

Project Scope for AwwaRF Asset Management Research Roadmap

1. Background

Asset management (AM) is defined as an integrated optimization process of “managing infrastructure assets to minimize the total cost of owning and operating them, while continuously delivering the service levels customers desire, at an acceptable level of risk.” (AMSA, AMWA, WEF, AWWA 2001). While this definition is useful to convey a general concept, there has never been a consensus in the United States (US) water and wastewater industries regarding the programs and practices that are required to successfully implement this definition of asset management. There have been several recent attempts by industry leaders to determine what is known and well defined in the area of asset management, and what knowledge gaps exist. This Project will build on past efforts and will focus on developing an organized agenda for further research.

2. Research Approach

The objective of this project is to produce a comprehensive white paper and research needs roadmap on asset management for water and wastewater utilities. The project will provide guidance for future research and will help form the basis for strategic alignment amongst USEPA, water and wastewater utilities and industry associations, and non-governmental research associations.

Our approach (Figure 1) will build upon past and on-going research efforts, recent workshop findings and the current technical literature to avoid duplication and to produce work products that are immediately useful and applicable to the water and wastewater industry. The core elements of the requested approach are the white paper and workshop.

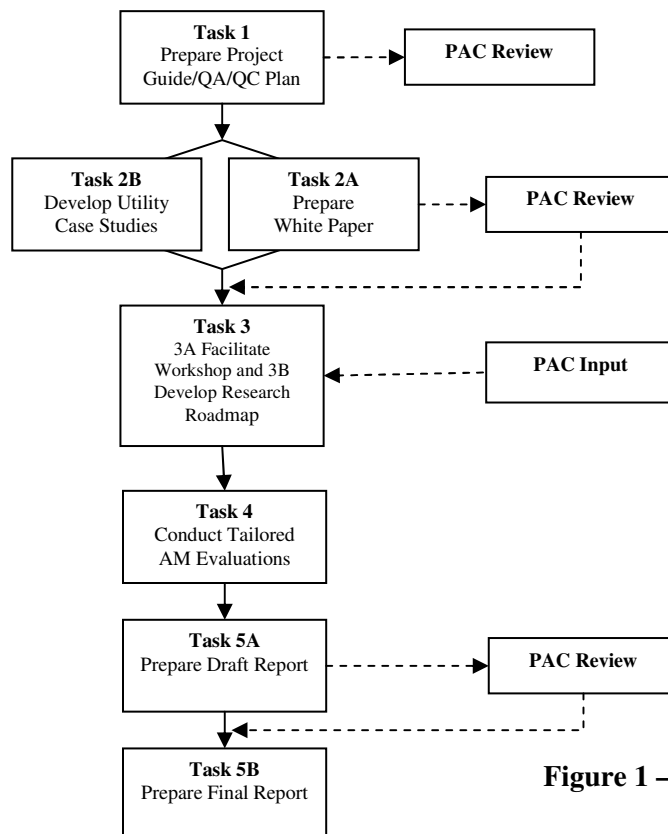


Figure 1 – Project Approach

Task 1 – Prepare Project Management Guide and Quality Assurance Project Plan (QAPP)

Our first task is to prepare the Project Guide. The Project Guide is essentially a reference book and workplan for the Project. It will include information on the Project Scope, Team, Communications, Schedule, Quality Plan, Budget, Administration, and Document Control. The Quality Plan, termed the QAPP will describe the quality assurance and quality control procedures involved in managing data, reports and technical literature reviewed or otherwise utilized as part of this project. It will not need to meet the EPA requirements but will address all pertinent QA/QC requirements for this project.

Task 2 – Prepare White Paper and Develop Utility Case Studies

Task 2A Prepare White Paper. In Task 2A we will develop a comprehensive white paper that presents a cohesive understanding of the state of asset management practices for water and wastewater utilities in North America. The white paper will integrate information from previous studies and on-going research studies, workshop sessions and the technical literature and case studies, and will form the basis for workshop discussions.

