THE DRACHMAN INSTITUTE

The Drachman Institute is a research and public service unit of the College of Architecture and Landscape Architecture at the University of Arizona, dedicated to the environmentally sensitive and resource-conscious development of neighborhoods and communities. The Drachman Institute dedicates its research and outreach activities to the proposition that housing is the building-block of neighborhoods, and neighborhoods are the building-blocks of communities.

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CPPW

Communities Putting Prevention to Work (CPPW) is a national initiative of the Centers for Disease Control and Prevention (CDC). The goal is to prevent or reduce the spread of obesity and related diseases by increasing opportunities for improved nutrition and active living. The method is implementation of policy, systems and environmental change. Pima County was one of 44 communities nationwide to receive funding for the CPPW grant, part of the American Recovery and Reinvestment Act of 2009.

CPPW is being developed and administered by the Pima County Health Department, in partnership with Activate Tucson, a coalition advocating healthy eating and active living.
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*photo credit: Arizona Wilderness Coalition*
When given a choice, it appears that children prefer natural environments to play in (R. C. Moore 1986) (Titman 1994). Armitage researched children’s perceptions of playgrounds and found that while equipment initially attracted children to playgrounds it was the natural features, such as grass flowers, trees, and shrubs, that children rated highly and sustained the play for longer (Armitage 1999). Children “read” and assign meaning to their environments. An open space full of equipment creates an expectation for physical exercise. An area with surfaces full of lines, shapes, numbers, alphabets and colors reads as a learning space. A space full of padded mats and plastic toys signals a need for their protection from the world. The design of play space can have great significance and therefore it should reflect children’s needs.

Children see the outdoors as a dynamic, living space that is constantly changing and in which they can participate in its transformation. Design of play spaces needs to enhance these dynamics rather than become a fixed setting or a backdrop. Natural areas are by their very nature dynamic so good playground design includes the natural world. When play space is allowed to be mutable children not only read their environment, they become its authors (Tovey 2007).


**Shade and Texture Zones**

The areas immediately surrounding the play structures and the outdoor chalkboard at Desert Winds would be an ideal place to plant mesquite and palo verde trees for shade, and kid friendly yet desert adapted shrubs such as Texas ranger and woolly butterfly bush. These plants will provide children and school staff out for recess with not only relief from the sun, but the tactile and tough plants offer opportunities for play.

The bushes provide spaces to hide, flowers and leaves to pick to be used for imaginative play, and the opportunity to view pollinator species like butterflies. The pods and flowers that appear seasonally on the trees also offer a changing variety of loose parts for play as well as an up close visual example of the changing seasons and life cycle of plants.

The shrubs should only be pruned to remove dead or damaged material. They should be planted an appropriate distance from any pathways or equipment to eliminate the need for pruning due to being in the way. They should not be shaped, but instead should be left to grow naturally. Students should be allowed to pick some amount of the flowers and leaves, and otherwise interact with the vegetation so long as these tough plants are not unduly harmed. *(see Recommended Plant Materials, page 11)*
tactile, drought tolerant, hardy plants

adding trees for shade in the playground will expand the outdoor “comfort zone”

seating boulders are a less expensive, more attractive, and more interactive alternative to benches
Ironwood Forest Habitat Zone

Linking the two campuses together and following the flow of storm water from the dirt hill at Picture Rocks Intermediate down to and along the drainage culvert in the Desert Winds playground, an area of native plants -- the Ironwood Forest Habitat Zone -- could become an outdoor learning lab for the children at both schools. Just to the west of the Picture Rocks area is Ironwood Forest National Monument, a beautiful and diverse open space in the Sonoran Desert. Ground squirrels and other desert creatures have already made their homes in this part of the schoolyard, and providing native ground cover and food plants such as wolfberry will give them a quality habitat as well as attracting other desert species for the children to observe, such as small lizards and native bird species. Children and teachers could build small “lizard hotels,” piles of rock and other material, in order to attract some of these animals. (see Recommended Plant Materials, page 11)
teachers and students can observe native plants and animals
recontoured hill with “wash” directs storm water
less sand washing onto sidewalk improves safety
Pollinator Zones

A pollinator garden of beautiful drought adapted plants would be a beautiful addition to each school. At Desert Winds, the pathway out to the playground is the ideal location for such a garden. A native tree could shade the water fountain and become the center piece of a small but colorful oasis. The small garden in the courtyard of Picture Rocks Intermediate would be another great spot to attract butterflies and hummingbirds. Planting these spaces with native plants will help to ensure that the gardens survive over long school breaks and dry spells, saving money and resources.

