Advancing Resilience through Distributed Stormwater Capture and Conservation

A roadmap to promote water and community resilience through enhanced incentive programs

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ONEWATER ECON

waternow alliance
water leaders. resilient solutions.

ARLA

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Executive Summary

The Metropolitan Water District of Southern California (MWD or District) is at an inflection point. Like much of the western United States, the region of Southern California served by MWD is facing an increasingly uncertain water future. Prolonged drought over the past decades has diminished the amount of water available to MWD from in-state watersheds. At the same time, deepening aridification across the Colorado River basin, exacerbated by the effects of climate change, has resulted in a 15 percent diminution in flows in that critical water supply.

Accelerate Resilience Los Angeles (ARLA) applauds MWD for launching the Climate Adaptation Master Plan for Water (CAMP4W) to identify strategies that build resilience to this enduring challenge. The CAMP4W process and One Water[1] commitments expressed by MWD leadership and Board of Directors specifically call for MWD contributions to environmental and economic justice outcomes. **Leadership on these issues requires MWD to make financial investments in programs that deliver community benefits—these investments, in turn, can drive partnerships with member agencies, local governments, and other entities that leverage and expand upon the level of funding provided by MWD.**

This Roadmap provides steps and strategies to support MWD in leading Southern California to build water and community resilience by incentivizing distributed multi-benefit outdoor conservation, landscape transformation,[2] and stormwater capture projects through rebate programs. The process requires a shift in MWD's business model, away from a singular focus on being a regional water wholesaler toward becoming a steward of water resources for the benefit of its member agencies and their ratepayers. This shift, which embraces the need to provide reliable water supplies in the face of uncertainty and risk, has been acknowledged by MWD General Manager Hagekhalil, who has described MWD's future as "requir(ing) shifting the agency's focus from being purely a water importer to being more of a regional steward and caretaker of water…the transformation also requires changing the financial model from one that depends on selling imported water to member agencies, to one that will support investments in local infrastructure."[3]

Incentivizing multi-benefit resilience projects benefits MWD as a water provider and regional leader, while also benefitting member agencies, their municipal governments and stormwater management departments, and importantly, the residents in the neighborhoods that MWD serves. MWD is well positioned to lead on providing conservation and stormwater capture incentives that promote water savings while also delivering other co-benefits to the communities of Southern California.

The recommended enhancements to the rebate program advance the CAMP4W objectives by increasing water resilience and reliability, enhancing financial sustainability and affordability, and making MWD's

[1] A One Water approach recognizes the interconnected nature of imported and local supplies to meet both community and ecosystem needs and adapt to a changing climate. *2023-2024 General Manager's Business Plan* https://www.mwdh2o.com/media/1gbpmvs3/gm-23-24-business-plan-final.pdf

[2] Landscape transformation is a term of art that describes the process of replacing traditional turf lawns with landscape designs that restore healthy soils through densely and diversely planted, mulched, and climate resilient/native landscapes.

[3] Municipal Water Leader, *General Manager Adel Hagekhalil: Planning the Future of the Metropolitan Water District of Southern California*. N.d. Available https://municipalwaterleader.com/general-manager-adel-hagekhalil-planning-the-future-of-the-metropolitan-water-district-of-southern-california/

outdoor conservation incentive strategies more equitable (see text box). A summary of specific actions MWD can take to advance CAMP4W are highlighted below.

This Roadmap is informed by a year-long study conducted by the ARLA-led team in 2022 and 2023, with input from MWD staff. It included the following key elements.

- Modeling project opportunities in three study areas: Las Virgenes Metropolitan Water District, Lower San Gabriel River, and Long Beach to identify the most effective best management practices (BMPs) to capture and conserve water on different property types, while increasing community investment benefits;
- Quantifying and monetizing the multiple benefits associated with landscape transformation and stormwater capture BMPs using standard economic methods and tools;
- Performing financial and policy analysis to inform funding and financing strategies; and
- Conducting outreach and engagement with MWD, L.A. County, select member agencies, and community groups to inform our approach and recommendations.

The Roadmap proposes the following steps to guide MWD through a process for developing an updated, more equitable incentive strategy that captures the multiple water supply, water quality, and community benefits of landscape transformation and stormwater capture BMPs (Figure ES-1).

1. Update Incentive Program Offerings

As an initial step, the ARLA team recommends that MWD update its existing turf replacement program to support a more comprehensive landscape transformation program. Landscape transformation is centered on landscape designs that help restore the small water cycle and get at the root of

Roadmap Advances CAMP4W Themes

Reliability: Investing in conservation will increase water efficiency and diversify the supply portfolio to support system reliability. Landscape transformation and stormwater capture can contribute to a more flexible water supply system, and these projects are faster to build than other alternative supplies.

Resilience: Multi-agency collaborative funding of incentives creates opportunities for integration across water supply and other areas and a cooperative approach to system flexibility. Resilience can also refer to investments in infrastructure that enable flexibility to adapt to changing conditions and risks. Increased stormwater capture and landscape transformation contribute to risk reduction by extending water supplies further, creating less drought-sensitive urban landscapes, and optimizing the use of the most essential local water supply—rainfall.

Financial Sustainability: Pooling funds from partner agencies increases the amount of funding for rebates and reduces overall costs to MWD. By supporting resource sharing among member agencies, MWD can expand its overall investment in landscape transformation and stormwater capture projects and receive greater water supply and community benefits.

Affordability: The recommended enhancements to the rebate program increase access for the most vulnerable customer segments. Access to rebates can enable these households to increase water conservation, reducing the economic burden of their water costs.

Equity: Enhancements to the rebate program can improve affordability and access to conservation and associated benefits for disadvantaged community members. An updated program can also tap potential workforce and small business development opportunities and creating a 'green jobs' economy around landscape transformation design, installation, and maintenance.

aridification by **focusing on what replaces the turf once it is removed**. This would require that participating property owners create more densely and diversely planted, mulched, and climate resilient/native landscapes, with a stormwater feature sized to manage runoff from an 85th percentile storm. These improvements will enhance the stormwater quality benefits of each project while also fostering parcel-scale enhancements to soil health, urban shading, and community amenities. Section 2.1 provides more detail about this enhancement, and Appendix G includes a comparison of the existing and proposed guidelines.

In addition, the modeling and analysis conducted by the project team as part of Roadmap steps 3 and 5 indicate opportunities for additional incentive program enhancements and focus, including:

a. ***Installation of cisterns*** sized to meet remaining irrigation needs and, where relevant, increased protection against catastrophic wildfire damage or loss.

b. ***Conversion of non-functional turf areas on commercial and institutional properties*** using new landscape transformation guidelines.

c. ***Installation of enhanced bioretention BMPs*** as part of a commercial and institutional landscape transformation incentives package.

Ideally, MWD will promote residential and commercial landscape transformation incentives as part of a "bundle" that also includes support for upgrades to remaining irrigation systems, other outdoor water conservation measures, and potentially, indoor water/energy conservation measures. See Sections 2.1 and 2.3 for more detailed discussion.

Figure ES-1. Implementation Roadmap: Outdoor Conservation and

2. Appropriately Monetize the Value of Conservation

Prioritizing climate resilience requires a shift in MWD's approach to valuing stormwater capture and outdoor conservation as core water supply. For nearly a decade, MWD has capped its investment in water conservation practices at $195 per acre foot (AF) based on a dated comparison to "hard infrastructure" water delivery projects. This is no longer reflective of the value of alternative water supplies and places conservation on an unequal footing. While stormwater capture and conservation alone will not close MWD's projected water supply gaps, these practices can allow MWD to stretch its available water supplies. The results of this project show that combinations of landscape transformation with cisterns and bioretention can deliver this

resilience in a cost-effective manner compared to alternative water supplies. This Roadmap proposes $3,000 per AF as the appropriate value of conserved water, based on MWD's Long Term Financial Plan estimates for alternative core water supplies.[4] This reflects the cost of developing new supplies that conservation will help to avoid. See Section 2.2 for more detailed discussion.

3. Identify Opportunity Areas and Priority BMPs

The recommendations in this Roadmap generally focus on incentive program offerings that can be implemented across MWD's entire service area. However, MWD may be interested in tailoring certain program offerings, such as a direct install program, to specific locations based on need, stormwater capture potential, and/or partnership opportunities. MWD can use the resources provided in this Roadmap, particularly the modeling undertaken by Craftwater Engineering, as an initial opportunity assessment that illuminates geographies, property types, and BMPs that provide priority benefits, leverage partnerships with member agencies and other stakeholders, and unlock co-funding opportunities. This analysis can also identify communities within the service area where equitable access to rebates has been a concern and could be addressed through targeted actions, in line with the Board and CAMP4W's emphasis on the importance of affordability and equity. It can also point the way to additional inquiries, modeling, and prioritization.

See Section 2.3 for a detailed discussion of the modeling conducted for three pilot areas within Los Angeles County by Craftwater Engineering and the results that informed this Roadmap. We have also provided a dashboard to view opportunity areas within the three study areas.

4. Set an Outdoor Water Conservation Target

MWD's current turf replacement incentive program does not appear to be connected to an outdoor water conservation goal that is (a) linked to appropriate levels of funding and staff investment, (b) easily understood by the public, and (c) fully reflective of the value of water supply resilience. The 2023 Long Term Financial Plan Update, presented to the MWD Board of Directors in August 2023, includes conservation within the "core supply" category, which requires the development of 200,000 AF by 2032. While conservation and stormwater capture cannot provide this entire volume, these practices can play an important role in efficiently closing the water supply gap. We recommend that MWD set a volumetric target for outdoor conservation projects, including residential and commercial property projects. A target will be instrumental in supporting the dedication of sufficient financial and programmatic resources to attain this conservation goal (and in tracking and reporting progress.)

The importance of setting an outdoor conservation target is highlighted in Section 2.4.

5. Identify and Calculate Co-Benefits

Landscape transformation and stormwater capture projects on residential and commercial properties can be designed and implemented to optimize the co-benefits that they provide, including stormwater pollution prevention and runoff reduction, climate change resilience, and community co-benefits, among others. These benefits, in turn, have economic value to MWD, its member agencies and customers, municipal governments, and other stakeholders. We recommend that MWD and its program partners optimize the combination of incentives, BMPs and property types to deliver benefits to water providers,

[4] This is based on the annualized unit cost rate of $3,000 per AF from MWD's 2023 Financial Forecast. MWD reports that half of this amount ($1,500) is annual O&M, while the remainder is capital and financing costs.

stormwater managers, and regional communities. Toward these ends, **we have developed an interactive Planning Tool (Tool) that allows MWD to assess the monetary value of the benefits associated with landscape transformation and stormwater capture incentive program scenarios, understand the economic importance of these benefits, and explore appropriate levels of financial investment in projects that deliver them.** The Tool also has the potential to be used to support project evaluation against some of the CAMP 4 Water Evaluation Criteria, as those evolve in the coming year.

Importantly, MWD leadership and Board members have also prioritized the attainment of these co-benefits as an important component of its One Water approach.

The valuation of co-benefits and the Planning Tool are more fully explored in Section 2.5.

6. Identify Co-Funding and Financing Opportunities

Because the proposed conservation and stormwater capture projects provide multiple benefits there is an opportunity for MWD to build strategic partnerships with agencies and organizations that have interests in these benefits. These partnerships can be the basis for co-funding and/or provide co-implementation support for the incentive program. The Planning Tool described above is intended to inform negotiations between MWD and other potential co-funders, including County and municipal stormwater, flood control, energy, and water supply agencies, among others. The stormwater pollution prevention benefits can assist stormwater agencies in complying with their MS4 permit and other regulatory requirements. Several Watershed Management Plans (WMPs) within the region have identified projects on private property as a significant pathway to compliance. In Los Angeles County, Safe Clean Water (SCW) Program revenues may provide an opportunity to co-fund an incentive program or to otherwise support incentivized projects.

Bringing the recommended incentive strategy to full scale will likely require investment at a level commensurate with any water supply infrastructure project. The Roadmap suggests that MWD and its partners consider approaches to using general obligation and/or revenue bonds (perhaps enabled through a Joint Powers Authority) to secure sufficient and financially responsible resources for the incentive program. We recommend MWD explores using debt financing to make meaningful investments in conservation and stormwater capture, which our research indicates is an allowed but underutilized strategy. Innovative funding and financing approaches, including access to SCW PROGRAM funds, are more fully explored in Section 2.6.

7. Prioritize Equity Outcomes

MWD's current rebate structure has high barriers to entry for low-income households. This incentives approach creates structural inequities that result in wealthy people having the opportunity to conserve water and therefore reduce their water bills, while lower income households struggle to access rebates. MWD can lead the region by updating its incentive strategies to be administered in a manner that promotes equitable access to incentives by reducing implementation barriers for disadvantaged homeowners and renters. This flips the script on the current rebate structure, covering more of the costs and adding direct install options to ensure incentivized projects are accessible and affordable to all.

MWD also has an opportunity to play a leadership role in developing consistent project design, installation, and maintenance standards which, in turn, can catalyze local workforce development to install and maintain landscape transformation and stormwater capture projects. MWD also has

opportunity to lead workforce development efforts for directly installing and maintaining landscape transformation and stormwater capture projects for qualifying households.

Direct installation and maintenance of low water use landscaping and associated conservation practices is seen as a particularly important approach to reducing barriers to incentive uptake, particularly among older and lower income residents. A direct install program (potentially modeled on the City of Long Beach's Direct Install Gardens, or DIG, program) could leverage MWD investments with Conservation Corps or other workforce development organizations and landscaping firms, engage local youth in job training and other skills, and create access to incentives for households disadvantaged by income, age, or physical ability. MWD can play a leading role in achieving these outcomes by promoting certainty and consistency through uniform design, installation, and maintenance standards for outdoor conservation and stormwater capture projects; specifying skills training requirements; and promoting partnerships with Conservation Corps programs and other community-based organizations (CBOs) with relevant capabilities. MWD's leadership in this also helps the region advance the State's new Conservation as a Way of Life water budgets.

Equity considerations related to incentive program design and administration are discussed in Section 2.7.

8. Adopt a Program Administration Strategy

MWD's current method of administering its incentive programs, using SoCal Water$mart, is effective at disbursing and tracking payments, but may not be sufficient to implement a more robust, multi-partner program. MWD should investigate and pursue additional and/or alternative approaches that are better suited to provide technical support and/or direct installation services to property owners while leveraging workforce and community development resources. These additional capacities will be critically important for ensuring that an updated incentive strategy is accessible to economically-disadvantaged and other under-resourced property owners and communities. Additionally, a strengthened delivery model would enhance MWD's ability to deliver bundles of incentives to eligible property owners. We recommend MWD explore a Public-Private Partnership (P3) as an option that can deliver community-centered outcomes while meeting water conservation targets.

Alternative program administration and project delivery models are explored in Section 2.8.

Moving Toward Implementation

To advance collaboration, accompanying this document (and described more fully below) is an Excel-based Planning Tool that responds to input from MWD staff by allowing them to visualize the costs and benefits of various incentive program models with different (customizable) funding levels, co-funding partnerships, BMPs, and property types. As demonstrated throughout this document, the Planning Tool indicates that **under example incentive program scenarios, MWD could significantly reduce its cost for achieving potable water supply offsets by co-funding incentive programs with other agencies based on the percentage of benefits that accrue to different partners.** In some examples, the total cost per AF to MWD would be significantly less than the $3,000 per AF that MWD assumes for alternative supplies.

Also supporting this Roadmap is an interactive "dashboard," which is intended to serve as a communications resource, useful for illustrating the potential for stormwater capture and the corresponding costs and benefits within three sample geographies in the Los Angeles region.

The analyses, guidance, and resources provided as part of this Roadmap document are intended to help MWD advance the CAMP4W planning process and demonstrate early progress toward realizing the CAMP4W goals by:

- Providing recommendations to inform and achieve CAMP4W time-bound targets, including closing a portion of the supply gap identified in MWD's Integrated Resource Plan Regional Needs Assessment and final Long Range Finance Plan;
- Offering a methodology to evaluate and quantify a suite of environmental co-benefits, and associate those benefits with potential co-funders, to support the CAMP4W Evaluative Scoring Criteria and Decision-Making Framework;
- Proposing creative funding and financing strategies to help evolve MWD's business model and increase investments in conservation and stormwater, including taking affirmative steps to appropriately value water conservation as a source of supply;
- Presenting a cooperative funding model for MWD to align with regional partners and deepen collaboration within its member agency family and across Southern California;
- Creating an equity framework around incentives to ensure the benefits of conservation accrue to those most in need;
- Advancing climate-resilient landscapes to help restore the small water cycle throughout MWD's service area; and
- Demonstrating opportunities for MWD to lead on workforce development by promoting consistent training standards and programming.

1. Introduction

This comprehensive report is the result of a multi-year effort, led by Accelerate Resilience L.A. (ARLA), to assess opportunities for further integrating outdoor water conservation and stormwater capture into Metropolitan Water District's (MWD's) current and future water supply portfolio. The goal of the project is to help MWD design and implement a scalable outdoor conservation and stormwater capture incentive program that provides water supply, water quality, and community benefits for MWD, its member agencies, retail water customers, and the larger Los Angeles County community. This report encourages MWD to embark upon a process that builds on its successful rebate programs to enhance program benefits and equity, build partnerships to co-fund the program at an appropriate scale, and collaborate with community partners to expand outreach and installation opportunities. Through these steps, MWD can meet its water supply and regional leadership goals in concert with its Climate Action Master Plan for Water (CAMP4W) criteria and other long-range plans.[5]

Climate change, ongoing drought, and changing demographics in Southern California all create challenges for MWD's water supply and business model. Expanding water conservation across the MWD service area is, and will be, an essential tool for ensuring a secure water future, as well as building climate change resilience at the local and household levels. As noted by MWD in its future planning documents, conservation is a "core source of supply," which can help stretch the District's other supply sources while reducing the need for costly alternative supplies. The importance of increasing the availability of local water supply options has been repeatedly stressed by local elected leaders and water officials in the Los Angeles region. MWD General Manage Adel Hagekhalil has repeatedly underscored his (and MWD's) commitment to a One Water future that:

> *"brings people together, captures more water locally, uses our groundwater and surface reservoirs, captures our stormwater, and recycles our wastewater. Our goal is to create a future in which when people turn the faucet on, no matter what's going on with the climate, they have water at an affordable cost. We need to develop a fourth aqueduct that is not a physical pipeline, but a combination of local resources and conservation that creates a new, sustainable water supply for Southern California. We need to ensure that we are saving and reusing every drop of water we have."*[6]

MWD has a history of making significant investments in water conservation programs. In 2022-23, MWD spent **$46 million** on conservation programs, leading to a total new water savings of **4,372 acre feet (AF).** The District's turf replacement program, which provides rebates for residential, commercial, industrial, and institutional sites, helped remove about **10.5 million square-feet** of lawn, resulting in an estimated annual water savings of about **1,200 AF**.[7] Despite these successes, there is considerable room for enhancements to MWD's conservation programming. MWD's current turf replacement rebate program takes important steps toward incentivizing outdoor conservation, but does not fully encourage resilient landscapes that provide a range of water supply, water quality, and other community benefits. The changes to the program recommended in the following pages deepen the connection among turf

[5] See https://www.mwdh2o.com/planning-for-tomorrow/addressing-climate-change/#camp4w.

[6] Municipal Water Leader, *General Manager Adel Hagekhalil: Planning the Future of the Metropolitan Water District of Southern California*. N.d.

[7] Metropolitan Water District Draft 2024 Annual Progress Report on Achievements in Conservation, Recycling and Groundwater Recharge (Report).

replacement, stormwater capture, and multiple resilience benefits. These changes begin with alterations to the program standards to promote landscape transformation as part of a bundle of conservation incentives. Coupled with incentives for above-ground cisterns and stormwater capture bioretention, the recommendations will transform MWD's program from one singularly focused on water conservation to a multi-benefit strategy that provides value to co-funders and community partners. This collaborative, higher-value approach to outdoor conservation will require deeper financial and programmatic investments from MWD but will deliver commensurate water savings and other benefits. MWD's leadership in making these investments is a crucially important element of a strategy that extends its role as a steward of Southern California's water supply.

MWD's investment in an enhanced approach to outdoor conservation incentives is also a necessary complement to Los Angeles County's effort to fund decentralized nature-based solutions to stormwater pollution. The County's Safe Clean Water Program (SCW Program) provides funding for stormwater capture projects that could possibly contribute to an enhanced incentive program. The County also offers tax credits to property owners who implement stormwater management projects on site; however, the incentive to participate is quite low (see text box), significantly limiting participation. More comprehensive landscape transformation and outdoor conservation incentives are necessary to mobilize water conservation and stormwater capture on privately-owned parcels.

Like most other water conservation incentive programs, MWD's current effort prioritizes the singular benefit of reduced water consumption. Our research and policy suggestions are intended to expand on that "return on investment" by (a) moving from turf replacement to landscape transformation to increase the co-benefits of potable water offsets, (b) increasing the amount of stormwater capture obtained through each incentivized project, and (c) creating partnership and collaboration opportunities that increase resilience in the urbanized Los Angeles area (and indeed, throughout the District's service area). **Incentivizing multi-benefit resilience projects benefits MWD as a water provider and regional leader, while also benefiting member agencies, their municipal governments and stormwater management departments, and importantly, the residents in the neighborhoods that MWD serves.**

Incentives Are a Necessary Complement to the Safe Clean Water Program

Despite early optimism about the SCW Program tax credit and planned tax credit trading programs, neither of these SCW Program elements currently offers a realistic pathway for delivering significant numbers of private property stormwater capture projects within the County. This is primarily because the maximum $0.025 cent per impervious square foot tax credit available to private landowners is not large enough to incentivize project delivery. In a recent unpublished study by The Nature Conservancy (TNC), it was estimated that a tax credit incentive would need to be closer to $2.50 to $3.00 per impervious square foot to cover both construction and long-term maintenance costs. While private landowners are eligible to apply for grant funding under the SCW Program, there are several barriers to entry, including that eligible projects must be incorporated into relevant Watershed Management Plans. Design requirements and costs associated with the application process create additional barriers, particularly for small-to medium-sized landowners. As a result, MWD incentives for landscape transformation and stormwater capture can play an outsized role in promoting the implementation of projects on private property.

Achieving multiple benefits at an expanded scale likely will require additional financial contributions, which can be supported by stormwater agencies as well as other public and private entities who realize the benefits associated with incentivized projects. A portfolio approach to co-funding incentives may also open opportunities for alternatives to the current incentive administration model. Engaging a public-private partnership, for example, could create institutional capacity for direct installation, workforce development, and property-owner assistance with incentivized projects.

This document is intended to support MWD in leading Southern California to build water and community resilience by incentivizing distributed multi-benefit outdoor conservation, landscape transformation, and stormwater capture projects through rebate programs. The process encourages a shift in MWD's business model, away from a singular focus on being a regional water wholesaler to a steward of water resources for the benefit of its member agencies and their ratepayers. This shift, which embraces the need to provide reliable water supplies in the face of uncertainty and risk, has been acknowledged by MWD General Manager Hagekhalil, who has described MWD's future as "requir(ing) shifting the agency's focus from being purely a water importer to being more of a regional steward and caretaker of water…the transformation also requires changing the financial model from one that depends on selling imported water to member agencies to one that will support investments in local infrastructure."[8]

The following document is organized into sections that each provide supporting detail for the eight steps of the Roadmap. These steps were identified through a collaborative modeling and analysis process conducted by the ARLA-led team of watershed engineers and economic, technical, and policy experts. The order of the discussion tracks a sequence of planning, analytical, and administrative changes to the existing incentive program and reflects the lessons learned through the team's analysis.

Section 2 of the Roadmap provides the core content for each of its component steps:

1. Update Incentive Program Offerings
2. Appropriately Monetize the Value of Conservation
3. Identify Opportunity Areas and Priority BMPs
4. Set an Outdoor Water Conservation Target
5. Identify and Calculate Co-Benefits
6. Identify Co-Funding and Financing Opportunities
7. Prioritize Equity Outcomes
8. Select a Program Administration Model and Mobilize Partnerships

Section 3 contains responses to programmatic obstacles and challenges that MWD staff have raised with the ARLA-led team.

Section 4 offers concluding thoughts and recommendations.

Several appendices provide supporting information about relevant policies and peer examples.

[8] Municipal Water Leader, *General Manager Adel Hagekhalil: Planning the Future of the Metropolitan Water District of Southern California*. N.d. Available https://municipalwaterleader.com/general-manager-adel-hagekhalil-planning-the-future-of-the-metropolitan-water-district-of-southern-california/

2. Roadmap to Implementation

The following sections provide a detailed, stepwise process (Roadmap) for implementing an effective landscape transformation and stormwater capture incentive program (Figure 2-1).

Figure 2-1. Implementation Roadmap: Outdoor Conservation and Stormwater Capture Incentives

1 Update Incentive Program Offerings

We recommend MWD shift its turf replacement program to a more comprehensive incentive program that incorporates updated landscape transformation standards, requiring participating residential, commercial, and institutional property owners to convert their turf grass to more climate resilient/native landscapes, with a stormwater feature sized to manage runoff from the 85th percentile storm.

MWD's current turf replacement program has achieved notable successes, particularly through ensuring uptake across Southern California by encouraging and supporting member agencies to co-implement the program. These successes have occurred despite technical challenges and irregular funding levels. By 2022, the program had incentivized the removal of over 4,500 acres of water-intensive turf, saving more than 30,000 AF of water. Despite these successes, the lack of enforceable program standards has resulted in some undesirable effects. For example, initial experiences with turf replacement programs in the Los Angeles area resulted in the conversion of many lawns to crushed rock and other hardscapes.[9] While eliminating outdoor irrigation, these conversions have had the negative consequences of increasing stormwater runoff, contributing to increased urban temperatures, and generally diminishing habitat values and other ecosystem services. They also represent an opportunity cost: when turf grass is replaced with functional native landscapes, including vegetation and trees, positive air quality, temperature reduction, habitat values, and stormwater capture can be provided.

While MWD's turf replacement incentive program no longer subsidizes the installation of crushed rock or hardscape, the current standards still do not fully incentivize residential and

[9] See, e.g., Los Angeles Department of Water and Power, "LADWP Changes Turf Removal Program Guidelines," 9/1/2016. Available at https://www.ladwpnews.com/ladwp-changes-turf-removal-program-guidelines/.

commercial landscapes that provide multiple benefits or that aid in creating drought and climate change resilience at a neighborhood scale. With adjustments to these standards, MWD's incentive program can become a catalyst for urban resilience across the region. Our suggested alterations foster landscape transformation as a core foundation for an enhanced incentive program. These alterations align MWD's program standards with the standards in the Model Water Efficient Landscape Ordinance (MWELO). By agreeing to design and install MWELO-consistent landscapes, property owners will likely attain levels of water conservation that reflect landscape water budgets. In turn, MWD and its partners will be able to follow participation levels to more accurately determine and track conservation gains attributed to the incentive program. Appendix G contains detailed recommendations for updating MWD's current turf replacement standards.

Specific guidelines changes to support landscape transformation include:

- *Projects designed to achieve a calculated water budget*
- *Sufficient plant density to achieve 80 percent coverage of area at maturity*
- *Include a passive stormwater feature = 150 sq. ft. surface area x 6" deep per 1,000 sq. ft. of adjacent building roof or impervious drainage area*
- *No impervious hardscape within transformed area. Permeable hardscape limited to maximum 20 percent of landscaped area*
- *A minimum three inch (3") layer of mulch applied on all exposed soil surfaces of planting areas except in creeping or rooting groundcovers, or*

In addition to updated landscape transformation standards, the modeling and analysis conducted by the project team (as part of Roadmap steps 3 and 5) indicates opportunities for additional incentive program enhancements and focus, including:

- Optional installation of cisterns for residential landscape transformation projects, sized to meet remaining irrigation needs (e.g., from trees, bushes, and gardens) and, where relevant, increased protection against catastrophic wildfire damage or loss.
- Installation of enhanced bioretention BMPs as part of a commercial and institutional landscape transformation incentive package.
- Pairing the above options within a bundle of available incentives, including rebates and direct installation of other existing conservation practices (e.g., irrigation upgrades, trees and potentially, indoor conservation offerings).

Compared to typical turf replacement, the proposed incentive program enhancements offer an increased return on investment by creating more drought-resilient properties (ultimately requiring less application of potable water for irrigation, particularly when paired with cisterns, see Section 2.3.2), improving water quality, and providing multiple community investment benefits. Critically, the healthy living soil and transformed landscape helps to heal the broken small water cycle, reducing the effects of aridification and drought when installed at scale. In addition, on-site cisterns will be able to sustain trees and other plantings that require dry season supplemental water.

From a stormwater treatment perspective, revised design standards and stormwater capture BMPs will ensure that incentive projects retain and/or infiltrate runoff associated with up to the 85th percentile storm from rooftops and/or other impervious areas. This same standard is incorporated into regional stormwater discharge permit requirements. When projects are sufficiently concentrated across a

neighborhood, they will likely promote recharge of shallow (vadose zone) groundwater, increasing the amount of water available for street trees and other plantings across this area. As a result, the subsurface hydrology and vegetation will contribute to the reduction of heat island impacts and improvements in air quality beyond the implementing parcels and will promote healthier soils, carbon sequestration, and urban cooling through evapotranspiration. When concentrated in areas with underlying geology that is conducive to deeper infiltration, such as in the Forebay region, these projects may contribute to recoverable aquifer recharge.

Appropriately Monetize the Value of Conservation

The pathway described in this Roadmap begins with a substantial revision to MWD's appreciation for, and economic valuation of, the water saved through conservation measures. Throughout the team's work on this project, we have engaged MWD staff, Board members, and partners in conversations about the factors that limit the District's investment in conservation as a key component of its water supply infrastructure. These conversations have revealed the importance of a 2012 decision in which MWD leadership defined the value of conserved water as $195 per AF, apparently derived from a 2009 estimate of the avoided costs of pursuing marginal water supplies during dry years, and including calculations (and various assumptions) for power, treatment, and dry-year supply.[10] This policy decision effectively operates as a cap on MWD's willingness to pay for conservation projects and programs and is the source of the $1 per square foot turf replacement rebate amount (the portion provided by MWD). However, the cap is somewhat flexible, as the MWD Board agreed to use available general funds to support the turf rebate program at $2 per square foot in 2021.

If MWD is to succeed in its One Water ambitions and attainment of CAMP4W goals, it must evolve beyond this policy decision, which was set in an era with different water issues, before supply risks were heightened by prolonged drought in California and deepening aridification in the Colorado River Basin. The value of conserved water, to MWD and its member agencies, is considerably different now. While the project team agrees that the value of conservation should reflect the avoided costs of developing alternative supplies, these costs have changed considerably since the 2009 comparison to the $195 per AF cost. **Instead, MWD should apply the avoided costs associated with alternative water supplies that it is currently considering.**

Notably, the Needs Assessment in MWD's Long Term Finance Plan[11] uses a modeled unit cost of $3,000 per AF to evaluate the fiscal impacts of assuring adequate "core supply." As core supply includes conservation projects, the ARLA-led team recommends using this number and has incorporated it into its Planning Tool (see Section 2.5, below). Establishing a more accurate value for water conservation as a source of core supply is directly linked to proposed CAMP4W Criterion #7 and is a necessary precondition for attainment of the goals underlying Criteria #5 and #6, at a minimum.[12]

MWD's willingness to pay to develop new supplies such as desalination and/or reuse demonstrates its recognition that water supply security can be achieved by investing in alternative sources of water.

[10] Email from Gary Tilkian, MWD to Janet Clements, One Water Econ, Sept. 22, 2023.
[11] MWD 2023 Long-Range Finance Plan Draft. Attachment 1 in MWD Finance, Audit, Insurance and Real Property Committee Agenda, meeting with Board of Directors on August 15, 2023.
[12] See MWD, Development of a Decision-Making Framework and Draft Evaluative Criteria - Board Letter (November 21, 2023). The ten proposed criteria include: Equitable Supply Reliability, Risk Mitigation, Project Feasibility, Scalability, Environmental Impacts, Disadvantaged Community Benefits, Unit Cost ($/AF), Locally-Sited Project, High Impact, and Bond Feasibility.

Conservation practices such as landscape transformation are another opportunity to increase water supply resilience, but MWD needs to value and fund these projects at a level more reflective of current conditions and costs to yield meaningful results.

Another reported barrier to valuing conserved water is related to how conservation will affect MWD's revenues. Specifically, this question centers on the loss in revenues associated with conserved water (which cannot be sold) as compared to water supplies developed from alternative sources. Future supply shortages can be offset through conservation or purchases of additional water. Both options have costs that will impact MWD, member agencies, and customers. New water supplies will become increasingly expensive. Costs for these supplies will be distributed equally across all ratepayers. The result will be rate increases that disproportionately impact lower income customers. Conservation sustains existing water supplies which can be sold to current customers (in lieu of new supplies), reducing the supply shortfall and lost revenue. In both scenarios, costs will be passed to customers and recovered in the form of revenues. However, conservation programs enable customers to reduce water use, limiting impacts on household finances. Accordingly, conservation can reduce lost revenue and promote more equitable results for ratepayers.

Identify Opportunities Areas and Priority BMPs

Craftwater Engineering, part of the ARLA-led team, conducted modeling to identify locations, parcel types, and practices that provide the greatest opportunity for water savings and stormwater capture in three illustrative geographies within Los Angeles County—the City of Long Beach, the Lower San Gabriel River Watershed, and the Las Virgenes Municipal Water District service area. These areas were chosen with input from MWD staff because they are representative of the several different types of land use and hydrogeologic conditions found across the MWD service area and can provide results that can be extrapolated to provide planning insights across this wider geography.

We encourage MWD to utilize Craftwater Engineering's watershed modeling and the team's subsequent analysis as a starting place in its assessment of incentive opportunities. The results, and subsequent analysis highlight opportunities for distributed infrastructure and provide a bounded estimate of the potential for landscape transformation and stormwater capture in the region. The modeling data directly informed the project team's recommendations for structuring the incentive program, including which BMPs to include. In conjunction with the Planning Tool (see Section 2.5.2 and Appendix H) and the modeling dashboard provided to MWD, **our analysis of modeling results can help MWD identify optimal land uses, project types, and BMPs that will maximize benefits, as well as leverage support from member agencies and other co-beneficiaries. Additionally, targeted analyses may also inform MWD's programming. For example, a more demographic-based analysis in these or other areas may be particularly informative for efforts to identify outreach, engagement, and direct install program options.**

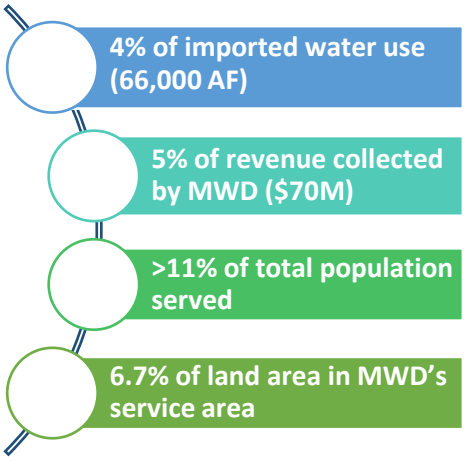


Figure 2-2. Study areas' collective representation of MWD

2.3.1 Modeling overview and key assumptions

The three study areas (Figure 2-2) were chosen for a variety of reasons:

- MWD expressed interest in the Lower San Gabriel River (LSGR) area because of its proximity to existing projects and partnerships MWD has there (e.g., the John Ansen Ford project in Bell Gardens). Additionally, areas in the LSGR have connectivity to the underlying aquifer and present an opportunity for potential groundwater recharge through stormwater capture and infiltration.
- MWD also expressed interest in Las Virgenes Municipal Water District (LVMWD) because they are heavily dependent on the State Water Project (SWP) and were only receiving 5 percent of their SWP allocation at the time. Additionally, the team was interested in how large cisterns could help the Las Virgenes area with wildfire resilience.
- The team selected the City of Long Beach to test meaningful opportunities to offset irrigation demand with landscape transformation due to the high density of single-family homes. Long Beach also provided a mix of economic, environmental, and social characteristics, including disadvantaged communities.

Baseline hydrologic modeling (i.e. modeling without any stormwater capture infrastructure) suggests that both the Lower L.A. River and the Lower San Gabriel watersheds would lose about 80 percent of rain run off to the drainage system on a long-term average annual basis. When modeling accounts for existing infrastructure, runoff to the ocean is about 30 percent of rainfall for the L.A. River, or roughly 174,000 AF per year (AFY), and 15 percent of rainfall for the LSGR, about 95,000 AFY. **The total volumes of runoff to the ocean are substantial and represent a significant opportunity for capture and reuse**. By way of comparison, in 2024 MWD is projected to import approximately 982,000 AF from the Colorado River Basin.[13]

For each study area, Craftwater paired parcel-level information such as soil type, building footprint, impervious area, and rooftop area with potential practices. Parcels were classified as either single-family residential, multifamily residential, commercial, public institutions (e.g. schools, libraries), or private institutions (e.g. churches, hospitals). Modeled practices included landscape transformation, above-ground cisterns (with and without storage capacity for fire protection), below-ground cisterns, bioretention, and combinations of these practices (Figure 2-3).

The model was granular enough to assess the general feasibility, siting, and costs of different practices. Parcel-level practices were modeled to capture the maximum runoff from a parcel's boundary for the 85th percentile event rainfall depths. The model aggregated parcel-level results for each region to demonstrate stormwater capture and conservation potential across the study areas. A summary of assumptions can be found in Table 2-1; Appendix F contains a more detailed description of all modeling considerations.

It is important to note that Craftwater's modeling did not account for the ongoing operations and maintenance costs of landscape transformation, cisterns, or bioretention practices that would be installed with incentive program support. As a result, the analysis presented in this report does not include these long-term costs. The assumption in our analysis is that most homeowners would be responsible for the ongoing upkeep of their converted residential landscapes, either directly or by hiring landscaping crews in a manner similar to their approach to turf maintenance. In this respect, these properties are unlikely to create maintenance costs to MWD and its partners. Larger commercial properties likely will require more

[13] U.S. Bureau of Reclamation, January 2024 Most Probable 24-Month Study.

1. Parcel level data for impervious area used to calculate stormwater capture potential

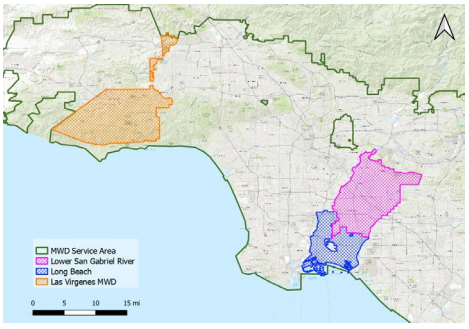
Purple impervious area used to calculate parcel runoff.

2. Parcel level details paired with selected practices

Selected stormwater capture and conservation practices (landscape transformation and cistern pictured above).

Parcel analysis scaled up across neighborhoods. Green areas show opportunities for bioretention.

