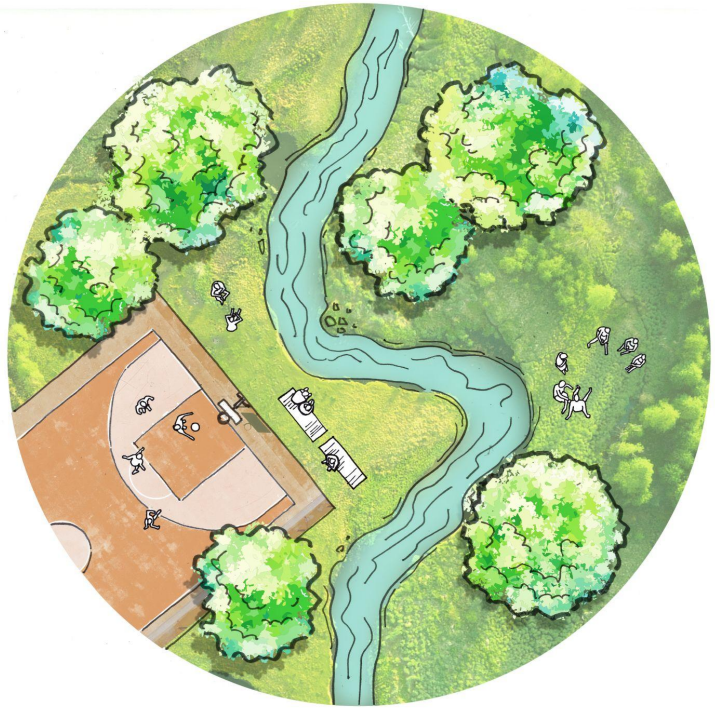
# Untapped Potential – Living Schoolyards Scientific Study

*"The objective of the Living Schoolyards Study is to determine how school campus greening can best* ***advance regional water quality*** *& drought preparedness goals while also* ***supporting student learning & health*** *..."*

*– Uncovering the Barrier Between Stormwater and Schools, Phase 1 Report*



SAFE CLEAN WATER PROGRAM

CRAFTWATER SCIENCE • STRATEGY • ENGINEERING

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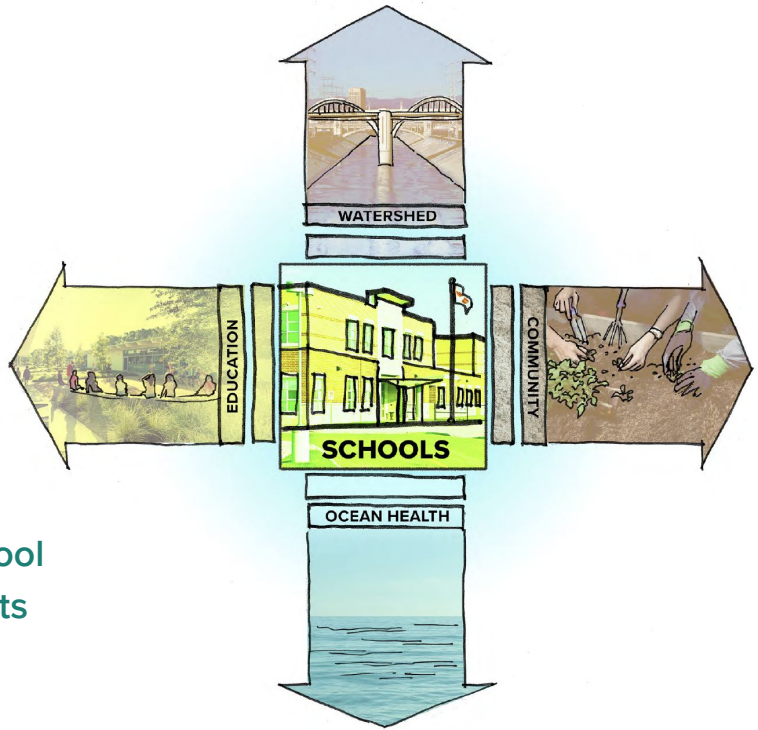
# Key Points

Stormwater management BMPs are compatible with green schoolyards design

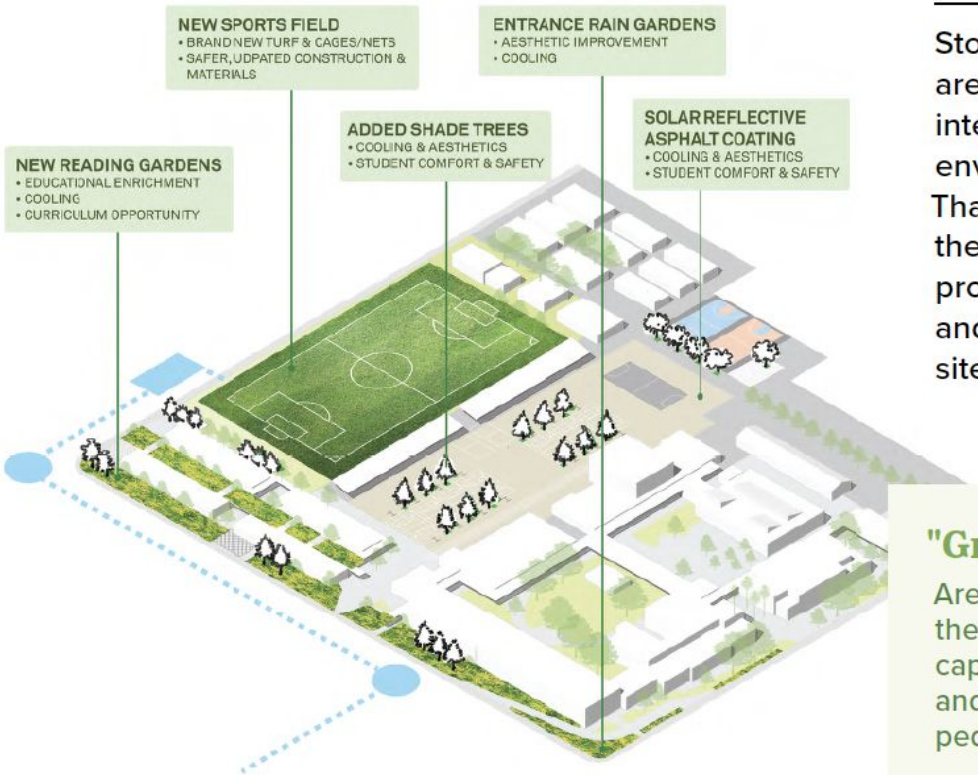
Schools have high-impact potential for stormwater management & pollutant reduction if they accept off-site stormwater

Off-site stormwater management limited by persistent perceptions of liability

Liability concerns may be more manageable in smaller school districts, or in response to changing regulatory requirements



# Campus “Green” Design Approach




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:

