



MEMORANDUM

Date: August 28, 2018

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

A handwritten signature in black ink, appearing to read "CHH", is written over the printed name "C.H. Huckelberry".

Re: **National Recognition of the Kino Environmental Restoration Project (KERP) for Urban Stormwater Harvesting**

The attached article appeared in the *Municipal Sewer and Water* magazine and website. The article highlights the benefits of urban stormwater harvesting. The KERP continues to be a national model for sustainability and water conservation. Our efforts of large scale flood control stormwater harvesting more than a decade ago, continue to be recognized for sustainable water practice, urban ecosystem restoration and fiscally prudent in supporting public recreation park development.

The same system that now provides turf irrigation for the existing Kino Sports Complex will be expanded to increase the urban stormwater capture capacity to irrigate new athletic field development south of Interstate 10 for the expansion of Kino. Planning is underway to connect these systems with the athletic field development south of Interstate 10 including additional storage lakes and other facilities necessary to increase the volume of stormwater captured for water conservation and turf irrigation.

If you have any questions regarding this article or our expansion of water harvesting concepts for the Kino Sports Complex, please contact me.

CHH/anc

Attachment

c: Jan Leshar, Chief Deputy County Administrator
Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Nanette Slusser, Assistant County Administrator for Public Works
Suzanne Shields, Director, Regional Flood Control District

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Utility Uses Stormwater to Create an Urban Oasis

Restoration project provides flood control, rainwater harvesting, wildlife habitat and a host of recreational opportunities.

- [Appeared in print as "An Urban Oasis"](#)
- [By Lee Allen](#)
- [September 2018](#)
- [Storm](#)





Some stormwater projects protect assets. Pima County, Arizona, used its stormwater to create assets.

A couple of decades ago, the county, with help from the Army Corps of Engineers out of Los Angeles, rounded up some earthmovers and went to work on an initial flood diversion project, the 50-acre Ajo Detention Basin.

When the dust finally settled many years later, the modest endeavor ended up triple that size, a 155-acre playground on the south side of Tucson, the largest professional sports and entertainment venue in southern Arizona with a 3,000-seat stadium; a 2,000-seat grandstand; and lots of soccer fields, softball fields, and outdoor basketball courts.

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What is lesser known is the other part of that package called the Kino Environmental Restoration Project, or KERP — a well-designed flood control, rainwater harvesting, ecological Eden. It's a wildlife habitat with a 2.2-mile paved bicycle and pedestrian path as part of the retention basin that serves irrigation needs of the site and its surrounding area.

Publicity for the complex calls its construction “an excellent example of a sustainable living community. The project demonstrates what can be achieved when people join forces and share resources to achieve a common goal.”

“The purpose of ecosystem restoration is to establish the attributes of a naturally functioning and self-regulating system,” says Dr. Sharon Megdal, director of the University of Arizona Water Resources Research Center, quoting from the Corps’ mission statement. The Corps came on board belatedly after passage of the National Environmental Policy Act that established environmental protection as one of its primary missions in addition to flood control.

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It’s a testimonial to excellence as evidenced by a 2006 Army Corps Chief of Engineers award in recognition of “a truly exceptional project — technically sophisticated while appearing natural — that takes an existing mud flat in an arid area and creates aesthetic landscapes, recreation features, and flood control — a prototype for water harvesting.”

Different perspective

The KERP captures and directs runoff from an 18-square-mile watershed into a system of lined basins that retain over 114 million gallons (350 acre-feet) of water available for irrigation needs. By harvesting that water, taxpayer costs are reduced because of the water that doesn’t have to come out of reclaimed system distribution.

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That harvested rainwater is a big positive, a low-cost alternative to purchasing and using groundwater. All the basin’s vegetation, the ballfields, median landscapes, and easements are nourished by the harvested water.

“Stormwater from the KERP basin saves taxpayers an average of close to \$400,000 in annual irrigation costs,” says Jennifer Becker, principal hydrologist with the Pima County Regional Flood Control District.

It cost \$11 million to build the KERP, a partnership between the Corps, Pima County Flood Control District, and the County Regional Wastewater Reclamation Department. “The county share of the construction costs, about \$6 million, was amortized this year because of the money saved by using that harvested water,” Becker says. “And our detention basin helps reduce peak flood discharge amounts by

45 percent. Instead of a big flash of floodwater coming through quickly, it slows down and stores that input, minimizing peak discharge. That's public safety in its rawest form."

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Storing and reusing stormwater in lieu of pumping groundwater or using reclaimed water or any other source is somewhat unique to the Southwest.

