



LEADING THROUGH UNCERTAINTY: A FISCAL PLAYBOOK FOR A THRIVING COMMUNITY

WINTER 2026 POLICY MEETING
JANUARY 30-31 • WASHINGTON DC

How do you fund a bold future when the present is unpredictable? Across the country, forward-looking leaders are realizing that resilience is becoming a new engine for a thriving community. We will explore how treating resilience as a strategy—rather than a safety net—can unlock new forms of capital and signal stability to insurers, investors, and developers who want to build in places preparing for the future. By integrating these principles into budgeting, asset management, and land-use planning, cities can strengthen their balance sheets and accelerate critical projects. Join us for a fiscal playbook designed to turn uncertainty into the foundation for your city to thrive.



DISCLAIMER

For length, clarity, and printing purposes, many of these sources have been abbreviated and/or edited from their original form. To read the full, unabbreviated resources from this book, please visit our website or view them on the usb drive provided in your meeting materials.

RESOURCES

PAGE

1

“Rethinking Risk: Why Local Governments Can’t Shoulder Climate Burdens Alone,” Matt Posner, The Epicenter, Sep. 12, 2025.

7

Pages excerpted from “Rethinking Budgeting: Should We Rethink Reserves? A Multimillion-Dollar Question,” Government Finance Officers Association, 2023.

16

“Mission Possible: How cities and counties can innovate to overcome fiscal challenges” Andrew Kleine, Smart Cities Dive, May 1, 2025.

21

“State and Local Governments Use Innovative Financing to Build Disaster Resilience” Kristiane Huber, The Pew Charitable Trusts, Dec. 20, 2024.

27

Pages excerpted from “New flood wall saves Mount Vernon, Snohomish County roads face major repairs,” Mario Lotmore, Lynwood Times, Dec. 13, 2025.

29

Pages excerpted from “Mount Vernon Downtown Flood Projection Project,” City of Mount Vernon, WA Public Works Department, Nov. 2023.

40

“Mount Vernon Downtown Flood Protection Project,” City of Mount Vernon, WA.

41

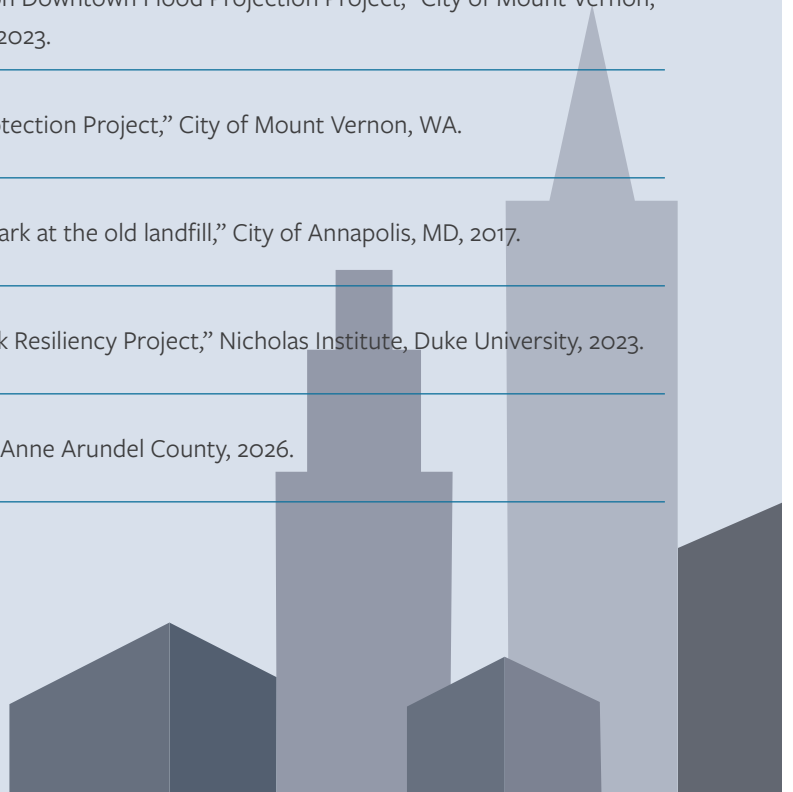
“Annapolis Renewable Energy Solar Park at the old landfill,” City of Annapolis, MD, 2017.

44

“Case Study: Annapolis, MD, City Dock Resiliency Project,” Nicholas Institute, Duke University, 2023.

46

“Resilience Authority,” Annapolis and Anne Arundel County, 2026.



PUBLIC FINANCE | LOCAL GOVERNMENT

Rethinking Risk: Why Local Governments Can't Shoulder Climate Burdens Alone

The majority of U.S. infrastructure is funded, built, and maintained by city councils, county boards, and state legislatures. But aging infrastructure, escalating climate risk, and other factors are converging to leave local communities less prepared to absorb their growing risk.

 MATT POSNER

Photo by [Nathan Vogeles](#) / [Unsplash](#)

SEPTEMBER 12 2025 • 11:48 AM

7 MIN READ [SHARE](#) 

For more than a century, the U.S. infrastructure system has been quietly managed by a set of invisible hands: local governments. From roads and bridges to water systems and public buildings, the vast majority of infrastructure in this country is funded, built, and maintained not by Washington or Wall Street, but by city councils, county boards, and state legislatures.

The financial engine powering this work is the municipal bond market, a uniquely American institution. With nearly \$4 trillion in outstanding debt and default rates below 0.1%, it has been a resounding success in mobilizing capital for essential services. Local governments issue bonds, backed by future taxes or user fees, and investors receive stable, tax-advantaged returns. Despite uneven disclosure standards and a self-regulator often criticized for being too cozy with Wall Street, the system has endured. It works. Until it doesn't.

Today, the pressures on this model are multiplying. Aging infrastructure, escalating climate risk, a retreating federal government, and the collapse of private insurance in key markets are all converging. The result: a growing share of risk is falling back on local communities, precisely when those converging factors leave them less prepared to absorb it.

It's time we acknowledge that the model of yesterday cannot meet the needs of tomorrow. Local governments will remain central, but they can't go it alone.

A System Built on Local Capacity

Roughly 80% of U.S. infrastructure is financed and managed by state and local governments. Whether through general obligation bonds paid for with property taxes or revenue bonds supported by tolls, water bills, or parking fees, the premise has remained constant: those who benefit from public infrastructure pay for it. And historically, that has meant local residents.

This decentralized model has largely worked for decades. Many cities across the country have built world-class transit systems and utilities without federal help. Small towns in every county and state have harnessed the muni bond market to finance schools, libraries, and public safety buildings.

The logic is simple: local governments borrow, and they repay over time using local revenues. This creates direct accountability between taxpayers and public investments. But it also

creates fragility, especially in an era when the threats to those assets and to the residents who depend on them are increasingly shaped by forces outside of local control.

Disasters Were Meant to be Someone Else's Problem

For decades, the unspoken deal in American governance has been that while local governments fund and manage the day-to-day operations of public infrastructure, the federal government and private insurance markets would step in when disaster struck.

This informal division created a system where risk was effectively transferred: local governments paid for long-term infrastructure, while emergency relief and catastrophic coverage were someone else's job. But that deal is breaking down.

Historically, the federal government has absorbed the lion's share of disaster costs. In federally declared disasters, the Federal Emergency Management Agency (FEMA) typically covers 75% to 100% of eligible recovery expenses through Public Assistance grants. As a result, from 2005 to 2019, the federal government shouldered approximately 60% to 75% of total disaster costs. FEMA's Disaster Relief Fund has swelled accordingly, growing from about \$2 billion in annual spending in the 1990s to over \$20 billion in recent years. Meanwhile, federal insurance programs like the National Flood Insurance Program (NFIP) have paid out over \$70 billion in claims since 1978, and the federal crop insurance program pays more than \$10 billion annually to mitigate agricultural losses.

Private insurance has long served as the complementary buffer, covering over \$20 trillion in insured property value in the U.S. alone. In some years, insurers have absorbed more than 60% of total disaster losses. For many homeowners, businesses, and utilities, insurance was the first and most reliable line of defense.

Today, with 80% of public infrastructure financed and maintained by state and local governments, as previously cited by the Brookings Institution, those same governments are being asked to manage a growing share of climate risk. Their budgets, reliant on property taxes for at least 75% of local fiscal capacity, are now strained by compounding threats. All told, local governments now spend an estimated \$800 billion annually on weather and infrastructure-related repairs, a figure that represents over one-third of local economic output in some jurisdictions, according to research from The Resiliency Company.

The promise of external relief has been replaced by a slow-motion transfer of risk back to the bottom rung of government. Without intervention, the fiscal backbone of American

infrastructure—our cities, counties, and states—will be forced to bear the full weight of a problem they did not create and cannot manage alone.

Climate Risk is Changing the Game

Over the last many decades, disasters have become more frequent, more expensive, more disruptive, and harder to insure.

In 2023, the United States experienced 25 separate weather and climate disasters that each caused over \$1 billion in damages. That's up from an average of just three such events per year in the 1980s. But not all damage is dramatic. Chronic “nuisance flooding,” rising heat indexes, and intensifying freeze-thaw cycles are straining pipes, roads, and buildings in ways that don't make headlines but wreak havoc on municipal budgets.

All the while, insurers are backing away. Major carriers have exited high-risk markets like Florida, California, and Louisiana altogether. In some cases, residents are seeing premiums double or triple—if they can get coverage at all.

At the same time, the federal government is shifting. Under the Trump administration, many federal climate commitments were rolled back. Key datasets were removed or defunded, and programs aimed at climate resilience were deprioritized or politicized. With a non-traditional federal government changing budget priorities, local governments can't afford to assume that Washington will be there when disaster strikes.

The once-reliable backstops of FEMA and the private insurance market are eroding. Risk is drifting back to where it began: the local level.

The Limits of the Conventional Model

Local governments are now being asked to do more with less: maintain existing infrastructure, prepare for emerging risks, and adapt to long-term climate change—all obligations within budgetary frameworks that were designed for a different era.

Most communities lack the data, tools, and staff capacity to evaluate climate risk in a meaningful way. Even fewer have the authority or political cover to raise taxes or issue debt to address it.

Further complicating matters, national free tools for understanding and communicating risk are being hollowed out. Federal sources like the National Climate Assessment and various FEMA datasets have been downsized or made less accessible. Without reliable information, it

becomes nearly impossible for a mayor or city manager to build a consensus around long-term resilience investments.

The truth is, local governments alone can't manage the risks they now face. But they also shouldn't have to.

Why should locals pay for everyone else's risk?

This is the crux of the matter: Why are local governments expected to foot the entire bill for resilience when the consequences of inaction ripple in so many directions? Consider:

- **Real estate developers** benefit when neighborhoods remain livable and insurable.
- **Employers** benefit when their workforce is safe, housed, and mobile.
- **Utilities** benefit when their systems aren't overwhelmed by climate events.
- **Insurers** benefit when communities invest in risk reduction—lowering their exposure.
- **Investors** benefit when public assets remain operational and creditworthy.

Everyone stands to gain—or lose—from the adaptation choices made today. Yet the financial tools available to share in that burden remain limited and disjointed. The capital stack for resilience is fragmented, underdeveloped, and uncoordinated.

It doesn't have to be this way.

A New Mandate: Share the Burden, Share the Upside

If the last century was defined by local self-reliance in infrastructure, could the next be defined by shared responsibility in resilience?

