



MEMORANDUM

Date: August 7, 2014

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

From: C.H. Huckelberry
County Administrator

A handwritten signature in black ink, appearing to read "CH Huckelberry", is written over the printed name and title.

Re: **Conservation Effluent Pool Taskforce**

In 2000, Pima County and the City of Tucson agreed conceptually to allocate up to 10,000 acre-feet of effluent and reclaimed water in a Conservation Effluent Pool (CEP) for environmental restoration of riparian projects. Provisions for the use and allocation of this pool of water were defined in an intergovernmental agreement (IGA) approved by the City and County in 2010.

Since approval of the IGA, no real activity has taken place for the use of this water for riparian restoration projects. In 2012, the Community Water Coalition offered to help facilitate use of this resource by hosting a taskforce to identify candidate project sites for use of the CEP. The taskforce included representatives from the Community Water Coalition, City, County and the Pima Association of Governments.

Over the last year, the CEP taskforce has identified 13 candidate projects within three groupings: immediate potential, strong potential and long-term potential. The attached CEP Taskforce Report describes the candidate project sites and the methodology used to identify these projects.

On Page 9 of the report, the taskforce has recommended four projects that have immediate potential for implementation. These are: 1) the Santa Cruz River adjacent to Continental Ranch; 2) Tucson Origins Oasis; 3) Santa Cruz River, 29th Street to Ajo: Paseo del Las Iglésias Phase 1; and 4) Isabella Lee Natural Preserve. I have directed staff to initiate these four conservation effluent pool projects with the City of Tucson.

I also believe it is now time to move forward with the administrative structure described in the CEP agreement to implement riparian restoration projects using CEP water. The agreement provides for the appointment of a Conservation Effluent Pool Administrator. I am appointing Environmental Planning Manager Julia Fonseca to this position. Ms. Fonseca will coordinate the necessary activities of County departments, including the Regional Flood Control District and, primarily, our Regional Wastewater Reclamation Department.

The Honorable Chair and Members, Pima County Board of Supervisors

Re: Conservation Effluent Pool Taskforce

August 7, 2014

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Administration of the CEP will be implemented with existing staff and resources and minimal budget impact.

CHH/mjk

Attachment

- c: John Bernal, Deputy County Administrator for Public Works
- Suzanne Shields, Director, Regional Flood Control District
- Jackson Jenkins, Director, Regional Wastewater Reclamation
- Linda Mayro, Director, Sustainability and Conservation Office
- Julia Fonseca, Environmental Planning Manager, Sustainability and Conservation Office
- Kathy Chavez, Water Policy Manager, Regional Wastewater Reclamation

CONSERVATION EFFLUENT POOL TASK FORCE REPORT



July 9, 2014

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APPENDIX: CEP Task Force Candidate Project Sites

EXECUTIVE SUMMARY

The City of Tucson and Pima County found common ground in an Intergovernmental Agreement (IGA) that focused on the restoration of riparian areas to ensure a sound future for native plant and animal species. The IGA initiative evolved over the last 15 years due to the efforts of the County, City, and conservation community. The IGA set aside reclaimed water for riparian areas that would be undertaken by a number of governing bodies that contribute to the Conservation Effluent Pool (CEP).

After the IGA was signed, no real activity was apparent related to the use of the reclaimed water that had been set aside for the intended purpose of restoring riparian habitat. The Community Water Coalition (CWC) was interested in helping facilitate the use of this resource, and approached the Mayor, and subsequently the County Administrator, about serving as a host to a task force that would help identify candidate project sites for the use of the CEP. Representatives from the CWC, City, County, and Pima County Association of Governments were identified to serve on the group.

With the formation of the CEP Task Force in early 2013, there was an opportunity to identify projects that might qualify for a portion of the water available under the IGA. During the course of a little over a year, task force members identified 19 project sites for review and consideration. After review and deliberation, 13 candidate project sites were selected and placed into three groupings: 1) immediate potential, 2) strong potential, and 3) long-term potential. There are four project sites that are in the immediate potential grouping and can be implemented in the very near term. Of the 13 project sites, 10 have governing bodies that will serve as sponsors.

The CEP allows for an allocation of reclaimed water and effluent over the course of two periods of time. During the first five years, 5,000 acre feet are available, while up to 10,000 acre feet can be allocated in subsequent years. There is sufficient water under the CEP allocation to provide for the requirements of the 13 projects, and subsequent projects that may be identified in the future. This conclusion is based on the pre-establishment and post-establishment requirements presented for each project site.

The task force realized that candidate project sites may be identified in the future following our deliberations. Some were identified early on, while others were nominated toward the end of the group's efforts. As a result, the City and County may wish to endorse a process to have a joint review of potential projects completed every two or three years. This will help ensure that other viable candidate project sites are highlighted and may receive a share of the CEP allocation in the future.

BACKGROUND

The framework for the Conservation Effluent Pool agreement was established by the City of Tucson and Pima County in a supplemental Intergovernmental Agreement approved in February of 2000. It was seen as a “watershed event” when it was adopted by the City and County. It provides a commitment to reserve a specific amount of effluent for riparian projects benefiting the entire community, and specifically the regulated community under the Endangered Species Act, by assisting in mitigation of the permitting activities and Capital Improvement Projects of both the City and County and other participating local jurisdictions through their respective Habitat Conservation Plans. The implementing Intergovernmental Agreement, which sets aside 10,000 acre-feet of effluent for the environment, was approved by the Pima County Board of Supervisors on December 14, 2010, and by the City of Tucson Mayor and Council on January 25, 2011.

The Tucson Mountains Association, Community Water Coalition (CWC), and Coalition for Sonoran Desert Protection supported the Intergovernmental Agreement (IGA) between the City and County.