3. Scaled across neighborhoods and aggregated for each study area



Modeling completed for three study regions

Figure 2-3. Watershed modeling process

intensive maintenance of their landscape transformation and bioretention projects. This analysis again assumes that property owners would bear these costs (as they do for existing landscapes) and therefore pose no budget impacts to rebate providers.

Installation and maintenance of the recommended practices require skills that are somewhat more specialized than typical landscaping. As a result, the rebate program standards and the incentives provided to property owners can create an opportunity for the development of a more skilled, specialized workforce. The value of green job creation benefits driven by installation costs is incorporated into the team's analysis. The ongoing maintenance, especially for larger installations on commercial and institutional properties, could sustain or enhance demand for this specialized green workforce. Since only construction costs were included in the analysis, the MWD Planning Tool limits benefits to jobs created from the initial capital investment (see Section 2.5.2 and Appendix H). However, should MWD and its partners wish to add some subsidy of maintenance costs, or incorporate into the program budget the long-term maintenance of direct install programs, the Planning Tool allows users to input a maintenance cost as a percentage of capital expenditures. Recommendations and sources for estimating ongoing maintenance costs can be found in Appendix H.

2.3.2 Modeling results

The modeling results presented below provide a grounded estimate of the **total maximum potential** for stormwater capture and potable water savings associated with each BMP type and **within each study area**, broken out by practice or combination of practices and land use type. The model assumed 100 percent implementation, providing a benchmark by which to evaluate various levels of participation. Realistically, implementation rates will be much lower and will differ among communities. The modeling results outlined here only include stormwater capture and potable water supply offsets associated with the modeled practices.

Table 2-1 Practices modeled and basic modeling assumptions

Practice	Parcel Types[b]	Costs	Notes
Landscape Transformation	SF, MF, C/I	$15/sq. ft.[a]	- Assumes 1 sq. ft. of rain garden for every 15 sq. ft. of impervious area on parcel. - Irrigation demands calculated using the SLIDE rule are divided by Irrigation Efficiency coefficient (0.55) for more realistic irrigation demand estimates. Average annual irrigation demand for landscape transformation areas is 22.8 gallons per square foot. - Continuous stormwater capture modeling carried out using L.A. County Department of Public Works' LSPC model.
Above-Ground Cisterns	SF, MF, C/I	$1.86/gallon storage	- Additional costs for filtration, pumps, distribution, connections, installation, and maintenance are not included in analysis. - Cistern assumed to be emptied in the 7-day period post rainfall event. - Sized to capture rooftop runoff from the 85th percentile storm and to fit within the footprint of each parcel. - Continuous stormwater capture modeling was carried out using L.A. County Department of Public Works' LSPC model; paired with pollutant timeseries. - Potable water supply offsets reflect seasonal irrigation demand and rainfall records.
Below-Ground Cisterns	C/I	$9.90/gallon storage	- Same as Above-Ground Cisterns.
Red-Flag Hydration Storage Cisterns	SF, MF, C/I	$1.86/gallon storage	- Additional costs for filtration, pumps, distribution, connections, installation, and maintenance are not included in analysis. - Sizing assumed sufficient water to irrigate between 5'-30' from building footprints for 1-week at peak irrigation demand (as defined by SLIDE rule) for use during Red Flag conditions. - Only modeled for areas where there is elevated wildfire risk (i.e. Las Virgenes).
Infiltrative Bioretention	SF, MF, C/I	Residential = $3.78/sq. ft. + $8,363 Institutional/Commercial = $33.50/sq. ft.	- Features an engineered "cell" with 1' of ponding depth and 4' of engineered soil media/gravel with 0.4 porosity for an effective storage depth of 2.6' (per L.A. County Design Guidance). - Modeling captured benefits of continuous runoff. - Tree planting incorporated at rate of 1.35 trees per 1,000 sq. ft. of bioretention.
Landscape Transformation + Cisterns	SF, MF, C/I	Same as unit costs for individual practices	- Potable offset and stormwater capture benefits are adjusted for combined practices, including potential reduction in converted turf area due to cistern placement.
Infiltrative Bioretention + Cisterns	SF, MF, C/I	Same as unit costs for individual practices	- Potable offset and stormwater capture benefits are adjusted for combined practices, including potential reduction in converted turf area due to cistern placement. Bioretention modeled to replace some impervious area on C/I properties where available. - Runoff from rooftops routed to cisterns and ground level runoff routed to bioretention cells.

a. Represents average of bids collected from MWD-approved contractors over the summer of 2023.

b. SF = single-family, MF = multifamily, C/I = commercial/institutional

Additional benefits that flow from landscape transformation and stormwater capture BMPs are discussed in Section 2.5.The modeling maximized the size of practices on each property to capture runoff from the 85th percentile storm. Total potential does not account for cost efficiency or property owner preferences. For example, modeling assumed removal of all turf from properties, while in practice, property owners may only wish to install landscape transformation on part of their turf. **These results should therefore be utilized to understand where opportunities exist, and which practices and locations will maximize the benefits of stormwater capture and potable offsets. The results are also helpful to frame the potential for stormwater capture and potable offset benefits from distributed infrastructure (at various levels of participation) relative to larger scale regional projects.**

As shown in Figure 2-4, below-ground cisterns outpace other practices in terms of stormwater capture potential (although further analysis revealed that below-ground cisterns are not cost effective compared to other practices). When either above- or below-ground cisterns are paired with landscape transformation, total potential capture is enhanced. In the Lower San Gabriel River study area, which is very densely developed, show higher potential stormwater capture volumes because there are significantly more private properties where these practices could be installed. The maximum potential stormwater capture across the three study regions is reflected in the combined practices of below-ground cisterns and landscape transformation, for a total of 32,705 AFY. Note that these results are not additive; each practice was modeled separately from other practices. The total potential capture across all regions varies by practice type and is listed in bold at the end of each bar.

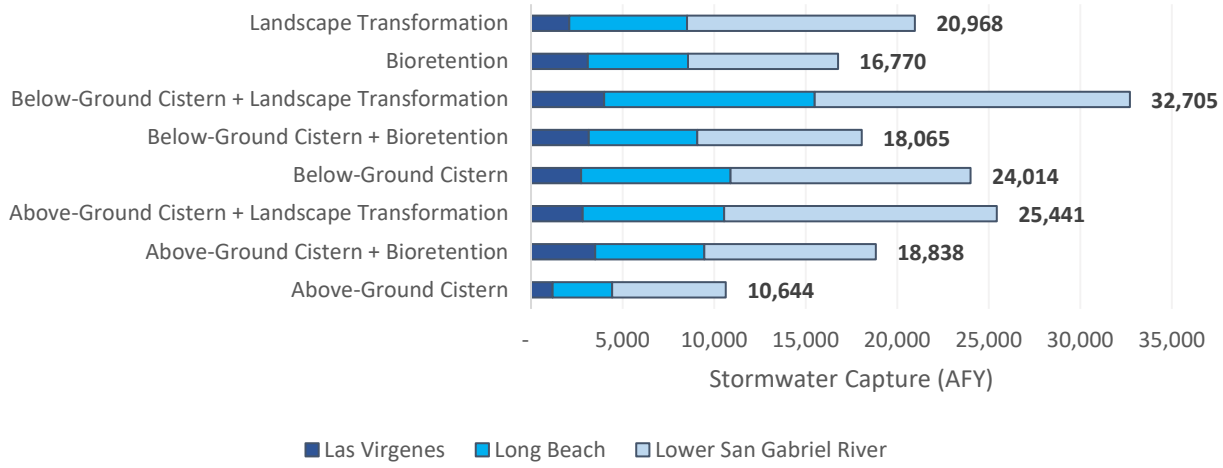


Figure 2-4. Annual stormwater capture potential by practice type and study region

Figure 2-5 shows opportunities for implementation by land use and practice type across the study areas. Relative to other land use categories, there is significant potential to retrofit single-family properties for stormwater capture. This is because of the large number of single-family parcels within each region. At the parcel level, BMPs installed at single-family properties result in a lower capture volume, on average, compared to other land use types. This means that more installations are necessary to yield the same level of capture.

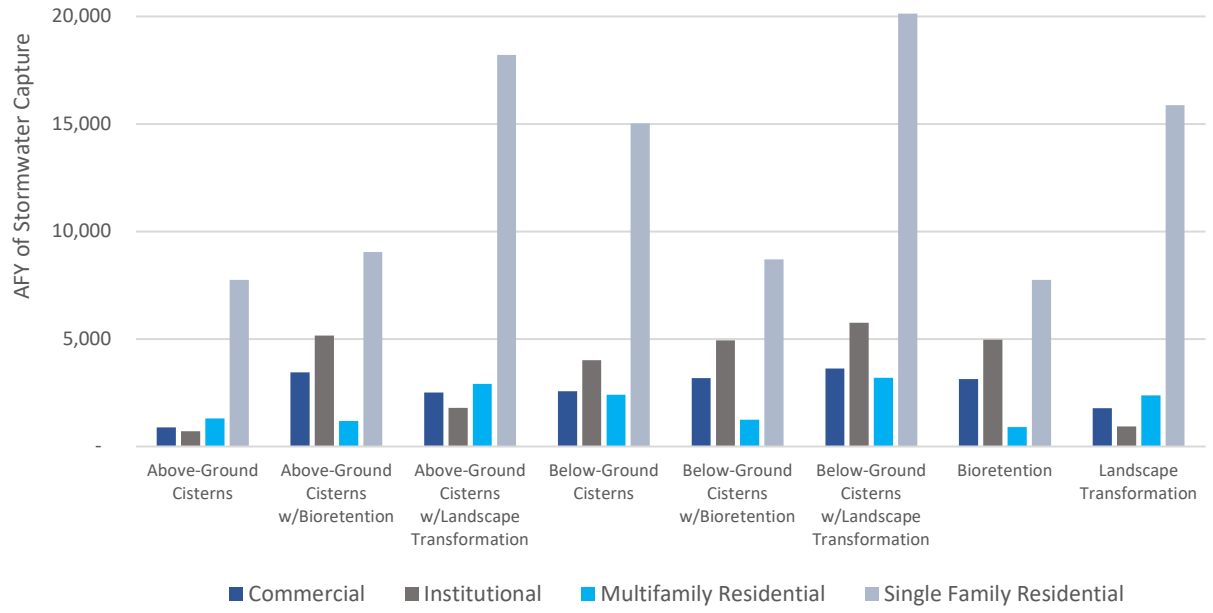


Figure 2-5. Annual stormwater capture potential by practice and land use type

In addition to identifying potential stormwater capture volumes, the model examined the conservation potential (or potable water offsets) on each parcel for relevant BMPs. For each study area, removing turf and transforming the landscape (together with cisterns) yields the highest potable offset benefit. When homes and commercial properties do not have to maintain turf lawns, their irrigation demand declines. Landscape transformation also promotes healthier soils that can retain more moisture, further reducing the irrigation demands for climate-resilient plants. Based on input from project team partner Green Gardens Group, total savings amount to 40 to 50 gallons per square foot per year compared to turf grass, depending on location within the County.

Modeling results indicate that below- and above-ground cisterns alone also result in potable water savings, although to a much lesser extent. This is primarily due to the mismatch in timing between rainfall events and irrigation demand. The modeling assumed cisterns would be emptied within seven days of a rain event. However, a full cistern indicates significant rainfall, which reduces irrigation demand because the soil is sufficiently saturated. At the same time, in Southern California, the timing of rain events can mean that larger volumes of water are stored at the beginning of the growing season but are often not sufficient to meet irrigation demands over longer dry periods. The team adjusted the modeling results downward to better reflect these realities. Thus, the potable offset estimates reflect the amount of water from cisterns that would likely actually be used for irrigation.

Figure 2-6 shows the total potential potable water supply offsets for each region and relevant practice type. As described above, the potential for potable water supply offsets for outdoor irrigation from cisterns alone is relatively minimal. However, subsequent analysis of modeling results indicates that large volume cisterns can provide meaningful fire risk reduction benefits in high fire prone areas like Las Virgenes. In addition, they provide important stormwater capture and water quality benefits and, when paired with landscape transformation, can provide a cost-effective method for meeting remaining irrigation demand. As an important note, the project team did not assign any water supply benefits to the

infiltration-based BMPs included in the modeling because the infiltrated stormwater is unlikely to reach drinking water aquifers in these three locations within a relevant timeframe (see text box).

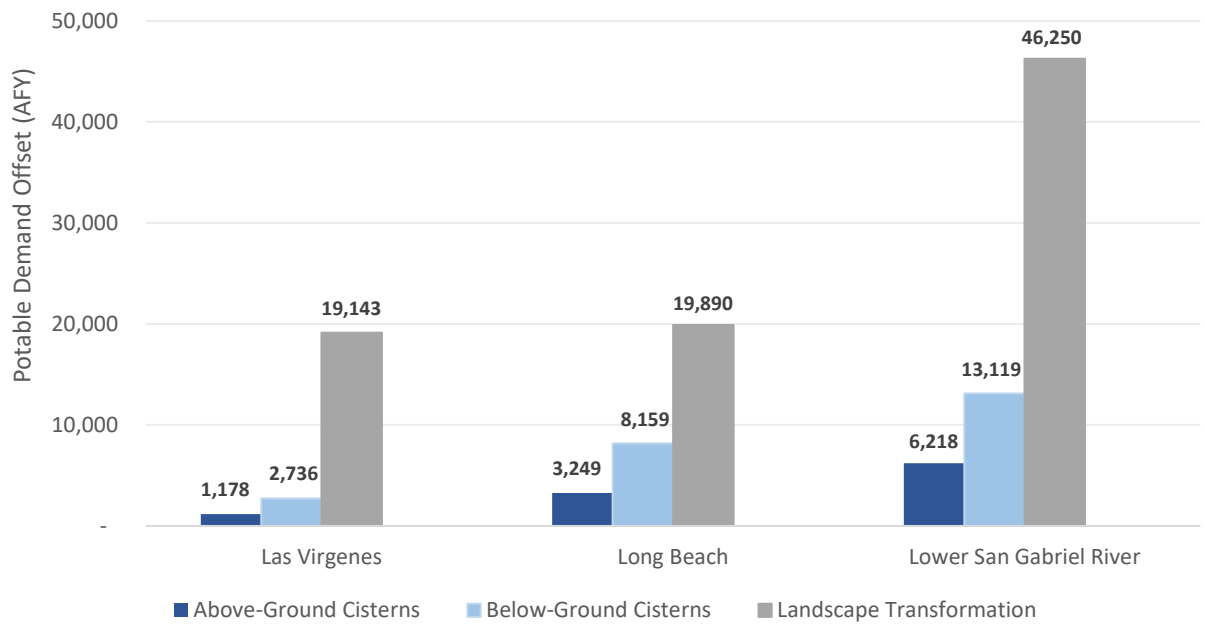


Figure 2-6. Total maximum potable demand offset by practice for each study region

Figure 2-7 shows an example of a single-family residential home receiving both landscape transformation and an above-ground cistern.

2.3.3 Identifying priority property types and BMPs

The results from Craftwater's modeling allowed the team to identify areas, land use types, and BMPs that offer the greatest stormwater capture and potable water conservation benefits in the most cost-effective manner. For each BMP and property type (and within each study area), we compared average stormwater capture and potable offsets per installation, cost per installation, potential for fire risk reduction benefits, cost effectiveness (i.e., cost per AF), and other metrics. We then weighed the modeling results against the team's applied knowledge, the experiences MWD shared regarding implementing conservation programs, and preferences gleaned from discussions with local member agencies. For example, although below-ground cisterns offer the greatest stormwater capture benefits, they were the least cost effective of all BMPs, since private properties that are not being redeveloped are unlikely to undergo the level of excavation required to install a below-ground cistern. Further, other programs around the country have found success building on incentives and structures that already exist, which suggests that building on MWD's existing turf replacement program may hold more promise than other approaches. Many utilities have also found that working with commercial and multifamily properties on a large scale can be difficult due to owners that do not live locally or who do not prioritize property improvements.[14] These challenges were among the many, non-data factors that informed our recommendations. These examples highlight just a few of the factors the team considered when formalizing our recommendations.

[14] Clements et al. 2018. *Incentives for Green Infrastructure on Private Property: Lessons Learned*. Water Research Foundation Project 4684. Denver, Colo.: The Water Research Foundation.

Groundwater Infiltration in the MWD Service Area

Groundwater is an important component of the water supply portfolio in L.A. County. Watershed modeling conducted for this project examined the potential for distributed infrastructure to capture and infiltrate stormwater for groundwater recharge. If significant infiltration were possible, this could serve as an additional source of water supply.

However, the underlying geology and its hydrologic impacts significantly limit the ability of distributed stormwater capture projects to meaningfully recharge groundwater supplies or provide recoverable water supply in most areas of L.A. County. There is some potential for significant recharge operations in the L.A. Forebay region, which mostly lies outside of the study areas. Recharge from distributed projects in the Forebay region could augment Los Angeles Department of Water and Power (LADWP) supply portfolio (and by extension, potentially MWD's), if pumping, treatment, and distribution infrastructure were constructed and operated in the future. Due to these constraints, this research took a conservative approach and, when considering potential water supply benefits of recommended practices, does not account for groundwater recharge to drinking water aquifers.

However, shallow groundwater recharge opportunities are plentiful, including within the urbanized areas of Long Beach and the Central Basin. Stormwater that infiltrates into the shallow soil zone can be accessed by trees and other vegetation, potentially sustaining these vital amenities in the absence of supplemental irrigation when incorporated into properly designed green infrastructure practices. ***Although this shallow groundwater may not contribute to supply in the traditional sense, stormwater infiltration increases resilience in the face of drought, provides ecological benefits, and decreases reliance on potable water for irrigation.***

Based on the modeling results, input from MWD and member agencies, and our team's expert knowledge, **the project team recommends that MWD revise its incentive program focus in the following ways:**

1. Landscape transformation (as opposed to turf replacement) on single-family and multifamily residential properties;
2. Optional installation of cisterns sized to meet remaining irrigation needs and, where relevant, increased protection against catastrophic wildfire damage or loss;
3. Conversion of non-functional turf areas on commercial and institutional properties using landscape transformation standards; and
4. Support for installation of enhanced bioretention BMPs as part of the commercial and institutional landscape transformation incentive package.

First, we recommend focusing on the abundant, cost-effective opportunities for potable water savings through landscape transformation on single-family and multifamily residential properties. We also recommend bundling the landscape transformation incentive with an additional cistern incentive for property owners who desire one. This cistern could be sized to meet spatial constraints, capture runoff from an appropriate rooftop drainage, and provide irrigation water to meet a portion of dry season

Figure 2-7 Example of a single-family residential home retrofit

The project team examined model results, removing outliers to prioritize cost-effective and multi-benefit installations. Our analysis of these opportunities indicates that across the three study areas, the average single-family residential home has approximately 1,400 square feet of turf that could be converted to a transformed landscape. This ranges from an average of 800 square feet in Long Beach to 3,400 square feet in Las Virgenes. The average cistern size necessary to capture the 85th percentile storm in the Long Beach and Lower San Gabriel study areas is approximately 1,500 gallons.[a] In Las Virgenes, added capacity for red-flag hydration resulted in an average cistern capacity of approximately 5,000 gallons.[d] Cisterns larger than 9,000 gallons will likely require building permits.

The picture below shows an example installation opportunity for landscape transformation paired with an above-ground cistern for a typical Long Beach home. Assuming the average area available for landscape transformation in Long Beach (close to 750 square feet when paired with a cistern)[b] and an average cistern size of approximately 1,200 gallons (when paired with landscape transformation), these practices would offset approximately 32,585 gallons of potable water each year. Over 30 years, this is approximately 3.1 AF of water conserved. Roughly the same amount of stormwater would be captured in this example; however, the ratio of potable offsets to stormwater capture for this mix of BMPs depends on the property's roof size and area available for landscape transformation.[c] The total cost of this project would amount to $13,500 (not including maintenance).

a. This reflects the cistern size necessary to capture runoff from the entire roof area; smaller cisterns can be installed to capture a portion of roof runoff (a common practice).
b. Landscape transformation area available decreases when paired with a cistern.
c. In both Lower San Gabriel and Las Virgenes, the volume of potential potable offsets is greater than the total stormwater capture potential when these two BMPs are combined because the ratio of lawn sizes to impervious area on single-family homes in these two areas is much larger relative to Long Beach.
d. A red flag warning means that weather conditions are conducive to wildfires. During a red flag warning, homeowners can enhance defensible space by ensuring vegetation is sufficiently watered to decrease likelihood of ignition.

irrigation needs for trees, shrubs, and plantings.[15] We also suggest providing additional support for larger cisterns in areas with high wildfire risk, such as the Santa Monica Mountains.[16] Our modeling suggests that this collected rainwater can be instrumental in creating an ember-proof landscape moat around homes, reducing risk of catastrophic damage or loss during red-flag fire events.

For commercial and institutional properties, this strategy combines expanded landscape transformation rebate payments with an additional, tiered rebate to install bioretention cells to capture and treat stormwater to manage runoff from parking lots, access roads, and/or rooftops on site. A strategy that emphasizes the participation of commercial properties is a practical response to AB 1572, the recently adopted legislation prohibiting the use of potable water to irrigate non-functional turf. Without some intervention, it is probable that commercial property owners will either allow currently irrigated grass parkways, parking lot margins, and ornamental lawns to wither and dry up, or convert them to hardscape. Either option could have negative impacts on ambient urban heat and air quality and contribute to further aridification in the State.

Set an Outdoor Conservation Target

While MWD and its member agencies rightly celebrate the successes to date of the turf replacement and other outdoor conservation programs, it is difficult to evaluate those successes against progress toward attaining a water conservation goal. Based on conversations with MWD staff, it is clear that the District recognizes efforts to reduce outdoor irrigation as a response to drought conditions and/or State Water Resources Control Board (SWRCB) mandates, as well as for the (meaningful) public relations value associated with highly-visible efforts to enhance urban water conservation. For example, in a 2022 Memorandum of Understanding (MOU) by and among Colorado River Basin municipal and public water providers, MWD committed to reduce the quantity of non-functional turf grass by 30 percent through replacement with drought- and climate-resilient landscaping, while maintaining vital urban landscapes and tree canopies that benefit our communities, wildlife, and the environment.[17] Nevertheless, these conversations, to date, have not revealed a specific, volumetric outdoor water use reduction target that MWD and member agencies seek to achieve through conservation. However, as of January 2024, MWD has initiated an effort to set new, time-bound targets as part of the CAMP4W process. Therefore, the team recommends MWD set an outdoor conservation target as part of the CAMP4W Climate Decision-Making Framework because:

1) It creates another time-bound target for core supply. Conservation is discussed as a core supply throughout MWD's planning documents, but there are no specific outdoor conservation targets to ensure it gets funded, implemented, and achieved;
2) It helps achieve the proposed CAMP4W target to meet MWELO standards regionwide by 2035 (0.55 ETAF);
3) It advances the CAMP4W draft policy-based target to reduce non-functional turf by 30 percent. However, the team recommends this target be modified to 30 percent transformation of non-

[15] Our modeling assumes cisterns are sized for the 85th percentile storm and fit within the footprint of each parcel.
[16] The modeling for this project analyzed benefits for cisterns up to 5,000 gallons capacity. Larger cisterns may require building permits.
[17] Memorandum of Understanding by and among Colorado River Basin Municipal and Public Water Providers November 15, 2022. Available at https://www.snwa.com/assets/pdf/mou-2022.pdf.

functional turf as a reduction in non-functional turf could unintentionally allow for passive drying out of these landscapes; and

4) It will help inform the draft CAMP4W target for annual investments in conservation and water use efficiency rebates, incentives, and innovation programs.

The Planning Tool (accompanying this Roadmap) provides MWD with some resources for exploring an outdoor conservation target and understanding the financial commitments necessary to achieve it. **One result of MWD's current detachment from conservation outcomes is the inconsistent levels of investment in conservation rebate programs and the inadequate level of funding that the District and member agencies have provided.** One researcher has noted that the lack of predictability in turf replacement rebate levels has likely prevented broader participation in the program.[18] While MWD regularly notes that the rebate program is typically fully subscribed, this is more indicative of the low level of funding for the program than a reflection of satisfied public demand for incentives.

Notably, MWD's Long-Range Finance Plan Needs Assessment (LRFP-NA) discusses future capital spending in the context of needs for "core supplies", "flex supplies", and "storage". The LRFP-NA includes conservation as a core supply and assumes that some volume of conservation will be necessary to meet the challenges of a climate-stressed future (Scenario D in the LRFP-NA). The plan assumes that 300 TAF of core supply will be needed by 2032 to meet water demands under this scenario. In an analysis of the cost of providing this volume solely through conservation, MWD finance staff note that an increase in incentive funding would likely be required (~$4/ square foot) to attain 37,500 AF of conserved water annually (at a lifetime cost of approximately $1000/AF).[19] Closing the Scenario D supply/demand gap would require a budget of $1.1 billion per year from 2025 through 2031, however the water supply gained through these expenditures would continue to provide benefits after this level of conservation spending ceased.[20]

Other research supports this correlation between increased rebate levels and greater participation in turf replacement programs.[21] Coupled with other adjustments to the incentive program, it is likely that increasing the rebate amount will increase participation from households facing economic and other disadvantages. As the LNRP-NA states, MWD would benefit from undertaking a price elasticity study to gauge the role of incentive levels in motivating property owner behavior and other research to identify strategies for increasing uptake. We suggest that MWD conduct this research.

Pragmatically, conservation through incentive programs should be considered as a significant tool to close a portion of the projected supply gap, not the entirety. MWD staff could improve the LRFP-NA

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[18] Winseck, Kevin. *Takeup, Spillovers and Heterogeneity in Water-Wise Landscaping Incentive Programs,* Spring 2023, University of California, San Diego. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4511055. In addition, this research suggests that the program is significantly underfunded in relation to the funding levels that would be needed to reduce residential water consumption by 15 percent as called for in a 2021 drought conservation request by Governor Newsom. Rather than the $1 or $2/square foot incentive provided by MWD, rebate levels of $5.04-$6.37 (2022$) would be needed to generate the level of program participation needed to meet a 15 percent reduction target within ten years.

[19] See Metropolitan Water District, 2023 Long Range Finance Plan, at 41. Available at https://www.mwdh2o.com/media/msjfw5vv/concurrence-with-the-long-range-finance-plan-for-camp4w-planning-purposes-nov-14-2023.pdf.

[20] The LRFP notes that MWD would need to cash fund this level of investment, however, as Section 2.6 below makes clear, this is not the only option.

[21] Pincetl, Stephanie, et al. *Evaluating the Effects of Turf-Replacement Programs in Los Angeles County: The Metropolitan Water District of Southern California's Incentive Program Since 2015*. July 2017. Available https://cawaterlibrary.net/document/evaluating-the-effects-of-turf-replacement-programs-in-los-angeles-county/.

assessments by determining a level of conservation attainable through the stormwater capture incentive program (and other outdoor conservation measures), calculating a corresponding level of funding, and integrating this spending plan into an updated LRFP-NA.

Identify and Calculate the Value of Co-benefits

The ARLA-led team conducted an economic analysis of the co-benefits associated with landscape transformation and the incorporation of cisterns and bioretention into MWD's rebate program. This assessment builds on established valuation resources, including a Water Research Foundation co-benefits tool previously developed by One Water Econ staff. The team also created an interactive Planning Tool for MWD and its partners to use to quantify and monetize the benefits associated with various funding levels, allocation structures, and BMP/property type combinations. **The assessment and Planning Tool provide a methodology by which MWD can evaluate and quantify a suite of environmental co-benefits, as called for in the CAMP4W draft Decision-Making Framework and Evaluative Scoring Criteria.** We encourage MWD to use these resources at this stage in the Roadmap.

2.5.1 Quantifying incentive program benefits

Moving from turf replacement to Landscape Transformation using native and climate-appropriate plants, as well as 85th percentile stormwater capture features does more than just conserve water; this shift also results in multiple financial, social, and environmental benefits. The modeling efforts described in Section 2.3 allowed the project team to quantify stormwater capture and potable offset benefits for different practices across the study areas. To quantify additional benefits, and monetize the value of all co-benefits, the project team relied on local data and standard economic practices, including methodology derived for the Water Research Foundation's "*Economic Framework and Tools for Quantifying and Monetizing the Triple Bottom Line Benefits of Green Stormwater Infrastructure*" (WRF TBL Tool).[22] **The monetization of benefits allows for a direct comparison to the costs of proposed interventions and can provide the basis for potential partnerships and co-funding models.**

It is important to note that the watershed modeling described in the previous section incorporated tree planting into bioretention practices at a rate of 1.35 trees per 1,000 square feet of bioretention installed. Trees were not incorporated into the modeling for landscape transformation. Trees create shade, reduce reflective surfaces, capture stormwater runoff, provide habitat, sequester carbon, remove air pollutants, and improve the livability and aesthetics of neighborhoods. Trees generate significantly higher benefit on a per unit basis than other stormwater capture practices. The associated community benefits could increase substantially if investments in conservation are expanded to include a rebate for tree planting.

In addition, the construction, operations, and maintenance of distributed infrastructure practices that capture stormwater runoff and conserve water have the potential to create entry-level jobs for low income and/or low-skilled workers. The benefits of green job creation and their associated value are predicated on targeting unemployed or underemployed people through existing (or newly-created) workforce development programs. Additionally, the benefits outlined below are specific to installation only. The number of job-years (i.e. the longevity of new jobs created) of green jobs could be expanded significantly if we were to include ongoing maintenance activities.

[22] Clements, J., J. Henderson, and A. Flemming. 2021. "Economic Framework and Tools for Quantifying and Monetizing the Triple Bottom Line Benefits of Green Stormwater Infrastructure." Water Research Foundation.

Table 2-2 summarizes the benefits calculated for the incentive programs outlined in this report. For more information on how job creation benefits are calculated, see Appendix B.

2.5.2 Determining co-benefits and MWD investment levels: MWD's Planning Tool

In discussions with MWD staff, it became apparent that it would be helpful to provide the District with a tool it could use to evaluate the costs and benefits of investing in landscape transformation and stormwater capture BMPs. In response, we developed an Excel-based tool that monetizes the array of benefits associated with landscape transformation, cisterns, and bioretention (with tree planting) based on the parcel-level modeling discussed above. The tool incorporates well-established economic methods and modeling to derive per unit benefit values (e.g., benefits per AF of conserved water, per tree, per square foot of landscape transformation). Aptly named the MWD Planning Tool, its purpose is to help MWD better understand the multiple benefits of investing in proposed incentive strategies and evaluate co-funding strategies. The Tool also has the potential to be used to support project evaluation against some the CAMP 4 Water Evaluation Criteria, as those evolve in the coming year.

Figure 2-8 represents the results generated using the Tool for one illustrative scenario of funding, multi-agency contributions, and BMP combinations. Section 2.6 demonstrates an application of the Tool. For detailed instructions regarding the use of the Planning Tool, see Appendix H.

Identify Funding and Spending Needed to Achieve Target [23]

To launch and scale an enhanced multi-benefit stormwater capture incentives program MWD will need to take a portfolio funding and financing approach. This approach should combine available funding and financing mechanisms such as agency revenues, bonds, loans, or other long-term payment structures, as well as grants (although many grants are one-time, opportunistic grants should supplement dedicated funding). With respect to debt financing, there are multiple legal, policy, and accounting pathways available to MWD, municipal stormwater agencies, and the Los Angeles County Flood Control District (County or LACFCD) to leverage water rates and SCW Program revenues to debt finance investments in stormwater capture incentives.

This Roadmap outlines various debt financing mechanisms to provide avenues for full-scale adoption of the proposed incentive programs. At scale, programmatic costs may exceed the amount MWD and potential co-funders may be able to pay from annual revenues without experiencing rate shock. Municipal bonds and other forms of debt have long been the financing vehicle of choice for cities and public water agencies to pay for big capital projects such as pipes, tunnels, and treatment plants. **To invest in stormwater capture on private property at a scale necessary to maximize the water supply, stormwater management, and multiple co-benefits of these systems,[24] MWD and co-payors will also need to access capital budgets and finance these projects alongside other long-term capital projects.** As further detailed below, this is the approach Los Angeles Department of Water and Power[25] and Seattle Public Utilities, among others, use to invest in similar consumer incentive programs.

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[23] These materials are not offered as or intended to be legal advice. Readers should seek the advice of an attorney when confronted with legal issues. Attorneys should perform an independent evaluation of the issues raised in these materials. By providing these materials WaterNow does not endorse, either expressly or by implication, their legality and expressly disclaims any and all liabilities and warranties related to use of these materials.

[24] See Section 4.5 above for discussion of benefits.

[25] Kelly, Melissa L. et al. *Tap Into Resilience: Pathways for Localized Water Infrastructure* (2021) at 29, 30, https://www.law.uci.edu/centers/cleanr/news-pdfs/tap-into-resilience-report.pdf.

Table 2-2. Monetized annual benefits of incentive program practices

Annual Benefits	Potable Water Offset ($/AF)	Stormwater Capture ($/AF)	Landscape Transformation ($/sq. ft.)	Cisterns ($/gallon of storage)	Bioretention ($/sq. ft.)	Trees[a]	Notes
Potable Water Supply	$3,000						Avoided cost of alternative core water supplies/MWD resource development[26]
Water Quality		$3,526					Avoided cost of SCW Program regional projects[27]
Community Uplift			$0.22				Value of improved aesthetics, livability
Habitat/Biodiversity			$0.05		$0.05	$27	Willingness to pay for diversity of native, climate-appropriate plants that provide habitat
Fire Risk Reduction				$0.15			Only applicable to areas with fire risk
Energy Savings						$12	Energy saved from tree shade reducing building cooling needs
Air Quality	$37		$0.02		$0.02	$34	Avoided emissions + pollutant removal
Avoided Pollutant Emissions	*$37*					*$1*	*Avoided emissions from reduced energy use; represents avoided health care costs associated with reduced emissions.*
Air Pollutant Removal			*$0.02*		*$0.02*	*$33*	*Pollutant uptake and removal associated with urban greening*
Carbon Reduction	$91		$0.01		$0.01	$5	Avoided $CO2_e$ emissions + carbon sequestration
Avoided GHG Emissions	*$91*					*$2*	*Avoided $CO2_e$ emissions from reduced energy use; represents avoided health care costs associated with reduced emissions*
Carbon Sequestration			*$0.01*		*$0.01*	*$3*	*Increased shrub and herbaceous plant uptake and improved soil conditions*
Reduced Heat Stress						$14	Avoided mortality and morbidity due to increased shade from tree canopy
Value of Green Jobs			$0.30	$196 per cistern	$0.30		Represents total value, not annual value
Green Job-Years			3.6 per acre	47.5 per 1,000 cisterns	3.6 per acre		Represents total value, not annual value

a. Represents value in year 30, when tree has reached maturity.

[26] Metropolitan Water District of Southern California Board Meeting. Agenda: Finance, Audit, Insurance, and Real Property Committee - Final - Revised 1. Attachment 1, Page 31. (8/15/23); represents annualized value for water supply alternatives over 30-years.

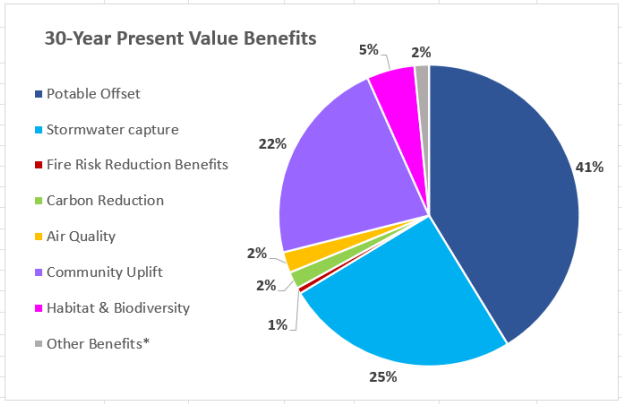
[27] Based on the cost per AF of stormwater capture for SCW Program regional projects from FY2021-2024.

MWD Water Conservation Investments Planning Tool

MWD Inputs

Design life	30
Discount rate	3%
MWD Funds	$5,000,000
Total	**$12,500,000**

Agencies	Contribution	Amount
MWD	40%	$5,000,000
Stormwater agencies	30%	$3,750,000
Retail Water agencies	20%	$2,500,000
Customers	10%	$1,250,000
Local Govt/grants/other	0%	$0
Totals	**100%**	**$ 12,500,000**



Benefit Category	Annual Value	Present Value
Potable Offset (AF)	100	2,997
Stormwater capture (AF)	52	1,551
Potable Offset	$ 299,748	$ 5,875,201
Stormwater capture	$ 182,271	$ 3,572,591
Fire Risk Reduction Benefits	$ 4,578	$ 89,724
Community Benefits:		
Carbon Reduction	$ 13,300	$ 260,083
Air Quality	$ 16,607	$ 318,930
Community Uplift	$ 161,522	$ 3,165,906
Habitat & Biodiversity	$ 37,646	$ 733,138
Other Benefits*	$ 214,842	$ 220,893
Green Jobs Created	65	65
Total Benefits	$ 930,514	$ 14,236,466

*Other benefits include energy savings, heat stress reduction, and value of green job creation

			Program Outputs				Annual Benefits							
Program components	**Program proportion of cost**	**Amount**	**Landscape Transformation (sq. ft.)**	**Cistern Volume (gal)**	**Bioretention (sq. ft.)**	**# of Trees**	**Potable Offset (AF)**	**Stormwater Captured (AF)**	**Potable Offset ($)**	**Stormwater capture ($)**	**Community Benefits ($)**	**Fire Benefits ($)**	**Total Cost per AF of Potable Water (30 year)**	**MWD Cost per AF of potable water (30 year)**
Single Family - Landscape Transformation	60%	$7,500,000	500,000				69.90	31.0	$ 209,711	$ 109,387	$ 306,491		$ 3,576	$ 1,431
Single Family - Landscape Transformation + Cistern	7%	$875,000	49,275	73,054			7.40	3.7	$ 22,208	$ 13,080	$ 30,284		$ 3,940	$ 1,576
Single Family - Landscape Transformation + Fire Safety Cistern	3%	$375,000	21,118	31,309			3.17	1.6	$ 9,518	$ 5,606	$ 17,557	$ 4,578	$ 3,940	$ 1,576
Commercial/Institutional - Landscape Transformation	10%	$1,250,000	83,333				11.65	5.2	$ 34,952	$ 18,231	$ 32,434		$ 3,576	$ 1,431
Commercial/Institutional - Landscape Transformation + Bioretention	10%	$1,250,000	55,697		12,375	17	7.79	10.2	$ 23,360	$ 35,966	$ 27,848		$ 5,351	$ 2,140
Subtotal		*$ 11,250,000*	*709,423*	*104,362*	*12,375*	*17.00*	*99.92*	*51.69*	*$ 299,748*	*$ 182,271*	*$ 414,614*	*$ 4,578*		
Capital Cost per AF													$ 3,814	$ 1,526
Administrative	10%	$1,250,000											$ 381	$ 153
Total Capital Cost	**100%**	**$12,500,000**											**$ 4,195**	**$ 1,678**
Annual O&M (as a % of Capital Cost)	0%	$0											$ 4,195	$ 1,678

Figure 2-8. Illustration of MWD Planning Tool results

Debt financing these investments is also appropriate from a policy perspective. It matches the benefits with costs. **Because these projects have long-term benefits, the costs of those projects are appropriately paid for over the long-term**. Debt financing provides intergenerational equity ensuring that both current and future ratepayers bear the burden of the cost because current and future ratepayers both enjoy the benefits. Investing in stormwater capture water conservation programs with debt also provides reliability and commitment to the program, advancing a core theme of MWD's CAMP4W effort.[28] Using bond proceeds or a loan can secure large-scale, dedicated funds upfront—funds that are not subject to annual budget allocations that often change year to year.