As climate hazards accelerate, public infrastructure and local government leaders will experience an increased need for:

- **Better tools** to size, scope, and communicate climate risk at the local level;
- **Smarter investment vehicles** that can blend public, private, and philanthropic capital;
- **Transparent platforms** for sharing data and building consensus;
- **Place-based strategies** that elevate local priorities while attracting national interest.

One emerging blueprint to address many of these challenges is Resilient America, a national platform designed to help local governments manage physical risks by empowering their own decision-making capacity and bringing others to the table.

Resilient America is not positioned as a nonprofit offering free technical assistance, nor as a grant program supporting predevelopment work or pilots. Rather, through its place-based chapters, Resilient America helps communities:

- Analyze their risk using common sense modeling to better understand the scope of physical risk in their jurisdictions and connect that attention to risk to their operating budgets;
- Communicate the issues at hand to investors, residents, and regional partners so that there is both internal and community-wide support of action;
- Build or support existing investment vehicles that link adaptation strategies to funding pathways in order to unlock participation from allies—insurers, utilities, housing developers, large employers—who share in the outcomes.

In 2026, Resilient America will support ten communities on this journey and The Epicenter will partner closely with Resilient America to document their progress.

The Future is Local—But it Doesn't Have to be Lonely

America's local governments have carried our U.S. infrastructure system for 150 years. They've borrowed prudently, spent carefully, and maintained a level of trust that is the envy of public finance systems around the world.

But now they face a challenge unlike any other. One that grows more complex with each passing year, each warming degree, each insurance pullout, each political reversal.

They are still the front line. But they don't have to be the only line.

Over the last 200 years, the U.S. has been able to fund and finance amazing works through local government leadership—from the Erie Canal, to railway expansion through the Rockies, and even the Golden Gate Bridge. These infrastructure investments were local *financial* feats as much as *engineering* ones. The next few decades will require local, municipal, and state governments around the nation to meet the growing financial needs that accelerating weather hazards will require.



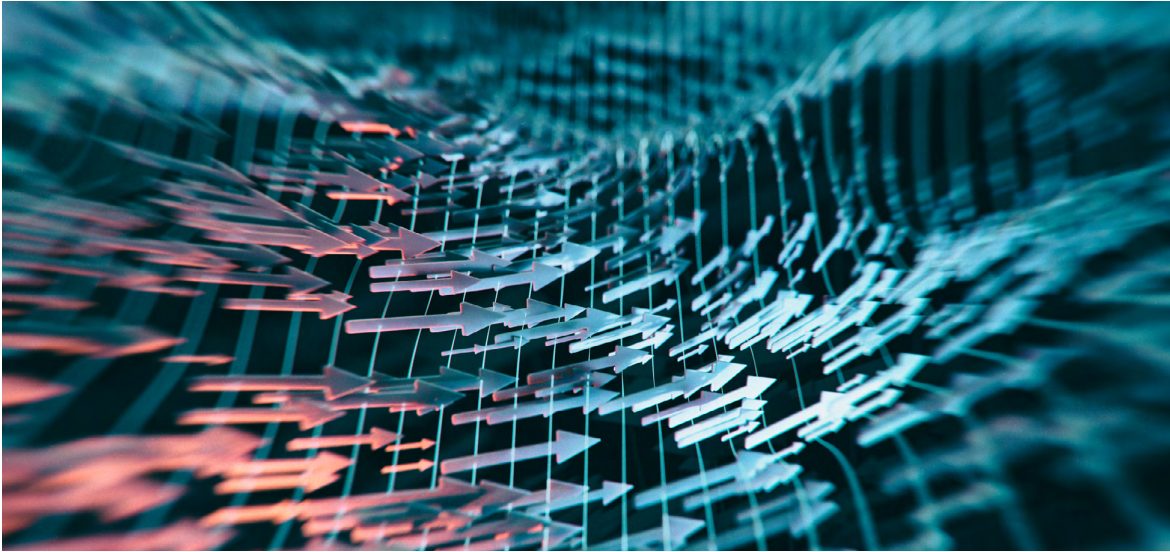
RETHINKING BUDGETING

SHOULD WE RETHINK RESERVES?

A Multimillion-Dollar Question



For more information, visit gfoa.org/rethinking-budgeting



SECTION 1

Why Might We Need to Rethink Reserves?

Reserves are the liquid financial resources* that local governments do not include in the annual spending plan. These resources are held back from the budget and held in “reserve” for some other purpose. The most important purpose is to respond to significant, unplanned, unavoidable costs or revenue losses, such as a natural catastrophe or recession. Another common purpose is as a sinking fund or “piggy bank” for a large, nonrecurring, planned future expenditure, like purchasing a capital asset. Reserves also support a strong bond rating by signaling to investors that the local government has resources to pay back debt even with potential disruptions to its financial position.

It has long been thought that having substantial reserves is desirable. Often it is thought that bigger is better. So why might we need to rethink reserves? The reasons are consistent with [many of those cited for GFOA’s Rethinking Budgeting initiative](#). Though, these reasons take on special significance when applied to reserves.

An increasingly volatile and uncertain world. Reserves play a role in buffering local government from volatility. However, if volatility is increasing, we should reexamine how reserves are managed to ensure local government has an adequate buffer. For example, damages from natural disasters have been on the rise in recent decades.¹ Reserves fund the response to natural disasters. Even if federal or state/provincial financial assistance is available, reserves fill the gap until assistance arrives, which can take months or even years.

Lower trust in government and experts. Local government’s stakeholders may be suspicious of large reserves, especially if it is not clear why the government is holding these resources instead of spending them on current services or cutting taxes.² In the past, the expert opinion of the finance officer, perhaps citing GFOA’s “Best Practices,” might have been sufficient to justify reserves, but expert opinion may not be so readily accepted in the future.³ Finance officers may need to be prepared to provide justification for reserves that rely less on appeals to expertise and more on the fundamental reasons why reserves are important.

* Typically comprising cash and investments that can be converted into cash.

Local governments are becoming more resource constrained. Local governments are expected to maintain a sizable reserve by “industry standards” and by bond rating agencies.* At the same time, local governments are facing more resource constraints, especially with employee health care and pension costs rising. For many governments, the increases in costs have consumed revenue increases, which may soon level off.† In fact, some economists believe that the United States’ long-term growth trajectory will slow; indeed, the general trend has been slowing growth since the 1970s.⁴ Further, long-term demographic trends point toward an aging population. Though the United States’ demographic outlook is not as dire as other developed countries, an aging population still does not bode well for local government revenues.⁵ In addition, legislative constraints limit revenue growth. For example, there is evidence that local government revenues do not recover as quickly from setbacks, like recessions, compared to the past, due to legislative constraints.⁶

Building reserves is a use of current revenues, and governments need to weigh the opportunity costs of doing so. Is it better to provide services today or save the money for later?

Rising costs paired with stagnating revenue growth means that local governments need to make efficient use of resources, including reserves. Building reserves is a use of current revenues, and governments need to weigh the opportunity costs of doing so. Is it better to provide services today or save the money for later?

None of this suggests that local government reserves should always and everywhere be lower than they are today. Instead, we should look for more and better options to provide buffers to local governments than reserves have traditionally provided. For example, are there opportunities to make more cost-effective combinations of commercial

insurance and reserves? This might not always lead to reserves going down. In fact, it could call for reserves to be increased as part of a high-deductible insurance strategy for some perils to reduce the total cost of risk (insurance plus reserves).

Information technology makes rethinking reserves easier. Information technologies, like some we will describe later in this report, make it easier to analyze reserve strategies and optimize the strategy to the conditions faced by each local government.

In the next section, we will discuss how to rethink reserves, with emphasis on the reserve’s role in managing risk. In Section 3, we will suggest several actions local governments can take to rethink their reserves and get better value from reserves for their communities.

* GFOA’s “Best Practices: Fund Balance Guidelines for the General Fund” recommends that, at a minimum, general-purpose governments, regardless of size, maintain unrestricted budgetary fund balance in their general fund of no less than two months of regular general fund operating revenues or regular general fund operating expenditures. Moody’s Rating Agency looks for fund balances above 35% of annual revenue to provide a Aaa rating for General Obligation debt.

† Note: We are not referring to the impact of economic cycles (e.g., recessions) but rather the long-term trend across cycles.



SECTION 2

How Do We Rethink Reserves?

We begin rethinking reserves by starting from “first principles”—that is, why do local governments have reserves in the first place? *The answer is to reduce volatility and uncertainty in public finances.* Uncertainty exposes a government to financial risks. *GFOA has found that framing the reserve explicitly as a risk management tool and linking the reserve to concrete risks that decision-makers can appreciate is a great way to communicate why reserves are important.* Let’s examine the key risks that reserves guard against. We will see that there are many possible risks, and it is difficult, if not impossible, to buy commercial insurance to protect against many of them.

Cash flow risk is a concern, especially for governments where a major revenue source, like property taxes, is received only once or twice a year in large chunks, while expenditures occur evenly throughout the year. A similar problem can occur if large portions of state-shared revenue have to be authorized by the state each year through the state budget process. Delays in approving the state budget could result in delays in local government revenues. Reserves help smooth out resource availability and have important advantages over other options like tax anticipation notes (TANs). TANs can entail the risk of high interest rates, for example.

A big risk for many governments is revenue instability, with recessions being the major culprit. If a recession dramatically reduces revenue, then reserves can be used to help a government make a “soft landing.” For example, the City of Savannah’s sales tax was a large revenue source that was sensitive to the economy. The city, therefore, developed a sales tax stabilization reserve. When the Great Recession hit, the city was able to draw from the reserve and avoid layoffs.

RETHINKING IS LOCAL

Each local government will need to decide how to best apply the ideas in this paper to their circumstances. For example, a local government’s “reserves” are commonly associated with the general fund. Yet, many of the same ideas presented in this paper could apply to other funds, like enterprise funds.

There could be other sources of revenue instability, too. Perhaps a major revenue source is subject to changes in the political environment, as in the case of some state-shared revenue. It might also be the case that a local revenue source is subject to periodic reapproval by the voters. In one city the GFOA worked with, the potential for a major industrial employer to close was a risk because the city relies heavily on a local income tax.

Historically, reserves have not consistently been used by local governments to offset revenue losses from a recession.⁷ This has been, perhaps, the result of state and federal government support during the last two recessions that came through the American Recovery and Reinvestment Act of 2009 and the American Rescue Plan Act of 2021. While these pieces of legislation were a major help to local government fiscal health, local governments should not expect these to be available in future

GFOA has found that framing the reserve explicitly as a risk management tool and linking the reserve to concrete risks that decision-makers can appreciate is a great way to communicate why reserves are important.

recessions. Recovery funds require Congress to pass major legislation, and the rise of political polarization and gridlock makes this far from guaranteed. Even if the federal government offers relief, future funding might have restrictions, and it will be impossible for local governments to predict how much money they will receive. Hence, local governments would be wise to prepare to handle the impacts of recession on their own. Reserves provide another option, besides spending cuts.

