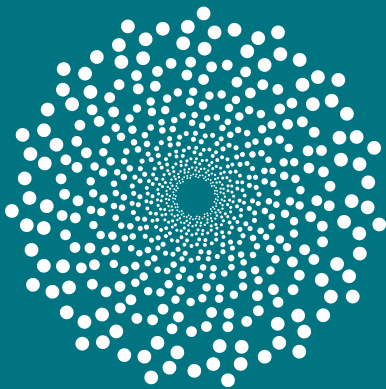




BUILDING RESILIENCY THROUGH GREEN INFRASTRUCTURE.

A Community Wealth Building Approach

Johanna Bozuwa
The Democracy Collaborative



DEMOCRACY
COLLABORATIVE

BUILDING RESILIENCY THROUGH GREEN INFRASTRUCTURE.

A Community Wealth Building Approach

Johanna Bozuwa

CONTENTS

3	Foreword
7	Executive Summary
11	Introduction
21	Green Infrastructure
29	Regulating and Paying for Green Infrastructure
37	From the Field: Case Studies
79	Strategies to Deepen and Expand Community Wealth Building Enterprises
113	Conclusion
115	Notes



Foreword

Mami Hara, General Manager/CEO, Seattle Public Utilities

How do we build thriving, resilient cities in the face of climate change? What solutions serve low-income communities and communities of color—those who will be and already are the most affected by climate change—and transform neighborhoods where these communities live and work? At Seattle Public Utilities, we strive to be a truly community-centered utility that advances the values of the people we serve: environmental justice; protection of everyone’s right to equitable, affordable, essential services; and sustained community resiliency. We aim to maximize the benefit of every investment we make by building a broad platform for our community to capitalize upon: by intentionally building enduring natural, infrastructure, human, social, and cultural capital. As we look to the future, we are intent upon demonstrating how job creation, workforce development, and community wealth building can fruitfully intersect with our missions of environmental enhancement and reliable, equitable service.

Building Resiliency through Green Infrastructure: A Community Wealth Building Approach provides clear ways for cities to build better relationships with our natural assets through green infrastructure at the same time as fostering stronger, more resilient communities. When I worked to implement Philadelphia’s *Green Cities, Clean Waters* program, one of the most ambitious green

infrastructure programs in the nation, our team centered upon creating a virtuous cycle of investment in our city and people but we had no roadmaps to work from. We experimented with embedding key goals into the planning and design of the program, including workforce development; job creation; community enhancement; and incentivizing businesses, land owners, and individuals to invest in or deliver green infrastructure—as well as aversion of unintended negative consequences such as economic displacement.

Community wealth building serves as a critical framework for the water sector to conceptualize resiliency in a more holistic, systemic way that centers workers and communities.

In particular, this report identifies how new, equitable business models can help address our desperate need for the benefits of green infrastructure, while also providing a transformative way to build local, long-term resiliency for everyone in our cities. Worker-owned cooperatives, social enterprise, and other models that operate with the values of broad-based ownership and equity pave a major way forward toward a more diverse workforce in the water industry.

Drawing from enterprises and cooperatives across the United States—from Oakland to Pittsburgh—we gain real-world strategies to deliver on community wealth building. In order to build true resiliency, we need to fully integrate communities into the workforce and build long-term, mission-driven jobs. We need to contemplate the relationship between green infrastructure and affordable housing. We need to discuss the role of utilities and other anchor institutions, like large, place-based nonprofits like hospitals or universities, in launching a new era of place-based economies.

I expect this report will catalyze a substantive debate within cities on how we deliver on the imperative of equitable community wealth building as well as how we can implement programs that level the playing field for

mission-controlled or employee-owned businesses in green infrastructure. With cities already mobilizing towards climate action, they are simultaneously seeking strategies for meaningful actions that build sustained and sustaining jobs and community wealth.

—Mami Hara

General Manager/CEO, Seattle Public Utilities

Prior to assuming her leadership role at Seattle Public Utilities, Mami Hara served as the chief of staff at Philadelphia Water, where she helped implement Philadelphia's Green City, Clean Waters program, which stands as one of the most ambitious green infrastructure programs in the nation. Hara is also a founder of a practitioner network that supports communities seeking to expand green stormwater infrastructure programs.



Executive Summary

Creating climate-resilient cities takes more than a series of infrastructure investments; more than sea walls and permeable pavement. It takes investment in people. Those most vulnerable to the effects of climate change are those without living wages or access to political power—very often communities of color. As the seas continue to rise, climate resiliency strategies need to not only build the infrastructure but also tackle the underlying reasons why those who bear the disproportionate burden of climate change are those with the least ability to recover. Doing so means applying a framework of **community wealth building** to climate resiliency planning—a vibrant place-based economic system where democratic ownership and control creates more equitable and inclusive outcomes.

Cities have recently integrated more **green infrastructure** strategies into their climate resiliency planning, which could be a key intervention point for applying the concept of community wealth building in practice. Harnessing nature's innate ability to manage water, green infrastructure captures and diverts stormwater before it reaches the sewer system through a strategically planned network of natural features, such as vegetation and soil. While green infrastructure's primary function is to limit stormwater runoff, its benefits, like more



walkable communities and cleaner air, also have the potential to facilitate healthier, more prosperous communities—if done so intentionally.

Community wealth building enterprises

In particular, a buildout of green infrastructure projects could create new opportunities for **social enterprises**, mission-driven nonprofits with a fee-for-service component, and **worker cooperatives**, democratically owned-and-operated businesses, to thrive. Both social enterprises and worker cooperatives are community-based enterprises that go beyond making a profit and can play a critical role in building community wealth. Green infrastructure's decentralized nature, relying upon projects of varying size that need continual tending and maintenance, creates access points for smaller firms and opens up a space to experiment with business models focused on providing community ownership and control.

This report investigates the state of worker cooperatives and social enterprises in the green infrastructure field in order to understand the possibilities and strategies for these community wealth building enterprises to seize the opportunity to provide positive jobs in their communities. It focuses on four case studies of enterprises already operating in the field in a variety of economic and environmental contexts. It provides practical insights to practitioners as well as local governments and anchor institutions—large, place based nonprofits like universities and hospitals—to deepen and expand community wealth building enterprises.

Strategies to deepen and expand community wealth building enterprises

Interviews with practitioners and experts alike uncovered strategies that range from the systemic—reimagining a workforce that centers dignified labor and the intersection of displacement and green infrastructure—to the



brass tacks—the process of starting organizations and the nuts and bolts of contracting at different scales. The report addresses these four key issues:

- **Employment models for economic resiliency.** One of the major ways that the social enterprises and worker cooperatives profiled in this report seek to build community wealth is by redefining the culture of construction and landscape work, and by providing jobs to those who may be underemployed and therefore the most vulnerable to the effects of climate change. Even though there are lower barriers to entry in green infrastructure, creating positive jobs for underserved residents means investing in workforce development, from technical capacities to so-called “soft skills” like communication and English as a Second Language (ESL). In areas where seasonality poses a significant barrier to consistent work, practitioners should tailor employment practices to match the climate (with pathways to long-term jobs), or even take on programming like weatherization or snow removal during months of low green infrastructure implementation.

The water and construction sectors have historically had a significant union presence. Unions help to provide solid, long-term jobs, and social enterprises and worker cooperatives, as well as their clients, should ensure that their operations do not detract from union jobs. Doing so may mean clearly defining a body of work separate from traditional union work and creating a relationship with unions by providing pre-apprenticeship programming, or it could mean embracing unionization itself.

- **Tackling green infrastructure’s displacement potential.** A major grappling point in all of the case studies is the potential for green infrastructure projects to either be sequestered away from those most vulnerable to climate change or increase the potential to displace the very communities they seek to serve.



Stemming displacement means deepening relationships with the communities at the site of implementation, by for instance prioritizing neighborhood hiring. Furthermore, governments and anchor institutions can help facilitate community ownership *and* stewardship, by for instance incentivizing control of land and housing by community groups committed to affordable housing and stormwater abatement.

- **Starting up an enterprise.** While the case studies show that there are robust community wealth building enterprises already implementing green infrastructure projects, there is significant room for expansion. That expansion requires supportive structures for burgeoning enterprise and a financial ecosystem for enterprises that provide more than profit on the part of anchors and governments.
- **Expanding practitioners' reach through contracting.** Government and anchor institution contracts hold serious promise for community wealth building enterprises, but most government and anchor procurement practices haven't aligned to nurture such practitioners and allow them to gain inroads. To do so will mean both designing protected contracting spaces and committing to long-term investment in green infrastructure for continued care of the projects. Practitioners must also consider a combination of expertise in both installation and maintenance of green infrastructure to deal with fluctuations in demand as well as build a diverse portfolio of clients of varying sizes to protect against long waits for big contracts, like those of government agencies.



Introduction

In August 2017, Houston’s Interstate 10 was transformed into a rushing river, flooded with more than nine trillion gallons of water as Hurricane Harvey pounded the area.¹ While the rain levels in this case were extreme, the disaster was aggravated by a built environment that prioritizes economic development and growth over sustainability.

In essence, a city is a huge concrete mass that gives water nowhere to go. In the coming years as weather conditions intensify with the onset of climate change (including stronger and more frequent hurricanes, rising sea levels, and droughts), cities across the United States will increasingly have to address the fact that existing patterns of development are often incompatible with climate mitigation and resiliency efforts.

Already, the reality is that our infrastructure is hard-pressed to handle even small fluctuations in water flows. Cities across the United States often have aging combined sewer systems (CSS)—which collect household sewage, stormwater, and industrial waste into the same pipes for transmission to sewage treatment plants—that overflow and discharge raw sewage and chemicals into waterways when only a few inches of rain hit. In 2017, the American Society of Civil Engineers gave our water systems a D+ rating.² The more intense



snowstorms and rain deluges of the past few years have stressed some cities' failing systems to a breaking point. Stormwater, filled with industrial chemicals and raw sewage, is polluting streets, rivers, streams, lakes, and drinking water on a daily basis. In a 2004 report to Congress, the Environmental Protection Agency (EPA) reported that every year such overflows contaminate US water with over 850 billion gallons of untreated sewage—enough to cover the entire state of Pennsylvania an inch deep.³

This has a profoundly negative impact on human health and ecosystems. When cities continue to develop their land with roads, parking lots, and all types of concrete structures, stormwater has increasingly no place to be absorbed and it collects all kinds of pollutants before finally flowing into rivers or streams. By developing cities covered in impermeable surfaces—the proverbial concrete jungle—while underinvesting in water and sewage infrastructure and failing to take action to limit emissions that cause climate change, we have created a situation in which a precious resource is a potent force for destruction.

“
A changing climate paired with deteriorating and underfunded infrastructure exacerbates inequality.
”

What's more, a changing climate paired with deteriorating and underfunded infrastructure exacerbates inequality. For instance, vulnerable residents are more likely to live in places more exposed to flooding with less investment in infrastructure.⁴ During the storm in Houston, the Northeast part of the city—predominantly low-income—was one of the hardest-hit. As Ben Hirsch, a member of the organizing coalition for an equitable recovery, Houston Organizing Movement for Equity (HOME), and founder of West Street Recovery cooperative, puts it:

There are so many layers of unfairness. The lack of investment by the city over time rendered Northeast Houston more vulnerable to



these flooding events. You live near an oil refinery, so your health is degraded, so you don't work as much, so your house is poorly maintained [...] making the damages even worse when you have a flooding event. Then, FEMA [Federal Emergency Management Agency] says you're ineligible for money because they're not going to take care of preexisting damages. That is the stack of complete inequity of climate and infrastructure together.⁵

Disparities in environmental burdens like this, from acute examples of Hurricane Harvey to chronic problems like stormwater overflows that flood certain neighborhoods more consistently because of underinvested infrastructure, are not only examples of inequality but also environmental racism.⁶ In California as of 2018, 89 percent of people living in the top 10 percent of environmentally overburdened census tracts are people of color.⁷ Historical redlining and disinvestment in certain neighborhoods means that communities of color and low-income residents are more likely to live in less safe housing and their neighborhood covered in concrete with fewer natural assets, which can also increase the costs of items like flood insurance.⁸ America's deep-seated and widening racial wealth gap and lack of access to the political system for communities of color (as well as undocumented, women, and disabled residents), further leaves groups with less economic resilience.⁹ These systemic problems of racial inequity and economic stratification exacerbate the effects of climate change on specific communities.

Mitigating stormwater – green and gray infrastructure

Excessive sewer discharges are prohibited under a variety of federal and state laws (including the Clean Water Act) and many municipalities have been fined and put under **consent decrees**, agreements or plans between the EPA and the municipality to resolve the over-pollution.¹⁰ With the increasing exacerbation of climate change's effects on communities, the 860



municipalities in the United States that have combined sewer systems are at the most risk for more overflows (and, by extension, consent decrees), since their antiquated sewer networks are much more prone to discharging raw sewage.¹¹ These old systems are not just under-invested, but were not built to meet the current needs we are confronted with through the effects of climate change.

Traditionally, the way that cities have worked to mitigate flooding, or implement **stormwater management**, has been through capital-intensive “gray” infrastructure projects that mostly put bigger pipes under the city to deal with increasing populations and bigger weather events. Gray infrastructure is certainly necessary, but far from a full, effective solution. Cities have recently started to redefine their relationship with water, intentionally integrating more **green infrastructure** methodologies into their planning. Instead of trying to control water, green infrastructure seeks to work with natural water systems, leveraging nature’s innate ability to manage water where humans have often struggled to accomplish fully with gray infrastructure. It attempts to restore wetlands to retain water, plant trees to soak it up, install green roofs and rooftop gardens, preserve natural areas, and eliminate excessive impermeable surfaces.

Huge amounts of public money need to be poured into stormwater management projects in the upcoming years as we adapt to both climate change and new demands on our aging infrastructure. The EPA estimates that the United States will need to invest \$271 billion in wastewater infrastructure over the next 25 years, the majority of which is needed within the next four years.¹² There is still great need for traditional “gray” stormwater infrastructure investments, but green infrastructure can be far less expensive and employs a diversity of tactics in a decentralized manner—a boon to cities that may not have the money to put up for these big projects. When combined, green infrastructure can divert some of the need for gray



infrastructure and save the municipality money. For instance, New York City was able to save \$1.4 billion by substituting green infrastructure for some gray systems like tunnels.¹³

While green infrastructure's primary function is to limit stormwater runoff, its benefits also provide opportunities to build healthier, safer, and more prosperous local communities. Trees and other vegetation help suck up water from rains and flooding, but also help to improve air quality, especially in low-income areas.¹⁴ Building out wetlands and green spaces within neighborhoods that can take on water in intense storms also creates more public spaces for residents to foster community, encourage physical activity, and limit the urban heat island effect.¹⁵ Rain gardens built in traffic medians can slow rushing water on the roads, but also provide job opportunities with relatively low thresholds to entry.¹⁶ Health costs directly associated with climate change are estimated to be between \$2 billion and \$4 billion per year by 2030, but implementing green infrastructure with its multiple associated health benefits could help to lower that cost.¹⁷

“
These interventions have the ability to develop more inclusive, equitable, and democratic local economies.
”

These interventions have the ability to develop more inclusive, equitable, and democratic local economies, but, if not delivered with equity in mind, these co-benefits could be sequestered to a small number of high income neighborhoods, ostensibly creating elite ecological enclaves.¹⁸ As cities continue to invest, and begin to take more rigorous action on climate, we need to capture the potential of that spending power to build resilient cities for everyone.

This report takes a look at one particular strategy for doing so: harnessing the burgeoning need for green infrastructure to provide economic resiliency



to communities through nonextractive or nontraditional enterprises focused on community control, or **community wealth building**, enterprises—such as **social enterprises and worker cooperatives**—that provide community services, workforce development, respectful employment, and family-sustaining wages.

Drawing from practitioners and experts in the field, the report explores capitalization strategies, important partnerships, business model design, community relationship-building, and workforce development. It also looks at the relationship between community wealth building businesses and the larger community ecosystem, with a particular eye for the role of supporting institutions like **local governments** and **anchors**—large, place-based non-profit or public institutions that act as a major economic force in local areas like universities or hospitals—in shepherding growth of these nonextractive business structures.

First and foremost, the report offers a framework for resiliency based on community wealth building. It then provides a brief description of green infrastructure tactics, followed by an overview of stormwater regulation in the United States and some key ways to pay for the infrastructure. Then it details the experiences of practitioners in the field from a diverse set of cities—from Oakland to Detroit—to show the opportunities to expand the reach of these tactics. It finishes with both practitioner and supporting institution recommendations to expand community wealth building enterprises to deliver on building more equitable, climate-resilient cities.

Resilient cities – a framework for the climate and the economy

As cities prepare for the effects of some inevitable amount of climate change, limiting the inequity of climate vulnerability should be a core goal. As is clear from the Northeast Houston example, degraded infrastructure



and insufficient capital for recovery operate as two major multipliers for low-income vulnerability to flooding. We must build a broader, more systemic understanding of resilience—one that not only mitigates the effects of climate change but one that also alters the status quo of economic and social inequality and injustice.

Community wealth building is a new form of equitable, inclusive, and sustainable economic development that seeks to build, from the ground up and according to the principle of subsidiarity, a vibrant place-based economic system where democratic ownership and control creates more equitable and inclusive outcomes, fosters ecological sustainability, and promotes flourishing democratic and community life. Below are eight “Principles of Community Wealth Building” in the context of climate resiliency:¹⁹

Labor Means More than Capital – If one of the major determinants of one’s ability to cope with the effects of climate change is economic status, then good, secure jobs should be a critical part of any community resiliency strategy. Adaptation measures cannot be evaluated on a classical least-cost or maximum-profit model, but need to instead reconcile the implications of economic instability in the face of climate change.

Local, Broad-Based Ownership – A thriving economy requires building from a base of local and broad-based forms of ownership and control (for instance, through cooperative, community, or employee ownership). Not only does such broad-based ownership provide more people with a say in what and where resiliency tactics are used, it also ensures more stable, better jobs and the more equitable distribution of proceeds from the work required to create more resilient communities.

Active Democratic Ownership and Participation – Our current economic model sees communities as isolated individuals, engaged in civic life only as passive consumers. However, one cannot be a passive consumer of



resiliency; a community has to build trust in one another in order to grapple with the uncertainty, complexity, and inevitability of climate events. To build community wealth and a commitment to each other, we need to reconstruct the fabric of an active community and heal past marginalization or discrimination, building real opportunities for collective decisionmaking.

Multipliers Matter – When it comes to resiliency, multipliers matter. Resiliency strategies that consciously incorporate racial and economic equality and democratization lens can have effects that multiply through the

local community. For instance, improvements in health associated with green infrastructure can lead to reductions in public costs for medical treatment, which in turn, can free up resources for additional social services, further increasing health and well-being, and so on. The multipurpose abilities of projects like green infrastructure need to be carefully tended and integrated so that its multipliers work with and accrue to all residents, not just a few.

“

Resiliency requires a complex, systems-based understanding of needs and risks to work effectively.

”

Localizing Investment – There are vast pools of capital in the portfolios of local anchor institutions:²⁰ large-scale, place-based nonprofit or public institutions like hospitals, universities, and local governments. Imagine what’s possible if these investments were put to work locally to secure the future and increase the resilience of the community surrounding the anchor.

Collaboration – Resiliency requires a complex, systems-based understanding of needs and risks to work effectively. Integrative planning for a collective future means building long-lasting relationships based on mutual support. In particular, it means creating lines of communication so that planning lifts up most vulnerable populations, those historically marginalized, including people of color, throughout the process.



Place Matters – Climate change will affect different areas in radically different ways. While Boston may be hit by more extreme winters and dumped with snow, Miami will be hit by more hurricanes. Natural and cultural landscapes differ, which mean that harnessing and using the environment around us will necessitate different tactics. This means that resiliency strategies must be rooted to place and the people who live there.

Community Wealth Building is Where the Next System Begins – This is not about one or two good projects, while the rest of climate action planning goes as normal. We need large-scale deployment of community wealth-based resiliency planning to not only survive, but to build a more equitable society that can thrive in an inevitably changing environment.

Building community wealth through green infrastructure projects

Green infrastructure projects have a particular opportunity to deliver on the principles of using community wealth building for resiliency, especially in valuing labor over capital as well as localizing investment and promoting broad-based ownership. Many water works and green infrastructure jobs can be best learned through on-the-job experience and do not require advanced degrees for entry-level opportunities and tend to pay more on average compared to other options, paying up to 50 percent more to workers at the lower end of the income scale.²¹ This provides excellent opportunities for onramps to employment, especially for historically disinvested communities with barriers to employment. However, water workers have been largely older and white to date, signaling need for major shifts that allow better access to jobs historically.²² Gray infrastructure construction contracts are often large and picked up by national, or even multinational, firms.²³ Green infrastructure's decentralized nature, relying upon small projects that need continual tending and maintenance, creates access points for smaller, local firms and opens up a space to experiment with business models focused



on providing community ownership and control—core values of community wealth building.

Specifically, a build-out of green infrastructure projects in cities and counties could create new opportunities for social enterprises (mission-driven nonprofits with a fee-for-service component) and worker cooperatives (local democratically owned-and-operated businesses) to survive and thrive. Both social enterprises and worker cooperatives subscribe to theories of business that go beyond making a profit and can play a critical role in building community wealth. Furthermore, they could be used as a tool to stop economic exploitation of historically marginalized communities and seed a more diverse workforce in the water industry.

Social enterprises (as defined in this report) are businesses run by nonprofit organizations whose main goal is to provide a social good—such as opportunities for employment and/or transformative products or services. By operating a “fee-for-service” business, these nonprofits can use independently generated revenue to support programs that make sense for their communities while also providing critical jobs and skills training.²⁴

Worker cooperatives are businesses in which (1) member owners invest in and own the enterprise together and share profit, and (2) decision-making is democratic, governed by the concept of one member, one vote.²⁵ This helps to ensure that the cooperative creates quality, empowering jobs. Since most workers are community residents, worker cooperatives are more likely than other businesses to employ sustainable business practices that do not harm the local environment, and profits are more likely to circulate within the community.



Green Infrastructure

A diversity of tactics

The development and evolution of human civilization is inexorably linked to water. Over centuries, people slowly were able to harness the power of water and to protect themselves from it. This opened up new realms for settlement: cities bloomed in the desert, land was reclaimed from the ocean, and vast expanses were electrified by tapping mighty rivers. However, with climate change already reshaping the United States, we are increasingly confronted with the challenges of dealing with new water conditions: too much water, too little water, or water at the wrong time.