Conservation Effluent Pool Intergovernmental Agreement

The agreement recognized that the City of Tucson is engaged in the development and operation of a Reclaimed Water System and Pima County is engaged in the operation of wastewater treatment facilities that produce treated effluent, a portion of which is delivered to the City Reclaimed Water System. The City and County further agreed that riparian areas in the Southwest are severely threatened and vulnerable, and that the loss of riparian habitats will have far-reaching effects on native plant and animal species. They reserved up to 5,000 acre-feet of metropolitan effluent per year during the first five-year period, and 10,000 acre-feet annually thereafter. Based on other agreements reached by the City of Tucson with Oro Valley and the Metropolitan Domestic Water Improvement District, they contribute to the CEP on a proportional basis.¹

In addition to reaching an agreement on the allocation of a portion of the CEP for riparian habitat, the IGA further outlines the type of projects that qualify for the use of the effluent or reclaimed water. CEP water can be used on two types of projects; an Endangered Species Act (ESA) or a designated project. An ESA riparian project is operated to comply with a Habitat Conservation Plan approved under Section 10 of the Endangered Species Act or a mitigation project established by an operator pursuant to Section 7 of the Act. A designated project is located entirely within Pima County, is operated for purposes of environmental restoration, and accepted by the governing bodies of Pima County and City of Tucson as a Riparian Project.

¹ Intergovernmental Agreement between Pima County and the City of Tucson for Implementation of the Conservation Effluent Pool, December 14, 2010, pp. 1-2.

Appointed City and County representatives oversee the CEP, including a review of applications for compliance with the agreement. They also monitor the progress of each project, and report to the various governing bodies each year on the status of the CEP based on each operator's annual report.²

Formation of Task Force

During a meeting with the Mayor in September of 2012, the CWC presented three possible partnership efforts. The Mayor voiced interest in a suggested CEP endeavor to help identify projects for the use of the CEP allocation. The CWC then discussed formation of a group to identify candidate projects for consideration.

In response to the CWC's September, 2012 letter on water policy matters, Pima County Administrator Chuck Huckelberry outlined strong support to improve utilization of reclaimed water in his letter of October, 2012 to the CWC. He requested the CWC work with the County on this objective. In a follow up discussion with the County Administrator, the County requested that they have representatives on the CWC group. The Mayor's office had a similar request when the effort was further outlined to a representative in his office, and the City Manager's office offered two nominations. The Pima Association of Governments also was contacted and asked to participate in the task force. Members of the task force included:

- ❖ Ed Veburg, Task Force Coordinator (Chair, Community Water Coalition)
- ❖ Catlow Shipek, Senior Program Manager, Watershed Management Group
- ❖ Leslie Ethen, Director, Office of Conservation and Sustainable Development, City of Tucson
- ❖ Chris Avery, Principal Assistant City Attorney, City of Tucson
- ❖ Kathy Chavez, Water Policy Manager, Regional Wastewater Department, Pima County
- ❖ Julia Fonseca, Environmental Planning Manager, Sustainability and Conservation Office, Pima County
- ❖ Charles Wesselhoft, Deputy County Attorney, Pima County
- ❖ Claire Zucker, Sustainable Environment Director, Pima Association of Governments

TASK FORCE

The task force held its first meeting in March of 2013 and continued to meet until it completed its report in July of 2014. The task force initially discussed its objectives, which are noted below:

² IGA, pp. 3-4.

- ❖ Candidate Project Sites: Identify possible sites and discuss the merits of each one based on initial observations.
- ❖ Site Descriptions: Collect information and develop papers on projects that provide a description of the sites, and the basis for being a CEP project.
- ❖ Project Selection Guidelines: Create guidelines for reviewing and selecting candidate sites, which might include:
 - > Accessible site that encourages public use,
 - > Adjacent to reclaimed water infrastructure or available reclaimed water,
 - > Timing of project (immediate, near term, or long range),
 - > Consistent with requirements outlined in CEP agreement, e.g., establish a riparian area that will be sustainable, and
 - > Others identified based on considerations discussed by the task force.
- ❖ Summary of Findings: Report on the results to the Mayor, City Manager, and County Administrator, and, if appropriate, the City Council and Board of Supervisors.

