

Risk Assessment Summary Report for City of Ramsey

Report Date: June 21, 2021

Risk and Resilience Assessment Summary

Purpose

This risk and resilience assessment of City of Ramsey was performed on June 21, 2021 using the U.S. Environmental Protection Agency's (EPA) Vulnerability Self-Assessment Tool (VSAT) Web Version 2.0. EPA developed and maintains VSAT Web to serve as an all-hazards risk and resilience assessment tool for water and wastewater utilities of all sizes. Specifically, EPA designed Version 2.0 of VSAT Web to assist community water systems with meeting the requirements for risk and resilience assessments in America's Water Infrastructure Act of 2018 (AWIA).

VSAT Web 2.0 can help water sector owners and operators with identifying the threats that present the highest risks to their facilities and with evaluating the costs and benefits of countermeasures to reduce those risks.

Methodology

VSAT Web 2.0 addresses malevolent acts, natural hazards, and dependency/proximity threats to water sector operations and analyzes the cost-effectiveness of countermeasures to reduce risk. The methodology in VSAT Web 2.0 is based on assessing the risk to a water system asset from a specific threat or hazard (i.e., an Asset-Threat Pair), where risk is defined as follows:

Risk (R) = Threat (T) X Vulnerability (V) X Consequences (C)

- T = Likelihood that the threat will be perpetrated or occur against the asset;
- V = Likelihood that the threat will damage the asset, considering the effectiveness of countermeasures; and
- C = Economic (cost to the utility and region) and public health (injuries and deaths) impacts resulting from damage to the asset.

A monetary value of statistical illness and value of statistical life are assigned to injuries and deaths, respectively, so that risk can be determined as a single monetized value.

AWIA requires community water systems to assess the risks to and resilience of specified assets from both malevolent acts and natural hazards. Accordingly, VSAT Web 2.0 begins with a characterization of water system resilience using the Utility Resilience Index, as described below. The analyst then conducts a qualitative assessment of risks from malevolent acts and natural hazards to all the assets required in AWIA. These steps can ensure that the assessment may be certified as compliant with AWIA.

Following these steps, the analyst determines which assets and threats will undergo a quantitative risk assessment, involving estimates of threat, vulnerability, and consequences. The quantitative risk assessment may include a broad spectrum of assets encompassing the entire water system, or be limited to those assets at highest risk. For threat selection, VSAT Web 2.0 includes all the malevolent acts, natural hazards, and dependency/proximity threats listed in the AWWA J100-10 Standard, along with source water (accidental and intentional) and finished water (accidental) contamination. Analysts may also designate a custom threat.

After completing a quantitative risk assessment under the current (baseline) conditions for the water system, the analyst may choose to conduct an optional assessment of additional (potential) countermeasures (an improvement analysis). VSAT Web 2.0 provides the analyst with a suite of countermeasures from which to select, or the analyst may designate a custom countermeasure. This analysis results in a profile of existing risk and a benefit/cost analysis of potential countermeasures to reduce risk.

Utility Overview

Utility Type and Information	
Utility Type	Drinking Water
Utility Name	City of Ramsey
State/Territory	Minnesota
Zip Code	55303
Population Served	15,000
Ownership	Public
Average Daily Water Service (MGD)	2
Average Rate (\$/1000 gallons)	\$3.11
Comments	

To edit utility type or information, return to the Utility Overview section in the tool.

Utility Resilience Index

The Utility Resiliency Index (URI) is a risk management tool that can assess a utility's capability to respond to and recover from an incident that impacts critical operations.¹ The URI is a valuable complement to the risk assessment performed in VSAT Web 2.0. A utility can use the URI together with the risk assessments results when developing an overall risk management plan.

The URI uses 12 indicators to calculate the index. Responses to the indicators are assigned values and weights, which are aggregated to provide a characterization of a utility's resilience on a scale from 0% to 100%. A low URI score indicates a low capability of the utility to respond to and recover from an incident, while a high URI score indicates a greater capability to do so. If multiple statements under one indicator apply to the utility, select the statement at the highest resilience level. Statements are arranged from lowest to highest resilience level under each indicator.

The URI for City of Ramsey is: 39%

¹Adapted from Morley, K. M. (2012). *Evaluating resilience in the water sector: Application of the Utility Resilience Index (URI)*. (<http://www.worldcat.org/oclc/801849602>) and used with permission.

1. **Emergency Response Plan (ERP)**

An ERP provides a tactical level plan for immediate response to incidents of all types. Select the statement below that best describes the utility's ERP.

No ERP or ERP status unknown

2. **National Incident Management System (NIMS) Compliance**

NIMS establishes a common framework for defining roles and responsibilities to enhance incident response. NIMS applies the Incident Command System (ICS) to provide the support structure for response activities. Select the statement below that best describes the utility's NIMS compliance.

