Watershed Discovery Campuses

Stormwater at Schools

Lessons Learned

Claire Robinson
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626 676 5027
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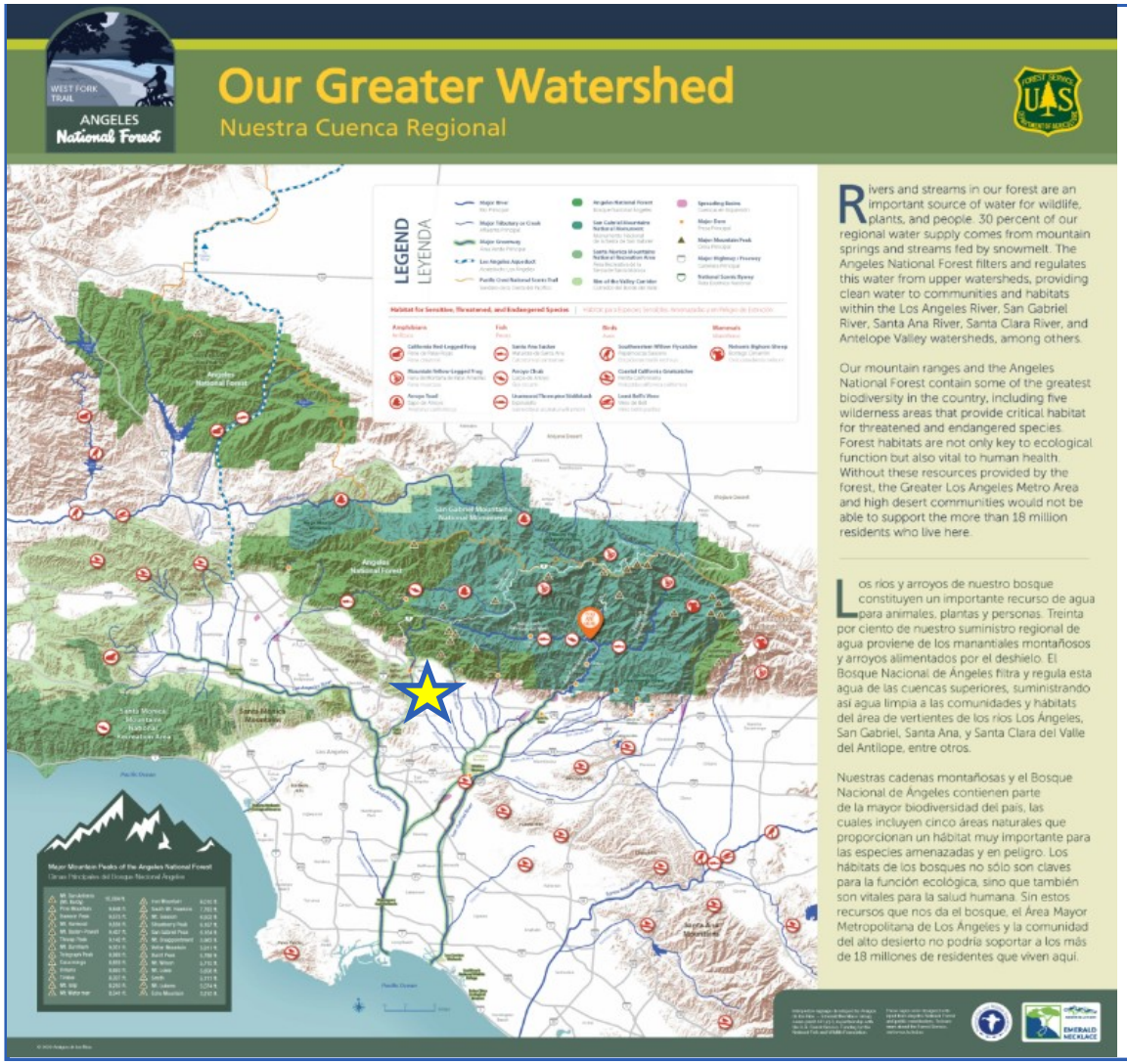

WEST FORK TRAIL
ANGELES
National Forest
Our Greater Watershed
Nuestra Cuenca Regional
LEGEND
LEYENDA
Habitat for Sensitive, Threatened, and Endangered Species
Amphibians
Fish
Birds
Mammals
Angeles National Forest
San Gabriel Mountains National Monument
Santa Monica Mountains National Recreation Area
Pacific Ocean
Mojave Desert
Major Mountain Peaks of the Angeles National Forest
Principales Picos del Bosque Nacional Angeles
Rivers and streams in our forest are an important source of water for wildlife, plants, and people. 30 percent of our regional water supply comes from mountain springs and streams fed by snowmelt. The Angeles National Forest filters and regulates this water from upper watersheds, providing clean water to communities and habitats within the Los Angeles River, San Gabriel River, Santa Ana River, Santa Clara River, and Antelope Valley watersheds, among others.
Our mountain ranges and the Angeles National Forest contain some of the greatest biodiversity in the country, including five wilderness areas that provide critical habitat for threatened and endangered species. Forest habitats are not only key to ecological function but also vital to human health. Without these resources provided by the forest, the Greater Los Angeles Metro Area and high desert communities would not be able to support the more than 18 million residents who live here.
Los ríos y arroyos de nuestro bosque constituyen un importante recurso de agua para animales, plantas y personas. Treinta por ciento de nuestro suministro regional de agua proviene de los manantiales montañosos y arroyos alimentados por el deshielo. El Bosque Nacional de Ángeles filtra y regula esta agua de las cuencas superiores, suministrando así agua limpia a las comunidades y hábitats del área de vertientes de los ríos Los Ángeles, San Gabriel, Santa Ana, y Santa Clara del Valle del Antílope, entre otros.
Nuestras cadenas montañosas y el Bosque Nacional de Ángeles contienen parte de la mayor biodiversidad del país, las cuales incluyen cinco áreas naturales que proporcionan un hábitat muy importante para las especies amenazadas y en peligro. Los hábitats de los bosques no sólo son claves para la función ecológica, sino que también son vitales para la salud humana. Sin estos recursos que nos da el bosque, el Área Mayor Metropolitana de Los Ángeles y la comunidad del alto desierto no podría soportar a los más de 18 millones de residentes que viven aquí.
EMERALD NECKLACE

Emerald Necklace
Watershed Discovery Campuses

- ●Declining Student Population/School Closures Imminent
- ●Consequential Fiscal Challenges
- ●High Management & Administrative Staff Turnover
- ●Limited to No Knowledge Transfer Protocol
- ●Aging Facilities / Deferred Maintenance / Code Compliance Challenges
- ●No 'As Builts' of Individual Facilities /No Reference Archives for Efficient Strategic Facilities Management
- ●ADA Accessibility Path of Travel Compliance = 18th Century
- ●Excessive Utility Water & Energy Utility Bills
- ●Facilities Departments - Extremely Limited: Staff Capacity / Implementation Expertise/ $ Budget
- ● No Staff Procurement Expertise for Natural Infrastructure Development
- ● No Staff Training / No Confidence/ No Incentive to Engage in Natural Infrastructure Care
- ● No Active Response / Empathy to Climate Change Impact on Students - No Empowerment to Problem Solve with New Materials Science

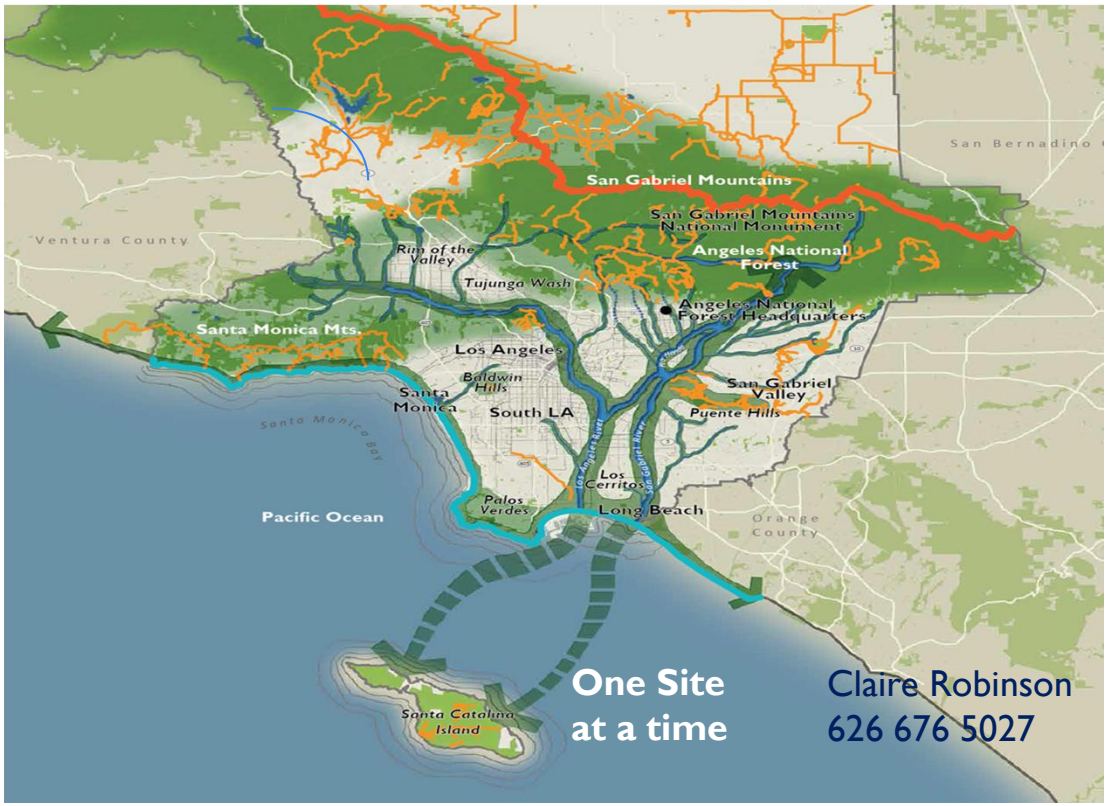
AMIGOS DE LOS RIOS

EMERALD NECKLACE

Who We Are ?

We **Plan & Implement** community based **Natural Infrastructure Projects** in direct response to Environmental Justice & Climate issues -by creating an **'Emerald Necklace - Mountains to Sea'** **network of sustainable river greenways, parks, trails & green 'Watershed Discovery Schools' for East Los Angeles County** to **protect public health**, the environment and to increase equitable access to benefits of **Nature for All students.**

LANDSCAPE SCALE CONSERVATION
'WATERSHED APPROACH'
Olmsted Bartholomew Plan 1930/First Peoples
501©3 Founded 2003

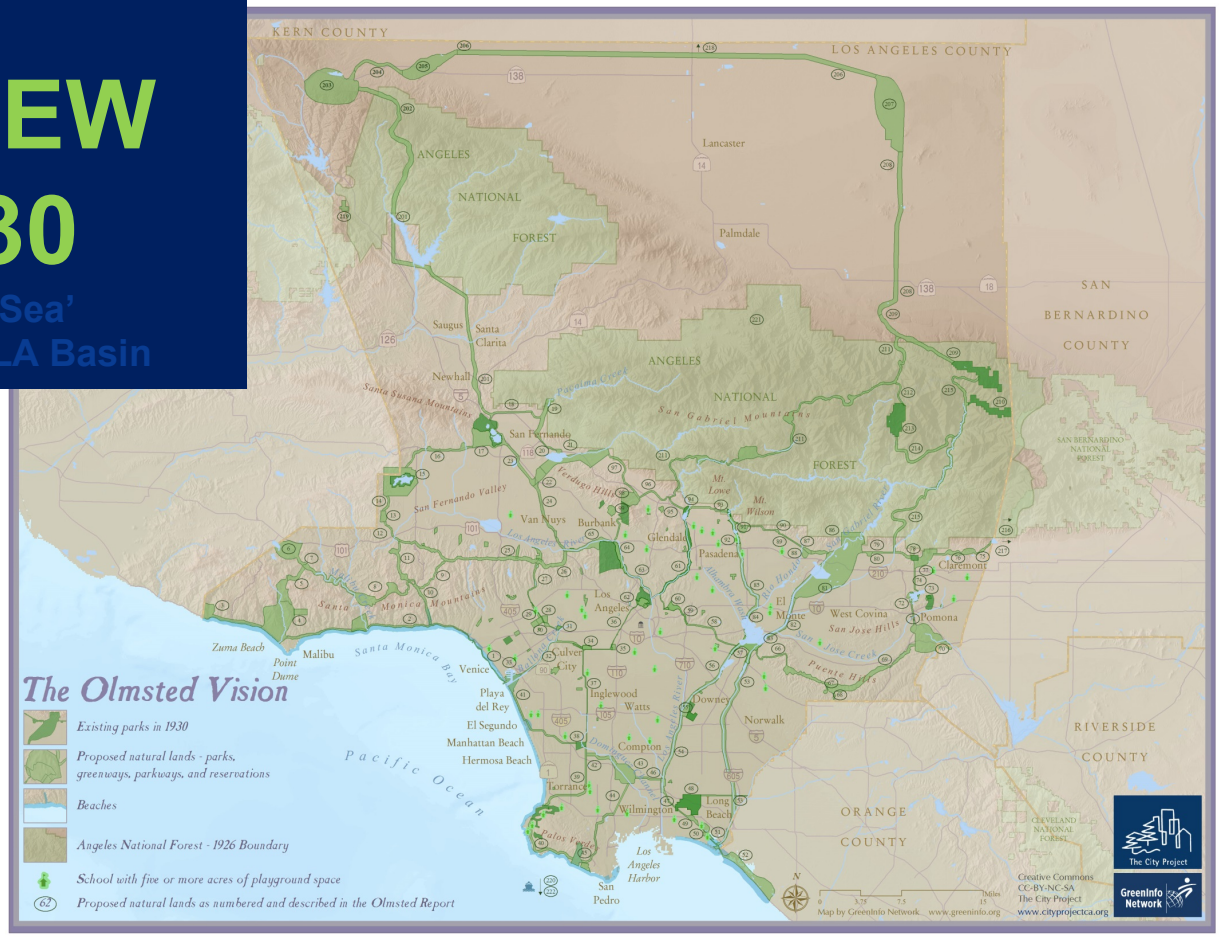


‘INSIDE OUT’ Classroom at Plymouth Elementary School in Monrovia

OLMSTED BARTHOLOMEW VISION - 1930

Comprehensive 'Mountains to Sea' Natural Infrastructure Network for LA Basin

- EXPAND EXISTING PARKS
- GREENWAYS ALONG URBAN RIVER CORRIDORS
- BEACHES / COASTAL TRAIL NETWORK
- ANGELES NATIONAL FOREST/SANTA MONICA MOUNTAINS TRAIL NETWORK
- SCHOOLS TO SERVE AS MUCH NEEDED PARKS



First People's Knowledge

MULTI BENEFIT GREEN SCHOOL PROJECTS

EMERALD NECKLACE

PECK ROAD WATER CONSERVATION PARK

VETERANS MEMORIAL PARK

RIO VISTA PARK

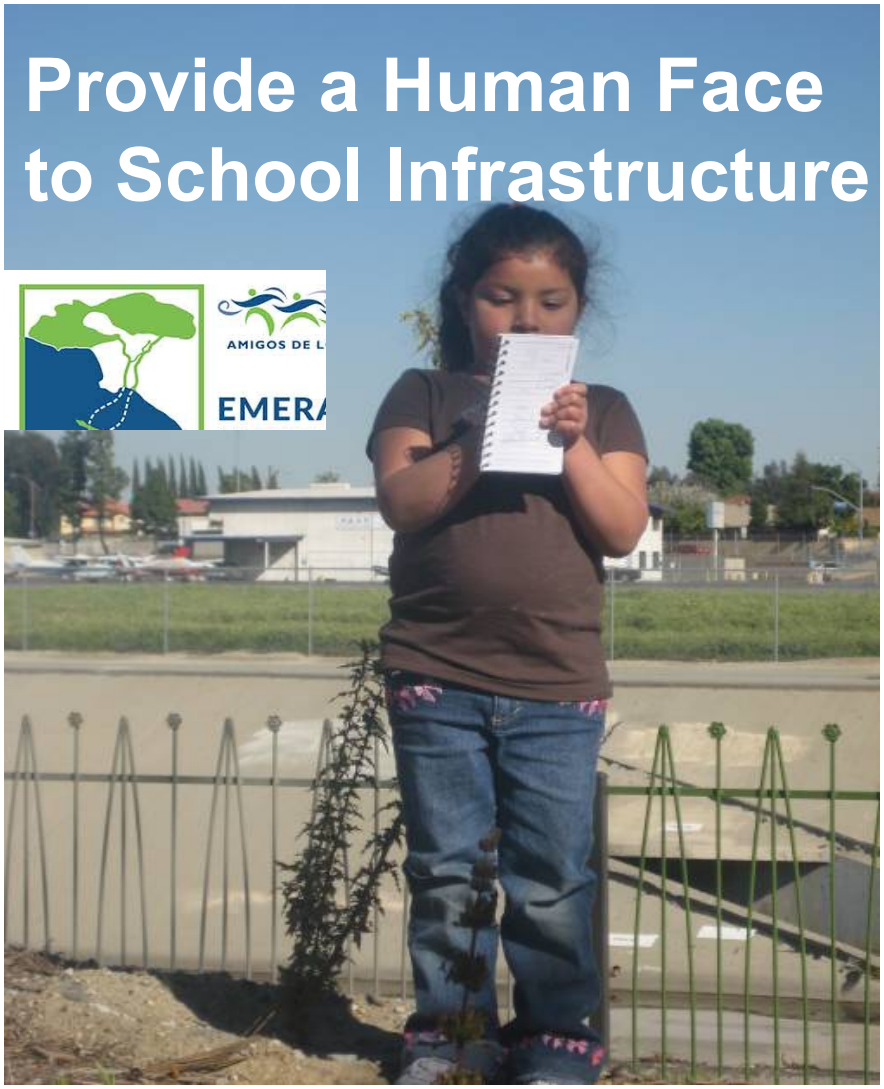
LASHBROOK PARK

GIBSON MARIPOSA PARK

DURFEE THOMPSON GREEN SCHOOL

Angeles National Forest

Connecting the Forest to our School Yards



Necessity of Natural Infrastructure:

Majority of US population
live in urban areas:

- **PUBLIC HEALTH**
- Equitable Access to Recreation
- Social Equity/Environmental Justice
- Nature Deficit Disorder
- **ENVIRONMENTAL HEALTH**
- Air & Water Quality
- Greenhouse Gas /Carbon Sequestration
- Heat Island Mitigation
- **COMPLIANCE FEDERAL & STATE MANDATES**
- Clean Water & Air Acts
- MS4 Storm water Permits, Climate Action
- **BEAUTY…CULTURAL HERITAGE**
- **NATURAL CAPITAL & GREEN JOBS**

EMERALD NECKLACE GREEN SCHOOLS

Emerald Necklace Green Infrastructure | Los Angeles County

DURFEE-THOMPSON SCHOOL JOINT USE TRAIL

-JOINT USE PROJECT, EL MONTE

www.amigosdelosrios.org|908 E. Altadena Dr.|Altadena, CA 91001|t:|626|791.1611|f:|626|791.1771

> amenities

>Outdoor Classroom

>Therapy Area

>Educational Signage

>Nature Trail

Emerald Necklace Green Infrastructure | Los Angeles County

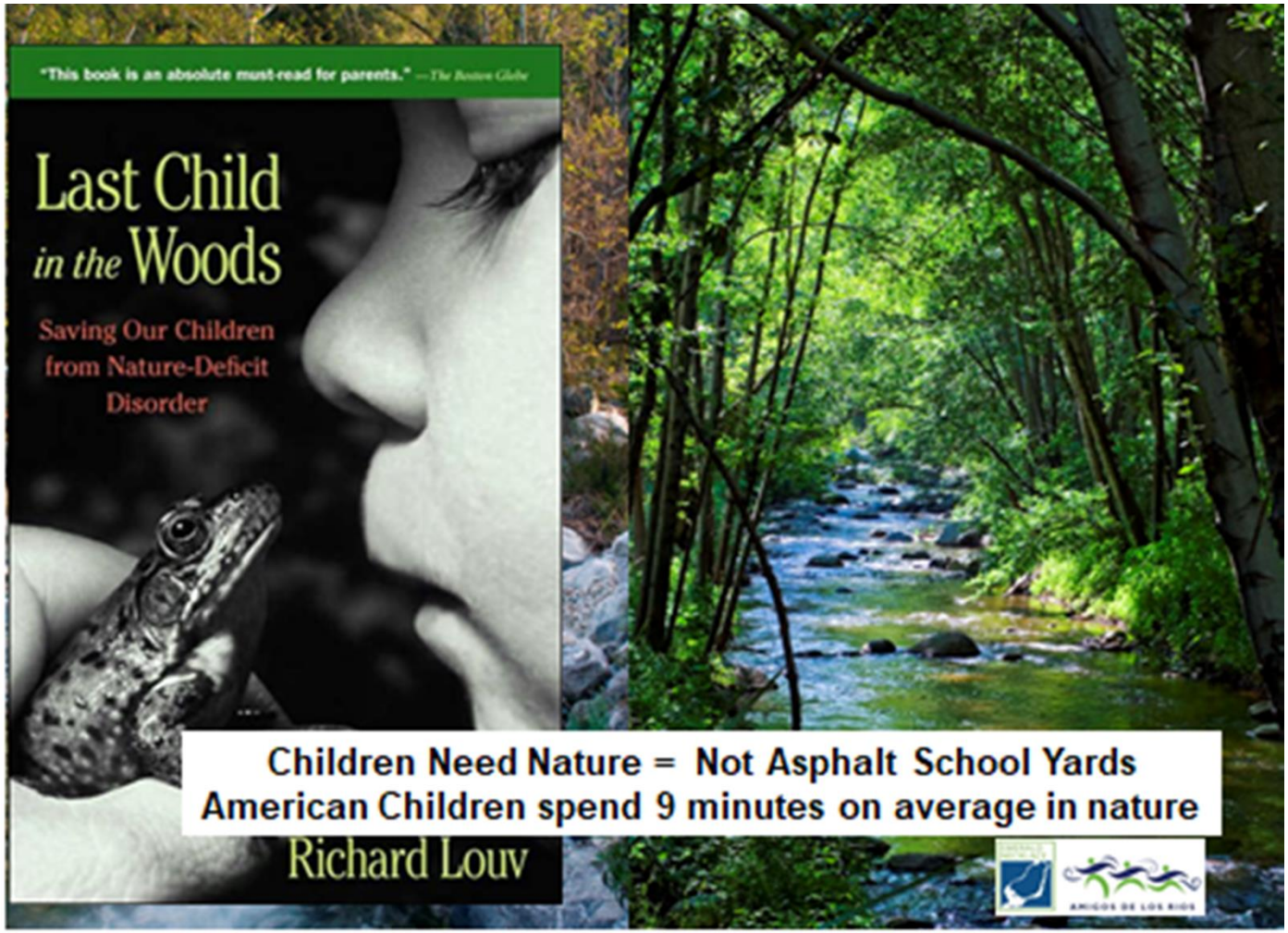
MADRID EXERCISE & NATURE TRAIL

-JOINT USE PROJECT, EL MONTE

www.amigosdelosrios.org|908 E. Altadena Dr.|Altadena, CA 91001|t:|626|791.1611|f:|626|791.1771

>exercise & nature

2004



CONNECTING URBAN STUDENTS TO NATURE

CHILDREN'S OUTDOOR BILL OF RIGHTS

"After tens of thousands of years of children playing and working primarily outdoors, the last few generations have seen such interaction with nature vanish almost entirely. The implications -- for children's physical and mental health... -- are immense."

(Richard Louv, Interviewed by David Roberts, 30 March 2006)

Vision

All California children will be inspired to actively and creatively engage with and appreciate the natural environment.

Mission

To energize, educate and engage public, private and nonprofit entities to increase the number and variety of opportunities for California children to experience and benefit from interacting with the natural world.

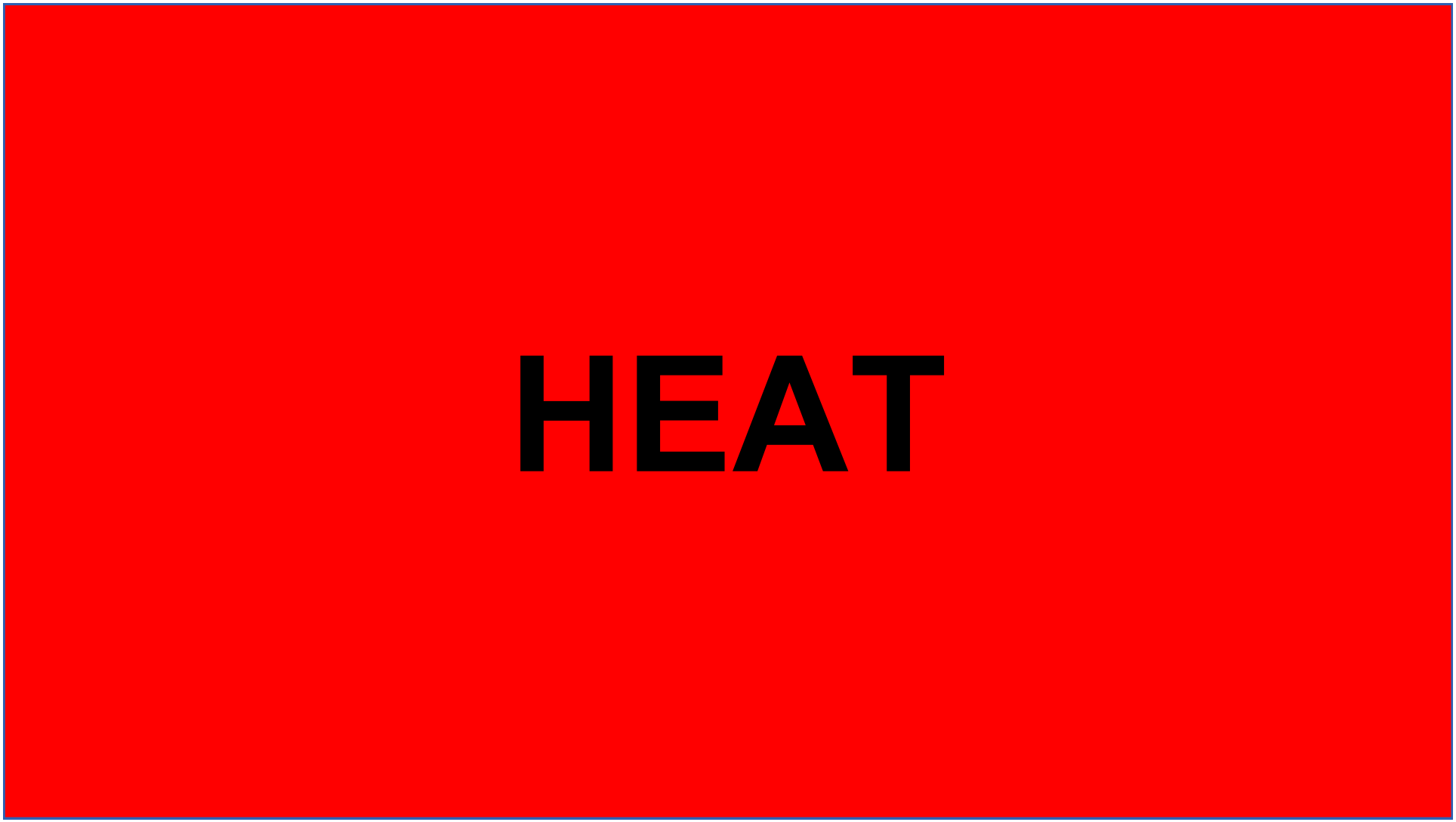
children in nature

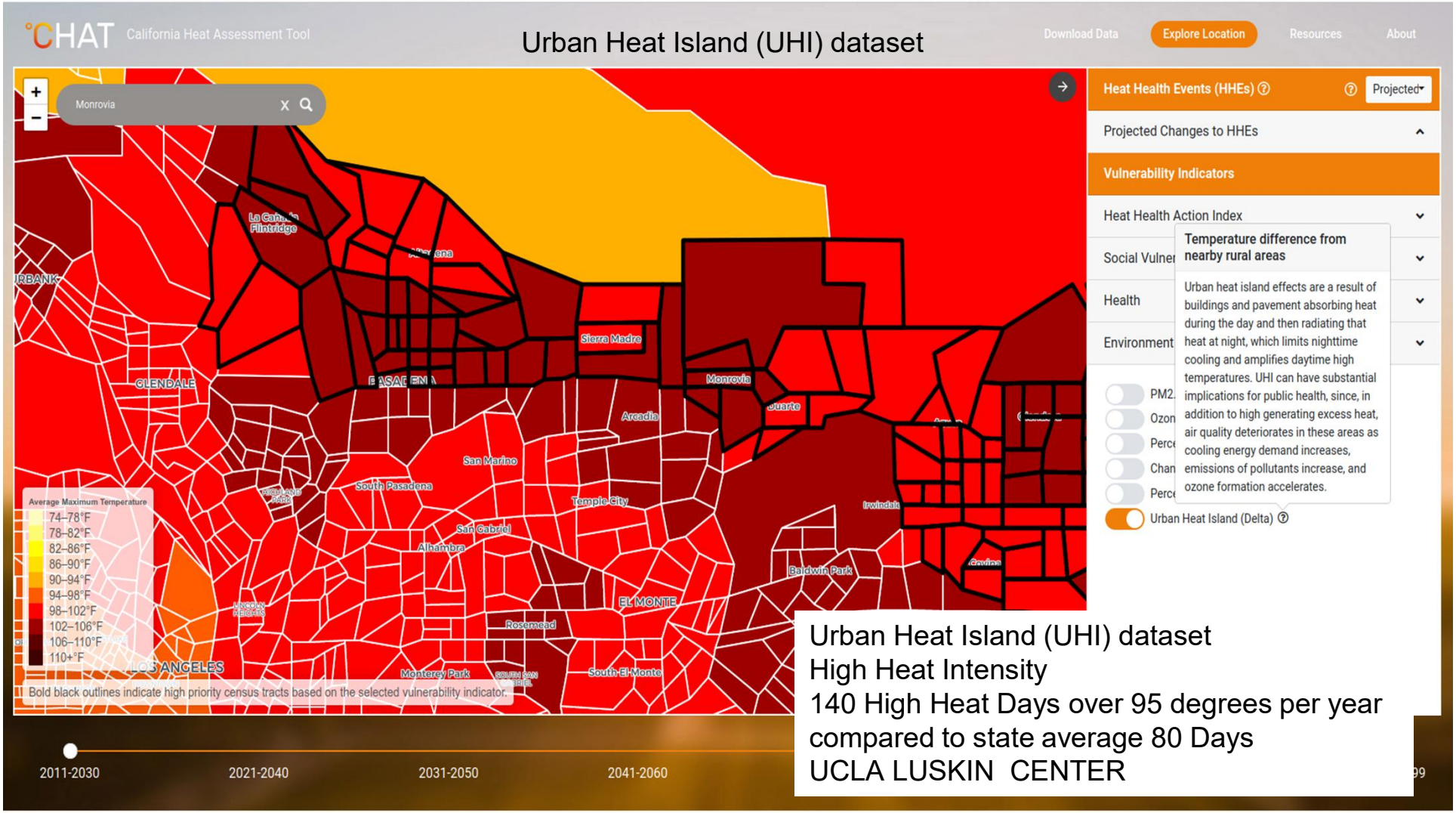
California Children's Outdoor Bill of Rights

