



Lessons for the Future

Public Works

November 04, 2022

By:

Anthony Ladd
Elizabeth McDonald
Josh Morgan
Gordon Okumu
Lorizelda Stoeller
Teanna Thompson
Ryan Webb



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Executive Summary

The American experiment, known as a democratic government, has long been an act of human trial and error through adaptation to societal demands. Governance is complex, tricky, and ever-evolving. As humanity transitions to an era of enlightenment and information, so does the need to adapt its government. The National Academy of Public Administration (NAPA) has identified twelve (12) Grand Challenges of government. These challenges formulate critical focus areas to ensure sustainable governance. Of the many disciplines required to run government effectively, the products of Public Works are primarily tangible and critical for thriving communities. As government evolves to meet societal demands, so does the world of Public Works. Of the twelve (12) Grand Challenges, four (4) challenges are of particular interest to ensure that the field of Public Works advances and sustains effectiveness within American communities.

Modernize and Reinvigorate the Public Service

The American workforce has never felt the importance of human capital more than now. The COVID-19 pandemic shook the core of humanity and set the trajectory for an unknown path that society had to learn to manage quickly. Moreover, the pandemic revealed the everyday heroes that make a functional society. These "heroes" are essential workers. Essential workers, such as nurses, postal workers, police officers, and sanitation collection operators, raised public awareness of their role in providing critical services. Without essential workers, these critical services would cease to exist, ultimately impacting humanity's ability to function as we do today.

The pandemic awakened the field of Public Works. The role of the Public Works employee is to provide essential services, which requires essential workers. Since the COVID-19 pandemic, the labor market has transformed for all industries, most notably by the "great resignation," which has shown an increase in employee resignations across all industries. Public Works has not been immune to these vast resignations and faces the challenge of continuing to provide critical public services with a diminished workforce. The Public Works discipline must meet these workforce challenges with a new approach to attracting and retaining effective and reliable employees. In order to continue carrying out the mission of Public Works, it is imperative that the labor force is modernized and reinvigorates its approach to public service.

Recommendation 1: Modernize and Reinvigorate the Public Service through a focus on recruiting, developing, and retaining employees.

Local governments must build a positive work culture, invest in employees, and provide relevant benefits to help attract professionals and modernize the workforce. Partnerships between local governments and educational organizations that develop work opportunities and engagement will present space for communities to thrive by growing their Public Works focused services and programs via the reinvigorated workforce.

Steward Natural Resources and Address Climate Change

As humanity's population grows, more is required of Public Works departments. With an increase in demand for public services, there is an increase in the demand for natural resources. Environmental challenges, such as climate change and the depletion of natural resources, directly impact the field of Public Works. All communities feel the effects of climate change through natural disasters, limited resources, and the struggle to provide equitable and cost-efficient services for the masses. Pressures to provide services with minimal environmental harm while protecting and preserving our natural environment continue to grow. Public Works professionals are responsible for meeting the challenge head-on and ensuring the future viability of many communities.

Recommendation 2: Steward Natural Resources and Address Climate Change through the identification of trends directly related to our environment.

These trends can assist in prioritizing efforts to plan, mitigate, respond to, and recover from natural disasters. Thus, if local governments implement Public Works programs and services with the lens of protecting and preserving our natural environment, they will help ensure our planet's viability for human life.

Build Resilient Communities

NAPA describes resilient communities as "communities with the capacity to respond to, withstand, and recover from adverse situations." Public Works departments are critical in creating that capacity in every community. Local governments must build a well-trained, reliable, and nimble workforce to respond to public needs. In addition, communities face challenges such as economic dislocations, health epidemics, and unaffordable housing. As society navigates these unique problems, Public Works will continue to play a critical role in overcoming these issues by building a future of resilient and thriving communities.

Recommendation 3: Build Resilient Communities through intentional analysis and proactive planning for critical infrastructure maintenance and replacement.

Plans should be designed to target system weaknesses and vulnerable infrastructure. Additionally, efficient emergency response programs allow for the effective implementation of projects during recovery efforts. As a result, a community becomes more resilient as it overcomes challenges. A society can enhance its resiliency by fulfilling these recommendations.

Foster Social Equity

The field of Public Works provides varied programs and services to communities central to the lives of many. Public agencies must act in the best interest of all, regardless of race, creed, and socio-economic status. However, as the public evolves, it has become apparent that many public programs and services were not implemented equitably. Significant disparities across communities can either promote or degrade the quality of life for a specific group. Public Works professionals are charged with equitably providing public services. Although many public agencies strive to do their best to ensure equitable access to public services, only some communities are adequately equipped to tackle the challenge. Creating awareness of the importance of equity while being mindful of building communities with a lens of fairness will ensure the advancement of humanity.