Another major risk category is natural disasters like earthquakes, wildfires, floods, hurricanes, and the like. These can result in urgent needs like overtime

for first responders or shelter, food, and supplies for displaced families. They also sustain recovery from disasters by covering unforeseen expenditures like the cleanup that follows the initial devastation. Sometimes, a local government will have some of its costs reimbursed by the Federal Emergency Management Agency (FEMA) and/or state agencies. If this is the case, reserves are still important to cover the nonreimbursable costs, including lost revenue and fees and increased operating costs, while also fronting the costs until reimbursement arrives. GFOA sampled several local governments that received FEMA reimbursement for natural disasters and found it took an average of 18 months to be reimbursed.

Some extreme weather events might not be declared an “emergency” by national or state government. In this case, the local government may be on its own. A common example of this is an extreme snow season where an unusually large amount of snow may cause the local government to dramatically exceed its snow removal budget. Reserves could be used to fund the overage and be replenished by surpluses from light snow seasons.

Man-made disasters are also a risk. The possibility of hazardous material spills that cost a lot to clean up is one such risk that can have a material impact on local finances. Cyberattacks are another example of a man-made risk that might have implications for reserves. As of this writing, cyber insurance policies are becoming more expensive or totally unavailable to some governments. So a government might need to raise the deductible on a commercial policy or forgo a policy altogether. In this case, the government is self-insuring against cyberattacks either partially or fully, and reserves provide the financial backing. Capital infrastructure also presents risks that reserves can help mitigate. Debt is a powerful tool for local governments to finance infrastructure acquisitions, and reserves provide assurances to creditors that the local government is not at unacceptable risk of default. Reserves can also be used to pay for capital assets directly (i.e., cash financing).

There may be other risks we haven't covered that might be relevant to reserves. These risks might fall into categories of financial/economic, health crises, security, reputational, and more. Here are a few examples from governments the GFOA has worked with to analyze their risk exposure. You might think of others that are relevant to your jurisdiction.

- ➔ **Financial/economic:** For governments with large pension liabilities, a reduction in the rate of return on pension investments could increase the annually required pension payment.⁸ Reserves could be used to smooth out the impact on the budget.
- ➔ **Public health:** The COVID-19 pandemic is an extreme example of the potential financial impact of a health event. Less extreme outbreaks could still have financial impacts. For example, local governments with public health responsibilities in urban areas could face large costs from local outbreaks of serious diseases, like hepatitis.
- ➔ **Public safety:** Terrorism and civil disorder can cause a spike in public safety costs. It is worth noting that civil disorder events could become more difficult to insure against because social media can spread civil disorder beyond a local phenomenon.⁹ In other words, civil disorder in one community can easily spread to others. Insurance companies try to avoid insuring risks where this kind of “domino effect” is in play.

Recognizing that *reserves are essentially a tool for risk management* leads to our next point on how to rethink reserves: Adjust your mental model.

A mental model is a way in which we view the world. Mental models guide how we make decisions. *If public finance officers can give decision-makers a better mental model, they will make better decisions.* The traditional mental model for reserves is **a savings account**.

Indeed, the savings account has several advantages as a mental model. First, it's an easy analogy to grasp for people who are not public finance experts. Second, it has a seemingly obvious parallel to the personal lives of local governments' stakeholders. This is particularly true for the “sinking fund” function of reserves, as most people have experience with building up their personal savings to pay for some consumer expenditure or personal investment (e.g., education, house, car, etc.).

However, the savings account model has disadvantages as well.

First, the analogy to personal savings as a buffer against risk might not be as powerful as it seems. Personal savings rates have been in long-term decline.¹⁰ Not only that, but most consumers also start saving reactively, after an adverse event has occurred (e.g., recession, pandemic). Obviously, this is not a viable strategy for local government reserves.¹¹ Given the reactive strategy that most savers adopt, it is not surprising that most Americans are well short of the amount of personal savings that personal finance experts recommend keeping for an emergency.* Given the lack of emphasis on saving for an emergency, many people may now see personal savings more as a vehicle for saving up for future purchases than as a way to manage risk.¹²

RESERVES AREN'T ALWAYS THE ANSWER

We must recognize that reserves are not the best way to manage all of the consequences of the risks local governments are subject to. Let's take pensions. Though reserves could be used to cushion the initial shock from a reduced rate of return and consequent increase in required annual contributions, a government will, at some point, need to realign its annual spending to accommodate increased pension costs.

* The average American's monthly expenses are \$5,111. Fifty-one percent of Americans have less than \$5,000 in savings. Personal finance experts recommend more than one month's worth of expenditures, with three months regarded as the minimum. Information taken from: Backman, M. (2022, May 9). *Study: Average American's savings account balance is \$4,500*. The Ascent. <https://www.fool.com/the-ascent/research/average-savings-account-balance>

There is evidence that financial managers are more likely to view their own personal savings as a tool for managing risk compared to the average person. This means that the “saving account” metaphor for reserves may be more impactful in the minds of financial managers than it is for other people.¹³

Second, the savings account mental model implies that having more in your account is better. However, this is not always true with local government reserves. Local governments are faced with *opportunity* costs that are different from private individuals. Monies placed in reserves are resources that are removed from the private economy. It can be argued that **excess*** reserves could do better for the community if those resources were put to work in the private economy. Even if excess reserves weren't returned to the private economy, a good argument could be made that the excess amounts should be used by the government to benefit the current generation of taxpayers (the ones who provided the money to create the reserve). Further, there are diminishing returns to putting aside money to offset risk. We will mathematically demonstrate this later in this paper. For now, a simple thought experiment will do. Imagine a person had \$10,000 in their savings account to offset personal risk. This is a healthy amount, but it is not hard to imagine circumstances where this amount proves insufficient. Now imagine another similar person had \$1 million in their savings account. It is much harder to imagine the circumstances where this would be insufficient. Now imagine each person was given an additional \$10,000. It is easy to see how the first person could better insulate themselves from risk by using this money to build their savings. It would be hard to argue that the second person would experience an equal gain in risk mitigation from building their savings further. The \$10,000 creates greater marginal benefit for the first person than the second. The same logic applies to government. We will address how to identify the point at which excess has been reached later, including establishing for floor and ceiling amounts on the desired level in reserves.

If the savings account mental model has important limitations, what is the alternative? **We propose insurance as a new mental model. This does not necessarily replace the savings account model but does supplement it by providing a new and better perspective on some of the most important purposes of a reserve.**

Insurance has an obvious parallel to people's personal lives. Given that local governments hold reserves to manage risk, insurance is an accurate analogy for reserves. Further, insurance is purchased *proactively*, before an adverse event occurs; much like reserves must be built up ahead of time to prepare for future, unpredictable adverse events.

Another advantage of insurance as a mental model is that it invites local governments to think about how commercial insurance and self-insurance can work together for an optimized risk financing strategy. Reserves are a self-insurance strategy, but commercial insurance policies (those purchased from a broker) can supplement reserves. For example, commercial insurance could be useful for protecting against low probability but extreme consequence events. Later in this report, we will discuss specialized insurance policies called “parametric” insurance that are designed to provide the policyholder with compensation in the event of an extreme event.

RESERVES AS INSURANCE AND THE ELECTED BOARD

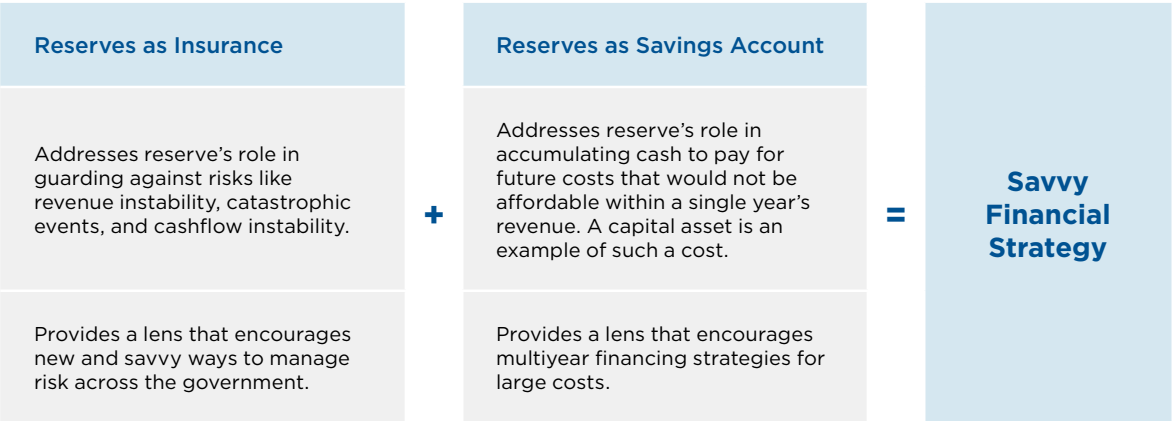
One author of this paper was part of a discussion with a city council about reserve strategy. One council member asked what the practical implications of spending the reserve would be. Reserves as insurance would point out that lower reserves would be the equivalent of taking a lower limit (or higher deductible) on your insurance policy. Reserves as savings account struggles with this question because an increasingly prevalent view is that savings exist to be spent.

* Of course, defining the point of excess is key. We will address that later in this paper.

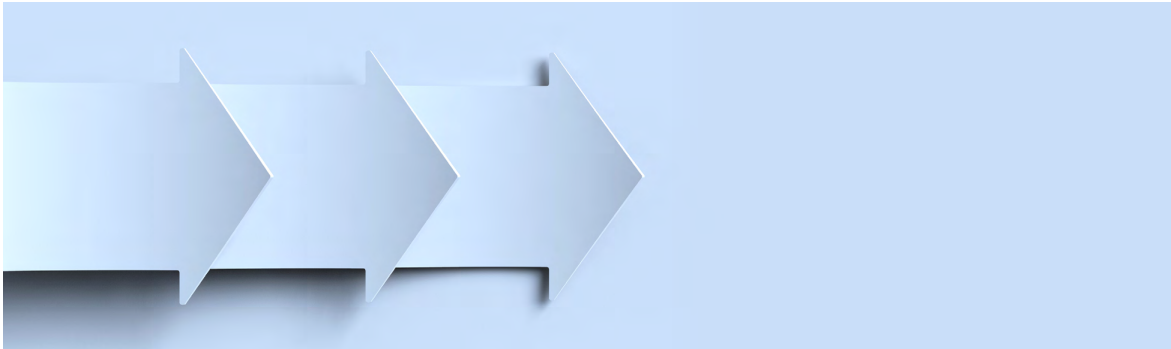
Using insurance as a mental model also implies that there is an optimal amount to have on hand. Nonexperts can appreciate that it is possible to either overinsure or underinsure the risks that you face. Insurance also implies that there is a point at which the “policy” should be used. Let’s consider recessions as an example. Recessions are the most important source of financial instability for local governments, so reserves can play a crucial role in counteracting downturns in economic cycles. However, there is little evidence that local governments use reserves during times of economic recessions.¹⁴ In the Great Recession, the 30 largest U.S. cities used their fiscal reserves, but only 25% of the 600 smaller cities studied drew down their reserves (the remaining cut spending).¹⁵ Failure to use reserves likely caused distress to the community in the form of interruption to public services. While local governments should consider spending cuts during a revenue downturn, a strong reserve can help avoid the most damaging spending cuts.

The insurance mental model is not without its disadvantages, though. Insurance can be an abstract and difficult concept to grasp, even in our personal lives. This means people sometimes don’t make optimal personal decisions about insurance, just like they make suboptimal decisions about personal savings. Another disadvantage is that the analogy becomes more complicated when commercial insurance and intergovernmental aid is considered. Taking these other risk management tools into account is necessary for an optimal risk management strategy, but the trade-off is additional complexity.

