throughout the company. The SAP EAM system will provide a platform for connecting people, processes, assets, industry-based knowledge, and decision support capabilities based on quality information. It allows for a holistic view of an organization's asset base, better enabling managers to manage operations for quality and efficiency. The following are some of the anticipated benefits of the integrated CIS and EAM system:

- Greater first contact resolution because of greater automation in the billing process and redirected resources providing the opportunity to resolve customer requests in a timely manner

- Improved scheduling between field service representatives and customers that will increase customer convenience and service that could lead to offering a smaller window of time for service call appointments. Currently, all appointments are offered in three-hour blocks.

- More integrated systems (and fewer manual processes) leading to the timely closure of service orders and efficient handling of customer requests. Some examples of the manual processes that will be improved include the creation, dispatching, and execution of service orders as well as researching various items such as water quality information and business rules.

- Fewer repeat calls into the call center since the new system will better equip Customer Service Representatives with the information they need to resolve customer inquiries. Currently, business rules and state-specific data reside in multiple databases that are needed to support customer inquiries. These databases are difficult to navigate and can limit Customer Service Representatives' timely resolution of customer issues.

- More efficiently dispatch service orders by bundling work and improving visibility of outstanding orders to enable the offloading of excess work to contractors (better way to manage peaks and valleys).

- Improved complaint resolution effectiveness by attaching a timer on escalated utility contacts. For example, if a customer has a billing inquiry and the Call Service Representative cannot resolve it, the Customer Service Representative would set up a utility contact and route the question to the billing department. Currently, there is no timer on the utility contact, thus no aging report that highlights how long an escalated customer inquiry has gone unresolved.

- Better asset reliability and fewer unexpected outages by improving American Water's reliability centered maintenance programs.

- Improved customer solutions and response times through more visible data that will improve employee dispatch.

In response to the recommendations in the Schumaker Report listed under “Affiliate Relationships and Transactions Review,”

> Recommendation II-2 Perform a detailed analysis to verify that the use of the number of customers for allocating AWWSC costs among regulated utilities reasonably approximates the use of cost-causative factors; subsequently make modifications, as appropriate. (Refer to Finding II-2)

TAWC states that it had an analysis completed that was provided in the last proceeding and is attached to this response.

As for the following recommendation,

> Recommendation II-3 Continue to regularly evaluate the cost of services provided to TAWC by its affiliates, specifically AWWSC, so as to verify that TAWC ratepayers are not being harmed by charging these services at cost rather than market. (Refer to Finding II-3)

TAWC states that American Water has undertaken a number of different reviews of the cost of services provided that are provided in response to Item 72 of this same data request.

Finally, as to the following recommendation,

> Recommendation II-6 Update corporate tax allocation documentation to reflect the current American Water organization structure. (Refer to Finding II-6)

TAWC states that American Water adopted a new taxing policy which is attached.

August 3, 2012 Supplemental Response:

TAWC is providing a supplemental response with an additional attachment regarding a presentation that is related to:

> Recommendation II-5 Develop full-fledged service level agreements for all major AWWSC groups providing service to TAWC, except those primarily performing policy, strategy, and/or governance functions. (Refer to Finding II-5)

American Water has undertaken a project that will include updated Joint Accountability Agreements for TAW and American Water Support Services.

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a new way of working

Project 9e: Improved Support Services – Service Delivery Framework

"Voice of the Client" Workshops

December 2011 – February 2012

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Project 9e Overview & Scope

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Overview: 9e – Improved Support Services – Service Delivery Framework

- **Project Purpose**
  - In order for a service providing organization to **create a collaborative, partnering relationship** with the clients they serve, certain operating protocol must be established. The "service delivery framework" is that operating protocol and this project is intended to establish a common framework for all service organizations through the collective work of the service organizations and you - their client.

  - At the completion of the project, operating protocols will be defined, each service organization will determine how they will utilize these components, and document them in order to establish clear expectations between the service organization and their clients

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Overview: 9e – Improved Support Services – Service Delivery Framework

- **Who are the "service organizations"?**
  - Through the "new way of working" operating model, an organization will fall in one of three categories – Corporate, Operating Company, or a Service Organization. Any group in the Services Organization category are those where work activities for the corporation or a group of companies have been consolidated or who primarily provide services to groups within American Water. This includes the SSC, ITS, CSC, and the Centers of Expertise that are under development.
- **Purpose of this Discussion**
  - Since the terminology "service delivery framework" may be new to some, this discussion is intended to establish components of operating protocol and develop an understanding of what they are.
  - Determine how each service organization should use the components in their operations.
  - Identify opportunities where standard approaches or consolidating activities might generate efficiencies or more importantly, provide clarity, consistency, and ease for the client to interact with the service organizations.
  - Gather feedback from you, the client of a service organization, on how these items should work.

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Setting the stage…

You are hiring a contractor for a long term arrangement to provide you some type of service

What is included in the contract?

- How are the services defined?
- How are you billed for the service?
- How would you measure that the services were being performed adequately?
- Who and how do you contact if the contractor doesn't show up on the scheduled work day?
- How would you go about changing an aspect of the service?

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Project 9e: Improved Support Services – Service Delivery Framework

Objective and Descriptions

- Improve service delivery framework and implement with all service providing organizations
- Enhance the current service delivery framework to involve the critical stakeholders and internal "buyers" of services.
- The model should include joint accountability arrangements, account management, regulatory cost recapture strategies and issue resolution elements in order to reduce costs and improve service levels on an ongoing basis

Scope

- Phase I: Design of common service components
- Phase II: Implementation in SSC, ITS & CSC
- Phase III: Implementation in Centers of Expertise (COE) - Supply Chain, Lab, Finance, Engineering, SCADA, Safety, ORM, Innovation, Operations Training, etc...

Benefits

- Cost reductions in transactional processes due to clear definition of roles and responsibilities
- Improved transparency of service costs and client controlled levers
- Increased effectiveness of service organization operations due to single point of contact
- Improved internal client satisfaction
- Increased transparency of costs to regulators
- Increased accountability for services delivered

Work Products

- Updated Joint Accountability Agreements (JAA)
- Common Service Delivery Model for AW Service Organizations
- Policies and procedures supporting service delivery framework
- Implementation plans

Core Project Team

- Doneen Hobbs
- Jeff Linam
- John Cole

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Project 9e – Key Work Steps

	Kick off	Conduct current state assessment	Develop service delivery framework	Develop migration plan	Execute against migration plan
Activities	• Name leaders and Steering team • Prepare for and conduct kick off meeting • Confirm project objectives, key assumptions (e.g., functions in scope, service delivery framework areas to address) • Discuss preferred approach, timing, work products • Update/validate project plan and resource requirements • Review and discuss project kick off communications	• Conduct as-is assessment of service delivery framework • Agreements, resources and processes in place • "Voice of the Client" survey • Customer council(s) / Steering committees	• Conduct workshop to develop governance framework incorporating the following components: • Scope of services by function (HR, Finance, IT, Customer Service) • Relationship management approach • Issue escalation and change management • Pricing and regulatory impact • Develop documentation to support service delivery framework (e.g., JAA's, roles and responsibilities, policies and procedures) • Review service delivery documentation with key shared services, corporate and divisional resources • Identify and source new roles to support service delivery (Customer council, relationship managers, etc.) • Develop communication and training plans	• Develop communication strategy with appropriate organizations • Develop detailed implementation plan (activities, timing)	• Execute against implementation plan (activity migration, shared services hiring and training, management reporting, documentation, knowledge transfer, performance management) • Execute employee communications

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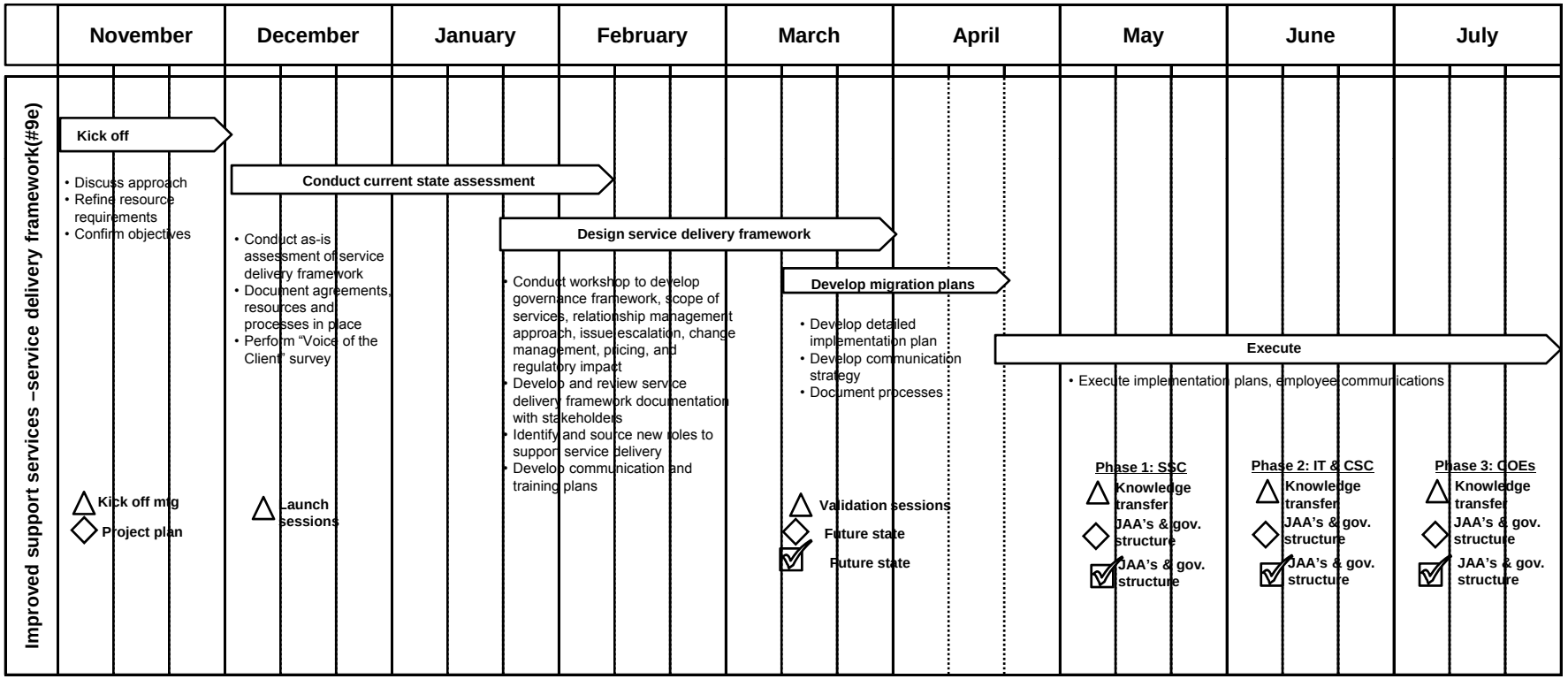
Project 9e – Proposed Timeline



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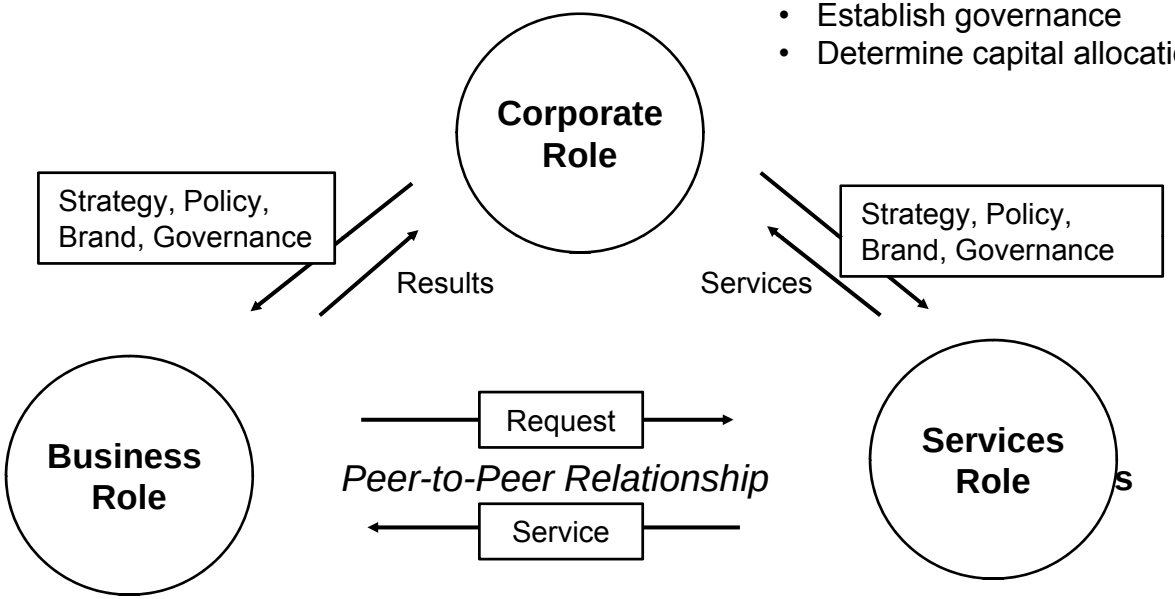
a new way of working: Operating Model

Operating Model

- Develop strategy & policy
- Create identity/branding
- Establish governance
- Determine capital allocation



- Operate and manage assets
- Manage state regulatory relationship
- Grow the business
- Develop local management
- Serve the customer

- Provide cost-effective client-driven services
  - "shared services" for services; realizing economies of scale
  - Centers of expertise services; realizing economies of skill
  - Service management framework (JAA's, governance, continuous improvement, service charging, customer satisfaction, resource & talent management)

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Operating Model: Service Organizations - Types

"shared services" (ss)

- Support services that involve transactions and / or repetitive or "back office" characteristics
- Activities that benefit from economies of scale
- Goal of shared services group is to provide services "better, faster, cheaper"
- Example activities could include: accounts payable, payroll, performing G/L accounting, benefits administration, customer call centers, ITS help desk, etc.

center of expertise (coe)

- Support services that are specialized, confidential, non-repetitive / customized
- Activities that benefit from economies of skill
- Goal of a COE group is to utilize expertise and leverage best practices across the organization
- Examples of activities: technical accounting, procedure development, laboratories, strategic sourcing, etc.

coe Local/"ss" resources

- Support services that are specialized and need to be closer to the client receiving the service
- Activities that benefit from economies of skill
- Activity is managed and performed by COE utilizing resources with dedicated local and "shared services" resources
- Example of activities include: budget & forecast process, FR/BPR reporting, engineering, rates

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Service Delivery: Current Challenges & Perceptions

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Service Delivery Current Challenges

- Different service delivery models to the client from the service organizations (e.g. .Shared Services, IT, CSC, etc).
- Clear definitions of who is responsible for what.
- Lack of coordination and trust between services and clients sometimes results in duplication of the services received and some activities
- Need for more frequent interactions and forums for clients to influence a service organization's type of services and level of services delivered
- Ability to provide clients enough visibility into the cost of services, types of services and quality of services received
- Not all organizations have metrics and those that do, may not have metrics that are meaningful to the client – *why should I care?*
- Current metrics are not always "actionable" - *What can someone do about them?*
- Limited visibility and focus on opportunities for continuous improvement
- Limited understanding of the value provided from services delivered (Value > Price > Cost)
- Need to establish interactions between the Operating companies and service organizations that provide for more collaboration and partnering

VISION

Standard service delivery framework to further promote a culture of continuous improvement, driving to value, efficiency and quality.

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Service Delivery: Perceptions of Current Performance

- **Actual comments taken from the 2011 SSC Client Satisfaction Survey**
  - "What services does the SSC provide?"
  - "I'm not even familiar with what exactly the SSC does for me in my position"
  - "The response times when requesting information is sometimes slow"
  - "Better equip employees with the tools they need to help our customers and do their job"
  - "Provide metrics to the clients that demonstrate the level of service being provided by SSC. The metrics that I have seen to date seem more focused on how well the clients are performing as opposed to how well SSC is performing"
  - "Continue efforts to implement process improvements. Automate manual processes"
  - "Shared Services must partner with each state more closely to understand what our needs are"
  - "Keep the focus on the internal customers as we must do consistently with external customers"
  - "Better communications, most problems are caused by some failure to communicate"

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Service Delivery Framework and Components

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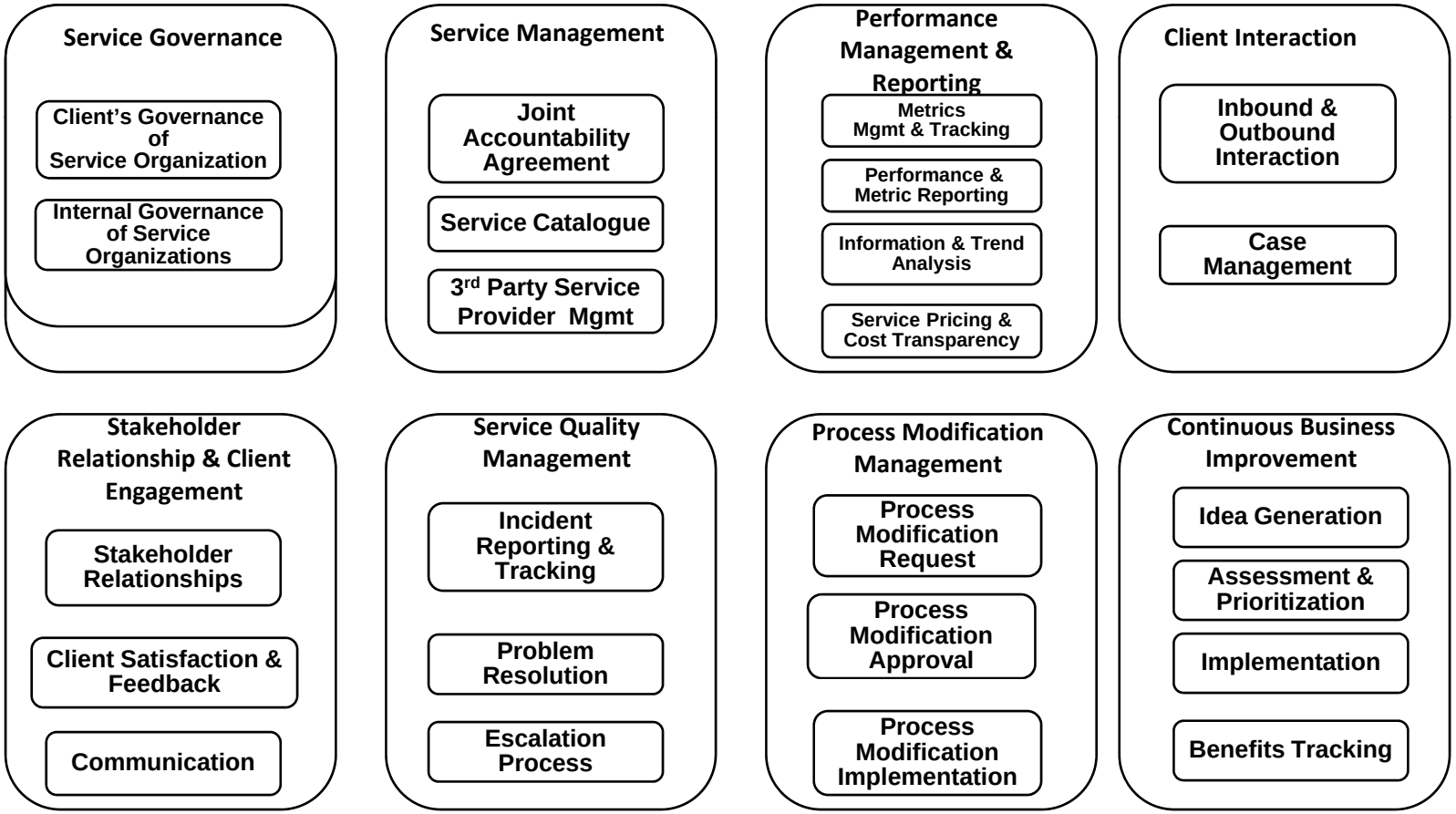
Service Delivery Framework

Service delivery management is about promoting the right client-focused behaviors, defining how service organization employees should interact with clients, and providing the right models and tools for managing inquiries, integrating feedback and ideas, measuring service performance and reporting on success and service improvements.



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Essentials of Service Delivery Framework

An efficient, effect services organization will assess client requirements, deliver and manage services and ensure client participation in the management of both existing operations and future developments. The service delivery framework will clearly define the approach, responsibilities, and tools employed to carry out these activities by:

- **Setting service delivery expectations for all parties, based on a clear definition of services**
- **Defining the roles and responsibilities of both the services organization and its client**
- **Fostering a strong working relationship between the services organization and the operating units**
- **Ensuring that the service targets are met or exceeded on a consistent basis**
- **Facilitating continuous improvement in the operations of the services organization**

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Service Governance

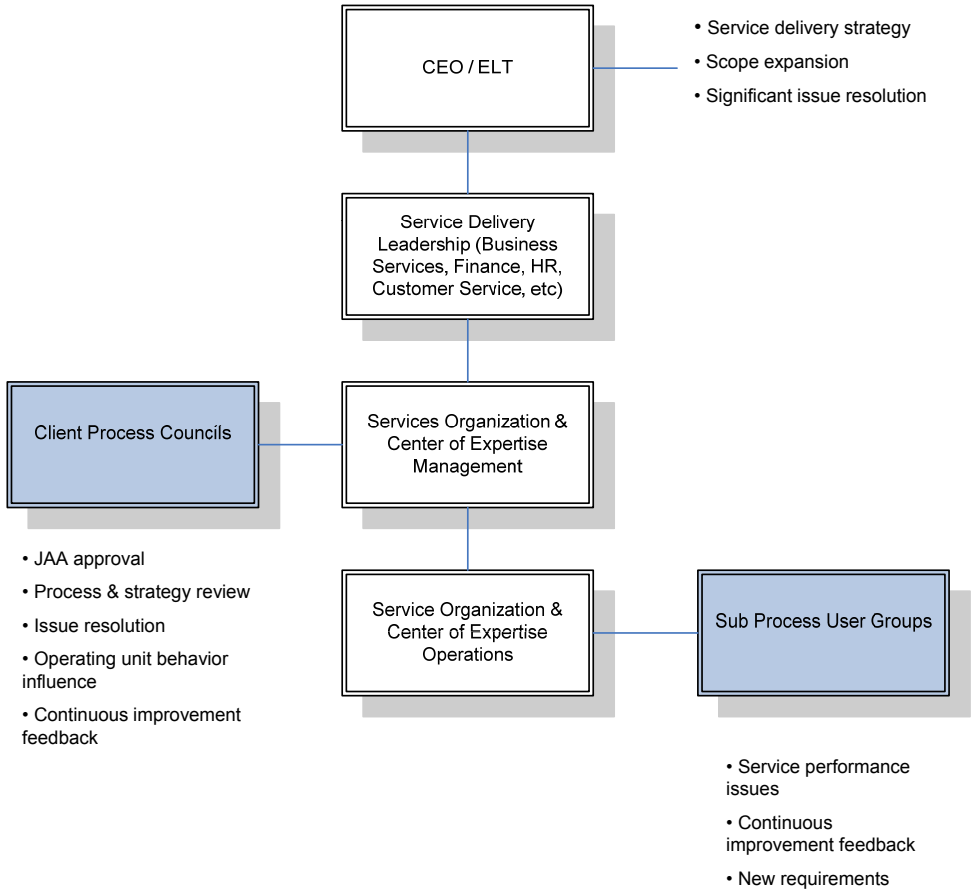
How a service organization is managed both within a formal organization and reporting structure as well as by the client groups served

Component	Description	Purpose	Value	Existing Examples
Client's Governance of Service Organizations	• The structure established to enable the client to set expectations, provide input, and feedback on how the services organization will service the client	• Aligns service organization with the business strategy and the client 's goals	• Position each service organization and client to work together to deliver results.	• SSC Joint Accountability Agreement (JAA) Strategic Council • SSC JAA Operational Committee
Internal Governance of Service Organization	• The formal structure and processes of the service organization that defines how they will operate and be managed	• Establishes reporting relationships, performance reporting mechanisms and expected service levels of the service organizations	• Ensures service organization is performing as expected and has appropriate management oversight	• SSC, CSC, ITS: Formal organization structure, reporting lines and management reporting. • ITS - Information Technology Infrastructure Library (ITIL) Framework

Service Governance

Objectives

- **Foster a productive working partnership between the services organization and its clients**
- **Provide ongoing direction and client feedback required for the service organization's leadership to administer, direct, control, and manage the operation**
- **Establish confidence that the services organization will be accountable and focused on service delivery**
- **Each level of client governance has distinct & specific decision making responsibilities related to service delivery**



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Service Governance

- **Client Process Councils (estimated 6 or 7)**
  - One council for each end to end process and possibly one IT Infrastructure / BATT council
  - Process, data & technology for assigned process streams
  - Coordinated and chaired by End to End Process Owners / Leads
  - Core members have understanding of and alignment with company strategies
  - 7 voting members with decision making authority
    - 4 client representatives that understand end to end processes & impacts to business
    - 3 representatives that understand customer, regulatory & employee impacts
  - Subject / Process experts
    - Non-voting advisory members from process and service organization areas
- **Sub Process User Groups (multiple – tbd)**
  - User groups focused on sub process areas (e.g. Plan to Build – User Groups would include: Plan, Design, Build, Record, Run & Maintain)
  - Process, data & technology from a sub-process view
  - Coordinated and chaired by End to End Process Owners / Leads
  - Core members have working understanding of sub processes and related tasks & activities (subject / process experts)
  - Higher focus on continuous process improvements, sub process performance, etc.

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Service Management

A key feature and differentiator of effective services organizations compared to traditional centralized functions is formalizing service relationships. These components will establish those relationships between the services organizations and their clients.

Component	Description	Purpose	Value	Existing Examples
Joint Accountability Agreement (JAA)	• Formal document that defines the relationship between the service organization and clients. Items such as services required to meet business needs, establishing ownership of tasks, and defining metrics are included in the document.	• Establishes clear understanding of service levels and their associated metrics that can serve as a reference of the agreement to how the services will be delivered.	• Ensures that the processes are performed and monitored leading to satisfactory service delivery and effective and efficient processes.	• SSC - Joint Accountability Agreement • ITS - Service Level Agreements • CSC– Service Level Target Document
Service Catalog	• A directory of services and costs available through and provided by the services organization	• Provides information on all services / activities that the service organizations is providing to the client	• Gives client ability to determine the best alternative to use in obtaining services	• ITS – Service Catalogue of hardware & standard software options is published in AW Intranet
3rd Party Service Provider Management	• Processes to manage vendors for activities that have been outsourced by the service organization	• Ensures vendor is providing services outlined in the contract and service level agreement	• Ensures value expected from the outsourcing arrangement is being achieved.	• ITS, CSC & SSC – Currently have segments of services outsourced to 3rd party providers where value has been demonstrated to do so. No formal monitoring / management / reporting process is currently in place.

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Performance Management & Reporting

A process for measuring, analyzing, and reporting metrics and performance

Component	Description	Purpose	Value	Existing Examples
Metrics Management & Tracking	• Establishing, tracking, monitoring and analyzing appropriate metrics for various audiences (e.g. client, service org management, etc.)	• Ensure that objectives related to the processes have measures and are monitored to enable corrective actions to be taken timely.	• Establishes performance levels/expectations • Continual monitoring for quicker corrective actions • "What gets measured – gets attention"	• SSC – 3 levels of metrics established per the JAA on an annual basis. Monitored & analyzed monthly.
Performance & Metrics Reporting	• Method in which performance of service organizations and process metrics are reported.	• Provides visibility to stakeholders of metrics, processes, and areas needing attention	• Transparency of performance and effectiveness of processes to all stakeholders that will enable corrective actions	• ITS – Functional metrics updated monthly & published to IT Sharepoint site
Information & Trend Analysis	• Highlights the relationship between performance data and trends	• Identifies areas for continuous improvement • Conduct internal / external benchmarking • Identify deterioration of service levels	• Set targets for improvement • Provides comparisons to others • Cost data, competitive analyses, quality and economic data to support continuous improvement	• SSC – Metrics analyzed monthly and reviewed quarterly with JAA Operational Committee.
Service Pricing & Cost Transparency	• Establishes cost related to each service offering and defines how the client be charged for services	• Understand cost drivers, identify requirements for services, understand costs related to "non-standard" services and to agree the way for which these services should be charged.	• Info needed to do cost / benefit analysis before services are requested • Provides insight on actions that can be taken to reduce costs.	• SSC, ITS, CSC – Services are direct billed to clients as appropriate and allocated by formula. • SSC – Activity Based Costing analysis

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Client Interaction

Tools and approaches used by clients and external stakeholders to communicate with the services organization about required services

Component	Description	Purpose	Value	Existing Examples
Inbound & Outbound Interaction	• The methods in which clients and stakeholders contact the services organization (e.g. calls, emails, faxes, etc.) and how the services organization manages the contacts and responds	• Defines a variety of means that the client/stakeholder can contact the services organizations • Defines processes and timing on how services organization will respond	• Gives clients options in how they interact with the service organization • Provides data / information for consideration in continuous improvement initiatives	• SSC & CSC – Primarily phone & e-mail interactions, no formalized process beyond center contact guides. • ITS – Primary inbound interaction is via SD-Online, also utilizes phone & e-mail. • Currently no single interaction entry point for all service organizations across AW, or formal process to ensure outbound follow-up.
Case Management	• Process used to track, manage, and record client contacts with the service organization. Technology tool is often used to facilitate this process	• Ensure that client/stakeholder contacts are addressed timely and in a systematic manner	• Client request are addressed timely and thoroughly • Ability to track and measure requests improves turnaround and resolution	• ITS – HP Openview service request tracking system. • SSC – Internally developed Access databases utilized in functional pockets of the center. HP Openview utilized in the Business System Support team, Clarify is used in Benefits Services.