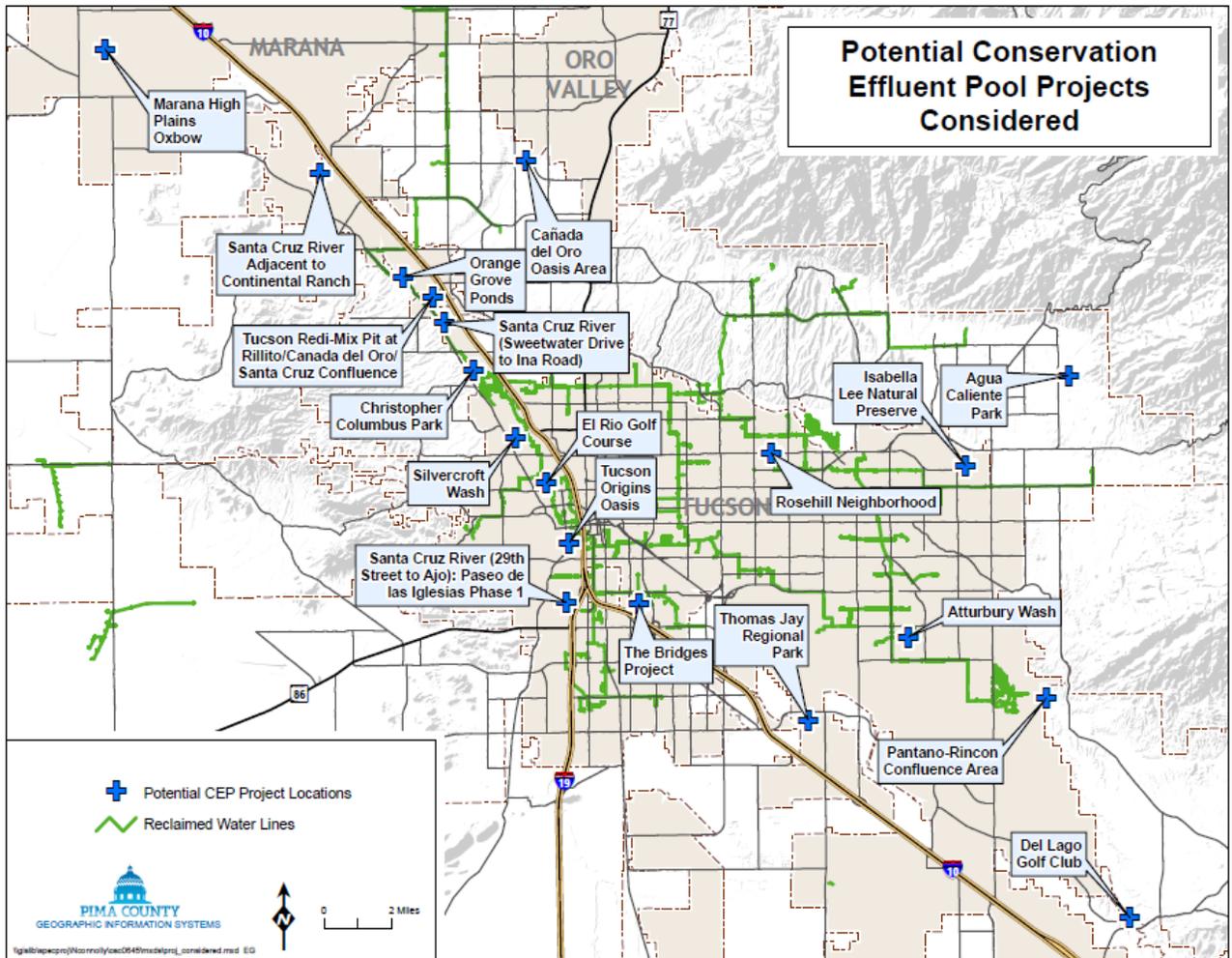
The first step of the group was to nominate project sites that might be candidates for the use of the CEP allocation. The task force then developed an outline that would be used for all candidate project sites to ensure comparable information was researched and presented. Initial descriptions then were developed using research through various online websites. Using those early draft papers, the City and County representatives worked with staff, and the Pima County Flood Control District, to provide more information.

METHODOLOGY

The task force followed a step-by-step process to identify candidate project sites. When a project site was identified, and there was a sufficient basis to further explore the candidate, project descriptions were completed. Additionally, selection guidelines were developed to enable the group to present the project sites that might be considered. The process is described in this section.

Candidate Project Sites

Just before the task force was convened, Tucson Water had developed a map that illustrates the reclaimed water piping infrastructure in the metropolitan area. A request was made for large copies of the map. The map is keyed to show if the reclaimed water line has remaining capacity to deliver more water or already is at full capacity. As candidate project sites were suggested, they were placed on the map along one of these reclaimed water lines or next to effluent discharged into the Santa Cruz River. Over the course of the year, representatives identified 19 candidate project sites as illustrated in Figure 1, Potential Conservation Effluent Pool Projects Considered.



It was determined that 13 potential project sites may merit consideration for an allocation from the CEP. They are listed below:

- ❖ Marana High Plains Oxbow
- ❖ Santa Cruz River Adjacent to Continental Ranch
- ❖ Orange Grove Ponds
- ❖ Tucson Redi-Mix Pit at the Rillito/Canada del Oro/Santa Cruz River Confluence
- ❖ Santa Cruz River (Sweetwater Drive to Ina Road)
- ❖ Christopher Columbus Park
- ❖ Tucson Origins Oasis
- ❖ Santa Cruz River, 29th Street to Ajo: Paseo del Las Iglesias Phase 1
- ❖ The Bridges Project
- ❖ Pantano-Rincon Confluence Area
- ❖ Atturbury Wash
- ❖ Isabella Lee Natural Preserve

- ❖ Canada del Oro Oasis Area

The first eight projects are located on the Santa Cruz River. They are relatively adjacent to one another, and each one offers distinct benefits. The eight projects are spread along the river from the south to more northern locations, and depending on which one(s) might be implemented, there may be opportunities for broader benefits related to habitat restoration, local and migratory wildlife, and public use.

During the course of the task force deliberations, six additional project sites were considered. They include:

- ❖ Silvercroft Wash
- ❖ El Rio Golf Course
- ❖ Thomas Jay Regional Park
- ❖ Del Largo Golf Course
- ❖ Agua Caliente Park
- ❖ Rosehill Neighborhood

Initial draft project descriptions were completed for most of these sites, unless there was early agreement the site did not offer enough potential for habitat restoration. These candidate sites were not included in the final task force list due to one or more of the following reasons:

- 1) Golf Courses: While the City was considering the status of a number of golf courses, including possible closure, two golf courses were on the early list of candidates. The City ultimately decided to use outside contractors to run the golf courses. The task force also agreed that golf course layouts generally do not offer the opportunity to establish riparian habitats or areas for endangered species.
- 2) Site Information: Insufficient site information was available to make a determination on the feasibility, although that may change in the future.
- 3) Water Availability: Sites were eliminated due to their lack of reasonable proximity to the reclaimed water system or access to reclaimed water.