Within this context, the following sections provide example target conservation/incentive program scenarios to highlight MWD's options for funding and financing its contributions to an incentive program, including navigating accounting and policy barriers. It also describes how L.A. County, municipal stormwater agencies, member agencies, and other parties can contribute to a co-funded program.

2.6.1 Enhanced conservation and stormwater capture incentive illustrations

The ARLA-led team created the Planning Tool to allow MWD to customize its level of investment in the proposed incentive programs by inputting the level of MWD funding, MWD's share of the total program cost, and the mix of practices and land use types included in the program. Instructions for the Tool are explained more fully in Appendix H.

To illustrate the options available to MWD for creating a funding and financing portfolio, this section applies the Tool to explore two hypothetical conservation and cost-sharing scenarios to demonstrate how the benefits of investing in enhanced stormwater capture incentives can provide water supply, water quality, and community benefits. These illustrations are provided purely for demonstration purposes; they are not intended to dictate MWD's investment choices.

In this report we provide answers to common questions about legal and accounting issues that water and stormwater utilities considering debt financing incentives may encounter, including:

- Legal authority to finance private property installations,
- Accounting for investments that do not result in an asset owned by the utility, and
- How the investments on private property provide public benefit.

As explained below, MWD should have the legal authority to finance incentives using streamlined accounting approaches and can make a strong case that private property installations provide significant public benefits.

Conservation Target Illustration 1:
Achieve 100 AF of annual potable offset

Illustration 1 assumes the conservation target is 100 acre feet of annual potable water offset. At this target, the total program cost would be $12.5 million. As detailed below, this cost can be shared among several co-payors, including MWD.

Figure 2-9, which reflects the bottom half of the main tab in the Tool, shows that this $12.5 million investment (from all co-funders, not just MWD's contribution) reflects a program with a mix of installations (60 percent single-family landscape transformation, 7 percent single-family landscape transformation paired with cisterns, 3 percent single-family landscape transformation paired with fire-safety cisterns, 10 percent commercial/institutional

[28] See Winseck 2023.

landscape transformation, and 10 percent landscape transformation with bioretention). These program components would achieve:

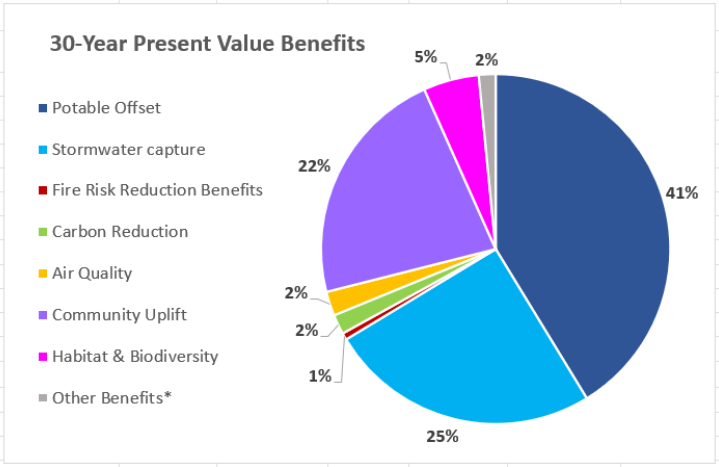
- 709,423 square feet of landscape transformation;
- 104,362 gallons of cistern storage volume;
- 12,375 square feet of bioretention; and
- 17 new trees.[29]

			Program Outputs			
Program components	**Program proportion of cost**	**Amount**	**Landscape Transformation (sq. ft.)**	**Cistern Volume (gal)**	**Bioretention (sq. ft.)**	**# of Trees**
Single Family - Landscape Transformation	60%	$7,500,000	500,000			
Single Family - Landscape Transformation + Cistern	7%	$875,000	49,275	73,054		
Single Family - Landscape Transformation + Fire Safety Cistern	3%	$375,000	21,118	31,309		
Commercial/Institutional - Landscape Transformation	10%	$1,250,000	83,333			
Commercial/Institutional - Landscape Transformation + Bioretention	10%	$1,250,000	55,697		12,375	17
Subtotal		*$ 11,250,000*	*709,423*	*104,362*	*12,375*	*17.00*
Capital Cost per AF						
Administrative	10%	$1,250,000				
Total Capital Cost	**100%**	**$12,500,000**				
Annual O&M (as a % of Capital Cost)	0%	$0				

Figure 2-9: Conservation Target Illustration 1 – Program Components

Figure 2-10 shows the upper right quadrant of the first tab in the Planning Tool, which highlights the benefits achieved by the above interventions. As shown, the 100 AF annual conservation target results in $5.9 million in potable water offset benefits in present value terms (over 30 years). This represents 41 percent of total benefits, reflecting the avoided costs of developing alternative water supplies. The $12.5 million investment would also capture 52 AF of stormwater annually, resulting in $3.6 million in present value water quality benefits (calculated based on the avoided costs of regional stormwater capture projects funded through the SCW Program) or 25 percent of the total benefits. In total, the monetized value of water supply (potable offset), water quality, and community investment benefits associated with this level of investment amount to $14.2 million in present value terms. Sixty-five green jobs would also be created.

[29] In addition to the recommendations outlined here, the ARLA-led team recommends that MWD consider bundling its new tree rebate with the practices modeled for this Roadmap. The trees included here are connected only to bioretention installations.



Benefit Category	Annual Value	Present Value
Potable Offset (AF)	100	2,997
Stormwater capture (AF)	52	1,551
Potable Offset	$ 299,748	$ 5,875,201
Stormwater capture	$ 182,271	$ 3,572,591
Fire Risk Reduction Benefits	$ 4,578	$ 89,724
Community Benefits:		
Carbon Reduction	$ 13,300	$ 260,083
Air Quality	$ 16,607	$ 318,930
Community Uplift	$ 161,522	$ 3,165,906
Habitat & Biodiversity	$ 37,646	$ 733,138
Other Benefits*	$ 214,842	$ 220,893
Green Jobs Created	65	65
Total Benefits	$ 930,514	$ 14,236,466

*Other benefits include energy savings, heat stress reduction, and value of green job creation

Figure 2-10: 30-Year Present Value Benefits Resulting from $12.5M Investment in Stormwater Capture Incentives

Conservation Target Illustration 2: Achieve 1,000 AF of annual potable offset

Illustration 2 assumes a target of 1,000 AF of annual potable water demand offsets, for a total program cost of $125 million (to all co-funders, not just MWD). As detailed in Figure 2-11 (a snapshot of the bottom half of the Planning Tool main tab), this example investment also reflects a program wherein 60 percent of total costs are allocated to single-family landscape transformation, 7 percent to single-family landscape transformation paired with cisterns, 3 percent to single-family landscape transformation paired with fire-safety cisterns, 10 percent to commercial/institutional landscape transformation, and 10 percent to landscape transformation paired with enhanced bioretention. These program components achieve:

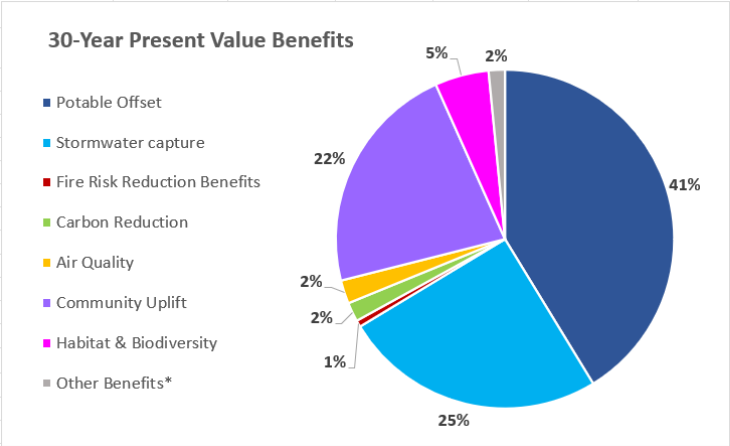
- 7,094,225 square feet of landscape transformation;
- 1,043,622 gallons in cistern volume;
- 123,746 square feet of bioretention; and
- 167 new trees.

			Program Outputs			
Program components	**Program proportion of cost**	**Amount**	**Landscape Transformation (sq. ft.)**	**Cistern Volume (gal)**	**Bioretention (sq. ft.)**	**# of Trees**
Single Family - Landscape Transformation	60%	$75,000,000	5,000,000			
Single Family - Landscape Transformation + Cistern	7%	$8,750,000	492,747	730,536		
Single Family - Landscape Transformation + Fire Safety Cistern	3%	$3,750,000	211,177	313,087		
Commercial/Institutional - Landscape Transformation	10%	$12,500,000	833,333			
Commercial/Institutional - Landscape Transformation + Bioretention	10%	$12,500,000	556,968		123,746	167
Subtotal		*$ 112,500,000*	*7,094,225*	*1,043,622*	*123,746*	*167.00*
Capital Cost per AF						
Administrative	10%	$12,500,000				
Total Capital Cost	**100%**	**$125,000,000**				
Annual O&M (as a % of Capital Cost)	0%	$0				

Figure 2-11: Conservation Target Illustration 2 – Program Components

As shown in Figure 2-12, the value of a 1,000-acre foot conservation target amounts to potable water offsets of $59 million in present value terms, representing 41 percent of total program benefits. This investment would also capture 517 AF of stormwater annually, resulting in water quality improvements that account for 25 percent of total benefits. Together, total project benefits, including potable offsets,

stormwater capture/water quality improvements, and other community benefits (e.g., carbon reduction, air quality, community uplift, habitat and biodiversity, among others) would total $142.4 million over 30 years (present value). The program would also create 645 green jobs (measured in job-years). These benefit/cost proportions are the same as Illustration 1 because benefits scale linearly with investment, proportional to the program components.



Benefit Category	Annual Value	Present Value
Potable Offset (AF)	999	29,975
Stormwater capture (AF)	517	15,507
Potable Offset	$ 2,997,484	$ 58,752,008
Stormwater capture	$ 1,822,710	$ 35,725,911
Fire Risk Reduction Benefits	$ 45,776	$ 897,237
Community Benefits:		
Carbon Reduction	$ 132,981	$ 2,600,647
Air Quality	$ 165,969	$ 3,188,460
Community Uplift	$ 1,615,222	$ 31,659,055
Habitat & Biodiversity	$ 376,382	$ 7,330,612
Other Benefits*	$ 2,148,338	$ 2,207,786
Green Jobs Created	645	645
Total Benefits	$ 9,304,861	$ 142,361,717

*Other benefits include energy savings, heat stress reduction, and value of green job creation

Figure 2-12: 30-Year Present Value Benefits Resulting from $125M Investment in Stormwater Capture Incentives

2.6.2 MWD contributions to achieving conservation targets

The illustrations outlined above demonstrate that investing in distributed outdoor conservation and stormwater capture projects provide water supply, water quality, and multiple community investment benefits. These benefits provide a basis for MWD (along with other co-payors) to invest in these strategies.

The benefits of offsetting potable water use accrue to MWD and its member agencies, as well as to customers who experience lower bills. Given MWD's stated desire to shift to more holistic water management—rather than water sales—the fire risk reduction, carbon reduction, community uplift, energy reduction, heat stress reduction, green jobs, and habitat co-benefits also accrue at least in part to MWD by advancing MWD's CAMP4W objectives. MWD should therefore determine an appropriate percentage of these costs to pay for.

Conservation Target Illustration 1: MWD contributions

Assume a total investment scenario of $12.5 million among all co-funders. Based on the benefit calculations shown above (see Figure 2-10), Figure 2-13 shows that the Planning Tool apportions 40 percent of the program cost ($5 million) to MWD, roughly matching its share of benefits with costs (note that the 40 percent is an input and can be changed to examine alternative scenarios). **With this cost-share scenario, the District would pay $1,678 per acre foot of potable water offset**. If MWD's cost-share is 40 percent, using a similar apportionment approach for the remaining potential co-payors, stormwater agencies would be responsible for 30 percent of total costs, retail water suppliers would cover 20 percent (so that these agencies are paying for some of the potable water offset benefits and some co-benefits),

and customers would contribute 10 percent. Given that the availability of grants is uncertain and opportunistic, zero percent has been allocated to grants.[30]

Agencies	Contribution	Amount
MWD	40%	$5,000,000
Stormwater agencies	30%	$3,750,000
Retail Water agencies	20%	$2,500,000
Customers	10%	$1,250,000
Local Govt/grants/other	0%	$0
Totals	**100%**	**$ 12,500,000**

Figure 2-13: Conservation Target Illustration 1 Cost-Shares

The shares shown in Figure 2-13 are provided to illustrate a possible distribution to achieve 100 AF of potable water offset annually at a total cost of $12.5 million, while realizing $14.2 million in benefits. The ultimate cost-share distribution is a policy decision to be made by the co-payors. For example, **at 40 percent cost-share, MWD's contribution to program costs would be roughly proportional to, but lower than, its share of the benefits because potable water offset represents 41 percent of the total benefits.** Aligning MWD's contribution with the water savings follows the approach the utility has suggested during the development of this Roadmap. Investing in water infrastructure that provides multiple benefits also presents an opportunity for MWD decision makers to implement policy changes to value community-oriented benefits in infrastructure investment decisions. **MWD could make the case for contributing more than 40 percent to represent the value MWD places on benefits such as community uplift, habitat and biodiversity, and energy savings.**

Conservation Target Illustration 2: MWD contributions

Assuming a conservation investment of $125 million, Figure 2-14, apportions 40 percent of the total program cost (i.e., $50 million) to MWD, again roughly matching benefits with costs. Under this scenario, the District would also pay $1,678 per acre foot of potable water offset—an amount well below the $3,000 per acre foot cited in MWD's Long Range Finance Plan.[31]

Agencies	Contribution	Amount
MWD	40%	$50,000,000
Stormwater agencies	30%	$37,500,000
Retail Water agencies	20%	$25,000,000
Customers	10%	$12,500,000
Local Govt/grants/other	0%	$0
Totals	**100%**	**$ 125,000,000**

Figure 2-14: Conservation Target Illustration 2 Cost-Shares

[30] The Planning Tool is designed to allow adjustments to these allocations.

[31] See Metropolitan Water District, 2023 Long Range Finance Plan, https://www.mwdh2o.com/media/msjfw5vv/concurrence-with-the-long-range-finance-plan-for-camp4w-planning-purposes-nov-14-2023.pdf.

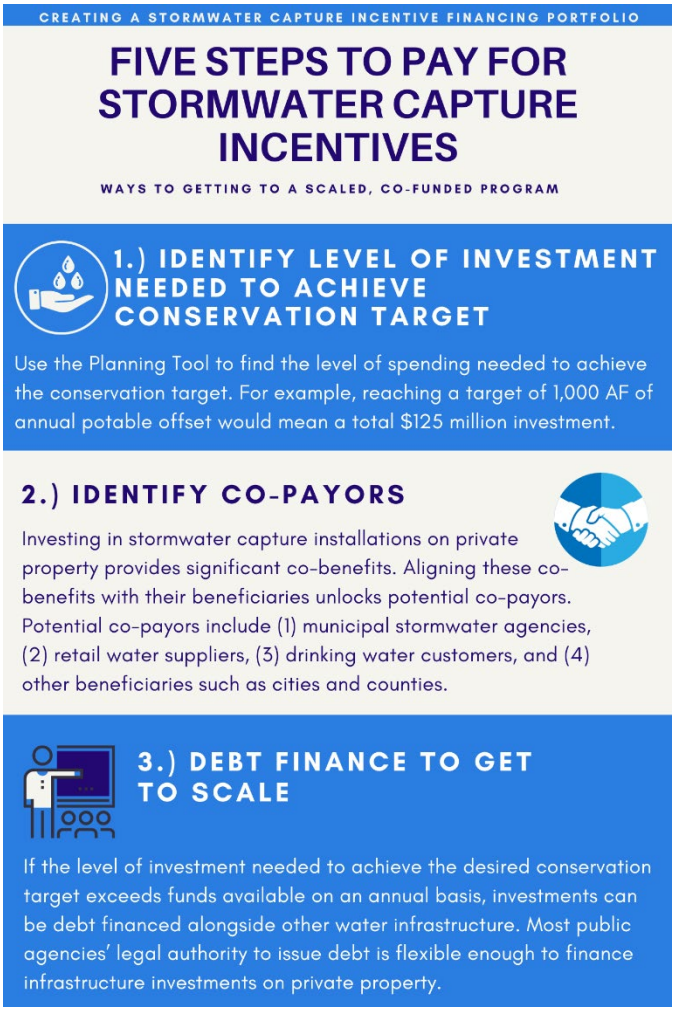
Again, the ultimate cost-share distribution is a policy decision to be made by the co-payors. The shares in Figures 2-13 and 2-14 are provided to illustrate a possible distribution to achieve 1,000 acre feet of potable water offset annually at a total cost of $125 million while realizing $142.4 million in monetized benefits.

2.6.3. MWD's options for paying for conservation targets

MWD has options to pay for its portion of the costs for achieving the conservation targets illustrated above. The District can use annual revenues (i.e., cash) or it can finance these investments and pay for them over a longer period. The approach to paying for the conservation targets depends on the scale of investment needed to achieve the goal.

Overview of funding and financing options

The MWD Board is authorized to set the rate at which water is sold.[32] MWD can use the revenues from these rates to "acquire, construct, operate, and maintain any and all works, facilities, improvements, and property necessary or convenient to the exercise" of MWD's authorities and responsibilities outlined in the Metropolitan Water District Act.[33] These authorities and responsibilities include "increased emphasis on sustainable, environmentally sound, and cost-effective water conservation."[34] As of the 2022/23-2023/24 Biennial Budget, MWD's annual budget is $2 billion, with nearly $1.5 billion of this total from water sales revenues.[35]



MWD is well-versed in using its rate revenues to pay for water conservation incentives. Over the last three decades, the District has invested millions in conservation rebates to incentivize purchases of water-efficient devices like low-flow toilets, flow monitor devices, smart irrigation controllers and high-efficiency clothes washers.[36] MWD's turf replacement program supported the conversion of millions of acres of turf grass to

[32] Metropolitan Water District Act §§ 130(d), 133. It is also authorized to set other charges and assessments. See, e.g., Metropolitan Water District Act §§ 130(d), 134.5, 134.6.
[33] Metropolitan Water District Act § 130(e).
[34] Metropolitan Water District Act § 130.5(b).
[35] MWD, Biennial Budget, Fiscal Years 2022/23 – 2023/24, at 28.
[36] MWD, Being Water Wise Rebates, https://www.mwdh2o.com/your-water/being-waterwise/.

more waterwise landscapes.[37] The draft Long Range Finance Plan identifies a baseline annual average funding level for conservation of $30.5 million.[38]

The Long Range Finance Plan notes certain challenges with paying for increased conservation incentives, including the impacts of rate increases on MWD customers.[39] **Investing in multiple-benefit conservation infrastructure can help alleviate some of these impacts because MWD can share in the cost with multiple payers that benefit from the investments. While the Long Range Finance Plan recommends further study of the options for accelerated investment in conservation,[40] investments in multiple-benefit conservation infrastructure is not mentioned. This is a gap that the solutions included in this Roadmap can help fill.** As detailed below, there is a path for MWD to debt finance its portion of costs; this would be another avenue to mitigate the challenges with funding large-scale conservation in a cost-effective way that avoids rate shock.

In sum, MWD's rate revenues are available to fund enhanced incentives for stormwater capture practices, including landscape transformations, cisterns, and bioretention. These infrastructure investments will advance MWD's efforts to increase cost-effective water conservation and put conservation on par with how other core supply is paid for. **Because these infrastructure solutions offer benefits beyond water conservation, MWD can also leverage additional, non-MWD revenues to pay for them.** These additional revenues, including stormwater and retail water revenues, are detailed below.

Paying for Conservation Target Illustration 1

To pay for MWD's portion of the total program cost for Conservation Target Illustration 1, MWD can likely use revenues (i.e., PAYGO). The 2022/23-2023/24 Biennial Budget notes that MWD's Capital Investment Plan includes $270 million in PAYGO spending on capital investments for "aging infrastructure," "drought response," and "compliance with regulatory requirements."[41] This Biennial Budget also specifies that MWD plans to increase funding for the Conservation Program to $86 million. Given that MWD's share of the cost for Illustration 1 would be $5 million and the scale of planned PAYGO and conservation spending

[37] *Id*.
[38] MWD, Long Range Finance Plan at 25, Figure 6.
[39] *See* MWD, Long Range Finance Plan at 39-41, 45, 73, 75.
[40] MWD, Long Range Finance Plan at 73, 75.
[41] MWD, Biennial Budget, Fiscal Years 2022/23-2023/24, at 3.

is $86 million, MWD could reasonably fold this level of investment into its next budget cycle. This $5 million investment using revenues would not appear to pose significant, if any, rate concerns. Of course, an investment of this size would not appear to advance the scale of investment in conservation envisioned in CAMP4W.

In addition, at this scale, MWD could defray the investment with grants. Several of the grant options summarized below could provide up to half of the needed funding (see Section 2.6.5 and Appendix D for details on grant options).

Paying for Conservation Target Illustration 2

To cover the $125 million investment needed to achieve the 1,000 acre feet in annual potable water offset, MWD and/or the co-payors will need to debt finance the program. As detailed below, there are at least two options for issuing this debt, as well as a range of available debt financing mechanisms.

Options for Issuing Debt[42]

There are at least two options for MWD to issue debt to finance Conservation Target Illustration 2. First, MWD could be the issuer, leveraging loans or revenue bonds of $50 million. In this instance, assuming 5 percent interest on a 30-year term, MWD would make $3.2 million payments for 30 years a total cost of $97.6 million. But, assuming a 3 percent rate of inflation, present value cost would be $65.6 million. Accounting for the time value of money, MWD would pay $15.6 million in interest. At a present value cost of $65.6 million, the debt financed program is cost-effective. Assuming MWD values potable water offset plus the community uplift, carbon reduction, fire risk reduction, habitat and biodiversity, energy savings, heat stress reduction, and green job creation benefits, the monetized value of those benefits totals $107 million. With these co-benefits included, the total benefits accruing to MWD are $41 million more than costs.

Under Illustration 2, however, the co-payors (i.e., stormwater and retail water agencies) may not have the ability to finance their share of the total program costs. **MWD and the co-payors could, thus, consider a second option: forming a joint powers authority (JPA).** The JPA could issue debt covering the capital cost of the program of $112.5 million. In this instance, assuming 5 percent interest on a 30-year term, the JPA would make annual payments of $7.3 million payments over 30 years, for a total cost of $219.5 million. But, assuming a 3 percent rate of inflation, present value costs amount to $147.8 million. Accounting for the time value of money, the JPA would pay $35.2 million in interest. Assuming MWD contributes 40 percent of the cost as of part of the JPA, MWD's costs would be $50 million plus $14 million in interest for a total of $64 million. In this JPA financing scenario, the benefits to MWD still outweigh the costs by $43 million. The Long Range Finance Plan recognizes the potential value of a JPA for achieving MWD's goals, including that JPA members "each would have the flexibility to determine the source of funding that supports its obligations, including operations and maintenance costs and debt service expenses."[43] This would also create a framework for the co-payors to contribute their shares by helping repay the debt without the need for separate financing.

[42] Any debt MWD or other co-payors would take on to pay for these investments would need to not only meet the threshold legal and county requirements outlined in the Roadmap, but also applicable debt policies governing the overall amount of debt MWD can responsibly carry. The Roadmap references to debt financing assume bonds or loans would be issued only in a fiscally responsible manner.

[43] MWD, Long Range Finance Plan, at 9.

Options for Financing Mechanisms

Whether the debt is issued by MWD or a JPA, there are several mechanisms available to finance the cost of Conservation Target Illustration 2. The financing mechanisms are detailed below.[44]

Clean Water State Revolving Fund Loans

The Clean Water Act established state revolving funds (CWSRFs) to assist communities with low-cost financing to build water infrastructure. While states establish their own eligibility criteria, the American Recovery Act of 2009, and subsequent appropriations bills, require all CWSRFs to use at least 10 percent of their federal capitalization grant for green infrastructure, water and energy efficiency projects, or other environmentally innovative activities. This requirement is commonly referred to as the Green Project Reserve.

The State Water Resources Control Board administers California's CWSRF, which has established state-specific eligibilities and financing procedures. In California, CWSRF loans can be used to pay for a variety of projects including, but not limited to:

- Construction of publicly-owned stormwater treatment facilities
- Implementation of nonpoint source projects to address pollution associated with urban areas
- Development and implementation of estuary comprehensive conservation and management plans for Santa Monica Bay, among other areas.[45]

In addition, to meet the Green Project Reserve requirements, California follows EPA's 2012 Guidance for Determining Project Eligibility.[46] EPA's guidance specifically cites green infrastructure as a categorically eligible project type, including regional- and parcel-scale green stormwater infrastructure (GSI) such as constructed wetlands, permeable pavement, bioretention, green roofs, green streets, urban forestry programs, rainwater harvesting and reuse, and comprehensive retrofit programs designed to keep stormwater discharges out of all types of sewer systems.[47] Given these authorized uses, there should be a path for seeking CWSRF loans to finance parcel-scale stormwater capture infrastructure on private property, including those implemented with consumer incentives.

MWD, Los Angeles County, and other local agencies are eligible borrowers. Borrowers eligible for CWSRF loans include, but are not limited to, any city, town, district, or other public body created under state law.[48]

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[44] Retail water suppliers also have the authority to incur debt. These options include Clean Water State Revolving Loans, WIFIA loans, and revenue bonds. The details of the CWSRF and WIFIA programs described in this section apply equally to water suppliers. Describing retail water suppliers' within MWD's service area individual revenue bonding authority is beyond the scope of this Roadmap. However, the analysis provided here should be instructive for determining whether retail suppliers have the authority to bond finance consumer incentives.

[45] State Water Resources Control Board, Clean Water State Revolving Fund Program (CWSRF) Basics, https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/srf_basics.html; see also Cal. Water Code § 13481.

[46] California State Water Resources Control Board, CWSRF Intended Use Plan 2021-2022, 16 (June 2021), https://www.waterboards.ca.gov/water_issues/programs/grants_loans/docs/cwsrf_iup_sfy2021_22_final2.pdf.

[47] State Water Resources Control Board, Procedures for Implementing Certain Provisions of EPA's Fiscal Year 2012 Appropriations Affecting the Clean Water and Drinking Water State Revolving Fund Programs, https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/docs/fy1213/prdcr_implmnt.pdf.

[48] State Water Resources Control Board, Clean Water State Revolving Fund Program (CWSRF) Basics, https://www.waterboards.ca.gov/water_issues/programs/grants_loans/srf/srf_basics.html.

Water Infrastructure Finance and Innovation Act (WIFIA) Loans

The Water Infrastructure Finance and Innovation Act was enacted in 2014 specifically to accelerate investment in local water and wastewater infrastructure. It supplements state revolving funds (SRF) programs by providing long-term, low-cost supplemental credit assistance to local utilities for major projects. Since 2014, the WIFIA program has closed 93 loans totaling $16 billion in credit assistance to help finance nearly $34 billion for water infrastructure projects.[49]

WIFIA program eligibilities are coextensive with the SRFs, and expressly include drought prevention, reduction, or mitigation and alternative water supply projects.[50] Unlike the SRF, however, WIFIA loans are issued by EPA. WIFIA funds projects of $20 million or more for large communities and $5 million or more for small communities.[51] WIFIA loans can fund up to 49 percent of project costs and can have a maturity date of no more than 35 years. Interest rates are based on the U.S. Treasury rate. EPA accepts applications on a rolling basis. As of February 2023, WIFIA has financed 100 loans totaling $17 billion.[52]

As recognized in MWD's Long Range Finance Plan, flexibility is a hallmark of WIFIA. A single WIFIA loan can finance multiple projects so long as those projects are secured by the same revenue, serve a common purpose, and are included in a single loan application. This bundled approach allows project proponents to secure funding for projects that would not meet the $20 million or $5 million thresholds individually. It also reduces administrative costs, which are usually 0.4 percent of the loan amount. EPA also offers a variety of loan structures and terms, including master loan agreements that allow phased financing and flexible maturity dates.[53]

So far, these federal loans have been used to pay for centralized infrastructure.[54] **But parcel-scale stormwater capture projects on private property meet the WIFIA eligibility criteria and could be funded under this program.**[55] **WIFIA may be a particularly attractive option in California where there is strong competition for Clean Water SRF funds (so much that the program can often not cover all loan applications)**.

MWD Revenue Bonds

The Metropolitan Water District Act authorizes MWD to issue revenue bonds for the "acquisition, construction or completion" of any public improvement or works of the District "the cost of which will be too great to be paid out of the ordinary annual income and revenue of the district."[56] Under Section 237, public improvements or works are those capital projects that are "necessary or convenient to carry out the objects or purposes of the district."[57] The MWD Board has discretion to secure such revenue bonds

[49] Environmental Protection Agency, WIFIA Closed Loans, https://www.epa.gov/wifia/wifia-closed-loans.
[50] Environmental Protection Agency, Water Infrastructure Finance and Innovation Act: What is WIFIA?, https://www.epa.gov/wifia/what-wifia.
[51] 128 Stat. 1193.
[52] Environmental Protection Agency, WIFIA Projects, epa.gov/wifia/wifia-projects.
[53] Details on loan structures and terms can be found here: WaterNow Alliance, TiR 2021 Virtual Summit Session: Water Infrastructure Finance and Innovation Act (WIFIA) Loans 101, https://youtu.be/Z6K4mNbbxmg.
[54] Environmental Protection Agency, One Hundred WIFIA Loans, 2018-2023, https://storymaps.arcgis.com/stories/d9dc301e82ce4f8ea3a6bc29e95eb461.
[55] WaterNow Alliance, TiR 2021 Virtual Summit Session: Water Infrastructure Finance and Innovation Act (WIFIA) Loans 101, https://youtu.be/Z6K4mNbbxmg.
[56] Metropolitan Water District Act § 237.
[57] *Id*.

with all or any part of the District's revenues and any other funds MWD is authorized to use for the District's purposes, except any proceeds derived from taxes.[58]

Based on this authority, it should be possible for MWD to issue revenue bonds to pay for investments in stormwater capture infrastructure. These investments provide significant water conservation benefits, a cost-effective source of supply.

Indeed, as detailed above, MWD recognizes the increasingly important role stormwater will play in its water supply portfolio: "Stormwater is another local water supply and is surface runoff that is captured and contained on-site…."[59]

Further, MWD's revenue bond authority under the Metropolitan Water District Act should be flexible enough to allow MWD to finance projects on both public and private property. The scope of projects eligible for bond financing is broad and includes projects that are "necessary or convenient to carry out the objects or purposes of the district."[60] As explained above, landscape transformation and stormwater capture systems on private property would carry out MWD's purposes. When adopting its 2022/23-2023/24 Biennial Budget, MWD and its Board appeared to agree by planning to bond finance some, or all, of the Conservation Program:

> *The adopted budget continues to fund the Board's key priorities, including: … Continues to support demand management programs, including an increase in funding for the Conservation Program to $86M over the biennium, $36M of which is anticipated to be bond-financed. The Board, however, authorized staff to bond finance the entire $86M of Conservation Program costs to provide flexibility in case of revenue shortfalls.*[61]

The Conservation Program includes consumer incentives for outdoor water conservation. The Long Range Finance Plan notes without elaboration that "[b]ecause conservation does not construct physical assets" bond financing "is not feasible."[62] This conclusion is not consistent with MWD's biennial budget or its bonding authority.[63] MWD's broad debt financing authority does not require MWD to own or control financed projects. Construction of a physical asset is thus not necessary to bond finance conservation incentives. And, as explained below, accounting rules do not require construction of a physical asset to book capital assets.

Thus, MWD should be able to use the proceeds from revenue bonds to finance consumer incentives to encourage adoption of distributed stormwater/rainwater capture and use systems. It should be able to do this without obtaining a lien, easement, or some other ownership interest in the property where the system is installed.[64] This, in turn, opens the door to regulated operations accounting treatment of these investments as detailed below.

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[58] *Id*.
[59] Water Revenue Refunding Bonds, 2022 Series B (July 2022).
[60] Metropolitan Water District Act § 237.
[61] MWD, Fiscal Years 2022/23-2023/24 Biennial Budget, at 3.
[62] MWD, Long Range Finance Plan, at 40.
[63] MWD, Fiscal Years 2022/23-2023/24 Biennial Budget, at 3.
[64] This is not to suggest that MWD would not enter into maintenance agreements with property owners to ensure proper maintenance of incentivized projects, which can be useful to ensure long-term performance. The key point here is that these agreements do not need to rise to the level of "ownership" in order to legally finance these investments.

JPA Revenue Bonds

JPAs have standalone authority to issue revenue bonds set out in California Government Code sections 6540-6579.5.[65] In particular, JPAs are authorized to issue revenue bonds to finance the cost and expenses of "acquiring or constructing a project" or "conducting a program" for several purposes, including:

- Programs, facilities, rights, properties, and improvements for the management, conservation, reuse, or recycling of water,[66] wastewater, or recycled water and other programs and facilities designed to reduce the demand for, or permit or promote the efficient use of, water resources;
- Facilities for the production, storage, transmission, or treatment of water or wastewater; and
- A regional or local public park, recreational area, or recreational center, and all related facilities and improvements.[67]

These authorized uses of proceeds from a revenue bond issued by a JPA likely include stormwater capture infrastructure, including installations on private property. These facilities conserve drinking water, manage stormwater, and promote the efficient use of water resources.

JPA Could Include Out of State Members

California JPAs are authorized to include out of state public agencies as JPA members. For example, a JPA formed to finance and implement stormwater capture incentives could include MWD, as well as water agencies from across the Colorado River Basin. These out of state agencies may be potential co-funders given their interest in conservation in the Basin. Whether they are eligible members will depend on their states' JPA rules. At a minimum, an MWD-led JPA could contract with out of state agencies to unlock co-funding potential.

JPAs must follow certain procedural requirements prior to issuing revenue bonds and all JPA members must authorize the bond issuance.[68] The specific requirements that apply depend on the type of project to be financed; as relevant to bonds to finance GSI investments, these procedural steps include adopting an ordinance authorizing the bond and stating that the bond is subject to referendum provisions of section 9142 of the California Elections Code.[69]

[65] See, e.g., The California Debt And Investment Advisory Commission, California Debt Financing Guide, 3-60 (June 2021), https://www.treasurer.ca.gov/cdiac/debtpubs/financing-guide.pdf.

[66] The Government Code defines water as: "any system of public improvements intended to provide for the production, storage, supply, treatment, or distribution of water from any source." Cal. Gov't Code § 53750(n).

[67] Cal. Gov't Code § 6546.

[68] See, e.g., Cal. Gov't Code § 6547.

[69] Section 9142 provides that if a county records more than 500,000 votes for governor in the prior election that the bond must be placed on the next ballot for voter approval if at least 5 percent of the entire votes cast in the county sign a petition seeking referendum on the bond, or if a county records less than 500,000 gubernatorial votes in the prior election and receives a referendum petition from at least 10 percent of the votes cast then voter approval is required. Section 9142 does not specify by what percent approval is required for the referendum to pass.

But revenue bonds issued by JPAs may be a pathway to issuing debt without prior voter approval. "Revenue bonds are the preferred financing vehicle for enterprise revenue debt when revenue bonds can be issued without voter approval."[70]

2.6.4 Navigating perceived accounting and policy challenges

This section provides insights into two common challenges (or perceived challenges) related to accounting for and funding/financing projects on private property.

Using "Regulated Operations Accounting" to capitalize incentives

In addition to the legal authority to issue bonds to finance incentives, as with all spending of utility revenues, MWD will also need to consider the appropriate accounting treatment for these investments. For accounting purposes, stormwater capture incentives on private property may constitute an asset of the utility if the expenditure creates a "regulatory asset" under Governmental Accounting Standards Board (GASB) Statement No. 62. By treating these investments in stormwater capture infrastructure on private property as regulatory assets, MWD can avoid the typical accounting requirement that it "control" a physical asset, which can be seen as a barrier to capitalizing infrastructure on private property.[71] **Thus, Regulated Operations accounting is much more flexible and is a game-changer when it comes to scaling investments in onsite systems**.

GASB Statement 62 allows public agencies to book the cost of "business-type activities" as assets instead of annual expenses—a Regulated Operations accounting approach. These are called "regulatory assets" and can be capitalized by cities and public water utilities. **The Regulated Operations approach is a complete alternative to traditional public agency accounting for capital assets.** To use Regulated Operations accounting and access debt-financing for distributed GSI, local water providers need to have a governing board that:

- Is empowered to set rates;
- Can set those rates at levels to cover the cost of the specific programs to be financed; and
- Can commit to setting rates in the future to pay for the cost of these programs.

MWD meets these requirements because it is a governmental agency with a governing board empowered to set rates, and its rates can be set to recover the cost of investments in stormwater capture and use projects and programs.

Electricity utilities have been bond financing distributed energy conservation programs on private properties for many years using GASB 62 accounting. However, this is not an approach that has been widely embraced by the public water resource sector. Many water utility chief financial officers question whether it truly could apply to investments in consumer incentives for localized water strategies. Addressing this uncertainty, in May 2018, GASB issued new guidance under GASB 62 making it clear that public water resource agencies are authorized to capitalize investments in localized water strategies employing consumer rebates and direct installations as "Regulated Operations." **The practical implication of this clarification is that utilities can now access bond proceeds to invest in consumer rebate (and/or direct installation) programs without obtaining an ownership or control interest over the property**

[70] The California Debt And Investment Advisory Commission, California Debt Financing Guide, 3-17 (June 2021), https://www.treasurer.ca.gov/cdiac/debtpubs/financing-guide.pdf.

[71] As detailed below, the control requirement is not a barrier and can be addressed by securing a property or contractual interest in the installation on private property.

where the installation occurs. The GASB 62 accounting approach applies to investments made through both revenue and general obligation bonds and can be used when issuing tax-exempt or taxable municipal bonds, as well as other forms of debt.