Recommendation 4: Foster Social Equity through the unbiased implementation and distribution of Public Works programs and services.

Forming inventories with ratings based on condition can help ensure an equitable distribution of infrastructure improvements. These inventories can prioritize the needs of communities by risk instead of by complaints. Statistically, neighborhoods composed primarily of minority populations get infrastructure maintenance and replacement at alarmingly lower rates than affluent neighborhoods. Municipalities have an obligation to make all constituents aware of their rights and privileges.

Array of Programs

The discipline of Public Works is inherently varied. Any engineered structures financed, owned, operated, or maintained by the government comprise the discipline of Public Works. Thus, depending on the prerogative of each jurisdiction, a Public Works department can oversee any number of infrastructure-based programs and services. Table 1 contains an overview of programs and services typically provided by Public Works departments; however, this list is not all-inclusive.

The programs and services that Public Works departments provide can be divided into three (3) categories: Public Works, Utilities, and Other. The Public Works category, as described above, would be all structures of engineering that the government owns; this includes buildings and transportation infrastructure. While still considered Public Works by definition, the Utilities category includes infrastructure that characterizes itself by performing a service for citizens. Typically these services are provided for a fee and are fiscally self-sustained. Common utilities include potable water, sanitary sewer, stormwater, electricity, and natural gas. Finally, the catchall category, designated here as "Other," includes any additional programs and services that the discipline of Public Works provides that do not fit the definitions of the Public Works and Utilities categories. While not physical infrastructure, these other programs and services are still pivotal to a functioning society.

Some communities only provide a few of the programs and services listed in Table 1. Others provide programs and services not discussed here. Emphasizing the breadth of vocations within Public Works, a modern society could not function without the programs and services this discipline provides. The importance of Public Works to society cannot be overstated. A community is nonexistent without the role Public Works professionals provide. However, society often takes these vital public services and infrastructure for granted. It is not until these critical public services are disturbed that we recognize their importance in ensuring a positive quality of life. Public Works is the heart and soul of a community, and it is the backbone that supports all other services provided by a local government.

Programs and Services

The following table provides an overview of core programs and services provided by Public Works departments and is not meant to be all-inclusive.

Table 1: Programs and Services

Program and Services	Description of Programs and Services
Public Works	
Bridges	Ensuring the safety of bridges by performing routine inspections and required maintenance.
Capital Projects	Managing the planning, design, permitting, and construction of costly long-term projects that improve capital assets.
Engineering	Providing technical design expertise on Public Works programs and services as well as for other government disciplines.
Facilities	Maintaining publicly owned buildings and structures.
Streets	Constructing new roadways, maintaining existing roadways, providing traffic signage, and ensuring the operation of traffic signals.
Utilities	
Electricity	Generating and distributing electric energy for use by the public.
Natural Gas	Extracting and distributing natural gas for use by the public.
Potable Water	Treating raw water to regulated standards and distributing potable water for use by the public.
Right-of-Way Utility Coordination	Ensuring all utilities within publicly maintained rights-of-way do not interfere with each other or are negatively affected by construction.
Stormwater	Collecting and treating rainwater and runoff to prevent flooding and preserve the quality of surface water and groundwater.
Wastewater	Collecting sanitary sewage and treating it to regulated standards for safe release into the environment.
Other	
Cemeteries	Managing the maintenance and operations of publicly owned cemeteries.
Fleet	Managing routine and impromptu maintenance of publicly owned vehicles and machinery.
Forestry	Landscaping of publicly maintained areas to protect natural resources and ensure positive vegetative aesthetics.
Geographic Information System	Managing, analyzing, and visualizing geographic data of municipal assets.
Parks	Providing and maintaining green spaces for recreational use by the public.
Recycling	Collecting and disposing of recyclable solid waste via regulated means and methods.
Solid Waste	Collecting and disposing of non-recyclable, typically organic, solid waste via regulated means and methods.

The Challenges

Modernize and Reinvigorate the Public Service

When considering the current state of employment within the discipline of Public Works, the urgency has never been more present to reinvigorate, strengthen, and prepare the workforce. It is essential for the workforce to be motivated and adequately equipped to handle the demand that municipal infrastructure requires. This demand is due to the growth and successes of previous generations, coupled with the ever-changing landscape of environmental health concerns and threats of climate change.