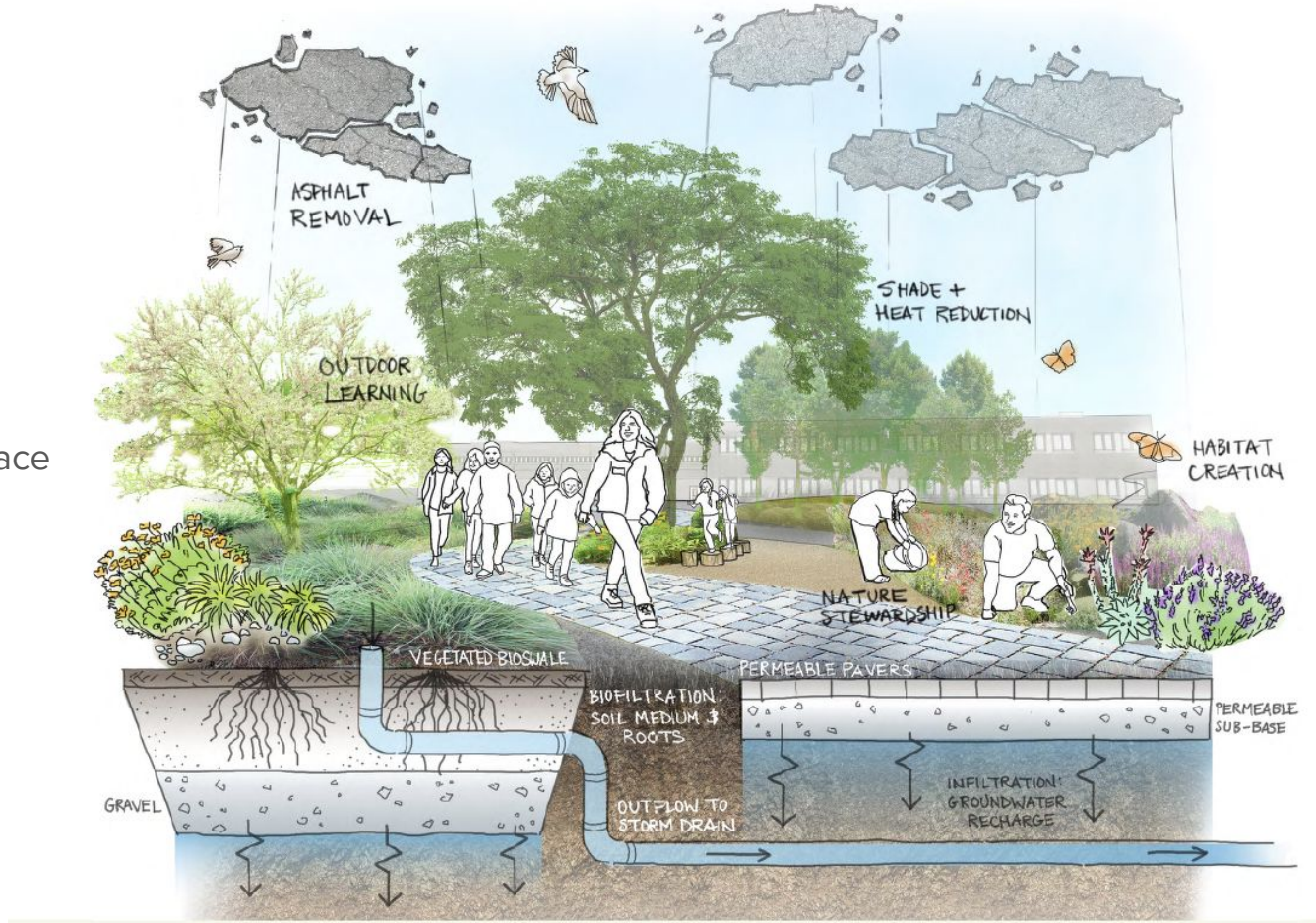
Areas made permeable for the installation of stormwater capture devices become active and passive green space at the pedestrian level.

