WATERID USER MANUAL

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Abstract:

Agencies are investing enormous resources into asset management programs for their water and wastewater piping systems, including comprehensive asset condition assessments and predictive maintenance programs, which lead to asset renewal prioritization and scheduling. Unfortunately, once assets are scheduled for renewal, the concepts of asset management are then largely ignored. Without a holistic approach of “cradle to grave” sustainable asset management integration and implementation, the true cost-savings of asset management cannot be achieved. Asset management principles particularly need to be applied to the actual renewal programs, but knowledge gaps in the industry are generally precluding such implementation. The Water Infrastructure Database (WATERiD) is intended to help to bridge this knowledge gap so that the true promise of asset management can be achieved.

WATERiD is designed to be a knowledge base where water and wastewater utilities can upload and gather information about the asset management technology and practice experiences. Although there is some information publicly available on the website (case studies, paper reviews, technology profiles, etc.), most of the information can only be accessed by registering onto the website and logging in with a personal username and password.

This manual is designed to guide users so that they can use the website efficiently and seamlessly. It contains detailed information about the website and the database structure, how to navigate the website, how to upload and gather information, and answers frequently asked questions by users. Most of the titles are directly linked to the pertinent part of the database. Therefore, users can click on these hyperlinks to access the part of the website explained in the user manual.

Benefits:

♦ Guides WATERiD users on how and where they can find information with an efficient and seamless user access.

♦ Answers frequently asked questions by the users of WATERiD.

♦ Serves as an example for the databases created in the same manner to help WATERiD users.

♦ Electronic version of this report is available at the WATERiD website (www.waterid.org), which will have live link to the appropriate pages in the WATERiD national database.

Keywords: Strategic Asset Management, WATERiD, user manual.
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EXECUTIVE SUMMARY

Agencies are investing enormous resources into asset management programs for their water and wastewater piping systems, including comprehensive asset condition assessments and predictive maintenance programs, which lead to asset renewal prioritization and scheduling. Unfortunately, once assets are scheduled for renewal, the concepts of asset management are then largely ignored. Without a holistic approach of “cradle to grave” sustainable asset management integration and implementation, the true cost-savings of asset management cannot be achieved. Asset management principles particularly need to be applied to the actual renewal programs, but knowledge gaps in the industry are generally precluding such implementation. The Water Infrastructure Database (WATERiD) is intended to help to bridge this knowledge gap so that the true promise of asset management can be achieved. WATERiD will continuously improve through constant accumulation of industry knowledge. Data within WATERiD can be readily accessed and compiled into updates of existing Manuals of Practice, additional Manuals of Practice, and other decision support tools to compliment the proposed national database website developed by Virginia Tech.

Condition assessment is the collection of data and information through direct and/or indirect methods, followed by analysis of the data and information to make a determination of the current and/or future structural, water quality, and hydraulic condition of the pipeline. Once the current condition of the pipeline is known funds can be better allocated to the assets which need urgent attention. System Renewal includes a wide range of repair, rehabilitation, and replacement techniques that bring the pipeline system to acceptable levels of performance within budgets. Various commercially available products present the current state of the art in pipe repair, rehabilitation and replacement. The decision-making process for the proper balance of repair, rehabilitation and replacement is a function of the condition assessment of the pipe, the life-cycle cost of the various repair/rehabilitation/replacement options, and the related risk reductions.

The knowledge and experiences of various utilities about the condition assessment, renewal engineering, and buried pipe location technologies, best practices, experience with technologies (positive and negative), cost of technology, cost models, list of vendors, contractors and case studies, etc. all exist but are generally not shared and not readily available outside of WATERiD. WATERiD focuses on transfer of performance and cost information of condition assessment, renewal engineering, and buried pipe location technologies for water and waste water pipes. WATERiD includes primary information about individual condition assessment, subsurface utility engineering, and renewal technologies’ cost and performance, and case studies for their real-world applications. WATERiD also includes lists of vendors, consultants, and contractors available for a particular technology on a regional basis. WATERiD ensures a single point information center for the utilities where they can find all of the relevant information that will help in expediting the selection of appropriate condition assessment, buried pipe location, and renewal engineering technologies.

This manual is designed to aid users in uploading and receiving information through the website. In the electronic copy that can be accessed through the WATERiD website, following sections starting form the introduction to the homepage are dynamically linked to the actual URL addresses of the pages discussed. Thus, the users can directly click on the titles and access the pages.
Note that WATERiD is a living project that is continuously evolving, receiving new information, and providing the latest developments related to water infrastructure. Because of this, the screenshots included in this manual may not always be representative of the actual pages within the WATERiD database.
CHAPTER 1.0

WATERiD USER MANUAL

1.1 Website Overview

WATERiD is designed to be a knowledge base where water and wastewater utilities upload and gather information about the asset management technology and practice experiences. Although there is some information publicly available on the website, most of the information (case studies, paper reviews, technology profiles, etc.) can only be accessed by registering onto the website and logging in with a personal username and password.

1.1.1 Homepage

The following illustration shows the WATERiD homepage which is the first page a user will see when they access the WATERiD database. Note that the illustration was taken without logging into the website. Thus, the information that can be accessed is limited. The following sections further discuss the functionalities of the website once logged in. Figure 1-2 represents the pages that can be accessed through the home page.

![Diagram of WATERiD homepage]

Figure 1-1. Pages that Can be Accessed through the Home Page.
The main menu on the top of the web page contains seven items as seen in Figure 1-2.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>Displays the front page at any point during navigation.</td>
</tr>
<tr>
<td>About WATERiD</td>
<td>Information about the WATERiD Project</td>
</tr>
<tr>
<td>My WATERiD</td>
<td>Access data submission and forums</td>
</tr>
<tr>
<td>WATERiD 101</td>
<td>Contains information to get you started with WATERiD</td>
</tr>
<tr>
<td>Links</td>
<td>Links to other websites</td>
</tr>
<tr>
<td>Navigation</td>
<td>Allows quick access to information in database</td>
</tr>
<tr>
<td>Search</td>
<td>Provides easy ways to find data from the data collection</td>
</tr>
</tbody>
</table>

The home page of WATERiD provides access to publicly available information. More detailed information requires login in. As part of the public information, the WATERiD home page contains the following elements:

**Login Area**

This area at the top right side (under the banner) allows registered users to access WATERiD and new users to create an account. Some WATERiD menu features will not show without logging in. The creation of an account is thus required for full access to the website.

**Public Information and Case Studies Maps**

These two maps provide access to geo-referenced information. Clicking on any U.S. state in the *Public Information Map* will display general information related to WATERiD pertaining to that state. The *Case Studies Map* allows the user to search for case studies in WATERiD that are related to specific geographical areas in the U.S.

**Links to Related Sites (Must View)**

These links provide access to other sites that might be of interest to the WATERiD user, such as NRC Canada, the Liquid Assets documentary, Bridging the Gap Asset Management Primer, etc.

**House Diagram**

The *House Diagram* was created to represent the main topics covered in the WATERiD database. All of the boxes are clickable and contain fundamental information about the main topics. As well as the fundamental information, users can also view products related to these topics. One other functionality of these pages allows technology and service providers to upload their product information as well as case studies through the links located at the bottom of every page.

**Sustainable Water Management, Resilient Infrastructure, and Asset Management**

By clicking any of these links, the user can access a general information page on the specific topic (Sustainability, Resiliency, and Asset Management). The displayed page also allows the user to submit specific practice information for each topic.

**GIS**

This section summarizes the fundamentals of Geographical Information Systems and its applications for water and wastewater asset management applications.
Condition Assessment, Renewal Engineering, Utility Engineering, and Financial Information

These four links are the fundamental information for the specific domains covered in WATER/D for public education.

Water for People and the Environment

This section provides some information and reference documents that investigates the relationship between the population and environment.

By following the data and information link provided at the bottom of the page, users can view and analyze information on infrastructure grade, GDP, temperature, precipitation, population, % good and impaired water, and number of waterborne disease. By clicking the links, users access the Google Fusion tables where they can visualize and analyze information. Figure 1-3 is an example of the data tables where the water and wastewater infrastructure grades are compared through the years.