The reserves as insurance mental model addresses the risk management function of reserves well. The reserves as savings account mental model addresses the “sinking fund” function of reserves, so we do not suggest discarding the savings account mental model entirely. Rather, putting these two models together offers a more comprehensive perspective on the role of reserves.



With better mental models in place, we are positioned to think about the actions we can take.



SECTION 3

What Actions Can We Take to Rethink Reserves?

In this section, we'll look at the steps local governments can take to rethink reserves. We've summarized the major ideas and will discuss them in detail immediately after. The ideas are presented in a rough order of importance.

- 1. Risk-Based Reserve Analysis.** A perennial question in local government finance about reserves is “how much is enough?” The reserves as insurance model would say it depends on what your risks are. We'll discuss different options for how local governments can take account of their risks.
- 2. Develop a Comprehensive Reserve Policy.** A policy helps the government commit to savvy decision-making about reserves by showing why a smart risk-informed reserve strategy is good for the community and defining the boundaries of acceptable actions around reserves. Most important, a policy should address the amount in reserves that a local government will strive to maintain, including a minimum and maximum amount.
- 3. Optimize the Combination of Commercial Insurance and Self-Insurance.** Commercial insurance and self-insurance each have advantages that can complement the other. If we think of reserves as self-insurance, it opens up new ways of thinking about the application of commercial insurance to the risks that local governments face. By using a risk-based approach to identify how much and for what severity of events reserve funds are needed, it becomes easier to identify pricing efficiencies between holding funds and purchasing private insurance.
- 4. Optimize Investment Strategies.** Reserves are constituted by cash held back from current spending. Knowing how much cash is necessary to keep liquid to provide reasonable assurances for unplanned, unavoidable expenditures tells you how much can be invested in long-term, less liquid but higher yield instruments.
- 5. Pool Risk.** Local governments often participate in *external* risk pools to save money. Local governments may have unrealized *internal* risk pooling opportunities. The reserves as insurance model highlights these opportunities.
- 6. Understand Bond Ratings and Reserves.** Bond ratings are often used as a reason to maintain high reserves. However, the interest rate advantage will only be justified under certain conditions. Reserves as insurance asks us to consider if higher reserves are “worth” the cost to obtain a higher bond rating.

COLUMN

Mission possible: How cities and counties can innovate to overcome fiscal challenges

Cities and counties will need to draw on lessons learned and engage with partners to succeed.

Published May 1, 2025

By Andrew Kleine

Editor's note: *This article was originally published in American City & County, which has merged with Smart Cities Dive to bring you expanded coverage of city innovation and local government. For the latest in smart city news, explore Smart Cities Dive or sign up for our newsletter.*

Many American cities and counties are facing fiscal and economic threats that would make even “Mission Impossible”’s Ethan Hunt nervous. American Rescue Plan funding that buoyed local government budgets is expiring. Downtowns have not fully recovered from the remote-work revolution. The inflation spike of 2021-22 pushed costs up permanently. Wealth inequity, homelessness and other long-standing issues demand action, even as cuts to federal grants and expertise loom. Economists are warning of a higher chance of recession.

When it comes to tackling fiscal challenges, local leaders have no choice but to accept the mission, impossible though it may seem. Completing it does not require black ops-type tactics, but cities and counties will need to employ innovative (and perhaps unconventional) strategies, draw on lessons learned and engage with partners to succeed. What follows is a mission plan to achieve fiscal sustainability. Don't worry — the message won't self-destruct in five seconds.

Develop a multiyear financial plan. When the first step of a mission is to develop a plan, you might be in trouble, but a multiyear financial plan is the foundation of fiscal sustainability. It provides not just direction but also inspiration. As human beings, we are willing to endure painful growth to achieve a meaningful

goal; think training for a marathon or learning to play a musical instrument. A plan that connects fiscal stewardship to community ambitions can serve as a rallying point when facing harsh realities and making hard choices.

Good financial planning can be viewed as having three core components. The first is well-informed projections of revenues and the costs of maintaining current service levels. The relationship between revenues and costs sets the stage for the ambitions and limitations of the planning process. Second is a set of goals grounded in an assessment of financial strengths, weaknesses, opportunities and threats. These might include achieving structural budget balance plus building schools, fixing streets or cutting taxes. Third is a robust set of options for achieving the goals. The options should be assessed for feasibility and impact to facilitate decision-making.

Enhance the value of government assets. Many governments underutilize assets due to a lack of inventory, valuation or monetization strategies. Analysis of real estate holdings, for example, can unlock significant one-time and recurring revenue by paving the way to a sale, swap, lease, development project, consolidation or other strategy. Thorough asset analysis — real estate holdings, uncollected taxes, advertising space, even tree waste — can unlock new revenue. Atlanta, for example, found that four scattered acres of city property in the downtown core had a combined market value of \$100 million, far more than what appears on the books. One parcel near City Hall will soon become a 228-unit mixed-income housing development with ground floor retail. Asset optimization can help offset federal funding losses and sustain critical services.

Enhance service delivery. Governments continue to face labor shortages and record numbers of unfilled positions — offering a unique opportunity to rethink service efficiency. There may be a range of options for making services better, faster and cheaper. For instance, streamlining operations through methods such as lean process improvements can enhance service quality while freeing up funds. A coordinated effort that engages frontline employees as full partners in “straightening the pipes” of government can lead to practical, lasting improvements and help mitigate budget pressures.

Now may be the right time to test the market and find out if the private sector can more cost effectively collect trash, run health clinics, sweep streets, account for payables and receivables, etc. Vacancies may enable local governments to reassign employees displaced by outsourcing, minimizing disruption. Local governments can also follow the Indianapolis example of allowing labor unions to bid for contracted services and using gainsharing to reward employees for improving productivity.

Leverage outcomes to find new revenue. Addressing the root causes of societal problems can save money. That's the basis of social impact bonds, also known as pay for success (PFS). Denver attracted \$8.6 million in private investments to provide permanent supportive housing to 360 chronically unhoused individuals. An evaluation by the Urban Institute found that the program reduced jail, health and other costs enough to repay investors with a return. The same concept has been used in other places to increase pre-K slots, enhance prenatal nurse visits and reduce recidivism.

Check your tax expenditures. When Baltimore's budget office studied the city's development tax credit programs in 2022, it found many issues: The credits primarily benefited wealthier neighborhoods; they also over subsidized some development without controls on cost and eligibility, and they profited developers, who used them to increase the asking price of homes instead of passing them along to homeowners. Local governments that use tax credits or similar incentives should give them the same scrutiny as other expenditures.

Prioritize spending strategically. When faced with budget shortfalls, state and local governments often respond by implementing across-the-board cuts — thinning the soup, as it were. While this approach may seem equitable on the surface, it may have the unintended consequences of protecting lower-value programs and punishing those that demonstrate results and advance important goals. In preparation for tighter budgets, governments should consider taking the following steps:

- Break the budget down into programs to better understand how money is spent.
- Measure how each program is performing and whether it can show evidence of its impact.

- Evaluate how each program aligns with organizational and community goals.

A strategic budgeting approach can help governments decide whether and how to backfill potential federal funding cuts.

Match your rainy-day fund with the forecast. The Government Finance Officers Association (GFOA) — whose rule of thumb is that local governments should hold a minimum two months' operating revenue in reserve — advocates that specific reserve levels be based on each jurisdiction's unique risk profile. GFOA's case study on Colorado Springs, Colo., is an example of how to factor the local economy, infrastructure conditions, vulnerability to extreme weather events and other considerations into determining a reserve target. Providence, R.I., has connected its reserve planning to equity, using advanced probability analysis to ensure it can protect its most vulnerable residents from service cuts in a downturn.

The list of risks faced by local governments continues to grow. Less than 10 years ago, civil unrest, cyberattacks and a global pandemic were not on the radar of most public officials. The reality of these unforeseen developments should help CFOs initiate critical conversations with leaders about how much risk is tolerable and how to manage uncertainty.

Bring everyone to the tabletop. Financial resiliency planning should be more than a paper exercise in the finance department. In the same way they plan emergency preparedness for natural disasters and terrorist attacks, local governments should simulate what they would do in the event of revenue loss. The purpose of such a tabletop exercise is for local governments to develop strategies for their own economic and fiscal scenarios.

Every part of government plays a role in financial resilience. Operating departments can find efficiencies to increase resource flexibility, policymakers can decide how to prioritize and target services when money is tight and HR professionals can incorporate contingency planning into labor relations. The entire team can brainstorm ways to better leverage government assets to reduce costs, generate revenue and share risk.

A theme running through these action steps is the critical role of private, philanthropic and nonprofit partners. They invest in social

impact bond projects, deliver cost-effective services as contractors and grantees, buy ad space at bus stops, and purchase carbon credits for tree preservation and energy efficiency improvements. There are many examples of business and civic groups studying complex issues such as pension reform and tax policy. Public-private partnerships have been used to finance, design, build and maintain infrastructure, including highways, schools and stormwater management facilities.

The list goes on, and the point is that local governments cannot get big things done on their own. Like Ethan Hunt, they must put together a team to make the impossible possible.

Good luck.

The views reflected in this article are the views of the author and do not necessarily reflect the views of Ernst & Young LLP or other members of the global EY organization.

Commentary is a space for state and local government leaders to share best practices that provide value to their peers. Email Smart Cities Dive to submit a piece for consideration, and view past commentaries here.