The literature review will cover the full range of asset management topics related to the North American water and wastewater industry and will include a relevant list of references. To supplement the extensive libraries of our team members, we will contact research organizations and water and wastewater industry associations for pertinent technical publications and will contact topic experts and PAC members as needed to gather key papers and reference lists. We will review the latest water and wastewater industry conference proceedings for the most current information on asset management.

A complete draft of the white paper will be distributed to all workshop participants and the PAC between two and four weeks prior to the workshop date.

Task 2B Develop Utility Case Studies. Utility case studies will be developed to illustrate various approaches to asset management and implementation challenges. Existing case studies published in reports such as the GAO 2004 report, the USEPA workshop summary, and the AwwaRF #2848 project (Matichich et al. 2006) will be reviewed and briefly summarized, as needed, in the white paper. These existing case study utilities are identified in Table 1. Where the same utility has been described in more than one of these previous research efforts (i.e. Seattle Public Utilities), their multiple case studies will be merged into one summary.

A number of utilities with mature asset management programs or pertinent experiences have agreed to develop new case studies to provide more current information for this project. Participating utilities will provide information and data to the project team who will write up the case studies. Each draft case study report will be reviewed by the utility prior to inclusion in the final report. Our planned case studies include Anchorage Water and Wastewater, Charleston Water System, City of Clearwater, Dallas Water Utilities, DCWASA, Henrico County, Los Angeles Department of Water and Power, DuPage Water Commission, American Water, Louisville Water Company, Newport News Dept. of Public Utilities, and Long Beach Water Department.

Table 1 – Existing Case Studies for Water and Wastewater Utilities			
Source: AwwaRF #2848 (2006) Asset Management Planning and Reporting Options for Water Utilities	Source: GAO Report	Source: USEPA Workshop May 2005	Source: AwwaRF #3048 Protocols for Assessing Condition and Performance of Water and Wastewater Assets
The Montgomery Water Works & Sanitary Sewer Board, AL	Massachusetts Water Resources Authority, Boston, MA	Seattle Public Utilities, WA	Water Corporation of Western Australia, Australia
Honolulu Board of Water Supply, AL	Melbourne Water Corporation, Australia	Jacksonville, FL	Northeast Ohio Regional Sewer District, OH
Pittsburg Water and Sewer Authority, PA	Louisville Water Company, KY	Northeast Ohio Regional Sewer District, OH	Bellevue Utilities Department, WA
Portsmouth Department of Public Utilities, RI	Sacramento Regional County Sanitation District, Mather, CA	Orange County Sanitation District, Fountain Valley, CA	Watercare Services Limited, Auckland, New Zealand
St. Paul Regional Water Services, MN	Eastern Municipal Water District, Perris, CA	Saskatoon, Canada	
San Francisco Public Utilities Commission, CA	Greater Cincinnati Water Works, OH		
Santa Clara Valley Water District, Ca	South Australia Water Corporation, Australia		
Seattle Public Utilities	Tacoma Water, WA		
City of Ottawa, Canada	Seattle Public Utilities		
Portland Water Bureau, OR	Charleston Commissioner of Public Works, SC		
City of Toronto, Canada	Des Moines Water Works, IA		
Ann Arbor Water Utilities Department, MI	Hunter Water Corporation, Australia		
	Orange County Sanitation District, Fountain Valley, CA		
	Western Carolina Regional Sewer Authority, Greenville, SC		
	Augusta County Service Authority, Verona, VA		
	East Bay Municipal Utility District, Oakland, CA		
	Department of Public Works, Billerica, MA		
	St. Paul Regional Water Services, MN		
	Somersworth Department of Public Works, NH		
	Department of Public Works, Denton, MD		

Task 3 – Facilitate Workshop and Develop Roadmap

Task 3A Expert Workshop. The primary goal of the expert workshop is to identify and prioritize research gaps and needs on water and wastewater utility asset management in the United States as major input to the development of a Research Needs roadmap. The workshop

will be based on lessons learned from the USEPA and GWRC asset management workshops held in May 2005, as well as this project's comprehensive white paper prepared in Task 2.