When there is excess water—from snow melts, heavy rain events, or storm surges—in a natural system, the soil usually soaks it up with the help of plants. However, our cities—some of which, like Houston, are built in flood-prone areas—are covered with impermeable surfaces, such as concrete. Water falls on roofs, parking lots, and streets. With no soil to absorb the water, it flows wherever the topography takes it, collecting a variety of pollutants along the way. In highly urbanized areas, more than 90 percent of rainwater that hits the ground runs off directly into sewer systems, often overwhelming the system's capacity. Because many sewer systems are integrated with the pipes removing waste from homes and businesses, this flooding then sends raw sewage into our rivers and lakes.²⁶ Contaminants like nitrogen from sewage and fertilizer runoff

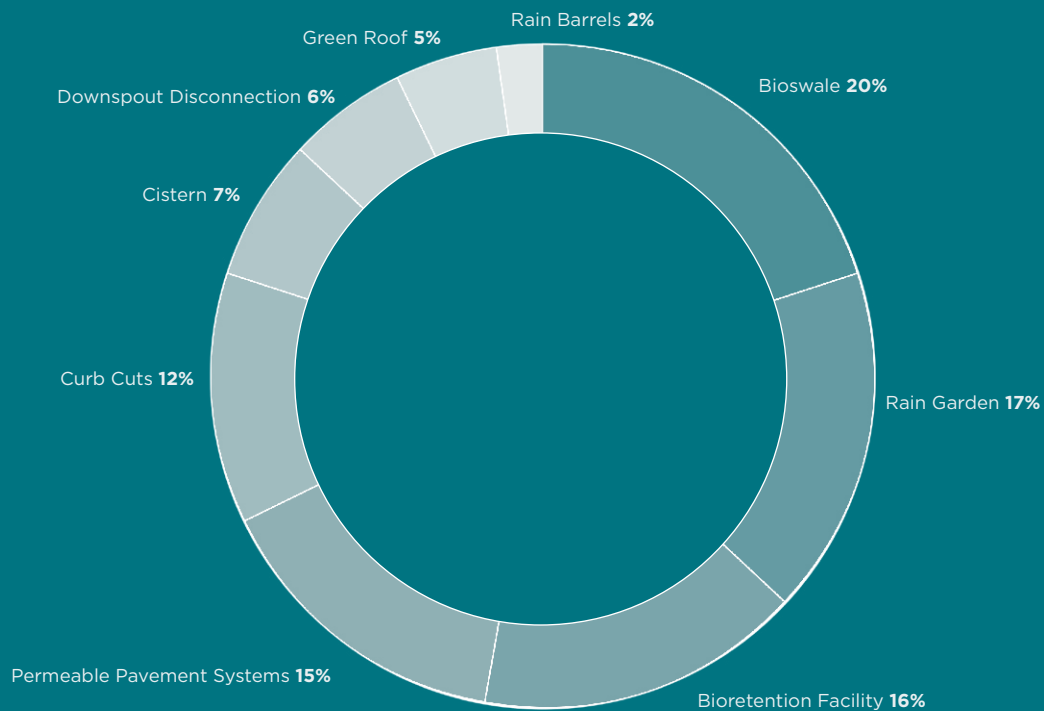


Figure 1: Installation type of green infrastructure by US Cities Jessie Martin, Et al., “From Projects to Portfolios: Mainstreaming Large-Scale Investment in Integrated Infrastructure,” Earth Economics, 2018.

can cause algal blooms, dissolving oxygen below what some fish and other species need to survive in the water ecosystems.²⁷ These pollutants can also cause waterborne illnesses, creating serious public health problems.²⁸ The prospect of storms with more intense rainfall and increased flooding associated with climate change threatens to worsen the problem.²⁹

Green infrastructure describes the practice of harnessing natural processes for stormwater management and climate resiliency. It works to hold back water where it hits to lower the amount of pollutants it picks up and limit erosion.³⁰ It is more than a few small-scale greening projects; it is a multi-scale network of systems that interact with both the natural world and our larger built environment, like gray infrastructure, to build resiliency.³¹ Interventions can be accomplished in municipally owned areas (such as medians, sidewalks, public buildings, and traffic medians and circles) as well as residential spaces and private commercial property. Educational institutions and open spaces or parks make up close to 50 percent of all installed green infrastructure in US cities—clearly outlining opportunities to engage anchor institutions and municipal governments as major landholders for green infrastructure.³² Every community or city will need to identify the type of green



infrastructure that works best with their needs, including their climate, land use, and current gray infrastructure, as well as the institutions that control viable land for green infrastructure integration.

The following introduces some of the most common types of green infrastructure in order to help identify where green infrastructure works best, the potential for delivering shared benefits, and the cost of both implementation and continued care. Understanding the type of work green infrastructure requires can be helpful for practitioners trying to decide how to enter the sector. The following interventions show the variation in scale and capital-intensity associated with green infrastructure:

Rain gardens (Bioretention): Rain gardens, also referred to as bioretention or bioinfiltration, collect stormwater from a variety of surfaces, such as roofs and vacant lots, through depressed planted areas so that they can suck up the water runoff. The gardens can be used in coordination with downspout disconnections to absorb the water and allow it to slowly seep back into the ground.

Where it works: Residential yards, office and commercial storefronts, parks, traffic medians, sidewalks, parking lots. The gardens are best positioned in natural depressions where water will flow naturally towards them.

Advantages: works at different scales—from large commercial areas to small residential gardens, increases both water and air quality, reduces runoff, adds shaded areas and green spaces, and can increase biodiversity.

Disadvantages: If not cared for properly, can become a breeding ground for mosquitos.



Implementation Cost: This intervention can be installed in practically any unpaved space. Depending on design, a rain garden can be cost-effective and straightforward.

Continued Care: If debris accumulates in the rain gardens, it can limit effectiveness. Rain gardens need consistent weeding and replenishing of mulch.

Bioswales: Bioswales are landscape elements that concentrate or even remove debris from stormwater runoff. They are gently sloped ditches that are filled with vegetation or compost. The vegetation helps pull the pollutants into the soil so they can be broken down by bacteria. These structures are ultimately larger versions of rain gardens—bioretention—that often require more engineering and are longer and deeper.

Where it works: Bioswales work well in places near parking lots, areas with a lot of car pollution, road-side medians, or areas with consistent flooding.

Advantages: Slowing the velocity of water is one of the core tasks of bioswales, but they also relieve pollution, restock the local groundwater supply, and can increase water and air quality.

Disadvantages: Vegetation and design need to be considered to ensure that the water is effectively drained.

Implementation Cost: Bioswales vary in cost due to scale, and other contributing factors such as groundwater table, soil type, and slope near implementation.³³ They are generally much less expensive than the traditional curb-and-gutter or underground stormwater systems.

“
Understanding the type of work green infrastructure requires can be helpful for practitioners trying to decide how to enter the sector.
”



Continued Care: To have continued storage capacity, the bioswale needs to be maintained by limiting erosion, debris, and excessive sedimentation.

Rainwater harvesting: This covers a wide variety of practices in which stormwater is redirected away from sewers, captured, and then stored onsite for later use. It can include downspout disconnects, where runoff is directed away from sewer systems and onto property that is in need of water. It also can include rain barrels for residential areas or larger cisterns in public and commercial areas. When rainwater is harvested in these ways, the so-called “graywater” can be used for many purposes, including irrigation, toilet flushing, washing clothes, and so on.

Where it works: Rainwater harvesting can be implemented in local residences or at a larger scale at sites including schools and public and commercial buildings. It can be a particularly important stormwater management technique in drought-susceptible areas.

Advantages: Rainwater harvesting can be an affordable option for homeowners to lower their water bills in the long term and increase water supply in times of drought. Particularly, it can alleviate reliance on groundwater, particularly important as water resources become more stressed with increasing population and climate change.

Disadvantages: Depending on the system, the initial implementation cost can be high, but over the course of around 10 years, savings are most often accrued.

Implementation cost: Implementing rainwater harvesting techniques is complex. Downspout disconnects are easy and inexpensive using basic household tools, whereas cisterns will take active engineering.



Continued care: Cisterns should be well maintained, particularly because owners depend on their continued operation to reduce water usage and realize cost savings. Maintenance consists mostly of checking site loading.

Urban tree canopy: Trees can slow stormwater by catching the rain as it comes down with their leaves and branches and by soaking up the soil's moisture into their root system (which also makes it so that the soil can hold even more of the water).

Where it works: Urban tree canopy tactics can include everything from a few trees along a sidewalk to full swaths of urban forest. Soil conditions, climate, and space are major determinants when it comes to the types of trees planted. Some of the best locations include road right-of-ways, landscaped medians or traffic circles, and parking lots.

Advantages: Trees increase both water and air quality (especially when planted around areas with heavy vehicle traffic), lower the urban heat island effect, and provide green space, traffic calming, the potential for more foot traffic, and more walkable streets.

Disadvantages: Trees are susceptible to disease and a wide variety of stressors, which can shorten their lifetime.

Implementation cost: Urban tree plantings can be relatively low in cost, depending on the plant material and equipment needed.

Continued care: Maintenance requires invasive species removal, water, replacement of any dead trees, and pruning.

Vegetated roof: Also known as a green roof, a vegetated roof is a layered system of plants, filtering fabric, and drainage layer that allows the roof to absorb stormwater. Once the water has been absorbed, it is either used by the plants or it returns to the air. Vegetated roof technology has improved



as the roofs have become more common, with modern designs able to both store more water and keep the overall system weight low.

Where it works: New building developments or retrofits—including commercial, industrial, or public building types.

Advantages: A typical vegetated roof can produce 55 percent less storm-water runoff than a conventional roof.³⁴ They also needs less replacement than conventional roofs.

Disadvantages: Not all roofs, particularly older building stock, have the structural integrity to hold vegetation. Often those buildings that stand up to present-day code are amenable to vegetated roofs.

Implementation cost: Vegetated roofs usually cost between \$20 to \$30 per square foot.³⁵

Continued care: Minimal maintenance, including weeding and replanting.

Permeable pavements: Permeable pavement absorbs and filters rainwater and snow melt, unlike conventional, impermeable, pavement. As the rain-water or snow goes through, the pavement filters the runoff and improves the water quality while slowing down the rush of water. Similar to regular pavement, this material can be used for parking lots, sidewalks, and roads and does not impact traditional use of that infrastructure (such as car and bicycle traffic).

Where it works: Low-traffic streets, bike paths, sidewalks.

Advantages: Lowers the urban heat island effect, increases water quality, reduces runoff.

Disadvantages: Not suitable for heavy vehicles or high speeds.



Implementation cost: Permeable pavement is double to triple the cost of normal pavement and requires additional maintenance.

Continued care: If not maintained the pores of permeable pavement can clog, therefore vacuum sweeping is helpful.

Constructed wetland: Human-made wetlands can reduce and treat stormwater runoff and flooding. These areas work in a similar way to natural wetlands and consist of large surface areas covered in vegetation with shallow water. Hydrology is the most important design factor in constructing wetlands so that the stormwater input can actually work to output cleaner water through the flow process.

Where it works: A constructed wetland should be considered within the context of the larger watershed, including wildlife corridors and hydrologic routing.

Advantages: The constructed wetlands have the ability to improve water quality, limit surface runoff from stormwater, and increase biodiversity. They also often act as a congregating space and recreation hub for residents and are able to deal with fluctuations in the amount of water and flow.

Disadvantages: They will require larger land areas to achieve the same drainage as some of the more conventional wastewater treatment processes. However, if land is available, they can be a more economical alternative.

Implementation cost: The initial implementation cost is highly dependent on the amount of land available to be transformed into wetland. It also takes significant planning, knowledge of hydrology, and engineering skills.

Continued care: Maintenance is more straightforward following implementation, and includes watering during times of low rainfall, reinforcement planting when certain plants are dead, and general weeding care.



Regulating and Paying for Green Infrastructure

The Environmental Protection Agency (EPA) has its origins in regulating water. In the 1960s, with few environmental regulations, water pollution was so rampant that the Cuyahoga River near Cleveland, Ohio literally burst into flames. The EPA was formed in 1970 to deal with this overwhelming environmental degradation and was initially tasked with implementing and monitoring compliance with the Clean Air Act and Clean Water Act.³⁶

Under the Clean Water Act, cities are prohibited from discharging any pollutants into the waters unless they have a National Pollutant Discharge Elimination System (NPDES) permit, which tracks point-source pollution and requires controls to minimize the pollutants.³⁷ However, in part due to antiquated and deteriorating infrastructure, cities routinely violate the Act when their sewer systems overflow.

There are two major types of stormwater systems in the United States:

Combined sewer systems (CSS): Combined sewer systems are old sewers that often were first implemented in the early 1900s—the majority of which are located in the older Northeast and Great Lakes regions. These systems collect rainwater runoff, sewage, and wastewater all in one pipe, which transports it to a sewage treatment plant before sending it back into the local



river or lake. However, when it rains or snows, the amount of water can overflow the system. When this happens, any overflow is dumped directly into local waterways—called a **combined sewer overflow (CSO)**. In some cities, it only takes a couple of inches of rain for the systems to be overwhelmed. Raw sewage, such as industrial waste, debris, and human excrement, getting into the water system has huge implications for communities' health, particularly as extreme weather events accelerate with the onset of climate change. More than 860 municipalities serving 40 million people have to deal with the effects of CSOs.³⁸

Municipal separate storm sewer systems (MS4): MS4 systems are newer sewer systems that disaggregate stormwater from solid waste. This helps to limit the overflows that the CSS systems see regularly. However, in wet weather events, stormwater still picks up contaminants once it hits the ground, such as oils on pavement, that then go into the stormwater system and are unloaded into rivers and lakes. MS4 systems provide a better solution to CSOs but fail to eliminate pollutants fully. In some cases, too much water hitting MS4 systems can still cause backups in people's basements or on the streets. When such overflows occur, they're called Sanitary Sewer Overflows (SSOs). Annually, there are between 23,000 and 75,000 SSO events—equivalent to from 3 billion to 10 billion gallons of contaminated water.³⁹

In the case that a sewer system overwhelms water bodies with pollutants—in technical terms, if it goes over its total maximum daily load (TMDL) allowed by its NPDES permit—then the EPA can fine the municipality. If there is not enough action to limit pollution under the TMDL, the EPA can also require that the municipality enter into what is called a **consent decree**. This decree outlines how the municipality plans to deal with its stormwater pollution with help from the EPA. A large number of cities have entered into consent decrees and therefore have made major commitments to stormwater management. Importantly, in 2011 the EPA officially integrated



green infrastructure interventions as an applicable way to satisfy a municipality's consent decree mandates after a historic agreement with the city of Philadelphia.^{40, 41} Cities like Chicago, Cleveland, Washington, and Chattanooga, Tennessee have integrated green infrastructure into their consent decree plans.⁴²

Programs or mechanisms to pay for green infrastructure stormwater management

Cities and towns have reported that some of their most costly projects are to comply with federal wastewater and stormwater regulations.⁴³ As more of them deal with the realities of climate change in their areas, cities will need to further bulk up resiliency investments—both green and gray—in order to adapt to their new realities.

“
‘Non-water’ benefits are often not considered through the conventional financing mechanisms.
”

While green infrastructure can help in relieving some financial burden, finding ways to pay for it can run into barriers because it is a relatively new concept. Furthermore, the “non-water” benefits are often not considered through the conventional financing mechanisms.⁴⁴ While gray infrastructure requires some amount of interdepartmental engagement in governments, green infrastructure requires much more cross-collaboration between different governmental agencies—having significant effect on evaluating budgets. For instance, effective green infrastructure planning should be orchestrated in concert between water utilities and departments of transportation or public works, both of which manage large amounts of land that could be optimized with green infrastructure. While this provides additional opportunities to pay for the new infrastructure, it requires governmental institutions to break down financial silos and move towards integrative planning. The city of Chicago



has taken on this integrative approach and implemented a Green Stormwater Infrastructure Strategy, incorporating interventions into all of its major public investment in capital projects over the next five years.⁴⁵

Generally, there are two major ways that governments pay for infrastructure investment: funding or financing. Financing refers to debt like bank financing or municipal bonds or other types of private capital investments. In comparison, funding refers to grants, tax dollars, user fees, or other charges. While there are many models for investing in stormwater infrastructure using both financing and funding, below describes some of the key ways governments pay for their green infrastructure.

Financing

Green and municipal bonds – According to Earth Economics’ report, *Projects to Portfolios*, more than 160 green bonds have been issued by municipalities or municipal agencies (like utilities or educational institutions) since 2013.⁴⁶ While Green Municipal Bonds are not solely for green infrastructure, about 23 percent of them were issued for water-related projects (see Figure 3). DC Water, the publicly-owned water utility for Washington, DC, issued a \$350 million green bond for municipal water and wastewater in 2014. Since then, Connecticut, Cleveland, Indiana, San Francisco Public Utilities Commission, and St. Paul have used green bonds to finance water infrastructure projects.⁴⁷

Green banks – Green banks are capitalized by public funds either through budget allocation, taxes, or fees, and provide another opportunity to build out green infrastructure for both public and private projects. Often structured as a revolving loan fund, green banks can provide low-to-no interest loans to help close gaps in projects where private financing will not be enough.⁴⁸ For example, the Washington, DC Green Bank, chartered in July



2018, focuses on providing access to financing for green infrastructure, energy efficiency, and renewables. In order to ensure low-income residents are served through the bank's lending, two of the seven Green Bank board members that monitor and steer the direction of the bank are required to have backgrounds in affordable housing or community development.⁴⁹ Revenues made through carbon fees on natural gas and oil in the district act as one of the major funding tools for the bank.⁵⁰

Funding

Clean Water State Revolving Fund (CWSRF) (federally allocated, state deployed) – The CWSRF has been around since 1987 and has provided a low-cost funding mechanism for clean water programs. It is a coordinated program through the EPA and state's environmental agencies. The Fund requires that at least 20 percent of the money is used for stormwater infrastructure, water and energy conservation, or other innovative projects.⁵¹ Starting in 2009, green infrastructure was recognized as a stormwater intervention within the fund.⁵²

The Fund was just about the only EPA program that was not either eliminated entirely or its budget slashed in President Trump's 2019 budget proposal. However, Congress rejected Trump's proposal and left the EPA's budget relatively intact.⁵³ The precarity of the EPA and its limited enforcement ability in the current administration still stand as big barriers to keeping waters clean.⁵⁴ Furthermore, by rejecting climate programs like the Clean Power Plan, the Trump administration locks the world into much higher rates of carbon emissions, resulting in more extreme weather and water events in the long term.⁵⁵

Community Development Block Grants (CDBG) (federally allocated) – Since green infrastructure has the opportunity to increase livability and potential economic opportunities in a neighborhood, it can be



integrated into community development block grants given out by the Department of Housing and Urban Development (HUD).⁵⁶ In particular, there are block grants that focus specifically on disaster recovery projects that can be used post-disaster to rebuild more resilient cities using such tactics as green infrastructure.⁵⁷

Taxes and fees (multiple levels) – Taxes and fees act as another option to fund green infrastructure. In Warrington, Pennsylvania, the residents even voted in a 2012 referendum to borrow \$3 million to preserve and protect open space that can make room to integrate green infrastructure into the township, paid back over time through a small property tax increase.⁵⁸

“

The precarity of the EPA and its limited enforcement ability in the current administration still stand as big barriers to keeping waters clean.

”

In the November 2018 elections, the city of Portland, Oregon passed a ballot initiative for the Portland Clean Energy Fund that puts a 1 percent tax on large corporations that have national sales over \$1 billion and is expected to generate \$30 million annually—of which 10 to 15 percent will be directed towards regenerative agriculture and green infrastructure.⁵⁹ Championed by the NAACP Portland Branch, Asian Pacific American Network of Portland, Coalition of Communities of Color, Sierra Club, and Verde (a social enterprise studied later in this report), this bill directly focuses on redistributing the money to create a funding stream and jobs opportunities for green projects, like energy efficiency and green infrastructure installations, with a focus on low-income communities.

Many cities across the United States have implemented **stormwater fees** to raise money for green infrastructure projects and stormwater mitigation more generally. These fees have been set up in multiple ways. Some cities have one flat rate whereas others set a rate based on a property's metered

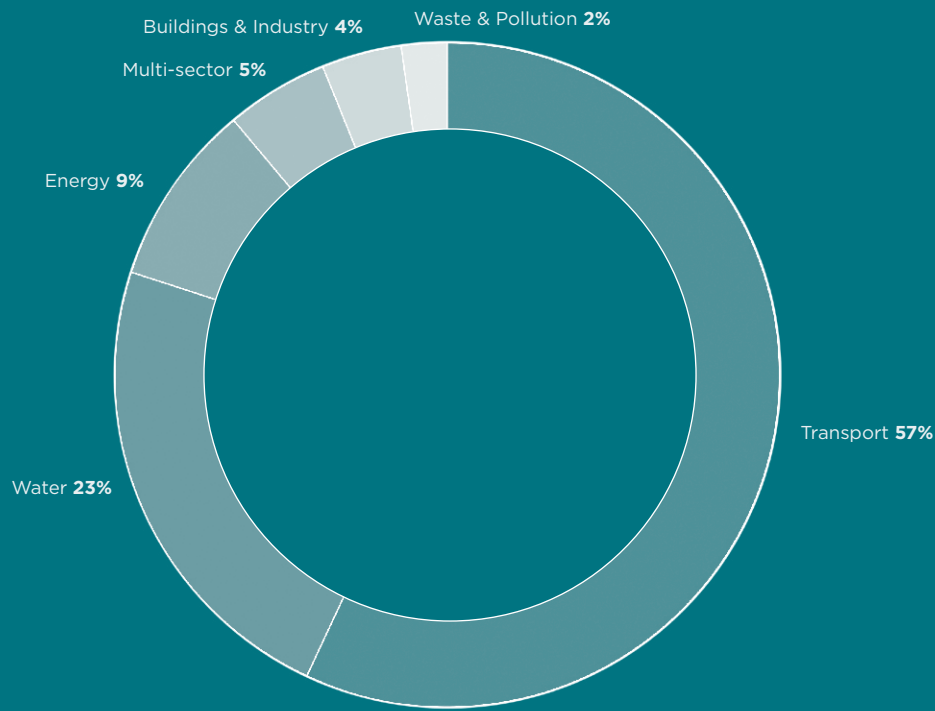


Figure 2: Green Municipal Bonds primarily finances water projects. Graph from Devashree Saha, "Green bonds take root in the US municipal bond market," Brookings, October 25, 2016, <https://www.brookings.edu/blog/the-avenue/2016/10/25/green-bonds-take-root-in-the-u-s-municipal-bond-market/>

water flow. However, neither mechanism relates directly to the amount of stormwater runoff each landholder generates.

Many municipalities have shifted towards an impervious-area-based fee, in order to effectively shoulder the brunt of stormwater burden on those who contribute the most to the problem.⁶⁰ Issues of equity still come into play here, though, since often community convening places like churches can get heavily penalized for assets like parking lots and have little ability to pay whereas large institutions may not be as heavily affected by stormwater fees, paying the price without making a change.⁶¹ Prince George's County in Maryland has recognized this imbalance and has sought to help groups like churches or nonprofits pull up impervious areas or achieve rebates in other ways, like tree plantings.⁶²



From the Field

Case studies of community wealth building enterprises

In the following chapter, we explore four examples of social enterprises and worker cooperatives across the United States active in green infrastructure.

These case studies were picked to study both different contexts and business models. Specifically, the case studies span a breadth of climates, from the dry heat of Oakland to the deep winters of Detroit, and economic development differences, from gentrified Portland to the recovering industry town of Pittsburgh. Each case study analyzes the ways that the business model was used to build community wealth, as well as how the enterprise started, how it operates today, and where it builds strategic partnerships.



Overview of practitioner case studies

Eastside Community Network's Green Team

A new social enterprise in the city of Detroit, seeking to provide eastside Detroit residents with opportunities for employment while also harnessing the vast amount of vacant land—an outcome of both deindustrialization and the housing crisis— for community benefit.

Organizational Structure	Location	Founding Year	Employment	Focus of Work
Social Enterprise	Detroit, Michigan	2017	In the process of deciding if The Green Team will operate on a cohort training or longer-term job model.	Maintenance for green spaces (mowing, leaf blowing, weeding, etc.) Installation including raingardens and bioswales.

Verde Landscape

Verde Landscape seeks to ensure environmental wealth is open to all. Working in the largely Latinx neighborhood of Cully, Verde works with other partner organizations to create green infrastructure assets in community spaces and new affordable housing buildings.

Organizational Structure	Location	Founding Year	Employment	Focus of Work
Social Enterprise	Portland, Oregon	2005	Four-year training program, with three pathways for graduation: (1) continue to work for Verde, (2) acquire long-term job elsewhere, (3) start your own business.	Installations including urban tree plantings, rain gardens, and bioswales. Maintenance of green infrastructure.