Figure 1-3. Example of the Data Tables Where the Water and Wastewater Infrastructure Grades are Compared through the Years.
1.2 Creating an Account

You can create your own WATERiD account by clicking Create new account. It will bring you to a user account registration page. Your User Account will also function as your WATERiD Directory Profile.

![Figure 1-4. WATERiD User Registration.](image)

The page displayed above is the User Account registration page. To improve your WATERiD networking opportunities, you are encouraged to fill in as many fields as you are willing. Required fields are tagged with an asterisk (*).

After you complete and submit the required information in the user registration page, the registration moderator will be notified by email, and you will also receive an email saying your registration is pending.

You will receive another email after the moderator reviews your information and assigns the appropriate access level to your account. After the registration moderator approves your account, you are registered and can log in. Logging in as a registered user provides access to the WATERiD Directory, WATERiD Technology Profiles and Data Sheets, and the WATERiD Library, including detailed case studies capturing utility experience with condition assessment, renewal engineering, and subsurface utility engineering.
1.3 About WATERiD

Figure 1-5. About WATERiD.

This tab contains information about the project, research team, and acknowledgements to the people, organizations, agencies, and utilities who are involved in making WATERiD a success. Figure 1-6 illustrates the map of the links that can be accessed through this tab.

1.3.1 WATERiD Project
Displays the information about the WATERiD project contained in the introduction of this user manual.

1.3.2 Funding Agency
Provides information on and acknowledgements of the funding agencies for the WATERiD project.

1.3.3 Research Team
Provides information on the research team working on the WATERiD project.
1.3.4 Acknowledgments

Participation and feedback from all groups involved in the successful advancement of this project is greatly appreciated:

♦ **Database User Group (DUG)**

The Virginia Tech research team would like to thank the people who contributed to the development, implementation, and population of the Water Infrastructure Database. The research team is grateful to the members of the Database User Group (DUG), who volunteered their time to guide the research team in the development and testing of this database.

♦ **Innovative Infrastructure Research Committee (IIRC)**

The Virginia Tech research team is grateful to the members of the Innovative Infrastructure Research Committee (IIRC), who monitored the progress of the project and helped guide the research team.

♦ **Participating Utilities**

The Virginia Tech research team is especially grateful to the personnel of the utilities that have participated in this project. Without their generous donations of time and documented information, WATERiD would not exist. All the participating utilities with the links to their websites can be found in this section.

1.4 My WATERiD

![My WATERiD Tab](image)

Figure 1-7. My WATERiD Tab.

My WATERiD is only accessible to logged-in registered users. My WATERiD provides access to data submission forms, forums, and funding opportunities. WATERiD is a “living project” that will be continuously evolving, receiving new information for the database, and providing its users with the latest developments related to water infrastructure. The forums promote additional collaboration among WATERiD users. The *Funding opportunity* tab contains links to the external sites Grants.gov and FedConnect.net. Figure 1-8 represents the pages that can be accessed through this tab.
Figure 1-8. Pages that Can be Accessed through the My WATER/iD Tab.
1.4.1 Submit Data

As a logged-in registered user, selecting *My WATERiD* and then the submenu *Submit Data* allows you to access forms for submitting entries to WATERiD according to their specific data type.

The Submit Data menu has six sub-menus.

- Library Submission
- Models and Tools Profile
- Technology or Product Profile
- Organization Profile
- Utility Profile
- Bid Information

**Library Submission**

WATERiD is intended to accumulate knowledge that will assist utilities in their asset management efforts, particularly as it pertains to condition assessment, renewal engineering, and subsurface utility engineering of pipes. The WATERiD library is intended to serve as a central depository for all available documents pertaining to these technologies and their use. The scope of this project is large and never-ending, so in order to be viable and sustainable, it requires the effort of volunteer industry professionals to identify and submit entries from their own publications and others which they have found to be particularly useful. Where the submitter has the legal copyright to permit a submission to be shared publicly, the original file can be attached and submitted for public access through WATERiD. Where the submitter does not have legal copyright to permit a submission to be shared publicly, the industry professional can still provide an entry about the submission which identifies the value of the submission and from where the file can be obtained.
Library submissions are accomplished through the use of the following form:

![Create Library Submission Form](Image)

**Figure 1-10. Create Library Submission Form.**

The library submission form contains several categories as follows:

- Title*
- File Upload*
- Basic information*
- Detailed information
- Vocabularies (taxonomy)

*Title* and *File Upload* fields and several fields in *Basic information* are required (mandatory) fields, and thus marked with an asterisk. *Detailed information* and *vocabularies* are optional; however, submission of additional information is encouraged. The more accurately and specifically a WATERiD entry is categorized by thorough completion of the form, the easier it is to access the information available in the WATERiD, and the more useful this project becomes for all registered users. WATERiD editors will review the submitted forms for thoroughness and accuracy.
Detailed Information

If you are willing to provide more detailed information about the data you are submitting, click Yes in the field highlighted above. The page will automatically generate more subcategories directly below the field. These categories are mostly optional, but fill in as many as possible.

The subcategories are:
- Commercial Info
- Utility Info
- Geographic Info
- Host Pipe Info
- Extended Pipe Info
- Site Condition Info
- Vocabularies

You can provide more detailed information by filling in the fields in the subcategories. Thorough completion of these fields will result in more robust WATERiD search capabilities.

See Appendix A for the standard protocols followed by the WATERiD research team in managing library submissions.
The Vocabularies section is for assigning the WATERiD taxonomy terms to the data. The taxonomy provides a structure to the database contents, and is the most critical information for enabling WATERiD users to find what they are looking for. The taxonomy has hierarchical structure. The subcategories for each term will show up after you select higher level terms.

- Industry Class
- Water Types
- Technologies
- Strategic Asset Management
- Area of Focus
- Key Interest
Models and Tools Profile

![Create Models and Tools Profile](image)

This form is for submitting profiles for models and tools. Models and tools may be solely based upon academic research or they may be specific commercial products. Although only few fields are mandatory, submission of additional information is also encouraged. The more thorough and accurate the categorization, the more accurately and precisely the document will be found through WATERiD search results.

See Appendix C for the standard protocols followed by the WATERiD research team in managing models and tools-related profile submissions.

Technology or Product Profile

This form is for submitting profiles of technologies (either generic or branded). The WATERiD research team has already provided most generic technology profiles, but WATERiD users are welcome to submit additional technology profiles for review and possible inclusion. WATERiD users are also invited to contact the WATERiD research team regarding necessary updates to existing technology profiles. The generic technology profiles will only contain utility-verified capabilities and limitations, so suggested changes should include utility contacts for verification of claims.

WATERiD users are also invited to submit product profiles for specific commercial products. Although only a few fields are mandatory, submission of additional information is also encouraged. Technology suppliers are encouraged to thoroughly complete the forms for their products and to provide the WATERiD research team with utility contacts that can verify claimed capabilities and limitations of technologies. Whereas the “branded” product profiles are free to contain unsubstantiated claims of the technology suppliers, utility references will increase the credibility of such claims. Furthermore, the WATERiD research team will review submitted
changes to product profiles in their ongoing efforts to ensure that the generic technology profiles continue to properly cover the known capabilities and limitations of each technology class.

Figure 1-14. Creating Technology or Product Profiles.

The more thorough and accurate the categorization, the more accurately and precisely the document will be found through WATERiD search results. In the case of technology and product profiles, the various fields are intended to also be utilized by decision support tools to determine applicability for use and design of specific technologies and products. With the rapid pace of technology advancement, the WATERiD research team appreciates the help of the WATERiD users in keeping these profiles up-to-date with current information confirmed with utility experience. Any WATERiD user is encouraged to submit a threaded comment at any technology profile to suggest improvements. Comments will only be visible to WATERiD editors.

See Appendix D for the standard protocols followed by the WATERiD research team in managing technology related profile submissions.
Organization Profile

You can register your organization or company with this form for inclusion in the WATERiD Directory. The organization/company profile form has several sub categories.

- **Organization/Company Name** ("Title" field)
- **Organization Information** (including Description of the Organization, Media Files, Date of Founding, Industry Roles, Credentials, etc.)
- **Location**
- **Contact Information**
- **Products or Services**
- **Geographic Information**
- **Vocabularies**

*Organization/Company Name, Description, and Industry Role* are required fields. All entries require a description and the WATERiD editors do not wish to be responsible for describing any organization. The *Industry Role* field allows sorting in the directory for specific classes of organizations (such as consultants, contractors, etc.), and as such, is critical to the website functionality.

