



CASE STUDY

Atlanta's Department of Watershed Management

A Community Treading Water

The neighborhoods around Proctor Creek in Atlanta were once a thriving and historic center for the Civil Rights Movement in Atlanta, with Martin Luther King, Jr. and other local leaders living nearby. In recent years, these historic neighborhoods have been adversely impacted by frequent flooding, poor creek water quality, and other environmental and economic development challenges.

The environmental justice issues pervading the community aren't new, but both rainfall and heavy urbanization have increased, without infrastructure investment keeping pace to properly manage these challenges. Proctor Creek's "headwaters" now originate from runoff of impervious surfaces in downtown Atlanta, such as parking lots, buildings, and highways. This urbanization, combined with increasing total rainfall and extreme storm events, has concentrated stormwater impacts in the low-income neighborhoods downstream and put pressure on the area's existing stormwater and wastewater infrastructure. Proctor Creek now carries floodwater, illegally-dumped trash, and contaminants that threaten the health and well-being of roughly 60,000 people during heavy rain events.

The City of Atlanta's Department of Watershed Management (DWM) had succeeded in addressing some of the impact of stormwater on its infrastructure in the Proctor Creek area, primarily through the separation and rehabilitation of much of its combined sewer system, which previously sent raw sewage into streets and homes in heavy rain events. However, challenges have remained in the neighborhoods from local flooding of streets and homes, poor water quality, and the degradation of Proctor Creek itself and its tributaries. To meet these challenges, DWM increasingly focused on green infrastructure and how it can improve social equity for low income communities like those around Proctor Creek – serving not just as a way to manage

stormwater, but also as community assets that provide access to greenspace, recreation, job opportunities, and mitigation of air quality and urban heat island impacts.

With competing budget priorities, however, high-impact green infrastructure projects for these neighborhoods, developed in DWM's capital improvement plans and through community-led engagement efforts, remained unfunded and undeployed. DWM searched for a pathway to re-prioritize, finance, and deploy projects that would address these communities' challenges.

The Environmental Impact Bond

DWM had already begun to incorporate select green infrastructure projects, such as by mandating green infrastructure for new developments and re-developing the Historic Fourth Ward Park into a major stormwater detention feature. However, the Department had a desire to better understand the local impacts of green infrastructure on communities throughout the City, and particularly to implement projects that would benefit low-income communities in a way that would best suit their needs. This desire was enhanced under the new goals of Mayor Keisha Lance Bottoms, who assumed office in January 2018, to improve social equity in Atlanta.



Photo courtesy of Chattahoochee Riverkeepers



Mohamed Balla, CFO City of Atlanta's Department of Watershed Management

"The more we learned about EIBs, the more of a 'no-brainer' they became."

