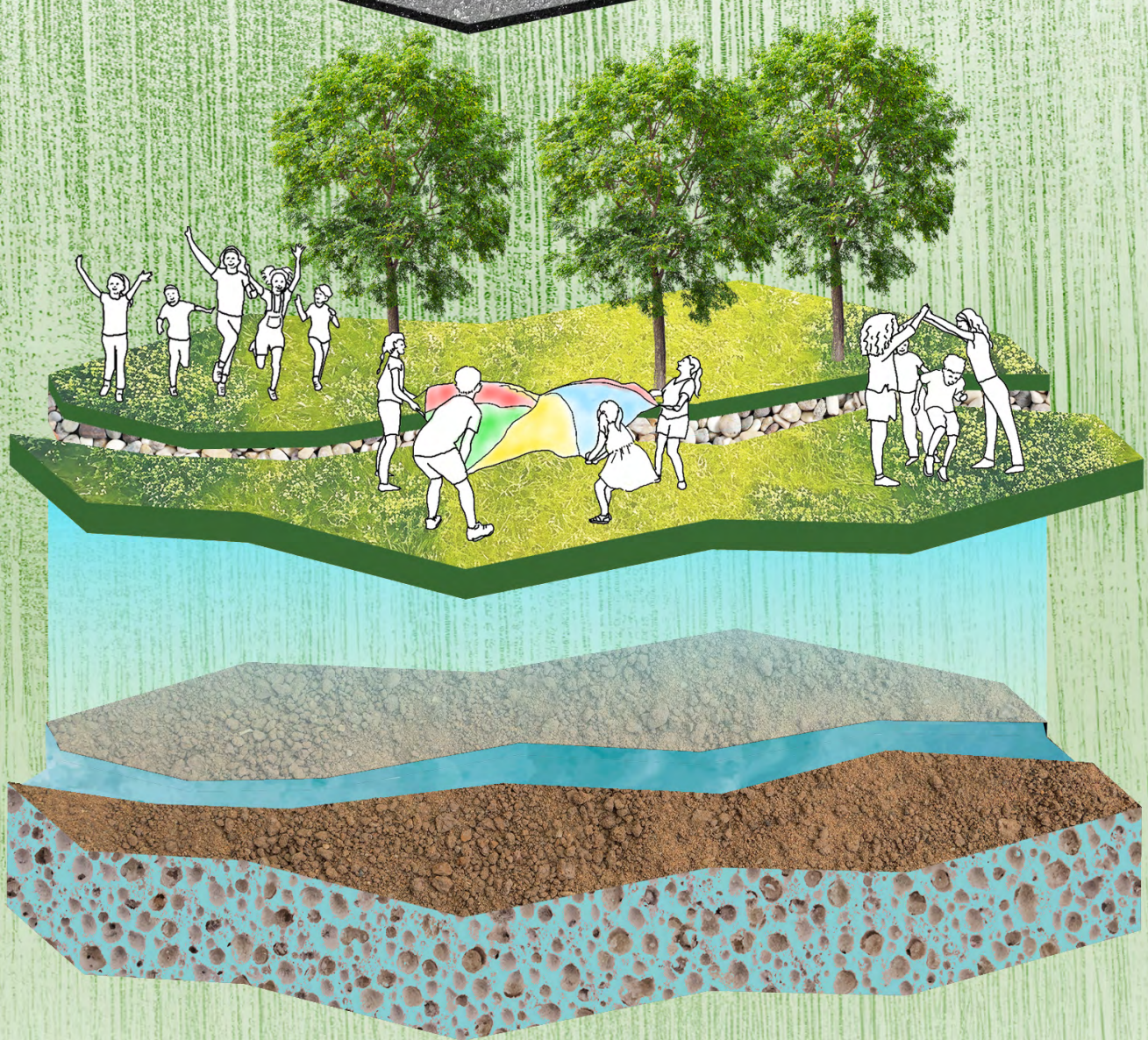


Untapped Potential

Leveraging Schoolyards for Stormwater Management & Climate Resilience



LIVING SCHOOLYARDS SCIENTIFIC STUDY | PHASE 3 REPORT



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01 Introduction: Why Schools, Why Now?



96th Street Elementary School tree planting

Photo credit: Saxon Miller-Jones



Introduction

Why Schools? Why Now?

The catalyzing potential of policies supporting school campus greening over the past two years is undeniable. Through the first quarter of 2025, there has been significant progress made towards the target of nature-based heat mitigation for vulnerable student populations in Los Angeles County schools – particularly within the Los Angeles Unified School District (LAUSD).¹ This advancement comes at a crucial time as researchers sound the alarm over the increasing burden of heat stress experienced by students in K-12 schools.² Despite this progress, another significant threat persists for many communities in Los Angeles County—limited access to reliable and renewable sources of safe, clean water. Current reliance on vast amounts of imported water threatens not only Los Angeles itself, but also the cities, counties and communities upstream whose waterways are diverted to help quench demands in Los Angeles. Strengthening regional capacity to capture, treat and infiltrate stormwater back into the aquifer is key in establishing long-term water resilience.³

The need for creative water management solutions to improve local self-sufficiency was a significant factor influencing voter support for the Measure W Safe Clean Water Program (SCWP) on the November 2018 ballot. Since its adoption, LA County residents have invested over \$670 million in projects designed to meet this goal. Generally, these projects also serve the prevailing need for improved access to parks and natural spaces in urban neighborhoods. Although school campuses do not currently make up a significant portion of the SCWP's project portfolio, their potential to contribute to watershed goals cannot be overstated. School campuses are uniquely positioned to achieve the core objectives of the program specifically because they make up an enormous percentage of urban, civic land in Los Angeles County. Every watershed in Los Angeles houses school campuses, nearly all of which include playfields and outdoor facilities that can be made more permeable, safer and more accessible.

The Safe Clean Water Program can play a vital role as a convener, particularly by advocating for updated state level guidelines that balance safety with implementation feasibility.

¹ Policies include the LAUSD Green Schoolyards for All Resolution, mandating a minimum greening requirement across all district schools by 2035 with supportive funding from programs including the CAL FIRE Green Schoolyard Grant Program.

² [UCLA Luskin](#), [LAist](#), [LACOE](#)

³ [LA County Water Plan](#)



Coldwater Canyon Park Cistern

Photo credit: Adam Corey Thomas

Beyond the potential of the built environment, schools are a unique community asset which influence nearly all residents. All communities have school-aged children, for whom they want the best enrichment possible. Improvements to water resilience interventions at schools is inseparable from community investment potential in the form of improved community spaces, accessible natural environments and regionally specific climate knowledge and curriculum programming to cultivate the next generation of well-informed leaders and changemakers.

Schools have not directly contributed to water capture and infiltration infrastructure in Los Angeles County. However, the near-universal push for school districts to replace asphalt and concrete sealed spaces across their service areas with cooler, more natural, more permeable surfaces as well as the allocation of funding to support those green initiatives presents a clear need to assess schools and school districts for their water capture potential. Previous County water strategy reports have acknowledged school campuses for their potential to contribute significantly to this goal. To read more about county specific water policies and targets, read our Phase One Report *Uncovering the Barrier Between Stormwater and Schools*.⁴

⁴ The Phase 1 report includes specific plans of action, analyses and proposals by City and County agencies.

Our modeling indicates the potential to manage nearly
60,000
acre feet of offsite stormwater runoff annually.

If captured and reused, this volume is enough water to support over
700,000
Angelenos each year (assuming 70 gallons per capita day).

Pilot School Sites

For this study, ten LAUSD pilot school sites within the Upper Los Angeles River Watershed Area (ULAR) were assessed for their potential contribution to regional water capture goals. Of those ten sites, seven compatible sites were selected for stormwater infrastructure integration design and impact modeling. Concise assessments of the pilot school sites within LAUSD selected for this study and what criteria were applied to identify the seven final study sites used to model results for this report are available in our Phase Two *Design Concepts Portfolio*.

02 Schools and the Safe Clean Water Program



Compton Avenue Elementary School tree planting
Photo credit: Alex Turner

This Report

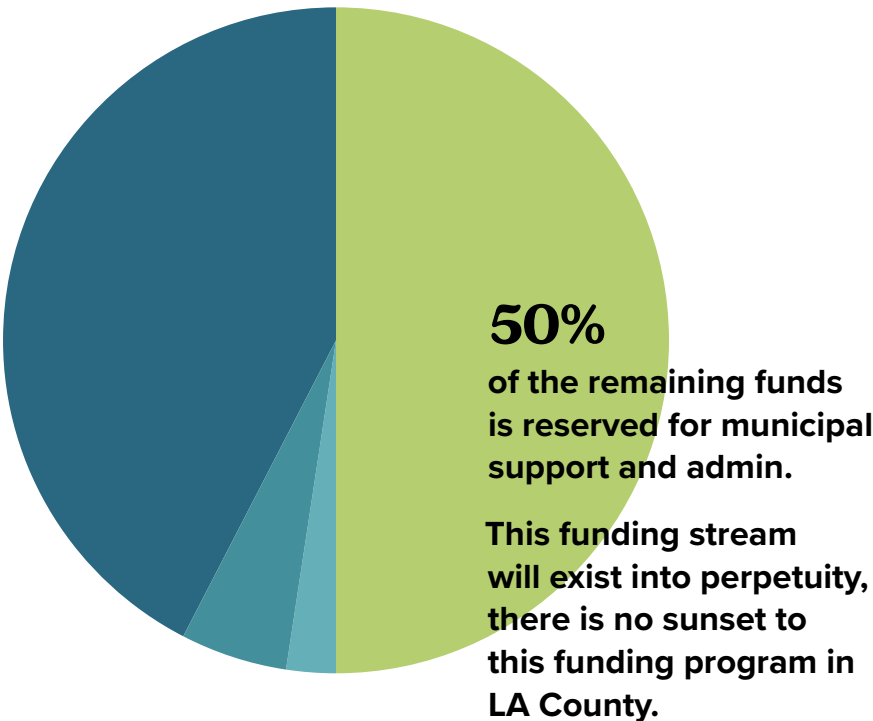
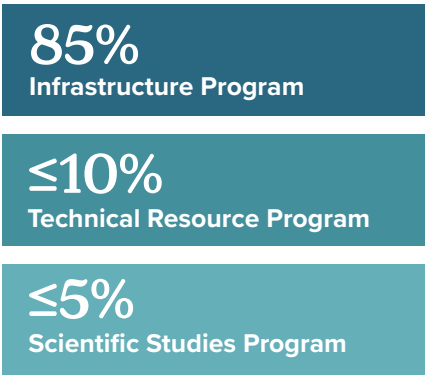
This report presents a summary of findings from the final iteration of a three-phase, Safe Clean Water Program Scientific Study with three primary objectives:

- 1. **To model the regional water capture potential that is possible by integrating water infrastructure with nature-based greening projects on school campuses at the district-scale and to demonstrate the programmatic benefits this integration presents for students and campus communities.**
- 2. **To identify the unique challenges that accompany this potential and synthesize recommendations for changes in policy, relevant partnerships and additional research needed to make school-based contributions to regional water goals a reality.**
- 3. **To present a roadmap for school districts and municipal administrators who are interested in investing in their community schools and strengthening their water resilience through the Safe Clean Water Program.**

These objectives are informed through the perspectives of school district and campus-site administrators as well as tradespeople within the Los Angeles Unified School District, County water management targets and priorities, and organizations with experience designing and implementing school campus improvement projects in Los Angeles County.

Allocation of Safe Clean Water Program Funding

50%
of the roughly \$285 million generated annually is spent on the 3 regional program investments:



SCWP 2025 Interim Guidance Figure 2, SCW Program funding allocations by sub-program

Primary Outcomes

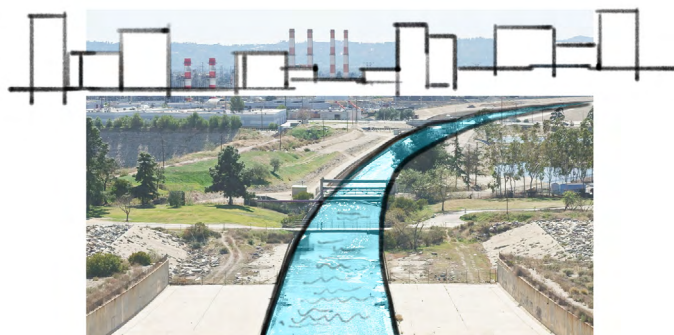
There are two primary outcomes described in this report:

- 1. Preliminary estimates on the amount of stormwater that can potentially be diverted and infiltrated by LAUSD campus sites across the county in acre-feet per year as well as the compatible greening potential that can be supported by SCWP funding to implement the stormwater infrastructure.**
- 2. Recommended actions for the Safe Clean Water Program to make schoolyard stormwater capture and treatment partnerships with LA County school districts a feasible strategy for water resilience.**

School campuses offer significant untapped potential for LA County's stormwater capture and infiltration goals. However, LAUSD administrators have expressed hesitation likely to be encountered across other school districts to engage in water infrastructure projects due to unresolved concerns around liability, particularly regarding long-term operation and maintenance responsibilities.

Fostering stronger partnerships to maximize these opportunities requires proactive consultation with districts to co-develop clear, shared frameworks for managing liability, offering technical and financial support for ongoing maintenance, and creating clear pathways for project implementation and management specific to school district partnerships.

This report outlines a path forward for a trust-based, solutions-oriented approach that will be critical to unlocking school campuses as high-impact contributors to LA County's regional water capture goals.



03 Resilience by (*Nature~Based*) Design



Wilmington Middle School asphalt removal
Photo credit: Kai McDaniel

Resilience by (nature-based) Design



As they exist now, the majority of public school campuses in Los Angeles City and County are covered almost entirely by asphalt blacktops and concrete. These conditions amplify heat and drive students to crowd beneath the few existing shade structures during outdoor breaks for lunch and recess. As a result, a significant portion of campus spaces are inaccessible for safe use by students and faculty when temperatures are high. The design features that characterize green campus renovation prioritize the removal of hardscaping (asphalt, concrete, and other heat-trapping paved surfaces) for replacement with gardens and natural features that seamlessly connect and integrate with campus buildings, courtyards, walking paths and sports fields.

