Davis-Woodland Schools and Parks Water Conservation Projects Plan

Funded by the Water Resources Association of Yolo County

Melton Design Group | September 8, 2016

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Produced by
Melton Design Group
September 8, 2016
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BACKGROUND

The City of Davis, in coordination with the City of Woodland, Davis Joint Unified School District and Woodland Joint Unified School District was granted funding from the Water Resources Association of Yolo County to identify water conservation opportunities in Davis and Woodland schools and public use areas. Through a competitive Request for Proposal process, landscape architectural consultants Melton Design Group (MDG) were chosen by a representative group from the four agencies and hired by the City of Davis to evaluate potential sites for water conservation and identify opportunities for improvements and funding.

Initial meetings for the project included staff representatives from the cities and school districts of Davis and Woodland. MDG provided direction for staff to identify sites to consider as candidates for the water conservation project. Individual meetings occurred with each agency. Potential sites were discussed, some involving existing staff ideas and others with ongoing efforts for water conservation. Maps or existing plans were available for some sites but Google map aerial views were used to review options for most sites.

Further meetings occurred at potential project sites to analyze existing conditions of site feasibility and in the case of the school districts, to meet with teaching staff to discuss how the improvements such as demonstration gardens and outdoor laboratories can fit into their curriculum.

Sites were then analyzed according to best potential for water conservation, opportunities in education and how proposed improvements would align with existing and future sources of funding. This report provides detailed project descriptions, budgets, and funding opportunities for four of the identified water conservation sites (one from each municipality and school district).

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WATER CONSERVATION

As outlined in the grant for this project, the primary goal of this study is to identify water conservation opportunities. Additional water conservation in the cities of Davis and Woodland, including public use areas and schools, will provide added flexibility in the operation of the Woodland-Davis Water Supply Project. Prioritizing water conservation at schools and parks will help both cities reduce water use and achieve water conservation targets and will also serve as examples to the communities at large. Citywide water conservation will provide additional water supply flexibility in times of shortage. Additional conservation in the cities of Davis and Woodland could help achieve statewide priorities by potentially leaving more water in the Sacramento River after the two cities have completed their move to surface water in 2016.

EDUCATION

Students, teachers and education are an intrinsic aspect of site improvements for water conservation. While implementing water conserving landscape improvements, there is a great opportunity to benefit educational programs by incorporating educational features and settings for outdoor classrooms at the schools. The proposed projects will be ecologically sound, integrated into the curriculum, and designed to encourage long-term stewardship by students and the community along with incorporating water conserving landscape improvements. Similar opportunities fit with city park improvements through interpretive trails, gardens and landscape features.

HABITAT AND POLLINATOR GARDENS

Pollinator species are necessary in the production of about a third of the food we eat, and they are at a critical point in their own survival. There are many factors that are contributing to their decline, but we do know that creating more nectar and pollen sources will help improve their health and numbers. Planting native habitats with pollinator plants will definitely help in this effort and partner very well with water conservation and opportunities for education.

WATER CONSERVATION FOR EXISTING LANDSCAPES

One of the most visible uses of water in landscapes is irrigation of large areas of turf grass, especially at a public area or school. Converting turf areas to low water-use plants can reduce water bills and maintenance costs by 60 to 75%, requiring fewer irrigation repairs, considerably less fertilizer, weed control and, of course, no mowing. A low-pressure drip or bubbler irrigation system will also greatly reduce the likelihood of runoff that occurs with a conventional overhead spray system. Converting school and park turf to a landscape that better aligns with our native climate also provides great opportunities for education through outdoor classrooms for students or interpretive displays for the public.

In order to reduce the amount of turf in a park or other landscape, we can use an approach similar to that of the recent State Water Efficient Landscape Ordinance for new development, and limit turf to active use areas. Each part of a site should be analyzed to determine the best type of ground treatment for that space. The results of this analysis will determine alternatives to turf according to the use of the space.

Alternatives can include a range of options. Planting with drought tolerant, native plants and using drip irrigation are becoming commonly accepted practices. Another primary component to consider is to plant less as a whole.

~ Limit aesthetic pops of landscape to drought tolerant and native plants at entrance features or other accent areas. Pollinator gardens are also a much needed alternative to turf. Pollinators can be an effective educational tool. They are important to our food system and can help reproduce wild plants and pollinating insects that are in decline.

~ Limit border landscape in between accents to include only irrigated trees without shrubs. Allow fallen leaves and tree duff to remain in planters to decompose and replenish soil nutrients. Leaves and duff also help to retain soil moisture. Native grasses can grow according to rainfall and be mowed a few times a year.

~ Parts of a facility may do better without a planted landscape. If you consider the use of a picnic site or school quad that needs to support heavy foot traffic, materials such as decomposed granite or concrete may be more appropriate. This approach will be utilized as we analyze sites to identify opportunities for outdoor learning spaces for schools and interpretive displays for public areas.

Sparse layout of drought tolerant, native plants on drip irrigation.

Deer Grass and California Fuchsia at Verbena Fields, a neighborhood park in Chico, CA

~ A useful resource for plant selection in the Davis, Woodland area is the *UC Davis Arboretum All Stars, 100 Plants Tested and Recommended for California Gardens.* http://arboretum.ucdavis.edu/documents/AllStarsBook_201415_final-reduced.pdf

Where possible, install point source irrigation; drip or low-volume irrigation systems to conserve water and limit runoff. Utilize reclaimed or recycled water if available and appropriate for use, in which case the irrigation system would need to be updated with approved hardware. Besides replacing turf, there are other changes to existing irrigation and storm water systems that can help save water:

- ~ Update nozzles of existing spray heads to be match precipitating and install pressure regulators where pressure exceeds 80 psi.
- ~ Replace old irrigation controllers with "smart controllers" that have weather-based operating systems and soil moisture sensors.
- ~ Capture storm water runoff in the landscape.
- ~ Provide cisterns or bioswales to capture roof and air conditioner discharge.

This study will focus on replacing turf in most cases with water conserving landscapes and educational opportunities.

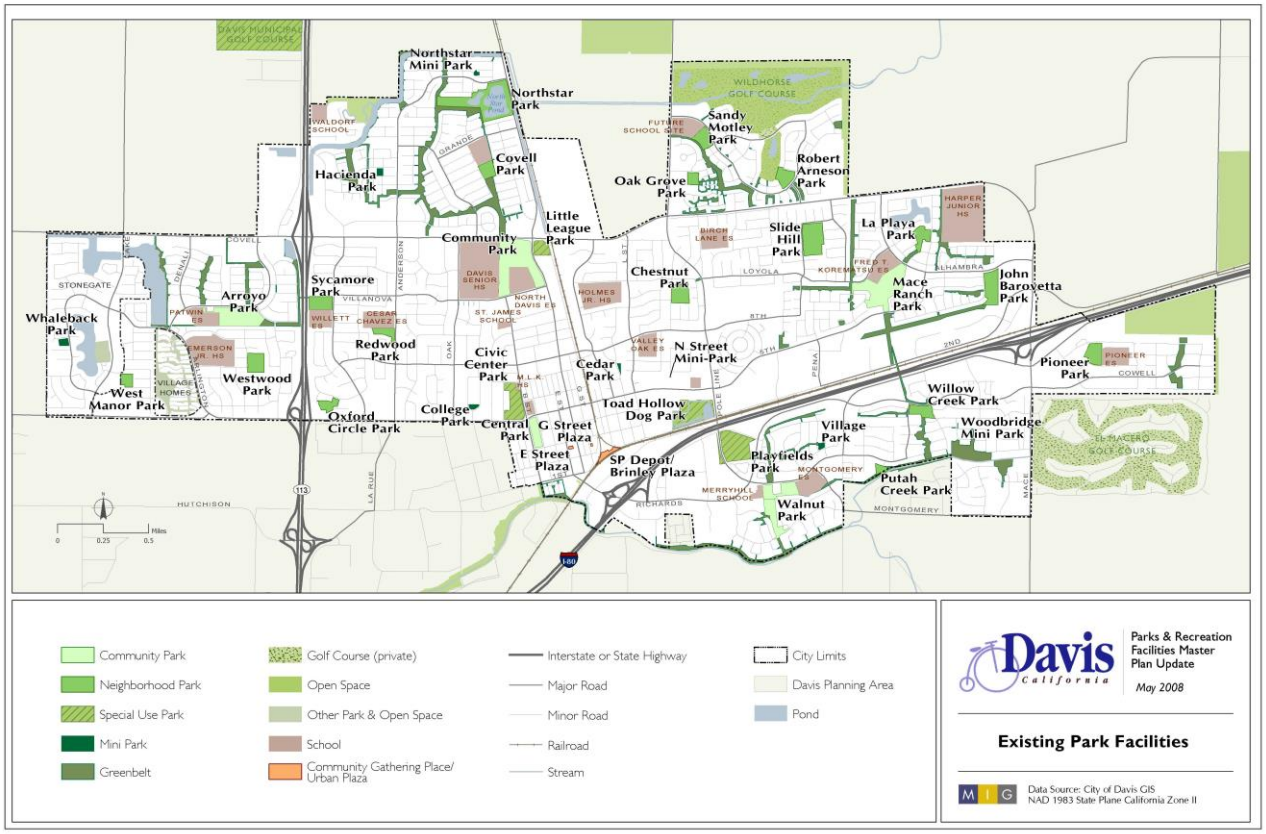
Creative bioswale design at the West Village Apartments, University of California, Davis