About the Author

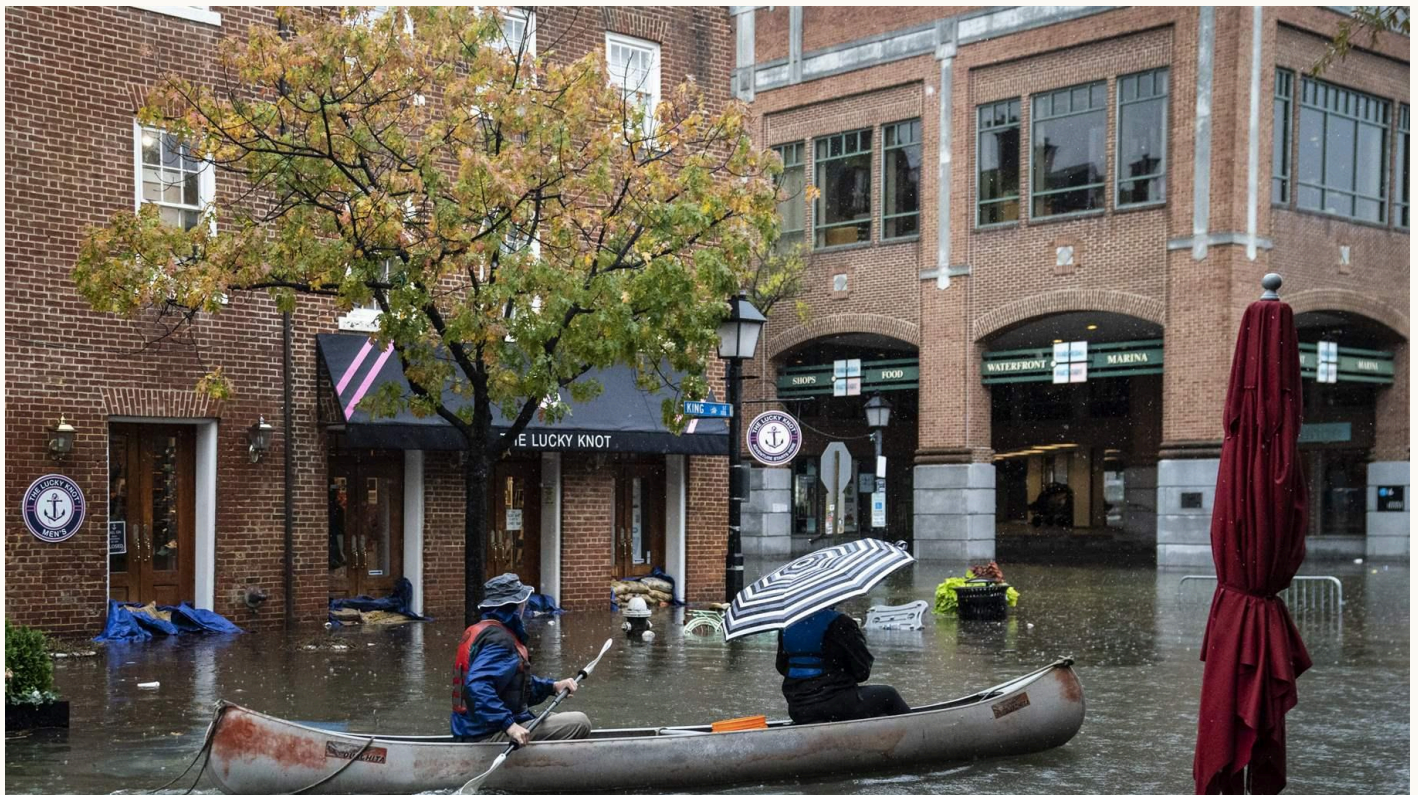
Andrew Kleine is a managing director in the Government & Public Sector practice at EY-Parthenon, Ernst & Young LLP. He is the author of “City on the Line: How Baltimore Transformed Its Budget to Beat the Great Recession and Deliver Outcomes” (Rowman & Littlefield, 2018) and has served as Baltimore’s budget director. His email is andrew.kleine@ey.com, and his X/Twitter handle is @awkleine.

State and Local Governments Use Innovative Financing to Build Disaster Resilience

With investments in planning and projects, communities are countering flooding, wildfire, and other disaster threats

Authors: Kristiane Huber

Article | December 20, 2024 | 4 min



Residents paddle a canoe through Old Town Alexandria, Virginia, on Oct. 29, 2021, after a storm prompted the nearby Potomac River to flood—a frequent challenge in this Washington, D.C., suburb. In September 2024, the Virginia Department of Conservation and Recreation awarded the city a \$525,000 grant to help fund a new comprehensive flood resilience plan.

JABIN BOTSFORD / THE WASHINGTON POST VIA GETTY IMAGES

Rising costs and threats from extreme weather in the U.S. have prompted historic government investments in hazard mitigation and disaster resilience—including more than \$50 billion cumulatively from the Infrastructure Investment and Jobs Act of 2021 and the Inflation Reduction Act of 2022.

However, it's unclear whether federal funding for resilience will be sustained at similar levels in the future. Faced with the combination of uncertain funding and rising disaster expenses, state, county, and city governments are taking the initiative—and getting creative—to invest in resilience and risk mitigation. And, based on election results in November, voters are on board, passing ballot initiatives to create or expand resilience funding at the state level in California and Louisiana; the county level in Harris County, Texas, home to Houston; and citywide in Honolulu.

Against the backdrop of these successful ballot initiatives, members of The Pew Charitable Trusts' State Resilience Planning Group (SRPG) gathered virtually in November to learn about innovative local approaches—from the Rocky Mountains to the mid-Atlantic—to finance community resilience projects.

A Colorado county uses voter-backed sales tax to fund implementation of risk management plan

In 2016, Chaffee County, about 100 miles west of Colorado Springs, faced rapid growth in population, tourism, traffic, housing prices, and wildfire risk. This prompted county commissioners to convene Envision Chaffee County, an initiative to manage the growth and associated risks. At the SRPG meeting, Envision Chaffee County co-lead Cindy Williams shared how the organization engaged ranchers and farmers, business owners, economic development advocates, environmentalists, and other community members to develop the Envision Community Action Plan.

The county is funding implementation of the plan with a 0.25% sales tax increase that voters approved in 2018, which so far has generated \$9 million in revenue and \$36 million in matching funds from the federal and state governments and other sources.

Envision Chaffee County also implements the Chaffee County Community Wildfire Protection Plan, which has mitigated wildfire risk on more than 10,000 acres of public and private forests through practices such as thinning trees and prescribed

burns. “It’s not just about the money,” said Williams. “It’s about getting really effective work done on the ground.”



A volunteer with the Chaffee Recreation Rangers program spreads grass seed in a wildfire damaged area. Among other duties, the rangers check for smoldering and illegal campfires and educate visitors on how to minimize their impact on public lands.

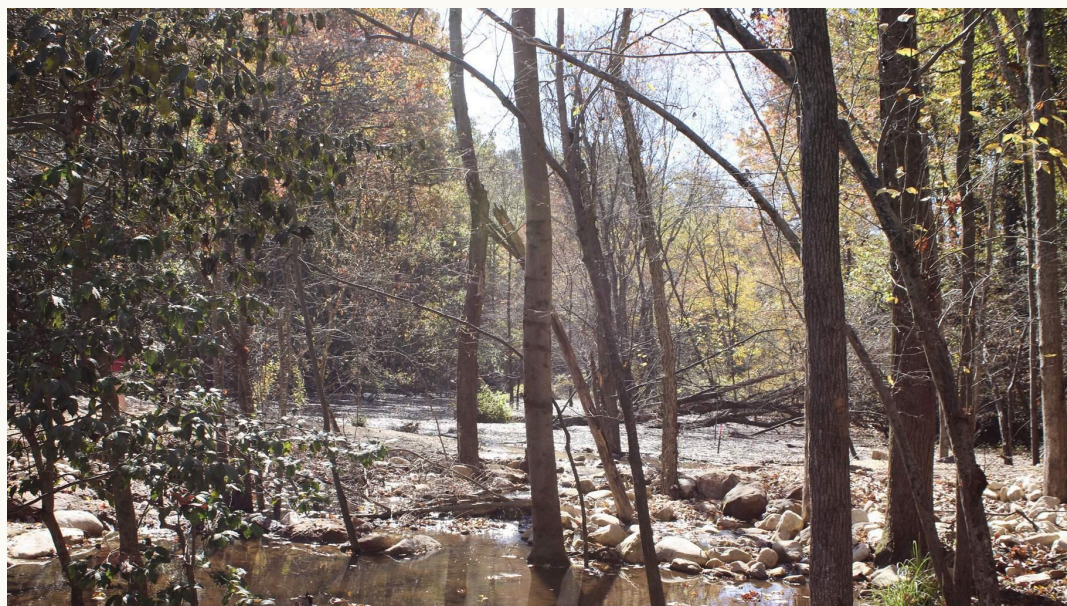
COURTESY OF CHAFFEE COUNTY ENVISION

State-created nonprofit takes the lead in a coastal Maryland county

The 500 miles of coastline in Anne Arundel County, including the state capital Annapolis, are a natural asset as well as risk to communities because of sea-level rise, nuisance flooding, and coastal storms. To help manage these risks at the local level, the Maryland General Assembly passed legislation in 2020 enabling the creation of local resilience authorities: nonprofit organizations that can finance and contract resilience projects.

That led to the 2021 formation of the Resilience Authority of Annapolis and Anne Arundel County, the first multijurisdictional authority in the country to take a regional, innovative, and long-term approach to investing in resilience projects that also provide significant environmental and economic benefits. Matt Fleming, executive director of the Resilience Authority, told the SRPG meeting attendees that, to date, the authority has secured \$43 million of outside funding for resilience projects and completed about \$9 million in climate infrastructure projects.

The authority attracts and strategically applies federal, state, and private funding to quickly develop and implement projects. One example is the Maryland Department of Natural Resources' Jabez Branch flood plain restoration project, funded by the authority and the National Fish and Wildlife Foundation, to address significant pollution and erosion in and around a waterway that eventually feeds into the Severn River and Chesapeake Bay. The project included expanding the surrounding wetland and engineering the streambed to slow water flow and allow floodwaters to spread into the flood plain during severe storms.



Jabez Branch flows through a forested area in central Anne Arundel County, Maryland. A recent restoration project included filling an eroded, 10-foot-deep channel with native sands, gravel, and wood chips to reconnect the stream to its flood plain.

COURTESY OF ANNE ARUNDEL COUNTY

Commonwealth of Virginia uses loans and grants to incentivize local action

The Resilient Virginia Revolving Loan Fund, which the state established in 2022, invests in local and regional resilience loan programs to support risk mitigation projects for individual buildings.

Matthew Wells, director of the Virginia Department of Conservation and Recreation, explained that the first funding round in 2023 focused on helping local governments meet requirements to unlock federal or state matching funds and support risk mitigation projects to buildings on private property. This includes projects such as elevating structures to minimize flood risk and voluntary buyouts

—in which residents sell their flood-prone properties to the state or local government and relocate to areas with lower flood risk. Operating alongside the state’s Community Flood Preparedness Fund, which supports community-scale flood resilience through local planning and larger infrastructure projects, the revolving fund offers a model for other states seeking to expand their resilience financing toolbox beyond grant support and to spur resilience action on individual properties.

“We essentially have designed these two funds to offer a holistic approach for local governments,” said Wells. “The state will help fund flood resilience studies, the development of a resilience plan, and build capacity—including by hiring staff.”



Machinery in place to work on the Seatack drainage improvement project—supported by a Virginia Community Floods Preparedness Fund grant and designed to address flooding issues in Seatack, the oldest African American community in Virginia Beach. The project, scheduled for completion in June 2025, received \$1.9 million to improve the drainage system to withstand future flood risk.

PUBLIC WORKS ENGINEERING DRONE / CITY OF VIRGINIA BEACH

State and local projects can inspire resilience investments elsewhere

State and local governments must work together to plan for an uncertain climate future and to invest in proven solutions that limit climate and weather risks while providing the greatest possible benefits for communities and sensitive ecosystems.

Other states and localities could help their residents—and nature—by following the examples from Colorado, Maryland, and Virginia.

Coupled with forward-looking resilience plans, local funding sources and creative financing give communities a greater say in how projects are developed, prioritized, and implemented and can help speed project timelines. As Cindy Williams from Envision Chaffee County says, “Having those plans in place and connecting the funding to them has been the key to success.”

Kristiane Huber works on climate resilience and nature-based climate solutions with The Pew Charitable Trusts’ U.S. conservation project.

