EXECUTIVE SUMMARY

The City of Los Angeles Department of Water and Power (LADWP) is responsible for providing the City of Los Angeles (City) with a safe and reliable supply of water for residential, commercial, governmental, industrial, and institutional uses. Since the early 1900s, the City has supplied water from a variety of sources. Today, the City's water comes from the Owens Valley via the Los Angeles Aqueduct; purchased water from the Metropolitan Water District of Southern California (MWD) imported from Northern California via the California Aqueduct and the Colorado River via the Colorado River Aqueduct; and several local water sources including groundwater, recycled water, and conservation.

Future water supplies from distant sources are becoming more restricted and less reliable. Environmental commitments, periods of dry years, low snow pack, and judicial decisions have all contributed toward significant cuts in imported supplies. These threats and the need for action were recently highlighted in the Mayoral Directive Number 5 which calls for a 20% reduction in the City's fresh water use by 2017 and a 50% reduction in LADWP's purchase of imported potable water by 2024. To ensure a safe and reliable water supply for future generations of Angelenos, one of the City's key strategies is to increase the local water supply and decrease the need to purchase imported water. However, in large part due to urbanization, the majority of precipitation that falls onto the City flows into storm drains and out to the ocean. In light of these conditions, stormwater is an increasingly viable supply.

Capturing and using stormwater on-site can offset potable water demand. Capturing and

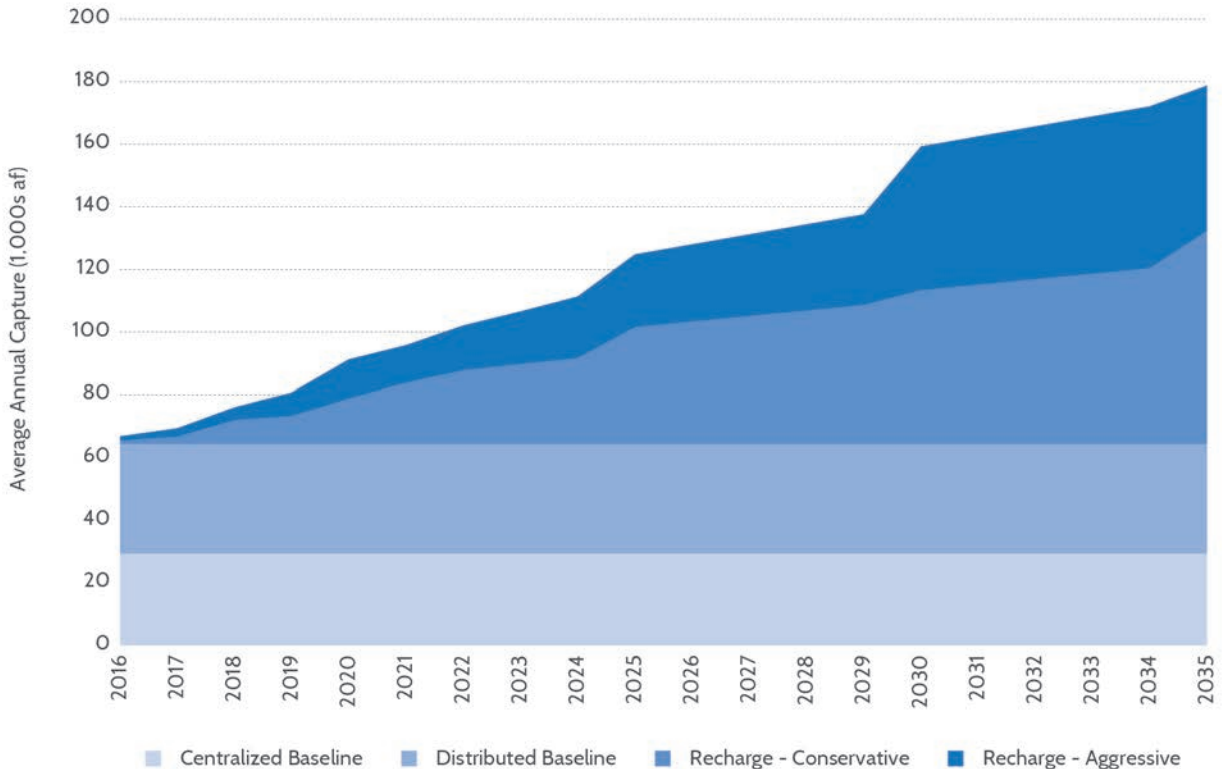

Figure ES-1. Baseline and Potential Stormwater Capture Within the City of Los Angeles

infiltrating stormwater into subsurface groundwater aquifers increases local groundwater reserves. Both infiltration and capture for direct use enhance the reliability of the City's water supply. Projects to capture and conserve stormwater runoff comprise an important component of the City's water supply portfolio. The City is a part of a complex multi-jurisdictional region. As such, implementing effective and comprehensive local stormwater capture projects involves a collaborative effort between several agencies including LADWP, the Los Angeles County Flood Control District (LACFCD), the Los Angeles Bureau of Sanitation (LASAN), the Los Angeles Bureau of Street Services (LABSS), the Los Angeles Bureau of Engineering (LABOE), and the US Army Corps of Engineers (USACE). Additionally, LADWP partners with many community-based organizations to leverage their relationships with the residents of the City. Working together on projects that have multi-benefits for multiple agencies allows for the opportunity to cost-share and reduces the financial burden.

Currently LADWP and its partners actively capture and recharge approximately 29,000 acre-feet per year of stormwater, along with another 35,000 acre-feet per year infiltrating into the potable aquifers through incidental recharge. This water source represents approximately 10% of the City's annual water demand. Through the work on LADWP's Stormwater Capture Master Plan (SCMP), it has been demonstrated that an additional 68,000 to 114,000 acre-feet per year could be realistically captured through a suite of projects, programs, and policies over the next 20 years (Figure ES-1). Potential projects and programs to capture additional stormwater are particularly important to consider, not only because of the increasing economic value of this water supply but also because stormwater projects address a host of other challenges faced by the City. Some of these challenges include reducing dependence on imported water, meeting federal water quality mandates, providing enhanced flood protection, reducing peak flows in the region's waterways, providing green space for habitat and recreation, and providing climate mitigation and adaptation opportunities. Through the process of developing the SCMP, LADWP and the SCMP Team, including Geosyntec Consultants and TreePeople[1], evaluated and characterized the role that increased centralized and distributed stormwater capture can play in the City's water supply portfolio, while also providing ancillary benefits to help meet some of these other important challenges faced by the City.