The next four sections will outline potential improvements for each site and highlight opportunities to meet the project goals of water conservation, education, creating habitat and pollinator gardens.

I. THE CITY OF DAVIS – GREEN BELTS

A. PROJECT DESCRIPTION

One of the greatest assets to the Davis park system is the network of more than 60 miles of Green Belts with bike trails that connect parks and neighborhoods throughout the City. Each belt is typically between 100 to 200 feet across with an 8-foot bike path meandering through the middle. Most of the landscape consists of irrigated turf and shade trees. Large open turf areas are greatly appreciated as multi-use event areas for local neighbors, but a majority of the space is mostly utilized by the public as aesthetic while passing through on the bike path. It is these spaces that are great candidates to convert existing turf to a low water use, drought tolerant landscape with interpretive learning opportunities to show the general public ways of converting their landscapes at home.



City of Davis, Existing Park Facilities – including over 60 miles of Green Belts.

B. WATER CONSERVATION IMPROVEMENTS

For the purposes of this report, we'll study a segment of green belt that's about an acre in size just north of West Covell Boulevard, next to Aurora Avenue. The City has designated this green belt area as a typical turf area along the green belt that is underutilized for recreation an ideal candidate for water conservation, demonstration gardens and interpretive education.

Sample Davis Green Belt Conservation Area next to Aurora Ave, north of W. Covell Blvd.

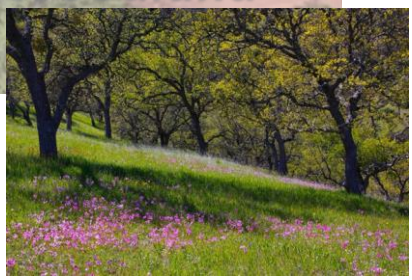
Typical improvements for green belts may consist of the following improvements:

- This green belt space is an example of a network of improvements that could occur, interspersed among the 60-mile length of green belts in Davis to conserve and store water while restoring a native, pollinator oak woodland throughout the City.
- Turf removal and replacement with drought tolerant native plants and a network of oak woodland and pollinator plants on a drip irrigation system.
- Soil amendments and bark mulch ground cover to improve water retention.
- Bioswales to prevent runoff, enhance habitat, recharge aquifers and reduce water in city storm drain system
- Decomposed granite paths and interpretive signs to inform the public of the benefits of projects.

The next two pages will show photos of existing conditions and a schematic drawing of potential improvements.

Photos of existing green belt turf areas with potential to convert to water conserving landscape;

- *Remove existing turf*
- *Water capture through bioswales*
- *Pollinator gardens, shade trees and interpretive opportunities*



Typical Green Belt Water Conservation Improvements

TOTAL WATER SAVED

-Existing Water Use with Turf: 1,373,084 gallons of water a year

-New Water Use with Native Plants: 168,312 gallons of water a year

Total Water Saved 1,204,772 GALLONS OF WATER A YEAR

C. ESTIMATED COST OF CONSTRUCTION

City of Davis - Sample Greenbelt Area

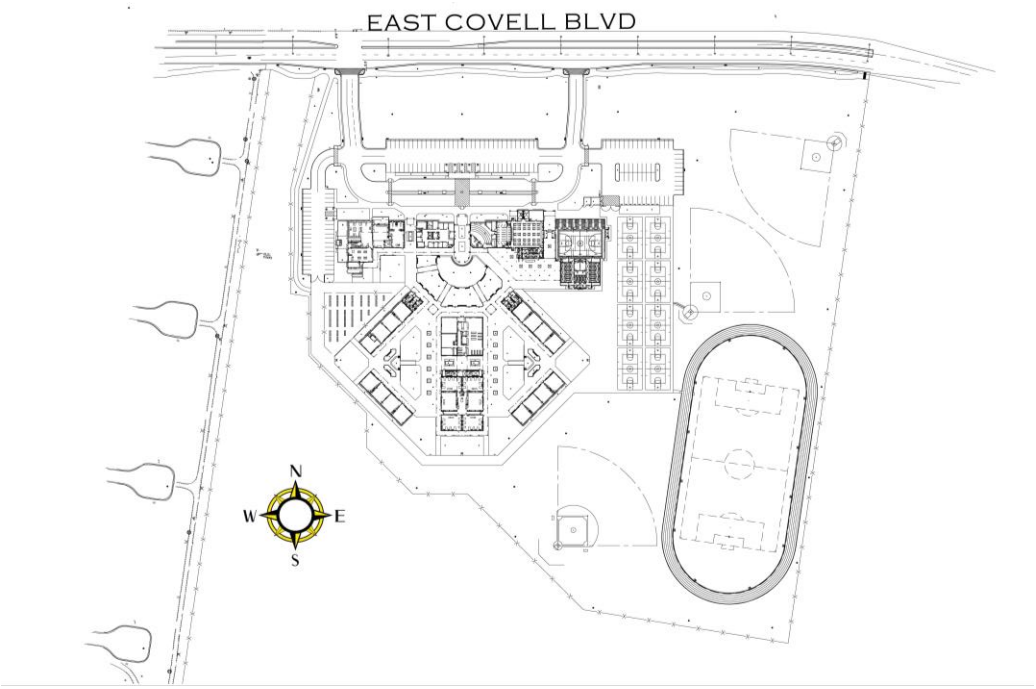
DESCRIPTION		QUANTITY		UNIT PRICE	TOTAL
1	Demolition - Remove Existing Turf	36,605	SF	$0.50	$18,302.50
2	Salvage - Existing Turf Irrigation System	36,605	SF	$0.03	$1,098.15
3	Grading	36,605	SF	$0.60	$21,963.00
4	Landscape - planting, bark mulch and weed barrier fabric	19,384	SF	$2.50	$48,460.00
5	Drip Irrigation System	19,384	SF	$1.50	$29,076.00
6	Benches	3	EA	$1,200.00	$3,600.00
7	Picnic Tables	2	EA	$2,000.00	$4,000.00
8	Interpretive Panels	5	EA	$5,000.00	$25,000.00
9	Decomposed Granite Paths	4,147	SF	$3.00	$12,441.00
10	Interactive Interpretive Exhibit	1	EA	$10,000.00	$10,000.00
				Subtotal	$173,940.65
				Grant Applications, Planning, Bid, Docs, Construction Administration 25%	$43,485.16
				Contingency 10%	$17,394.07
				TOTAL	$234,819.88

Total Project Cost per Square Foot: $7.06

II. DJUSD – HARPER JR. HIGH SCHOOL

A. PROJECT DESCRIPTION

Frances Harper Junior High School presents a unique opportunity for water conservation through education and the creation of outdoor classrooms. The school serves over 600 students in grades 7 to 9. Located on East Covell Boulevard, the property is a 45-acre parcel with about 23 acres in active use. Primary improvements for water conservation are proposed to occur at the front and interior of the site.