Pre-Workshop Phase. Prior to the workshop, we will complete five primary tasks that set the stage for the successful achievement of all workshop objectives and the creation of the Research Needs roadmap: (1) identify workshop participants; (2) develop workshop agenda; (3) address workshop logistics including the facility, travel and local accommodations; (4) query workshop participants; and (5) distribute pre-conference materials to participants. These five tasks are described in more detail in the following paragraphs:

1. Identify Workshop Participants.

The HDR team understands that AwwaRF and the PAC would like to participate in the selection of workshop participants. We have begun this process by contacting and getting commitments from some 30 participants from a diverse cross-section of water and wastewater utilities as well as interested research organizations and other experts. We will cooperate with AwwaRF and the PAC to finalize this list as well as to identify additional participants from professional consulting firms, academia and research organizations.

2. Develop Workshop Agenda

The project team will prepare a draft workshop agenda based on HDR team experience with similar AwwaRF workshops and findings from the Task 2 white paper. The draft agenda will be circulated to the AwwaRF project manager, the PAC, and several key workshop participants for review and input. The final workshop agenda will be distributed to all workshop participants two to four weeks prior to the workshop date, along with the white paper.

3. Address Workshop Logistics

The workshop will be hosted by American Water (AW). AW's training facility is located outside Philadelphia in Delran, New Jersey at AW's Water Plant, a 30 MGD facility built in the 1990's. The main conference room is fully equipped with audiovisual equipment and can accommodate up to 50 people. Several adjoining conference rooms can also be used for breakout sessions. AW's staff has already identified local hotel accommodations. A detailed workshop brochure describing the workshop purpose, agenda and travel information will be developed and distributed to each participant two to four weeks prior to the workshop.

4. Query Workshop Participants

A web-based query will be designed and administered to capture detailed and specific information about the research participants' demographics, the state of each utility's asset management program, specific research interests and concerns. The information generated by this activity will be used as input to the workshop.

5. Distribute Pre-conference Materials to Participants

The workshop agenda, draft white paper and travel information will be distributed to all workshop participants two to four weeks prior to the workshop.

Workshop Phase. The expert workshop will be structured using the appropriate facilitation, presentations, open discussion, and break-out groups to direct, synergize, and extract pertinent knowledge from the team of experts.

The expert workshop will be conducted over two consecutive days and will include five (5) major activities. The facilitated and sequential completion of the activities described below will lead to the development of the Research roadmap.

1. **Workshop Kickoff**

Activities: Team building activity to facilitate participant introduction and the formation of a workshop atmosphere that supports open communication and collaboration.

Facilitation: Presentation and large group discussion to clarify workshop goals and objectives, project team member roles responsibilities and outcomes, and the workshop events that will lead to the facilitation of a successful workshop.

Outputs: The workshop environment will be established for active participation by all attendees.

2. **Information Sharing**

Activities: Pre-workshop query results, the project team's white paper on the current state of asset management research, and presentations from experts (both inside and outside the water and wastewater industry) will be delivered for approximately one half of the first day.

Facilitation: 30 minute presentations, each followed by facilitated large group discussions.

Outputs: Enhanced participant understanding of the current state of water and wastewater asset management and potential research gaps between water and wastewater and other industries.

3. **Identify Major Research Categories or Areas**

Activities: Build group consensus on four to five major research areas (e.g. condition assessment, asset lifecycle, buried infrastructure, systems and processes, financial and CIP planning, maintenance, organizational issues, etc.) through a facilitated SWOT and Gap Analysis session.

Facilitation: Large group discussion using proven methods of group participation and categorization including the Consensus Criteria Method.

Outputs: Set of four to five groupings of research categories for small group discussion.