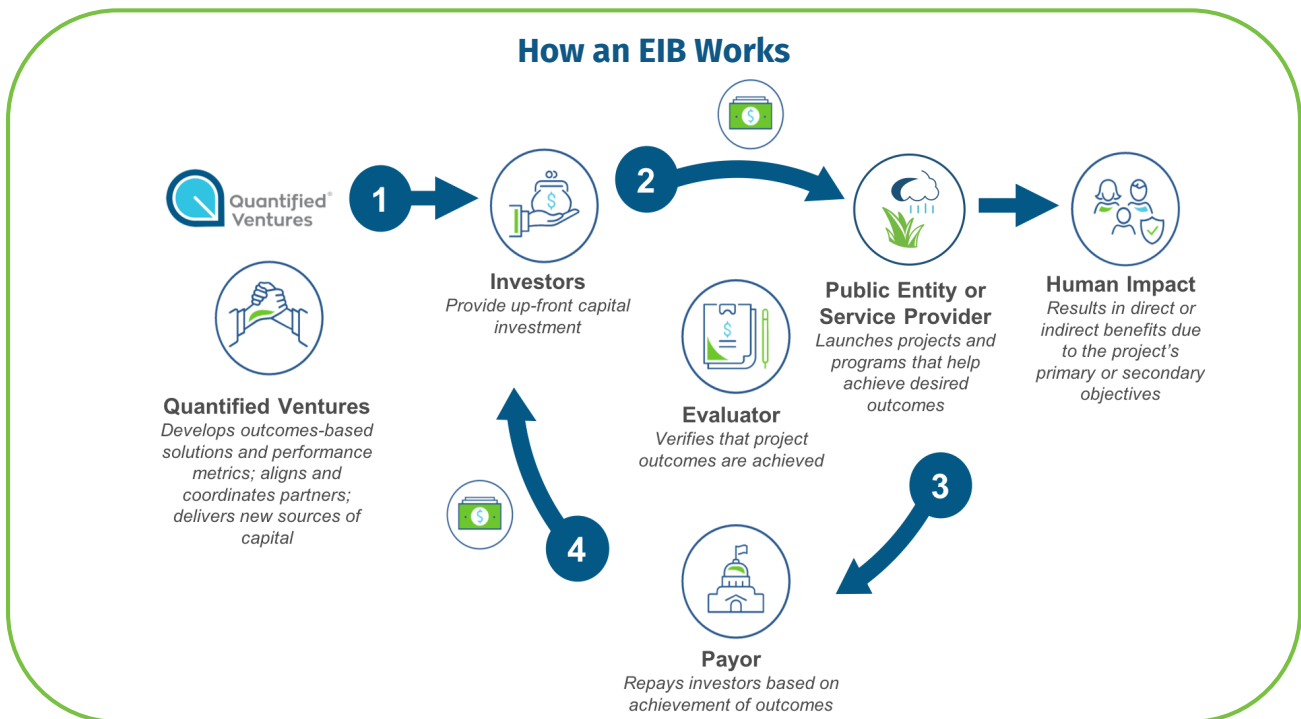
DWM estimated that the city needs an additional \$40-60 million per year to adequately improve the city's stormwater infrastructure system. Without adequate capital matched specifically to these projects, they would likely sit shovel ready for years.

A national competition to structure an Environmental Impact Bond (EIB) – a form of outcomes-based financing – with Quantified Ventures sponsored by The Rockefeller Foundation presented an opportunity for the Department to leverage innovative financing to deploy these high impact projects. The EIB would allow DWM to attract new investors to the City, better understand the benefits of these projects to distressed communities, link their spending on the projects to the degree to which they achieve those benefits, and determine how it should value these local impacts in future planning. Quantified Ventures selected Atlanta's proposal based on their demonstrated commitment to innovation, the strength of potential impact to vulnerable neighborhoods, their level of community engagement, and their internal alignment. Together, the Department of Watershed Management and Quantified Ventures got to work.

An EIB is a form of debt financing where the overall return is linked to the degree to which the project(s) it finances achieve pre-defined environmental or social outcomes. As with traditional debt, such as bonds or loans, upfront capital for projects is provided by private investors, which is then repaid over time at a set interest rate. However, an EIB

also contains a performance payment mechanism, where additional or lower payments may be made following the completion of a third-party evaluation or validation of the pre-defined outcome metric. Though there are several ways the outcomes-based element can be structured, the general structure of an EIB for urban green infrastructure projects is illustrated in the diagram below.

Linking the repayment of financing for projects to the beneficial outcomes they generate can help issuers – typically state or local governments or utilities – in a number of ways. First, it can help make public spending more efficient, since repayment of financing is linked to the value of the environmental, social, or economic impact projects generate, rather than for the projects themselves without regard to how successfully they achieve their goals. Second, it can help incentivize issuers to pilot more innovative types of infrastructure and programs or those whose performance is less certain, by transferring risk of their performance to investors. Third, it can allow issuers to access a new set of "impact" investors seeking to align their financial returns with environmental or social ones. Fourth, by framing the financing around outcomes, and through the outcomes evaluation that is a fundamental component of the EIB, it can help public debt issuers re-prioritize and draw attention to high impact projects, as well as build an evidence base for outcomes that can help future planning and funding efforts. Finally, in certain cases, by taking a holistic view of the positive externalities that can be generated by projects and where they accrue, it can sometimes encourage additional public or private entities to help share in or support the financing if they also repay based on the benefits they receive, or allow issuers to pay for ecosystem services generated outside of their jurisdiction (for example, a downstream municipality paying for upstream management practices to reduce nutrient or other pollutant runoff).



