

Protecting Your Community's Assets:

A Guide for Small Wastewater Systems



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(Printed Edition)

Disclaimer

This document contains information on how to plan for protection of the assets of your wastewater system and your community. The work necessarily addresses problems in a general nature. You should review local, state, and federal laws and regulations to see how they apply to your specific situation.

Efforts have been made to ensure the accuracy of these materials. However, NETCSC, West Virginia University, West Virginia University Research Corporation, and those involved in the development of this document cannot accept liability for circumstances arising from the use or misuse of these materials.

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A Note About the Use of this Document

This document, upon completion, will include detailed information about vulnerabilities in your wastewater system. Access to this document should be limited on a “need to know” basis to those persons who will use it, as determined by your community. A duplicate copy should also be stored in a secure off-site location.



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Introduction

An effective wastewater system is an important part of any community. Your wastewater system protects public health and the environment, and it is a foundation for your local economy. Your wastewater system also represents a sizable investment by the community, so protecting it is a critical part of managing your system.

Wastewater systems may be vulnerable to a wide variety of threats that can affect operations including natural disasters, operator errors, vandalism, and even terrorism. By identifying potential vulnerabilities early and taking appropriate corrective actions, key community members can prevent some security breaches and prepare for potential emergencies before they occur. By adequately preparing, you are protecting your community's investment, public health, environment, and other community assets that rely on the system.

This guide is designed to help small community representatives identify vulnerable components of their wastewater system and to prioritize actions to address those vulnerabilities. In general, this “vulnerability assessment” process involves the identification of vulnerabilities in system security, and focuses on threats that could damage the system or affect its ability to provide adequate service. The end result of this process should be an improved ability to prioritize and implement effective actions to safeguard your community's public health, economic assets, and environment.



Small wastewater systems, defined generally as those serving less than 10,000 people, are vulnerable for many reasons. Treatment plants are often isolated and may not always have staff people present. Collection systems may be spread over a large area and may be accessible to unauthorized people. Hazardous materials are often stored on site.

Local decision-makers and system personnel should recognize that it is impossible to totally eliminate vulnerabilities. The key to being prepared is to identify conditions that are likely to occur during an emergency, and then to minimize the vulnerability of critical assets that are likely to be affected.

Good management is a key to the successful operation of a wastewater system, and preparing for emergencies is an important part of good management. Like all management processes, minimizing vulnerabilities is not something that is done just once. It is a process that involves assessment, action, and review on a regular basis.

How To Use This Guide

This guide is an asset-based tool. Assets are parts of the system that are important for its operation, the community, and the environment. The guide focuses on the key assets of a wastewater system, and also considers the threats to those assets. Everyone recognizes that physical structures, such as the treatment plant and the collection system, are critical assets that need to be maintained and protected. However, there are other community assets that also need to be considered, such as the staff, system records (or knowledge base), and the system's customers. Each of these assets should be assessed for vulnerabilities that could affect the system.

Assets vary widely from community to community. A town of 200 may have fewer assets, and therefore, fewer assets to protect than a town of 10,000. When using this guide, those involved with the assessment must decide which aspects of it apply to them and which do not. A community with a small lagoon, one lift station, and a part-time operator will probably find that sections of this guide will not apply to them. A community with two mechanical treatment plants and a larger collection system may find that nearly everything applies. This guide was designed so users could modify it as necessary to fit their system, by eliminating issues that do not apply, and adding any that may not be included. Simply check or write "N/A" over items that are not issues for your community. Spaces are also provided throughout the guide to enable you to consider any assets, threats, or potential corrective actions that apply to your community that were not included in the guide.



For this assessment to be most effective, it is important to get input from all groups and individuals who have decision-making and operational responsibilities for your wastewater system. Wastewater operations personnel are unlikely to have all the needed information. Members of the water board or town government will have some important information. In some towns, for example, the street department may oversee the collection system. It is important to identify and involve the appropriate people in the process. Input from operators, managers, town officials, legal advisors, and local emergency response personnel will broaden the knowledge base and make completing the assessment easier. For the smallest systems, it may be possible to make the assessment in one or two meetings; for bigger systems, several meetings may be necessary.

The process presented here is relatively simple. First, those involved in the process identify the system's assets. Second, they determine which threats are most likely to occur and which threats would be likely to have the greatest impact on the system if they were to occur. Third, they identify system vulnerabilities, based on a series of questions provided. And finally, they prioritize potential corrective actions to be taken. The prioritized corrective actions are drawn from measures identified to correct specific vulnerabilities and measures intended to guard against important threats to the system.

There are four separate tools to help you with this process:

- **Inventory of Critical Assets**



Completing this inventory will enable you to identify and focus on the key assets of your system that need to be protected.