Landforce

Landforce provides a robust training program for underserved community members in the post-industrial city of Pittsburgh, providing everyone from returning citizens to refugees an opportunity to get back on their feet while also performing an environmental service.

Organizational Structure	Location	Founding Year	Employment	Focus of Work
Social Enterprise	Pittsburgh, Pennsylvania	2015	Eight-month season cohort model, then placed at longer-term jobs.	Trail construction Habitat and vacant land restoration. Installations including raingardens, bioswales, etc. Maintenance of green infrastructure.

Dig Cooperatives, Inc.

Dig Cooperatives, Inc. is one of the few worker cooperatives in the field. It has taken on the task of redefining what it means to work in the construction sector by committing to a democratic workplace and sharing the surplus of revenues. The coop operates in Oakland, which is seeing an increase in gentrification and the climate impacts of drought.

Organizational Structure	Location	Founding Year	Employment	Focus of Work
Worker Cooperative	Oakland, California	2005	Six-month trial period and a contribution of \$2,000 to become a worker-owner.	Installations of rainwater catchment systems, also referred to as graywater systems. Additional sustainable construction projects.



Photo courtesy of author.

The Green Team, Eastside Community Network

Type: Social enterprise, landscape maintenance business

Location: Detroit, Michigan

Green Infrastructure Type: Green infrastructure installation and maintenance, such as rain gardens and bioswale medians. General maintenance, including property mowing and leaf blowing.

The Green Team, a project of the Eastside Community Network (ECN) is a new social enterprise focused on employing local Eastsiders, residents of a neighborhood hard-hit by disinvestment and the 2008 recession, to install and maintain green infrastructure assets in their community. With huge



swaths of vacant land in Detroit, there is a need to leverage the untended areas for stormwater management to stop the pollution of an important freshwater source, The Great Lakes, and limit chronic flooding in low-income areas. As a new venture started in 2017, the Green Team is proving its business model on ECN's network of properties and is in the process of expanding its customer base.

City background: In the 1950s, Detroit had 2 million residents and laid claim to the highest per capita income of any American city.⁶³ As a city heavily dependent on its automobile corporations (Ford, Chrysler, and General Motors), Detroit was hard-hit by the decline of domestic manufacturing in recent decades and the 2008 recession wiped out many of the remaining jobs that Detroit's inhabitants had relied on. By then, the city became home to the zip codes with the most foreclosed buildings in the country from the housing crisis. That was worsened in part by unpaid water bills: In 2014 alone, 11,979 homes that went to auction had water debt included in the property taxes.⁶⁴ Today, the Detroit Land Bank Authority, an agency that acquires and manages abandoned and foreclosed property, owns one in every four parcels of land in the city.⁶⁵

Detroit sits at the intersection of two of the largest freshwater lakes in the world—Lakes Erie and Huron—making taking care of Detroit's water system and sewer overflows all the more important. Higher volumes of precipitation associated with climate change are likely to increasingly overwhelm the city's old, combined sewer system and spill into the Rouge and Detroit Rivers, which will take the sewage directly to the Great Lakes.⁶⁶ Detroit's large percentage of low-income families are less likely to have the money, time, or ability to handle the flooding, exacerbating such public health concerns as mold and vector-borne diseases. Furthermore, the Detroit city government reported 22,000 vacant houses throughout the city as of the spring of 2018,⁶⁷ many with people squatting in them, that aren't being maintained but are still being affected by these overflow instances.⁶⁸ Making matters worse, in 2014 DWSD started cutting off water supplies to its lowest-income



users who were unable to pay to alleviate their debt, leading to a water crisis in the city.⁶⁹

In 1999, Detroit was put under a consent decree requiring action to limit excess combined sewer overflows, which was fulfilled and lifted in 2017. The city now operates under a National Pollutant Discharge Elimination System (NPDES) permit that requires them to invest \$50 million in stormwater management by 2029 with specific stipulations for green infrastructure.⁷⁰

How Eastside Community Network builds community wealth: Eastside Community Network has worked alongside Eastside Detroiters for over 30 years to build a resilient, equitable community that fosters support for community members. ECN's work has catalyzed a community development bank, a credit union, two health clinics, and, most recently, investment in green infrastructure in the local area.⁷¹

“
ECN prioritizes turning vacant plots into productive spaces for community—such as thriving gardens—that alleviate flooding from stormwater overflows.
”

In the wake of the 2008 mortgage crisis, whole swaths of Detroit were left vacant. To revitalize these neighborhoods and leverage the now-open space, ECN prioritizes turning the vacant plots into productive spaces for community—such as thriving gardens—that alleviate flooding from stormwater overflows. The nonprofit acquires, sells, and maintains properties through a range of creative land assemblies and local partnerships with investors and developers. As a partner of the Detroit Land Bank Authority, ECN has been able to acquire land at a low price and preserve it for the needs of Eastsiders.⁷² For instance, Chandler Park residents and ECN are collaborating to implement green infrastructure designs that will support community needs and limit stormwater overflows in the vacant space.⁷³



ECN's Green Team: ECN has recently launched “The Green Team,” which has been developing its expertise and business model. As Andrea Benson, ECN’s Economic Development Manager described it, “The Green Team can be stewards and potentially fill a gap in the market and reinforce the importance of stormwater management. This team will hopefully will be able to get a head start on the potential demand we see for managing or installing projects of various scales in the community.”

Currently funded and contracted by ECN, The Green Team considers itself in the “piloting” stage of development. Right now, it is working on getting its first cohort trained up and working. The Green Team currently employs three workers and a manager for 25 hours per week with hopes to expand both the team and the hours. The nonprofit hopes to spin off The Green



Photo courtesy of author.



Team into its own self-sustaining enterprise that can provide Eastsiders green jobs that serve its community members.

As a young team, it is still strategizing how to provide the most job benefits to Eastsiders. In other words, should the program act as a workforce training program that shepherds on cohorts to full-time positions with other companies or does it provide long-term, stable employment to a smaller group of Eastsiders?⁷⁴

Workforce development: One of the main goals beyond building green infrastructure is to provide Eastsiders—particularly those who lack access to the workforce—with good, equitable, reliable jobs. Detroit’s downturn and precipitous fall into bankruptcy following the 2008 crash was a wake-up call—Detroiters can’t just rely upon big companies to provide the jobs. Instead, they need employment programs that will be there for the long haul and provide job opportunities that give them a second chance. While the unemployment rate has dropped since its high of between 28 and 50 percent in 2009, its rates are still higher than that of Michigan state or the nation.^{75s}

Jobs that prepare Detroit for the effects of climate change, transitioning land from vacant to productive, and creating public good could be a positive answer. However, in a city with four seasons like Detroit, winter is a quiet time for green infrastructure installations. This poses a major question: Should The Green Team provide year-round employment in order to deliver on a reliable job, and if so, how? “This goes back to equity and sustainability,” Andrea says, “Based on this work, it can be seasonal or year-round—and what are the implications for stability in someone’s life if you just hire them for a season?”⁷⁶

Keeping workers on staff for a full year at \$15-\$20 an hour without enough cashflow during slow seasons could run the organization dry. That’s why



the Green Team and ECN are partnering with other organizations to identify other types of important work, such as snow removal, that could help residents or small businesses in the area and can keep the Green Team afloat during the colder seasons.

How ECN's social enterprise got started: Originally, ECN set out to educate residents about stormwater management and how to install rainwater gardens and rainwater catchment systems with a grant from the Institute for Sustainable Communities. However, a combination of factors made ECN shift focus in order to achieve its ultimate goal: developing a sustainable, resilient, and thriving Eastside community.

The program's residential focus targeted lowering residents' water bills by gaining rebates on stormwater fees. The Detroit Water and Sewerage Department's recent changes to stormwater fees had created a need for lowering stormwater bills for residents.⁷⁷ However, when it became clear that the Authority did not have the capacity to individually inspect and accept green infrastructure implementation, such as the rain gardens ECN wanted to train residents to establish, the authority decided to provide all residents with a 20 percent reduction in their stormwater bill "in good faith" that they would initiate downspout disconnects and other green infrastructure tactics. To receive additional stormwater rebates, residents had to prove their plans would achieve more than a 20 percent reduction—which can be challenging and expensive.⁷⁸

Realizing this, ECN tacked course. The better opportunity, paired with better incentives, was to focus on larger-scale green infrastructure installation and maintenance, particularly on small- to medium-sized business land,



“

One of the main goals beyond building green infrastructure is to provide Eastsiders with good, equitable, reliable jobs.

”



since the new stormwater fee structure would affect this group more substantially. Plus, ECN identified the opportunity to employ Eastsiders with this new focus, achieving their goal of community-scale sustainable change and providing economic opportunity to local residents. The new project was dubbed “The Green Team.”

The umbrella nonprofit, ECN, has proven an important resource by providing space for tools and capacity for overhead costs like payroll and insurance that allowed The Green Team to get on its feet. But as the program grows and projects increase in complexity, The Green Team will have to find long-term funding streams to become sustainable on its own.

Major contracts: As a young social enterprise, ECN continues to incubate its Green Team in-house. ECN cancelled its contracts for lawn mowing, gardening, and general landscape maintenance on its properties in order to redirect those funds towards the Green Team’s work. This has allowed the Green Team time and a protected space to build up both skills and a portfolio, while dealing with early-stage hurdles. Providing the Green Team access to ECN’s properties, well known on the Eastside, gave the Green Team the opportunity to socialize with the larger community so other local businesses or residents can hire its services.

While ECN continues to buy more property from the Land Bank for community-based development, relying only on ECN property will not sustain the social enterprise alone. The Green Team expects to build out its green infrastructure work through installation contracts, but also in large part through general maintenance projects, like mowing.

Funding, financing, and revenues: ECN was able to secure a \$28,000 grant from the Institute for Sustainable Communities, which helped finance the ideation and some of the initial costs of the social enterprise. Furthermore, ECN’s support in the form of a space, general operating assets like printers



or computers, also delivers capacity that a startup without nonprofit support may not have had.

Key partnerships: Since the Green Team is a burgeoning social enterprise without many contracts in place now, its key partnership is with its incubating organization—ECN. However, ECN’s deep relationship with many organizations, businesses, and residents in Detroit provides it with opened doors to speak and learn with others across the city, and across the United States. In fact, ECN has been in contact with Landforce—another social enterprise profiled in this report—to exchange ideas, particularly around how to structure employment at the organization. The Green Team has interest in building partnerships with other skill-building organizations to shape in-house capacity for training on green infrastructure, as well as identify other jobs to fill the “off-season,” such as home weatherization or snow removal.

“
Having land as an asset is a key way to incubate a small green team.
”

While ECN has partnered with the government in a nonprofit capacity in the past, the Green Team to date has not pursued government contracts because of the immense amount of time and effort that it takes to apply. Instead, it is looking for contracts with real estate managers, local businesses, and even some residential contracts to diversify the client base and job-type.

Lessons learned

- In a four-season climate like that of Detroit, it can be hard to keep workers employed all year with enough green infrastructure projects or mowing contracts. This proves to be a major concern for providing long-term stability in a construction



industry typically seen as providing work that is seasonal and unpredictable.

- Having land as an asset is a key way to incubate a small green team. This opens up the opportunity to contract in-house, proving the business model while also defraying costs like initial insurance coverage and physical space to store equipment. Such access can make a huge difference in giving more space to work out the kinks of the social enterprise.



Photo courtesy of Verde Landscape.

Verde Landscape

Type: Social enterprise, landscape contracting business and herbicide operator

Location: Portland, Oregon

Sewer type: Mostly combined sewer

Green infrastructure type: Focus on installations like urban tree plantings, rain gardens, and bioswales. Some maintenance work.

Verde Landscape is the longest running social enterprise division of the Portland, Oregon-based nonprofit, Verde. The social enterprise installs and maintains green infrastructure sites for stormwater, including bioswales, rain gardens, and tree plantings. After the success of Verde Landscape, a new social enterprise called Verde Builds started in 2013 to refurbish and retrofit



low-income housing.⁷⁹ The two social enterprises work together on projects to deliver and sustain livable communities, particularly within their home neighborhood of Cully on the east side of Portland.⁸⁰

City background: Portland is famous for its rain. The city receives on average 37 inches each year, which generates ten billion gallons of stormwater runoff.⁸¹ Most of the city was constructed in the late 19th century, and for decades combined pipes collected and carried stormwater, sewage, and industrial waste through the same pipes and then dumped it directly into the Willamette River and Columbia Slough without treatment.⁸² An early adopter of green infrastructure, the city has implemented at least 172 ecoroofs, constructed 920 green street facilities like bioswales and curb extensions, and has a goal of planting 83,000 trees. In fact, the city has even begun to buy and protect around 420 acres of land in areas vital to green infrastructure.⁸³ All city government projects now require stormwater remediation in an attempt to integrate resiliency into city planning.

An ever-developing hotspot, much of Portland has seen neighborhood rent prices rise over the years.⁸⁴ Average rents for low-income families has risen about 40 percent since 2011.⁸⁵ Communities as well as the local government are taking specific actions to redress displacement from gentrification, such as efforts to give citizens pushed out by high rents the “right to return”⁸⁶ or organizing by coalitions to stop imminent gentrification and ensure that low-income areas (such as the diverse Cully neighborhood) get the investments like green infrastructure they deserve.⁸⁷

How Verde Landscape builds community wealth: Verde Landscape’s core mission is to ensure low-income people directly benefit from environmental investments—reinterpreting sustainable investments as an anti-poverty strategy. The social enterprise bases itself out of the Cully neighborhood, a predominantly low-income community. Portland was infamously called “the whitest large city in America” by *The Atlantic*,⁸⁸ but Cully is a predominantly



Latinx neighborhood, struggling with issues of displacement and environmental disinvestment in a gentrifying city.⁸⁹ Using an intersectional approach, Verde works on issues of anti-displacement, workforce development, and ecological justice so that achieving environmental wealth and community development can be possible in one project. As Carlina Arango, the Landscape Programming Assistant at Verde describes, “Part of what we are doing is saying that these things don’t have to happen the way they have in the past.”⁹⁰

In partnership with a local Latinx community development corporation, Hacienda, the social enterprise started as a way to provide employment opportunities for those living at Hacienda, in a way that enabled skills training while also ensuring a living wage.⁹¹ Since then, the social enterprise has hosted an intensive, four-year training program as well as permanent employment options.⁹² Verde Landscape’s relationship to Hacienda has made the Cully neighborhood more livable and ensures that the original community members continue to gain access to the benefits of development, instead of being pushed out.



Photo courtesy of Verde Landscape.



Working for Verde Landscape: Verde Landscape was founded with an explicit purpose to provide jobs to those families living at Hacienda and other Cully neighborhood residents who would otherwise not have access to a job. Verde Landscape continues to foster a deep relationship with Hacienda and employs many workers from its affordable housing units. As Tony DeFalco, Verde’s executive director, describes, “People who live in Hacienda and work for Verde come there as a result of word of mouth. When you are able to build trust, people talk about it; if you treat people well, they will want to work there.”⁹³

“

Verde works on issues of anti-displacement, workforce development, and ecological justice so that achieving environmental wealth and community development can be possible in one project.

”

Verde Landscape currently has 11 crew members and four ancillary staff. Employees of Verde Landscape are paid a living wage, and the social enterprise paid \$615,328 in wages and \$84,173 in health insurance premiums in fiscal year 2015.⁹⁴ It is also looking to expand the business to potential satellite campuses in the West of Portland, opening up at least five new positions in the near term.⁹⁵ When Verde Landscape first started around the time of the 2008 financial crisis, Portland’s unemployment rate was very high; today jobs in the landscape sector are more plentiful, since more organizations and companies are entering the scene. The social enterprise wants to expand and continues to look for those with barriers to employment to hire within the tighter employment environment.

Workforce development: The workforce development component is key to its model. In addition to higher-than-industry wages and full insurance, Verde Landscape invests in its employees’ futures. Workers get paid for their training time, and each trainee receives 80 hours of training for both hard and soft skills.⁹⁶ In total, Verde Landscape contributed 945 paid training hours to their staff.⁹⁷ The traineeship lasts for four years, at which point



there are three avenues of graduation: moving onto another landscape firm or different business, creating your own business, or transitioning internally into a long-term position with Verde. To date, two trainees have started their own business in landscaping, and five have gone onto other landscaping enterprises. The others have stayed within the Verde social enterprise. Verde sees its traineeship as key to the model and hopes that others will continue in permanent positions at the organization, but it provides space for trainees to expand to new employment opportunities through the graduation pathways.

How Verde Landscape got started: Verde Landscape developed out of the Latinx community development corporation, Hacienda, located in the Cully neighborhood in 2005. Hacienda provides affordable housing, home-ownership support, as well as educational and economic development opportunities to local Cully community members and is one of Oregon’s largest Latinx-led, Latinx serving organizations.⁹⁸

Hacienda provided spaces for community members and families in need, and in order to stop the perpetual cycle of poverty, it needed an employer who understood that context. Hacienda also needed to contract and hire someone to implement stormwater infrastructure and general landscape maintenance on the properties. Founding Verde Landscape helped it reach those goals at the same time.

Hacienda’s large affordable housing complexes acted as an experimental zone for Verde Landscape to prove its model. The new social enterprise contracted with its parent organization to implement and maintain green infrastructure, in part to fulfill the city’s requirements for stormwater management in commercial areas, using structures like bioswales. Verde Landscape secured a few smaller grants as well as donations from the local Home Depot and a local landscaping equipment company in order to fund the projects—particularly the training component.



Major contracts: Verde Landscape has had relatively good success cultivating a relationship with the local Portland government and acquiring public contracts. Its first project with the city consisted of a small \$5,000 grant as a skills-based stormwater management project, which helped Verde Landscape build up its training capacity for its employees. At the time, Portland conducted all of its green infrastructure and stormwater management in-house—from tree plantings to bioswales—but it proved to be too much work for the city alone.⁹⁹ Since the small grant had proven to be a success, the city entered into a larger contract with Verde Landscape for bioswales and tree plantings, which allowed it to expand the business.

Knowing that Portland had plan to plant thousands of trees over the next few years for bioretention, Verde Landscape worked with a nonprofit called Friends of Trees on a small project to teach the crew tree planting and maintenance. When a large contract was tendered by the city, Verde Landscape had examples of its efficacy and could competitively bid on the project. It secured a contract for three years planting trees all across Portland. In need of more capacity, the city then put out a larger, public request for proposals to implement bioswales and other stormwater retention structures across the city. The concept of green infrastructure was relatively new at the time, which gave Verde Landscape a leg up as an early adopter in addition to its proven relationship with the city. “We got the first contract that came out through the city, just because we had a little bit of experience which put us a bit ahead of everyone else,” said Ricardo Moreno, the landscape program manager.

Verde Landscape has not limited itself solely to government projects. It has continued to contract with Hacienda and is continuously growing its affordable housing stock, in addition to other affordable housing and community projects. For instance, Verde Landscape operated as the general contractor working alongside local community residents on a park redevelopment project to install greener infrastructure. The parent organization has now



extended its expertise and started a new weatherization social enterprise: Verde Builds. The new social enterprise has worked alongside Verde Landscape in Cully development projects and Verde Build worked with the Portland Community Reinvestment Initiative to complete a 17-home affordable housing weatherization pilot that subsequently expanded to 25 homes in 2015.¹⁰⁰

Funding, financing, and revenues: Verde Landscape has artfully layered a combination of philanthropic, public, and private business revenue to make its model work. The umbrella organization fundraises through philanthropic and individual donations to cover some of the “soft-skill” fees and additional advocacy work. For instance, donations help to cover some of the workforce training programming like English as a Second Language (ESL) courses.¹⁰¹ As a small nonprofit business, Verde Landscape has found that its institutional relationship with the parent Verde nonprofit and its allies like Hacienda has allowed them to share resources such as office space, payroll, and accounting, opening up capacity.¹⁰²

At the beginning, Hacienda arranged a foundational contract for the social enterprise to test its business model and continues to provide a steady stream of work. While government contracts have acted as a major boon to financing Verde Landscape, there are major hurdles associated with garnering city contracts. First, the contracting process takes a serious amount of time, effort, and know-how. Verde Landscape has been lucky enough to rely heavily on an executive director who had the capacity and knowledge to navigate the proposal process. With the executive director now stepping out of this function, the parent organization has been searching for someone to specifically work on contract and grant-making. Also, when Verde Landscape got government contracts, the



“
Verde Landscape has artfully layered a combination of philanthropic, public, and private business revenue to make its model work.
”

VERDE: SNAPSHOT OF FINANCES

Revenue		Expenses	
Service Contracts	\$908,937	<i>Program Services</i>	
Government Contracts	\$2,170,865	Let Us Build Cully Park	\$2,236,900
Contributions	\$1,034,091	Outreach-Advocacy	\$766,891
In-kind Contributions	\$900	Verde Landscape	\$777,792
Miscellaneous	\$159,062	Verde Builds	\$62,081
Total	\$4,273,855	<i>Supporting Services</i>	
		Administration	\$346,774
		Fundraising	\$18,854
		Total	\$4,209,292

This chart depicts Verde's revenue and expenses in 2017, as reported in the umbrella nonprofit's 2017 financial statements.²²³ It shows that government contracts make up the bulk of Verde's current revenues currently. The expense breakdown shows the administration and fundraising capacity the larger organization gives to its programs like Verde.

reimbursement-based compensation process also posed problems as a small nonprofit with less upfront capital to invest into projects without an advance. Finally, the proposal process does not fully recognize the value and benefits associated with Verde Landscape's model. For instance, as a nonprofit in Oregon, it is ineligible for a small- or minority-owned business credit in the contracting processes—eliminating a clear edge for Verde Landscape in bidding.

Key Partnerships: While Verde has cultivated relationships with many groups throughout its 15 years of existence—from nonprofits to foundations to city government—by far the most important and long-lasting partnership has been with Hacienda. Together from the very beginning, commitment to the strategic partnership has only grown, creating strength together in their missions. Together, the umbrella nonprofit Verde and Hacienda worked to start a long-term, deep investment in the Cully neighborhood in a project called *Living Cully*. “We have been intentional that environmental issues need to be paired with social services, such as affordable housing, which



was the genesis of Living Cully, and to build wealth among low-income and community members of color,” DeFalco says.¹⁰³ The project works to build environmental wealth and invest in instead of displacing the community members who live there in the process. When talking about the Living Cully commitment, Carlina Arrango says, “Just because a place has environmental wealth doesn’t mean that displacement has to happen.”¹⁰⁴

One of Living Cully’s larger projects to date is Cully Park (the first phase was completed in 2018), and involves additional groups, including Habitat for Humanity Portland, the Native American Youth and Family Center (NAYA), Cully Association of Neighbors, and Portland Parks and Recreation.¹⁰⁵ The new park is located on an old landfill site, repurposed to improve a green-deficient neighborhood. Verde Builds acts as the general contractor and lead developer for the site, and Verde Landscape conducts all the landscape installation and maintenance. “It is a chance to restore essentially a mountain of trash into a community asset,” DeFalco says.¹⁰⁶ All of the projects have been designed using a deep, community-based approach with job opportunities for Cully community members and provide opportunities for youth engagement.

The most recent project to get off the ground is Living Cully’s partnered acquisition of the Sugar Shack, a decrepit strip club in Cully. Working collaboratively as the Living Cully Partners, Hacienda, Habitat for Humanity, the Native American Youth and Family Center, and Verde were able to mobilize support to buy the building in November 2017 for \$2.5 million, then transferred ownership to Hacienda to transform it into a 130-unit affordable housing site. Verde Builds was hired for general contracting and Verde Landscape will develop green infrastructure on and around the building, representing a by-design community wealth building approach, where the community gains access to housing, green space, and jobs all at once.



