

Infrastructure Resilience Planning Framework **PLAYBOOK**

FEBRUARY 2025

Cybersecurity and Infrastructure Security Agency

Contents

| | |
|--|----|
| IRPF PLAYBOOK OVERVIEW..... | 3 |
| STEP 1: LAY THE FOUNDATION | 4 |
| STEP 2: IDENTIFY CRITICAL INFRASTRUCTURE | 11 |
| STEP 3: ASSESS RISK..... | 17 |
| STEP 4: DEVELOP ACTIONS..... | 22 |
| STEP 5: IMPLEMENT & EVALUATE..... | 29 |
| APPENDIX A. FOUNDATIONAL INFRASTRUCTURE RESILIENCE CONCEPTS..... | 34 |
| APPENDIX B. GRAPHICS SHOWING INTEGRATION INTO SELECT PLANS | 36 |
| APPENDIX C. AFFILIATED RESOURCES & TEMPLATES | 38 |

IRPF PLAYBOOK OVERVIEW

The Infrastructure Resilience Planning Framework (IRPF) Playbook is a supplementary, how-to guide to assist users in executing IRPF guidance to incorporate infrastructure resilience into planning so that communities can become more secure and resilient in the face of multiple threats and changes. Designed as a companion to the IRPF, this Playbook offers users concise instruction and highlights useful resources for accomplishing key actions within each of the five steps for planning for infrastructure resilience. The Playbook also provides a narrative hypothetical illustration of how a community might conduct planning using the various steps of the IRPF.

In addition, the Playbook includes several helpful appendices:

- Appendix A explains in a simple manner various foundational concepts of infrastructure resilience.
- Appendix B outlines how the various planning elements and actions laid out in this Playbook could be specifically integrated into three common types of community plans—Hazard Mitigation Plan, Comprehensive Economic Development Strategy, and Emergency Operations Plan.
- Appendix C provides links for all of the IRPF resources and templates identified for use throughout the Playbook.

Intended Users: The primary users of this Playbook are intended to be state, local, tribal, and territorial governments (SLTTGs), regional planning organizations, and public and private sector infrastructure system owners/operators seeking to enhance their resilience and security and/or incorporate elements of infrastructure resilience into their planning. Other users may include those providing planning support or technical assistance to primary users.

Benefits: Resilient infrastructure is critical to the safety, security, and viability of our communities. There are many benefits to prioritizing infrastructure resilience, such as helping minimize the detrimental impacts of natural and man-made hazards on our communities, reducing the risk of disruption to critical services, and keeping restoration costs low. Additionally, a secure and resilient infrastructure can enhance the overall quality of life for community members by improving the mobility and connectivity of essential services, leading to increased economic opportunities.

Throughout this Playbook, we provide links to resources developed by partners other than the Federal Government. This information is provided “as is” for informational purposes only. CISA does not provide any warranties of any kind regarding this information. CISA does not endorse any entity, product or service, including any subjects of analysis. Any reference to specific commercial products, processes, or services by service mark, trademark, manufacturer, or otherwise, does not constitute or imply their endorsement, recommendation, or favoring by CISA.

STEP 1: LAY THE FOUNDATION



Objective

Form a collaborative planning group, engage infrastructure stakeholders, and review existing information that may be relevant to the planning effort.



Actions to Accomplish

- 1.1 Identify a project champion
- 1.2 Define and scope the effort
- 1.3 Collect and review existing information
- 1.4 Form collaborative planning group
- 1.5 Establish goals and objectives

1.1 Identify a Project Champion



Before you get started

Helpful Resources:

- A preliminary list of potential championing entities or individuals



Outcomes

- A committed individual or entity to advocate for the planning effort

Find your champion. Any resilience planning initiative needs a champion to be successful. The Project Champion is the individual or entity who will promote and actively support your planning efforts. The champion should serve as the project coordinator, helping generate buy-in and sustain project momentum. When seeking a Project Champion, look for someone who will:

- Help identify participants
- Provide or garner the resources needed to accomplish the effort
- Help resolve any obstacles that may arise
- Ensure that project goals are met
- Relay outcomes to key participants

Depending on your community and culture, members from local non-governmental organizations, houses of worship, or volunteer-led community boards could serve as potential resources when looking for your champion.

1.2 Define and Scope the Effort



Before you get started

Helpful Resources:

- IRPF's Table 3. Planning Team Lead Qualifications
- IRPF's quick-start tool *IRPF Launchpoint*



Outcomes

- An assigned Planning Team Lead
- Preliminary project plan that outlines timeline and staffing
- Purpose or problem statement

Select a Planning Team Lead. The Planning Team Lead will be the project manager and would be best filled by an individual with the skillsets listed in Table 3 of the IRPF. The Planning Team Lead may be appointed by the Project Champion, take on this role organically during early discussions, be nominated from within the planning team, or volunteer to fill the role. In coordination with the Project Champion, the planning Team Lead should conduct preliminary activities to lay the foundation for the planning effort, including defining the purpose of your effort, developing a scope and schedule, setting up planning meetings, identifying and inviting stakeholders, and other planning activities.

Staff your effort. Developing infrastructure security and resilience is a complex and multi-faceted effort that requires a diverse team with a broad range of skills and knowledge across multiple domains. Individuals with backgrounds in engineering, planning, and policy administration would prove to be useful, although not crucial to ensure community resilience. If a community lacks the internal capacity to staff their resilience effort, academic institutions, regional development organizations, professional planning organization networks, non-profit organizations, regional collaborative working groups, and consultants are suitable sources to assist your efforts. Additionally, having a team with representatives from across the community may enhance the overall success of the resilience-building process.

Fund your effort. A good way to fund your effort is to integrate it into an existing community planning process that is already funded, or one for which grants, or technical assistance are available. One example of such funding for planning is FEMA's Hazard Mitigation Grant Program which offers resources to state, local, tribal, or territorial governments to develop hazard mitigation plans or conduct planning related activities that reduce or mitigate future disaster losses in their communities.

Define your effort by asking yourself purpose questions. Start framing and defining your effort by asking questions that can help you understand what is driving the desire or need for resilience planning in your community:

- Is there a particular issue, threat, or hazard my community is facing?
- Is there an existing community plan that needs updating?
- Are there specific shortcomings in infrastructure serving the community that need to be addressed?
- Is there a specific infrastructure system my community is particularly concerned about?
- Is there specific funding my community is trying to use or become eligible for?

Based on the answers to these questions, develop a succinct purpose statement to guide your planning effort.

For additional help in focusing your planning, check out CISA's *IRPF Launchpoint* resource, a downloadable quick-start tool that walks through a series of questions to help you understand your needs and point you to the most pertinent IRPF guidance.



IRPF Launchpoint

1.3 Collect and Review Existing Information



Before you get started

What You'll Need:

- Purpose statement established in Action 1.2
- Awareness of existing plans and data

Helpful Resources:

- IRPF's *Data Collection Sample List of Resources*
- IRPF's Table 2. Planning Efforts the IRPF Can Inform



Outcomes

Existing information/data relevant to your planning effort, such as historical records of disasters, hazard information, economic data, and infrastructure asset/system data.

Identify previous information. A vital step in establishing a solid foundation is to review previous planning efforts, studies, mapping, stakeholder feedback, existing plans and data, best practices, and other data that can inform your effort. Review both the *Data Collection Sample List of Resources* and the list of potentially existing plans in IRPF Table 2. Planning Efforts the IRPF Can Inform to identify those that may have information pertinent to your current planning effort. Next, identify the owner of each data source or plan and contact them to obtain that information.