Project Site Guidelines

When the task force had narrowed the number of candidate project sites to 13, it used three screening factors to further review them. The first was a list of selection guidelines, which are provided below:

- ❖ Environmental
 - >Preserves or restores existing riparian areas
 - >Improves wildlife habitat and connection to wildlife corridors
 - >Promotes establishment of appropriate native plants
- ❖ Economic

- >Promotes economic (business) investment
- >Considers potential access to business areas
- >High return on long-term investment
- >Attracts recreational opportunities
- ❖ Social Equity
 - >Promotes access to green spaces by the public
 - >Invites stewardship from neighboring community
 - >Benefits a portion of the community whose population is low income or otherwise disadvantaged
 - >Mitigates urban heat island issues
- ❖ Water Resource Availability and Governmental Support
 - >Adjacent to effluent infrastructure (reclaimed water system or treatment plant discharges)
 - >Meets requirements outlined in CEP agreement
 - >Represents project(s) agreed to by City and County representatives
 - >Potable water offset

The second point of consideration was the project site description and the merit of the various topics presented (e.g., profile of site, site potential [proposed habitat—desired, proposed recreational features, and proposed recharge features], analysis of site (water need, reclaimed water source, sponsor name and capability), and other relevant information).

The third factor was the project timeline. Timelines included: 1) immediate (one to two years), 2) mid-term (three to five years), and 3) long-term (five plus years). This has some relevance given the interest in moving forward with viable projects.

The task force did not assign weights to the three factors. They were used as a point of reference as each task force member reviewed the projects relative to the best use of the CEP set aside.

Groupings of Selected Candidate Project Sites

Recognizing that all candidate project sites would not be implemented at once, the task force members created three groupings for the candidate projects:

- ❖ Immediate potential
- ❖ Strong potential
- ❖ Long-term potential

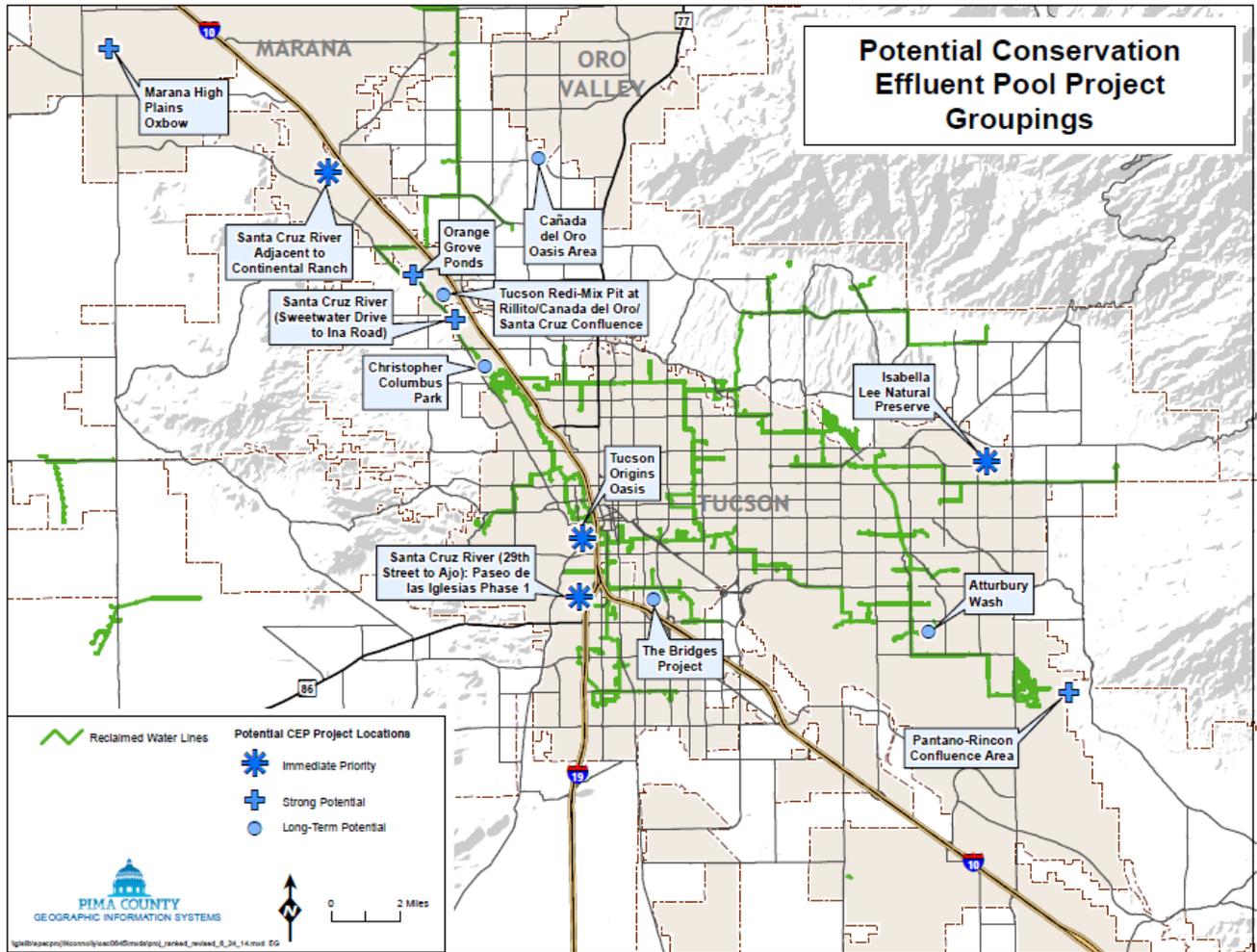
Using the screening factors presented above, task force members placed the candidate project sites into one of the three groups. The task force then met and discussed the preliminary results, and placed each of the 13 sites into one of the categories based on this review. The groupings actually provide for a balance across a broad array of needs in the community,

including projects immediately adjacent to low income neighborhoods with ready access for residents (e.g., Tucson Origins Oasis, Santa Cruz River, 29th Street to Ajo and the Bridges Project), while others are located more outside the core city area.