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Stakeholder Relationships & Client Engagement

Defining formal methods to develop collaborative, partnering relationships between the service organization and its clients

Component	Description	Purpose	Value	Existing Examples
Stakeholder Relationships	• Process to identify key client personnel and establish appropriate service organization interaction	• Establish relationships throughout client and services organization to facilitate communications and issue resolution • Define role and responsibilities of business liaisons	• Ability to address issues by those closest to the issue • Creates partnerships & collaboration throughout the client and services organizations	• SSC – Stakeholder Relationship Matrix, Business Liaisons
Client Satisfaction & Feedback	• Establishes what the client values and defines methods and tools used to obtain feedback from the clients.	• Create committees, surveys, interviews, etc that will encourage two-way dialogue and result in both parties engaging in improving services	• Facilitates communications • Provides forum for continual feedback to improve services and processes • Results in partnering and collaborative relationships	• SSC – Annual Client Satisfaction Survey, Business Liaison site visits & client interactions. • ITS – Annual Client Survey, targeted service request completion surveys.
Communication	• Establishes forums, tools, messages, correspondence, information and approaches to communicate with clients and stakeholders.	• Defines types of and best methods for information to flow between the client and services organization	• Identifies what info is important to the client • Clarifies where client can obtain information • Establishes routine communications and content	• CSC, SSC & ITS – No standard processes set. Utilizes the existing internal communication tools available to the entire to distribute a wide variety of news.

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Service Quality Management

Processes established to ensure events which may have a negative impact on standard service levels are reported and addressed in a timely and systematic manner

Component	Description	Purpose	Value	Existing Examples
Incident Reporting & Tracking	• Incident – any event that is not part of the standard operation that causes an interruption or reduction in the quality of service and/or client productivity that has been reported by the end user to the service organization • Process established to report and resolve an incident	• To provide a means for the client to report an incident and ensure that they are researched and/or resolved timely	• Identifies sub-standard service that may only be realized by the client • Helps reduce risk of incident becoming a major problem • Client has assurance failure is known and being addressed	• ITS – Utilizes a internally customized form of the FEMA Incident Command System (ICS), modified to specifically handle AW technology based incidents and natural disaster incident support. • SSC – "Firefighting Mode", address as incidents occur.
Problem Resolution	• Problem - the root causes of incidents • Process established to identify and resolve the root cause of a problem and prevent further incidents	• Identify the underlying cause the of incidents and to ensure the problem is being addressed to minimize/prevent recurrence of future incidents	• Addresses problems so that they do not recur • Assures established standard service levels can consistently be delivered	• ITS – Formalized root cause analysis (RCA) process, documentation, and analyst role to manage the resolutions of problems. • SSC – Address as problems surface
Escalation Process	• Process established for client to escalate service quality concerns when the routine process is not providing timely or adequate resolution	• Establish a secondary track for the client get resolution to their service concerns when the normal process fails	• Client has formal means to have unresolved concerns addressed • Improves turnaround time on addressing service quality failures	• SSC, CSC, ITS – No formal escalation processes or matrix beyond "chain of command" structures.

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Process Modification Management

Defines how modifications to the standard service processes are requested, agreed upon and implemented

Component	Description	Purpose	Value	Existing Examples
Process Modification Request	• An approach to initiate a modification to the standard processes that have been defined for a specific service	• To have a defined way for the client to pursue changes to the standard processes that are in place for a specific service	• Creates a forum for modifications to processes that may be needed if a business' service requirements change	• All End to End Process areas – No existing formalized/standard process or governance to manage process modification requests.
Process Modification Approval	• An approach to review, analyze, and gain acceptance of the applicable stakeholders for modifications to the standard processes.	• Ensures that any modifications are thoroughly evaluated and their impact analyzed prior to implementation • Ensures that modification has been discussed and approved by the appropriate stakeholders	• Requires that the benefit and cost to a process is understood prior to action being taken • Maintains standard processes • Establishes consensus on standard processes	• All End to End Process areas – No existing formalized/standard process or governance to manage process modification approvals.
Process Modification Implementation	• An approach that ensures necessary testing, training, and communications to implement a modification has occurred	• Ensures that full impact of modification is understood prior to use • Ensures impacted end users know about the modification and are adequately trained	• Impact of modifications are thoroughly understand • Users know and understand how modified process will work • Helps maintain standard processes	• All End to End Process areas – No existing formalized/standard process or governance to implement approved process modifications.

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Continuous Business Improvement

Developing an environment that encourages employees involved in performing the business processes to identify changes that will result in more efficient and effective ways to perform the service and establishing a process to identify, evaluate, and implement these improvements to business processes and quantify the resulting benefits derived from those improvements.

Component	Description	Purpose	Value	Existing Examples
Idea Generation	• Establishing a process that encourages the identification of new ideas for process improvements	• Sets expectations for employees to share ideas and their experiences that will result in improved processes	• Generates ideas from those closest to the processes • Sets expectations that idea generation is part of employee's job responsibilities	• SSC – Lean Six Sigma, ideas generated by functional departments • CSC – Quarterly "Summit Meetings" with Customer Relationship Management Directors
Assessment & Prioritization	• Reviewing and screening ideas against established objectives and benefits	• Allows ideas with the greatest benefit to be addressed first	• Determines benefit of each idea and eliminates those not beneficial • Allows for scheduling of improvement projects	• SSC – Lean Six Sigma project viability matrix and pick chart analysis. • CSC – Internal value analysis process
Implementation	• Execute the chosen improvement ideas	• Moving forward by means of a project or a specific delivery mechanism to achieve desired value / outcome	• Ensures improvements get implemented in a systematic ways • Involves appropriate people in the execution	• SSC – Lean Six Sigma implementation methodology
Benefits Tracking	• Evaluation of results after implementation of ideas	• Ensure outcomes anticipated with the idea are achieved	• Ability to quantify benefits • Evaluate the effectiveness of the assessment process	• CSC, ITS & SSC – No consistent, standardized benefit tracking process

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What it is

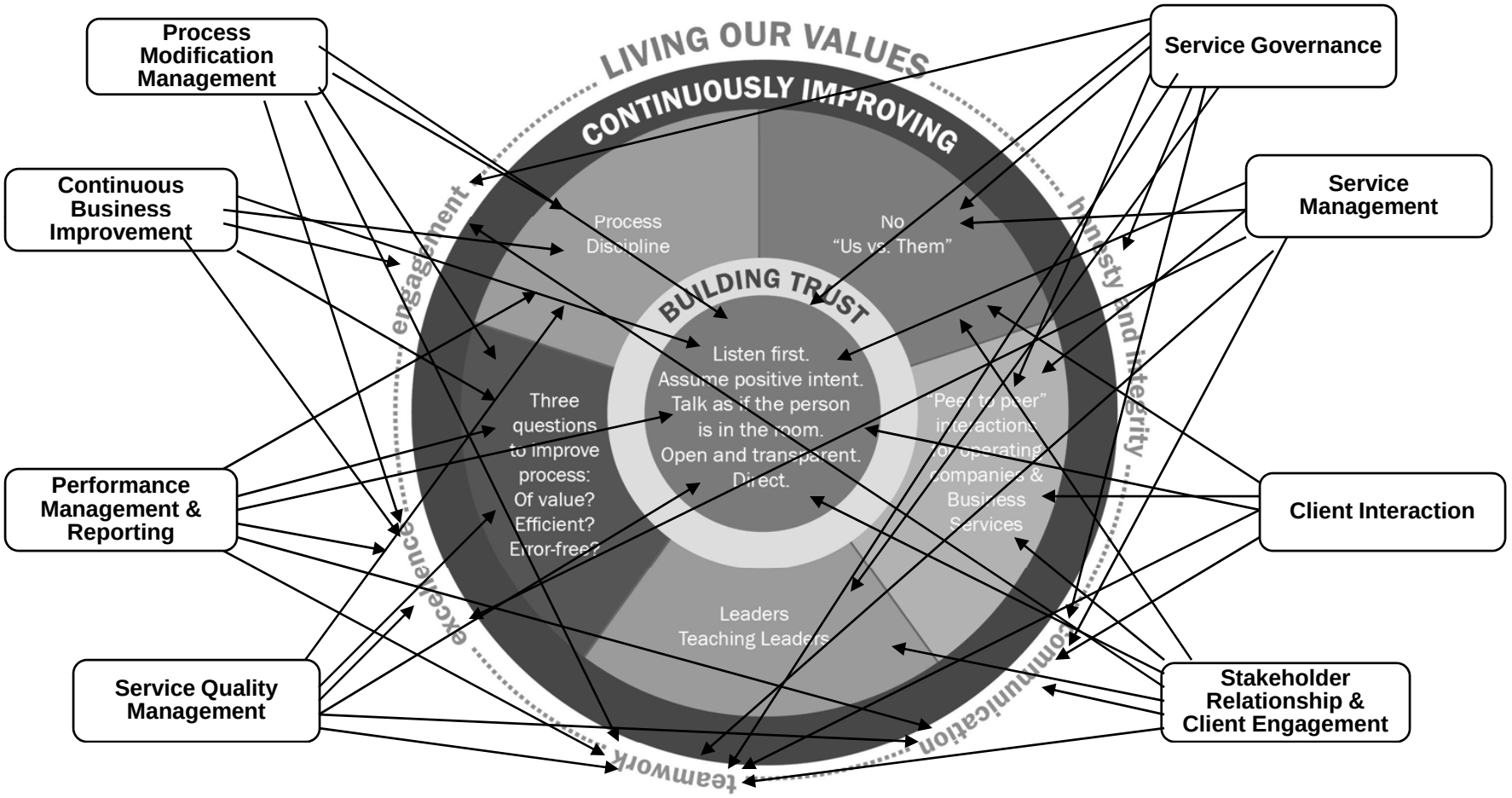
- Creating a partnering & collaborative approach to service delivery
- Establishing protocol within each service organization
- Engaging and empowering the client organizations in service delivery decisions through client councils
- Documenting the agreements through a joint accountability agreement (JAA)
- Establishing performance measurement and metric programs with accountabilities to achieve mutual success
- Creating a culture of continuous improvement striving towards process excellence
- Developing consistent data and process standards and coordinating activities where appropriate

What it isn't

- Forcing processes and tools that are not effective for a particular service organization
- Accommodating individual preferences
- More bureaucracy
- Another cycle of centralization
- Creation of another document (JAA) that sits on a shelf
- Continuation in the blurring of governance roles and service delivery roles
- Same culture that exists today
- Client organizations having complete authority over how a service organization is managed
- Service organizations independently establishing process and data requirements

AMERICAN WATER

How does service delivery framework fit into our new way of working?



AMERICAN WATER

Next Steps

- **Complete Voice of the Client workshops**
- **Analyze As-Is Inventory of existing Service Delivery Components**
- **Develop To-Be Service Delivery Framework & recommendations for what/how service organizations should implement them**
- **Follow up with clients on To-Be Service Delivery Framework for feedback**
- **Develop & Implement Common Service Delivery Framework**
- **Phased Development & Implementation of Service Delivery Components for AW Service Organizations**

AMERICAN WATER

TENNESSEE AMERICAN WATER COMPANY
DOCKET NO. 12-00049
FIRST DISCOVERY REQUEST OF THE
CITY OF CHATTANOOGA

Responsible Witness: Gary VerDouw

Other Participating Employees: Linda C. Bridwell

Question:

80. Please produce a copy of all trade articles, journals, treatises, speeches and publications of any kind in any way utilized or relied upon by any of ***TAWC***'s proposed expert witnesses in evaluating, reaching conclusions, or formulating an opinion in the captioned matter as well as all articles, journals, speeches, or books written or co-written by any of the ***TAWC*** witnesses.

Response:

Information relied upon by Gary M. VerDouw in his testimony:

Pension Tracker:

1) CRS Report for Congress, Summary of the Pension Protection Act of 2006
2) Technical Explanation of H.R. 4, the "Pension Protection Act of 2006," as passed by the House on July 28, 2006, and considered by the Senate on August 3, 2006. Document can also be found at the following web address: http://www.jct.gov/x-38-06.pdf

DSIC:

1) The American Society of Civil Engineers 2009 Report Card for America's Drinking Water Infrastructure.
2) Two USEPA Reports discussed in VerDouw testimony on Page 45, which already references applicable websites footnoted therein. No copies are attached.
3) Various state DSIC statutes or regulations or Commission/Authority Orders that provide for recovery of operating cost increases/decreases occurring between base rate cases. These documents have been provided in response to Item 28 and Item 30 of this same data request, respectively.
4) TRA Director Roberson Concurrence and Dissent of September 30, 2011.

Purchased Power and Chemical Charge:

1) Various state statutes or regulations or Commission/Authority Orders that provide for recovery of operating cost increases/decreases occurring between base rate cases. These documents have been provided in response to Item 31 and Item 33 of this same data request, respectively.
2) Review of Company Witness Kerry A. Heid submitted in Indiana American rate case docketed as Cause No. 43187.

The relevant pages of articles relied upon by Dr. Vander Weide have been provided in response to Item 7 and Item 8 of the Consumer Advocate and Protection Division First Data Request in this proceeding. Articles published by Dr. Vander Weide, to the extent they are available, are attached and are detailed in the curriculum vitae attached to his testimony.

Articles published by Linda Bridwell are attached to this response.

Mr. Herbert has not published any articles. He has relied upon the American Water Works Association Manuals M1 and M31 which are available on their website.

Information relied upon by Mr. Chelius are provided in response to Item 32 of the Tennessee Regulatory Authority's First Data Request in this proceeding. Articles published by Mr. Chelius are not in possession of the Company but will be made available at a supplemental filing if they are received.

Mr Allen published a number of manuals when he was an instructor that are not in his possession and are no longer available as updated editions have been published of which he is not an author.

Mr. Keathley, Mr. Petry, Ms. Schwarzell, and Mr. Rogers have not published any articles, journals or speeches.

August 3, 2012 Supplemental Response:

TAW is supplementing its response to provide two articles authored by Mr. Chelius. Please refer to the supplemental attachment. Mr. Chelius has also identified a publication he co-authored:
1990: "Water Main Rehabilitation Practices,";Deb, A.; Snyder, J.; Chelius, J.; American Water Works Association Research Roundation. This publication was not relied on in his testimony, but may still be available through AWWA.

Operations

Declining Residential Water Use Presents Challenges, Opportunities

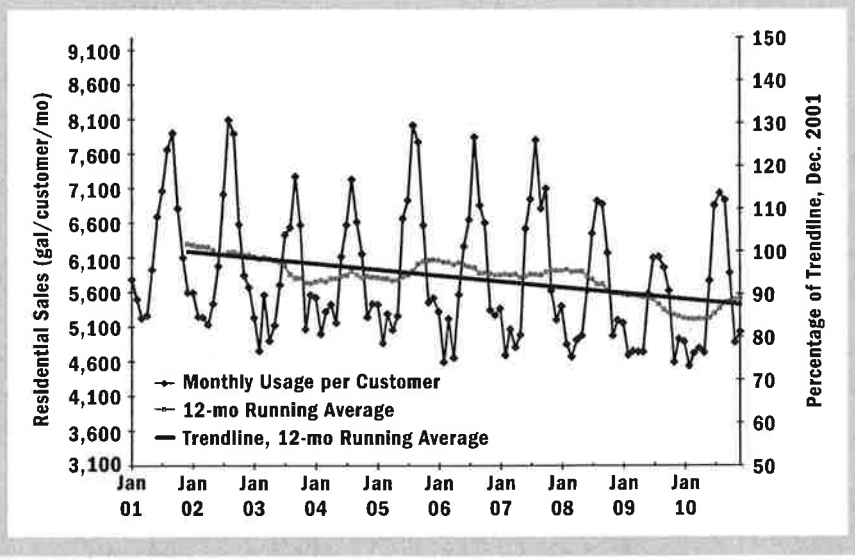
Conservation efforts and use of more efficient appliances are causing residential customers to use less water. How does this affect the way utilities conduct their business and operations?

BY MARGARET HUNTER, KELLY DONMOYER, JIM CHELIUS, AND GARY NAUMICK

FOR MANY North American utilities, residential water use has declined steadily for the last 20 years. In many locations, the trend has accelerated in the last decade. The long-term trend could significantly affect utilities.

A utility services company studied historic water usage trends for its US operations during the last 10 years. Figure 1 shows monthly residential use per customer. Overall, residential water use across the company's largest state subsidiaries declined about 1.4 percent/yr/customer between 2001 and 2010. The trend of declining use was consistent across widely ranging geographic locations and demographic characteristics. Similar results were found in a study of winter-only consumption in northern US service areas where there's little or no outdoor water use during winters.

Figure 1. Monthly Residential Sales Per Customer
Residential water use declined between 2001 and 2010 among state subsidiaries of a large utility services company.

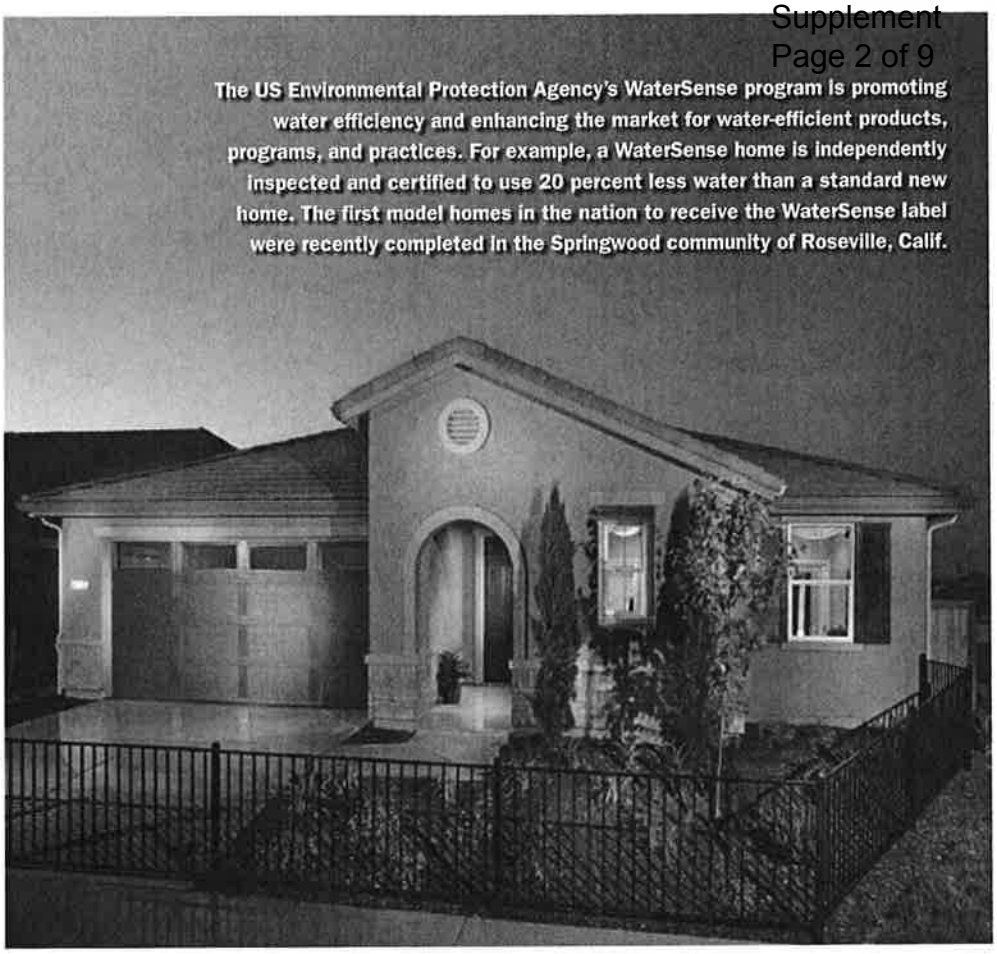


The consistency of the findings indicates strong underlying drivers are affecting indoor residential usage patterns. These findings closely match data published in a 2010 Water Research Foundation Report, North America Residential Water Usage Trends Since 1992.

CAUSES OF DECLINING USE

Several factors appear to contribute to declining household water use, including high-efficiency plumbing fixtures; a decline in persons per household in many locations; utility-led water efficiency programs, such as consumer education, fixture retrofit, and water audit programs; increased conservation practices and awareness; economic conditions; and price elasticity.

The Energy Policy and Conservation Act of 1992 mandated the manufacture of water-efficient toilets, showerheads, and



The US Environmental Protection Agency's WaterSense program is promoting water efficiency and enhancing the market for water-efficient products, programs, and practices. For example, a WaterSense home is independently inspected and certified to use 20 percent less water than a standard new home. The first model homes in the nation to receive the WaterSense label were recently completed in the Springwood community of Roseville, Calif.

PHOTOGRAPH: KB HOMES

Margaret Hunter, Kelly Donmoyer, Jim Chelius, and Gary Naumick are with American Water (www.amwater.com), Voorhees, N.J.

faucet fixtures. For example, a toilet manufactured after 1994 uses 1.6 gal/flush (gpf) or less compared with an older toilet's water use, which was 3.5–7 gpf.

The Energy Independence & Security Act of 2007 established high-efficiency standards for dishwashers and clothes washers. Dishwashers manufactured after 2009 and clothes washers manufactured after 2010 must meet water efficiency requirements that could reduce water used by such fixtures by 54 percent and 30 percent, respectively. Fixtures and appliances that surpass these requirements are increasingly available in the marketplace.

All other factors being equal, typical residents living in a home built in 2011 would use 35 percent less water for indoor purposes than a nonretrofitted home built before 1994. The accompanying table contains more details about regulatory requirements and the typical effect they have had on residential water use. Changing household demographics, such as a decrease in the number of persons per household, have also affected residential water use.

Although indoor water use for consumption and hygiene is considered relatively inelastic, i.e., not affected by economic conditions, it can be affected by water and sewer rate increases. For example, leaks that may be ignored when rates are low tend to be repaired when rates increase. Nonessential residential water use for lawn and garden irrigation, car washing, water features, and swimming pools tends to have more elasticity relative to water and sewer rate increases. In addition, conservation-inducing rate structures have prompted significant elasticity in indoor water use. Price elasticity estimates generally range from -0.05 to -0.50 (percentage change in consumption divided by the percentage change in price). Elasticity estimates the percent change in consumption expected to occur in response to a percent price increase; the negative sign implies that consumption decreases as the price of water increases.

OPERATIONAL IMPLICATIONS

Because the current water use trend is likely to continue, water utility managers and operators must consider the effects of reduced consumption on their systems and rates. In some service areas,

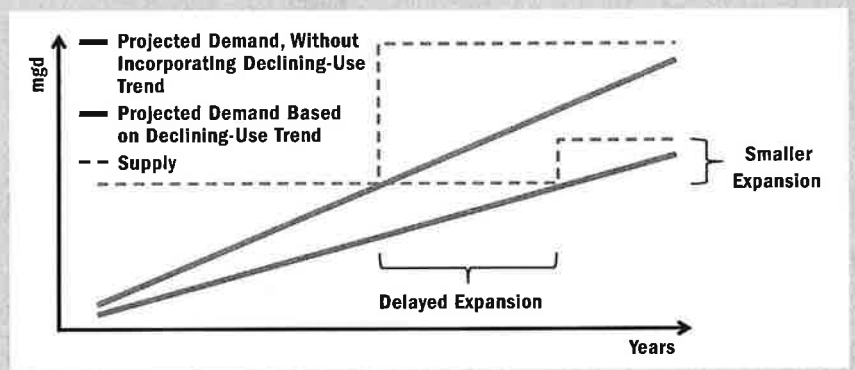
Flow Rates for Typical Household Fixtures and Appliances

Flow rates vary significantly before and after implementation of various federal standards.

Type of Use	Pre-Regulatory Flow*	Regulatory Standards and Flows			WaterSense/ ENERGY STAR Current Specification+
		Regulatory Standard (maximum)	Federal Law	Year Effective	
Toilets	3.5 gpf	1.6 gpf	US Energy Policy Act	1994	1.28 gpf
Clothes washers**	41 gpl (14.6 WF)	Estimated 26.6 gpl (9.5 WF)	Energy Independence and Security Act of 2007	2011	Estimated 22.4 gpl (8.0 WF)
Showers	2.75 gpm	2.5 gpm at 80 psi	US Energy Policy Act	1994	No specification
Faucets***	2.75 gpm	2.5 gpm at 80 psi (1.5 gpm)	US Energy Policy Act	1994	1.5 gpm at 60 psi
Dishwashers	14 gpc	6.5 gpc for standard; 4.5 gpc for compact	Energy Independence and Security Act of 2007	2010	5.8 gpc for standard; 4.0 gpc for compact

* Source: *Handbook of Water Use and Conservation*, Amy Vickers, May 2001
** Average estimated gallons per load and water factor
*** Regulation maximum of 2.5 gpm at 80 psi, but lavatory faucets available at 1.5 gpm maximum
+ Source: www.epa.gov/watersense and www.energystar.gov websites

Figure 2. Declining Use and Delayed Smaller Expansion
Declining water use may affect long-term capital planning.



population growth has been sufficient to provide an overall increase in total residential use (gal/mo). However, in areas where customer growth is slow or nonexistent, declines in customer use have resulted in lower overall water use. Utilities must address the financial implications of reduced consumption.

Several environmental and operational advantages result from lower water use. Necessary diversions from supply sources are lessened, leaving more water for passing flows or drought reserve. Reductions in power consumption, chemical use, and waste disposal reduce utility operating costs and provide environmental benefits, such as reduced carbon footprints and waste streams.

Declining water use also affects long-term capital planning. Utility planners should ensure that capital projects are based on the most current information. As shown in Figure 2, when anticipated customer demand indicates declining use, a project to develop a supply to meet future demands could be downsized or postponed. However, it's important to note that, although a utility's average daily consumption may decline, its peak day demands may not. Peak day demands typically drive capital infrastructure needs, such as treatment and pumping capacity. Peak day demands are driven by short-term events, such as hot, dry weather or seasonal community events that temporarily increase population or use. Utility managers and operators should understand customer demand patterns to determine peak demand trends and to understand whether those trends are the same as average usage.

Declining usage can also present opportunities to optimize management of water supplies, treatment facilities, and pump stations. Systems that rely on multiple supply sources with significant cost differences for securing, pumping, and treating may be able to save money by minimizing use of higher-cost supplies. Purchase water agreements should be reviewed regularly and given consideration for reducing annual purchases and minimizing take-or-pay limits where continued declining usage is anticipated. This can be particularly advantageous for systems that must purchase water to supplement more economical but limited or stressed supplies.

Reduced demands can present opportunities for more efficient and effective pumping and treatment. For example, lower demands can result in increased system storage capacity that allows more off-peak pumping and reduced electricity demand charges. Scheduled maintenance of certain process equipment, such as granular activated carbon media and membrane replacement, might be extended.

SUSTAINABILITY

Efficient residential water use has environmental, economic, and energy-efficiency benefits and should be encouraged. It may help utilities optimize asset allocation and reduce costs. However, many water utility capital needs (infrastructure renewal, reliability, regulatory projects, etc.) and operating costs (salaries, plant maintenance, customer services needs, IT support, security, etc.) are unaffected by reduced consumption. Water utilities must, therefore, mitigate the impact of lost revenue. However, reduced demand presents utilities with a significant but surmountable financial challenge: Rising infrastructure costs must be recovered from a declining sales base. Tariff design mechanisms, such as revenue-balancing accounts and increased fixed charges, help to decouple revenue from sales.

In its June 2008 publication—*Effective Utility Management, a Primer for Water and Wastewater Utilities*—the US Environmental Protection Agency described the attributes of an effective utility, which included water resource adequacy, financial viability, and operational optimization. By taking proactive steps to address revenue stability, efficient operations, and customer education, utility operators and managers can ensure that customers, the utility, and the environment benefit.

RESOURCES

- Beecher, Janice A., 2010. The conservation conundrum: How declining demand affects water utilities. *Journal AWWA*, 102:278.
- USEPA, 2006. Expert Workshop on Full Cost Pricing of Water and Wastewater Service.
- Vickers, Amy, 2001. *Handbook of Water Use and Conservation*, WaterPlow Press, Amherst, Mass.
- Water Research Foundation, 2010. North America Residential Water Usage Trends Since 1992.

Trends in Residential Water Usage and Its Impact on Water Utility Financial Planning

Margaret Hunter, Gary Naumick, James Chelius, & Kelly Donmoyer
American Water

Introduction and Study Methodology

American Water, Inc. owns and operates approximately 300 regulated water systems in 19 states. Residential water usage rates in American Water's operating subsidiaries have been studied over the last decade. Residential customers comprise over 90% of the Company's total customer base, and represent over 60% of total water sales.

Overall, the residential water usage across American Water subsidiaries has declined on a per customer basis (gallons/customer/month) by about 1.2% between 2000 and 2009. This declining trend was consistent across 17 states encompassing over 260 water systems. This decline was isolated from summer weather impacts on demand, through analysis of consumption in the months of December through April. This analysis appears to reflect a decline in indoor residential water usage. The declining trend has accelerated since the mid-1990's in many service areas. The causes of this decline are attributed to plumbing fixture retrofits with higher efficiency models; a decline in persons per household across the US; increased conservation ethic and awareness; economic conditions; and price elasticity.

In many service areas, growth in the number of customers served has been sufficient to continue an overall increasing trend in total residential sales (gallons/month). However, in areas where customer growth is slow, declines in per customer usage rates have resulted in a decline in sales volume (gallons/month). Factors such as water system acquisitions and meter reading frequency changes have impacted the data in many areas. For the purposes of this study, these factors have been isolated so that the underlying trend can be seen.