To reinvigorate public service for Public Works, agencies should concentrate on three main areas of focus: "recruiting," "developing," and "retaining" employees. Each of these plays a part in attracting talent to the industry, preparing them to handle the challenges of the future, and ensuring that they work in those areas long enough to provide stability and help bring up the generation behind them. Personnel management has not traditionally been a strength of Public Works departments, regardless it is necessary, given the demand placed on our departments when facing aging infrastructure, changing requirements, and the ever-present need to prepare for the future. The situation remains that there is a nationwide shortage of workers applying for jobs as the median age of workers is getting increasingly older.

Recruiting

Recruiting for these jobs is the first step. Currently, interest in Public Works is low. Today, most young people are not looking to become involved in the discipline of Public Works because of antiquated styles of work activity and the lack of visibility that most agencies have. If a Public Works agency is doing its job correctly, no one notices its work. However, this is something that needs to change to show the public just how important this work is. Local governments must focus on participating in community events, speaking to school-aged students early and often, and creating internship or work programs. Public Works departments should also consider how they could better align themselves with the modern workforce. Historically there has been resistance to adopting technology at a rate that intrigues younger people. Additionally, a lack of focus on social and environmental goals hinders local governments from reaching a wider group of potential workers.

Developing

Developing employees in the modern era of Public Works has been challenging for several reasons. Time and demand do not allow the opportunity to adequately train workers on what is needed. Additionally, those who would perform the necessary training are challenged with time and demand constraints and often retire or leave the public sector. With each retirement and resignation, a local government loses institutional knowledge, and this loss is happening faster than the agencies can accommodate. Internal stakeholders need the opportunity to capture and document this knowledge; creating formal procedures to preserve processes as turnover occurs is vital. Agencies must invest time, effort, and resources into training programs inside and outside the organization. In the coming years, it will be vital for local governments to partner with non-profit organizations and learning institutions to develop training programs that educate and attract potential workers to the public sector. Training

programs will aid in recruiting new employees and provide the time current employees need to improve their skills. Prioritizing worker development will be one of the most significant contributions to a local government's success and will build a solid culture to sustain decades of highly effective service.

An example of an effectively implemented training program within the Public Works workforce is the City of Phoenix, Arizona's state-certified Solid Waste Equipment Operator (SWEO) Apprenticeship Program. In partnership with LIUNA 777, a local labor group, and in response to an increasingly growing shortage of skilled Commercial Driver's License (CDL) holders, the approach to "growing their own" operators came to fruition. The 2,000-hour apprenticeship program attracts and trains individuals who desire to earn their CDL and become skilled SWEOs for the City of Phoenix, Arizona. The program seeks to develop skilled operators through a detailed classroom and on-the-job training model, which educates apprentices in a safe, efficient, economical, and customer-centered collection operation. Since its inception in 2017, twenty-two (22) apprentices have graduated from the program and have become certified Solid Waste Equipment Operators.

Retaining

Employee retention is increasingly becoming an issue as public agencies face a more competitive job market. Applicants seem more focused on benefits they can receive in the immediate rather than the long-term benefits and securities provided by a job in the public sector. The strong economy that has existed for over a decade exacerbates this shift in focus. Workers have not needed to consider if their job status would be secure in a weak economy. Public service, historically, has been able to provide this security and should be a part of the message provided by local governments to its employees. Another desire that is expressed by many is the opportunity for career advancement. Many local government employees plateau in their careers and feel they cannot move up or into other work areas. As a result, employees feel limited, which diminishes their motivation to provide service.

Public agencies should not demonize the private sector but rather have it be a model to see how the public sector can be a more competitive employer. The skillset required of employees is no less challenging or demanding in public service; therefore, the compensation should also be comparable. Unfortunately, there has been resistance to compete with the private sector, which has hindered public agencies in the talent they have been able to attract and retain and provides an excuse not to innovate.

Historically, innovation has not been a strength of Public Works. Terms like artificial intelligence, outsourcing, privatization, or public-private partnerships have been shied away from in most Public Works circles because of the uncertainty or change they would bring. However, the reality is that maintaining the status quo is not sustainable. Many agencies are either running into debt or choosing not to fund services, which cannot be an option with the responsibility of public safety and health at stake for communities around the country. There will need to be open and honest conversations on how local governments fund these activities and what is in the community's best interest. The field of Public Works needs to find a balance: where technology might be the best mechanism to deliver consistent results or what activity might require the expertise or agility of private sector companies. Agencies that embrace and use these tools will be more prepared to address future challenges.

Appropriately staffing a Public Works department is only sustainable with a strong, highly promoted, and positive organizational culture. A positive organizational culture has never been as large of a focus and as highly desired by employees as it is today. People want purpose in their work. Employees want to work where they feel they are making a positive difference and can better the lives of those around them. The stakes are high, but the public sector is the ideal industry to champion these ideals. Local governments must remind their employees and the general public why the industry of Public Works is so essential.