Data Collection Sample List of Resources

Review collected information. Once relevant data are collected, it is essential to review infrastructure information to gather an accurate and comprehensive understanding to make informed decisions regarding the resilience effort. To accomplish this task, it is crucial to first determine information pertinent to the community's infrastructure assets, systems, networks, data on potential threats, hazards, and disasters. Next, review regulatory and compliance information within the community that may need to be updated to comply with the resilience efforts. Lastly, identify resilience vulnerabilities within this dataset to discern potential points of concern.

1.4 Form Collaborative Planning Group



Before you get started

What You'll Need:

- Purpose statement established in Action 1.2
- Awareness of existing partnerships and collaborations

Helpful Resources:

- IRPF's *Planning Participant Contact Information Sheet*
- IRPF's *Stakeholder Invitation Letter*
- IRPF's Table 4. Potential Planning Group Participant
- IRPF's Figure 1. Results of Effective Collaboration
- CISA Regional Staff
<https://www.cisa.gov/about/regions>



Outcomes

- A dedicated core planning team who can execute or be involved in most planning activities
- List of willing participants who can periodically provide insight, information, and input

Identify participants. Keep your established planning purpose in mind as you review the list of potential stakeholders in IRPF's Table 4. Potential Planning Group Participants to help you identify who might be relevant participants in your planning effort. These participants may include community and private sector partners responsible for the planning, design, development, investment in, and operations and management of critical infrastructure assets and systems. It may be beneficial to use the "snowball method" to identify additional participation that you may not have thought of within the effort. Specifically, once you have contacted the more obvious stakeholders, ask them, "who else should be included in this effort?" and see if they recommend any other entities or names lacking within the group. Use the *Planning Participant Contact Information Sheet* to keep track of contact information for potential stakeholders organized by type.



Planning Participant Contact Information Sheet

Invite participants. When you have identified participants and their relevant contact information, your planning team lead should invite them to participate. The *Stakeholder Invitation Letter* provides example content for use in inviting and encouraging participation in your planning process.



Stakeholder Invitation Letter

Secure commitments and document participation. After sending out invitations, be sure to follow up with invited stakeholders to confirm their commitment to participate and provide them with a high-level overview of what that will entail. It is suggested to divide the participants into a “Core Team” responsible for day-to-day actions and a “Collaborative Team” consisting of subject matter experts and other skilled individuals, which would assist the team to inform high-level decisions or strategic planning. Consider adding columns to the Planning Participant Contact Information table to track which identified stakeholders have agreed to participate in the planning process, their level of participation (core planning team vs. broad collaboration group), and ultimately what activities they participate in (e.g., meetings attended, information submitted, feedback provided, etc.).

1.5 Establish Goals and Objectives



Before you get started

What You'll Need:

- Purpose statement established in Action 1.2
- Existing community goals

Helpful Resources:

- IRPF's *Sample Goals and Objectives*



Outcomes

- Clear resilience planning goals and objectives.

Clearly lay out what you intend to accomplish. Start with the purpose statement you developed during initial scoping activities (Action 1.2) and further develop it into distinctly outlined intentions, or goals and objectives, for your planning effort.

- **Formulate resilience goal(s):** Goals are broad statements that describe what you seek to achieve through planning for infrastructure resilience. These can be developed through a review of existing goals the community has, such as a community vision contained in their master plan; collaborative discussions with the core planning team; and consultation with key community stakeholders.
- **Establish specific planning objective(s):** For each identified goal, determine specific activities needed to achieve the goal, whether its filling knowledge gaps, performing analysis, or establishing partnerships, as examples.

You may find it helpful to review the *Sample Goals and Objectives* resource in the IRPF to give you some ideas of what infrastructure resilience planning goals and objectives might look like.



Sample Goals and Objectives



Key Takeaways

- It is important to identify a Project Champion who can authorize time and resources for the planning effort and is invested in incorporating infrastructure resilience into planning. A strong champion can help generate buy-in, arrange resources as needed, and help coordinate stakeholder participation.
- A key step is defining and scoping the effort and determining goals and objectives; this includes determining how the IRPF will be used to support a planning effort and determining what resources will be most applicable. This may change over time as the planning process proceeds, but it is helpful up front to know what outcomes you're seeking from integrating the IRPF into planning.
- Establish a list of relevant stakeholders. Broad participation is valuable when examining the resilience of critical infrastructure systems because those systems cross geographic boundaries and involve a wide range of owners, operators, regulators, and end users.



Hypothetical Example: Step 1 in Action

Amy and Aaron are planners with the Woodvale County Department of Planning. They have heard presentations on enhancing security and resiliency and as planners in a growing community in the Southwest U.S., they'd like to incorporate it into their planning activities. Interested in pursuing these concepts further, they speak to their boss, Denise, who leads the planning department. Denise is initially reluctant but is intrigued by an opportunity to reduce long-term infrastructure costs by investing wisely today. She agrees to have the department champion the effort and authorizes Amy and Aaron to spend time digging into resilience and also agrees to coordinate with other relevant departments and external partners.

With Denise's support behind them, Amy and Aaron begin breaking down a big question: what does infrastructure resilience actually mean for our community and how do we do it? In one of the recent presentations in which they participated, they learned about the IRPF and its accompanying quick-start tool, *IRPF Launchpoint*. They review the IRPF to better understand how incorporating infrastructure resilience into planning can contribute to a stronger community. They then sit down to complete the *IRPF Launchpoint*, and after about 15 minutes, have a better understanding of areas to focus on in their planning. The analysis from *IRPF Launchpoint* suggests they understand risk but need help identifying dependencies. They have a large, diverse community and they could spend years studying ways to improve security and resilience, but they also have a day job to do. Sure, Denise has authorized some time for them to study how infrastructure resilience could benefit Woodvale, but that time isn't infinite. To make real progress, they'll have to focus their efforts in a way that supports their ongoing projects and priorities.

They speak with Denise and other community leaders and determine that there is concern about the effects of drought and flooding for Woodvale. Woodvale's economic strength is largely due to the presence of chemical manufacturing and healthcare services industries in the community. These water-intensive industries are especially affected by drought and rely on predictable water and wastewater services that have been disrupted by previous storms. Moreover, the local water and wastewater treatment systems are expanding to accommodate a growing population and the community is conducting capital investment planning to ensure their infrastructure can keep pace. Amy and Aaron decide they'll help lead an effort to better understand risks to these systems to support ongoing capital planning and inform next year's Emergency Operation Plan update.

To get started, Aaron and Amy gather up relevant plans, documents, and data, including the most recent hazard mitigation plan, GIS mapping of the current water and wastewater systems, emergency operations plans, data for growth projections, and capital plans. They also begin outreach to key partners, including the Woodvale Water Utility, the Regional and State Public Utility Commissions, Woodvale Emergency Management, and community groups. At this point, Amy and Aaron are simply informing these partners that an effort is underway, consulting them about how they perceive the challenges, and asking for their input in outlining goals and objectives.

Ultimately, Amy and Aaron establish the following intentions for the planning effort:

Goal

Improve the resilience of key community functions by strengthening water and wastewater services in Woodvale through Capital Investment and Hazard Mitigation Planning

OBJECTIVE 1: Understand risks to water and wastewater systems from drought and flooding

OBJECTIVE 2: Understand dependencies for water and wastewater system operations and understand downstream dependencies on water and wastewater services

OBJECTIVE 3: Identify projects and activities that will enhance the security and resilience of water and wastewater services

STEP 2: IDENTIFY CRITICAL INFRASTRUCTURE



Objective

Identify infrastructure that is critical to the community and the dependencies among those critical infrastructure systems and assets.