American Water has studied historic water usage trends in more detail for selected American Water states of operation across the United States, including Indiana, Kentucky, Missouri, Pennsylvania, Tennessee, West Virginia and New Jersey. Our analysis was based on monthly customer consumption data. Linear regression of the 12-month running average consumption was calculated. Ten years of data were studied to dampen the effect of variable summer weather. Additionally, winter data (December through April) was studied. This analysis theoretically eliminates the impact of weather-driven outdoor usage. In our winter analysis, we studied a shorter timeframe of five years, to get a better view of recent demographic and economic drivers. The results are shown in **Table 1**. The results show a consistent trend across a number of states spanning a wide range of geographic and demographic characteristics, particularly among states in the central and northeastern US. According to a 2009 Water Research Foundation report, "many water utilities across the United States and elsewhere are experiencing declining water sales among households." (Coomes et al. 2010, page 1).

This report further states: A pervasive decline in household consumption has been determined at the national and regional levels. (Coomes et al. 2010, page 72)

Table 1: AW Eastern States Summary Table - Usage Trends

Historic Slopes of Trendlines (Residential Usage)			
State	**10 Year Trend**	**5 Year Trend**	**5 Year Winter Trend**
IL	-1.35%	-4.08%	-1.93%
IN	-1.49%	-1.60%	-1.42%
KY	-1.14%	-2.00%	-1.44%
PA	-1.23%	-1.97%	-1.86%
TN	-1.03%	-0.77%	-1.51%
WV	-1.41%	-1.48%	-1.34%
MD***	-1.20%	-2.32%	N/A
NY***	-0.77%	-2.62%	N/A
VA***	-0.92%	-2.73%	N/A
Maximum	-1.49%	-4.08%	-1.93%
Minimum	-0.77%	-0.77%	-1.34%
Average	-1.17%	-2.17%	-1.58%

IL, IN, KY, PA, TN, and WV slopes based on monthly data
MD, NY, and VA slopes based on annual data

Drivers of the Water Usage Decline

The retrofitting of plumbing fixtures with high efficiency models is predominately due to the influence of federal mandates such as the Energy Policy Act of 1994 and its subsequent amendment, the Energy Policy Act of 2005, as well as the Energy Independence and Security Act of 2007. Each of these different federal regulatory standards contributes primarily to reductions in water consumption in the residential and commercial sectors. These effects by water use type are presented in **Table 2**.

Table 2:
Theoretical Daily Indoor per Capita Water Use from Various Fixtures and Appliances in a Typical Single Family Home Before and After Federal Regulations

Type of Use	Pre-Regulatory Standards		Post-Regulatory Standards		Savings***
	Amount** (gpcd)	Percent of Total	Amount** (gpcd)	Percent of Total	
Toilets	17.9	30.4%	8.2	21.4%	54%
Clothes washers*	15	25.5%	9.8	25.6%	30%
Showers	9.7	16.5%	8.8	23.0%	9%
Faucets	14.9	25.3%	10.8	28.2%	28%
Dishwashers*	1.4	2.4%	0.65	1.7%	54%
Total Indoor Water Use	**58.9**	**100%**	**38.3**	**100%**	**35%**
Note: List only includes common household fixtures and appliances and excludes leaks and "other domestic uses".					

*Regulatory Standards effective in 2010 and 2011.
**Source: *Handbook of Water Use and Conservation*, Amy Vickers, May 2001
***Note: Greater savings could be achieved with WaterSense or ENERGY STAR labeled fixtures or appliances as this brand specification is more water efficient that the regulatory requirement.

The Energy Policy and Conservation Act of 1992 mandated the manufacture of water efficient toilets, showerheads and faucet fixtures. For example, a toilet manufactured after 1994 uses 1.6 gallons per flush, compared to an older toilet which uses 3.5 to 7 gallons per flush. The "Energy Independence & Security Act of 2007" (Public Law 110–140) establishes high efficiency standards for dishwashers and clothes washers. Dishwashers manufactured after 2009 and clothes washers manufactured after 2010 must meet water usage requirements that could reduce water used by these fixtures by 54% and 30%, respectively. Overall, with all other factors being equal, a typical residential household in a new home constructed in 2011 would use 35% less water for indoor purposes than a non-retrofitted home built prior to 1994. **Table 3** contains more details on the requirements of the laws and the typical expected impact on residential water usage.

Table 3:
Theoretical Flow Rates from Typical Household Fixtures and Appliances
Before and After Federal Standards

Type of Use	Pre-Regulatory Flow*	New Regulatory Standards and Flows			WaterSense / ENERGY STAR Current Specification+
		New Standard (maximum)	Federal Standard	Year Effective	
Toilets	**3.5 gpf**	**1.6 gpf**	U.S. Energy Policy Act	1994	**1.28 gpf**
Clothes washers**	**41 gpl (14.6 WF)**	**Estimated 26.6 gpl (9.5 WF)**	Energy Independence & Security Act of 2007	2011	**Estimated 22.4 gpl (8.0 WF)**
Showers	**2.75 gpm**	**2.5 gpm at 80 psi**	U.S. Energy Policy Act	1994	**No specification**
Faucets***	**2.75 gpm**	**2.5 gpm at 80 psi (1.5 gpm)**	U.S. Energy Policy Act	1994	**1.5 gpm at 60 psi**
Dishwashers	**14.0 gpc**	**6.5 gpc for standard; 4.5 gpc for compact**	Energy Independence & Security Act of 2007	2010	**5.8 gpc for standard; 4.0 gpc for compact**

* Source: *Handbook of Water Use and Conservation*, Amy Vickers, May 2001
** Average estimated gallons per load and water factor
*** Regulation maximum of 2.5 gpm at 80 psi, but lavatory faucets available at 1.5 gpm maximum
+ Source: http://www.epa.gov/watersense/ and http://www.energystar.gov websites

A decline in persons per household has been noted across the United States. As the baby boomer generation grows older, the composition of the typical American household has changed in recent years. An aging household composite and increasing divorce statistics lend to lower persons per household in the typical American household. (Bianchi, S. page 6) Compounded by lower usage by older household members, this factor can cause a significant reduction in water use. (Coomes et al. 2010, page 4)

Indoor water usage typically used for consumption and hygiene is considered inelastic. However, non essential residential water use for lawn and garden irrigation, car washing, water features, and swimming pools has a higher elasticity to water and sewer rate increases. Leaks that may be ignored under low prices would be repaired under higher prices. (Coomes et al. 2010, page 5) Estimates of price elasticity have generally been in the -0.05 to -0.5 range; the negative sign implies that consumption decreases with increases in water rates. (Vista Consulting Group Inc., 1996, page 45)

The increasing prominence of water conservation practices by customers is also apparent, due to both water company programs and also increasing conservation ethic practiced by customers. American Water became a WaterSense promotional partner in 2008. All American Water state subsidiaries offer conservation-related educational materials and several have programs which offer water-saving devices. All American Water subsidiary internet pages have links to the EPA WaterSense site. Our California, Arizona, New Mexico, Pennsylvania and New Jersey subsidiaries have pilot scale to

statewide conservation programs that include offering water-efficient fixtures by request or by rebates.

Business Planning

It became apparent that Business Plans that forecast future revenues based on an average of historic consumption were often leading to a revenue shortfall. Therefore, the historic declining usage trends were given consideration when projecting future sales. Many of the drivers that have caused the decline in recent years are still in place; therefore, Business Plans should still consider the likelihood of continued future declines. For example, the recent introduction of more efficient washers and dishwashers will lead to further declines as new homes are built and as older appliances are replaced.

Conclusions and Next Steps

Efficient water use by residential customers has environmental, economic, and energy efficiency benefits, and should be encouraged by water utilities. However, many water utility capital needs, such as infrastructure renewal, reliability, and regulatory projects, are unaffected by the reduced consumption. Similarly, many operating costs such as salaries, plant maintenance, customer services needs, IT support, security, etc. are also unaffected by the reduced consumption. Therefore, water utilities will need to mitigate the impact of lost revenue from reduced residential water sales. With increased water efficiency, utilities may benefit from improved capacity utilization and life extension, and customers benefit from avoided capital and operating costs. However, demand erosion presents utilities with a significant but surmountable financial challenge: Rising infrastructure costs must be recovered from a shrinking sales base (Beecher, 2010). To mitigate the financial impact, utilities should consider modifications to tariff design. Mechanisms such as revenue balancing accounts, increased fixed charge, and other forms of decoupling can be considered.

References:

Beecher, Janice A. The conservation conundrum: How declining demand affects water utilities. Journal AWWA. vol. 102 No. 2. February 2010.

Bianchi, S. Population Bulletin –American Families, Vol. 55, No. 4. Population Reference Bureau, December 2000.

Coomes et al. North America Residential Water Usage Trends Since 1992, Water Research Foundation, 2010.

USEPA (United States Environmental Protection Agency). 2006. Expert workshop on Full Cost Pricing of Water and Wastewater Service. Washington, D.C. EPA.

Vickers, Amy. Handbook of Water Use and Conservation, WaterPlow Press, 2001.

Vista Consulting Group, Inc., Managing the Revenue and Cash Flow Effects of Conservation, American Water Works Research Foundation, 1996.

ABBREVIATIONS USED	
gpcd	gallons per capita per day
gpf	gallons per flush
gpl	gallons per load
gpm	gallons per minute
gpc	gallons per cycle
WF	water factor, or gallons per cycle per cubic feet capacity of the washer (the smaller the water factor, the more water efficient the clothes washer)

TENNESSEE AMERICAN WATER COMPANY
DOCKET NO. 12-00049
FIRST DISCOVERY REQUEST OF THE
TENNESSEE REGULATORY AUTHORITY

Responsible Witness: Linda C. Bridwell

Question:

75. Provide copies of all RFPs sent out for all projects covered within the CWIP testimony, all proposals that were returned and indicate which proposals were accepted.

Response:

In addition to the response to Item 76 of this same data request, TAW has located one RFP for project 2602-4 which is attached. There were no RFP's sent out on this project. A sole source proposal was requested from CTI because they provided the services for the Catoosa Utility District service improvement study, had an in-depth understanding of the TAW system and expectation, and had a good understanding of the project deliverables as well as the work experience in carrying out projects of this nature.

We believe that additional information may be in the files and the response will be supplemented when it is located.

August 3, 2012 Supplemental Response:

TAW is providing additional information in response to this request:

1) The Filter House #2 Roof Replacement project Task Order with Consolidated Technologies, Inc. which includes the Scope of Services and proposed costs. This proposal for scope of services was accepted with execution of the agreement. (pages 1-19)
2) The US 27 Main Relocations project RFP and Evaluation of Proposals received. The proposal from Consolidated Technologies, Inc. was accepted. (pages 20-37)
3) The GIS Conversion Project RFP and the one proposal received from Applied Water Management which was accepted (pages 38 – 104)
4) The Clearwell #3 Rehabilitation project Task Order with Tank Industry Consultants which includes the Scope of Services and proposed costs. The proposal for scope of services was accepted with the execution of the agreement. (pages 105-110)

AGREEMENT FOR
GENERAL ENGINEERING SERVICES
BETWEEN TENNESSEE-AMERICAN WATER COMPANY AND
CONSOLIDATED TECHNOLOGIES, INC. FOR
FILTER HOUSE NO. 2 REPLACEMENT PROJECT

TASK ORDER NO. TN-11-CTI-05

Article 2 – Scope of Services shall be per the Updated Proposals titled Filter House No. 2 Replacement dated September 19, 2011, in accordance with the terms of the Master Agreement for Engineering Services between Owner and Engineer effective 01-01-2010, inclusive of Appendices A through F, this Task Order, and the instructions of Owner's Representative.

Article 3 – Engineer's Representative in charge of the services is Jerry D. Hightower who may be contacted at 423-267-7613. Owner's Representative in charge of the services is Kate Nartey, who may be contacted at 423-755-7603, kate.nartey@amwater.com.

Article 4 – The Services performed within the Task Order shall commence within 5 days of the notification to proceed, and shall be complete on or before the dates listed in the Proposal.

Article 9 - Payment shall be a not-to-exceed contract in the amount $14,550 in accordance with the fees and hourly rates stated in the Engineer's Proposal per the Services Agreement. If it becomes necessary for time and efforts to exceed these amounts using the agreed upon rates, an agreement must be reached between the Engineer's Representative and Owner's Representative for additional time and expense and a new Task Order shall be executed. In addition, any necessary filing or permitting fees shall be paid by the Engineer and will be reimbursed by the Owner.

INVOICING INSTRUCTIONS: All invoices shall be submitted in duplicate and addressed to: Tennessee American Water, Southeast Region, Attn: Kate Nartey, Workbasket No. A26ENG02, c/o Shared Services Center, P.O. Box 5608, Cherry Hill, NJ 08034.

Owner and Engineer have caused this Agreement to be executed by representatives duly authorized to act, all as of the effective date of 10-7-11.

PREPARED BY: Kate Nartey, E. I. Date 09-23-2011
(OWNER's REPRESENTATIVE)

CONSULTANT Consolidated Technologies Inc.	OWNER Tennessee-American Water Company
By Allen A. Stephens	By
Title Exec. Vice President	Title President
Date 9-23-11	Date 10-7-11

TAW Citico WTP Filter House No. 2 Roof Engr. Services Task Order
Jerry Hightower
to:
Kate.Nartey@amwater.com
09/26/2011 12:06 PM
Show Details

Kate,
The originals of this signed Task Order No. TN-11-CTI-05 are being delivered to your office today. The proposed schedule for the work follows:

1. **CTI:** Review and Revise as necessary Contract Drawings and Specifications by **Wednesday, Sept. 28th, 2011.**
2. **General Contractor, Helton Construction Co.:** Review Revised Drawings and Specifications and Update Bid as necessary by **Friday, October 7th**.
3. **CTI:** Request Bids for Asbestos Remediation: **Friday, Sept. 30th**.
4. **Asbestos Remediation Contractors:** Submit bids to TAW by **Friday, October, 7th.**
5. **CTI:** Review Bids for both Contracts and make recommendation of award or re-bid by **Tuesday, October 11th.**
6. **TAW:** Award both contracts and isssue Notice-to-Proceed by **Friday, October 14th.**
7. **TAW, General Contractors, and CTI: Pre-Construction Meeting: Tuesday, October 18th.**
8. **General Contractor:** Begin work by **Monday, October 24th.**
9. **General Contractor:** Submit shop drawings by **Monday, October 31st.**
10. **General Contractor: Schedule and Coordinate Asbestos Remediation Contractor's work, as needed.**
11. **General Contractor: Complete work by December 31, 2011.**

Obviously, this is going to be a very tight schedule in order to achieve TAW's desired goal of completion of the work by the end of the year; therefore, it will require very timely responses on all submittals and approvals. Please let me know if you have questions or comments about this.

Thanks,
Jerry

Jerry D. Hightower, PE
Senior Project Manager
CTI Engineers, Inc.
1122 Riverfront Parkway
Chattanooga, TN 37402
423-267-7613 office
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---------- Forwarded message ----------
From: **Copier at Cti** <chatt-scanner@ctiengr.com>
Date: Fri, Sep 23, 2011 at 5:48 PM
Subject: Scanned from toshiba2 09/23/2011 17:48
To: Jerry Hightower <jhightower@ctiengr.com>

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Date: 09/23/2011 17:48
Pages:1
Resolution:400x400 DPI

CTI Engineers, Inc.
1122 Riverfront Parkway
Chattanooga, TN 37402
Phone 423.267.7613
Fax 423.267.0603
www.ctiengr.com

September 19, 2011

Ms. Kate Nartey, E.I.
Tennessee American Water
PO Box 6338
Chattanooga TN 37401

Subject: Citico Station Water Treatment Plant
Filter House No. 2 Roof Repair
Engineering Services Amendment No. 1
CTI Project No. C06049

Dear Kate:

As requested, we are attaching for review and approval two copies of Amendment No. 1 to the engineering services agreement for the subject project, dated April 26, 2006. A summary of the fees follows:

Appendix B - Fees for New Items of Work:

Paragraph C)	Construction phase services (Revised fees for existing scope items) - $8,500, lump sum
Paragraph D)	RPR services - $8,500, cost plus, not-to-exceed amount
Paragraph E)	Drawings and specifications update - $3,600, lump sum
Paragraph F)	Renegotiation of bid - $1,600, lump sum

The project was designed and bids were received on October 20, 2006; however, the contract was not awarded per TAW preference. We are also attaching a copy of the CTI's "Letter of Recommendation of Award" dated October 26, 2006, which discusses the bids received and potential reductions of project cost offered by the low bidder, Helton Construction Company. Helton is willing to negotiate a price for completion of the work on or before December 31, 2011. As we discussed recently, the work requires a separate, but related, construction contract, which would be contracted directly through Tennessee American Water, for remediation of asbestos in the intermediate layer of roofing material. No quotations for this work have been received; however, the bid for the roof work includes coordination with the remediation contractor.

If you have any questions, please contact me.

Sincerely,

Jerry D. Hightower, P.E.
Senior Project Manager

Gary M. Cosby, P.E.
President

Enclosure

M:\K08001-02 TWSA boyer SEC plan rev 072010 (ID 245978) (ID 245979)

TN-06-CTI-02

FILE C06049

AGREEMENT FOR ENGINEERING SERVICES

This Agreement made this 26TH day of APRIL 2006, by and between Tennessee-American Water, 1101 Broad Street, Chattanooga TN 37402 (hereinafter referred to as TAW) and Consolidated Technologies, Inc., 401 Chestnut Street, Suite 220, Chattanooga, Tennessee 37402 (hereinafter referred to as CTI).

Whereas, TAW desires to engage CTI to perform certain professional services in connection with replacement of the roof for the Citico Treatment Plant Filter House No. 2 (hereinafter referred to as the project).

Now, therefore, TAW and CTI do hereby agree as follows:

1. CTI shall provide engineering services for the project as outlined in attached Appendix B, Scope of Services, in accordance with the terms and conditions of this Agreement.

2. TAW shall assume responsibilities relative to the project as outlined in the attached Appendix B, Scope of Services.

3. For the services provided by CTI as outlined in the attached Appendix B, Scope of Services, CTI will be paid an amount equal to salary costs plus 110 percent of salary costs plus 110 percent of direct non-salary expenses. The total fees will not exceed those shown below without the prior authorization of TAW.

Service	Fee Basis	Fee
Design	Cost Plus	$20,000 ✓
Bidding	Cost Plus	1,500 ✓
Construction Phase Services	Cost Plus	3,000
RPR*(based on 3 months, part-time)	Cost Plus	8,500

*After written of authorization by TAW

Salary costs shall include the salaries and wages paid to all CTI personnel engaged directly on the project, plus the cost of customary and statutory benefits and payroll taxes. Direct non-salary expenses shall include subcontracts, travel and subsistence, computer and CADD service charges, communications, field supplies and equipment rental, reproduction, and other project-related expenses.

4. Additional services may be performed when authorized in writing by TAW. Compensation for these additional services shall be an amount equal to salary cost plus 110 percent of salary cost plus 110 percent of direct non-salary expenses.

5. Invoices will be submitted by CTI monthly. For lump sum services, the invoice amount will be based upon the percentage of work completed during the period. For cost-plus or hourly

rate services, the invoice amount will be based upon the time and expenses chargeable to the project during the period.

6. Payments for invoices submitted by CTI are due and payable upon receipt. Payments due CTI under this Agreement are subject to a service charge of 1-1/2 percent per month on all balances not paid within twenty-five (25) days after the date of receipt of invoice.

Unless otherwise stipulated in writing, CTI is authorized to begin work on the project upon receipt from TAW of an executed copy of this Agreement.

The following appendices are attached hereto and made a part of this Agreement as if written herein: Appendix A, General Conditions; Appendix B, Scope of Services; and Appendix C, Duties and Responsibilities of Resident Project Representative.

In witness whereof, both parties have caused this Agreement to be executed by their duly authorized representatives as of the day and year first written above.

ACCEPTED BY TAW:

TENNESSEE-AMERICAN WATER

BY _____

NAME John Watson
VICE-PRESIDENT

TITLE General Manager

DATE APRIL 26, 2006
(Insert here and on first line)

ACCEPTED BY CTI:

CONSOLIDATED TECHNOLOGIES, INC.

BY _____

NAME Gary M. Cosby, P.E.

TITLE President

DATE 3/30/06

APPENDIX B
SCOPE OF SERVICES

I. Services of Consolidated Technologies, Inc. (CTI)

A. Detailed Design Drawings, Specifications, and Contract Documents

1. CTI will prepare detailed design drawings, technical specifications, and contract documents for the replacement of the roof for the Citico Treatment Plant Filter House No. 2. Specific elements included are:

   a. Field Investigation

      1) Measure and sketch existing building including filter pits.
      2) Determine truss dimensions, connections, and steel sizes.
      3) Inspect truss bearing conditions to verify walls are still capable of transferring load to the foundation.
      4) Draw existing structure in CAD (floor plan and roof plan.)

   b. Force analysis

      1) Determine external loads per building code.

   c. Truss analysis

      1) Model truss using FE software.
      2) Determine truss capacity.
      3) Develop field modifications if necessary.

   d. Structure design

      1) Design roof members and decking.
      2) Prepare drawings showing all new structural members, connection details, structural sequencing (so filters can remain in operation), roofing material, opening details, and all information necessary for construction.

   e. Prepare contract drawings.

   f. Prepare contract specifications.

   g. Prepare contract documents.

   h. Coordinate design activities with TAW and appropriate regulatory agencies.

   i. Prepare an opinion of probable project construction cost.

   j. Provide appropriate numbers of copies of plans, specifications, and contract documents for review by TAW and involved regulatory agencies. TAW will pay any review fees established by the State.

k. Distribute drawings and bound contract documents and specifications to the contractors for TAW's use in bidding the project.

2. CTI's design budget is strictly based on the work tasks identified in Paragraph I.A.1 above, which presume that the existing roof superstructure (steel trusses) and wall supports are adequate for use in the new structural system. Should CTI's analyses indicate that any of these existing building components are not adequate for use in the new structural system, CTI will stop work and notify TAW of the inadequacy. It is understood and agreed that, in this event, the scope of services and CTI's design budget will be adjusted to cover design work required to overcome such inadequacy. CTI will not resume its design work until agreement is reached as to the needed contract modifications.

B. **Bidding Services**

1. CTI will assist TAW in the preparation of bid packages, bidding and bid analysis, and contract award. Bidding services will include the following tasks:

a. Assist TAW in preparing and distributing advertisement for bids.

b. As required, interpret contract documents and issue addenda.

c. Attend bid opening and assist TAW in collecting and tabulating all bids.

d. Analyze bids received and prepare bid tabulation sheet.

e. Make recommendation of award.

f. Assist TAW in assembling construction contract documents for execution.

C. **Construction Phase Services**

1. *General Administration of Construction Contract.* CTI will consult with and advise TAW and act as TAW's representative as provided in the General Conditions of the construction contract, except as modified herein. The extent and limitations of the duties, responsibilities, and authority of CTI as assigned in said General Conditions will not be further modified, except as CTI may otherwise agree in writing. All of TAW's instructions to Contractor will be issued through CTI who will have authority to act on behalf of TAW to the extent provided in said General Conditions, except as otherwise provided in writing.

2. *Visits to Site and Observation of Construction.* In connection with observations of the work of Contractor while it is in progress:

a. CTI will make visits to the site at intervals appropriate to the various stages of construction as CTI deems necessary in order to observe as an experienced and qualified design professional the progress and quality of the various aspects of the Contractor's work. CTI will provide the services of a Resident Project Representative (RPR) and assistants, if required, at the site to assist CTI and to provide more continuous observation of such work. Based on information obtained during such visits and on such observations, CTI will endeavor to determine in general if such work is proceeding in accordance with the Contract Documents and CTI will keep TAW informed of the progress of the work.

b. The RPR and any assistants will be CTI's employee or agent and under CTI's supervision. The duties and responsibilities of the RPR are described later in this scope of services.

c. The purpose of CTI's visits to and representation of the RPR (and assistants, if any) at the site will be to enable CTI to better carry out the duties and responsibilities assigned to and undertaken by CTI during the Construction Phase, and, in addition, by exercise of CTI's efforts as an experienced and qualified design professional, to provide for TAW a greater degree of confidence that the completed work of the Contractor will conform generally to the Contract Documents and that the integrity of the design concept as reflected in the Contract Documents has been implemented and preserved by the Contractor. On the other hand, CTI will not, during such visits or as a result of such observations of the Contractor's work in progress, supervise, direct, or have control over the Contractor's work, nor will CTI have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected by the Contractor, for safety precautions and programs incidental to the work of the Contractor or for any failure of the Contractor to comply with laws, rules, regulations, ordinances, codes, or orders applicable to the Contractor furnishing and performing the work. Accordingly, CTI can neither guarantee the performance of the construction contracts by Contractor nor assume responsibility for the Contractor's failure to furnish and perform the work in accordance with the Contract Documents.

3. *Defective Work.* During such visits and on the basis of such observations, CTI may disapprove of or reject the Contractor's work while it is in progress if CTI believes that such work will not produce a completed project that conforms generally to the Contract Documents or that it will prejudice the integrity of the design concept of the project as reflected in the Contract Documents.

4. *Interpretations and Clarifications.* CTI will issue necessary interpretations and clarifications of the Contract Documents and in connection therewith prepare work directive changes and change orders as required.

5. *Shop Drawings.* CTI will review (or take other appropriate action in respect to) Shop Drawings (as that term is defined in the aforesaid Standard General Conditions), samples, and other data which the Contractor is required to submit, but only for general conformance with the design concept of the project and compliance with the information given in the Contract Documents. Such reviews or other action will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions and programs incidental thereto.

6. *Substitutes.* CTI will evaluate and determine the acceptability of substitute materials and equipment proposed by Contractor, but subject to the provision of Paragraph 2 of "Required Additional Services."

7. *Inspections and Tests.* CTI will have authority, as TAW's representative, to require special inspection or testing of the work and will receive and review all certificates of inspections, testings, and approvals required by laws, rules, regulations, ordinances, codes, orders, or the Contract Documents (but only to determine generally that their content complies with the requirements of, and the results certified indicate compliance with, the Contract Documents).

8. *Disputes between TAW and Contractor.* CTI will act as initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the work thereunder and make decisions on all claims of TAW and Contractor relating to the acceptability of the work or the interpretation of the requirements of the Contract Documents pertaining to the execution and progress of the work. CTI will not be liable for the results of any such interpretations or decisions rendered in good faith.

9. *Applications for Payment.* Based on CTI's on-site observations as an experienced and qualified design professional, on information provided by the Resident Project Representative and on review of applications for payment and the accompanying data and schedules:

   a. CTI will determine the amounts owing to the Contractor and recommend in writing payments to the Contractor in such amounts. Such recommendations of payment will constitute a representation to TAW, based on such observations and review, that the work has progressed to the point indicated, and that, to the best of CTI's knowledge, information, and belief, the quality of such work is generally in accordance with the Contract Documents (subject to an evaluation of such work as a functioning whole prior to or upon Substantial Completion and to the results of any subsequent tests called for in the Contract Documents). In the case of unit price work, CTI's recommendations of payment will include final determinations of quantities and classifications of such work (subject to any subsequent adjustments allowed by the Contract Documents).

   b. By recommending any payment, CTI will not thereby be deemed to have represented that exhaustive, continuous, or detailed reviews or

examinations have been made by CTI to check the quality or quantity of the Contractor's work as it is furnished and performed beyond the responsibilities specifically assigned to CTI in this Agreement. CTI's review of the Contractor's work for the purposes of recommending payment will not impose on CTI responsibility to supervise, direct, or control such work or for the means, methods, techniques, sequences, or procedures of construction or safety precautions or programs incidental thereto or Contractor compliance with laws, rules, regulations, ordinances, codes, or orders applicable to furnishing and performing the work. It will also not impose responsibility on CTI to make any examination to ascertain how or for what purposes any Contractor has used the moneys paid on account of the Contract Price, or to determine that title to any of the work, materials, or equipment has passed to TAW free and clear of any lien, claims, security interest, or encumbrances, or that there may not be other matters at issue between TAW and the Contractor that might affect the amount that should be paid.

10. *Contractor's Completion Documents.* CTI will receive and review maintenance and operating instructions, schedules, guarantees, bonds, and certificates of inspection, tests, and acceptance, which are to be assembled by Contractor in accordance with the Contract Documents (but such review will only be to determine that their content complies with the requirements of, and in the case of certificates of inspection, tests and acceptance of the results certified indicate compliance with, the Contract Documents); and will transmit them to TAW with written comments.

11. *Inspections.* CTI will conduct a visual inspection to determine if the work is substantially complete and a final inspection to determine if the completed work is acceptable so CTI may recommend, in writing, final payment to the Contractor and may give written notice to TAW and the Contractor that the work is acceptable (subject to any conditions therein expressed), but any such recommendation and notice will be subject to the limitations expressed in Paragraph 9b above.

12. *Project Meetings.* Attend all project-related meetings and conferences with TAW, Contractor(s), and other applicable parties.

13. *Record Drawings.* Review and correlate the Contractor's as-built records with designer's records. Provide contract record drawings to TAW.

14. *Limitation of Responsibilities.* CTI will not be responsible for the acts or omissions of any Contractor, or of any subcontractor or supplier, or any of the Contractor's or subcontractor's or supplier's agents or employees or any other persons (except CTI's own employees and agents) at the site or otherwise furnishing or performing any of the Contractor's work; however, nothing contained in Paragraphs 1 through 13, inclusive, will be construed to release CTI from liability for failure to properly perform duties and responsibilities assumed by CTI under this Agreement.