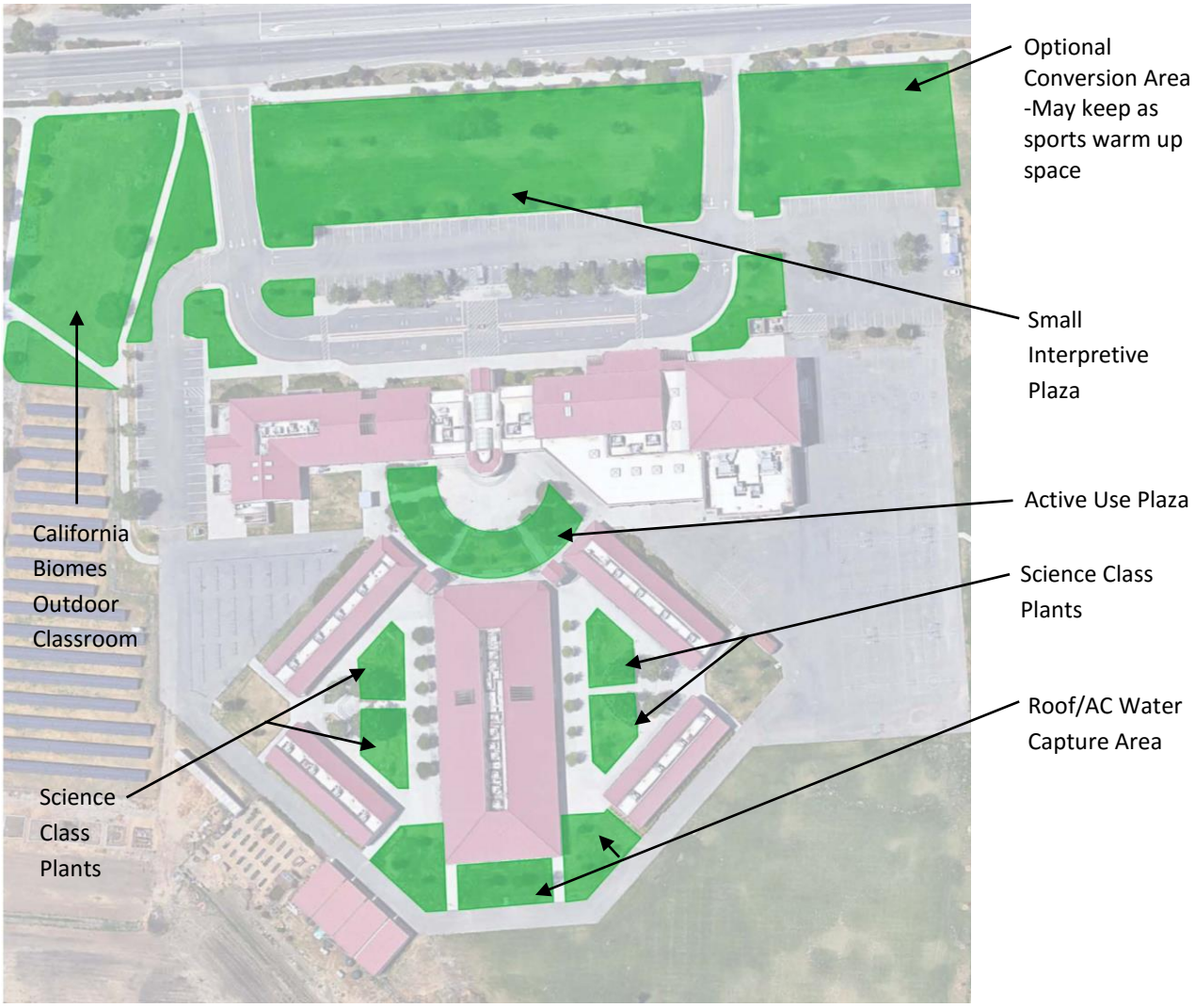


Harper Junior High School

Current landscape at the front of the school includes 2.3 acres of turf that is primarily for the purpose of aesthetics. There are also interior courtyards with underutilized turf panels that total a little over one-third of an acre. Planned improvements for these areas include replacing the turf with drought tolerant plants, pollinator gardens, benches, bio swales and decomposed granite paths. Interpretive panels would be installed to inform students and visitors of the benefits of the water conservation improvements and the relative ecosystems for each environment.

Interior improvements would also include capturing roof water from downspouts and directing the water to bio swales where it would be filtered before entering the storm drain system or simply percolate into the soil. Interior courtyard landscapes would also be laid out to accommodate a setting for outdoor classrooms.

B. WATER CONSERVATION IMPROVEMENTS



Harper Jr. High School Water Conservation Areas

Typical improvements for Harper Jr. High School may consist of the following improvements:

- Interpretive outdoor class room space with a focus on native landscape per California biomes, from Meadows to Oak Woodland to Alpine Forests.
- Roof water capture and re-use through Cisterns and bioswales
- Turf removal and replacement with drought tolerant native plants and a network of pollinator plants on a drip irrigation system.
- Soil amendments, bio swales and bark mulch ground cover to improve water retention.
- Decomposed granite paths and interpretive signs to inform the public of the benefits of projects.
- Interactive displays and elements for outdoor classrooms.
- Tables and benches for outdoor classrooms and social settings.

Large turf areas in front of Harper Junior High School. Great space for low water use plant and bio swale educational tour garden, creating a more attractive arrival to the school.

Modify central courtyard to reduce water use, maintenance and improve aesthetics.

Interior turf courtyards next to science class, ideal for outdoor classrooms.

Harper Jr. High School– Front of School Improvements

Science Class Plant Garden

PLANT MATERIAL FOR SCIENCE CLASSES
- ANCIENT/CURRENT
- PIPE VINE - CYCAD
- STAG HORNE - MAGNOLIA
- HORSETAIL.
- SAGO PALM
- SPICE BUSH
- GINKGO
- DAWN REDWOOD

REPLACE TREES W/LARGE SHADE VARIETY

TYPICAL WATER SHED (DOWN SPOUTS)

NEW SHADE TREES
- PROVIDE SHADE
- COOL CONCRETE

ROOF WATER COLLECTION
- CISTERN
- BIOSWALE

RAIN GARDEN

PED FLOW

DI

TURF REMOVAL

NATIVE PLANTS
- SCIENCE
- BOTANY

Roof Water Collection

Harper Jr. High School– Interior Courtyard Teaching Opportunities

Harper Jr. High School- California Biomes

WATER SAVED (ALL HARPER JR HIGH SCHOOL IMPROVEMENTS)

- Existing Water Use with Turf: 4,246,113 gallons of water a year
- New Water Use with Native Plants: 642,903 gallons of water a year

Total Water Saved 3,603,210 GALLONS OF WATER A YEAR

GROUND WATER RECHARGE

- 3.0 acres of new native planting
- 6,660 square feet pervious bio swales
- 41% OF ROOF STORM WATER CAPTURE in bioswales, cisterns or landscape