CONTEXT

LADWP's Water System's mission is to provide its customers with safe, reliable, high quality, and reasonably priced water service in a transparent and environmentally responsible manner. LADWP currently meets over 85 percent of annual water demand from sources hundreds of miles away through the Los Angeles Aqueducts and water purchased from MWD that originates in the watersheds of the Bay Delta and the Colorado River. Flows from the Bay Delta and the Los Angeles Aqueduct are currently at or near historic lows and all of these sources face significant challenges going into the future, including:

- Allocations and pumping restrictions threaten supplies from the Bay Delta and Colorado River;
- Owens Lake dust mitigation reduces supply from the Los Angeles Aqueduct;
- Climate change threatens to reduce supplies from all water sources due to changes in precipitation patterns and

1. TreePeople has been a core partner and pro bono adviser on the SCMP since its inception, helping to launch the Plan and working collaboratively with LADWP and Geosyntec to guide the process.

increased evapotranspiration caused by rising temperatures; and

- The energy needed to transport water from such distances is expected to become increasingly costly and the resulting carbon footprint of such energy use is a significant concern.

LADWP's long term goal is to be drought and climate resilient and it understands that in order to maintain reliability, actions must be taken before these threats are fully realized. Imported water threats, combined with anticipated regional population growth, demonstrate a clear need for the development of local water supplies to maintain water supply reliability.

LADWP has already begun to reduce imported water use through aggressive water conservation programs and is developing new local water resources by increasing recycled water usage, initiating clean-up of local groundwater resources, and working to increase stormwater capture. LADWP's 2010 Urban Water Management Plan (UWMP) outlines a general strategy for reducing reliance on MWD water by nearly 50% by 2035, by increasing these local supplies. Stormwater capture is a critical piece of this strategy.

THE MASTER PLANNING PROCESS

The SCMP is a document that outlines LADWP's strategies over the next 20 years to implement stormwater projects and programs, and to cooperate with others on projects in the City that will contribute to more reliable and sustainable local water supplies. The SCMP is a planning document. Projects and programs recommended in the SCMP require approval by the LADWP Board of Commissioners on a case–by–case basis. Similarly, the recommendations of the SCMP are part of a broad input to decision-makers regarding future courses of action.

The goals of the SCMP are to quantify stormwater capture potential and identify new projects, programs, and policies to significantly increase stormwater capture for water supply within the 20-year planning period. Projects and programs were prioritized based on water supply criteria, though other benefits of stormwater capture and partnership opportunities were considered as part of the development process. The SCMP also presents costs and benefits for proposed projects, programs, and policies, while defining timing and key milestones. The SCMP was developed in close coordination with the LACFCD/United States Bureau of Reclamation (USBR) Basin Study, and LASAN's Enhanced Watershed Management Plans (EWMPs) as both efforts are closely related, and offer important opportunities to leverage the resources of each agency.

PUBLIC OUTREACH

Public participation was an important part of the development of the SCMP to ensure that the plan has the support of key stakeholders and is integrated with other regional stormwater management efforts. Investing in public awareness and approval of the SCMP during its development facilitates its future implementation and broad acceptance as an essential part of ensuring a sustainable local water supply. As such, public outreach activities were ongoing throughout the SCMP development process, and included outreach with local and state elected officials, regulators, entities involved in research or implementation programs related to stormwater capture, the Technical Advisory Team (TAT)–composed of internal LADWP and City staff as well as representatives from other government agencies with planning-level interests that overlap with the SCMP planning process–key regional stakeholders (including

leaders of environmental, neighborhood, civic, and community organizations), and the general public. Table ES-1 summarizes public outreach events conducted over the course of the SCMP development. Figure ES-2 depicts the significant public participation enjoyed throughout the planning process.

Table ES-1. Public Outreach Events Conducted Throughout the SCMP Development Process

Public Outreach Event	Topic	Date(s)
TAT #1	Stormwater capture potential modeling approach	9.16.2013
Key Stakeholder Meeting #1 – All Key Stakeholders	Introduction to SCMP	10.21.2013
TAT #2	Stormwater capture potential	2.24.2014
General Public #1	Introduction to SCMP, potential for stormwater capture, and solicitation of project/program ideas	3.26.2014
Key Stakeholder Meeting #2 – GreenLA	Stormwater capture potential preliminary results and solicitation of project/program ideas	3.26.2014
Key Stakeholder Meeting #3 – Prop O Citizens Oversight and Advisory Committee (COAC)	Introduction to SCMP and preliminary modeling results	5.19.2014
Key Stakeholder Meeting #4 - UCLA	Coordination between SCMP and UCLA/Colorado School of Mines	7.22.2014
TAT #3/Key Stakeholder Meeting #5	Distributed stormwater capture program unit response curves	10.9.2014
General Public Meeting #2a	Presentation of interim report	1.22.2015
General Public Meeting #2b	Presentation of interim report	1.29.2015
TAT Meeting #4/Key Stakeholder Meeting #6	Implementation strategies	3.25.2015
TAT/Key Stakeholder "Office Hours"	Implementation rates	6.1.2015, 6.4.2015
General Public Meeting #3	Presentation of final SCMP	6.25.2015
EWMP Coordination Meetings	Coordination between plans	Multiple
Basin Study Coordination Meetings	Coordination between plans	Multiple
Meeting with The River Project	Project update and collaboration	1.14.2014
Meeting with Arid Lands Institute	Project update and collaboration	3.21.2014
Presentation at H20 Conference	Informational presentation	5.28.2014
Presentation to Studio City Residents Association	Project update	7.8.2014
Presentation to National Research Council	Informational presentation and project update	7.31.2014

Table ES-1. Public Outreach Events Conducted Throughout the SCMP Development Process

Public Outreach Event	Topic	Date(s)
Meetings with LAUSD	Project update	10.2.2014, 10.15.2014
Presentation at IRWMP Leadership Committee Meeting	Informational presentation and project update	10.22.2014
Presentation at the Westchester Rotary Club	Project update	12.17.2014
Presentation to Upper LA River Area IRWMP Group	Informational presentation and project update	1.21.2015
Presentation at Southern California Water Committee Meeting	Informational presentation and project update	1.22.2012, 6.25.2014
Presentation to LA Neighborhood Council Coalition	Project update	2.7.2015
Presentation at American Water Resources Association Conference	Informational presentation	3.30.2015
Briefings with City Council Members, EPA Region 9 Administrator, RWQCB, and SWRCB	Informational presentation and project update	Multiple

Figure ES-2. Public Outreach Event "General Public #1"

CURRENT CAPTURE

Los Angeles has a long history of managing stormwater runoff. For most of its history, the primary objective of "stormwater management" has been to control catastrophic flooding. To this end, a regional flood control system was developed consisting of conveyances, impoundments, spreading grounds, flood control basins, and debris basins.