Actions to Accomplish

- 2.1 Identify infrastructure
- 2.2 Prioritize infrastructure
- 2.3 Identify infrastructure dependencies

2.1 Identify Infrastructure



Before you get started

What You'll Need:

- Base knowledge of existing critical utilities and community services

Helpful Resources:

- IRPF's *Infrastructure Assets Matrix*
- IRPF's *Datasets for Infrastructure Identification*



Outcomes

- Inventory of infrastructure assets

Determine what infrastructure is critical to your community.

- **Take a functional approach** – What are essential functions in my community? What infrastructure systems enable those functions?
- **Cover the fundamentals** – Identify key local systems associated with the four fundamental CI sectors – Water & Wastewater, Communications, Transportation, and Energy.

Document key information. You may already have pre-existing information on critical infrastructure assets and systems in your community, but if you don't, the *Infrastructure Assets Matrix* provides a template for what information you should consider collecting. The resource identifies key data collection suggestions for critical infrastructure systems and assets.



Infrastructure Assets Matrix: Suggested Data Fields

Update and expand your data. If needed, update and expand your data on infrastructure in your community to better match the scope of your effort established during Step 1. The *Datasets for Infrastructure Identification* resource provides links to Homeland Infrastructure Foundation-Level Data (HIFLD) datasets which provides basis geospatial data from federally derived information, and your CISA Regional Office may be able to provide supplementary information on infrastructure in your community. The document also provides instructions for accessing resources like ArcGIS MapViewer, ArcGIS StoryMaps, the Homeland Security Information Network (HSIN), and other datasets to explore the critical infrastructure assets in your area.



[Datasets for Infrastructure Identification](#)

2.2 Prioritize Infrastructure



Before you get started

What You'll Need:

- Inventory of infrastructure assets established in Action 2.1

Helpful Resources:

- IRPF's Table 5. Key Consideration for Prioritizing Infrastructure Systems/Assets



Outcomes

- List of priority infrastructure systems/assets

Rank your identified infrastructure. Planning for infrastructure can be overwhelming if you try to consider everything all in one effort. Thus, it is wise to narrow the scope of your effort by prioritizing infrastructure systems and/or assets in your inventory list. This can be done by following the basic approach described below:

1. **Choose criteria.** First, determine factors by which to rate each infrastructure system/asset you've identified. Table 5 in the IRPF suggests five possible ones to use—Safety, Context, Operational, Economic, and Service—that focus on the impact infrastructure has on your community. You can choose one or more of these impact criteria or determine others that best suit your needs, such as exposure to a particular hazard of concern (e.g., flooding, security breach) or eligibility for a particular funding program.
2. **Rate infrastructure.** Focusing on one of your chosen criteria at a time, do a quick assessment of each identified infrastructure system/asset and rate them as either low, medium, or high (or alternately use numerical scoring) based on how well they meet the criterion.
3. **Combine ratings.** After completing the rating for each of your chosen criteria, combine (add up) the ratings across criteria to get a total 'score' for each individual infrastructure system/asset.
4. **Order by priority.** Finally, sort your rated infrastructure from highest to lowest total score to result in a prioritized list of your identified infrastructure—those at the top being higher priority to address.

Note: Your infrastructure prioritization may change over time or be different from one planning effort to the next depending on the goal of the effort. That is to be expected as new infrastructure systems/assets emerge and/or new priority issues arise. Planning for security and resilience is inherently an iterative process.

Focus on priority infrastructure. To most effectively use your allocated time and resources, focus on your highest priority infrastructure systems first. Include lower priority infrastructure sectors, systems, and assets as time and resources allow.

2.3 Identify Infrastructure Dependencies



Before you get started

What You'll Need:

- Inventory of infrastructure assets established in Action 2.1

Helpful Resources:

- IRPF's *Infrastructure Dependency Primer*
- IRPF's *Dependency Identification Worksheet*
- IRPF's *Community Systems Dependency Discussion Guide*
- IRPF's *System Owner/Operator Dependency Interview Guide*
- IRPF's *Meeting Facilitation Guide*
- IRPF's Table 6. Examples of Typical Dependencies



Outcomes

- List of critical dependencies for key infrastructure systems

Get your bearings. If you're already familiar with dependencies, great! If not (or if you're just looking for a refresher), CISA's online *Infrastructure Dependency Primer (IDP)* is a great resource for learning about them. The IDP consists of three modules with information and videos that can be independently explored to help you better understand critical infrastructure dependencies, the impact they have on communities, and how to address them. The LEARN module, in particular, contains especially useful content to assist you in identifying dependencies:

- "How Dependencies Affect Communities" video – illustrates how a single event can disrupt multiple systems due to dependencies and impact nearly every facet of daily life.
- "What Are Dependencies" section – provides a definition of dependencies including key characteristics and types
- "Closer Look" section – presents information about the four universally important infrastructure systems and their common upstream and downstream dependencies.



[Infrastructure Dependency Primer](#)

Collect data. Use the IRPF's *Dependency Identification Worksheet* as a guide for what information will be pertinent to obtain in order to start identifying potential dependencies associated with each of the most fundamental infrastructure systems in your community.



Dependency Identification Worksheet

In addition, CISA has developed a series of question sets and guides that can help you facilitate discussions with critical infrastructure stakeholders to collect dependency information, as follows:

- Facilitate a group discussion using questions from the *Community Systems Dependency Discussion Guide* with various government officials, community groups, and local business owners.



Community Systems Dependency Discussion Guide

- Conduct one-on-one interviews with utility and critical infrastructure owners and operators using questions from the *System Owner/Operator Dependency Interview Guide*.



System Owner/Operator Dependency Interview Guide

- Conduct a community-level infrastructure dependency identification exercise using the facilitation questions and handout provided in the *Meeting Facilitation Guide*.



Meeting Facilitation Guide



Key Takeaways

- Identify what critical infrastructure systems support functions within your community, prioritize those systems, and identify key dependencies for them.
- Several resources support this process including an asset matrix that can help communities think through the assets and systems that may exist in their communities, and a worksheet and discussion guide that can be used to document key dependencies in either interview settings with system operators or in workshop settings.
- Dependency questionnaires can be used in group or one-on-one settings with community partners and infrastructure system operators. These guides are based on more than decade of experience conducting assessments of infrastructure systems and dependencies.



Hypothetical Example: Step 2 in Action

Amy and Aaron are ready to dig in. To kick things off they begin by reviewing the set of critical infrastructure identified in their current Hazard Mitigation Plan as well as the GIS data from open source providers and the Homeland Security Information Network (HSIN) they collected for the water and wastewater treatment systems. They quickly realize they'll have to do some updating, since a key chemical manufacturer began operations last year and recent expansions to the water and wastewater treatment systems have not been reflected in the Emergency Operation Plan or GIS platform. They get in touch with the Woodvale Water Utility to get the latest data on their systems, including treatment facilities, storage facilities, pumping and lift stations, and water mains and trunklines. Knowing that they'll also be preparing for an update to their Emergency Operation Plan soon, they also reach out to their CISA Protective Security Advisor and CISA Regional Office to identify other critical infrastructure asset and system data relevant to their community. Equipped with this new data, Aaron and Amy feel prepared to forge on.