As a local example of regulated operations accounting, Los Angeles Department of Water and Power (LADWP) finances a variety of water efficiency and stormwater capture programs, including rebates for water efficient installations, high-efficiency washing machines, permeable pavement, rain barrels, cisterns, and replacement of turf with low-water landscaping consumer rebate programs with municipal bond proceeds using the GASB 62 Regulated Operations accounting approach. As of 2020, LADWP reported $160 million in distributed water conservation and stormwater regulatory assets.[72] Since 2010, LADWP's conservation program has saved roughly 25,000 acre-feet of water per year.[73] King County & Seattle Public Utilities also use Regulated Operations accounting for their debt financed RainWise incentive program. The RainWise program provides residential customers rebates that cover up to 100 percent of the costs to install rain barrels and rain gardens to address stormwater runoff and combined sewer overflows.[74] As of September 2020, Seattle has been able to finance GSI projects that manage 410 million gallons of stormwater per year, bringing the city closer to meeting its goal of managing 700 million gallons of runoff per year with GSI by 2025.[75]

Los Angeles Department of Water and Power *finances a variety of water efficiency and stormwater capture programs, including rebates for water efficient installations, high-efficiency washing machines, permeable pavement, rain barrels, cisterns, and replacement of turf with low-water landscaping consumer rebate programs* ***with municipal bond proceeds using the GASB 62 Regulated Operations accounting approach****. As of 2020, LADWP reported $160 million in distributed water conservation and stormwater regulatory assets.*

Investing in Infrastructure on private property: navigating California's Constitutional Gift Prohibition

When paying for or debt financing conservation and stormwater capture incentives, MWD (and potential public agency co-payors) will also need to demonstrate that using public revenues for investments on private property fall within the exceptions to California's constitutional "gift prohibition." The reasons such exceptions apply are provided below.

Nearly all states prohibit "gifts" of public funds to private individuals or groups. However, most states have also developed extensive exceptions allowing public funds to be directed to private parties when these funds are deployed for primarily public benefits. These constitutional provisions were adopted in the wake of the public debt crisis of the 1830s, when eight states defaulted on debt incurred to build public infrastructure through private partnerships. Nearly every state adopted a constitutional amendment to prohibit the use of public bonds and credit for private projects that do not benefit public

[72] City of Los Angeles, Office of the City Controller. Comprehensive Annual Financial Report 105. 2021. Available https://lacontroller.org/wp-content/uploads/2021/01/CAFR-FY20_1.28.21.pdf.
[73] Kelly, Melissa L. et al. *Tap Into Resilience: Pathways for Localized Water Infrastructure* (2021) at 29, https://www.law.uci.edu/centers/cleanr/news-pdfs/tap-into-resilience-report.pdf.
[74] King County and Seattle Public Utilities, 700 Million Gallons: Advancing Public-Private Investments, https://700milliongallons.org/project/advancing-public-private-investments/.
[75] Kelly, Melissa L. et al. *Tap Into Resilience: Pathways for Localized Water Infrastructure* (2021) at 29, https://www.law.uci.edu/centers/cleanr/news-pdfs/tap-into-resilience-report.pdf.

interests. Together the amendments have formed the "public purpose" doctrine, which provides that public dollars must be allocated for public purposes and government interests, and cannot only be used to aid private persons.

Because of these exceptions, state gift prohibitions should not be viewed as barriers to implementing distributed GSI on private property with public capital. Most states allow expenditures that incidentally benefit private interests, as long as they primarily serve and effectuate a public purpose. Some states choose to apply narrow interpretations of terms like "public purpose" and "private benefit" to limit the scope of the prohibition. Other states, however, have not extended an exemption as broadly as others.

In California the prohibition against the gift of public funds is set out in Article XVI, section 6 of the California Constitution. "In determining whether an appropriation of public money is to be considered a gift within the constitutional prohibition, the primary question is whether the funds are to be used for a public or a private purpose."[76] **So, as long as the money serves a public purpose, there is no gift of public funds even if private persons benefit from the investment.** And where a legislative body, e.g., the state legislature, a county board of supervisors, or a city council, determines an investment of public funds serves a public purpose that has a reasonable basis, California courts will not overturn that decision as a prohibited gift. "The courts will not disturb a legislative determination of what constitutes a public purpose so long as it has a reasonable basis."[77] Examples of constitutionally valid public purposes include flood control, free school textbooks, and free treatment in county hospitals for the indigent.

The public purposes of stormwater/rainwater capture and use infrastructure investments are cited throughout this Roadmap, including stormwater management to improve water quality and mitigate localized flooding, and creating local water supplies to improve water security and resilience in the region. **Given these extensive public purposes, it is likely that using MWD rates and SCW PROGRAM revenues and bond dollars to pay for these systems located on private property will not be a prohibited gift of public funds even if those projects incidentally benefit the private property owner where they are located.**

Incentivizing multiple benefit stormwater capture practices opens the door to a range of co-payors that should be willing to share in the program costs in proportion to the benefits accruing to those potential payors. In addition to MWD, these co-payors include: (1) municipal stormwater agencies, (2) retail water suppliers, (3) drinking water customers, and (4) other beneficiaries such as electric utilities, cities, and counties. The following sections detail how these co-payors might contribute to a stormwater capture incentives program.

2.6.3 Safe Clean Water Program contributions

Given the stormwater capture and multiple co-benefits of the infrastructure solutions described in this Roadmap, local stormwater agencies are key beneficiaries who may be willing to share in the cost with MWD.

MWD has successfully participated in similar partnerships. Notably, as part of its WaterScape program, San Diego County, the agency responsible for stormwater management in that region, has partnered with MWD to co-fund multiple-benefit incentives in San Diego. A similar approach is viable in Los Angeles with

[76] *County of Los Angeles v. La Fuente*, 20 Cal.2d 870, 876-877 (1942).
[77] *County of Los Angeles v. La Fuente*, 20 Cal.2d 870, 877 (1942).

the stormwater agencies that participate and receive revenue for stormwater investments through the SCW Program. As explained in Section 2.8, unlike the San Diego model, MWD can lead a co-funded program that modifies its current incentives, obviating the need for LA stormwater managers to create their own piecemeal incentive programs. This section summarizes how SCW Program agencies might use their stormwater revenues to participate in an MWD-led incentive program.

Stormwater capture and other benefits accruing to stormwater agencies and potential cost-share

As detailed in Section 2.6.2, investing in enhanced stormwater capture infrastructure strategies provides stormwater capture and water quality benefits that can help SCW Program municipalities meet their MS4 permit requirements, while achieving multiple community benefits. To summarize, Conservation Target Illustration 1 (i.e., a total investment of $12.5 million), would provide 51 AF per year (on average, 1,534 AF over 30 years) in stormwater capture benefits, with a monetized 30-year net present value of $3.5 million. This investment would also provide $3.4 million in carbon reduction, air quality improvements, community uplift, habitat and biodiversity, and other benefits, and create 64 green jobs.

Under Illustration 2, a total investment of $125 million would provide an average of 511 AF per year (15,340 AF over 30 years) in stormwater capture benefits, with a monetized 30-year net present value of $35.3 million. This investment would also provide $34.5 million in additional co-benefits and create 637 green jobs. Stormwater capture/water quality benefits alone represent 26 percent of all benefits. Key co-benefits important to SCW Program municipalities such as community uplift and habitat and biodiversity represent 22 percent and 5 percent of total benefits, respectively. Roughly equating the percentage of benefits received with the share of cost share contributions makes the case for stormwater agencies to share 30 percent of the total program cost (i.e., $3.75 million for Illustration 1 and $37.5 million for Illustration 2).[78]

While, as explained above, the ultimate cost-share distribution is a policy decision to be made by the co-payors, the Planning Tool provides a basis for MWD to work together with local stormwater agencies (and others) to share in the costs of these investments. **Revenues from the SCW Program created by Los Angeles County's Measure W (2018) can fund stormwater capture incentives.**[79]

Paying for incentives with SCW Program funds

The SCW Program allocates the approximately $280M[80] in tax revenues collected annually between three subprograms: (1) the Regional Program; (2) the Municipal Program; and (3) the LACFCD Program. Stormwater capture incentives for private property owners—both residential and commercial—should be eligible to receive funding from each of these three programs.

[78] This share of the total program could be covered by one or more SCW Program municipalities. For example, three municipalities could contribute $12.5 million each to make up the $37.5 million stormwater agency cost-share.
[79] The ability of local stormwater agencies outside of those that receive SCW Program revenues is a separate question outside the scope of this roadmap. A similar analysis would apply, however, fostering MWD conversations with a broad range of stormwater agencies within its service area.
[80] SCW Program, Safe Clean Water Tax Collection Totals, https://safecleanwaterla.org/wp-content/uploads/2022/10/SCW-2021-22-Tax-Collection-Totals.pdf.

Under the Regional Program, stormwater capture projects on private property should qualify as projects and programs eligible for funding. These systems installed on already developed properties constitute "retrofits," which are expressly called out in the SCW Program ordinance as eligible project types. Based on the FY24-25 projections, the Regional Program will have at least $118.5 million to invest in eligible infrastructure projects. At present, however, no approved Stormwater Investment Plan includes an incentive program for distributed stormwater capture and use projects. However, the Lower San Gabriel River Watershed Area Steering Committee (LSGR WASC, one of nine WASCs that receive Regional Program funding)[81] has set aside $1.5M for "small-sized" projects that may be a readily available pathway to accessing Regional Program funds for stormwater capture incentives (see text box for details).

Prioritizing Smaller-Scale Stormwater Projects:
Lessons from the Lower San Gabriel River Watershed Area

As of FY22-23, the LSGR WASC is estimated to receive $16.73M in Regional Program funding. In February 2023, as part of its Prioritization Criteria, the Lower San Gabriel River Watershed Area Committee (LSGR WASC) reserved $1.5 million in SCW funds to pay for "small-sized" projects, e.g., projects less than $1 million. The LSGR WASC is using this approach to ensure smaller, community-driven projects are competitive in the Regional Program process. Stormwater capture incentives could fall within this set-aside.

Further, based on the benefits detailed above, stormwater capture infrastructure should meet the minimum 60-point scoring threshold to receive Regional Infrastructure Program funds. Based on the modeled benefits, examples of how this minimum can be achieved are provided in Table 2-5 and Table 2-6. Table 2-5 provides an example scoring based on the standard scoring used to evaluate projects applying for funds. Table 2-6 provides an example scoring based on a pilot scoring rubric that SCW Program managers tested in 2022-2023 to refine how water supply magnitude benefits are evaluated and provide more granular metrics for that category of benefits.[82]

Table 2-5. Potential Safe Clean Water Regional Program, Standard Scoring[83]

	Water Quality Cost Effectiveness	Water Supply Cost Effectiveness	Water Supply Magnitude	CIBs	Nature-Based Solutions	Leveraging Funds & Community Support	Total*
Illustration 1 ($12.5M)	20	10	2	10	15	10	67
Illustration 2 ($125M)	20	10	12	10	15	10	77

**Minimum score needed to qualify for funding = 60*

[81] Watershed Area Steering Committees oversee how SCW Program funds are spent in their watershed area.
[82] SCW Program, Interim Guidance 2022, https://safecleanwaterla.org/wp-content/uploads/2022/05/SCWP-2022-Interim-Guidance-20220519.pdf.
[83] The potential SCW Program's Regional Program scoring in Table 2-5 and Table 2-6 are initial estimates offered for purposes of examples for this Roadmap only. Final scoring would done via the SCW Program application process and may differ from these initial estimates.

Table 2-6. Potential Safe Clean Water Regional Program, Pilot Water Supply Scoring

	Water Quality Cost Effectiveness	Pilot Water Supply Cost Effectiveness	Pilot Water Supply Magnitude	CIBs	Nature-Based Solutions	Leveraging Funds & Community Support	Total*
Illustration 1 ($12.5M)	20	12	7	10	15	10	74
Illustration 2 ($125M)	20	12	12	10	15	10	79

**Minimum score needed to qualify for funding = 60*

Regional Program dollars are likely best suited to cover capital costs, near-term operations and maintenance costs, **plus potentially, pro rata administrative costs for an incentive program administered by another agency (e.g., MWD)**. This co-funding approach could be structured similar to local retail water agencies or cities' participation in MWD's current turf replacement program, where the local agency adds funds on top of the baseline MWD program to increase the rebate amount. To contribute to the incentives, a municipality could apply through the usual Regional Program process, or ideally, WASCs could also consider setting aside or reserving funds for their share of an incentive program (similar to the above LSGR WASC example).

As with the Regional Program, stormwater capture and use infrastructure on private property should qualify for funding under the Municipal Program because these dollars are to be spent on project implementation and maintenance. The projected FY24-25 estimated revenue for the full Municipal Program is $111.6 million.[84] For example, Long Beach is projected to receive $4.55 million in local return funds in FY24-25, and as of its 2022-2023 Annual Plan, Long Beach has total of $10.3 million in available funding.[85] These funds will be spent on meeting MS4 permit requirements. As part of that compliance, Long Beach will need to meet the targets set out in the (Enhanced) Watershed Management Plans that apply to Long Beach, which together set a stormwater capture target of 3,363 AF per year.[86] **Achieving 511 AF of stormwater capture under Illustration 2 would represent 15 percent of this requirement.** Other SCW Program municipalities have similar goals and requirements.

Similarly, **stormwater capture and use infrastructure on private property should qualify for funding under the LACFCD Program, which can also fund project and program implementation**. The FY2024-25 projected revenues for the District Program are $27.9 million. As of November 2023, over the program's first four years, the District Program received $111.5 million and spent $24 million. An "additional $20M in contracts are in progress for several significant efforts," as discussed in the SCW Program (Draft)

[84] SCW Program, FY 2024-25 Local Tax Return Projected Total, https://safecleanwaterla.org/wp-content/uploads/2023/11/FY-24-25-Projected-Local-Funds-by-Municipality-20231017.pdf.

[85] Id; City of Long Beach, FY 22-23 Municipal Annual Plan, https://www.dropbox.com/sh/0ynkhec2yib4c09/AAASntkzd8JZDidUfoFiaO0pa?dl=0&preview=2020MP46+Long+Beach+FY22-23.pdf.

[86] This cumulative total is based on capture goals for WMPs and EWMPs that cover Coyote Creek, San Gabriel River, and Los Angeles River. Links to WMPs/EWMPs here: https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/#:~:text=The%20Los%20Angeles%20County%20MS4,best%20management%20practices%20(BMPs).

Biennial Review Progress Report.[87] The (Draft) Biennial Review details how the District Program dollars have and will be spent.

A key takeaway from our analysis is that the infrastructure strategies modeled as part of this project meet the SCW Program purposes (across all three fund categories), providing the exact type of cost-effective and multiple benefit projects the program was created to fund. However, there is stiff competition for the somewhat limited SCW Program dollars. Taking a combined approach and building a portfolio from all three sources could therefore be a useful strategy. **Importantly, SCW Program municipalities can best leverage their parcel-tax revenues by joining an MWD incentive program compared to setting up their own city-by-city incentive programs.** As described below, they may also have the option to debt finance their cost-share to generate sufficient funds upfront to accelerate investments in these infrastructure solutions.

Table 2-7 summarizes projected allocations for the various SCW Program funding programs for FY 2024 – 2025. It also highlights the best fit allowable cost categories for each program, underscoring allowable uses for stormwater incentives.

Table 2-7. Aligning Funding Options for Safe Clean Water Funds

SCW Program Fund Category	Best-fit Stormwater Capture and Use Incentive Cost Categories	FY2024-25 Projected Revenue
Regional Program	Capital costs Operations and maintenance Administration costs	$120.65M
Municipal Program	Capital costs Administration costs Operations and maintenance	$111.57M
District Program	Capital costs Local workforce job training	$27.88M $22.3M (Projects and Programs and SCW Program administration) $5.58M (Local workforce job training, public education, and school curriculum)

Safe Clean Water General Obligation Bond

Given the available annual revenues from the Regional, Municipal, and District Programs, SCW Program municipalities could potentially cover 30 percent of the costs of Target Conservation Illustration 1 (i.e., $3.75 million) with annual revenues. It is not likely, however, that annual dollars can cover the hypothetical 30 percent cost-share for stormwater agencies set out in Conservation Target Illustration 2 (i.e., $37.5 million). To get to this scale of investment, SCW Program municipalities, namely Los Angeles County, could consider financing their contribution.

[87] SCW Program, Draft Biennial Progress Report, https://safecleanwaterla.org/wp-content/uploads/2023/10/SCWP-Draft-Biennial-ROC-Report_ROC-Discussion-Draft.pdf.

The SCW Program authorizes the County[88] to use revenues from the Special Parcel Tax to "finance bonds … so long as the bond proceeds are used for Projects and Programs that are eligible for funding under the SCW Program," and the District determines that bonds or loans "are prudent and necessary" to fund those projects.[89] Projects and programs eligible for funding under the SCW Program include, among other things, residential and/or commercial stormwater retrofits, incentive programs established by the Los Angeles County Board of Supervisors, and projects that "improve Stormwater or Urban Runoff capture or reduce Stormwater or Urban Runoff pollution for improving water quality, increasing local water supplies, or improving the quality of life for communities."[90] Moreover, as discussed throughout this Roadmap, investments in stormwater capture systems on private property materially benefit and serve the entirety of Los Angeles County. Because these bonds would be repaid with revenues from the Special Tax—a parcel tax—they would likely be issued as general obligation bonds.[91]

As detailed in Appendix C, the Los Angeles Flood Control Act and Government Code Section 29900 *et seq.* should authorize the County to issue bonds secured by SCW Program revenues to finance these installations on behalf of the LACFCD. If the County were to issue a general obligation bond to finance the stormwater agencies' 30 percent share of Illustration 2, assuming 5 percent interest on a 30-year term, the County would make $2.44 million in payments for 30 years for a total cost of $73.2 million. But, assuming a 3 percent rate of inflation, present value cost would be $49.3 million. Accounting for the time value, the County would pay $11.7 million in interest. At a present value cost of $49.3 million, the debt financed program is cost-effective. The estimated monetized value of the stormwater capture and co-benefits accruing to the stormwater agencies totals $69.9 million. In other words, while contributing 30 percent of the program cost, the County benefits would exceed the cost by $20.6 million.

Further, given that the SCW Program Ordinance expressly authorizes bond financing for private property retrofits and incentives, this authority should not require the County to own or operate the financed stormwater capture systems. This eliminates a *legal* requirement for the County to obtain any lien, easement, or other ownership interest in the property where these systems are located. Because debt incurred by the County to pay for stormwater capture projects would be secured by SCW revenues—which are parcel tax revenues collected at a rate set by Measure W—the County (or other SCW Program municipalities) does not have the rate setting authority to use Regulated Operations accounting; see Section 2.6.2 above for an explanation of Regulated Operations accounting. While not required by the bond authority, from an accounting perspective the County would need to meet the control requirements of GASB 4 to account for investments in distributed stormwater capture and use systems. As a general matter, control results from the city or utility's ability to determine the nature and manner of use of the investment. Easements or contracts can usually establish the needed level of control. In any event, it may be advisable from a policy and regulatory compliance perspective to enter into an operation and

[88] Municipalities within the District boundaries are also authorized to issue bonds financed by the Special Tax.
[89] Fld. Ctrl. Dist. Code, Ch.16.04(B); Fld. Ctrl. Dist. Code, 16.05(A)(2)(i).
[90] Fld. Ctrl. Dist. Code, Ch. 16.05(A)(2)(a), (e), (f), (h), (*l*).
[91] It is possible that the County could issue "limited obligation bonds" to finance these investments by pledging SCW Program revenues as security for the bonds rather than the County's "full faith and credit." *See* Cal. Gov Code § 50665.2. This approach may require the County to obtain an easement over the properties where the stormwater capture infrastructure is installed and would not avoid voter approval requirements, however. Cal. Gov Code § 50665.8. There may also be an option to issue a "Special Tax Revenue Bond." See National Bond Lawyers Association, Bond Basics: https://www.nabl.org/bond-basics/special-tax-bond/. Although further research is needed to determine whether California law authorizes these types of revenue bonds backed by special taxes.

maintenance agreement with private property owners. Section 2.8 discusses these program implementation and administration recommendations.

A small but important set of water utilities are finding that they can invest municipal bond proceeds in distributed infrastructure and comply with GASB Concepts Statement No. 4. For example, over the last two decades, the Southern Nevada Water Authority has bond financed more than $260 million (as of 2021) in incentive programs such as private property turf replacements. This large-scale investment has saved nearly 467,000 acre-feet of water, which is 167,000 acre-feet more than the amount of Colorado River water that the State of Nevada has the right to consumptively use each year.[92] Similarly, the Milwaukee Metropolitan Sewerage District (MMSD) capitalizes and bond finances GSI investments on property it does not own by requiring recipients of GSI grants to enter into a conservation easement with MMSD.[93] In 2019, MMSD invested $1.9 million in private property GSI. In February 2020, MMSD issued a certified Climate Bond to finance $20 million in "community based" GSI.

2.6.4 Additional contributors to achieving conservation targets

In addition to MWD and local stormwater agencies, there are several other potential co-payors who may be willing to contribute to an MWD-led enhanced conservation and stormwater capture incentive program. This Roadmap focuses on retail water providers and water and stormwater customers as additional co-payors. There may be even more potential co-payors given the multiple benefits of private property landscape transformation, cisterns, and bioretention infrastructure; see text box below for details.

Retail water providers

As with MWD, retail water suppliers in MWD's service area can, and many do, use their water rates to pay for consumer incentives to encourage water conservation**. Recent changes to state conservation requirements will drive increased retail water supplier conservation investments—investments that will include additional incentives for residential and commercial customers.**

In particular, to meet California's forthcoming Conservation As a Way of Life regulations, many retail water agencies in MWD's service area will need to conserve more water (see Figure 2-15 for examples from our study areas). For example, the Las Virgenes Municipal Water District (LVMWD) will need to reduce water use by 31 percent by 2035. The City of Long Beach will need to reduce water use by 6 percent by 2035. Based on these agencies' historical use, this will mean conserving thousands of

Additional Co-Payors for Future Consideration

Parcel-scale stormwater capture infrastructure provides benefits beyond water supply and stormwater management, including energy savings, reduced wildfire risk, and community uplift. These co-benefits may open the door to additional co-payors, such as:

- *Energy utilities*
- *Municipal parks departments*
- *Insurance companies*
- *Resource Conservation Districts*

Full exploration of the pathways for these additional potential co-payors to participate in an MWD-led incentive program is beyond the scope of this Roadmap but is a recommended area for future consideration.

[92] WaterNow Alliance et al, Financing the Future: How to Pay for Turf Replacements in Colorado, at 4 (Aug. 2022), https://tapin.waternow.org/wp-content/uploads/sites/2/2022/04/2022_0803_UtilityTurfReplacement_Final.pdf.
[93] Milwaukee Metropolitan Sewerage District, Limited Term Conservation Easement for Green Infrastructure, https://tapin.waternow.org/wp-content/uploads/sites/2/2019/05/MMSD-Conservation-Easement.pdf.

acre feet of water over the next 12 years.[94] These retail suppliers also plan to conserve hundreds of acre feet based on their 2020 Urban Water Management Plans.

Agency	Average service area population	Average total use in millions of gallons	Reductions needed to meet 2025 standards	Reductions needed to meet 2030 standards	Reductions needed to meet 2035 standards
Long Beach, City of	475,636	16,713	0%	−3%	−6%
Las Virgenes Municipal Water District	74,271	7,054	−13%	−26%	−31%

Table: Bay Area News Group • Source: State Water Resources Control Board estimates • Get the data • Created with Datawrapper

Figure 2-15: Proposed Conservation As a Way of Life Water Reductions Targets

Investing in enhanced stormwater capture incentives can help retail water suppliers, such as LVMWD and Long Beach, meet these needed reductions. **Because these investments help meet retail water agencies' regulatory requirements, MWD can make a case for these retailers to contribute to increased incentives for stormwater capture infrastructure. As with local stormwater agencies, if retail water providers were to join an MWD-led program, this would help bring the investments to scale and accelerate the pace of implementation of climate resilient infrastructure.**

2.6.5 Grants

As MWD's Long Range Finance Plan recognizes, federal and state grants can supplement agency revenues to fund incentive programs.[95] MWD has leveraged significant grant dollars in the past, including a recent WaterSMART grant from the Bureau of Reclamation.

Building on MWD's understanding of federal and state grants, Appendix D identifies a set of grants that can likely fund stormwater capture incentives and be accessed by MWD, its member water agencies, Los Angeles County, and/or other local entities. The project team examined a wide range of grant programs, focusing on those that are amenable to support incentive programs and/or the underlying conservation and stormwater capture infrastructure described in this Roadmap. Several of these grants are available on a regular basis with notices of funding availability opening on nearly an annual basis (e.g., the Bureau of Reclamation's WaterSMART grants). Others are available on a rolling basis (e.g., Coastal Conservancy). Table 2-8 provides a high level summary of priority grant funding options.

[94] Final acre-feet reductions based on these utilities' water budgets will be determined according to pending State Water Resources Control Board regulations: https://www.waterboards.ca.gov/conservation/regs/water_efficiency_legislation.html.
[95] MWD, Long Range Finance Plan at 63-64.

Table 2-8. Priority Grant Options

Grant Type	Administering Agency	Program Name	Available Funding Amount
State	Office of Planning and Research	Regional Resilience Planning Grants	Implementation: $800,000 to $3M Planning: $150,000 to $650,000
	Coastal Conservancy	Coastal Conservancy Grants	$200,000 to $5,000,000
	Department of Transportation	Clean California Local Grants	$5M max per project
	California Strategic Growth Council	Transformative Climate Communities Implementation Grants	Planning: $300,000 Project development: $7M Implementation: up to $35M
	State Water Resources Control Board	Nonpoint Source Pollution Control Grants	Implementation for impaired waters: $3M Implementation for high quality waters: $400,000 Implementation for post-fire recovery: $800,000 Planning: $800,000
Federal	Bureau of Reclamation	WaterSMART Water and Energy Efficiency Program	Two-year projects: $500,000 Three-year projects: $2M Large, three-year projects: $5M
		WaterSMART Drought Response Program	Two-year projects: $500,000 Three-year projects: $2 million Large, three-year projects: $5M
	FEMA	Building Resilient Infrastructure and Communities (BRIC) Program	Total for all projects: $2.3 billion Funding is distributed through state partner agencies
		Hazard Mitigation Grant Program	FEMA HMGP: $428M in total federal funding PrepareCA Match: $255M in total federal funding 2021 FEMA HMGP: $173M in total federal funding

Customer contributions

MWD can also look to customers to contribute. However, to ensure enhanced stormwater capture incentives are accessible to all customers and distributed more equitably among customers, and given the addition of local stormwater agencies as co-payors, expected customer contributions can be significantly reduced. Given MWD's focus on equity, see Section 2.7, below, for details on customer contributions.

Prioritize Equity Outcomes

MWD staff, leadership, and Board of Directors have all taken steps to prioritize equitable access to water, to rebate programs, and to the benefits associated with a safe, secure, Resilient water supply. These commitments are reflected in the charter of the Board's Underserved Communities Committee, which specifies that it shall provide advice and recommendations to "(i)ncrease the participation of currently underserved communities in Metropolitan's rebate, conservation, and other local resources programs."[96] Equity is also a core theme of CAMP4W. This Roadmap outlines two clear opportunities to prioritize equity outcomes through an enhanced stormwater capture and conservation incentives program.

First, reducing the customer's share of costs for installing landscape transformations, cisterns, and/or bioretention on their property is consistent with MWD's new paradigm for water management to increase its support for investments in local infrastructure, as well as its commitment to equitable infrastructure investments.[97]

As detailed in Section 2.6.1, above, many customers could share 10 percent of the cost of installing stormwater capture infrastructure on their property. **This shift would be a policy choice for MWD and any partnering public agencies, as MWD's current turf replacement incentive program requires customers to bear roughly 90 percent of the installation costs.** Choosing to essentially reverse who pays the majority of the costs is not only a sound water infrastructure investment decision but helps align MWD with its stated CAMP4W objectives to "pursue collaborative cost-sharing partnerships and promote affordability initiatives."[98] Investing at scale in these parcel-level projects, alongside centralized systems is a cost-effective, affordable approach.

Second, MWD and other co-funders have the option to create a sliding scale for customer cost-share contributions, depending on customers' ability to pay. **This sliding scale could include establishing a direct installation delivery model to support more equitable distribution of stormwater investments in communities.** Setting customers' cost-share at 10 percent also paves the way for a direct installation delivery model because the public agency co-payors are already budgeting to cover the majority of the program costs. It also could make the program accessible to property owners who historically have been unable to participate in water use efficiency rebate programs. **Unlike customer bill assistance programs, infrastructure investments through direct installation on private property can potentially be based on owners' income without running afoul of California's Prop 218 requirements** (Figure 2-16).

MWD has some data regarding the current degree of participation in MWD's incentive programs by households that are economically disadvantaged, have low English language proficiency, or encounter other barriers. During the five-year period from 2013 to 2018, low-income properties reportedly made up less than 25 percent of the turf area converted through the MWD replacement rebate program.[99] More recent data has been difficult to obtain. However, several studies suggest that homeowners who

[96] Admin Code § 2499.30(c).
[97] James 2023. Metropolitan Water District of Southern California. *Metropolitan Officially Signs on to Initiative to Bring Greater Equity to Construction of the Nation Infrastructure*. June 29, 2022. Available, https://www.mwdh2o.com/press-releases/metropolitan-officially-signs-on-to-initiative-to-bring-greater-equity-to-construction-of-the-nation-infrastucture.
[98] MWD, Climate Adaptation Master Plan, https://www.mwdh2o.com/planning-for-tomorrow/addressing-climate-change/.
[99] Metropolitan Water District of Southern California, Board Presentation, Aug. 21, 2018, Item 4c.

Figure 2-16. Prop 218 and Investing in Stormwater Capture Infrastructure

The inability of lower-income customers to shoulder the upfront costs of stormwater capture infrastructure is often a barrier to participation in reimbursement-based incentive programs. Incentive programs implemented through a direct installation model can eliminate this barrier. This approach installs the landscape transformation at no cost to the customer; the cost is covered upfront. (See Section 4.6 for details on direct installation delivery method; details Section 4.6.1. on cost-share options between co-payors).

To ensure that only customers that need this type of additional incentive receive it, direct installations should be available only to certain income-qualified customers. This approach would thus treat water agency customers differently based on income. Water agencies are often wary of this income-based approach because of concerns about complying with the proportionality requirements of Proposition 218 (Prop 218). ***Prop 218 should not be viewed as a barrier to income-qualified direct installation incentives, however.***

Prop 218 does not apply to how incentives for installing stormwater capture infrastructure are disbursed. The requirements of Prop 218 relevant to water agencies, set out in California Constitution Article XIII D, apply only to how public agencies establish property-related fees, e.g., water rates. *The purposes of Article XIII D are to "limit[] local government revenue and enhance[e] taxpayer consent." In keeping with these purposes, Article XIII D requires that agencies: "follow the procedures pursuant to this section* ***in imposing or increasing*** *any fee or charge as defined pursuant to this article… " and that: "A fee or charge shall not be* ***extended, imposed, or increased*** *by any agency unless it meets all of the following requirements… ."* ***Once a water rate has been set pursuant to these rules, how an agency spends the collected revenue on infrastructure investments is a separate question.***

In other words, when a water utility makes decisions about how to use water rates already collected, e.g., to repair pipes, expand a treatment system, or add storage, Prop 218 has already been met during the rate setting. So long as the revenues are used on investments included in the rate setting, precisely how the revenue is spent is not a Prop 218 question. ***Thus, a water agency could choose to make investments in stormwater capture infrastructure on lower-income customers' properties by offering those customers additional incentives so long as parcel-scale stormwater capture infrastructure are baked into their rates alongside all other infrastructure investments. In this way, water utilities could offer no-cost direct installations without running afoul of Prop 218.***

undertake turf replacement tend to be white with middle-class or higher income levels.[100] This research also suggests that technical difficulties in completing application materials, lack of access to contractor support, and highly variable and unpredictable rebate amounts and availability all create challenges for Latino and other non-English speaking households.[101]

It is also worth emphasizing that the amount of the turf replacement rebate, historically $1 to $2 per square foot, is far less than typical project costs incurred by a homeowner, which range from $10 to $15 per square foot. The difference in cost and the rebate amount creates a significant barrier for low income

[100] See, e.g., Winseck 2023, Hartin 2022.
[101] Winseck 2023.

households, as does the need to pay for improvements upfront while awaiting repayment. Thus, **MWD's current incentive approach creates structural inequities that result in wealthy people having the opportunity to conserve water and therefore reduce their water bills, while lower income households lack equal access to the rebates.**[102] One result of this inequity is a condition in which lower income ratepayers are subsiding wealthier households. To address this undesired result, several peer water utilities provide landscape assessment, rebate assistance and direct installation associated with their rebate programs. See Appendix E for peer utility case studies. Interviews conducted by the research team confirm that increasing participation by economically/other disadvantaged households will require direct community outreach and a combination of technical, financial, and direct installation assistance. Interviews, and the available research, also suggest that increasing the rebate amount is important in attracting participation from low-income households, enabling them to access the economic and other benefits that the incentivized projects provide to parcel owners.[103]

Direct installation of low water use landscaping and associated conservation practices is seen as a particularly important approach to reducing barriers to incentive access, particularly among older and lower-income residents.

Examples of programs providing direct installation of outdoor water conservation or stormwater capture retrofits include Washington D.C. DOEE's RiverSmart Rewards Program, City of Seattle/Kings County RainWise program, and City of Long Beach's Direct Install Gardens (DIG) program. Notably, the City of Long Beach's DIG program combined funding provided to the City via MWD's Local Returns program with grant funding from the Coastal Conservancy and Bureau of Reclamation's WaterSmart grant programs. Significantly, it also leveraged a partnership with the Long Beach Conservation Corps, which provided the labor force for the installation projects and associated funding. Implementation of a program that undertakes direct installation of landscape transformation and bioretention retrofits is an important link to the workforce development benefits that an updated incentive strategy can provide.

By leading a more "full service" incentive program that supports workforce opportunities and other benefits, MWD and its local partners could leverage economic development and green jobs training programs and associated funding. Such a program harnesses the capacities and capabilities of both workforce-oriented non-governmental organizations (NGOs) and the private sector, creating green job opportunities that grow from entry level to greater expertise and responsibility. Partnerships with these employers can leverage the funding sources to which they have access in order to expand support for the incentive program while also delivering high-value community benefits within MWD's service area. See the text box below for an example of a workforce development program in Prince George's County, Maryland that has realized these benefits.

While the existing incentive program mobilizes the landscape contractor community to some extent, much more could be done to access the partnership potential from this industry. In other cities, the contractor community has played significant roles in outreach, pre-project implementation funding, and workforce development. Within Los Angeles County, the existing partnership between the City of Long

[102] See Shimabaku, Morgan and Snyder, Jessi, *Ensuring Water Conservation and Efficiency Programs Are Accessible to All—In California and Beyond.* N.d. Pacific Institute. Available https://pacinst.org/water-conservation-efficiency-accessibility/.
[103] Interviews with City of Long Beach, North Santa Monica Bay WASC, Malibu Foundation; Hartin 2022, Jessup 2016.

Clean Water Partnership in Prince George's County, MD Fosters Small, Local Business Development

Image credit: The Clean Water Partnership

The Clean Water Partnership (CWP) is a public-private partnership between Prince George's County and Corvias. This 30-year partnership, initiated in 2015, taps into revenues from the County's stormwater fee to pay Corvias for the design, installation, and maintenance of GSI projects that meet the County's MS4 permit compliance requirements and deliver meaningful, measurable economic benefits to County residents and businesses. The contract between the County and Corvias spells out local employment and local business participation goals to ensure that the economic benefits of the $100 million program are realized by the local community. To date, nearly 80 percent of project funds have been awarded to local businesses, and nearly 70 percent of labor hours contributed to the project have been worked by county residents. Through these approaches, the $350 million program is expected to have a local economic benefit of $655 million.

The CWP has created several programs to expand the local GSI workforce and provide support to small businesses and business owners within the county. The Emerging Landscapers Program provide trainings, coaching, and certifications to develop firms' GSI installation and maintenance skill levels and improve their ability to compete for work on CWP projects. The CWP Mentor Protégé program focuses on developing the capacity of local, small and minority firms related to stormwater management and green infrastructure projects. The Program provides, coaching, training, access to bid opportunities, and other supportive services.

Sources: CWP, 2023, Corvias, N.D.

Beach and Long Beach Conservation Corps provides a useful example of a mutually-supporting relationship. In this manner, the rebate program becomes an engine for job training and cultivation of local businesses that are qualified to undertake landscape transformation and conservation installs on other participating properties. Investment in a direct install element can help to resolve the workforce constraints that have limited installation of turf replacement projects as well as their long-term maintenance.

Other initiatives underway, including a partnership between the Pacific Institute and LADWP to install leak detection devices in multifamily rental units, point the way toward the value of both direct installation and technical assistance to promote disadvantaged residents' access to bundles of incentive programs. Tucson Water's partnership with Sonoran Environmental Research Institute (SERI), for example, engages an organization trusted by the community to connect low English speaking households to direct installation of cisterns and other water conservation devices and associated incentives.[104] **A revision to MWD's incentive strategy that emphasizes direct engagement with, and assistance to, qualifying households could enable these community members to better access the full range of indoor and outdoor conservation incentives and technologies.**

Addressing challenges to equitable participation in the incentive program, and reaching disadvantaged households, will likely require significant changes to MWD's incentive strategy. These changes will almost certainly increase program costs; however, they may also create new opportunities for partnerships and open access to funding sources from other public agencies, utilities, and potentially philanthropic institutions to help mitigate cost increases. To achieve a more equitable program, we recommend that MWD consider:

- Implementing a direct install program for qualifying properties through expanded, region-wide collaboration with the Conservation Corps and other workforce development programs;
- Leveraging these collaborations' ability to access workforce and economic development funding sources;
- Increasing incentive program funding and other resources to support improved public outreach, particularly in areas with low rebate participation rates;
- Creating a 'pool' of technical assistance providers who are trained to install and maintain landscape transformation and stormwater capture infrastructure and who can work with participating households;
- Stabilizing and increasing rebate amounts (and/or adopting rebate amounts tied to household budget levels, or similar approaches that link rebate amounts to a customer's ability to pay for project design and installation); and
- Undertaking outreach and other programs directed at rental property owners.

The overarching benefits for MWD and member agencies may include increased ability to meet water conservation targets, and perhaps more importantly, contribute to the creation of Community Investment Benefits in Disadvantaged Communities.

[104] See Snyder, Cora. *Saving Water, Time, and Money by Fixing Leaks in Affordable Housing*. 2023. Pacific Institute. Available https://pacinst.org/saving-water-time-and-money-by-fixing-leaks-in-affordable-housing/. See also Appendix E.