4. **Identify Specific Research Topics Within Major Categories**

Activities: Brainstorm potential research within an assigned major category. Small groups will prioritize all identified research topics and will also summarize critical information about each topic that will aid the large group in determining whether to include the topic in the Research roadmap. Approximately six (6) hours will be

devoted to this activity including presentation of topics by each small group and discussion with large group.

Facilitation: Small-group breakout sessions will be facilitated by a member of the project team. Each small group will be given a decision/prioritization matrix to guide their discussions and to ensure that all teams capture and present critical information.

Following the small group breakout sessions, each group will make a presentation to the large group followed by facilitated large-group discussions (30 minutes per group) of each group's recommendations.

Outputs: Identification of top three to four topics within each category. Supporting justification for priority including description of the research need, rationales for the research need, current market situation, industry value of the research, and potential research cost requirements.

5. Discuss and Prioritize Research Topics

Activities: Project team to analyze small group reports and consolidate into format for final prioritization session. This process will include identifying and grouping similar topics and/or separating broad topics into manageable topics.

Facilitation: Large group discussion to discuss, question, challenge, and prioritize top research topics for the Research roadmap. The Full Analytical Criteria Method (prioritization through a criterion-based matrix) or similar approach will be used to systematically compare each potential area of research and achieve the final prioritization.

Outputs: Summary matrix describing all recommendations and the criteria weighting assigned by the workshop participants for each recommendation research topic. Final workshop report on prioritization, dependencies, schedule, funding value/cost rating.

3B Research Needs Roadmap. A roadmap will be developed for water and wastewater utility asset management to identify and prioritize information gaps and research needs, and to recommend and describe research projects to fill these gaps. The descriptions of research projects will include project objective, background, research approach, estimated project schedule and budget. The Research roadmap will be developed based on review of the project white paper, workshop discussions and consensus. The final draft will be distributed to AwwaRF, the PAC, and workshop participants for review and input following the workshop. We plan to distribute these results within a month following the workshop while it is fresh in everyone's minds.

Task 4 – Tailored Evaluations for Specific Utilities

Following the expert workshop, the HDR team will test pertinent concepts developed at the workshop through evaluations at two specific locations – Denver Water, CO and Tacoma Public Utilities, WA. HDR/Westin will meet with and interview staff; review records, asset information, condition assessments, etc.; and will develop a conceptual report including a tailored evaluation for the utility on developing and implementing their Asset Management Program.

Task 5 – Prepare Project Deliverables

Project deliverables include status reports to AwwaRF and the PAC, interim work products, and draft and the final reports. Status reports will be prepared every three months to update the PAC on project budget, schedule, outreach activities, project findings and any administrative issues that need attention. Interim work products that require review by the PAC include the white paper, the workshop agenda, the list of workshop participants, and the workshop summary which will include the Research Needs Roadmap. The project's final report will bring together the findings of the white paper and the expert workshop plus additional findings for utility case studies and tailored AM evaluations. The final report will present recommended and prioritized research needs and provide a preliminary structure for top priority projects.

Task 6 – Conduct Project Management Activities

This task will include Project Management Activities including budget, schedule, project and team organization, contracting, invoicing, and quality control activities.

Project Scope for AwwaRF Asset Management Research Roadmap

Subconsultant: American Water

- Refer to entire project scope for reference.
- American Water's participation will include hosting the proposed workshop at the conference facilities in Delran, NJ. There is a need to accommodate approximately up to 50 experts plus representatives from AwwaRF and the project team. The conference facilities are located within 30 minutes of the Philadelphia Airport. A full array of presentation equipment, together with continental breakfast and lunch for the two days will be provided.
- David M. Hughes, P.E., will provide 61 hours towards the project. He is an experienced workshop and conference leader and moderator as well as a contributor to several AwwaRF research reports and AWWA documents. His primary functions will be to assist in the workshop and to help develop and review white papers but he also will participate throughout the preparation of the research documents.
- American Water will provide a delegate to participate in the two-day asset management workshop to help develop a Research Needs Roadmap of asset management topic areas for the water industry (utility participation).
- American Water will also provide information to the project team about the asset management program from one of their utility operations so that it can be included as a case study in the final report.
- Provide invoices two weeks before they are due to AwwaRF – approximately on a quarterly basis.