An organizational culture that will be embraced by current and future employees places a high value on every worker and every person affected by the work. Employees should feel they have a voice and that their organization values them. Providing a purpose for employees and creating a place of respect and appreciation will have a tremendous effect. While there are many issues beyond the control of individual Public Works departments, it will always remain in their ability to foster a place where people want to work.

Steward Natural Resources and Address Climate Change

The dynamic world of Public Works requires professionals to respond quickly to the needs of the public they serve and the environment in which they work. Trends that impact Public Works include the public, societal situations, and the environment.□□

The environment visibly changes as the climate and natural resources are put under pressure to provide for the ever-growing public.

Across the country, every state feels the effects of climate change, whether it is a devastating hurricane in Florida or significant droughts and wildfires in California. Global climate change affects everything, including weather, plants, animals, ecosystems, agriculture, and infrastructure. The most recent decade was the warmest on record for the United States and the number of annual frost-free days has been increasing since the 1980s. In addition, overall precipitation has increased for the country, with the timing and intensity of rain events also changing, resulting in increased seasonal flooding and drought for several regions in the United States. During and following every disaster, Public Works steps up to provide aid to the public and participate in recovery efforts. This demand is becoming a standard service offering for Public Works officials. This growing demand will pose challenges for the profession in the short and long term.

The frequency of natural disasters is increasing due to climate change. Preventive measures will protect our assets and provide the greatest return on investment. Society depends on the discipline of Public Works to provide clean water, efficient transportation networks, flood prevention, removal and disposal of waste, and key critical infrastructure elements.

A modern and well-maintained infrastructure is the backbone of any prosperous society; as custodians of America's Infrastructure, Public Works professionals are acutely aware of their responsibility. Public Works professionals are first responders to a community in need and are ready to lead efforts to plan, mitigate, respond to, and recover from natural disasters. Equally important, Public Works employees understand the importance of building infrastructure which is resilient and able to withstand the increasing challenges of climate change and severe weather. Babcock Ranch, Florida, is an example of a resilient community built to weather any storm. The developers of this private-public partnership strategically engineered this community to withstand hurricane-level winds and rain. The developers installed electricity lines underground and designed streets to absorb flood water to spare residential homes from potentially devastating damage. The design of Babcock Ranch recently spared the community during Hurricane Ian, a Category Four (4) hurricane that ravished most of the state in September 2022 (Neuman, 2022).

Trends

With greater demand placed on natural resources and the increased frequency of natural disasters due to climate change, local, state, federal, and tribal governments are looking for ways to combat these issues. A current trend impacting the way Public Works plans and operates regarding solid waste management is the concept of Zero Waste and Zero Emissions.

Zero Waste

Zero Waste is not a new concept or trend; however, it has increasingly come to the forefront in many communities over the past few decades. For example, the City of Phoenix, Arizona, has recently adopted a sustainability goal to become a Zero Waste city through participation in the circular economy by 2050. This ambitious goal focuses on expanding the current recycling program to remove commonly recycled products from the waste stream by incubating local businesses to capture new products from the waste stream. Additionally, this goal encourages industries to provide products that are 100 percent recyclable or able to be repurposed at their end of life.

The Zero Waste movement is an antidote to contemporary society's throwaway culture and convenience economy. Zero Waste is about reducing waste consumption, which can be accomplished by not acquiring things that will end up in the landfill, particularly disposable and non-recyclable products and packaging. Although Zero Waste does not mean nothing goes to the landfill, it highlights the need to reduce the amount of waste transported and buried in a landfill.

Choosing a Zero Waste lifestyle helps support the economy and create jobs. The only way society stands a chance at preserving our natural environments and wildlife habitats is by adopting Zero Waste, Circular Economy, and Zero Emissions principles.

Zero Emissions

Zero Emissions, or Net Zero, means we are not adding new emissions to the atmosphere. Emissions continue but are balanced by absorbing an equivalent amount of pollutants from the atmosphere. If we continue to pump out the emissions that cause climate change, temperatures will continue to rise to levels that threaten the lives and livelihoods of people everywhere. Thus, many countries are committing to achieve carbon neutrality, or Net Zero emissions, within the next few decades. It is a big task, requiring immediate ambitious actions. An example of combating climate change by lowering emissions is through a focus on redevelopment. Infill projects have become a necessity in many cities to meet growing housing demand and have been shown to combat climate change. "Well-planned infill housing can help to reduce emissions from all sorts of sources, from transport to construction and heating" (Wilson, 2022). Additionally, diminishing urban sprawl reduces the need for residents to travel, thus lessening the extent of carbon emissions caused by gas-powered vehicles.