C. ESTIMATED COST OF CONSTRUCTION

Water Conservation Improvements at Harper Jr. High School

DESCRIPTION		QUANTITY		UNIT PRICE	TOTAL
1	Demolition - Remove Existing Turf	113,197	SF	$0.50	$56,598.50
2	Salvage - Existing Turf Irrigation System	113,197	SF	$0.03	$3,395.91
3	Grading	113,197	SF	$0.60	$67,918.20
4	Picnic Tables	4	EA	$2,000.00	$8,000.00
5	Benches	24	EA	$1,200.00	$28,800.00
6	Landscape - planting, bark mulch and cobble	88,704	SF	$1.75	$155,232.00
7	Drip Irrigation System	88,704	SF	$1.50	$133,056.00
8	Interpretive Panels	4	EA	$5,000.00	$20,000.00
9	Decomposed Granite Paths	24,493	SF	$3.00	$73,479.00
10	Footbridge/Culvert	2	EA	$1,500.00	$3,000.00
11	Cisterns / connections to downspouts, pipe to bio swales	1	EA	$3,500.00	$3,500.00
12	Porous Pavement at interpretive area	1,407	SF	$8.00	$11,256.00
13	Shade Structures	1	EA	$75,000.00	$75,000.00
				Subtotal	$639,235.61
	Grant Applications, Planning, Bid, Docs, Construction Administration 25%				$159,808.90
				Contingency 10%	$63,923.56
				TOTAL	$862,968.07

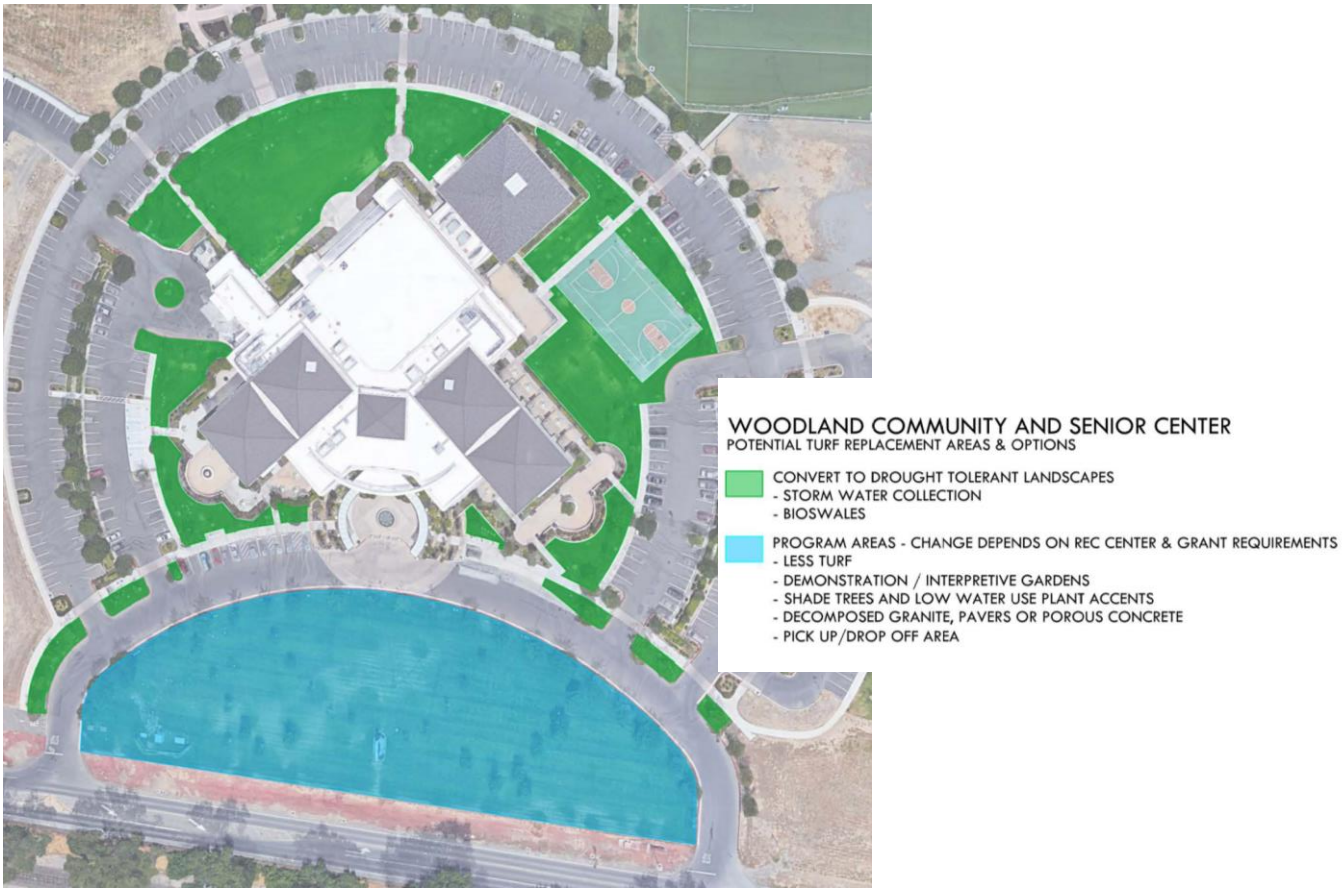
Total Project Cost per Square Foot: $7.62

III. THE CITY OF WOODLAND – WOODLAND COMMUNITY AND SENIOR CENTER

A. PROJECT DESCRIPTION

One of the greatest assets to the City of Woodland is its Community and Senior Center, with many outdoor features, including softball/baseball diamonds and soccer fields, and a Dog Park, truly making the facility a regional park. Most of the landscape consists of irrigated turf and shade trees. Large open turf areas are greatly appreciated as multi-use event areas for social gatherings but a large portion of the space is mostly utilized by the public as aesthetic. It is these areas that are a great candidate for converting to a new aesthetic that is functional and uses less water through a drought tolerant landscape.

For the purposes of this report, we'll study the areas around the Community and Senior Center building. The City has designated these areas as examples of typical turf areas that are underutilized for recreation and ideal candidates for water conservation.



Woodland Community and Senior Center Water Conservation Areas

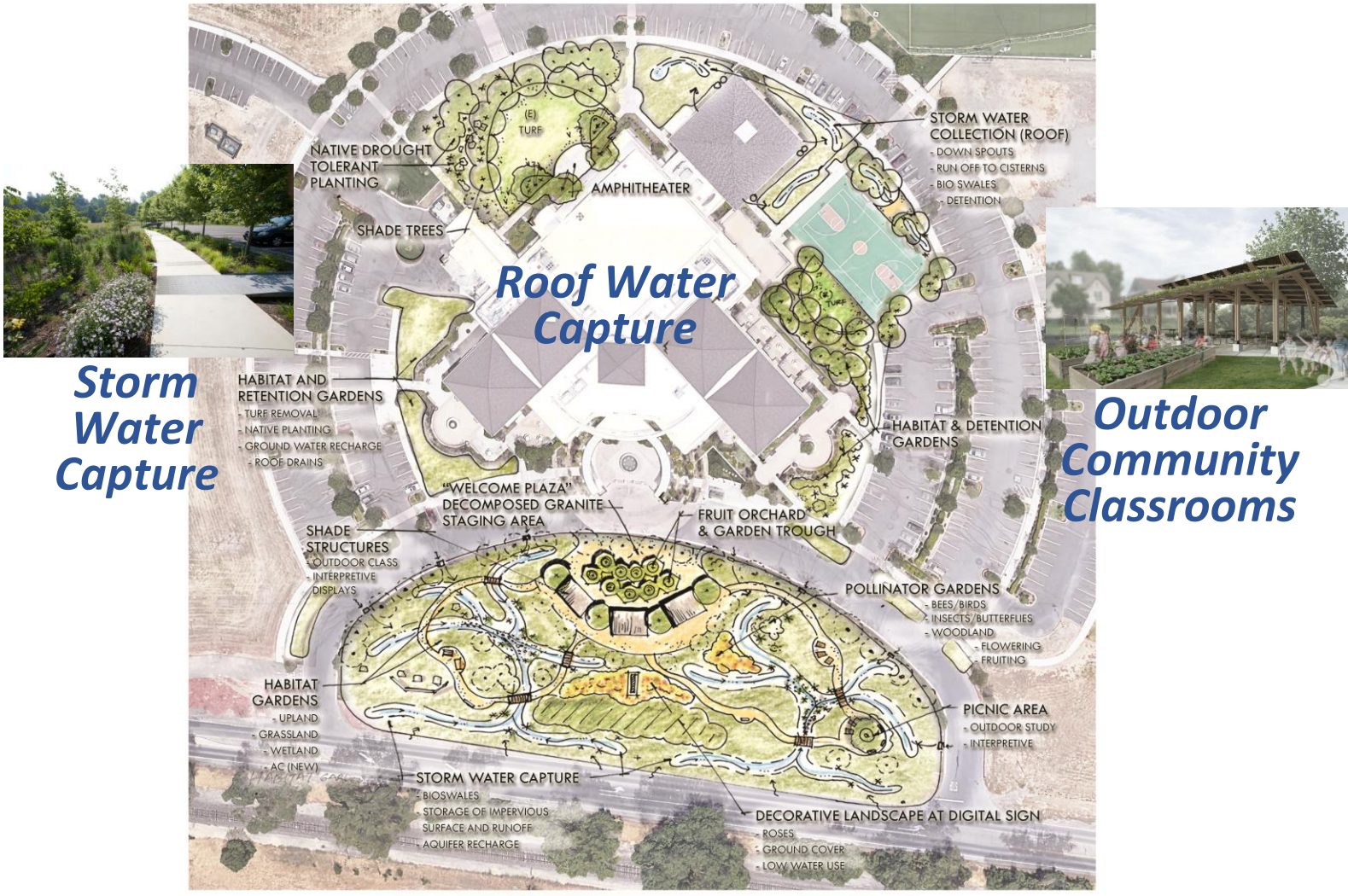
1.5 acres of existing turf in front of the Woodland Community and Senior Center used only for aesthetics. Improvements could include a Water Conservation Educational Plaza with paths that lead to interpretive planting exhibits.