Project Scope for AwwaRF Asset Management Research Roadmap

Subconsultant: EPRI

- Refer to entire project scope for reference.
- Jeremy Bloom of EPRI will participate in a two-day AwwaRF workshop on development of an Asset Management Research Needs Roadmap (Task 3A).
- Mr. Bloom will make a brief presentation regarding EPRI's programs and will provide copies of his presentation materials (Task 3A).
- Mr. Bloom will provide HDR with off the shelf materials and pertinent information and reports that will assist HDR in preparing the white paper (Task 2A).
- Provide invoices two weeks before they are due to AwwaRF – approximately on a quarterly basis.

Project Scope for AwwaRF Asset Management Research Roadmap

Subconsultant: John W. Fortin

- Refer to entire project scope for reference.
- Assist with white paper as requested (Task 2A).
- Provide Review comments on the first draft of the White Paper, prior to distribution to team members (Task 2A).
- Participate in the two-day workshop (Task 3A).
- Provide review comments on the research road map following the two-day workshop (Task 3B).
- Provide review comments on the first draft of the final report (Task 5).
- Provide invoices two weeks before they are due to AwwaRF – approximately on a quarterly basis.

Project Scope for AwwaRF Asset Management Research Roadmap

Subconsultant: Westin

1. General Requirements

The Products prepared by the Subconsultant will be in a format as stipulated by the latest AwwaRF Guidance Manual on Style and Format.

Subconsultant's work will be conducted in such a manner to accommodate the schedule in the contract between HDR and AwwaRF (attached).

Invoices will be submitted at least two weeks prior to when HDR is required to submit the overall invoice to AwwaRF, which is approximately on a quarterly basis. In-kind contributions by Westin are to be tracked.

2. Specific Role

Westin will provide the Co-PI, senior and supporting staff in all phases of the Project as follows:

- Doug Harp - Co-PI
- Bud Templan - Senior Staff
- Doug Spiers - Senior Staff
- Scott McKinney - Senior Staff

Refer to the "Project Scope" for a full description of all work related to project. Westin's specific task functions are as follows.

Task 1 – Prepare Project Management Guide and Quality Assurance Project Plan (QAPP)

- Provide input to Project Guide.
- Establish Project Website.
- Review and provide comments on Project Guide.

Task 2 – Prepare White Paper and Develop Utility Case Studies

Task 2A Prepare White Paper.

- Provide input to white paper as requested.
- Prepare sections of white paper as requested.
- Gather and provide papers, information, and technical data for white paper.
- Review and comment on draft of white paper.

Task 2B Develop Utility Case Studies.

- Organize and lead the subtask on case studies.
- HDR will provide a person to assist on each case study.
- Prepare list of questions, example case study, guidance, etc. on preparing case studies.
- Review and comment on each case study.
- Assemble existing and new case studies into chapter for the final report.

Task 3 – Facilitate Workshop and Develop Roadmap

Task 3A Expert Workshop.

- Assist in all phases of workshop planning and execution.
- Provide minimum of 3 staff to attend workshop.
- Lead subgroups.
- Assist in developing agenda.

3B Research Needs Roadmap.

- Lead the development of roadmap (Doug Harp).

Task 4 – Tailored Evaluations for Specific Utilities

- Provide Senior Staff person to lead or assist in performing AM studies.
- Prepare or assist in developing AM reports.

Task 5 – Prepare Project Deliverables

- Assist with preparing Draft and Final reports.
- Assume lead role in report sections addressing Case Studies and Research Needs Roadmap.

Task 6 – Conduct Project Management Activities

- Conduct internal Project Management functions.
- Prepare and submit invoices.