D. **Resident Project Representation (part-time basis, 3 months, 20 hours per week)**

CTI will furnish an RPR to observe performance of the work of the Contractor. Through more extensive on-site observations of the work in progress and field checks of materials and equipment by the RPR and assistants, CTI will endeavor to provide further protection for TAW against defects and deficiencies in the work of the Contractor; but the furnishing of such services will not make CTI responsible for or give CTI control over construction means, methods, techniques, sequences, or procedures or for safety precautions or programs, or responsibility for the Contractor's failure to perform the work in accordance with the Contract Documents.

The duties and responsibilities of the RPR are more fully described in Appendix C.

E. **Additional Services Requiring Authorization in Advance**

If authorized in writing by the CLIENT, CTI will furnish or obtain from others Additional Services of the types listed in the following paragraphs. These services are not included as part of Basic Services.

1. Start-up services.

2. Preparation of Operation and Maintenance Manuals.

3. Preparation of applications and supporting documents (in addition to those furnished under Basic Services) for private or governmental grants, loans, or advances in connection with the project; preparation or review of environmental assessments and impact statements; review and evaluation of the effect on the design requirements of the project of any such statements and documents prepared by others; and assistance in obtaining approvals of authorities having jurisdiction over the anticipated environmental impact of the project.

4. Services to make measured drawings of or to investigate existing conditions or facilities, or to verify the accuracy of drawings or other information furnished by the CLIENT.

5. Services resulting from significant changes in the general scope, extent, or character of the project or its design including, but not limited to, changes in size, complexity, CLIENT's schedule, character of construction method or financing; and revising previously accepted studies, reports, design documents or Contract Documents when such revisions are required by changes in laws, rules, regulations, ordinances, codes, or orders enacted subsequent to the preparation of such studies, reports, or documents, or are due to any other causes beyond CTI's control.

6. Providing renderings or models for the CLIENT's use.

7. Preparing documents for alternate bids requested by the CLIENT for Contractor's work which is not executed or documents for out-of-sequence work.

8. Investigations and studies involving, but not limited to, detailed consideration of operations, maintenance, and overhead expenses; providing value engineering during the course of design; the preparation of feasibility studies, cash flow and economic evaluations, rate schedules, and appraisals; assistance in obtaining financing for the project; evaluating processes available for licensing and assisting the CLIENT in obtaining process licensing; detailed quantity surveys of material, equipment, and labor; and audits or inventories required in connection with construction performed by the CLIENT.

9. Furnishing services of independent professional associates and consultants for other than Basic Services (which include, but are not limited to, customary civil, structural, mechanical and electrical engineering and customary architectural design incidental thereto); and providing data or services of the types described in Paragraph 4 of "Required Additional Services" when the CLIENT employs CTI to provide such data or services in lieu of furnishing the same in accordance with Paragraph 4 of "Required Additional Services."

10. If CTI's compensation is on the basis of a lump sum or percentage of construction cost or cost-plus a fixed fee method of payment, services resulting from the award of more separate prime contracts for construction, materials, or equipment for the project than are originally contemplated. If CTI's compensation is on the basis of a percentage of construction cost and CTI has been required to prepare Contract Documents on the assumption that more than one prime contract will be awarded for construction, materials, and equipment, but only one prime contract is awarded for construction, materials, and equipment for the project, services attributable to the preparation of contract documentation that was rendered unusable and any revisions or additions to contract documentation necessitated by the award of only one prime contract.

11. Services during out-of-town travel required of CTI other than visits to the site or the CLIENT's office.

12. Assistance in connection with bid protests, rebidding, or renegotiating contracts for construction, materials, equipment, or services.

13. Providing any type of property surveys or related engineering services needed for the transfer of interest in real property and field surveys for purposes of redesign or changes in alignment.

14. Preparing to serve or serving as a consultant or witness for the CLIENT in any litigation, arbitration, or other legal or administrative proceeding involving the project (except for assistance in consultations which is included as part of Basic Services).

15. Preparation of documentation to assist CLIENT in obtaining variances or exemptions from codes or regulations.

16. Assistance in applying for and obtaining zoning changes and appeals.

17. Additional services in connection with the project, including services which are to be furnished by the CLIENT and services not otherwise provided for in this Scope of Services.

F. **Required Additional Services**

When required by the Contract Documents in circumstances beyond CTI's control, CTI will furnish or obtain from others, as circumstances require during construction and without waiting for specific authorization from the CLIENT, Additional Services of the types listed below. These services are not included as part of Basic Services. CTI will advise the CLIENT promptly after starting any such Additional Services.

1. Services in connection with work directive changes and change orders to reflect changes requested by the CLIENT if the resulting change in compensation for Basic Services is not commensurate with the additional services rendered.

2. Services in making revisions to drawings and specifications occasioned by the acceptance of substitutions proposed by the Contractor; and services after the award of each contract in evaluating and determining the acceptability of an unreasonable or excessive number of substitutions proposed by the Contractor.

3. Services resulting from significant delays, changes, or price increases occurring as a direct or indirect result of material, equipment, or energy shortages.

4. Additional or extended services during construction made necessary by (1) work damaged by fire or other cause during construction, (2) a significant amount of defective or neglected work of any Contractor, (3) acceleration of the progress schedule involving services beyond normal working hours, and (4) default by any Contractor.

5. Services (other than Basic Services during the Operational Phase) in connection with any partial utilization of any part of the project by the CLIENT prior to substantial completion.

6. Evaluating an unreasonable or extensive number of claims submitted by the Contractor or others in connection with the work.

II. Responsibilities of TAW

TAW will be responsible to:

A. Provide all criteria and full information as to its requirements for the project.

B. Upon identification by CTI and approval by TAW of the necessity and scope of information required, furnish CTI with data, reports, surveys, and other materials and information required for this project, except those included in CTI's scope of services.

C. Acquire all land, easements, and rights-of-way as required for this project.

D. Provide access to the project site and make all provisions for CTI to enter upon public and private lands as required for CTI to perform its services under this Agreement.

E. Examine all studies, reports, sketches, opinions of the construction costs, specifications, drawings, proposals, and other documents presented by CTI to TAW, and render in writing TAW's decisions pertaining thereto within a reasonable time so as not to delay the services of CTI.

F. Give prompt written notice to CTI whenever TAW observes or otherwise becomes aware of any defect in the project.

G. Furnish to CTI, prior to execution of this Agreement, a copy of any design and construction standards TAW shall require CTI to follow in performing its services under this Agreement.

H. Pay applicable permit and review fees assessed by regulatory agencies in connection with the project.

I. Furnish to CTI a copy of site safety and health plans and hazard communication (MSDS) information as required by OSHA regulations.

APPENDIX C
DUTIES AND RESPONSIBILITIES OF RESIDENT PROJECT REPRESENTATIVE

The duties and responsibilities of the RPR are limited to those of CTI in CTI's agreement with TAWC and in the construction Contract Documents, and are further limited and described as follows:

1. General

The RPR is CTI's agent at the site, will act as directed by and under the supervision of CTI, and will confer with CTI regarding the RPR's actions. The RPR's dealings in matters pertaining to the on-site work will in general be with CTI and the Contractor, keeping TAWC advised as necessary. The RPR's dealings with subcontractors will only be through or with the full knowledge and approval of the Contractor. The RPR will generally communicate with TAWC with the knowledge of and under the direction of CTI.

2. Duties and Responsibilities of RPR

a. *Schedules.* Review the progress schedule, schedule of shop drawing submittals, and schedule of values prepared by the Contractor, and consult with CTI concerning acceptability.

b. *Conferences and Meetings.* Attend meetings with the Contractor, such as preconstruction conferences, progress meetings, job conferences, and other project-related meetings.

c. *Liaison:*

(1) Serve as CTI's liaison with the Contractor, working principally through the Contractor's superintendent, and assist in understanding the intent of the Contract Documents; and assist CTI in serving as TAWC's liaison with the Contractor when the Contractor's operations affect TAWC's on-site operations.

(2) Assist in obtaining from TAWC additional details or information, when required for proper execution of the work.

d. *Shop Drawings and Samples:*

(1) Record date of receipt of shop drawings and samples.

(2) Receive samples which are furnished at the site by the Contractor, and notify CTI of availability of samples for examination.

(3) Advise CTI and the Contractor of the commencement of any work requiring a shop drawing or sample if the submittal has not been approved by CTI.

e. *Review of Work, Rejection of Defective Work, Inspections, and Tests:*

(1) Conduct on-site observations of the work in progress to assist CTI in determining if the work is in general proceeding in accordance with the Contract Documents.

(2) Report to CTI whenever the RPR believes that any work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test, or approval required to be made; and advise CTI of work that the RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection, or approval.

(3) Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate personnel, and that the Contractor maintains adequate records thereof; and observe, record, and report to CTI appropriate details relative to the test procedures and start-ups.

(4) Accompany visiting inspectors representing public or other agencies having jurisdiction over the project, record the results of these inspections, and report to CTI.

f. *Interpretation of Contract Documents.* Report to CTI when clarifications and interpretations of the Contract Documents are needed and transmit to the Contractor clarifications and interpretations as issued by CTI.

g. *Modifications.* Consider and evaluate the Contractor's suggestions for modifications in drawings or specifications and report with the RPR's recommendations to CTI. Transmit to the Contractor decisions as issued by CTI.

h. *Records:*

(1) Maintain at the job site orderly files for correspondence, reports of job conferences, shop drawings and samples, reproductions of original Contract Documents, including all work directive changes, addenda, change orders, field orders, additional drawings issued subsequent to the execution of the contract, CTI's clarifications and interpretations of the Contract Documents, progress reports, and other project-related documents.

(2) Keep a diary or log book, recording Contractor hours on the job site, weather conditions, data relative to questions of work directive changes, change orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to CTI.

(3) Record names, addresses, and telephone numbers of all Contractors, subcontractors, and major suppliers of materials, and equipment.

i. *Reports:*

(1) Furnish CTI periodic reports as required of progress of the work and of the Contractor's compliance with the progress schedule and schedule of shop drawing and sample submittals.

(2) Consult with CTI in advance of scheduled major tests, inspections, or start of important phases of the work.

(3) Draft proposed change orders and work directive changes, obtaining backup material from the Contractor and recommend to CTI change orders, work directive changes, and field orders.

(4) Report immediately to CTI and TAWC upon the occurrence of any accident.

j. *Payment Requests.* Review applications for payment with the Contractor for compliance with the established procedure for their submission and forward with recommendations to CTI, noting particularly the relationship of the payment requested to the schedule of values, work completed, and materials and equipment delivered at the site but not incorporated in the work.

k. *Certificates, Maintenance, and Operation Manuals.* During the course of the work, verify that certificates, maintenance, and operation manuals and other data required to be assembled and furnished by the Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to CTI for review and forwarding to TAWC prior to final payment for the work.

l. *Completion:*

(1) Before CTI issues a Certificate of Substantial Completion, submit to the Contractor a list of observed items requiring completion or correction.

(2) Conduct final inspection in the company of CTI, TAWC, and Contractor and prepare a final list of items to be completed or corrected.

(3) Observe that all items on the final list have been completed or corrected and make recommendations to CTI concerning acceptance.

3. Limitations of Authority

The RPR:

a. Will not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by CTI.

b. Will not exceed limitations of CTI's authority as set forth in the Agreement or the Contract Documents.

c. Will not undertake any of the responsibilities of the Contractor, subcontractors, or the Contractor's superintendent.

d. Will not advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences, or procedures of construction unless such advice or directions are specifically required by the Contract Documents.

e. Will not advise on, issue directions regarding, or assume control over safety precautions and programs in connection with the work.

f. Will not accept shop drawing or sample submittals from anyone other than the Contractor.

g. Will not authorize TAWC to occupy the project in whole or in part.

h. Will not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by CTI.

TENNESSEE-AMERICAN WATER COMPANY
HAMILTON COUNTY – I-124 FROM 0.27 MILES SOUTH OF RIVERFRONT PARKWAY TO 0.54 MILES NORTH OF RIVERFRONT PARKWAY WATERLINE RELOCATION PROJECT

REQUEST FOR PROPOSAL

Background Information

The Consultant will provide professional engineering services for the relocation of Tennessee American Water Company (TAWC) facilities in conflict with Tennessee Department of Transportation (TDOT) Project #33006-1130-44. This will consist preliminary engineering design, detailed engineering design and an overall project management that will be associated with the water main relocations along the I-124/U.S 27 project corridor. The scope of services shall include, but is not limited to, coordinating with TDOT, and preparing a complete set of plans, specifications, and an engineer's estimate for the proposed project.

Estimated Timeline

- RFP issued on January 25, 2011
- Responses due no later than February 23, 2011
- Selection and Award of Contract on or about February 28, 2011
- Preliminary Design Review by TAW: April 1, 2011
- Preliminary Design Submitted to TAW: April 8, 2011
- Preliminary Design due to TDOT: April 22, 2011
- Detailed Design due to TDOT: August 10, 2011
- Bid Receipt: September 30, 2011
- Start Construction (Notice to Proceed): November 1, 2011
- End Construction (Substantial Completion): January 31, 2012

I. SCOPE OF SERVICES

IA. DESIGN

A separate lump sum proposal for project design must include the following services. Coordination and review of the design will be managed by Kate Nartey, E.I. of TAWC, and your primary contact throughout the design phase of the project. Any changes in the scope of services during the design phase must be addressed by the Consultant before the work is performed in the form of a task order in accordance with the Engineering Services Agreement found in the Attachment A. This is a TDOT Reimbursable project and all TDOT requirements must be met.

1. Project Narrative Description

The project is located in Chattanooga on I-124/U.S 27 freeway and begins approximately 0.27 miles south of riverfront parkway and ends approximately 0.54 miles north of riverfront parkway. TAW has determined that its facilities in cross streets/roadways to the freeway will be in conflict with the proposed project. Specifically proposed ramps originating and terminating from the freeway at cross streets such as Riverfront Parkway, Main Street, West 12th Street, Carter street, M.L King Blvd and 19th Street, Gateway Ave., and West 4th street collectively has 12-inch, 8-inch, 6-inch mains, fire hydrants and related appurtenances

needs to be relocated. These mains are at a minimum of 3' deep. The Consultant should assess how much of a cut and fill sections will be anticipated and determine whether the water mains on the existing grade elevations needs to be relocated or not. The Consultant should recommend the optimum pipe size/sizes for any betterment of the relocated water mains. The time of completion desired by the Water Company for preliminary design of this project is 30 calendar days after award of contract. ALL TDOT DEADLINES MUST BE MET (SEE ATTACHED LETTER FROM TDOT).

The proposed project shall consists of the design, easement acquisition if any, permitting, bidding and construction administration, and resident observation for the all water main relocation within the project limits.

The tasks required for this project include:

- Project Management
- Route Evaluation and Preliminary Design
- Detailed Design
- Deliverables
- Bidding
- Construction Administration
- Resident Observation

2. Project Management

a. Periodic meetings with the Water Company at the Tennessee-American offices on Broad Street. Your proposal shall include a minimum of three (3) meetings. This would include an initial project meeting, a meeting to review the preliminary design, and a final meeting to review the completed design drawings and specifications and to prepare for the bidding and construction phase of the project. All information which will be reviewed at each of the above mentioned meetings shall be submitted and received by the Water Company prior to the meeting. The Consultant shall prepare and distribute meeting minutes.

b. Total interaction with all utility companies to design and specify proper service for the proposed improvements, and to coordinate the relocation of any existing utilities as required. The consultant shall also determine if any additional capital or usage fees will be imposed by any specific utility.

c. Determine which Local, State, and Federal permits are required for this project, prepare the necessary applications, and provide technical input as required in securing these permits. The Consultant shall also provide the Water Company with information regarding the approximate length of review time for each permit, and any special requirements that could delay this process (e.g., public hearings). The permit applications will be formally submitted and paid for by the Water Company.

d. Preparation of a preliminary budget construction cost estimate broken down by major work item, and a detailed construction cost estimate broken down by CSI division and major process components. The preliminary estimate shall be submitted with the Preliminary Design and the final estimate shall be submitted for the final design review meeting. The preliminary estimate shall be used by the Water Company to evaluate the adequacy of the budget for this project. The final estimate shall be used for evaluation of project costs and subsequent contractor bids.

3. Route Evaluation and Preliminary Design

a. Recommend a route based upon field walks, available aerial photography, topographic maps and the review of existing information on utilities and property owner information. Also determine alternative routes along the project corridor.

b. Select a route based on available data and site visits, brainstorming sessions with the Water Company staff, and interviews with property owners along and adjacent to the proposed route. Also evaluate location alternatives.

c. The following minimum 50 foot wide field survey shall be performed by consultant if necessary.

    1. Layout the preliminary route according to physical requirements in the field.

    2. Locate, using centerline of road as baseline, all existing utilities (e.g., telephone, gas, cable TV, electric, water, storm, sanitary, etc.) and existing structures (e.g., mail boxes, telephone poles, fire hydrants, water service lines, meter settings, driveways, roads, property pins, above ground and underground utilities, fences, trees, stream crossings, rail roads, etc.) that might interfere with construction along the selected project route.

    3. Identify all existing property owners, property lines and high points along the proposed route.

    4. Perform a topographic survey at any extreme changes in grade, stream crossings, railroad crossings and jack and bore intersections. Vertical and horizontal control shall be tied to USGS datum.

d. Preliminary design based on the aerial and any additional survey data as described above. The design shall include the preliminary water main route, connections to existing mains, coordinate geotechnical investigation, if required and provide preliminary construction cost estimate.

e. Based on State requirements, calculate the amount of existing footage in right-of-way versus the amount of existing footage in TAWC easement. Calculate the percent reimbursable by the State.

4. Detailed Design

a. All land and aerial survey work as necessary to complete the detailed design and file permit applications.

b. All geotechnical investigations including soil borings as necessary to adequately complete the design, if required.

c. As a minimum, plans shall include the following: cover sheet, size and type of pipe material, all valves (including blow offs), air releases, appurtenances, fire hydrants, north arrow, scale, typical depth, variations in depth, thrust restraint, water meters, gas meters, fittings, flow metering and SCADA connection details, steel casing, existing utilities

above and below ground, driveways, paving, bridges, rail roads, location map, 24 hour contact representative phone numbers, permanent and temporary easement limits, trees to be retained and removed, erosion control structures, curbing, drains and culverts, streams, and connections to new and existing mains. This set of plans must also comply with State standards and following TAWC approval, will be submitted to State for approval. To comply with the State, all aboveground features pertaining to the relocation of TAWC's facilities including meters, valves, hydrants, etc. will be located on the Department's plans at the appropriate station and offset. Likewise, all belowground facilities including mains, service lines, fittings, etc. will be located on the Department's plans by station and offset AND a profile should be prepared to show the elevation of our facilities. Cross-sections should also be provided for critical areas where our main is crossing another utility or approaching a road or entrance. Each sheet of plans must have material required for that sheet summarized with a total material required on the cover sheet. **Plan sheets will also follow the States' format for title block and page numbering. Any additional State requirements not mentioned above should be met according to State specifications.**

d. Preparation of design drawings in CAD format for all disciplines as required including hydraulic profiles and all connections for utilities to render a complete design. The Consultant shall prepare plans at a scale of 1:1 and plot at 1 inch = 50 foot. For the State purposes, these plans must be duplicated at a scale of 1:50 foot. Plan and profiles will be shown for all stream crossings, railroad crossings, and jack and bore locations. All final design drawings shall be signed and sealed by a registered professional engineer in the State the project is located. Standards developed by American Water Works Service Company, Inc. and applicable to this project will be provided in the Attachments.

e. Preparation of technical specifications, Divisions 2 through 16, in the CSI Spec-Text format and the list of required shop drawings. The Water Company will provide its Standard Contract Documents and Division 1 General Requirements (excluding the list of shop drawings) in final form for printing and binding by the Consultant. The Water Company also will provide a listing of preferred equipment and other technical information for use in the specifications during the design phase, if necessary. Since this project will be a portion of the State contract, certain additional requirements will be necessary to address in the specifications. These specifications must also be submitted to the State for approval.

f. Submission of all design information at the completion of design including:

    1. Two sealed and signed complete sets of 24" x 36" design drawings for TAWC, and one signed and sealed complete set of 22" x 34" on 4 Mil mylar drawings with the appropriate State specifications for the sheet block (as stated in the letter - Attached B) for the State.

    2. CAD drawings compatible with AutoCAD 2007 for Windows and submitted on CD in addition to the mylars. Provide CD labels with the project name and drawing numbers. Use fonts, shapes, linetypes, etc. common to AutoCAD 2007 for Windows or below. Use the Water Company's standard system of start models, layers, menus, fonts, shapes, symbols, text height, and dimensions throughout the drawing set. Since this is a State project, Microstation may also be used, but appropriate levels must be used for easy conversion to AutoCAD. If

the Water Company does not have standards for all of these AutoCAD elements, include data sheets on and provide disk copies of any customized linetypes, etc. in the submittal. The consultant shall use only AutoCAD and AutoLISP routines and no vendor-furnished or third party add-ins. These drawings will illustrate TAWC's facilities as they were constructed in the field, reflecting any changes or revisions from the proposed relocation plans. The as-built drawings must also comply with State requirements, with details being no less than that shown in the proposed plans including facility locations by station, offset, and elevation.

3. Please note that Engineer's or Land Surveyor's seal or stamp on any drawings, reports or specifications submitted electronically (i.e, via e-mail, CD, or disk) is acceptable. But the Water Company requires "printed" original and copies of the original and shall contain the stamp or seal as well.

4. CD copy of all specifications in a format 100% compatible with Microsoft Word 2007.

g. Provide a total of three (3) sets of design memorandums, if required, drawings, and specifications to be used during the design period for review purposes prior to each meeting.

6. Deliverables

The Consultant will furnish, but is not limited to, the following deliverables during the course of the project:

Project Management
a. Meeting Minutes.
b. Monthly Project Invoices.

Route Evaluation and Preliminary Design
a. Preliminary design based on aerial and field surveys.

Detailed Design
a. Minutes of all design meetings.
b. Detailed construction cost estimate.
c. Final Design Drawings.
d. Specifications

Bidding
a. Items as stated in Section IB.

Construction Administration
a. Items as stated in Section IC.

Inspection Services
a. Items as stated in Section ID.

IB. BIDDING

The design phase ends following incorporation of all comments from the final design review meeting. This relocation project is **not** intended to be included in the State Construction Contract. Consequently, bidding and Construction Administration Services shall be provided by the selected consultant. A separate lump sum proposal for project bidding must include the following services:

1. Provide a total of ten (10) sets of Contract Documents (drawings and specifications) to contractors invited to bid on the project. Contractors invited to bid will be designated by TAW.

2. Responding to contractors or potential equipment suppliers' questions and preparation of addenda as required to document design changes or clarifications. Addenda requiring revisions to the technical specifications shall be prepared by direct revision of the specification and reissuance of the effected pages. Each revised page shall have the following header: "Revised Per Addendum No. ___". Addenda requiring drawing revisions shall be made by direct revision and reissuance of the effected drawings unless otherwise approved by TAW. The use of words in an addendum to revise drawings is strictly prohibited. If time does not allow for drawing revisions, TAW may allow supplemental sketches to depict drawing revisions.

3. Maintain the official plan holder's list.

4. Attendance of the Design Project Manager/Engineer at a pre-bid meeting. The Design Project Manager/Engineer shall be thoroughly familiar with the design and be prepared to explain the technical aspects of the project and respond to questions from attendees.

5. Provide the list of bidders to potential equipment suppliers as requested. Drawings and specifications, excluding the first set provided at no cost to all listed bidders, will be purchased through the Consultant.

6. Provide a written evaluation of all alternative equipment offered by the bidding contractors as to whether each alternative satisfies the design requirements of the project, and based on objective or subjective criteria, provide a recommendation as to the acceptability of each alternative submitted.

IC. CONSTRUCTION ADMINISTRATION

The bidding phase of the project shall end with the signing of the construction contract by the successful bidder and TAW. This will occur after all permits are received. Overall construction management of the project will be handled by the Consultant which will include all direct dealings with the Contractor. Rates for construction administration must include the following services for the entire period of construction.

1. General construction administration, including coordination and attendance at construction meetings (assume 4 meetings), resolution of construction problems related to the design, and review and interpretation of the design.

2. Shop drawing review and approvals including review and approval of resubmittals.

3. Review of contractor pricing of change orders and written recommendation to TAW of the reasonableness of the cost.

4. Preparation of supplementary detailed working drawings, specifications, and written instructions or meetings as necessary throughout the construction period to interpret the contract plans and documents and to resolve changes brought about by actual field conditions encountered.

5. Provide the services of the Design Project Manager/Engineer who will participate in and observe initial operation of the project (start-up) and review operation and performance tests required by the contract specifications. At least 3 days should be allotted for on-site start-up services and resolution of initial operating problems. Engineers from all of the engineering disciplines shall be made available to resolve start-up issues as required, and also to resolve problems which may arise during the construction period. The Design Project Manager/Engineer will assist the Resident Observer in the preparation of the punch list and recommend acceptance of the facility by TAW.

6. Preparation and submittal of record drawings on the original mylars (or vellums) and CD (software) copies of all drawings in AutoCAD® format within two (2) months after start-up. The CAD CD's and drawing files shall meet the requirements for submission of design information previously outlined in this document. Data, information, sketches and working drawings, to be incorporated with the record drawings, shall be provided by the Resident Observer. The record drawings shall include all above and below grade changes from the original design drawings for all engineering disciplines. Changes made to reflect the as-installed conditions shall be made in the same level of detail and to the same degree of drafting quality as the original design drawings.

7. Provide the services of the Design Project Manager/Engineer to attend a one (1) day post-construction meeting at the site immediately following demobilization by the contractor.

8. Provide the services of the Design Project Manager/Engineer for a one (1) day inspection of the facilities approximately nine (9) months after they are placed into operation.

9. Your construction supervision proposal shall be prepared based on the Consultant providing the Resident Observer for the project. A separate hourly rate proposal for resident observer to spend 16 hours per week and rate shall include the resident observer's vehicle, phone, and overhead costs.

ID. INSPECTION SERVICES

It is important to provide inspection services throughout our portion of the project to assure appropriate construction. Rates must be provided for inspector services utilized during the project. Inspection services must be provided on a daily basis to obtain and document information on materials installed and to provide general oversight that the project is carried out according to plans and specifications. Any problems or discrepancies that may happen in the field must be corrected by the inspector or immediately reported to Kate Nartey of Tennessee-American Water Company (TAWC). The inspector will work no more than 16 hours per week, unless authorized by TAWC.

The inspector will also be expected to measure and provide stations, offsets, and elevations for all underground appurtenances and provide stations and offsets for all aboveground

appurtenances. Elevations should also be provided for critical areas such as where our main is crossing another utility or approaching a road or entrance. This information will be included on the final as-built drawings that will be submitted to the State following the completion of the project.

II. INFORMATION TO BE SUBMITTED WITH THE PROPOSAL

The following minimum information must be submitted with your proposal for it to be accepted:

1. A separate lump sum fee for design and rates for inspection services as provided on TDOT estimate sheet as attached for engineering cost along with a recommendation on easement development per linear feet and easement acquisitions if necessary per hour and resident observers per hour.

2. Supplemental hourly rates for staff members by discipline which would also be applicable for resident construction observation. Also, provide a separate unit cost for attendance at each construction meeting additional to that specified in the Scope of Services required for construction administration.

3. A brief narrative description of the Consultant's understanding of the design concept. Additionally, provide specifics of any alternative design concepts which may be proposed by the Consultant. The Consultant is encouraged to submit alternative design concepts, however, a proposal based on the defined design concept is mandatory. Should alternative proposals be submitted, preliminary sketches of the proposed facilities shall be included along with relative construction cost estimates comparing the alternative designs with that defined in this document.

4. The anticipated number and depth of all soil borings, if required. The Water Company does not provide soil information for pipeline installation to contractors for bid.

5. Specifics of any exceptions which are taken to items requested in this document. If no exceptions are taken, it is not necessary to reiterate the information in the Scope of Services Required.

6. A listing of drawings and specifications required for this project, with titles for each drawing as per the TDOT specifications for Utility relocation plans (Comply with specifications stated in the letter from TDOT – Attachment B).

7. A listing of all Federal, State, and local permits required for design, construction and operation of the proposed facility and anticipated schedule for obtaining them.

8. A company work history of recent projects which have been designed by your firm that demonstrate your experience as it relates to the design aspects required for this project. References for those projects, including a specific contact person and phone number, shall also be required. A minimum of three (3) and a maximum of five (5) references are required.

9. A project team organizational chart headed up by the proposed project manager and

including all other engineering personnel from all disciplines who are expected to be directly associated with this project.

10. Resumes and a work experience history of each individual identified in the project team organizational chart. The resumes of those individuals to be associated with the instrumentation and controls design must demonstrate their capabilities in those areas identified in the Scope of Services required for design, if required.

11. Specific identification of any sub-consultants that will be utilized for this project. If sub-consultants will be utilized, the resumes of the specific individuals will be required as well as a work experience history of their firms, including three (3) references with specific contacts and phone numbers.

12. A preliminary schedule from date of award in bar chart form. If the time of completion desired by the Water Company is not acceptable, it shall be explicitly stated in the proposal. The required time frame to meet TDOT deadline of 4/29/2011 for preliminary plans submission must be stated (i.e. the consultants latest date that he can be Notified to Proceed and still meet the various TDOT deadline).

13. Concurrence that you have read the Agreement for Professional Engineering Services in the Attachments and are prepared to sign this contract should your proposal be accepted by the Water Company.

III. INFORMATION PROVIDED BY TAWC

TAW distribution system map of the project area will be provided.

TDOT's Right of Way Plans of the proposed project are available at the TAW Engineering Department or at TDOT Offices.

IV. FEE

Not-to-Exceed amount in accordance with Master Services Agreement and related Billing Rate Schedule.