Parking lot and building perimeter turf areas ideal for water conservation and water capture from parking lot and roof down spouts.

B. WATER CONSERVATION IMPROVEMENTS

Typical improvements for the Community and Senior Center areas may consist of the following:

- ~ Outdoor classrooms and interpretive walking tours focused on Community and Senior Center programs demonstrating water conservation improvements and local ecosystems
- ~ Water capture and re-use through downspout cisterns and possible collection off AC condensers
- ~ Water table regeneration through bioswales, soil amendments and bark mulch ground cover
- ~ Turf removal and replacement with drought-tolerant native plants and a network of pollinator plants on a drip irrigation system to reduce irrigation and save water
- ~ Shade trees and shade structures to create comfortable spaces
- ~ Permeable surface and porous pavements and decomposed granite paths
- ~ Demonstration/interactive gardens to inform the public of the benefits of projects



Woodland Community and Senior Center - Water Conservation Improvements

Woodland Community and Senior Center – Front Water Conservation Improvements

WATER SAVED

- Existing Water Use with Turf: 4,201,813 gallons of water a year
- Proposed Water Use with Native Plants: 687,534 gallons of water a year
- Proposed Water Use with New Turf Area: 313,591 gallons of water a year

Total Water Saved 3,200,689 GALLONS OF WATER A YEAR

GROUND WATER RECHARGE

- 2.5 acres of new native planting
- 14,825 square feet of pervious bioswales
- 44% OF ROOF STORM WATER CAPTURE in swales or cisterns or landscape

C. ESTIMATED COST OF CONSTRUCTION

Woodland Community and Senior Center – Water Conservation Improvements

DESCRIPTION		QUANTITY		UNIT PRICE	TOTAL
1	Demolition - Remove Existing Turf	112,015	SF	$0.50	$56,007.50
2	Salvage - Existing Turf Irrigation System	112,015	SF	$0.03	$3,360.45
3	Grading	112,015	SF	$0.60	$67,209.00
4	Cisterns / connections to downspouts, pipe to bioswales	5	EA	$3,500.00	$17,500.00
5	Footbridge/Culvert	5	EA	$1,500.00	$7,500.00
6	Landscape - planting, bark mulch and cobble	112,015	SF	$1.75	$196,026.25
7	Drip Irrigation System	112,015	SF	$1.50	$168,022.50
8	Fruit Tree Trough Planters	9	EA	$1,000.00	$9,000.00
9	Benches	7	EA	$1,200.00	$8,400.00
10	Picnic Tables	11	EA	$2,000.00	$22,000.00
11	Interpretive Panels	3	EA	$5,000.00	$15,000.00
12	Decomposed Granite Paths	10,013	SF	$3.00	$30,039.00
13	Shade Structures	3	EA	$75,000.00	$225,000.00
				Subtotal	$825,064.70
	Grant Applications, Planning, Bid, Docs, Construction Administration 25%				$206,266.18
				Contingency 10%	$82,506.47
				TOTAL	$1,113,837.35

Total Project Cost per Square Foot: $9.94

IV. WJUSD – WOODLAND HIGH SCHOOL

A. PROJECT DESCRIPTION

There are many opportunities for water conservation and outdoor learning at Woodland High School. Portions of the interior landscape could be exciting spaces for outdoor classrooms and laboratories to learn about water conservation methods. There is close to an acre of turf around the library, most of which is a slope behind an amphitheater. Classrooms could learn from the conservation efforts by measuring roof water capture, monitoring bioswales and planting gardens. Underutilized turf areas outside of the school fence include 2.6 acres along the front (south and east sides) of the school and most of the planters around the east side parking lot.

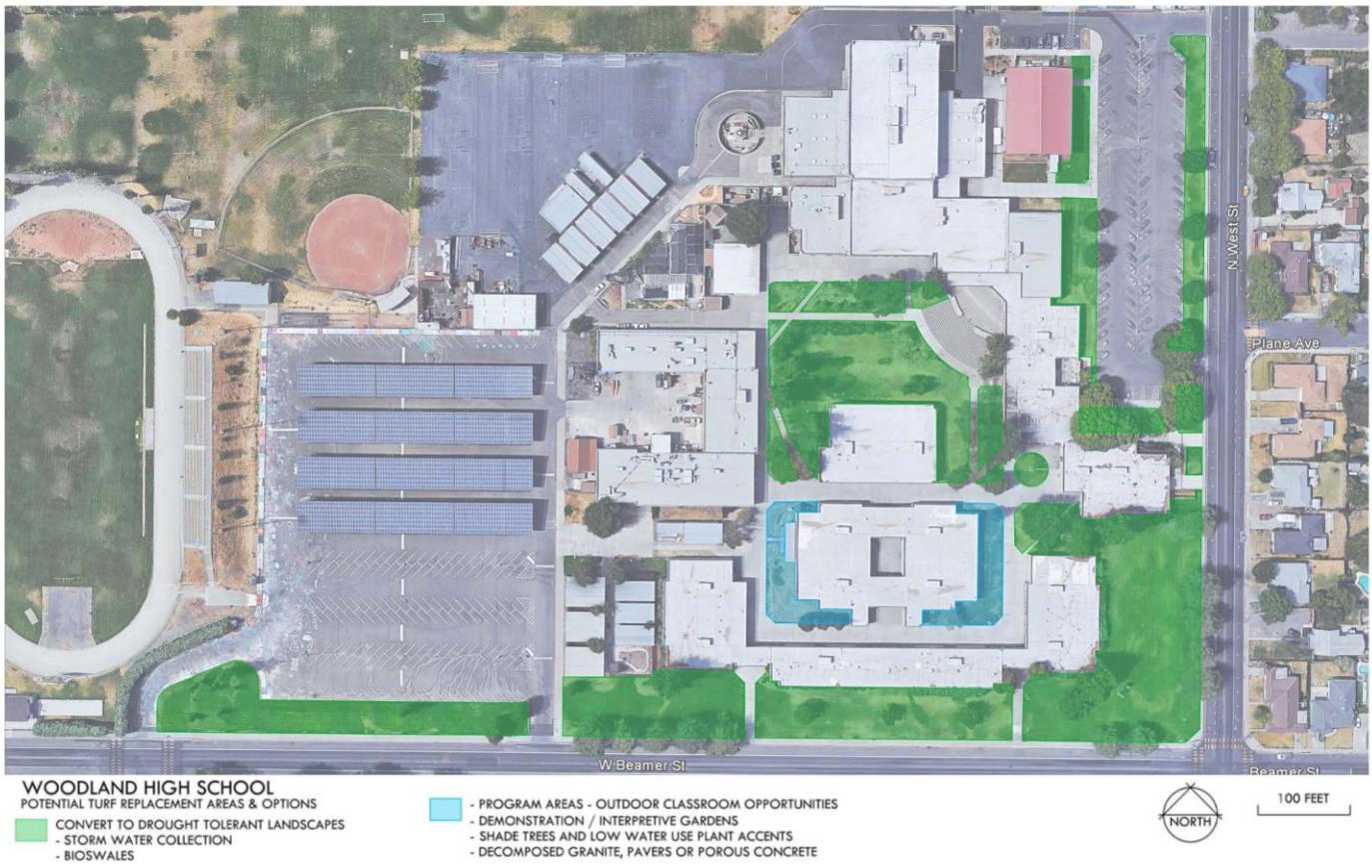
Landscape improvements near buildings include capturing roof water from downspouts and directing the water to cisterns for irrigation water or bioswales where it will be filtered before entering the storm drain system or simply percolate into the soil. Two outdoor classroom areas are designed to experiment with the cistern system and raised planting beds. Typical planter improvements will include replacing existing turf with drought tolerant plants, pollinator gardens, benches, bioswales and decomposed granite paths.