Figure 2, Potential Conservation Effluent Pool Project Groupings, illustrates the groupings by project, which are listed below:

- ❖ Immediate potential
 - >Santa Cruz River Adjacent to Continental Ranch
 - >Tucson Origins Oasis
 - >Santa Cruz River, 29th Street to Ajo: Paseo del Las Iglesias Phase 1
 - >Isabella Lee Natural Preserve
- ❖ Strong potential
 - >Marana High Plains Oxbow
 - >Orange Grove Pond
 - >Santa Cruz River (Sweetwater Drive to Ina Road)
 - >Pantano-Rincon Confluence Area
- ❖ Long-term potential
 - >Tucson Redi-Mix Pit at the Rillito/Canada del Oro/Santa Cruz River Confluence
 - >Christopher Columbus Park
 - >The Bridges Project
 - >Atturbury Wash (note incorrect spelling on map—needs correction)
 - >Canada del Oro Oasis Area

Of the 13 projects, 10 have governing bodies that will serve as sponsors. The sponsors to date include the City of Tucson (one), Pima County Flood Control District (eight), and Pima County (one). Projects identified in the Immediate Potential group will not use large amounts of water, and can serve as prototypes to help establish templates for future projects.



Water Requirements of Projects and the CEP Allocation

Given the water requirements specified across the 13 candidate project sites, the task force found there is sufficient effluent along the Santa Cruz River and Reclaimed Water system to meet the needs of these projects, especially since they will be phased in based on readiness of the sponsors identified with the projects. This broad observation was further refined by considering the effluent flow that would be required along the Santa Cruz River. The task force would recommend consideration of up to 4,000 acre feet be reserved for maintaining flow in the Santa Cruz River to benefit downstream projects.

In the first five years of the IGA, 5,000 acre feet of water are available per year. In the next five years, 10,000 acre feet will be available. With the allocation of up to 4,000 acre feet per year during the first five year period for projects along the Santa Cruz River, and in subsequent years, there should be sufficient water for other projects. For the projects not on the river with specified water requirements, the pre-establishment and post-establishment have a specified amount of approximately 1,000 acre feet in the first five years, and 520 acre feet in the next five years.

PROJECT DESCRIPTIONS

The descriptions of the 13 candidate projects are listed in the Appendix. There is some variance in the descriptions based on the amount of information that could be obtained on each site. For example, some have comprehensive site development plans while others are scheduled to have plans developed over the next three to five years. However, all of the 13 candidate project sites were reported based on the best information available as of the drafting of this report.

Future New Projects

The task force found that there is a high potential of additional candidate project sites which were not identified during our deliberations. Some candidate project sites actually were nominated as we met over the course of the year, including toward the end of our review process. Additionally, two neighborhood groups and the business community have recently voiced interest in the opportunity to propose projects beyond those we identified as candidates, and should be encouraged to solidify their proposals. An educational forum might be useful to help these interested parties. Therefore, we believe there will be other sites in the future that will be identified, and a review every two to three years would be beneficial. This would ensure that a new project can be profiled and enter the process for a portion of the CEP allocation, especially as projects enter the post-establishment phase where less water may be required. The Community Water Coalition could serve as a facilitator as it did with this effort, or the two jurisdictions may wish to appoint a committee with representatives from the City, County, and stakeholders similar to the Joint Water and Wastewater Committee that helped provide the foundation for the City's Water Service Area policy.

NEXT STEPS

As project sites are reviewed and approved, it is recommended that signs be placed at each location so residents can identify with the use of the Conservation Effluent Pool as a positive contribution to the City and County. After the CEP Task Force submits its report to City and County officials, sponsors with a near term implementation schedule are encouraged to apply to the CEP Administrators to receive an allocation of reclaimed water for their project(s). Sponsors with proposed projects that do not have immediate time frames should consider applying somewhat ahead of the schedules adopted for those projects. The IGA specifies the information that is necessary for an application. Some of this information is included in the Appendix to this report. Periodic reviews and reporting related to the projects that are implemented, as stipulated in the IGA, will be helpful points of reference as applications continue to be considered. It also will serve as a source of information for the community, City Council, and Board of Supervisors.

CEP TASK FORCE

Candidate Project Sites Appendix

The Conservation Effluent (CEP) Task Force identified 13 potential project sites that may merit consideration for an allocation from the CEP. They are listed below in the order presented and include the following:

- ❖ Marana High Plains Oxbow
- ❖ Santa Cruz River Adjacent to Continental Ranch
- ❖ Tucson Redi-Mix Pit at the Rillito/Canada del Oro/Santa Cruz River Confluence
- ❖ Orange Grove Pond
- ❖ Santa Cruz River (Sweetwater Drive to Ina Road)
- ❖ Christopher Columbus Park
- ❖ Tucson Origins Oasis
- ❖ 29th Street to Ajo: Paseo del Las Iglesias Phase 1
- ❖ Bridges Project
- ❖ Atturbury Wash
- ❖ Isabella Lee Natural Preserve
- ❖ Canada del Oro Oasis Area
- ❖ Pantano-Rincon Confluence Area

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MARANA HIGH PLAINS OXBOW

Profile of Site

Location

This effluent dominated 1.5 mile linear project site of 30 acres is adjacent to the Santa Cruz River in northwestern Pima County, one half mile east of Sanders Road.



Description of Current Habitat and Topography

- **Plants and Plant Communities:** Existing plant communities are typical of hydroriparian species including willow, cottonwood, tamarisk, and mesquite. The area has abundant native vegetation and invasive species. It is designated as an Important Riparian Area (IRA) on Pima County's Riparian Classification Maps, with an underlying hydro and mesoriparian classification (Class H). The habitat also has been classified as Riparian Gallery Forest by some ecologists.³
- **Wildlife:** This site has an excellent wildlife connection to the Tortolita and Silverbell Mountains, and north and south along the Santa Cruz River. The habitat supports local populations of lizards, toads, jack rabbits, and small birds and mammals. It has foraging and potential nesting areas for raptors, and foraging areas for larger mammals—coyote, javelina, and bobcat. The site includes Sonoran Mud Turtles, and non-native American Bullfrog. Large populations of birds, including Bell's Vireo, Abert's Towhee, Lucy's Warbler, Common Yellowthroat, Yellow-rumped Warbler, and a variety of other

³ Rosen, P.C., 2005. Ecological Opportunities in the Lower Santa Cruz Valley of Avra Valley and the Santa Cruz Flats, With a Focus on Reconnaissance of Pima County Flood Control District Properties. February 15.

abundant songbirds and wading birds are found at this site. EBird records suggest that some birders visit the site (52 species reported).