The interventions assessed in this study have the potential to capture and manage almost **20 Billion** gallons of stormwater annually if they are implemented at scale.⁵

Tearing out concrete and introducing trees, plants, mulched beds and ecological landscaping contributes more than shade and cooler ambient temperatures. It effectively makes the campus more pleasant, more supportive of mental wellness and academic performance, and overall more accessible to students and faculty more often. The features which make campuses more accessible, supportive and green, also possess the potential for significant stormwater capture. Green campuses can be designed to infiltrate or store rainwater through bioswales, rain gardens, permeable surfaces and galleries under large open spaces like those found on sports fields. Unlike conventional spreading grounds, these improvements also contribute to the cumulative benefits of greener community schools. The impact of investments in school water infrastructure radiates beyond individual campuses. This potential is undeniable and relies heavily on the development of stormwater best management practices (BMPs) that are specifically designed to integrate seamlessly and safely into the school campus environment.

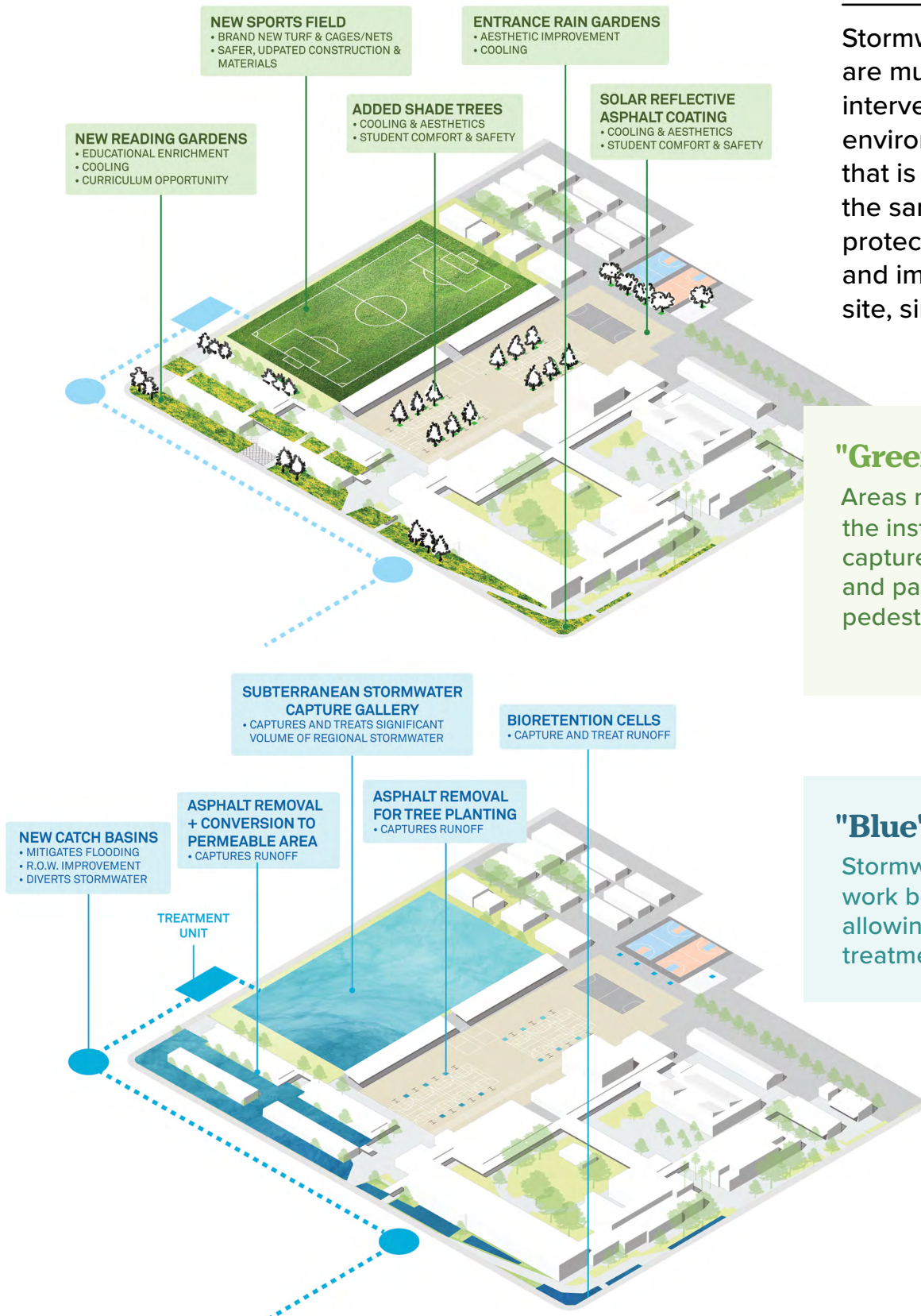
⁵ 20 billion gallons of stormwater capture potential if implemented on roughly 785 school properties within the Los Angeles Unified School District. While LAUSD maintains the largest service area in the county, there are 79 additional school districts within [Los Angeles County according to the Los Angeles County Office of Education](#)

04 Contextualizing Schoolyard Interventions



Pacoima rainwater harvesting workshop
Photo credit: James Kellogg

"Green" & "Blue" Campus Benefits



Stormwater BMP's are multi-beneficial interventions, promoting environmental resilience that is two-fold: within the same footprint, they protect the watershed and improve the school site, simultaneously.

"Green" Benefits:

Areas made permeable for the installation of stormwater capture devices become active and passive green space at the pedestrian level.

"Blue" Benefits:

Stormwater BMP's are doing work beneath the surface: allowing infiltration and treatment of runoff.

Best Management Practices (BMPs)

Best Management Practices (BMPs) are the vital infrastructure components that mitigate the harm of contaminated stormwater in our urban environments — either containing it for slow decontamination through percolation into groundwater, or cleaning it before releasing it into existing storm management infrastructure. There are many different BMPs available that handle different scales of water volume, and through different levels of intervention both above and below ground.

BMP Typologies

For the purposes of this study, BMPs are categorized by specific defining principles. Across these BMP typologies, specific solutions were selected as compatible with the school sites in our study.

LARGE-VOLUME BMPs: Large-volume BMPs can handle significant amounts of stormwater (into the millions of gallons per year range) and are able to make an impact on a regional level.

SMALLER-VOLUME BMPs: Smaller-volume BMPs may be able to handle the stormwater runoff that falls directly on one site, or a portion of a site or right of way.

ABOVE-GROUND BMPs: Above-ground BMPs describe infrastructure where the capture happens at the surface level. These solutions can enhance the landscape via incorporation of aesthetic and functional aspects of planting and softscape that provide multiple benefits in addition to stormwater treatment.

BELOW-GROUND BMPs: Below-ground BMPs occur where the major function of the intervention is to divert water towards underground treatment and storage while also having minimal visible disruption above-ground.

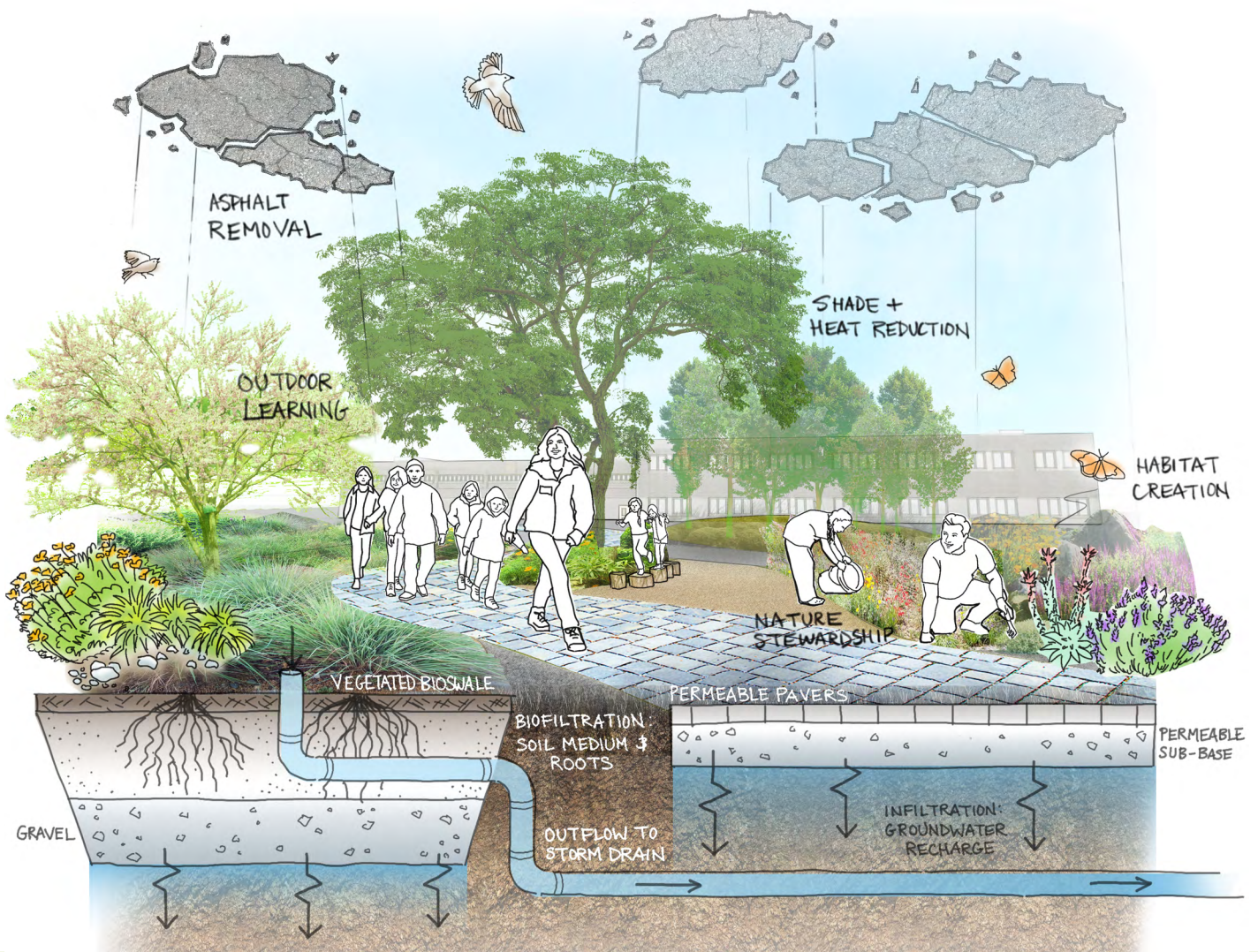
Campus Context

In the context of a school site, we found that installation of BMPs should be carefully considered to either enhance the campus in a way that is tangible to the school community, or to create as little disruption as possible while achieving the greatest level of positive impact on the regional watershed.

In some instances, BMPs may also improve the conditions that affect the adjacent community by creating a solution for nuisance flooding in the public right of way. Although each school campus is different and is best supportive to specific BMPs, this study determined that there are some solutions that have the potential to perform best at schools overall.

BMP Selection

The most suitable BMPs became apparent after walking through school campuses and discussing site-level priorities and visions with school staff, LAUSD personnel, and student liaisons when possible. The following describes the BMPs found to have the highest potential for installation on the campuses we studied, and the benefits they can directly provide.



Permeable Paving

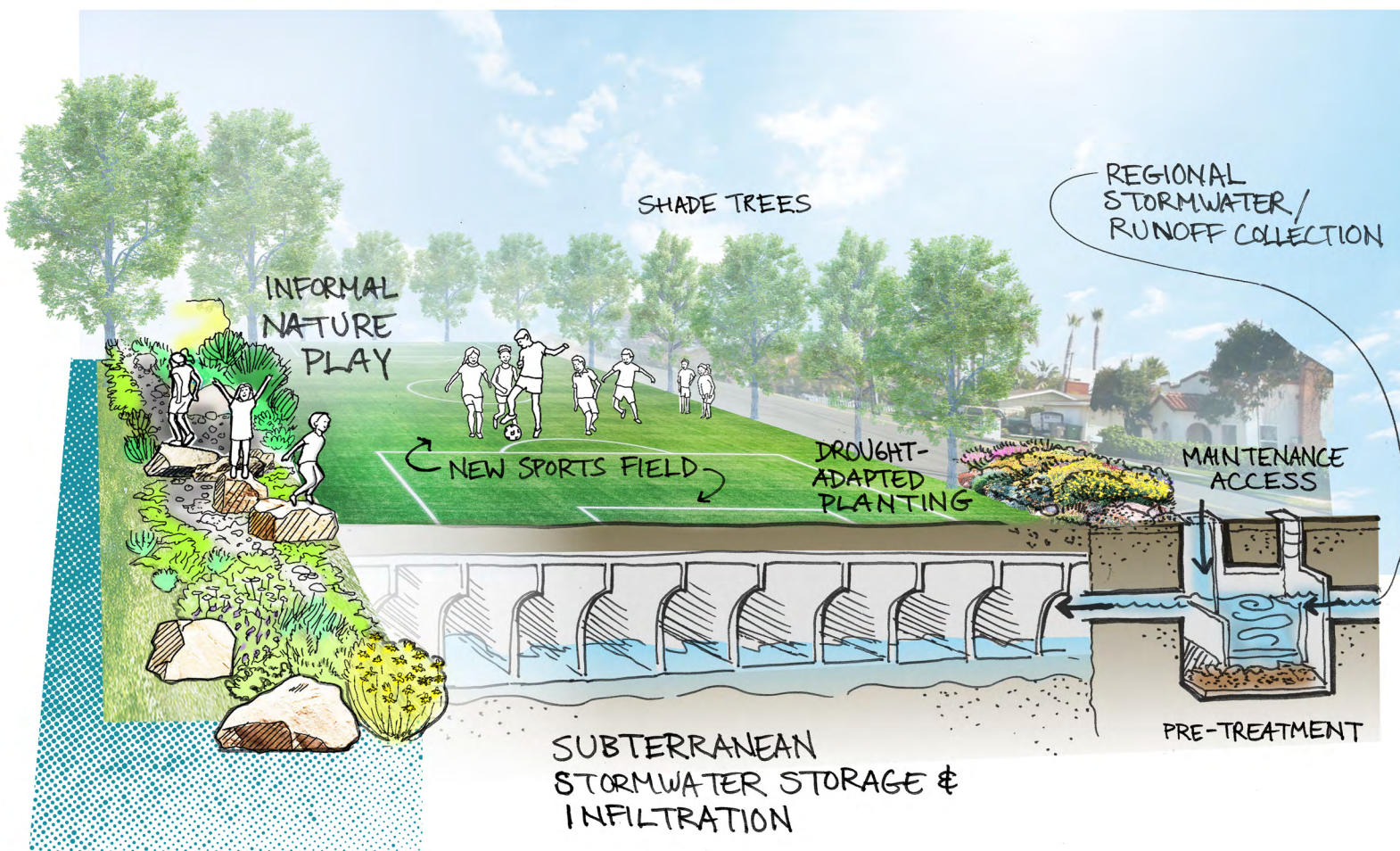
STORMWATER POTENTIAL: Permeable paving is a low-volume stormwater capture strategy. It is best used to deal with an area of flooding, or to capture runoff on-site. The runoff capture potential can be increased if underground storage is installed beneath, otherwise it can help with general surface permeability for water to infiltrate into the soil. Permeable paver systems are excellent at filtering sediment, metals, oil, grease and other contaminants.