# Green BMPs

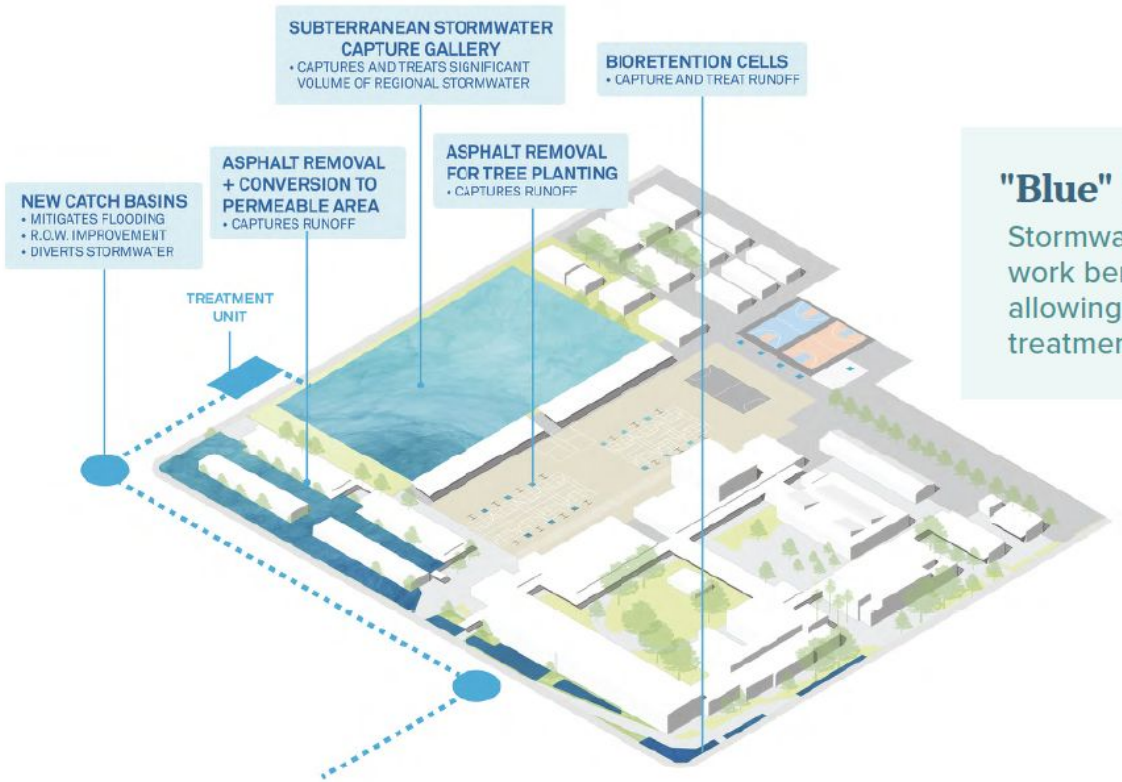
Nature-based cooling

Hardscape removal

Improved permeability & surface drainage



# Campus “Blue” Design




## "Blue" Benefits:

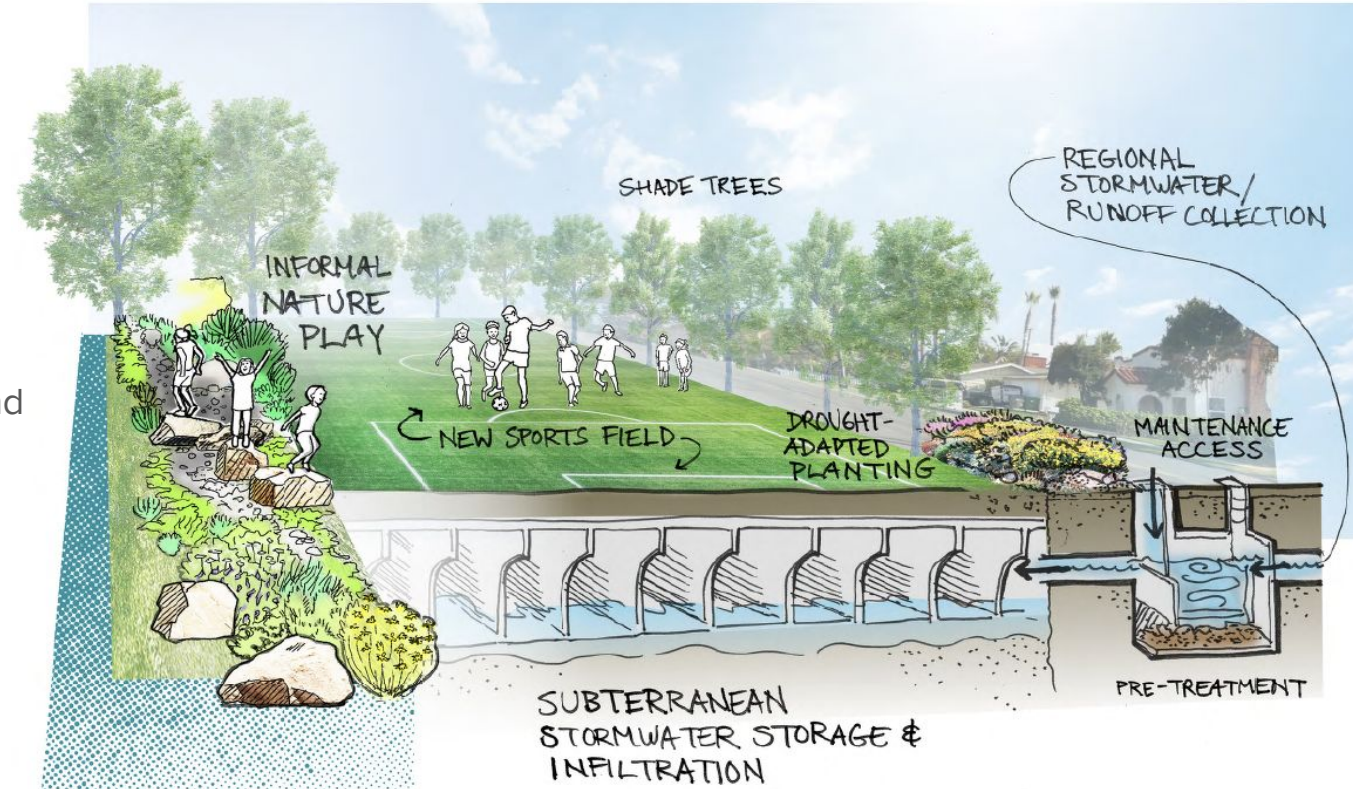
Stormwater BMP's are doing work beneath the surface: allowing infiltration and treatment of runoff.