No ICS/NIMS training completed or NIMS compliance unknown

3. **Mutual Aid and Assistance (MAA)**

MAA agreements between other utilities and jurisdictions help to provide rapid response to incidents. Participation in such agreements is traditionally at no cost and does not obligate signatories to respond. An example is the Water/Wastewater Agency Response Network (WARN). Select the statement below that best describes the utility's MAA agreements.

Local-Local (with adjacent city/town)

4. **Emergency Power for Critical Operations (EPCO)**

EPCO is a minimum benchmark of 72 hours for backup power for critical operations and assets. Select the statement below that best describes the utility's EPCO.

Greater than or equal to 73 hours of backup power

5. **Minimum Daily Demand/Treatment (MDDT)**

MDDT is the ability to meet minimum daily demand or treatment when the production or treatment plant is non-functional. For example, a drinking water utility typically has some level of in-system storage that can provide minimum daily flows for a time even though a treatment plant may be non-functional. Select the statement below that best describes the utility's MDDT.

Greater than or equal to 73 hours

6. **Critical Parts and Equipment (CPA)**

CPA is the lead time for repair, replacement, or recovery of operationally critical parts or equipment. Critical parts are defined as components of the system that upon failure may have the potential to impair the ability to produce, distribute, or treat drinking water or wastewater, including both physical and cyber/process control systems. Select the statement below that best describes the utility's CPA.

3-4 weeks or greater, or lead time is unknown

7. Critical Staff Resilience (CSR)

CSR is the percentage of response-capable staff who are cross-trained in critical operations and maintenance positions and available as staff backup. This indicator is primarily related to pandemic flu planning. Select the statement below that best describes the utility's CSR.

Greater than 25 to 50%

8. Business Continuity Plan (BCP)

A BCP provides an overall indicator of a utility's commitment to integrating risk management principles into the management culture that supports their operations. These plans address the potential financial effects of a crisis, as well as the utility's flexibility to adapt human resource policies to meet the changing needs of employees. Select the statement below that best describes the utility's BCP.

No BCP or unknown

9. Utility Bond Rating (UBR)

UBRs are assigned by Moody's and indicate a utility's ability and willingness to satisfy financial obligations. The rating includes five primary factors related to municipal finance, which include market position, financial position, debt levels, governance, and covenants. Some utilities may not have a bond rating since they do not seek additional investment capital from the market. Select the statement below that best describes the utility's UBR.

AA

10. Government Accounting Standards Board (GASB) Assessment

A GASB Assessment determines how much infrastructure has been evaluated to provide an indication of the utility's overall commitment to proper asset management. The assessment coverage is calculated as: $100 \times \text{total number of critical assets categorized into condition categories} / \text{total number of critical assets as determined in the asset characterization step of the J100 standard}$. Select the statement below that best describes the utility's GASB Assessment.

Less than 20% assessed or unknown

11. Unemployment*

Unemployment is a general socioeconomic indicator of a community's economic health. The Bureau of Labor Statistics (BLS) maintains a database of state and local rates (see <http://www.bls.gov/lau/tables.htm>) which provides a consistent source for determining this indicator. The value for this indicator is based on the unemployment level in the community served by the utility. Select the statement below that best describes the unemployment rate in the service area.

+/- 2% National Average

12. Median Household Income (MHI)*

MHI is a socioeconomic indicator of the wealth of the community served by the utility. This indicator provides insight on the fragility of a community to withstand a significant incident that could threaten the financial stability of the utility. The U.S. Census Bureau maintains a database for each state and county (see <https://www.census.gov/quickfacts/fact/table/US/PST045218>). Select the statement below that best describes the MHI in the service area.

10% or more above State Median

To adjust any of the responses above, return to the tool and revise the selections in the Utility Resilience Index section.

Qualitative Risk Assessment

Results from the Qualitative Risk Assessment for the utility are shown below

Asset Category	Threat Type: Malevolent Act	Threat Type: Natural Hazard	Reason for not selecting threat type
Physical Barriers	X	X	
Source Water			Source is deep aquifer, water travel time from surface is decades.
Pipes and Constructed Conveyances, Water Collection, and Intake		X	
Pretreatment and Treatment	X	X	
Storage and Distribution Facilities		X	
Electronic, Computer, or other Automated Systems (including the security of such systems)	X	X	

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Asset Category	Threat Type: Malevolent Act	Threat Type: Natural Hazard	Reason for not selecting threat type
Monitoring Practices		X	
Financial Infrastructure			Financial Infrastructure is protected from cyber attacks and can be moved to new location if building is damaged.
The Use, Storage, or Handling of Chemicals			Chemicals are stored at point of use. Separate storage facilities do not exist in City.
The Operation and Maintenance of the Utility			These risks are addressed in the other categories.