Although not mandatory, organizations significantly benefit from also filling out the Location, Contact Information, Geographic Information, and Vocabularies fields. The Location and Contact Information fields each include key contact information for the organization. The Geographic Information fields enable WATERiD directory users to identify which organizations offer products and services in a specific location. The Vocabularies fields enable WATERiD directory users to identify the classes of products and services offered by the organization.
The **Image** field is for uploading the organization’s logo.

The **Description** field should contain a brief description of the organization and what it does.

The **Media Files** field allows the entry of links to organizational videos, Powerpoint presentations, etc. which provide a more detailed description of the organization and what it does. Typically, a link to the organization’s promotional video will be provided.

The **Date of Founding/Incorporation** field provides WATERiD users with some understanding of the experience and stability of an organization.

The **Licenses and Certifications** field allows an organization to provide its state business and/or contractor license numbers, etc. (as applicable), to verify professional credentials. WATERiD users can use such license and certification numbers to make inquiries with the applicable governing authorities regarding organizational conduct.

The **Industry Affiliations** field provides WATERiD users with some understanding of the activity level of the organization within various fields of the water infrastructure industry.

The **Location** field asks for basic organizational contact information such as address, phone, and fax number.

The **Contact Information** group contains several fields, including the organization website, social networking sites, email address, and employees. Beyond the organization’s primary website, the social networking sites field allows an organization to provide links to their organizational pages at popular social media sites such as Facebook, Twitter, and LinkedIn. This field can also be used to provide links to organization “storefronts” that are frequently maintained at key industry websites. The **Employees** field allows the organization to include links to the WATERiD profile pages of key employees of the organization, for direct contact information.

The **Products or Services** group allows an organization to provide links that showcase the organization’s specific products or services. By thoroughly completing this section of the organization profile, the organization effectively creates a comprehensive “storefront” from which a WATERiD user can explore the product and service offerings of the organization. Generally speaking, an organization will first want to complete the other sections of the Organization Profile, submit it, then upload any other required WATERiD submissions listed below (such as product profiles and library submission), ideally request permission from other organizations for reference inclusion, and then come back and edit the Organization Profile to include the WATERiD links to the various other WATERiD submissions. While this takes time and effort, it creates a very prominent and comprehensive presence at WATERiD for those organizations that optionally choose to complete these fields.

The **Technology Brand Names** field allows an organization to provide the names of branded products offered, and permits the input of links to the specific WATERiD product profiles where available.

The **Technology Practitioners** field allows an organization the option of providing the names of other organizations (such as contractors, consultants, or utilities) that utilize this organization’s products or services. These entries effectively serve as “references,” and can include WATERiD organization profile links to provide contact information.
The *Technology End-Users* field allows an organization the option of providing the names of other organizations, such as utilities, which regularly utilize this organization’s products or services. Once again, these entries effectively serve as “references” and can include WATERiD organization profile links to provide contact information.

The *Case Studies* field allows an organization the option of providing specific case study references for some of their past projects. These case studies are a key means of assessing an organization’s “real world” capabilities. Where available, the case study entries can include WATERiD library links to the reference document.

The *Publications* field allows an organization the option of providing links to its key publications, including: specifications, manuals, technical data sheets, design information, and literature, which can all be submitted to the WATERiD library for linking.

It should also be noted, that the WATERiD editors will review submitted case studies, and (where utility experience can be confirmed) may choose to also provide links to those case studies from the generic *Technology Profiles* as a means of confirming technology capabilities and limitations. When submitting your organization’s products and services, you may also wish to provide voluntary peer review of the WATERiD technology profiles. The WATERiD team appreciates the significant volunteer efforts of industry professionals in ensuring the current accuracy of all information within the WATERiD website.

**Utility Profile**

The *Utility Profile* form is basically a slightly modified and extended *Organization Profile* form (as described in the My WATERiD section of this User Manual). The *Utility Profile* form goes beyond a typical organization profile to more fully describe the geographic, operational, and political conditions that affect water infrastructure design and performance. Although the data requests appear daunting, much of this extended information is available in the utility’s annual report or is already reported as part of the Clean Water Needs Survey. The WATERiD research team has limited resources, but is willing to attempt to assist a utility in completing the *Utility Profile* if needed.
Bid Information Submission

One of the primary goals of WATERiD is to provide reliable cost information based upon actual utility experience. Whereas the WATERiD library includes many case studies that include valuable cost information, such cost information is not consistently formatted to permit easy analysis of numerous projects at once. For reliability reasons, the Technology and Product Profiles only contain cost drivers and not specific costs that fluctuate with numerous variables, and which would require unacceptable expenditures for routine updates. As the Bid Information submissions are received, the Technology and Product Profiles can eventually be linked to the “dynamic” cost information contained therein.

Figure 1-16. Submitting Bid Information.

See Appendix B for the standard protocols followed by the WATERiD research team in managing the Bid Information submissions.
1.4.2 Data Summary

This section contains a dynamic summary of the number of documents in the WATERiD database. The document list is broken down by type of form submitted. This section is useful for monitoring the type of information being input into WATERiD over time. Note that the technology or product profiles include broad category profiles (following the taxonomy), as well as “specific” generic technology profiles, and “branded” product profiles, thus the number is not representative of the number of “specific” classes of technologies covered, nor of the number of specific products available in the market. The following figures represent the pages that can be accessed through this link.

Figure 1-17. Data Summary Page.
Data Summary Chart for My WATERiD

More detailed Charts
- Library Submission by Publication Type
- Case Study by Water Type
- Technology or Product Profile by Tech. Use
- Technology and Service Provider Case Study

Note
- **Library Submission:** Contains General documents including Case study, Datasheet, Technical Paper, Report, etc.
- **Technology or Product Profile:** Contains Specific document related to Technology and Product.
- **Models and Tools Profile:** Contains document focused on Models and Tools.
- **Utility Profile:** Contains document related to Utility information.
- **Organization Profile:** Contains document related to Organization information.

Figure 1-18. Data Summary Chart.
1.4.3 Funding Opportunities

This section is intended to be a hub where organizations can announce their funding opportunities for the water and wastewater community.

1.4.4 Forum

WATERiD’s Forum is intended to encourage registered WATERiD users to freely network and share information with one another in an open manner that is publicly reviewed. While the forums are monitored for inappropriate behavior, the WATERiD editors do not control or otherwise editorially review their content.

![“You Are Here” Forums](image)

**Forums**

<table>
<thead>
<tr>
<th>FORUM</th>
<th>TOPICS</th>
<th>POSTS</th>
<th>LAST POST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Private forum</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUC/IIRC</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td>Utilities</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition Assessment (CA)</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td>Renewal Engineering (RE)</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td>Subsurface Utility Engineering (SUE)</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Wastewater</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition Assessment (CA)</td>
<td>1</td>
<td>2</td>
<td>Laser ... by jaijung 2011-08-04 11:51</td>
</tr>
<tr>
<td>Renewal Engineering (RE)</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td>Subsurface Utility Engineering (SUE)</td>
<td>0</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other relevant topics</td>
<td>2</td>
<td>4</td>
<td>My ... by jaijung 2011-08-04 11:57</td>
</tr>
</tbody>
</table>

![Forum Contains New Posts](image) ![Forum Contains No New Posts](image) ![Forum is Locked](image)

**Figure 1-19. WATERiD Forums.**
Forums allow the discussion of different topics among WATERiD registered users. This space enhances the information sharing capabilities of the WATERiD. Use the forums to thread on an existing discussion or to start a new discussion. Your participation is encouraged. Just click on the name of the forum you want to participate, and then click either post new forum topic or, after selecting a topic, on add new comment.

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1.4.5 Utility Hub Pages

The utility hub pages are created to share the utility specific information on WATERiD. The case studies regarding specific utilities as well as project information that are extracted from their websites are shared here. Figure 1-20 shows the utility hub page example created for Blacksburg VA.

Town of Blacksburg Utility Hub Page

Figure 1-20. Utility Hub Page Example.