CAMPUS BENEFITS: The permeability of porous paving promotes the slow evaporation of stored water and is able to maintain a cooler temperature than concrete or asphalt. This is beneficial for high-use areas that require paving, reducing the heat-island effect and improving health conditions. Aesthetically, permeable paving offers the opportunity to clearly define walkways and courtyards in a more formal and pleasing way than concrete. They may also outlast other typical paving methods, such as asphalt which need to be replaced every 20 years.

Rain Gardens

STORMWATER POTENTIAL: Rain gardens are low-volume stormwater capture devices. They are best used to deal with areas prone to flooding, or to capture runoff on-site. They may either utilize simple percolation if the soil conditions allow for it, or they may be engineered with special treatment cells below the surface.

CAMPUS BENEFITS: Rain gardens enhance the campus with green space, providing habitat for pollinators and birds. Rain gardens can serve as excellent educational tools, especially since their function and connection to local ecology and the watershed can be directly observed by students and worked into the school's curriculum.



Underground Storage Galleries

STORMWATER POTENTIAL: Underground storage galleries are high-volume BMPs that can provide significant impact on local and regional stormwater quality. They are designed to hold and treat large volumes of water. There are numerous solutions for how the water they capture is handled. For example, captured water can be infiltrated to the groundwater or returned to the storm drain system as delayed runoff. Further, captured water can be treated for pollutants, even to the point where it can be used for irrigation.

CAMPUS BENEFITS: Installation of underground water storage equipment is well suited for play fields and parks or large open areas in need of redesign. Construction of underground storage galleries can be a great opportunity to update campuses with new sports fields, open green space, or other above ground play areas. Additionally, their ability to divert large volumes of runoff make them an excellent resource to promote safety in and around a campus by diverting nuisance runoff and flooding.



Left: Stormceptor oil/sediment filtering device installation

Photo credit: Federal Highway Administration

Right: Polypropylene stormwater dry well system

Photo credit: Jacqfrost

Manufactured Treatment Devices

STORMWATER POTENTIAL: There are many types of manufactured stormwater treatment devices with a variety of sizes and functions. These devices are critical to thorough treatment of stormwater runoff and can be designed to handle large or small volumes of water, thereby reducing the amount of pollutants present before storage or infiltration of captured stormwater.

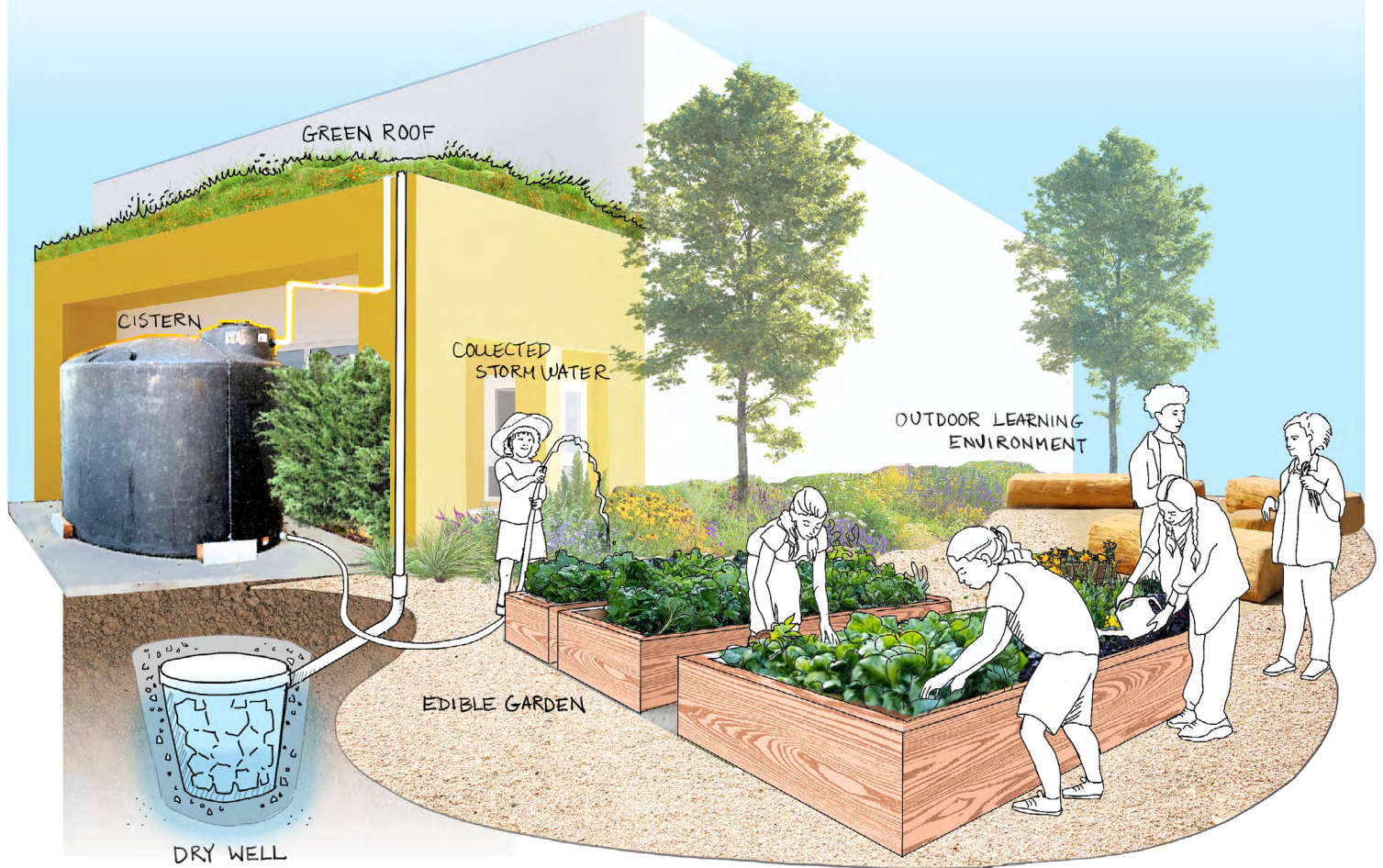
CAMPUS BENEFITS: Manufactured treatment devices help to remove the pollutants and contaminants that are otherwise present in stormwater runoff, improving the quality of water that infiltrates the soil beneath school campuses. Treatment devices offer a solution to concerns surrounding stormwater quality on school campuses. Specifically, they reduce contaminants that would otherwise accumulate on and below the surface of school campuses from urban stormwater runoff. Treatment devices also allow captured stormwater to meet LA County's target for reduced pollutant load for infiltrated groundwater. Treatment devices could be installed in the public right-of-way, rather than directly on a campus.

Public right-of-way installations have the further benefit of allowing system maintenance to occur without accessing school campuses or disrupting their activities. Described below are additional BMPs that hold potential for use in schoolyards but were not identified as appropriate solutions for the sites in this study.

Dry Wells

STORMWATER POTENTIAL: Dry wells are underground, low-volume capture BMP's used to handle flooding and runoff problems at very specific locations. They can be installed singularly or in groups. They can be very cost-effective for handling small-scale runoff control.

CAMPUS BENEFITS: The primary benefit of dry wells is their easy and low-cost method of installation. We did not find any school sites where we were able to specifically identify the potential effectiveness of this specific BMP, however dry wells could be a good solution as a case-by-case basis for certain schools trying to quickly deal with issues of runoff, and with a lack of space for some of the large BMP solutions.



Green Roofs

STORMWATER POTENTIAL: Green roofs slow the velocity of runoff from buildings, which improves the health of streams and waterways. Stormwater is mitigated by green roofs through temperature cooling, slower return to the water system and evaporation. Green roofs also moderate the temperature of buildings through positive insulation effects and filter pollutants out of the stormwater.

CAMPUS BENEFITS: Green roofs are a unique stormwater management feature in that it is also an architectural upgrade that sparks great curiosity in students. Green roofs offer a living teaching tool to educate on aspects of the water cycle, building energy use, and many other environmental processes. Green roofs can provide a co-benefit of reducing energy use or helping undersized HVAC systems maintain ideal indoor climates on extreme heat days.

The sites in our study were not found to be conducive to recommending the installation of green roofs. This is due to many factors, and each school site had different conditions that prevented our study from recommending this specific BMP.

However, as many schools seek to increase greenspace, modernize curriculums, and increase their energy efficiency, green roofs are a strong solution and asset to future campus improvement projects, and certainly to incorporate in the design of new campuses.

05 Scaling Up Benefits: From Campus to Community



Sparks Middle School tree planting

Photo credit: Kai McDaniel

Modeling the Impact



Based on available data, seven of the ten sites revealed significant potential for stormwater capture. Collectively, these seven sites could have the capacity to manage an estimated **1,490** acre feet of stormwater annually.

Vena Elementary concrete cutting
Photo credit: Adam Corey Thomas

As part of this study, 10 schoolyards across LAUSD were assessed for their potential for schoolyard greening and stormwater BMPs. The sites included a mix of elementary, middle, and high schools located across the upper LA River watershed in diverse neighborhoods, many of which are in historically underserved areas with limited green space and high levels of impervious surfaces. The evaluation process incorporated multiple steps, including hydrological analysis, site visits, consultation with school personnel where possible, and a review of existing infrastructure conditions. Key factors considered in the evaluation included proximity to existing storm drains, available open space for stormwater BMPs, soil infiltration rates, and opportunities for multi-benefit improvements such as tree planting, pavement removal, and the creation of outdoor learning spaces.

At each site, conceptual designs were developed based on best practices in stormwater management, including subsurface infiltration galleries, bioswales, permeable pavement, and bioretention features. The implementation of green stormwater infrastructure at these schools would significantly improve local water quality by filtering pollutants from urban runoff.

Moreover, the installation of new drainage infrastructure at select locations could help reduce localized flooding.

These stormwater infrastructure investments could also contribute to groundwater recharge in areas with suitable infiltration conditions, or to local water reclamation plants that are tied into water reuse networks.

Several sites were found to be suitable for large-scale stormwater capture interventions, while others were identified as key candidates for green space enhancements and community-focused improvements.