# Blue BMPs

Large galleries

Pre-treatment of diverted stormwater

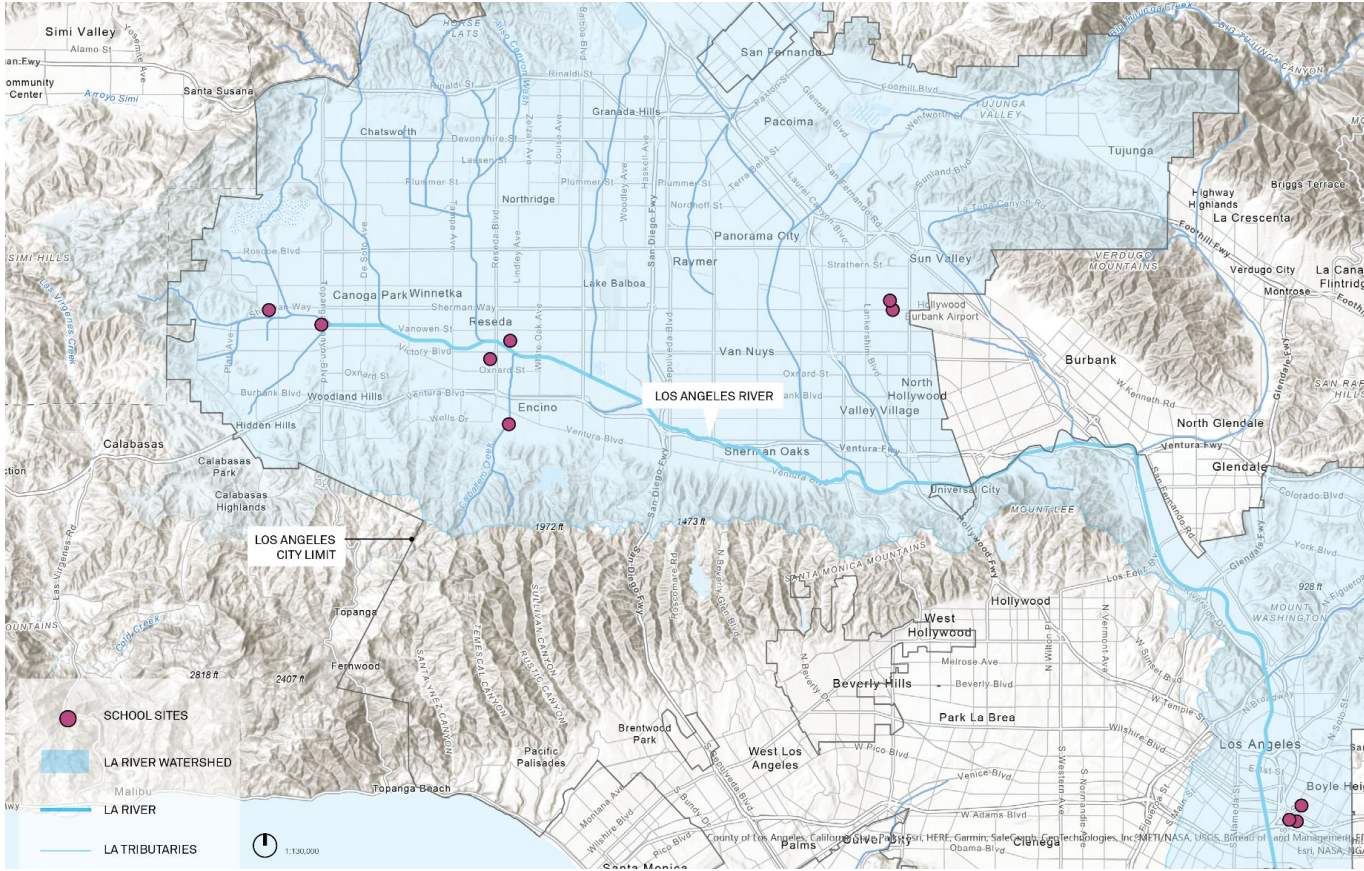
Integration with above ground design



# Integrating Green & Blue on School Campuses

**10** pilot school sites in ULAR watershed area

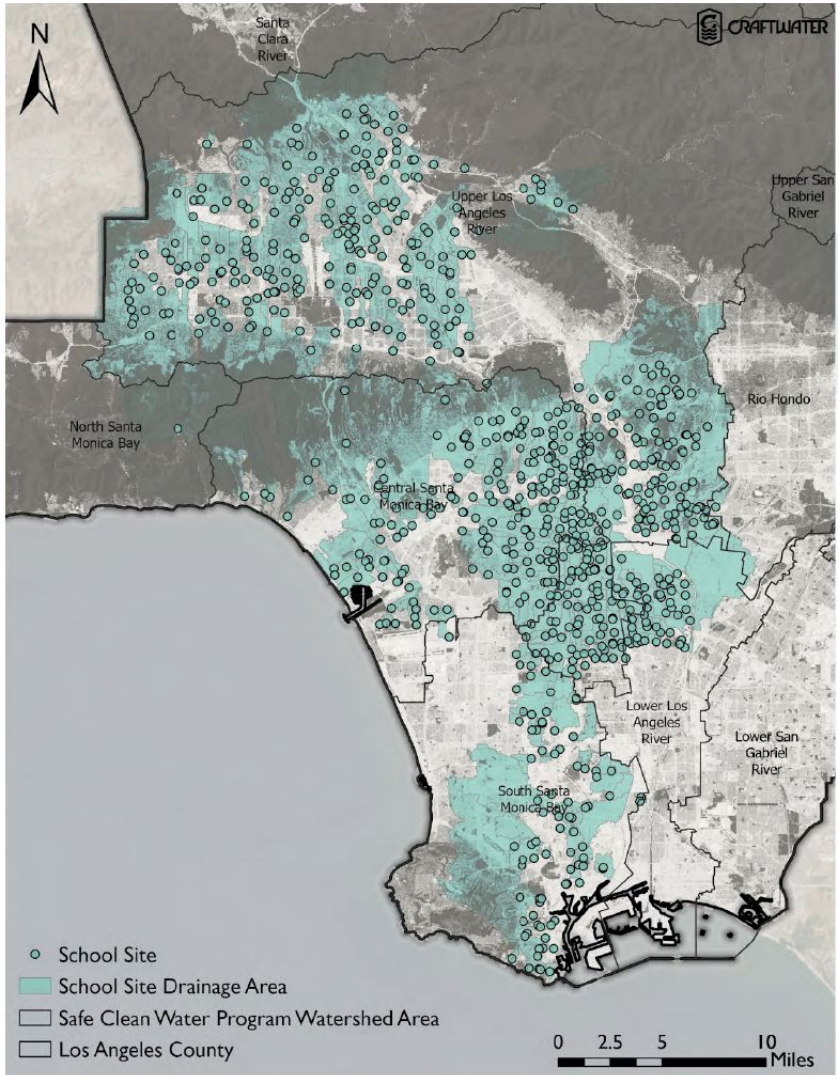
Scaled to **785** district-wide campuses



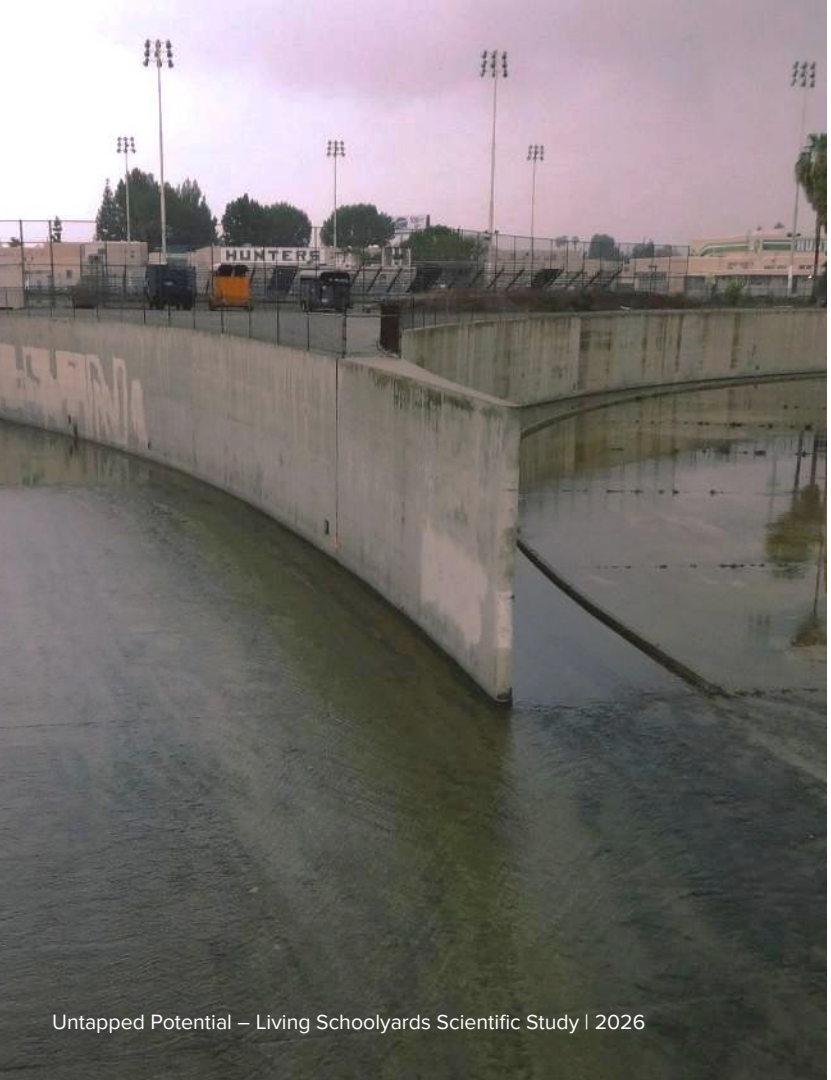
# Modeling the Impact

**60,000** acre-feet management potential per year across 785 sites

**15,000** lbs of zinc reduction per year, approximately 20% of targeted annual zinc reduction in corresponding watersheds