Over the past few decades, as imported water has become more expensive, less reliable, and more susceptible to limitations, stormwater flowing to the ocean has been recognized as an increasingly valuable resource for the region. As a result, existing flood control facilities and individual parcels have been and continue to be retrofitted, and new large-scale facilities are being developed to infiltrate stormwater for groundwater recharge. In the past 40 years, stormwater capture in centralized facilities has increased 50 percent (Figure ES-3). Modeling conducted as part of this study showed that on average, the centralized facilities that exist today capture nearly 30,000 acre-feet of stormwater annually. LADWP has several new centralized projects funded and underway, and many more identified that will significantly increase this capture potential.

In tandem with the development of centralized capture facilities, LADWP is also contributing to the implementation of distributed capture projects. LADWP understands that the opportunities for centralized capture projects are limited due to their space requirements, and acknowledges the important benefits provided by distributed capture projects. While there are many examples of distributed projects both planned and in service, their contribution toward total aquifer recharge is

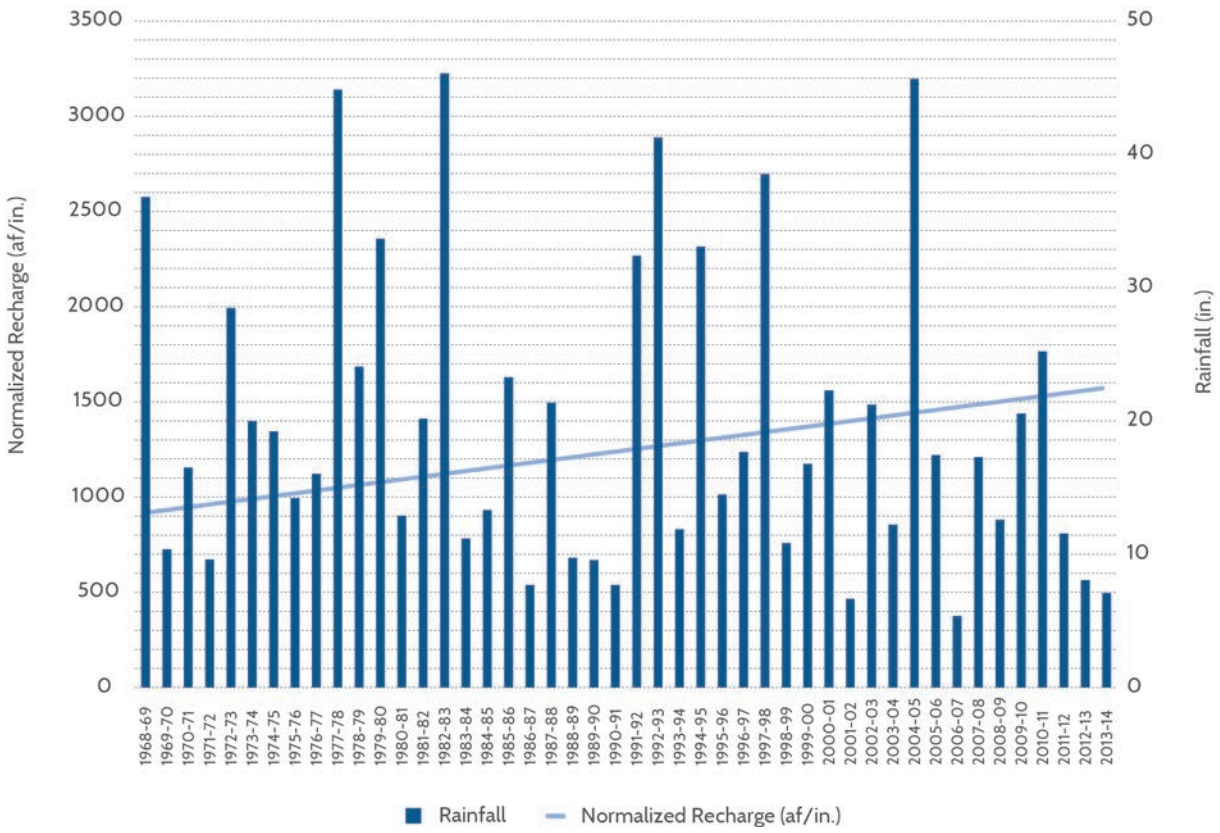

Figure ES-3. Increased Efficiencies in Centralized Facility Capture Over the Past Four Decades

relatively minor due to the limited capture capacity of each individual project. For distributed projects to make a more significant contribution to groundwater recharge, these groundbreaking pilot projects can be implemented on a programmatic basis across the City.

While distributed capture projects do not currently provide significant recharge volumes, continuous simulation modeling performed for the SCMP showed that 63,000 acre-feet per year of distributed infiltration is currently occurring incidentally via pervious surfaces throughout the City. However, only 35,000 acre-feet per year of this infiltrated water is being recharged into water supply aquifers. The remaining 28,000 acre-feet per year is infiltrating into soils above confined aquifers. Water currently being infiltrated incidentally above confined aquifers does not constitute an existing supply, though it could potentially contribute to LADWP's water supply portfolio if LADWP established pumping, treatment, and distribution in the future.

FUTURE SCENARIOS

In developing the SCMP, two scenarios–Conservative and Aggressive–were considered to create an "envelope" of the range of potential future outcomes (Figure ES-4). These two scenarios reflect broader conditions outside the direct control of LADWP that could impede or accelerate stormwater capture. Regardless, swift, significant, and sustained action on the part of LADWP and its partners is a significant part of realizing either scenario.

LONG-TERM STORMWATER CAPTURE POTENTIAL

Prior to developing targets for the SCMP, the long–term stormwater capture potential was estimated to refine estimates developed in previous studies, and to better understand the realistic potential for stormwater capture and

