

WATER UTILITY BOARD

CAPITAL PROJECTS MONTHLY REPORT

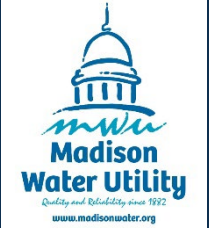


Pete Holmgren, P.E.
Chief Engineer

July 22, 2025



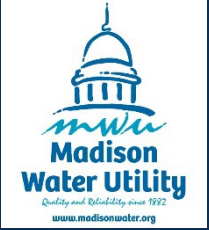
Capital Projects Monthly Report



■ PRESENTATION OVERVIEW:

1. Actual Expenditures Through June 2025
2. 2025 Expense Depreciation for Water Main Replacement
3. Capital Project Updates:
 - Unit Well 19 Iron, Manganese, & Radium Treatment Facility
 - Unit Well 15 PFAS Treatment Facility
 - Unit Well 12 Reconstruction
 - 2025 Engineering Internship and Project

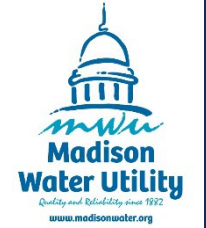
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2025 Actual Expenditures and Encumbrances (Through June):

- Total of Actual Expenditures and Encumbrances: ~\$18,176,000
- June 2025 Actual Expenditures (~\$2,560,000):
 1. Facilities: ~\$1,045,000
 2. Fleet/Other: ~\$720,000
 3. Pipelines: ~\$795,000

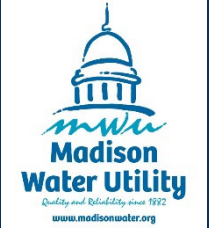
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2025 Water Main Expense Depreciation:

- The total targeted spend amount in 2025 is \$5,000,000.
- Actual expenditures through June are ~\$1,700,000
- Estimated encumbrances *plus* expenditures through June are ~\$4,527,000

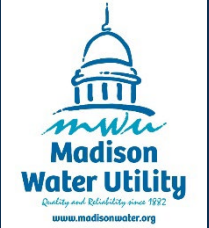
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Project Update: Unit Well 19 Iron, Manganese, & Radium Treatment

- Project Budget: \$9,183,000
 - Current Status: Construction
 - Deep well pump installation, borehole rehabilitation
 - Doors and hardware installations
 - Upcoming:
 - Chemical room completion and startup (August)
 - Facility startup and testing of deep well and booster pumps (August)
 - Filter tank startup and testing (September)

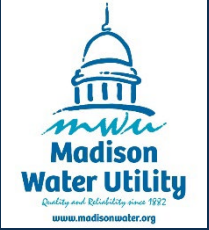
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Project Update: Well 15 PFAS Treatment Facility

- Project Budget: \$5,943,000
- Current Status: Construction
 - Equipment programming and testing
 - Filling, startup, training, and testing of new filter tanks
- Upcoming:
 - Equipment commissioning and training – all components
 - Floor, landscaping, driveway finishes
 - Mid-August final completion at current schedule

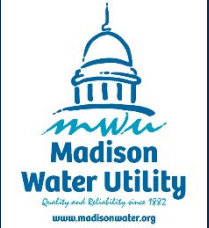
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Project Update: Well 12 Reconstruction

- Project Budget: \$8,00,000 (2025: \$800,000)
- Current Status: Planning and Analysis
 - Additional reservoir volume information to DNR (post-June 30th SDWLP application)
 - Awaiting DNR review and feedback of project report
- Upcoming:
 - Zoning meeting to review requirements of parcel
 - Updated estimate of probable costs
 - Preparation of PSC Construction Authorization Application

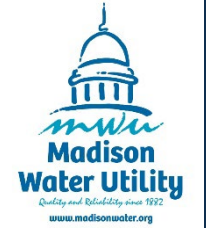
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2025 Engineering Internship and Project

- Water Utility Engineering Internship program has been in place since 2011
 - 14 interns to date
 - Full semester and summer terms, generally either January 1st – August 31st OR May 20th – December 20th
- Entry-level professional engineering work and exposure
 - Primary “mentorship” rotates annually among Engineering staff but will involve work across the entire Utility
- Interns must be:
 - Currently enrolled and in good standing in a Bachelor's or Master's degree program in Civil, Environmental, or Construction Engineering, or a similar engineering program
- OR
 - Currently enrolled and in good standing in an Associate degree civil engineering technology program w/1-year of program completed