Lessons Learned

- A mixed financing model of business contracts and philanthropy allows the organization to continue to provide important services, like access to ESL for trainees, while seeking competitive bids with mission-aligned institutions, such as other affordable housing commercial property managers and the local municipality.
- While government contracts provided large amounts of work, the proposal, bidding, and reimbursement process is burdensome and puts a social enterprise at a disadvantage by not considering its social benefits, including its nonprofit status.
- Collaboration with other community-based groups to implement anti-displacement, sustainable development initiatives can both act as a way to ensure workers are not pushed out of their communities at the same time as providing long-term contracts.
- The combination of a general contractor for projects like weatherization—Verde Builds—and a landscape contractor—Verde Landscape—can provide unique opportunities for cross-pollination and contracts.



Landforce

Type: Social enterprise, land steward and maintenance business

Location: Pittsburgh, Pennsylvania

Sewer type: Combined sewer

Green infrastructure type: Landforce works on trail construction and habitat restoration as well as vacant land restoration and stormwater management (such as rain gardens and bioswales, installation and maintenance).¹⁰⁷

Landforce got its start in trail conservation, providing six-month traineeships to underserved or underemployed community members in the Rust Belt city of Pittsburgh. Now Landforce takes on urban green infrastructure projects



with a variety of clients, including private developers and a new, intentionally designed and foundation-funded Hazelwood Green Development Project.

City background: Like many cities served by aging sewer infrastructure, the “Steel City” faces serious challenges as it addresses stormwater runoff and subsequent spillage into its three rivers, the Allegheny, Ohio and Monongahela. In 2008, the Allegheny County Sanitary Authority (ALCOSAN), the City of Pittsburgh, and 83 regional municipalities signed a joint consent decree to deal with sewer overflows before 2036.¹⁰⁸ ALCOSAN’s original plan to meet its consent decree obligations depended heavily on “gray” solutions, costing nearly \$3.6 billion, a burden being borne by ratepayers.¹⁰⁹ As a result, the Clean Rivers Campaign, a coalition of environmental groups, called for less gray and more green infrastructure. In response, in 2016 ALCOSAN appealed to the EPA and the state Department of Environmental Protection to integrate green infrastructure solutions to lower construction costs. The request was subsequently approved by the EPA.¹¹⁰

Once a steel powerhouse, Pittsburgh has, with a serious uptick in investment, all but transformed into a post-industrial city, becoming a hub for high-tech companies and healthcare. Nevertheless, the boom hasn’t been felt by everyone.¹¹¹ African Americans make up 11.4 percent of men ages 18 to 64 in Pittsburgh, yet are just 5.4 percent of the region’s adult male workforce; less than half make enough to support a spouse and two children above the poverty level.¹¹² Vacant lots are still regular features of certain neighborhoods that continue to be disinvested in terms of jobs and infrastructure within the burgeoning northern metropolis.¹¹³

How Landforce builds community wealth: Landforce focuses on combining workforce readiness with land stewardship, providing both employment opportunities in the Pittsburgh region as well as widespread community and environmental benefit. Landforce specifically works to train and employ



low-income and unemployed people who possess a wide range of barriers to employment.¹¹⁴

As the economic landscape in Pittsburgh continues to change dramatically, Landforce seeks to provide avenues to family sustaining jobs that will allow community members to stay in their historical homes and neighborhoods. When Landforce enters new areas of Pittsburgh, one of its strategies has been to try to employ workers from the local community to ensure that the benefit felt by the installed projects brings economic benefit to the area.¹¹⁵

Employment at Landforce: Landforce leverages green infrastructure to place underserved people into a growing number of jobs in the Pittsburgh area. It explicitly recruits, trains, educates, and employs over the course of six months people with barriers to employment.¹¹⁶ Returning citizens, returning veterans, individuals with a history of substance abuse or poverty, refugees, and individuals struggling to find a sustaining job are all eligible to become crew members. Executive Director Ilyssa Manspeizer explains that Landforce is unique because “we pay wages for important environmental work while also training for priority jobs.”¹¹⁷

“
Landforce seeks to provide avenues to family sustaining jobs that will allow community members to stay in their historical homes and neighborhoods.
”

As a philanthropic supporter of Landforce and partner in the Hazelwood Green development project (described later), Matt Barron from The Heinz Endowments recognizes Landforce’s importance in bringing people back into the workforce, saying that “one of the big barriers for employment is a solid vouch [or recommendation]. People will hire someone with a record if they have someone to vouch for them.”¹¹⁸ One result of Landforce’s reputation in the Pittsburgh area and its commitment to their crew members’



professional development is that 87 percent of crew members have directly moved onto jobs with other employers by the end of the season.¹¹⁹

Workforce development: Adults with barriers to employment enter into traineeships with Landforce for a six-month season. Crew members are trained in and carry out land stewardship projects, like green infrastructure, while working with a workforce development manager to establish long-term employment goals and address barriers to employment, improve job search and retention abilities, build budget management and banking skills, and connect to potential employment opportunities or further education.¹²⁰ The extensive orientation process includes CPR certification, learned job site





and tool safety skills, land stewardship training, a financial empowerment workshop, and the establishment of personal and professional goals.¹²¹ Over the last three years, Landforce hired 47 people, provided more than 3,900 hours of workforce readiness training, and 600 hours of career coaching.¹²²

Landforce partners directly with other employers, getting to know them and their employment needs to help identify good potential permanent positions for its crew members.¹²³ Through Landforce's relationships with external employers, the social enterprise hopes to set up pipelines to industry employment, particularly good, unionized jobs like those offered by the municipality on large-scale projects. The social enterprise does not limit those possible permanent jobs to the green infrastructure space, but instead recognizes that the skills built through workers' experience at Landforce can apply in different contexts. "Most people do not go into green infrastructure," Manspeizer says. "The more successful individuals go into union jobs but some still have difficulty dealing with employment barriers. Outcomes are very individual."¹²⁴

How Landforce got started: Landforce got its start working with nonprofits on land conservation projects.¹²⁵ In 2011, Emerald Trail Corps (ETC) started as a project to employ a local workforce from historically disenfranchised areas of Pittsburgh to work on Emerald View Park's trail network, an extensive plot of 257 acres being restored after being used historically as a mining and illegal dump site.¹²⁶ In 2015, ETC began the process of restructuring for expansion beyond trail conservation, adopting the working name Pittsburgh Conservation Corps until the organization settled on its permanent name, Landforce, in early 2016.¹²⁷ By November 2016, Landforce had grown from a community development project into a regional stewardship and employment training resource. It had hired on 12 crew members, secured \$100,000 in contracts, maintained thousands of square feet of Pittsburgh's vacant land, worked on multiple green infrastructure and garden bed projects, and restored native woodland.¹²⁸

LANDFORCE: SNAPSHOT OF FINANCES

Revenue		Expenses	
Individual, Board	\$6,875	Permanent Personnel	\$370,405
Foundation	\$441,079	Temporary Personnel	\$114,683
Government	\$7,185	Contracted Services	\$45,376
Nonprofit	\$10,000	Administrative	\$15,928
Earned Income	\$127,492	Facility	\$18,440
Total	\$592,631	Operations/Program	\$23,870
		Marketing	\$201
		Total	\$588,902

This chart depicts Landforce's revenue and expenses in 2017 (its third year), as reported in its 2017 Annual Report.²²⁴ To date, Landforce relies more heavily on foundation grants than earned income from contracts, but the ratio of earned income to foundation giving has shifted over time as Landforce has gained capacity and notoriety in the community.

Major contracts: Landforce has taken steps more recently to diversify its contracts, working with municipal government and private companies or property managers.

In seeking contracts, Landforce has been intentional in the type of work it seeks. Particularly, it has focused on identifying contracts that do not encroach on jobs usually done by union workers. This is particularly important since the social enterprise hopes to place workers in jobs across the city after the traineeship, and unionized employment can provide high wages and worker protections. When it comes to municipal contracts, "Landforce is in conversation with municipalities to find the appropriate space for organizations, such as [ours], that combine workplace development and work," Manspeizer says.¹²⁹ The social enterprise has yet to acquire a municipal contract in part because, as a nonprofit, it is not eligible for the small, minority or woman-owned business preferences that would give it better access to contracting opportunities.



Funding, financing, and revenues: Funding started with a two-year seed grant from the Hillman Foundation, a local philanthropic organization, to partially support Landforce’s creation and capitalization, followed by other foundation grants, including from the Heinz Foundations.¹³⁰ The start-up money allowed Landforce to establish itself and build a steady increase in contracts.¹³¹ In its three years, it has increased its project income by 200 percent.¹³² Landforce’s growth can be attributed to earned contracts rather than foundation funding. “When Landforce gets its legs underneath them, then these types of contracts can come in,” says Rob Stephany, the Heinz Endowments’ director of community and economic development, while discussing the endowments’ role in funding the growth of Landforce. “We can underwrite a dream, they can underwrite performance.”¹³³

Key partnerships: Manspeizer explains that “Landforce grew out of partnerships and is based on partnerships.” These partnerships include different community development organizations and local nonprofits, including the Allegheny Land Trust, the Western Pennsylvania Conservancy, and other organizations. The Allegheny County Human Services Department provides government grants to help support the wraparound services that Landforce supplies to its workers, such as help paying childcare support.

Landforce’s new contract with the Hazelwood Green redevelopment, facilitated in part through the Heinz Endowments—a co-owner major partner of the redevelopment—provides an example of collaborations that have the potential to build community wealth. Along with two other Pittsburgh-based foundations, the Heinz Endowments bought a former steel manufacturing site on the Allegheny River that was destined to be turned into a coal coke plant. The foundations have been working to intentionally

“
Relationships with anchor institutions that have land assets, such as the Heinz Endowments, can result in contractual opportunities beyond grant funding.
”



design the new area, surrounded by an underserved, yet vibrant, mixed-income and multiracial community, to revitalize the local environment. They have also prioritized connecting with the current community to deal with the changes to the neighborhood, and produce local jobs.¹³⁴ In order to have such a “world-class economic engine without displacing people,” Hazelwood Green funders have worked with community members and low-income homeowners to establish rent stabilization measures and advance plans to build new, high-quality affordable housing in the Greater Hazelwood neighborhood.¹³⁵

One of the ways that the Hazelwood Green team delivers on its vision is through employing local workers. The Heinz Endowments’ prior philanthropic relationship with Landforce made Landforce the obvious organization to reach out to and encourage to bid on the area’s green infrastructure installation and contract. While the Heinz Endowments was not in charge of choosing the contractor, the coalition of owners directed the Hazelwood Green property manager to evaluate bids based on “best value,” considering categories like the mission of the organization and its multiplicative benefits.¹³⁶ Landforce compiled a competitive package that the property manager subsequently accepted. The Heinz Endowments’ philanthropic support, deep relationship with the organization, and influence with the property manager all contributed significantly to expanding Landforce’s portfolio.

Lessons learned

- Wraparound services—everything from helping with expired licenses to childcare support—are integral to making a social enterprise like Landforce work effectively.
- Relationships with anchor institutions that have land assets, such as the Heinz Endowments, can result in contractual opportunities beyond grant funding.



- For those crew members seeking long-term work and careers, an understanding of green infrastructure is a skilled asset that can enable work in the wider field of landscaping, construction, and more. Further, the soft skills provided by Landforce helps trainees gain important skills well beyond green infrastructure work.
- For a social enterprise focused on providing on-ramps to employment, identifying jobs that do not overlap with historical union work is important to not eroding other family-sustaining jobs in the community, maintaining relationships with future employment partners, and continuing to provide pathways to long-term employment.



Photo courtesy of Dig Cooperatives

Dig Cooperatives, Inc.

Type: Worker cooperative, design-build general contractor

Location: Oakland, California

Sewer type: Mostly combined sewer

Green infrastructure type: Focus on rainwater catchment systems, also referred to as graywater systems

Dig Cooperatives, Inc. is an Oakland-based design and build general contracting worker cooperative committed to implementing both graywater and rainwater systems to preserve water in a state increasingly affected by droughts. The founders of Dig not only wanted to build a water-sustaining community in the Bay area, but also wanted to engage in job creation



squarely in contrast to the exploitative norm of the construction industry by enabling worker democracy, paying fair wages, and distributing wealth fairly among workers.

City background: Oakland is facing multiple intersecting climate change impacts. As of August 2018, abnormal dryness or drought affected approximately 93 percent of California’s population.¹³⁷ In addition to drought, rising tides will hit sinking shores and push ocean water inland, increasing water levels as much as 6 feet in the Bay area by the end of the century.¹³⁸ Already today, rising tides result in serious flooding in parts of Oakland.¹³⁹ The combination of too little freshwater and an encroaching shoreline means that Oakland has to make serious plans for climate resiliency.

The city is also experiencing an unprecedented amount of growth associated with the tech industry. As B. Tondre, a founder of Dig, states, “The amount of development pouring into Oakland right now is unprecedented.”¹⁴⁰ However, this development is extremely uneven. In neighborhoods that high-earners want to live in, development is pushing existing residents out due to rising prices. In other neighborhoods, neglect and underinvestment remain the dominant reality. Both of these forces have led to an increasing homelessness problem in the Bay area.¹⁴¹

How Dig builds community wealth: Dig roots its work in the principles of permaculture: “care for people, care for the earth, and a fair share for the distribution of surplus.” Permaculture ethics integrates technology with health, economics, and land use to produce a more sustainable world.¹⁴²

To care for the earth, Dig’s work focuses on graywater and rainwater catchment systems to store precious water in a state where droughts are becoming more frequent. Graywater installations capture gently used water from places like washing machines or showers that can be beneficial for practices like irrigation, and rainwater harvest systems collect distributed



stormwater runoff for reuse in processes like flushing toilets or irrigation. Dig leverages regenerative design and decentralized water management systems in order to responsibly reuse and retain water as a vital resource, while also limiting stormwater overflows in the Bay Area.¹⁴³

To care for people and distribute profits equitably, Dig established itself as a worker cooperative. Particularly in California, the construction profession is known for its precarity, misogyny, and exploitation, particularly of migrant workers.¹⁴⁴ The founders of Dig designed their construction company as a worker cooperative to confront this paradigm of exploitation and demonstrate a viable alternative. At Dig, each workers' success is intrinsically tied to that of the others, as high-level decisions are made together and workers are paid dignified and stable wages.¹⁴⁵

“

To care for people and distribute profits equitably, Dig established itself as a worker cooperative.

”

Employment at Dig: Dig has fluctuated in size over the past 15 years of its existence. At most, Dig hosted eight worker-owners, and today has four. As a cooperative, Dig operates under the tenet of “one-person, one-vote,” meaning that worker-owners have a say in strategic decisions of the organization and benefit from production of surplus. After six months of working at Dig and a contribution of \$2,000, new workers gain access to those decision-making processes and shared revenues.

One of the major challenges that Dig had to solve for its business model to work was, as B. Tondre explains, “horizontal decision-making in the board room and vertical implementation in the field.”¹⁴⁶ While still working to ensure equity of its co-owners, hierarchy in the field has been necessary to reconcile the varying levels of know-how and experience around safety and service quality. Graywater and rainwater systems take a certain amount of



expertise, which new workers learn in part on the job. However, it also requires some colleagues to have backgrounds and advanced knowledge in areas like water and irrigation systems.

Dig is considered a Class B general contractor according to its license, which means that it oversees project plans, implementation, and physical labor. The co-op often hires outside subcontractors for specialized work that they cannot do themselves due to the constraints of general contracting. Often worker-owners are on site with independent contractors or subcontractors, which means worker-owners often interface with groups that don't hold the same value set on the job. This has proven to be a tension in the field, but also an opportunity to champion an alternative modality of work to others.

Moving beyond the American standard of “getting the most amount of work for the least amount of pay” has always been a core belief at Dig, and the cooperative has prioritized shifting construction industry norms to value nonviolent communication, collective understanding around decision-making processes, and ensuring a consistent, livable wage for workers. While Dig pays dignified wages and refuses to let go of worker-owners without warning, unlike many construction companies, Oakland has become more expensive and gentrified, which has priced out Dig's workers, with many living in other areas (like Richmond) instead of their often-historical home in Oakland.¹⁴⁷

Workforce development: Unlike some of the social enterprises identified in this report, Dig's model does not revolve around creating “graduation pathways” for its workers, though it has found that skills development, everything from how to dress on the job to technical knowledge of graywater, has been a key process in each worker-owners entrée to the cooperative.



Dig does provide workforce development, often in the form of youth training, as part of community engagement on some of its projects—primarily those funded by public investment. For example, Dig Co-op collaborated with the City of Oakland Redevelopment Agency on a green job training at the East Oakland Boxing Association when it put in a bioswale, a graywater system, and drought-tolerant landscaping.¹⁴⁸ It also worked with Rosie's Girls—an homage to Rosie the Riveter who was from Richmond, California—to teach girls carpentry and landscaping skills. With its roots in working alongside the community to build resiliency, on-the-job education has continued to be a big part of Dig's reputation.

How Dig got started: Fifteen years ago, in the height of a California drought, a group of friends—an architect, landscaper, contractor, permaculture expert, community organizer, and biologist—came together to start Dig Cooperative. At the time, graywater catchment systems had been improvised and installed “guerilla style” in the city without mandates or laws. Water reuse had not been integrated into building or landscape codes, but the onset of more droughts compelled the team to act.¹⁴⁹

The new team's goal was to try to put together effective graywater solutions while also working closely with local government to write the codes so that people could implement systems legally and safely. Initially a project, the members of Dig worked with the nonprofit Berkeley EcoHouse to design and install the City of Berkeley's first permitted graywater system and California's first residential constructed wetland to treat graywater. Through a series of workshops, the groups involved the public in the demonstration project to educate and also build ownership over the resilient design. The project including dual-flush toilets, a laundry-to-landscape system, and a constructed wetland. Working in

“
On-the-job education
has continued to be
a big part of Dig's
reputation.
”



coordination with both the local government and nonprofit, the Dig team was key to developing a lasting relationship between the East Bay Municipal Water District and the EcoHouse to form the official Water Smart Showcase Home.¹⁵⁰

After the completion of the project, the eight founders went on to formalize their relationship in a worker cooperative. Starting a construction cooperative proved hard to accomplish. While the Bay area is abundant with cooperative bakeries, homecare companies, and grocery stores, to date there are still not many examples of cooperative general contractors. Dig ran into multiple regulatory and financial hurdles as a worker cooperative. Particularly, there wasn't a legal worker-cooperative form in California until 2015 with the passing of AB 816 (almost ten years after Dig was started), limiting applicable capitalization opportunities and requiring Dig to initially register as a consumer cooperative.¹⁵¹ Furthermore, the permitting process for contractors is not well adjusted to decentralized ownership of a construction business.

Much of Dig's first years were about gaining trust in the Oakland area; building up a reputation for their work through multiple projects. "There are other issues involved in gaining trust," said Tondre about those first couple of years getting the cooperative off the ground. "Sometimes my appearance as a person of color, not looking as old and experienced as I am affected trust. If I show up and I'm not company-issued shirt tucked in, tape measure on my belt, truck with magnets... that whole appearance, I was judged."

Major contracts: Residential and small commercial projects serve as the backbone of Dig's work. More often than not, particularly with the smaller contracts, the customers are less enticed by Dig's status as a cooperative and more impressed by the high-quality service. However, Tondre attributes the service quality to operating as a worker cooperative since its staff is well compensated, given agency in choosing projects, and invested in the future



of the company. In acquiring new contracts, it often focuses on high quality work and being local rather than its cooperative status.

In the early days of the cooperative, worker-owners attended numerous events to teach people about the opportunities for graywater and green infrastructure systems, and often worked with local groups on demonstration projects. Now, Dig has moved into a new marketing strategy to build out a large online presence by asking clients to write positive reviews on platforms such as Yelp to garner additional contracts. Ensuring long-term employment with full work is paramount. This means that, while Dig is committed to its graywater and rainwater systems, it has learned that it needs to be open to other types of projects to keep work coming in.

Moving forward, Dig is thinking about ways to enter into other markets. Tondre has proposed bringing an engineer on staff, allowing Dig access to more governmental, institutional, or multifamily projects. “Because of our Class B License, we’re excluded from a lot of public projects and commercial projects,” Tondre explains. “When a commercial project is going to do some advanced water conservation technology in, say multifamily residential buildings, it’s at a scale of work for billionaire developers, engineers, a millionaire contractor.” Dig has also thought about a different tack: adding more green infrastructure maintenance work in its portfolio so as to both sustain the organization and also provide opportunities for more workers with barriers to employment.¹⁵²

Funding, financing, and revenues: Dig used a bootstrapping model to finance itself initially and get off the ground. In part, this is because Dig had limited access to loans as a worker cooperative, particularly 15 years ago at its start when worker cooperative financing options were much more limited.¹⁵³ Traditional loans often require collateral from the borrower to ensure the loan. In the case of worker cooperatives, personal collateral means that specific people within the co-op would have to put up their own house or



truck as collateral, putting increased risk on specific people in the organization instead of collectively.

Without access to traditional startup money, Dig worked to build up its name within the community by taking on a number of different types of jobs, with preference for graywater systems. Dig was able to make the project financing work by contracting with clients to pay 10 percent in upfront costs plus a retainer for specialized equipment necessary to complete the job. While not originally eligible for loans, members of Dig did engage in grassroots funding, including setting up a gallery of graywater interventions in a downtown area with opportunities for donations and setting up a crowdfunding page to help invest in new hardware, tools, and software.¹⁵⁴ Over time, the cooperative has been able to accrue more capital, allowing it to purchase larger-ticket items key to running a successful construction company, such as trucks branded with the Dig logo and its own office. This, in turn, allows the worker-owners more say in the types of jobs they take on.¹⁵⁵

Dig works with Renew Financial to offer a government-sponsored upfront financing program for water-saving improvements, repaid over a course of up to 20 years on clients' property tax bills.¹⁵⁶ Thus far, Dig has not found that the rebates or financing has been a core motivator for its clients to implement the systems. Instead most of its clients are environmentally inclined and looking for ways to save water.¹⁵⁷





Key partnerships or clients: Realizing that government contracts are hard to gain within the city, Dig focuses more on multiple small residential or commercial projects across the Oakland and the Bay Area. Most of the jobs put forth by the municipality are outside of Dig's scope, since they require licensing beyond Dig's Class B General Contractor status due to the need for engineering or architectural design capacities. As Dig moves forward, the worker-owners are thinking of bringing an engineer on full-time in order to access more of these projects.

“
The worker-owners
found that nonprofits
were good allies to
build trust in the
community.
”

When Dig began as a worker cooperative, the worker-owners found that nonprofits were good allies to build trust in the community. For instance, the first project that Dig conducted alongside the Berkeley EcoHouse helped it gain a reputation for expertise and exposed a way to save water in the Bay Area that hadn't been open to residents before.¹⁵⁸ However, more often than not, small nonprofits and nongovernment organizations Dig interacted with did not have the funds necessary to pay for such systems on their own properties.

Lessons learned

- To keep projects coming in consistently, Dig found that it was important to keep the funnel for jobs wider than its specialization in graywater. This specialty gained it exposure, but willingness to accept different projects provided consistent jobs.
- Loan practices for cooperatives were a major pain-point for getting Dig off the ground, in addition to the construction licensing processes. The lack of institutional support for cooperatives has left Dig lacking access to capital and licensing that matches its structure.