During the discussion with the Woodvale Water Utility, they are also able to prioritize the water and wastewater systems by ranking them based on the Context and Service considerations from IRPF Table 5, thus accounting for how they support important healthcare and manufacturing industries in the community. The next step is to better understand how those systems operate, identify dependencies for water and wastewater operations, and determine how disruptions to those systems might affect other key sectors and community functions. To get started, they review the videos and guidance provided in the Infrastructure Dependency Primer to understand the importance of dependency analysis and learn about common dependencies for the water and wastewater sector. They set up an interview with operations personnel at Woodvale Water Utility and use the IRPF's Dependency Identification Worksheet to facilitate the discussion. Through that discussion they learn several critical things:

- The water and wastewater treatment systems are heavily reliant on both electric power and communications services to operate at full capacity.
 - Woodvale Water Utility does have backup generators at all of its water and wastewater treatment facilities but in an emergency, some facilities may have to be prioritized because of fuel availability.
 - Woodvale Water Utility does not have backup generators for all lift and pumping stations; even if treatment facilities are operating, it cannot guarantee that lines remain pressurized and that sewage continues to move through the system.
 - Communications systems support process control and quality monitoring within treatment facilities and throughout the system. Within facilities, wired internet service is essential to continued operations, and remote monitoring and control of pumping stations and storage facilities help the system to operate safely and efficiently.
- Only one pumping station is responsible for sending treated water to a key industrial district that houses several major chemical manufacturing facilities and also contains a hospital.
- There are water system interconnects between the Woodvale Water Utility and two neighboring water systems, Hamilton County to the northeast, and Los Gatos to the south.
 - These interconnects allow for Woodvale to receive treated water from or send treated water to neighboring communities in an emergency.



Based on this discussion, Amy and Aaron have uncovered some potential challenges as well as a couple of new stakeholders. First, they hold a meeting with businesses in the industrial district served by only one pumping station. While not all the businesses show, they are able to have a productive conversation about water requirements and impacts of water disruption using the IRPF's Meeting Facilitation Guide as well as possible options for managing a disruption. While they see loss of water service due to a pumping station outage as a problem, several businesses raise an issue that is even more pressing—water reliability. They use large volumes of water in their processes and the risk of shortages due to drought is their major concern. Next, Amy and Aaron reach out to the water utilities in Los Gatos and Hamilton. While these operators agree that there are interconnects with their systems in place, they aren't exactly sure how things would work in an emergency. There aren't memoranda of understanding or documented procedures in place for using interconnected emergency water services, and the capability hasn't been exercised or tested. Finally, Aaron and Amy hold a series of meetings with emergency management personnel, healthcare facilities, and members of the community to identify how they rely on the water sector. Through this effort, they determine that while major healthcare facilities in the community have ample onsite water storage and plans to replenish it, disruptions to the wastewater system could take them offline in just over a day. Similarly, while evacuation centers have plans for distributing bottled water, they don't have contracts for portable toilets in the event of wastewater system disruption.

After several weeks of meetings and deep discussions on the water and wastewater sector, Amy and Aaron are feeling much better informed about how the water sector operates, what it depends on, and what depends on it. With their initial work on dependencies complete, Aaron and Amy get ready for the next step.

STEP 3: ASSESS RISK



Objective

Identify infrastructure that is critical to the community and the dependencies among those critical infrastructure systems and assets.



Actions to Accomplish

- 3.1 Identify threats and hazards to infrastructure
- 3.2 Assess infrastructure vulnerabilities
- 3.3 Assess consequences
- 3.4 Prioritize risk to infrastructure

3.1 Identify Threats and Hazards to Infrastructure



Before you get started

What You'll Need:

- Inventory of infrastructure assets and systems from Step 2: Identify Critical Infrastructure
- Hazard information including records of past events, which may be in the form of historical or experiential knowledge of stakeholders

Helpful Resources:

- IRPF's Table 7. Example of Threats & Hazards by Category
- IRPF's *Hazard Information and Analysis Resources*



Outcomes

- List of priority threats/hazards

Consider hazards of all types. There are a myriad of threats and hazards that could affect your infrastructure. It is a good idea to consider all types, including those you have experienced in the past and those you haven't. Review the list of example natural, accidental, and deliberate hazards in the IRPF (Table 7) and identify those that are applicable to your identified critical infrastructure systems. When available, it may be helpful to overlay hazard maps with maps of infrastructure systems to determine if and/or where they coincide.

The IRPF's *Hazard Information and Analysis Resources* document identifies various sources of hazard information that can be useful in determining your infrastructure systems' exposure to various natural hazards.



Hazard Information and Analysis Resources

Focus on significant threats. At this point, your list of applicable hazards may still be quite long. To prioritize hazards with the greatest potential impact, rank them based on the likelihood that each one will occur.

3.2 Assess Infrastructure Vulnerabilities



Before you get started

What You'll Need:

- Inventory of infrastructure assets and systems from Step 2: Identify Critical Infrastructure
- List of priority threats/hazards established in Action 3.1

Helpful Resources:

- IRPF's *System Owner/Operator Dependency Interview Guide*
- IRPF's *Risk Assessment Methodologies*



Outcomes

- List of key infrastructure vulnerabilities

Engage infrastructure owners/operators. To understand the vulnerabilities and operational capabilities of an infrastructure system, ask those who know the system best. The IRPF's *System Owner/Operator Interview Guide* can help you facilitate a discussion with infrastructure owners or operators to identify system vulnerabilities and potential service limitations during a hazard event.

Identify susceptibility to hazards. Match priority hazards with appropriate critical infrastructure components to assess the characteristics that may render the infrastructure susceptible to disruption.

- For all types of hazards, consider characteristics such as location, design, dependencies, redundancies, and operational ability to adapt or recover.
- For deliberate threats, also consider public accessibility, recognizability, security system effectiveness, and proximity to other targets.



System Owner/Operator Dependency Interview Guide

The IRPF *Risk Assessment Methodologies* resource describes various methods for analyzing hazard vulnerabilities that you may want to consider using.



Risk Assessment Methodologies

3.3 Assess Consequences



Before you get started

What You'll Need:

- Inventory of infrastructure assets and systems
- List of priority threats/hazards
- List of key infrastructure vulnerabilities
- Infrastructure system service information

Helpful Resources:

- Records of historical events



Outcomes

- Estimated potential impacts to infrastructure for each identified threat/hazard and consequences of service disruptions

Estimate potential losses. Using the same hazard and infrastructure pairings from the vulnerability assessment, estimate the effects of an event in terms of human safety (injury, illness, loss of life), loss of service, physical damages, and economic losses caused by infrastructure disruptions.

Draw on past history. A review of historic hazard events can be a good way to gather insights into the consequences an incident can have on infrastructure systems, as well as the effects a disruption of critical services has on the public and the economy. Use historic data from past events around the country to estimate the losses associated with similar scenarios you are assessing.

Engage infrastructure owners/operators. To understand who and what would be affected by an infrastructure system disruption, consult with the experts on that system—the operators. A discussion with infrastructure operators about service area and key customers can yield insights on potential impacts of system disruption.

3.4 Prioritize Risk to Infrastructure



Before you get started

What You'll Need:

- Inventory of infrastructure assets and systems from Step 2: Identify Critical Infrastructure
- List of priority threats/hazards established in Action 3.1
- List of key infrastructure vulnerabilities established in Action 3.2
- Estimated potential consequences established in Action 3.3



Outcomes

- Prioritized ranking of infrastructure risks

Rank system disruption risk. Rank infrastructure-hazard pairings from highest to lowest risk based on the combination of greatest threat likelihood, most vulnerable system, and largest consequence of disruption.