The First Publicly-Offered EIB

Quantified Ventures’ work with Atlanta DWM resulted in closing the first form of outcomes-based financing to be sold to the public in January 2019. The \$14 million municipal bond, backed by Atlanta DWM’s Water and Wastewater Enterprise Revenues, financed six green infrastructure projects in neighborhoods within the Proctor Creek watershed, which include a combination of bioretention cells in public parks, stormwater bump-outs in the right-of-way, and larger floodplain, wetland, and stream restoration projects.

The publicly offered bond, which was highly rated by S&P (A+) and Moody’s (Aa3), allowed Atlanta to access mainstream municipal bond investors and build supporting documentation and legislation that would allow it to easily issue additional EIBs in the future. The public offering represents a key innovation from previous impact bonds, such as the one Quantified Ventures issued with DC Water in Washington, DC, which have all been privately placed. The significant step of a public EIB issuance introduced the \$4 trillion municipal bond market to outcomes-based transactions, where impact is not only directly measured, but also integrated into the financing itself.

Leading up to the public issuance, a single outcome metric was selected – volumetric capacity for stormwater capture measured in gallons – to be aggregated across the six projects. This metric could be applied to the different types of practices and is linked to both flood risk reduction and water quality improvement – the two major drivers of “performance” in terms of mitigating local stormwater challenges.

To support the public offering and enhance the appeal of the Atlanta EIB to mainstream municipal bond investors, Quantified Ventures developed a two-tiered performance structure with a “base” and a “high” performance scenarios. If the green infrastructure projects capture more stormwater in aggregate than expected (“high performance”), investors will receive a pro rata share of an additional \$1 million payment. This is compensated, however, by a lower “base” rate that is paid on the bond. The rate was designed to be set at a below-market rate, so that when taking into account the respective probabilities of “base” or “high” performance, the overall expected value of the EIB’s yield would be similar to that for an otherwise traditional bond, without the performance payment mechanism. This structure allowed DWM to hedge some of the uncertainty around how effective the green infrastructure projects will be at capturing stormwater while offering investors a known floor for their return with potential for upside.

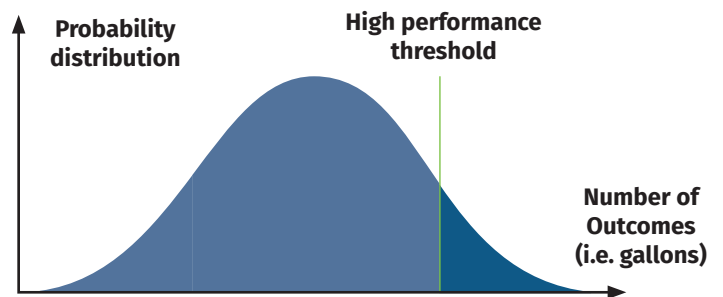
In an additional innovation to make the Atlanta EIB efficient and appealing to the mainstream municipal markets, it uses a relatively simple and cost-efficient evaluation methodology for outcomes. Central to any impact bond is a third-party evaluation of one or more outcome metrics, which drives how “performance” is defined and thus how repayments are made. While many impact bonds have used randomized control trials or other complex and



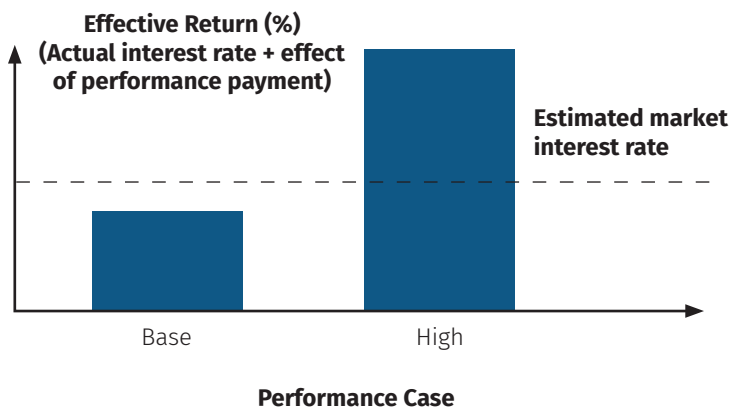
Amanda Hallauer, Watershed Manager, City of Atlanta’s Department of Watershed Management

“The EIB opportunity has been extremely valuable to the department not just because it brought funding but in the sense it’s been a vehicle to pilot and advance new ways of engaging with the community.”