- Changing the long-embedded culture in the construction industry, particularly when working alongside different crews, proves to be a long process of reconciliation and learning.
- Dig has found that “horizontal decisions in the board room and vertical decisions in the field” have been important to providing agency while also ensuring safety and high-quality work.
- While Dig pays above-average wages, it has found its workers still priced out by the tech boom in the Oakland area.



Strategies to Deepen and Expand Community Wealth Building Enterprises

What follows are strategies for intentionally expanding the role of community wealth building enterprises, such as worker cooperatives and social enterprises, in the green infrastructure sector. Based on discussions with experts and practitioners in the field, this section explores the systemic possibilities, reimagining a construction and landscape workforce that centers dignified labor and the intersection of displacement and green infrastructure, as well as the brass tacks, the process of starting organizations and the nuts and bolts of contracting at different scales. It thinks through how to better capture already existing pathways like city contracting for community wealth building as well as completely new ideas.



Employment models for economic resiliency: workforce development, graduation paths, and long-term work

One of the major ways that the social enterprises and worker cooperatives profiled in this report seek to build community wealth is by redefining the culture of construction work, currently based on short-term and exploitative workplace practices, and by providing jobs to those who may be underemployed and therefore the most vulnerable to the effects of climate change.¹⁵⁹ In other words, they attempt to adhere to the community wealth building principle of “labor over capital.”

Length of employment

The process of providing that stable employment varies greatly from organization to organization—from a strictly skills-development cohort model on a delineated time frame (for example, Landforce) to a full-time basis employment model (for example, Dig Cooperatives, Inc.). Landforce’s model focuses specifically on workforce development for a large subset of community members who could graduate from the organization and be sent onto new jobs. This allows Landforce to touch the lives of more people and focus on maintenance and relatively straightforward installations while eliminating the need to sustain jobs in seasons that don’t have high levels of green infrastructure or maintenance work.

By contrast, Dig has worked hard to increase the length of employment by creating a way to buy into the ownership structure of the company. Workers are given a say on the type of work they engage in and collectively try to make decisions on how to make sure they have enough projects to sustain themselves, and they benefit collectively through shared profits.



In the end, creating economic resiliency for community members means stable, dignified jobs for the long haul. Organizations trying to decide how to enter into green infrastructure work to build economic resiliency need to weigh their context and larger vision. Determining an employment strategy should take multiple factors into consideration:

- **Seasonality:** Is there consistent work throughout the year in the region's climate, or is it cyclical?
- **Pathways:** Are there pathways to good-paying, dignified jobs in similar fields?
- **Trade-offs:** Is the goal to train the highest number of people in green infrastructure, or to retain a team for the long-term?
- **Engagement with unions:** How does the organization interact with local unions in the sector? Is the organization seeking to provide a pathway to a union job? (*See below for more information.*)
- **Type of work:** Does the work by the organization allow for professional growth on the long term? Or is it limited to low-skill work?

Relationship with unions

When it comes to employment models for large-scale deployment of green infrastructure, unions should to be part of the conversation. Historically, unions have had a strong foothold in government construction jobs and often have specific project labor agreements (PLAs) with municipalities—pre-negotiated contracts that define such issues as wages and working conditions.¹⁶⁰ Labor unions seek to provide good and stable jobs with excellent salaries and benefits to its union members, much like social enterprises and worker cooperatives. As non-traditional businesses seek to acquire larger contracts, unions may perceive their expansion as a threat. In recent



decades, there has been a serious erosion of labor power in the United States, making unions highly protective of jobs they have been able to secure.¹⁶¹ Multiple experts and practitioners identify this tension as a key point to address, if worker ownership and social enterprise expand in the sector.¹⁶²

One of the ways to gain support rather than opposition from unions is for enterprises to define their niche outside of union work and explicitly clarify roles with local unions to limit distrust. In other words, focus on bodies of work not historically provided by union members. An example

provided by Matt Nichols, the Policy Director for Infrastructure & Transportation for the City of Oakland, would be maintenance projects on medians and parklets across the city that don't require high-skilled work or heavy machinery often under the purview of unions.¹⁶³ Dig Cooperative also mentioned that it mostly sticks to the residential sector and some institutions, where unionized firms rarely look for work because of issues of scale.

“
Connecting with local social enterprises and worker cooperatives could provide unions access to new workers, especially residents of color.
”

Nontraditional businesses could also provide training capacity for local workers so they're poised to enter the union. Labor unions face a graying reality—the highest rate of unionization is among workers between the ages of 45 and 65, and construction trade unions traditionally serve white men.¹⁶⁴ In

some cases, union members can come to jobs from outside of communities when there isn't local capacity, which can undermine the goal of localizing investment, a community wealth building value. With an increasing number of contracts and PLAs incorporating local hire requirements, connecting with local social enterprises and worker cooperatives could provide unions access to new workers, especially residents of color.¹⁶⁵ For instance, Landforce has a vested interest in staying outside the wheelhouse of unionized jobs since it focuses on graduating workers from the program, in some



cases graduating them into union jobs in the long term. Nontraditional businesses could work with unions, acting as pre-apprenticeship stewards that help identify quality local candidates with background in the work, even stipulated in a PLA. By providing clear routes for new workers towards unionized jobs through graduation pathways, worker cooperatives or social enterprises can enter into mutually beneficial productive collaborations with unions in the green infrastructure sector.

Alternatively, to expand social enterprise or worker cooperatives out of a maintenance niche and into large-scale government or commercial work, they could themselves unionize. As workplaces with unionized workers, the organizations would then become eligible for larger-scale jobs under PLAs, and potentially help projects achieve their local worker quotas, since nontraditional workplaces are more likely to be rooted in a locality in comparison with large corporations. Cooperative Home Care Associates (CHCA) in the healthcare sector is a key example of the union-cooperative model in the United States. CHCA is the largest worker-owned cooperative in the nation and a unionized shop that trains 400 low-income, majority Latinx or African-American women per year, with 2,000 staff at present.¹⁶⁶ Similar to what happens with large construction or landscape jobs, “if we were not unionized,” the founder Rick Surpin notes, “we would not get contracts that other companies which are unionized get.”¹⁶⁷

Not only could unionization provide access to new contracting, it can help manage conflict between managers and rank-and-file workers, provide access to skills training, and give workers access to greater political power.¹⁶⁸ In managing conflict, a union can protect individual workers and provide formal procedures to keep management accountable, for both non-management owners and probationary non-owners.¹⁶⁹ When it comes to skills training, unions may have access to certifications that would otherwise be harder to access.



In the wake of Hurricane Sandy in 2012, the United Steelworkers secured OSHA training slots for members of Make the Road New York.¹⁷⁰ Political power, worker cooperative and union advocates came together in Madison, Wisconsin to advance worker cooperative development in the city as an anti-poverty strategy, which led to the city-funded Madison Cooperative Development Council (MCDC).¹⁷¹ Without the political dexterity of the union working in Madison, the worker cooperative advocates would not have had the same sway in local politics.¹⁷² Creating solidarity across the worker movement, nontraditional businesses and unions can coalesce for political power to gain policy ground.

However, reconciling the relationship between worker cooperatives, in particular, and unions is not one without difficulties. Unions often have an adversarial relationship with an organization's management in order to get their members the best deal. In contrast, successful cooperatives generally base decisions on collaboration. CHCA admits that this perceived dichotomy created strains at the beginning because the union representatives were used to operating in an adversarial relationship.¹⁷³ Identifying ways to navigate the historically-adversarial role of unions towards management and collective decision-making of worker cooperatives will be key to achieving the potential benefits of the union-cooperative model.

Workforce development

Green infrastructure jobs have a unique capacity to provide onramps to employment because much of the work can be learned on the job and hurdles like criminal records can be better accommodated than in other jobs, like nursing.¹⁷⁴ However, working with members of underserved communities consistently written off by general society, such as those with high levels of poverty, incarceration, and/or incomplete schooling, means that workers will have additional needs beyond learning technical capacities—they need and deserve dedication and mentorship. Many of the organizations profiled



in this report recognize the need to provide “soft skills,” such as communications or career development, to their workers as well as to support them in overcoming mitigating circumstances that may make them late for work or even fail to show up, such as the expense of child support or suspended licenses. As Brian from Green City Works, another green infrastructure social enterprise based in the Philadelphia, says, “You have to recognize your employees’ value, and not see them as a cost.”¹⁷⁵

The Washington Interfaith Network (WIN) in Washington, D.C. and the local union—Laborers International Union of North America (LIUNA)—championed a campaign to leverage the consent decree requiring the District to make \$2.6 billion in stormwater infrastructure investments to create good jobs for the city’s underserved residents.¹⁷⁶ The coalition pushed the city to revise the consent decree to integrate more green infrastructure and a Community Workforce Agreement (CWA) to set quotas for a local workforce, providing a broader opportunity for local employment than the big-pipe project that the city had planned.¹⁷⁷ In 2015, the city revised the consent decree and DC Water, the municipal water utility, initiated a groundbreaking project with the University of the District of Columbia (UDC) that helps to develop new job opportunities around stormwater management, specifically green infrastructure. “We wanted to be able to bring people up through the workforce, focusing on underemployed residents and disenfranchised folks,” says DC Water’s Bethany Bezak. Particularly unique to the program, DC Water has engineered the end of the training to align with DC Water contract requests. The new program helps to funnel graduates directly into long-term jobs with DC contractors, since DC Water requires that 51 percent of new hires be District residents and that at least 10 percent of the person hours be certified through the UDC project, ramping up to 50 percent over the

“
Workers will have additional needs beyond learning technical capacities—they need and deserve dedication and mentorship.
”



next five years.¹⁷⁸ DC Water only hired DC residents at a rate of 9 percent prior to the campaign, but the new program graduates help in achieving the local hire quotas.¹⁷⁹

Creating ecosystems and relationships between contractors or workforce development organizations (like the social enterprises or worker cooperatives), the local government, and local educational anchors could provide a wealth of capacity in training as well as robust pathways to long-term contracts. In the cases of Verde and Dig Cooperative, the workforce development projects were the first programmatic connections they had to the local government, which then opened additional doors to new contracts.

In developing a capable workforce, it is also important to recognize the differences in job types. While entry-level jobs have relatively low requirements, green infrastructure requires understanding natural water flows, plant types, and watershed dynamics, to name a few of the advanced skills that are eventually necessary. Access to additional career development beyond initial maintenance techniques can build know-how around green infrastructure and ensure longer-term employment with positive trajectories.

Key takeaways

Practitioners

Length of employment: Length of employment can be heavily dependent upon a variety of factors—everything from seasonality to working relationships with unions. Ultimately, practitioners should provide stability and opportunities for advancement in their organizations.

Union relationship: Practitioners should identify a strategy that either defines the organization's niche outside that of the traditional union work, particularly in municipalities with active project labor agreements; create a



relationship with unions by providing pre-apprenticeship programming; or embraces unionization of the enterprise itself.

Workforce development: While some preliminary jobs are relatively straightforward, pathways to more technically-involved green infrastructure work requires additional training. Furthermore, “soft skill” development serves as a necessary component to providing underserved communities job development. Depending on what is needed, practitioners should work with local anchors, governments, or even unions to facilitate training.

Anchors and governments

Unions: Governments and anchors working on large-scale, commercial projects should both provide work opportunities for social enterprises and worker cooperatives and clarify the role of the organizations on their projects in ways that do not jeopardize unions in areas with project labor agreements. This can be done by carving out specific space for nonunion contracts that do not use the heavy machinery or high-level skillsets of union workers.

Workforce development: Governments and anchors can help to build out skillsets through institutionalized programming in coordination with one another, and particularly in coordination with contractors like social enterprises or worker cooperatives.



A job guarantee: green infrastructure for shovel-ready jobs

In April 2018, US Senators Bernie Sanders of Vermont, Cory Booker of New Jersey, and Kirsten Gillibrand of New York all announced or supported plans for a federally funded job guarantee for any worker who “wants or needs one” in the United States. Under this plan every American would be entitled to a \$15-an-hour job with benefits. But what kind of socially necessary work can be connected to such a job guarantee?

One answer is that these workers could be integral to deploying green infrastructure projects. Because of the low threshold for entry, with a bulk of the work best taught through experiential learning, green infrastructure jobs could be a great fit for temporary job-seekers. Right now, cities could use a huge influx of short-term workers for a green infrastructure overhaul—planting native species on thousands of medians and setting up stormwater-sucking parklets. In the long term, green infrastructure needs consistent maintenance to sustain the infrastructure’s efficacy.

Local governments could either operate the jobs projects themselves or coordinate with local social enterprises, with special tasks assigned for building up professional development and the technical capacities of workers.



Tackling green infrastructure's displacement potential

A major grappling point in all of the case studies is the potential for green infrastructure projects to displace the communities they seek to serve. In some cases, green infrastructure projects have been isolated to wealthier communities that already have fewer problems with stormwater overflows in comparison to lower-income, higher-need neighborhoods. However, when green infrastructure is implemented in low- or moderate-income neighborhoods, it can also act as a catalyst for displacement. Its added co-benefits, such as better air quality and more green spaces, can increase home values and the “desirability” of the community in the eyes of speculators and higher-income families.¹⁸⁰

The High Line in New York City is a great example of such greening gentrification. The extended greenspace created an attraction that subsequently pushed out local residents and small businesses due to rising rents and higher cost of living.¹⁸¹ Similarly, Dig Cooperative found that, even while paying higher wages than average construction firms, their cooperative workers did not have sufficient income to live within Oakland, where they worked and historically had lived.

Integrating affordable housing projects with green infrastructure

Green infrastructure projects can be tethered to anti-displacement programs, such as affordable housing or community land ownership projects. Verde's Living Cully project provides a compelling example of integrating anti-displacement work with green infrastructure benefits. By working directly with a CDC focused on providing access to affordable housing, the green infrastructure social enterprise has been able to increase environmental wealth without displacement.



Verde is not the only organization working at this intersection. Aaron Bartley, co-founder of PUSH Buffalo—a community organization working on affordable housing with a green infrastructure social enterprise based in Buffalo, New York—describes its anti-displacement strategy as “creating long-term control through ownership or taking land off the market through land trusts. We have about 124 properties that are in the [Buffalo] land bank and we are working on a whole bunch of campaigns around community access to public land, inclusionary zoning, and stop subsidization of high-rent construction.”¹⁸²

“
Green infrastructure projects can be tethered to anti-displacement programs, such as affordable housing or community land ownership projects.
”

Community land trusts are nonprofit, community-based organizations that aim to guard against residential and commercial displacement that may stem from gentrification or community renewal through stewardship of land and housing that is permanently affordable.¹⁸³ Establishing a new, or supporting an existing, community land trust in a community where prospective green infrastructure projects may develop could help ensure that the negative outcomes of such projects, including displacement, aren’t realized.

Along these lines, Eastside Community Network acquired multiple vacant lots from the Detroit Land Bank that it has now turned into community-controlled productive plots of land that integrate green infrastructure and other sustaining services, such as urban gardens.¹⁸⁴ The land also now operates as the start-up space for The Green Team as it works on limiting stormwater overflows, ensuring community access to land, and increasing job access.

Another community land ownership form is what is known as a resident-owned community (ROC). In *Community Control of Land and Housing*, Jarrid Green and Thomas Hanna briefly detail the experience of Pasadena



Trails, one such ROC near Houston, Texas, which used community ownership to collectively borrow capital to invest in a chronic problem in the neighborhood—stormwater overflows.¹⁸⁵ When Hurricane Harvey struck in 2017, the resident-owned community was better able to weather the storm because their ownership of the land had given them the agency to invest in collective needs.

By integrating community land acquisition with long-term green infrastructure upkeep, like that of Eastside Community Network, PUSH Buffalo, Verde, and even Pasadena Trails, projects can stem the pressure of displacement while still ensuring access to environmental wealth.

Local workforces

As previously stated, employing local workforces—particularly those that have barriers to employment—can increase economic resiliency for community members. Doing so can also help to ensure that community members are able to continue living in their neighborhoods. Furthermore, employing local workers can provide important local insight to ensure that the project provides the services that best fit the neighborhood, allows more voice for community members, and facilitates community pride and ownership over the project.

Key takeaways

Practitioners

Hire Local: Practitioners should prioritize hiring community members within the neighborhoods in need of green infrastructure to enable local engagement and ownership over the new infrastructure, create local pride over projects, intentionally design green infrastructure for that community, and increase the economic resilience of residents through job opportunities.



Connect with community partners: Community partners can prove vital to structuring neighborhood-wide anti-displacement plans that bring local land into community control as well as help ensure that the projects best serve the community's needs. Practitioners should connect with community partners to align and collaborate on projects.

Anchors

Investing in affordable housing and community control: Working with local communities, anchors should leverage their dollars to invest in strategies for community ownership of land that mitigates displacement, like community land trusts (CLTs) or resident-owned communities (ROCs). They can use their training, convening, and other technical expertise to help residents develop the skills needed to start and run such organizations. The anchors can also provide business incubation services that could support hiring for the care of the spaces, giving jobs to the community members for whom they seek to provide housing.

Government

Generate equitable access to green infrastructure development: Governments have the power to clearly define who receives what benefits in both planning and operating stormwater infrastructure projects. They should take steps to identify gaps in accessibility and implement strategies that will rectify the imbalance.

Integrate affordable housing investment: Local governments can address imbalance in green infrastructure deployment by integrating projects into new affordable housing projects as well as retrofitting old housing units with more stormwater mitigation and greenspace.

“
Employing local workforces—particularly those that have barriers to employment—can increase economic resiliency for community members.
”



Leverage the power of land banks: In places like Detroit, vacant land acts as an opportunity for green infrastructure in communities. Local governments should set up programs that prioritize community ownership *and* stewardship, by for instance incentivizing land-plot purchases by community groups committed to affordable housing and stormwater abatement.

After the storm: equitable recovery and local jobs

There has to be clear pathways towards equitable recovery in areas affected by extreme weather, such as Houston, North Carolina, Florida, or Puerto Rico. Weather-related disasters are not merely natural, particularly in the age of anthropogenic climate change, but operate within the context of already-imposed social, political, and economic divisions. A vicious feedback loop of inequity and disaster hits low-income, often people-of-color neighborhoods the worst and further marginalizes their residents. As the NAACP's report, *In the Eye of the Storm*, records, middle-income white people are more likely to get assistance after disasters because they have the resources to navigate a complicated relief system. When low-income and people of color can access the system, they're "treated with suspicion." Some opt out of help altogether because their immigration status leaves them vulnerable to deportation if they speak out.¹⁸⁶

Once it is time to rebuild, "disaster capitalists" can swoop in, taking advantage of affected areas to redevelop them for profit, and politicians can use the emergency as a pretense to force through unfavorable programs, from eliminating environmental regulations to weakening labor rights.¹⁸⁷ In Robert Bullard and Beverly Wright's crucial book, *Race, Place, and Environmental Justice After Hurricane Katrina*, they recount that black-owned firms were "frozen out of the clean-up and rebuilding of the Gulf Coast [...] only 1.5 percent of the



\$1.6 billion awarded by FEMA went to minority businesses, less than a third of the 5 percent normally required by law.”¹⁸⁸

Instead of letting disaster capitalism set in, communities can build towards long term equitable recovery by rebuilding neighborhoods with and for the people. For instance, those most affected by the weather events could be the ones to rebuild their neighborhoods to be more resilient in the future. Not only does this potentially provide them with agency in the process, it also could help rebuild economic resiliency. As Ben Hirsch of West Street Recovery says, “All this recovery money is coming in and community members are in desperate need of capital. It just makes sense for the government to hire locals, particularly people of color, for these jobs.”¹⁸⁹

In allocating relief money like Community Development Block Grants for Disaster Relief or Federal Emergency Management Agency dollars, local governments could work to contract with cooperatives and social enterprises that hire from those most-impacted neighborhoods. This would help in re-establishing these communities, repairing neighborhood infrastructure and livelihoods at the same time. In order for such an intervention to provide equity, programs and policies have to be put into practice with intention and clear accountability mechanisms.

Starting up

Anchors as a key to starting up

For the practitioners profiled in this report, an incubating organization with access to land ownership—often an anchor institution—was a common key to success. The incubating organization often had the ability to contribute



funds to capitalize the social enterprise, and also act as a first, sympathetic client through its own property assets. This allowed the social enterprise to innovate and troubleshoot on the ground.

For example, both Landforce and Verde relied on community development corporations (CDCs) as an incubating institution, which provided them access to land for initial projects, and in the case of Verde, access to constituencies they wished to employ. This was also true in the case of GreenCity Works, a social enterprise based in a neighborhood of Philadelphia with a confluence of university anchor institutions. Green City Works is housed within a larger nonprofit business improvement district (BID) with a workforce development program in the University City neighborhood. The standing relationship between anchors and the BID enabled the new social enterprise to grow because it was able to lock in anchor partners early, “Anchor institutions are the ones that gave us a shot,” Brian English says.¹⁹⁰ Similarly, Landforce’s philanthropic ties to the Heinz Endowments to support their “soft programming” for workers primed the Heinz Endowments to encourage Landforce to bid on the large-scale development project at Hazelwood Green, widening Landforce’s market substantially.

Supportive structures for burgeoning enterprise

Social enterprises also find that being housed in an already-operating institution provided ancillary services that could be onerous to a startup. This includes a physical building to house tools, access to printers, payroll services, and already-built relationships with the community and with funders. For example, Eastside Community Network, The Greening of Detroit (another social enterprise based in the Detroit area), and Verde all mention that having a well-established partner in the startup process is helpful in gaining a business reputation and defraying costs.



Financial ecosystem

Enabling additional opportunities for accessible financing, particularly for worker-owned cooperatives, can better ensure that these groups get off the ground. As nontraditional businesses, both worker cooperatives and social enterprises lack the same funding options of other startups (such as traditional loans or investors). For worker cooperatives, financial institutions often don't know how to provide loans when there is not a single owner or small group of owners. Social enterprises' multifaceted missions mean that they do not always operate under the traditional model of the supremacy of profits and the bottom line.

For instance, Dig Cooperative relied more heavily on a bootstrapping business model, without external help with starting capital. This was in part because, as a worker cooperative, obtaining loans at the time in California was difficult to impossible due to the collective ownership structure. While Dig Cooperative proved to be successful, it took serious legwork on the part of the founding workers to find new contracts, sometimes outside of their focus area, and necessitated living project-to-project at the beginning.

Scaling these alternative enterprises will require innovative financing strategies that cater to their nontraditional structures. As mission-aligned organizations with higher capital and technical capacity, anchor institutions are a clear potential partner in providing patient capital or grants. Anchors gave many of the organizations profiled in this report their start. In addition to financing, anchors could provide additional support in areas that pose as limiting factors for startup organizations, such as technical training or physical space. Anchor institutions can also create coalitions to collectivize their financial capacity to get cooperatives or social enterprises started at scale. For instance, a multi-stakeholder coalition of local anchors called the Greater University Circle in Cleveland pools and deploys its resources to improve the quality of life in the areas surrounding their institutions—specifically by



funding the startup of the Evergreen Cooperatives, including upfront capital and shifting procurement to the cooperatives in a top-down funding and programmatic strategy to build the cooperative's capacity and provide positive jobs in the area.¹⁹¹ Green City Works' in Philadelphia has a similar startup story, where the University City District—filled with anchor institutions—started and incubated the social enterprise.