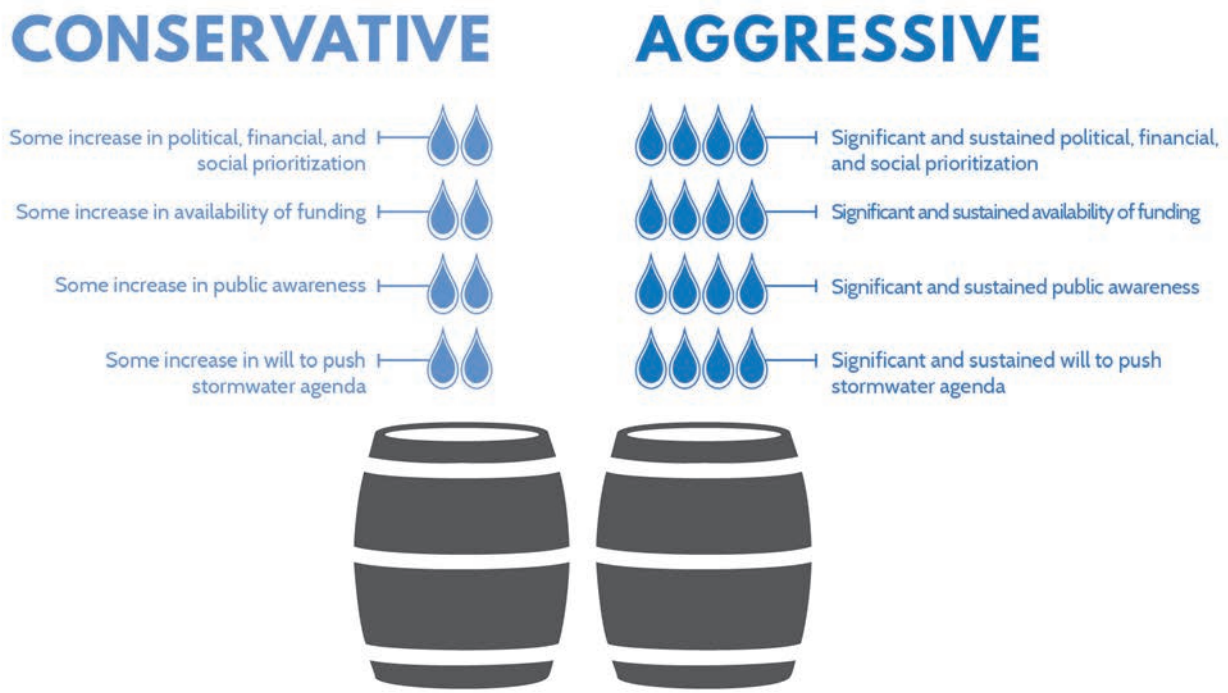

Figure ES-4. Aggressive Versus Conservative Scenario

serve as a context for developing the SCMP. These stormwater capture estimates included both centralized and distributed capture that might be implemented by the year 2099 (Figure ES-5).

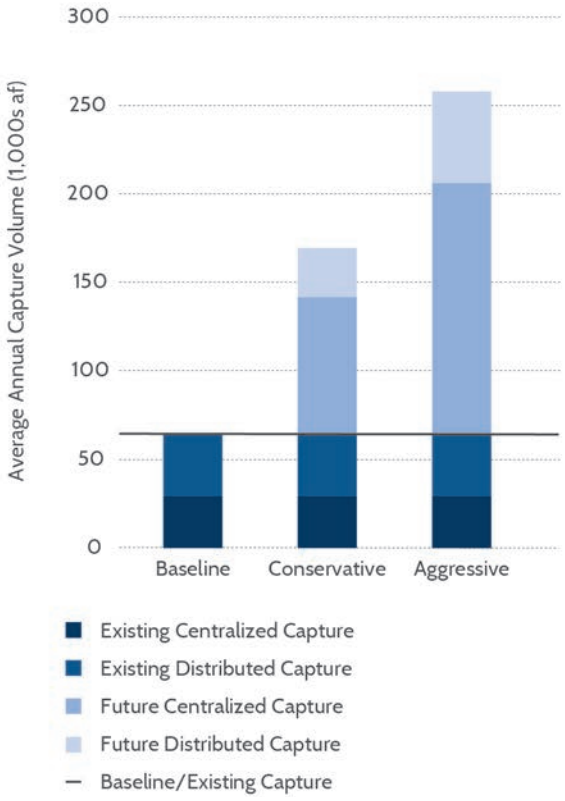

Figure ES-5. Potential Stormwater Capture by 2099

STORMWATER CAPTURE ALTERNATIVES

The SCMP considered both centralized and distributed stormwater capture projects. Centralized capture projects are those that capture generally more than 100 acre-feet per year and are unique to a specific location and opportunity. Distributed capture projects are smaller (less than 100 acre-feet per year) and have similar designs, allowing them to be implemented programmatically across the City.

For centralized projects, a comprehensive list was compiled from a review of previously implemented stormwater capture studies, LADWP's current list of centralized projects, new project concepts, and input from the TAT, key stakeholders, and the general public. These centralized stormwater capture alternatives were identified for potential inclusion in the final SCMP. Potentially feasible alternatives were evaluated and scored based on criteria developed by the SCMP Project Team, including water supply benefit, cost, ownership, compatible uses/partnership opportunities, and operating costs.

To identify distributed stormwater capture program opportunities and evaluate their costs and benefits, an emphasis was placed on flexibility such that the widest possible variety of programs could be evaluated based on their implementation in different areas throughout the City to guide development of the final SCMP implementation strategy. Table ES-2 lists stormwater capture programs grouped into program types.

Table ES-2. Distributed Program Alternatives

Project	Program
On-site Infiltration	Residential Rain Garden Program
Green Streets	Commercial Green Street Program
Subregional Infiltration	Neighborhood Recharge Facility Program
On-site Direct Use	Residential or Commercial Cistern Program
Subregional Direct Use	Park Subsurface Storage and Irrigation Program
Impervious Replacement	Impervious Surface Replacement Program

IMPLEMENTATION POTENTIAL

To determine the stormwater capture potential for the City, centralized and distributed projects and programs were identified, and

implementation rates and schedules were established with extensive input from LADWP and SCMP stakeholders.

For centralized projects, implementation phasing was developed by analyzing the status of each project, understanding the technical complexity of each project, determining the level of permitting required, and assessing the individual project costs and partnership opportunities. For distributed capture programs, program type alternatives were developed by creating categories based on different combinations of project attributes, including tributary sources (either on-site or off-site areas), land use type (private property, public property right of way), and use of captured water (aquifer recharge or direct use). This categorization resulted in a total of five feasible program categories along with several subcategories (Table ES-3).

Table ES-3. Distributed Program Categories

Program Category	Subcategory
On-Site Infiltration/Direct Use	Single Family Residential
	Multi-Family Residential
	Commercial
	Industrial
	Educational
	Institutional
Green Street Programs	Commercial Streets
	Residential Streets (Parkway Retrofits)
	Street Ends at Rivers (Rio Vistas)
Subregional Infiltration	N/A
Subregional Direct Use	N/A

A detailed analysis was performed on these programs to determine their costs and potential benefits, including capture volume, pollutant reduction, increased green space, and peak flow reduction. Results from this analysis helped guide the establishment of potential implementation rates for each program over the SCMP planning period.