CalFire Grant Project Components

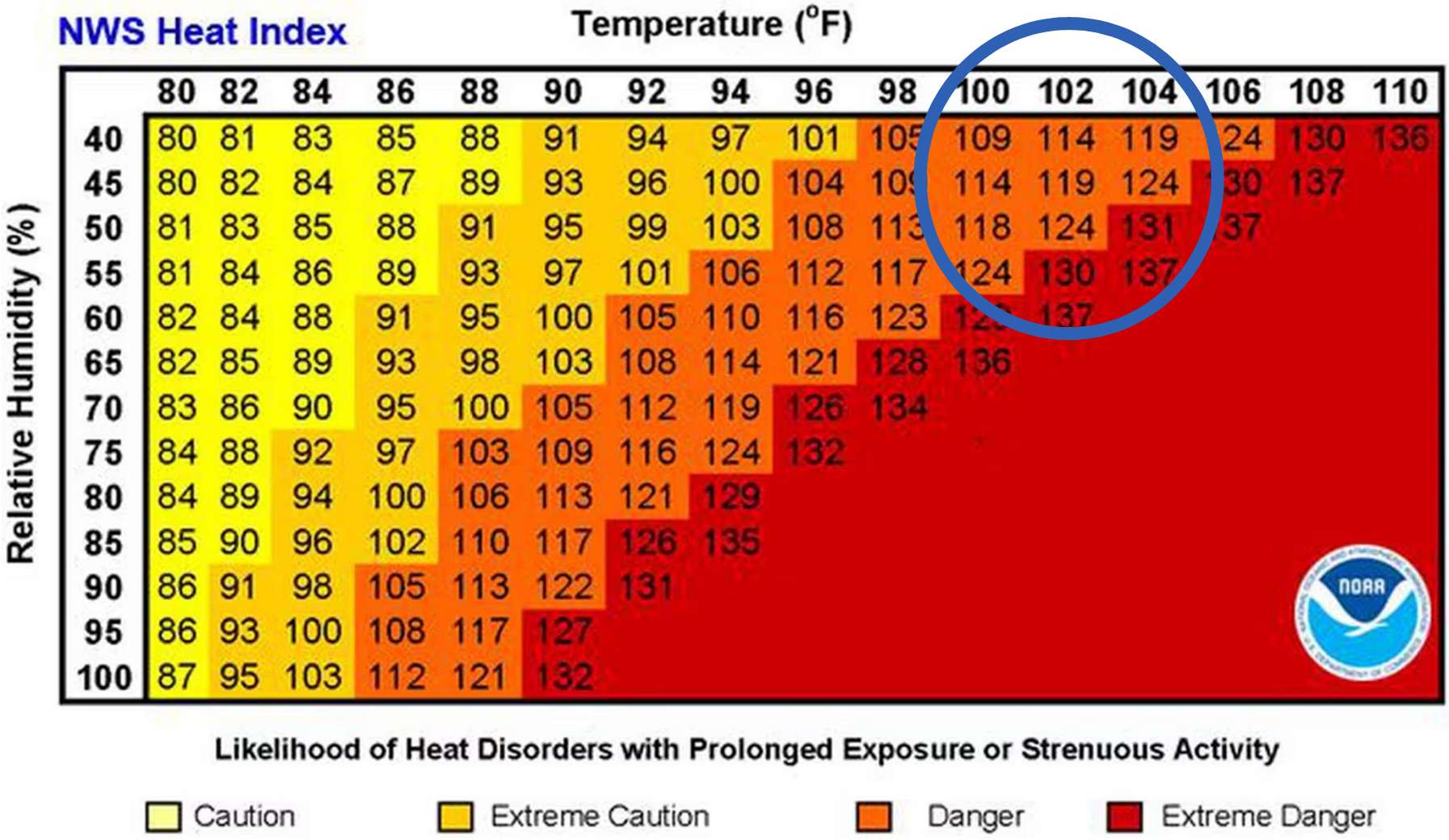
- **Storm Water Management**
  - Bioswales & Rain Gardens/Landscape Planters
  - Porous Services – Pervious Concrete /DG Trails
- **Urban Forest – Ghg Reduction/Energy Savings**
  - Shade Canopy Heat Mitigation/Soil Improvement
  - Nature Discovery Areas/ ‘Near by Nature’
- **Native Plant Landscapes**
  - Water Conservation/Habitat Enhancement
- **Nature Based Play Elements**
  - Walk/ Run Nature Discovery Trail
  - Mounds & Depressions/Natural Form Play Areas
  - ADA Accessible Play Elements/Spaces
- **Watershed Interpretive Elements**
  - Immersive STEAM Outdoor Classrooms/ Seating Areas

WORKFORCE TRAINING


HEAT



Urban Heat Island (UHI) dataset
High Heat Intensity
140 High Heat Days over 95 degrees per year
compared to state average 80 Days
UCLA LUSKIN CENTER


NWS Heat Index
Temperature (°F)
Relative Humidity (%)
80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110
40 80 81 83 85 88 91 94 97 101 105 109 114 119 124 130 136
45 80 82 84 87 89 93 96 100 104 109 114 119 124 130 137
50 81 83 85 88 91 95 99 103 108 113 118 124 131 137
55 81 84 86 89 93 97 101 106 112 117 124 130 137
60 82 84 88 91 95 100 105 110 116 123 131 137
65 82 85 89 93 98 103 108 114 121 128 136
70 83 86 90 95 100 105 112 119 126 134
75 84 88 92 97 103 109 116 124 132
80 84 89 94 100 106 113 121 129
85 85 90 96 102 110 117 126 135
90 86 91 98 105 113 122 131
95 86 93 100 108 117 127
100 87 95 103 112 121 132
NOAA
Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity
Caution
Extreme Caution
Danger
Extreme Danger

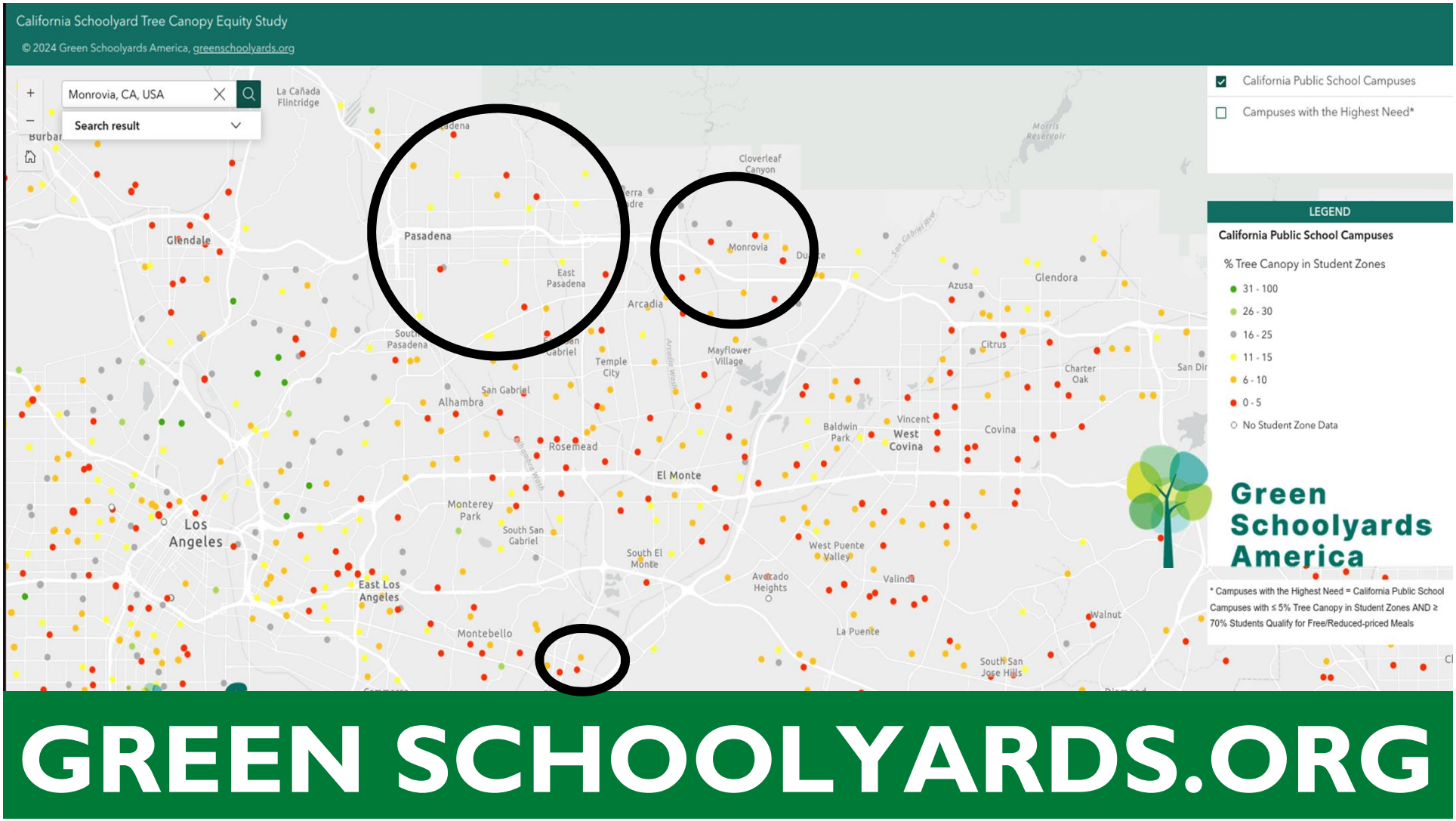
CDPH Heat Risk Grid: Understanding "HeatRisk" Level, Who is At Risk, and What Actions to Take

Revised July 27, 2023. Adapted from the National Weather Service (NWS) HeatRisk tool. Learn more about how to stay safe during extreme

Value	Risk	What does this mean?	Who / What is at risk?	What
0 (Green)	Little to None	• This level of heat poses **little to no risk** from expected heat	• No elevated risk	• No preve
1 (Yellow)	Minor	• Heat of this type is **tolerated by most**; however, there is a **minor risk for extremely heat-sensitive groups*** to experience negative heat-related health effects	• **Primarily those who are extremely sensitive to heat,*** especially when outdoors without effective cooling and/or adequate hydration	• Increase • Reduce t the shad • Open wi
2 (Orange)	Moderate	• Heat of this type is tolerated by many; however, there is a **moderate risk for members of heat-sensitive groups*** to experience negative heat-related health effects, including heat illness • **Some risk for the general population who are exposed to the sun for longer periods of time** • **Living spaces without air conditioning can become uncomfortable during the afternoon and evening**, but fans and leaving windows open at night will help	• **Primarily heat-sensitive or heat-vulnerable groups,*** especially those without effective cooling or hydration • Those not acclimatized to this level of heat (i.e., visitors) • Otherwise healthy individuals exposed to longer duration heat, without effective cooling or hydration, such as in the sun at an outdoor venue • Some transportation and utilities sectors • Some health systems will see increased demand, with increases in emergency room visits	• Reduce t warmest • Stay hyd • Stay in a the day (• Move ou of the da • For thos fans to k windows inside bu
3 (Red)	Major	• Heat of this type represents a **major risk to all individuals who are 1) exposed to the sun and active or 2) are in a heat-sensitive group** • **Dangerous to anyone without proper hydration or adequate cooling** • **Living spaces without air conditioning can become deadly during the afternoon and evening. Fans and open windows will not be as effective.** • **Poor air quality** is possible • **Power interruptions** may occur	• **Much of the population, especially anyone without effective cooling or hydration** • Those exposed to the heat/sun at outdoor venues • Health systems likely to see increased demand with significant increases in emergency room visits • Most transportation and utilities sectors	• **Cancel o heat of t** p.m.), an parts of t • Stay hyd • Stay in a heat of t • If you ha use it, or a few ho risk. Fans
		• This is a rare level of heat leading to an **extreme risk for the entire population** • **Very dangerous to anyone without proper**	• **Entire population exposed to the heat is at risk** • For people without effective cooling, especially heat-sensitive groups, **this level of heat can be**	• **Cancel o** • Stay hyd • Stay in a

SHADE
URBAN FOREST

Heat Safety Planning



GREEN SCHOOLYARDS.ORG

DRAINAGE CHALLENGES

MOSQUITO VECTOR

21th Century
ADA
PATHS/Surfaces
OF TRAVEL

Physical Fitness
Greater Variety of Opportunities

Mental Health
Anxiety Reduction
Mindfulness & Focus

Immersive Lessons
Campus as Living lab
Outdoor Learning Opportunities

School Campuses – Health and Safety ?

- Safe, Engaging, Nurturing & Inclusive Spaces for all students
- Supportive of Child Centric Educational Specifications
- Free of DRAINAGE CHALLENGES
- Free of Mosquitos & Disease Vectors/PANDEMIC RESILIENT SPACES
- Inclusive, Welcoming ADA Paths of Travel & Organic Circulation
- Microclimate Heat Island Protection w/ Shade, Temperate Outdoor Play/Eating/Learning Spaces
- Nature Based Play - Opportunity for Exercise, Fun, Play, Relaxation, Quiet Moments - Connections with Nature
- Foster Mental Health, Physical Fitness, Optimal Academic Performance

A New Materials Science

Climate Change New Policies, Specifications & Resolutions Needed

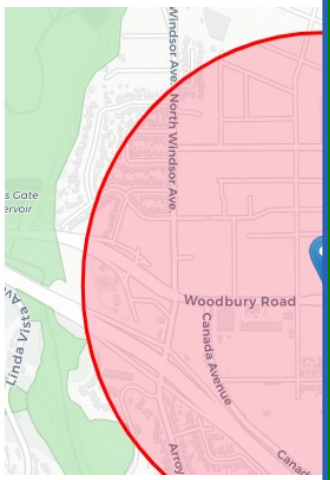
Meaningful Health Benefits

School Communities

TITLE 1 SCHOOLS

Results for Unincorporated (County: Los Angeles)

Latitude, Longitude	34.18352400,-118.16318700
Total Population	5,337
Youth Population	945
Senior Population	769
Median Household Income	$80,094
Per Capita Income	$36,524
People in Poverty	547
Households Without Access to a Car	50
Parks Total Area	0.05



Physical Activity

Beneficial Play

Social Emotional Skills

Mental Health/Academic Success

GHG Reduction/Air Quality

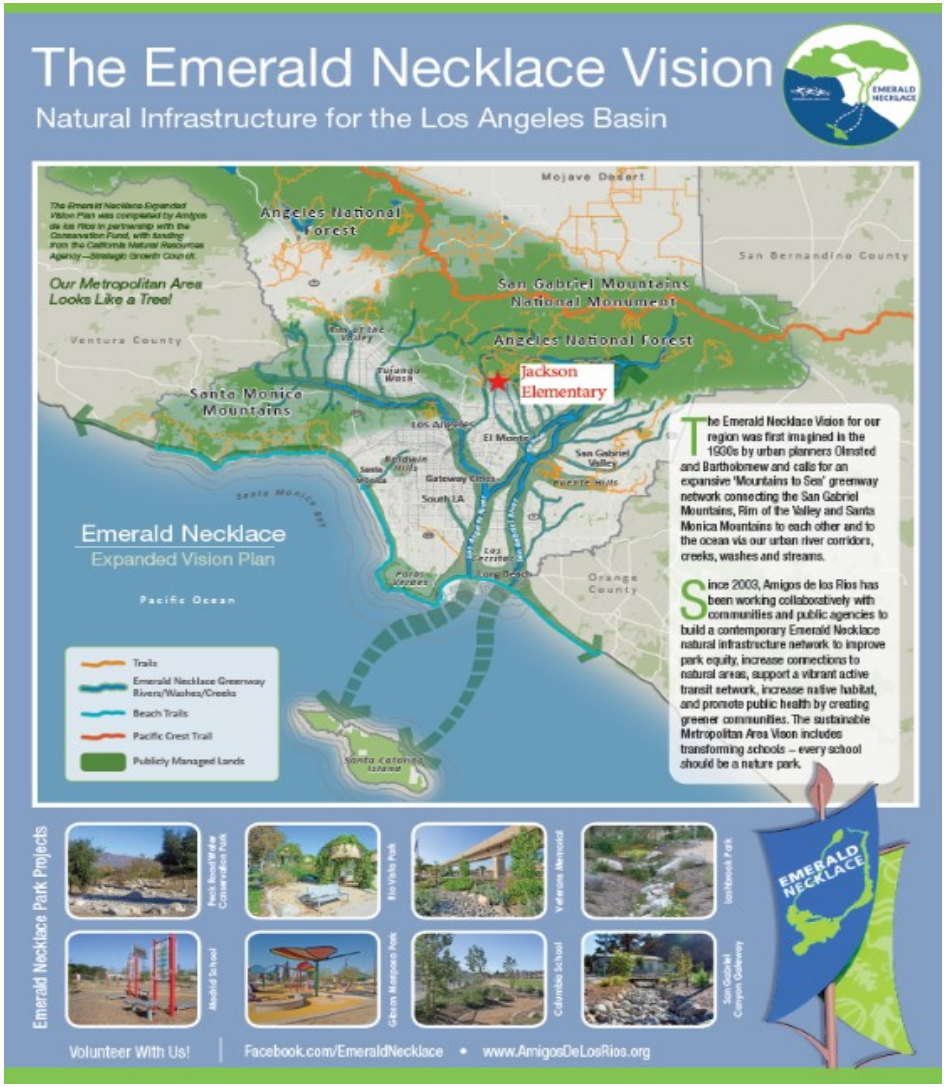
Sustainable Water Management

Shade Canopy/Heat Island Reduction

Wildlife Habitat/Biodiversity

Environmental Literacy

Each School Project as a Microcosm of the Watershed



Watershed Discovery Campuses
Action Zones & Priorities

Front of School - Critical 'DNA' for Campus

Main Play Yard - 30% Shade Minimum

Sports Fields - Perimeter Trees & ADA Paths

Quads/Courtyards - 'Inside Out Classrooms

Parking Lots - Urban Forest

Jeff Seymour Family Center | # Native Plants

Plant Communities

- Riparian
- Oak Woodland
- Coastal Sage Scrub
- Chaparral
- Desert Wash

Usage Legend

- Spiritual
- Constructional
- Dietary
- Medicinal

Tongvan Use of Native Plants

The native plants featured at the Jeff Seymour Family Center are culturally significant to the original inhabitants of the Los Angeles Basin, the Tongva-Gabrielino. Their knowledge and use of native plants extends from the medicinal and spiritual, to constructional and dietary. **Spiritual** plants are used for religious processionals and rites of passage. **Constructional** plants are used for building houses, making tools, basketry, and clothing. **Dietary** plants are key elements of the Tongva-Gabrielino diet. **Medicinal** plants are used for all types of healing — from colds to wounds.

Native Plants Conserve Water

The use of native plants in public landscapes helps us to conserve water. These drought-tolerant plants are suited to our climate. By using these plants in the Emerald Necklace, we also protect biodiversity and the cultural heritage of the river corridor.

El uso de plantas nativas en paisajes públicos nos ayuda a conservar agua. Estas plantas toleran las a la sequía son adecuadas para nuestro clima. Mediante el uso de estas plantas en el Emerald Necklace, también protegemos la biodiversidad y el patrimonio del río.