"We're the smart kids on the block because we looked at stormwater from a different perspective and were willing to take the risk in building this collection/distribution basin," says Suzanne Shields, P.E., director of Pima County Flood Control. "Detention basins aren't new, but what we've done and how we've configured it to capture rather than lose the liquid makes it unique. We even had to file for the water rights of the natural runoff that has increased because of urbanization."

Flood control

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Located in a generally arid environment with an average annual rainfall of about 11 inches, when summer storms do come, they arrive so fast and hard that the desert soil can't absorb more than a small percentage. And as the rains continue to fall, they gather in speed and intensity, overflowing washes and arroyos with walls of water, necessitating a need for some kind of flood control.

"In general, from the start of the annual rainy season in July through the spring of the following year, the entire complex is watered by runoff. In addition to the flood control benefits of modifying a storm's first flush and the neighborhood natural enhancement, stormwater goes into two ponds (ingeniously named Big Pond and Small Pond) that is then pumped out as needed," Shields says. "It's built; it's working; and we've proven it does the job and does it well."

Building dams to hold that runoff isn't really an option because of numerous earthquake fault lines that run through the area. "It's a gravity-fed system," Becker says. Stormwater flows through the main channel into Big Pond with a connector pipe to fill Small Pond. "That stormwater sustains the entire

complex. In the last 10 years, we've used reclaimed water in this facility just twice, and one of those two times, it was only for a day. I'm not sure the county could afford to run this complex if it couldn't get this water."

An extensive pumping system mixes and circulates stormwater (and, if truly needed, reclaimed water) within the basin. The rainy day offerings are cleaned of sediment and floating debris, then parked in a lined storage pond.

Water is circulated along three stream courses that drain into the ponds, and cooler water is pumped from the bottom of the pond to improve quality and aid with mosquito vector control.

Model project

The size and scope of the project are part of what has made it so effective.

Among the facts and figures:

- There are 15,000 linear feet of piping (ranging from 4 to 42 inches in diameter) to support the stormwater harvesting, flood discharge, irrigation, and recirculation needs of the site.
- The intake pipe is a 30-inch epoxy-coated steel pipe within a concrete encasement at the bottom of the pond, a depth of 65 feet below the pumps.
- There are 850,000 square feet of 40 mil HDPE liner installed under the KERP pond and stream areas.

Although regional geologies differ, engineers from elsewhere with similar topographies have expressed interest in the project construction and application.

"Researchers from all over the world, like Mexico, China, and Romania, have come to visit what we've built," Shields says with a modest smile. "Essentially the Kino Environmental Restoration Project represents flood control, a needed source for more water and one that brings in urban wildlife and supports all kinds of recreation — all at a savings to taxpayers."

Retention basin draws wealth of wildlife

In the southern Arizona end of the arid Sonoran Desert lies a 114-million-gallon retention basin that serves not only as a flood control mechanism during the rainy season, but a dry-month source of water that keeps a lush riparian area green during a time of triple-digit heat.

The Kino Environmental Restoration Project in Tucson has brought about a multipurpose stormwater harvesting project where the practical and the aesthetic are blended together.

Located on 155 acres of what used to be flood plain storm runoff, the complex has five different environments ranging from uplands to open water (that includes a 5-acre, 50-foot-deep pond), riparian

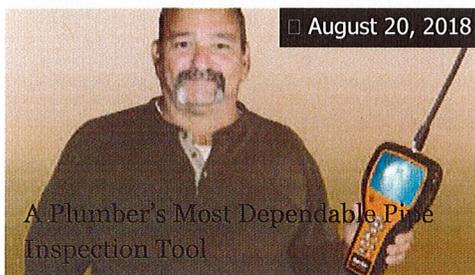
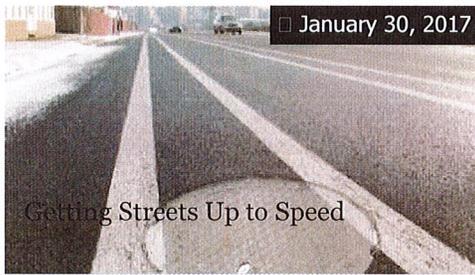
communities, wetlands, and a mesquite bosque. A big chunk of the acreage (over 90 acres) includes a basin berm and flood control structures.

And as might be expected, having wetness in a dry climate is a big attraction for sightseers, primarily of the birder and flora/fauna types. The Tucson Audubon Society likes this place so much they schedule birding field trips there.

Upland birds are numerous with red-tailed hawks, Gambel's quail, curve-billed thrashers, cactus wrens, and the ubiquitous roadrunner being the most prevalent in that group, although the open water, riparian wetlands, and shady bosques hold dozens of other varieties.

Bird watchers, as well as walkers, joggers, and bicyclists, like to view flying critters and other wildlife along the 2.2-mile paved trail.

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