Finally, in addition to specifically targeting low-income customers through direct installation and outreach, the project team recommends that MWD provide technical assistance/audits for all property owners to increase participation. As noted by several stakeholders interviewed during our outreach activities, the absence of this technical and administrative assistance may be a significant factor limiting uptake across economic and geographic ranges. Interviewees noted the need for a "one stop shopping" approach to turf replacement/landscape transformation and expressed opinions that, even in economically-privileged communities, the multiple steps required by the rebate process dissuaded property owners from participating. An expanded incentive program would benefit from an ability to provide technical assistance to property owners related to navigating options within the bundle of available rebates, submitting rebate applications as well as project design and installation. See the text box below for a successful example of this model implemented through Montgomery County's RainScapes Reward Rebate Program.

Adopt a Program Administration Strategy and Mobilize Partnerships

MWD's existing turf replacement program is limited in its scalability and ability to achieve more meaningful conservation outcomes. In its current form, the program (administered through SoCal Water$mart) provides a "one size fits all" approach for property owners interested in accessing the rebate. The base $1 per square foot (or occasionally, $2 per square foot) rebate is available to all property owners who successfully design a project, fill out and submit the application form, and implement the turf replacement project at their own expense. MWD does not provide hands-on technical or financial assistance to assist residential property owners with any step in the process (although a distinct minority of the District's retail water agency members do offer some technical assistance).

In addition, as noted earlier in this Roadmap, the turf replacement program has also received relatively low and **inconsistent levels of funding.** While MWD regularly notes the fact that the rebate program is typically fully subscribed, this is more indicative of the overall limited budget and the level of customer contributions required (which are significant for many property owners), rather than a reflection of satisfied public demand for incentives.

There are a range of program administration models that could enable MWD and member agencies to expand upon the services provided to property owners, leverage additional funding, and provide implementation support. These include:

1. Expanding the scope of the contractual arrangement with EGIA as the SoCal Water$mart provider (essentially, maintaining the status quo with some limited enhancements);
2. Bringing program administration and partnership development tasks "in-house" within MWD and staffed by MWD;
3. Partnering with a range of Community Based Organizations (CBOs) across the MWD service area; and/or
4. Spinning off the program to a single (or multiple) outside entity (or entities) through a outcomes-based public private partnership (P3).

There is some overlap between these options; for example, SoCal Water$mart's rebate processing services (provided by EGIA) may be retained even in a P3 model, and P3 models may also integrate CBOs

Montgomery County (MD) RainScapes Rewards Rebates Program Offers Onsite Assistance and Contractor Support

Montgomery County's RainScapes Rewards Rebates program offers rebates to residential, commercial, and institutional property owners for the installation of rain gardens, permeable pavement, rain barrels, conservation landscaping, and other approved GSI projects that infiltrate stormwater onsite. Property owners can fill out the application online in less than 15 minutes. Montgomery County Department of Environmental Protection (MCDEP) staff also conduct site visits and can help applicants evaluate their site and design plans for GSI installations. Program staff also help participants complete the online application for the rebate onsite.

The MCDEP RainScapes program is well-known for its GSI contractor training program, RainScapes for Landscape Contractors. Through the program, the county has trained more than 400 landscapers (as of 2017), landscape architects, designers, and stone, mason, and garden center staff on GSI design, implementation, and maintenance. The training program not only ensures that there are contractors available to implement RainScapes projects, but has also helped to create a "sales force" for the rebate program. Landscapers and others that have gone through the training often "sell" the program to their clients and, in some cases, even fill out the application for them. MCDEP's trainings and newsletter, the *RainScapes Gazette for Landscape Professionals,* also provide a networking forum to support the development of professional expertise.

MCDEP provides guidance to participants on how to select a contractor to perform the work, and publishes a list of contractors that have completed the program online. The list is ordered based on how many projects the contractor has completed through RainScapes Rewards, and then alphabetically.

Source: Clements et al. 2018

as implementation and funding partners. In addition, the JPA model suggested in Section 2.6 can be integrated with at least two of the following options. With or without a JPA, each of the following could create opportunities to scale up the landscape transformation incentive program to a level at which MWD may opt to debt finance the stormwater capture infrastructure at the heart of the incentivized projects. An important feature of Options 2 through 4 is the ability to respond to the need for more hands-on engagement with property owners by offering site assessments that identify bundles of relevant incentives and conservation actions, provide technical assistance with project design and implementation, deliver direct installation of landscape transformation projects to qualifying property owners, and support the ongoing health of installed projects through post-installation maintenance.

These options also create opportunities for improved tracking and monitoring of incentivized projects, enabling MWD to benchmark the incentive program against water conservation and other metrics. The relative advantages and disadvantages of these four models are summarized in Figure 2-17, which suggests a ranking of each model's ability to meet the CAMP4W criteria.

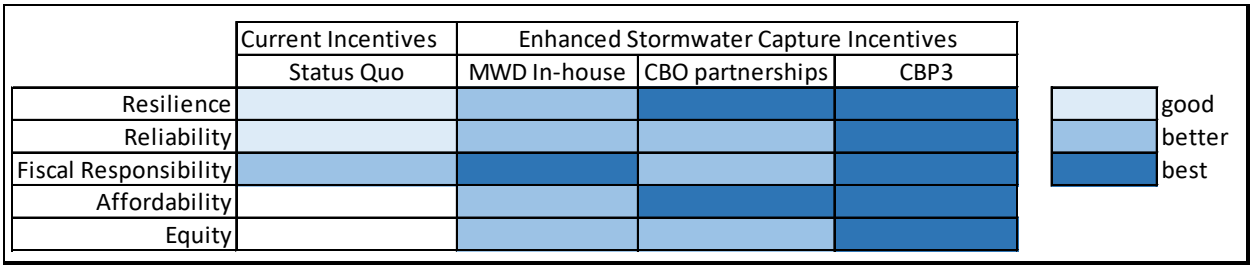

Figure 2-17. Program Administration Models and CAMP4W Themes

Program administration costs are likely to range widely across the following options, however they are difficult to predict and largely dependent upon the scale of program needed to meet the conservation target identified in Section 2.3. In its economic analysis, and based on input from MWD staff, the project team assumed that program administration costs would be ten percent of the overall incentive program budget as a working estimate.

In the team's judgment, a public-private partnership (P3) with a compensation structure tied to the attainment of conservation, environmental, and social outcomes, would be the optimal administration model for an enhanced incentive strategy. This model is more fully discussed below (Option 4).

Option 1: Status Quo

Description

MWD would continue to utilize EGIA as the contractor providing SoCal Water$mart as a funding administrator, rebate application processor, and public outreach brand identity. Some revision to the contract may be needed to expand EGIA's role to manage more multi-agency funding, but existing rebates involving contributions from multiple agencies are apparently processed without difficulty.

This option also continues the existing level of support that MWD provides to member agencies who, in turn, tailor the MWD incentive offerings through additional funding, property owner support, and direct installation (for example, in Long Beach).

Costs

Program costs under this option are likely to be in line with existing costs for program administration. Additional financial support for member agency programs could expand the capacity of those efforts and enable additional direct engagement with property owners. Additional budget for incentives would be required, commensurate with the conservation goals established by MWD and an appropriate rebate amount.

Advantages

The existing system is well understood by water agencies and contractors, and well recognized by the general public, and often is incorporated into water agency rebate webpages and programs. This is not an insignificant factor as a change from this provider would likely require financial and staff commitments by member agencies to change out well-established web and print resources, which often exist in multiple languages.

The program currently manages to provide tailored rebates that combine MWD and local agency funding. However, experience with San Diego County's WaterScape program indicates that MWD struggles to accept financial contributions to an incentive package from non-member agencies. If this issue is surmountable, EGIA's services could be valuable in disbursing rebates from a multi-funder pool.

Disadvantages

This approach would maintain the "status quo" for rebates, including the limitations described above. Except when member agencies independently do so, **this approach provides no significant ability to engage CBOs or external partners or to deliver any form of direct install program or technical support.** Each member agency would be responsible for activities and costs if undertaking one or both of these activities, leading to inconsistent levels of service across various towns and water districts. Significantly, **this approach would also limit MWD's ability to demonstrate leadership on programs that reflect the CAMP4W equity goals.**

As mentioned above, MWD and County of San Diego staff have described challenges that MWD faced in accepting contributions to a rebate fund from the County (a non-member agency.) A single instance workaround was created, but systemically, this would be unsustainable and not supportive of a portfolio of funders that includes stormwater agencies, municipal governments, etc. Also, there apparently is no ability for EGIA (or MWD through EGIA) to independently obtain private or public sector financing to support an expanded incentive delivery program that includes workforce development and direct install opportunities.

EGIA, as the SoCal Water$mart administrator, does not have a community presence, but rather is a distant and somewhat inscrutable program administrator. This project team, for example, has unsuccessfully attempted to connect with staff associated with the Water$mart program over the last year. EGIA does not appear to be actively engaged in assessing conservation needs, developing programmatic responses, and engaging with the public or other regional stakeholders. EGIA would be challenging, if not impractical, for CBOs and others to engage or partner with, and therefore offers no meaningful community presence.

Option 2: Administer program in-house at MWD

Description

In this option, MWD establishes (or expands) its in-house capabilities and capacity to oversee, administer, and implement a multi-payor rebate program, with community partnership and direct project install

capabilities. MWD's staff could undertake community engagement or do so through partnerships with member agencies and municipal stormwater programs and CBOs. To facilitate job training and workforce development, MWD could develop maintenance, training, and certification standards and "qualify" landscape transformation installation and maintenance providers. These steps would ensure consistency across the District's service area and promote private sector engagement with the rebate program. MWD staff would also engage with contractors and CBOs to build direct installation options and provide workforce development benefits by leading or contracting/partnering with appropriate job training entities. MWD could continue to rely upon EGIA to process and issue rebate payments and provide program accounting.

Potentially, a JPA founded by MWD and its partners could provide additional financial support for an in-house program. Such an arrangement may not be desirable, however the JPA could be structured and staffed to provide program administration. Assuming the formation of a JPA results in increased revenues to the incentive program, this approach could provide adequate administrative and project delivery capacity to support community engagement, collaborative partnerships, and direct installation of landscape transformation projects on qualifying parcels.

Costs

This approach would require MWD to invest in increased budget for staff, program activities, direct install program support, and expanded/increased rebate amounts. Additional budget outlays may be required for JPA costs if that option is implemented.

Advantages

Bringing the rebate program 'in house' would enable MWD to more effectively own, represent, and implement a program that delivers a broader range of water supply, water quality, and community benefits. MWD could set strategic objectives for the program, taking advantage of opportunities to partner with member agencies and others to achieve priority outcomes (e.g., geographic, environmental, and community outcomes).

Potentially, having MWD staff design and direct a revamped incentive strategy could make the program more responsive to MWD leadership, and more accountable to MWD Board interests. Having MWD program staff also provides additional education, customer support, and services that small member agencies cannot provide on their own.

MWD has well-established "peer-to-peer" relationships with its member agencies; the combination of MWD and its local members creates a highly recognizable "brand" within the public and Southern California communities. Public recognition may be an asset to outreach and other programmatic elements.

Disadvantages

Bringing the enhanced program in-house would require significant expansion of MWD staff, with attendant budget implications. Depending on the extent to which EGIA is retained, in-house program management will likely not save MWD money.

Through this project, we have learned that many member agencies prefer to be the direct point of contact for their customers and to be recognized for their conservation efforts. Changing the incentive program to increase MWD's role could create undesired friction with member agencies unless the program design

continued to highlight local roles and successes. If a JPA is formed and able to assume management of the incentive program, it may be easier to represent and administer rebates in a manner that highlights local agency participation.

Not all public perceptions of MWD are positive, and it may be difficult for a MWD program to establish trust with CBOs and other potential implementation partners.

Option 3: Partnership with one or more Community Based Organizations

Description

MWD could contract with one or more community-based organizations (CBOs) to implement and manage portions of the rebate program. These portions could include: providing community outreach and property owner assistance to bolster access to rebates; creating and fostering relationships with local municipal agencies and water providers to contribute to (and benefit from) the rebate program; creating and fostering relationships with local contractors to directly install projects; and soliciting funding from philanthropic foundations, corporations, and other potential funders.

A partnership, or set of partnerships, with CBOs could continue to rely upon SoCal Water$mart to process and issue rebate payments, but act as a local point of contact to help customers resolve challenges with the application process and other issues. CBO partners may also be able to source their own funding which could be used to advance refunds to Disadvantaged Communities (DAC) property owners and then be (optionally) reimbursed by the rebates provided to participating property owners. These funds could also be used to support direct installation of landscape transformation on qualifying properties.

There is no readily-apparent CBO that could provide this level of engagement across the entirety of MWD's service area. A better approach may be to partner with multiple CBOs, each with an established reputation and capabilities within a single geography.

Costs

This approach could exceed existing program administration costs (under the EGIA contract), however CBOs could be well-positioned to undertake fundraising efforts that complement and leverage payments from MWD, member agencies, and other co-funding partners.

Advantages

Partnering with CBOs to deliver incentive programs could dramatically expand the effectiveness of the program by increasing capacity for public engagement and project delivery, as well as creating effective partnerships across public agencies and private sector supporters. The partnerships could also open up opportunities for philanthropic foundation grant support to bolster project implementation and workforce development in Disadvantaged Communities.

CBOs are likely to have higher levels of recognition and trust within a relevant community, which in turn support engagement with lower-income, disadvantaged, and disenfranchised populations that may not trust government agencies. CBOs are also more likely to have connections within local business communities, including contractors and workforce development resources.

Disadvantages

Contracting for program delivery through multiple CBOs could lead to inconsistencies across the MWD service area, some of which may be appropriate (tailored to local needs, characteristics, etc.) However,

consistent, comprehensive accounting of expenditures and reporting on outcomes may also be challenging. This model would likely be challenging for MWD to manage.

Examples:
There are numerous examples of partnerships between local and state governments and CBOs that provide services aligned with the missions of both entities. For example, CBOs can play (and have played) crucial roles in providing health services to California's Disadvantaged Communities. The State Department of Health Care Services, California county governments, and managed health care plan providers are leveraging CBO assets to achieve innovations in health care delivery.[105] Separately, in 2019, the Los Angeles County Probation Department joined a partnership with the Liberty Hill Foundation and California Community Foundation to expand and support CBO programs for at-risk youth and youth in the probation system.[106]

Option 4: Outcomes-based Public Private Partnership

Description
An outcomes-based public-private partnership (P3) model provides full delegation of the incentive program administration, as well as technical assistance and management of direct installations to a private-sector finance and implementation partner. The private-sector partnership manager could be well positioned to obtain additional funding and/or financing to support rebates and project installations; establish relationships with local CBOs and contractors to undertake public engagement and install projects; achieve workforce development and local employment outcomes; and deliver prescribed levels of benefits including potable water offsets, stormwater capture, and community investments. There are notable examples of entities with experience in developing and managing similar P3 programs, including Community Infrastructure Partners, Corvias Infrastructure Solutions, Environmental Incentives, and GreenPrint Partners. The P3 manager may (indeed, is likely to) retain EGIA as the rebate processing and tracking entity, making efficient use of this well-established platform.

This option may also provide a significant pathway for CBO participation in workforce development, project delivery, outreach, and property owner engagement. Existing models of community-based public private partnerships (CBP3s) structure such participation into the contractual agreement, as well as establish community benefits such as workforce development, local employment, and job creation as required outcomes.[107]

Under the JPA approach discussed in Section 2.6, the JPA could assume the role of the public partner that contracts with the P3 provider and uses JPA revenues to pay for the outcomes achieved through the implementation of landscape transformation and other required activities (e.g., meeting workforce development targets).

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[105] See California Health Care Foundation. *The Role of Community-Based Organization Networks in CalAIM: Seven Key Considerations*. Available https://www.chcf.org/publication/role-cbo-networks-calaim-seven-key-considerations/ - related-links-and-downloads.

[106] See California Community Foundation, *Los Angeles County Poised to Provide Additional Community-based Services for Youth Diversion and Development in History-making Partnership*. Available https://www.calfund.org/los-angeles-county-poised-to-provide-additional-community-based-services-for-youth-diversion-and-development-in-history-making-partnership/.

[107] This is particularly true of the Corvias/Prince George's County (MD) "Clean Water Partnership" program. See below.

Costs

Outsourcing the incentives delivery program to a P3 provider(s) will almost certainly require significantly greater investment by MWD than the existing turf replacement incentive / conservation program budget. Actual budget amounts would necessarily be tied to the conservation target and should reflect an appropriate level of spending to achieve the potential benefits of this model.

Advantages

As with the CBO model (above), a P3 model would facilitate delivery of a "full service" program that integrates public outreach to foster incentive uptake; coordination and partnerships with CBOs, local public agencies and businesses; provision of direct installation of landscape transformation projects through local service providers; and engagement with Disadvantaged Communities. Payments to the P3 provider could be tied to performance metrics or outcomes (e.g., installed retention volume, acreage of landscape transformation , and local employment/business development goals).

Potentially, the P3 manager(s) would have the ability to attract complementary financing, and potentially fund contributions from philanthropic foundations and other investors, which could expand program capabilities (e.g., pay for direct install) and fill gaps in program resources that remain even with increased contributions from MWD and other participating agencies. Finally, the P3 manager(s) would be a central connecting point able to engage CBOs, MWD member agencies, and other municipal government agencies.

Disadvantages

Entering into a P3 or similar contracting structure would be a significant departure from the existing model that would require additional investment from MWD. The complicated program and contracting structure associated with P3s may create administrative and logistic barriers (although L.A. County has deep experience with P3s).[108]

Private Sector experts in outcomes-based / CBP3 program delivery

These firms have pioneered community-led partnerships that deliver multiple benefits through outcomes-based contracting:

Corvias Infrastructure Solutions

Environmental Incentives

GreenPrint Partners

Examples

At least two stormwater service providers in major U.S. cities have entered into P3s as the optimal choice for delivering cost-effective multi-benefit GSI projects. The community-based P3 model achieves environmental goals while simultaneously ensuring that the local tax and rate revenues are reinvested in the community through business and workforce development and contracting requirements. In Wisconsin, the Milwaukee Metropolitan Sewerage District (MMSD) and Corvias launched the Fresh Coast Protection Partnership to finance, design, and deliver GSI across the 19 municipalities in the District's service area. This $29 million partnership transfers risk from MMSD which pays Corvias after projects are installed, certified, and local workforce and other benefits have been verified.

The Fresh Coast Partnership builds on the success of the Clean Water Partnership. This 30-year, $350 million dollar program integrates the financing, design, and implementation of GSI across the county with specific economic and workforce enhancement outcomes. Compensation under the contract is dependent upon not just the delivery of projects but the attainment of the community benefits.

[108] See, for example, Los Angeles County Department of Health Services My Health LA.

The team's assessment is that **entering into a public-private partnership (P3) based on CBP3 principles (Option 4) may be the optimal solution for MWD.** The incorporation of a JPA as a funding structure (Option 3) as part of this option raises promising opportunities. Together, these options are more likely to offer pathways to meeting CAMP4W goals, as well as the conservation and community benefits possible through enhanced landscape transformation implementation. Neither Option 1 (the status quo) or Option 2 (MWD in-house administration) are likely to secure the property owner support, community engagement, and active partnerships necessary to fully optimize the conservation value of an enhanced incentive program. Our outreach and analysis suggest that CBOs across Southern California could be beneficial partners, and bring complementary capacities, areas of expertise, on-the-ground relationships, and funding to an incentive delivery program. Additionally, and importantly, partnering with CBOs would go a long way toward addressing the shortfalls in DAC access to the incentive program and leveraging economic/workforce development opportunities. However, it's unlikely that any one CBO could administer such a program over the entire MWD service area, and securing sufficient partnerships to cover the entire service area is likely to be problematic.

A P3 organization could be tasked with attaining designated levels of conservation or project installation while also meeting community partnership and multi-benefit outcomes. This model could also provide a "one stop shop" for property owners and for MWD member agencies and be tailored to meet watershed or local government goals as they vary across the region. A P3 structure is ideally suited for sourcing, assembling, and managing multiple funding streams and is likely to be able to secure its own financing as well as grant awards.

3. Overcoming Barriers and Challenges

One of the underlying goals of this project has been to design an improved incentive program that is responsive to the constraints MWD experiences as a wholesale water provider and the barriers to conservation that its staff encounter or perceive. This Roadmap, and the approach the ARLA-led team recommends, is intended to both answer some of the concerns held by MWD staff and Board members and to suggest a path forward that avoids or solves actual constraints encountered by the District's conservation programming. For ease of reference, this section offers summary responses to concerns the team has understood from MWD staff and other stakeholders. These responses are generally drawn from discussion in preceding sections.

A. *Conservation is antithetical to MWD's business model*. This belief historically has been commonly held by water supply agencies, particularly those who derive a significant portion of revenue from volumetric rate charges. However, this narrow focus on "volume equals revenue" neglects to consider the overarching roles that a water supply agency has, and the roles and criteria that the CAMP4W process is highlighting now, including: ensuring water supply security and resilience; enabling the stewardship of water resources; securing the economic, community, and human health benefits that depend on safe, dependable water services; and engaging the rate-paying community in an equitable, sustaining manner. When viewed through this more expansive context, conservation plays a critically important role in MWD's business model. Additionally, updating MWD's approach to outdoor conservation incentives as described in this Roadmap can be accomplished through a multi-payor approach that shares the financial costs across multiple agencies and institutions while delivering water supply gains that are cost-competitive with other,

single benefit options. This portfolio approach to funding leverages the value of multiple benefits provided by landscape transformation, cisterns, and bioretention to engage and build partnerships with local governments and other entities with an interest in those outcomes.

Staff at MWD, and other stakeholders, have questioned the economic viability of conservation, noting that conservation results in lower water sales and, therefore, lost revenue. In contrast, staff have expressed a belief that acquiring new water supplies to overcome shortfalls would result in additional water sales, and additional revenue. This perception is inaccurate, and furthermore, ignores the financial impact on ratepayers.

The idea that conservation undercuts fiscal stability misperceives the role of conservation as a source of water supply. In the future, MWD is likely to experience additional constraints on its imported water supplies (as noted in the District's Long Range Financial Plan). As a result, in any scenario where demand outpaces supply, "new" water may not be available to make up for projected shortages or any available water will be increasingly expensive to obtain (with costs that will have to be passed on to ratepayers). Water saved through conservation, in effect, creates "new water" because the saved water will reduce the impact of water shortages and can be used to either be resold to existing customers or provide water for new customers. According to MWD, the most likely scenarios facing MWD and its member agencies are ones in which imported water supplies diminish. To resolve the resulting shortfalls and bring supply and demand into balance, MWD would have to either obtain increasingly rare and expensive traditional supplies or increase conservation. The purpose of investing in conservation would be the same as in traditional supply options—to have sufficient water to sell to meet demand.

Further, it is a misperception to view conservation as breeding fiscal instability. On the contrary, investing in conservation supports fiscal health by minimizing the rate impacts of investments in new supplies. Investing in either traditional supplies or conservation to close supply gaps would require funding and an increase in costs. If the cost of traditional supplies or conservation were the same, the total cost and average customer bills will be identical. If one of these supply options is less expensive it will have less of a financial impact on MWD and, by extension, ratepayers. Conservation tends to be the cheaper source of supply, however, meaning investments in conservation have less of an impact on ratepayers.

At a retail level, the costs associated with conservation or additional traditional supply have different effects. By purchasing traditional supply, MWD incurs costs which it will (in general) pass along equally to all customers, resulting in rate increases that will disproportionately impact lower-income households because they have less ability to absorb these high costs. Costs associated with conservation will also be passed along to customers. In contrast with how investing in traditional supply impacts ratepayers, customers who take advantage of conservation incentives will see their water usage, and bills, reduced relative to customers who do not conserve. As a result, costs associated with conservation are more likely to be more equitably distributed across ratepayers.

B. *As a wholesale water supplier, MWD has limited ability to engage directly with rebate customers and property owners. Diversity across the member agencies' embrace of incentives makes it difficult to administer a consistent program across the MWD service area.* This concern is intrinsically connected to MWD's structure and relationship with its member agencies. The members, and MWD, value flexibility and the ability to tailor their own conservation goals and program. Similarly,

member agencies desire any rebate funding they contribute to be spent within their own communities. We believe that our recommended enhancements to the incentive program, and the suggested P3 administration model, can continue to provide flexibility for member agencies while increasing the effectiveness of the incentive program. **The shift to landscape transformation has the potential to deliver improved water quality and other community benefits, which could open opportunities for partnerships between member agencies and local government programs**. A P3 program provider would be well placed to facilitate these partnerships and administer any funding associated with stormwater benefits. A P3 model, whether administered through one provider or multiple providers, could be structured to provide flexibility across the MWD member agencies.

C. *The MWD conservation program has limited budget and staff resources*. There is no denying that MWD's conservation and stormwater programs have succeeded despite insufficient budget and staffing resources. Equally undoubtedly, achieving even greater levels of conservation, as suggested by this Roadmap, will require a considerable increase in conservation funding. Resurrecting effective programming (such as the Stewardship Charge) requires rate increases, which the Board is resistant to doing. However, the ARLA-led team believes that a commitment to scale stormwater capture and conservation (financed as other core water supply alternatives) reflects the CAMP4W criteria and goals. It also would respond to the urgency of improving stormwater capture as water supply infrastructure, and the acknowledged importance of stormwater capture within MWD's One Water future. The anticipated return on investment for MWD would be a meaningful enlargement of conservation volumes as well as the opportunity to leverage its own funding with additional funds from co-partners. Administration of this program through a P3 would eliminate requirements for MWD to add significant new staff and would likely provide support for the District's current conservation and stormwater teams. Furthermore, Section 2.6 of this report provides clear pathways for debt financing and/or co-funding to achieve greater levels of investment.

D. *MWD cannot selectively offer incentives to specific geographies or consumer types.* This challenge, which has its roots in the multi-member agency make-up of MWD and the strictures of Prop. 218, can limit MWD's ability to use rate revenues to fund programs targeting priority areas or economically-disadvantaged households. However, as discussed above in Figure 2-16, we do not believe Prop. 218 limits the use of rate revenues for incentives for economically-disadvantaged households. Also, there is sufficient flexibility in MWD's funding and structure to allow for the recommendations identified above, including those that increase rebate access for low-income residents. Options 3 and 4, discussed above, describe program delivery models that could support targeted programs with non-revenue funding from MWD and other co-funding partners. MWD, a P3 provider, or other eligible contractor could also obtain federal, state or foundation funding for equity-focused programs. Even outside of Options 3 and 4, partnerships with CBOs in the MWD service area can leverage non-MWD funding to complement District incentive programs. A primary barrier to address through these efforts would be reducing the upfront cost to low-income residents, potentially through programs that carry these costs while the funder and resident await reimbursement. See Section 2.6 above.

E. *MWD has limited ability to track and report on the effectiveness of incentive strategies.* MWD's current ability to report on the success of its turf replacement incentive program is limited to tracking the square footage of incentivized projects. Adopting an updated strategy would logically include a focus on delivering more complete information about water conservation, water quality,

and other benefits provided by through the landscape transformation incentives. A core component of any of the program administration models described in Section 2.7 should include a collaborative process with MWD's partners to identify key performance indicators and monitoring methods for tracking these metrics. These metrics could be tailored to respond to public input, key environmental and social priorities, and water conservation goals for individual member agencies and funders.

4. Conclusion

Southern California's vibrant economy and public health depend on a secure, safe water supply. MWD's role in providing this supply is crucial to the region's future, and highly susceptible to the deepening impacts of climate change. Responding to these impacts will require increased investments in resilience such as landscape transformation and stormwater capture. This investment will effectively reduce demand for residential and commercial outdoor irrigation water while also building multiple environmental and social benefits across Southern California communities. This Roadmap provides compelling rationale for increased, collaborative funding of an updated incentive strategy focused on reducing water use, capturing stormwater, and fostering community resilience. Building on this analytic foundation, the process outlined here can support MWD, Los Angeles County, and other stakeholders as they work together to advance a new approach to outdoor conservation incentives, one that fosters partnerships across agencies, NGOs, and funders, and leverages partner resources to increase equitable access incentives and build a green jobs workforce.

The intention of this ARLA-led effort has been to enable dialogue and encourage policy developments that can enable and support MWD as it steps into a One Water leadership role, fostering watershed stewardship and promoting an equitable, resilient water future. This Roadmap offers a pathway toward that goal and suggests additional actions that MWD can lead. As MWD member agencies and Southern California municipalities increasingly identify, fund, and implement projects that capture the water supply potential of stormwater, MWD's unique position allows it to foster an embrace of nature-based, parcel-scale landscape transformation projects which complement larger, regional scale projects in an inclusive capture and conservation portfolio.

This Roadmap reflects the results of a comprehensive effort to model stormwater capture potential on residential and commercial properties across Los Angeles County. This modeling demonstrates that a shift from incentivizing simple turf replacement to a more environmentally-beneficial and water-efficient landscape transformation program can deliver enhanced water supply and community resilience benefits. When coupled with bioretention on commercial and institutional properties, landscape transformation can also provide water quality benefits that are meaningful to local and regional stormwater managers. This combination of benefits opens opportunities for co-funding incentive budgets, and collaborative partnerships between MWD and other local governments and non-profit organizations.

Improving and scaling a landscape transformation-based incentive program enables MWD to build on the success of its current turf replacement program in ways that respond to MWD priorities, particularly the values embodied in the CAMP4W commitments. The ARLA-led team recommends that MWD consider a new program administration model that can optimize the management of an incentive strategy, and delivery of enhanced landscape transformation and stormwater capture projects, in a manner that provides workforce development and small business opportunities, ensures equitable access to rebates

and conservation programming, and leverages partnership opportunities with local CBOs. A P3 model can harness private sector efficiencies, expertise, and flexibility while conditioning compensation on attainment of conservation and community goals. This model also enables a higher degree of rebate customer engagement, potentially providing a "one stop" point of access to site assessments, appropriate bundles of incentives, technical assistance, and follow up maintenance to ensure long-term functionality of incentivized projects. This longer-term engagement with rebate recipients can also lend itself to enhanced monitoring and reporting to provide assurance that conservation, environmental, and community goals are being met.

Shifting the incentive program to reflect the suggestions in this Roadmap will require considerable leadership, commitment, and investment from MWD. The result of this commitment can be a rebate program that is more deeply linked to the District's One Water future and CAMP4W goals and is reflective of its resilience priorities. As Southern California adapts to a hotter, drier future with increased water insecurity, MWD will have increased opportunity and responsibility to lead the region toward a sustainable water future. This Roadmap sets out a pathway for MWD to follow, and establishes a direction for MWD to lead.

Appendix A: Policy Drivers for Enhanced Incentives

Efforts by MWD to better recognize and support the value of conservation practices as water supply infrastructure are consistent with the District's current and emerging policy directions. As MWD strives to adapt to changing water supply conditions and changing demographic and political imperatives, District leadership is placing a greater emphasis on future resilience through a One Water approach. For example, a Resolution adopted by the Board on August 16, 2023, highlights a "call to action" to provide regional reliability for all member agencies and stresses the need to "Increase long-term water savings through water use efficiency and transformation of non-functional turfgrass into a more appropriate Southern California landscape (and) advance development of local supplies for recycled water, groundwater recovery, stormwater capture, and desalination projects."[109]

This commitment is further reflected in General Manager Hagekhalil's statements and in the work of the MWD Board Sustainability Committee. Interestingly, the emphasis on a One Water approach reflects the direction provided by the California legislature 25 years ago in the 1999 Metropolitan Water District Act:

> *It is the intent of the Legislature that the Metropolitan Water District of Southern California expand water conservation, water recycling, and groundwater recovery efforts.* ***The Metropolitan Water District of Southern California shall place increased emphasis on sustainable, environmentally sound, and cost-effective water conservation, recycling, and groundwater storage and replenishment measures.***[110]

At that time, the Legislature noted, MWD reported that conservation provided 7 percent of its water supply portfolio, a proportion that was expected to increase to 13 percent by 2020. It is worth noting that during its 2020/21 fiscal year, MWD's conservation programming saved approximately 207,000 AF, coming reasonably close to this goal.[111] Rebate incentive programs contributed approximately 4,000 AF of this conservation volume.

MWD has embarked on an iterative process to craft a Climate Adaptation Master Plan for Water (CAMP4W) as a successor to its 2022 Integrated Resource Plan effort. CAMP4W is expected "to build understanding among Board Members and the agencies they represent to advance strategies for an affordable, equitable and resilient water future" through a process that prioritizes engagement with member agencies and the public, with a focus on defining and sharing information about resilience strategies and accomplishing goals outlined by the Board of Directors in a February 2023 retreat. Relevant to this project, CAMP4W calls on MWD to prioritize "no regrets" investments in climate resilience and

[109] Metropolitan Water District, Board of Directors, Water Planning and Stewardship Committee, *Resolution, August 16, 2023.*Available https://mwdh2o.legistar.com/View.ashx?M=F&ID=11118093&GUID=AAD15627-C464-4C94-BF81-AB1553DCAA4D

[110] 1999 Metropolitan Water District Act 130.5

[111] Metropolitan Water District of Southern California , *Achievements in Conservation, Recycling and Groundwater Recharge*. February 2022.

specifically calls out an increased prioritization of conservation: "Resource planning must value and assume conservation as a core supply that sets a measurable proactive demand management target."[112]

A.1 State and local policy drivers

A.1.1 California policy

The State of California has responded to deepening water supply challenges over the last several decades. State policy drivers for reducing water demand and prioritizing stormwater as a source of additional water supply are abundant; this section highlights a few salient and more recent mandates and priorities set forth at the state level that relate to the topic of this memo.

The **Water Conservation Act** of 2009 (SB X7-7) requires all water suppliers to increase water use efficiency and reduce per capita consumption by 20 percent by 2020 (also known as the 20X2020). The intention was for urban and agricultural water consumers to implement conservation strategy and report usage to the Department of Water Resources (DWR). This bill was the first in the nation to set urban water use efficiency targets. As the impacts of ongoing drought and climate change became more apparent, it was clear that more needed to be done to address potential water shortages.

As landscaping irrigation typically accounts for about half of urban water use, large water savings can be gained through efficient water efficient landscape design. The **Model Water Efficient Landscape Ordinance (MWELO)** of 2015 sets standards for water efficiency in new development and retrofitted landscapes; local agencies must either adopt MWELO or establish more stringent local standards. The ordinance specifically encourages graywater use for irrigation, and planting of stormwater treatment drainage systems such as bioretention basins and bioswales.

The 2018 **Making Water Conservation a California Way of Life** legislation (AB 1668 and SB 606) amended existing law to provide expanded authorities and requirements that enabled permanent changes to improve the state's future water supply. In addition to requiring more stringent urban water use targets, the bill made financial incentives available to minimize leaks and requires water suppliers to submit water shortage contingency plans every 5 years and conduct a water budget forecast annually. Also in this legislation, the State Water Board was charged with setting new efficiency standards for water use in homes and businesses, and those new standards are on track to be established in 2024 with compliance milestone reporting by 2030.

Following the second driest year on record and a near record low storage in California's largest reservoirs, Governor Newsom issued a **proclamation of statewide water emergency in October 2021**. The proclamation added L.A. County to the growing list of places experiencing emergency drought and required local water suppliers to implement water shortage contingency plans. This proclamation suggested voluntary reduction in water use by 15 percent compared to 2020 , but did not mandate reductions in water use, as had been required in the previous emergency drought in 2015. The frequency with which emergency droughts are being declared suggests urgency in addressing conservation at the state level.

[112] Metropolitan Water District, Board of Directors, Long Term Regional Planning and Business Modeling Subcommittee. *Developing a Climate Adaptation Master Plan for Water.* Feb. 28, 2023. Available https://www.mwdh2o.com/media/rgnlubax/9_board-document-developing-a-climate-adaptation-master-plan-for-water-february-28-2023.pdf.

In August 2022, Gov. Newsom outlined California's **Water Supply Strategy** to update the state's priorities in securing future water supplies. The strategy includes creating additional storage space, increasing recycling and reuse, eliminating wastewater, and creating new water supplies through stormwater capture and desalination of ocean and groundwater. Specifically, the state aims to increase stormwater capture to 250,000 AF per year by 2030 and to 500,000 AF per year by 2040. The Strategy also identifies demand reduction as a primary goal for the state of California, building off the target efficiency standards from the 2018 Conservation legislation. The reduction in demand due to more efficient use could result in 450,000 AF per year of savings.

A.1.2 Los Angeles County-level drivers

In 2020, L.A. County released the Los Angeles Countywide Sustainability Plan, known as "OurCounty." The plan identifies twelve cross-cutting goals that "describe a shared vision for a sustainable L.A. County." Under each goal, the plan identifies specific strategies and actions and sets related targets for making progress towards sustainable outcomes. While many of the strategies identified in the plan relate to "one water" concepts, Strategy 2C (Create an integrated and resilient water system) specifically calls for increasing local supplies (including through rainwater capture) and further decreasing demand. Table A-1 summarizes the actions identified in the plan for achieving this strategy that are directly relevant to this project.

In addition to stormwater capture, conservation, and water supply reliability, the countywide plan also identifies several strategies that directly relate to workforce development initiatives that support the county's transition to a "green economy" (see Goal 4 of the plan), as well as increasing urban habitat and biodiversity (see Goal 5). As envisioned, a large-scale private property incentive program for GSI-based stormwater management practices would align well with these strategies. In addition, the seven Workforce Development Boards in Los Angeles County are well-placed to coordinate collaboration between public agencies, private sector entities and community-based organizations that provide entry-level workforce training and skills development that enable local landscaping contractors to provide GSI / turf replacement installation and care. Incentive programs that encourage adoption of these practices can be a valuable component of an overall strategy to expand this sector of the green economy.

Building on OurCounty and other regional efforts, the County also recently initiated the development of a County Water Plan. The Water Plan is intended to provide a regional Roadmap for holistically addressing water resource challenges, "fostering collaboration among stormwater, potable water, and recycled water stakeholders to identify opportunities for integrated solutions." The plan was recently adopted and includes the following action item: Promote use of both regional local supply development and distributed local supply development (e.g., cisterns, graywater systems) and stormwater capture.[113]

A.2 Incentives and MWD Climate Resilience Policy

MWD has embarked on an iterative process to craft a Climate Adaptation Master Plan for Water (CAMP4W) as a successor to its 2022 Integrated Resource Plan effort. CAMP4W is expected to "to build understanding among Board Members and the agencies they represent to advance strategies for an affordable, equitable and resilient water future" through a process that prioritizes engagement with

[113] Los Angeles County Water Plan, available at https://lacountywaterplan.org/.