⁶ Phase 1 - Uncovering the Barrier Between Stormwater and Schools

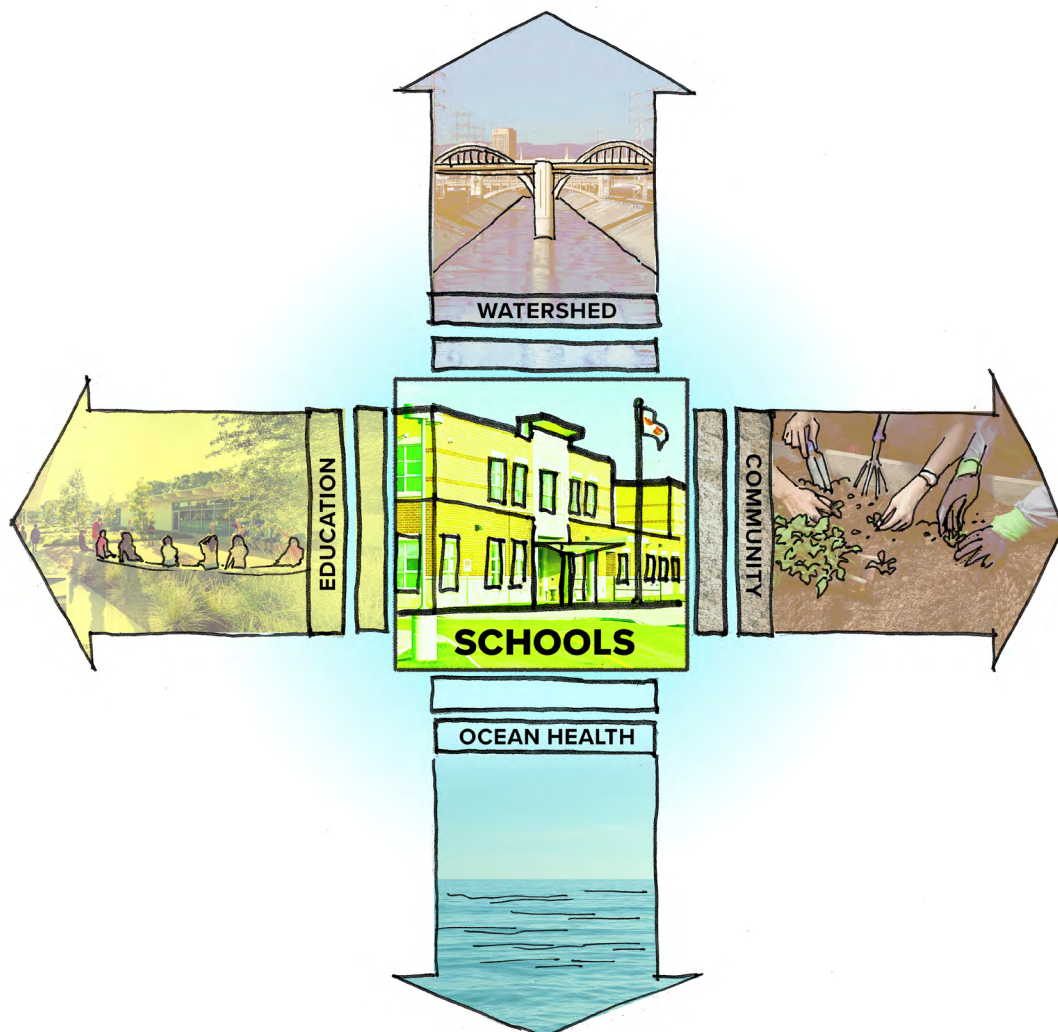
Community Benefits at Study Schoolyard Sites

Beyond stormwater capture, these projects could deliver substantial benefits to students, faculty, and surrounding communities. Many of the selected sites are located in areas with limited access to parks and green spaces. Retrofitting schoolyards with trees, rain gardens, and outdoor learning areas would provide much-needed shade, improve air quality, and create engaging environments for students. The addition of permeable surfaces and shade structures would also help mitigate urban heat island effects, reducing extreme heat exposure for students during school hours.

These schoolyard improvements also offer educational opportunities by integrating green infrastructure into science and environmental studies curricula, providing students with first hand exposure to sustainable water management practices.

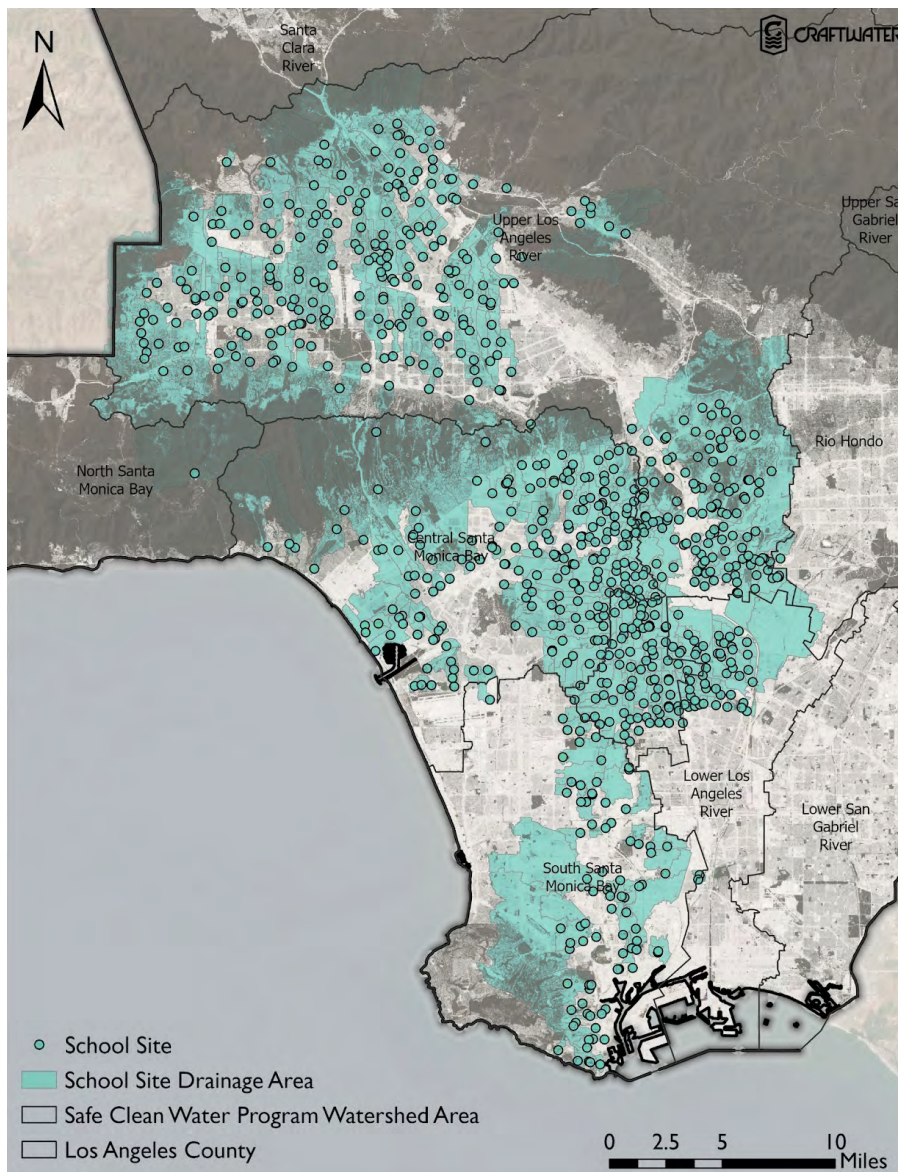
Visible infrastructure and design elements to manage stormwater, improve campus green space and provide expanded outdoor learning environments are directly compatible with environmental, engineering and STEM oriented campus clubs and academies in addition to other significant programs existing at pilot school sites such as gardening and outdoor equity clubs.

For the broader community, improved schoolyards can serve as neighborhood gathering spaces and enhance the aesthetic quality of the built environment. By transforming underutilized or asphalt-dominated spaces into vibrant green areas, these projects could contribute to community well-being and resilience against climate change.



Scaling Up the Pilot Results

The evaluation of the ten pilot school sites highlighted the immense potential of schoolyard retrofits in advancing stormwater management and community revitalization goals. To understand how those benefits could scale, a regional analysis was conducted to quantify the hypothetical regional stormwater capture at all 785 school properties within LAUSD.



Our regional modeling estimates that approximately **300,000 acres (~470 square miles)** of upstream drainage areas are tributary to all of LAUSD's properties.

This comprises an area equivalent to **90% of the City of Los Angeles.**

Collectively, our modeling indicates the potential to manage nearly **60,000 acre-feet** of off site stormwater runoff annually if every site offered feasible opportunities,* which is enough water to support over **700,000 Angelenos each year** (assuming 70 gallons per capita day).

*These estimates represent the upper end of possibility based on planning-level analysis; offsite stormwater capture may not be cost-effective or feasible on every LAUSD site.

See Appendix for modeling assumptions



Capturing this amount of stormwater runoff could also remove about
15,000 lbs
pounds of zinc per year, accounting for up to
20%
of targeted annual zinc reduction in the corresponding Safe Clean Water Program (SCWP) watersheds.

Coldwater Canyon Park cistern overflow

Photo credit: Adam Corey Thomas

While zinc is a high priority water quality contaminant in determining the value of stormwater infrastructure, many other pollutants of concern would be captured in high amounts as well.

In the interest of defining the upper limit of impact that may be possible from schoolyard-based interventions, the stormwater management potential that is presented in this section assumes a “best case scenario” that considers the SCWP's three priority impacts:

1. Water quality improvements
2. Water supply benefits
3. Community investment benefits

In our modeling, “best case” is an assumption that all sites have favorable conditions which permit the integration of stormwater infrastructure for the treatment and storage or infiltration of stormwater diverted from off-site of the school campuses themselves.

It is important to contrast with the currently accepted practice of capturing only on-site rainfall. In this scenario, total estimated stormwater capture volumes and zinc reductions would be ~2.8% of what is achievable with off-site stormwater capture. While every drop counts, capturing off-site runoff is likely the only viable pathway to making school parcels attractive for making investments to achieve the regional water objectives of the SCWP.

LAUSD was a particularly useful district to consider for this scaled modeling analysis because of the amount of school campuses administered across the County of Los Angeles. While partnerships with larger school districts such as LAUSD could hypothetically contribute to a streamlined, scaled implementation of schoolyard interventions, there is a notable limitation in which infrastructure features may be considered for installation in larger districts. In the case of LAUSD, this limitation is primarily expressed in the form of aversion to potential liability from stormwater infrastructure that diverts water from off-site for treatment and infiltration or storage on district controlled property.

Outside of the discussion of which school districts may be the most competitive for Safe Clean Water Program funds, there is a clear need for direct coordination between school district administrators and the Safe Clean Water Program to define and address constraints pertaining to stormwater infrastructure investments. Well defined roles for maintenance, operations, performance and liability assessment associated with integrated stormwater infrastructure is crucial in order to progress to higher resolution studies with the capacity to contextualize the scale of feasible impact from schoolyard interventions and to define priority sites to pilot these interventions.

06 Understanding Constraints & Advancing Solutions



Water Talks Summit 2024

Photo credit: Miguel Angel Vargas

Opportunities & Constraints

The enormous potential to capture stormwater runoff across school districts and represented in this study through the context of LAUSD campuses is undeniable. However, this potential cannot be met without addressing three interrelated constraints that exist due the perceived exposure of the District to greater fiscal burdens, delayed facilities updates, and new challenges to protecting school communities.

First, liability for environmental hazards is perhaps the most foundational constraint. LAUSD Offices of Eco-Sustainability and the General Counsel hold that by accepting diverted stormwater from surrounding watersheds onto District property, the District takes on liability for environmental hazards that could emerge such as contaminated soil or groundwater.

Second, any introduced contamination could limit future plans such as major renovations or alternative site uses given the need for environmental remediation and increased oversight by the Division of the State Architect.

Finally, any stormwater facilities represent a systemic, long-term risk—especially in the absence of clear assignments of liability. This includes potential for failure or uncertainty of being properly operated and maintained into perpetuity. While failure is uncommon in these systems, arrangements are currently unclear regarding responsibility for associated costs and how funds to address problems as they arise will be secured.

Collectively, these constraints are grounded in the fact that school districts have the core mission of educating students in a safe and supportive environment and that districts should not take on activities that could harm their core mission. In overcoming constraints then, solutions are necessary to make implementation of schoolyard-based stormwater infrastructure a clear and compelling high benefit, low risk endeavor for school districts in line with their core mission.

Chart Constraints

	Liability aversion associated with stormwater infrastructure and increased risk of damage, failure, contamination of school property.
	Uncertainty associated with the operation, maintenance and performance of offsite stormwater infrastructure on campus grounds.
	Schoolyard greening projects that integrate stormwater infrastructure are likely to prolong approvals processes with DSA and increase the cost associated with projects.

Pathways to Solutions

Defining a clear framework for assessing maintenance, operation and liability expectations for stormwater capture and treatment infrastructure projects on school district controlled properties.
Hosting an advisory panel of school district counsel representatives to discuss how liability will be defined and shared with county agencies if school districts choose to pursue SCWP partnerships.
Advocating for more protective policies at the county and state agency level, specifically concerning stormwater-contamination liability and streamlined development processes through DSA for qualifying projects which prioritize schoolyard investments without significant alterations to adjacent campus facilities.

While there are reasonable considerations in need of further assessment, there is a clear path forward to define solutions in partnership with school districts in Los Angeles County that may be particularly well positioned to advance SCWP aligned projects on their campuses.



Highland Hall Waldorf School rain barrel distribution

Photo credit: James Kellogg

Recommendations for the Safe Clean Water Program

Formalizing this pathway could offer districts regulatory cover and strategic incentive to participate in SCWP funded projects. To further strengthen school district participation and unlock high-impact stormwater capture opportunities, the SCWP should develop an MOU framework that is specific to school-district partnerships and which clearly defines shared responsibilities for the operation, maintenance and performance of infrastructure—particularly for systems diverting offsite flows. This framework should also consider provisions for the funding of emergency repairs in the event of system failure in order to reduce the burden of risk that would otherwise deter district involvement. Finally, the SCWP should consider applying special prioritization to school-based projects in its competitive review process, recognizing their scalable, multibenefit impact and alignment with voter-endorsed community investment goals.

The Safe Clean Water Program can play a vital role as a convener, particularly by advocating for updated state level guidelines that balance safety with implementation feasibility.

Recommendations for Los Angeles Unified and other districts considering SCWP partnership



While the District may be clearly positioned to advance a future partnership with the Safe Clean Water Program, this strategic advantage is not limited only to LAUSD. The modeling results of this study demonstrate that school campuses and districts are a significant source of untapped potential for County water plans overall.