- **Hilly, Flat, Wash, or Other Terrain:** The meandering perennial Oxbow is maintained by a diversion berm from the main channel of the Santa Cruz River. The banks are shallow on the north side and slightly steeper on the south side. Above the vegetated terraces, the floodplain is flat and wide to the south and north, but further north is the Marana protected levee. The project area includes Bridle Bit Ranch, which runs cattle on Arizona State leased lands. The Oxbow has been in use to divert effluent from the Santa Cruz River since 1984 for irrigation of adjacent Bridle Bit pastures, and since 2001 to supply effluent for recharge to Pima County's Marana High Plains Multipurpose Recharge Facility.



View of Marana High Plains Oxbow

Existing Access—Public Use

There is some public use of trails for passive recreation, most notably bird watching. To the north bank of the Santa Cruz River, opposite the Oxbow channel, there is a paved River Park pathway. Private roads lead to a point where it is possible to walk around on informal trails. Access may need to be formalized. The Santa Cruz River trail on the north bank of the river is between 1,000 and 2,000 feet away from the Oxbow, and currently does not provide a view of the Oxbow area.

Site Potential

Proposed Habitat—Desired

The work at the Oxbow will include enhancement and maintenance of the Riparian Gallery Forest created by diversion of effluent. Establishment of cottonwoods with pole plantings and implementing invasive species controls are of specific interest. The opportunity to reintroduce native fish may exist.

Proposed Recreational Features

This project will provide passive recreation, especially for birding in this exceptional Riparian Forest Gallery.

Proposed Recharge Features

Effluent from the Oxbow is used for diversion to the Marana High Plains Effluent Recharge Facility (MHPERF), a multi-purpose facility that recharges effluent while establishing riparian habitat in areas surrounding the facility. In addition, some incidental recharge occurs along the Oxbow while conveying effluent to MHPERF.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): An allocation of CEP water is needed for the project's environmental maintenance components, including maintaining already established hydro-riparian forest vegetation along the Oxbow, in and around the MHPERF basins, and along the remainder of western and north eastern historic floodplain. The water need is estimated to be 150 acre feet annually. However, the amount of effluent needed in the Santa Cruz River to convey from the Ina Road Wastewater Treatment Facility outfall to the Oxbow is approximately 12,000 acre feet per year based upon an average documented recharge rate of 3.3 acre feet/mile/day on the Santa Cruz River. This amount is currently supplying the Oxbow with effluent from the Lower Santa Cruz Managed Recharge Facility (LSCMRF), which benefits from obtaining effluent storage credits from recharge on the Santa Cruz River.
- Post Establishment (5 years plus): The project is projected to need 150 acre feet per year in perpetuity due to the perennial nature of the site. Because the source is effluent from the Santa Cruz River, effluent must be transported from the Ina Road WWTF ten miles to the site. With recharge rates considering improved water quality estimated at four (4) acre feet/mile/day, the amount of effluent needed to transport to the Oxbow is about 15,000 acre feet per year. The effluent which is recharged is a portion of storage credits for owners/ users of the LSCMRF.

Reclaimed Water Source or Effluent

This project area has no reclaimed water connection. Treated effluent from the Santa Cruz River (in stream flow) is the only source supplemented by storm flow.

Project Timeline

Planning and design for restoration at this site could be completed by 2015.

Sponsor Name and Capability

The project sponsor is Pima County Flood Control District.

Degree of Consistency with CEP Selection Guidelines

With regard to the task force's selection guidelines, the following information is provided.

- Environmental: This area is one of the richest and most diverse areas of the perennial Santa Cruz River and supplies a water source for multipurpose projects including the MHPERF and pasture lands for local ranchers. The environment is dominated by Gooding Willow, many of which are decades old having survived the 50-year and 100-year floods of 1983, 1993, and 2006. These willows provide raptor perches and excellent habitat for many other birds. The Oxbow is the most mesic forest currently existing on the floor of the Lower Santa Cruz Basin; even denser and more mesic than the Sabino-Bear Canyon confluence and upper Tanque Verde Wash (Rosen, 2005).
- Economic: The Oxbow is the conveyance of effluent for the MHPERF that recharges as much as 550 acre feet per year of effluent, and provides storage credits for Pima County. In addition it provides effluent for the Bridle Bit Ranch pastures and is part of a surface water right for the rancher. The recharges effluent has been valued at \$300 per acre feet and the surface water a similar value. Without the Oxbow as a conveyance these uses of the effluent could not survive.
- Social Equity: There is some social equity due to access to green areas by the public, and fostering possible stewardship from adjacent neighborhoods in Marana just north of the Oxbow and interested environmental groups. Trails will offer an opportunity for interested hikers and horseback riders.
- Water Resources and Support for Project: This project meets the non-Habitat Conservation Plan riparian project requirements outlined in the CEP agreement. Given

the resources committed to this project, and the Flood Control District's environmental restoration plan, this project is feasible in the short and long term.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

Urban population has grown north of the Oxbow. The linear park on the Santa Cruz River has been a launching point for birding. In addition, tours have been requested by the Tucson Audubon Society to conduct bird watching at MHPERF and the Oxbow.