Table A-1. Relevant actions from LA County Sustainability Plan, Strategy 2C: Create an integrated and resilient water system

Action	Lead Agency	Partner Agencies
Action 34: Invest in multi-benefit water management solutions that diversify and increase reliability of the water supply, reduce dependency on imported water, prioritize solutions that mimic natural systems, and maximize benefits to Native and Disadvantaged Communities.	Los Angeles County Public Works	Caltrans, Cities, Department of Regional Planning (DRP), Local water agencies, Metro, Los Angeles County Sanitation District (LACSD)
Action 37: Support efforts to maximize sustainable yield from local groundwater basins.	Los Angeles County Public Works	Local water agencies, Groundwater Sustainability Agencies, State Water Resources Control Board (SWRCB)
Action 39: Develop incentives for residential and commercial/small business water conservation and stormwater retrofits, particularly those that use a multi-benefit, watershed approach.	Los Angeles County Public Works	Local water districts
Action 40: Reduce barriers and increase accessibility to alternative water sources (rainwater, greywater, stormwater, and recycled water), including incentives for residential and commercial/small business greywater systems and streamlining permitting pathways.	Los Angeles County Public Works	Department of Public Health (DPH), DRP
Action 41: Advocate for a collaborative approach to partnering with the region's various groundwater managers to sustainably manage regional groundwater basins.	Los Angeles County Public Works, Chief Executive Office	Groundwater Management Agencies
Action 42: Develop a plan to ensure effective, well-maintained flood risk mitigation infrastructure to communities and include a mechanism to facilitate reporting of incidents by residents/ municipalities to help identify and address any chronic local flooding issues.	Los Angeles County Public Works	Cities

member agencies and the public, a focus on defining and sharing information about resilience strategies, and accomplishing specific goals outlined by the Board of Directors in a February 2023 retreat.[114] Relevant to this project, the CAMP4W calls on MWD to prioritize "no regrets" investments in climate resilience and specifically calls out an increased prioritization of conservation: "Resource planning must value and assume conservation as a core supply that sets a measurable proactive demand management target."[115] Because the CAMP for Water process is still underway, there is an opportunity to use it as a vehicle to implement some of the recommendations identified in this report

[114] https://www.mwdh2o.com/media/rgnlubax/9_board-document-developing-a-climate-adaptation-master-plan-for-water-february-28-2023.pdf
[115] Id.

A.3 Incentives and Water Quality Compliance

A.3.1 MS4 Regional Permit compliance

Stormwater discharges from the County's storm sewers are regulated under a regional MS4 permit issued by the Los Angeles Regional Water Quality Control Board (Regional Permit).[116] The Regional Permit was updated and reissued in July of 2021; it covers L.A. County and 85 municipalities and storm sewer operators within it. Each permittee is responsible for improving water quality and regulating discharges within its boundaries; the L.A. County Department of Public Works (and specifically, the L.A. County Flood Control District within Public Works) is designated as the County permittee. The portions of the Regional Permit most relevant to this analysis include:

- Part IV: Establishes a set of Water Quality Based Effluent Limitations that permittees must meet to limit the amounts of nutrients, pesticides, sediment, metals, trash, and other pollutants in County waterbodies, pursuant to Total Maximum Daily Loads (TMDLs).
- Part IV.B is important because it translates the various TMDL load limits into permit requirements. Significantly, for landscape transformation incentives, it sets compliance dates and requirements for "dry weather" discharges into the storm sewer system. These occur in the absence of precipitation and are generally caused by car washing, discharges from HVAC systems, and, significantly, over-irrigation of turf landscapes. These flows tend to carry high concentrations of metals and other pollutants to surface waters in the LA region, and for this reason are a primary focus of the Regional Permit and underlying TMDLs. Meeting the discharge requirements in these regulatory drivers, particularly through structural measures, can be very expensive. Non-structural practices, such as education, can be helpful but only partially effective. Replacement of irrigable landscapes with low/no water use plantings can be a cost-effective response. As a result, landscape transformation incentives can be an attractive pathway to regulatory compliance for stormwater management agencies. Conversations with County of San Diego staff revealed that compliance with dry weather permit conditions has been a primary driver for their WaterScape program engagement with HOAs to replace irrigated turf with native, non-irrigated landscaping. This initiative coupled funding from the County's stormwater program with SDCWA turf conversion rebate incentives to defray the cost to HOAs for full landscape transformation.
- Part IX: Allows the County and regulated municipalities to participate in an approved Watershed Management Program (WMP) or Enhanced Watershed Management Program (EWMP) that serve as a Roadmap to compliance, identifying specific measures for reducing targeted pollutants of concern in each watershed. This provision was first introduced in the previous permit (issued in 2012) and carried forward in the 2021 revision. The Permit provides detail regarding the content, purpose, and activities of WMPs and EWMPs, including the "watershed control measures" that may be included to "implement pollutant controls necessary to achieve (water quality-based effluent limitations)." These measures include:
    - Vegetated nature-based solutions (e.g., bioretention, green roofs, constructed storm water wetlands, wet and dry detention basins)

[116] Los Angeles Regional Water Quality Control Board, *Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) Permit for Municipal Separate Storm Sewer Systems (MS4) Discharges within the Coastal Watersheds of Los Angeles and Ventura Counties*, July 23, 2021. Available https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/regional_permit.html

- Multi-benefit regional projects
- Stormwater retention basins/subsurface stormwater infiltration galleries or dry wells
- Other green infrastructure
- Low Impact Development (LID) design features such as cisterns and rooftop/impervious area disconnection
- Diversions to sanitary sewer collection, treatment, and reclamation systems

Many of the WMPs and EWMPs developed for watersheds across the County indicate a need to manage runoff from private lands. For example, the WMP for the Upper L.A. River attributes 53 percent of expected pollutant reductions to projects on private property through a combination of LID-based practices at redevelopment sites, residential rebate programs, and regional BMPs located on private property. The WMPs/EWMPs do not generally identify specific approaches for delivering regional projects on private lands.[117] As noted in Section 2.6, above, the research team estimates that, under at least one investment scenario, incentives for landscape transformation and commercial bioretention could be a cost-effective way to attain compliance with nearly 15 percent of Long Beach's WMP/EWMP stormwater capture goals.

Overall, the permit is intended to encourage stormwater capture and groundwater infiltration and give cities and counties the time and flexibility to choose, plan and construct stormwater projects that are appropriate for local conditions.[118] However, many stakeholders have been critical of the WMP/EWMP process largely because it focuses solely on long-term stormwater projects and does not require immediate reductions in stormwater discharges.[119] Further, the enormous (estimated) costs associated with WMP and EWMP plans has significantly delayed the implementation of stormwater management projects necessary to achieve compliance with water quality standards.

A.3.2 L.A. County Safe Clean Water Program

In 2018, L.A. County residents approved Measure W, establishing the L.A. County Safe Clean Water (SCW) Program and imposing a special parcel tax on private properties located within the L.A. County Flood Control District (FCD). The tax amounts to $0.025 per square foot of impermeable area; it is expected to generate $280-300 million in annual revenues, which will provide much needed funding to increase stormwater capture, reduce pollution from stormwater and urban runoff into local waterways, and help comply with the provisions of the Regional MS4 permit.

The SCW Program is administered by the L.A. County FCD. In addition to providing a dedicated revenue stream to develop stormwater projects, it aims to holistically address water resource management challenges in L.A. County through the implementation of multi-benefit projects that:

- Increase local water supplies by capturing a significant portion of the 100 billion gallons of water that runs off into the ocean each year
- Reduce flood risk
- Create greener, healthier, and more livable spaces

[117] Progress toward meeting the goals of the WMPs is available at https://wramps2.org/app/welcome.

[118] "LA Water Board adopts new, comprehensive MS4 permit." *Stormwater Solutions*, July 29, 2021 https://www.stormh2o.com/compliance/press-release/21232304/la-water-board-adopts-new-comprehensive-ms4-permit.

[119] Harris, Benjamin. "The Ongoing Tension over Stormwater Discharges in Los Angeles." *Legal Planet*, June 29, 2021. Available https://legal-planet.org/2021/06/29/the-ongoing-tension-over-stormwater-discharges-in-los-angeles/.

- Protect coastal water and beaches from contaminants that make people sick and threaten marine life
- Otherwise prepare the region for the effects of a changing climate (e.g., recurring cycles of drought and wildfire)[120]

Forty percent of SCW Program tax revenues are allocated directly to municipalities to fund local stormwater projects and programs. Fifty percent of revenues are used to fund stormwater projects and programs at the regional level and are distributed among nine watershed areas. For each watershed, Watershed Area Steering Committees (WASCs) review proposed projects and develop Stormwater Investment Plans (SIPs) that recommend projects for funding under the regional program. The percentage of funds received by each municipality and regional/watershed area is proportional to the tax revenues collected within its boundaries. Section 2.6 provides additional detail on the potential use of SCW Program revenues for funding/financing stormwater capture projects on private lands.

All parcels subject to the SCW Program tax are eligible to participate in a credit-trading program, which provides property owners with up to a 100 percent tax credit if they implement projects on their property that provide water quality, water supply, community investment, and/or additional benefits (e.g., management of offsite runoff). There are significant concerns that the (yet to be finalized) structure of the trading program is unlikely to make economic sense for most residential property owners, and that a meaningful volume of trades is unlikely to occur. Water quality benefits are required for credit generating projects. Up to 20 percent credit is given for water supply benefits (determined based on the volume of stormwater captured) and 10 percent for projects that provide community investment benefits (as defined by the County). A 20 percent credit is granted for "additional activities" associated with projects that confer benefits to the broader regional community; this includes for example, the management of stormwater runoff generated outside the taxable parcel.

The County is also currently in the process of developing a tax credit trading program, which would allow property owners who cannot implement stormwater management projects on their property to purchase credit trading units (CTUs) to reduce their tax. CTUs can be generated by tax-exempt parcel owners who construct stormwater projects on their property (e.g., schools, churches) or by taxed parcel owners who receive 100 percent of their stormwater tax credit but go above and beyond to provide additional stormwater management capacity and/or associated benefits. Preliminary information from the development of the Tax Credit Trading Program indicates that projects funded with SCW Program funds will not be able to generate CTUs for sale (i.e., a private property incentive program funded through the SCW Program could not support credit-generating projects). However, the project team does not believe that receiving an incentive to construct a stormwater capture project would conflict with a property owner's eligibility to receive a tax credit.

Despite the credit and Tax Credit Trading programs, the SCW Program currently offers no realistic pathways for delivering significant numbers of private property projects within the County. While private landowners are eligible to apply for grant funding under the SCW Program (through the WASC process), there are several barriers to entry, including that eligible projects must be incorporated into relevant Watershed Management Plans. Design requirements and costs associated with the application process create additional barriers, particularly for small-to medium-sized landowners. Further, the $0.025 cent

[120] "Safe Clean Water for L.A. County." *Safe Clean Water Program.* Available https://safecleanwaterla.org/about/.

per impervious square foot tax credit available to private landowners is not large enough to incentivize project delivery. In a recent unpublished study by TNC, it was estimated that a tax credit incentive would need to be closer to $2.50 to $3.00 per impervious square foot to cover both construction and long-term maintenance costs.

In addition, some stakeholders have been frustrated by the relatively slow pace of implementation of the SCW Program overall. A review conducted by L.A. Times found that the county has disbursed only $95.5 million for projects out of $556 million collected (as of March 2022), and that actual construction has lagged well behind the money disbursed.[121] The Times analysis also found that the 79 projects and 48 technical or scientific studies approved by the County Board of Supervisors for the nine watershed areas are heavily weighted towards water quality rather than stormwater capture and reuse. In this context, alternative project delivery models, including private property incentive programs, provide an opportunity to accelerate the pace of implementation and increase the number of multi-benefit projects implemented throughout the County while offering everyday citizens a meaningful opportunity to get involved.

[121] Vartabedian, Ralph. *L.A. has $556 million and a plan to capture more storm water. But will they ever do it?*" Los Angeles Times, March, 4 2022. Available https://www.latimes.com/california/story/2022-03-04/red-tape-ensnares-los-angeles-storm-water-capture-plan.

Appendix B: Benefits Calculation Methodology

Nature-based solutions for water conservation and stormwater management can provide multiple benefits. Often as a prerequisite to integrating conservation and green stormwater infrastructure projects, practitioners want to understand the quantified value of these benefits. Towards that end, the project team quantified a range of financial, social, and environmental benefits associated with the programmatic elements outlined in the main body of this report. This Appendix describes our methodology for valuing these benefits and integrating them into the MWD Planning Tool.

Table B-1 shows the range of benefits evaluated by the project team and which benefits apply to the various practices recommended in this report. Note that trees were only included in bioretention practices; however, the benefits conferred from tree planting are significant enough to calculate them separately from bioretention for potential usefulness in other applications.

To value each benefit, the project team relied on standard economic practices, incorporating the most recent literature and data available at the time of analysis. Values for potable water supply, stormwater capture, and fire damage reduction benefits were applied or derived independently by the research team. All other benefit values were derived using methodology adopted from the Water Research Foundation Tool for Quantifying and Monetizing the Triple Bottom Line Benefits of Green Stormwater Infrastructure[122] (WRF TBL Tool). This tool, its guidance, and associated appendices that detail methodology utilized in the valuation of benefits are available through the Water Research Foundation. Flood risk reduction benefits associated with distributed stormwater capture infrastructure were not calculated as part of this analysis due to limitations in local data and appropriate hydrologic assessments.

B.1 Value of Water Supply Benefits

The Roadmap makes the case for valuing water conservation as a core water supply source. Conserving an acre foot of water frees up additional supply for alternative uses. This in turn reduces the need to provide that water in another way. In the Planning Tool, the value of conserved water is therefore based on the avoided cost of securing alternative water supplies.

As noted in the main body of this report, MWD currently values water saved through conservation at $195 per acre foot; this is based on a 2009 comparison of costs for a hard infrastructure project. The cost of securing new, reliable local water sources far exceeds this outdated calculation. As shown in Table B-2, the cost of securing additional water supplies today ranges from an estimated $2,000 (for MWD's planned Pure Water Project) to more than $3,000 per acre foot (for local desalination and reuse). These values demonstrate Southern California water agencies' willingness to pay to secure additional water supplies.

The Planning Tool applies an avoided cost of $3,000 per acre foot, per the modeled unit cost for core supply from MWD's 2023 Long-Term Financial Plan. We applied this value to the water savings associated with the different BMPs included in the stormwater modeling. Over a 30-year planning horizon at 3 percent discount, a project that yields one acre foot of potable water supply savings per year would have a water supply benefit of $58,800.

[122] Water Research Foundation. 2021. https://www.waterrf.org/research/projects/economic-framework-and-tools-quantifying-and-monetizing-triple-bottom-line

Table B-1. Recommended stormwater capture practices and their associated benefits

Benefits Valued	Landscape Transformation	Cisterns	Bioretention	Trees (in Bioretention)
Water Supply (Potable Water Offsets)	X	X		
Water Quality (Stormwater Capture)	X	X	X	X
Community Uplift	X			
Habitat/Biodiversity Value	X		X	X
Fire Damage Reduction		X		
Pollution Reduction				
Air Emission Savings	X	X		X
Air Pollutant Removal	X		X	X
Carbon Reduction				
Avoided GHG emissions	X	X		X
Carbon Sequestration	X		X	X
Energy Savings	X	X		X
Reduced Heat Stress				X
Green Jobs	X	X	X	

Table B-2. Per acre foot costs of water from various Southern California water projects[123]

Estimated $/AF of water	Project/Source
$2,000	Pure Water Project[a]
$2,975	Carlsbad Desalination Plant
$3,000	Modeled Unit Cost for Core Supply (per MWD's 2023 Long-Range Financial Plan)
$3,126	Santa Barbara Desalination Plan
$3,266	Ventura Water Pure

a. Since this estimate was published, estimates have reportedly increased to more than $3,000/AF.

B.2 Value of Water Quality and Stormwater Capture Benefits

The SCW Program reflects a commitment to invest in stormwater capture projects that improve water quality and create water supply and community investment benefits. To date, the projects approved for SCW Program funding have largely been regional-scale projects that capture and clean stormwater. However, small scale projects that capture and clean stormwater onsite, such as the nature-based practices recommended in earlier sections, can provide similar (and in some cases, greater) benefits.

Like the water supply benefit described above, the benefit of capturing and cleaning stormwater runoff can be valued at the avoided cost of having to capture and clean that same acre foot of water in a different

[123] Metropolitan Water District of Southern California Board Meeting. Agenda: Finance, Audit, Insurance, and Real Property Committee - Final - Revised 1. Attachment 1, Page 31. (8/15/23); represents annualized value for water supply alternatives over 30-years.

way (i.e., through a SCW Program regional project). Based on SCW Program grants awarded from FY21-FY24, the average cost of funded projects was $3,526 per AF.[124] This is the value applied to estimate the stormwater capture benefits of distributed infrastructure in the MWD Planning Tool. Over a 30-year life cycle at 3 percent discount rate, a project that captures one acre foot of stormwater per year has a water quality benefit of $69,100.

B.3 Community Uplift Benefits

MWD's General Manager Adel Hagekhalil has stated that the agency must shift its focus to be a "regional steward and caretaker of water…that will support investments in local infrastructure."[125] He is leading MWD in the direction of more holistic water management for the communities the member agencies serve. Transforming landscapes can uplift a community's value. This value is reflected by people's willingness-to-pay more to live in homes and neighborhoods with improved aesthetics and/or quality of life. Evidence from existing studies suggests that properties with enhanced landscaping, green infrastructure-like improvements, and sustainability elements can sell for up to 7 percent higher than otherwise similar properties (Clements et al. 2021). These studies cover single-family, multifamily, and commercial properties.

Increases in property values are an indirect way to measure the value people place on the amenities of climate resilient landscapes and improved aesthetics. However, higher property values can have impacts on affordability and implications for equity. Additional planning and investment considerations should be made when implementing distributed conservation infrastructure investments. For additional information, see the Green Infrastructure Leadership Exchange 2022 Publication: Equity Guide for Green Stormwater Infrastructure Practices.

To estimate the enhanced aesthetic value of landscape transformation and bioretention improvements, the project team first applied a property value increase of 3.5 percent,[126][127] based on findings from existing studies, to the average home value in L.A. County. To ensure against double counting of benefits, we applied half of this estimate to the average area available on single-family properties for landscape transformation within the three modeled study areas (~2,100 square feet, as estimated by Craftwater Engineering). [128] This yielded an annual benefit for landscape transformation of $0.22 per square foot. This translates to an annual value of approximately $470 per single-family home installation per year, or an average of $9,200 over a 30-year period per property (discounted at 3 percent). The $0.22 value was

[124] Los Angeles Water Keepers. 2023. *Changing the course? An assessment of the first three rounds of the Safe Clean Water Program Regional Funding Program*. Available: https://www.lawaterkeeper.org/reports/scwp-assessment

[125] James, Ian. *Southern California's 'water doctor' pushes for transformation to adapt to climate change.* Los Angeles Times. August 23, 2023. Available: https://www.latimes.com/environment/story/2023-08-23/southern-california-metropolitan-water-chief-climate-change.

[126] Braden, J.B., and D.M. Johnston. 2003. *The Downstream Economic Benefits of Storm Water Retention.* Journal of Water Resources Planning and Management 130 (6): 498–505.

[127] Water Research Foundation. 2021. https://www.waterrf.org/research/projects/economic-framework-and-tools-quantifying-and-monetizing-triple-bottom-line

[128] Median home value in L.A. County equal to $805,600, sourced from the ACS 2022 1-year estimates. Based on studies described in the WRF TBL Tool, the Planning Tool accounts for 50 percent of the total property value benefits in the total value to adjust for potential double counting. When a home's value increases, it could be due to improved aesthetics, good shading and reduced temperature from trees, or prospects of a lower water bill. Reducing this value by 50 percent attempts to adjust for potential double counting of these benefits.

also applied to landscape transformation on commercial and institutional properties to reflect the enhanced neighborhood aesthetics that these projects would provide.

B.4 Fire Risk Reduction

Fire safety is an ever-increasing concern for residents in the north and northwest regions of L.A. County, as well as in many of the less populated areas served by MWD. Fire-safety cisterns can provide additional water to hydrate defensible spaces around homes in fire prone areas, reducing the risk of ignition from flying embers. Craftwater Engineering's modeling sized tanks for properties in fire prone areas to be full enough to irrigate up to 30 feet from building footprints during high wildfire risk, "red flag" events. The sizing assumption was based on providing one week's worth of irrigation water for use in this defensible space zone to retard ignition from windblown embers.

To value the benefit of this additional water supply, the project team assumed that a 5,000 gallon cistern designed for fire safety would be installed in areas with some documented level of fire risk. Although it is possible to build up to a 9,000 gallon tank without having to pull a building permit, the modeling conducted by Craftwater Engineering indicates that the average fire-safety cistern on a single-family home in Las Virgenes held about 5,000 gallons. The benefit of cisterns for fire risk reduction was calculated using the following formula:

*Fire risk reduction benefit = Median home value per square foot * area of the home * % annual fire risk * % damage reduction from cistern * % building value damage avoided*

Each variable is explained below.

1. Median home value per square foot was extracted from the US Census 2020 5-year estimates for owner-occupied single-family homes.
2. Area of the home was extrapolated from the modeling data.
3. Percent fire risk was determined by the annualized percent fire risk by Census Tract from FEMA's National Risk Index for wildfires. For the modeled results, the average fire risk across the Census Tracts in Las Virgenes was 0.49 percent in any given year.
4. The percent damage reduction represents the proportional damage reduction to a house that would be attributable to a cistern during a wildfire scenario. FEMA identifies a 10 percent reduction to potential damage attributable to any single given fire safety strategy, such as a cistern.
5. The percentage of damage avoided to the building is an estimate of the proportion of damage that would be avoided by having a fire-safety cistern on site. Based on input from experts at the Resource Conservation District of the Santa Monica Mountains, a fire-safety cistern could prevent up to 90 percent of damage from a wildfire to a home.

This equation yields a benefit estimate of $0.15 per gallon of cistern storage. For a 5,000 gallon tank, this results in an annual benefit of $731 and a present value benefit of $14,300 per household over 30 years, discounted at 3 percent.

B.5 Energy Savings

Reduced energy use for potable water supplies: For every turf lawn transformed into a climate resilient landscape, less potable water is required for irrigation. Potable water savings are even higher when property owners install cisterns, which can be used to store water for irrigation during drier times.

Conservation and stormwater capture practices that reduce potable water demand result in energy savings for MWD and its member agencies by: 1) avoiding the use of alternative water supplies (see Section B.1) and 2) reducing the amount of water that is treated and distributed to customers.

As noted above, the avoided cost of securing alternative water supplies is based on the estimated costs (per acre foot) for water reuse and desalination projects within Southern California (see Table B-2). The California Public Utility Commission (CPUC) Water-Energy Calculator Users Guide[129] documents the energy intensity of potable water production and conveyance for different water supply sources by region of the State. For Southern California, CPUC estimates an average of 3,332 kWh per AF for water reuse and desalination. The monetary value (cost savings) associated with this reduced energy use is included in the avoided cost ($3,000/AF) of securing alternative water supplies and is therefore not valued independently. However, the kWh/AF estimate informs our calculation of air quality and greenhouse gas emission (GHG) reduction benefits.

Trees: When trees are planted in urban areas near buildings, they provide shade and insulation that reduces energy demands for building cooling. Based on values from the WRF TBL Tool, the average annual building energy savings per tree (at full growth) on the Southern California Coast is 60 kWh per year. Applying the average cost of electricity in Southern California, each tree planted would provide an electricity savings of approximately $12 per year at full growth. Over 30 years, accounting for a 3 percent discount rate and tree growth over time, this amounts to $102 per tree.

B.6 Air Quality Improvements and Carbon Reduction

The public health and environmental impacts of specific air pollutants are well documented.[130] The U.S. EPA and others have developed several tools and methods for estimating air quality improvements and linking these improvements to public health outcomes. These data and studies allow for the translation of reductions in energy use into air pollutant and GHG emission reductions, and to value these reductions based on established estimates of willingness-to-pay (WTP) to avoid specific health outcomes and/or avoided healthcare costs. They also provide estimates for pollutant uptake by plants and trees, and related public health benefits.

Avoided emissions from reduced energy use

The U.S. EPA maintains extensive data on electricity power generation and energy-related emissions through its Emissions & Generation Resource Integrated Database (eGRID) and AVoided Emissions and geneRation Tool (AVERT) tools. These tools contain data on the environmental characteristics of almost all electric power generated in the United States, including emission rates (i.e., pounds of pollutant emitted per unit of electricity generated) for greenhouse gases and other pollutants. The WRF TBL Tool applies regional eGrid and AVERT emission rates by subregion to previously calculated GSI-related energy savings (see above) to estimate the associated reduction in emissions/pollutants.

Reduced energy use for potable water supplies: Based on the average energy use of 3,332 kWh/AF for alternative water supplies (see Section B.5), every 1,000 AF of potable water savings avoids 1.2 metric

[129] CPUC W-E Calculator 2.0 Users Guide (2021). Available: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/water-energy-nexus-programs

[130] U.S. EPA. 2018. Environmental Benefits Mapping and Analysis Program – Community Edition: User's Manual. Updated for BenMAP-CE Version 1.4.8. Available: https://www.epa.gov/sites/production/files/2015-04/documents/benmap-ce_user_manual_march_2015.pdf.

tons of NO_x and 0.08 metric tons of $PM_{2.5}$ emissions. To value this benefit, we applied per ton values for avoided health care costs developed by the U.S. EPA[131] for the electricity generating sector. This methodology yields an average value of $37 in emissions reduction benefit per AF of potable water supply offset. Over a 30-year period evaluated at 3 percent discount rate, this amounts to $702 per AF.

Trees: Energy savings from reduced building cooling demands also result in emissions reductions. The WRF Tool values the avoided air emissions value associated with one tree in Southern California at $0.70 per year. The total air quality benefits for a single tree, including avoided emissions and removal (see below), is $34 per year. This amounts to $281 per tree over a 30-year period, after adjusting for tree growth and applying a 3 percent discount rate.

Air pollutant removal from vegetation

Trees: Trees remove pollutants from the air at rates relative to the area of tree canopy cover. The WRF TBL tool applies estimates from the U.S. Forest Service on pollutant removal from trees for different regions of the U.S. These estimates are adjusted to account for canopy size of growing trees over each year of a 30-year period. At full growth, the value of this ecosystem service amounts to $33 per tree, per year. The total air quality benefits for a single tree, including avoided emissions and removal (see below), is $34 per year. This amounts to $281 per tree over a 30-year period, after adjusting for tree growth and applying a 3 percent discount rate.

Landscape transformation and bioretention: To estimate the pollutant removal rates for landscape transformation and bioretention that incorporate other types of vegetation, we used the WRF TBL Tool, which applies the ratio of tree to shrub/herbaceous cover removal efficiencies for relevant pollutants to the pollutant removal estimates for California based on published research and academic literature. For landscape transformation and bioretention as modeled, the total air pollution removal value per square foot amounts to approximately $0.02 per square foot per year. An average single-family residential landscape transformation project (replacing ~2,100 square feet of turf) removes about $36 worth of air pollutants per year, for a total of $705 per residence over a 30-year period at a 3 percent discount rate.

Avoided greenhouse gas emissions

Carbon dioxide (CO_2) and other greenhouse gases (GHGs, or CO_2 equivalents, CO_{2e}) contribute to rising atmospheric temperatures and related effects of climate change. The benefits of CO_{2e} reductions are valued using the Social Cost of Carbon, which represents the aggregate net economic value of damages from climate change across the globe. The most recent valuation for the Social Cost of Carbon per the U.S. EPA is $58 per metric ton (this is for the year 2020 updated to 2022 USD).[132]

Reduced energy use for potable water supplies: Using the emissions rates for different pollutants categorized by U.S. EPA eGRID, the WRF TBL Tool estimates total GHG emission reductions resulting from energy savings associated with reduced potable water demands. Based on an energy use of 3,332 kWh/AF for alternative water supplies, every acre foot reduction in potable water use avoids an estimated 1.47

[131] U.S. EPA. 2018. Technical Support Document: Estimating the Benefit per Ton of Reducing PM2.5 Precursors from 17 Sectors. EPA Office of Air and Radiation Office of Air Quality Planning and Standards. Available: https://www.epa.gov/benmap/estimating-benefit-ton-reducing-pm25-precursors-17-sectors

[132] U.S. EPA. 2016. Social Cost of CO_2, 2015-2050 [a] (in 2007 dollars per metric ton CO_2). Available: https://19january2017snapshot.epa.gov/climatechange/social-cost-carbon_.html

metric tons of CO_{2e} emissions, for a total value of $91 per AF (based on the Social Cost of Carbon). Over 30 years, this avoided GHG emissions amounts to $1,775 in value, when discounted at 3 percent.

Trees: There are also energy savings from tree plantings that reduce cooling requirements for buildings. An estimated 0.03 metric tons per tree of avoided carbon emissions equates to $1.70 per tree per year. The WRF TBL Tool estimates that the value of carbon reduction benefits for a single tree in Southern California, including avoided GHG emissions and carbon sequestration (see below), amounts to $4.90 per year. Over 30 years, this amounts to $61 per tree, after accounting for tree growth and applying a 3 percent discount rate.

Carbon sequestration

Vegetation removes CO_2 from the atmosphere, and stores carbon in the form of biomass. Both tree planting in bioretention cells and shrubs and plants installed for landscape transformation have the potential to sequester additional carbon equivalents.[133]

Trees: At full maturity, a tree in this region would sequester 51 kilograms of carbon equivalent, which is valued at $3.20 per tree per year. The WRF TBL Tool estimates that the value of carbon reduction benefits for a single tree in Southern California, including avoided GHG emissions and carbon sequestration (see below), amounts to $4.90 per year. Over 30 years, this amounts to $61 per tree, after accounting for tree growth and applying a 3 percent discount rate.

Landscape transformation and bioretention: For every acre of landscape transformation or bioretention installed, an estimated 4.1 metric tons of carbon is sequestered each year for an annual benefit of $242 per acre per year (or $0.006 per square foot). For an average single-family residential property replacing approximately 2,100 square feet of turf, carbon sequestration is worth an estimated $12 per year, equal to $238 in present value over 30 years at a 3 percent discount rate.

B.7 Habitat and Biodiversity Value

Urban areas are often a patchwork of green or vegetated spaces including parks, yards, street plantings, greenways, urban streams, commercial landscaping, and vacant lots. These spaces can provide important habitat and biodiversity benefits, such as providing food and refuge for birds, amphibians, bees, butterflies, and other species, promoting habitat for pollinators, and providing connectivity for mobile organisms between habitat patches. The habitat and biodiversity benefits are environmental goods that are not directly traded in the marketplace, and are therefore valued through non-market valuation techniques, including revealed and stated preference methods, to better understand how people value this benefit. The WRF TBL Tool relies on stated preference studies that estimate willingness-to-pay (WTP) for terrestrial habitat of specified quality.

Trees: An average tree in this region is estimated to generate 440 square feet of habitat at full growth, for a value of $27 per tree per year. Over a 30-year period, habitat creation is worth $257 per tree, adjusted for tree growth over time and accounting for a 3 percent discount rate.

Landscape transformation and bioretention: Habitat created through bioretention and landscape transformation that includes native plantings and/or suitable habitat is valued at $0.05 per square foot,

[133] Carbon equivalent (CO_2e) is a measurement of total greenhouse gas emitted, expressed in terms of the equivalent measurement of carbon dioxide with the same global warming potential.

or an average of $108 for a single-family residential property installation (~2,100 square foot conversion). Over 30 years, this single-family residential property would generate an estimated $2,120 in habitat creation benefits, adjusted for a 3 percent discount rate.

B.8 Reduced Urban Heat Stress

The urban heat island effect occurs when dense concentrations of pavement, concrete, buildings, and other non-natural surfaces absorb and retain heat, causing increases in temperatures and in some cases, increased heat-related illnesses and mortalities. Planting trees creates shade that helps reduce heat stress in urban areas. The WRF TBL Tool estimates the reduction in peak urban temperatures associated with a given greening scenario (such as planting trees) and quantifies the related average annual reduction in heat-related mortalities, hospitalizations, and illnesses. This benefit is valued by applying values from EPA on avoided health care costs and mortality risk.[134]

Trees: Reductions in heat stress were valued for trees planted in bioretention cells. Using the reference year 2050, and accounting for increasing temperatures due to climate change, the WRF TBL Tool estimates that the heat-related health benefits per tree planted in L.A. amount to $14 per tree in the year 2050. This includes reduction in heat related deaths, emergency room visits, and hospitalizations. Over a 30-year period, adjusted for tree growth and accounting for a 3 percent discount rate, this equates to $125 per tree.

B.9 Green Job Creation

Investments in water and other infrastructure are one of the most efficient methods of job creation. The installation and construction of landscape transformation, cisterns, and bioretention can create entry-level job opportunities for low income, low skilled workers. When paired with workforce development programs and implemented at scale, the job creation from conservation programs can provide technical skills necessary to enter the green workforce, earn a livable wage, and further professional development. Note that while any meaningful level of spending by MWD will generate additional jobs, this benefit is preconditioned on the jobs being targeted towards un- or under-employed individuals. The value of green jobs will likely be highest when working in partnership with a workforce development program such as those described in previous sections of the Roadmap.

The WRF TBL Tool draws on studies that have quantified the direct construction jobs created by green infrastructure programs or projects, usually based on construction bid estimates or economic impact models. This method was used to estimate the number of jobs created by different levels of spending; on average, an estimated 5.5 jobs are created for every $1M spent on green stormwater infrastructure.

To value job creation benefits, the WRF TBL Tool applies the reservation wage approach. The benefit of reduced unemployment is equal to the market wage associated with the new job minus the unemployed persons reservation wages. The reservation wage is equal to the lowest wage rate at which a worker would be willing to accept a specific job. The methodology for calculating the reservation wage is specific to the region, and well documented in the WRF TBL Tool Appendix H.

[134] The value of a statistical life is an estimate of how much people are willing to pay for small reductions in their risks of dying from adverse health conditions that may be caused by environmental pollution. U.S. EPA. 2019. Mortality Risk Valuation. Available: https://www.epa.gov/environmental-economics/mortality-risk-valuation

Landscape transformation and bioretention: For every acre of landscape transformation and/or bioretention installed, approximately 3.6 job-years are created. These job-years are estimated to generate a benefit of $12,900 per acre of landscape transformation installed annually. Job-years are assumed to be implemented in the first few years of construction and do not include ongoing maintenance positions. This value is therefore not discounted over 30 years but instead included as a total value.

Cisterns: Cistern installation also generates employment, with 47.5 job years per 1,000 cisterns. For every 1,000 cisterns, a total value of $195,800 benefits in green job creation are generated. Job-years are assumed to be implemented in the first few years of construction and do not include ongoing maintenance positions. This value is therefore not discounted over 30 years but instead included as a total value.

Appendix C: Paying for Target Conservation Illustrations with Safe Clean Water Program Funds

C.1 Introduction

The Safe Clean Water (SCW) Program allocates the appropriately $280M[135] in tax revenues collected annually between three subprograms: (1) the Regional Program; (2) the Municipal Program; and (3) the Los Angeles County Flood Control District (LACFCD) Program. Stormwater capture incentives for private property owners—both residential and commercial—should be eligible to receive funding from each of these three programs.

Thus, there are three pathways for SCW Program municipalities to contribute to an MWD-led incentive program; these options can be accessed as standalone or as a combined approach. Importantly, SCW Program municipalities can best leverage their parcel-tax revenues by joining an MWD program compared to setting up their own city-by-city incentive programs. They may also have the option to debt finance their cost-share to generate sufficient funds upfront to accelerate investments in these infrastructure solutions.

C.2 Safe Clean Water Regional Program

Fifty percent (50%) of all SCW Program tax revenues are allocated to pay for:

- Implementation
- Operation and maintenance, and
- Administration

of Projects and Programs implemented through the Regional Program – Infrastructure Program (Infrastructure Program).[136] Based on the FY24-25 projections, the Infrastructure Program will have at least $118.5 million to invest in eligible infrastructure projects across the County's nine watershed areas.

Eligible projects include "Projects and Programs"[137] identified in approved regional plans such as stormwater resource plans, watershed management programs developed pursuant to waste discharge requirements for MS4 discharges within the coastal watersheds of the County, and other regional water management plans, as appropriate. Projects and programs to be funded with Infrastructure Program dollars must have a completed Feasibility Study and must be included in an approved Stormwater Investment Plan. To award Infrastructure Program dollars to eligible projects and programs, the SCW Program administrators review, score, and ultimately select projects and programs to be funded on an annual basis.[138]

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[135] Safe Clean Water Program, *Tax Collection Totals 2021-22*, https://safecleanwaterla.org/wp-content/uploads/2022/10/SCW-2021-22-Tax-Collection-Totals.pdf.

[136] "Multi-Benefit Project" means a Project that has: (1) a Water Quality Benefit, and (2) a Water Supply Benefit or a Community Investment Benefit, or both. Fld. Ctrl. Dist. Code, Ch.16.03(P).

[137] "Program" means a planned, coordinated group of activities related to increasing Stormwater or Urban Runoff capture or reducing Stormwater or Urban Runoff pollution in the District. "Project" means the development (including design, preparation of environmental documents, obtaining applicable regulatory permits, construction, inspection, and similar activities), operation and maintenance of a physical structure or facility that increases Stormwater or Urban Runoff capture or reduces Stormwater or Urban Runoff pollution in the District. Fld. Ctrl. Dist. Code, Ch.16.03(U).

[138] Safe Clean Water Program, *Regional Program Overview*. Available https://safecleanwaterla.org/regional-program-2/.

Stormwater capture projects on private property should qualify as projects and programs eligible for funding under the Infrastructure Program. These systems installed on already developed properties constitute "retrofits," which are expressly called out in the SCW Program ordinance as eligible project types. And they provide the co-benefits of improving stormwater capture, reducing urban runoff pollution, increasing local water supplies, and improving Angelino's quality of life. At present, however, no approved Stormwater Investment Plan includes an incentive program for distributed stormwater capture and use projects. But the Lower San Gabriel River Watershed Area Steering Committee (LSGR WASC)[139] has set aside $1.5M for "small-sized" projects that may be a readily available pathway to accessing Regional Program funds for stormwater capture incentives (See text box for details).

Prioritizing Smaller-Scale Stormwater Projects: Lessons from the Lower San Gabriel River Watershed Area

As of FY22-23, the LSGR WASC is estimated to receive $16.73M in Regional Program funding. In February 2023, as part of its Prioritization Criteria, the Lower San Gabriel River Watershed Area Committee (LSGR WASC) reserved $1.5 million in SCW funds to pay for "small-sized" projects, e.g., projects less than $1 million. The LSGR WASC is using this approach to ensure smaller, community-driven projects are competitive in the Regional Program process. Stormwater capture incentives could fall within this set-aside.