Users can access the case studies related to that utility by clicking on the links in the related case studies section. The users can also access to project data related to the WATERiD domains by clicking the links at the Utility Data section. Figure 1-21 provides a data visualization example of the cost information for Blacksburg, Virginia.
Utility Data: Cost

Under development!

Cost

- Analyze more with raw data

Percent Cost by Technology Used

Number of Technology Used

Average Unit Cost by Technology Used

(See raw data for further description)

Figure 1-21. Data Visualization Example.
Users can also analyze the visualized information by clicking on the analyze more with raw data section. Following is the representation of the raw data that is visualized in the previous figure.

<table>
<thead>
<tr>
<th>Date</th>
<th>Project Name</th>
<th>Project Type</th>
<th>Application Type</th>
<th>Existing Pipeline Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Manhole</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>AC</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
<tr>
<td>9/7/09</td>
<td>Cedar Run W Source Elimination Project Contract...</td>
<td>Renewal Engineering</td>
<td>Wastewater</td>
<td>Clay Tile</td>
</tr>
</tbody>
</table>

**Figure 1-22. Detailed Data Example.**

**Editing Utility Hub Pages**

In order to edit the contents in the utility hub pages, select the utility hub page you want to edit as shown in the Figure 1-23.

**Figure 1-23. Editing Utility Hub Pages**
In order to be able to edit utility hub pages, the user should attain the editing privileges from the administrator. The second step is to click on the *Pages* tab on top of the page as shown in the Figure 1-24.

![Figure 1-24. Pages Tab.](image)

After the user click on the pages tab, the list of pages on the utility profile will show. These pages can be edited by clicking on the *Edit Content* button as highlighted in Figure 1-25.

![Figure 1-25. Edit Content Button.](image)
This link takes users to the Content Management page. Users can modify the content in the windows by clicking on the gear symbol on the right upper corner as shown in Figure 1-26.

![Figure 1-26. Modifying the Content.](image1)

After clicking the Edit link, users can modify the contents shared on the specific utility hub page as shown in Figure 1-27.

![Figure 1-27. HTML Coding to Modify the Content.](image2)
This tab provides the detailed information about the functionality of the database. Figure 1-29 represents the pages that can be accessed through this tab.
Figure 1-29. Pages that Can be Accessed through WATERiD 101 Tab.

The WATERiD 101 tab provides basic information about this project and database and contains the following sub-categories:

1.5.1 How To
This section contains this WATERiD User Manual

1.5.2 Learn More
This section contains videos about the project.

1.5.3 Acronyms
This section contains a list of common industry acronyms for reference.

1.5.4 Public Awareness
This section contains links to important sites that contain information about asset management and consequences of failure of assets.

1.5.5 Reference Documents
This section contains links to key industry publications. These publications can be filtered and sorted with the help of the drop down menus located at the top.

1.5.6 Federal Data
This section contains figures and raw data pertaining to the population, health, and asset condition both in federal and state levels. The information on this page are automatically extracted and transformed from leading federal databases.
1.6 Links

This tab contains links to organizations that have partnered and assisted with WATERiD on content aggregation and in achieving industry awareness of WATERiD. The following four organizations provided initial support to enable WATERiD to succeed. The Other links are for additional organizations that actively support WATERiD’s success. Figure 1-30 shows the pages that can be accessed through this tab.

Figure 1-30. Pages that Can be Accessed through the Links Tab.

1.6.1 VT-SWIM

This is the Sustainable Water Infrastructure Management (SWIM) in Virginia Tech’s Institute for Critical Technology and Applied Science (ICTAS). Its mission is “To make America’s water infrastructure systems more integrated, effective, resilient, and sustainable through multidisciplinary research, and to disseminate results through development and training programs designed to maximize the value of these long-lived assets”.

1.6.2 EPA-AWI

The U.S. Environmental Protection Agency (EPA) conducts research on Aging Water Infrastructure (AWI). Its research goal is “To generate the science and engineering to improve and evaluate promising innovative technologies and techniques to reduce the cost and improve the effectiveness of operation, maintenance, and replacement of aging and failing drinking water and wastewater treatment and conveyance systems”.

1.6.3 WERF

The Water Environment Research Foundation (WERF), formed in 1989, is America’s leading independent scientific research organization dedicated to wastewater and stormwater issues.
1.6.4 WaterRF

The Water Research Foundation (WaterRF) is "Devoted to advancing the science of water, its research gives drinking water utilities and suppliers practical solutions to today’s most complex challenges. The staff works with the water supply community to identify, prioritize, fund, manage, and communicate research across the globe”.

1.6.5 Others

Contains links to other external sites that might be of interest to the WATERiD user, such as EPRI, FHWA, NIST, etc.
1.7 Navigation

Figure 1-31. The Navigation Tab.

The navigation menu contains links to the key sections of WATERiD to simplify website navigation. These sections are only accessible to logged-in, registered users. Figure 1-32 shows the pages that can be accessed through this tab.

- Directory
- Technology Class
- Management Practice
- Models and Tools
1.7.1 Directory

The WATERiD Directory is intended to assist WATERiD registered users in identifying individuals and organizations involved with water infrastructure. The Directory pages, only give “basic” sorting capability. However, the WATERiD Advanced Search allows profiles (for individuals), organization profiles, and utility profiles to be searched in relation to keywords. Thus, the directory entries can be “advanced searched” to identify, for example, an organization in a specific state that utilizes a specific technology. Searching WATERiD is discussed more thoroughly in search of the WATERiD Manual.

The WATERiD Directory has three sub-sections:

User List

The Individual Profiles consist of the data entered into the User Account Form during WATERiD registration and identifies industry credentials, contact information, and areas of expertise.

Organization List

The Organization Profiles are of self-identified organizations which are involved in the water infrastructure industry. Organization profile entries can offer information on their industry credentials, products and services offered, areas serviced, and areas of expertise.

Utility List

The Utility Profiles are of utilities which are identified as being involved in the water infrastructure industry. The primary goal of the utility profiles is to help utility professionals find peers with similar requirements and appropriate expertise for networking purposes. Fully populated utility profiles will also provide the water infrastructure industry with at least a partial census of technology use trends.
1.7.2 Technology Class

The Technology Class section of WATERiD consists of links which allow navigation to the specific technology classes, which then lead to links to Technology Profiles. From each technology profile, the WATERiD user can follow links to navigate to related profiles that are either more general or increasingly specific. This navigation scheme allows a WATERiD user to easily click through and explore related technologies and to compare their respective capabilities and limitations.

Figure 1-34. Related Technology Classes.
Not only do technology profiles provide a wealth of information about each technology, they also provide the primary mechanism for click-through navigation of the WATERiD site. In addition to being able to readily navigate to related technology profiles, the technology profiles contain navigational links to key WATERiD library and directory content pertaining to that particular technology. From the technology profile a user can link through to access available media files, cost information, case studies, technology data sheets, product profiles, etc. from the library, and to access the organization profiles of technology providers and referenced utility end-users from the directory. The technology profiles provide a simplified means of click-through navigation to library documents pertaining to each technology. This guided navigation helps less-informed WATERiD users readily find the information that they need.

More expert WATERiD users may prefer to use the robust search capabilities of the WATERiD database to search the site for “precisely” the WATERiD entries for which they are looking. For example, in order to search for technologies for or case studies about a specific use (application), such as “condition assessment of a metal water pipe,” the WATERiD user can leverage the powerful search capabilities of WATERiD as described in the Search section of the WATERiD Manual.

See Appendix F for the standard protocols followed by the WATERiD research team in managing supplier’s products and case study submissions.
This section contains links to the technology profiles for the primary classes of condition assessment. As described in the previous section, the technology profiles provide essential information for those interested in implementing a specific technology, and provide the primary means of click-through navigation to WATERiD content of interest.
### Renewal Engineering

This section is analogous to the previous, but focused on renewal engineering. Technologies for maintenance, repair, rehabilitation, and replacement of water infrastructure are considered within *Renewal Engineering*. As described in the previous section, the technology profiles provide essential information for those interested in implementing a specific technology, and provide the primary means of click-through navigation to WATERiD content of interest.