V. COST PROPOSALS

See attachment B for TDOT's Estimate of Engineering Cost Form.

VI. ATTACHMENTS

See Below

VII. APPENDICES

EVALUATION OF CONSULTANT PROPOSALS

*(**NOTE**: FOR INTERNAL USE ONLY)*

February 27, 2011
BUDGET – RP-2602-D1
TENNESSEE AMERICAN WATER

EVALUATION OF CONSULTANT PROPOSALS

To: John S. Watson, President

From: Kate Nartey, E.I.

Re: US-27 Between 19th Street and Riverfront Pkwy

Proposals for design, bidding and construction administration/Inspection services were received on time for the referenced project on February 23, 2011 from GRW Engineers, Inc., Arcadis U.S. Inc. and Consolidated Technologies Inc. The proposal was in response to a Request for Proposal issued by this office on January 25, 2011. The attached lump sum proposals and letter of clarification are summarized below.

PROPOSAL SUMMARY	**GRW**	**ARCADIS**	**CTI**
Preliminary Studies (if applicable)	-	-	-
Design Services	**$96,394.74**	**$46,830.00**	**$31,000.00**
Use Conventional topographic survey or New 100-scale aerial photography	NA	$3,000.00	$3,000
Bidding Services	NA	$600.00	$5,000.00
SUBTOTAL	**$96,394.74**	**$50,430.00**	**$39,000.00**
Construction Services	**$53,323.50**	**$10,100.00**	**$9,350**
Easement Acquisitions (/hr.)	N/A	$100/ft if required	Rates provided
Acquisition Time (hrs.) (assumed by firm)	N/A	N/A	N/A
Total Easement Acquisition (based on firm's estimate)	N/A	N/A	N/A
Total Easement Acquisition (assume 260 hrs)	N/A	N/A	N/A
Easement Development and Staking (per parcel)	N/A	N/A	N/A
Total Easement Development and Staking (assume 40 parcels)	N/A	$133/ft if required	Rates provided
Total Easement Staking	N/A	N/A	N/A
Resident Observations (per hour)	$0 (not eligible for TDOT reimbursement)	$9,900.00	$12,374.00
Other Expenses (Transportation, meals, etc.)	Included in total	Included in total	Included in total
Indirect or Overhead Expenses	Included in total	Included in total	Included in total
Profit	Included in total	Included in total	Included in total
TOTAL CONSULTING COST	**$149,718.24**	**$70,430.00**	**$60,724.00**

A. General Compliance with RFP

1. *Was all of the "Information to be Submitted with the Proposal" included as required by the RFP?* **Yes, all the Consultants did.**

2. *Was the Consultant able to comply with the proposed design duration? If not, was the proposed design duration acceptable?* **All consultants submitted schedules that complied with the proposed preliminary and detailed design submission due dates of 04/29/2011 and 8/17/2011 respectively. However, GRW stated they will be able to meet the deadline for preliminary plans submission if they are notified to proceed with the design by mid-March.**

3. *Did it become necessary to clarify any of the Consultant proposals with follow up phone conversations or correspondence? If so, what was the result of this additional effort?* **Yes with CTI to clarify the overhead rate of 168%. (See enclosed letter from TDOT for approval of CTI's rate of 168% on federally funded projects)**

4. *Were any exceptions taken to any items in the proposal which are not acceptable?* **Yes, CTI and GRW took exceptions to the minimum 50 foot wide field survey to be performed if it is necessary. GRW plans on utilizing the TDOT plan sheets in order to minimize conflicts.**

B. Consultant's Understanding of the Project

1. *Were the preliminary sketches, process schematics, hydraulic profiles, etc. submitted by the Consultant adequate in terms of their general understanding of the scope of work?* **Not applicable.**

2. *Do the number of drawings proposed adequately encompass the required scope of work?* **Yes.**

3. *Does the listing of specifications proposed adequately encompass the required scope of work?* **Yes.**

4. *Did the Consultant's submittal of information regarding permit requirements adequately demonstrate their understanding of this phase of the project?* **Yes, all the consultants adequately demonstrated their knowledge of the necessary permits.**

5. *Was a critique of the conceptual design submitted by any of the Consultants? If so, provide a listing of each item that was critiqued items using the attached Table No. 1. A summary of the effort of each Consultant should then be provided along with a listing of those recommended items which should be pursued by the selected Consultant.* **None of consultants submitted a critique of the conceptual design. GRW did not propose a cost for resident inspections on this project because inspection cost is not eligible for reimbursement under TDOT's contract.**

C. Cost Analysis

1. *Is the proposed average cost per drawing in line with typical drawing costs in a range of $3,500-5,000 for complex projects or $2,500-$3,500 for less complex projects?* **Not applicable.**

2. *Does the total proposed design cost compare favorably with the anticipated costs**?*** **CTI and Arcadis proposed design costs compare favorably with anticipated costs, GRW Engineers did not.**

3. *Is the proposed construction administration services cost in line with typical costs for these services in the range of 2%-4% of the estimated construction cost for complex projects or 0.5%-2% for less complex projects?* **We do not have an estimate of the construction cost yet.**

D. <u>Company Work Experience</u>

1. *Does the Company work experience history demonstrate adequate experience as it relates to the work required for this project?* **Yes all the consultants have adequate experience in this area.**

2. *Have the Consultants performed any recent projects which are very similar in nature to this project?* **Yes, as requested in the RFP, CTI designed the relocation of 6, 8, 12, and 16-inch water line for Shallowford Road in Hamilton County, TN for TAW. GRW has designed the relocation of the Lookout Creek Bridge, Shallowford Rd project in Hamilton County, TN for TAW and Arcadis assisted in acquiring easements for the Lookout Mountain mains Replacement.**

3. *Were any of the Consultant's references contacted? If so, were satisfactory responses received?* **Not deemed necessary since we have prior contact and work experience with all the consultants.**

4. *Has the Consultants previously performed work on American System projects? If so, was their performance adequate?* **Yes, for all Consultants.**

E. <u>Project Team</u>

1. *Does the background of the proposed Project Manager reflect adequate experience and qualifications in the primary areas of design required for this project as well as project management?* **Yes, this has been approved for GRW and CTI per the Master Services Agreement. The background of the Project Manager for Arcadis reflects adequate experience and qualifications for the proposed project.**

2. *Does the project team include engineers for all disciplines required for this project?* **Yes, for all Consultants.**

3. *Does the resume and work experience of the proposed lead instrumentation and controls engineer demonstrate adequate experience in the areas specifically defined in the RFP?* **Not applicable.**

4. *Are any sub-consultants proposed for this project? If so, do the resumes of the sub-consultants demonstrate adequate experience in the proposed areas?* **GRW and Arcadis are not anticipating using sub-consultants on this project. CTI proposed to use Beginning Pointe Surveys of Chattanooga for surveying services.**

F. Budget Status

1. *Can the current approved budget support the design costs and cash flow proposed by the selected consultant?* **Yes.**

2. *Does an IP revision need to be made?* **No not applicable.** *Is it necessary to initiate design before the revised IP can be approved at the next board meeting?* **No not applicable.**

3. *Have there been any changes in the scope of work during the proposal submittal stage which could impact construction costs?* **No.**

4. *What were the general comments from the Consultants regarding the adequacy of the construction budget for this project?* **No comments were made since the construction budget was not part of the Request for Proposal.**

G. Recommendation

Recommend which consultant should be selected for the project and summarize the major factors which are the basis for the recommendation. **After careful review of the proposals, all the Consultants demonstrated an understanding of the scope of the project. All the Consultants have experience with similar projects. CTI and Arcadis cost proposals were relatively comparable in cost. Both consulting firms proposed conducting surveys as part of their design which is built-in their total engineering cost. CTI's cost proposal was based on a 168% of the pre-construction and construction fees for Indirect/Overhead expenses which is 23% more than TDOT's requirements. TDOT approved on the higher rate for CTI after verifying with them. I therefore recommend CTI to carry out the scope of works for this project since they had the lowest bid and they proposed a cost-effective design concept.**

_____

Approved

TENNESSEE AMERICAN WATER

US-27 BETWEEN 19TH STREET AND RIVERFRONT PKWY WATERLINE RELOCATION PROJECT

PROPOSAL EVALUATION CHECKLIST

Were the following items submitted in each Consultant's proposal and were they adequately addressed?

ITEM	GRW	ARCADIS	CTI
1. Construction estimate adequacy	N/A	N/A	N/A
2. Design critique	None	None	None
3. Separate lump sum fees	X	X	None
4. Supplemental hourly rates	Per MSA	X	X
5. Adequate understanding of the project	X	X	X
6. Number and depth of soil borings	None	None	None
7. Listing of project drawings and specs	X	X	X
8. Listing of required permits	X	X	X
9. Preliminary schedule	X	X	X
10. Company work history	X	X	X
11. Project organizational chart	X	X	X
12. Resumes	X	X	X
13. Identification of sub-consultants	None	None	Yes
14. Exceptions to drafting standards	None	None	None
15. General exceptions	None	Field Survey - Limited	Field Survey - Limited
16. Concurrence w/terms and conditions	X	X	X

What were the specific values for each of the following?

ITEM	GRW	ARCADIS	CTI
1. Preliminary studies fee (if applicable)	-	-	-
2. Design fee	$39,582.21	$39,972.00	**$31,000.00**
3. Bidding fee	-	$8,500.00	$5,000.00
4. Construction fee	$20,640.15	$15,550.00	$18,253.00
5. Easement Acquisition	N/A	N/A	N/A
6. Easement Development and Staking	N/A	N/A	N/A
7. Resident inspection fee (if applicable)	$15,871.65	$19,997.00	$10,899.00
8. Record drawing fee (if applicable)	N/A	N/A	N/A
9. Additional constr. meeting cost	N/A	$400 per 2-hr meetings	Rates in proposals
10. Number of drawings	N/A	N/A	N/A
11. Cost per drawing	N/A	N/A	N/A
12. Number of soil borings	0	2	0
13. Depth of soil borings	N/A	10-12 feet	N/A
14. Design duration (months)	25	25	25

*(**NOTE**: DO NOT SUBMIT THIS FORM WITH THE PROPOSAL EVALUATION)*

REQUEST FOR PROPOSAL
FOR PROCUREMENT OF
GIS DATA CONVERSION SERVICES

Tennessee-American Water
1101 Broad Street
Chattanooga, TN 37401

Proposal Release Date: 03/12/2012

Proposal Submittal Date: 04/03/2012

Proposal Completion Date: 07/31/2012

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SECTION 1: OVERVIEW OF REQUESTED SERVICES AND PROPOSAL SUBMITTAL PROCEDURES

1.1 Overview of Project Scope

This Request for Proposals solicits proposals from qualified firms for the services of GIS data conversion for Tennessee-American Water. The requested services include the creation of GIS data and digital documents according to the specifications in this RFP. These database development services pertain to Central Division Service Area of Tennessee. This RFP explains technical requirements and administrative procedures for the preparation and submittal of proposals and qualifications for Respondents. Additional copies of this RFP may be downloaded in digital form from the AW GIS SharePoint page or by contacting American Water representative cited in sub-Section 1.2.

Tennessee-American Water uses geographic data to support mapping of its water distribution, routine operations and a range of planning and analysis requirements. The data developed through this project will enhance the ability of Tennessee-American Water to provide quality GIS services and products to users. Compliance with the requirements of this RFP will produce predictable, consistent GIS data across AW, which will work seamlessly with other integrated and interfaced applications.

1.2 Proposal Submittal

Proposals must be submitted to the Tennessee-American Water contact below by the close of business on 04/03/2012.

Robbie Harvey
Draftsperson – Engineering Dept
1101 Broad Street
Chattanooga, TN 37401
P:423-755-7665
Em: robbie.harvey@amwater.com

1.3 Contact Information and Questions

Prospective Respondents are encouraged to submit questions about this RFP. Questions should be submitted in writing (email message or letter) to the following by 03/26/2012:

Robbie Harvey
Draftsperson – Engineering Dept
1101 Broad Street
Chattanooga, TN 37401
P:423-755-7665
Em: robbie.harvey@amwater.com

All questions and responses to the questions will be copied to the main contact of each respondent via email, fax or mail.

1.4 Procurement Steps and Timing

The proposal solicitation, evaluation, and selection steps and projected timing associated with the RFP are summarized as follows:

- RFP Release: 03/12/2012
- Final Question Submittal: 03/26/2012
- Proposals Due: 04/03/2012
- Complete Initial Proposal Review and Short-list Selection: 04/06/2012
- Notification of Selection: 04/11/2012
- Contract Completion: 04/18/2012
- Project kick-Off Meeting: 04/23/2012
- Project Completion: 07/31/2012

The dates indicated above are approximate and Tennessee-American Water reserves full rights to change these dates.

1.5 Proposal Format and Content Requirements

To expedite and simplify proposal evaluation and to assure that each proposal receives the same orderly review, all proposals shall adhere to the format described in this section. Proposals shall contain all of the elements of information specified without exception. Proposal sections and pages shall be appropriately numbered. The required proposal sections are:

- Cover Letter signed by individual with authority for contract negotiations
- Title Page (making reference to TN GIS Data Conversion, the prime contractor, and proposal date)
- Table of Contents
- Section 1: Introduction and Executive Summary
- Section 2: Short Summary of Relevant Experience
- Section 3: Proposed GIS Data Conversion Approach
- Section 4: Project Organization and Management
- Section 5: Company Description, Corporate Structure, Financial Information, Experience, Qualifications of Proposed Project Team
- Section 6: Compliance with Contract Terms and Legal Requirements
- Section 7: Price Proposal

- Appendices

A more detailed explanation of the content of each section is provided below

1.5.1 Proposal Section 1: Introduction and Executive Summary

Provide a brief overview about the proposal including the following:

- Summary of project team including an identification of any subcontractors
- Brief overview of company qualifications and proposal team
- Summary of proposed data conversion approach and deliverables
- Statement indicating the Respondent's understanding of the requested work and factors that will contribute to their team's success in completing said work.

1.5.2 Proposal Section 2: Short Summary of Relevant Experience

Respondents should include a brief description of company background and history, business focus, and experience in GIS data conversion work particularly relevant to the requested work.

1.5.3 Proposal Section 3: Proposed Data Conversion Approach

This proposal Section must contain a full response to RFP Section 4 (Data Conversion Specifications) and RFP Section 5 (Quality Control Requirements and Data Acceptance Criteria). Respondents should clearly state their compliance with the requirements stated in RFP Sections 4 and 5 and explain the approach, methodologies, and tools that will be employed. Respondents should specifically state their compliance with the AW data model format and quality requirements of stated deliverables. Respondents may expand on the basic requirements stated in Sections 4 and 5 and propose products that exceed the stated format and quality requirements.

1.5.4 Proposal Section 4: Project Organization, Management, and Schedule

This proposal Section must contain a full response to RFP Section 6 (Project Operations, Logistics, and Management). Respondents should clearly state their compliance with the requirements stated in RFP Section 6 and explain how they intend to meet this requirements. Respondents should specifically cite any tools and practices to be used to support project management, communications, status monitoring, and reporting. Respondents shall provide an organizational chart that identifies the structure of the proposed team including management personnel and technical staff. Roles for each project team member shall be described and the Respondent will state expectations about the type and level of support and involvement of American Water personnel throughout the project. In this proposal section, the Respondent will confirm an understanding of the following project requirements stated in Section 6.10 of this RFP:

- Monthly status reports citing accomplishments, project issues, and upcoming work for the project

- Documentation summarizing the contents of each data deliverable
- Summary notes from project meetings that the Contractor leads

In this proposal Section, Respondents will also present a preliminary schedule (as explained in RFP 6.2) showing major project tasks and milestones.

1.5.5 Proposal Section 5: Company Description, Corporate Structure, Financial Information, Experience, Qualifications of Proposed Project Team

This section shall include the following:

- Full name of the company submitting the proposal an identification of the type of company (sole proprietorship, S Corporation, LLC, etc.). Indicate if the company is privately held or a public company. If applicable, provide the stock symbol and Dun and Bradstreet number.
- Company size (number of employees by functional classification.
- Financial information that includes: a) gross revenue and revenue for GIS-related services for most recently completed fiscal year, b) gross revenue figures for past 5 years, c) balance sheets (asset/debt summary) for most recently completed fiscal year, c) identification of any current legal encumbrances or corporate obligations with financial impact on company operations.
- Name of individual with authority to negotiate and approve contract terms for an award resulting from this RFP process.
- Identification of any subcontractors included in the proposal, subcontractor company type and location, number of years in operation, and identification of current or past projects which the Respondent has worked with the subcontractor.
- Description of the services provided by the prime contractor and subcontractor and a clear description of the proposed roles of the prime contractor and subcontractors.
- Location of home office and office(s) from which services will be provided.
- Project references including an identification and description of at least three and no more than six projects, similar in scope to that described in this RFP. It is preferred that these projects involve water data conversion. Project references should include an identification of the client organization name and location, year(s) service was provided, description of the project scope, approach, and deliverables, and a client name and contact information (including phone and email address).
- Identification of project team members, their affiliation (prime or subcontractor), their roles, and their professional credentials and experience.
- A concise summary of qualifications for this project.

A biographical summary for each team member shall be provided that summarizes education, training, pertinent work experience, and years of experience in fields that specifically relate to their role in the project. The Respondent should indicate the amount of time, on average, that the proposed project

manager will devote to the project with a statement confirming his or her availability. Full resumes for key project personnel should be included in an Appendix to the proposal.

1.5.6 Proposal Section 6: Compliance with Contract Terms and Legal Requirements

Respondents shall respond to the requirements of RFP Section 7 (Standard Contract Terms and Legal Requirements) which requests that Respondents fully review American Water's contract terms (Appendix E) and other legal requirements and state their acceptance or cite exceptions and alternate wording for specific terms.

1.5.7 Proposal Section 7: Price Proposal

This proposal Section must contain a full response to RFP Section 8 (Price Proposal). This must include a full project price itemized as explained in RFP Section 8.

1.5.8 Proposal Appendices

The Respondent may use appendices to the proposal to provide material or examples that elaborate on material in the body of the proposal. All appendices should be cited in the body. Appendices may reference documents or sources that are readily available on the Web. If Web sources are cited, an active URL should be provided.

1.6 Administrative Rules and Requirements

1.6.1 Proposal Packaging and Submittal

Respondents will submit 3 hard copies and one digital .pdf file that includes the entire proposal contents. Proposals should be submitted by 03/14/2012 to:

Robbie Harvey
Draftsperson – Engineering Dept
1101 Broad Street
Chattanooga, TN 37401
P:423-755-7665
Em: robbie.harvey@amwater.com

Any proposals submitted after the identified day and time may be rejected by Tennessee-American Water.

1.6.2 Responsibility for Work and Use of Subcontractors

All work described in this Request for Proposal is assumed to be done by the selected Contractor or an approved subcontractor unless otherwise specified in writing in the proposal. The use of subcontractors is generally acceptable but all proposed subcontractors and the scope associated with those subcontractors shall be clearly detailed in the proposal. The Contractor may expect assistance from

Tennessee-American Water in the organization and providing of source materials and data, answering questions during the conversion work, and other support tasks. Respondents shall clearly identify the expected types and level of support from Tennessee -American Water.

1.6.3 Duration of Proposal

Proposed services and costs stated in the Respondent's proposal will remain in effect for ninety (90) calendar days after proposal submittal

1.6.4 Rejection of Proposals

This RFP implies no guarantee of an award for stated services. Tennessee-American Water retains full rights to reject any proposal based on format and content or to cancel the project before initiation.

1.6.5 Cost of Proposals

Respondents assume full responsibility for the costs of proposal preparation and submittal, response to questions from Tennessee-American Water, shortlist presentations, contract preparation, or any other costs associated with responding to and complying with this RFP through the execution of a contract for the services described herein.

1.6.6 Authorized Signature

The proposal must contain the signature of a duly authorized officer of the Respondent empowered with the right to bind the Respondent to the proposed services and cost.

1.6.7 Compliance with Laws and Licenses

The selected Contractor will adhere to all applicable local, state, or federal laws, regulations, or licensing requirements prior to the beginning of project work.

1.7 Standard Definitions

This Section defines key terms that are used throughout this RFP:

- "Request for Proposal (RFP)" refers to this solicitation from Tennessee-American Water for proposals for GIS data conversion and supporting services.
- American Water refers to the American Water Works Service Company including the particular state operation cited in this RFP.
- The term "Respondent" means the firm or corporation which submits a proposal and which may or may not be successful in being awarded this procurement.
- The term "Contractor" means the Respondent awarded the work described in this RFP and contracted to perform those services. Reference to the Contractor in this RFP shall also apply in full to any subcontractor for the named Contractor.

- The term “Subcontractor” refers to a company or person that is providing specific services for this project through a written agreement with the Contractor.

SECTION 2: BASIC QUALIFICATION REQUIREMENTS AND SELECTION CRITERIA

2.1 Minimum Qualifications for Respondents

Tennessee-American Water seeks to retain the services of a company or team of companies qualified to provide the services described in this RFP at a reasonable price. For a Respondent to be considered minimally qualified for this work, the following basic qualifications must be met:

- Adherence to the content and format requirements of this RFP
- Financial stability and no legal encumbrances that could negatively impact schedules
- Successful completion of at least three past projects of similar nature and scope
- Sound management and delivery of high-quality GIS data conversion and document scanning/indexing services as ascertained from the Respondent's proposals and reference checks
- Availability of adequate and qualified staff and free from project timing conflicts that could negatively impact the work
- In possession of the necessary tools (hardware and software) to carry out this work

2.2 Selection Criteria and Process

Tennessee-American Water will assign a team of knowledgeable individuals to evaluate and score proposals and select one Respondent to be awarded the project work. Scores will be based on the quality of the proposal, supplemental information provided by respondents as requested by Tennessee-American Water, the results of reference checking, proposed price, and other information gathered by Tennessee-American Water. During the proposal evaluation, American Water reserves the right to request clarification or additional information, additional project references, interviews or site visits, or other means for evaluating Respondent proposals.

Scoring will include multiple criteria under the following categories, each of which are weighted showing their contribution to a final composite score on which selection will be based:

- Corporate Structure, Financial Stability, and Acceptance of AW Contract Terms (taking into account corporate structure, financial information, and response to AW standard contract terms): 10%
- Technical merit (understanding of scope and technical quality based on response to RFP Sections 4 and 5): 30%
- Project Management, Schedule, and Project Resources (ability to meet required schedule, effectiveness of project management approach based on response to RFP Section 6, and skills and experience of project manager and proposed team): 20%
- Company Experience (extent of utility data conversion experience, ESRI software experience, and results of reference checking): 20%
- Cost (highest points awarded to lowest cost proposal): 20%

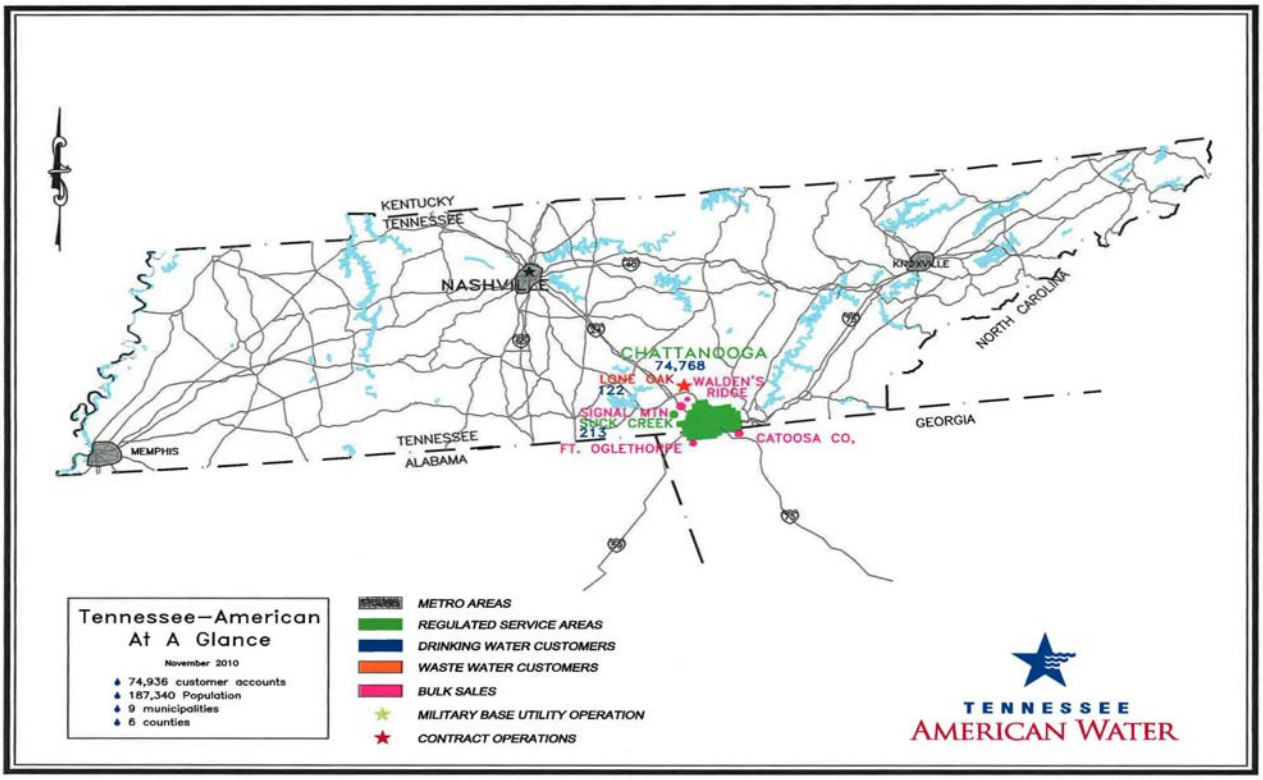
SECTION 3: BACKGROUND INFORMATION, PROJECT SCOPE, AND SOURCE MATERIAL DESCRIPTION

3.1 Description of Organization and Water Systems

American Water is a national organization with presence in 22 states and is centrally managed from its headquarters in Voorhees, NJ. While each State has its own management structure and support staff, technical standards and policies are developed centrally with consensus and review by the State organizations. Implementation of GIS within each State is that State's decision, based on financial and regulatory considerations. The data structure for all American Water asset information is very similar throughout the business. Therefore, maintenance of American Water GIS data model is centrally coordinated and maintained. If there is a need for any data model modifications, the change is brought to a committee for approval and implementation. Similar approach is taken for integrating GIS with other systems. Such initiatives are scoped with input from State operations, then are developed and tested and are distributed to the States for implementation.

Tennessee-American Water operates water systems throughout the state of Tennessee. Figure 3-1 shows the general location of these systems.

Figure 3-1: General Location of Tennessee-American Water



3.2 Existing GIS Program and System Environment

GIS at American Water includes central coordination through a corporate GIS unit that works with representatives from American Water state operations to develop and promote standards, maintain a common GIS data model, and provide technical and organizational support to each state. American Water States operate and support their own GIS programs providing staff and physical resources for GIS data maintenance, user support, and providing a range of GIS products and services.

Currently Tennessee-American Water uses Atlas GIS as its primary mapping software for creation and editing of maps. The maps are on a 145 individual map grids covering approximately 5,000' x 7,000' each for the Chattanooga system and paper plans for the Lone Oak and Suck Creek system. The Chattanooga system encompasses Hamilton, Dade, Walker and Marion counties. Lone oak system is in Sequatchie county and Suck-Creek system is in Marion county.

3.3 Minimum fields to populate

Easy data interchange between GIS and CMMS, will enable functionality derived from integration of GIS and SAP. If CMMS database is fully populated and reconciled with existing asset mapping (AutoCAD, paper), then all additional information can be brought to GIS on the key ID field. For the Water Data Model these key fields are: hydrantID for hydrants, valveID for valves and structureID for Facilities. Pipelines currently are not stored in Infor CMMS, so there is no need to generate a unique ID for mains to be shared between GIS and CMMS. There is GISUID field (GUID type field) in the data model which is another unique identifier that is used for integrating GIS with hydraulic modeling software. This field could be used for integration with SAP in the future, but this has not been determined at this time.

Water Systems

Bold Italic text identifies a key field for each feature class.