- **Threat Assessment**



The Threat Assessment is used to identify the most likely threats to your wastewater system and their potential impacts on your community's assets. The worksheet provided allows you to rate the most important threats based on their likelihood of occurrence and potential magnitude of impact. Don't rule out an incident automatically just because you do not remember it occurring before.

- **Vulnerability Assessment Checklist**



This checklist has a simple design, requiring "yes" or "no" answers to a series of questions. For any "no" answer, list potential corrective actions in the right hand column. If you think of a vulnerability that applies to your system that is not listed, write it in the blank spaces available at the end of each section, and list any appropriate corrective actions in the space provided. In instances where a question or section does not apply to your system, simply check "N/A."



As you work through this and other portions of the guide, seek additional assistance through appropriate local resources, such as technical assistance providers, local emergency officials and planning committees, and experts and professional associations, as needed.

- **Prioritization of Potential Corrective Actions**



Use this section to prioritize the corrective actions that you should take, based on the degree to which they are likely to result in reduced risks to your community's public health, economic assets, and environment. The prioritization process involves three steps. First, you list and rank the corrective actions identified on your vulnerability assessment checklist. Second, you list the largest threats facing your community, identify any *additional* corrective actions that may be necessary to protect against those threats, and rank them as well. And finally, you merge these two rankings into one unified priority ranking that accounts for the feasibility of implementing the actions identified. This final list of priorities can guide your community's efforts to improve the security of your wastewater related assets and minimize their vulnerabilities.

There are two additional tools to help you prepare for emergencies:

• **Emergency Contact List** 

This list will help you identify who you need to contact in the event of an emergency or threat and will help you develop appropriate communication and outreach strategies. Completing the Emergency Contact List is an important step toward developing an Emergency Response Plan, which provides detailed procedures on how to respond to an emergency. As you review the contact list, determine who needs to receive the contact list and your ERP.

• **Incident Log** 

The incident log can be used to record reports of problems in the system. Train everyone who answers calls or works at your facility to use this log or another one of your choosing. This kind of incident information will be important to operations personnel and emergency responders in the event of a problem, and will help document responses to the incident.

No community will ever be able to anticipate every problem or event that might occur, nor can every emergency be avoided. The key is to prepare for the most likely threats and those that would have the greatest impact on the system. Then take steps to minimize vulnerabilities. Every community needs to decide for themselves what corrective actions are essential to protect their assets.

Once you have completed this document, review the actions you need to take to improve your system's security. When you have identified critical threats and vulnerabilities and determined that minimizing those threats is feasible, it is important to follow through and take action. Consult with your community's legal counsel for information about the legal implications of taking or not taking action to correct vulnerabilities.

The guide should be considered a working document. It is important to reassess the vulnerability of your system on a regular basis. Preparedness is not an end point, but a goal that can be achieved only through continued efforts to assess and improve the overall security of your system.

Consider this document to be sensitive information. It should be stored separately in a secure place at your wastewater system office. A duplicate copy should also be stored at a secure off-site location. Access to the completed document should be limited to key wastewater system personnel and local officials, appropriate emergency responders, and potentially others on a need-to-know basis. We hope this guide helps increase awareness for you, your staff, and governing officials about the vulnerabilities of your system. We also hope it enables you to take action to protect the assets of your system and community.



1) Inventory of Major Small Wastewater System Assets

List the major assets of your wastewater system. These assets are likely to include personnel, customers, and major system components. For each of these asset categories, major assets that often exist in smaller communities are listed in the left hand column of the table. Blank spaces allow you to list assets of your particular system that are not already shown in the table. The purpose of this effort is to provide a concise background of your system's assets for all those conducting the assessment. Minor items such as specific pieces of laboratory equipment or supplies need not be listed. For communities with more than one centralized wastewater system, it is best to make a copy of the inventory sheets, and list the assets of each system separately. If you do this, please make sure to attach this additional asset list to the overall document.