Atlanta EIB Performance Structure



Performance:	Base	High
Fixed (Actual) Interest Rate:	Below market rate (estimated)	Below market rate (estimated)
Additional Payment:	None	Atlanta DWM to Investors



NOTE: This two-tiered performance structure is illustrated at a high level above – note that while the magnitude of the difference between high performance return and market rate is greater than that between the base performance and market rate, the high performance case is associated with a lower probability. Therefore, the overall expected value of the effective return (not illustrated) is similar to the estimated market rate.

expensive evaluations, DC Water innovated by installing sensors near their green infrastructure to assess the volume of stormwater flowing into the sewer system before and after projects are completed, as a proxy for reduction of downstream combined sewer overflows and other water quality issues. The Atlanta EIB takes this use of proxies one step further by evaluating stormwater capture from the projects as a capacity, rather than a flow, with one-time validation of storage capacity from the completed projects through as-built surveys and aerial imagery rather than installing sensor equipment and requiring continuous monitoring.

Finally, to set the performance terms of the EIB, Quantified Ventures, Atlanta DWM, and its consultants developed an economic model valuing the benefits from the projects, and a probability model calculating the expected likelihood of achieving various levels of stormwater capture capacity as measured in aggregate from the projects in gallons. At the mean expected base level of stormwater capture, the \$14 million set of projects are expected to generate \$18,030,597 in benefits related to flood risk reduction and water quality improvements as well as air quality improvements, urban heat island mitigation, and job creation and workforce development for both construction and long-term maintenance of the projects. At the threshold for “high performance”, which was set at 6.52 million gallons of stormwater capture capacity (associated with a 27.7% likelihood), the value of these benefits was estimated at \$19,846,265. This \$1,815,668 difference is much greater than the \$1,000,000 additional performance payment DWM would have to pay at or above this high performance threshold in exchange for the lower base interest rate. Any performance greater than 6.52 million gallons of stormwater capture would be associated with even greater value to the Department, the City, and the communities around Proctor Creek.

As a result of the projects funded through the EIB, DWM estimated that more than 55 million gallons of stormwater runoff will be avoided each year – gallons diverted away

from streets and living rooms. Construction will create dozens of local and sustainable-wage jobs both during construction and following through on-going maintenance and operations. Most importantly, the projects will finally help address flooding for nearly 500 surrounding homes.



Darryl Haddock, Director of Environmental Education, West Atlanta Watershed Alliance

“An EIB has built-in guidelines and aspirations to be equitable and to have the rich and deep community design and engagement that’s articulated for and by the community. I love that it’s in the milestones for the success of the project. It feels like we’ve turned a corner to working together on these Green Infrastructure projects that are needed and greatly desired.”

Conclusion

With these new innovations, Atlanta has demonstrated a novel approach to financing high-impact resilience projects that lacked funding and a path to implementation through traditional channels. By employing the use of the Environmental Impact Bond and its embedded measurement, Atlanta’s Department of Watershed Management will have more direct insight into the effectiveness of these projects than if they had financed through a regular bond. If as successful as predicted, this Environmental Impact Bond will serve as a ‘proof case’ for mobilizing additional funding within the broader capital markets for green infrastructure projects in Atlanta and elsewhere that are struggling to become more resilient and equitable communities.

Environmental Impact Bond Co-Benefits:

- **Manage stormwater**
- **Reduce local flooding**
- **Alleviate water quality impacts**
- **Provide workforce development opportunities**
- **Increase access to greenspace**
- **Improve public health**

Impact by the Numbers:

- **\$18MM+ in value** in terms of flood reduction and water quality as the base case
- **55 million gallons** avoided stormwater runoff
- **~500 homes protected** from flooding
- **100% of the green spaces implemented** in economically disadvantaged areas
- **Dozens** of jobs created