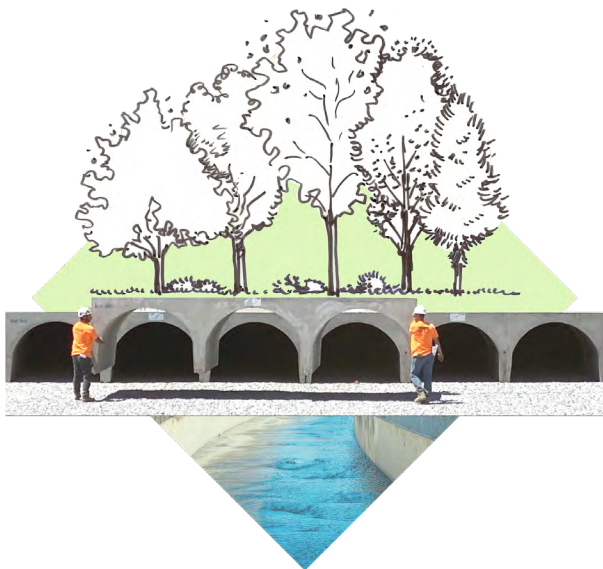
112th St Elementary School tree planting
Photo credit: Adam Corey Thomas

LAUSD has a timely, high-impact opportunity to advance its vision of high-performance, climate-resilient schools by leveraging its vast land assets to support regional water sustainability and resilience in the communities it serves. The results of this study demonstrate that the District alone could vastly improve the feasibility of County water targets which have been determined as necessary to improve the quality and reliability of water resources regionally. Through strategic engagement with the Safe Clean Water Program, the District can pursue this opportunity while negotiating clear liability protections and securing a new, sustained funding source to support greening targets and facilities improvements across its campuses.⁷ Safe Clean Water Program partnership offers a pathway for LAUSD to solidify its leadership in environmental innovation, equity-driven investment, and student-centered infrastructure prioritization.

Individual districts should assess their potential capacity for regional water target contributions as a mechanism to fund green campus renovations as part of a broader agenda of regional climate resilience.

⁷ LAUSD's [Green Schoolyards for All Resolution](#) resolved a target for all district campuses to have a minimum 30% natural and green surfaces through hardscape removal by 2035.

The [Green Schoolyards for all Plan](#) identified sustained, reliable funding sources for projects starting in the immediate term as the greatest limiting constraint preventing this target.



Forward facing reassessments of facilities, programs and policies are a significant part of any school district's strategic growth plans—this is visible in the prevailing push towards greener campuses where paving had been a historic norm. For school district administrations that are interested in exploring the potential of a Safe Clean Water Program Partnership, it would be useful to consider:

1. Commission a legal risk assessment

Tasking general counsel and risk management teams with reviewing potential liability frameworks and identifying negotiable protections through the SCWP's governance structure.

2. Initiate a structured dialogue with SCWP leadership

The limitations and constraints of engaging with a new programmatic approach to campus renovation can be best addressed by defining an internal working group tasked with exploring partnership models with the County and SCWP that could work best for school district needs and priorities. This also allows for a structured assessment of case studies where other public entities and partners have addressed liability concerns successfully.

3. Assess projected district changes within the context of SCWP objectives

Consider how future changes on real estate management, student population growth and resulting campus and district growth planning over the medium to long term can be best supported by SCWP target priorities of water resilience and community improvement investments. This can help facilities divisions to identify shovel-ready or priority projects that most likely qualify for SCWP funding.

4. Develop a strategic communications plan

Discuss stormwater management within the context of district priorities for campus greening, renovation and water sustainability as well as other core components of the high-performance school identity. This prepares students, families, staff and the broader public for conversations to determine what priorities are best suited for local campuses and neighborhoods.

It can also drive a meaningful approach to identifying non-profit, design and other partners best suited to supporting the school district in its goals.

5. Pilot demonstration sites

Identifying a small cohort of schools for technical or feasibility studies through the SCWP can allow both the district and SCWP to assess implementation needs and limitations, build internal capacity, and demonstrate visible success before scaling implementation across a district.

Schools and school districts are well suited to qualify for Safe Clean Water Program funding support in Los Angeles County because of their immense potential for providing community benefits in addition to their capacity for water management infrastructure integration. It is important to note that, while schoolyard projects are at an advantage, the SCWP is a competitive grant application program. The process to advance partnerships with funding sources like the SCWP, while straightforward, can still be a complicated one. Partnering with organizations that have the experience to navigate these projects with school districts can make a significant difference in advancing an application that is successful.

The schoolyard advantage is best met when applications effectively demonstrate the broad set of benefits a SCWP partnership would bring for both the campus community and surrounding neighborhood. This can be achieved through an effective demonstration of the broad impacts a proposed project would bring in the form of more accessible natural space, cutting edge and relevant climate literacy curriculum and efficient, nature-based design that advances cool schools and water resilience targets.

These strategies are most impactful when the benefits are demonstrated in a way that is contextualized within local priorities, which necessitates effective engagement. With the understanding that effective and meaningful engagement is different across school sites within a district, there are some strategies that have been particularly helpful for TreePeople, StudioMLA and Craftwater in developing successful engagement with school communities for campus greening projects and education curriculum development.



96th St Elementary School tree planting

Photo credit: Saxon Miller-Jones

07 Outlining the Process: Scaled SCWP Project Design & Implementation



Viewpoint School workshop

Photo credit: Adam Corey Thomas



Generation Earth water workshop

Photo credit: Adam Corey Thomas

Community-informed Curriculum & Design

Community engagement is a crucial component in developing effective programming that meets the needs and expectations of the local school community. This is crucial both for the creation of relevant and impactful schoolyard designs as well as meaningful, supportive environmental curriculum.

Engagement For Design

School communities are unique and special in that they include diverse and often vulnerable populations, especially within public school systems. To facilitate an effective and successful engagement process is a design challenge in and of itself. In the context of School Green Infrastructure projects, a community is introduced to how their school campus not only fits into the enrichment of its students and families, but how that campus is part of a bigger picture of ecological resilience and a healthy urban network. These are big ideas and ambitious

challenges to take on and require significant community input. Below is an outline of the basic steps to running a Community Engagement for a school site design.

Identify Audience & Participant Groups

Understand the depth and diversity of the community that will be affected, impacted and directly confronted with any changes to their site and surrounding environment. Break out your community into specific demographics. For example, if the school is K-12 or K-8, you may have two separate age ranges for students that each constitute their own feedback group. Teachers constitute another participant group, as would parents of students, and neighbors that live next to the school. Understanding and categorizing the different perspectives within the campus community is a first step towards generating engagement content that is most appropriate and relevant.

Share the Vision: Educate and Inspire

Perspectives on the role and function of green infrastructure on school campuses will be as wide-ranging as the school community itself. Hosting effective conversations on how a schoolyard can be redesigned to be “greener” requires an intentional process of defining what the targets are for renovation and how they are understood by teachers, students, parents and the design team.

Many factors around the function of Green Infrastructure in and of itself might not be immediately familiar to everyone involved. It is important to educate and share the vision for WHY this is important, especially why it would be important at schools. The notion of improving campuses with Green Space and all the tangible, immediate benefits of green infrastructure implementation is very positive and inspiring for many.

Tailor Content and Build Trust

Tailoring content to each stakeholder group is important in facilitating an effective engagement exercise.

For example, students or younger participants might be more inspired to participate in an exercise that utilizes visual and creative inputs, such as drawing or game-like activities. Parents, however, might best respond to a survey where they can write their own thoughts on their own time. It is also important to hold engagement opportunities in multiple formats including virtually and in-person to offer opportunities for participation across different availability. This mixed-approach to events builds trust by facilitating interactions, hearing peoples’ voices, and promoting an open and public face towards their desires and concerns.

The opportunity to INSPIRE is critical, and of equal weight in the importance of educating. It is important to note that the process of education and inspiration is not one-directional but a conversation informed through the perspectives of both the campus and the design team.



Dream schoolyard drawings

Photo credit: Zoie Matthew

Encourage Participation

Make strong efforts to reach as many people in the community as possible. It may be necessary to reach out to people more than once to secure their participation, as people are often busy and overwhelmed—especially parents and teachers. Sharing the engagement opportunities through multiple communication and promotion channels, providing as many ways to participate as possible (especially if some people cannot be there in person) makes for a more successful engagement. Collect as many voices and participants as possible for the most accurate community feedback.

Make Meaning of Results

Once feedback from the community is collected, it is important to analyze it in a way that is useful and will demonstrate their contribution to how the project takes shape. In some cases, the needs of the community may be very clear if the same needs and priorities are repeatedly identified. If a survey was given, review the feedback and see what priorities are standing out, and to which groups. It may be that analysis of the data shows a need to re-engage the community for clarity on certain topics. It is important to consider community feedback within the parameters of the project with regards to site opportunities, available budget, and other factors—and how the community's needs can be best met within those parameters.

Contextualizing Engagement: Curriculum Development

The development of a curriculum that supports climate literacy in a way that is locally specific and representative of the distinct environmental factors surrounding the campus and its community is a particularly significant opportunity that can be advanced through Safe Clean Water Program investments in local schools. Similarly to the design engagement process, community perspectives and guidance in defining this curriculum is of utmost importance.

Engagement and Information Gathering

The development of a greening curriculum that serves the goals of individual schools undertaking a greening project as well as the goals of the Safe Clean Water Program begins with engaging the teachers and students who use their schoolyard daily. Introducing the curriculum development discussion at the beginning of the concept design process allows teachers, school administrators, students and parents to provide invaluable input on how both the greening design and complementary curriculum can meet their needs.

In early design and curriculum concept workshops, asking students and teachers about their overall experiences of the schoolyard as it currently exists can provide site-specific information about the challenging and valued areas in the schoolyard that the design and curriculum may address or highlight:

- What challenges do you experience when supervising or teaching students in the schoolyard?
- Are there any greening related improvements that may address those challenges?
- Do you have any concerns related to weather and student safety in the schoolyard?
- What are your hopes for this greening project?
- Is flooding or water pooling an issue in your schoolyard?
- Where do you spend recess on a hot day? What about the day after a heavy rainfall? What areas do you avoid?
- Where on campus would you go to read a book?
- Are there parts of the schoolyard you avoid? If so, why?
- What is your favorite area of the schoolyard and why?



Generation Earth Teacher Institute

Photo credit: Rebacca Saltsman

In engagement sessions with teachers only, instruction-related questions can provide insights to inform a curriculum responsive to their needs. This is a time to ask about teachers' prior experience teaching outdoors, and their interest and comfort level with incorporating outdoor instruction into their teaching practice. Many teachers in LA County found themselves teaching outdoors for the first time during the COVID pandemic, and often express having found the experience more enjoyable for themselves and students than they would have anticipated. This common experience may be a useful entry point for future conversations with educators about increasing instructional time outdoors, and integrating a greening curriculum into their lesson planning.

The goal for teacher specific feedback sessions at the beginning of the greening design and curriculum development phase should be to gauge interest and comfort with teaching outdoors, understand the benefits and challenges those who have done so before perceive, and gather information on the resources and strategies teachers would want to facilitate bringing students outdoors. Additional information useful to gather at this stage could include specific areas of campus as-is or in the greening design that could serve as a focal point in a greening-related lesson or activity.

Sample questions to prompt feedback specific to curriculum customization from teachers:

- How are you using the outdoor space(s) at your campus?
- What's the ideal way you imagine utilizing outdoor space for instruction with your students?
- How do you currently incorporate environmental education into your curriculum?
- What type of support would help you to introduce or expand your environmental education units?
- What challenges do you imagine for using outdoor space or expanding your environmental education units?
- What type of environmental education content would you like to introduce or expand?
- Regarding already established areas of the schoolyard with green features, for example: Is there a raised bed garden or a planter somewhere the students already engage with? Is there an established tree on campus students gravitate towards?

Opportunities for further teacher involvement in curriculum development could include attending a workshop for teachers to discuss incorporating outdoor learning environments into their lesson plans, and volunteering to pilot lessons with their students and share feedback.

Curriculum Development

Feedback gathered in the initial design workshops with students, teachers, staff, and parents will inform the design process, and the education team, to inform the development of curriculum. Additional information incorporated into the curriculum development includes school specific information such as documentation mapping of schoolyard features gathered in a site walk, class period length, average class size and overall curriculum arc by grade level, as well as Next Generation Science Standards appropriate to the topics considered for incorporation into the curriculum.

Curriculum designers should keep the following in mind to inform content development: Unique physical and cultural school features, descriptive characteristics of the surrounding watershed, proximity to regional water features including rivers, washes, and the Pacific Ocean, teachers' stated goals and the multi-benefit goals of the greening project.

In crafting learning objectives, designers should work to align with the design in process, the goals of the project and the Safe Clean Water Program as well as the grade and school specific learning goals and standards.

TreePeople has found success in organizing grades by clusters (i.e. K-2, 3-5) and designing flexible lesson plans for each cluster to accommodate learning style preferences and offer age appropriate strategies and activities techniques for each lesson.

Some topical questions for curriculum designers to ask themselves when designing curriculum specific to a school site to incorporate into lessons: What watershed is the school located in? Are there examples of water infrastructure—storm drains, rain barrels, irrigation spigots, visible in the area where students learn and play? Are there rivers, washes, or other regional water features in the neighborhood served by the school? Is there an opportunity for a field trip with students to the beach or the ocean? Do teachers at that school already have relationships with partner organizations that lead outdoor education opportunities that can enhance or reinforce lesson themes?

TreePeople Eco-Tour

Photo credit: Adam Corey Thomas



Targeted Feedback Through Teacher Focus Groups

Once the draft curriculum is developed, the next step is to share it with teachers who plan to implement it with their students for targeted feedback. Teachers who enthusiastically participated in the first round of engagements and showed an interest in engaging further can be a good starting point for focus group recruitment. In virtual or in person focus groups, curriculum designers can walk teachers through the curriculum, by grade level, and solicit feedback with questions such as:

- How does this curriculum meet your learning objectives for your students this year?
- Are the activities and content appropriate for your students?
- What logistical challenges do you foresee as you imagine implementing these lessons with your students?
- Would you be comfortable leading this lesson?
- What additional information or resources would you want in order to deliver this curriculum confidently?

These focus groups can also be an opportunity for further education around the greening project itself. This can be a good time to provide an update on the design, if any elements have changed, to provide context and education around the key features and goals of the greening project, and answer questions or address concerns about the changes coming to campus. As timelines on construction projects can often shift over time, this is also a good opportunity to provide a timeline update and keep lines of communication open to establish transparency and trust with the school community around the project.

Feedback gathered in this focus group stage is particularly useful in adjusting the curriculum to meet the specific needs of the teachers and students at specific schools, and ensuring the activities are appropriate for the intended grade level.