- Hydrants - location, ***hydrantID*** and legacy hydrant number (if different from hydrant ID)
- Valves (distribution, transmission and production) - location, ***valveID*** and legacy valve number (if different from valveID)
- Facilities – location, ***structureID***, facilityname, legacy structure name (if different from structureID and facilityname). Facilities to include: tanks, pump stations, wells, reservoirs, interconnections and treatment facilities)
- Pipelines - location, diameter, material, year of installation (if known)

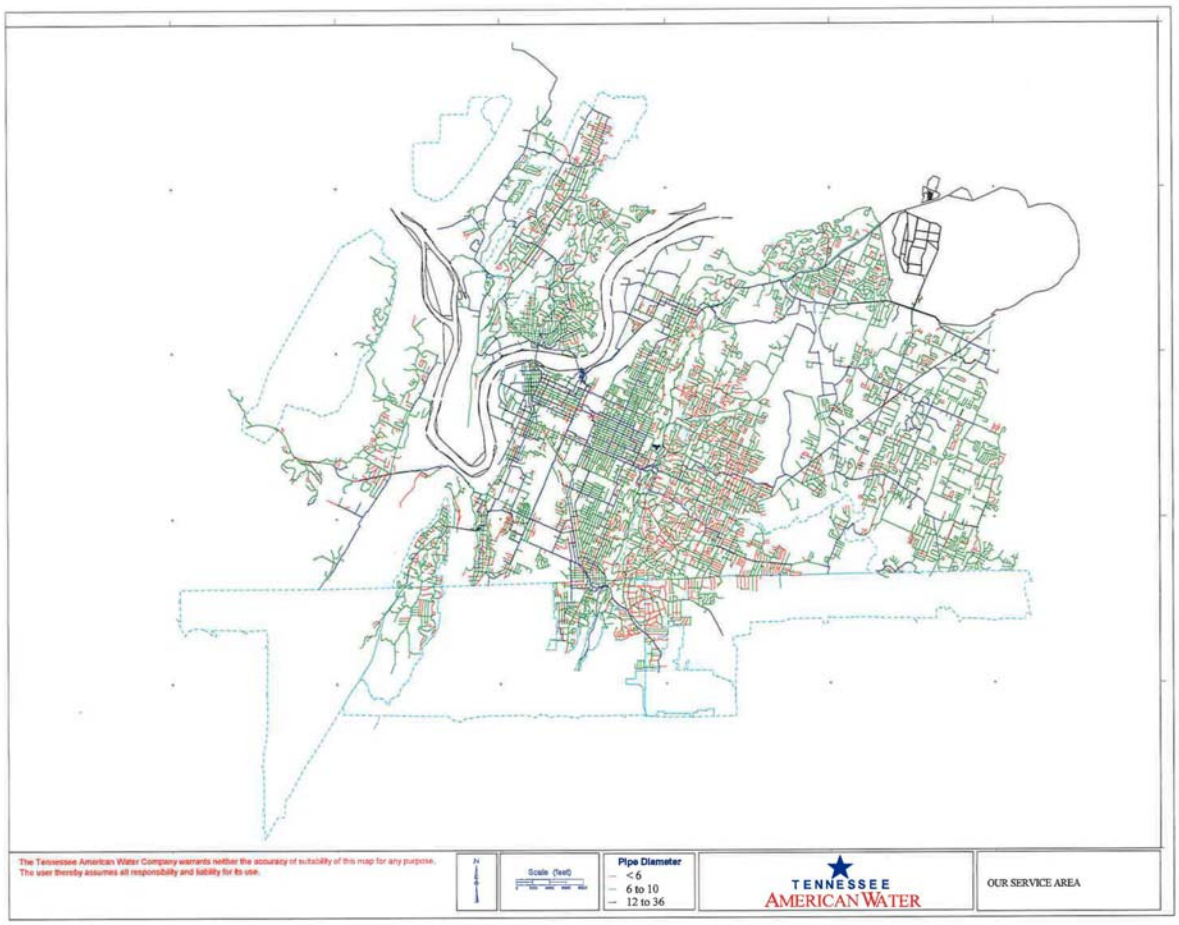
3.4 Overview of Project

The objectives of this project are to provide: a) water GIS data in an ESRI Geodatabase format. This RFP addresses requirements data conversion services pertaining to water services in the Central Division located in the downtown area of Chattanooga, Tennessee portion of the state.

3.4.1 Conversion Area and Characterization of Water Services

The geographic area for data conversion covers the Chattanooga service area located in the southeast portion of the state of Tennessee and parts of north of the state of Georgia. Figure 3-2 shows a more detailed depiction of the Chattanooga water system in this service area. This area occupies about 200 square miles. Other areas are the Suck Creek Area and the Lone Oak Service area. Map of these areas will be provided.

Figure 3-2: System Map for Chattanooga District Service Area



Estimated counts of system features in this area are:

- Number of water customers: 74,936
- Miles of water mains: 1,290
- Number of water valves: 18,247
- Number of Fire Service valves: 1500
- Number of Pressure reducing valves: 16

- Number of line Stops: 23
- Number of hydrants: 5,088

3.4.2 GIS Data Conversion Overview

GIS data conversion will follow an approach that American Water refers to as, High Accuracy Conversion with GPS. This approach uses high-precision GPS data collection to give accurate map positions for water features (anchor points) visible from the surface (e.g., hydrant, manhole, water valves), Standard system maps and other sources would be used to guide a controlled conversion of the water network, and to support attribute population. This approach could use GPS feature collection by field crews taking observations on foot or high-speed GPS-equipped vehicle (e.g., integrated GPS, video, inertia navigation, laser positioning) collection. The proposed approach and tools should support the placement of locatable surface utility features with an absolute accuracy of 1-foot or better.

3.5 Base Map Source(s)

Source data for base maps should be the current version of the 1-meter aerial imagery from NAIP. In areas, such as Chattanooga, the highest Resolution imagery should be used. In all areas, the most current version of the county parcel data that include address should be used. If the address data is not included or part of the parcel data include the address point data. This data can be obtained through each individual county GIS department we serve and contractors will be required to obtain the data.

3.6 Source Material for Water GIS Data Conversion

Descriptions of the primary and secondary sources that contain information useful for water system GIS data conversion are summarized in Table 3-1. Examples of these sources are included in Appendix A. Tennessee-American Water is not mandating specifically how these sources will be used in the Contractor's data conversion process. Respondents should do necessary examination of the sources to determine which are needed and what data conversion methods should be used to meet deliverable requirements.

Table 3-1: Summary of Potential Primary and Secondary Sources for GIS Data Conversion

Data Source Name	Basic Description and Format	Content	Estimated Count Covering Area	Availability/ Completeness	Condition/ Accuracy	Potential Use for GIS Data Conversion
A. Standard Water Distribution Map	1" to 400' scale map in sheets each covering a grid – 5,000' x 7,000' portion of the service area. Available in shape file .shp file format	Includes base map line work (ROW lines), water mains, hydrants, valves. Annotation and feature symbolization provides information on type of feature, feature ID, main diameter, material	145 map sheets	Available and updated for entire conversion area.	Physical condition is excellent. Absolute accuracy varies (5' to 40') depending on based map source	Will be main source for locating assets and mains
B. Valve Card	5" X 11" card stock filed in card drawers by jurisdiction and street name.	Valve ID#, intersection or street address, type of valve, turns, installation and maintenance dates and actions. Includes locational sketch on back side, with dimension annotation locating valve relative to curb, ROW, or physical feature.	About 18,247	Fairly complete in Valve books. Estimate that less than 150 are missing. These are in excel spreadsheet also.	Physical quality very good.—folds or tears are rare. Over 90% are very readable. Rest have minor problems (fading ink or light pencil).	Secondary source for valve location.
C. Hydrant Card	6" X 8" card stock filed in card drawers by jurisdiction and street name.	Valve ID#, intersection or street address, type of valve, turns, installation and maintenance dates and actions. Includes locational sketch on back side, with dimension annotation locating valve relative to curb, ROW, or physical feature.	About 5,088	Fairly complete in Hydrant book. Estimate that less than 150 are missing. These are in excel spreadsheet also.	Physical quality very good.—folds or tears are rare. Over 90% are very readable. Rest have minor problems (fading ink or light pencil).	Secondary source for valve location.
D. As-Builts	Completion drawings on each main project over the past 125 years. Various sizes .	Completions drawing showing the fitting to fitting measures of each project. Some are un-viewable due to age and inability to scan or copy.	About 150 mylars	Fairly complete in drawers. Estimate that less than 10 are missing.	Physical quality very good.—folds or tears are rare. Over 90% are very readable. Rest have minor problems (fading ink or light pencil).	Secondary source for valve location.

3.7 Source Material Preparation, Organization and Handling

3.7.1 Source Material Management Responsibilities of Tennessee-American Water

Tennessee-American Water will make all hard copy source materials available on-site for use by the contractor under the oversight of Tennessee-American Water personnel. No original hard copy source materials will be removed from their filing site unless specifically approved by Tennessee-American Water. Source materials will be inventoried and their file location will be identified. Source materials will be updated prior to their use by the Contractor. Digital source materials will be provided to the Contractor (via disk or FTP download) as needed during the conversion project Tennessee-American Water will be responsible for: a) ensuring that hardcopy source materials are filed in an organized manner and accessible by the contractor, b) making digital source documents available as needed, c) locating any missing source documents identified by the contractor, and d) responding to contractor's questions about the source documents (e.g., missing or conflicting information on a source document.

The Respondent shall state other assumptions or expectations about Tennessee-American Water's role or responsibilities for source material handling or preparation.

3.7.2 Source Material Handling Responsibilities of the Contractor

Unless specifically approved, no original hard copy source materials will be removed from their filing location at a Tennessee-American Water facility. It is assumed that any scanning of hard copy source materials will occur on-site at the Tennessee-American Water facility. Under the oversight of Tennessee-American Water personnel, the Contractor will be responsible for retrieving hard copy source materials during the conversion project, refiling properly after use, and tracking the access and refiling of specific hard copy documents. The contractor will put in place appropriate procedures and management controls to ensure that hard copy sources are not lost or refilled in the wrong location.

SECTION 4: DATA CONVERSION SPECIFICATIONS

4.1 Data Conversion Scope Overview

As stated in Section 3, this RFP requests services for development of Water GIS data. The Contractor will be responsible for delivering database products, for the area identified in sub-Section 4.2, that meets all requirements for content, format, and quality described in this RFP.

4.2 Deliverables and Delivery Format

4.2.1 GIS Database

GIS data deliverables will be submitted to Tennessee-American Water in an ESRI geodatabase format meeting the design requirements stated in sub-Section 4.5 AND Appendix B. Deliverable submittals should correspond to the standard distribution map sheet grid shown in Figure 2, which is based on [geographic basis for the map sheets].

4.3 Basic Geodatabase Parameters

The current coordinate system in use is Tennessee State Plane North American Datum 83 with map units in feet and a Lambert Conformal Conic Projection. All deliverables should be provided in this coordinate system.

4.4 Base Map Compilation

It is believed that suitable base map already exists in all areas. Contractor will have to determine if this is not the case. The contractor will be required to perform a base map conversion if need be.

4.5 GIS Database Content and Data Model

American Water maintains a standard data model that Contractors will use as a basis for data capture and delivery of GIS data in geodatabase format. The following data model related documents, including the empty GIS water schemas, are found in Appendix B (available as a CD that accompanies this RFP document):

- ArcGIS database schema
- Access Database containing domain values
- Instructions to the States to load the domain values to the GIS Schema
- Data Model Usage Guide
- Software for GUID generation

Each GIS feature will have a unique ID (GUID) that will serve as a unique ID for the feature. Software used by AW for GUID generation is included in the CD that accompanies this RFP.

4.6 GIS Data Conversion Techniques

Generally, the conversion project and the deliverables should be planned in stages, where one section (geographic or service area) is converted and delivered to Tennessee-American Water. If that first deliverable passes Tennessee-American Water QA process, they can proceed with moving that section to our GIS production environment, while the vendor can proceed with converting the next section. These deliverables should not be very large, especially at the beginning of the project, to allow catching of any errors that could be propagated into future deliverables.

As stated in sub-Section 3.4, GIS data conversion will follow an approach referred to as High Accuracy Conversion with GPS. The Contractor will use high-precision GPS data collection to give accurate map positions for water features (anchor points) visible from the surface. For water system conversion, the Contractor is responsible for collecting GPS locations for hydrants, valves, [##other surface features]. Standard system maps and other sources would be used to guide a controlled conversion of the water network, and to support attribute population. In cases where the feature cannot be found in the field (e.g., paved over valve cap), the Contractor will enter a location as close as possible to the actual location using available sources (e.g., as-built drawings, sketch from valve card, work order ticket) and the Contractor will populate an attribute identifying the source.

The Respondent will describe in detail, the proposed approach for data conversion including the GPS field data collection procedures, software, and equipment, and all steps for data capture and processing to deliver the high-accuracy GIS database meeting the format, content, and data quality specifications stated in this RFP Section. In particular, the Respondent will explain the following with specific reference to procedures, software, and equipment:

- GPS receivers and field data collection equipment and associated software used in the field.
- Components and operational information for vehicle based field data collection (if applicable).

- Availability and location of base stations to be used for correction of GPS coordinates.
- Approach for getting accurate locations for surface features which cannot be found in the field.
- Software, methods, and steps for processing GPS data collected in the field and import to a GIS database.
- Approach for using GPS data as a basis for creating the full GIS database (e.g., delineation of mains, service lines, and capture of features for which GPS coordinates were not captured in the field).
- Approach and sources to be used for populating required attributes.

4.7 Geospatial Metadata Capture Requirements

The contractor will compile a limited set of metadata corresponding to the GIS data compiled in this project. The metadata categories listed below will be provided with each GIS data deliverable. These categories and metadata elements apply to the entire dataset and following the content definition and format standards of the most recent *Content Standard for Geospatial Metadata* from the Federal Geographic Data Committee (FGDC). The contractor will set-up a metadata style sheet using the capabilities of ArcCatalog and populate the following metadata categories (from the FGDC Content Standard) for each geodatabase feature class:

1. Identification Information: including a general description of the conversion project, creator, age of data, extent of coverage, why data was compiled, limitations of use, and reliability of provider.
2. Data Source and Quality Information: Description of sources, QC steps used, and deliverable quality information (positional accuracy, attribute accuracy, completeness, adherence to logical and connectivity rules).
4. Spatial Reference Information: projection, coordinate system, datum, and any other spatial reference parameters.
8. Citation Information: Owner and custodian of the data, organization that converted the data, and date of completion.
10. Contact Information: contact person and contact information for the data

Tennessee-American Water will work with the Contractor to compile metadata content.

SECTION 5: QUALITY CONTROL REQUIREMENTS AND DATA ACCEPTANCE CRITERIA

In the context of this data conversion project, data quality may broadly be defined as, "the level of conformance of the delivered data with stated specifications".

The Contractor will use sound procedures in the data conversion process to ensure proper quality meeting specifications stated in Section 3.7. In general, these procedures should include such practices as:

- Proper documentation of conversion procedures and mapping rules and communication and training of all staff involved in the project.
- Automated checks, at appropriate steps in the conversion process, to identify and correct mapping and attribute capture errors. Automated checks may use any available software packages or custom applications to identify errors of spelling, graphic integrity, logical connectivity, attribute completeness, attribute value domain consistency, and other quality criteria that lend themselves to automated checking.
- Appropriate manual inspection at steps in the conversion process to catch and correct errors that are not found through automated means.
- Appropriate validity checks to ensure proper compliance with the geodatabase design and logical connectivity rules included in the AW GIS data model (see Appendix B).
- Final testing of data with ArcGIS software before it is completed as a formal submission to American Water.

Quality control should be approached with the goal that each submission will fully meet stated specifications. Each submission should be accompanied with documentation indicating that it has passed quality control procedures. Technical specifications for data content and format along with specific data quality criteria stated in this sub-Section are collectively described as "data acceptance criteria" (DAC). American Water will put in place quality assurance checking procedures to identify the quality of the Contractor's deliverables and the level to which data acceptance criteria are met. This QA checking will include automated tests for attribute value validation, compliance with logical and connectivity rules, and other checks that will be performed on the entire deliverable. In addition, there will be visual checks of a sample of locations in the deliverable to check for compliance with accuracy, symbology, and annotation requirements. The results of the quality assurance checks will determine whether a deliverable is accepted or returned to the Contractor for additional work. Appendix D provides a summary of the Laurel Hill software that American Water will use for conducting quality assurance checks for all Contractor deliverables. This QA testing will employ a series of automated and manual checks using QA/QC software from Laurel Hill GIS, Inc.

The Respondent will describe quality control procedures and tools (manual and automated) that will be used during the data conversion process to ensure that deliverables meet the data acceptance criteria.

5.1 GIS Database Quality Requirements and Data Acceptance Criteria

Respondents will describe proposed procedures and tools that will ensure that the data acceptance criteria in this sub-Section are met.

5.1.1 File Naming and Organization

5.1.1.1 Proper File Format and Spelling

All files will be delivered with properly spelled and formatted names and the names of all feature datasets, feature classes, and data entities will be properly spelled 100 percent of the time.

5.1.1.2 Feature Class Content and Organization

All geodatabase feature classes will be organized as stated in the data model and all feature datasets will be delivered with their proper, associated feature classes 100 percent of the time.

5.1.2 Graphic Quality and Connectivity

5.1.2.1 Graphic Data Structure

Map features will use valid geodatabase feature types (point, line, polygon) 100 percent of the time.

5.1.2.2 Edge-matching/Spatially Continuous Database

While data capture may be carried out on a sheet-by-sheet basis, the data shall be spatially continuous with no invalid breaks in map features across map sheet or tile boundaries.

5.1.2.3 Feature Duplication and Graphic Data Quality

No duplication (multi-digitization) of map features is permitted. Base map and water features will be depicted accurately and consistently. For example, a) there should be adequate shape points for a smooth representation for curved features for features, b) water line features which are straight (no bends) should be shown as straight segments bounded by two end points, and c) no overshoots or undershoots for line features that intersect.

5.1.2.4 Geometric and Logical Connectivity of Features

The geometric and logical connectivity among GIS features must follow exactly the rules defined in the American Water GIS data model (see Appendix B). In other words, there must be a valid physical connection or a spatial relationship, as called for in the design, for every map feature including the following general rules:

- All line features must terminate with a valid point feature (e.g., fitting, valve).
- Point features that are part of a network should be positioned directly on the linear feature and there should be no gap created on the line feature.
- Line features will connect to valid point features as defined by logical connectivity rules (e.g., each water main segment must terminate at a node representing a fitting or value point feature).
- Polygon features should close properly and there should be no invalid donut or separated polygons (unless called for in the design).

- All entities will have GUID (Unique ID) assigned to them. The tools for this functionality are provided by AW included on the CD (Appendix B) that accompanies this RFP.

5.1.3 Feature Completeness

The map feature completeness rate (for all Feature Classes) is 98.5 percent. This percentage is based on the total set of map features that can be identified on source material, through field data collection approaches used in this project, or by information provided by American Water personnel. The contractor shall identify cases in which the existence of a feature is suspected but source material or field conditions do not allow its position to be determined.

5.1.4 Map Feature Placement and Positional Accuracy

Placement of locatable surface water features should be based on survey grade GPS equipment that captures coordinates with a horizontal accuracy of 1 foot or better. The accuracy of underground features should be placed accurately based on the locations of surface features with which they connect (e.g., placement of a water main segment based on the positions of water valves). For features which cannot be located for GPS capture, accuracy should be as high was possible given the quality of the best available sources (e.g., as built drawings, high resolution orthoimagery).

5.1.5 Attribute Accuracy

The Contractor will deliver data with an attribute accuracy rate (for all feature classes) of at least 98.5 percent (unless a different acceptance level is indicated below). This percentage is based on the total set of attributes for map features for which values can be reliably determined from source materials or from information provided by American Water personnel. The following rules contribute to attribute accuracy:

- All attribute table schemas are correct 100 percent of the time.
- Relationship classes have proper cardinality (origin-destination) and the Primary and Foreign keys are properly assigned and all Primary keys have properly formatted unique values 100 percent of the time.
- Subtype attributes, when used, will be properly entered 99.5 percent of the time.
- No null values for attribute fields where null entries are not valid.
- Entry is consistent with the data type format (e.g., integer, decimal, date) for the attribute field: 100 percent compliance required.
- Adherence to all domain rules (lists of valid entries or within stated range for numeric fields).
- Proper spelling for all text entries.

5.2 Field Verification Requirements

If it is necessary to meet accuracy requirements, the Contractor may request field verification of the position of utility features. While this is assumed to be required only in some cases, Tennessee-American Water will take responsibility to verify feature location in the field.

SECTION 6: PROJECT OPERATIONS, LOGISTICS, AND MANAGEMENT

6.1 Roles and Responsibilities

Tennessee-American Water has assigned Robbie Harvey as project manager for this data conversion. This person will be the primary point of contact for all project activities, contract issues, and the enforcement of data acceptance criteria for all deliverables. As needed, additional Tennessee-American Water personnel will be assigned to provide support throughout the project. The basic responsibilities of Tennessee -American Water include:

- Providing hard copy source materials and digital files in a manner that supports the work of the contractor.
- Prompt quality assurance (QA) review and a decision for acceptance or rejection of contractor deliverables.
- Prompt response to questions from the Contractor in all design, database development, and application development activities.
- Providing access to a server and system resources for data loading and application development.
- Lead resolution of any issues with data sources.

The Respondent will identify a project manager who will be the principal contact for Tennessee-American Water and will oversee all work described in this RFP. The Respondent will include an organizational chart showing all proposed project personnel and their roles in the project.

The Respondent will state any assumptions or expectations on responsibilities of and resources to be provided by Tennessee-American Water during this project.

6.2 Data Conversion Phases, Anticipated Schedule, and Major Milestones

Tennessee-American Water expects full completion of all deliverables, including Contractor's performance of all applicable QC measures (both manual and automated procedures) and corresponding documentation certifying passing results, by or before 07/31/2012. This includes the full completion of all deliverables taking into account QA and acceptance steps by Tennessee-American Water. The Respondent will include in the proposal a preliminary schedule identifying main steps and milestones with intermediate dates. If the Respondent believes that the desired end date for full completion does not provide adequate time for all project work, this should be stated with reasons why additional time is necessary. The respondents should coordinate their schedule with Tennessee-American Water to perform QA, notification to Contractor of any and all deficiencies that exceed the data acceptance criteria (DAC), and Contractor's resolution of such deficiencies.

6.3 Data Deliverable Submittal Requirements

GIS data deliverables should include data from specific sheets based on the map grid identified in 4.2.1. Digital document deliverables should be organized in a manner that supports efficient quality assurance checks by Tennessee-American Water. Data deliverables should be submitted on a CD or DVD in a form that is easily loaded to the designated server. All deliverables should be accompanied by a written report that identifies the contents and which confirms that the data has been subjected to all QC checks by the contractor.

6.4 Data Conversion Work Plan Preparation

Early in the project, prior to pilot launch, the Contractor will prepare a "Data Conversion Work Plan" that defines the details about conversion project execution and is used as a tool to assign roles, support communication among project participants, and to facilitate status tracking and reporting. Contractors are responsible for suggesting a format for this plan and working with American Water project personnel to complete it. The "Data Conversion Work Plan" should cover the following topics:

- Description of tasks and deliverables.
- Timing of tasks and milestones and relationships and dependencies between them.
- Handling of source materials and procedures for source preparation.
- Statement that the Respondent has reviewed and understood AW GIS Data Model (see Appendix B) and that the deliverables will comply with the Data Model.
- Quality control procedures and quality assurance checking procedures.
- Understanding of Tennessee-American Water version check out procedures (in case GIS data is stored in SDE database) and the corresponding requirements; the document describing procedures will provided at the time of Work Plan preparation.
- Procedures for flagging issues and resolving them in an efficient manner (problem resolution).
- Procedures for making potential changes in design or specifications (Note: Tennessee-American Water must approve any design changes that are made during the course of data conversion. If design changes require revision of deliverables already completed, Tennessee-American Water will make these changes or issue a change order for the Contractor to make these changes).
- Project Manager and team member roles and contact information.
- Management, monitoring, reporting, and communication procedures.
- Approach to managing changes and updates to source data that occur during the database development effort.

Respondents shall state their acceptance of this Work Plan requirement and provide proposed ideas for the content and format of such a Work Plan.

6.5 Location of Conversion Work and Source Material Handling

The Respondent shall explain where the conversion work will be carried out. If different locations will be used for different parts of the conversion work, this should be specified. Unless specifically allowed, no original source documents maintained by Tennessee-American Water will be removed from the premises.

6.6 Pilot Project Planning and Execution

The Contractor will plan and perform a GIS data conversion for a small area for the purpose of demonstrating and testing GIS data conversion methodologies. Tennessee-American Water has tentatively selected a 1.25 square mile area in the Brainerd Rd from Tunnel Blvd to Tuxedo Ave and a section of Germantown Rd. This area represents a good mix of utility features and ages of the water systems. There are approximately 22.9 miles of water mains in this area. The Contractor will prepare a pilot data conversion plan that includes all set-up, pilot data capture, handling of source materials, data conversion work, data delivery and QA and a review of pilot project results.

After completion of the pilot data conversion, the Contractor, with participation of Tennessee-American Water, will examine the results of the pilot and identify any suggested adjustments to the database design, database rules, source material handling, data conversion and QC methods, or other parts of the project. Any adjustments will be documented and put in place prior to the start of the post-pilot data conversion work.

6.7 Quality Assurance and Acceptance Procedures

Tennessee-American Water will perform a prompt QA check on all data deliverables and will inform the Contractor about acceptance or rejection of each deliverable. QA will include automated checks for certain format and quality criteria (checks on graphic connectivity, compliance with geometric connectivity rules, database validation and manual (visual checks) of a large sample of the deliverable products (GIS and digital document indexes). This QA testing procedures will employ a series of automated and manual checks using QA/QC software from Laurel Hill GIS, Inc. An overview of these tools is included in Appendix D.

6.8 Documentation of Data Capture Rules and Exceptions during Conversion Process

The Contractor will maintain a log of data capture rules, exceptions to rules, and special cases that arise during the conversion work that drive decisions for data capture. Tennessee-American Water will promptly answer questions from the Contractor on how to handle special cases. As appropriate, changes to or additional mapping rules will be implemented during the data conversion process to support handling of special cases in the future. The Respondent will describe how the logging of exceptions, special cases, and rule changes or additions will be accomplished. Tennessee-American Water prefers that questions, notes, or mark-ups about specific data conversion cases that require input by Tennessee-American Water project personnel, be included on a separate annotation map layer that can be viewed with ArcSDE feature classes.

6.9 Managing Updates During Conversion

There will be cases in which new utility development or maintenance operations occur, during the conversion project, in areas for which data has already been converted and delivered. The Respondent shall provide suggestions on how database update will occur for areas that have already been converted. Options should include in-house conversion by Tennessee-American Water or updates performed by the Contractor during or at the end of the data conversion project.

6.10 Status Reporting Requirements

Status reporting by the Contractor will include the following:

- Monthly written status report that document work completed and in progress during the reporting period, percentage completion for each project deliverable, any project issues that need to be dealt with, and key goals for work in the next reporting period.
- Periodic status meetings (in person or by phone) as needed during the project.
- A web-based tool, accessible by the Contractor and Tennessee-American Water that provides a map based tool showing the status of GIS conversion work, delivery status, and QA/Acceptance status by Tennessee-American Water.
- In person, email messages and/or phone contact as needed during the project.

SECTION 7: STANDARD CONTRACT TERMS AND SPECIAL LEGAL REQUIREMENTS

7.1 Standard Contract Terms

Respondents shall review American Water's standard contract terms (in Appendix E) and state their compliance with these terms or cite specific exceptions to the terms. If exceptions are taken to any contract terms, the Respondent should provide suggested alternate language, a rationale for any suggested change or deletion of American Water's standard contract term with an explanation on how the intent of the contract language is met.

7.2 Contract Time and Liquidated Damages

Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified as Preferred Project Completion or as specified by Contractor. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner **$1,500** for each day that expires after the time specified for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time, Contractor shall pay Owner **$1,500** for each day that expires after the time specified for completion and readiness for final payment until the Work is completed and ready for final payment.

7.3 Special Legal Requirements

7.3.1 Data Warranty

Once the data has been accepted by the American Water, the contractor will provide a written warranty for a period of 6 months after acceptance of each deliverable. If any errors are found or cases in which data acceptance criteria have not been met are discovered within the warranty period, the Contractor will be obligated correct these problems.

7.3.2 Malware Protection

The Contractor will put in place controls to ensure and warrant that all data deliverables are free from viruses or other malware. If data deliverables have been shown to contain viruses and malware that infects American Water computer systems, the Contractor will bear the full costs incurred by American Water to recover from the infection.

7.3.3 Security Policy Compliance

The Contractor will comply with American Water's formal policy on the "release of system maps for official use" dated 6/30/2009. This practice establishes rules for any release of a system map to any local

government agency, public utility organization, or private corporation. The portion of this practice that will apply to the GIS data conversion services is addressed in, Section 1.1 of the policy, where it states that:

SECTION 8: PRICE PROPOSAL

Respondents shall provide fixed prices and projection of hours, by functional project role, for each of the deliverables identified in the table below. The fixed prices should include all labor and direct expenses. The sum of deliverable prices presented in the proposal should be equal to the total cost for performing all work defined in this RFP. Spaces are provided for optional deliverables, not specifically stated as requirements in the RFP, which the Respondent may decide to offer. During contract preparation with the selected Respondent, specific invoicing milestones and format will be determined.