“
Anchor institutions
can also create
coalitions to
collectivize their
financial capacity to
get cooperatives or
social enterprises
started at scale.
”

City governments could also provide an avenue for initial project funding as well as help with technical assistance or capacity-building. Although not specific to green infrastructure or resiliency jobs, the Madison, Wisconsin example bears weight here. The city committed to invest \$1 million a year from 2016 to 2020 on worker-owned business development as a bottom-up (rather than trickle-down) economic development tool to target neighborhoods with high poverty rates.¹⁹² The Madison Cooperative Development Coalition (MCDC), a city-funded initiative, provides access to mini-grants for co-op development, capacity building, and community organizing help to identify new co-ops or convert existing businesses.¹⁹³

Key takeaways

Practitioners

Supportive structures of an existing nonprofit: In starting a social enterprise, practitioners should consider building within a previously-formed nonprofit or proven program in order to defray important startup costs through shared services and tap into an important, already-built local network. Doing so can also help fund on the longer term more soft-skill trainings, such as English as a Second Language (ESL).



Anchors

Starting capacity: As both holders of substantial land and capital, anchors can act as key partners for start-up success, providing support in the forms of a capitalization partner, an incubating space for a nontraditional business to prove its design, and technical skill-sharing can act as a key to success.

Collectivizing action: To help worker cooperative and social enterprises get off the ground, anchors should work in coalition and give support both through initial funding and through their own shifted procurement.

Government

Programming and regulation for startup success: Governments should set up programming and regulatory processes that enable access to capital, particularly for worker-owned firms that have historically lacked opportunities for such tools as lines of credit. They can also provide technical capacity that can help catalyze a larger subset of nontraditional businesses to enter the green infrastructure space.



Expanding practitioners' reach: contracting

Types of projects

The project pipeline: Where to focus? There are three major phases of green infrastructure construction: design of the project, installation, and follow-up maintenance. Overall, multiple practitioners and experts interviewed for this report identified that the scope of work for niche, growing businesses like social enterprises and worker cooperatives is most successful when it includes a combination of installation and maintenance projects at varying scales. While some organizations have project design capabilities, many large-scale design jobs, such as municipal-wide planning or large creek daylighting, take significant engineering expertise and therefore generally are less of a focus for these organizations. Depending on the contract, sometimes the design process is disaggregated from the implementation, making the second stage of installation accessible to the organizations described here.¹⁹⁴

Installation projects, such as executing a series of median rain gardens or parklets in a region, can, in turn, lead to larger contracts with opportunities to build additional skillsets and expertise for workers. However, they can also act as one-off, or time-delineated contracts. Depending on type, installation projects may also require that the organization gain additional permits or even employ people with specific expertise, like an engineer or architect. For instance, Dig Cooperatives does not enter into many government or large-scale commercial projects because of its licensing status. Green City Works also has an architect on staff who works consistently with the social enterprise on their projects.

All stormwater infrastructure requires maintenance. However, green infrastructure can differ from traditional gray infrastructure in how that



maintenance needs to occur—it is often more labor-intensive and requires different knowledge bases from gray maintenance, for instance more knowledge of local and invasive species.¹⁹⁵ While implementing the green infrastructure projects is important, maintenance is essential to maximizing the benefits of installed green infrastructure for the long haul.¹⁹⁶ Maintenance allows for consistent work over an extended period of time, since it is less project-specific. The work can also allow for scale, both in terms of employment and clients. For employment, projects like weeding and mowing are labor intensive, but also do not take significant formal education or training. This makes maintenance an optimal entry-point to employment. For clients, the practice is also not limited to natural assets categorized as green infrastructure but can also include general maintenance (that can also have beneficial effects to stormwater management). Maintenance contracts also come in many sizes, allowing for projects to fill gaps between larger installation projects.

However, maintenance can be the first thing to go when budgets get tight. Even though green infrastructure installation is often much cheaper than gray infrastructure projects, municipalities often have a hard time appropriating funds for longer-term maintenance costs.¹⁹⁷ Similarly, private customers like property managers will often eliminate maintenance services or look for the cheapest rates, as a relatively saturated market, when tight times come around.¹⁹⁸

As Alvaro Sanchez from the Greenlining Institute says, “All infrastructure projects must fully consider long-term maintenance implications. Green infrastructure investments must look at the entire life cycle of community improvement, from jobs, to outreach, to contracting, to engagement, to maintenance, and to the next infrastructure project and so on. Scaling green infrastructure means thinking through all aspects that touch a community, not simply installation.”¹⁹⁹ Integrating the two capacities can help the organizations reach larger scale while also honing a market niche, ladders to new



skillsets for workers, consistency in generated work, and sustainability for the organization over the long haul.

Dealing with seasonality. One of the major problems affecting the organizations' ability to provide consistent employment is the seasonality of green infrastructure and landscaping work. This stood out particularly in the climates of such cities as Detroit or Pittsburgh, where the ground is covered in snow for whole months of the year, resulting in periods of low demand for services. As a relatively new social enterprise, Eastside Community Network's Green Team has grappled with how to fill lows in demand; in some cases, short-term employment with graduation programs to larger-scale firms may make more sense in colder climates—similar to the model of Landforce.

Alternatively, organizations can continue to employ workers throughout the year by identifying additional tasks, such as snow removal, or even broadening their scope to construction activities, such as energy-efficiency or weatherization projects. In fact, two green infrastructure social enterprises have done just that. PUSH Buffalo and Verde both got their fee-for-service start in green infrastructure projects and now have expanded out to become general contractors working on weatherization.²⁰⁰ Dig Cooperative also conducts alternative sustainability projects beyond graywater installations in order to keep up the consistent flow of jobs. While this may take additional licenses and capacity building, it can open the door to a holistic approach to building climate-resilient communities—a boon both in limiting carbon emissions *as well as* creating safer living environments for community members.

“
One of the major problems in providing consistent employment is the seasonality of green infrastructure and landscaping work.
”



Practitioners

Mix of GI work: Practitioners should consider a combination of expertise in both installation and maintenance in order to deal with fluctuations in both project forms.

Dealing with seasonality: In areas of the country where seasonality poses a significant barrier to consistent work and employment, practitioners should deal with it by either tailoring employment practices to match the climate or the organization can go beyond green infrastructure practices to take on additional community wealth and climate resiliency-building programming—such as home weatherization or snow removal.

Anchors or government

Don't stop investing: Anchors and governments should implement long-term, particularly financial, plans to invest in green infrastructure beyond implementation—not only does this ensure that communities continue to feel the co-benefits, but it also provides opportunities for enduring employment.

Contracting with whom?

The majority of the case studies in this report focus on large institutions and the municipal or local government contract market as clients because this provides the most consistency compared to the smaller residential market. Dig Cooperatives stood out as the only organization that focused on the residential market, although it also had institutional and government clients.

Government contracts. Government contracts offer a clear market in this sector. With specific regulatory requirements, oversight over whole watersheds, and major portfolios of land and buildings, local governments are a key force in green infrastructure implementation. All of the organizations



profiled in this report had some type of job or relationship with their local government. The types of government contracts varied from Dig’s young adult workforce development grant to Verde’s multiyear bioswale implementation and maintenance contract. However, as Melissa Hoover from Democracy at Work Institute says, “generally, [government contract] markets are locked down, have lots of barriers, and preexisting groups grab the contracts.”²⁰¹

Before outlining strategies to gain government contracts, it’s important to stress that if the government has existing internal capacity, it should avoid outsourcing to protect public-sector jobs that are often well-paid and provide good benefits.²⁰² Even in this context, there may be a role for nontraditional businesses, like social enterprises or worker cooperatives, as advisors or a funnel for new apprentices (much as Dig provides workforce development training). In the event that the government agency or utility does not have existing capacity or does not plan to move in that direction, contracting out makes sense.

Smaller operations like social enterprises or worker cooperatives often find that, when it comes to government contracts, their organizations do not operate at the scale necessary to be a prime contractor. Instead, the contracts often go to the large firms that have the additional institutional capacity to gather all the essential paperwork and certifications, write comprehensive proposals, and weather the (sometimes long) gap between the request for proposals and project implementation.²⁰³ They often find that they are affected by their limited staffing and capital capacity to endure the lag time between projects, and even their regulatory status as a nontraditional business is sometimes an impediment. In New York City, the contract vetting process took a median time of 188 days, which, Oscar Perry Abello writes in *Next City*, “can be especially hard on minority/women-owned business enterprises (MWBES), which, because of historic racial wealth gaps, typically don’t have the cash cushions of wealthier, mostly larger



and mostly white-owned firms that have historically dominated during city contracting.”²⁰⁴

Shifting to best value. Local governments have made some strides to shift their contracting practices so that instead of focusing on the “lowest cost” they focus on the “best value.” In other words, they implement proposal evaluations based on different indicators beyond cost, such as labor practices, community outcomes, and quality of work. Philadelphia shifted its contracting structures to “best value” in 2017 and now prioritizes proposals that deliver on local hiring, particularly for low-income workers; support for small or MWBE’s; and provide additional social, environmental, and economic benefits.²⁰⁵ Social enterprises and worker cooperatives often have these values embedded within their business model, making them more competitive in the bidding process. While a step in the right direction by helping to shift the government’s evaluator process, this does not fully address other structural barriers to entry. Below are a few ways to take on some of those barriers.

Protected spaces

Creating a protected space for small MWBEs, cooperatives, and social enterprises to apply for contracts could help these businesses overcome the arduous process of applying and vetting. In 2017 the government of New York City passed a law that allowed for certified MWBE’s to receive contracts of less than \$150,000 without going through the competitive process.²⁰⁶ Relatively decentralized in format, green infrastructure projects could be distributed to allow for a series of smaller businesses to gain access to the installation and maintenance contracts. The local government could act as an aggregator of the projects, enabling high-level design decisions that ensures comprehensive stormwater efficiency at the watershed level while also monitoring the progress of the projects.



Ensuring that nontraditional businesses gain access to these certifications is key to enabling worker-owned firms/cooperatives and social enterprises access to these protected spaces. For instance, in Verde’s state of Oregon and Landforce’s Pennsylvania, the social enterprise does not qualify as a MWBE because it is a nonprofit—although operated by and for the benefit of low-income minority residents.

Community-based public-private partnerships

Community-based public-private partnerships (CBP3s) have recently taken hold in different regions, including Prince George’s County in Maryland.²⁰⁷ This new type of public-private partnership could alleviate the onus on the social enterprise or worker cooperative of having to secure the prime contract while still having the potential to employ multiple small, local enterprises. Similar to the protected space described above, a private company would work as the aggregator in concert with the local government to design, install, and maintain stormwater infrastructure. The partnership requires the corporation with the higher capacity to take on administrative tasks and operate the high-level programming while employing local organizations in a subcontracting role.

In 2015, Prince George’s County became the first-ever jurisdiction in the United States to successfully implement and complete a CBP3 model for stormwater management at a large scale for the health of the local watersheds and Chesapeake Bay. This partnership, called the Clean Water Partnership, is implemented by Corvias, a company with the overhead capacity to deal with the large project oversight and a history of working with government contracts.

The goal of the first phase of the CWP was to use an aggregated approach with long-term operations and maintenance to turn a stormwater mandate into a program that was capable of creating local workforce and economic development while improving Prince George’s County’s environmental



challenges with stormwater runoff. The Partnership has awarded over \$3.1 million in construction contracts to local and minority-owned businesses, representing over 80 percent of the program's work and 51 percent of all work hours performed by Prince George's County residents. The first phase of the program delivered over 90 green infrastructure certified projects, retrofitting 2,000 acres and treating over four billion gallons of water per year. The program was able to reduce costs by 30 percent, as well as aid in creating local workforce that didn't exist before.²⁰⁸

In the early days of the CBP3, Prince George's County worked with a collection of nonprofits in attempt to incubate a worker cooperative as one of the subcontractors under the CBP3.²⁰⁹ However, the cooperative failed to launch, in part because relying on a single government contract at the outset, even if not as a prime contractor, stretched a young, under-capitalized organization given the wait time between vetting and implementation.²¹⁰ The Clean Water Partnership now has a Protégée Partnership, in which a cohort of businesses, with a focus on small, local, and disadvantaged businesses, are mentored to expand their capacities in a new and growing market of green infrastructure. In the first phase of the project, 17 companies participated in the program. Understanding the restraints of new businesses, those accepted into the program must have a background experience in a complementary type of work, like landscape or demolition, and have a baseline annual revenue of \$250,000.²¹¹

This example shows that while government contracts, even in the form of CBP3's, may provide long-term, stable work, new organizations have less ability to act as a strong incubation space. To deal with the delay, patient capital from funders in coordination with smaller, more easily attainable contracts could smooth the transition from startup to government contractor. For instance, Landforce, Green City Works, and Verde all had institutional support and contracts from anchors such as universities or community development corporations, prior to obtaining government contracts. CBP3s



show promise, particularly if there are specific carve-outs for value-based subcontractors, but they may require more mature organizations with proven records, diverse portfolios, and overhead to sustain them beyond the subcontract.

Project labor and community workforce agreements (PLAs and CWAs)
Many municipalities or states enter into project labor agreements (PLAs) with local trade unions for large-scale public works projects. These agree-

ments ensure that there are wage and working-condition standards for workers in the form of a collective bargaining agreement from the start, and they often help define which organizations can go after contracts (depending on such factors as unionized workforces).²¹²

“
A combination of quotas and supported institutions provided opportunities to employ community members.
”

Taking PLAs a step further, cities have started to implement Community Workforce Agreements (CWAs) that further build community wealth (often as part of a larger PLA).²¹³ Not only do these agreements set baseline working conditions and wages, they also can enable multiplier effects by increasing the number of jobs held by local residents or people of color as well as the level of local spending and tax collection. They also have the potential to help integrate more workers of color into traditionally white-dominated unionized construction and landscape jobs.²¹⁴

For instance, in New York City, unionized construction jobs held by black workers have increased substantially with the onset of apprenticeship programs between 1995 and 2015, and black union workers made 26 percent more than nonunion construction workers.²¹⁵ The San Francisco Public Utilities Commission implemented a CWA for its water improvement plan similar to DC Water’s program, including requirements for 50 percent of hours to be filled by local, particularly disadvantaged, workers. To do so, it worked



with CityBuild, a San Francisco-run pre-apprenticeship program, that helps underemployed workers enter the construction trade.²¹⁶ The agreements in both San Francisco and Washington show that a combination of quotas and supported institutions provided opportunities to employ community members.

There are two ways in which alternative business structures can operate within either a PLA or CWA. First, social enterprises or worker cooperatives could act as a pipeline or workforce intermediary to unionized jobs, institutionalizing the role that organizations like Landforce have created ad-hoc through pre-apprenticeship programs. This allows workers entering into the green infrastructure space to be trained and supported, as well as set up for long-term job opportunities within the union.²¹⁷ Second, by unionizing their own workforces, social enterprises or worker cooperatives can gain access to those contracts that operate under PLA or CWAs as subcontractors. Unionizing may allow the nontraditional businesses to expand and capture bigger contracts, but it also requires the worker cooperative or social enterprise to have grown to a capacity to take on work under a PLA or CWA.

Property managers and large institutional grounds

Many of the practitioners from the case studies in this report had contracts with managers of large institutional properties.²¹⁸ The organizations found these contracts desirable because the contracting process was often less arduous than with government contracts but still offered mid- to large-sized projects. Depending on the location, a large institution may have additional incentives in the form of stormwater fees or rebates that make green infrastructure work appealing.

Generally speaking, however, the average property manager did feel the “will of the market” as the major force for deciding contracts. In other words, when cash flow is constricted, property managers are more likely to find the least-cost option.²¹⁹ This is where large, mission-aligned



organizations like anchors can be important. In many circumstances, anchors like universities, hospitals, or even mission-oriented local development projects have property managers that operate the grounds for them. When there is downward pressure from the anchor, property managers are often more likely to choose organizations that fit with the values of the landowner—essentially moving from a least-cost to best-value contracting model. The example of Landforce stands out here: The organization’s relationship with the Heinz Endowments was key to both providing important kickstart funding, but important also in enabling the opportunity to apply for and win a contract for a large-scale green infrastructure project at Hazelwood Green.

In some cases, like that of Verde, working in collaboration with other like-minded organizations on community development projects also allows the organization to identify funds collectively, implement projects, and continue maintenance over time. The Living Cully project is an example where a coalition of partners, including Hacienda CDC, Habitat for Humanity, and Verde banded together to provide environmental wealth for the community they serve and employ the people from that community in the process.²²⁰

Small institutional or residential

The residential market was largely not a focus for the practitioners explored in this report. Dig Cooperative stood out as the only organization that directly targeted the residential market. The residential market is generally less appealing to the organizations interviewed in this report because the plots of land were much smaller and therefore collecting enough small plots of land to stay financially afloat can be challenging.

Small commercial institutions, though, can prove to be a helpful portfolio component. Often, they are harder hit by such charges as stormwater runoff fees than larger commercial groups with more cash flow. ECN’s Green Team saw its immediate client base as local businesses affected by changes in stormwater fees.²²¹ These smaller projects, both for green infrastructure



installation but also importantly for general maintenance, can provide smaller projects to support the organizations between larger contracts and contribute to a diversified portfolio.

Creating local networks for collaboration

The Sustainable Business Network of Greater Philadelphia (SBN) says that, while the higher incentive of local hiring gave its small businesses better access, they found that the local government had a hard time recognizing who to solicit contracts from.²²² Therefore, SBN provides an effective network that allows local businesses to collectively coordinate and manage a comprehensive list of eligible organizations, and advocate in local and state governments for more comprehensive policies. The opportunity to organize a robust ecosystem of small MWBEs, worker-owned firms, and social enterprises could help shift contracting at multiple levels within the community.

	Government contracts	Large commercial or property managers	Small commercial or residential
Barriers	<p>Locked down by, and used to working with, large contractors</p> <p>Long timeframe between proposal and contract initiation</p> <p>Extensive and often inaccessible proposal processes</p>	<p>Often succumb to market pressures</p> <p>Mid-to-long timeframe for contracts</p>	<p>Small plots of land, often smaller projects</p> <p>Flexible market that respond to economic pressures</p>
Opportunities	<p>Large land holder</p> <p>Have specific regulatory requirements to fulfill</p> <p>Can have local quotas for local workers or businesses</p>	<p>Large land holder</p> <p>Less arduous application process</p> <p>Varying project sizes</p>	<p>Often no arduous application process</p>



Key takeaways

Practitioners

Diverse portfolio: Practitioners should cultivate a diverse portfolio that includes different partners of varying sizes, particularly when seeking government contracts, to protect from failure in the event of long wait periods between contracts.

Relationship with unions: When operating within a context of PLAs or CWAs, practitioners should either act as pipelines to longer-term union work or unionize themselves to expand.

Local networks: Practitioners can come together with other local, mission-aligned organizations to collectivize assets, similar to the work of SBN of Greater Philadelphia, or even to initiate projects together, like Verde in Living Cully.

Anchors

Incubation: As an organization with often more leniency than government agencies in the contracting process, anchors should again help in providing sheltered spaces, growing the alternative businesses' capacity so it can take on larger projects over time.

Property managers: Though property managers are likely to follow the imperatives of the market, anchors should influence the outcomes of contracting by putting pressure on their property managers (if applicable).

Government

Least cost to best value: Considering worker benefits and economic resiliency, governments should move away from a least-cost methodology for



identifying contractors. This can be an important step in expanding the opportunities for alternatives to the large contractors.

Implement institutions that eliminate structural barriers: Governments should take up the opportunities afforded by project labor or community workforce agreements, community-based public-private partnerships, and protected contracting spaces to address structural barriers to contracting for nontraditional businesses like social enterprises or worker cooperatives.

Integrate community wealth building enterprises into incentives and financial structures: Government should identify ways to allow social enterprises access to preferred procurement, similar to MWBEs, even as a nonprofit organization. Similarly, agencies should identify ways to limit the impediments for worker cooperatives to capitalize and gain access to licenses.



Conclusion

Climate change, hegemonic development and planning, structural racism, and economic disparity are systemic problems of our era, exacerbated and intrinsically related to one another. How we tackle them will either lead to short-lived fixes or enable real, long-term change. Climate resiliency is a key space where these systemic issues collide. By applying community wealth building principles in resiliency planning so that it centers place, democratization, valuing labor over capital, and collaboration, we can make a start at dismantling these systemic problems.

This report focuses on one such tactic to tackle climate resilience. By growing community wealth building enterprises in the green infrastructure sector, we argue that we can simultaneously increase the economic resiliency and equity of community members as well as build cities that embrace the multiplicative benefits of harnessing natural assets to manage stormwater. Social enterprises like Landforce and worker cooperatives like Dig Cooperatives, Inc. are clear models of nontraditional businesses—already on the ground taking action—rooted in building community wealth. They articulate the payoff—employing workers, often people of color, who otherwise are cut off from the job market—and the hurdles in their work—navigating inaccessible municipal contracting



or strategizing how to stem gentrification sparked by green infrastructure implementation.

The strategies we lay out are based on the experiences of practitioners and experts alike. They account for macrodynamics, including proposals for the intersection of green infrastructure jobs with a federally implemented job guarantee, the displacement potential of green infrastructure, equitable recovery strategies after disasters, and inventing employment models for economic resiliency. They also deal with the brass tacks of operating nontraditional business models in the current context, including ideas on capitalization and startup, the merits of or barriers to pursuing certain project types, and relationships to institutions already in place (such as labor unions).

Expanding nonextractive business models that build community wealth is a step towards a systemic approach to tackling climate resilience but far from the full response. Such businesses need to be a portion of a larger ecosystem of change that enables a new paradigm: a next system. This new paradigm has to rethink what economic development means for sustaining our society, eliminate discrimination in land and housing, set visions for just transitions towards renewable energy, and more. In this new paradigm, climate resiliency not only limits harm for vulnerable groups but starts to build vibrant communities that repair histories of marginalization and provide mutual aid in the face of climate change.