School Greening Workshop

Photo credit: Emily Tyrer

Piloting the Curriculum

Once feedback from the focus groups has been incorporated, the curriculum is now ready for pilot testing. Teachers who participated in the focus group may volunteer to pilot test the curriculum in collaboration with the curriculum design team, or they may recommend suitable teachers in their school. Pilot lessons may be most successful with a combination of the curriculum design team and the classroom teacher delivering the lesson, to ensure students feel comfortable with new content in a new setting.

Teacher and student feedback is important to gather after the pilot lesson, this stage yields the most specific feedback to the appropriateness of the content to the school, and provides a temperature check on the students connection to the content and delivery methods.

Timeline: From Concept to Schoolyard with Safe Clean Water Funding

Phase 1: Apply for Feasibility Study Funding



Step 1: Site assessment and analysis



Step 2: Analyze community needs



Step 3: Collect imagery, and format formal application

Phase 2: Conduct Feasibility Study



Step 1: Engineering surveys, soil testing, and other geological analysis



Step 2: Site design - community engagement



Step 3: Schematic design



Step 4: Establishing partnerships/contracts/legal

Phase 3: Apply for Infrastructure Project Funding



Create an application and report from the results of the Feasibility Study

Phase 4: Design and Construction



Step 1: Design development



Step 2: Construction documents



Step 3: DSA review



Step 4: Finalizing contracts/legal/partnerships



Step 5: Construction

From Concept to Schoolyard

A step-by-step guide to creating Green Infrastructure projects at schools, through the Safe Clean Water Program

PHASE 1:

Apply for Feasibility Study Funding

STEP 1: SITE ASSESSMENT & ANALYSIS

During the initial phase, the school will submit an application for funding from the Safe Clean Water Program (SCWP) to support a feasibility study of its site. This funding is intended to facilitate the school's engagement in the design process, involving qualified consultants, to comprehensively assess the site's potential for implementing stormwater management interventions and green infrastructure solutions.

ESTIMATED TIME: 2 MONTHS

STEP 2: INVESTIGATE COMMUNITY NEEDS

An initial assessment of the school community's needs will include an introductory engagement activity. Broader community involvement will be integrated during later stages of the application and design process, beginning with the feasibility study. Experienced school staff will guide this process to ensure meaningful community input.

ESTIMATED TIME: 2 MONTHS

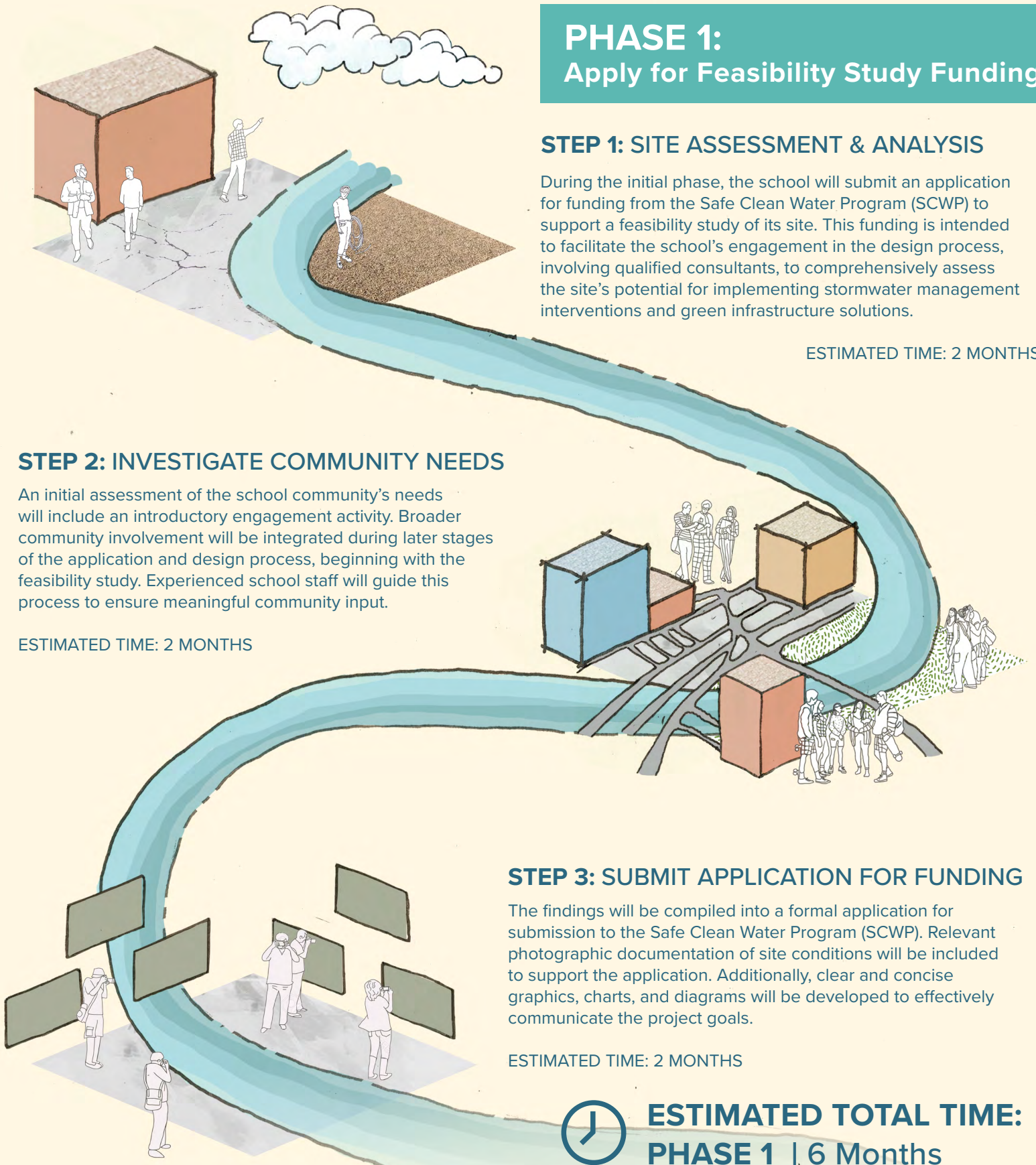
STEP 3: SUBMIT APPLICATION FOR FUNDING

The findings will be compiled into a formal application for submission to the Safe Clean Water Program (SCWP). Relevant photographic documentation of site conditions will be included to support the application. Additionally, clear and concise graphics, charts, and diagrams will be developed to effectively communicate the project goals.

ESTIMATED TIME: 2 MONTHS



ESTIMATED TOTAL TIME:
PHASE 1 | 6 Months



From Concept to Schoolyard (cont'd)

PHASE 2: Conduct Feasibility Study

STEP 1: SURVEYING & GEOLOGIC TESTING

The site will require professional surveys and analysis to understand the potential for stormwater interventions. Areas of exploration during this in-depth site reconnaissance include, but is not limited to soil drainage, potential equipment locations, relationships to an existing storm drain system, if any, and more.

ESTIMATED TIME: 4 MONTHS

STEP 2: COMMUNITY ENGAGEMENT

This is the time allotted for the official community engagement process to understand how to address the needs of the school stakeholders. This process can happen simultaneously with the survey and testing.

ESTIMATED TIME: 3 MONTHS (Concurrent with Geologic Testing)

STEP 3: SITE ASSESSMENT

The site will require professional surveys and analysis to understand the potential for stormwater interventions. Areas of exploration during this in-depth site reconnaissance include, but is not limited to soil drainage, potential equipment locations, relationships to an existing storm drain system, if any, and more.

ESTIMATED TIME: 4 MONTHS

STEP 4: ESTABLISHING PARTNERSHIPS

Reaching out to any outside agencies that would help handle the sanitation and maintenance needs required and associated with the stormwater infrastructure. These contracts would be finalized if the project is approved for infrastructure funding.

ESTIMATED TIME: 4 MONTHS (Concurrent with Step 3)



ESTIMATED TOTAL TIME:
PHASE 2 | 10 Months

From Concept to Schoolyard (*cont'd*)

PHASE 3:

Apply for Infrastructure Project Funding

COMPILE WORK & CREATE AN APPLICATION

Create an application and report from the results of the Feasibility Study. Use the engineering analysis, community input and design exhibits to make a compelling case towards funding the project.

ESTIMATED TIME: 2 MONTHS



ESTIMATED TOTAL TIME:
PHASE 3 | 2 Months

PHASE 4: Design & Construction

STEP 1: DESIGN DEVELOPMENT

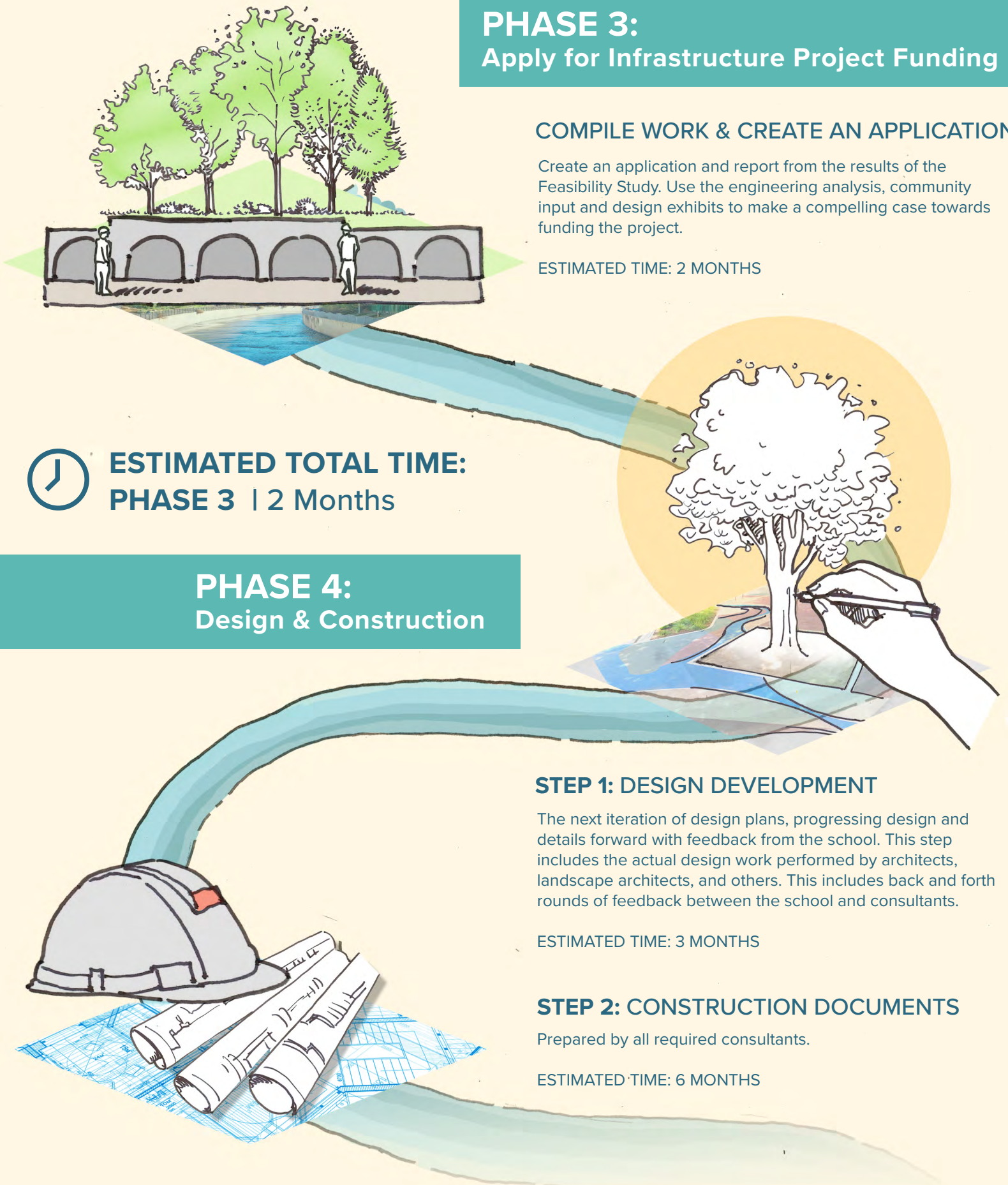
The next iteration of design plans, progressing design and details forward with feedback from the school. This step includes the actual design work performed by architects, landscape architects, and others. This includes back and forth rounds of feedback between the school and consultants.

ESTIMATED TIME: 3 MONTHS

STEP 2: CONSTRUCTION DOCUMENTS

Prepared by all required consultants.

ESTIMATED TIME: 6 MONTHS



From Concept to Schoolyard (cont'd)



STEP 3: DSA REVIEW

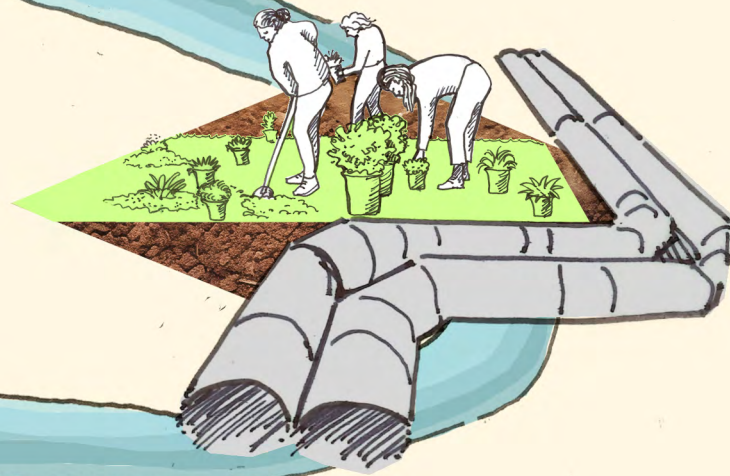
If the project requires review from the Department of State Architects, it will add time to the project to address their comments and update drawings.