Further, based on the benefits detailed in the Roadmap, stormwater capture infrastructure should meet the minimum 60-point scoring threshold to receive Infrastructure Program funds. Based on the modeled benefits, examples of how this minimum can be achieved are provided in Table C-1 and Table C-2, below. Table C-1 provides an example scoring based on the standard scoring used to evaluate projects applying for funds. Table C-2 provides an example scoring based on a pilot scoring rubric SCW Program managers tested in 2022-2023 to refine how water supply magnitude benefits are evaluated and provide more granular metrics for that category of benefits.[140]

Table C-1: Potential Safe Clean Water Regional Program, Standard Scoring[141]

	Water Quality Cost Effectiveness	Water Supply Cost Effectiveness	Water Supply Magnitude	CIBs	Nature-Based Solutions	Leveraging Funds & Community Support	Total
Illustration 1 ($12.5M)	20	10	2	10	15	10	67
Illustration 2 ($125M)	20	10	12	10	15	10	77

Minimum score needed to qualify for funding = 60

[139] Watershed Area Steering Committees oversee how SCW Program funds are spent in their watershed area.
[140] Safe Clean Water Program, *Interim Guidance 2022*. Avaiable https://safecleanwaterla.org/wp-content/uploads/2022/05/SCWP-2022-Interim-Guidance-20220519.pdf.
[141] The potential SCW Regional Program scoring in Table 2-5 and Table 2-6 are initial estimates offered for purposes of examples for this Roadmap only. Final scoring would done via the SCW application process and may differ from these initial estimates.

Table C-2 Potential Safe Clean Water Regional Program, Pilot Water Supply Scoring

	Water Quality Cost Effectiveness	Pilot Water Supply Cost Effectiveness	Pilot Water Supply Magnitude	CIBs	Nature-Based Solutions	Leveraging Funds & Community Support	Total
Illustration 1 ($12.5M)	20	12	7	10	15	10	74
Illustration 2 ($125M)	20	12	12	10	15	10	79

Minimum score needed to qualify for funding = 60

Infrastructure Program dollars are likely best suited to cover capital costs, near-term operation and maintenance costs, plus potentially pro rata administrative costs for an incentive program administered by another agency (e.g., MWD). This co-funding approach could be structured similar to local retail water agencies or cities' participation in MWD's current turf replacement program; the local agency adds in additional funds on top of the baseline MWD program to increase the rebate amount. To contribute to the incentives, a municipality could apply through the usual Regional Program process, or ideally, WASCs could also consider setting aside or "reserving" funds for their share of an incentive program similar to the above LSGR WASC example.

C.3 Safe Clean Water Municipal Program

Through what is known as the Municipal Program, forty percent (40%) of all SCW Program tax revenues are allocated to municipalities within the County on a pro rata basis. The municipalities are to spend the revenues in their respective jurisdictions and Los Angeles County is meant to spend it in unincorporated areas that fall within the boundaries of the Flood Control District,[142] for:

- Implementation
- Operation and maintenance, and
- Administration

of Projects and Programs. As with the Infrastructure Program, stormwater capture and use infrastructure on private property should qualify for funding under the Municipal Program. A municipality must spend at least seventy percent (70%) of its Municipal Program funds annually on eligible expenses related to Projects or Programs implemented on or after November 6, 2018, which also includes operations and maintenance of Projects built to comply with the MS4 Permit, so long as the Project complies with Municipal Program requirements. The projected FY24-25 estimated revenue for the full Municipal Program is $111.6 million.[143]

As with the Infrastructure Program, stormwater capture and use infrastructure on private property should qualify for funding under the Municipal Program because these dollars are to be spent on project implementation and maintenance.

[142] Because, as detailed below, the Los Angeles County Flood Control District receives dedicated funds that can also be used for infrastructure investments, there may be an opportunity to combine county return funds with these dedicated funds to increase the available SCW dollars Los Angeles County could contribute to a co-funded program.

[143] Safe Clean Water Program, *FY2024-25 Local Tax Return Projected Local Totals*. Available https://safecleanwaterla.org/wp-content/uploads/2023/11/FY-24-25-Projected-Local-Funds-by-Municipality-20231017.pdf.

The projected FY24-25 estimated revenue for the full Municipal Program is $111.6 million.[144] For example, Long Beach is projected to receive $4.55 million in local return funds in FY24-25, and as of its 2022-2023 Annual Plan, Long Beach has total of $10.3 million in available funding.[145] These funds will be spent on meeting MS4 permit requirements. As part of that compliance, Long Beach will need to meet the targets set out in the (Enhanced) Watershed Management Plans that apply to Long Beach, which together set a stormwater capture target of 3,363 AF per year.[146] Achieving 511 AF of stormwater capture under Illustration 2 would represent 15 percent of this target. Other SCW municipalities have similar goals and requirements.

C.4 Los Angeles County Flood Control District Program

Ten percent (10%) of all SCW Program tax revenues are allocated to the LACFCD for:

- Implementation and administration of Projects and Programs, and
- Payment of the costs of administering the SCW Program.

Not less than twenty percent (20%) of LACFCD Program funds shall be allocated for these Programs over a revolving five (5) year period:

- Public education programs;
- Local workforce job training; and
- School education and curriculum programs.[147]

As with the Regional and Municipal Programs, stormwater capture and use infrastructure on private property should qualify for funding under the LACFCD Program.

The FY2024-25 projected revenues for the LACFCD Program are $27.9 million. As of November 2023, over the program's first four years, the program received $111.5 million and spent $24 million. An "additional $20M in contracts are in progress for several significant efforts," as discussed in the SCW Program (Draft) Biennial Review Progress Report.[148] The (Draft) Biennial Review details how the LACFCD Program dollars have and will be spent.

Table C-3 provides a summary of SCW Program funding categories, including allowable uses for stormwater capture incentives and projected revenue allocations for FY 2024-25.

[144] Safe Clean Water Program, *FY2024-25 Local Tax Return Projected Local Totals.* Available https://safecleanwaterla.org/wp-content/uploads/2023/11/FY-24-25-Projected-Local-Funds-by-Municipality-20231017.pdf.
[145] Id; Safe Clean Water Program, *Municipal Annual Plan, Long Beach*. Available https://www.dropbox.com/sh/0ynkhec2yib4c09/AAASntkzd8JZDidUfoFiaO0pa?dl=0&preview=2020MP46+Long+Beach+FY22-23.pdf.
[146] This cumulative total is based on capture goals for WMPs and EWMPs that cover Coyote Creek, San Gabriel River, and Los Angeles River. Links to WMPs/EWMPs here: https://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/#:~:text=The%20Los%20Angeles%20County%20MS4,best%20management%20practices%20(BMPs).
[147] Fld. Ctrl. Dist. Code, Ch.16.05(B)(6).
[148] Safe Clean Water Program, *Draft Biennial Progress Report.* Available https://safecleanwaterla.org/wp-content/uploads/2023/10/SCWP-Draft-Biennial-ROC-Report_ROC-Discussion-Draft.pdf.

Table C-3: Aligning Funding Options for Safe Clean Water Funds

SCW Fund Category	Best-fit Stormwater Capture and Use Incentive Cost Categories	FY2024-25 Projected Revenue
Regional Program	Capital Costs O&M Administration Costs	$120.65M
Municipal Program	Capital Costs Administration Costs Operations and maintenance	$111.57M
District Program	Capital Costs Local workforce job training	$27.88M $22.3M (Projects and Programs and SCW Program administration) $5.58 million (Local workforce job training, public education, and school curriculum)

Thus, there are three pathways for SCW Program municipalities to contribute to an MWD-led incentive program; these options can be accessed as standalone or as a combined approach. Importantly, SCW Program municipalities can best leverage their parcel-tax revenues by joining an MWD program compared to setting up their own city-by-city incentive programs. They may also have the option to debt finance their cost-share to generate sufficient funds upfront to accelerate investments in these infrastructure solutions.

C.5 Safe Clean Water General Obligation Bond

Given the available annual revenues from the Regional, Municipal, and LACFCD Programs, SCW Program municipalities could potentially cover 30 percent of the costs of Target Conservation Illustration 1 (i.e., $3.75 million) with annual revenues. It is not likely, however, that annual dollars can cover the hypothetical 30 percent cost-share for stormwater agencies set out in Conservation Target Illustration 2 (i.e., $37.5 million). To get to this scale of investment, SCW Program municipalities, namely Los Angeles County, could consider financing their contribution.

The SCW Program authorizes the County[149] to use revenues from the Special Parcel Tax to "finance bonds … so long as the bond proceeds are used for Projects and Programs that are eligible for funding under the SCW Program," and the County determines that bonds or loans "are prudent and necessary" to fund those projects.[150] Projects and programs eligible for funding under the SCW Program include, among other things, residential and/or commercial stormwater retrofits, incentive programs established by the Los Angeles County Board of Supervisors, and projects that "improve Stormwater or Urban Runoff capture or reduce Stormwater or Urban Runoff pollution for improving water quality, increasing local water supplies, or improving the quality of life for communities."[151] Because these bonds would be repaid with revenues

[149] Municipalities within the District boundaries are also authorized to issue bonds financed by the Special Tax.
[150] Fld. Ctrl. Dist. Code, Ch.16.04(B); Fld. Ctrl. Dist. Code, 16.05(A)(2)(i).
[151] Fld. Ctrl. Dist. Code, Ch. 16.05(A)(2)(a), (e), (f), (h), (*l*).

from the Special Tax—a parcel tax—they would likely be issued as general obligation bonds.[152] General obligation bonds issued under this SCW authority can potentially be repaid from three sources: (1) revenues allocated to the Infrastructure Program; (2) revenues allocated to the County through the Municipal Program; and/or (3) revenues allocated to the LACFCD Program.[153]

To issue such a bond, the County would also need to follow the requirements set out in the Flood Control Act because the SCW Program does not include specific bond issuance procedures. The Los Angeles County Flood Control Act authorizes the County Board of Supervisors "to issue and sell bonds of the district."[154] Bonds may be issued for "**any purposes** for which the board of supervisors is authorized to expend the funds of the county."[155] The purposes for which the bonds are issued must "materially benefit and serve the general county interest and that the public interest, convenience, and necessity of the county as a whole requires the contribution to be made by the county."[156]

As detailed above, the LACFCD and the Board of Supervisors are authorized to expend SCW funds on projects that include stormwater capture systems on private property. Accordingly, the Los Angeles Flood Control Act should authorize the Board to issue bonds secured by SCW revenues to finance these installations on behalf of the LACFCD. Moreover, as discussed throughout this Roadmap, investments in stormwater capture systems on private property materially benefit and serve all of Los Angeles County.

The County's authority to issue debt for the purposes of water conservation and/or flood control is subject to one limitation. County's total indebtedness may not exceed 15 percent of the taxable property of the county as shown by the last equalized assessment roll.[157] And from a procedural perspective, to issue this type of general obligation bond, the County must receive approval from two-thirds of "qualified electors," (i.e., qualified voters in the county).[158] Although the voters approved issuance of bonds as part of Measure W, this approval may not be sufficient for purposes of the Government Code. In calling for voter approval the Board of Supervisors must specify the amount of the bonds and the maximum interest rate, among other requirements.[159] Measure W did not specify a bond amount or maximum interest rate. Debt limitations and public approval should not be viewed as prohibiting bond financing for incentives, however.

If the County were to issue a general obligation bond to finance stormwater agencies' 30 percent share of Illustration 2, assuming 5 percent interest on a 30-year term, the County would make $2.44 million payments for 30 years a total cost of $73.2 million. But, assuming a 3 percent rate of inflation, present value cost would be $49.3 million. Accounting for the time value, the County would pay $11.7 million in interest. At a present value cost of $49.3 million, the debt financed program is cost-effective. The

[152] Possibly the County could issue "limited obligation bonds" to finance these investments by pledging SCW PROGRAM revenues as security for the bonds rather than the County's "full faith and credit." *See* Cal. Gov Code § 50665.2. This approach may require the County to obtain an easement over the properties where the stormwater capture infrastructure is installed and would not avoid voter approval requirements. Cal. Gov Code § 50665.8. There may be an option to issue a "Special Tax Revenue Bond." See National Bond Lawyers Association, Bond Basics: https://www.nabl.org/bond-basics/special-tax-bond/. Further research is needed to determine whether California law authorizes revenue bonds backed by special taxes.
[153] Fld. Ctrl. Dist. Code, Ch. 16.04.
[154] Cal. Uncod. Water Deer, Act 470 § 8.
[155] Cal. Gov. Code § 29900(b).
[156] Cal. Gov. Code §§ 29901.5, 29902, 29905, 29908.
[157] Cal. Gov. Code § 29909.
[158] Cal. Gov. Code §§ 29902, 29905, 29908.
[159] Cal. Gov. Code § 29901.

estimated monetized value of the stormwater capture and co-benefits accruing to the stormwater agencies totals $69.9 million. In other words, while contributing 30 percent of the program cost, the County benefits would exceed the cost by $20.6 million.

Further, given that the SCW Ordinance expressly authorizes bond financing for private property retrofits and incentives, this authority should not require the County to own or operate the financed stormwater capture systems. This eliminates a *legal* requirement for the County to obtain any lien, easement, or other ownership interest in the property where these systems are located. Because debt incurred by the County to pay for stormwater capture projects would be secured by SCW Program revenues—which are parcel tax revenues collected at a rate set by Measure W—the County (or other Measure W municipalities) does not have the rate setting authority to use Regulated Operations accounting; see Roadmap Section 2.6.2 an explanation of Regulated Operations accounting. While not required by the bond authority, from an accounting perspective the County would need to meet the control requirements of GASB 4 to account for investments in distributed stormwater capture and use systems. As a general matter, control results from the city or utility's ability to determine the nature and manner of use of the investment. Easements or contracts can usually establish the needed level of control. In any event, it may be advisable from a policy and regulatory compliance perspective to enter into an operation and maintenance agreement with private property owners. Roadmap Section 2.8 discusses these program implementation and administration recommendations.

A small but important set of water utilities are finding that they can invest municipal bond proceeds in distributed infrastructure and comply with GASB Concepts Statement No. 4. For example, over the last two decades, the Southern Nevada Water Authority has bond financed more than $260 million (as of 2021) in incentive programs such as private property turf replacements. This large-scale investment has saved nearly 467,000 acre-feet of water, which is 167,000 acre-feet more than the amount of Colorado River water that the State of Nevada has the right to consumptively use each year.[160] Similarly, the Milwaukee Metropolitan Sewerage District (MMSD) capitalizes and bond finances GSI investments on property it does not own by requiring recipients of GSI grants to enter into a conservation easement with MMSD.[161] In 2019, MMSD invested $1.9 million in private property GSI. In February 2020, MMSD issued a certified Climate Bond to finance $20 million in "community based" GSI.

The SCW Program provides three sources of funding local stormwater agencies could access to contribute to an MWD-led stormwater capture incentives program: Regional, Municipal, and LACFCD Program funds. The infrastructure strategies modeled as part of this project meet the SCW Program purposes, providing the exact type of cost-effective and multiple benefit projects the program was created to fund. There is stiff competition for these somewhat limited SCW Program dollars, however. Taking a combined approach and building a portfolio from all three sources would be a useful strategy. It is also possible for the County to debt finance stormwater agencies' contributions; this would generate upfront funds that could be paid back overtime. Whatever the ultimate funding portfolio local stormwater agencies can create, as this Roadmap outlines participating in an MWD-led program rather than creating separate incentives would help streamline implementation of parcel-scale stormwater capture infrastructure.

[160] WaterNow Alliance et al, Financing the Future: How to Pay for Turf Replacements in Colorado, at 4 (Aug. 2022), https://tapin.waternow.org/wp-content/uploads/sites/2/2022/04/2022_0803_UtilityTurfReplacement_Final.pdf.
[161] Milwaukee Metropolitan Sewerage District, Limited Term Conservation Easement for Green Infrastructure, https://tapin.waternow.org/wp-content/uploads/sites/2/2019/05/MMSD-Conservation-Easement.pdf.

Appendix D: Potential California and Federal Grant Program Funding Sources

D.1 Introduction

This project team has identified a set of recommended rainwater harvesting incentive strategies that could be adopted across metropolitan Los Angeles to reduce outdoor water consumption and build regional resilience to drought and climate change. These incentive strategies can be (and have been) funded by water rate and other revenues collected by MWD and its member water agencies. The project team envisions that the incentive strategies should be updated/revamped to provide more water supply, deliver myriad of co-benefits to communities and ecosystems, and bring an equitable framework to MWD's incentive programs. Doing so will require additional financial support. As discussed in Section 2.6, the team recommends a portfolio approach, with key beneficiaries co-funding the program. Despite their limitations and complications, grants provided by federal and California state agencies can be an important component of this "portfolio" approach to funding incentives. We encourage MWD and its partners to integrate grants into a more sustainably resourced funding and financing strategy, as described in Section 2.6.

The overarching goal of this research is to identify plausible sources of grant funding which can be accessed by Metropolitan Water District of Southern California, its member water agencies, Los Angeles County or other local entities. The research examined a wide range of grant programs, focusing on those that are amenable to supporting incentive programs and/or the underlying rainwater harvesting strategies within our recommendations. This report summarizes the results of our research and provides recommendations for further steps to investigate and apply for relevant grants.

D.2 Summary of Work and Results

There are several federal and California state agencies that administer grant programs which support a wide range of resilience activities.[162] Our research sought to identify those that could be accessed by MWD or other entities to support either water conservation incentive programs or the underlying rainwater harvesting techniques that underpin our recommended incentive strategies.

The technique search terms used in our research included the following keywords: landscape transformation, rainwater capture cisterns, wildfire defensible space creation, stormwater quality bioretention, and landscape irrigation efficiency upgrades. To this end, we focused on grant programs that support: disaster recovery, pre-disaster mitigation, drought response, wildfire risk reduction, water conservation, energy conservation, and workforce development. Our review included grant programs that fund both project planning and implementation to ensure a comprehensive menu of options.

D.3 California State Grant Programs

D.3.1 Research approach

To identify relevant grant programs offered by California state and local agencies, we first identified relevant grant databases:

[162] Generally, see grants.gov for federal agency programs and grants.ca.gov for California state agency programs.

- https://ordspub.epa.gov/ords/wfc/f?p=WFC:12 (federal and California)
- https://www.grants.ca.gov/
- https://water.ca.gov/Work-With-Us/Grants-And-Loans
- https://www.waterboards.ca.gov/water_issues/programs/grants_loans/
- https://cleancalifornia.dot.ca.gov/local-grants/local-grant-program
- https://fundingnaturebasedsolutions.nwf.org/
- https://www.fundingresource.org/stormwater
- https://lccf.org/find-your-local-community-foundation/
- https://www.lacgp.org/community-foundations
- https://arccacalifornia.org/grant-tracker/
- https://resilientca.org/topics/investing-in-adaptation/
- https://upliftca.org/resource-finder/?utm_term=0_365e1ade28-1a445b1df6-201806609

We then searched these databases for key search terms, including:

- Urban water infrastructure
- Onsite reuse
- Stormwater
- Stormwater capture
- Rainwater harvesting
- Green infrastructure
- Water use efficiency or water conservation
- Stormwater quality improvements
- Wildfire mitigation or prevention
- Drought or climate change resilience
- Green jobs, workforce development, or job training
- Clean Water
- Climate Resilience
- MS4

We also applied these search terms to general google searches to cast a wide net on identifying additional grant opportunities. This wide-net approach resulted in an initial list of state funding options. Based on this initial list, we reviewed webpages and other information associated with grant opportunities to create a refined list.

From the refined list, we narrowed our research even further to emphasize the programs that seemed most appropriate for support of rainwater harvesting strategies. This process led us to prioritize five most suitable programs. They are:

1. Regional Resilience Planning Grants
2. Coastal Conservancy Grants
3. Clean California Local Grants
4. Transformative Climate Communities Implementation Grants
5. Nonpoint Source Pollution Control Grants

D.3.2 Top three recommended California grant opportunities

Of the five most suitable state grant programs, we suggest that ARLA and its future partners focus on the following three.

Office of Planning and Research's Regional Resilience Grant Program.

This program funds regional climate resilience efforts, including identifying climate resilience priorities, building capacity, and implementing projects that respond to a region's greatest climate risks. Over multiple funding rounds, the RRGP will invest $125 million into regions advancing resilience and responding to their regions' greatest climate risks through three major activities: capacity building, planning (including identifying climate resilience priorities), and project implementation. The RRGP will fund planning and projects designed to reduce climate risks from wildfire, sea level rise, drought, flood, increasing temperatures, and extreme heat events.

Rainwater harvesting incentive programs are directly relevant to the RRGP given the water supply and wildfire risk reduction benefits of landscape transformation, bioretention, and cisterns. Further, the proposed incentive program meets the requirements that projects have a regional focus and consider vulnerable communities, as the incentives would be available to property owners throughout LA County and will be designed to ensure lower income households can participate. These measures also address the greatest climate risks in LA County–wildfire and drought. Further, the draft RRGP guidelines specifically call out stormwater capture, water efficiency and conservation, green stormwater infrastructure projects, and urban greening as example eligible project types. The guidelines also cite "building and infrastructure retrofits to address wildfire risk," as an eligible project category, indicating that the grant funds can be used on private property.

The per project funding amounts also make this program a top priority. For the 2023 grants, implementation projects will be awarded between $800,000 to $3 million; planning projects will be awarded $150,000 to $650,000. No match funding is required. The current funding round closed in August 2023; a second round is expected to be announced in the spring of 2024.

Coastal Conservancy Climate and Wildfire Grants.

The Coastal Conservancy grant program funds projects that support the Conservancy's Strategic Plan. The Strategic Plan objectives include: (1) Revitalize coastal and inland waterfronts that provide significant public benefits and promote sustainable economic development; (2) Enhance biological diversity, improve water quality, habitat, and other natural resources within coastal watersheds; and (3) Enhance the resiliency of coastal communities and ecosystems to the impacts of climate change. Through its Wildfire Resilience Program, the Conservancy will also support local partners to develop and implement projects that improve ecological health of natural lands and reduce the risk of catastrophic fire in areas where people live. The Conservancy will fund most stages of a project including: pre-project feasibility studies, property acquisition, project planning including community involvement, design, environmental review, permitting, construction, and project-related monitoring.

Rainwater harvesting incentive programs are relevant to Coastal Conservancy objectives and priorities so long as the nexus between the landscape transformation, bioretention, and cistern practices and coastal resilience to climate change is clear. These practices provide the types of multiple benefits listed in the program criteria, including improved water quality, resilience to drought, and workforce development. The wildfire risk mitigation and resilience benefits of incentives for cisterns on private property may be particularly appealing for these grants given the Conservancy's focus on watershed protection from

wildfire and the priorities of the Wildfire and Forest Resilience Action Plan. Projects to install bioretention, climate resilient landscaping, and/or cisterns on all types of private property appear to be eligible so long as: (1) it's clear in the incentive program that the property owners give legal permission to install the practices, and (2) the property owner agrees to maintain the installation for a reasonable period of time.

Coastal Conservancy grants were selected as a priority program because the Conservancy accepts applications on a rolling basis through a two-step process, i.e., a pre-application and full application upon invitation. This program is also appealing because there are no maximum or minimum grant amounts and it is anticipated that most grants will be between $200,000 and $5,000,000.

Department of Transportation's Clean California Local Grants.

The purpose of this program is to beautify and improve streets and roads, tribal lands, parks, pathways, and transit centers. Depending on the final FY23-24 state budget, Caltrans expects program funding of $100 million for the next grant cycle. The program goals are to: Reduce the amount of waste and debris within public rights-of-way, pathways, parks, transit centers, and other public spaces; Enhance, rehabilitate, restore, or install measures to beautify and improve public spaces and mitigate the urban heat island effect; Enhance public health, cultural connection, and community placemaking by improving public spaces for walking and recreation; Advance equity for underserved communities. Infrastructure or non-infrastructure projects that reduce litter, beautify public spaces, improve public health, and foster place-making are eligible.

A "project" can occur in multiple locations. Projects on public property are eligible. Projects on non-residential, private property are also eligible so long as the private property project: (1) has a "clear public benefit;" (2) the property is under the applicant's jurisdiction to make improvements to or the applicant has written permission from the property owner to make improvements to the property and maintain those improvements for the life of the project; and (3) the project is partially or fully located in an underserved community and at least 75% of the population surrounding the project site(s) is underserved, i.e., census tracts within a half mile of the perimeter of the project site(s).

Rainwater harvesting incentive programs for commercial and institutional properties are eligible for Clean California Local Grant Program funding. The types of practices used for collecting and using rainwater are expressly called out in the grant guidance, e.g., bioretention, permeable pavement, trees and drought-tolerant plants, and other green infrastructure. Projects to install bioretention, climate resilient landscaping, and/or cisterns on private commercial and institutional properties would meet the program goals to beautify and improve public spaces. While privately owned, the spaces where these stormwater capture practices would be built, e.g., commercial parking lots, are accessible to and regularly used by the public. These installations would also serve a clear public benefit; they manage stormwater runoff and reduce demand for potable water. And this green infrastructure mitigates urban heat islands. In addition, at a pilot phase, sites for these practices could be selected to be located in underserved communities. Incentives aimed at residential property owners would not qualify, however. The Clean California Local Grant program does not provide funding for upgrades or improvements to residential properties. It is not clear from the grant materials whether "residential properties" means only single-family homes. Further clarity on this is needed because commercial properties could, potentially, include multi-family buildings even though they are residences.

This program was selected as a priority option because the max per project award amount is $5M and the sliding scale allowed for matching fund requirements. Awards under the first round of funding were announced in October 2023; information about a future round is expected in spring 2024.

D.4 Federal Grant Programs

D.4.1 Research approach

To identify relevant federal grant programs, we first took advantage of some recently developed on-line discovery tools, primarily the Ten Strategies and National Wildlife Foundation Nature-based Solutions Funding Database resources. Each allows users to segregate federal programs by agency, type of funding, program type/focus, and eligibility. There are other discovery tools that emphasize programs created or supported by the Bipartisan Infrastructure Law.[163] Using these tools, we narrowed our search to programs administered by over a dozen agencies, including:

- Bureau of Reclamation
- Environmental Protection Agency
- Federal Emergency Management Agency (FEMA)
- National Oceanic and Atmospheric Administration (NOAA)
- US Department of Agriculture
- US Department of Energy
- US Forest Service
- US Geological Survey (USGS)
- US Department of Housing and Urban Development
- US Department of Transportation
- US Department of the Treasury

From an initial list, we reviewed webpages and other information associated with each agency's relevant grant programs to create a refined list of federal funding options.

From the refined list, we narrowed our research even further to emphasize the programs that seemed most appropriate for support of rainwater harvesting strategies. This process led us to prioritize four most suitable programs. They are:

- Bureau of Reclamation's WaterSMART Water and Energy Efficiency program
- Bureau of Reclamation's WaterSMART Drought Response program
- FEMA's Building Resilient Infrastructure and Communities (BRIC) program
- FEMA's Hazard Mitigation Grant Program[164]

D.4.2 Top two recommended federal grant opportunities

Bureau of Reclamation's Drought Response Program.

The Drought Response program makes annual grants to projects that: increase the reliability of water supplies, improve water management, or provide benefits for fish and wildlife and the environment. In 2022, the program distributed $84 million to approximately 30 projects. The Drought Program will support

[163] See, e.g., U.S. Conference of Mayors Funding Opportunities; Brookings Institution Federal Infrastructure Hub.
[164] Both FEMA programs are co-administered by the California Office of Emergency Services.

planning activities and may be appropriate should ARLA or future partners pursue more detailed assessment of the recommended strategies or additional incentive approaches.

The overall incentives strategy recommended through this project meets the general criteria of improving water supply reliability or improving water management.

Of particular note, the Drought Program provided a $40,000 grant to Sonoran Environmental Research Institute (SERI), a community-based organization in Tucson that partners with Tucson Water to promote and implement the city's Low Income Rainwater Harvesting Rebate. The Bureau of Reclamation grant funded the purchase and installation of fifty 1,500 gallon cisterns at income limited households. The program has also funded the installation of large storage tanks at Portola Redwoods State Park through a grant to Trout Unlimited. This project reduced dry-season diversions from source water creeks and protected flows for endangered salmon.

Bureau of Reclamation's Water and Energy Efficiency Grants.
This program has a rich history of investing in turf conversion, residential landscape irrigation upgrades, and other water supply resilience measures in Southern California. It has previously awarded grants to Metropolitan Water, Orange County Water, West Basin and other California water utilities to support rainwater harvesting incentive programs.

The Bureau's grant application process, like most run by government agencies, can be cumbersome and time consuming. Larger water utilities, such as those who are stakeholders in this project, and well-funded NGOs have successfully navigated this process. Based on personal experience from this team, it is well worth establishing contact with the appropriate Bureau of Reclamation staff lead for advice and input into an application. The Bureau's Southern California point person for the Drought Program is Leslie Cleveland (LCleveland@usbr.gov); Debra Whitney (DWhitney@usbr.gov) is the local contact for the Water and Energy Efficiency Grant program. Sheri Looper in the Bureau's Denver office is the Drought Program manager (slooper@usbr.gov). (Josh German JGerman@usbr.gov) manages the Water and Energy Efficiency Grant program.

The current round of funding was announced November 14, 2023, and is open through February 2024.

D.5 Other Grant or Partnership Programs

While not directly related to federal or state grant programs, the project team also researched potential cost-sharing models associated with partnerships between municipal water providers and electric power utility companies. In part, this research was inspired by a Pacific Institute report, "Water Energy Synergies: Coordinating Efficiency Programs in California." Across Southern California, there are several examples of water providers collaborating with electric and natural gas utility companies to provide customer rebates for appliance upgrades that contribute to both water and energy conservation. The Pacific Institute report provides several examples, including a program in which the Los Angeles Department of Water and Power (LADWP) shares in the cost of an existing SoCalGas direct install program for water-saving devices in multi-family residences. This program was created through a joint partnership between LADWP and SoCalGas, ensuring specific programs for energy efficiency and resource savings could be developed and implemented by the two utilities. Another example was the California Advanced Homes Program where the utilities helped the building industry design and develop more environmentally friendly communities. The program offered rebates for efficient technologies, and free design assistance to help make the homes more energy and water efficient.

Southern California Edison also funds the Energy Savings Assistance Program, which works through qualified contractors to directly install energy saving upgrades to qualifying residences. Upgrades can include low flow showerheads and faucet aerators which save both water and energy.

There are fewer examples of collaborations that support water conservation gains which indirectly result in energy conservation. One example that may be instructive was a joint effort between San Diego Gas & Electric and San Diego County Water Authority (SDCWA)called the WaterSmart Landscape Efficiency Program (WSLEP). Rather than being a direct rebate offered to SDCWA customers, WSLEP focused on providing training to landscape contractors with the expertise needed to implement water budgeting techniques and technologies to effectively reduce outdoor irrigation on large commercial properties. The benefits included leak detection and repair, irrigation system pressure regulation, improvements in distribution uniformity of irrigation water, and the installation of flow sensors and weather-based irrigation controllers.

Partnering with a power and energy utility is an option that MWD should strongly consider. A combination of current programs SDCWA offers can easily become the framework for a new program much like WSLEP. SDCWA and MWD have partnered to fund the WaterSmart Contractor Incentive Program, providing rebates to commercial properties for water-efficient devices like smart irrigation controllers, high-efficiency sprinkler nozzles, flow sensors and drip irrigation. These devices also create energy savings, which may draw utility interest. The Qualified Water Efficient Landscaper Training (QWEL) is an affordable training program offering landscape professionals the opportunity to earn a certificate in sustainable and water efficient landscaping. The program's curriculum includes workshops on soil and local-climate plant selection, and irrigation system design, maintenance, operation, and auditing. These incentives illustrate the applicability and sustainability of a partnership with a power and energy utility.

Appendix E: Case Studies Highlighting Successful Programs in Peer Communities

RiverSmart Homes, District of Columbia Department of Energy and Environment

Summary

RiverSmart Homes is a District-wide program offering incentives to homeowners to reduce stormwater runoff from their properties. Homeowners receive a stormwater audit to determine their eligibility for financial and technical assistance to install one or more of the following features: rain barrels, shade trees, rain gardens, BayScaping (native planting), permeable pavers and re-vegetation.

Incentive goals / drivers

The program is part of the District's efforts to comply with the water quality requirements in its MS4 permit. It also contributes to efforts to reduce combined sewer overflows and increase the distribution of green infrastructure in high priority District neighborhoods.

Incentives available

RiverSmart Homes offers five different features that help reduce stormwater runoff from a property. Participants receive a free stormwater audit, which determines their eligibility for the following:

- Rain Barrels: DOEE will install rain barrels for a copayment of $50 per barrel (limit two rain barrels per property)
- Shade Tree Planting: DOEE plants trees for free (no limit)
- Rain Gardens: DOEE will install rain gardens for a copayment of $100 per 50 square foot rain garden (limit two gardens per property)
- BayScaping: DOEE will install native plant gardens (BayScaping) for a copayment of $100 per 120 square foot BayScape (limit two gardens per property)
- Permeable Pavers and Re-Vegetation: DOEE will reimburse participants for removing large hard-surface areas (like driveways, patios, and parking pads) and replacing it with permeable pavers or vegetation. DOEE reimburses $10 for every square foot converted to permeable pavers and $5 for every square foot converted to vegetation. **This rebate is only for homes within the MS4 sewershed, in Ward 7, or in Ward 8. There is a maximum rebate of $4,000 per property**

Incentive amount available to recipients

Varies across different GSI practices. See above. Stacking of incentives is an option.

How it works

Interested homeowners register for the free audit through the DOEE website. After visiting the property, an auditor determines which incentive options are appropriate for the property. DOEE has partnered with local NGOs and contractors to provide installation services; these partners reach out to audited landowners. DOEE websites also provide DIY instructions.

Lessons learned

Economically disadvantaged homeowners may not be able to carry the installation costs for their selected BMPs while awaiting reimbursement by DOEE.

Potential relevance for Los Angeles pilot

The RiverSmart Homes model straddles the line between a relatively "hands off", self-directed incentive program and a direct install model. The program features easy entry for interested property owners by requiring only a single application and, later, coordination with an approved installer. Working through a network of installation partners, DOEE has relieved property owners of the need to find their own installation contractor, which presumably could be a significant barrier for some interested homeowners. This network also allows the Department to avoid stocking rain barrels and other supplies; the installation contractors carry the responsibility for ordering or stocking necessary materials.

Additional information and resources

DC DOEE RiverSmart Homes program website

External RiverSmart Homes program website. Provides downloadable information sheets, installation and maintenance instructions, links to maintenance resources.

RainWise, Seattle/King County, WA

Summary

The RainWise program is a joint City and County rebate program to cover homeowner costs for installing rain gardens and rain harvesting cisterns. The program is largely "offloaded" onto the private sector and homeowners with oversight, training and administration retained by the City of Seattle Public Utilities and King County Wastewater Treatment Division.

Incentive goals / drivers

The RainWise program is a component of the City's Stormwater Management Plan and MS4 permit. It is also tied to the City/County CSO reduction strategy to improve water quality in Puget Sound. The City and County are both subject to a joint CSO control consent decree and operate under a joint control plan. Reducing stormwater contributions is a component of this plan.

Program funding level

$1.1 million (annual, in 2019)

Individual rebates have averaged $4800 (2021), typically covering about 90% of project costs.

Incentive amount available to recipients

The RainWise Program provides rebates that cover most or all of the cost of installing cisterns and/or rain gardens on your property. To receive a rebate, you must be in an eligible combined sewer overflow (CSO) basin and work with a RainWise-trained contractor. The rebate can be up to $4.00 per square foot of rooftop runoff controlled.

How it works

Residential property owners check eligibility on a program website (www.700milliongallons.org) to determine if they are eligible for a rain garden, cistern, or both. If eligible, owners can choose from a list of RainWise-trained contractors on the same website or attend a RainWise event to meet contractors in person. Property owners work with their chosen contractor to design and install rain gardens and/or cisterns. After a post-install inspection, the City processes a rebate. Alternatively, homeowners can assign their rebate to their contractor to cover costs, enabling installs with little or no upfront cost to homeowners. RainWise offers financial support (grants, bridge loans) to income qualifying households.

The RainWise Access Grant is available for low income homeowners and religious institutions to bridge the gap between the rebate amount and cost of the project. This grant program is run by a partnering non-profit, Stewardship Partners.

The RainWise Pilot Access Loan program is available to contractors who need assistance carrying the upfront costs of materials and labor while they await payment from the property owner's rebate. This loan program is administered through Craft3, a Community-Based Financial Institution.

Uptake/participation/metrics for success

Metrics for success generally are tied to volumes of stormwater captured. There are approximately 50,000 parcels within the eligible project areas. Through 2021, the program had supported 2,189 projects and captured 26.5 million gallons of runoff per year, with an average per parcel capture of 13,450 gallons/year. Seattle and King County share a goal to manage 700 million gallons/year by 2025 through green infrastructure; as of the end of 2021, they are managing 465 million gallons through a range of projects, including RainWise.

Potential relevance for Los Angeles pilot:

From an administrative perspective, RainWise leverages the private sector to provide outreach, design, materials and installation of landscape conversion and rainwater capture projects for homes and businesses. The City and County's roles are focused on rebate processing, credentialing contractors, public outreach, and compliance oversight.

The program also allows property owners to choose from a range of rainwater capture practices, including landscape conversion and cisterns.

SPU also classifies the rebate program as "regulatory assets," allowing it to use bond financing to support the program.

Additional information and resources

RainWise program website

WaterNow Alliance blog article about RainWise

City of Tucson / Tucson Water Rainwater Harvesting Rebate

Summary

Tucson Water offers a rebate to offset the cost of either passive (rain gardens) or active (cisterns) rainwater capture practices for homes in the Water Department's service area.

Incentive goals / drivers

Water conservation, particularly in response to deepening insecurity about the security of the city's imported supplies from the Colorado River.

Program funding level

Approximately $415,000 (2021), approx. $3.58M since 2012.

Incentive amount available to recipients

Residential customers are eligible for a rebate of up to $2,000 for two categories of capture. Passive (e.g., landscape modifications) : 50% of cost up to $500. Active (e.g., rainwater capture tanks): $0.25/gal for 50-799 gallon tanks, $1/gal for larger tanks. Passive and active rebates can be combined up to a maximum of $2,000.

The City also provides grants and loans to low/reduced income households: up to $1,000 for qualifying households (equal/less than 100% federal poverty level), $750 for 200% federal poverty level.

How it works

Interested homeowners download an application, attend a free rainwater/water conservation training, and submit an application via the mail with receipts to Tucson Water. Trainings are offered by local NGO partners, University of Arizona, and others. After working with a contractor to install a cistern or raingarden (or undertaking a DIY installation), homeowners submit a reimbursement request to the City.

Tucson Water partners with Sonoran Environmental Research Institute (SERI) to implement the Low Income Rainwater Harvesting rebate and grant program. SERI is trusted organization, particularly within Tucson's Spanish speaking population, and has had success promoting the city's indoor water conservation programs. SERI connects income qualified residents to the Limited Income Rainwater Harvesting Loan and Grant program.

Uptake/participation/metrics for success:

Within city limits, participation averages around 10% of residential customers. Lower (below 5%) for customers in service areas outside of city limits.

Projects installed with the support of the rebate have saved approximately 7 AF /year (2021) and a total of 315 AF since 2012.