Table 8-1: Price Proposal Table

TAW Completion date: 07/31/2012

		Projected Hours for Team Member Roles					
Deliverable Items	**RFP Reference**	Project Management	Quality Control	GIS Analyst	GIS Technician		**Total Fixed Price**
1. Completed data conversion Work Plan	6.4						$
2. Pilot Project Plan and Execution	6.6						$
3. Web-based Tool for deliverable production/acceptance tracking	6.4, 6.10						$
4. GIS Data Deliverables-Water Utility*	4.5, 5.1, 4.8 6.3						$
5. GIS Data Deliverables-Miscellaneous Features*							$
6. Geospatial Metadata Capture	4.8						$
7. Status Monitoring, Reporting, and Project Management	All of Section 6						$
TOTAL REQUIRED DELIVERABLES:							**$**
Optional Deliverables (proposed deliverables not cited in the RFP):							
							$
							$
							$
							$

*Will be broken down further for invoicing milestones

Table 8-2: Price Proposal Table

Respondent Proposed Completion Date: ----/----/----

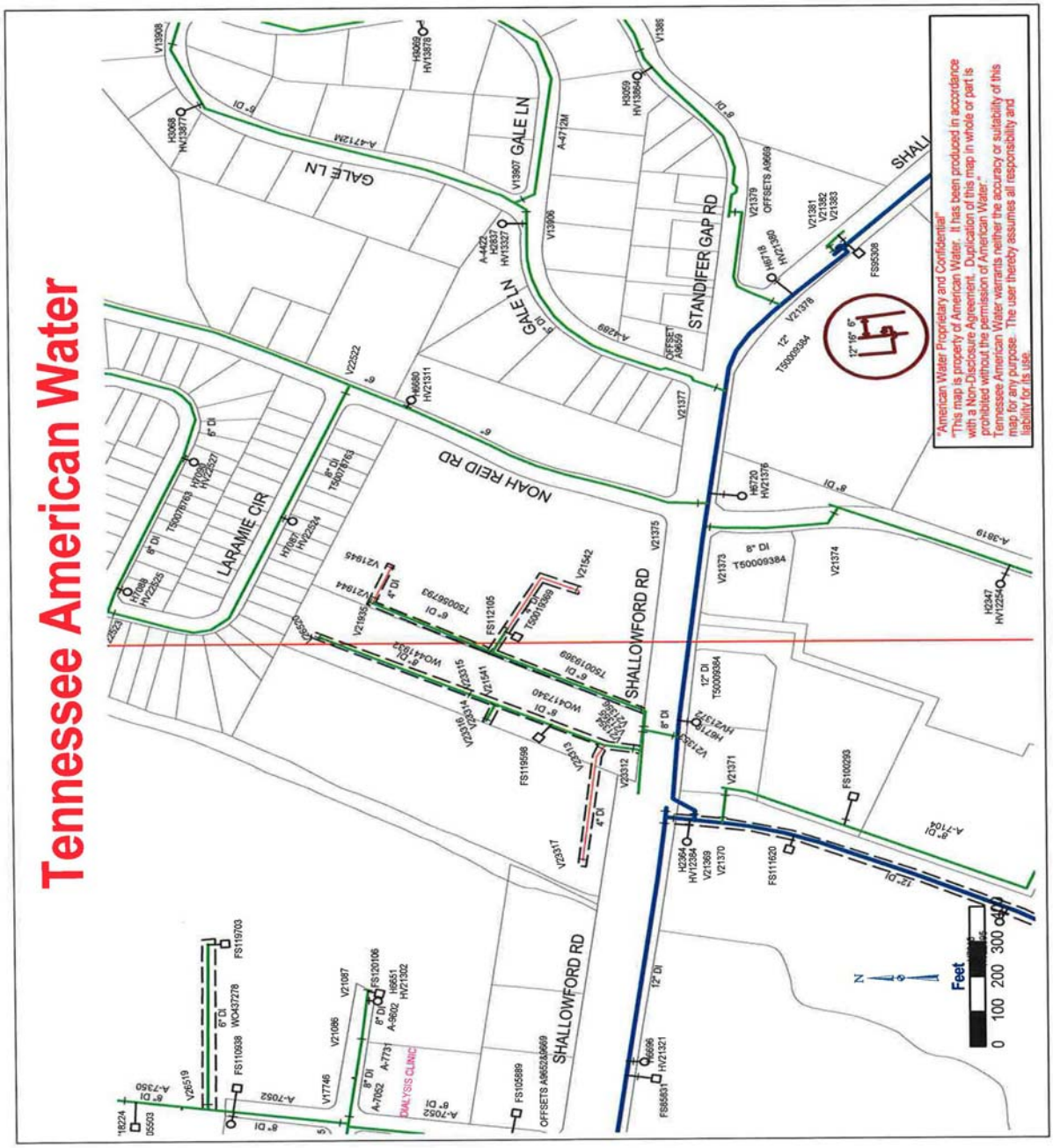
		Projected Hours for Team Member Roles					
Deliverable Items	**RFP Reference**	Project Management	Quality Control	GIS Analyst	GIS Technician		**Total Fixed Price**
1. Completed data conversion Work Plan	6.4						$
2. Pilot Project Plan and Execution	6.6						$
3. Web-based Tool for deliverable production/acceptance tracking	6.4, 6.10						$
4. GIS Data Deliverables-Water Utility*	4.5, 5.1, 4.8 6.3						$
5. GIS Data Deliverables-Miscellaneous Features*							$
6. Geospatial Metadata Capture	4.8						$
7. Status Monitoring, Reporting, and Project Management	All of Section 6						$
TOTAL REQUIRED DELIVERABLES:							**$**
Optional Deliverables (proposed deliverables not cited in the RFP):							
							$
							$
							$
							$

*Will be broken down further for invoicing milestones

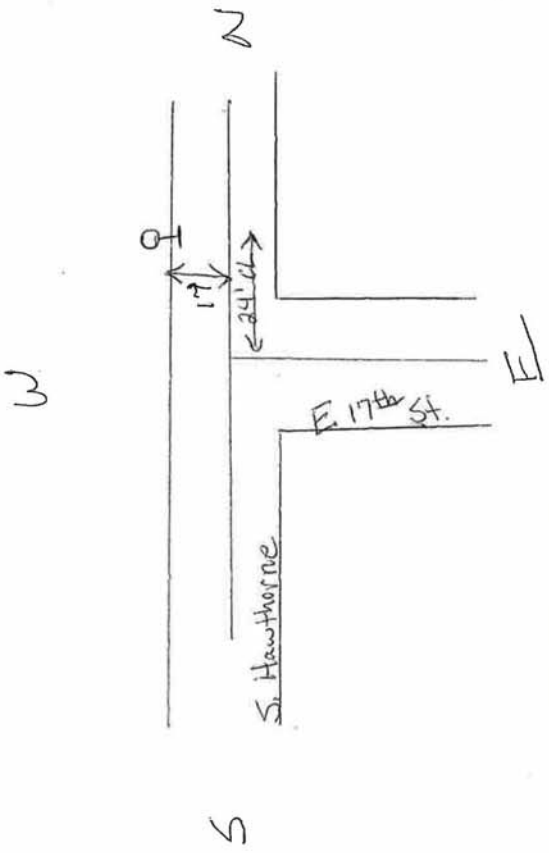
SECTION 9: APPENDICES FOR GIS DATA CONVERSION RFP

9.1 Appendix A: Base Map and Source Material Examples

A-1: Sample of typical distribution map with layers visible. (Item A on Table 3-1)



A-2: Sample of Valve, Hydrant, Blowoff Card. (Item B, C, & D on Table 3-1)



Replace #223

HYDRANT INSPECTION REPORT

MUNICIPALITY Chattanooga HYD. NO. _____

LOCATION 1700 S. Hawthorne St.

MAKE Mueller SIZE 4½

2½" NUZZLES 2 STEAMER NOZZLES 1

OPENS L SIZE MAIN 6" SIZE BRANCH 6" BRANCH VALVE NO. 223

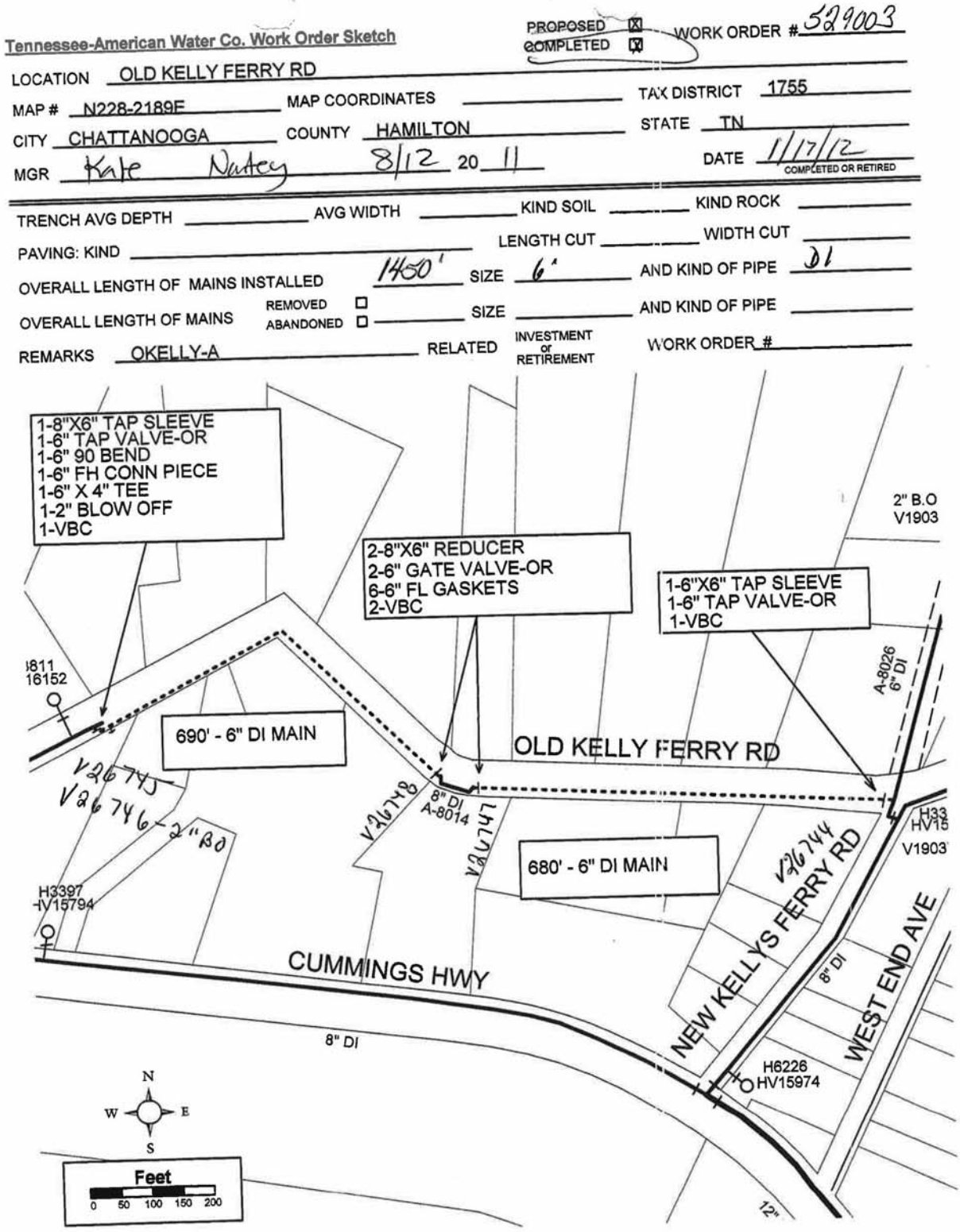
~~N 238-2375~~

CONDITION	INSPECTION DATES					
	2/3/12					
PAINT	✓					
CAPS	✓					
CHAINS	✓					
STEM	✓					
PACKING	✓					
DRIP	✓					
TOP NUT	✓					
VALVE	✓					
VALVE SEAT	✓					
CONDITION OF WATER	G					
MINUTES FLUSHED	1 min					
STATIC PRESSURE	84					
RESIDUAL PRESSURE	40					
FLOW	1060					
INSPECTED BY	TS/EK					

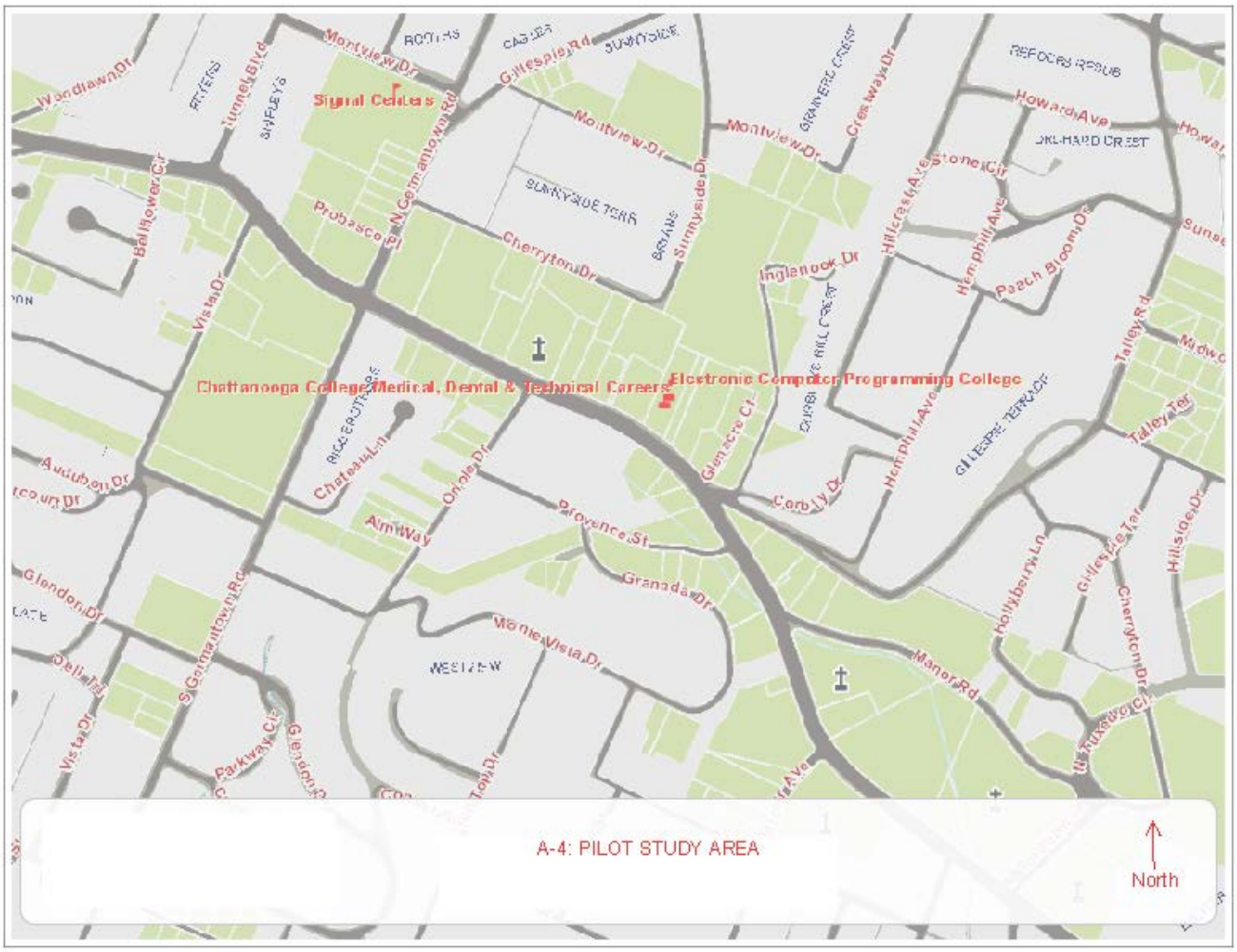
CONDITION	INSPECTION DATES					
PAINT						
CAPS						
CHAINS						
STEM						
PACKING						
DRIP						
TOP NUT						
VALVE						
VALVE SEAT						
CONDITION OF WATER						
MINUTES FLUSHED						
STATIC PRESSURE						
RESIDUAL PRESSURE						
FLOW						
INSPECTED BY						

FORM 277

A-3: Sample of Asbuilt. (Item D on Table 3-1)



A-4: Pilot Study Area



9.2 Appendix B: CD Contents

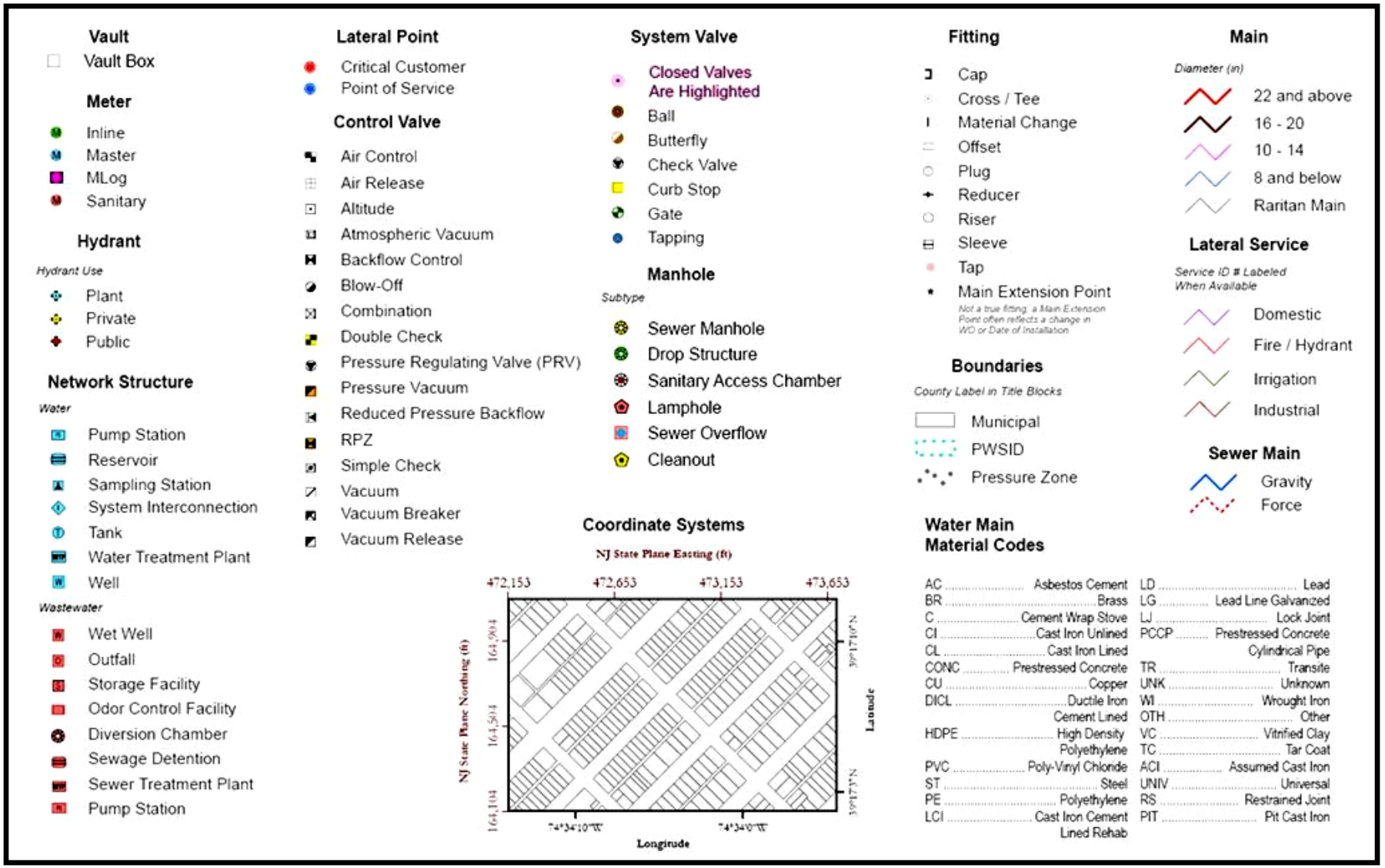
The included CD has samples of the Distribution Maps in the Pilot Study area. Pilot study area and map grid shapefiles for use in the evaluation of the project.

9.3 Appendix C: GIS Data Model

American Water maintains a standard data model that Contractors will use as a basis for data capture and delivery of GIS data in geodatabase format. The following data model related documents, including the empty GIS water schema, are found in Appendix B (available as a CD that accompanies this RFP document):

- ArcGIS database schema
- Access Database containing domain values
- Instructions to the States to load the domain values to the GIS Schema
- Data Model Usage Guide
- Software for GUID generation

9.4 Appendix C: Standard Symbology and Sample Map Layout


Vault
Vault Box
Meter
Inline
Master
MLog
Sanitary
Hydrant
Hydrant Use
Plant
Private
Public
Network Structure
Water
Pump Station
Reservoir
Sampling Station
System Interconnection
Tank
Water Treatment Plant
Well
Wastewater
Wet Well
Outfall
Storage Facility
Odor Control Facility
Diversion Chamber
Sewage Detention
Sewer Treatment Plant
Pump Station
Lateral Point
Critical Customer
Point of Service
Control Valve
Air Control
Air Release
Altitude
Atmospheric Vacuum
Backflow Control
Blow-Off
Combination
Double Check
Pressure Regulating Valve (PRV)
Pressure Vacuum
Reduced Pressure Backflow
RPZ
Simple Check
Vacuum
Vacuum Breaker
Vacuum Release
System Valve
Closed Valves Are Highlighted
Ball
Butterfly
Check Valve
Curb Stop
Gate
Tapping
Manhole
Subtype
Sewer Manhole
Drop Structure
Sanitary Access Chamber
Lamphole
Sewer Overflow
Cleanout
Coordinate Systems
NJ State Plane Easting (ft)
472,153
472,653
473,153
473,653
NJ State Plane Northing (ft)
164,904
164,504
164,104
Latitude
Longitude
Fitting
Cap
Cross / Tee
Material Change
Offset
Plug
Reducer
Riser
Sleeve
Tap
Main Extension Point
Not a true fitting, a Main Extension Point often reflects a change in WO or Date of Installation
Boundaries
County Label in Title Blocks
Municipal
PWSID
Pressure Zone
Main
Diameter (in)
22 and above
16 - 20
10 - 14
8 and below
Raritan Main
Lateral Service
Service ID # Labeled When Available
Domestic
Fire / Hydrant
Irrigation
Industrial
Sewer Main
Gravity
Force
Water Main Material Codes
AC Asbestos Cement
BR Brass
C Cement Wrap Stove
CI Cast Iron Unlined
CL Cast Iron Lined
CONC Prestressed Concrete
CU Copper
DICL Ductile Iron Cement Lined
HDPE High Density Polyethylene
PVC Poly-Vinyl Chloride
ST Steel
PE Polyethylene
LCI Cast Iron Cement Lined Rehab
LD Lead
LG Lead Line Galvanized
LJ Lock Joint
PCCP Prestressed Concrete Cylindrical Pipe
TR Transite
UNK Unknown
WI Wrought Iron
OTH Other
VC Vitrified Clay
TC Tar Coat
ACI Assumed Cast Iron
UNIV Universal
RS Restrained Joint
PIT Pit Cast Iron

9.5 Appendix D: Overview of Laurel Hill GIS QA/QC Software

9.5.1 GeoData Diagnostics Enterprise Edition

GeoData Diagnostics Enterprise Edition is a Geodatabase schema comparison product. Diagnostics test over 50 properties between geodatabase to determine if there are even slight schema differences.

9.5.2 GeoData Sentry Enterprise Edition

GeoData Sentry is an automated Quality Control/Quality Assurance application for ESRI ArcGIS geodatabases. GeoData Sentry helps to detect and report errors related to attribute validity, referential integrity, spatial relationships and logical connectivity.

9.5.3 GeoData Random Sampler Enterprise Edition

GeoData Random Sampler is an ArcMap extension that allows users to install and start analyzing samples within minutes. GeoData Random Sampler allows analysts to sample using percentage, absolute value, where clause and statistical (based on MIL-STD-105E/ ANSI ASQ Z1.4-2003) sample methods. There is no cost for sampler licensing for American Water. New Jersey American Water participated in a collaborative development effort to develop and initial version of GeoData Random Sampler. This effort allows American Water a perpetual license of this software product at no cost. Since the initial version of the sampler was delivered to New Jersey American Water, significant product updates have been complete, all of which will be provided to American Water at no cost. Each of the QA/QC products works with Personal, File-based, and ArcSDE geodatabases.

9.5.4 Software Licensing

All of the products in the Laurel Hill line are node locked at the current version. Laurel Hill offers a volume software discount that can be applied to the concurrent licensing scheme once it is available. The current AW MSA/License agreement does not detail the expected volume, so these details would need to be formalized. In general there is a price break at 2, 5, 10 and 25. American Water would only need to purchase license for Sentry and Diagnostics. There will be no cost for GeoData Random Sampler, based on the previous agreement. Conversion vendor will have an option the any Laurel Hill software for their internal QA/QC. In that case, [##enter state]-AW will provide the QA/QC tests that have been written for AW GIS Data Models.

9.5.5 Typical QA/QC Implementation Services

Each AW State will require basic implementation services for Automated Test planning, Test Configuration, Visual Test planning and Training. In general the vast majority of the test planning and configuration has been completed based on the work for New Jersey American Water.

Data model changes and individual business rules would drive configuration and visual inspection updates. Each AW State requirements will be addressed on a case by case basis for planning and

configuration updates. Additionally, each state will require training for the software products along with the procedures developed for New Jersey American Water. A rough order of magnitude estimate is one week of off-site configuration updates, depending on the magnitude of data model changes and individual business rules. An estimated one week of onsite training and implementation can also be expected for each AW State. This will allow for standard training for each software product and implementation of the tests and sampling processes. This assumes a general knowledge of the data model, general understanding of data acceptance and basic ArcGIS training. If the AW State operations require additional training on the Data Model, such training can be bundled with the on-site visit. Such training is expected to take several days and can be discussed in more details at the time of specific AW State proposal efforts.

9.6 Appendix E: Standard Contract Terms

Payment

Payment for the services set forth in Section 8 shall be made by OWNER to CONTRACTOR and shall be considered as full compensation for such services and all personnel, materials, supplies, and equipment used and costs incurred in carrying out such services.

A. Payment for services performed or furnished under terms of Section 8 of this RFP is specified shall be as described below:

1. Milestones will coincide with items 1 through 6 on table 8-1, in Section 8.

   Item Description
   1. Completed data Conversion Work Plan
   2. Pilot Project Plan & Completion
   3. Web-Based Tool for Deliverables, Successfully deployed
   4. GIS Data Deliverables, this will be broken down further
   5. GIS Data Deliverables-Miscellaneous Features
   6. Geospatial Metadata Capture
   7. Status Monitoring, Reporting and Project Management

2. Compensation to CONTRACTOR shall be on amount specified for each milestone.

3. Payments shall be monthly, based on percent completion. As each payment is due, a statement describing the services which have been performed or furnished and listing the percent of completion and the total amount of prior payments paid by OWNER shall be submitted to OWNER. Payment shall be made for the balance due under such statement, without retention unless OWNER contests all or part of said billing in which event only that portion so contested will be retained by OWNER pending resolution of the dispute and any uncontested portion will be paid.

B. CONTRACTOR's final statement or invoice for any services which include construction, or the final statement or invoice for the Project, whichever occurs earlier in time, shall include properly completed and executed Releases of Liens and Claims (see Appendix C). Payment of any invoice not satisfying this requirements may be withheld until the requirements has been satisfied.

C. Payments are due upon receipt of a statement or invoice prepared in a manner acceptable to OWNER and approved by OWNER. Interest shall accrue and be paid on any unpaid approved statement or invoice amount at the legal rate of interest from the 45th day after receipt of such statement or invoice to the date of payment. Interest shall be payable at the same time that said statement or invoice amount is paid.

Insurance

A. CONTRACTOR shall maintain worker's compensation and employers' liability insurance in accordance with the amount(s) and coverage(s) in the attached Appendix B.

B. CONTRACTOR shall maintain commercial general liability and automobile liability insurance protecting it against claims arising from bodily or personal injury or damage to property, including loss of use thereof, resulting from operations of CONTRACTOR pursuant to this Agreement or from the use of automobiles and equipment of or by CONTRACTOR. The amount(s) and coverage(s) shall be in accordance with Appendix B.

C. CONTRACTOR shall maintain a policy of professional liability insurance, protecting it against claims arising out of the negligent acts, errors, or omissions for which it is legally liable in the performance or furnishing of professional services pursuant to this Agreement. (Such insurance shall be maintained for one (1) year after final completion of construction. The amount(s) and coverage(s) shall be in accordance with Appendix B.

D. CONTRACTOR is required to provide OWNER with Certificates of Insurance evidencing the afore-referenced coverages and, upon OWNER's written request, complete copies of such policies or other evidence of coverage satisfactory to OWNER shall be provided to OWNER. Approval or acceptance of said insurance by OWNER shall not relieve or decrease the liability of CONTRACTOR hereunder.

E. OWNER agrees to endeavor to include a provision in the OWNER's contract with the Construction Contractor engaged on the Project which requires that CONTRACTOR be listed as an additional insured on such Construction Contractor(s) liability insurance policy and property insurance (Builder's Risk) policy, if any.

The limits of liability for the insurance required by Article XII are as follows:

XII	A. Worker's Compensation Employee's Liability	Statutory 100,000
	B. General Liability* General Aggregate Each Occurrence Products/Comp. Ops. Personal & Adv. Inj. Fire Damage (any one fire) Medical Expense (any one person) Automobile Liability Bodily Inj. & P.D. Combined Single Limit Each Accident	 2,000,000 2,000,000 2,000,000 2,000,000 50,000 5,000 2,000,000
	C. Professional Liability Limit Aggregate Deductible (if over 250,000)	[insert coverage amount]
	D. Excess Liability Occurrence Aggregate	 ** **

Additional Insured: OWNER will be added to the policies required in XII B as an additional insured.

* Ranges from $0 to $5,000,000 depending on the value of the constructed product and the approximate cost of rework to correct errors and omissions by the CONTRACTOR.
**As needed to provide limits requested in XII B.

TN GIS DATA Conversion RFP Recipients

True North Geographic Technologies
David Speight
405 Uptown Square
Murfreesboro, TN 37129

Mapsync
Dave Carter
3250 Blazer Parkway
Lexington, KY 40509-1847

URS
John Rickett
Waterfront Plaza Tower One
325 West Main Street, Suite 1200
Louisville, KY 40202-4251

GRW Engineers, Inc.
Brad Montgomery
801 Corporate Drive
Lexington, KY 40503

CDM
Josh Norton, P.E
1100 Marion Street, Suite 200
Knoxville, TN 37921

Applied Water Management
Adam Stern
2 Clerico Lane
Hillsborough Ln, NJ 08844

North River Geographic Systems, Inc.
Randal Hale, GISP
215 Jarnigan Ave.
Chattanooga, TN 37405

NATURAL SYSTEMS UTILITIES

Applied Water Management

An NSU Company

April 3, 2012

ATTN: Ms. Robbie Harvey, Engineering Department
Tennessee-American Water Company
1101 Broad Street
Chattanooga, Tennessee 37401

P: 423.755.7665

robbie.harvey@amwater.com

Re: GIS DATA CONVERSION SERVICES BID

Dear Ms. Harvey:

Please accept my sincere thanks for the opportunity to bid on this work.