**Pipe Maintenance Technologies**
1. Pipe Cleaning
2. Pipe Corrosion Control
3. Pipe Grouting

**Pipe Repair Technologies**
1. Pipe Joint or Leak Seals
2. Pipe Point Repairs

**Pipe Rehabilitation Technologies**
1. Cured-In-Place Pipe (CIPP) Liners
2. Pipe Coatings
3. Fold and Form Pipe Liners
4. Grout-In-Place Pipe (GIPP) Liners
5. Modified Slipping
6. Spray-In-Place Pipe (SIPP) Liners (needs to be created)
7. Slipping
8. Spiral Wound – Ungrounded

**Pipe Replacement Technologies**
1. In-Line Pipe Replacement (needs to be created)
2. Pipe Bursting

### Renewal Engineering Technologies:

System Renewal includes a wide range of repair/rehabilitation/replacement techniques that bring the pipeline system to acceptable levels of performance within budgets. The decision-making process for the proper balance of repair, rehabilitation, and replacement is a function of the condition assessment of the pipe, the life-cycle cost of the various renewal engineering (repair/rehabilitation/replacement) options, and the related risk reductions. Pipeline renewal cannot be addressed on a reactive basis. Installing a rehabilitation product is one part of a utility renewal program. Identifying the optimal renewal product requires knowledge of the relationships between key renewal decision-making factors. The unstructured process presents a challenge for educating our utility engineers on pipeline renewal.

**Pipeline Renewal Engineering Technologies:**

EPA states that “System Renewal includes a wide range of Repair, Rehabilitation, and Replacement techniques that bring the pipeline system at acceptable levels of"
**Subsurface Utility Engineering**

This section is also analogous to the previous, but focused on *Subsurface Utility Engineering (SUE)* technologies. The location of buried infrastructure assets provides utilities, contractors, and owners with fundamental information for appropriate management and project development decisions. As described in the previous section, the technology profiles provide essential information for those interested in implementing a specific technology, and provide the primary means of click-through navigation to WATERiD content of interest.
1.7.3 Management Practice

This section is analogous to the previous, but focused on management practices. *Management Practices* that are investigated in the database are listed in this page. As described in the previous section, the management practice profiles provide essential information for those interested in implementing a specific technology, and provide the primary means of click-through navigation to WATERiD content of interest. Figure 1-38 shows the management practice profiles covered for WATERiD database.

Figure 1-38. Management Practice Profiles.
1.7.4 Models and Tools

This section is analogous to the previous, but focused on models and tools. Models and tools that are investigated in the database are listed in this page. As described in the previous section, the models and tools profiles provide essential information for those interested in implementing a specific technology, and provide the primary means of click-through navigation to WATERiD content of interest. Figure 1-39 shows the models and tools profiles covered for WATERiD database.

<table>
<thead>
<tr>
<th>Prediction Algorithms</th>
<th>Models and Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Advanced</td>
<td>A model is a description of a system using logic, mathematical concepts, and language. An application model, often one that creates, manipulates, modifies, or analyzes can be termed tools. Models can take many forms, including but not limited to dynamical systems, or static models. These and other types of models can overlap, with a given model involving a variety of abstract structures. In many cases, the quality of a scientific field depends on how well the models developed on the theoretical side agree with results of repeatable experiments. Lack of agreement between theoretical mathematical models and experimental measurements often leads to important advances as better theories are developed. Sound infrastructure deterioration models are essential for accurately predicting future conditions that, in turn, are key inputs to effective maintenance, repair, and rehabilitation decision making. Deterioration models can be grouped into the following major categories: Deterministic Models, Statistical Models, probabilistic Models, Advanced Mathematical Models, and Heuristic Models. The deterioration modeling task for pipe infrastructure will consist of three major components: 1) development of experimental, probabilistic, and other mathematical models, 2) validation of proposed models through observed data, and 3) piloting of the proposed model at various utilities in North America for acceptance and use. Reference: Wikipedia, Mathematical Model – <a href="http://en.wikipedia.org/wiki/Mathematical_model">http://en.wikipedia.org/wiki/Mathematical_model</a></td>
</tr>
<tr>
<td>2. Mathematical</td>
<td></td>
</tr>
<tr>
<td>3. Deterministic</td>
<td></td>
</tr>
<tr>
<td>4. Heuristic</td>
<td></td>
</tr>
<tr>
<td>5. Probabilistic/Statistical</td>
<td></td>
</tr>
<tr>
<td>6. Physical</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predicted Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Condition</td>
</tr>
<tr>
<td>2. Financial</td>
</tr>
<tr>
<td>3. Functional Performance</td>
</tr>
<tr>
<td>4. Level of Service</td>
</tr>
<tr>
<td>5. Resiliency</td>
</tr>
<tr>
<td>6. Risk</td>
</tr>
</tbody>
</table>

Figure 1-39. Models and Tools Profiles.
1.7.5 Case Study Navigation

This section provides an easier access to the case studies on each specific domain. Figure 1-40 shows the clickable figure where users can select either water or wastewater sections to view to case studies related to each topic.

**Water Infrastructure System**

![Water Infrastructure System Diagram](image)

*Figure 1-40. Water Infrastructure System.*

Once the user selects to view case studies on water or wastewater domains, they can make a three-dimensional selection from the following figure.

![Case Study Navigation Diagram](image)

*Figure 1-41. Case Study Navigation.*
For example if the user chooses to view case studies pertaining to technology use for SUE in strategic level, they can click on the node highlighted on the previous figure. This selection will take them to a list of case studies pertaining to the category user selected to view.

1.7.6 Bid Information

This section provides the link to the bid tabs and pertaining information submitted by utilities. There are three main categories for the bid tabs.

**Condition Assessment**

This section lists the bid information submitted by utilities on the domain of condition assessment.

**Renewal Engineering**

This section lists the bid information submitted by utilities on the domain of renewal engineering.

**Subsurface Utility Engineering**

This section lists the bid information submitted by utilities on the domain of subsurface utility engineering.
1.8 Search

In addition to the click-through navigation available through the navigation links which extend all the way into the detailed technology profiles, the WATERiD website provides several other easy ways to find data. The Search menu also provides several search options. Figure 1-43 shows the different search functions that can be accessed through this tab.

Figure 1-43. Links that Can be Accessed through Search Tab.

![Search Tab](image_url)
1.8.1 Basic and Advanced Search

![Image of the search page](image)

**Figure 1-44. Basic and Advanced Search.**

The webpage image above shows the page you see after clicking the Search submenu. The search option locates documents and data from the entered keywords. If you want to use an advanced search option, click Advanced search link on the bottom.

The Advanced Search permits you to combine certain filters with the keywords to more accurately find what you are looking for.

**Show Image**

To use Advanced Search a “positive” search term of three letters or more must ALWAYS be entered into one of the three search boxes in the upper left of the search page. This term can be very specific, or if you want to return “everything,” it can be as general as the word “the”.

Additionally, you can further restrict your search to specific vocabulary/taxonomy terms contained in the Only in the category(s): box. To select multiple terms from this box, hold the Control (Ctrl) button as you click on the terms.

**Example 1**

If you are looking only for information pertaining to environmental considerations when utilizing cured-in-place pipe, then you would go to the Only in the category(s): box, find the technologies section of the vocabularies, and scroll through the structured entries and select “Cured in Place Pipe,” then you would find the strategic asset management section and while holding the control button, also select “environmental considerations”.

You can also choose to further restrict your search to http://waterid.org/search/node entries of a specific form type, by checking boxes of the Only of the Types: field. For example, if you are only looking for articles on the topic, then you would choose to select Library Submission in the Only in the category(s): box to avoid returning technology profiles.

Thus, if you are looking for a technology, rather than a library document, you would select a Technology or Product Profile in the Only of the Types: field.
1.8.2 Faceted Search

Faceted search merges the keyword search with the taxonomy browsing capability. By using this search functionality, users can search for a specific term by browsing through the taxonomy.

1.8.3 Visual Search

Visual search is intended for users that are less familiar with the technical terms that are used in the database. Every term is supported with a supplemental figure for better representation of the term. Following figure is the first page of the visual search functionality. It represents the highest level in the taxonomy and users can dig deeper by following the figures.