# Challenges & Possible Solutions

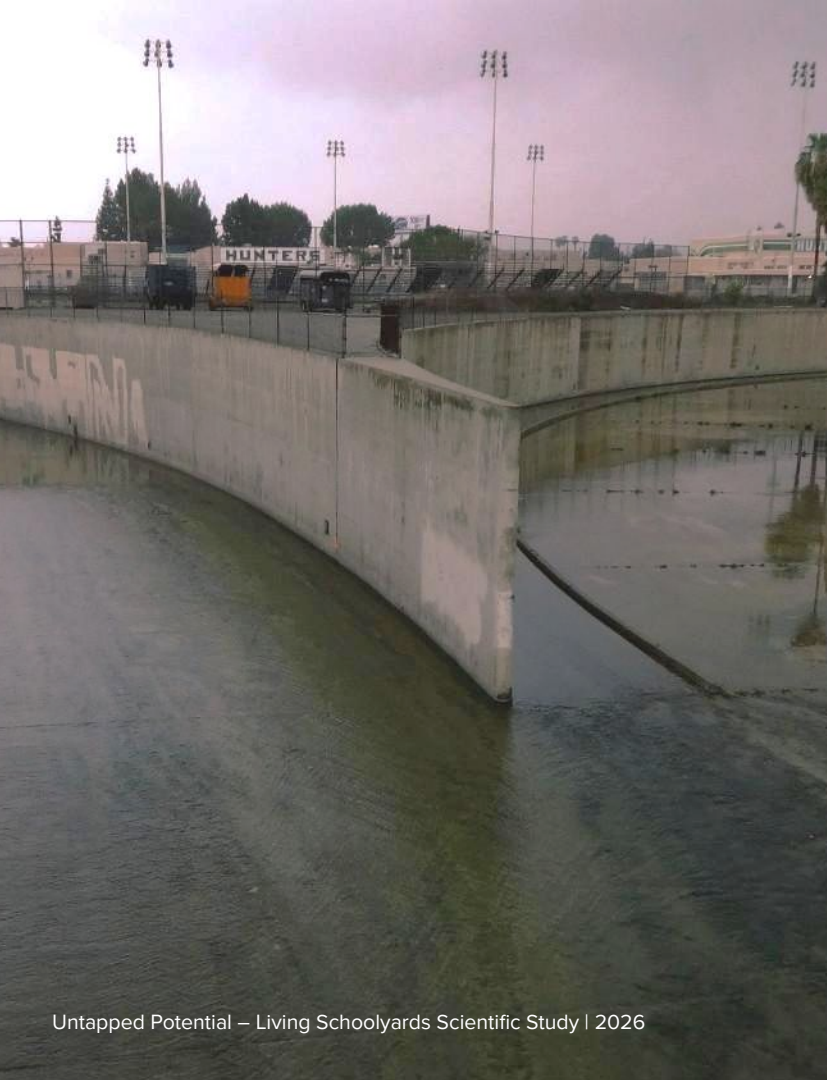



# Off-Site Diversion

Diversion from “off-site” ➔ highest regional impact potential

Also increases concerns of **District Liability**

- Smaller school districts may be better suited to pilot projects
- Number of projects can be scaled by district to reach regional impact

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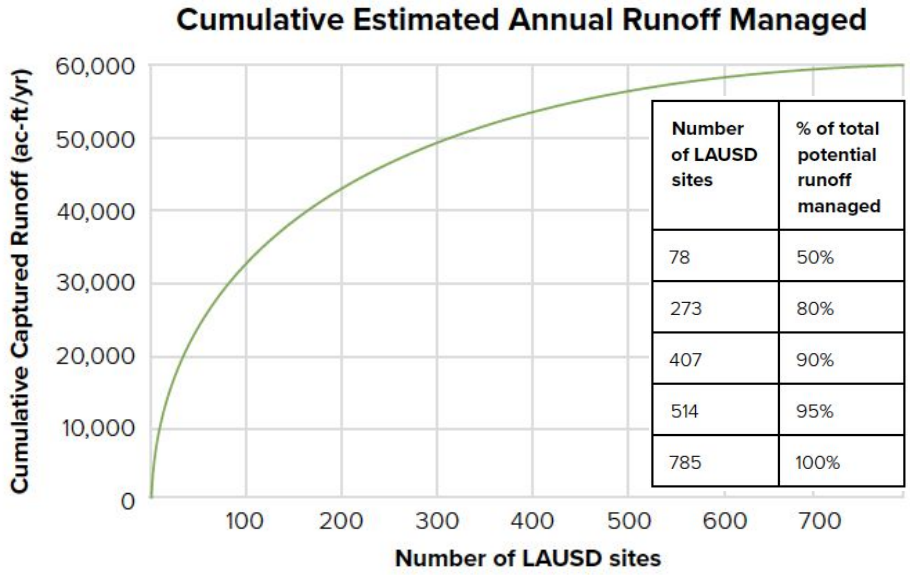



| Number of LAUSD sites | % of total potential runoff managed |
|---|---|
| 78 | 50% |
| 273 | 80% |
| 407 | 90% |
| 514 | 95% |
| 785 | 100% |

# Off-Site Diversion

Liability concerns can likely be managed in response to:

Changing regulatory requirements – Perceptions of required MS4 permitting for schools encourages adoption, exemption discourages

Sufficient indemnification partnerships, land use and real estate agreements

Trending increase in supplemental funding needs for greening projects

Liability vs Negligence – Risk framing in response to extreme heat events and associated impact on student health, landowner responsibility to water resource management

# Construction Downtime

Downtime for BMP installation is a significant concern, especially when paired with **intervention cost**

Tailoring BMP selection to campus-specific needs can effectively mitigate

- Nuisance flooding on and around campus
- Vector control from pooling
- Other peripheral community needs (greenspace, parks, etc)

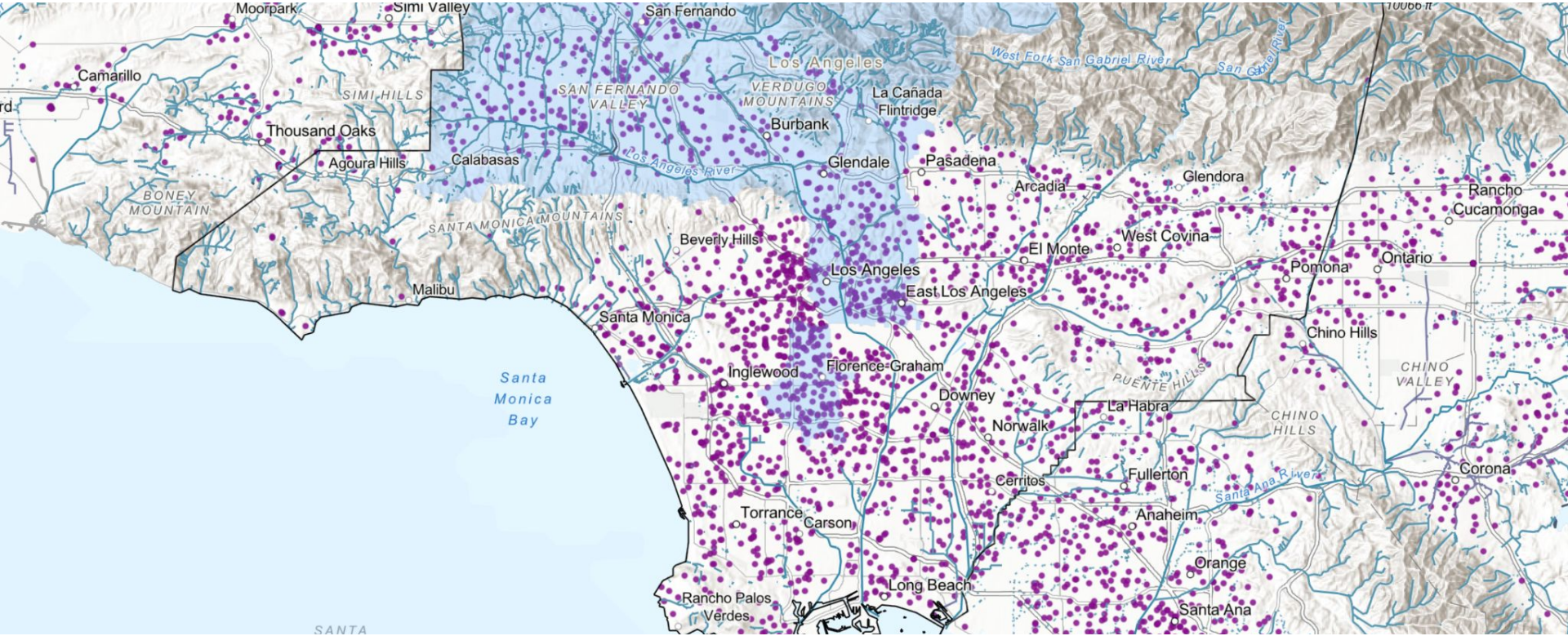
# “Larger” Interventions vs “Smaller” Community Benefit Projects

Are school greening projects competitive with the SCWP compared to larger, regional interventions?