Using centralized and distributed implementation rates, stormwater capture potential (in acre-feet per year) was developed for the Conservative and Aggressive Scenarios, at 5, 10, 15, and 20 years–the years 2020, 2025, 2030, and 2035 (Table ES-4). This table indicates that LADWP could nearly double the existing capture in centralized facilities over the next 20 years, and through participation in programmatic implementation of distributed solutions, provide an even greater amount of new capture through distributed capture projects. In total, LADWP could potentially realize increased local water supply through all of the planned uses of stormwater by 68,000 to 114,000 acre-feet per year within 20 years.

Table ES-4. Stormwater Capture Potential at 5, 10, 15, and 20 Year Milestones

		Conservative				Aggressive			
		2020	2025	2030	2035	2020	2025	2030	2035
Recharge Baseline	Baseline–Incidental	35	35	35	35	35	35	35	35
	Baseline–Centralized	29	29	29	29	29	29	29	29
	Baseline Subtotal	64	64	64	64	64	64	64	64
Recharge Potential	Centralized Facilities	9	22	25	35	15	29	48	51
	Distributed Infiltration	5	14	22	31	11	27	41	56
	Recharge Subtotal	14	36	47	66	26	56	89	107
Direct Use Potential	Distributed Direct Use		1	1	2	1	4	6	7
	Baseline Subtotal	***64***	***64***	***64***	***64***	***64***	***64***	***64***	***64***
	Potential Subtotal	***14***	***37***	***48***	***68***	***27***	***60***	***95***	***114***
	Total	***78***	***101***	***112***	***132***	***91***	***124***	***159***	***178***

There are multiple combinations of projects and program types that can be implemented to capture the potential volumes described. However, depending on multiple factors, the cost-effectiveness (or life cycle cost, in dollars per acre-foot) of these projects and programs varies considerably. These factors include capture volume, tributary area, capital costs, operations and maintenance requirements, among others. Cost-effectiveness varies within and among the different projects and program types (Figure ES-6).

As shown, centralized projects can provide the greatest opportunities for the most cost-effective means of capturing stormwater for water supply. Often, this is because of unique project factors, such as land ownership, already in place. Subregional infiltration projects, as part of a programmatic implementation plan, also show great promise across a wide variety of conditions, and recharge water into the local aquifers in a tight range of costs per acre-foot. Green Streets, on-site infiltration, subregional direct use, and on-site direct use also provide water supply potential at a lower price range yet warrant partnering entities.

VALUE OF RECHARGED/DIRECT USE WATER

Implementation of the centralized facilities and distributed programs may require funding, at least in part, by LADWP. Any proposal to use ratepayer monies to fund stormwater projects must be carefully evaluated. It is important to consider that expenditures on these projects and programs result in the development of a resource that has economic value to LADWP. The value of captured water to LADWP consists of the avoided cost of purchased water and the value of

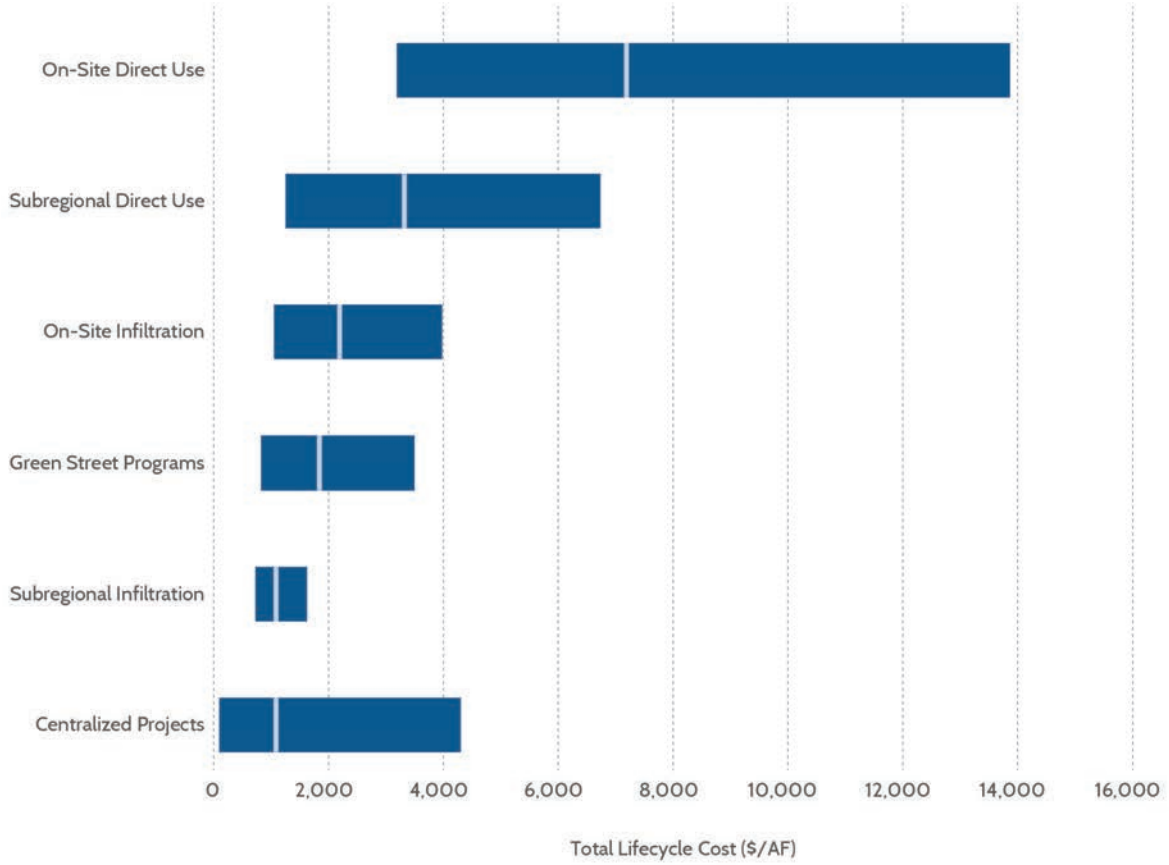

Figure ES-6. Cost-Efficiency of Projects and Program Types

increased water supply reliability resulting from development of local water resources. Analysis of MWD water costs and the value of local resources through its local resource program (LRP), including predicted escalation over time and using the value at the mid-point of the planning period, showed that stormwater projects that recharge water into groundwater aquifers, and thus avoid purchase of Metropolitan Water District (MWD) Tier 1 untreated water, can be considered to have a value of $1,100 per acre-foot of water generated over the life of the project (Figure ES-7).

Direct use projects, which can avoid the purchase of MWD Tier 1 treated water, can be considered to have a value of $1,550 per acre-foot (Figure ES-8).