Like the Shade and Texture Zone, the plants in this area should not be shaped or pruned beyond what is absolutely necessary, and plant materials should be planted at a distance from each other and any pathways to allow them to mature to full size and eliminate the need for large amounts of maintenance. (see Recommended Plant Materials, page 11)
The plant list below consists of mostly native plants. Native plants are well adapted to Sonoran desert conditions of extreme heat and low precipitation. In addition, the use of native plants will serve as habitat for native birds, lizards, and other wildlife.

All plants will need irrigation after being planted (except for some of the cactus) though many will be able to survive on Tucson’s natural rainwater and can be weaned off irrigation after several years. It is important that a maintenance plan be put in place to monitor and care for plants to ensure their survival.

The following list is meant to serve as a guide and can be modified as needed.

**Recommended Plant Materials**

**POLLINATOR ZONE**

*small*
- gooding verbena *Glandularia gooddingii*
- Parry’s penstemon *Penstemon parryi*
- Mexican sunflower *Tithonia fruticosa*
- butterfly mist *Ageratum corymbosum*

*medium*
- desert honeysuckle *Anisacanthus thurberi*
- baja fairyduster *Calliandra californica*
- brittlebush *Encelia farinosa*
- chuparosa *Justicia californica*

**SHADE AND TEXTURE ZONE**

- velvet mesquite *Prosopis velutina*
- blue palo verde *Parkinsonia florid*
- Texas ranger *Leucophyllum frutescens*
- silver cloud *Leucophyllum candicans*
- woolly butterfly bush *Buddleia marrubifolia*

**IRONWOOD FOREST HABITAT ZONE**

*trees*
- ironwood *Olneya tesota*
- velvet mesquite *Prosopis velutina*
- blue palo verde *Parkinsonia florid*
- foothills palo verde *Parkinsonia microphylla*
- sweet acacia *Acacia farnesiana*
- ocotillo *Fouquieria splendens*

*shrubs*
- creosote *Larrea tridentata*
- brittlebush *Encelia farinosa*
- wolfberry *Lycium barbarum*

*cacti*
- golden-flowered agave *Agave chrysantha*
- Parry’s agave *Agave Parryi*
- shindagger *Agave schottii*
- saguaro *Carnegia gigantia*
- yellow flowering cholla *Cylindropuntia acanthocarpa*
- Engelmann prickly pear *Opuntia engelmannii*
- purple prickly pear *Opuntia santa rita*
- staghorn cholla *Cylindropuntia versicolor*
- desert spoon *Dasylirion wheeleri*
- hedgehog cactus *Echinocereus fasciculatus*
- fishhook barrel *Ferocactus wislizeni*
- beargrass *Nolina microcarpa*
- banana yucca *Yucca baccata*
- soaptree yucca *Yucca elata*

sweet acacia
woolly butterfly bush
wolfberry
ironwood
Texas ranger
chuparosa
Seating

A seat wall that lines the sidewalk at Picture Rocks could be made with cast-in-place concrete and then painted with petroglyph imagery by the students at the school. The shade trees and desert plants that fill in the Ironwood Habitat Zone behind it will create a small desert oasis where the students and teachers will have the potential to view native flora and fauna right in the school yard.

Additional benches will be added to the backstop areas at both schools.
Beginning at Picture Rocks and flowing downhill towards and around the Desert Winds playground will be a man-made wash that will carry water from roofs and the condensate from the air conditioning systems.

Presently, water sheet flows down hill from the northwest corner of Picture Rocks Intermediate, washing dirt and gravel onto the sidewalk and basketball courts. Desert winds has a concrete drainage channel that fills with sand and channels water into the parking lot.

A new wash filled with rip rap and interplanted with native vegetation will be created on the hill at Picture Rocks to control the flow of storm water and minimize erosion.

The concrete channel at Desert Winds will be broken up and turned to rubble that will be left in place. Trees and vegetation will also be planted along this channel, and the porous drainage way will slow the flow of storm water, allowing it to sink into the ground to water the surrounding plants while also minimizing erosion.

A cistern can be added at the top of the hill to store excess water for irrigation.
The fitness circuit that will encircle both the fields at Desert Winds and Picture Rocks -- connecting together at two points to create a larger single pathway -- can be created simply by turning off or redirecting irrigation spray heads to leave an area at the edge of the field to become the trail. The pathway can be marked by and shaded with native desert trees.

The circuit pathway may need to be regraded towards the field to eliminate problems with standing water.