Notes

- 1 Matthew Cappucci, “Texas Flood Disaster: Harvey Has Unloaded 9 Trillion Gallons of Water,” *Washington Post*, 2017, <https://www.washingtonpost.com/news/capital-weather-gang/wp/2017/08/27/texas-flood-disaster-harvey-has-unloaded-9-trillion-tons-of-water/>; Amy Wang, “Harvey Turned Part of Interstate 10 into a Roaring River—with Actual Waves,” *Washington Post*, August 30, 2018, <https://www.washingtonpost.com/news/dr-gridlock/wp/2017/08/30/harvey-turned-part-of-interstate-10-into-a-roaring-river-with-actual-waves/>.
- 2 “2017 Wastewater Infrastructure Report Card,” ASCE Foundation, 2017, <https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Wastewater-Final.pdf>.
- 3 Emily Gordon et al., “Water Works: Rebuilding Infrastructure, Creating Jobs, Greening the Environment,” 2011, <http://pacinst.org/publication/upgrading-water-systems-can-reduce-pollution-and-put-1-9-million-people-to-work/>; “Report to Congress on the Impacts and Control of CSOs and SSOs - Executive Summary,” US Environmental Protection Agency, 2004, <https://doi.org/10.1227/01.NEU.0000028680.51299.00>.
- 4 Kathryn Lane et al., “Health effects of coastal storms and flooding in urban areas: A review and vulnerability assessment.” *Journal of Environmental and Public Health*, 2013, Article 913064, <http://dx.doi.org/10.1155/2013/913064>.
- 5 Ben Hirsch (West Street Recovery), interviewed by Johanna Bozuwa, March 30, 2018.
- 6 Robert Bullard and Beverly Wright, *The Wrong Complexion for Protection: How the Government Response to Disaster Endangers African American Communities* (New York: NYU Press, 2012).
- 7 “Analysis of Race/Ethnicity, Age, and CalEnviroScreen 3.0 Scores,” Office of Environmental Health Hazard Assessment California Environmental Protection Agency, June 2018, <https://oehha.ca.gov/media/downloads/calenviroscreen/document-calenviroscreen/raceageces3analysis.pdf>.
- 8 Jeremy Martinich, et al. “Risks of sea level rise to disadvantaged communities in the United States.” *Mitigation and Adaptation Strategies for Global Change* 18(2):169-185. doi:10.1007/s11027-011-9356-0; Bill M. Jessdale, Rachel Morello-Frosch, and Laura Cushing, “The Racial/Ethnic Distribution of Heat Risk-Related Land Cover in Relation to Residential Segregation,” *Environmental Health Perspectives*, (2013) doi.org/10.1298/ehp.1205919; Virginia Eubanks, “My Drowning City is a Harbinger of Climate Slums to Come,” *The Nation*, October 10, 2016, Jeremy Martinich, et al. “Risks of sea level rise to disadvantaged communities in the United States.” *Mitigation and Adaptation Strategies for Global Change* 18(2):169-185. doi:10.1007/s11027-011-9356-0.
- 9 Dedrick Asante-Muhammed, et al., “The Ever Growing Wealth Gap: Without Change, African-American and Latino Families won’t Match White Wealth for Centuries,” Institute for



- Policy Studies, August 2016, https://ips-dc.org/wp-content/uploads/2016/08/The-Ever-Growing-Gap-CFED_IPS-Final-2.pdf.
- 10 “Status of Civil Judicial Consent Decrees addressing Combined Sewer Systems,” US Environmental Protection Agency, accessed October 2, 2018, <https://www.epa.gov/enforcement/status-civil-judicial-consent-decrees-addressing-combined-sewer-systems-csos>.
 - 11 “Combined Sewer Overflows (CSOs),” US Environmental Protection Agency, accessed October 2, 2018, <https://www.epa.gov/npdes/combined-sewer-overflows-csos>.
 - 12 Robert Daguillard, “EPA Survey Shows \$ 271 Billion Needed for Nation’s Wastewater Infrastructure,” *US EPA*, January 13, 2016, <https://archive.epa.gov/epa/newsreleases/epa-survey-shows-271-billion-needed-nations-wastewater-infrastructure.html>.
 - 13 “NYSDEC & NYCDEP Announce Groundbreaking Agreement to Reduce Combined Sewer Overflows Using Green Infrastructure in New York City,” Department of Environmental Conservation, 2012, <http://www.dec.ny.gov/press/80919.html>.
 - 14 “Stormwater Trees,” US Environmental Protection Agency, 2016, https://www.epa.gov/sites/production/files/2016-11/documents/final_stormwater_trees_technical_memo_508.pdf.
 - 15 Viniece Jennings, Lincoln Larson, and Jessica Yun, “Advancing Sustainability through Urban Green Space: Cultural Ecosystem Services, Equity, and Social Determinants of Health,” *International Journal of Environmental Research and Public Health* 13, no. 2 (2016), <https://doi.org/10.3390/ijerph13020196>.
 - 16 Sarah Lamback, “Exploring the Green Infrastructure Workforce,” *Jobs for the Future*, March 27, 2017, <https://www.jff.org/resources/exploring-green-infrastructure-workforce/>.
 - 17 Kathryn J. Bowen and Yvonne Lynch, “The Public Health Benefits of Green Infrastructure: The Potential of Economic Framing for Enhanced Decision-Making,” *Current Opinion in Environmental Sustainability* 25, no. November 2016 (2017): 90-95, <https://doi.org/10.1016/j.cosust.2017.08.003>.
 - 18 Isabelle Anguelovski et al., “Equity Impacts of Urban Land Use Planning for Climate Adaptation: Critical Perspectives from the Global North and South,” *Journal of Planning Education and Research* 36, no. 3 (2016): 333-48, <https://doi.org/10.1177/0739456X16645166>.
 - 19 Ted Howard, “Community Wealth Building: Eight Basic Principles,” The Democracy Collaborative, 2018, accessed October 3, 2018, <https://democracycollaborative.org/content/community-wealth-building-eight-basic-principles>.
 - 20 Anchor institutions are nonprofit institutions that once established tend not to move location. Emerging trends related to globalization—such as the decline of manufacturing, the rise of the service sector, and a mounting government fiscal crisis—suggest the growing



importance of anchor institutions to local economies. For more information, see <https://community-wealth.org/strategies/panel/anchors/index.html>.

- 21 Joseph Kane and Adie Tomer, "Water Workforce: Improving Water Infrastructure and Creating a Pipeline to Opportunity," Metropolitan Policy Program at Brookings, June 2018, <https://www.brookings.edu/wp-content/uploads/2018/06/Brookings-Metro-Renewing-the-Water-Workforce-June-2018.pdf#page=20>.
- 22 Joseph Kane and Adie Tomer, "Water Workforce: Improving Water Infrastructure and Creating a Pipeline to Opportunity," Metropolitan Policy Program at Brookings, June 2018, <https://www.brookings.edu/wp-content/uploads/2018/06/Brookings-Metro-Renewing-the-Water-Workforce-June-2018.pdf#page=20>.
- 23 James Kenney, "As green infrastructure pioneers, Philadelphia is primed for workforce development," Brookings Institute, May 15, 2017, <https://www.brookings.edu/blog/the-avenue/2017/05/15/as-green-infrastructure-pioneers-philadelphia-is-primed-for-workforce-development/>.
- 24 For more information, see <https://community-wealth.org/strategies/panel/social/index.html>.
- 25 For more information, see <https://community-wealth.org/content/worker-cooperatives>.
- 26 "How Sewage Pollution ends up in Rivers," American Rivers, accessed October 2, 2018, <https://www.americanrivers.org/threats-solutions/clean-water/sewage-pollution/>.
- 27 Dana Beach, "Coastal Sprawl: The Effects of Urban Design on Aquatic Ecosystems in the United States." Pew Oceans Commission, 2002, http://www.pewtrusts.org/-/media/legacy/uploadedfiles/wwwpewtrustsorg/reports/protecting_ocean_life/envpewoceans-sprawl.pdf.pdf.
- 28 Stephen J. Gaffield et al., "Public Health Effects of Inadequately Managed Stormwater Runoff." *American Journal of Public Health*, 93.9 (2003): 1527-1533. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448005/>.
- 29 "Climate Adaptation and Stormwater Runoff," US Environmental Protection Agency, accessed November 8, 2017, <https://www.epa.gov/arc-x/climate-adaptation-and-stormwater-runoff>.
- 30 Peter Harnik and Abby Martin, "City Parks , Clean Water: Making great places using green infrastructure," The Trust for Public Land, 2016, https://www.tpl.org/sites/default/files/City%20Parks%20Clean%20Water%20report_0.pdf.
- 31 Courtney Kimmel et al., "Greening the Grey: An Institutional Analysis of Green Infrastructure for Sustainable Development in the US," Center for Leadership in Global Sustainability, Virginia Tech, 2013, http://narc.org/wp-content/uploads/CLiGS-NARC_GI2013_final.pdf.



- 32 Jessie Martin, et al., *From Projects to Portfolios: Mainstreaming Large-Scale Investment in Integrated Infrastructure*,” Earth Economics, 2018.
- 33 Mark Clark and Glenn Acomb, “Bioswales/ Vegetated Swales,” University of Florida IFAS Extension, 2008, <http://www.davey.com/hoa/elements/pdf/5-4%20bioswale%20fact%20sheet.pdf>.
- 34 Albert Jarrett and Robert Berghage, “Green Roofs for Stormwater,” 2016, <https://extension.psu.edu/green-roofs-for-stormwater>.
- 35 Jarrett and Berghage.
- 36 “The Origins of the EPA,” US Environmental Protection Agency, accessed April 25, 2018, <https://www.epa.gov/history/origins-epa>.
- 37 “National Enforcement Initiative: Keeping Raw Sewage and Contaminated Stormwater Out of Our Nation’s Waters,” US Environmental Protection Agency, 2017, <http://www2.epa.gov/enforcement/national-enforcement-initiative-keeping-raw-sewage-and-contaminated-stormwater-out-our>.
- 38 “Combined Sewer Overflows,” US Environmental Protection Agency, 2017, <https://www.epa.gov/npdes/combined-sewer-overflows-csos>.
- 39 “Report to Congress on the Impacts and Control of CSOs and SSOs - Executive Summary,” US Environmental Protection Agency, 2004, <https://doi.org/10.1227/01.NEU.0000028680.51299.00>.
- 40 Nancy Stoner and Cynthia Giles, “Achieving Water Quality Through Integrated Municipal Stormwater and Wastewater Plans,” 2011, https://www.epa.gov/sites/production/files/2015-10/documents/memointegratedmunicipalplans_0.pdf.
- 41 Mike Shapiro, “Utilizing SRF Funding for Green Infrastructure Projects,” 2014, https://www.epa.gov/sites/production/files/2014-04/documents/efab_report_srf_funding_for_green-infra_projects.pdf.
- 42 “Enforcement Examples of Settled Clean Water Act Enforcement Cases That Include Green Infrastructure,” US Environmental Protection Agency, 2017, <https://www.epa.gov/green-infrastructure/enforcement>.
- 43 “2017 Wastewater Infrastructure Report Card,” ASCE, 2017, accessed October 2, 2018 <https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Wastewater-Final.pdf>.
- 44 “Expanding Green Infrastructure Financing,” National Resource Defense Council, accessed October 2, 2018, <https://www.nrdc.org/issues/expand-green-infrastructure-financing>.
- 45 Jennifer Cotting, Deron Muehring, and Lori Beary, “Innovative Financing for Green Infrastructure,” 2014 Green Infrastructure Webinar Series US Environmental Protection Agency, November 4, 2018, https://www.epa.gov/sites/production/files/2015-12/documents/gi_financing_webinar_slides_11-4-14_0.pdf.



- 46 Jessie Martin, et al., *From Projects to Portfolios: Mainstreaming Large-Scale Investment in Integrated Infrastructure*, Earth Economics, 2018.
- 47 Since 2016, Devashree Saha, “Green Bonds Take Root in the US Municipal Bond Market,” Brookings Institute, October 25, 2016, <https://www.brookings.edu/blog/the-avenue/2016/10/25/green-bonds-take-root-in-the-u-s-municipal-bond-market/>.
- 48 Johanna Bozuwa, “Green Bank,” The Next System Project, 2018, Retrieved November 19, 2018, <https://thenextsystem.org/learn/stories/green-bank>.
- 49 Sarah Dougherty, “Hot in DC: Green Bank Edition,” National Resources Defense Council, July 11, 2018, <https://www.nrdc.org/experts/sarah-dougherty/hot-dc-green-bank-edition>.
- 50 Chris Mills Rodrigo, “DC Lawmakers Vote for 100 Percent Clean Power by 2032,” *The Hill*, November 27, 2018.
- 51 “Encouraging Efficient Green Infrastructure Investment 2013,” Environmental Finance Center, 2013, https://efc.umd.edu/assets/encouraging_efficient_green_infrastructure_investment_1-23-13.pdf.
- 52 Andrew Sawyers, “Green Infrastructure Policy for the Clean Water State Revolving Fund Program,” US Environmental Protection Agency, January 6, 2018, https://www.epa.gov/sites/production/files/2016-01/documents/cwsrf_green_infrastructure_policy_final.pdf.
- 53 Timothy Cama, “Senate Panel Rejects Trump’s Proposed Interior, EPA Cuts” *The Hill*, June 12, 2018, <http://thehill.com/policy/energy-environment/391805-senate-panel-rejects-trumps-proposed-interior-epa-cuts>, John Flesher, “Spending bill rejects Trump effort to gut cleanup of Great Lakes, other waterways,” *Chicago Tribune*, March 23, 2018, <http://www.chicagotribune.com/news/nationworld/midwest/ct-spending-bill-great-lakes-clean-up-20180322-story.html>.
- 54 Interview, US Environmental Protection Agency representative, interviewed by Johanna Bozuwa, March 23, 2018.
- 55 Tom DiChristopher, “Trump administration to replace Obama’s Clean Power Plan with weaker greenhouse gas rules for power plants,” CNBC, August 21, 2018, <https://www.cnbc.com/2018/08/21/trump-administration-to-replace-obamas-clean-power-plan.html>.
- 56 “Federal Funding,” Georgetown Climate Center, accessed October 3, 2018, <http://www.georgetownclimate.org/adaptation/toolkits/green-infrastructure-toolkit/federal-funding.html>.
- 57 “Federal and State Funding Programs – Stormwater & Green Infrastructure Projects,” US EPA Water Infrastructure and Resiliency Finance Center, April 2017, <https://www.epa.gov/sites/production/files/2017-05/documents/federal-and-california-sw-funding-programs.pdf>.
- 58 Jennifer Cotting, Deron Muehring, and Lori Beary, “Innovative Financing for Green Infrastructure,” 2014 Green Infrastructure Webinar Series, US Environmental Protection



- Agency, November 4, 2018, https://www.epa.gov/sites/production/files/2015-12/documents/gi_financing_webinar_slides_11-4-14_0.pdf.
- 59 “The Portland Clean Energy Initiative Means Clean Energy and Green Jobs in Portland,” Portland Clean Energy Initiative, accessed November 28, 2018, <https://www.portland-cleanenergyinitiative.com/about/> .
- 60 “Funding Stormwater Programs,” US Environmental Protection Agency New England, April 2009, <https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/FundingStormwater.pdf>.
- 61 Alison Knezevich, “Congregations, nonprofits work to address stormwater pollution,” *The Baltimore Sun*, February 17, 2014, <http://www.baltimoresun.com/news/maryland/baltimore-county/towson/bs-md-stormwater-nonprofits-20140217-story.html>.
- 62 Knezevich, “Congregations, nonprofits work to address stormwater pollution.”
- 63 Jordan Rappaport, “US Urban Decline and Growth, 1950 to 2000,” *Federal Reserve Bank of Kansas City, Economic Review* 2013(3), <https://www.kansascityfed.org/publicat/econrev/PDF/3q03rapp.pdf> , Paul Harris, “How Detroit, the Motor City, turned into a ghost town,” *The Guardian*, October 31, 2009, <https://www.theguardian.com/world/2009/nov/01/detroit-michigan-economy-recession-unemployment>.
- 64 “Mapping the Water Crisis: The Dismantling of African-American Neighborhoods in Detroit,” We The People of Detroit Community Research Collective, accessed October 3, 2018, <http://wethepeopleofdetroit.com/communityresearch/water/>.
- 65 Kristi Tanner and Jennifer Dixon, “How does Detroit Land Bank know how many homes are occupied?” *Detroit Free Press*, July 19, 2018, <https://www.freep.com/story/news/local/2018/07/19/how-does-detroits-land-bank-count-squatters/783733002/>.
- 66 Kelly Gregg, et al., “Foundations for Community Climate Action: Defining Climate Change Vulnerability in Detroit,” University of Michigan Taubman College of Architecture & Urban Planning, December 2012, <https://detroitenvironmentaljustice.org/wp-content/uploads/2017/10/SmClimate-Change-Vulnerability-Detroit-Report-1.pdf>.
- 67 Dana Afana, “Detroit aims to fix, demolish or board up 22,000 abandoned homes by end of 2019,” *MLive.com*, March 7, 2018, https://www.mlive.com/news/detroit/index.ssf/2018/03/detroit_expects_to_fix_demolis.html.
- 68 Kristi Tanner and Jennifer Dixon, “How does Detroit Land Bank know how many homes are occupied?” *Detroit Free Press*, July 19, 2018, <https://www.freep.com/story/news/local/2018/07/19/how-does-detroits-land-bank-count-squatters/783733002/>.
- 69 Laura Gottesdiener, “Detroit is Ground Zero in the New Fight for Water Rights,” *The Nation*, July 15, 2015, <https://www.thenation.com/article/detroit-is-ground-zero-in-the-new-fight-for-water-rights/>.



- 70 “Green Infrastructure Projects,” City of Detroit, accessed November 30, 2018, <https://detroitmi.gov/departments/water-and-sewerage-department/programs-and-initiatives/green-infrastructure-projects>.
- 71 “About Eastside Community Network,” Eastside Community Network, accessed October 3, 2018, <http://ecn-detroit.org/what-we-do-1/>.
- 72 Andrea Benson (Director of Economic Development, Eastside Community Network), interviewed by Johanna Bozuwa, May 18, 2018.
- 73 “Chandler Park Open Space,” Eastside Community Network, accessed October 3, 2018, <http://ecn-detroit.org/cp-open-space/>.
- 74 Andrea Benson (Director of Economic Development, Eastside Community Network), interviewed by Johanna Bozuwa, March 26, 2018.
- 75 “Detroit’s Unemployment Rate is Nearly 50%, According to the Detroit News,” *Huffington Post Business*, May 25, 2011, https://www.huffingtonpost.com/2009/12/16/detroits-unemployment-rat_n_394559.html , Evan Comen, “Detroit Unemployment Rate Higher than Nation,” *Detroit Stats*, June 5, 2017, <http://detroitstats.com/detroit-unemployment-rate-higher-than-nation/>.
- 76 Andrea Benson (Director of Economic Development, Eastside Community Network), interviewed by Johanna Bozuwa, March 26, 2018.
- 77 “A Guide to the Drainage Charge Bill Adjustment” Detroit Water and Sewage Department, February, 2018, <https://www.detroitmi.gov/Portals/0/docs/DWSD/A%20Guide%20to%20the%20Drainage%20Charge%20Bill%20Adjustment.pdf?ver=2018-02-24-232003-670>.
- 78 Andrea Benson (Director of Economic Development, Eastside Community Network), interviewed by Johanna Bozuwa, May 18, 2018.
- 79 “Verde Builds,” *Verde*, accessed October 3, 2018, <http://www.verdenw.org/verde-builds/>.
- 80 “Living Cully,” *Verde*, accessed October 3, 2018, <https://verdelandscapes.org/>.
- 81 “Stormwater Management,” City of Portland Bureau of Environmental Services, accessed October 3, 2018, <https://www.portlandoregon.gov/bes/31892>; “Portland’s Green Infrastructure: Quantifying the Health, Energy, and Community Livability Benefits,” City of Portland Bureau of Environmental Services, accessed October 3, 2018, <https://www.portlandoregon.gov/bes/article/298042>.
- 82 “Combined Sewer Overflow Information,” City of Portland Bureau of Environmental Services, accessed October 3, 2018, <https://www.portlandoregon.gov/bes/69511>.
- 83 “Portland’s Green Infrastructure: Quantifying the Health, Energy, and Community Livability Benefits,” City of Portland Bureau of Environmental Services, accessed October 3, 2018, <https://www.portlandoregon.gov/bes/article/298042>.



- 84 Gosia Wozniacka, "Rising Rents are Pushing Out Artists that Made Portland Cool," *AP News*, November 11, 2015, <https://apnews.com/dce0fb9481594faca62170b0fe0bf1fe/rents-skyrocketing-portlands-creatives-pushed-out>.
- 85 Jeff Stein, "In Expensive Cities Rent Fall for the Rich but Rise for the Poor," *Washington Post*, August 6, 2017, https://www.washingtonpost.com/business/economy/in-expensive-cities-rents-fall-for-the-rich--but-rise-for-the-poor/2018/08/05/a16e5962-96a4-11e8-80e1-00e80e1fdf43_story.html?utm_term=.3b66ba5468df.
- 86 Melanie Sevckenko, "Un-gentrifying Portland: Scheme Helps Displaced Residents Come Home," *The Guardian*, March 1, 2018, <https://www.theguardian.com/cities/2018/mar/01/portland-anti-gentrification-housing-scheme-right-return>.
- 87 Tony DeFalco, et al., "Not in Cully: Anti-Displacement Strategies for the Cully Neighborhood," *Living Cully*, June 2013, https://www.pdx.edu/usp/sites/www.pdx.edu.usp/files/A_LivingCully_PrinterFriendly_0.pdf.
- 88 Alana Semuels, "The Racist History of Portland, the Whitest City in America," *The Atlantic*, July 22, 2016, <https://www.theatlantic.com/business/archive/2016/07/racist-history-portland/492035/>.
- 89 Tony DeFalco, et al., "Not in Cully: Anti-Displacement Strategies for the Cully Neighborhood," *Living Cully*, June 2013, https://www.pdx.edu/usp/sites/www.pdx.edu.usp/files/A_LivingCully_PrinterFriendly_0.pdf.
- 90 Carlina Arango (Landscape Program Assistant, Verde Landscape), interviewed by Johanna Bozuwa, April 4, 2018.
- 91 Ricardo Moreno (Landscape Program Manager, Verde Landscape), interviewed by Johanna Bozuwa, April 4, 2018.
- 92 "Our Story," Verde Landscape, accessed October 3, 2018, <https://verdelandscap.org/ourstory/>.
- 93 Tony DeFalco, (Executive Director, Verde), interviewed by Johanna Bozuwa, April 1, 2018.
- 94 "Jobs/Economic Development," Living Cully, accessed October 3, 2018, <http://www.living-cully.org/programs/jobs-and-economic-development/>.
- 95 Carlina Arango (Landscape Program Assistant, Verde Landscape), interviewed by Johanna Bozuwa, April 4, 2018.
- 96 Ricardo Moreno, (Landscape Program Manager, Verde Landscape), interviewed by Johanna Bozuwa, April 4, 2018.
- 97 "Jobs/Economic Development," Living Cully, accessed October 3, 2018, <http://www.living-cully.org/programs/jobs-and-economic-development/>.
- 98 "Welcome to Hacienda CDC," Hacienda Community Development Corporation, accessed October 3, 2018, <https://haciendacdc.org/>; Noah Enelow and Taylor Hesselgrave, "Verde



- and Living Cully: A Venture in Placemaking,” *Future Economy*, February 2, 2015, http://www.livingcully.org/incoming/2015/10/NE_Final_PDF_new-Ecotrust-final.pdf.
- 99 Ricardo Moreno, (Landscape Program Manager, Verde Landscape), interviewed by Johanna Bozuwa, April 4, 2018.
- 100 “Partners and References,” Verde Landscape, accessed October 3, 2018, <https://verdelandscape.org/verde-builds/>.
- 101 Noah Enelow and Taylor Hesselgrave, “Verde and Living Cully: A Venture in Placemaking,” *Future Economy*, February 2, 2015, http://www.livingcully.org/incoming/2015/10/NE_Final_PDF_new-Ecotrust-final.pdf.
- 102 Ricardo Moreno, (Landscape Program Manager, Verde Landscape), interviewed by Johanna Bozuwa, April 4, 2018.
- 103 Tony DeFalco, (Executive Director, Verde), interviewed by Johanna Bozuwa, April 1, 2018.
- 104 Carlina Arango (Landscape Program Assistant, Verde Landscape), interviewed by Johanna Bozuwa, April 4, 2018.
- 105 “Community,” Cully Park, accessed October 3, 2018, <http://letusbuildcullypark.org/community/>.
- 106 “Park Features,” Cully Park, accessed October 3, 2018, <http://letusbuildcullypark.org/park-features/>.
- 107 “Join Our Crew,” Landforce, accessed October 3, 2018, <https://www.landforcepgh.org/join-our-crew/>.
- 108 Will Pickering and Timothy McNulty, “Combined Sewer Overflows & Aging Infrastructure Tackled by Pittsburgh Green First Plan,” *Pittsburgh Green Story*, April 13, 2017, <https://pittsburghgreenstory.com/combined-sewer-overflows-aging-infrastructure-tackled-pittsburgh-green-first-plan/>.
- 109 Teake Zuidema, “Raw Sewage Flows into Pittsburgh’s Rivers. Is there an Environmentally Friendly Fix that Won’t Break the Bank?” *PublicSource*, December 6, 2017, <https://www.publicsource.org/will-green-or-gray-infrastructure-solve-the-problem-of-raw-sewage-running-into-the-pittsburgh-regions-rivers/>.
- 110 Zuidema, “Raw Sewage Flows into Pittsburgh’s Rivers.”
- 111 Allen Dieterich-Ward, “Pittsburgh: A City of Two Post-Industrial Tales,” *The Conversation*, June 6, 2017, <https://theconversation.com/pittsburgh-a-city-of-two-post-industrial-tales-78877>; Patrick Vitale, “The Pittsburgh Fairy Tale,” *Jacobin Magazine*, June 20, 2017, <https://jacobinmag.com/2017/06/pittsburgh-tech-new-economy-manufacturing-inequality>.
- 112 “Organization Directory: Landforce,” Social Enterprise Alliance, accessed October 3, 2018, <https://socialenterprise.us/organization/landforce/>.