Most of the landscape and sport field areas in the Woodland School District are irrigated by antiquated systems. Woodland High School is a prime example. There have been little to no improvements to the irrigation system since it was installed in 1971. The turf that is utilized for sports is not watered very efficiently with old rotors and manually controlled valves. Half of the school's irrigation system is not on an automatic controller. Recommended improvements for water conservation include a new smart controller to be connected to all irrigation valves on site and an update to water efficient rotors. Rotor improvements may also require a revised layout in some areas.

Woodland High School Ariel from Google Maps

2.6 acres of turf along the front and sides of Woodland High School. The space outside of the gated school grounds is not ideal for school activities but would function well as a low water use landscape with bioswales to treat water from parking lots and roof down spouts.

Interior turf courtyard areas with potential for water conservation and outdoor classrooms.



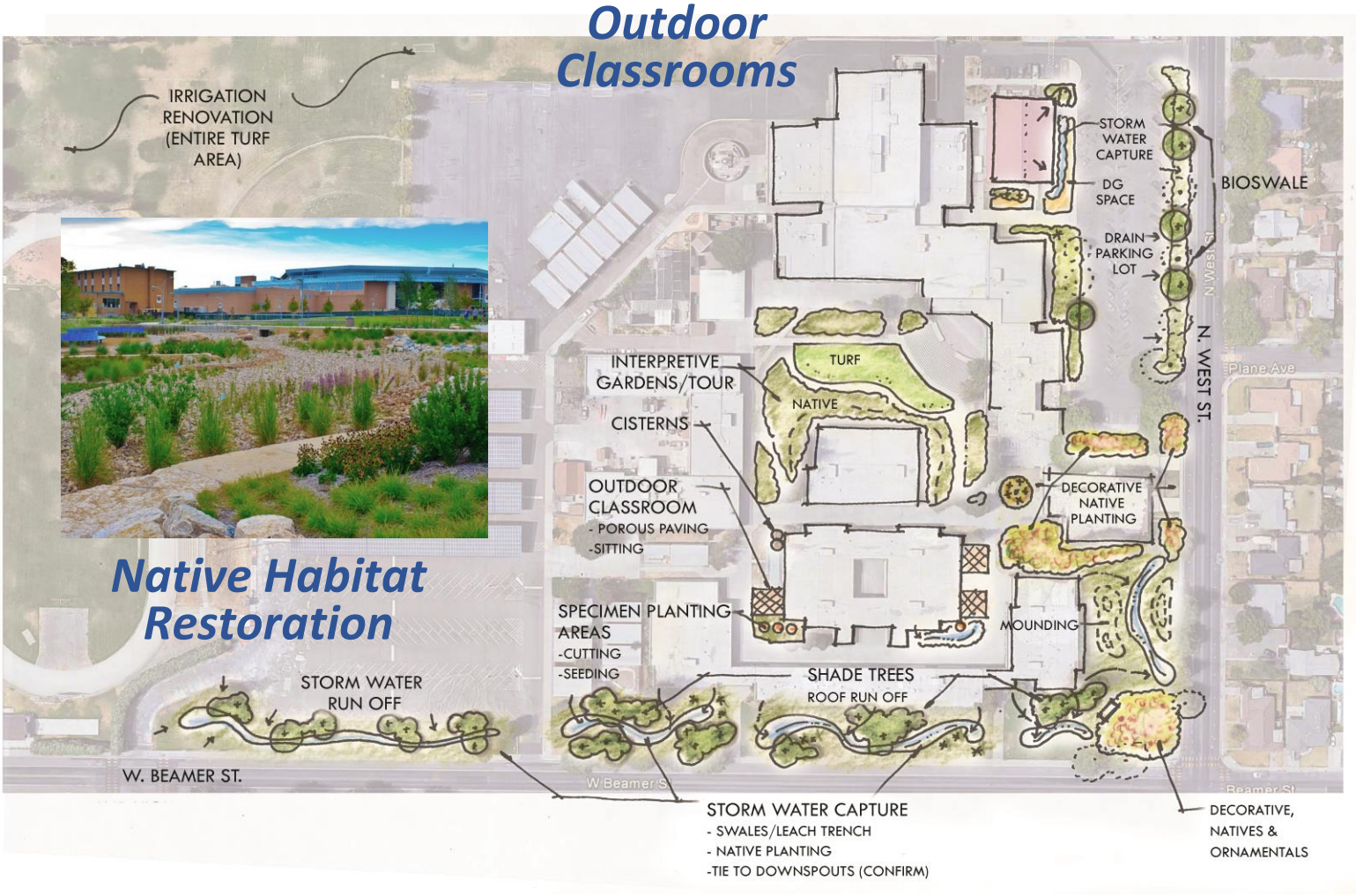
Woodland High School – Potential Water Conservation Areas

B. WATER CONSERVATION IMPROVEMENTS

Typical improvements for Woodland High School may consist of the following improvements:

- ~ Interactive native landscapes for Outdoor Classroom / Laboratory
- ~ Roof water Cisterns tied to classroom activities for landscape irrigation.
- ~ Turf removal and replacement with drought tolerant native plants and a network of pollinator plants on a drip irrigation system.
- ~ Soil amendments, bioswales and bark mulch ground cover to improve water retention.
- ~ Decomposed granite paths and interpretive signs to inform the public of the benefits of projects.
- ~ Tables and benches for outdoor classrooms and social settings.