ESTIMATED TIME: 6 MONTHS

STEP 4: FINALIZING CONTRACTS / LEGAL / PARTNERSHIPS

Finalizing any contracts with outside entities for sanitation and maintenance of new infrastructure.

ESTIMATED TIME: 2 MONTHS (Concurrent with Step 3)



STEP 5: CONSTRUCTION

Including bidding, project start, and project close-out.

ESTIMATED TIME: 18 MONTHS



ESTIMATED TOTAL TIME:
PHASE 4 | 33 Months



Foster Elementary School
Photo credit: James Kellogg

Here is an example, hypothetical scenario to further illustrate the full timeline, wherein the recommendations above would translate to an example schedule as follows: If Phase 1 began in March, 2026 and a feasibility study was funded and completed by July (Phases 1, 2, and 3 as outlined), SCWP review and selection for the SIP (Stormwater Investment Plan) would be awarded in approximately Jan 2028. Formalized agreements and funds transfer would occur in Jan 2029 (if following the current SCWP timelines). Following an aggressive development schedule, the designer may formalize a 60% design by July 2029 for construction funding application that would be awarded in January 2030, with funds transferring by January 2031. At this point construction would begin, and last approximately 18 months. This gives a final project end date of July 2032.

The timespan between a school's interest in pursuing SCWP funding, and a finished project can last several years. These projects have the potential to revolutionize school campuses in need of site improvements, while meeting environmental goals for the region.

Curriculum Development Timeline

Six months is a reasonable timeline for the development of an education curriculum program with partner schools, broken down by the following phases:

- Develop the first draft of the curriculum incorporating school information, design features, school community feedback, and learning standards and objectives. (3 months)
- Conduct focus groups (ideally during school year or on professional development days) and incorporate feedback. (1-2 months)
- Conduct pilot lessons and incorporate teacher feedback and lessons learned. (1-2 months)

08 Visualizing Cost (*An Example*)



Pacoima Middle School Living Schoolyard

Photo credit: Michelle Bagnato

Cost Estimate

The following is a summarized cost-estimate for a Green Infrastructure project at a school site. The cost estimate was based on a conceptual design that was created during this study for Sun Valley Magnet School—a middle school in the upper LA River watershed. This conceptual design would include regional stormwater capture infrastructure and is an example of a design that may qualify for SCWP funding. The cost has been divided into specific categories for clarity of understanding.

School Greening and Above-Ground BMPs

Paving & Site Improvements	\$480,000
Planting	\$225,000
Irrigation	\$28,000
Mobilization, General Conditions, Contingency	\$210,000
Site Furnishings	\$22,000
Bioswale	\$165,000
Estimated Total	\$1,130,000

Stormwater Capture and Filtration

Bioswales (~2000sqft)	\$165,000
This includes excavation, biofiltration media, and plantings/irrigation.	
Retention Gallery Ranging 2.5-25 ac ft² of Storage, based on \$1.75 million per acre-foot of storage	\$4.4 - 40 Million
Pump/Filter (<i>Pump, Filter, Piping</i>)	\$1.5 Million
Estimated Total	\$6 - 40 Million <i>(varies depending on footprint and scope)</i>

09 Concluding Summary



Vena Elementary School Living Schoolyard

Photo credit: Adam Corey Thomas

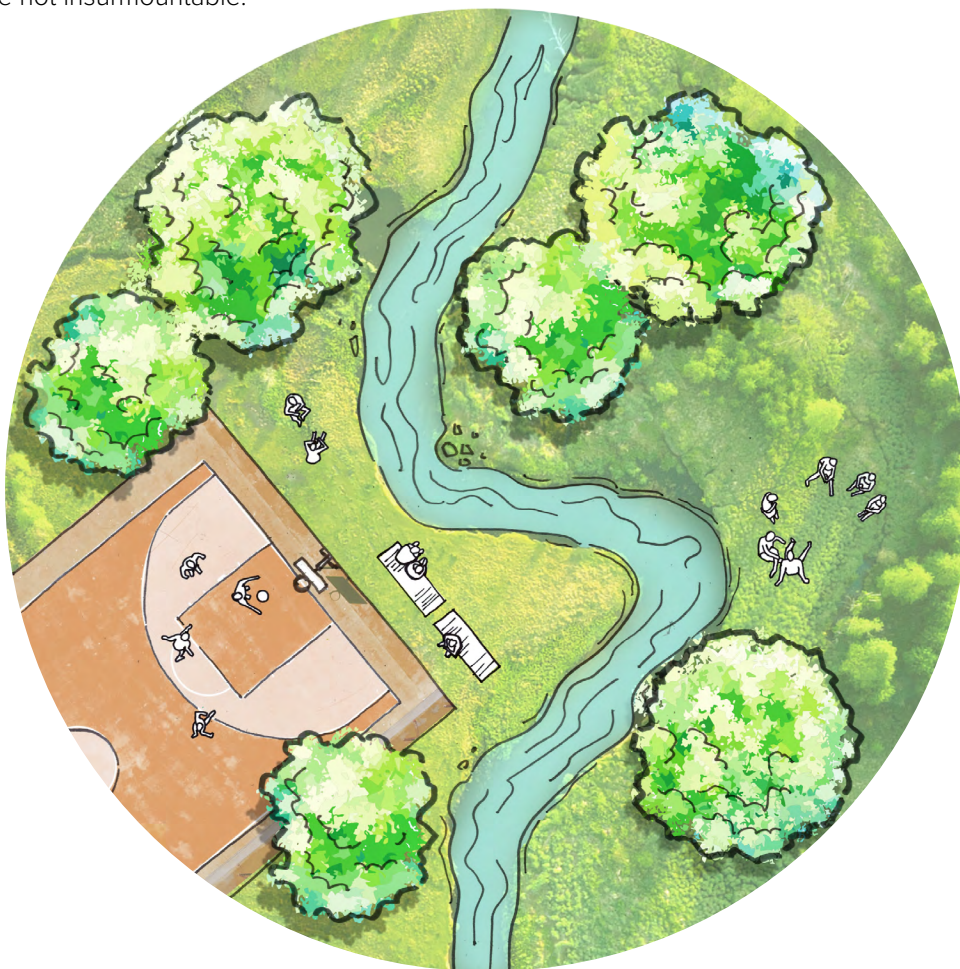
Conclusion

This Living Schoolyards Scientific Study highlights and quantifies the substantial and currently underutilized capacity of schoolyards to act as vital infrastructure for regional water sustainability through the Safe Clean Water Program. Initial studies at ten schools show that combining stormwater management with green schoolyard improvements is achievable and offers multiple advantages, including decreased local flooding, increased groundwater replenishment, better student health, and greater community adaptability. Scaled modeling indicates that implemented district-wide, LAUSD campuses could go a long way towards meeting Los Angeles County's annual groundwater infiltration targets and contribute substantially to pollutant load reductions.

These benefits cannot be realized without addressing multiple constraints and limitations, particularly those related to liability, regulatory complexity and operational uncertainty. While these challenges are significant, they are not insurmountable.

Strategic coordination between school districts and the Safe Clean Water Program can make a clear path forward by clarifying legal responsibilities, aligning infrastructure planning with state and county policy frameworks, and developing shared models for long-term operation and maintenance of schoolyard-integrated stormwater infrastructure.

By proactively engaging with the Safe Clean Water Program, LAUSD has the opportunity to leverage its land assets to meet its campus resilience targets and to lead on climate resilience, equity and community-centered design. The same is true for other school districts within Los Angeles County. Ultimately, Living Schoolyards have the power to exist not only as places of learning, but as vital systems in Los Angeles' climate adaptation strategy. With the right partnerships and policy support, the schoolyard can become a pillar for a more sustainable and equitable Los Angeles.



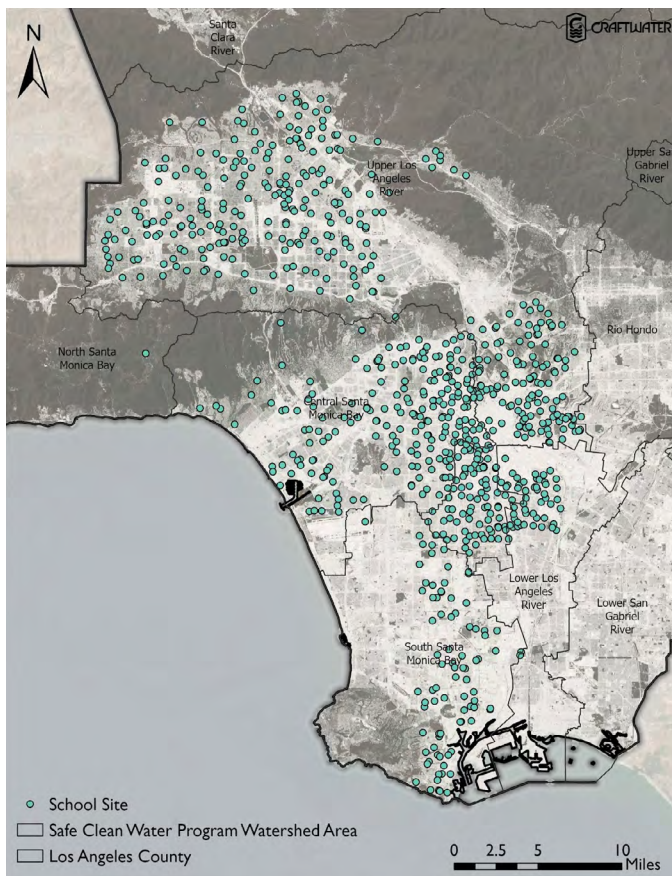
Appendix



Hubbard Elementary School tree care
Photo credit: James Kellogg

Living Schools Modeling

Detail Appendix

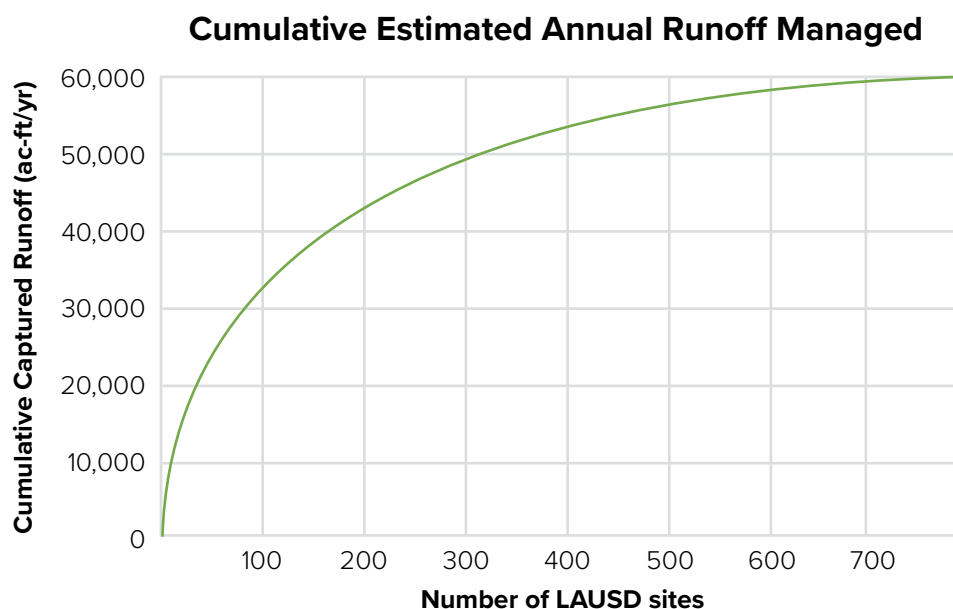


Goal: Analyze School Site Runoff

The goal of this exercise was to estimate the maximum potential for regional runoff capture at all 785 K-12 school sites in the Los Angeles Unified School District (LAUSD) by mapping drainage areas and estimating runoff and pollutant loading for each site. **While this planning-level analysis is grounded in site-by-site runoff capture potential, it did not conceptualize and explicitly model project configurations to the level of detail included in Phase 2 of the study.**

Workflow and Assumptions

Approximate drainage areas for each school site (limited to 10,000 acres per site to avoid overloading treatment systems) were delineated using a digital elevation model and storm drain lines within 1,000 linear feet from each school site. Annual precipitation data from the Los Angeles County Watershed Management Modeling System (WMMS) was averaged over a ten-year period and assumed to be spatially uniform across the corresponding sub-watershed. Effective imperviousness was calculated using a land-use imperviousness raster surface (National Land Cover Dataset, USGS, 2021) and a correlative equation for effective imperviousness (Alley and Veenhuis, 1983). The precipitation and imperviousness data were combined to estimate annual baseline runoff for each school site's drainage area. Average BMP runoff capture and pollutant treatment efficiencies were estimated using modeling results from the SCWP's Metrics & Monitoring Study (MMS) that looked at the upper ends of regional treatment potential, assuming full watershed buildout and an approximate project implementation density; median runoff managed and zinc captured by all projects represented in the MMS in the LA River Watershed at full buildout was 50.2% and 62.2%, respectively. An average zinc concentration (assumed to be uniform across LA County) was used from a 2007 Southern California Coastal Water Research Project (SCCWRP) study on metals in urban stormwater. Note that zinc, assumed to be a limiting pollutant, is used as the proxy pollutant for meeting TMDL requirements for other pollutants in the majority of LA County watersheds. These efficiencies and concentration values were combined with the estimated annual baseline runoff to estimate capture and pollutant removal potential for each school site. Because this was a planning-level modeling exercise, feasibility studies were not conducted for each site to confirm the most effective fate of captured runoff (i.e., groundwater infiltration, diversion to sewer for reclamation/reuse, onsite use for irrigation, etc.); instead, it was assumed that water would be managed either through infiltration or filtration, consistent with typical regional projects funded by the SCWP.