Efforts to reach Net Zero must be complemented with adaptation and resilience measures, as the technology exists to reach Net Zero. A key element is powering economies with clean energy by replacing polluting coal, gas, and oil-fired power stations, with renewable energy sources, such as wind or solar, which would dramatically reduce carbon emissions. A wholesale switch to electric transport, powered by renewable energy, would also play a huge role in lowering emissions, with the bonus of slashing air pollution. Electric vehicles are rapidly becoming cheaper and more efficient. Many countries, including those committed to Net Zero, have proposed plans to phase out the

sale of gas-powered vehicles. Public Works across America will play a vital role in constructing the infrastructure and providing clean energy for electric vehicle charging.

Public Works departments are equipped to offer basic services to the community and meet the daily workloads expected by the public. However, Public Works professionals are becoming less equipped to provide necessary services due to added demands from the effects of climate change. Public Works professionals must be prepared to answer new service demands and models that consider climate change and natural resources. Preparing a workforce to meet the demand is paramount to success in providing essential and effective public services.

Build Resilient Communities

NAPA describes resilient communities as "communities with the capacity to respond to, withstand, and recover from adverse situations." Public Works departments will be critical in creating that capacity in every community. The ability "to respond" to adverse situations means having a well-trained, reliable, and nimble staff that can adapt to unknown scenarios.

The critical nature of Public Works services requires any disruptions in services to be minimal to all citizens within the community. The capacity "to withstand" adverse situations requires extensive, proactive planning and preventative improvements. Proactive planning means creating resilient public spaces and infrastructure as well as requiring private improvements to be resilient. Preventative improvements are necessary from every division within Public Works. Before failures occur, all systems and infrastructure networks should be analyzed and addressed for weaknesses. This process will be most effective in previously underserved areas and provide the most significant benefit for the most vulnerable populations.

Two (2) components determine the ability "to recover from" adverse situations: financial capacity and recovery desire. The role of Public Works in the first component is to implement recovery projects efficiently and effectively. The second component is much more nuanced and requires a long-term commitment. When done well, the day-to-day activities of Public Works departments will create a place that is loved and appreciated by its citizens, creating an attachment. This attachment will provide the desire within its citizens to remain and recover in that place. Without this desire, recovery efforts will stagnate and never receive the funding or attention necessary to be effective. These principles of resiliency apply differently to "adverse situations."

Extreme Weather Conditions and Natural Disasters

Extreme weather conditions are becoming more frequent with climate change. In Kentucky alone, one of the worst tornado events and one of the worst flooding events occurred in the past twelve (12) months. Public Works plays a vital role in each step of resiliency concerning natural disasters. Public Works departments must be prepared to react quickly and efficiently during a disaster. Planning and preparation are also vital to ensure the most effective response. Shelter and water are two basic human needs that must be restored quickly following a natural disaster. Restoring shelter and water involves reestablishing the transportation network, restoring the treatment and distribution of potable water, and providing temporary housing and infrastructure access. Public Works departments must prepare for these situations and have contingency plans. Specifically, this can be done by having repair materials on-hand; this is becoming especially vital due to supply chain issues and long lead times. Additionally, the distribution of resources will increase the ability to respond. In both Kentucky examples, equipment and vehicles for entire departments were destroyed due to a centralized location of assets.

Withstanding a natural disaster is a much more difficult step to reaching resiliency. Disasters are unpredictable. It can often seem impractical to build infrastructure to withstand them. Planning needs to be involved early in development processes to ensure infrastructure is adequately constructed and located appropriately to withstand extreme events. Public Works departments need to evaluate their existing infrastructure to locate vulnerable areas. Once the vulnerabilities are identified, funding can be used strategically to reduce the impact of the next disaster.

Without a functioning and effective Public Works department, recovery from a disaster would be impossible. Public Works is integral to a community's recovery and functionality, from the initial restoration of services such as solid waste and wastewater treatment to the long-term recovery of facilities and parks. Recovery efforts put a tremendous strain on staff due to increased workload coupled with existing day-to-day activities. Supporting staff during recovery efforts is critical in maintaining morale. Another component of disaster recovery is strong relationships with nearby communities that can share equipment, facilities, and personnel.