If the cost of a project or program is less than the value of the captured water it provides, then implementation of this project would be considered "good business" and would be defensible to the ratepayer. Projects or programs that cost more than the value of the water they provide may still be worth implementing when other project benefits are considered and other beneficiaries contribute to the cost of implementation.

Based on the analysis of identified project and program alternatives, each project/program category contains individual projects that could be implemented for a cost that is less than or equal to their value to LADWP (with the exception of the onsite direct use program). And each project/program category also contains projects with costs that exceed their value to LADWP in terms of water supply benefit where partnerships can close this

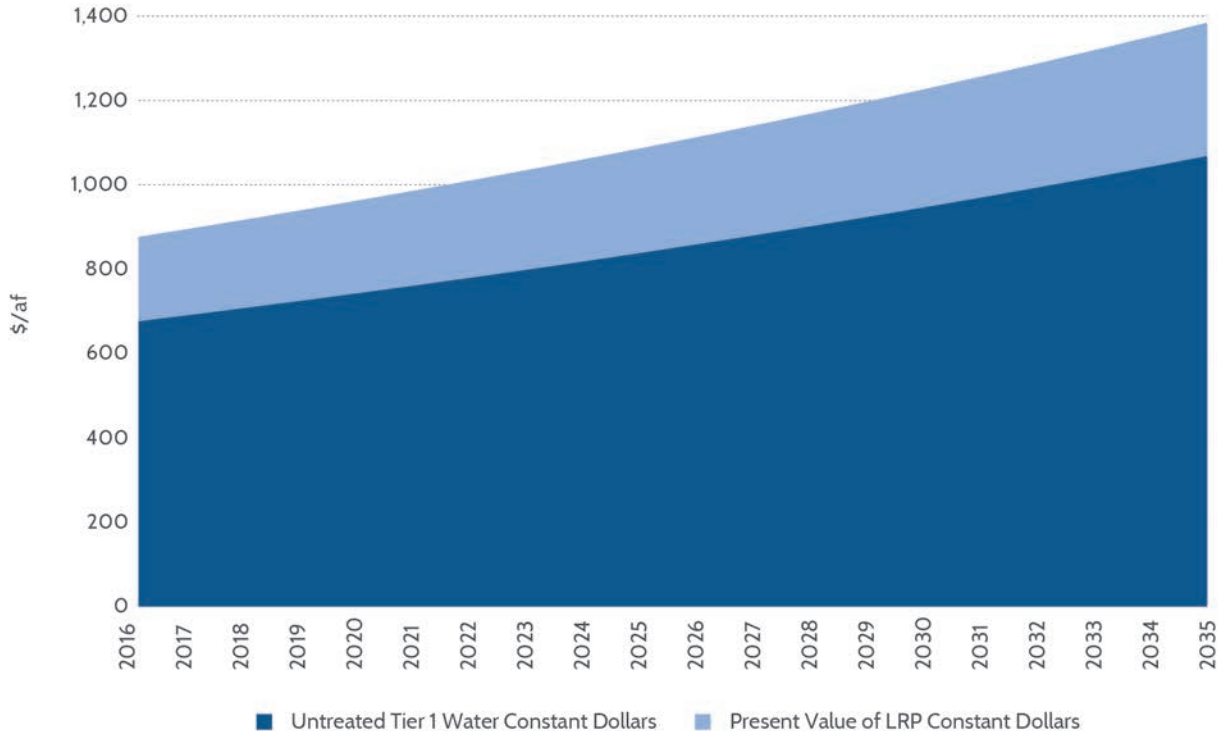

Figure ES-7. Value of Recharged Water to LADWP

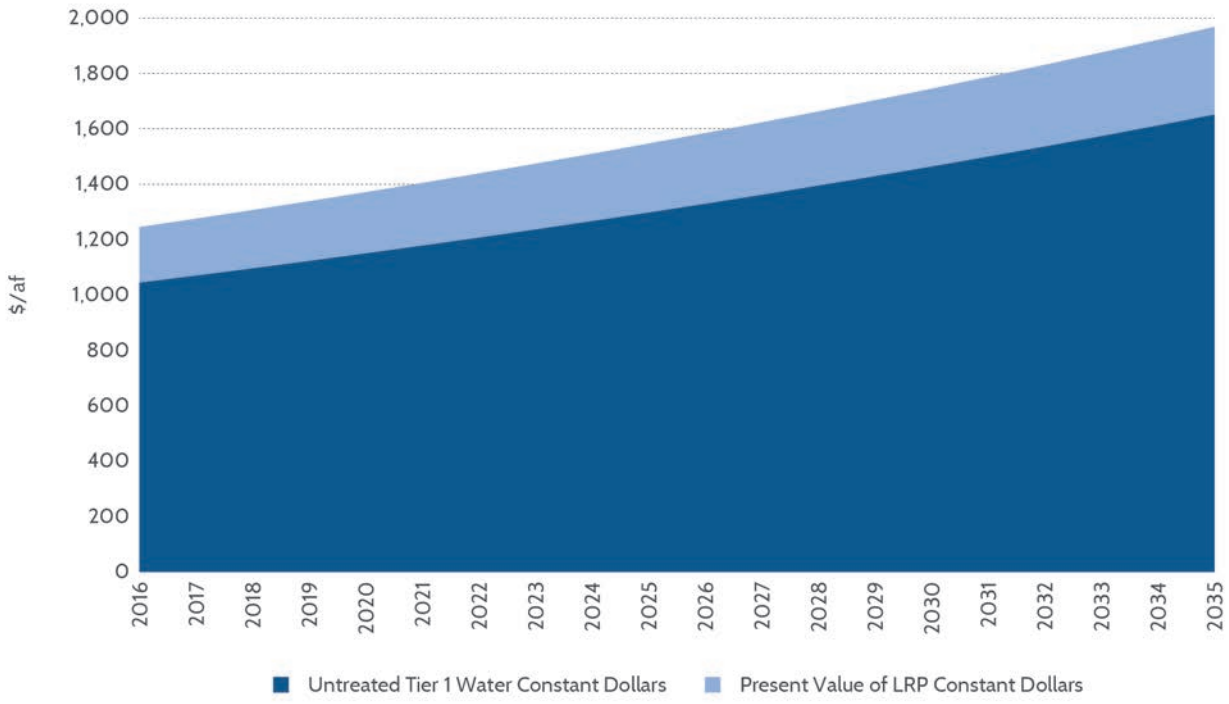

Figure ES-8. Value of Direct Use Water to LADWP

funding gap. Though there is often a sound business case for LADWP to implement projects independently, their implementation approach should also include a strategy for coordination with other agencies to cost-effectively implement projects and programs.