在公共景观设计中使用本土植物有利于节约水资源。这些抗旱植物更适于我们所在当气候环境。正是因为在“翡翠项链”中将这些本土植物应用到景观设计中，我们不仅保护了多样河道的生态多样性，同时还传承了它的生态环境资产。

Jeff Seymour Family Center El Monte - Before

Jeff Seymour Family Center El Monte – In Process

2010 Jeff Seymour Family Center El Monte – Stormwater Gardens/Cool Pavement

2014

Jeff Seymour Family Center El Monte – Stormwater Gardens/Cool Pavement

Jeff Seymour Family Center | Green Infrastructure Campus

10900 Mulhall Street
El Monte, CA 91731

Green Infrastructure Elements

A — Urban Community Forestry
Habitat • Heat Island reduction
Stormwater capture • Carbon sequestration

B — Rain Garden
Stormwater capture • Habitat

C — Bioswale
Stormwater capture • Habitat

D — Rain Modules
Stormwater capture

E — Stormwater Basin
Stormwater capture • Rain modules

F — Bike Safety Track
Cool pavement / Heat Island reduction
Bike training / active transportation
Stormwater capture • Habitat

G — Community Garden
Food production • Education

H — Bike Park / Skills Track
Bike training / active transportation
Nature-based play

I — Walking Paths
Physical fitness • Habitat

J — Interpretive Elements
Education • Community Science

● = Location of Green Infrastructure Signage

Campus green infrastructure plan implemented through a community-based process by AMIGOS DE LOS RIOS, a 501(C)3
We hope you enjoy! • www.amigosdelosrios.org

AMIGOS DE LOS RIOS

Funding for this project has been provided by the California Greenhouse Gas Reduction Fund through the California Department of Forestry and Fire Protection (CAL FIRE), Urban and Community Forestry Program.

Tactile Learning & Interpretive Elements

Our Greater Watershed

Nuestra Cuenca Regional

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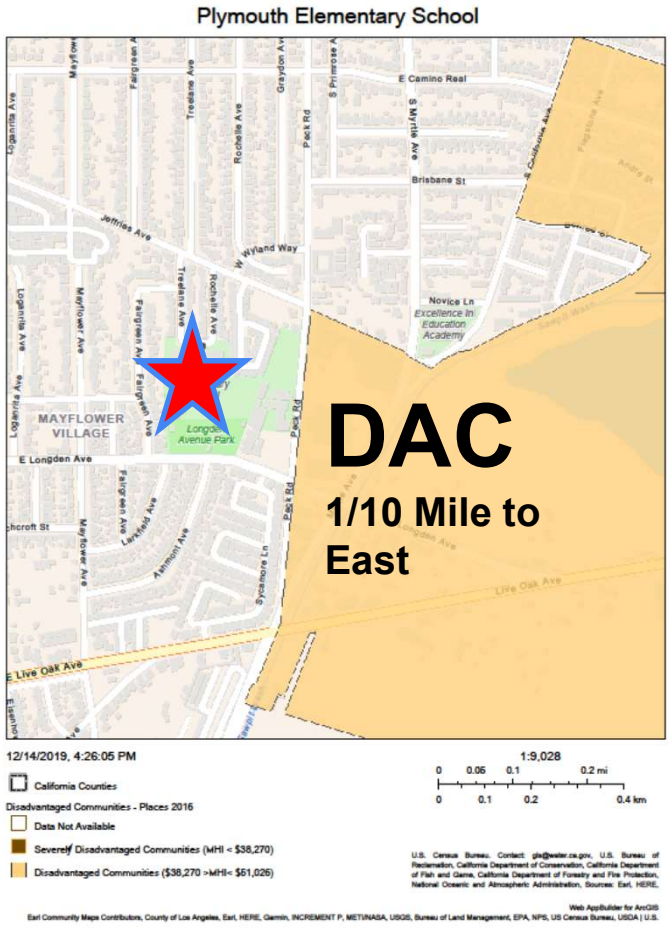
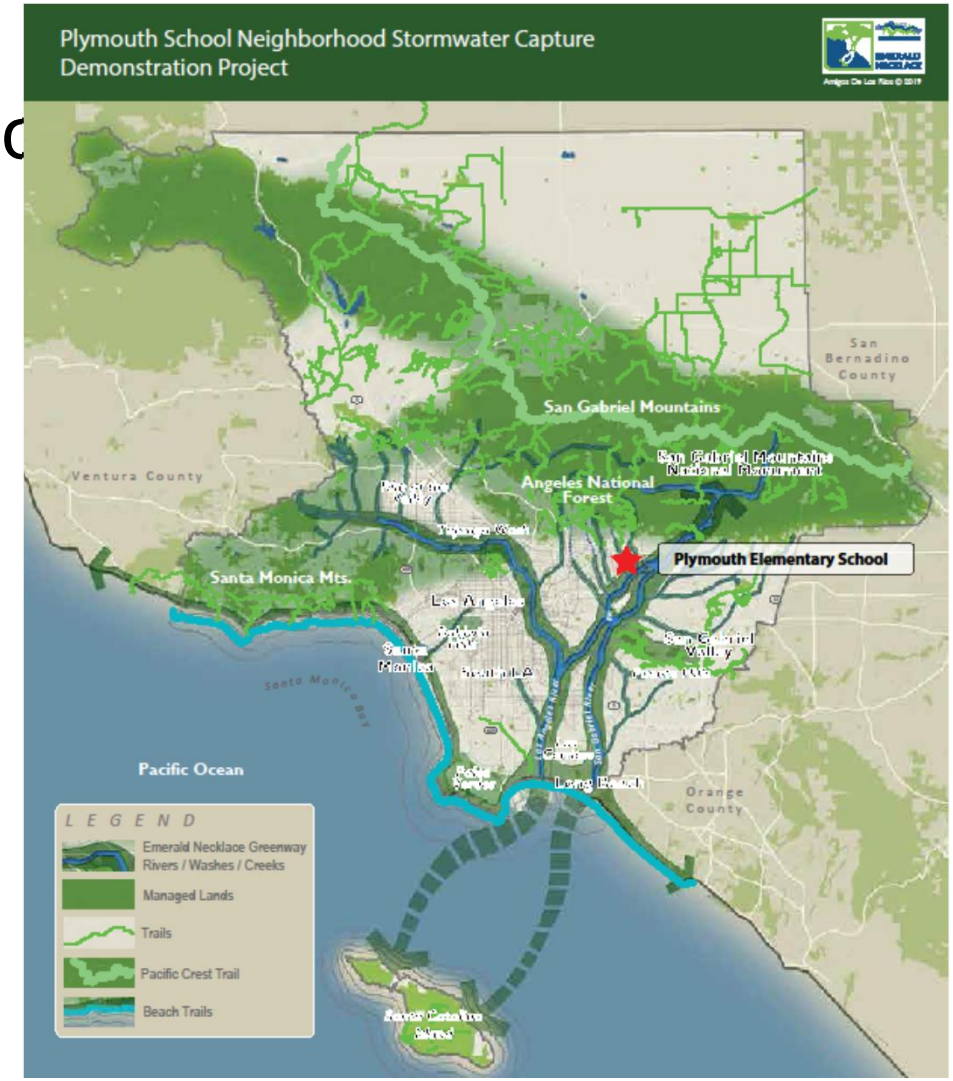
STORMWATER MANAGEMENT

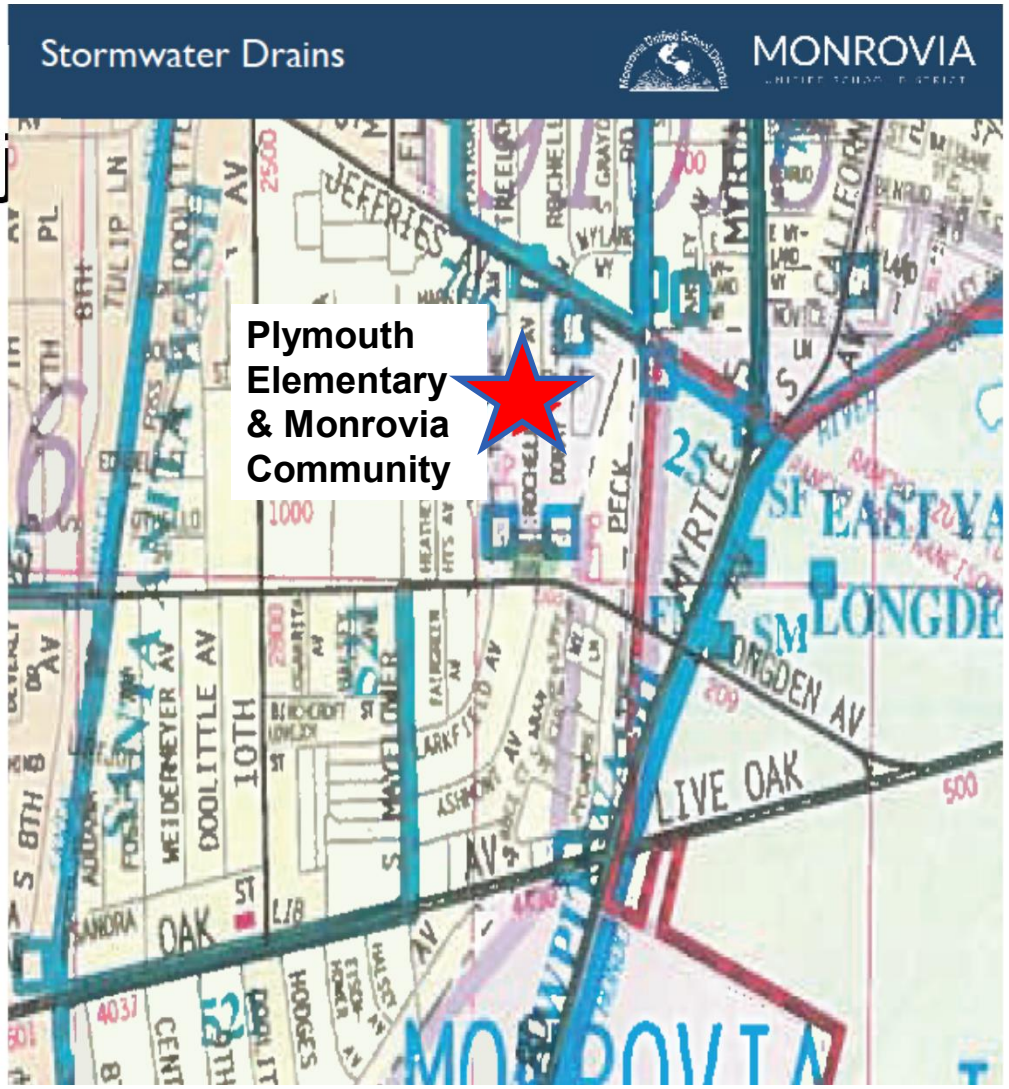

Plymouth Elementary School
E Camino Real
Brisbane St
Jeffries Ave
W Wyland Way
Novice Ln
Excellence in Education Academy
MAYFLOWER VILLAGE
Longden Avenue Park
E Longden Ave
E Live Oak Ave
DAC
1/10 Mile to East
12/14/2019, 4:26:05 PM
1:9,028
California Counties
Disadvantaged Communities - Places 2016
Data Not Available
Severely Disadvantaged Communities (MHI < $38,270)
Disadvantaged Communities ($38,270 >MHI< $51,026)

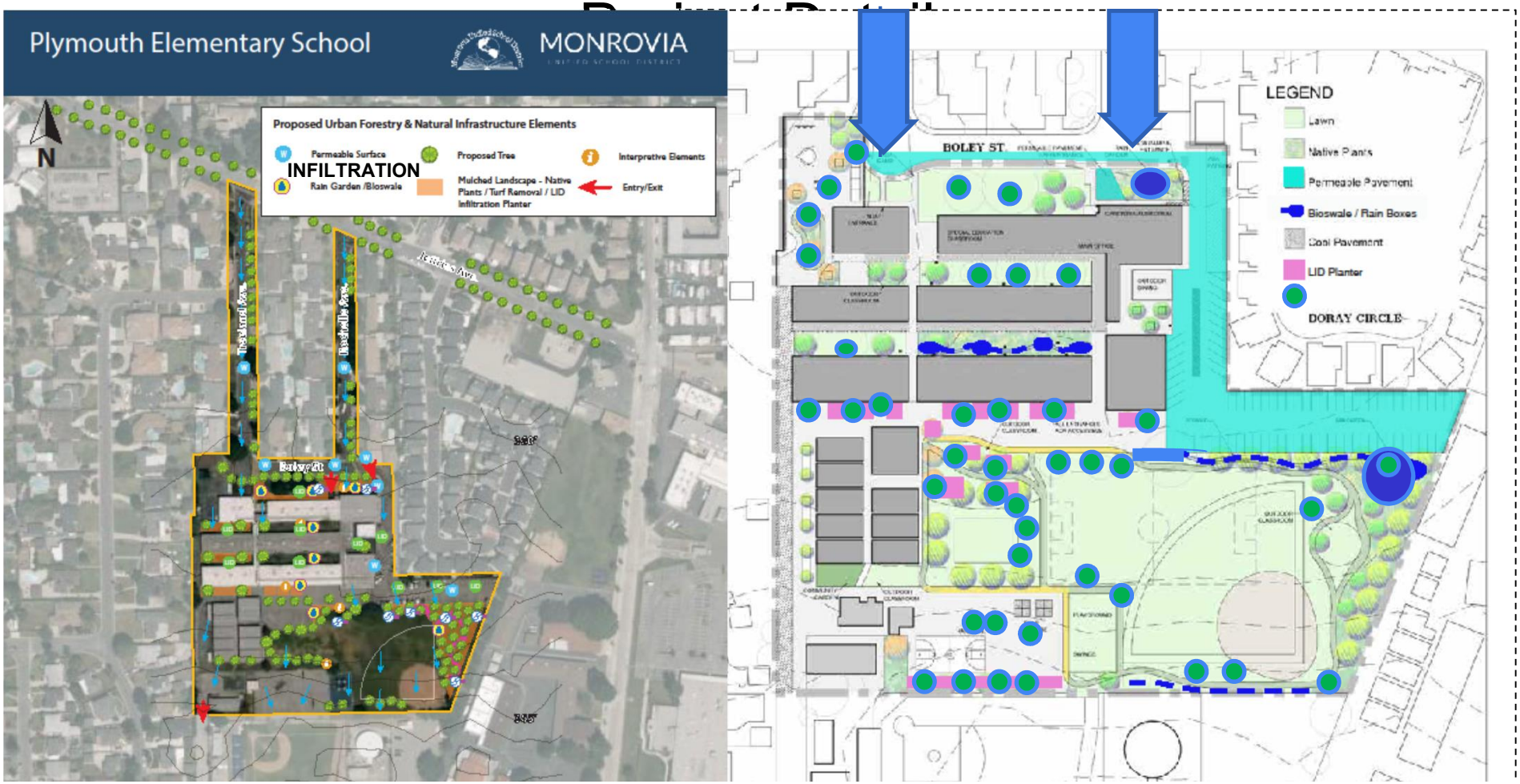

Plymouth School Neighborhood Stormwater Capture Demonstration Project
San Bernadino County
San Gabriel Mountains
Ventura County
Angeles National Forest
Plymouth Elementary School
Santa Monica Mts.
Pacific Ocean
Orange County
LEGEND
Emerald Necklace Greenway
Rivers / Washes / Creeks
Managed Lands
Trails
Pacific Crest Trail
Beach Trails