Number of LAUSD sites	% of total potential runoff managed
78	50%
273	80%
407	90%
514	95%
785	100%

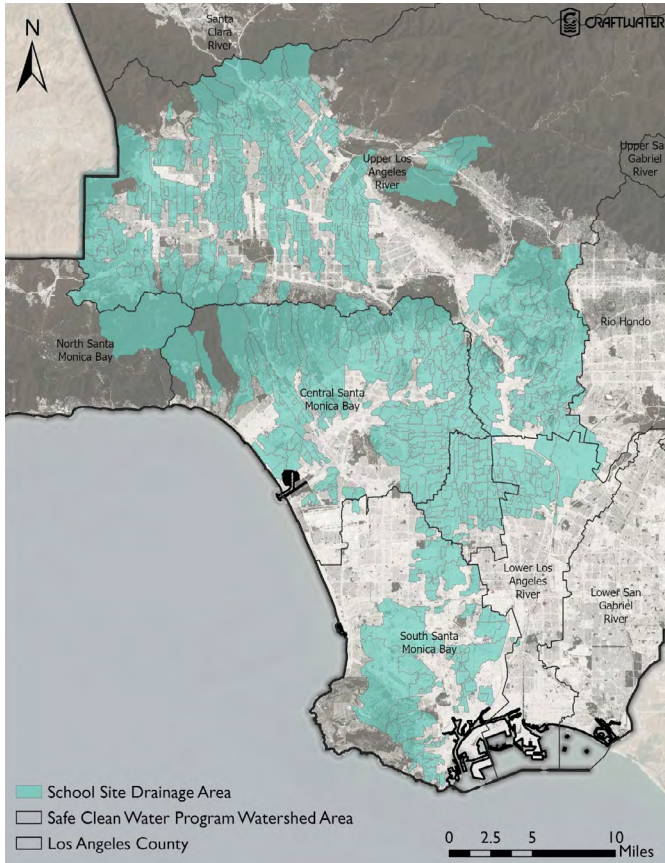
Results

Given the implementation of projects at all 785 school sites, there is the potential to capture nearly 60,000 acre-feet of stormwater runoff annually, which is a substantial volume of water for groundwater recharge, diversion to the sewer for reclamation and reuse, or onsite use. Capturing this amount of stormwater runoff could also remove about 15,000 pounds of zinc per year, accounting for nearly 20% of the targeted annual zinc reduction in the SCWP watershed areas.

Additional analysis shows that if stormwater capture were limited to only onsite runoff from school parcel areas, total estimated stormwater capture volumes and zinc reductions would be scaled to only about 2.8% of the full regional capture potential; this demonstrates the potential regional benefits of off site stormwater capture on school properties.

Implementing offsite runoff capture on all 785 sites is likely impractical due to funding and engineering constraints, so the potential benefits of retrofitting just a fraction of sites was also investigated (see the chart and table above). The curve ranks the sites by total estimated capture and showing the cumulative estimated annual runoff managed by the number of sites. The table summarizes this same data, showing the minimum number of sites required to reach benchmark percentages of the cumulative potential runoff. For example, 50% of the estimated total runoff could potentially be managed by capturing runoff at only 10% of the LAUSD sites; difference in performance between sites in this analysis is primarily driven by drainage area size and availability of runoff. These results can be used to contextualize scaling scenarios and help to prioritize implementation of projects.

The following pages summarize the planning-level results by regional drainage area, by parcel, and by Safe, Clean Water Program Watershed Area.

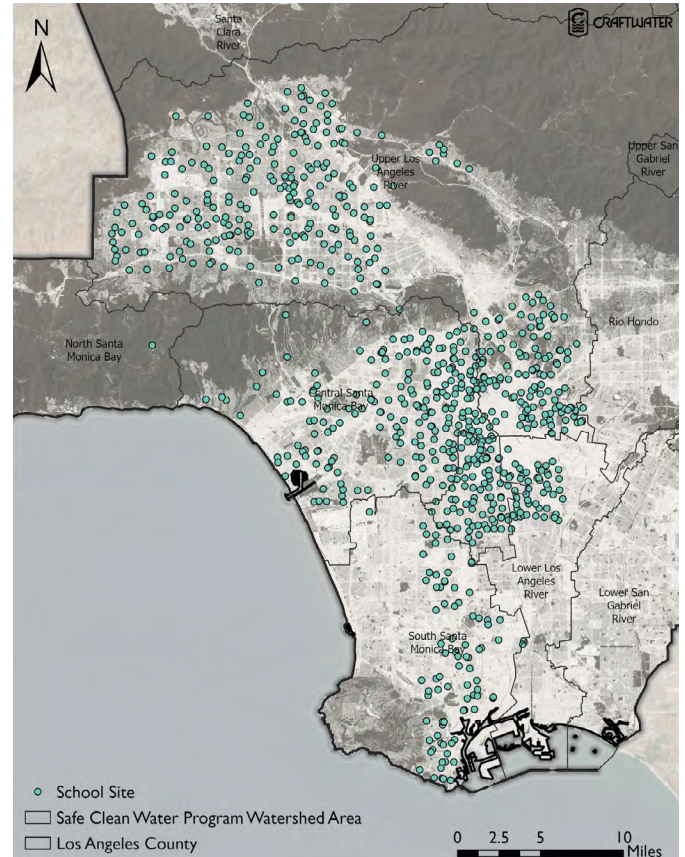


Estimates by Drainage Area

	Total	Median
Approximate drainage area (ac)	300,000	140
Estimated effective average annual baseline runoff (ac-ft)	120,000	71
Estimated effective average annual captured runoff (ac-ft)	60,000	36
Estimated annual zinc load in baseline runoff (lbs)	49,000	29
Estimated annual zinc reduction (lbs)	15,000	9.1

Estimates by School Parcel

	Total	Median
Approximate drainage area (ac)	6,400	5.8
Estimated effective average annual baseline runoff (ac-ft)	3,300	3.0
Estimated effective average annual captured runoff (ac-ft)	1,700	1.5
Estimated annual zinc load in baseline runoff (lbs)	1,400	1.2
Estimated annual zinc reduction (lbs)	420	0.4



Estimates by SCWP Watershed

	North & Central Santa Monica Bay	South Santa Monica Bay	Santa Clara River	Upper Los Angeles River	Lower Los Angeles River	Rio Hondo	Total
Approximate drainage area (ac)	89,000	35,000	76	154,000	14,000	1,300	300,000
Estimated effective average annual baseline runoff (ac-ft)	32,000	17,000	11	58,000	11,000	890	120,000
Estimated effective average annual captured runoff (ac-ft)	16,000	8,700	6	29,000	5,300	450	60,000
Estimated annual zinc load in baseline runoff (lbs)	13,000	7,100	5	24,000	4,300	370	49,000
Estimated annual zinc reduction (lbs)	4,100	2,200	1	7,400	1,400	110	15,000
Per MMS, targeted annual zinc reduction (lbs) [% achieved]	16,150* [25%]	29,050 [8%]	2,900 [<1%]	21,220 [35%]	10,810 [12%]	1,490 [8%]	81,620* [18%]

* does not include NSMB's annual zinc reduction target (which is unlisted, as NSMB's pollutant of concern is total phosphorous)

LAUSD, City and County MOU Constraints and Recommended Considerations

On February 3, 2025, the City of Los Angeles Bureau of Sanitation and Environment released a report detailing constraints limiting City departmental coordination and partnerships with Los Angeles Unified School District (LAUSD) and nongovernmental organizations to apply for Safe Clean Water Program (SCWP) stormwater infrastructure projects as directed in City Council Motion #23-0656. The report identified 4 unresolved challenges limiting the development of an MOU with LAUSD:

1. **LAUSD's refusal to accept offsite runoff onto school campuses over concerns of liability and safety concerns**
2. **LAUSD's concern for the future fate of schools**
3. **LAUSD's concern of future development restrictions having to work around stormwater infrastructure**
4. **LAUSD's concerns over operation and maintenance, particularly concerning access and liability**

LAUSD Living Schoolyards Scientific Study

In 2021, TreePeople in partnership with Craftwater, StudioMLA and LAUSD were awarded a SCWP Scientific Study grant to model the impact of integrating offsite stormwater management infrastructure within green campus schoolyard designs on 10 LAUSD campuses.

This study includes the objectives of modeling stormwater BMPs across all feasible LAUSD campuses and advancing recommendations to pursue further SCWP partnerships with LA City, County and NGOs.

Primary results from this study include:

1. Confirmation that stormwater BMPs can be safely integrated into schoolyard greening designs to redirect and manage offsite stormwater without negatively impacting school education activities.¹
2. SCWP partnership with school districts can significantly benefit academic resources in the form of improved outdoor learning environments, improved campus facilities and new environmental curriculum development aligned with District objectives, specifically the Green Schoolyards for All Resolution.
3. Scaling stormwater BMPs across feasible LAUSD properties could contribute to management of **60,000 acre-feet of stormwater runoff annually. This volume meets nearly 75% of LA County's groundwater recharge water plans target - enough water to support over 700,000 Angelenos each year.**²
4. Capture and management of this amount of stormwater could result in the **removal of up to 15,000 pounds of zinc per year** (up to 20% of watershed pollutant targets) in addition to the removal of significant amounts of other pollutants from surface runoff.³

¹ Offsite stormwater management infrastructure is defined in this study as infrastructure that diverts stormwater runoff from the surrounding watershed to be treated, collected, and infiltrated using engineered below-ground best management practices (BMPs) installed in conjunction with above ground greening features.

² Water demand for over 700,000 Angelenos assumes 70 gallons per capita per day. While this study does not contextualize water recycling for potable use, this metric is useful to better understand the potential scale of impact.

³ Zinc is considered a high-priority water quality contaminant and is therefore used as reference in this study.

Recommendations to Advance SCWP Partnerships with LAUSD, City and County Agencies

The enormous potential for successful SCWP partnerships to advance City, County and LAUSD sustainability targets is undeniable. However, this potential cannot be met without addressing constraints that exist due to the perceived exposure of LAUSD to greater liability. While there are reasonable considerations in need of further assessment, there is a clear path forward to define partnerships with Los Angeles City and County agencies that may be particularly well positioned to advance SCWP-aligned infrastructure projects.

Key recommendations to advance further discussion between City, County and LAUSD administration are outlined below.

Liability, Operation and Maintenance

Considerations to address LAUSD's refusal to accept offsite runoff onto school campuses over liability and safety concerns center on the reassignment of liability for contamination events to the City or a designated government agency responsible for Operation & Maintenance (O&M) of stormwater infrastructure, not the District.

Strategies for consideration include:

- **Indemnification:** Require City or water agency to hold the District harmless from any legal or financial repercussions due to stormwater contamination.
- **O&M Permissible Expense:** Educate LAUSD and other policymakers on the unique opportunity SCWP presents as one of the few programs without a sunset provision that allows for O&M costs.
- **Combine Municipal & Regional Programs:** SCWP allows for the combining of both programs, which if executed collaboratively can lead to impactful projects with optimal cost sharing potential.

- **Insurance:** Mandate and define insurance that covers environmental liability; including a State option through the Insurance Commissioner's Office or State programs.
- **Mitigation Funds:** Create a mitigation fund for site redevelopment or emergency repair scenarios.

Conversations with LAUSD's Office of Eco-Sustainability and other decision makers revealed that District disinterest in partnership with agencies on SCWP projects that divert stormwater from offsite has centered primarily on the absence of a clear pathway for assigning liability and management of proposed projects. As mentioned above, the opportunity to have O&M costs covered by SCWP funded projects addresses a critical first step. Defining a clear framework for assessing O&M, performance of stormwater capture and treatment expectations for infrastructure installed on or below District owned properties is a significant priority to advance discussion on stormwater projects overall. This includes more clear definitions of which agencies would be responsible for stormwater infrastructure and how coordination between municipal agencies and district administration can be understood.

Development Restrictions and the Future Fate of Schools

Forward facing reassessments of facilities, programs and policies are a significant part of any school district's strategic growth plans—this is visible in the prevailing push towards greener campuses where paving had been a historic norm. The District itself is best situated to define how stormwater management infrastructure—and the investment potential it brings—should be integrated into campus greening and facilities improvement plans over the next decade. **However, it would be useful for City and County agencies to consider how they can facilitate these plans. Relevant considerations include:**

- **Renewable term agreements:** Define projected timelines for infrastructure operation into the future with periods for reassessing easement agreements.
- **Infrastructure compensation:** Consider the feasibility of infrastructure buy-out provisions allowing the City, County, or other relevant agency to purchase if the District decides to sell the land.
- **Recorded agreements tied to land, not operations:** Define pathways for agreements to remain enforceable if the District opts to sell or transfer land ownership, particularly automatic transfer agreements requiring new landowners to preserve O&M and access obligations.
- **Utility easements & development compatibility terms:** Explore surface use rights and shared use agreements that define acceptable building loads or foundation types that will not interfere with stormwater infrastructure.

- **Joint development & capital planning:** Integrate schoolyard greening and stormwater infrastructure planning into District capital investment. Define how to coordinate between District, City and County to assess and avoid potential conflicts between long-term facility plans and fixed infrastructure.
- **Pilot demonstration sites:** Identifying a small cohort of schools for technical or feasibility studies through the SCWP can allow the District, City and SCWP to assess implementation needs and limitations, build internal capacity, and demonstrate visible success before scaling implementation across the District.

The City of LA, LA County, and LAUSD have a timely, high-impact opportunity to advance the vision of high-performance, climate-resilient neighborhoods and schools while also supporting City and County water sustainability targets. Through strategic engagement with the Safe Clean Water Program, the District can pursue this opportunity while negotiating clear liability protections and securing a new, sustained funding source to support greening targets and facilities improvements across its campuses indefinitely.⁴

⁴ While the Safe Clean Water Program Regional Program runs on a competitive grant application cycle, funding for the program itself will continue to renew annually until the voters of Los Angeles County vote to end the program.



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