Personnel (names)	Title	Full Time / Part Time/ Contract Employees
1)		
2)		
3)		



Customers	Number	Special Information about Wastes (type/volume, etc.)
1) Residential		
2) Commercial		
3) Industrial		
4) Institutional		
5) Septage Haulers		
6) Other		



Treatment Plant	Type, Number & Location (if applicable)	Description
1) Buildings		
2) Preliminary Treatment		
3) Primary Treatment		
4) Lagoon		
5) Secondary Treatment		

Treatment Plant (contd.)	Type, Number & Location (if applicable)	Description
6) Residuals Handling		
7) Residuals Disposal		
8) Disinfection Processes		
9) Chemical Storage		
10) Laboratory Facilities		
11) Other		



Power**Type, Number & Location
(if applicable)****Description**

1) Primary Power

2) Auxiliary / Back-up Power

3) Other

Collection System**Type, Number & Location
(if applicable)****Description**

1) Manholes

2) Cleanouts



Collection System (contd.)	Type, Number & Location (if applicable)	Description
3) Sewers		
4) Lift Stations		
5) Other Collection System Assets		

Offices	Type, Number & Location (if applicable)	Description
1) Buildings		
2) Computers and Computer Control Systems		
3) Files		
4) Transportation/Work Vehicles		
5) Other		

Communications	Type, Number & Location (if applicable)	Description
1) Telephone		
2) Cell Phone		
3) Radio		
4) Other		

2) Threat Assessment Checklist

Complete the Threat Assessment using the following method:

- A. Frequency of Past Occurrences: For single event, list date; For multiple events, indicate the frequency over 1, 5 or 10 year periods.
- B. Probability of Future Occurrences: 1 – extremely unlikely; 2 – not too likely; 3 – somewhat likely; 4 – likely; 5 – very likely.
- C. Magnitude of Impact: 1 – little or no impact; 2 – some impact; 3 – medium impact; 4 – significant impact; 5 – major impact.
- D. Overall Threat Rating: $B \times C = D$

Probability of Occurrence, Magnitude of Impact, and Overall Threat Rating



Potential Threat	A Frequency of Past Occurrence	B Probability of Future Occurrences	C Potential Magnitude of Impact	D Overall Threat Rating
<i>Example</i> Floods	<u>3 times / 10 years</u>	<u>5 (very likely)</u>	<u>5 (major impact)</u>	<u>5 X 5 = 25</u>
Natural Disasters Floods (rivers, dams, snowmelt, low lying areas, streams, ocean, storms etc.)	_____	_____	_____	_____
Landslide/Mudslide	_____	_____	_____	_____

Potential Threat	A Frequency of Past Occurrence	B Probability of Future Occurrences	C Potential Magnitude of Impact	D Overall Threat Rating
Natural Disasters, contd.				
Thunderstorms and Lightning				
Tornado				
Hurricane / High Winds				
Winter Storms and Blizzards				
Freezing				
Drought				
Extreme Heat				
Other Severe Weather				
Forest or Brushfires				
Earthquake				
Avalanche				
Volcanic Eruption				



Potential Threat	A Frequency of Past Occurrence	B Probability of Future Occurrences	C Potential Magnitude of Impact	D Overall Threat Rating
Intentional & Unintentional Acts				
Equipment Failures	_____	_____	_____	_____
Lift Station Failure	_____	_____	_____	_____
Sewer Blockage	_____	_____	_____	_____
Transportation Accident	_____	_____	_____	_____
Construction Accident	_____	_____	_____	_____
Other Accident/Human Error	_____	_____	_____	_____
Energy Disruptions (fuel, lights, etc.)	_____	_____	_____	_____
Major Gas Line Break	_____	_____	_____	_____
Major Water Main Break	_____	_____	_____	_____
Criminal Acts	_____	_____	_____	_____
Strikes	_____	_____	_____	_____
Riots	_____	_____	_____	_____



Potential Threat	A Frequency of Past Occurrence	B Probability of Future Occurrences	C Potential Magnitude of Impact	D Overall Threat Rating
Terrorist Attack	_____	_____	_____	_____
Obstructed Access to Facilities	_____	_____	_____	_____
Harmful Inputs to System				
Hazardous Materials Release	_____	_____	_____	_____
High Strength Organic Material	_____	_____	_____	_____
Chemical Inputs	_____	_____	_____	_____
Radioactive Inputs	_____	_____	_____	_____
Communication System Failures				
Communication Disruptions	_____	_____	_____	_____
Telephone Failure	_____	_____	_____	_____
Two-way Radio Failure	_____	_____	_____	_____
Cell Phone Failure	_____	_____	_____	_____
Telemetry Failure	_____	_____	_____	_____



Potential Threat	A Frequency of Past Occurrence	B Probability of Future Occurrences	C Potential Magnitude of Impact	D Overall Threat Rating
Cyber Attacks and Failures SCADA Failure/Disruption	_____	_____	_____	_____
Hackers	_____	_____	_____	_____
Loss of Sensitive Information Stored on Computer	_____	_____	_____	_____



This Threat Assessment Table was adapted from material found in the American Water Works Association’s, “Emergency Planning for Water Utilities: Manual of Water Supply Practices M19” and NETCSC’s training module, “Preparing for the Unexpected: Security for Small Water Systems.”