Key Takeaways

- Understanding what infrastructure systems are exposed to threats, how the systems are vulnerable to those threats, and what the consequences of disruption might be to essential functions those systems provide can help communities better comprehend what needs to be done to reduce risk and enhance resilience.
- The IRPF contains several resources that can support a risk assessment, including a list of sources for hazard exposure data and a set of risk assessment methodologies that communities can choose to apply as they seek to better understand threat, vulnerability, and consequence.



Hypothetical Example: Step 3 in Action

Now that Aaron and Amy have identified priority water and wastewater system assets and both upstream and downstream dependencies, they turn their focus to understanding and determining what the risk is to these critical systems. They begin by first focusing on what hazards or threats their water and wastewater systems are exposed to, as well as the hazards that may affect the electric power and communications systems on which the water and wastewater systems rely.

There is a long list of historical data on threats and hazards to sort through including nearly annual flooding and occasional windstorms. As Aaron and Amy sort through the list trying to rank them by likelihood, they recognize that there are multiple other hazards that they haven't specifically experienced but that may affect their systems, such as a deliberate cyberattack that Aaron recalls hearing about happening to a utility's communication system in another state.

Aaron and Amy continue to read through the list of potential hazards/threats identifying all that might be applicable to their critical systems. They then rank the list of hazards by likelihood of occurrence using their best judgement based on the information they can gather from historical records and future predictions. Flooding and cyberattacks turn out to be the highest priority hazards.

Amy and Aaron must also assess the infrastructure assets vulnerabilities, which means more engagement with the owners and operators on the ground. To better understand which assets to engage, Amy and Aaron overlay flood maps to identify water and wastewater facilities that are in areas of concern, finding that a critical pump station is in the floodplain.

Aaron and Amy hold a discussion with Woodvale Water Utility's SCADA/IT director where it is also revealed that their cybersecurity protocols may be a bit outdated.

Aaron and Amy next begin to determine how the consequences disrupt basic community functions, such as blocked roads affecting tourism, as well as disrupting the day-to-day activities of the local workforce of their community's chemical manufacturing and healthcare services industries. Amy and Aaron specifically look at the various hazard-asset scenarios and evaluate consequences using the information they gathered about dependencies to estimate the cascading impacts of disruption of water service. For example, they are able to see how the aged piping system, if compromised, could lead to a boil water advisory lasting as long as a week based on repair time estimates. They also recognize that a heavy rain could lead to a mudslide over the city's closest interstate entrance, which will not only disrupt the flow of traffic ultimately affecting critical supply lines, but also sever internet cables slowing communications.

As their consequence research continues, Aaron and Amy are able to make use of the IRPF's System Owner/Operator Dependency Interview Guide to facilitate discussions with the identified owners and operators. This in turn guides the discussion to focus on how the systems and assets could be affected, and what ripple effects there might be through the dependencies.

After working through this assessment of threats, vulnerabilities, and consequences, Aaron and Amy have a good idea of the risks associated with their critical water and wastewater systems.

STEP 4: DEVELOP ACTIONS



Objective

Identify mitigation strategies to address priority infrastructure risks and achieve community security and resilience goals.



Actions to Accomplish

- 4.1 Refine goals and objectives
- 4.2 Identify resilience solutions to mitigate risk
- 4.3 Identify and assess existing resources and capabilities
- 4.4 Select resilience solutions for implementation
- 4.5 Develop implementation strategies

4.1 Refine Goals and Objectives



Before you get started

What You'll Need:

- Findings from Step 2: Identify Critical Infrastructure
- Findings from Step 3: Assess Risk

Helpful Resources:

- IRPF's *Sample Goals and Objectives*



Outcomes

- Updated goals and objectives

Revalidate resilience objectives. With the insight you gained about infrastructure that is critical to your community, revisit the security and resilience goals and objectives you established at the beginning of your planning effort. Ask yourself, 'Do these goals and objectives address what I now know are priority systems and risks?' Then, in collaboration with the core planning team, adjust the objectives, if necessary, to reflect your current knowledge and increased understanding of what will likely most improve resilience. For additional validation or inspiration when revising your resilience objectives, refer to the IRPF's *Sample Goals and Objectives* resource. It is advised to take a holistic approach to your community's infrastructure to recognize potential future infrastructure degradation and potential disruptions within critical nodes.



Sample Goals and Objectives

4.2 Identify Resilience Solutions to Mitigate Risk



Before you get started

What You'll Need:

- Refined list of goals and objectives established in Action 4.1
- Findings from Step 2: Identify Critical Infrastructure
- Findings from Step 3: Assess Risk

Helpful Resources:

- IRPF's *Sources for Resilient Solutions*
- CISA's *Infrastructure Dependency Primer*



Outcomes

- List of potential solutions and strategies to mitigate identified risks

Develop solutions. Once you have the identified infrastructure risks by conducting a risk assessment, the next task is to determine what can be done to mitigate those risks and increase security and resilience. Options for mitigation efforts can take the shape of new policies, strategies, plans, programs, or even new infrastructure projects.

The IRPF contains a resource, *Sources for Resilient Solutions*, that provides links to sources with resilience solution ideas for addressing various types of hazard risks.



[Sources for Resilient Solutions](#)

In addition, CISA's online *Infrastructure Dependency Primer* IMPLEMENT module has a Resilience Solutions section that lists various approaches, ideas, and things to consider in identifying solutions to address infrastructure dependency risks.



[Infrastructure Dependency Primer](#)

4.3 Identify and Assess Existing Resources and Capabilities



Before you get started

What You'll Need:

- Information about authorities, policies, programs, administrative/technical capabilities, and financial resources within your community

Helpful Resources:

- IRPF's *Sample Capability Assessment Worksheet*
- IRPF's Figure 2. Common Types of Community Capabilities



Outcomes

- A list of currently available community capabilities that can be used to implement identified resilience solutions

Assess existing capabilities. As a planning group, review the common example types of community capabilities listed in IRPF Figure 2 and identify the capabilities that exist within your community and amongst key infrastructure stakeholders. Then assess each capability to determine which ones could potentially be applied to help implement identified resilience solutions. The IRPF provides a sample assessment worksheet that can be used as a template to help with your capabilities review.



[Sample Capability Assessment Worksheet](#)

4.4 Select Resilience Solutions for Implementation



Before you get started

What You'll Need:

- Findings from Step 3: Assess Risk
- List of resilience solutions established in Action 4.2
- Understanding of existing capabilities from Action 4.3

Helpful Resources:

- IRPF's *Mitigation Alternatives Evaluation Guide*
- NIST's Economic Decision Guide Software
- FEMA's Benefit-Cost Analysis Toolkit
- IRPF's Criteria for Evaluating Solutions box



Outcomes

- Evaluated and prioritized list of resilience solutions/projects

Evaluate options. It is important to determine which of the various solutions or projects you have identified will be the best ones to implement. To do so, you will want to work together as a planning team to weigh the pros and cons of your various solutions. The IRPF identifies a variety of factors to consider in doing so, including social, political, legal, environmental, and financial aspects. You may want to use one the following methods to evaluate and prioritize solutions for implementation:

- **Coordinate with existing resources.** If there is an existing public initiative, technical capability, or funded contract that could be utilized to take action on one of the identified resilience solutions, that solution should be prioritized for implementation.
- **Facilitate an evaluation workshop.** Use questions from the *Mitigation Alternatives Evaluation Guide* resource in the IRPF or the IRPF's Criteria for Evaluating Solutions box to facilitate a discussion with the core planning team to qualitatively evaluate options.