![Visual Search](image)

**Figure 1-45. Visual Search.**

**By admin - Posted on 11 November 2011**
### 1.8.4 Taxonomy Browsing

This search functionality allows users to follow the WATERiD taxonomy and find documents pertaining to the term they are searching for. Figure 1-46 shows the first page of this search functionality. The links can be extended for lower levels if there is a (+) in front of it.

<table>
<thead>
<tr>
<th>Industry class</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water (1059)</td>
<td></td>
</tr>
<tr>
<td>Gas (245)</td>
<td></td>
</tr>
<tr>
<td>Oil (235)</td>
<td></td>
</tr>
<tr>
<td>Nuclear (194)</td>
<td></td>
</tr>
<tr>
<td>Telecommunications (209)</td>
<td></td>
</tr>
<tr>
<td>Electrical Power (208)</td>
<td></td>
</tr>
</tbody>
</table>

#### Water Types
- Drinking Water (785)
- Wastewater (858)
  - Stormwater (169)
  - Source Water (73)
  - Gray Water (Reuse) (54)
  - Industrial (101)
  - Agricultural (53)

#### Technologies
- Condition Assessment (311)
  - Acoustic Technologies (82)
  - Temperature Based Technologies (8)
  - Electrical or Electromagnetic Technologies (53)
  - Laser Technologies (3)
  - Physical Testing (13)
  - Flow Based Technologies and Methodologies (15)
  - Environmental Testing (1)
  - Visual Based Technologies (91)
  - Other (2)
  - Gyroscope (old) (3)
  - Inclinometer (old) (1)
  - Pressure Testing (old) (9)
- Renewal Engineering (431)
- Subsurface Utility Engineering (177)

#### Strategic Asset Management
- Data Assets Management (227)
- Human Assets Management (16)
- Physical Assets Management (327)
- Specific Drivers (97)
- Sustainability (83)

#### Models and Tools
- Sustainability (5)
  - Human Assets Management (1)
  - Physical Assets Management (26)
  - Data Assets Management (1)

---

Figure 1-46. Taxonomy Browsing.
This page provides an alphabetical index of all WATERiD pages. By clicking the character (number or letter) at the top of the page, you can quickly find data whose title starts with that character. The number in parentheses indicates how many WATERiD pages have titles which start with that number or letter. This allows simplified location of a document by its title.
### 1.8.6 Database Directory

The *Database Directory* allows WATERiD documents to be sorted according to the form used to submit the document, and then by other applicable sorting of likely interest. The search results are then returned according to the date of WATERiD submission. Sorting by date of submission allows a WATERiD user to return to WATERiD and identify newly added content.
1.9 Top Rated

The documents that will be shared in the WATERiD digital library will be evaluated according to their ability to help the users search for the most valuable documents in an easier fashion. Figure 1-49 shows the pages that can be accessed through this tab.

![Figure 1-49. Links that Can be Accessed Through the Top Rated Tab.](image)

1.9.1 Reviewer Rating

The reviewer rating is given to a document to evaluate the quality of a specific document in the digital library. According to the scores that the documents receive in the criteria discussed in the following sections, documents will receive a rating ranging from 1 to 5. Table 1-1 summarizes the score range used to evaluate the documents.

<table>
<thead>
<tr>
<th>Reviewer Rating</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>100-80</td>
</tr>
<tr>
<td>4</td>
<td>79-60</td>
</tr>
<tr>
<td>3</td>
<td>59-40</td>
</tr>
<tr>
<td>2</td>
<td>39-20</td>
</tr>
<tr>
<td>1</td>
<td>19-0</td>
</tr>
</tbody>
</table>
There are six different types of written documents that are shared in the digital library which are: journal articles, conference papers, trade publications, reports, case studies, and MOP/BOPs. However, only case studies that are shared on WATERiD receive a reviewer rating to access their quality. Following table represents the grading rubric that is used to assess the reviewer ratings for the case studies.

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Applicability</th>
<th>Quality of the Info</th>
<th>Reliability of the Info</th>
<th>Uniqueness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Applicable = 23 pts</td>
<td>High = 20 pts</td>
<td>High = 20 pts</td>
<td>High = 20 pts</td>
<td></td>
</tr>
<tr>
<td>Moderately Applicable = 18 pts</td>
<td>Fair = 15 pts</td>
<td>Fair = 15 pts</td>
<td>Fair = 15 pts</td>
<td></td>
</tr>
<tr>
<td>Slightly Applicable = 10 pts</td>
<td>Poor = 10 pts</td>
<td>Poor = 10 pts</td>
<td>Poor = 10 pts</td>
<td></td>
</tr>
<tr>
<td>Obscure = 5 pts</td>
<td>V.Poor = 5 pts</td>
<td>V.Poor = 5 pts</td>
<td>V.Poor = 5 pts</td>
<td></td>
</tr>
<tr>
<td>Unknown = 0 pts</td>
<td>NA = 0 pts</td>
<td>NA = 0 pts</td>
<td>NA = 0 pts</td>
<td></td>
</tr>
</tbody>
</table>

The reviewer rating for the reports shared in the digital library will be determined based on the applicability, quality, reliability, and the uniqueness of the information presented in the case study.

Data quality refers to the degree of excellence exhibited by the data in relation to the portrayal of the actual scenario. Whereas, data reliability is a state that exists when data is sufficiently complete and error free to be convincing for its purpose and context. Uniqueness of the case study is the measure where the data or the practice discussed is evaluated. If the practice discussed is considered to be highly unique, than it should be presenting a case where the practice or the data is highly distinctive and unparalleled.

1.9.2 Top User Rating

This section ranks the documents according to the average user ratings they receive. Every user can give a user rating to every document and the average of the user ratings are considered when sorting the documents for this section.

1.9.3 Most Viewed

This section ranks the WATERiD pages according to the view counts they received. The server keep track of how many times a page is viewed by the users. The view count can be found at the very bottom of every page.

1.9.4 Recent Content

This section lists the contents of the WATERiD in a chronologically increasing or decreasing order according their creation time.
CHAPTER 2.0

HOW YOU CAN HELP TO IMPROVE WATERiD

WATERiD is an enormous and ongoing undertaking. Water infrastructure technologies are changing rapidly, and industry professionals struggle to keep pace with those changes while simultaneously fulfilling their professional roles. The research team asks that members of the industry work together to share their knowledge and expertise with one another. There are several ways that you, as a WATERiD User can help the rest of the industry:

♦ Thoroughly complete your User Account Profile so that you can be identified as a professional resource according to your areas of expertise.

♦ If it hasn’t already been created, get permission and create a WATERiD Organization Profile for the water infrastructure related organization for which you work or with which you belong.

♦ If you have responsibility for a condition assessment, renewal engineering, or subsurface utility engineering product, then, if the product profiles do not already exist, please provide a product profile on each product for which you have responsibility.

♦ Likewise, if they have yet to be submitted to WATERiD submit any case studies (particularly those that describe utility experience) and technical literature pertaining to condition assessment, renewal engineering, or subsurface utility engineering. Don’t forget that if you are responsible for maintaining an organization or product profile, that you have the option of returning and including links to such key publications to simplify in depth access to information about such products and services.

♦ Review existing technology and product profiles with which you have particular expertise, and if you are aware of required corrections to the content or the categorization, or if you can suggest helpful supplemental information, use the comment button at the bottom of the relevant Profile to contact the WATERiD research team with suggested improvements.

♦ The research team encourages you to take the time to submit WATERiD library entries for your published papers. Where you hold the copyright permission to share your publications, you are welcome to upload the entire paper as an attachment to the WATERiD library entry for public domain use. Where you do not hold the copyright for the published paper, you are still invited to upload supplemental public domain materials such as a Powerpoint presentation regarding the paper’s contents. Don’t forget that you have the option of returning to your User Account Profile and including links to such key publications, to allow others to explore your expertise from your individual profile in the WATERiD Directory.
If you have found specific publications to be particularly useful, search WATERiD to determine if these publications have already been included in the WATERiD library. If not, the research team invites you to complete a Library Submission form for consideration for inclusion. The publications you identify and share on WATERiD will also help others to recognize your areas of expertise and your active efforts to help advance the industry.