Explore

TAGS

[Floods](#) [Local policy](#) [Disasters](#) [U.S. state policy](#) [Infrastructure](#)

PLACES

[United States](#)

People



Kristiane Huber

Officer
U.S. Conservation

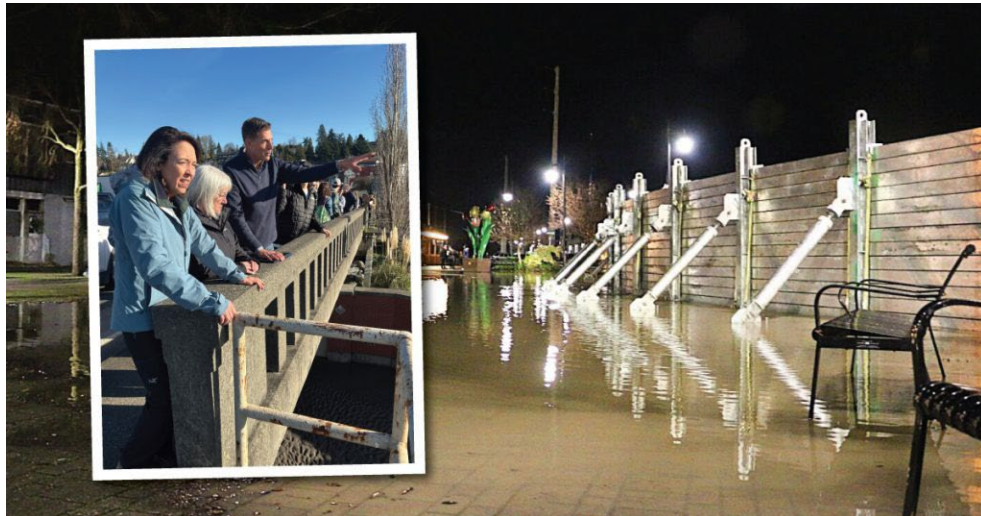
Media Contact

Monique O'Grady
Senior Manager, Communications
202.540.6336
[✉](#)

New flood wall saves Mount Vernon, Snohomish County roads face major repairs



Mario Lotmore December 13, 2025



Background is an image of “The Wall” holding back flood waters from the Skagit River (Source: Mount Vernon Downtown Association). The Second image is that of Mayor Peter Donovan sharing assessments with Senators Maria Cantwell and Patty Murray (Source: Office of Senator Maria Cantwell).

MOUNT VERNON—On the Saturday following record-breaking [Skagit River flooding](#), Mount Vernon Mayor Peter Donovan stood before the city’s 1.4-mile flood wall (a.k.a. The Wall) and declared it a game-changer, as U.S. Senator Patty Murray, Governor Bob Ferguson and local emergency officials gathered to assess response efforts and brace for more rain.

“Downtown Mount Vernon stayed dry this week,” **Donovan said**. “But more importantly, downtown Mount Vernon residents were saved again. And downtown businesses were saved again.”

The Wall, deployed in about 12 hours by city employees, protected 225 downtown buildings this week, keeping the area dry despite the river's record crest of 37.73 feet on Thursday and lifting those structures out of the federal 100-year floodplain. The Wall also reduced flood insurance costs for residents and businesses by more than 40 percent, Mayor Donovan shared.

Built through collaboration among local, state and federal governments, Mayor Donovan specifically thanked Senator Murray for championing the initial study and securing funding for "The Wall."

"I'm grateful to Senator Murray, who championed the initial study and found the funding to get this project off of the ground," **Donovan said.**

In past floods, hundreds of volunteers would rush to fill sandbags for makeshift barriers. With The Wall in place, residents could now focus on being good stewards by helping neighbors.

Senator Murray, reflecting on her experience in "knee-deep water" 20 years ago, called The Wall's performance "really incredible."

"I saw business owners with tears in their eyes [20 years ago] because they lost so much of their merchandise and [who] had to recover, are now safe," **Sen. Murray said.** "The investment in this wall really made a difference for this community in lives and dollars and businesses and in this community it's a really good example showing you preventive infrastructure makes a difference."



Mount Vernon Downtown Flood Protection Project

AND RIVERWALK PLAZA

APWA Washington | 2020 Project of the Year Award |
Category: Disaster or Emergency Construction Repair
Projects - \$25 Million, but less than \$75 Million

Executive Summary

Ever since the City of Mount Vernon was established in 1893 along the banks of the Skagit River, its downtown has been threatened by major floods. Protecting the downtown from river flooding always required the mobilizing up to 2000 volunteers working intensely for almost a day placing 150,000 sandbags along the waterfront. These conditions caused the downtown business district to be in the Federal Emergency Management Agency's (FEMA's) 100-yr flood zone, requiring costly flood insurance for land owners and hampering development in this important area. Fifteen years ago the City began the project that would solve these problems by permanently protecting the historic downtown from flooding and removing it from FEMA's 100-year flood zone



In 2019 the City completed a four phase waterfront project with a system of concrete and steel floodwalls and earthen levees that extends for 1.6 miles along the left bank of the Skagit River past the downtown around its waste water treatment plant. The project duration spanned almost 15 years from the start of conceptual design to completion of construction, and it cost over \$31 million dollars. The City completed the project in 2019 when on October 25th FEMA officially removed the downtown from its 100-year flood maps.

The project has transformed the City, and it has many laudable features beyond the floodworks that protect the downtown. It includes a river walk, plaza area, aesthetic features such as theme lighting and artwork, and low impact development (LID). (See the "Downtown Flood Protection Project and Riverfront Trail" graphic for a diagram of the entire project.



Construction Schedule, Management, and Control Techniques



Top: Crews installing the Sheet piling.

Right: Phase 1 construction.

Bottom: Where the Floodwall meets the Levee.



The project was constructed in four phases and employed a number of proactive construction management techniques. During each phase of construction, the City sought to build a partnership between the City, contractor, construction management firm, and local businesses. A partnership approach provides for good outcomes by recognizing that all parties have a vested interest in the project.

The partnership was nurtured with the public through a number of simple techniques. For example:

- By providing regular project updates through multiple communication outlets such as a project website and project email list.

- By listening to the concerns of affected businesses, citizens, and working quickly to address reasonable requests.

- By providing advanced notice of project impacts so businesses and the public can plan accordingly.

- By reinforcing the vision and long-term benefit of the project.

- By meeting in person with affected business owner.





A partnership was built with the four Contractors during construction by employing the following:

By meeting weekly with the City, construction management firm and the contractor.

By addressing questions and resolving issues quickly so as to maintain construction schedules.

By providing full-time onsite construction oversight to ensure project quality and to provide real-time problem solving in the field.

By showing the contractor that their success is the City's success.

The overall construction was divided into four separate phases of construction, consisting of four separate construction contracts. Each of the phases were broken into a reasonable and affordable size of work tailored to the overall general nature of the construction. For example, the earthwork portion of work was largely separated into a phase, as was phase 2, the most architecturally intense phase of the project.

By breaking the project into phases, the City was able to break the design, construction management, and construction work down to be performed by area engineering, construction management, and construction contractors; all of whom demonstrated genuine interest in the success of the project and success for the community.

Top: Sheet piling installation near Commercial Cold Storage (CCS).
Middle: Complete and exposed sheet piling by CCS.
Bottom: Workers install sheet piling underneath the Division St Bridge (SR536).

Community Relations



Community relations are especially vital to the success of a project such as this. The big components of the effort were the citizen advisory group of downtown business leaders and community representatives that was formed by the mayor to help develop the aesthetics, concepts, and the mitigation of the project impacts for the downtown. Secondly the City completed a state environmental impact statement that included many formal procedures for involving the community and stakeholders in the project.

The City continuously interacted with the community about the vision for this project. It was advertised and talked about continuously for at least 12 years with involvement at all levels of local and state government. Relations included dike districts, local organizations, and residents. The project was presented on the local City T_v10 station, website, council meetings, public works committee meetings, project meetings, community meetings, and discussed at every public forum where it made sense. The City made videos that showed a preconstruction conceptual promotional advertisement and a post construction video of the project.

Mount Vernon has a population of 36,000 and it became obvious that the message was getting out as many of the residents in the town were talking about the project. The downtown business owners and residents were the easiest to reach and the most excited about the project as they also are the most impacted by it, and gained most directly from its effects. There was outreach before every phase of construction and public meetings explaining work sequences and downtown parking. During construction, City staff and the public works director walked the project daily and informally talked with affected business owners and residents to help address their needs and concerns.

Environmental Protection



The Skagit River is quite environmentally pristine with all five species of salmon, and it is one of the main bull trout rivers in the United States. These facts make the environmental elements of this project especially important. Beyond its overall positive environmental benefit in preventing pollution and damage that would otherwise occur during major flood events (such as flooding the wastewater treatment facility grounds, inundation of pavements, and server systems), the project has other benefits to the environment.

A large asphalt parking area immediately adjacent to Skagit River in the City's downtown was demolished and replaced with permeable pavers so that the area can be used as a public plaza. The permeable pavers cover approximately half the area and almost all of the 30,000 square foot plaza drains into an infiltration and tree cell gallery. The plaza is designed to maximize both organized and informal public recreation. Also included in the large open area is a gallery of bioretention tree cells that provide shading which will reduce any heat island effects from the pavers and create additional stormwater quality and quantity treatment.

At the time of design and construction, LID was encouraged by the state, county, and local jurisdictions but it was not a requirement. Even so, the City chose to design the plaza as a functional gathering place that highlighted the use of LID.

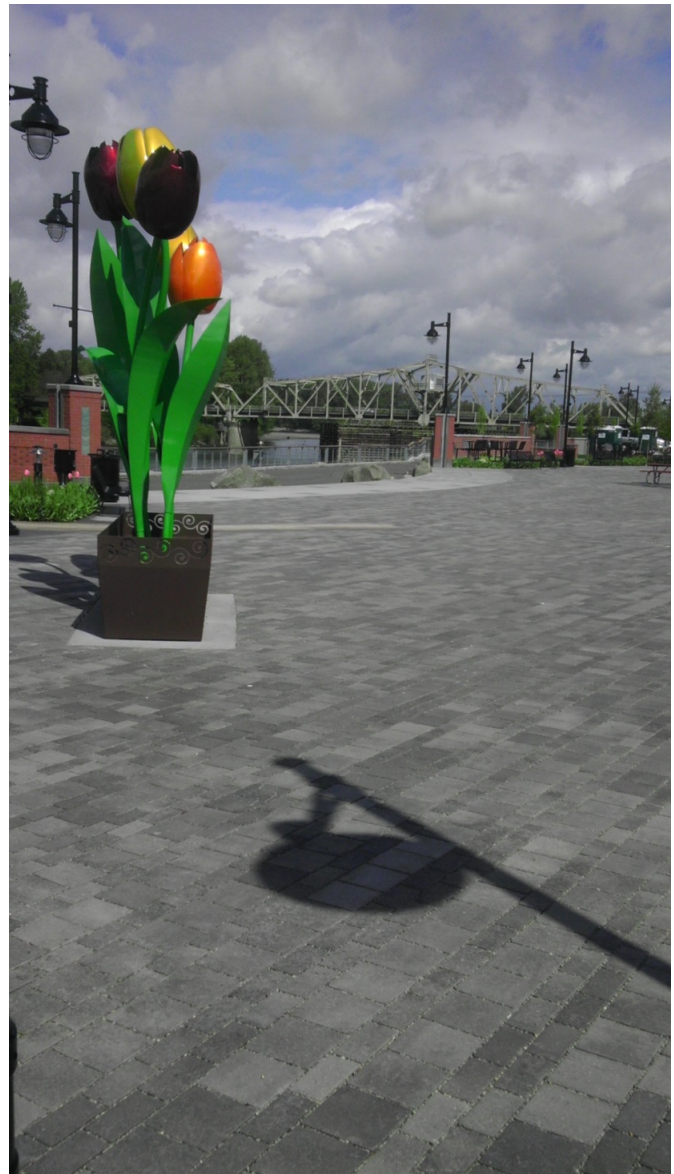


Specific Water Quality Benefits

The City of Mount Vernon on average gets 38 inches of precipitation per year. In the project area all of that precipitation would have drained directly into the Skagit River prior to the project. Further statements of the benefits are as follows:

1. The LID areas treat an average of 6,650 cu. ft. of runoff annually.
2. The Contech filter that were installed as part of the project treat an average of 17,250 cu. ft. annually.
3. There is an educational benefit of events that are held in downtown that expose LID to people. Between the Tulip Festival, Plaza Concert series, Farmers Market, and the Lincoln Theater Brew Festival there are conservatively over 250,000 people that use and see the Downtown LID features.