Mitigation Alternatives Evaluation Guide

- **Perform a benefit-cost analysis.** This can be done by estimating the total risk reduction benefits of a solution and comparing it to the estimated overall cost of implementing it.
 - Cost should include estimated design, construction, and future operations or maintenance costs of a solution or project.
 - Benefits are equal to the estimated economic value of any consequences that would be avoided by implementing the solution or project. Examples include avoided:
 - loss of life and/or physical injury
 - property damage
 - critical service loss (e.g., no potable water for 100 people for 2 days)
 - business operation downtime resulting in revenue loss
 - After estimating benefits and costs for each solution option, rank them based on their benefit-cost ratio (BCR), which is calculated by dividing the combined estimated benefits by the overall estimated cost. The higher the BCR, the more cost-effective the solution. Solutions with BCRs less than 1.0 are potentially not worthwhile to implement.

4.5 Develop Implementation Strategies



Before you get started

What You'll Need:

- Prioritized list of infrastructure systems, assets, and risks from Step 2: Identify Critical Infrastructure and Step 3: Assess Risk
- Evaluated and prioritized list of resilience solutions established in Action 4.4

Helpful Resources:

- IRPF's *Resilient Solution Strategy Worksheet*



Outcomes

- A resilience solutions implementation strategy

Lay out a plan of action. Now that you have refined your goals, assessed your capabilities, and identified priority security and resilience solutions, all that remains is developing a plan to implement them. This is where you should describe how each solution will be implemented and administered by the community, such as responsible party, timeline, funding requirements, steps involved, and potential barriers.

You can use the *Resilient Solution Strategy Worksheet* in the IRPF directly or as a guide to document potential infrastructure resilience projects identified during the planning process.



Resilient Solution Strategy Worksheet



Key Takeaways

- Revisit and refine the goals set out at the start of the planning process to ensure they remain accurate based on the data collection and analysis completed up to that point.
- Work through the process of reviewing the most important risks to community functions and identify options for enhancing security and resilience. Based on an assessment of existing capabilities and resources, as well as other selection factors like cost, communities can be guided through a process of selecting projects and priorities that will best reduce their risk.
- There are resources to help communities work through this process, including a guide for assessing community capabilities, a guide for evaluating mitigation alternatives, and a worksheet for developing strategies for increasing resilience.
- The resilience solutions resource provides links to best practices, case studies, and other documents that offer ideas for enhancing resilience and reducing risk.



Hypothetical Example: Step 4 in Action

Aaron and Amy are now getting the planning team ready for the next phase in their security and resilience planning effort. They know the hazards that threaten the community, and what could happen to the critical infrastructure that Woodvale County relies on.

They present their information to Denise, who while reluctant to do any large reforms is impressed at the collected data on Woodvale's critical infrastructure assets, and how hazards could affect the community.

Aaron and Amy review the goal and objectives they established during Step 1 of their security and resilience planning process. The goal identified was to improve the resilience of key community functions by strengthening water and wastewater services in Woodvale through Capital Investment and Hazard Mitigation Planning. Before proceeding, they take the time to look back at what they learned to see about refining or altering the original goal and objectives.

While conducting Step 2 activities on infrastructure identification, Aaron and Amy obtained GIS data to support how to prioritize the water and wastewater systems with links to the healthcare and manufacturing industries in the community. In addition, they learned there aren't established or tested procedures in place for using interconnected emergency water services. They agree no refinement was needed based on the information gathered in Step 2.

During the risk assessments of Step 3, the planning team spent time reviewing historical data of past incidents and establishing rankings of what hazards or threats water and wastewater systems are exposed to, as well as the hazards that may affect the electric power and communications systems on which the water and wastewater systems rely. The group agreed that flooding should be their highest priority, and the deliberate threat of cyberattacks should also be prioritized. After reviewing with Denise, the third objective was refined to include cyber resilience:

OBJECTIVE 3: Identify projects and activities that will enhance the physical and cyber resilience of water and wastewater services

Amy and Aaron must now develop a set of action steps to include identification, evaluation, and selection of project/solutions to enhance resilience. With their better understood goals and risk information, they begin to examine new policies and programs.

Using the IRPF's Sources for Resilient Solutions, they're led to the existing guides and lessons learned on how best to achieve their goal.

Amy and Aaron use the sample solutions in consultation with the Woodvale Water Utility, as well as other stakeholders from previous steps, and discuss what actions would have the greatest impact on improving their resilience. By referring back to the IRPF's Mitigation Alternatives Evaluation Guide, they conduct a preliminary benefit-cost analysis, and estimate timelines for completion.

The planning team develops concepts for drought related supply chain emergencies, including back up agreements with neighboring jurisdictions, as well as the building of additional culverts and water collection points to divert flooding away from Woodvale's main transportation routes.

Through the evaluation of these actions, Aaron and Amy can now collaborate with multiple partner agencies within Woodvale County during evaluation workshops. These agencies can provide insight on costs, timeline, as well as point them to existing programs that are in need of updating.

STEP 5: IMPLEMENT & EVALUATE



Objective

Implement prioritized resilience solutions through existing planning mechanisms, potential funding sources, and technical assistance programs.



Actions to Accomplish

- 5.1 Implement through existing planning mechanisms
- 5.2 Monitor and evaluate effectiveness
- 5.3 Update plans

5.1 Implement Through Existing Planning Mechanisms



Before you get started

What You'll Need:

- Findings from Step 2: Identify Critical Infrastructure and Step 3: Assess Risk
- Implementation strategy from Step 4: Develop Actions

Helpful Resources:

- IRPF's *IRPF Plan Integration*
- IRPF's *Compendium of Programs and Mechanisms for Funding Infrastructure Resilience*
- IRPF Playbook Appendix B



Outcomes

- Infrastructure resilience considerations integrated into existing community plans

Integrate findings into existing plans. While the results of your IRPF-supported planning effort can be documented in a standalone resilience plan, the most effective and efficient way to implement your findings is to incorporate them into community plans that already exist. Key elements to integrate into existing plans include:

- identified priority infrastructure systems/assets
- a summary of critical dependencies
- a summary of risks to key infrastructure systems/assets
- the list of identified resilience solutions/projects
- your solutions/project implementation strategy

For general ideas on how information/outcomes derived from using the IRPF can be incorporated into different types of existing community plans (e.g., comprehensive plans, capital improvement plans, and others) check out the *IRPF Plan Integration* resource.



In addition, check out Appendix B of this playbook, which provides explicit mapping of IRPF steps/actions to the required elements of three specific, commonly developed plans—Local Hazard Mitigation Plan (HMP), Comprehensive Economic Development Strategy (CEDS), and Emergency Operations Plan.

Obtain assistance. Funding and resources are always in high demand, in this step you should familiarize yourself not only with traditional mechanism such as taxes, fees, and bonds, but also grants at the public and private level, as well as partnering with other initiatives to share financing. CISA offers the *Compendium of Programs and Mechanisms for Funding Infrastructure Resilience* to assist your search for relevant grants and funding for your resiliency goals.