FUNDING STRATEGIES

LADWP could contribute funds to projects in accordance with the water supply and local supply values described above. Recognizing the capital-intensive nature of many of these projects, a variety of strategies for debt financing could be employed. These strategies include issuance of debt by LADWP, but also debt issuances by other entities, including low interest loans from State and Federal sources, and cooperative pledges of LADWP funds toward repayment of debt issuances by other entities including public agencies, property owners and private sector entities. New forms of debt issuance may include formation of "Joint Powers of Authority" (JPA) or special assessment districts, in which LADWP funds could be combined with new sources of revenue to support new debt vehicles. In this regard, the SCMP includes a number of recommendations on how LADWP's avoided costs and the potential LRP subsidy from MWD can become significant sources of revenue pledged toward operating costs, capital costs, and debt repayment. It is also recommended that LADWP consider potential financing from Public Private Partnership opportunities.

LADWP can also serve as an important entity to receive grant monies for implementation of stormwater capture. Grants may include funds from the Water Quality, Supply and Infrastructure Improvement Act, and new sources of grant monies may become available. LADWP could help ensure that these grant opportunities are effectively realized over time. Optimizing grants and leveraging LADWP funding will require careful coordination with other entities including LACFCD, LASAN (through the EWMP process), and others.

For distributed projects, LADWP may also offer debt financing vehicles to projects that allow consumers to reduce their use of LADWP's water to encourage these projects without additional cost to other ratepayers. For distributed projects that would result in recharge benefit to LADWP, new incentive programs including grants, purchase agreements and financing would be offered. Also, LADWP would likely purchase water from a number of projects sponsored by other public agencies as a form of financial contribution to projects that are sponsored for other purposes.

IMPLEMENTATION RECOMMENDATIONS

Implementation of centralized and distributed projects and programs, and hence increased stormwater capture over the past several decades (Figure ES-3), is directly attributable to LADWP's growing focus on stormwater capture as a means of augmenting local water supplies. These increasing efforts toward identifying projects, welcoming project partnerships, and providing funding critical to the successful and timely implementation of projects is readily apparent in the increased role stormwater plays in the City's water supply portfolio. Even with LADWP's and their partners' sustained efforts, there remains significant untapped potential for additional capture from both centralized and distributed projects. Realizing this potential requires new strategies to allow projects and programs to be implemented at an accelerated pace.

GUIDING PRINCIPLES

The SCMP provides planning level guidance on the projects and programs that LADWP should implement or support to increase stormwater capture. However, as this plan gets

implemented, additional decisions will need to be made to select and prioritize specific projects. To guide LADWP in making these decisions, specific attributes will be considered when evaluating individual projects. These are:

Sound Planning. LADWP is conservative in its approach to water supply planning, meaning that it errs on the side of more water and more storage. LADWP anticipates future regulations and policies, and how they may impact water supply planning. LADWP collaborated with the community and stakeholders throughout the development of the SCMP, and will continue to collaborate when proposing investments.

Appropriate Investment/Cost-Effectiveness. LADWP is committed to its ratepayers to ensure that it only implements projects that make good business sense. Investments must be based on clearly defined planning, reliability, environmental, and financial standards. However, while some projects may at first appear to have a high dollar per acre-foot price tag, by entering into partnerships with other agencies and co-investing in multi-benefit projects, LADWP may be able to reduce its share and make a defensible case for implementation of the project.

Reliable and Resilient Water Supply and Service. LADWP expects to continue to meet 100% of the demand 100% of the time. To accomplish this, LADWP needs to diversify its water supply portfolio in order to become drought and climate change resilient. While some individual projects may initially appear more costly, their additional expense in the near term may be warranted if they provide LADWP with a diversified water supply portfolio that is resilient in the face of anticipated threats to long-term water supply reliability.

Multiple Benefits. Though cost-effectiveness is an important metric to be used for evaluating a project, projects with multiple benefits have an advantage over projects that only provide water supply benefits, even though their total cost per acre-foot of captured water may be higher. LADWP looks to pursue multi-beneficial projects that address not only water supply, but water quality, localized flood protection, and open space. Multi-beneficial projects present the opportunity for collaboration and cost sharing, thus improving the cost-effectiveness of a project when viewed strictly as costs to LADWP.

Transparency and Collaboration. LADWP's goal is to provide easy-to-access information on policy decisions, outreach activities and follow-up, and governance. LADWP encourages dialogue with policy makers, community leaders, and the general public regarding LADWP standards. Not only does collaboration potentially reduce LADWP's share of project costs, collaboration among agencies also works toward different goals that improve the City's overall efficiency in meeting all of its goals, in that there is less redundancy and/or conflict between different agency projects.

Stormwater capture projects have the potential to provide non-water supply benefits (Table ES-5). Projects that include multiple additional benefits should be prioritized over those that provide few or no additional benefits. Collaboration should be a fundamental element of all work associated with implementation of the SCMP. LADWP should work closely with other City agencies to develop coordinated strategies for meeting overlapping goals.

Consistent with being multi-beneficial and collaborative, stormwater capture projects should also be prioritized opportunistically. While a given project may not be at the top of LADWP's priority list in a given moment, it may nevertheless be appropriate to implement if there are time-limited circumstances that would work in favor of said project. For instance, if a green street project has been

identified for future implementation and that street is slated to be repaired before the green street project is implemented, it may be worthwhile to adjust the timeline of implementation to coincide with the street repair. This not only has the potential to reduce project costs and improve the environmental sustainability of the project, but could also reduce disruption to the neighborhood and increase public goodwill for the project.

Table ES-5. Potential Non-Water Supply Benefits of Stormwater Capture

Category	Potential Benefits of Stormwater Capture Project
Environmental	Flood protection
	Water Quality
	Habitat
	Heat island
	Climate adaptation/ mitigation
Infrastructure	Street repair
	Facility O&M
	River Revitalization
Social	Recreation
	Neighborhood revitalization
	Public health
Economic	Job creation

RECOMMENDED IMPLEMENTATION APPROACHES

The SCMP creates a vision for implementation of a wide variety of projects with multiple benefits. To implement all of the programs presented in the SCMP, a variety of approaches must be employed. Although LADWP will take the lead on implementation of projects and programs most beneficial from a water supply perspective, the projects and programs proposed in this plan are not expected to be implemented solely by LADWP. There are a variety of responsible parties who may direct and/or fund implementation, and there are different approaches for implementation that may be employed. Each project and/or program may be most suitably implemented through one or more of these approaches.

Four general approaches proposed for implementation of projects and programs described in this document are summarized below, including key recommendations for implementing these approaches.