Jurisdiction in which the Project Occurs

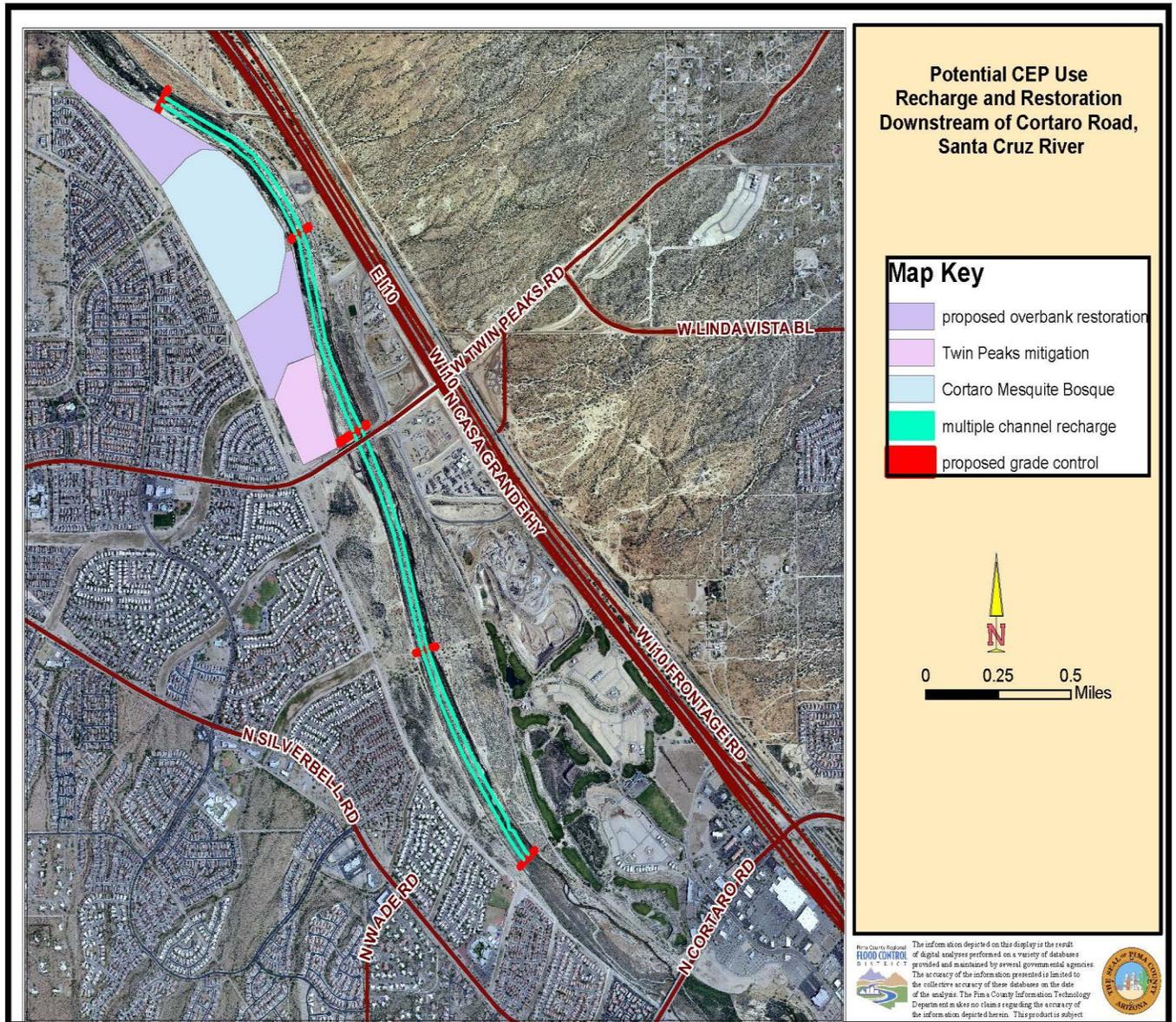
The Oxbow lies mostly within property owned by Pima County and is within the jurisdiction of the Town of Marana. A portion of the Oxbow is on Arizona State land.

SANTA CRUZ RIVER ADJACENT TO CONTINENTAL RANCH (Enhanced in-Channel Restoration and Recharge Downstream of Cortaro Road)

Profile of Site

Location

Santa Cruz River channel and select over bank areas extending 3.75 miles downstream of Cortaro Road Bridge.



Description of Current Habitat and Topography

- **Plants and Plant Communities:** Effluent discharges into the Santa Cruz River provide perennial surface water through this reach and supports a viable and diverse riparian ecosystem within this proposed project site. Native willows and non-native salt cedars dominate the mature riparian vegetation that occurs immediately adjacent to the low-flow channel. Two existing riparian restoration projects occur within this project area. The Cortaro Mesquite Bosque and the Twin Peaks mitigation area cover over 100 acres on the west overbank of the Santa Cruz River immediately downstream from the Twin Peaks Road Bridge. The restoration areas contain several additional species of riparian trees and shrub such as cottonwood, Arizona ash, and netleaf hackberry, and provide a seed source for these species that could extend their range up and downstream. Abundant wetland type vegetation including cattails is present. These projects benefit from their proximity to the Santa Cruz River's riparian corridor and provide additional habitat for wildlife that utilize the riparian corridor. Mesquite is present in some portions of the channel overbank, but much of the overbank area is degraded and devoid of habitat.
- **Wildlife:** The area supports an abundant bird population that consists of both resident and migratory birds. The Santa Cruz River is an essential wildlife corridor and provides connectivity between the Tucson Mountains and the Tortolita Mountains.
- **Hilly, Flat, Wash, or Other Terrain:**

Existing Access – Public Use

This portion of the Santa Cruz River is adjacent to several major residential areas. The Anza National Historical Trail parallels the river and an existing linear park provides pedestrians, cyclists, and equestrians easy access. The area is popular with bird watchers who come to view migratory species utilizing the Santa Cruz River Flyway.