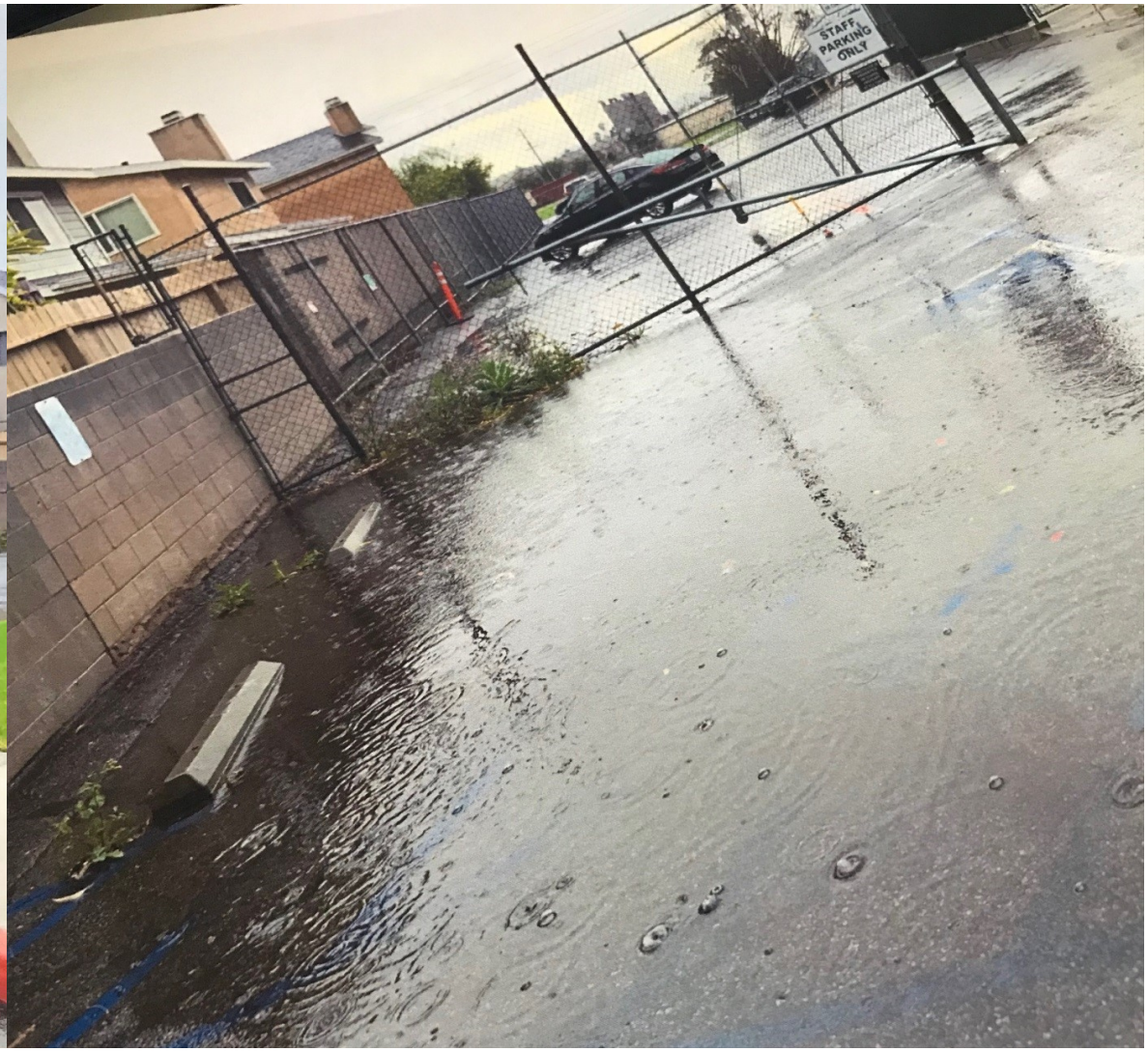
Monrovia Unified School District

"World-Class Schools For World-Class Students"

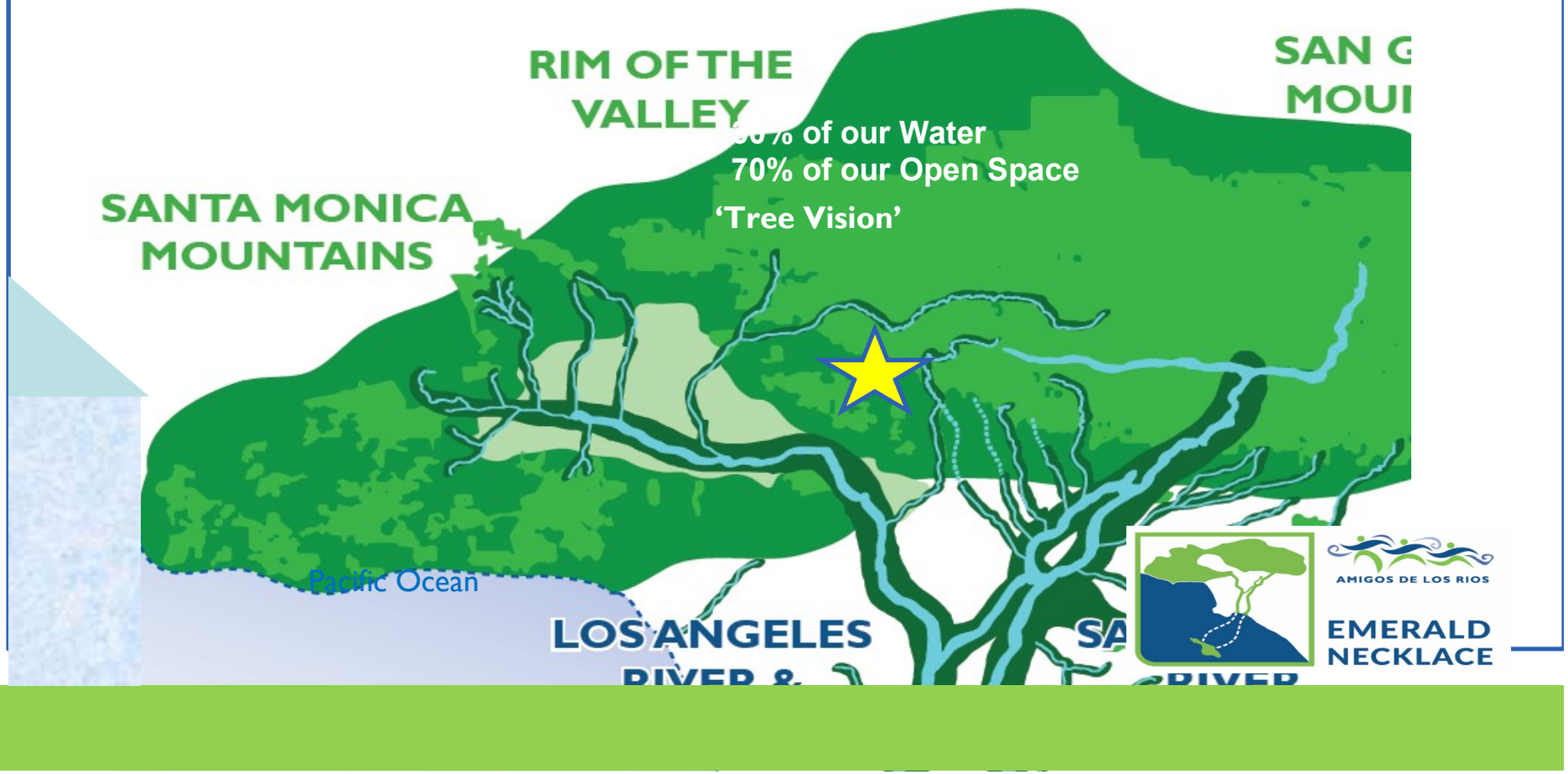
Proj




Plymouth Elementary School
MONROVIA
N
Proposed Urban Forestry & Natural Infrastructure Elements
Permeable Surface
Proposed Tree
Interpretive Elements
INFILTRATION
Rain Garden /Bioswale
Mulched Landscape - Native Plants / Turf Removal / LID Infiltration Planter
Entry/Exit
BOLEY ST
DORAY CIRCLE
LEGEND
Lawn
Native Plants
Permeable Pavement
Bioswale / Rain Boxes
Cool Pavement
LID Planter


STAFF
PARKING
ONLY

Emerald Necklace
Watershed Discovery Campus



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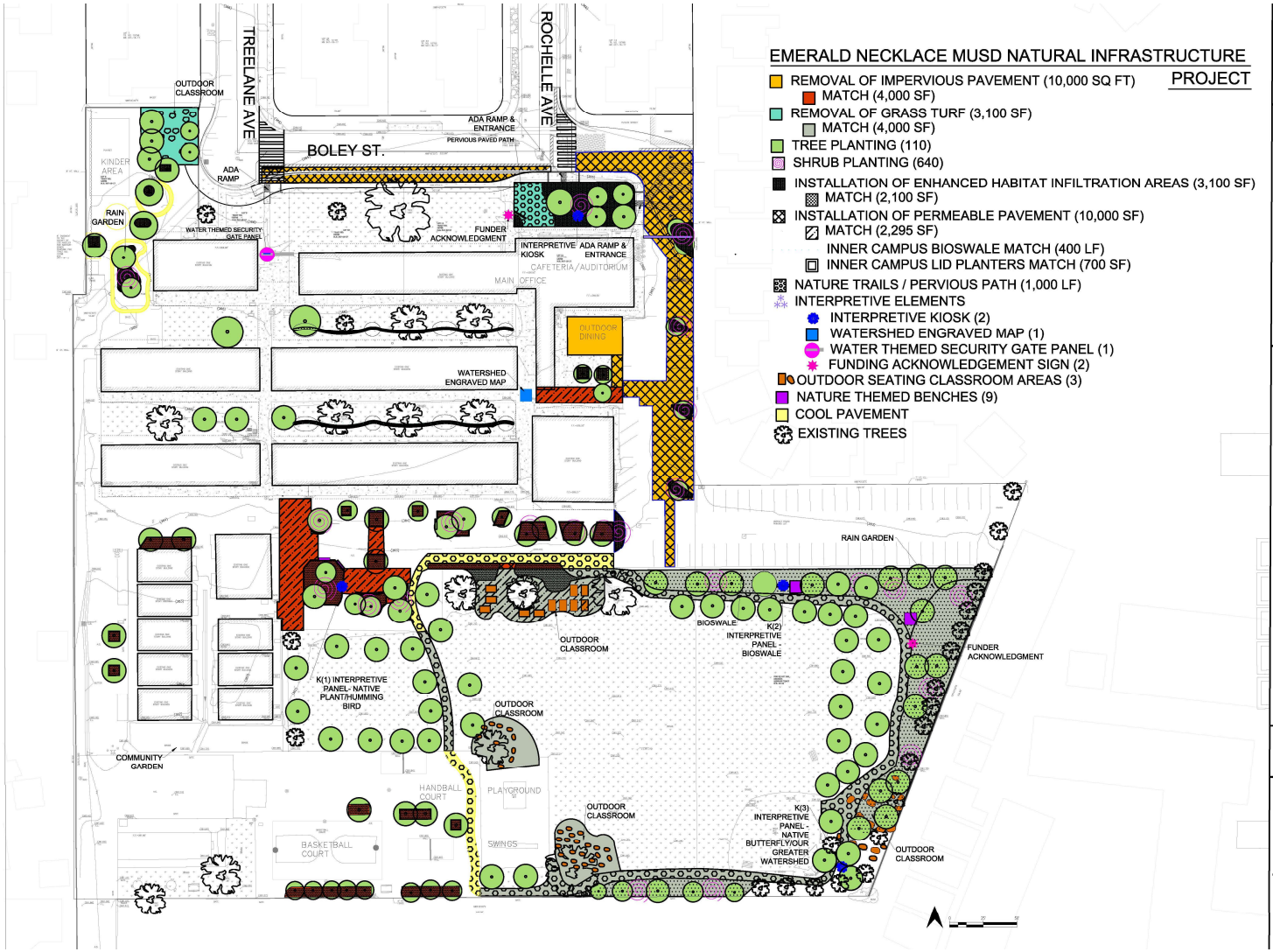
Athens Services
888/336-6100



EMERALD NECKLACE
AMIGOS DE LOS RIOS
908 E.
ALTADENA DR.
ALTADENA, CA
91001
(626) 791-1611

CNRA GRANT
DELIVERABLE PLAN

EMERALD NECKLACE
MONROVIA UNIFIED SCHOOL DISTRICT
NATURAL INFRASTRUCTURE PORJECT

Date 07/27/2022
Revisions

Drawn By : DM
Sheet 1 Of 1

Plymouth School Project Benefits

Nexus Stormwater & Urban Runoff Capture & Pollution Reduction

- **MS4/TMDL Compliance -** Improve Water Quality w/ LID & Natural Infrastructure Solutions
- **Stormwater Capture Capacity –** 3.1 acre-feet per storm event
- **Treatment Technologies -** Infiltration using natural media & bioretention

Serves City of Monrovia & DAC Community w/in 0.1 mi.

Community Benefits:

- Prevent Flooding, Enhance Drainage, Address Vector Issues (Mosquitoes), Urban Heat Island Reduction, Shade, Habitat, Air Quality Enhancement,
- COVID-Safe Outdoor Education Spaces
- Celebrate Water Resources Stewardship w/Plymouth School Community/Educate Future Water Stewards

CALIFORNIA natural resources AGENCY

SAFE CLEAN WATER

SAFE CLEAN WATER PROGRAM

Plymouth School Neighborhood Stormwater Capture Demonstration Project (Rio Hondo)

Project Lead: [illegible]

Photo: Amigos de los Rios

- **Overview:**
- [illegible]

- **Benefits:**
  - [illegible]
  - [illegible] Replacement of asphalt with “water wise” [illegible]

- **Funding & Construction:**

2022 Plymouth School - Monrovia

PLYMOUTH ELEMENTARY WATERSHED DISCOVERY CAMPUS
EMERALD NECKLACE COMMUNITY STEWARDSHIP EVENTS
Natural Infrastructure Element Care

Year	# Events	# Participants	# Hours	In Kind $ Stewards Value	Labor, Equipment Materials Annual $ Cost to Host	Annual $ Value Emerald Necklace Stewardship Program - O & M	Year 1
2021	46	594	1782	$ 62,370.00	$ 87,400.00	**$ 149,770.00**	**1**
2022	18	505	1515	$ 53,025.00	$ 40,680.00	**$ 93,705.00**	**2**
2023	12	470	1410	$ 49,350.00	$ 31,560.00	**$ 80,910.00**	**3**
2024	18	409	1227	$ 42,945.00	$ 40,860.00	**$ 83,805.00**	**4**
TOTAL	94	1978	5934	**$ 207,690.00**	**$ 200,500.00**	**$ 408,190.00**	

MULTIPLE BENEFIT SOLUTIONS ARE AWESOME

"Landscape"

Hardscape - Universal Access
Paths of Travel ADA Access
Circulation Flow
Access to Play spaces & Outdoor Classrooms
Existing Black Top
Current Condition
% of total SF
Cool Pavement
Stormwater Compliance
Pervious Pavement % Proportion Permeable to Impermeable
Mulched Landscape Areas
Rain Gardens/ Bioswales
Existing Tree Canopy
Legacy Tree Assets & Care
Existing Landscape Areas
Heat Island Map
Energy Savings Targets
State of Playgrounds
Nature Based Play
ADA Accessible
Developmentally Appropriate for each Age Group
Current Condition Repair needed
Inclusive Equipment needed
Nature Based Education
Out door Learning Opportunities
Multi Cultural Interpretive Elements
INSIDE OUT Outdoor Classrooms
Climate Curriculum
Water Resources
Efficient Irrigation
Habitat Plant - Water Appropriate
Sports Fields and Auxiliary
Condition Access

EMERALD NECKLACE

2020 Santa Fe Middle School

2020 Santa Fe Middle School

Connecting Students to Nature

CalFire Green Schoolyards Grant 2022/2023

Amigos de los Rios

Natural Infrastructure - 'Watershed Discovery Campuses'

EXISTING INFRASTRUCTURE

- Boundary
- School Main Entrance
- Fire Lane
- ADA Path of Travel
- Pedestrian Entry
- Parking Lot Entrance
- Parking Lot
- Student Dropoff Area
- Solar Panel Area
- Storm Drain

EXISTING KEY ELEMENTS

- Trees
- Landscape Planters
- Sports Field
- Playground
- Asphalt Play Yard

NATURAL INFRASTRUCTURE & URBAN FOREST

- Proposed Trees
- Native Habitat Landscape
- Tree Well
- Pervious Pavement
- Nature Trail
- Bioswale
- Rain Garden
- Community Garden
- Cool Pavement

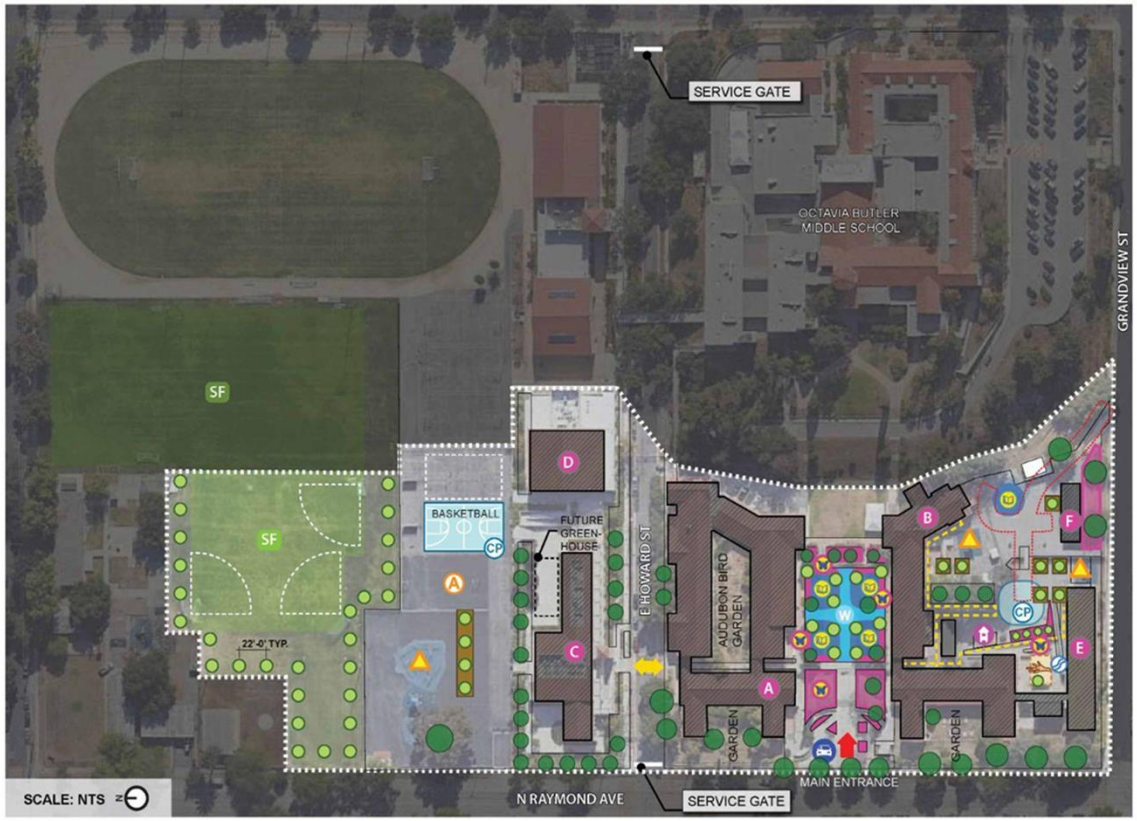
NATURAL BASED ELEMENTS

- Outdoor Classroom
- Boulder Group Seating
- Log Seating
- Picnic Table
- Metal Bench
- Natural Based Play Area
- Nature Themed Gate
- Interpretive Elements
- Mini Forest
- Playhouse

BUILDINGS

- A — Grades 2-5, Main Office, Library
- B — Children's Center - Preschool, Kinder, Learns
- C — Grades 3-5, STEM & Math Labs
- D — Cafeteria
- E — 1st Grade
- F — Children's Center- School Aged

*All proposed alterations or additions to existing facilities will comply with CBC Section 11B-2024 and will include an accessible path of travel.