As you explore the WATERiD site, if you find content that is incorrect, could use additional information, or is improperly categorized, use the comment button at the bottom of that page to notify the WATERiD research team.

Invite your professional colleagues to get involved at WATERiD and provide their input into the WATERiD content as well.

Thank you for your valuable time and energy towards making WATERiD a resource that benefits everyone in the industry.
APPENDIX A

WATERiD STANDARD PROTOCOLS FOR MANAGING LIBRARY SUBMISSIONS

1. Library submissions are used to upload published and unpublished documents which are expected to provide academic or engineering value to the industry. Types of files submitted to the WATERiD library can include:

- Audio or Video files
- Best Appropriate Practices
- Books
- Brochures
- Case Studies
- Data Sheets
- Guidance Documents
- Journal Papers or Conference Proceedings
- Magazine or Newsletter Articles
- Presentations
- Reports
- Software
- Specification or Standard
- Web postings

2. As the research team identifies industry publications, many of these are entered into the WATERiD library as resources for WATERiD users. This research team effort provides the foundation for a useful WATERiD library. However, the true value of the WATERiD library will be derived as industry volunteers submit their own publications and information about the public publications which they have found useful. The continuous effort of industry volunteers will help keep WATERiD content from going stale over time.

a. If a publication is in the public domain and available for upload to WATERiD, then the file can be attached for inclusion.

b. If a publication has restricted copyright, the WATERiD library submission form can be completed without a file attachment. The library submission form should include sufficient information to be able to locate and access the copyrighted publication.

c. The WATERiD research team confirms that library submissions comply with the intent of the WATERiD library, that copyright permissions have been received for file uploads, and that the library submission form fields have been sufficiently populated to enable retrieval of the library submission. The WATERiD research team will specifically ensure that:

   i. technologies utilized are sufficiently taxonomically tagged.

   ii. where available, the end-user application is sufficiently taxonomically tagged.

d. It should be noted and recognized that the WATERiD research team does not have the resources to confirm the claims within non-WATERiD authored submissions. If the WATERiD research team is notified that a WATERiD library submission contains erroneous information, the WATERiD research team will make an effort to contact the
utility or other end-user referenced in the case study to confirm the facts. If a WATERiD library submission is found to be misleading, it will be removed from the WATERiD library at the sole discretion of the WATERiD research team.

3. As the research team authors unique case studies from utility experience that is data mined during a research project, they are added to the WATERiD library. WATERiD developed case studies involve interviews with utilities and analysis of data submitted by utilities.
   a. The WATERiD research team ensures that case studies authored by the research team are reviewed by the utility personnel for accuracy.
   b. The WATERiD research team ensures that case studies authored by the research team are submitted to the DUG for peer review prior to being made available through the WATERiD library.
   c. The WATERiD research team ensures that access restrictions to case studies authored by the research team comply with the requests of the utilities to which they pertain.
   d. The more stringent control of the content and quality of WATERiD research team authored case studies provides added value to the WATERiD users.

4. The WATERiD research team actively contacts utilities and major publishing sources to solicit submission of their relevant publications to the WATERiD library.

5. The WATERiD research team actively encourages WATERiD users to submit their own publications to the WATERiD library.

6. As new submissions are added to the WATERiD library, the research team will review the submissions for the following opportunities:
   a. Does the library submission identify a new class of technology that requires the creation of a new technology profile? (technology profiles should be established for every combination of materials and methods that generate a significant applicability for use or cost difference.)
   b. Does the library submission contain useful technology cost information that should be added to the relevant technology profiles?
   c. Does the library submission provide evidence of a new applicability for use, which should be confirmed and incorporated into relevant technology profiles?
   d. Is the library submission a particularly valuable reference document that should be specifically linked from the relevant technology profiles?
APPENDIX B

WATERiD STANDARD PROTOCOLS FOR MANAGING BID INFORMATION SUBMISSIONS

1. Bid Information Submissions are intended to assist WATERiD.org users in several ways:
   a. Providing “real world” cost information.
   b. Where information is available, simultaneously providing brief case studies for projects.
   c. Permitting bid information to be sorted according to the taxonomical field information, including by technology, contractor, utility, project conditions, utility census data, and geographic region.

2. When a bid information submission is received, the WATERiD research team will:
   a. Confirm the accuracy of the submission, and ensure it is properly taxonomically tagged.
   b. Check the attachments for the proper format and condition.
   c. Assist with more thorough completion of the form if additional information is contained in the attachments.
   d. Check to see if the project provides new insights regarding cost drivers that should be indicated in the technology profile.
   e. If the Bid Information submission provides particularly valuable cost information, then directly link it from the relevant technology and product profiles.
   f. Consider contacting the utility for the development of a WATERiD research team authored case study, particularly if it pertains to a technology with minimal prior coverage.
1. *Models and Tools* are primarily software related resources used in decision support systems. Some are theoretical academic research, some are in-house developed, and some are commercial products. Models and tools frequently drive the selection and use of condition assessment and renewal engineering technologies, and are a key component of utility management practice.

2. Management practice is beyond the original scope of the WATERiD research grant; however, many models and tools have been analyzed by the research team as part of their research, and where available have been turned into “generic” model and tool profiles. WATERiD.org has been structured to permit the submission of models and tools by the industry to enhance the content value of WATERiD.org.

   a. When method differences make a “significant” difference in the “applicability for use,” then a separate model and tool profile is needed for each. Understanding of these differences will evolve over time with the help of industry peer review. Industry standards and existing industry classification schemes provide some initial guidance to the research team for targeting the creation of needed model and tool profiles.

   b. The basic taxonomy class is included in the name, along with specific methods that drive “applicability for use.”

   c. From the very “specific” model and tool profiles that match each known commercial software package, the research team then also makes more “general” model and tool Profiles that don’t distinguish between all of the methods that influence “applicability for use.”

3. The research team ensures that each model and tool profile has navigation links from the most “specific” related model and tool profile all the way up to the most “general” model and tool profile as contained in the taxonomy.

   a. The increasingly “general” profiles will each link down to the more “specific” model and tool profile options already made.

   b. These “general” model and tool profiles allow an industry professional with a moderate knowledge of decision support tools to navigate the website into a deeper and deeper understanding of the nuances of each method utilized.
c. Likewise, an industry professional can navigate from a very specific decision support tool that they are already aware of, up to more and more “general” profiles, and then navigate back down to related models and tools that may also be of interest.

4. The research team ensures that ALL “applicability for use” claims within the model and tool profiles are verified with utility experience. Where possible this utility experience is summarized into a case study that is linked to within the WATERiD library.

5. The research team ensures that there is a method profile created and linked for every method utilized in each model and tool profile that is created. Eventually, every analytical method employed in various decision support tool models should have their own method profile that indicates applicability for use, with links to case studies providing examples.

6. The research team ensures that the applicable applications (such as water pipe, wastewater pipe, pressure pipe, non-pressure pipe, etc.) are all properly tagged in each model and tool Profile.

7. The research team ensures that referenced and supporting documents are linked from the model and tool Profile to the document within the WATERiD library.

8. The research team will embed pre-configured “advanced, relational” search queries within each section of the model and tool profiles that allow industry professionals to quickly identify relevant entries in WATERiD.

9. The research team contacts product suppliers and encourages and assists them to enter their own “branded” product profile entries.
   a. “Applicability for Use” claims are verified as much as possible with utility experience.
   b. The research team works with product suppliers to include their related publications.
   c. The research team works with the product suppliers to “attempt” to include case studies with utility experience that verifies each and every “Applicability for Use” claim.

10. The research team ensures that applicable product suppliers and product profiles have navigational links from each model and tool, and that each product profile includes navigational links to the appropriate model and tool profiles.

11. As product profiles are submitted and their “applicability for use” claims are confirmed, the research team fact checks each related model and tool profile for required updates. Where new capabilities and limitations require the distinction of a new, more “specific” model and tool or method profile, they will be created.
APPENDIX D

WATERiD STANDARD PROTOCOLS FOR MANAGING TECHNOLOGY PROFILES SUBMISSIONS

1. Currently, there are five possible types of technology related profiles in the WATERiD website:
   ♦ Material Profiles (resins, tubes, etc.)
   ♦ Method Profiles (insertion method, curing method, etc.)
   ♦ Technology Profiles (consisting of specific combinations of materials and methods)
   ♦ Product Profiles (“branded” technology profiles that are from a specific product supplier)
   ♦ Navigational Profiles

2. The technology taxonomy has been developed based upon common “applicability for use” and not “only” based upon similarities in materials and methods. Many classification schemes in the industry do not adequately consider “applicability for use,” even though it is the primary “driver” in technology selection.