5.2 Monitor and Evaluate Effectiveness



Before you get started

What You'll Need:

- Implementation Strategy from Step 4: Develop Actions

Helpful Resources:

- IRPF's Key Considerations for Evaluating Plans
- CISA Tabletop Exercise Package [<https://www.cisa.gov/resources-tools/resources/cisa-tabletop-exercise-package>]



Outcomes

- An established review process to gauge progress toward resilience

Track progress. To realize success of your security and resilience planning efforts, lay out a process for periodic review of identified infrastructure risks and the progress of resilience measures implementation. Include the following elements in this review plan:

- **Schedule:** Establish a timeline for review. This may be a discrete date, such as 2 years from completion of the planning effort, or a recurring timeline, such as every 5 years.
- **Responsible Party:** Identify an entity/person who will be accountable for completing the review. Possible candidates may be the Project Champion entity, the Planning Team Lead, or another core planning team participant.
- **Type of Review:** Identify the method that will be used for evaluation.
 - One method may be to hold a workshop with the former core planning team participants to facilitate a discussion around the following questions:
 - Have the nature or magnitude of the threats or hazards changed?
 - Are there new threats or hazards affecting the community?
 - Do the identified goals, objectives, and solutions address current and expected risk conditions?
 - Have the security and resilience solutions been implemented and completed?
 - Has the implementation of solutions resulted in expected outcomes?
 - Are current resources adequate to implement solutions?
 - What other resources are needed to implement the solutions?
 - What factors have resulted in successful implementation of solutions?
 - What obstacles to implementation have you encountered? What can be done to overcome these obstacles?
 - Another good evaluation method is conducting exercises or hazard scenario simulations with community and infrastructure stakeholders. Visit the *CISA Tabletop Exercise Packages* webpage for tools to help you conduct exercises for a wide range of scenarios.

5.3 Update Plans



Before you get started

What You'll Need:

- Established review process to gauge progress towards resilience

Helpful Resources:

- IRPF's Key Reasons for Updating Plans



Outcomes

- Revisions to existing plans

Continually improve. Now that you have the data on how well your program is doing, incorporate these metrics into future efforts. It is important to follow the lessons learned be they successes or obstacles, and then make changes where needed. These might be as simple as updating action implementation timelines, stakeholder communications, funding sources, or your known hazards based on new events.



Key Takeaways

- This final step provides guidance on how IRPF outcomes can be incorporated into plans and links to funding and financing opportunities. It also provides a process for monitoring and evaluating the effectiveness of resilience solutions and updating plans.
- The funding compendium is a list of federal, state, and non-governmental funding programs that can be used to support resilience solution implementation. It provides links to relevant grant and loan programs, as well as contextual information about eligibility and requirements



Hypothetical Example: Step 5 in Action

Aaron and Amy have presented their actions to Denise, and it is agreed these plans could help make Woodvale County more secure and resilient. Now the only thing left is to implement and evaluate. Aaron and Amy start by reviewing the IRPF's Plan Integration Resource, which provides an overview of possible integrations with other community planning efforts/processes that Woodvale County might have in place. With that as a starting point, they identify some existing planning mechanisms at a workshop with several of the new partner agencies.

For their goal, Aaron and Amy find an existing Capital Investment Plan (CIP), which has a set process to provide for advance project identification, planning, evaluation, scope definition, design, public discussion, cost estimating and financial planning over the next five years. They ensure cybersecurity concerns are included in the plan.

Denise is able to facilitate the actions of the planning team that have been incorporated in the community's CIP as newly identified capital projects for implementation.

They further are able to leverage an upcoming Hazard Mitigation Plan (HMP) update for flooding concerns. Communities use HMP's to identify risks and vulnerabilities associated with natural disasters and to develop long-term strategies for protecting people and property from future hazard events.

The Woodvale County Planning Department intends to get this HMP approved by the Federal Emergency Management Agency, which would make it eligible for receiving certain types of pre- and post-disaster assistance.

With these plans now in place, Denise directs Aaron and Amy to monitor the plans and update them as necessary. As an existing plan, the CIP had already established maintenance procedures for measuring performance and incorporating changes on a set schedule. The HMP, on the other hand, is a new plan for Woodvale.

Aaron and Amy set up an evaluation process to monitor, evaluate, and assess the effectiveness of its planning activities. This process establishes set times where their department will collect feedback based on successes, obstacles encountered, and lessons learned that would be added to future plan iterations over the next five years.

With Woodvale County more prepared, it is also more resilient. Aaron and Amy now begin to review how the IRPF can help support their community for other resilience goals not considered this time around.

APPENDIX A. FOUNDATIONAL INFRASTRUCTURE RESILIENCE CONCEPTS

What Makes Infrastructure Important?

Infrastructure is the backbone of our communities. Virtually everything we do—from getting around town, to sending an e-mail at work, to making our evening meal—relies on a network of interconnected infrastructure systems. The importance of an infrastructure system or asset is based on the societal function(s) that it enables, be it health, public safety, economic growth, environmental considerations, or something else. Users should consider what functions and services are most critical or important to their community.

What Is Critical Infrastructure?

Per the National Security Memorandum on Critical Infrastructure Security and Resilience (NSM-22), critical infrastructure comprises the physical and virtual assets and systems so vital to the Nation that their incapacity or destruction would have a debilitating impact on national security, national economic security, or national public health or safety. It is diverse and complex, and includes distributed networks, varied organizational structures, operating models, interdependent systems, and governance constructs.

What Is Infrastructure Risk?

Our infrastructure systems are increasingly at risk, which by definition is the potential for an adverse outcome due to the combination of threat, vulnerability, and consequence.

- There are three main types of threats to infrastructure —natural (e.g., flooding), accidental (e.g., maintenance failure), and deliberate (e.g., terrorist)—each of which have an associated likelihood of occurrence.
- An infrastructure system's vulnerability is its susceptibility to failure, damage, or disruption due to one of these threats. Examples of vulnerabilities include a flaw in an IT system's cybersecurity or location of an asset in a floodplain.
- Consequence is the direct or indirect impact of a threat because of a vulnerability. Consequence is often measured in terms of loss of life, damage to property, and disruption of normal operations.

What Are Infrastructure Dependencies?

Dependencies are relationships of reliance within and among infrastructure systems that must be maintained for those systems to operate and provide services. Dependencies can be one-way relationships, such as a water system's reliance on electric power to run pumps and treatment operations. Dependencies can also be two-way relationships where the operations of both systems mutually affect the other. For example, communications systems depend on electric power to operate and transmit signals, and in turn, electric power systems rely on communications systems to monitor and control the transmission of power.

The *National Infrastructure Protection Plan* affirms that an understanding of critical infrastructure dependencies is essential to enhancing the resilience of communities. This is because dependencies represent both the efficient manner in which infrastructure systems work together, but also the potential points of failure that can lead to cascading disruptions across systems that deliver essential services.

What Is Resilience?

Given infrastructure's vital significance and the fact that it is increasingly at risk, ensuring both its security and resilience is paramount. In accordance with NSM-22, resilience means the ability to prepare for threats and hazards, adapt to changing conditions, and withstand and recover rapidly from adverse conditions and disruptions.

How Can Infrastructure Resilience Be Incorporated into Planning?