Fitness “nodes” or resting points with seating boulders and room to set up fitness activities will be planted with shade trees in small basins. Where possible, nodes should be placed in areas that already have trees for shade, especially at the farther edges of the field, which lessens the need for additional irrigation. Stations could include simple activities such as a balance beam walk, rope net climb, recycled concrete pipes, stepping stone pathway, and a set of monkey bars.
**Sand Volleyball Court**

A sand volleyball court will be installed to the west of the playground equipment at Picture Rocks, and shaded with native trees.

The playing area consists of the court and a safety space around it measuring 10’ in each direction (50’X80’). The playing area will be level and consist of good quality sand to a thickness which prevents player contact with the underlying surface.

Dimensions of the playing area are 30’X60’. The boundary lines are made of brightly colored tape or rope that is removable on a daily basis.

Poles are made of galvanized metal that will not bend or break under tension. Poles are 10 to 16 feet long and cemented into a concrete footing measuring a least a foot in diameter and 3 feet deep.

The court will be excavated 1.5 to 3’ deep depending on site drainage. A drainage ditch leads away from the lowest point of the court. Perforated drainage pipe should be laid across the court with one end capped and the other open to the drainage ditch.

Smooth rounded gravel forms the court foundation which is covered with landscape fabric and topped with 1’ to 2’ of beach sand or washed masonry sand.

The net measures 32’X39” and is strung anywhere from 6’ to 8’ feet high depending on age and gender. Aircraft cable is used to string the net to the poles.

*Note: for more construction details see:*

[http://www.volleyballusa.com/How-To-Build-Your-Own-Sand-Court.html](http://www.volleyballusa.com/How-To-Build-Your-Own-Sand-Court.html)

*and/or CPPW Action Plan Options for Schools, Section 6*
HANDWASHING STATIONS
Handwashing stations inside the gated courtyards at each school will give children and teachers the opportunity to wash up before lunch after coming in off the playground from recess. The following wash station is an economical example of an outdoor sink. It can accommodate up to 5 people at a time, is ADA compliant, and is available in a shorter height to better accommodate elementary age children.


SAND PLAY AREA
A sandbox at Desert Winds can be made with modular pieces held in place by metal stakes that secure it to the ground. This can be easily and quickly installed, and even moved in the future should there be a need or desire to do so. Installation could be done by a volunteer group of parents and teachers.

http://www.playproviders.com/sandboxpackage1.html
Water Harvesting

An underground holding tank at the top of the hill at Picture Rocks Intermediate would be the ideal way to capture rainwater and air conditioner condensate for later use on drier days. Placing the system underground is vital to preventing damage to the tank due to vandalism, and a plastic underground holding tank system is an economical option for rainwater storage.

Although the tank is situated at the highest point of the campuses, water will need to be pumped up out of the tank in order to reach vegetation. It should not be placed in the path of heavy vehicles or equipment.

WATER HARVESTING RESOURCES

Brad Landcaster
Rainwater Harvesting for Drylands
• http://www.harvestingrainwater.com/

City of Tucson
Rain Water Harvesting
• http://cms3.tucsonaz.gov/water/harvesting
Wtaer Harvesting Guidance Manual

University of Arizona Cooperative Extension
Harvesting Rainwater for Landscape Use
• http://cals.arizona.edu/pubs/water/az1344.pdf

Texas A&M AgriLIFE Extension
• http://rainwaterharvesting.tamu.edu/
Partnerships and Funding

SONORAN DESERT MUSEUM
Ironwood Forest Habitat Zone, Shade and Texture Zones, Pollinator Gardens
[Outdoor Education Programs, Ecology Gardens]
http://desertmuseum.org/

TUCSON CACTUS AND SUCCULENT SOCIETY
Ironwood Habitat Zone
[Funding for Native Desert Plants]
http://tucsoncactus.org/

LOWES
Fitness Trail, Sand Volleyball Court, Playground Improvements
[Funding Source]
http://www.toolboxforeducation.com/

SAGUARO NATIONAL PARK
Ironwood Habitat Zone
[First Bloom Gardens, Funding, Outdoor Education]
http://www.nationalparks.org/npf-at-work/our-programs/apply-grants-programs/

DESERT SURVIVORS NURSERY
Ironwood Forest Habitat Zone, Shade and Texture Zones
http://www.desertsurvivors.org/Nursery.html

NATIVE SEED SEARCH
Ironwood Forest Habitat Zone
http://www.nativeseeds.org/

TUCSON RAIN JAR PROJECT
Water Harvesting Projects
http://www.rainjars.org/Home.html

NATIONAL GARDEN ASSOCIATION
Pollinator Gardens
[Funding source]
http://assoc.garden.org/

WATERSHED MANAGEMENT GROUP
Water Harvesting Projects
Director: Lisa Shipek
Phone: 520-396-3266
Website: http://www.watershedmg.org