Campus # 6

Pasadena Unified School District: Washington Elementary Stem / Environmental Magnet School

1520 N Raymond Ave, Pasadena, CA 91103

San Rafael Elementary School

1090 Nithsdale Rd, Pasadena, CA 91105

EMERALD NECKLACE
AMIGOS DE LOS RIOS

EXISTING INFRASTRUCTURE

- Boundary
- School Main Entrance
- Fire Lane
- ADA Path of Travel
- Pedestrian Entry
- Pedestrian Gate
- Utility Gate

EXISTING KEY ELEMENTS

- Trees
- Landscape Planters
- Sports Field
- Playground
- Asphalt Play Yard

- Electric
- Sewer
- Telecomm
- Storm Drain
- Trench
- Water

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NATURAL BASED ELEMENTS

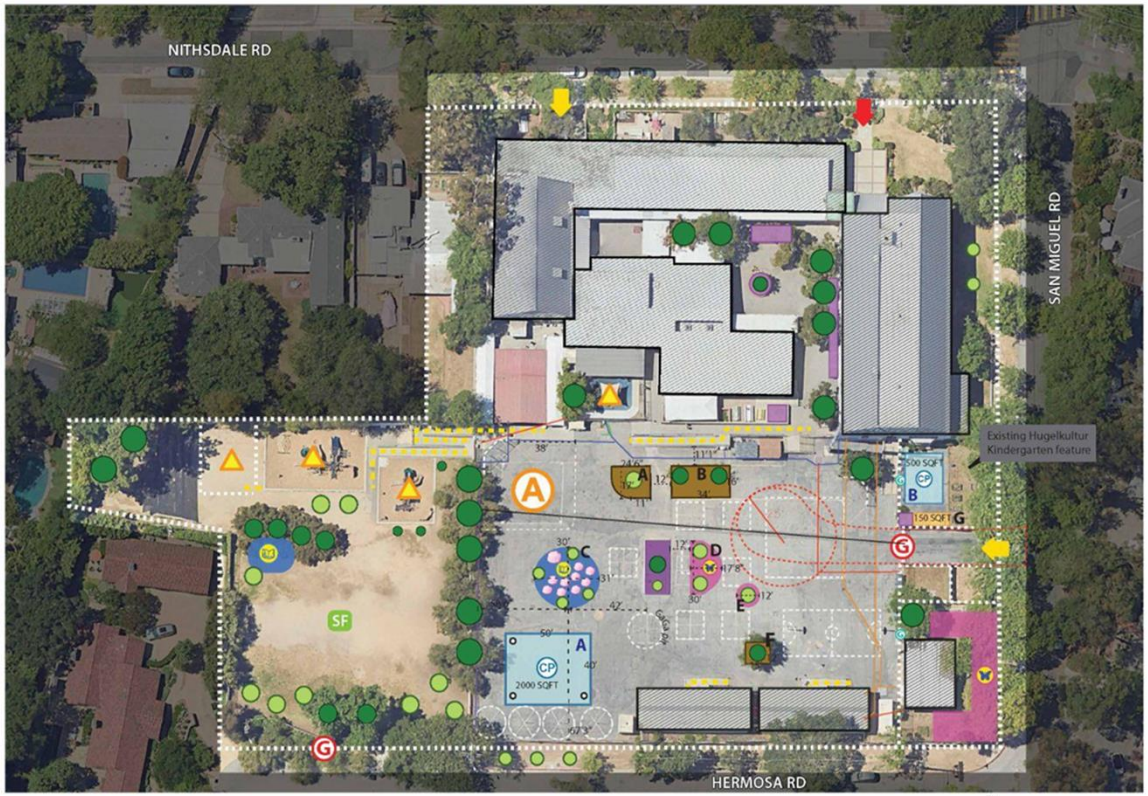
- Outdoor Classroom
- Boulder Group Seating
- Log Seating
- Natural Based Play Area

NATURAL INFRASTRUCTURE & URBAN FOREST

- Proposed Trees
- Native Habitat Landscape
- Tree Well
- Asphalt Removal
- Cool Pavement

Asphalt Removal	
A	367
B	544
C	730
D	269
E	113
F	162
G	150
Total	**2335 sqft**

Cool Pavement	
A	2000
B	500
Total	**2500 sqft**



N SCALE: NTS

CalFire Green Schoolyards Grant 2022/2023

Natural Infrastructure - 'Watershed Discovery Campuses'

CalFire Green Schoolyards Grant 2022/2023

Amigos de los Rios

Natural Infrastructure - 'Watershed Discovery Campuses'

EXISTING INFRASTRUCTURE

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- Parking Lot Entrance
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- Native Habitat Landscape
- Tree Well
- Pervious Pavement
- Nature Trail
- Bioswale
- Rain Garden
- Community Garden
- Cool Pavement

NATURAL BASED ELEMENTS

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- Boulder Group Seating
- Log Seating
- Picnic Table
- Metal Bench
- Natural Based Play Area
- Nature Themed Gate
- Interpretive Elements
- Mini Forest
- Playhouse

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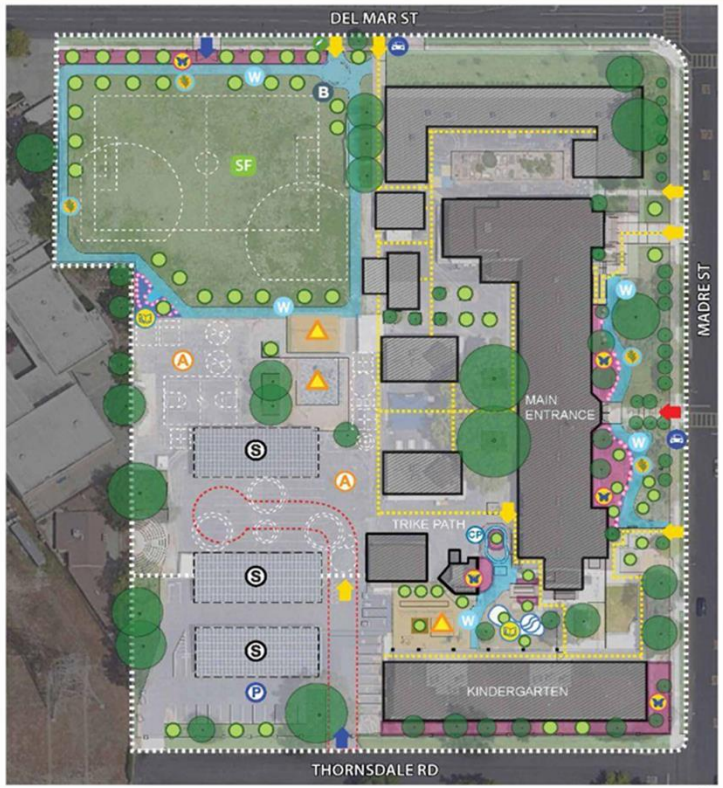


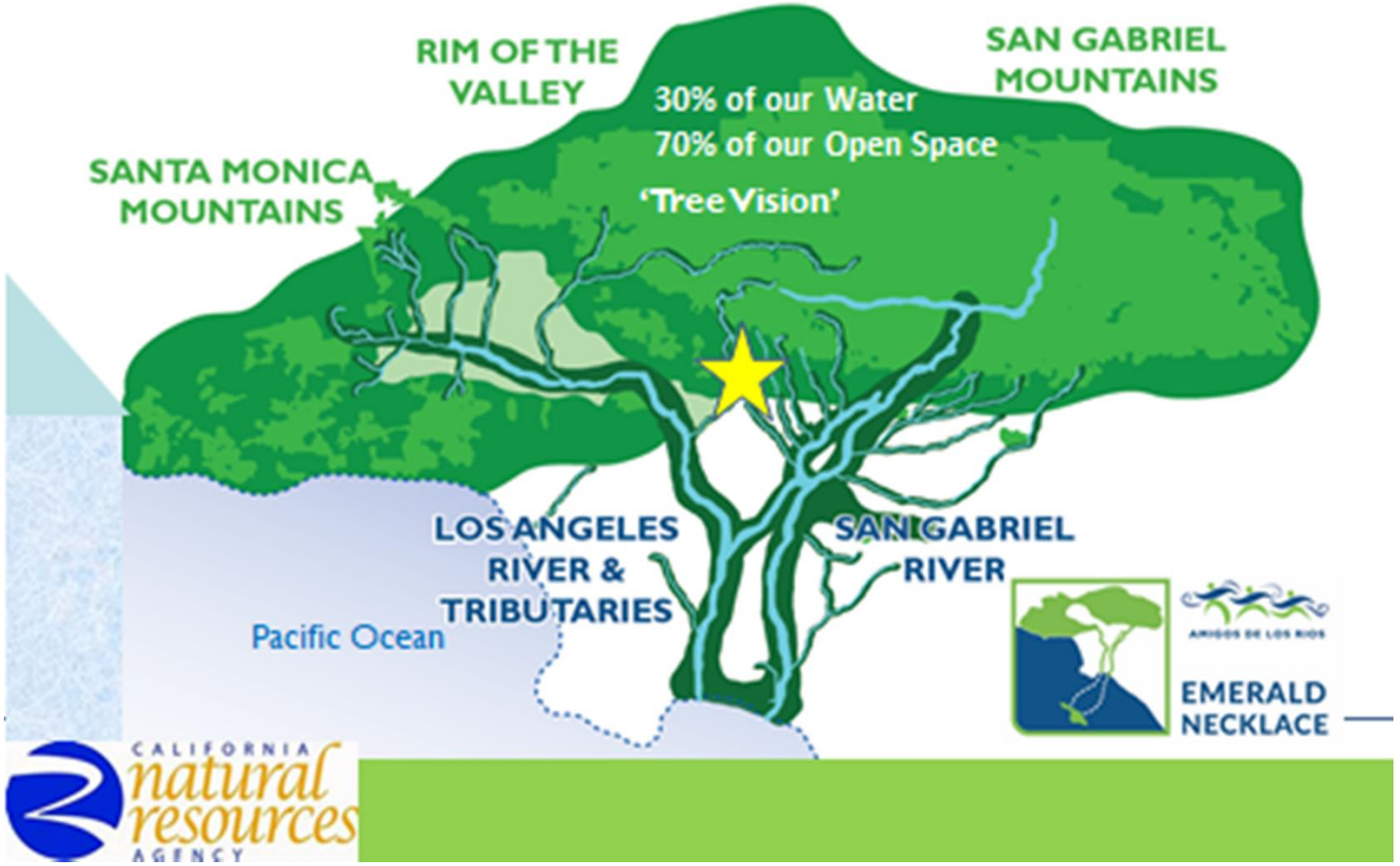
SCALE: NTS

Campus # 4

Pasadena Unified School District: Willard Elementary School

301 Madre St, Pasadena, CA 91107

Emerald Necklace Mary Jackson Watershed Discovery Campus



Mary Jackson

Incremental Approach

1. Plant trees
2. Convert Front Grass Habitat Landscape
3. Soil Conditioning – Storm Water Garden
4. Watershed Discovery Conversion – Asphalt/
5. Workforce training

30 to 50%
Tree Canopy
where students spend time


SLOW
DOWN
For a
Safer Community

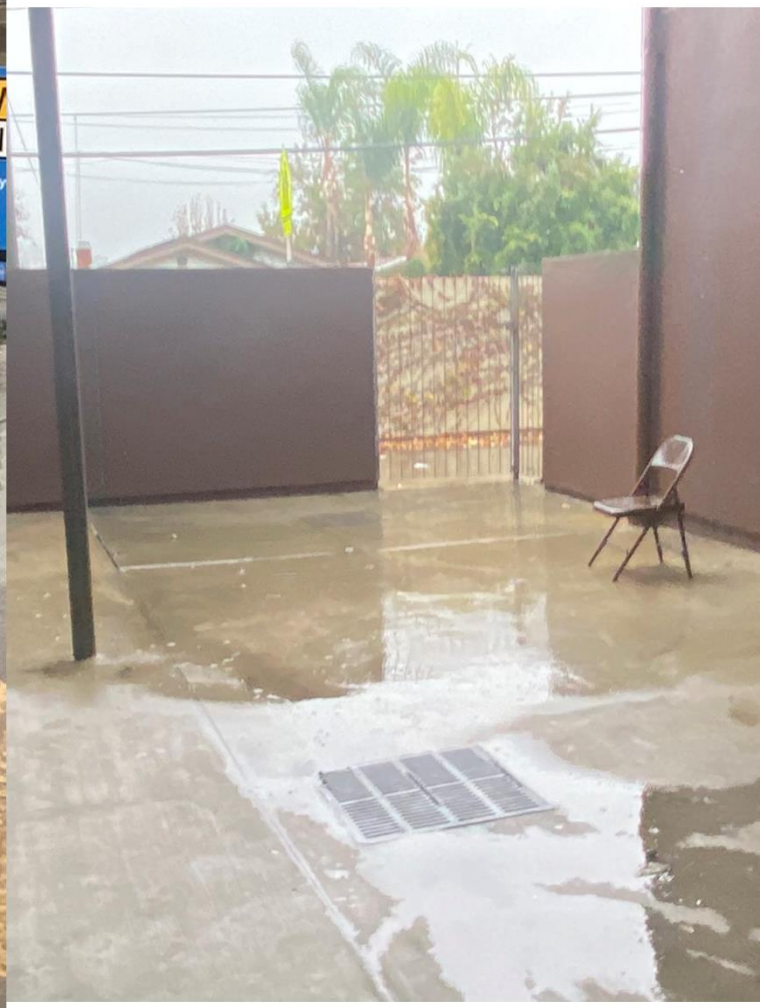
2022 Mary Jackson School


SIDE STREET.ORG


CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION

BIODIVERSITY


SLOW
DOWN
For a
Safer Community

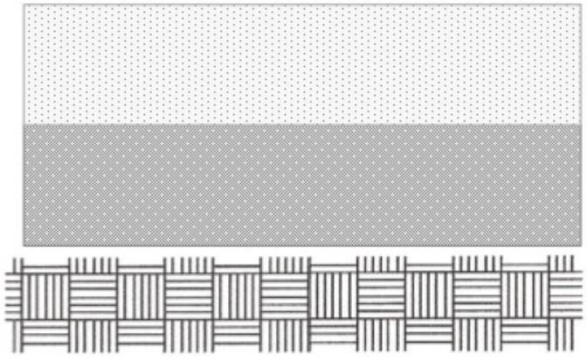



Be safe
Because it's the right thing to do!