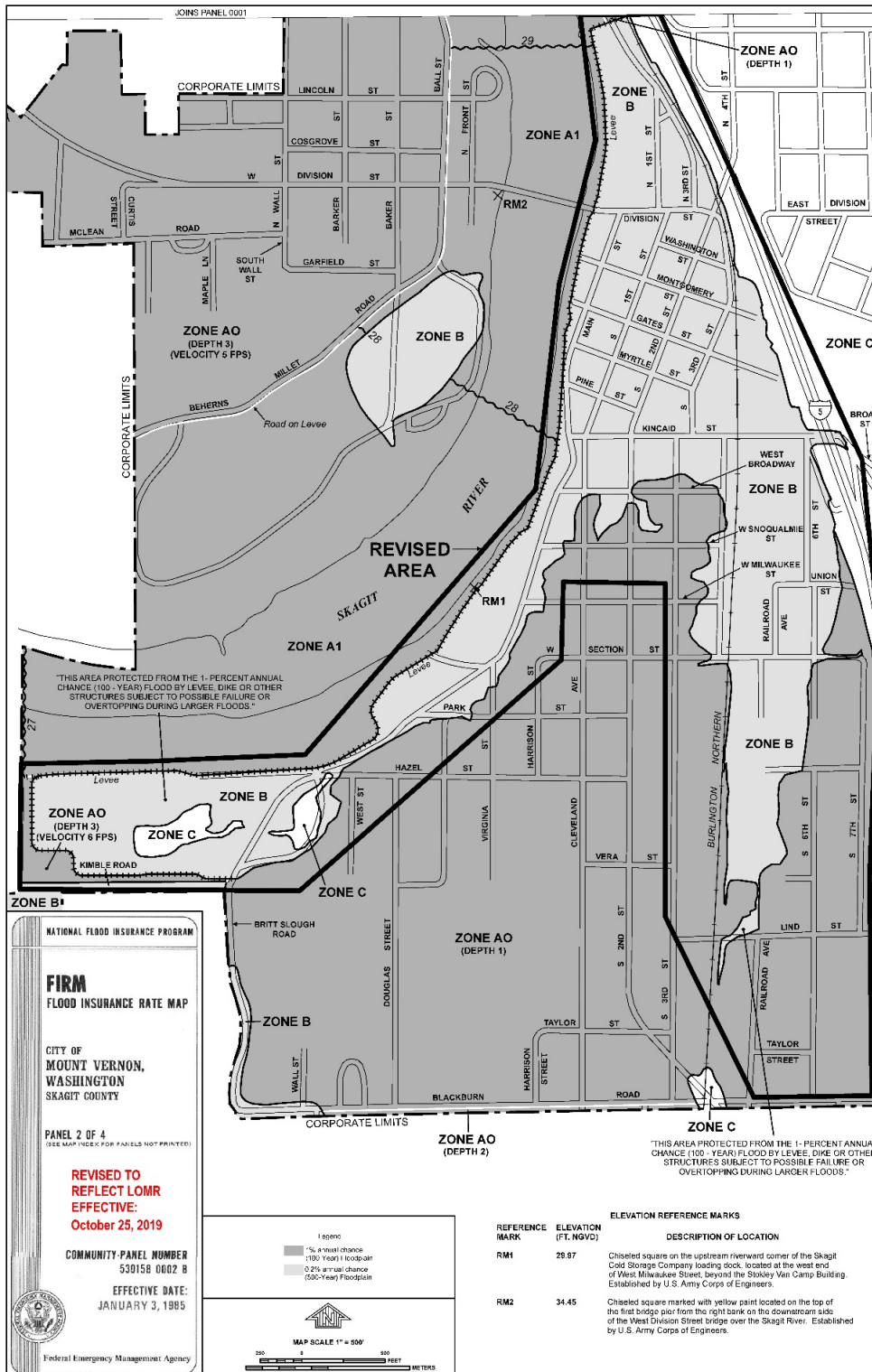
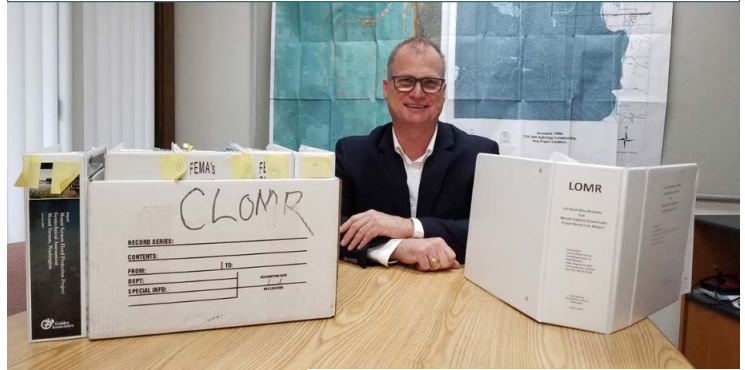
Removal of an over-the-river-bank parking structure that eliminated pollutants such as total suspended solids (TSS), nitrogen, heavy metals, petroleum, and greases from draining directly to the Skagit River was a good benefit. The installation of permeable pavers also greatly reduces the amount of stormwater that enters portions of the City's combined sewer system by allowing for surface infiltration where previously there was none. In addition, the tree cells increase the water holding capacity of the soil profile under the permeable pavers. These bioretention tree cells add a combined 4000 cubic feet of uncompact, highly retentive organic soil that is retained in the cells. A built in structure supports the pavers and allows for vehicle traffic as needed for events or floodwall operation.



Unusual Accomplishments

The project itself is an unusual accomplishment for a small city. Clearly, the City's downtown had Skagit River flooding from the beginning and a flood protection project was understood to be needed for decades. Even so, mustering the will and resources to complete the project was not achieved and sustained until now.

Mount Vernon Public Works Director, Esco Bell, sitting with the multiple binders of paperwork for both the CLOMR and the LOMR.



FEMA's LOMR process stands out as a herculean accomplishment (certainly from a city staff point of view), and FEMA has certified very few flood works in Washington. \$1.5 Million dollars went into developing a model of the Skagit River and the design along with about 2 years of back and forth effort to get FEMA's conditional letter of map revision (CLOMR) that was not received until construction had already begun. At the completion of the project more than a year of back and forth work with FEMA staff was required to finally get the flood works accepted and the downtown removed from the 100 year floodplain. As a result the City just completed working with FEMA to obtain the Letter of Map Revision (LOMR) that officially recognizes the project and removes the downtown from the 100-year flood.

FEMA has chosen the Downtown Flood Protection Project to use as a national example of resilient cities. FEMA has produced a video and literature of the flood protection project to use for its resilient cities campaign.



Left: Bioretention LID cells improve water quality running off of the parking lot.

Bottom: Riverfront Trail facing south.

This project received national recognition as the 2019 Green Infrastructure -Top Overall Project Award Winner from NAFSMA (National Association of Flood and Stormwater Management Agencies).

This project is a beautiful amenity and it is widely used by the community as a river walk, community park and a pleasant place to stroll. The tree wells along the river walk are beautiful as is the plaza. The Farmers Market uses the riverfront plaza every Saturday from late spring to the middle of fall. Concerts, and other events are held at the Plaza during the summer. There are numerous restaurants located near the river walk in the downtown and folks tend to use it for late evening strolls. There is striking LED lighting along the river walk that especially enhances the experience of the waterfront during the evening.



Additional Considerations

For the City of Mount Vernon, this project is truly transformational, and it was very difficult to achieve. It reduced the enormous threat of Skagit River floods to something that can be managed with city staff in one long work shift, and the project removed the downtown from the 100-year flood plain.

The project protects the City's historic downtown from flooding with FEMA certified flood protection and serves to revitalize the historic downtown area. Removing the downtown from the 100-year flood plain has saved flood insurance, alleviated serious physical threats, and released pent up economic opportunities that are so important to our region. The project is the key component of the comprehensive downtown redevelopment plan that is being used to guide public and private investments over the next 20 years.

The project transformed the public access to the river. Instead of parking structure over the river bank, there is a beautiful river walk and plaza area. Few projects are so impactful for the communities that they serve as this one and few are so difficult to accomplish

There were numerous challenges to overcome. This project had to go through property acquisition, permitting, and financial hurdles. There were many regulatory agencies that the City had to work with in order to fulfill numerous requirements. This included federal, state, and local requirements. The project, from planning and design to completion, has taken 15 years. The construction was done over 10 years and in 4 phases. The City has had the benefit of many great funding partners, talented professionals, and wonderful citizens that made this project possible.





Mount Vernon

Downtown Flood Protection Project

Hazard

Downtown Mount Vernon in Washington State lies within the Skagit River delta, an area famous for its tulip production made possible by the fertile soil brought to the valley by regular flooding. The Skagit River has flooded numerous times since 1897 causing a great deal of damage to the downtown area.

Solution

The City of Mount Vernon assembled an advisory group consisting of a diverse selection of community members. This group, charged with creating a long-term solution to the flooding problem in the downtown area, ultimately determined that a floodwall would be the best solution. In the end, 12 sources of funding from local, state, and federal sources were used to build the floodwall.

Result

The flood protection project brought about a **40% reduction** in flood insurance premiums and removed **223 buildings** from the regulatory floodplain, increasing community safety and improving the economic vitality of the downtown business district.



The new floodwall is an integral part of the downtown promenade so it not only provides flood protection, but public recreation space as well.

 Floodwall
 Earthen Levee
 Area Protected by Floodwall
This map is for illustrative purposes only. For more precise mapping information consult the adopted FEMA Flood Insurance Rate Map.

1984: FEMA publishes the Skagit River Flood Insurance Rate Maps.

2010: FEMA approves proposed downtown flood protection project. Flood and river trail from Division Street Bridge north to Lions Park completed.

2016: Floodwall built to protect historic downtown; 1650 feet of floodwall, 24-ft wide riverwalk and trail connection to regional trail system, 30,000 sq ft Riverfront Park.

2018: 1.4 miles of floodwall and earthen levee and 0.9 mile of riverwalk and trail connection to regional trail system is completed.

2019: Flood Insurance Rate Maps are updated identifying flood protection downtown.