- 113 “Resilient Pittsburgh,” 100 Resilient Cities, accessed October 2, 2018 http://apps.pittsburghpa.gov/redtail/images/542_PRA_2016.pdf.
- 114 Ilyssa Manspeizer, (Executive Director, Landforce), interviewed by Johanna Bozuwa, April 3, 2018.
- 115 Manspeizer.
- 116 “About Landforce,” Landforce, accessed October 2, 2018, <https://www.landforcepgh.org/about-landforce/>.
- 117 “About Landforce,” Landforce, accessed October 2, 2018, <https://www.landforcepgh.org/about-landforce/>.
- 118 Matt Barron, (Program Officer, Sustainability, The Heinz Endowments), interviewed by Johanna Bozuwa, May 24, 2018.
- 119 “Landforce Annual Report 2017,” Landforce, accessed October 11, 2018, http://pub.lucidpress.com/c6a81200-2296-4499-b0e5-9249b2fb2a9/#vNPTTWMVus_9.
- 120 Ilyssa Manspeizer, (Executive Director, Landforce), interviewed by Johanna Bozuwa, April 3, 2018.
- 121 “Time Flies: Reflecting on the Start of the 2018 Season,” Landforce, accessed October 2, 2018, <https://www.landforcepgh.org/time-flies-reflecting-on-the-start-of-the-2018-season/>.
- 122 Ilyssa Manspeizer, (Executive Director, Landforce), email to Johanna Bozuwa, October 23, 2018.
- 123 “Benefits of Being a Landforce Crew Member,” Landforce, accessed October 2, 2018, <http://www.landforcepgh.org/join-our-crew/benefits-landforce-crew-member/>.
- 124 Ilyssa Manspeizer, (Executive Director, Landforce), interviewed by Johanna Bozuwa, April 3, 2018.
- 125 Manspeizer.
- 126 “Emerald View Park,” Landforce, accessed October 2, 2018, <https://www.landforcepgh.org/project/emerald-view-park/>; “History of Landforce,” Landforce, accessed October 2, 2018, <https://www.landforcepgh.org/about-landforce/history-of-landforce/>.
- 127 “History of Landforce,” Landforce, accessed October 2, 2018, <https://www.landforcepgh.org/about-landforce/history-of-landforce/>.
- 128 “Organization Directory: Landforce,” Social Enterprise Alliance, accessed October 3, 2018, <https://socialenterprise.us/organization/landforce/>.
- 129 Ilyssa Manspeizer, (Executive Director, Landforce), interviewed by Johanna Bozuwa, April 3, 2018.
- 130 Manspeizer.
- 131 Manspeizer.



- 132 Manspeizer.
- 133 Rob Stephany, (Director, Community & Economic Development, Heinz Endowments), interviewed by Johanna Bozuwa, April 3, 2018.
- 134 “The Site,” Hazelwood Green, accessed October 2, 2018, <https://www.hazelwoodgreen.com/site/>.
- 135 Rob Stephany, (Director, Community & Economic Development, Heinz Endowments), interviewed by Johanna Bozuwa, April 3, 2018.
- 136 Matthew Barron, (Program Officer, Sustainability, Heinz Endowments), interviewed by Johanna Bozuwa, April 3, 2018.
- 137 “Summary of Drought for California,” National Integrated Drought Information System, accessed October 2, 2018, <https://www.drought.gov/drought/states/california>.
- 138 Robert Sanders, “Sinking Land Will Exacerbate Flooding from Sea Level Rise in Bay Area,” *UC Berkeley News*, March 7, 2018, <http://news.berkeley.edu/2018/03/07/sinking-land-will-exacerbate-flooding-from-sea-level-rise-in-bay-area/>.
- 139 Jean Tepperman, “Oakland’s Poorest Neighborhoods Will be the Most Susceptible to Flooding Due to Climate Change and Sea-Level Rise,” *East Bay Express*, accessed October 2, 2018, <https://www.eastbayexpress.com/oakland/oaklands-poorest-neighborhoods-will-the-most-susceptible-to-flooding-due-to-climate-change-and-sea-level-rise/Content?oid=6401808>.
- 140 B. Tondre, (Worker-Owner, Dig Cooperatives), interviewed by Johanna Bozuwa, April 2, 2018.
- 141 Jean Tepperman, “Oakland’s Poorest Neighborhoods Will be the Most Susceptible to Flooding Due to Climate Change and Sea-Level Rise,” *East Bay Express*, accessed October 2, 2018, <https://www.eastbayexpress.com/oakland/oaklands-poorest-neighborhoods-will-the-most-susceptible-to-flooding-due-to-climate-change-and-sea-level-rise/Content?oid=6401808>; Mark Hedin, “Survey Confirms Oakland Homeless Crisis Growing Worse,” *East Bay Times*, June 2, 2017, <https://www.eastbaytimes.com/2017/06/02/survey-confirms-oakland-homeless-crisis-growing-worse/>.
- 142 “The Seven Domains of Permaculture Action,” *Permaculture Principles*, accessed October 3, 2018, <https://permacultureprinciples.com/flower/>.
- 143 “Our Services,” Dig Cooperatives, accessed October 3, 2018, <http://www.dig.coop/about.html>.
- 144 Fiona Smith, “Construction Industry Becoming Increasingly Gender-Segregated, Report Finds,” *The Guardian*, December 11, 2016, <https://www.theguardian.com/sustainable-business/2016/dec/12/construction-industry-becoming-increasingly-gender-segregated-report-finds>; Emily Green, “Undocumented Immigrants Still Mistreated by



- Employers Despite New Laws,” *KQED News*, September 8, 2014, <https://www.kqed.org/news/146984/undocumented-immigrants-still-mistreated-by-employers-despite-new-laws>.
- 145 B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, April 2, 2018.
- 146 B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, May 5, 2018.
- 147 Nate Berg, “Oakland’s Housing Crisis: “I’m the Last One Here. I Don’t Know if I Can Stay or Go,” *The Guardian*, April 21, 2016, <https://www.theguardian.com/cities/2016/apr/21/oakland-housing-crisis-rising-rents-evictions>.
- 148 B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, May 5, 2018.
- 149 B. Tondre.
- 150 “Berkeley EcoHouse,” Dig Cooperatives, Inc., accessed October 2, 2018, <http://www.dig.coop/berkeley-ecohouse.html>.
- 151 Christina Oatfield, “Governor Brown Signs California Worker Cooperative Act, AB 816,” Sustainable Economies Law Center, August 12, 2015, http://www.theselc.org/governor_brown_signs_california_worker_cooperative_act.
- 152 B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, May 5, 2018.
- 153 B. Tondre.
- 154 “Anya: Dig Cooperative” Kiva, accessed October 2, 2018, <https://www.kiva.org/lend/1089557>.
- 155 B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, May 5, 2018.
- 156 “Financing,” Dig Cooperatives, accessed October 2, 2018, <http://www.dig.coop/financing.html>.
- 157 B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, May 14, 2018.
- 158 B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, May 5, 2018.
- 159 Ilyssa Manspeizer, (Executive Director, Landforce), interviewed by Johanna Bozuwa, April 3, 2018; Brian English, (Director, Green City Works) and Alissa Weiss (Director of Strategic Initiatives and Communications, University City District), interviewed by Johanna Bozuwa, June 1, 2018; B. Tondre, (Worker-Owner, Dig Cooperatives, Inc.), interviewed by Johanna Bozuwa, May 5, 2018.



- 160 Mark Erlich and Jeffrey Grabelsky, "Standing at a Crossroads: The Building Trades in the Twenty-First Century," Cornell University, ILR School, 2005, <https://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1283&context=articles>.
- 161 Harold Meyerson, "The Seeds of a New Labor Movement," *American Prospect*, October 30, 2014, <http://prospect.org/article/labor-crossroads-seeds-new-movement>.
- 162 Ilyssa Manspeizer, (Executive Director, Landforce), interviewed by Johanna Bozuwa, April 3, 2018; Alvaro Sanchez, (Environmental Equity Director, Greenlining Institute), interviewed by Johanna Bozuwa, May 23, 2018; Mary Grant (Public Water for All Campaign Director, Food and Water Watch), April 2, 2018; Matt Nichols (Policy Director for Infrastructure & Transportation, City of Oakland), interviewed by Johanna Bozuwa, May 15, 2018.
- 163 Matt Nichols (Policy Director for Infrastructure & Transportation, City of Oakland), interviewed by Johanna Bozuwa, April 3, 2018.
- 164 By age, union membership rates continued to be highest among workers ages 45 to 64. "Union Members - 2017," Bureau of Labor Statistics, US Department of Labor, January 19, 2018, <https://www.bls.gov/news.release/pdf/union2.pdf>; Whet Moser, "Rahm Emanuel, Trade-Union Racism, and the Burden of History," *Politics & City Life*, October 4, 2012, <https://www.chicagomag.com/Chicago-Magazine/The-312/October-2012/Rahm-Emanuel-Trade-Union-Racism-and-the-Burden-of-History/>.
- 165 "Local and Small Local Business Enterprise Program (L/SLBE)," Office of the City Administrator, Contracts and Compliance, February 1, 2012, <http://www2.oaklandnet.com/oakca1/groups/contracting/documents/form/oak029719.pdf>; Brentin Mock, "Why the Federal Government Should Let Cities Hire Local Workers," *CityLab*, October 7, 2015, <https://www.citylab.com/life/2015/10/why-the-federal-government-should-let-cities-hire-local-workers/409315/>.
- 166 Cooperative Home Care Associates, "Providing Quality Care through Quality Jobs," accessed October 17, 2018, www.chcany.org/
- 167 Rick Surpin, "Cooperative Healthcare Associates," (keynote at the Second US Federation of Worker Cooperative Conference, October 15-17, 2006), accessed October 4, 2018, <http://www.geo.coop/node/53>.
- 168 Laura Hanson Schlater, "Stronger Together? The USW-Mondragon Union Co-op Model," *Labor Studies Journal*, 42(2), (2017): 124-147.
- 169 Schlater, "Stronger Together?"
- 170 Carmen Huertas-Noble, "Worker-Owned and Unionized Worker-Owned Cooperatives: Two Tools to Address Income Inequality," *Social Justice Research and Scholarship at CUNY School of Law*, 22 (2), (2016).



- 171 Laura Hanson Schlachter, "MCDC Milestone Reflections: City of Madison Grant Writing Process," University of Madison-Wisconsin, August 2016.
- 172 Schlachter, "MCDC Milestone Reflections."
- 173 Rick Surpin, "Cooperative Healthcare Associates," (keynote at the Second US Federation of Worker Cooperative Conference, October 15-17, 2006), accessed October 4, 2018, <http://www.geo.coop/node/53>.
- 174 Brian English, (Director, Green City Works) and Alissa Weiss (Director of Strategic Initiatives and Communications, University City District), interviewed by Johanna Bozuwa, June 1, 2018.
- 175 English and Weiss.
- 176 Alvaro Sanchez, Cynthia Marshall, and Amy Vruno, "Invisible to Invaluable: Organizing communities in Howard County, MD and Washington, DC, for Clean Water and Economic Opportunity," Industrial Areas Foundation, People Acting together in Howard, Washington Interfaith Network, and Center for Community Change, 2014.
- 177 Jennifer Knox (Lead Organizer, Washington Interfaith Network), interviewed by Johanna Bozuwa, July 11, 2018.
- 178 Bethany Bezak, (Director of Engineering and Technical Services, DC Water), Interview with Johanna Bozuwa, April 3, 2018.
- 179 Jaimie Worker, (Lead Project Organizer, Metro Industrial Areas Foundation & Washington Interfaith Network), interviewed by Johanna Bozuwa, June 28, 2018.
- 180 Isabelle Anguelovski, "Who Benefits from Green Cities?" Barcelona Laboratory for Urban Environmental Justice and Sustainability, July 6, 2017, <http://www.bcnuej.org/2017/07/06/benefits-green-cities/>.
- 181 Jeanne Haffner, "The Dangers of Eco-Gentrification: What's the Best Way to Make a City Greener?" *The Guardian*, May 6, 2015, <https://www.theguardian.com/cities/2015/may/06/dangers-ecogentrification-best-way-make-city-greener>.
- 182 Aaron Bartley, (Co-Founder, PUSH Buffalo), interviewed by Johanna Bozuwa, April 5, 2018.
- 183 "Community Land Trusts," The Democracy Collaborative, accessed October 4, 2018, <https://community-wealth.org/strategies/panel/clts/index.html>.
- 184 "Green Growth," Eastside Community Network, accessed October 4, 2018, <http://ecn-detroit.org/green-growth-1/>.
- 185 Jarrid Green and Thomas Hanna, "Community Control of Land & Housing," The Democracy Collaborative, August 2018, <https://thenextsystem.org/sites/default/files/2018-08/CommunityControlLandHousing.pdf>.



- 186 Lora Steinchenv, Jaqueline Patterson, and Katherine Taylor, "In the Eye of the Storm: A People's Guide to Transforming Crisis and Advancing Equity in the Disaster Continuum," National Association for the Advancement of Colored People, 2018, https://live-naacp-site.pantheonsite.io/wp-content/uploads/2018/09/NAACP_InTheEyeOfTheStorm.pdf.
- 187 Naomi Klein, "How Power Profits from Disaster," *The Guardian*, June 6, 2017, <https://www.theguardian.com/us-news/2017/jul/06/naomi-klein-how-power-profits-from-disaster>.
- 188 Robert Bullard and Beverly Wright, *Race, Place, and Environmental Justice After Hurricane Katrina: Struggles to Reclaim, Rebuild, and Revitalize New Orleans and the Gulf Coast* (Boulder, CO: Westview Press, 2009).
- 189 Ben Hirsch (West Street Recovery), interviewed by Johanna Bozuwa, March 30, 2018.
- 190 Brian English, (Director, Green City Works) and Alissa Weiss (Director of Strategic Initiatives and Communications, University City District), interviewed by Johanna Bozuwa, June 1, 2018.
- 191 Walter Wright, Kathryn W. Hexter, and Nick Downer, *Cleveland's Greater University Circle Initiative: An Anchor-Based Strategy for Change* (Washington, DC: The Democracy Collaborative, 2016).
- 192 Jay Cassano, "Madison, Wisconsin, Is Investing \$5 Million in Worker Cooperatives," *Fast Company*, February 2, 2015, <https://www.fastcompany.com/3041736/madison-wisconsin-is-investing-5-million-in-worker-cooperatives>.
- 193 "Be a Partner," Madison Cooperative Development Coalition, Accessed October 20, 2018, <http://www.mcdcmadison.org/be-a-partner/>.
- 194 Dale Schlautman (Vice President and Manager of Nebraska Operations, EA Engineering), and Sarah Ridgway (Senior Vice President, EA Engineering), Interview with Johanna Bozuwa, June 8, 2018.
- 195 Stacey Detwiler, "Staying Green: Strategies to Improve Operations and Maintenance of Green Infrastructure in the Chesapeake Bay Watershed," American Rivers and Green for All, 2016, <http://americanrivers.org/wp-content/uploads/2016/05/staying-green-strategies-improve-operations-and-maintenance.pdf>.
- 196 "The Importance of Operation and Maintenance for the Long-Term Success of Green Infrastructure," US Environmental Protection Agency, Office of Water, March 2013, https://www.epa.gov/sites/production/files/2015-04/documents/green_infrastructure-om_report.pdf.
- 197 Stacey Detwiler, "Staying Green: Strategies to Improve Operations and Maintenance of Green Infrastructure in the Chesapeake Bay Watershed," American Rivers and Green for All, 2016, <http://americanrivers.org/wp-content/uploads/2016/05/staying-green-strategies-improve-operations-and-maintenance.pdf>.



- 198 Fai Foen (Director of Green Infrastructure, Greening of Detroit) and Dave Anderson (Business Administrator for Landscape Services, Greening of Detroit), Interview with Johanna Bozuwa, May 17, 2018.
- 199 Alvaro Sanchez, (Environmental Equity Director, Greenlining Institute), interviewed by Johanna Bozuwa, May 23, 2018.
- 200 “Verde Builds,” Verde, accessed October 4, 2018, <http://www.verdenw.org/verde-builds/>; “Creating Jobs,” Push Buffalo, accessed October 4, 2018, <https://pushbuffalo.org/creating-jobs/>.
- 201 Melissa Hoover, (Executive Director, Democracy at Work Institute), interviewed by Johanna Bozuwa, April 5, 2018.
- 202 Mary Grant (Campaign Director, Public Water for All), interviewed by Johanna Bozuwa, April 2, 2018.
- 203 Dave Zuckerman (Director of Healthcare Engagement, The Democracy Collaborative), interviewed by Johanna Bozuwa, April 20, 2018. Tony DeFalco, (Executive Director, Verde), interviewed by Johanna Bozuwa, April 1, 2018.
- 204 Oscar Perry Abello, “Leveling the Playing Field in City Contracting,” *Next City*, March 26, 2018, <https://nextcity.org/daily/entry/leveling-the-playing-field-in-city-contracting>.
- 205 “Regulations Governing the Purchase of Goods and Non-professional Services Other Than by Awarding of Contracts to the Lowest Responsible Bidder,” The Philadelphia Procurement Department, June 26, 2017, <http://regulations.phila-records.com/pdfs/Procurement%20Department%20Regs.7-26-17a.pdf>.
- 206 Oscar Perry Abello, “Leveling the Playing Field in City Contracting,” *Next City*, March 26, 2018, <https://nextcity.org/daily/entry/leveling-the-playing-field-in-city-contracting>.
- 207 “Prince George’s County Maryland Clean Water Partnership,” US Environmental Protection Agency, accessed October 4, 2018, <https://www.epa.gov/G3/prince-georges-county-maryland-clean-water-partnership>.
- 208 Keisha Brown (Partnership Liaison, The Democracy Collaborative), email correspondence to Johanna Bozuwa, November 15, 2018.
- 209 Including The Democracy Collaborative.
- 210 Dave Zuckerman (Director of Healthcare Engagement, The Democracy Collaborative), interviewed by Johanna Bozuwa, April 20, 2018. Additional internal correspondence.
- 211 Nicole Copeland (Contractor Development Manager, The Clean Water Partnership) and Michael Burke (Quest2 Consulting, LLC), Interviewed by Johanna Bozuwa, September 19, 2018.
- 212 “Project Labor Agreements,” AFL-CIO, accessed October 4, 2018, <https://aflcio.org/what-unions-do/empower-workers/project-labor-agreements>.



- 213 “Policy & Tools: Community Workforce Agreements,” Partnerships for Working Families, accessed October 4, 2018, <http://www.forworkingfamilies.org/page/policy-tools-community-workforce-agreements>.
- 214 Maria Figueroa, Jeff Grabelsky, and J. Ryan Lamare, “Community Workforce Agreements: A tool to Grow the Union Market and to Expand Access to Lifetime Careers in the Unionized Building Trades,” *Labor Studies Journal*, 38(1)7-31, DOI:10.1177/0160449X13490408.
- 215 Lawrence Mishel, “The increased diversity of New York City union construction employment,” Economic Policy Institute, January 19, 2017, <https://www.epi.org/blog/the-increased-diversity-of-new-york-city-union-construction-employment/>.
- 216 Ardis Graham, “San Francisco Public Utilities Commission Water System Improvement Program Bidding Under the Project Labor Agreement,” Office of the Assistant General Manager, Infrastructure Division, San Francisco Public Utilities Commission, accessed October 4, 2018, http://www.forworkingfamilies.org/sites/pwf/files/documents/SFPUC_PLA_summary.pdf.
- 217 Alvaro Sanchez, (Environmental Equity Director, Greenlining Institute), interviewed by Johanna Bozuwa, May 23, 2018.
- 218 Fai Foen (Director of Green Infrastructure, Greening of Detroit) and Dave Anderson (Business Administrator for Landscape Services, Greening of Detroit), Interview with Johanna Bozuwa, May 17, 2018; Ilyssa Manspeizer, (Executive Director, Landforce), interviewed by Johanna Bozuwa, April 3, 2018; Brian English, (Director, Green City Works) and Alissa Weiss (Director of Strategic Initiatives and Communications, University City District), interviewed by Johanna Bozuwa, June 1, 2018.
- 219 Fai Foen (Director of Green Infrastructure, Greening of Detroit) and Dave Anderson (Business Administrator for Landscape Services, Greening of Detroit), Interview with Johanna Bozuwa, May 17, 2018.
- 220 “Living Cully,” Living Cully, accessed October 4, 2018, <http://www.livingcully.org/>.
- 221 Andrea Benson (Director of Economic Development, Eastside Community Network), interviewed by Johanna Bozuwa, March 26, 2018.
- 222 Alanna Wittet (GSI Partners Program Associate, Sustainable Business Network) and Fran Lawn (GSI Partners Manager, Sustainable Business Network), interviewed by Johanna Bozuwa, March 26, 2018.
- 223 “Financial Statements Year Ended June 30, 2017,” Verde, Inc., June 30, 2017, <https://static1.squarespace.com/static/57bf2cf2beba6b692dd3505c/t/5acb9931758d46742a864b-fb/1523292466765/Verde+Inc.+Signed+Financial+Statement+EC+06.30.17.pdf>.
- 224 “Landforce Annual Report 2017,” Landforce, accessed October 22, 2018, http://pub.lucidpress.com/c6a81200-2296-4499-b0e5-9249b2f1b2a9/-_6_z9QCtfnBPT.

Author: Johanna Bozuwa
Director of Research: Thomas M. Hanna
Research Assistant: Megan Huyn
Editor: Isaiah J. Poole
Expert Reviewers:
Jessie Martin, Earth Economics
Paula Conolly, GI Exchange
Alvaro Sanchez, Greenlining Institute
Cover Photo courtesy of Landforce

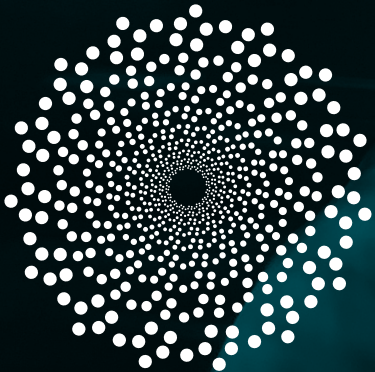
Supported by The Summit Foundation

A special thank you to the many people who were willing to lend their knowledge and expertise in interviews to make this report possible.

Johanna Bozuwa is a research associate for The Next System Project at the Democracy Collaborative. Her research focuses on transitioning from today's extractive, fossil fuel economy to resilient, sustainable and equitable communities based on energy democracy. She has also been active in climate action and divestment campaigns in the United States and Europe. Johanna received her M.Sc. in sustainable innovation from Utrecht University in the Netherlands and a B.A. in environmental policy from Barnard College, where she was an Athena Scholar for Women's Leadership.

The Democracy Collaborative

is a research and development
lab for the democratic
economy. Learn more at
democracycollaborative.org.



DEMOCRACY COLLABORATIVE

Photo courtesy of Landforce