DRAINAGE CHALLENGES

PERVIOUS

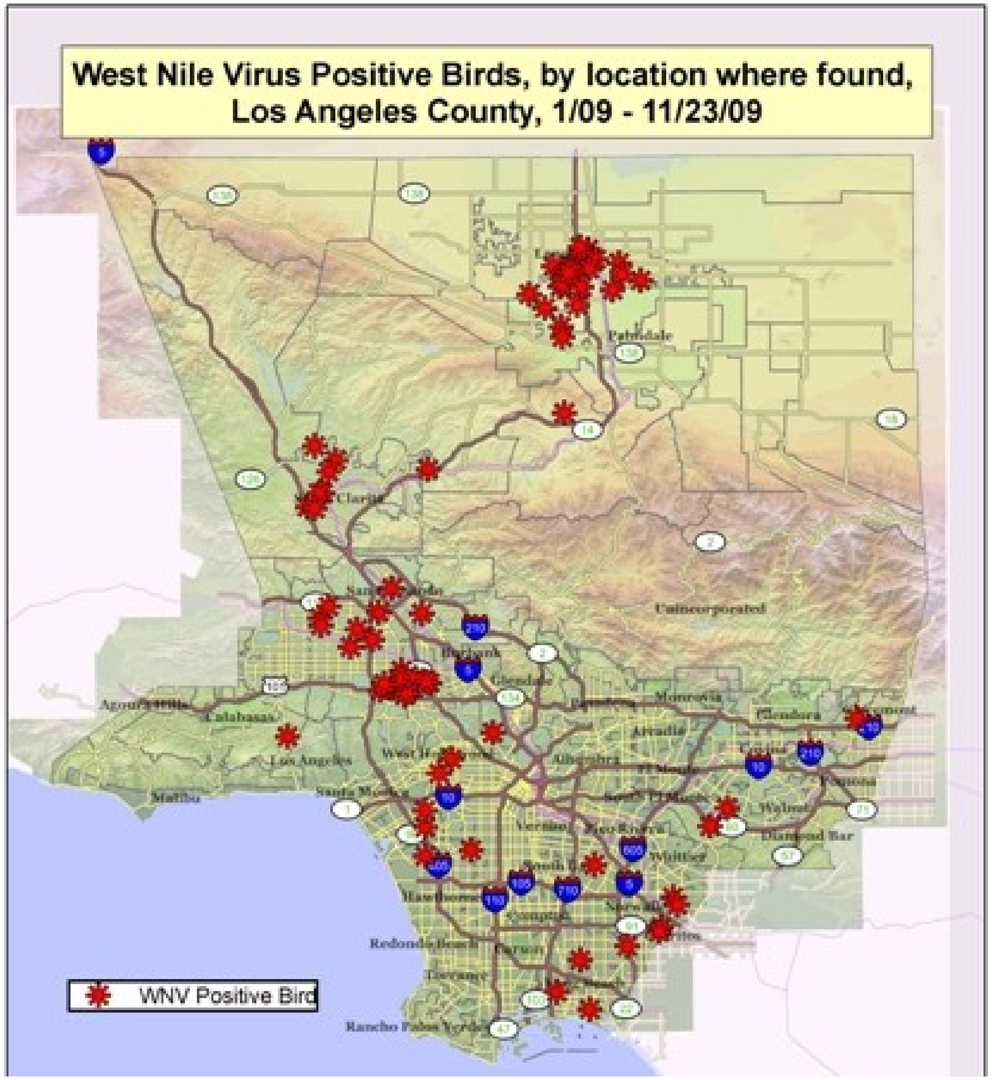
Typical Pervious Concrete Section



6 in. 3/8” mix pervious concrete
(6” x 20% voids = 1.2” of storage capacity)

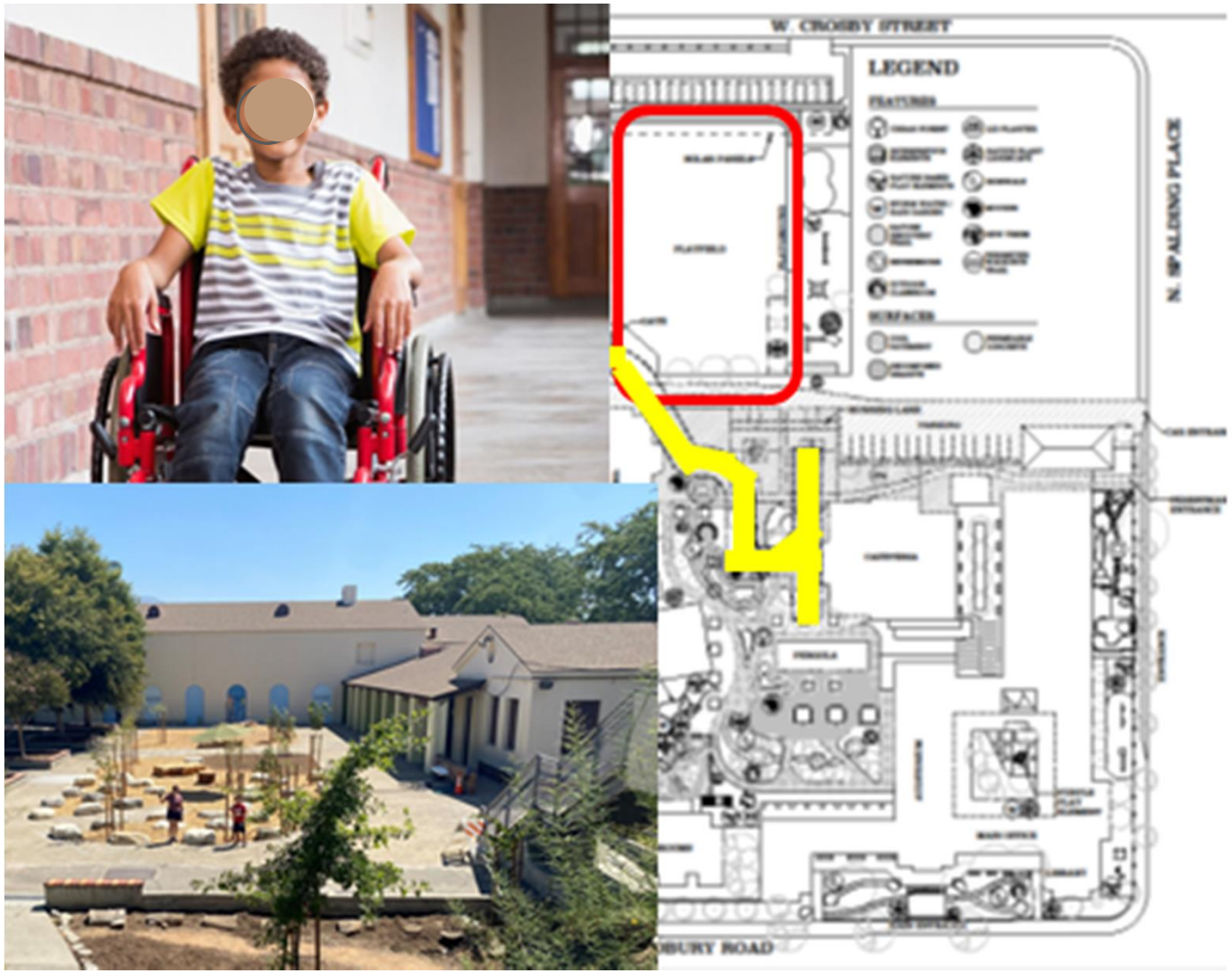
6 in. ¾” open graded aggregate base, semi-compacted
(6” x 35% voids = 2.1” of storage capacity)

native sub-grade, 0.25”/hr. infiltration rate
(Infiltrates into subbase – takes +/- 8 hours with 0.25”/hr. infiltration rate)


West Nile Virus Positive Birds, by location where found,
Los Angeles County, 1/09 - 11/23/09
WNV Positive Bird
Palmdale
Unincorporated
Burbank
Monrovia
Glendora
Calabasas
Los Angeles
Malibu
Arcadia
Alhambra
Walnut
Diamond Bar
Pomona
Vernon
Pico Rivera
Whittier
Compton
Redondo Beach
Carson
Torrance
Rancho Palos Verdes

MOSQUITO VECTOR

21th Century
ADA PATHS OF TRAVEL

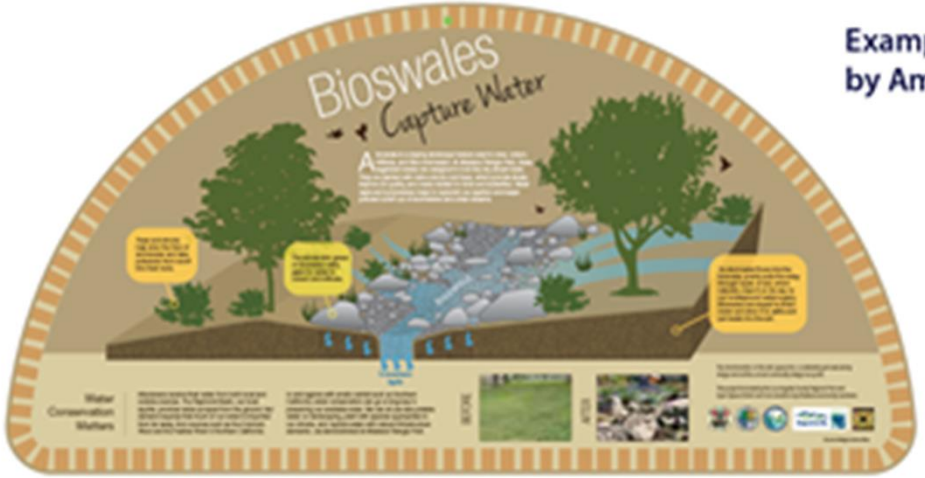

W. CROSBY STREET
LEGEND
FEATURES
SURFACES
N. SPALDING PLACE
BURY ROAD


SUNBELT RENTALS
JCB
JCB

30 to 50%
Tree Canopy
where students spend time


Bioswales
Capture Water
A

Interpretive Signage is Mission Critical



Examples of Interpretive Signage by Amigos de los Rios

AMIGOS DE LOS RIOS
EMERALD NECKLACE

LONG TERM SUSTAINABIITY OF GREEN SCHOOLS /Watershed Discovery Campus

- Non Profit Lead/ Instigator

- Superintendent/ Board of Education/ District Facilities Team
- Bond Measure Master Plan/ Implementation Team

- Site Principal / Site Janitorial Staff/ PTA
- Core Teachers - EG. Science - Climate Action Curriculum
- Physical Education Teacher
- Garden Education Leader

- Emerald Necklace Volunteer Stewards – Students Community Service/ Service Orgs /Businesses
- Philanthropy

MULTI DISCIPLINARY TEAM: (Left to right) Mary Jackson School Science Teacher; ADLR Natural Infrastructure Fellow, PUSD Board of Education Member, Jackson School Principal, Angel City Lumber Founder

SOAK IT ALL IN!

School Communtiy

Pride

CIVIC Engagement


MARY W JACKSON
"There's
Learn


AMIGOS DE LOS RIOS
EMERALD
NECKLACE

Emerald
Necklace
Watershed
Stewards

Let us turn Classrooms ‘INSIDE OUT’

For benefit of **all** students


ACTIVE
SGV

PRINCIPAL 1	PRINCIPAL 2	PRINCIPAL 3	PRINCIPAL 4	PRINCIPAL 5
People Depend on Natural Systems	**People Influence Natural Systems**	**Natural Systems Change in Ways that People Benefit From and Can Influence**	**There are no Permanent or Impermeable Bondaries that Prevent matter from flowing between Systems**	**Decisions Affecting Resources and Natural Sytems are Complex and Involve many Factors**
The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems and goods that provide essential goods and ecosystem services.	The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.	Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.	The exchange of matter between natural systems and human societies affects the long-term functioning of both.	Decisions affecting resources and natural systems are based on a wide range of considerations and decision-nmakign processes
Connection to principals and Jackson's retrofit:				
1. Water Scarcity -Investigate growing problems of water scarcity **2. Watershed** -Understanding how human communities depend on the health of our watershed **3. Soil Health** -Understanding how its integral to the functioning of our economies and culture **3. Infrastructio to relate:** Bioswales, Rain Gardens, Stormwater Basins	**1. Rain Garden/Bioswale** -Investigate how human behaviors can affect certain plant species or animals **2. Watershed** -Research threats to these species and allow them to make their own conservation plan **3. Plant Conservation** -Connect ideas of conservation to species living in rain garden (worms, birds, ducks) **3. Animal Conservation** -Connect ideas of conservation to species living in rain garden (worms, birds, ducks)	**1. Bioswale** -Understand engineering ways in which humans can hold back floods or slow down erosions **2. Carbon Cycle, Greenhouse Gasses, Water Cycle** -Understand how human activities can alter these cycles **3. Flower Garden** -Examine how native plants are crucial for our health and culture	**1. Community Garden** -Understand engineering ways in which humans can hold back floods or slow down erosions **2. Bioswale** -Understand how human activities can alter these cycles	**1. Taking on role of scientist or Big Decision Maker** -Identify problems of old campus -Allow students to connect previous problems to solutions -Investigate the social, economic, political and environmental factors when making decisions about the use of natural resources

EEI

California Education and the Environment Initiative

Questions for School Districts

1. Does your district have a ‘GREEN SCHOOL Resolution/Policies/ Board Regulations?

2. Do you have Sustainable Green School Yard Design Specifications as part of Facilities Planning ? Heat Island/ Stormwater

3. Do you have a great Partners/ Contractors for Natural Infrastructure Design & Implementation set up for procurement?

4. Post Covid - Have you created permanent outdoor classrooms/ Diversity of inclusive outdoor spaces ?

Grants for Teachers

to adopt lessons to outdoors

Science Scope & Sequence

Grade	Unit 1	Unit 2	Unit 3	Unit 4
	August - Nov	November - Feburary	Feburary - May	
K	Animal Needs (LS1-1)	Weather Conditions (ESS2-1)	Pushes and Pulls (PS2-1)	N/A
	Habitats (ESS3-1)	Weather Patterns (ESS2-1)	Speed and Direction	
	Organisms' Impact on	Weather Hazards (ESS3-2)		
	Environments (ESS2-2)	Energy from the Sun (PS3-1 & PS3-2)		
	Reducing Human Impact			
	(ESS2-2; ESS2-3)			
	August - November	November - Feburary	Feburary - May	
1	Parts of Plants (LS1-1)	Sound (PS4-1)	Patterns in Space (ESS1-1)	N/A
	Parts of Animals (LS1-1)	Communication (PS4-4)	Seasonal Patterns (ESS1-2)	
	Plant Survival (LS1-1)	Behavior of Light (PS4-2)		
	Animal Survival (LS1-1)			
	Plant Trait Inheritance and			
	Variation (LS3-1)			
	Protecting the Young (LS1-2)			
	Animal Trait Inheritance and			
	Variation (LS3-1)			
	August - November	November - Feburary	Feburary - May	
2	Properties and States of Matter	Mapping our world	What Plants Need	N/A
	Properties of materials	Forms of water on earth	Animal and Plant Dependence	
	Building blocks of matter	Quick Changes to Land	Diversity to Living Things	
	Changes from heat	Slow Changes to Land		
	August - November	November - Feburary	Feburary - May	
3	Life Cycles	Weather and Climate	Objects and Motion	N/A
	Inheritance and Variation of Traits	Impacts of Natural Hazards	Electic and Magnetic Forces	
	Social and Group Behavior			
	Survival of the Fittest			
	Environmental Traits			
	Env. Changes and Effects			
	Adaptions			
	Fossils			
	Plant and Animal Extinction			
	August-October	October-December	December-January	January-March
4	Sense Receptors	Energy and Speed	Wavelength and Amplitide	Rock Patterns
	Plant and Animal parts	Transfer of Energy in Collisions	Motion of Waves	Changing Land
	Light Reflection	Using Stored Energy		Plate Tectonics
	Technologies	Re/Non-renewable resources		Natural Processes
	August - September	September - December	December - January	January - March
5	Gravity (PS2-1	Matter is Everywhere	Matter and Energy in Plants (LS1-1)	Earth's Systems Interactions
	Earth's Rotation (ESS1-2)	(PS1-1)	Food Webs (LS2-1)	Water Sources
	Observing the Stars	Changes to Matter (PS1-2)	Ecosystems (LS2-1)	Reducing Human Footprint
	(ESS1-1)	Properties of Matter (PS1-3)	Matter Cycles (LS2-1)	

JACKSON STEM
Dual Language Magnet Academy

Immersive Lessons

Campus as Living lab

Outdoor Learning Opportunities tied to State Standards

Science Teacher
John Newell

Celebrate Participation in Watershed Discovery School Campus Creation

Acknowledge School District Leadership

Safe Clean Water 'Watershed Discovery Campus' - Gorgeous Framed Certificate (Shepard Fairey)
For Board of Education & In Person Ribbon Cutting for School Community Team
Principal –' Watershed Discovery Champion'
Science Teacher - 'Living Laboratory Stipend'
Art Teacher - 'Beauty of Storm water Stipend'
Language Arts 'Turn the Classroom Inside Out'
PTA / Parent Landscape Committee – Watershed Discovery Campus Support Award
Student Ambassador – Watershed Discovery – Stipend for Leading 4 Stewardship Events – College Scholarship 529
Janitor - 'Happy Dance through Green School Yard'
Facilities Team ' Expanding Horizons Award'