Potential relevance for Los Angeles pilot

The Tucson program effectively engages resource providers within the city to provide trainings and installation support for residential rainwater capture. SERI and local contractors are responsible for ordering supplies and undertaking installations; the University of Arizona, Watershed Management Group and others provide the free trainings required for participation in the rebate program.

SERI has been a key partner, enabling the Water Department to overcome lack of trust issues within the Spanish speaking and lower income communities. By providing access to grants, loans, and installation services, SERI expands access to the program to economically disadvantaged and Spanish-speaking households. Because of the trust SERI has established in this community, it is able to bridge decades of mistrust many residents have toward the City of Tucson.

Additional information and resources

City of Tucson program website

SERI program website

Moulton Niguel Water District Turf Removal Incentives

Summary

MNWD provides a range of outdoor irrigation rebates and assistance programs, including "NatureScape" Native Garden Design Program (a landscape conversion assistance program), Residential Turf Removal rebate (through the Municipal Water District of Orange County) and a Commercial Turf Removal rebate (also through MWDOC)

Incentive goals / drivers

Reduce reliance on imported water (provided by MWD), the District's sole source of water.

Program funding level

These programs fall within MNWD's efficiency program budget of $2.5 million annually, or approximately 2% of its overall budget (as of 2019).

Incentive amount available to recipients

NatureScape Native Garden Design Program: NatureScape is a Turf-to-Native Garden Program that helps customers replace turf with a native, low water-use landscape. NatureScape participants receive a free pre-qualification landscape and irrigation assessment and 50% off design fees. Participants are then eligible for the turf removal incentive (described below.)

Residential Turf Removal: MNWD routes participation in the turf removal rebate through MWDOC's rebate program, and adds $1 to the amount provided by MWDOC for a total of up to $4/sq ft (with 3,000 sq ft cap)

Commercial Turf Removal: Also administered via the MWDOC program, which provides $3/sq foot up to a 10,000 sq. foot maximum. The District also runs H2O Pro, a free irrigation assessment and water management program for community associations and commercial landscapes. This program will assess water usage, analyze landscape irrigation needs, and identify landscape and irrigation improvements to reduce water use.

How it works

NatureScape: MNWD hosts NatureScape workshops to provide homeowners with guidance about designing, installing and caring for a native garden. Homeowners interested in participating in the program register through an MNWD website; the District will arrange for a contractor to visit the property and provide an eligibility assessment and a design consultation which will discuss potential landscape layouts, a native plant palette, and estimated project costs.

Residential and Commercial Turf Removal: MNWD's website links to the MWDOC "Droplet Portal" where interested individuals can register for either the commercial or residential rebate programs. Business or homeowners may work with a landscape contractor they select or undertake turf removal on their own. After applying to participate, MWDOC arranges for a site inspection, which will then lead to a Notice to Proceed. After completing installation, the participant submits a notification of completion via the Droplet

Portal. MWDOC arranges for a post-completion inspection and provides payment of incurred costs (up to maximum amount) within 10-12 weeks.

Uptake/participation/metrics for success:

As of 2019, MNWD's turf replacement program had removed over 5 million square feet of turf, saving approximately 1500 AF.

Potential relevance for Los Angeles pilot:

One of the strengths of MNWD's program is the effort it makes to bundle incentives with technical assistance, and to ease participation in the NatureScape and rebate programs through a single web platform.

Another element in MNWD's success has been its creative and comprehensive consumer outreach and education strategies. The District recognizes that achieving efficient use of water often requires a change in consumer interaction with and mindset about water. Key to achieving this change is MNWD's shrewd ability to develop messaging that resonates locally. This commitment is a contrast to MWD's more passive approach to messaging about water conservation and turf conversion.

MNWD's success is also predicated on its commitment to partnering with a range of regional agencies and nonprofits, and a focused approach to changing consumer behavior. For example, MNWD partners with the California Native Plant Society to help resource the NatureScape program. A partnership between MNWD, the Native Plant Society and WaterNow Alliance provides the education and tools necessary for nurseries to adapt their business models to accommodate the seasonality of native plant stock.

Additional information and resources

Moulton Niguel's Landscape Transformation Center website and Rebate Programs website

WaterNow Alliance's Tap Into Resilience MNWD Case Study

Appendix F: Modeling Assumptions and Methodology

Craftwater Engineering conducted a parcel-scale modeling effort for targeted regions within the MWD service area to examine the potential for distributed stormwater capture infrastructure on privately owned and institutional parcels. This modeling served as a baseline and guiderail for the recommendations put forth in the Roadmap. An overview of this modeling effort can be found in Section 2.3 of the Roadmap report. This Appendix documents the assumptions made in that modeling effort for individual practices and describes how this data was used to inform the benefits analysis described in Appendix B.

Craftwater utilized Loading Simulation Program in C++ (LSPC) model from Reasonable Assurance Analyses (RAAs) for baseline hydrology and water quality time series data. Modeling was conducted over a long-term timeseries, from water year 2010 to 2019. BMPs were sized to the 85th percentile storm volume, as this tends to be the upper limit of cost-effective capture at the site scale. Modeling for each practice maximized possible stormwater capture from the runoff associated with onsite impervious area (e.g. rooftops, driveways, etc.), and practices were capped at the maximum potential onsite stormwater capture. For example, landscape transformation was modeled to capture the maximum potential runoff from all impervious area for a single-family home, but it was not designed to manage additional runoff from the neighboring homes or streets.

The Simplified Landscape Irrigation Demand Estimation (SLIDE) Rule modeling used California Irrigation Management Information System (CIMIS) monthly evapotranspiration (ET) data to calculate irrigation demand. The SUSTAIN best management practice (BMP) model was customized to regional specifications for BMP capture and dynamics.

Data sources utilized in this modeling effort include:

- Land cover derived from previous analysis of Los Angeles Region Imagery Acquisition Consortium (LARIAC) data (2015)
- United States Forest Service (USFS) Existing Vegetation (2016)
- Gateway Area Pathfinding (GAP) Study & preSIP Study
- LA County Parcel and storm drain data
- Soil Survey Geographic Database (SSURGO) soil data

The following pages document key information, methods, and assumptions for each of the BMPs included in Craftwater's modeling effort.

LANDSCAPE TRANSFORMATION

ASSUMPTIONS, METHODOLOGY & DATA SOURCES

Project Type Description

Landscape transformation is a more robust approach to typical Turf Replacement projects that focuses on replacing turf with plant and organic material that prioritize soil health in order to maximize water capture and other co-benefits. Landscape transformation involves removing irrigated turf, grading the landscape with several shallow depressions (creating several mini-rain gardens across the converted area), and planting a dense, diverse palette of native vegetation to promote healthy soil structure. When it rains, the water spreads across the landscape and is momentarily detained in the graded contours before infiltrating and being stored in the root zone of the plants.

Land Uses

- Single-Family Residential
- Multifamily Residential
- Commercial/Institutional

Geographies

- Las Virgenes Municipal Water District
- Long Beach
- Lower San Gabriel River

Opportunity Identification Methodology

Land cover data from LARIAC were used to identify all Grass and Tall Shrub areas as candidates for landscape transformation. Any existing Native Vegetation areas from the USDA Existing Vegetation data layer that coincided with these identified areas were removed so as not to propose landscape transformation of areas already in native planting. No parcel line or building setbacks were delineated because landscape transformation is designed to retain all runoff without the need to provide any buffer.

Contributing Runoff

Assumed 1 square foot (sq.ft.) rain garden for every 15 sq.ft. of impervious parcel area per sizing recommendations from G3 Landscaping.

Sizing and Cost Calculation

- Full conversion of suitable area defined above
- 6" deep storage, 1.5' soil layer storage with 40 percent void space on up to 80 percent of converted area per design
- 0.57 in/hr infiltration rate, assuming soils start at 0.3 in/hr (minimum rate allowed by LA County for infiltration), then infiltration rate doubles over first 5 years of root growth, averaged over 30 years

Costs Applied

Capital costs of $15.00 per sq. ft., reflective of actual contractor bids received (from MWD's list of recommended contractors) to complete landscape transformation projects in Southern California (per survey conducted by G3 Landscaping). Note that it is significantly higher than the existing rebate offered by MWD ($2.00/square foot). Costs include labor and materials; but does not include maintenance. We assumed property owners would take on maintenance responsibilities and/or hire a landscaping firm to provide maintenance services.

Potable Water Offset Assumptions

Landscape transformation reduces irrigation demand by removing turf. Landscape transformation promotes healthy soils due to infiltrated water being stored in the root zone of the plants, thus reducing their need for watering. The ability for plants to store water in their root zone was factored when calculating the total volume of potential stormwater capture derived from landscape transformation projects, contributing to stormwater capture estimates. Groundwater recharge benefits were not attributed to landscape transformation projects.

- SLIDE Rule irrigation demand: The SLIDE rule is a method for estimating irrigation demand of different vegetation types. Vegetation type was identified using the LARIAC land cover data. We did not assume a higher irrigation demand for plant establishment period.
- 0.55 Irrigation Efficiency applied (from ACWA): The irrigation efficiency value represents the ratio of water actually used by the plants being watered compared to the amount of water being output from an irrigation device. Some irrigation nozzles/sprayers are more efficient than others and we took a conservative approach.
- Irrigation demands calculated using the SLIDE rule are divided by the Irrigation Efficiency coefficient for more realistic irrigation demand estimates that account for actual water used to irrigate. Following this formula, the average irrigation demand for areas converted by landscape transformation is 22.77 gallons per square foot per year.

Stormwater Capture Assumptions

Continuous modeling was carried out using the L.A. County Department of Public Works' LSPC model. Modeling directed runoff to the shallow depressions associated with the landscape transformation to estimate runoff captured from parcel impervious areas.

Landscape transformation was modeled to capture maximum runoff from all onsite impervious area for the 85th percentile storm but capped at the maximum potential runoff generated onsite.

LANDSCAPE TRANSFORMATION EXAMPLE

ABOVE-GROUND CISTERNS

ASSUMPTIONS, METHODOLOGY & DATA SOURCES

Project Type Description: Above-ground cisterns provide storage for runoff collection from building rooftops that can subsequently be utilized manually or in conjunction with irrigation systems to provide water for local use.

Land Uses

- Single-Family Residential
- Multifamily Residential
- Commercial/Institutional

Geographies

- Las Virgenes Municipal Water District
- Long Beach
- Lower San Gabriel River

Opportunity Identification Methodology

Previous analysis has shown that using LIDAR can be problematic for cistern opportunity identification because it screens out things like trees which you can actually locate a cistern below. Because cisterns in the analysis were sized to capture the 85th percentile storm from rooftops, recommended sizes tend to have a relatively small footprint compared to the rooftop and total parcel area. Additionally, above-ground cisterns are available in a variety of shapes and heights. Since there are so many unknowns associated with site-specific configuration, we assumed space would always be available at a ratio of approximately 45-60 gallons/100 sq. ft. of roof area. We applied this "liberal" assumption so that we could understand the maximum potential benefits of cisterns.

Contributing Runoff

Runoff contributing to above-ground cisterns was assumed to be all rooftop areas on the parcel to maximize potential capture and reuse on-site. Multiple cisterns or rain gutters may be necessary if not existing on a site-specific basis to accommodate this. The modeling assumed one "lumped" cistern representative of the total potential storage, which would likely be divided between multiple cisterns on most sites.

Sizing and Cost Calculation

- The volume of the above-ground cisterns was set to fully capture runoff from the 85th percentile storm falling on rooftop areas as a cost-effective sizing estimate that will capture runoff from most storm events and a portion of the largest events that occur.
- Rainfall depths (0.75 in. Long Beach; 0.90 in. LSGR; 0.95 in. Las Virgenes) were identified from Los Angeles County isohyetal maps for the 85th percentile rainfall event depths.

Costs Applied

- $1.86/gallon storage (low end; corrected to 2022 USD from 2013 @ $1.50) Additional costs are incurred for filtration, pumps, distribution systems, distribution plumbing and drainage connections, installation, and other components which can add an additional $2-5/gallon not included in this analysis. (USEPA Rainwater Harvesting Manual, 2013).
- $78/year operations and maintenance (O&M) (CLASIC, 2022) includes 3x annual inlet screen cleaning, 1x annual tank interior cleanout, and small pump maintenance every 5 years. Note that this modeling effort includes O&M cost calculations, while the MWD Planning Tool does not include operations or maintenance expenses.
- Does not include costs for treating to Title 22 standards (only necessary if using spray irrigation).

Potable Water Offset Assumptions

Potable water offset benefits for above-ground cisterns were assumed to derive from the use of captured water for irrigation. To estimate irrigation demand offsets in line with the temporal patterns of rainfall in L.A., conservative estimates for the irrigation demand that could be met with captured rainfall were used. Monthly correction factors were applied to account for general differences in irrigation demand depths and rainfall depths to ensure demand offsets were not counted in months when runoff supply is likely lower than needed to fill needs.

Water Supply estimates were developed with continuous modeling of runoff directed to the above-ground cistern. Captured runoff was assumed to be utilized over a 7-day period following rainfall of greater than 0.1 in. (typical regional designation for wet-weather events). Average annual capture numbers were then downscaled based on the monthly differential between irrigation demand and rainfall records for final water supply volume estimates (in other words, water supply benefit is tied to the irrigation demand of the landscape).

Stormwater Capture Assumptions

Water quality benefits for cisterns are derived from capturing stormwater runoff and sequestering it on-site, thus removing it from contributing to downstream aggregation of pollutants in storm drains and receiving waters.

Above-ground cisterns were sized to manage maximum potential runoff from the 85th percentile storm for each properties entire roof area.

ABOVE-GROUND CISTERN EXAMPLE

BELOW-GROUND CISTERNS

ASSUMPTIONS, METHODOLOGY & DATA SOURCES

Project Type Description: Below-ground cisterns provide subsurface storage for runoff collection from building rooftops as well as surrounding impervious surfaces. Runoff captured by these systems can subsequently be utilized via pumps or in conjunction with irrigation systems to provide water for local use.

Land Uses

- Commercial
- Institutional

Geographies

- Las Virgenes Municipal Water District
- Long Beach
- Lower San Gabriel River

Opportunity Identification Methodology

Because below-ground cisterns are sited subsurface, they can be installed anywhere that surface disturbance for construction is okay and underground utilities can be avoided. At the scale of the analysis, it was assumed that adequate siting would be available on parcels since these cisterns would be most likely sized with a footprint less than 5 percent of the areas they are designed to treat.

Contributing Runoff

Below-ground cisterns were assumed to be able to capture runoff from all parcel impervious areas to maximize on-site runoff capture and reuse; offsite capture was not assumed because of the added costs and permitting of installing stormwater diversions from public infrastructure to private parcels, and because the complexities of how projects operate in series at the watershed scale would confound the study's programmatic analysis.

Sizing and Cost Calculation

- The volume of the below-ground cisterns was set to fully capture runoff from the 85th percentile storm falling on contributing parcel areas as a cost-effective sizing estimate that will capture runoff from most storm events and a portion of the largest events that occur.
- Rainfall depths (0.75 in. Long Beach; 0.90 in. LSGR; 0.95 in. Las Virgenes) were identified from Los Angeles County isohyetal maps for the 85th percentile rainfall event depths.

Costs Applied

- $9.90/gallon storage (low end; corrected to 2022 from 2013 @ $8.00) (USEPA Rainwater Harvesting Manual, 2013) Additional costs are incurred for filtration, pumps, distribution systems, distribution plumbing and drainage connections, installation, and other components which can add an additional $2-5/gallon not included in this analysis. (USEPA Rainwater Harvesting Manual, 2013).
- $1,435/year O&M (corrected to 2022 from 2009 @ $1068) (USEPA Rainwater Harvesting Manual, 2013) includes 2x annual inspecting & reporting, 2x annual inlet screen cleaning, tank interior flush and cleanout every 3 years, and pump replacement every 5 years. Note that this modeling effort includes O&M cost calculations, while the MWD Planning Tool does not include operations or maintenance expenses.
- Does not include costs for treating water to Title 22 standards (only necessary if using spray irrigation)

Potable Water Offset Benefits Derived

Potable water offsets for below-ground cisterns were assumed to derive from the use of captured water to offset on-site irrigation demands. The estimates are based on continuous modeling of runoff directed to the below-ground cistern. To account for the differential between seasonal irrigation demand and rainfall/runoff patterns, runoff capture estimates were downscaled based on monthly differentials between irrigation demand and rainfall on record. Captured runoff was assumed to be utilized over a 7-day period following rainfall of greater than 0.1 in. (typical regional designation for wet-weather events).

Stormwater Capture Assumptions

Stormwater capture benefits for cisterns are derived from capturing stormwater runoff from impervious surfaces on each property and sequestering it on-site, thus removing stormwater from contributing to downstream aggregation of pollutants in storm drains and receiving waters.

Below-ground cisterns were modeled to capture maximum runoff from all onsite impervious areas for the 85th percentile storm, but capped at the maximum potential runoff generated onsite.

BELOW-GROUND CISTERN EXAMPLE

RED-FLAG HYDRATION STORAGE CISTERNS

ASSUMPTIONS, METHODOLOGY & DATA SOURCES

Project Type Description

Red-flag hydration storage Cisterns provide additional "static" storage for above-ground cisterns already sized to capture runoff from the parcel. This stored water is not available for irrigation use or otherwise, but rather maintained on-hand for site vegetation hydration for the purpose of fire risk reduction prior to Red Flag conditions. The assumptions below apply to the "static" storage, while above-ground cistern assumptions apply to additional storage that can be used for other purposes.

Land Uses

- Single-Family Residential
- Multifamily Residential
- Commercial
- Institutional

Geographies

- Las Virgenes Municipal Water District

Opportunity Identification Methodology

Previous analysis has shown that using aerial imagery analysis can be problematic for cistern opportunity identification because it screens out things like trees, which you can actually locate a cistern below. Additionally, above-ground cisterns are available in a variety of shapes and heights. Since there are so many unknowns associated with site-specific configuration, we assumed space would always be available at a ratio of approximately 45-60 gallons/100 sq.ft. of roof area. The additional cistern space here would be in addition to the cistern volume intended for irrigation uses and would be accommodated either by additional cistern height or slightly larger footprint, depending on the overall volume and site configuration.

Contributing Runoff

Runoff for the red-flag hydration storage cistern would be the same source as above-ground cisterns detailed above, however cisterns in this scenario are larger and therefore can hold more runoff than the above-ground cisterns. It was assumed that runoff for these purposes is captured initially upon installation and held for use during Red Flag conditions, with replenishment occurring in the event of use as needed.

Sizing and Cost Calculation

To size these cisterns, vegetation was measured between 5' and 30' from the building footprint according to currently defined Red Flag hydration requirements to diminish the risk of ember ignition surrounding buildings. Storage volumes were set equivalent to 1-week of irrigation demand (as defined by the SLIDE rule) to adequately hydrate this vegetation. We assumed the water would be used over the course of one week to keep the vegetation hydrated, not used all at once. Note that the modeling did not actually simulate discharge because it does not factor into the benefits calculations.

Costs Applied

Costs applied for these cistern volumes are the same as above-ground cistern costs commensurate to the additional storage volume required.

Potable Water Offset Assumptions

No potable offset is associated with red-flag hydration storage.

Stormwater Capture Assumptions

Stormwater capture for cisterns is derived from capturing stormwater runoff and storing it on-site, thus removing it from contributing to downstream aggregation of pollutants in storm drains and receiving waters.

Red-flag hydration cisterns were modeled to capture a maximum of 1-week of irrigation demand (as defined by the SLIDE Rule). Cisterns are assumed to always be kept full so water is available during an emergency. After initial fill, no additional runoff is captured until the tank is emptied for a red-flag fire safety event.

RED-FLAG HYDRATION STORAGE CISTERN EXAMPLE

INFILTRATIVE BIORETENTION

ASSUMPTIONS, METHODOLOGY & DATA SOURCES

Project Type Description

Infiltrative bioretention installations capture stormwater runoff in engineered, vegetated areas designed to accommodate runoff and infiltrate water through soil media into native soils and aquifers below.

Land Uses

- Single-Family Residential
- Multifamily Residential
- Commercial/Institutional

Geographies

- Las Virgenes Municipal Water District
- Long Beach
- Lower San Gabriel River

Opportunity Identification Methodology

Bioretention opportunities on residential parcels were identified using LARIAC land cover data to identify Bare Soil, Grass, or Tall Shrub Areas that could be converted without removing any functional impervious areas. Setbacks of 10 feet from property lines and 15 feet from building footprints were used to limit the potential areas in accordance with local guidance to avoid local drainage conflicts.

Similar considerations were applied for Commercial and Institutional parcels, but an additional allowance was provided for these parcel types to account for the potential conversion of some existing impervious areas to Biofiltration areas due to the high prevalence of parking areas that could be partially repurposed to accommodate these installations. This additional accommodation was restricted to no more than 10 percent of the parcel's non-rooftop impervious area.

Contributing Runoff

All parcel impervious areas were considered to contribute runoff to bioretention installations to maximize on-site capture.

Sizing and Cost Calculation

A standard design for bioretention installations was used based on L.A. County Design Guidance. This configuration features an engineered "cell" with 1' of ponding depth and 4' of engineered soil media/gravel with 0.4 porosity for an effective storage depth of 2.6'. This storage depth was used in conjunction with bioretention footprint area to provide adequate storage volume to capture runoff up to the 85th percentile of runoff given available space. An infiltration rate of 0.57 in/hr was used as an average soil condition for these types of installations, assuming soils start at 0.3 in/hr. (minimum rate allowed by County for infiltration), then infiltration rate doubles over first 5 years of root growth, averaged over 30 years.

Costs Applied

Capital Costs (residential from EPA, others from City of San Diego)

- Residential: average of typical ($1.91*footprint + $4,496.43) and complex ($5.64*sq.ft. + $12,228.93) costs; typical installations are more simple vegetated depressional storage, while complex represent more highly engineered installations
- Institutional and private commercial: ($33.5 *sq.ft.)
- Public commercial: ($33.50*1.4*sq.ft.)

Maintenance (ASCE EWRI Survey of BMP O&M Costs)

- Residential: capital costs * 0.01 * years
- Institutional and private commercial: capital costs * 0.015 * years
- Public commercial: footprint (sq. ft.) * 0.98 * years

Note that this modeling effort includes maintenance cost calculations, while the MWD Planning Tool does not include operations or maintenance expenses.

Potable Water Offset Assumptions

Potable water offset benefits for bioretention derive from captured runoff infiltrating and contributing to recoverable water supplies in underlying groundwater aquifers. Water Supply estimates were developed with continuous modeling of runoff directed to the bioretention installations. Given the limited access to usable aquifers in the study area, these benefits were only counted for bioretention projects located in the forebay area of Los Angeles.

Stormwater Capture Benefit Assumptions

Infiltrative bioretention removes pollutants from captured stormwater, generating water quality benefits.
Continuous modeling results from the L.A. County Department of Public Works' LSPC model were used for runoff capture estimates and are paired with pollutant timeseries.

Bioretention was modeled to capture maximum runoff from all onsite impervious area for the 85th percentile storm but capped at the maximum potential runoff generated onsite.

INFILTRATIVE BIORETENTION EXAMPLE
All photos credited to Brad Wardynski, Craftwater Engineering

Appendix G: Comparison of Current Turf Replacement and Suggested Landscape Transformation Program Standards

Prepared by Pamela Berstler, G3 (Green Gardens Group)

Current Program	Proposed Program	Rationale
Maximize water utilization and conservation	Maximize water utilization and conservation, energy conservation, and water quality improvement	Focusing solely on water conservation risks incentivizing landscapes that produce unintended consequences, like increased temperatures and reduced water quality. These degradations ultimately increase the need for irrigation in landscapes. Changes to landscapes need to take a holistic approach in order to achieve the best long term water utilization and conservation results. Examples of holistic changes include (1) maximizing groundcover and tree canopy for shade, cooling of soil, and sequestering of carbon, (2) building healthy living soil by adding organic matter and disturbing the site as little as possible to create the conditions for a "soil sponge" that maximizes infiltration rates while reducing the evaporation in dry times, (3) contouring the landscape to capture rainwater on site and directing rainwater from roofs into the contours to hydrate and cool the soil, provide a long-term water source to plant material (offsetting irrigation requirements), and improve water quality.
Incorporate watershed components to capture runoff	Incorporates watershed components to keep rainwater on site	Keeping rainwater on site in the landscape is not prioritized with the current standards - it is suggested and the methods of retaining that rainwater are not optimal. Keeping rainwater on site in the soil is one of the three key elements of building healthy living soils.
Synthetic turf not eligible	Synthetic turf and rock mulch are not eligible	For landscapes to receive incentive money they need to reduce heat island and create healthy living soil. Rock mulch and decomposed granite, etc. do not build healthy living soils and keep temperatures 15-60 degrees higher than ambient temps.

Current Program	Proposed Program	Rationale
Two step rebate application process	Two step rebate application process	No changes to the fundamental rebate process are recommended. However, this approach suggests adding bundles of incentives and making them easy to select. For example, the following offerings could all come with the selection of the landscape transformation rebate: • Landscape transformation $/sf • downspout redirect kit • flume + smart irrigation controller • drip irrigation kits • coupon for compost/mulch delivery • coupon for gutters installed
No performative water savings requirements	Project designed to a Water Budget as contemplated by MWELO: Landscape Sq. Ft. x 0.55 x EtO x 0.62	Requiring projects to adhere to a water budget. Edible landscapes could be given an exemption as is done in MWELO. However, there is no reason that edible gardens cannot comply with this target if using hand watering and drip irrigation.
No ongoing maintenance requirements or incentives for maintenance	Investment in workforce development for landscape maintenance (not just irrigation and plants, but stormwater and soil too) and a pledge from property owners to maintain the water budget requirements. Assume that homeowners would either hire landscapers or perform self-maintenance. Commercial and institutional customers will most likely hire commercial landscaping crews for maintenance.	Ongoing maintenance is one of the key factors attributing to actual water savings meeting the estimated water budgets. Current maintenance programs need to be upgraded to include soil and raingarden management in addition to plant and irrigation management. Property owners assume responsibility for continued investment in their landscapes by signing a maintenance agreement.
3 plants per 100 sq. ft. of area transformed	Living plant canopy at maturity = 80% of area transformed	Plant density directly contributes to building the healthy living soil microbiome that ultimately increases drought-tolerance. A living soil sponge needs more plants and a higher diversity of type, leaf structure, etc.
Include a storm water feature	Include a Passive stormwater feature = 150 sq. ft. surface area 6" deep per 1,000 sq. ft. of adjacent building roof area (designed to capture 85th percentile rain event.)	Providing more specific guidance for the required stormwater feature will ensure these are sized to capture meaningful volumes of stormwater. At a minimum, the passive stormwater feature should be 150 sq. ft./1000 sq. ft. (or 75 cu. ft./1000 sq. ft.) of adjacent building roof area. This calculation already includes the formula for runoff coefficient and 1" of rain rounded to an easily manipulated number. This is a minimum area required, but the goal of customer education should be to make this as big as possible.

Current Program	Proposed Program	Rationale
No hardscape within transformed area except permeable hardscape including decomposed granite	No impervious hardscape within transformed area. Permeable hardscape limited to maximum 20% of landscaped area, and decomposed granite is not permitted.	MWD and member agencies should not subsidize the creation of new impervious surfaces that have adverse effects on stormwater volumes and water quality.
3-inch ring of mulch around plants	A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turfgrass turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated. To provide habitat for beneficial insects and other wildlife, up to 5 % of the landscape area may be left without mulch.	Organic matter is necessary for building the soil sponge, cooling the roots of the plants, holding in water from planting, absorbing rainwater during winter, providing habitat for insects, and cooling the earth's surface. 100% of the landscape needs to be covered in permeable material, 80% of the landscape needs to be living plants at maturity, and in the interim covered by living mulch.
Mulch defined as sand, straw, decomposed granite, rocks, and wood chips	Mulch defined as any organic material such as leaves, bark, straw, compost or combinations specifically excluding rocks and decomposed granite or sand	Mulch has to be able to be broken down relatively quickly by the soil microbes to build the soil sponge.
Replacement or modification of inefficient overhead spray sprinklers (specifics left to Member agencies to define)	Replacement, modification, or removal of inefficient overhead spray sprinklers with incentives given for removal	If consumers are following all of the planting, rainwater capture, and mulch guidance, then removing or upgrading irrigation is a valuable next step that should be incentivized.
No irrigation system monitoring	Irrigation program provided to all completed projects	A professional provides an irrigation program and programs the irrigation timer (if irrigation is used). Again, this is the only way to know whether or not the target is being achieved.
Smart irrigation controllers (Member agency specific rebate)	Smart irrigation controller provided to all completed projects	A smart controller that can be managed remotely could be part of the incentive package, along with the flume, to monitor the performance of the landscapes(see above).

Appendix H: Using the MWD "Planning Tool"

We developed an Excel-based tool that monetizes the array of benefits associated with landscape transformation, cisterns, and bioretention (with tree planting) based upon the parcel-level modeling discussed above. The tool incorporates well-established economic methods modeling assumptions to derive per unit benefit values (e.g., benefits per AF of conserved water, per tree, per square foot of landscape transformation). Aptly named the MWD Planning Tool, this section details how to use this tool to better understand how investments in proposed incentive strategies can benefit MWD and the larger community it serves. The Tool also has the potential to be used to support project evaluation against some the CAMP 4 Water Evaluation Criteria, as those evolve in the coming year.

The MWD Planning Tool is an Excel-based tool with several tabs. Calculations in this Planning Tool are based on local modeling described in Section 2.3 (and Appendix F) and benefit valuations described in this section (and Appendix B). The Tool has been provided to MWD staff in emails as a downloadable file.

- **Planning Tool**: This tab allows for customization of MWD inputs such as the amount of conservation investment and distribution of this funding across the various BMP combinations (e.g., landscape transformation and cisterns for single family homes vs. landscape transformation and bioretention on commercial properties). It also shows benefits attributable to each program and broken down by benefit category proportionally. This is the only tab where inputs are required (for ease, all input categories are highlighted in green). Changing cells that are not highlighted in green will result in flawed benefit values. All other tabs are protected to prevent changes.

- **Benefits by Program**: This tab calculates the benefits accrued by the practices for each program recommendation. The values will change based on total amount and proportion funded for each program, users can input values on the Planning Tool tab.

- **Benefit Values**: For each practice, in addition to water supply and water quality benefits, we calculated the community benefits, relying heavily on the Water Research Foundation (WRF) Green Stormwater Infrastructure (GSI) Triple Bottom Line (TBL) Tool (GSI TBL Tool). We estimated seven benefits including Community Uplift, Habitat and Biodiversity, Air Quality Improvements, Carbon Reduction, Green Jobs, Energy Savings, and Reduced Heat Stress. This tab shows the intermediate inputs to each calculation and summarizes the per-unit benefit for each practice. These benefits are shown in both annual values and 30-year present value. The per-unit values described on this tab do not change based on inputs.

- **Assumptions & Inputs**: Here we have included our assumptions drawn from modeling and outside research that contribute to the underlying values presented in other tabs.

- **MWD.Calc**: This tab was provided by MWD to demonstrate how funding decisions are made for conservation programs internally. It is included here to allow for comparison to other results or explore financing options. Note that the Yield (AFY) is linked to the output on the Planning Tool Tab, so values will change on this tab dependent on inputs.

Basic assumptions are required to be able to build a planning tool that estimates benefits into the future. Based on discussions with MWD, as well as national infrastructure estimates and Federal standards, we

assume a 3% discount rate and a design life of 30 years for all practices. All dollar values have been updated to 2022 USD. Annual tree benefits reflect the benefit value for trees at full growth, while present value benefits associated with trees are scaled over time to reflect the change in benefits as a tree matures.

The Planning Tool tab allows for customization in three different areas, highlighted in green (as shown in Figure H-1):

1. **MWD Funds** allows MWD to input how much they want to allocate to a conservation and stormwater capture program.

2. **Contribution** allows MWD to determine what share of total program costs they want to invest in relation to what might be invested by stormwater agencies and others. Note that all Contribution values must add to 100%.

   The total program amount is a function of MWD Funds and the percentage of total contribution MWD assumes. For example, if MWD funds $5 million and contributes 40% of the total cost, the total program will cost $12.5 million. Alternatively, if MWD wanted to fund $3 million and decided to only fund 30% of the program, the total program cost would be $10 million.

3. **Program Proportion of Costs** allows MWD to input what percentage of the overall investment should go to various programs and practices. The program outputs and annual benefits will change depending on how total funding is allocated across programs. This provides some customization to target specific benefit categories. For example, devoting a larger proportion of investment to single family residential landscape transformation may increase potable offsets, while investing in commercial and institutional practices with bioretention and trees will drive up stormwater capture benefits.

   The percentages input to the Program Proportion of Cost for the program components must add to 90% of total funding in order to allow 10% of funding to pay for administrative costs. If administrative costs can be lower, the relative amounts spent on BMPs can be increased.

   The Program Components table also includes a line for Operations and Maintenance (O&M) as a percentage of capital costs. Since O&M costs were assumed to be borne by the recipient customer and not included in the cost calculations, this row has been left blank. Should there be a desire to add O&M costs for a one-to-three-year establishment period, they could be added here. To assist MWD in exploring the effects of financing the incentive program, we also include MWD's own calculation model in the "MWD.Calc" tab in our planning tool.

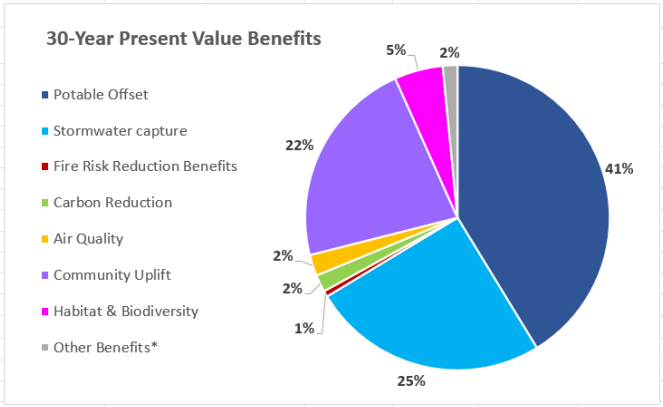
Annual benefits are calculated based on the total funding amount and the distribution of funding across program components. The monetized values of these benefits are summarized in Table 2-2 above; the methodology and assumptions used to estimate these benefits are detailed in Appendix B. The benefit values are displayed in the top right of the Planning Tool tab.

MWD Water Conservation Investments Planning Tool

MWD Inputs

Design life	30
Discount rate	3%
MWD Funds	$50,000,000
Total	**$125,000,000**

Agencies	Contribution	Amount
MWD	40%	$50,000,000
Stormwater agencies	30%	$37,500,000
Retail Water agencies	20%	$25,000,000
Customers	10%	$12,500,000
Local Govt/grants/other	0%	$0
Totals	**100%**	**$ 125,000,000**



Benefit Category	Annual Value	Present Value
Potable Offset (AF)	999	29,975
Stormwater capture (AF)	517	15,507
Potable Offset	$ 2,997,484	$ 58,752,008
Stormwater capture	$ 1,822,710	$ 35,725,911
Fire Risk Reduction Benefits	$ 45,776	$ 897,237
Community Benefits:		
Carbon Reduction	$ 132,981	$ 2,600,647
Air Quality	$ 165,969	$ 3,188,460
Community Uplift	$ 1,615,222	$ 31,659,055
Habitat & Biodiversity	$ 376,382	$ 7,330,612
Other Benefits*	$ 2,148,338	$ 2,207,786
Green Jobs Created	645	645
Total Benefits	$ 9,304,861	$ 142,361,717

*Other benefits include energy savings, heat stress reduction, and value of green job creation

			Program Outputs				Annual Benefits							
Program components	**Program proportion of cost**	**Amount**	**Landscape Transformation (sq. ft.)**	**Cistern Volume (gal)**	**Bioretention (sq. ft.)**	**# of Trees**	**Potable Offset (AF)**	**Stormwater Captured (AF)**	**Potable Offset ($)**	**Stormwater capture ($)**	**Community Benefits ($)**	**Fire Benefits ($)**	**Total Cost per AF of Potable Water (30 year)**	**MWD Cost per AF of potable water (30 year)**
Single Family - Landscape Transformation	60%	$75,000,000	5,000,000				699.0	310.2	$ 2,097,110	$ 1,093,874	$ 3,064,913		$ 3,576	$ 1,431
Single Family - Landscape Transformation + Cistern	7%	$8,750,000	492,747	730,536			74.0	37.1	$ 222,075	$ 130,804	$ 302,842		$ 3,940	$ 1,576
Single Family - Landscape Transformation + Fire Safety Cistern	3%	$3,750,000	211,177	313,087			31.7	15.9	$ 95,175	$ 56,059	$ 175,566	$ 45,776	$ 3,940	$ 1,576
Commercial/Institutional - Landscape Transformation	10%	$12,500,000	833,333				116.5	51.7	$ 349,518	$ 182,312	$ 324,337		$ 3,576	$ 1,431
Commercial/Institutional - Landscape Transformation + Bioretention	10%	$12,500,000	556,968		123,746	167	77.9	102.0	$ 233,605	$ 359,661	$ 278,199		$ 5,351	$ 2,140
Subtotal		*$ 112,500,000*	*7,094,225*	*1,043,622*	*123,746*	*167*	*999.2*	*516.9*	*$ 2,997,484*	*$ 1,822,710*	*$ 4,145,857*	*$ 45,776*		
Capital Cost per AF													$ 3,814	$ 1,526
Administration	10%	$12,500,000											$ 381	$ 153
Total Capital Cost	**100%**	**$125,000,000**											**$ 4,195**	**$ 1,678**
Annual O&M (as a % of Capital Cost)	0%	$0											$ 4,195	$ 1,678

Figure H-1. "Planning Tool" tab in MWD Planning Tool. This is an illustrative scenario. All green cells are inputs and modifiable.

Note: Potable Offset value annualized and present value.

The annual benefits pie chart reflects the proportion of total value attributable to each benefit on an annual basis for an illustrative program selection. This pie chart will change with changes to MWD's inputs in green. This pie chart is intended to show at a glance the relative value of the benefits calculated and described in the Program Component section of the worksheet and the tabs. It is not intended to set the contribution amounts, but rather to provide information for the policy decision that must be made to share costs. The table to the right of the pie chart highlights annual benefits and the present value benefits of those benefits over the design life of 30 years. Note that benefits scale linearly, so the pie chart will remain constant based on the amount of spending. The pie chart will change if the proportion of cost for each program component change.

The value of the stormwater capture/water quality benefits calculated by the Tool can play an opening role in partnership discussions with stormwater agencies while the potable water offset benefits will have obvious value to MWD and its retail agency partners. Each of these groups may also want to share in various community benefits and invest accordingly. In addition, customers, local cities, utilities, grant-making agencies and others might have an interest in funding some portion of any of these benefits. The pie chart can serve as a good place to start those discussions.