1. LADWP-Led Implementation

For projects on land owned by LADWP that are highly cost-effective initiatives and contribute significantly to water supply, LADWP should accept leadership responsibilities and work to increase efficiency of implementation. For these projects the recommended approach focuses on maximizing participation by private-sector expertise in project development and implementation, but includes placing specific responsibilities on LADWP for stewardship of these new initiatives. Projects suitable for this approach include several of the centralized projects described in this document, as well as highly cost-effective subregional and green street projects.

- Projects that could be implemented by LADWP on properties and facilities owned by LADWP or partnering entities should employ performance specifications and design-build delivery to avoid delays of the conventional design-bid-build projects.
- LADWP should explore methods of employing private sector development expertise to implement some of the most cost-effective and developmentally complex centralized projects and sub-regional programs identified in the SCMP. This would include developing RFPs requesting information and proposals from the

private sector and public agencies to develop and implement the projects and programs identified.

- LADWP has already established a method for identifying and prioritizing centralized projects and key distributed projects. However, to achieve the implementation rates of distributed projects called for in this plan, LADWP must develop a systematic approach to identifying subregional projects cost-effective enough to warrant LADWP implementation. Analysis performed for the SCMP should be used to help focus in on areas likely to contain project opportunities.
- On all projects led by LADWP, LADWP should work to include project partners where appropriate.

2. Coordination with Other Agencies and Coordination with EWMPs

Considering the multi-benefit nature of stormwater capture projects, it is understood that many projects identified in this plan would be implemented by other agencies, and LADWP should participate in these projects wherever they provide cost-effective water supply benefits. Approaches for coordination with other agencies may include new forms of governance to facilitate funding and implementation. It is recommended that LADWP:

- Consider formation of a JPA or other form of cooperative governance with LACFCD to create a focused organization to speed implementation of cost-effective centralized projects.
- Develop standard terms for participation in projects sponsored by other public agencies to contribute to project costs consistent with the water supply benefits of the projects, and encourage other beneficiary agencies to do the same.
- Monitor the projects of other agencies to identify opportunistic stormwater capture projects in which they may participate.
- Offer grants, purchase agreements, and/or financing to projects that capture stormwater and groundwater recharge basins from which LADWP can recover the groundwater.
- Work with Los Angeles Unified School District (LAUSD) to develop a program to allow for the installation of subregional capture projects on their campuses where appropriate.
- Continue its participation in the City's EWMPs, including sharing data and maps to allow for comparison of prioritized project areas, thus facilitating identification of opportunities for project collaboration.
- Contribute funds to projects identified in the EWMPs that generate new water supplies consistent with the benefits of those projects.
- Work with other City agencies to explore the formation of an Enhanced Infrastructure Financing District (EIFD) to facilitate financing for City projects which have water supply and other benefits such as water quality improvements, open space, and flood protection.

3. Property Owner Implementation

The approach for private properties involves creating incentives to empower property owners to implement projects without over investment of ratepayer funds, by offering financing with cost recovery. It is recommended that LADWP:

- Offer grants, purchase agreements, and/or financing to on-site projects and subregional projects installed on private property that capture stormwater and recharge groundwater basins in which LADWP can recover the groundwater. Grant amounts should be based on the lifetime capture potential of a given project and the value of the recharged water.
- Offer loans to customers to help finance projects that would capture stormwater and beneficially use the water to reduce potable demands.

4. Regulated Implementation

Many projects will be implemented through development ordinances and statewide policies. LADWP should maximize the stormwater capture benefit obtained through these means by working with policy makers to advise on sound policy from a stormwater capture perspective. It is recommended that LADWP

- Work with policymakers to implement better enforcement of the LID ordinance and cooperate in the development of an improved LID ordinance and an improved Sustainable Streets Ordinance.
- Offer support for a retrofit ordinance that would require stormwater capture projects to be installed on existing properties or upon resale of a property.

ADDITIONAL RECOMMENDATIONS

Achieving the targets laid out in this plan requires a broad effort aimed at supporting the general landscape of stormwater capture. To this end, it is recommended that LADWP

- Work with the water-rights panel in the Central and West Coast Basins seeking to lead a regional effort to solicit projects and implement water augmentation projects within the Central and West Coast Basins and offer participation rights to water rights holders in the groundwater basins that contribute. These include efforts to recharge the Los Angeles Forebay with new stormwater sources.
- Ensure that the clean-up efforts in the San Fernando Basin proceed to continue and improve LADWP's cost-effective access to the water supply and storage resources of that groundwater basin.
- Continue engagement with the public to educate and solicit input on new programs to capture stormwater, including opportunities for individual property owners to implement on-site stormwater capture projects and programs.
- Develop a comprehensive program to receive the LRP from MWD for stormwater capture projects.
- Optimize existing grant sources and monitor potential new grant opportunities to maximize receipt of grant monies for stormwater capture projects.
- Develop procedures to measure new stormwater capture to help secure funding and realize benefits from stormwater capture in major groundwater basins.
- Help develop more refined maps of areas where stormwater recharge projects may have adverse impacts due to expansive/contractive soils or liquefaction potential and coordinate with the City of Los Angeles Department of Building and Safety (LADBS) on procedures to approve local projects to retain and recharge stormwater.
- Consider the development of a programmatic environmental document

to allow for a more streamlined approach to implementing the recommendations made above.

CONCLUSION

With increased pressure on traditional water resources, LADWP desires to augment its local water supply portfolio to further its mission of providing a safe, reliable, and environmentally sensitive water supply for the City of Los Angeles. Local stormwater has historically contributed a significant amount of water for the City. LADWP and its partners actively recharge the local groundwater aquifers with approximately 29,000 acre-feet per year, and another 35,000 acre-feet per year is recharged into those same aquifers by incidental infiltration through mountain front zones and unpaved surfaces. Now, with the SCMP development process complete, results show that through the sustained implementation of a suite of centralized projects and the adoption of distributed programmatic approaches, an additional 68,000 to 114,000 acre-feet per year of stormwater for water supply could be realized in the next 20 years. The approximate value of this water to LADWP over the same 20-year time period is $1,100 per acre-foot for recharged water and $1,550 per acre-foot for directly used water, which represents a sound investment in the City's future water supply portfolio.

To achieve these goals, sustained effort on behalf of LADWP and its partners, in particular LACFCD, LASAN, and other City agencies, is required. These efforts include diligent tracking of funding opportunities, increased integration of common functions between agencies with similar charges, and exploring creative new mechanisms of project implementation. As this plan to increase the capture of this valuable local water supply is realized, additional benefits to the City will be gained, including water quality improvements, improved green spaces for habitat and recreation, and reduced peak flows in the region's waterways.