3. Known products are analyzed by the research team and turned into “generic” technology profiles.
   a. When material and method differences make a “significant” difference in the “applicability for use,” then a separate technology profile is needed for each. Understanding of these differences will evolve over time with the help of industry peer review. Industry standards and existing industry classification schemes provide some initial guidance to the research team for targeting the creation of needed Technology profiles.
   b. The basic taxonomy class is included in the name, along with specific materials and methods that drive “applicability for use.”
   c. From the very “specific” technology profiles that match each known industry product profile, the research team then also makes more “general” technology profiles that don’t distinguish between all of the methods and materials that influence “applicability for use.”

4. The research team ensures that each technology profile has navigation links from the most “specific” related technology profile all the way up to the most “general” technology profile as contained in the taxonomy.
   a. The increasingly “general” profiles will each link down to the more “specific” technology profile options already made.
b. These “general” technology profiles allow an industry professional with a moderate knowledge of technologies to navigate the website into a deeper and deeper understanding of the nuances of each technology.

c. Likewise, an industry professional can navigate from a very specific Technology that they are already aware of, up to more and more “general” profiles, and then navigate back down to related technologies that may also be of interest.

5. The research team ensures that ALL “applicability for use” claims within the technology profiles are verified with utility experience. Where possible this utility experience is summarized into a case study that is linked to within the WATERiD library.

6. The research team then ensures that there is a material profile and a method profile created and linked for every material or method utilized in each technology profile that is created.

7. The research team ensures that the applicable applications (such as water pipe, wastewater pipe, pressure pipe, non-pressure pipe, etc.) are all properly tagged in each technology profile.

8. The research team ensures that referenced and supporting documents are linked from the technology profile to the WATERiD library.

9. The research team will embed pre-configured “advanced, relational” search queries within each section of the technology profiles that allow industry professionals to quickly identify relevant entries in WATERiD.

10. The research team contacts product suppliers and encourages and assists them to enter their own “branded” product profile entries.

   a. “Applicability for Use” claims are verified as much as possible with utility experience.

   b. The research team works with product suppliers to include their related publications.

   c. The research team works with the product suppliers to “attempt” to include case studies with utility experience that verifies each and every “applicability for use” claim.

11. The research team ensures that applicable product suppliers and product profiles have navigational links from each technology profile, and that each product profile includes navigational links to the appropriate technology profiles.

12. As product profiles are submitted and their “applicability for use” claims are confirmed, the research team fact checks each related technology profile for required updates. Where new capabilities and limitations require the distinction of a new, more “specific” technology profile, they will be created.
APPENDIX E

WATERiD STANDARD PROTOCOLS FOR MANAGING DIRECTORY SUBMISSIONS

1. Currently, there are three types of Directory Related Profiles which are submitted to the WATERiD website:
   ♦ Individuals (User Registration)
   ♦ Organizations
   ♦ Utilities

2. The User Registration form is first submitted directly to the WATERiD Website Administrator.
   a. The Website Administrator:
      i. Checks to see if the individual was previously registered to avoid duplicates.
      ii. Assigns an appropriate access level, including a moderation level for the Forums.
      iii. Provides a temporary password.
      iv. Notifies the WATERiD research team.
   b. The Research Team:
      i. Checks to see if the individual was previously registered to avoid duplicates.
      ii. Ensures that the new registered user has been assigned the appropriate access level.
      iii. Contacts the new registered user and personally invites them to enhance their Individual profile and encourages them to actively participate in contributing to WATERiD.org by uploading an organization or utility profile for their employer, submitting publications to the WATERiD library, and participating in the forums.

3. When an organization profile is first submitted or when it is edited:
   a. For a new organization profile, the research team:
      i. Checks to see if the organization was previously registered to avoid duplicates. Note that divisions within large corporations are permitted to have separate organization profiles.
ii. Confirms that the registered user that submitted the organization profile has permission to maintain the profile on behalf of the organization.

iii. Ensures that the organization profile is properly linked from relevant Technology, model and tool, and product profiles.

iv. Edits the taxonomy and the vocabularies to ensure that they are appropriately representative of the organization.

b. For an edited organization profile, the research team:
   i. Ensures that the changes are appropriate.

4. When a utility profile is first submitted or when it is edited:
   a. For a new utility profile, the research team:
      i. Checks to see if the utility was previously registered to avoid duplicates. Note that divisions within large utilities are permitted to have separate utility profiles.
      ii. Confirms that the registered user that submitted the utility profile has permission to maintain the profile on behalf of the utility.
      iii. As resources permit, assists with fully populating utility census data from publicly available sources.
      iv. Edits the taxonomy and the vocabularies to ensure that they are appropriately representative of the utility.

b. For an edited utility profile, the research team:
   i. Ensures that the changes are appropriate.
APPENDIX F

WATERiD STANDARD PROTOCOLS FOR MANAGING SUPPLIER’S PRODUCT AND CASE STUDY SUBMISSIONS

1. The WATERiD research team has provided a public area, separate from the academically reviewed WATERiD library, where product suppliers can freely upload basic product information. This basic public information is not meant to replace the more comprehensive information that the WATERiD research team requests be submitted to the WATERiD library.

2. The WATERiD research team will:
   a. Review the submissions for typos, but otherwise not exercise editorial control over the contents.
   b. Remove content that directly and negatively discusses “branded” competitor offerings. WATERiD is not the location to upload materials used for negative marketing.
   c. Check the WATERiD library for related technology and product profiles.
      i. Confirm that the existing profiles properly identify the capabilities and limitations of the technology as indicated by the new submission.
      ii. Create technology profiles within WATERiD, as needed.
      iii. Contact the product supplier to solicit a thorough product profile for WATERiD, as needed.
   d. Specifically review technology provider submitted case studies pertaining to technologies with inadequate coverage within the WATERiD website.
      i. Identify the relevant utility.
      ii. Attempt to confirm the technology capabilities and limitations through direct Utility experience.
      iii. Request that the utility work with the WATERiD research team for the authoring of a WATERiD case study.
WERF Subscribers

WASTEWATER UTILITY

Alabama
Montgomery Water Works & Sanitary Sewer Board

Alaska
Anchorage Water & Wastewater Utility

Arizona
Avondale, City of
Glendale, City of
Peoria, City of
Phoenix Water Services Department
Pima County Wastewater Reclamation Department
Tempe, City of

Arkansas
Little Rock Wastewater Authority

California
Central Contra Costa Sanitary District
Corona, City of
Crestline Sanitation District
Delta Diablo Sanitation District
Dublin San Ramon Services District
East Bay Dischargers Authority
East Bay Municipal Utility District
Fairfield-Suisun Sewer District
Fresno Department of Public Utilities
Inland Empire Utilities Agency
Irvine Ranch Water District
Las Gallinas Valley Sanitary District
Las Virgenes Municipal Water District
Livermore, City of
Los Angeles, City of
Monterey County Sanitation District
Napa Sanitation District
Novato Sanitary District
Orange County Sanitation District
Palo Alto, City of
Riverside, City of
Sacramento Regional County Sanitation District
San Diego, City of
San Francisco Public Utilities, City and County of
San Jose, City of
Sanitation Districts of Los Angeles County
Santa Barbara, City of
Santa Cruz, City of
Santa Rosa, City of
South Bayside System Authority

South Carolina
Beaufort-Jasper Water & Sewer Authority
Charleston Water System
Greenville Metropolitan District
Mount Pleasant Waterworks
Spartanburg Water
Sullivan's Island, Town of

South Dakota
Cedar Rapids Water Pollution Control Facilities

Tennessee
Charleston-Mecklenburg Utilities
Durham, City of
Metropolitan Sewerage District of Buncombe County
Orange Water & Sewer Authority
Raleigh, City of

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Austin, City of
Dallas Water Utilities
Denton, City of
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Utah

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