Capital Projects Monthly Report



2025 Engineering Intern

Macie Wenning

- **College:** University of Wisconsin-Madison (Class of 2027)
- **Major:** Environmental Engineering (Bachelor's)
- **Work Term:** January through August



College of Engineering
UNIVERSITY OF WISCONSIN-MADISON

■ **Example Assignments:**

- Drafting Water Main Construction Plans
- Construction Inspection
- **Public / Board Meeting Participation**
- **Risk and Resilience Analyses**
- Main Break Repair Observation
- Quality Control
- Job Shadowing (Utility-Wide)
- Surveying / Record Drawing Creation

WATER UTILITY BOARD

RISK AND RESILIENCE ASSESSMENT PROCESS



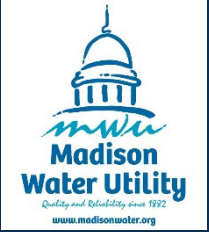
Macie Wenning

Engineering Intern
Madison Water Utility
mwenning@madisonwater.org

July 22nd, 2025



Background Legislation



- Public Health Security and Bioterrorism Response Act of 2002
 - Required vulnerability assessments which assessed a utility's vulnerability to a terrorist attack or other form of malevolent attack
- America's Water Infrastructure Act (AWIA) of 2018
 - Mandates risk and resilience assessments and emergency response plans for utilities that serve over 3,300 people
 - Requires utilities to verify completion of the report to the EPA every 5 years by March 31st
 - Analyzes direct attacks as well as natural hazards for a more holistic threat analysis
- ANSI/AWWA J-100-21 is the national standard for risk and resilience assessments
 - Uses a strict process of probability-driven determinations that accurately reflect likelihoods, vulnerabilities and probable consequences

PARRE Tool



- Generates a risk and resilience report via a 7-step process
 1. Asset Characterization
 2. Threat Characterization
 3. Threat-Asset Matrix
 4. Direct Threat Analysis
 5. Indirect Threat Analysis
 6. Resilience
 7. Risk Resilience Analysis
- Specifically designed to be compliant with the J-100 Standard
- Quantifies risk into a dollar amount
 - Risk = Consequences (\$) × Threat Likelihood (%) × Vulnerability (%)

Welcome to **PARRE**

Open or Create a Project

PARRE Tool

Asset Characterization

- Assets are chosen based on how important they are to daily operations and successfully supplying quality water to our customers
- These can include physical structures, people, or information
- Assets that are not directly integral to this are not included
 - Ex. Unit wells that supply to areas that could be covered by other nearby wells

Threat Characterization

- Threats are chosen based on scenarios that would prevent the utility from supplying quality water to our customers
- They are separated between direct threats, natural threats, and dependency & proximity threats

Not a concern for this
system, given its
location.

☐
Inconsequential.
☒

Threat-Asset Matrix

- Assigns each threat-asset pair a rating between 1-5 and analyzes pairs ranked 3 and above
- Weeds out more unlikely and unimportant threats
- 486 pairs narrowed down to 146

| | | THREATS | | | | | | | | | | | |
|--------|--|---------|---|---|---|---|---|---|---|---|---|---|---|
| ASSETS | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 2 | 3 |
| | | 5 | 2 | 2 | 3 | 2 | 2 | 3 | 4 | 4 | 4 | 2 | 3 |
| | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 3 | 3 |
| | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 2 | 2 |
| | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | 2 | 3 |
| | | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 2 | 2 |
| | | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 2 | 2 |
| | | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 4 | 2 | 2 |