Constitute Expert Advisory Panel

To Boost Awareness & Distill Info to Boards of Ed & beyond

Director California Department of Social Services State Secretary of Health & Human Services Secretary - Kim Johnson
Richard Louv - Children and Nature Network
LA County Office of Education - Chief of Well Being Alicia Garopa
Institute for Educational Leadership / Coalition for Community Schools, Dr. Michelle Lessly Blackburn, M.Ed, D.LP., Senior Policy Manager
Materials Scientist Dr. Eshan Dave - Assoc. Prof University New Hampshire, Sustainable Pavement Materials Research
Urban Forestry and Human Health Research University of Washington Dr Kathellen Woolf
Green School Yards National Network - Mikaela Randolph
Pacific Institute Reasearchers -Dr Sonali Abraham, Morgan Shimabuku, Shannon Spurlock
Earth Economics - Olivia Molden
Watershed Council for Health -Clarasophia Gust
Cal Fire Grants Director Walter Passmore
Climate Expert JPL/CalTech

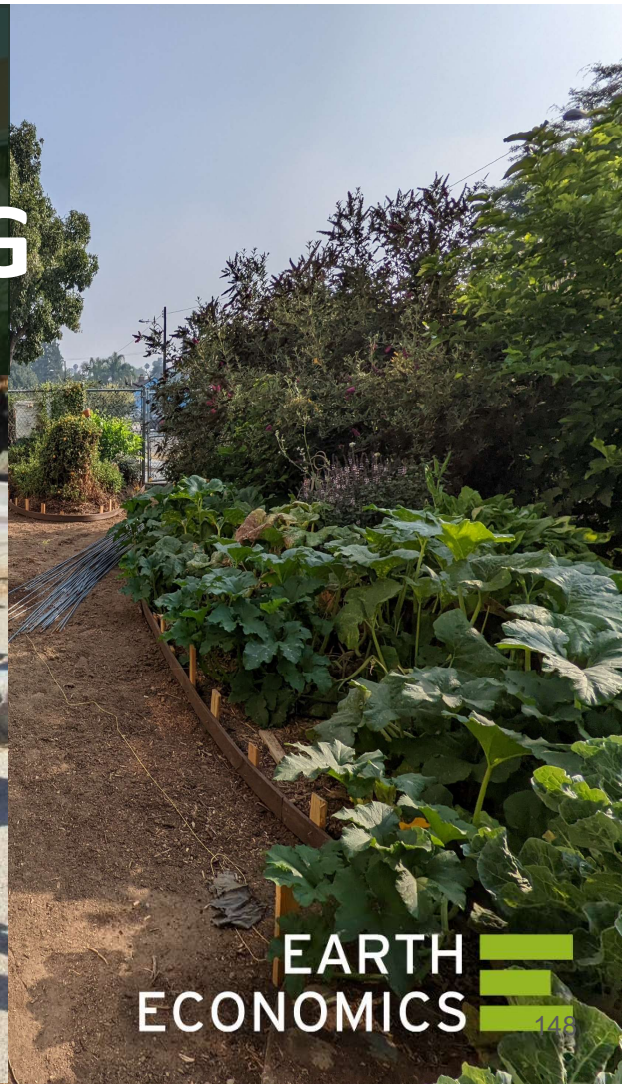
‘CASE STUDY’

Cost Benefit for Every School Project

* EG. Earth Economics

MEASURING THE BENEFITS OF SCHOOLYARD GREENING

Laura Villegas PhD /December 2023



EARTH ECONOMICS

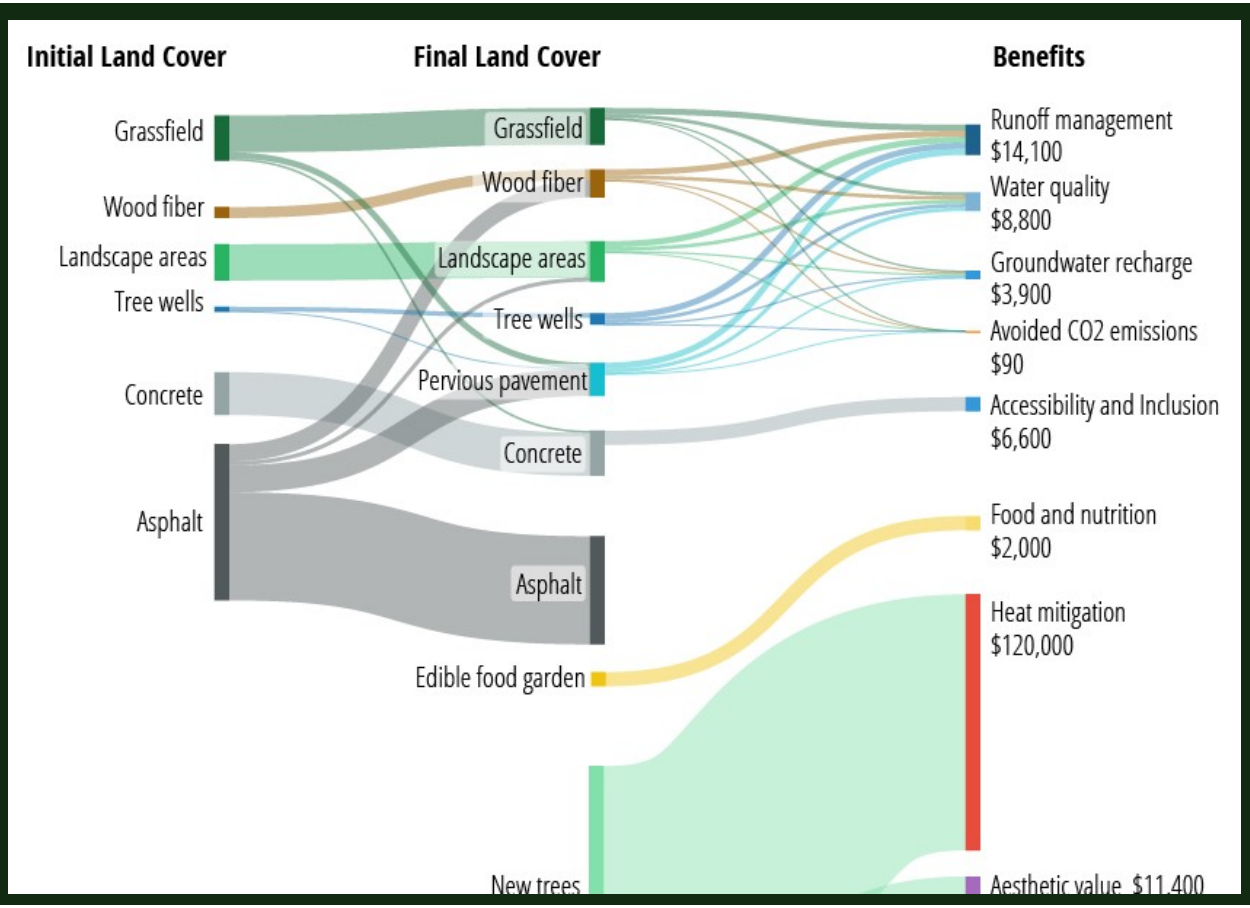
The Watershed Discovery Campus

ALL PHOTOS COURTESY OF AMIGOS DE LOS RIOS

Measuring green schoolyards benefits

Earth Economics

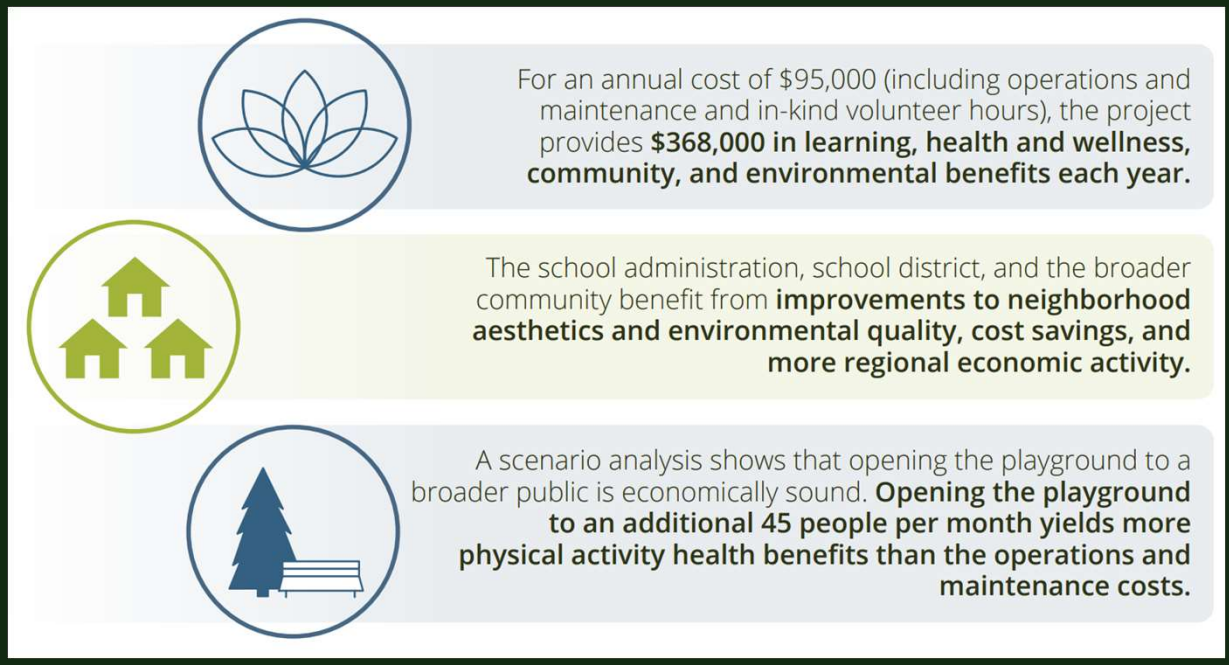
Measuring green schoolyards benefits



Earth Economics

Measuring green schoolyards benefits

Every dollar invested in greening, operating, and maintaining the schoolyard yields at least $3.60 in community, economic, and environmental benefits.



Earth Economics

SD Hurdles to Campus Greening

'Risk Management'/Health & Safety Current Definition – extremely limited

Trip, Fall, Scrape, on cracked asphalt OR

1. **Succumb to Heat Stroke –Heat Impacts to Physical Health, Academic Learning & Fitness**
2. **Vector Flood Drainage Challenges**
3. **Mental Health Impacts of Current Penitentiary Campuses**
4. **Chronic Illness from Lack of Safe Places to Exercise**
5. **Law Suits related to ADA compliance**

Per Principals, Teachers & Families point of view of Risk

'Procurement' & Current Contracting Process

SD Hurdles to Campus Greening

'Procurement' & Current Contracting Process features severely limited Menu of Options

- Limited to Contractors who do **Asphalt Replacement & Repair**

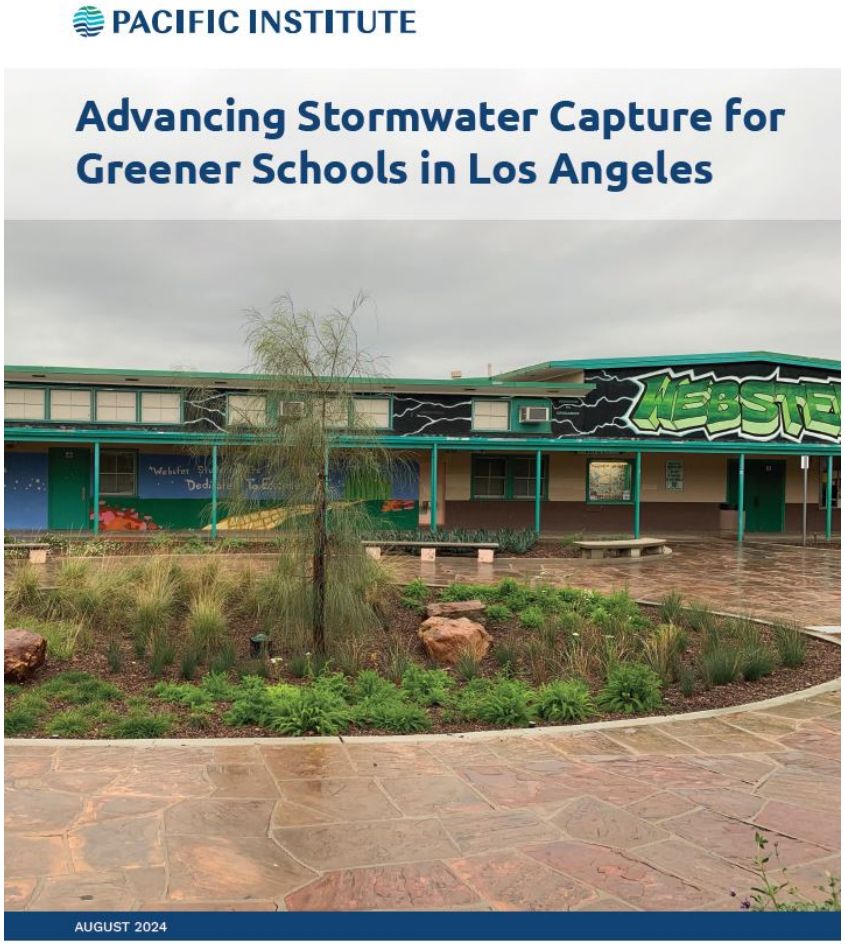
1. Natural Infrastructure : Pervious Concrete/ Pervious surfaces Decomposed Granite

2. Natural Infrastructure: Cool Surfaces / Cool Pavement - Urban Forest/ mulched biodiverse landscapes

3. Natural Infrastructure: Storm water Capture, Bioswales/Rain harvest gardens/LID Planters

KEY RECOMMENDATIONS:

- **Use a Multi-Benefit Lens for Stormwater Projects**
  - Expand stormwater programs to evaluate multiple benefits and costs. Consider various advantages when planning stormwater projects on school campuses.
- **Encourage Partnerships Between Schools and Community Organizations**
  - Schools and community groups should form partnerships to enhance stormwater management benefits.
  - Schools should reduce barriers for community partnerships.
- **Engage Students and Staff in Stormwater Projects**
  - Stormwater policies should include student benefits in project planning.
- **Prepare for New Regulations**
  - Provide schools with the tools and resources to manage stormwater proactively and meet future regulations.



https://pacinst.org/wp-content/uploads/2024/08/Exec_Summary_Stormwater_Capture_LA.pdf

CalFire Green Schoolyards Grant 2022/2023

Amigos de los Rios
Natural Infrastructure - 'Watershed Discovery Campuses'

Overall Plan

EXISTING INFRASTRUCTURE
- Boundary
- School Main Entrance
- Fire Lane
- ADA Path of Travel
- Pedestrian Entry
- Parking Lot Entrance
- Parking Lot
- Student Dropoff Area
- Solar Panel Area
- Storm Drain

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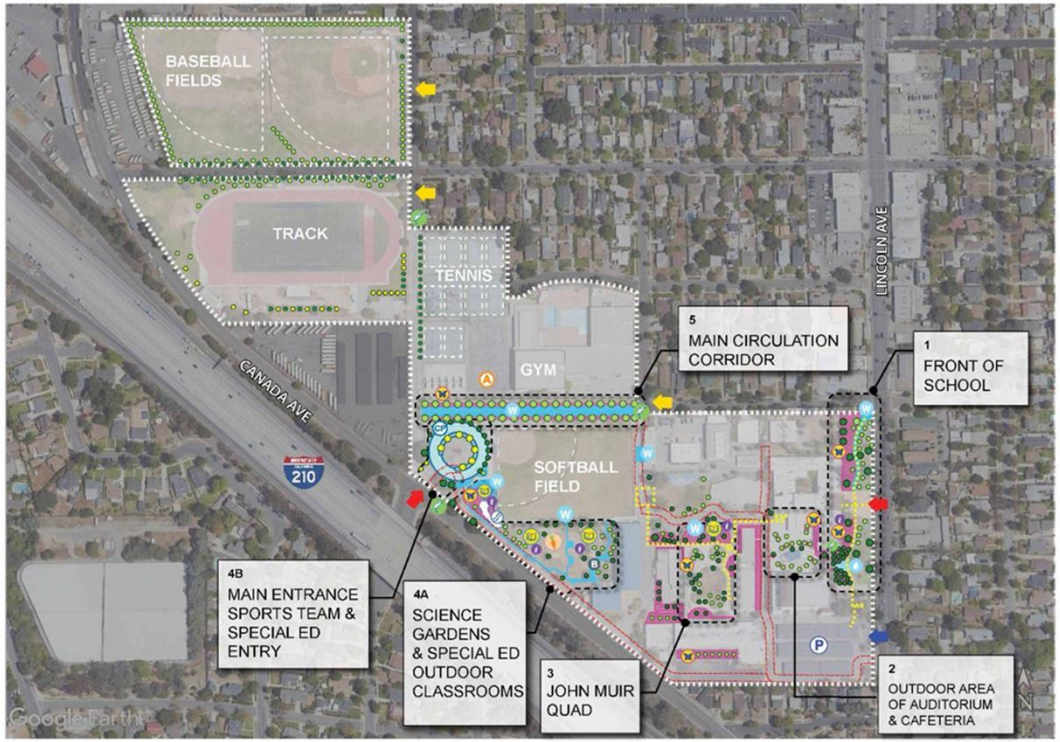

SCALE: NTS

Campus # 2

Pasadena Unified School District: John Muir High School Early College Magnet

1905 Lincoln Ave, Pasadena, CA 91103