We are very excited to work for you and the Tennessee-American team, and certainly hope that we've provided a sufficiently compelling combination of American Water experience, competitive pricing, and ability to deliver.

Based on recent discussions, Tennessee-American is self-performing the collection of GPS data points to support the GIS Conversion. Should assistance be needed with this effort, please note that in additional to the GPS training services AWM provided in February, AWM also has the ability to provide GPS data collection services, if requested.

If you have any questions whatsoever, Arie Hoogendoorn (908.431.7174) and I (908.431.7019) are available at your convenience.

Best Regards,

Adam G. Stern, PE
\\NJS098\Engineering\PROPOSALS\2012 Proposals\12-0030 (TNAW GIS Conversion)\~$12.04.03 Cover Letter.doc

NATURAL SYSTEMS UTILITIES

Applied Water Management

An NSU Company

Proposal for

GIS Conversion Services

Tennessee American Water

April 3, 2012

2 Clerico Lane, Building 1, Hillsborough, NJ 08844 (O) 908.359.1700 (F) 908.359.8286
www.naturalsystemsutilities.com

NATURAL SYSTEMS UTILITIES

Applied Water Management

An NSU Company

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SECTION 1: Introduction and Executive Summary

1.1 Applied Water Management (AWM)

AWM was a member of the American Water family but was recently acquired by Natural Systems Utilities (NSU). The acquisition of AWM by NSU transitioned AWM from an internal consultant for American Water to an external subcontractor. Although AWM is no longer an internal company, AWM's rates have remained extremely competitive. AWM continues to provide GIS assistance to multiple business units within American Water. Services include CAD to GIS conversions, GPS training, hydraulic modeling, engineering design, construction management, comprehensive planning, on-site GIS support, and GPS field collection. AWM has a core GIS team of five well qualified individuals which is expandable to up to ten individuals, when needs arise.

1.2 Executive Summary

Tennessee American Water Company (TNAW) has requested a proposal for Geographic Information System (GIS) data conversion of water distribution assets. In response, Applied Water Management is pleased to provide this proposal.

AWM can not only provide a cost effective solution for GIS conversion but fully understands, and helped develop, American Water's standards for GIS. AWM worked closely with American Water as it created the standards for GIS mapping. AWM has completed many American Water GIS data conversions and was also part of the committee that helped develop the American Water GIS standards. This experience affords AWM a distinct, experience based advantage.

AWM will approach the Tennessee conversion with speed and accuracy as it has done with conversions for many of Tennessee American Water's sister companies. AWM will begin by importing the Shapefiles exported from TNAW's Atlas GIS into the American Water data model using manual and automated tools. Next, the data will be corrected using the American Water standards for connectivity and the annotations already present on the Atlas drawings.

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SECTION 2: Relevant Experience

Over the past 15 years, AWM has focused on building and maturing its GIS team. The AWM GIS team began with Adam Stern. It developed further with Arie Hoogendoorn and Joel Smith, who is now a GIS "Subject Matter Expert" on the American Water Business Transformation Team. The team continued to grow and mature to what it is today.

Over the past 5 years, AWM's GIS team has concentrated on CAD to GIS conversions within American Water. Historically, AWM always had at least one team member participating in the American Water GIS community and the Data Model Council. AWM has worked on CAD to GIS conversions for many different American Water Business Divisions including:

- Applied Wastewater Management
- Illinois American Water
- Indiana American Water
- Long Island American Water
- Kentucky American Water
- Military Services Group
- New Jersey American Water
- New Mexico American Water
- Pennsylvania American Water

AWM has also held GPS training sessions for four (4) different business divisions, assisted in the installation of GIS servers, and assisted in day to day GIS maintenance as needed. All of this work for American Water has not only facilitated AWM's expertise in GIS conversion but also in the American Water Data Model.

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SECTION 3: GIS Data Conversion Approach

3.1 Water Utility Conversion

The TNAW Atlas GIS maps exhibit a high degree of spatial data accuracy. Therefore, AWM is proposing a conversion method that will take advantage of this accuracy as well as the additional accuracy of the GPS points. This approach will ensure smooth interoperability with CMMS by reducing data entry error associated with adding asset IDs manually.

AWM is familiar with and will comply with all American Water data model standards.

3.1.1 Atlas Shapefile Import

The first step would be to import all relevant Atlas features directly into the American Water Standard geodatabase, based on attributes already present in shapefiles such as Layer Name, Hydrant, Valve, or Blow-off ID.

3.1.2 Adjustment of GIS Features

The next phase of the project would be to adjust imported features to their correct position, and to correct any connectivity errors that may exist after the import. In this step features such as valves, hydrants, laterals, and mains will be shifted based on GPS locations provided by TNAW and available aerial photography.

3.1.3 Addition of Missing Features

Simultaneously, missing features or features that could not be imported from Atlas, such as fittings, virtual fittings, and lateral points, will be added to the data.

3.1.4 Addition of Facilities

In conjunction with the task described in section 3.3 facilities such as: tanks, pump stations, wells, reservoirs, interconnections, and treatment plants will be added along with the required attributes.

3.1.5 QAQC Process

Quality assurance checks will be applied throughout the process to ensure the highest data quality. As each tile is completed, a validation check will be performed to ensure that the data adheres to the American Water standards set forth in the geodatabase and geometric network.

Prior to issuing key deliverables during the conversion process, AWM will utilize the Laurel Hill test suite to ensure that the data meets the highest quality standards. The results of the Laurel Hill output will be shared with TNAW.

3.1.6 GUID

Prior to submittal of the database to TNAW, AWM will add Global IDs (GUID) to all network features using an automated tool.

3.1.7 Metadata

The final steps before final delivery to TNAW will be to add metadata to the database. See section 3.7.5

3.7 Deliverables

3.7.1 File Geodatabase

All data will be delivered in File Geodatabase (FGDB) format. File Geodatabases allow for unlimited storage without impeding performance, and can better facilitate the conversion process.

3.7.2 AW Water Data Model

All data will be delivered in conformance with the current American Water GIS Data Model (Version 2) in FGDB format. The geodatabases will be transmitted in ArcGIS 10 format.

As part of the American Water GIS Standards, data will be delivered within a Geometric Network. A Geometric Network is governed by a set of rules that define how components of a water system fit together in the GIS. For example, the rules prevent termination of a main without a fitting at the end of that main. This provides an inherent, base level of quality assurance.

3.7.3 Geodatabase Parameters

All data will be delivered in the following coordinate system:

North American Datum 1983 Tennessee US Feet.

3.7.4 Geodatabase Content

The delivered Geodatabases will contain framework for existing features, abandoned features, proposed features, network features, and non-network features.

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3.7.5 Metadata

The following information will be captured in the metadata, assuming all information is provided by TNAW within 30 days of the Notice To Proceed.

1. Identification Information
    a. General description of the conversion project, creator, age of data, extent of coverage, why data was compiled, limitations of use, and reliability of provider.
2. Data Source and Quality Information
    a. Description of sources, quality control steps used, and deliverable quality information.
3. Spatial Reference Information
    a. Projection, coordinate system, and datum.
4. Citation Information
    a. Owner of the data, organization that converted the data, and date completed.
5. Contact Information
    a. Contact information for TNAW GIS Coordinator.

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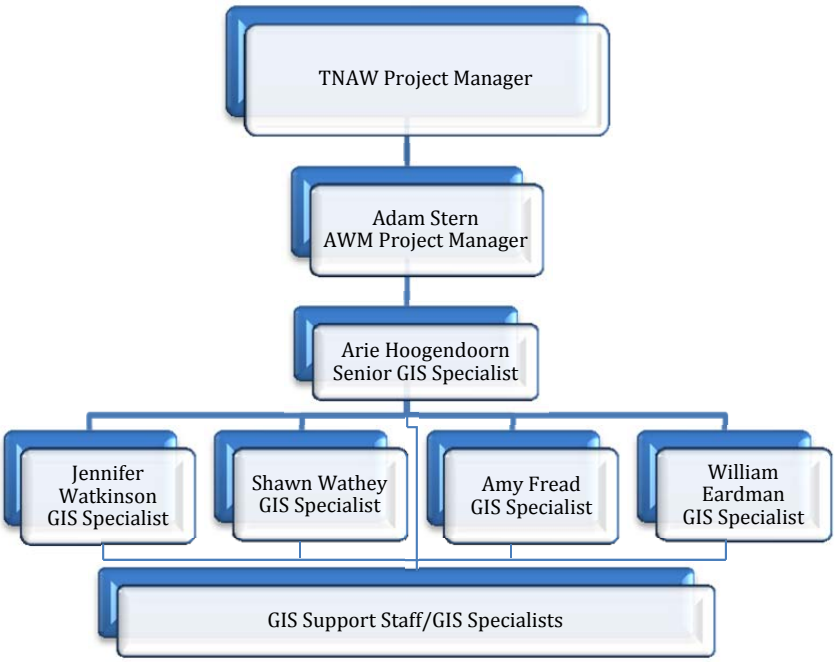
SECTION 4: Project Organization and Management

4.1 Project Organization and Management (KEY STAFF ONLY)



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4.2 Project Schedule

4.2.1 Kick Off

A Work Plan and Web-based tracking tool will be presented to TNAW during the kick off meeting. The kick off meeting can be held via online conference with screen sharing available. The project kick off meeting is expected to be held on April 23, 2012. This date and all following, assume an April 18th receipt of a Notice To Proceed.

4.2.2 Pilot Project

It is expected that the exported shapefile tile designated as the pilot area by TNAW will be completely converted into GIS on or before May 4, 2012, provided that all necessary information (GPS Points) are provided by TNAW.

4.2.3 Fifty Percent (50%) Submittal

Upon submission of the pilot area, AWM will begin conversion of the first Twenty Five Percent (25%) of the system as defined by TNAW. This will allow TNAW to review the pilot area and provide comment while AWM continues converting the rest of the system. It is expected that AWM will complete about 25% of the conversion by June 1, 2012 and submit to TNAW for review and comment.

4.2.4 Project Completion

The final submittal to TNAW will include the entire system including all corrections from previous submittals. This submittal will also include Global IDs (GUIDs) and metadata. Based on the original RFP schedule, the final submittal will be delivered on or before August 16, 2012.

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SECTION 5: Company Description, Corporate Structure, Financial Information, Experience, Qualifications of Proposed Project Team

5.1 Company Description and Corporate Structure

5.1.1 Company Name

Applied Water Management, Inc. (D&B 82-507-7233).

5.1.2 Company Size and Corporate Structure

80 Employees

- 5 Administrative
- 10 Construction
- 30 Engineering/GIS
- 35 Operations

5.2 Financial Information

5.2.1 Gross Revenue for GIS Services 2011

Approximately $500,000

5.2.2 Gross Revenue for AWM-Engineering Past 5 Years

Approximately $3,000,000 Per Year

5.2.3 Identification of Legal Encumbrances or Corporate Obligations with Financial Impact

None

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5.3 Experience, Qualifications, and Project Team:

5.3.1 Individual Responsible for Contract Negotiations

Adam G. Stern, VP of Engineering
(908) 431-7019
astern@naturalsystemsutilities.com

5.3.2 Subcontractors

AWM will not utilize any subcontractors.

5.3.3 Location of Home Office

2 Clerico Lane, Suite 1
Hillsborough, NJ 08844

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5.3.4 Project References

1. CAD to GIS Conversion
   - Organization: Indiana American Water (INAW)
   - Year(s): 2009 – 2011
   - Scope: All AW Water Service Areas in Indiana.
   - Approach: System redraw using heads up digitizing
   - Contact Information:
     - Keith Morgan
       317-885-2441
       Keith.Morgan@amwater.com

2. CAD to GIS Conversion
   - Organization: Illinois American Water (ILAW)
   - Year(s): 2010 – 2011
   - Scope: Chicago Metro Water and Wastewater Service Areas
   - Approach: System redraw using heads up digitizing
   - Contact Information:
     - Alan Stuemke
       618-239-3245
       Alan.Stuemke@amwater.com

3. CAD to GIS Conversion
   - Organization: Pennsylvania American Water (PAAW)
   - Year(s): 2010 – 2011
   - Scope: 5 Pennsylvania Water Systems
   - Approach: System redraw using heads up digitizing
   - Contact Information:
     - Steve Seidl
       717-520-4607
       Steve.Seidl@amwater.com

4. CAD to GIS Conversion
   - Organization: New Mexico American Water (NMAW)
   - Year(s): 2011
   - Scope: Clovis and Edgewood Water Systems
   - Approach: System redraw using heads up digitizing
   - Contact Information:
     - Christina Martinez
       623-780-3790
       Christina.Martinez@amwater.com

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5.3.5 Key Project Team Members

Key Project Team Members:

- Adam G. Stern, P.E.
  - AWM Project Manager
- Arie C. Hoogendoorn
  - AWM Senior GIS Specialist and Technical Lead
- Jennifer A. Watkinson
  - AWM GIS Specialist
- Shawn A. Wathey
  - AWM GIS Specialist
- Amy Fread
  - AWM GIS Specialist
- William Erdman
  - AWM GIS Specialist

5.3.6 Summary of Qualifications

Adam Stern, PE – holds a Bachelor's Degree in BioEnvironmental Engineering, a Bachelor's Degree in Bioresource Engineering, and a Master's Degree in Civil Engineering from Rutgers University. He is a licensed professional engineer in thirteen states including Tennessee and has eighteen years of experience with Applied Water Management. Mr. Stern directs a team of dedicated full-time GIS professionals and engineers that have executed over 400 water resource related projects. Mr. Stern is responsible for all aspects of project management and execution including business development, project scoping, site evaluation, GIS and GPS services, comprehensive planning studies, hydraulic and process modeling, engineering design of water resource infrastructure, specifications writing, report writing, local and state regulatory contact, permitting, construction inspection, compliance management, emergency event control, and professional testimony.

Arie Hoogendoorn – has a Bachelor's Degree in Geography from Bloomsburg University and has five years of full-time GIS experience. Expertise includes Trimble Geo XT, Trimble GPS Analyst, AutoCAD Map 3D, ArcObjects Programming, professional fluency in the ArcGIS suite: ArcMap, ArcCatalog, ArcEditor, and ArcPad; the Microsoft Office Suite: Word, Excel, Power Point and Front Page; as well as Pathfinder Office, Adobe Creative Suite, C-Sharp, and SDSFIE. Mr. Hoogendoorn has nearly four years of professional GIS experience and manages a growing team of GIS Specialists. Mr. Hoogendoorn's prior engagements include employment as a GIS Technician for Columbia County, Pennsylvania.

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Jennifer Watkinson - has a Bachelor's Degree in Environmental Planning from Bloomsburg University. Ms. Watkinson is professionally fluent in the ArcGIS suite: ArcMap, ArcEditor; and the Microsoft Office Suite: Word, Excel, Power Point and Access, as well as AutoCad, and Adobe Acrobat. Ms. Watkinson has been employed by Applied Water Management for nearly four years. Prior to this, Ms. Watkinson worked for the New Jersey Highlands Council and concentrated on GIS mapping efforts associated with the New Jersey Highlands Regional Master Plan.

Shawn Wathey - has a Bachelor's Degree in Geography from Bloomsburg University. Mr. Wathey has over two years of professional GIS experience and is professionally fluent in the ArcGIS suite: ArcMap, ArcEditor, Model Builder; the Microsoft Office Suite: Word, Excel, Power Point and Access, as well as AutoCad, Adobe Acrobat, Programming with C#.NET, JavaScript Programming, ASP.NET, HTML. Prior to his two years of professional experience at Applied Water Management, Mr. Wathey performed GIS related services for Columbia County, Pennsylvania, where he continued the efforts originated by Mr. Hoogendoorn.

Amy Fread - has a Bachelor's Degree in Environmental Studies with a concentration in GIS from Rowan University. Ms. Fread has worked professionally in the GIS field for a year with Rowan University and the New Jersey National Guard. Here, she collected and mapped facilities data using Trimble Geo XH GPS technology. She has also presented her work and research at the National Guard's Construction and Facilities Management Conference and ESRI's International User's Conference. Ms. Fread has worked for Applied Water Management for six months and her skill set includes the ArcGIS Suite: ArcMap, ArcEditor, and ArcCatalog, the Microsoft Office Suite: Word, Excel, and Power Point, as well as Adobe Illustrator and AutoCad.

William Erdman – has a Bachelor's Degree in Community, Environment, and Development from Penn State University and a Postbaccalaureate Certificate in Geographic Information Systems, also from Penn State. Mr. Erdman is professionally fluent in the ArcGIS suite: ArcCatalog, ArcMap, ArcEditor; Microsoft Office: Word, Excel, Power Point, Access. Mr. Erdman's experience includes leading an environmental GIS project of his hometown with an organization called BoroGreen, and a collaborative GIS research study with an energy engineer, exploring the possibilities of offshore wind energy site selection. Mr. Erdman has recently begun working with Applied Water Management, a Natural Systems Utility company.

Detailed resumes for all staff available upon request.

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SECTION 6: Compliance with Contract Terms and Legal Requirements

Applied Water Management has read and accepted all of the terms and legal requirements set forth by American Water.

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SECTION 7: Price Proposal

7.1 Price Proposal

Pursuant to Section 9.6 of the RFP, invoices will be issued monthly, based on a percent complete basis. The below fee shall be considered a FIXED FEE and will be invoiced as such.

Tennessee American Water GIS Conversion					
		Projected Hours for Team Member Roles			
Deliverable Items	**RFP Reference**	Project Manager	Sr GIS Specialist	GIS Specialist	**Total Fixed Price**
Rates		$ 168.00	$ 63.00	$ 54.00	
1. Completed Data Conversion Work Plan	6.4	4	4	0	$924
2. Pilot Project Plan and Execution	6.6	2	4	36	$2,532
3. Web-based Tool for deliverable production/acceptance tracking	6.4, 6.10	2	4	0	$588
4. GIS Data Deliverables-Water Utility*	4.5, 5.1, 4.8, 6.3	12	148	1480	$91,260
5. GIS Data Deliverables-Miscellaneous Features*					
6. Geospatial Metadata Capture	4.8	0	8	2	$612
7. Status Monitoring, Reporting, and Project Management	6 (All)	24	16	4	$5,256
TECHNOLOGY FEE:					$2,900
TOTAL FIXED FEE:					**$104,072**

** Can be broken down further for invoicing milestones*

NOTE: Due to AWM's aggressive pricing, a liquidated damages clause cannot be accepted.

Schedule (See also Section 4.2)

Issue Notice To Proceed (TNAW):	2012.04.18	(NTP)
Conduct Project Kick-Off Meeting (TNAW and AWM):	2012.04.23	NTP + 5
Receive all Data from TNAW Relevant to Pilot:	2012.04.23	NTP + 5
Receive all Data from TNAW for Remainder of Project (ex. GPS):	2012.05.04	NTP + 10
Submit Pilot Conversion to TNAW:	2012.05.04	NTP + 10
Receive Written Comments on Pilot from TNAW:	2012.05.08	NTP + 14
Receive all project GPS Data from TNAW:	2012.05.15	NTP + 21
Submit 25% Conversion to TNAW:	2012.06.09	NTP + 52
Receive Written Comments on 25% from TNAW:	2012.06.10	NTP + 56
Submit 100% Conversion to TNAW:	2012.08.16	NTP + 120

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Pricing assumptions were based on the RFP and the provided pilot CAD tiles, and are as follows:

Element	Count
Atlas Sheets	145
Customers	74936
Valves	18247
Hydrants	5088
Fire Services	1500
PRVs	16
Line Stops	23

TIC
TANK INDUSTRY CONSULTANTS INC.

7740 West New York Street
Indianapolis, Indiana 46214
317 / 271-3100 - Phone
317 / 271-3300 - FAX

Bolingbrook, Illinois
630 / 226-0745

Pittsburgh, Pennsylvania
412 / 262-1586

Houston, Texas
281 / 367-3511

January 31, 2012

Mr. Lance Williams, P.E.
Director of Engineering
Tennessee American Water Company
2300 Richmond Road
Lexington, Kentucky 40502

RE: Professional Services Associated with the Rehabilitation of the 1,820,000 Gallon Clearwell #2 in Chattanooga, Tennessee
TIC Project #H985.023

Dear Lance:

As you requested, Tank Industry Consultants is pleased to present the following proposal for professional services associated with the rehabilitation of Clearwell #2 at the water treatment facility in Chattanooga. This scope of services will include the preparation of Detailed Technical Specifications, and assistance during project bidding.

Preparation of Detailed Technical Specifications

This phase will encompass the design and preparation of the detailed plans and specifications for each tank based on the work you authorize. TIC will discuss with you the most appropriate scope of work within your budgetary constraints. TIC will prioritize the necessity for different repair options and compare the anticipated cost and life for alternative coatings options.

TIC's specifications and contract documents will be more extensive than provided by most engineers' designs due to our experience and intimate familiarity with the AWWA, API, NACE, NFPA, and SSPC standards and how they must be supplemented. The specifications will be prepared in accordance with local, state, and federal laws, and all specific requirements of Tennessee American. TIC will submit all documents to you for review as needed to maintain the project objectives. After all reviews are complete, TIC will revise all documents as required for final approvals and prepare a final detailed cost estimate for the project. The fee for preparing the project specifications is $5,235.

Scope: The anticipated scope of work to be specified includes:

- Clean to SP 6 and Paint Exterior with Epoxy/Polyurethane System, Containment
- Clean to SP 10 and Paint Interior with 3-Coat Epoxy System
- Grout Repair
- Foundation Sealant
- Foundation Repair
- Overflow Pipe Check Valve
- Exterior Ladder Removal
- Roof Safety Railing Installation (3 Required)
- New 30 in. Diameter Shell Manhole
- Roof Manhole Cover Modifications
- Clog-Resistant Vent
- Shell Vent Shields
- Concrete Floor Maintenance
- Miscellaneous Chipping and Grinding
- Roof Rafter Repair
- Relocate Overflow Pipe

Bidding Services

TIC will assist Tennessee American in obtaining competitive and qualified bids. Once the bids have been received, TIC can:

- Tabulate the bids
- Review the bids
- Check for signatures, bonds, and insurance
- If necessary, investigate the low bidder
- Recommend award to the lowest and "most qualified" bidder

The fee for Tank Industry Consultants to provide these services is **$712.50**. This fee is based upon TIC not attending the bid opening, but rather reviewing the bids in our offices.

These fees are in accordance with the previously negotiated American Water Rate Structure.

To proceed with this project, please sign and return the attached Task Order.

We look forward to working with you on these projects. If you need any additional information, please contact Patrick or me.

Sincerely,

Tank Industry Consultants

Penni Snodgrass
Sales and Marketing Manager

**AGREEMENT FOR GENERAL ENGINEERING SERVICES
BETWEEN TENNESSEE AMERICAN WATER AND
TANK INDUSTRY CONSULTANTS, INC. FOR
FOR THE REHABILITATION OF THE
1,820,000 GALLON CLEARWELL #2**

TASK ORDER NO. TN-12-TIC-01

Article 2 – Scope of Services shall be per the cost proposal dated January 31, 2012 including the lump sum fee for the preparation of detailed technical specifications for the rehabilitation of Clearwell #2 in Chattanooga, Tennessee, and assistance during project bidding in accordance with the terms of the Master Agreement between Owner and Engineer inclusive of Appendices, this Task Order, and the instructions of Owner's Representative.

Article 3 – Engineer's Representative in charge of the services Patrick J. Brown, P.E. who may be contacted at 317.271.3100. Owner's Representative in charge of the services is Lance E. Williams, P.E., who may be contacted at 859.268.6316 or 859.321.8235.

Article 4 – The Services performed within the Task Order shall commence on or about February 13, 2012 and shall be complete on or before April 30, 2012.

Article 9 – Payment shall be a lump sum payment of $5,947.50.

INVOICING INSTRUCTIONS: All invoices shall be submitted in duplicate and addressed to: Tennessee American Water, Attn: Lance Williams, Workbasket No. AZGENGOZ, c/o Shared Services Center, P.O. Box 5610, Cherry Hill, NJ 08034

Owner and Engineer have caused this Agreement to be amended by representatives duly authorized to act, all as of the effective date of December 1, 2006.

PREPARED BY: LANCE E. WILLIAMS (OWNER's REPRESENTATIVE) Date: 2/14/2012

CONSULTANT	OWNER
Tank Industry Consultants	Tennessee American Water
By _____	By _____
Title Managing Principal	Title DIRECTOR OF ENGINEERING

**AGREEMENT FOR GENERAL ENGINEERING SERVICES
BETWEEN TENNESSEE AMERICAN WATER AND
TANK INDUSTRY CONSULTANTS, INC. FOR
CONSTRUCTION PHASE SERVICES DURING THE REHABILITATION OF THE
1,820,000 GALLON CLEARWELL #2**

TASK ORDER NO. TN-12-TIC-02

Article 2 – Scope of Services shall be per the cost proposal dated May 10, 2012 including contract administration and onsite project observation during the rehabilitation of Clearwell #2 in Chattanooga, Tennessee in accordance with the terms of the Master Agreement between Owner and Engineer inclusive of Appendices, this Task Order, and the instructions of Owner's Representative.

Article 3 – Engineer's Representative in charge of the services Patrick J. Brown, P.E. who may be contacted at 317.271.3100. Owner's Representative in charge of the services is Lance E. Williams, P.E., who may be contacted at 859.268.6316 or 859.321.8235.

Article 4 – The Services performed within the Task Order shall commence on or about May 21, 2010 and shall be complete on or before July 15, 2012.

Article 9 – Payment shall be based on time and expenses. We estimate the fee will not exceed $38,000.

INVOICING INSTRUCTIONS: All invoices shall be submitted in duplicate and addressed to: Tennessee American Water, Attn: Lance Williams, Workbasket No. A26ENG02, c/o Shared Services Center, P.O. Box 5610, Cherry Hill, NJ 08034

Owner and Engineer have caused this Agreement to be amended by representatives duly authorized to act, all as of the effective date of December 1, 2006.

PREPARED BY: _____ Date: 05-19 2012
(OWNER's REPRESENTATIVE)

CONSULTANT	OWNER
Tank Industry Consultants	Tennessee American Water
By Stephen W Meier	By Lance E Williams
Title Managing Principal	Title DIRECTOR OF ENGINEERING

TIC
TANK
INDUSTRY
CONSULTANTS
INC.

7740 West New York Street
Indianapolis, Indiana 46214
317 / 271-3100 - Phone
317 / 271-3300 - FAX

Bolingbrook, Illinois
630 / 226-0745

Pittsburgh, Pennsylvania
412 / 262-1586

Houston, Texas
281 / 367-3511

May 10, 2012

Mr. Lance Williams, P.E.
Director of Engineering
Tennessee American Water Company
2300 Richmond Road
Lexington, Kentucky 40502

RE: Professional Services Associated with the Rehabilitation of the 1,820,000 Gallon Clearwell #2 in Chattanooga, Tennessee
TIC Project #H985.023

Dear Lance:

As you requested, Tank Industry Consultants is pleased to present the following proposal for construction phase services during the rehabilitation of Clearwell #2 at the water treatment facility in Chattanooga.

Based on the construction schedule established in the project specifications, we estimate that approximately eight weeks of resident project representation will be required. In order to complete the project within the required contract time, the Project Engineer estimates the contractor will work between 50 and 60 hours each week. In addition, Tank Industry Consultants will provide contract administration services during the project. All services will be invoiced on a time and expense basis in accordance with the previously negotiated American Water rate structure. We estimate:

8 Weeks @ approx. $4,000/60-hr work week	$32,000
Contract Administration	$ 3,000 to $4,000

To proceed with this project, please sign and return the attached Task Order.

We look forward to working with you on these projects. If you need any additional information, please contact me.

Sincerely,

Tank Industry Consultants

Penni Snodgrass
Sales and Marketing Manager

Encl

Tank Industry Consultants
7740 West New York Street
Indianapolis, Indiana 46214

TENNESSEE AMERICAN WATER- Rate Structure

Long-Term Resident Observation

Technician (travel and on-job time)	$47.00 per hour
Overtime Premium (over 40 hrs/week)	$66.00 per hour
Minimum 40 hours per week	
Per Diem	$72.00 per day

Spot Observation

Technician (travel and on-job time)	$55.96 per hour
Per Diem	$76.71 per day
One Hour Senior Engineering time added to each Observation	$96.57 per obs

Engineering and Support Staff

Field Services Manager/Contract Administrator	$63.18 per hour
Field Superintendent/NACE Certified Technician	$58.66 per hour
Project Manager	$69.72 per hour
Engineer - E.I.	$65.88 per hour
Registered Engineer	$81.23 per hour
Senior Registered Engineer	$96.57 per hour
Principal Engineer	$117.33 per hour
Senior Principal Engineer	$135.38 per hour
Technical Editor	$51.44 per hour
Clerical	$33.39 per hour

Mileage

- $0.33 per mile per vehicle from nearest office
  Indianapolis, IN • Houston, TX • Richmond, VA • Bolingbrook, IL • Philadelphia, PA,

Reimbursable Expenses

- Travel by public transportation at cost, plus 10%.
- All other reimbursable expenses (not otherwise listed on this rate structure) at cost plus 10%.
- Photographic, documentation mounted and labeled-if requested by Owner $3.33 per photo

Subcontract Laboratory Analysis (Fees are doubled for rush service)

• Total Lead in Samples by Atomic Absorption Spectroscopy (soil)	$76.71 per sample
• Total Metals (Cadmium, Chromium & Lead) in Samples by Atomic Absorption Spectroscopy (paint)	$162.45 per sample
• Leachable Lead in Samples by Toxicity Characteristic Leaching Procedure	$347.46 per sample