See the next page for a schematic drawing of a portion of these potential improvements



Woodland High School - Water Conservation Improvements

WATER SAVED

- Existing Water Use with Turf: 7,085,945 gallons of water a year
- Water Use with Proposed Native Plants: 1,563,029 gallons of water a year
- Water Use with Proposed New Turf Area: 333,659 gallons of water a year

Total Water Saved 5,189,257 GALLONS OF WATER A YEAR

C. ESTIMATED COST OF CONSTRUCTION

WOODLAND HIGH SCHOOL – WATER CONSERVATION IMPROVEMENTS

	DESCRIPTION	QUANTITY		UNIT PRICE	TOTAL
1	Demolition - Remove Existing Turf	188,904	SF	$0.50	$94,452.00
2	Salvage - Existing Turf Irrigation System	188,904	SF	$0.03	$5,667.12
3	Grading	188,904	SF	$0.60	$113,342.40
4	Landscape - planting, bark mulch and cobble	180,009	SF	$2.50	$450,022.50
5	Raised Planter Beds for outdoor class experiments	3	EA	$1,500.00	$4,500.00
6	Drip Irrigation System	180,009	SF	$1.50	$270,013.50
7	Benches	24	EA	$1,200.00	$28,800.00
8	Lab Tables	6	EA	$2,000.00	$12,000.00
9	Shade Structures	3	EA	$75,000.00	$225,000.00
10	Porous Pavement (outdoor classroom)	2,700	SF	$12.00	$32,400.00
11	Cisterns / connections to downspouts, pipe to bioswales	3	EA	$3,500.00	$10,500.00
12	Renovate Existing Irrigation System	1	LS	$250,000.00	$250,000.00
				Subtotal	$1,496,697.52
	Grant Applications, Planning, Bid, Docs, Construction Administration 25%				$374,174.38
				Contingency 10%	$149,669.75
				TOTAL	$2,020,541.65

Total Project Cost per Square Foot: $9.48

GRANTS & FUNDING OPPORTUNITIES

Each of the projects listed in this document offers a rich opportunity to improve the landscape to be drought tolerant, offer educational outdoor classrooms and creates social interactive areas. The grants that would best fit these projects are the following:

A. GENERAL GRANTS

These grants are grants that can be applied to all project sites.

The Butterfly Habitat Grant is a small grant set up to improve, increase, and create new areas for butterflies to grow and thrive. This will be accomplished by planting native pollinator friendly plants.

The timeline for this grant is: Open - January 1, 2017 Closes – 2 to 3 months later

Awarded: First Saturday in June

http://afbeducation.org/butterfly-conservation/butterfly-mini-grant/

The National Fish and Wildlife Foundation (NFWF) Monarch Butterfly Conservation Fund is a grant established to help increase the Monarch population. This will be accomplished in this plan by replacing turf areas with Monarch friendly plants, like Milkweed. Another way is to plant native pollinator plants that attract bees, butterflies, and other insects that pollinate a more diverse mix of plants.

http://www.nfwf.org/monarch/Pages/home.aspx

The Water Recycling Funding Program is focused on water conservation and recycling. This will be accomplished by installing bioswales and rain gardens that collect rain water and run off; keep water out of the storm drain system and replenish water tables; and collect water from downspouts and air conditioning units to water landscapes with low water use plants.

http://www.waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling/proposition1_funding.shtml

Environmental Solutions for Communities is designed for projects that support community well-being and the health of the environment. This will be accomplished by conserving water resources and creating native habitats with low water use, drought tolerant, native plants, bioswales and storm water collection.

http://www.nfwf.org/environmentalsolutions/Pages/home.aspx

My Macy's District Grants and Event Sponsorships focuses on the arts, culture, education, the environment, HIV/AIDS and women's issues. This plan addresses these objectives through water conservation, interpretive gardens, outdoor classes and opportunities for art in landscape.

http://www.federated-fds.com/community/grant-information/district-grants/instructions.aspx

The Land and Water Conservation Fund is for the development of outdoor recreation areas and facilities. This will be accomplished by creating natural areas with native plants, picnic areas, and cultural areas for recreational use.

http://www.parks.ca.gov/?page_id=21360

Five Star and Urban Waters Restoration addresses conservation needs of important species and habitats, providing measurable and meaningful conservation and education outcomes. Planning efforts for this grant include planting riparian species, installing bioswales and interactive education areas for students to learn about the native plant life and the ecosystem.

Timeline is: Open early November, Closes in February

http://www.nfwf.org/fivestar/Pages/home.aspx

B. GRANTS SPECIFIC TO SCHOOL PROJECTS

These grants best fit the school projects outlined in this plan.

California Youth Soccer and Recreation Development Program is for projects that create new opportunities for youth soccer, baseball, softball, and basketball. The project must include new opportunities and have a water conservation aspect. This grant could be ideal for Woodland High School to provide better sports fields with a new, low water use irrigation system, a weather smart controller and converting landscape outside of the sports fields to bioswales and low water use plants.

The deadline for this grant is November 1, 2016

http://www.parks.ca.gov/?page_id=28475

Drought Response Outreach Program for Schools (DROPS) Grant is focused on reducing water use, reusing water, and to raise awareness of water resources. This will be accomplished at school sites by planting with drought tolerant plants and collecting storm water with bioswales and a rain gardens. There will also be interactive displays and educational areas where students will learn about the water cycle, native plants, and water conservation.

http://waterboards.ca.gov/water_issues/programs/grants_loans/drops/

The Fruit Tree Planting Foundation – Fruit Tree 101 is a foundation that is giving grants to schools to create an outdoor edible orchard classroom to educate students on the benefits of fruit nutrition and the importance of trees in the environment. This can be accomplished by planting fruit trees as part of the low water use landscape and educational gardens.

No timeline; however, awards are given on a rolling basis and applications remain on file until there is an opportunity to award.

http://ftpf.org/resources.htm

PARTNERSHIPS & VOLUNTEER ORGANIZATIONS

Water conservation improvements can often be accomplished by partnering with conservation related agencies and non-profit groups or working with the community through volunteer programs and donated time or materials. School and city landscape improvements for water conservation present great opportunities for people to help and make the park or school more a part of the community. The following organizations offer a mix of services that could be helpful at different stages of each project.

The Student and Landowner Education and Watershed Stewardship (SLEWS) Program is a nonprofit organization who engages California high school students and teachers in meaningful environmental stewardship that allows students to learn and practice scientific skills, learn from natural resource professionals, and expand on classroom concepts, all while accomplishing real habitat restoration, and up keep. Not only does this program engage high school students it also provides mentorship and helps the community become a better greener place. The SLEWS Programs is provided by the Center for Land Based Learning in Winters. The Center has a successful record of grant awards for community improvements. Grant applications often offer incentives to applicants with partner groups or pre-determined matches for project installation and programming.

Cool Davis is a Davis local volunteer foundation whose goals are to reduce GHG emissions, adapt to changing climate, and to improve the quality of life for all. They have a network of more than 80 partners in support of the Cool Davis mission.

Just Serve is a nonprofit organization that matches faith, nonprofit, community and governmental organizations that need volunteers with volunteers willing to help. This organization helps communities by working side by side with others in the community.

Woodland Tree Foundation is a non-profit organization run by volunteers dedicated to improving Woodland through the planting of trees. Their goals are to educate residents, schools and the community about the benefits of a healthy tree canopy in Woodland; to plant and care for the trees, and to partner with the City, community groups, schools and businesses to cover resources for the trees. They are partnered with about 12 different companies and groups to accomplish their goals in creating a healthy tree canopy for the City of Woodland.

Tree Davis is a nonprofit organization committed to educating the public about trees because they view urban and community forestry as an integral part of a healthy environment. Tree Davis has been educating volunteers on how to plant, prune, care, and monitor trees for over twenty years. Tree Davis programs include tree planting, tree care, tree monitoring, and other efforts to help us fulfill their mission of expanding and enhancing the urban forest by teaching our community to plant and care for trees.

FUNDING & THE ESTIMATED COST OF CONSTRUCTION

As outlined in the beginning of this plan, Primary Project Goals include water conservation, education, habitat and pollinator gardens. These goals were founded in the Water Resources Association of Yolo County grant for the project and then built upon through meetings with the cities and school districts of Davis and Woodland. Potential for grant funding was also a primary factor in considering goals for site improvements.

The design for proposed improvements at each of the four sample project sites incorporates these goals while keeping in mind the basic design standards of safety, access, function, aesthetics, the cost of improvements and maintenance. In each case, improvements are proposed to replace existing underutilized turf areas. In combining these factors, the estimated cost of construction has been shown to be equal to or slightly higher than the cost of a new park, at $7 to $10 a square foot.