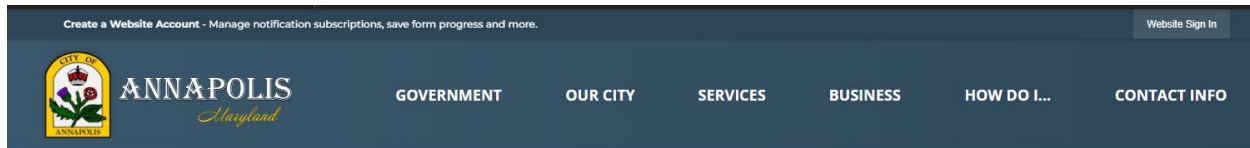
FEMA



Mount Vernon Flood Project Video
<https://youtu.be/-09IWDeAkiw>

Floodplain Mapping Video
https://youtu.be/CZMG6c1ZG_w

City of Mount Vernon Website
www.mountvernonwa.gov



Renewable Energy Solar Park at the old landfill

The Annapolis Solar Park is the City's largest renewable energy initiative that has been operational since 2018.

The City purchases 4 Megawatts (MW) (capacity) of the 12 MW produced from the facility per day.

Project Overview

The Annapolis solar park spans approximately 57 acres, containing 52,416 panels with an 18 MW DC capacity (12 MW AC capacity), and follows a standard utility-scale design, in which developers intentionally over-size the panels relative to inverters (1.5: 1 DC: AC ratio) to capture more sunlight during non-peak hours without wasting inverter capacity. Each panel is rated about 345 W under standard test conditions (STC), or 1,000 W/m² sunlight at 25°C (77 Fahrenheit). This is consistent with the typical 300-400 W.

DC Capacity (18 MW): Total peak power from all panels before conversion, measured in direct current (DC) generated by solar cells. It's the "nameplate" rating but rarely achieved fully due to real-world shading, dirt, or heat.

AC Capacity (12 MW): Maximum power delivered to the grid in alternating current (AC) after inverters convert DC, accounting for 3-5% efficiency losses and "clipping" excess DC at peak sun. AC defines grid interconnection limits and usable "consumption potential."

Energy Production Explained: Energy yield (in MWh or GWh) differs from capacity (MW peak power) because solar only generates during daylight, averaging 4-4.5 peak sun hours daily in mid-Atlantic regions like Maryland.

The capacity factor (~20% for AC here) quantifies this: actual average output as a percentage of running at full AC capacity 24/7.

Daily Average: 65-75 MWh. Calculation: 12 MW AC × 24 hours × 20% factor ≈ 70 MWh.

Summer peaks hit 100+ MWh (full sun 6+ hours), winter drops below 30 MWh (clouds/short days). Annual Total: 23.8-27.4 GWh (23,800-27,400 MWh).

Partnerships and Agreements

- The project is a partnership between the City of Annapolis, Anne Arundel County, and the Anne Arundel County Board of Education.

- Power purchase agreements were signed on July 28, 2017, by Annapolis Mayor Michael Pantelides, Anne Arundel County Executive Steve Schuh, Anne Arundel County Public Schools Superintendent Dr. George Arlotto, and BQ Energy Director Tim Ryan
- The energy production is distributed as follows:
 - Anne Arundel County: 50%
 - Anne Arundel County Board of Education: 17%
 - City of Annapolis: 33%
 - 19.2 MWh per day (7,000 MWh per year)

Financial Details

- The City of Annapolis owns the land and leases it.
- Pricing structure:
 - City of Annapolis: 7.75 cents per kilowatt hour (kWh) in the first year, with a 2% annual increase from year 2.
 - The project is expected to financially benefit the City of Annapolis in the amount of approximately \$150,000 per year.
 - Board of Education: 8.471 cents per kWh in the first year, with a 2% annual increase for years 2 through year 20.

Environmental and Economic Impact

- Offsets ~13,000 tons of CO₂ yearly (equivalent to removing 2,800 cars from roads).
- The project created over 100 green jobs during construction.
- It provides roughly 40% of the energy used by City-owned facilities.
- The solar park helps the city, county, and school board control their power costs and generate municipal land lease revenue.
- It is formerly the largest photovoltaic plant constructed on a closed landfill in the United States.

Current Status

As of 2025, the Annapolis Renewable Energy Park Solar Park has been operational for over six years, continuing to provide renewable energy to the City of Annapolis, Anne Arundel County, and the Anne Arundel County Board of Education.

Annapolis now intends to use the remaining open space to improve pollinator habitat and local environmental quality by establishing a meadow. Read more about the status of that project [here](#)



Frequently Asked Questions (FAQ)

Q: Who owns the land where the solar park is located?

A: The City of Annapolis owns the land, which is leased to Novis Renewables

Q: Who uses the energy produced by the solar park?

A: The energy is purchased by Anne Arundel County (50%), the City of Annapolis (33%), and the Anne Arundel County Board of Education (17%).

Q: How many solar panels are in the park?

A: The solar park contains approximately 55,000 solar panels.

Q: What are the environmental benefits of this project?

A: The project provides clean, renewable energy, reducing reliance on fossil fuels and lowering greenhouse gas emissions in the Annapolis region.

Q: How much does the City of Annapolis earn from this project annually?

A: The City of Annapolis earns approximately \$150,000 per year from the solar park. This is calculated from approximately \$15,000 per year per megawatt of power capacity (except for the portion purchased by the City), plus \$10,000 per year for lease of the land to the solar park operator.

Q: How long is the lease agreement for the solar park?

A: The lease agreement is for 20 years, signed in August 2015.

Q: Can residents of Annapolis or Anne Arundel County purchase energy directly from this solar park?

A: No, the energy is purchased directly by the city, county, and school board. Residents benefit indirectly through the use of this energy in public buildings and operations.



Case Study

Annapolis, MD, City Dock Resiliency Project

PROBLEM

Since 1969, nuisance flooding in Annapolis, MD, has increased by more than 1,200% (38 flood days in 1969; 52 in 2019). This increase in flood days per year can largely be attributed to sea level rise. The Annapolis City Dock, which is part of the city’s historic, social, and economic center, is one of the most flood-prone areas. The excessive flooding continues to threaten community safety and the economic viability of nearby businesses.

SOLUTION

The City of Annapolis and their partners have developed a plan to make the City Dock area more resilient to rising sea levels. The plan includes reconfiguring the storm drain system with a new stormwater pump station, raising the sea walls and installing flip-up storm surge gates, and a new elevated green space to provide stormwater infiltration.

OUTCOMES AND COBENEFITS

- Reduced risk of flooding streets and businesses in the area surrounding the Annapolis City Dock, which will improve human safety and economic resilience of proximate businesses
- Preservation of historic, cultural, and social center of Annapolis, MD
- Provides picturesque community spaces for residents and tourists

FINANCIAL MECHANISM

The total project cost is estimated to be at least \$50 million. The Maryland Economic Development Corporation (MEDCO) has issued a bond that will cover \$24.5 million for a new parking garage and a green waterfront in Annapolis. Additionally, the state of Maryland is contributing \$10 million towards the project. The remaining funds will be gathered from a combination of sources that may include federal resilience grants and/or the Resilience Authority of Annapolis and Anne Arundel County.

FINANCING SOURCE

MEDCO has issued a bond that will cover \$24.5 million for a new parking garage and a green waterfront in Annapolis.

REPAYMENT SOURCE

Parking revenue from the parking garage will be used to pay back the bonds over a 30-year period.

FINANCING SOURCE	REPAYMENT SOURCE
The Maryland Economic Development Corporation issued bond	Parking revenue from the parking garage will be used to pay back the bonds over a 30-year period

ROLE OF A GREEN BANK OR OTHER SIMILAR FINANCIAL INSTITUTION

In this case, MEDCO played the role of a green bank or community lender because they facilitated the bond sale and will collect parking and other revenues, as well as make payments on the debt and other expenses. It is also possible that the Maryland Resilience Authority may step into the role of a green bank to help finance the project in the near future.

“READINESS” LEVEL

Construction of the parking garage, which is now generating revenue, finished in the summer of 2023. As of November 2023, construction of the city dock has not yet begun but is expected to start early 2024.

MORE INFORMATION

To find other case studies and more information about financing nature-based solutions go to our website here:
<https://nicholasinstitute.duke.edu/project/green-banks-and-community-lenders-financing-nature-based-solutions>

REFERENCES

EOA Staff. (2020). Annapolis selects team to spearhead City Dock redevelopment and garage replacement. Eye on Annapolis. <https://www.eyeonannapolis.net/2020/12/annapolis-selects-team-to-spearhead-city-dock-redevelopment-and-garage-replacement/>
Simmons, M. (2019). \$50M redevelopment of City Dock eyed in Annapolis. Baltimore Business Journal. <https://www.bizjournals.com/baltimore/news/2019/11/08/50m-redevelopment-of-city-dock-eyed-in-annapolis.html>
(2023). City Dock Resiliency Project, Presentation to Planning Committee. https://www.annapoliscitydockproject.com/files/2023-05-18_Planning-Commission.pdf
(2023). City Dock Resiliency Project, Presentation to Planning Committee. https://www.annapoliscitydockproject.com/files/2023-06-08_City-Council.pdf

CASE STUDY CITATION

Torre, J. and Mason S. 2023. “Case Study: Annapolis, Maryland City Dock Resiliency Project.” *Nature-Based Solutions Financing Working Group Project*. Durham, NC: Nicholas Institute for Energy, Environment & Sustainability, Duke University. <https://nicholasinstitute.duke.edu/project/green-banks-and-community-lenders-financing-nature-based-solutions>.

Nature-Based Solutions Financing Working Group



Our Approach

"The work we do is all about anticipating, reducing the effects of, and responding to climate change, but how we get there is key to our success. Our three objectives provide us with a framework to develop strategies grounded in empirical data to drive meaningful change. Many of our initiatives support multiple objectives underscoring the complexity and interrelatedness of our resilience work."

Matt Fleming, Resilience Authority Director



Objective #1:

Improve community resilience through environmental infrastructure projects

Annapolis and Anne Arundel County are ground zero for the effects of climate change and there are a variety of organizations working to increase our resilience. Our role as a regional center of climate intelligence facilitates our ability to secure and organize financial and executional resources, to accelerate and scale project implementation, and to amplify the efforts of other organizations through complementary visioning and collaboration.



Objective #2:

Increase energy efficiency, renewable energy, and clean energy investment in the region

Mainstreaming and facilitating clean energy solutions now will reduce losses and damages for nature and people. While feasible and effective options are available to reduce GHG emissions and adapt to climate change, we will encourage and incent the adoption of clean

energy and energy efficiency technology, embrace new approaches, and support emerging technologies.



Objective #3:

Provide climate solutions for underrepresented and underserved communities

No geography can be truly resilient unless it safeguards all populations. The social cost of climate change is substantial, often born by those least able to absorb it. To respond and be prepared, we must address inequity in our community.

Evaluation Criteria

We evaluate every proposed project based on its projected impact and the qualifications, expertise, and proven track record of the implementing partner(s). Criteria for selection include, among others, factors such as:

Project contributions to improved community resilience, increased energy efficiency / renewable energy, and solutions for climate resilience in underrepresented and underserved communities.

- Project feasibility
- Likelihood of project success
- Potential ROI (benefit-cost analysis)
- Project potential to alleviate current / anticipated climate impact
- Alignment with City, County, and Resilience Authority objectives
- Total cost of implementation and maintenance
- Implementing partner(s) qualifications, expertise, capabilities, and track record
- Project contributions to improved community resilience, increased energy efficiency / renewable energy, and solutions for climate resilience in underrepresented and underserved communities.

**Sign up for our public notices
and our newsletter!**

Email Address