Economic Dislocations

The role of Public Works in the resiliency of a community as it relates to economic dislocation is less tangible than others but not less important. Public Works can help withstand economic dislocation by creating and maintaining attractive places and providing high-quality services. Increasing focus on the most affected neighborhoods is crucial to maintaining dignity and quality of life. This will create an opportunity for new businesses to emerge in the community that will support the neighborhoods, which will involve planning professionals and organizations that encourage entrepreneurs and create spaces for them to flourish.

Health Epidemics

The ability to recover from a health epidemic is the center of attention as the pandemic slowly wanes. By maintaining high-quality services that increase the general quality of life, local governments can expedite the recovery of communities. A local government can be an example of how to work through a health crisis and provide an opportunity for growth and employment as the community emerges on the other side.

Unaffordable Housing

Housing affordability is an issue that touches every community, especially as the cost of existing housing and construction skyrockets. Housing is a complex issue that needs to be addressed by all disciplines within local government. The primary role of Public Works in addressing this crisis is to create and maintain a high quality of life for the entire community. Public Works serves a role in creating affordable housing through coordination and collaboration with housing authorities. For example, the City of Savannah, Georgia regularly partners with private developers to construct affordable housing projects. The City typically reduces or waives utility-based fees to help push the project forward. A long-term approach involves keeping homeownership costs low through proper management of budgets. Rising housing costs paired with rising taxes, fees, and utility bills will hinder the resiliency of a community.

Resiliency in 2030

Each challenge is not just a problem of the future that requires preparation. Communities are now navigating each step, to "respond, withstand, (and) recover," and are becoming more resilient in the process. Each day, mistakes are made, lessons are learned, and successes are celebrated in communities across the United States. Documenting and implementing the characteristics of the communities that emerge from current and past crises is critical to preparing society for the known and unknown challenges that arise in the future.

Foster Social Equity

Social equity is the ability to be impartial, fair, and just to all people. Social policy ensures that systemic inequalities and barriers are removed so that everyone in the community can access the same opportunities and outcomes. Street-level bureaucrats argue that a great deal of planning and writing has been made on several occasions to try and improve social equity in society. However, it is not a secret that social equity has received relatively low attention from some jurisdictions compared to other initiatives.

It should be determined if it is possible to adopt government-initiated social equity programs wholly or if community-initiated social equity programs work better for the prosperity of society.

In 2013, in President Obama's "Remarks on Economic Mobility," he mentioned that income inequality is one of the defining challenges of our time:

"A child born in the top 20 percent has about a 2-in-3 chance of staying at or near the top. A child born into the bottom 20 percent has a less than 1-in-20 shot at making it to the top. He's 10 times likelier to stay where he is. In fact, statistics show not only that our levels of income inequality rank near countries like Jamaica and Argentina, but that it is harder today for a child born here in America to improve her station in life than it is for children in most of our wealthy allies -- countries like Canada or Germany or France. They have greater mobility than we do, not less."

With this in mind, different jurisdictions aim at prompting economic progress through their Public Works departments. Their goal is to help create great communities where citizens can enjoy living, working, learning, and raising their families. However, these positive ideas may sometimes bring unintended consequences to underserved communities, including Black Indigenous People of Color (BIPOC), immigrants, and low-income families.

More often than not, it has been reported in several jurisdictions that after major development projects whose intention is to uplift the community from poverty, residents and businesses become unable to afford rent in their upgraded neighborhoods. A community is often upgraded in value without any plans for economic upgrades at the level of the individual residents. Consequently, this leads to expensive homes and neighborhoods for which the people whom these improvements were intended cannot afford. As a result, citizens move away from their "upgraded community" to less expensive underdeveloped areas that they can afford. When this happens, wealthier people who can afford the upgraded communities move in. Having been displaced, these communities end up with even more of a financial burden: joblessness and transportation issues because of long commutes and distant amenities. In the end, all that started with good intentions by the Public Works department in their jurisdiction has become an additional burden to society. This all results from social inequality in planning, implementing, and commissioning the projects.

Thomas Dye stated that public policy is what governments do, why they do it, and what difference it makes. We can easily replace the word policy with "works," and the definition still stands true. The American Public Works Association (APWA) defines Public Works as "the combination of physical assets, management practices, policies, and personnel necessary for the government to provide and sustain structures and services essential to the welfare and acceptable quality of life for its citizens" (APWA 2022). Public Works is not a one shoe fits all model. Public Works can include many divisions depending on the city, county, or tribe.