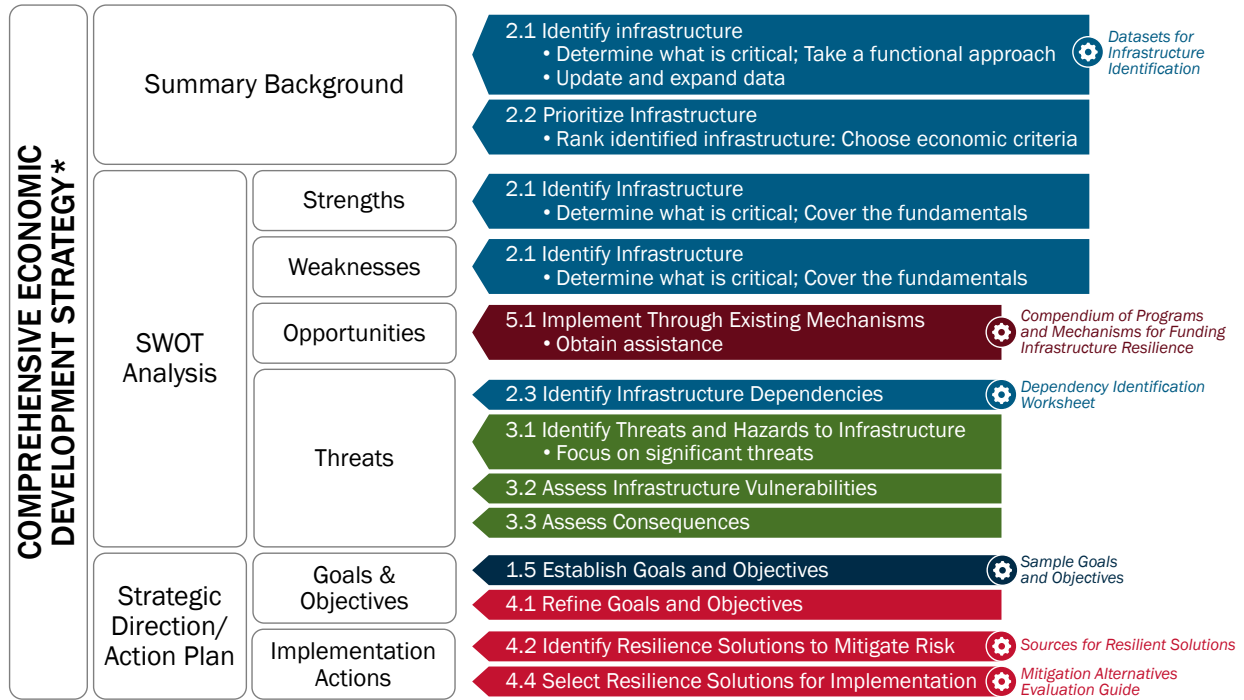
Infrastructure resilience can be integrated into almost any type of community planning, including comprehensive, hazard mitigation, capital improvement, emergency response, economic development, and business continuity planning.

Some specific ways in which this can be done include:

- Evaluating the effectiveness of an existing plan based on how it addresses implications of infrastructure security and resilience,
- Adding a description of critical infrastructure systems and the important societal functions they enable in the community overview section of an existing plan,
- Including mapping of critical infrastructure systems and their service areas for use by emergency responders,
- Using infrastructure risk analysis to identify obstacles to resilience that need to be addressed,
- Identifying new projects, policies, or procedures to plans based on the risks associated with infrastructure, or
- Adding a specific annex to a plan focused on the risk of and resilience solutions for a specific infrastructure system that is critical to the community or region.

CISA's IRPF provides flexible and voluntary guidance and resources that planners can use to incorporate infrastructure resilience into their planning activities. Considering infrastructure risk and resilience in planning can lead to more informed decision-making and better outcomes.

APPENDIX B. GRAPHICS SHOWING INTEGRATION INTO SELECT PLANS



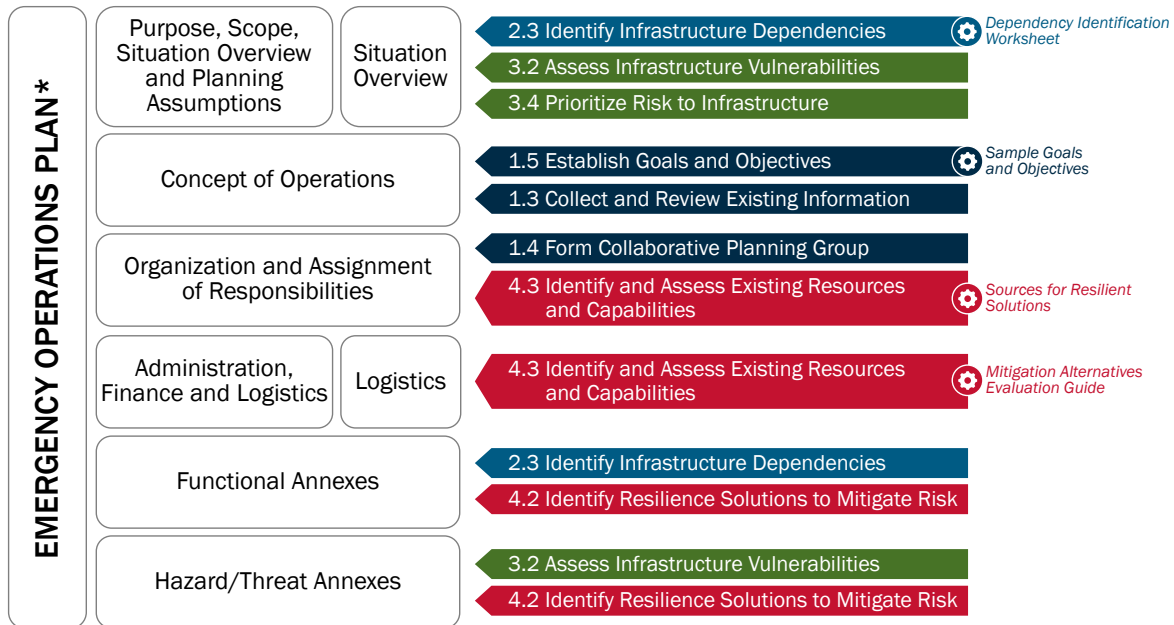
*U.S. Economic Development Administration. *CEDS Content*. <https://www.eda.gov/resources/comprehensive-economic-development-strategy/content>

Figure B1. Incorporating the Outcomes of IRPF Actions into a Comprehensive Economic Development Strategy



*Federal Emergency Management Agency. *Local Mitigation Planning Policy Guide*, FP206-21-0002. Released Apr 2022, Effective Apr 2023.

Figure B2. Incorporating the Outcomes of IRPF Actions into a Hazard Mitigation Plan



*Federal Emergency Management Agency. *Comprehensive Preparedness Guide 101: Developing and Maintaining Emergency Operations Plans*. Sep 2021, Version 3.0, p. 30-35, 67-108.

Figure B3. Incorporating the Outcomes of IRPF Actions into an Emergency Operations Plan

APPENDIX C. AFFILIATED RESOURCES & TEMPLATES

Step 1: Lay the Foundation

- IRPF Launchpoint
- Data Collection Sample List of Resources
- Planning Participant Contact Information Sheet
- Stakeholder Invitation Letter
- Sample Goals and Objectives

Step 2: Identify Critical Infrastructure

- Infrastructure Assets Matrix: Suggested Data Fields
- Datasets for Infrastructure Identification
- Infrastructure Dependency Primer (IDP)
- Dependency Identification Worksheet
- Community Systems Dependency Discussion Guide
- System Owner/Operator Dependency Interview Guide
- Meeting Facilitation Guide

Step 3: Assess Risk

- Hazard Information and Analysis Resources
- System Owner/Operator Dependency Interview Guide
- Risk Assessment Methodologies

Step 4: Develop Actions

- Sample Goals and Objectives
- Sources for Resilient Solutions
- Infrastructure Dependency Primer (IDP)
- Sample Capability Assessment Worksheet
- Mitigation Alternatives Evaluation Guide
- Resilient Solution Strategy Worksheet

Step 5: Implement & Evaluate

- IRPF Plan Integration
- Compendium of Programs and Mechanisms for Funding Infrastructure Resilience

References

- Infrastructure Resilience Planning Framework
- Methodology for Assessing Regional Infrastructure Resilience