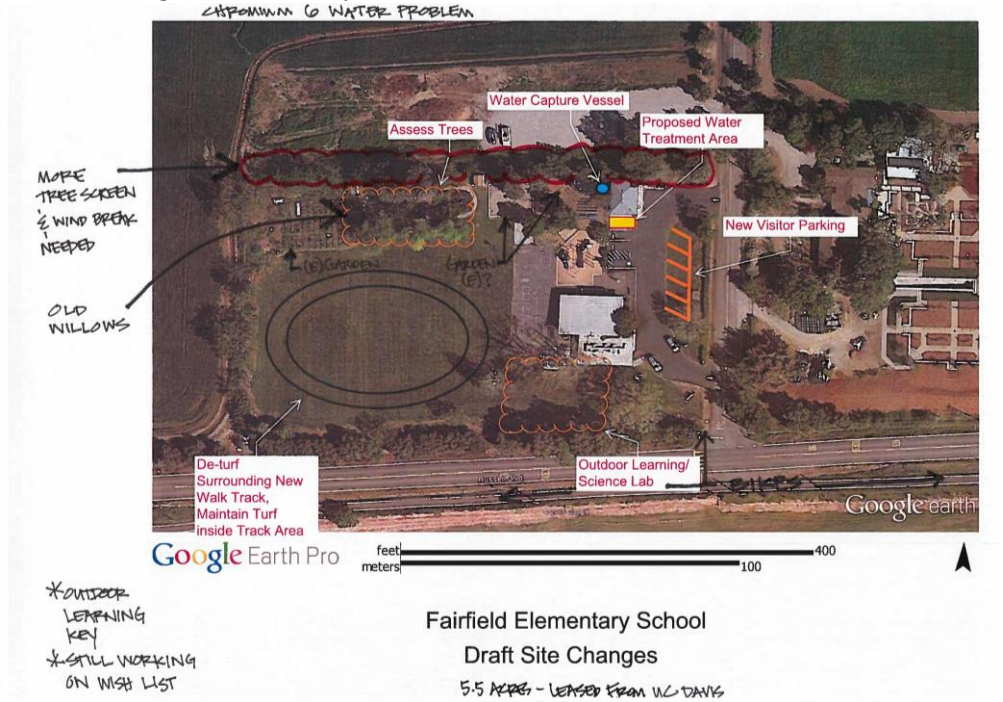
Landscape water conservation can of course be done with less improvements. Letting most of the landscape go native on its own and limiting improvements to about 20% of the site can be done for about $1.50 a square foot. Phased portions of each project could also be completed at smaller scales to meet available budgets.

In considering the scale of the drought in California and many parts of the United States, it's surprising to find that there are not many state or federal grant programs that fund improvements to public landscapes for water conservation. Where grants are not available, improvements can be allocated through internal programs, partnering agencies, non-profit groups, donations and volunteers.

The cost of improvements for a large scale project can seem daunting. Initial water budget savings are small in comparison. The return on investment does take time, 7 to 10 years for simple landscape projects and longer for projects that incorporate structures, interpretive aspects and improvements that cater to curriculum and programs. Cost savings also include less maintenance; time, fuel, mowing and fertilizer. In the meantime, water is being saved, venues are created for outdoor classrooms, improvements are exemplary to the community, educate the general public and inspire stewardship at home.

Alternate Sites

The following sites were reviewed leading up to choosing priority projects. Many of the sites do have great opportunities for water conservation. Brief descriptions accompany the site maps, noting reasons for choosing other sites as priorities.



Staff from the Davis Joint Unified School District have some existing innovative water conservation ideas for both Fairfield and Marguerite Montgomery Elementary Schools but the sites are relatively small and offered less opportunity than Harper Junior High School.

Pioneer High School in Woodland has great potential for converting turf to water conserving landscape and outdoor classrooms. The school is new compared to Woodland High School which has a much greater need for water conservation and irrigation improvements.

The City of Davis also proposed two small green belt areas near Northstar Park and Covell Park to include in the assessment. Although every bit counts, the spaces are too small in size to utilize as examples for the report.

Greenbelt North of Anderson Road

Greenbelt North of Catalina Drive between Corona Drive and Anza Avenue

Estimated Water Use

Estimated Water Use tables are typically used as part of a Maximum Allowed Water Allowance (MAWA) report to calculate the amount of irrigation water a new landscape will use and determine if it is within the parameters required by the local governing agency. In this case, report tables were used to calculate the typical amount of water each existing project turf area uses compared to the irrigation water required for a drought tolerant landscape. The totals were then compared as part of the improvements for each priority site.

ESTIMATED TOTAL WATER USE FORMULA

EWU = (Eto) (PF) (HA) (0.62) / (IE)

Where:

56.72 = Eto Reference Evapotranspiration (Ref: CIMIS Station 6 Davis)
PF = Plant Factor per Hydrozone
HA = Hydrozone Area (S.F.)
0.62 = Conversion factor (inches to gallons)
IE = Irrigation Efficiency per Sprinkler Type

GREEN BELTS - ESTIMATED TOTAL WATER USE

Existing Turf: High water use turf; rotator.				
PF =	0.8			
HA =	36,605	(square feet)	0.840335 Acres	
IE =	0.75			
EWU =	1,373,084	(gallons per year)	4.213839 acre-feet/year	1835.674 ccf/year

New Native: Low water use shrubs; drip bubblers				
PF =	0.2			
HA =	19,384	(square feet)	0.444995 acres	
IE =	0.81			
EWU =	168,312	(gallons per year)	0.516532 acre-feet/year	225.0167 ccf/year

HARPER JR. HIGH SCHOOL - ESTIMATED TOTAL WATER USE

Existing Turf; High water use turf; rotator.				
PF =	0.8			
HA =	113,197	(square feet)	2.598646 Acres	
IE =	0.75			
EWU =	4,246,113	(gallons per year)	13.03084 acre-feet/year	5676.622 ccf/year

New Native low water use shrubs; drip bubbler.				
PF =	0.2			
HA =	74,041	(square feet)	1.699747 acres	
IE =	0.81			
EWU =	642,903	(gallons per year)	1.972996 acre-feet/year	859.4954 ccf/year

WOODLAND COMMUNITY & SENIOR CENTER - ESTIMATED TOTAL WATER USE

Exisitng Turf; High water use turf; rotat new				
PF =	0.8			
HA =	112,016	(square feet)	2.571534 Acres	
IE =	0.75			
EWU =	4,201,813	(gallons per year)	12.89489 acre-feet/year	5617.397 ccf/year

New Turf; High water use turf; rotator. existing				
PF =	0.8			
HA =	8,360	(square feet)	0.191919 Acres	
IE =	0.75			
EWU =	313,591	(gallons per year)	0.962374 acre-feet/year	419.2387 ccf/year

New Native low water use shrubs; drip bubbler.				
PF =	0.2			
HA =	79,181	(square feet)	1.817746 acres	
IE =	0.81			
EWU =	687,534	(gallons per year)	2.109963 acre-feet/year	919.1624 ccf/year

WOODLAND HIGH SCHOOL - ESTIMATED TOTAL WATER USE

Existing Turf; High water use turf; rotator.				
PF =	0.8			
HA =	188,904	(square feet)	4.336639 Acres	
IE =	0.75			
EWU =	7,085,945	(gallons per year)	21.74597 acre-feet/year	9473.189 ccf/year

New Turf; High water use turf; rotator.				
PF =	0.8			
HA =	8,895	(square feet)	0.204201 Acres	
IE =	0.75			
EWU =	333,659	(gallons per year)	1.023961 acre-feet/year	446.0679 ccf/year

New Native low water use shrubs; drip bubbler.				
PF =	0.2			
HA =	180,009	(square feet)	4.132438 acres	
IE =	0.81			
EWU =	1,563,029	(gallons per year)	4.796761 acre-feet/year	2089.611 ccf/year