To adjust any of the responses above, return to the tool and revise the answers in the Qualitative Risk Assessment section.

Quantitative Risk Assessment

Below is a list of the assets and threats the analyst selected for the utility's quantitative risk assessment. To edit any of the asset/threat pairs below, return to the Quantitative Risk Assessment section of the tool and make the changes.

Identified Assets	Assigned Threats		
	EQ5 - Earthquake - PGA > 1.1 - USGS Maximum Probable Quake	T1 - Tornado - Fujita 1 - Most damaging common earthquake in Ramsey	T1 - Tornado - Fujita 1
Water System	X	X	
Water System Pipes			X
SCADA System			

Identified Assets	Assigned Threats
	Cyber Attack on SCADA
Water System	
Water System Pipes	
SCADA System	X

Countermeasure Risk Assessment

Countermeasures comprise any infrastructure, equipment, systems, or procedures that reduce risk (threat, vulnerability, or consequences). The table below shows both the existing countermeasures identified for the utility and the potential countermeasures selected for analysis to reduce risk. To edit any of the existing countermeasures, return to the Countermeasure Risk Assessment section of the tool and make changes there.

Selected Countermeasures	Identified Assets		
	Water System	Water System Pipes	SCADA System
Existing Countermeasures			
Backup power generation on-site	X	X	X
Potential Countermeasures			
Emergency operating procedural plan	X	X	X

Assessment Summary

The table below shows the monetized risk summary for each asset/threat pair. Baseline results reflect existing countermeasures and improvement results reflect enhanced mitigation with the selected potential countermeasures in place. To edit any of the information shown in the table(s) below, return to either the Quantitative Risk Assessment or Countermeasure Risk Assessment section of the tool and make changes there.

Asset/Threat Pair: Water System/EQ5 - Earthquake - PGA > 1.1 - USGS Maximum Probable Quake Monetized Risk Summary

Existing Countermeasures: Potential Countermeasures: Emergency operating procedural plan.

Risk Metrics	Baseline	Improvement
Monetized Risk	\$2	\$0
Utility Financial Impact	\$0	\$0
Regional Economic Impact	\$0	\$0
Fatalities	0	0
Injuries	50	0
Vulnerability Likelihood	72%	
Annual Threat Likelihood	7.2e-7	0

Asset/Threat Pair: Water System/T1 - Tornado - Fujita 1 - Most damaging common earthquake in Ramsey Monetized Risk Summary

Existing Countermeasures: Backup power generation on-site; Potential Countermeasures: Emergency operating procedural plan.

Risk Metrics	Baseline	Improvement
Monetized Risk	\$0	\$0
Utility Financial Impact	\$0	\$0
Regional Economic Impact	\$0	\$0
Fatalities	0	0
Injuries	0	0
Vulnerability Likelihood	91%	
Annual Threat Likelihood	0.00014	0

Asset/Threat Pair: Water System Pipes/T1 - Tornado - Fujita 1 - Monetized Risk Summary

Existing Countermeasures: Backup power generation on-site; Potential Countermeasures: Emergency operating procedural plan.

Risk Metrics	Baseline	Improvement
Monetized Risk	\$0	\$0
Utility Financial Impact	\$0	\$0
Regional Economic Impact	\$0	\$0
Fatalities	0	0
Injuries	0	0
Vulnerability Likelihood		
Annual Threat Likelihood	0.00014	0

Asset/Threat Pair: SCADA System/Cyber Attack on SCADA - Monetized Risk Summary

Existing Countermeasures: Backup power generation on-site; Potential Countermeasures: Emergency operating procedural plan.

Risk Metrics	Baseline	Improvement
Monetized Risk	\$0	\$0
Utility Financial Impact	\$0	\$0
Regional Economic Impact	\$0	\$0
Fatalities	0	0
Injuries	0	0
Vulnerability Likelihood		
Annual Threat Likelihood	1	0

Countermeasure Costs and Packages

The table below shows the cost analyses for the selected potential countermeasures. If the analyst provided both the capital and the operations and maintenance (O&M) costs for the potential countermeasures, VSAT Web 2.0 calculated an annualized cost using a 4% finance rate over 10 years. To edit any information shown below, return to the Countermeasure Costs section of the tool and make changes there.

Potential Countermeasure	Capital Cost	O&M Cost	Annualized Cost
Emergency operating procedural plan	\$0.00	\$0.00	\$0.00

To add information in this section, return to the Countermeasure Costs and Countermeasure Packages sections of the tool and complete the analysis there.