History of Social Equity within Public Works

History shows that Public Works has not been equitable or equal. Instead, resources went to the white upper- and middle-class neighborhoods. Meanwhile, most majority-minority communities suffered from failing public infrastructure. The interstate highway system is one of the most significant examples of infrastructure inequality. In 1956, the National Interstate Highway Act approved the construction of interstate highways from one coast to the other spanning 41,000 miles, one of the most significant Public Works projects in the history of the United States. However, many highways were constructed through thriving black communities. As a result, citizens were displaced to make room for the construction, which uprooted over 1,000,000 citizens in cities across the country, such as New Orleans, Louisiana, Houston, Texas, and Nashville, Tennessee. Another example occurs in the City of Fort Worth, Texas, where there is a neighborhood called The Butler Place. The Butler Place has been around since the 1940s. This neighborhood was developed as part of a project with the Public Works Administration for low-income housing. Unfortunately, parts of The Butler Place were demolished due to a north-south freeway construction project in the 1950s, thus, isolating the community. As a result, schools closed due to low enrollment, which led to overpopulated schools.

In addition, history proves that the placement of federal outlays has been inequitably distributed, "in the 1950s and 1960s, highway projects often targeted Black neighborhoods, destroying cultural and economic centers and bringing decades of environmental harm. In addition, state and local officials often steered roads through Black communities, isolating them from parks or economic gain" (Kanno-Youngs & Ngo, 2021).

Social Equity within Public Works Today

Today federal and local governments are still struggling to provide equitable services. Cities are identifying barriers and implementing focus groups, projects, and MMA (major minority areas) lists to ensure the underrepresented communities are being investigated and prioritized. Public Works resources, services, and infrastructure in good condition should be equitable, inclusive, and accessible to all. In the United States, infrastructure was built on racial inequalities.

The question arises, "how can we reconnect communities, upgrade old infrastructure, and implement new infrastructure systems that are equitable to all?" President Biden has signed a few executive orders to combat racial inequality, some of which can be found in Table 2.

Table 2: Executive Orders to Combat Racial Inequality

Executive Order 13985/ Advancing Racial Equity and Support for Underserved Communities Through the Federal Government Executive Order	This executive order instructs federal agencies to promote equity by identifying and addressing challenges underserved communities encounter due to government programs and policies.
Justice 40 Executive Order	This executive order ensures that 40% of federal investments benefit underserved and disadvantaged communities, which includes “climate change, clean energy, and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure” (House, 2022).
Bipartisan Infrastructure Deal/ (IIJA) Infrastructure Investment and Jobs Act	This deal addresses a list of issues, but the main points to address here are: this deal aims to fix roads and bridges, invest in clean drinking water, and upgrade the wastewater infrastructure.

Continuing with the Infrastructure Investment and Jobs Act (IIJA), this deal includes over \$550 billion invested in the United States infrastructure/framework. In addition to fixing highways, bridges, and roads, the proposal calls for an investment of \$20 billion into communities that infrastructure projects have historically hurt. It would also provide \$45 billion to replace lead pipes and service lines in communities like Flint, Michigan, and billions to expand broadband access and affordable housing options (Norwood, 2021). Inequality, race, and public infrastructure are being discussed on a national level, with more and more people understanding the importance of the conversation. For example, in response to The Butler Place, the City of Fort Worth, Texas started a program with the United States Department of Housing and Urban Development to relocate all current residents to better homes in good communities through a lottery process in 2020. In addition, the City is planning on using IIJA funding to reconnect the neighborhood and upgrade its infrastructure, including streets, utilities, transportation, and land redevelopment.



Potential IIJA Funding Sources

Subregional Studies	Butler Place	East Lancaster	Corridor Plans
Active Transportation Infrastructure Investment	Charging and Fueling Infrastructure	Competitive Bridge Grant Program	Competitive Bridge Grant Program
Infrastructure for Rebuilding America (INFRA)	Active Transportation Infrastructure Investment	Charging and Fueling Infrastructure	Charging and Fueling Infrastructure
Competitive Bridge Grant Program	Infrastructure for Rebuilding America (INFRA) Program	Active Transportation Infrastructure Investment Program	Active Transportation Infrastructure Investment
CMAQ, TAP, STPBG (COG)	FTA 5309	Infrastructure for Rebuilding America (INFRA) Program	Healthy Streets
Safe Streets and Roads for All Grant	Healthy Streets	FTA 5309	CMAQ, TAP, STPBG (COG)
National Infrastructure Project Assistance	CMAQ, TAP, STPBG (COG)	CMAQ, TAP, STPBG (COG)	Strengthening Mobility and Revolutionizing Transportation (SMART)
Local and Regional Project Assistance Program	Strengthening Mobility and Revolutionizing Transportation (SMART)	Strengthening Mobility and Revolutionizing Transportation (SMART)	Safe Streets and Roads for All Grant
	Safe Streets and Roads	Safe Streets and Roads for All Grant Program	Local and Regional Project Assistance
	Local and Regional Project Assistance	Local and Regional Project Assistance	
	Reconnecting Communities Pilot Program	Reconnecting Communities Pilot	12