PARRE Tool



Direct Threat Analysis

■ Consequences

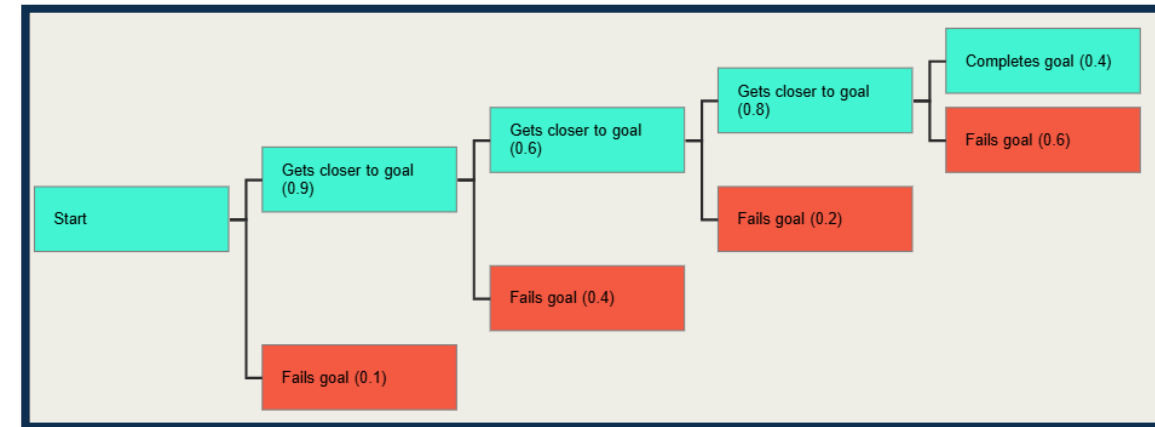
- Quantifies the worst reasonable consequences with metrics such as fatalities, serious injuries, financial loss, and economic losses to the community
- The US Department of Transportation statistical values of life are used to assign a monetary value for fatalities and serious injuries:
 - \$13.2 million for life
 - \$1.386 million for serious injury

■ Threat Likelihood

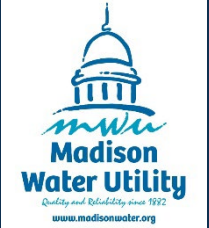
- Proxy Indicator
- Best Estimate
 - Threat likelihood of a cyber attack was best estimated as 1
 - Threat likelihood does not equate to success
 - With approximately 3.4 billion phishing emails are sent daily, a cyber attack is a not a matter of if, but when

■ Vulnerability

- A vulnerability tree is created to evaluate the probability of success for each threat-asset pair



Proxy Indicators



- Estimate threat likelihood of relatively infrequent attacks, based on attractiveness of utility, size of metropolitan area, number of governmental facilities, etc.
- Based on the 2007 work of the RAND Corporation and the 2008 work of the Risk Management Solutions Corporation
 - These are publicly available summaries of recorded threats around the world
- Proxy Indicators can be overridden
 - EPA provides a baseline range for theft threat likelihood (0.01-0.1)
 - Insider/Outsider Theft proxy indicator calculated by hand
 - J-100 standard provides steps on how to calculate a proxy indicator
 - Consists of estimating the average number of threats per year, selecting a metro region, selecting a broad target type, selecting a specific utility, and adjusting for detection and interdiction
 - J-100 standard provides tables to help with most of these values, and they are multiplied together to formulate the final threat likelihood values

PARRE Tool

Indirect Threat Analysis

- Accounts for all non-malevolent threats the utility may face
 - Natural hazards
 - Tornados, ice storms, flooding, outages, etc.
 - Dependency/Proximity
 - Key Employees
 - Key Customers

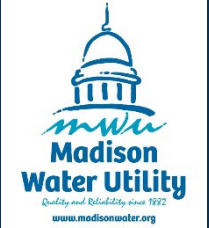
Resilience

- Evaluates the utility's ability to recover from an attack and reestablish service quickly using a Utility Resilience Index
- Determined by a Financial Resilience Index and an Operational Resilience Index
- Scores on a scale out of 100

Risk Resilience Analysis

- Not required for AWIA
- Creates a risk baseline which can be used to test new countermeasures by measuring them against their resulting reduction in risk
- Acts as a return on investment analysis that determines the lowest cost, yet most effective countermeasures

Importance



- Identify all possible threats, both malevolent and natural in origin
- Understand potential consequences of threats and vulnerabilities within the utility
- Return on investment analysis to determine low cost, highly effective measures to improve resiliency
- Inform and update the Emergency Response Plan to enhance effectiveness during and following an incident
 - Must be completed within 6 months of Risk and Resilience Assessment
 - Currently working on it to finish by end of September
- Reveal mitigation strategies to enhance security and resilience
- Inform resource allocation and future infrastructure planning





Thank you!

Questions / Comments?

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