Can batching of smaller interventions meet regional targets:

- Need for visible community-benefit projects
- Smaller, coordinated projects that prioritize community-benefit (ex Beach Cities Green Streets success)

# Feasibility of School Projects for Regional Resilience



# Schools Sites as Holistic Community Investments

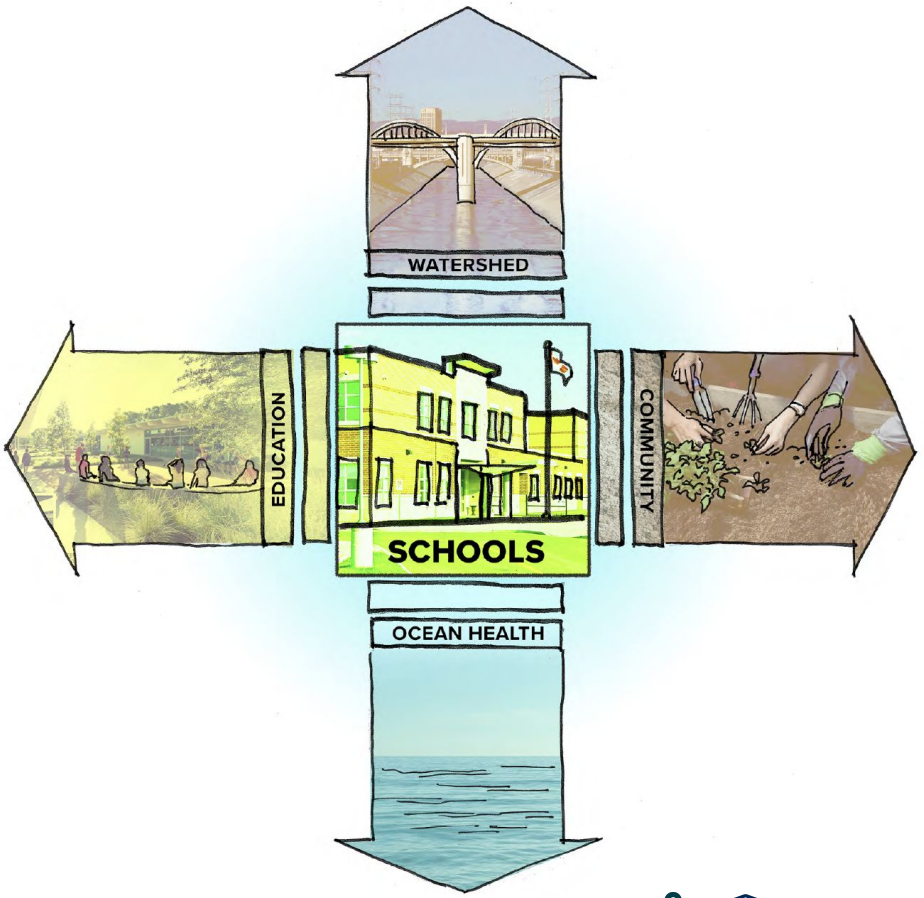
## School Contributions to Regional Resilience

Accessibility & extreme heat

Mental health & wellbeing

Community building & public programming

Regional watershed sustainability goals



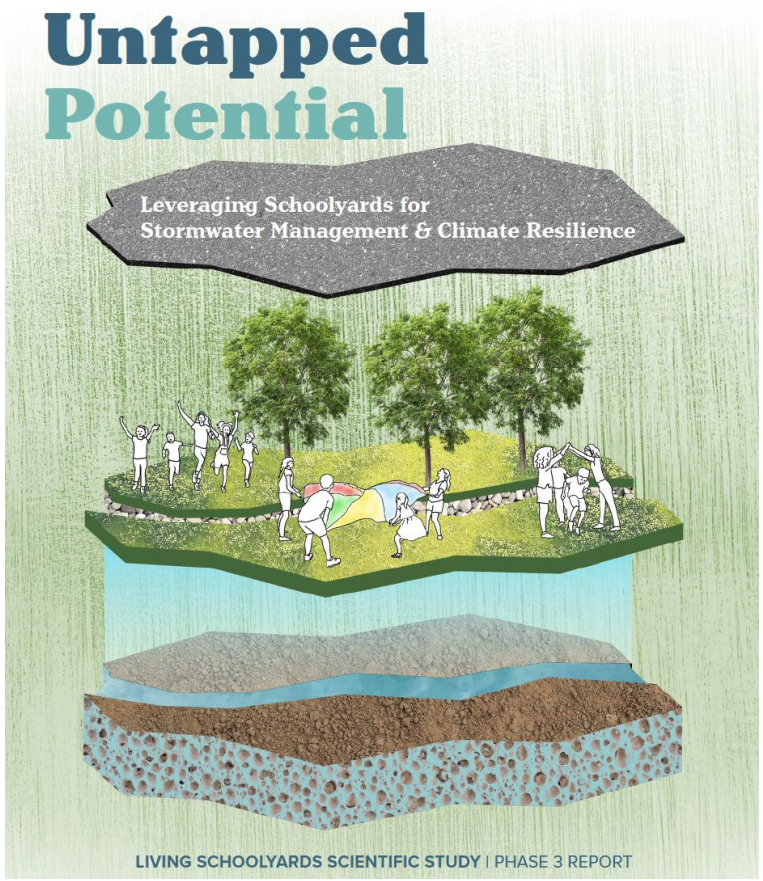
# Recommendations

Coordinate with partner agencies, municipal departments to identify priority watershed areas

Advance pilot projects on select schools in partnership with districts that are ready to break ground

Collect information on additional constraints, pathways to improve collaborative project development with SCWP

- DSA requirements
- Runoff requirements (MS4)




## Additional Content

Assessing constraints, advancing solutions

School District Admin Guidance on SCWP

Curriculum development & programming

For more information & to keep up to date, visit:

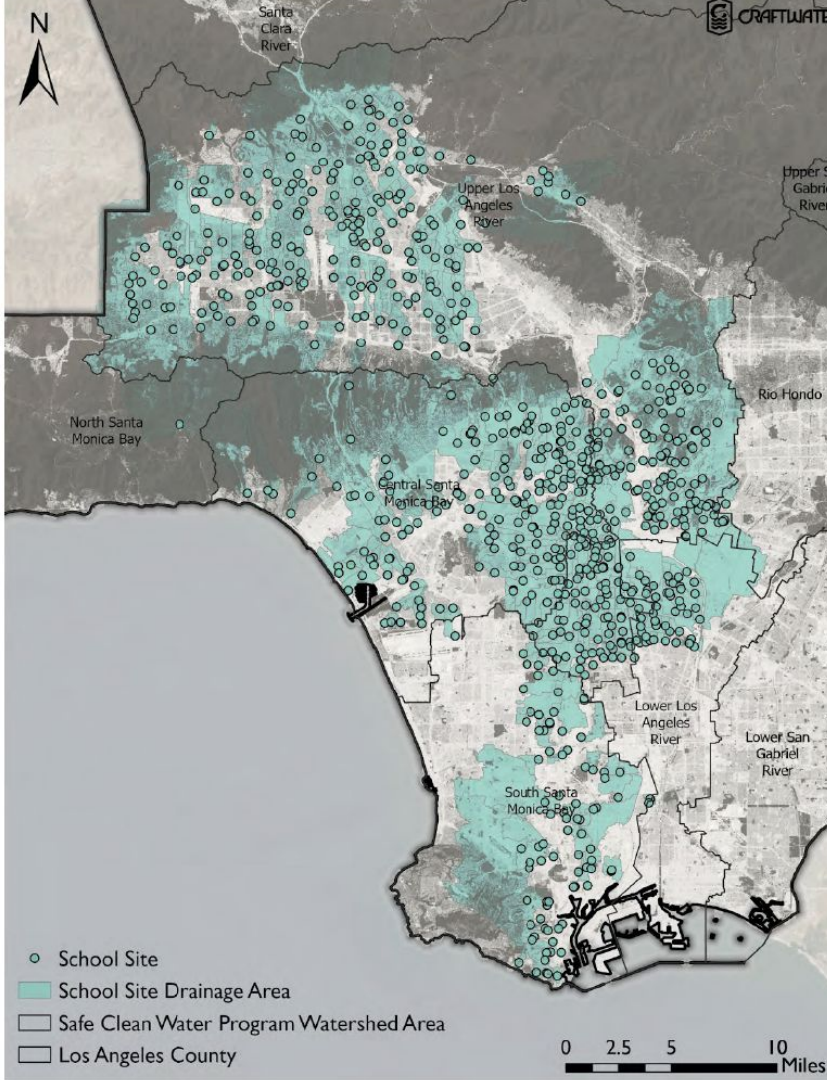
**treepeople.org/research**

# Appendix Material

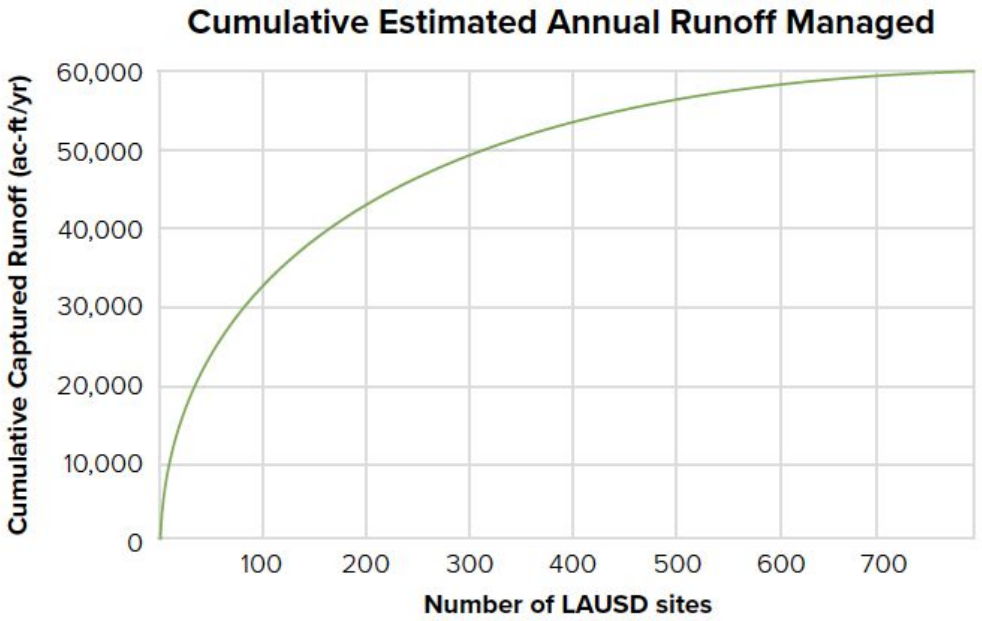
# Modeling the Impact

| | 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)



# Modeling the Impact

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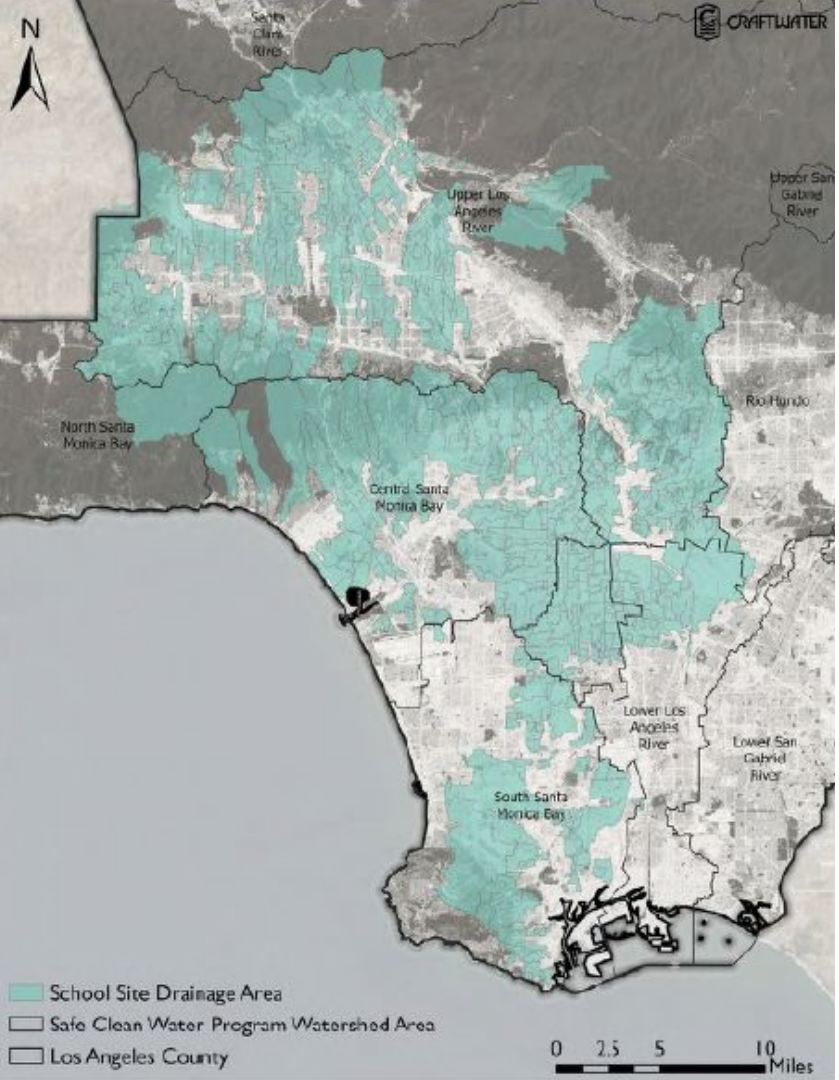