Figure 1: City of Fort Worth, Texas Potential IIJA Funding Sources

Cities have limited funding which creates limited resources. Many cities have a backlog of infrastructure repairs due to limited budgets. The IIJA will assist with providing \$110 billion in funding for roads and bridges for the next five (5) years. Per the White House, 173,000 miles of highways and roads plus 45,000 bridges are in a pitiable state. "This investment will repair and rebuild our roads and bridges with a focus on climate change mitigation, resilience, equity, and safety for all users, including cyclists and pedestrians" (House, 2022).

Since the highways were built to divide communities, the IIJA created a \$1 billion program that will work on reconnecting communities by reconstructing street grids and parks and by creating other necessary improvements. With people of color living in the most vulnerable locations for flooding, the IIJA will allot more than \$50 billion to combat flooding and droughts as well as aid in weatherization. Clean drinking water is also affecting over ten million United States citizens. IIJA is investing \$55 billion, which will assist in replacing old lead lines and preventing harmful chemicals from entering the water supply, with the main focus on underserved communities. In addition, this bill will provide funds to clean superfund sites and cap bereaved gas wells. Unfortunately, "26% of Black Americans and 29% of Hispanic Americans live within three miles of a Superfund site, a higher percentage than for Americans overall. Proximity to a Superfund site can lead to elevated levels of lead in children's blood" (House, 2022).

Some examples of how local governments are using the IIJA funds are as follows:

Table 3: Use of IIJA Funds

Percentage	Use
82%	Cities say they plan to use IIJA funds on roads, bridges, and major projects.
60%	Cities say they plan to use IIJA funds on water.
56%	Cities say they plan to use IIJA funds on road safety.
24%	Cities say they plan to use IIJA funds on environmental remediation.
9%	Cities say they plan to use IIJA funds on ports and waterways.

Actions to Address Social Equity

Instead of only focusing on infrastructure such as roads, water, or schools, local governments must focus on the people they serve. For example, planners should ask themselves questions that would help determine whether there are adequate access roads to schools, public transit centers, community centers, and amenities. These discussions would make Public Works planning effective in providing development that encompasses the interconnected nature of all the services and the people they are meant for.

Planners must prioritize projects in order of need. While there is a great need for upgrading amenities and affordability for local communities, residents, and businesses, prioritization must occur to ensure upgrades are made based on inadequacy and not on bias, financial persuasions, or nuisance complaints. The repercussions of not adjusting prioritization methods will lead to the displacement of communities and inequitable society.

Conclusion

The discipline of Public Works provides essential public services and programs to ensure humanity's advancement into the age of enlightenment and knowledge. As society evolves and progresses through its governance, so do the services and programs that support life. Of the NAPA twelve (12) Grand Challenges, four (4) are vital focus areas to ensure Public Works advances and ensures sustained effectiveness within American communities. Future Public Works professionals must provide equitable and sustainable infrastructure and services through a modernized workforce focused on protecting and preserving our natural resources. This commitment will ensure a community's resiliency to meet our reality's ever-changing societal and environmental demands. The future of this profession is poised to tackle these challenges and eliminate the disparities within Public Works programs and services. Every neighborhood, regardless of race, creed, or socio-economic status, should be afforded superior Public Works infrastructure.

It is not an understatement to say that social equity is needed. However, inequality exists because of society's acceptance and stereotyping by class within our communities. Government alone cannot solve social inequality without involving the community. Economic disparities, as well as legislative and political inequality, are fundamental contributors to historical injustices. Both local governments and citizens are responsible for undoing years of societal disparities. Measures must be adopted through which more robust and more stable societies can be built.

The NAPA Grand Challenges recognize that the public sector has been struggling to adapt rapidly to today's contemporary issues. Managing social equity through grassroots efforts over the next decade will offer a better society for the people who live there and enable local governments to address critical issues, including economic development and environmental stability.

The time is now for Public Works to come out of the shadows, to make the profession known to society, and to show the importance of what the discipline provides to humanity. Gone are the days of being the "unsung heroes" and the "no news is good news" mentality. Public Works professionals are ready to stand up and make their craft known and recognizable to all who benefit from the programs and services provided by this critical industry. Publicly sharing the profession's efforts to meet today's societal and environmental demands will safeguard the future of humanity.

APPENDIX A:
Citations

Citations

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