## Estimates by Drainage Area

| | 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 |

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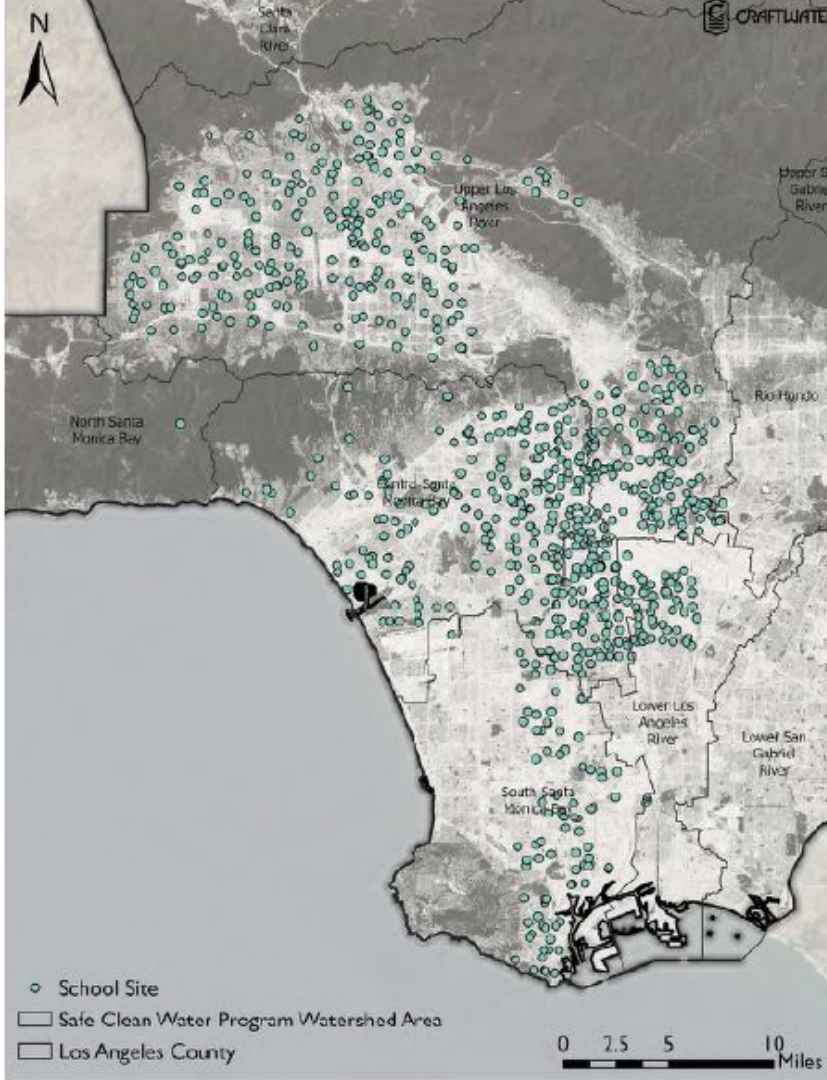
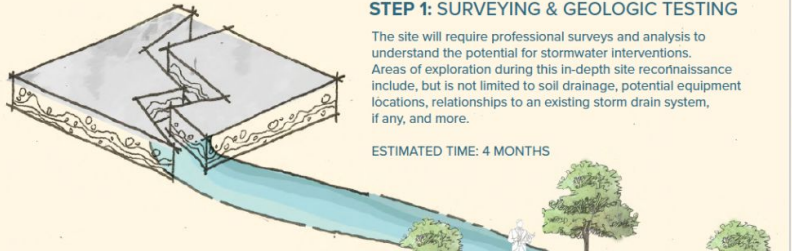
## Estimates by School Parcel

| | 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 |



# 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:** COMMUNITY ENGAGEMENT

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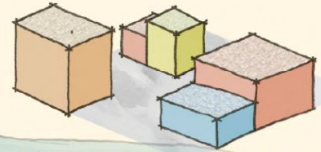
ESTIMATED TIME: 4 MONTHS

**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

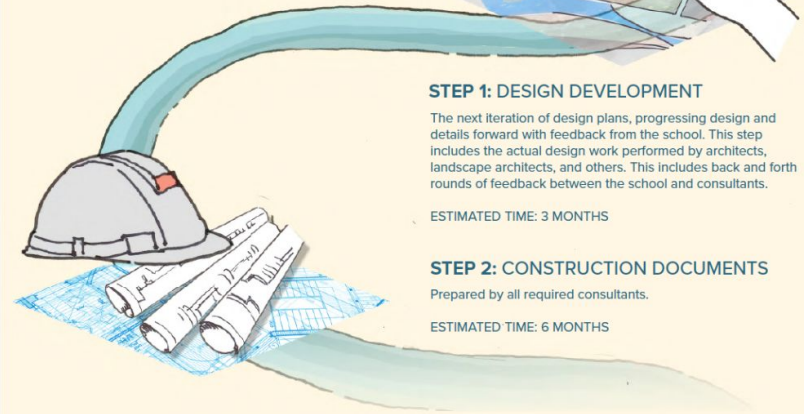
**COMPILE WORK & CREATE AN APPLICATION**

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.

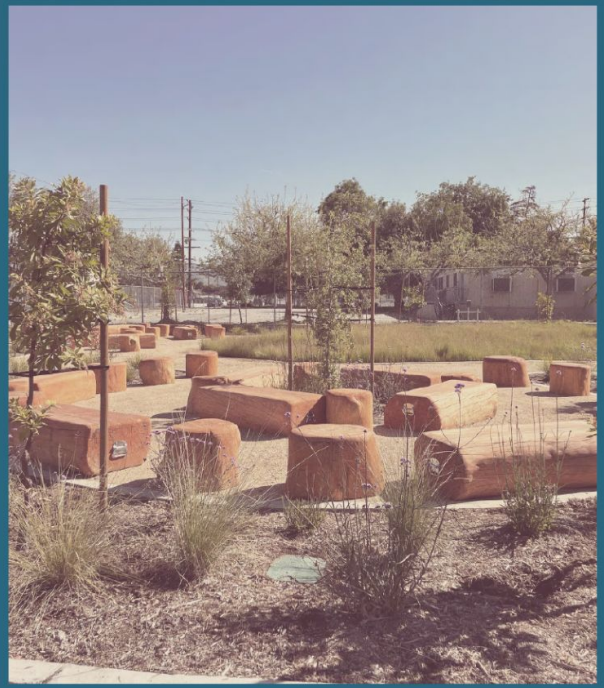
ESTIMATED TIME: 3 MONTHS

**STEP 2:** CONSTRUCTION DOCUMENTS

Prepared by all required consultants.

ESTIMATED TIME: 6 MONTHS

# 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 | $289,000 |
| Planting | $215,000 |
| Irrigation | $25,000 |
| Mobilization, General Conditions, Contingency | $300,000 |
| Site Furnishings | $20,000 |
| Estimated Total | **$1,650,000** |

### Stormwater Capture and Filtration

| | |
|---|---|
| Bioswales (~2000sqft)<br>This includes excavation, biofiltration media, and plantings/irrigation. | $165,000 |
| Retention Gallery<br>Ranging 2.5-25 ac ft$^2$ of Storage, based on $1.75 million per acre-foot of storage | $4.4 - 40 Million |
| Pump/Filter *(Pump, Filter, Piping)* | $1.5 Million |
| Estimated Total | **$6 - 40 Million**<br>*(varies depending on footprint and scope)* |

# 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.