Site Potential

Proposed Habitat—Desired

The existing riparian habitat in this project area is entirely dependent on continued effluent discharges into the Santa Cruz River. Effluent flows in the Santa Cruz are expected to decrease over time and may eventually not be sufficient to support the existing habitat. Using a portion of the CEP to maintain surface flows will protect and maintain the valuable existing habitat. Additionally, the amount of riparian vegetation in this reach could be vastly increased through the construction of several grade control structures that would serve to slow and pond the effluent, raise the water table, and increase the width of the wetted channel area. Weirs and some channel modification would be used to create multiple channels downstream of the grade control, which would also increase infiltration and provide more areas suitable to support riparian habitat. Currently, the majority of the vegetation is limited to a narrow thread immediately adjacent to the low-flow channel. Strategic use of grade control structures and weirs would increase the area within the channel suitable to support riparian vegetation.

Habitat restoration opportunities exist on the overbank areas, particularly on county owned parcels adjacent to the two existing restoration projects. These projects could be expanded and the existing infrastructure could be utilized or expanded to provide irrigation for plant establishment.

Proposed Recreational Features

The project follows the Anza National Historical Trail and the Loop bicycle/pedestrian linear park. Use of CEP water here protects and enhances existing habitat that benefits these recreation features.

Proposed Recharge Features

The area is currently part of the Lower Santa Cruz Managed Recharge Facility (LSCMRF). Proposed recharge features include the addition of grade control structures and channel modifications to create several low flow paths for the effluent to increase infiltration into the river bed. Constructed features provide the potential for increased recharge credits through the existing LSCMRF. Analysis provided in the U.S. Army Corps of Engineer's Tres Rios del Norte (TRDN) Restoration Feasibility Study shows that these features could provide up to 2,400 acre feet per year of recharge.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): The requirement is estimated to be up to 5,400 acre feet per year.⁴ This amount provides for in-channel recharge and consumptive use associated with restoration as well as maintaining existing vegetation.
- Post Establishment: (5 years plus): To be determined.

Reclaimed Water Source

Treated effluent.

Project Timeline

Planning and design is likely within the next five years.

Sponsor Name and Capability

Pima County could serve as the sponsor. These restoration/recharge features are components of the TRDN Restoration Feasibility Study. The Federal partner is the U.S. Army Corps of Engineers, and possibly the Bureau of Reclamation. Actively participating non-federal partners are Pima County Regional Flood Control District, the City of Tucson, and the Town of Marana.

Degree of consistency with CEP Selection Guidelines

With respect to the task force's selection guidelines, the following is relevant to this site:

- Environmental: The environmental returns of this project are positive due to the quality riparian habitat in portions of the site and the potential for riparian restoration along the Santa Cruz / Rillito corridors. This project also will enhance habitat connectivity and wildlife movement.
- Economic: Bird watching tourists bring in millions of dollars annually to the local economy and this is a known site for birding. In stream groundwater recharge is much more economically viable than overbank pits, which require energy to move the water.
- Social Equity: The site is accessible to the public for passive recreational use.
- Water Resource Availability and Support for Project: Water resource is readily available and political and public support for this project is considered high based upon the need to preserve this unique and popular riparian corridor.

⁴ Based on consumptive use and recharge estimates for Reach 2, TRDN Draft Feasibility Report, July, 2011.

Relevant Information

Engagement of Neighborhood or Other Organizations

There is substantial residential development to the west of this project. Tucson Audubon supports this project along with the Army Corps of Engineers, Bureau of Reclamation, and other local water providers.

Jurisdiction in which the Project Occurs

This project occurs on County owned property within the Town of Marana.

TUCSON REDI-MIX PIT

at the Rillito/Canada del Oro/Santa Cruz River Confluence

Profile of Site

Location

The Tucson Redi-Mix (TRM) pit is a sand and gravel operation that is situated on the east bank of the Santa Cruz River and bounded on the south by the Rillito River and on the north by the Canada del Oro (CDO).



Description of Current Habitat and Topography

- **Plants and Plant Communities:** Little or no viable habitat exists within the working pit area. The Rillito, CDO, and Santa Cruz each support a small amount of habitat immediately adjacent to the low-flow channel. This vegetation is primarily desert broom with a few willows and salt cedar.
- **Wildlife:** The confluence area is a critical wildlife corridor and provides connectivity between the Catalina, Tucson, and Tortolita Mountain ranges.
- **Hilly, Flat, Wash, or Other Terrain:** The TRM pit has very steep sides and the bottom is well below the grade of the stream channels that surround it on three sides. The pit fills with water, primarily effluent from the Santa Cruz, if not consistently pumped. The open water that sometimes has occurred in the bottom of the pit attracts a variety of bird species.

Existing Access—Public Use

The Anza National Historical Trail parallels the Santa Cruz River and an existing Pima County linear park provides pedestrians and cyclists access around the border of the site and offers overlook areas for bird watching.

Site Potential

Proposed Habitat—Desired

The low elevation and proximity to the water table at the bottom of the TRM pit makes it a suitable location for wetland/riparian restoration. The area could support vegetative species that require access to the water table, as well as large native riparian trees species such as cottonwood and Arizona ash, which are rare or non-existent in the vicinity. The proximity and accessibility of the water table in the TRM pit provides restoration opportunities with little need for additional infrastructure. Improved riparian habitat at this confluence area would improve connectivity for wildlife moving between the Catalina, Tortolita, and Tucson Mountains.

Proposed Recreational Features

This project follows the Anza National Historical Trail and the Loop bicycle/pedestrian linear park, and would provide bird watching opportunities.

Proposed Recharge Features

A portion of the TRM pit could be maintained as open water/wetland habitat and allowed to act as a recharge basin. The Santa Cruz River adjacent to this project area is currently part of the Lower Santa Cruz Managed Recharge Facility (LSCMRF). Any constructed features could provide the potential for increased recharge credits through the existing LSCMRF.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): A water estimate has not been completed. However, an allocation of CEP sufficient to maintain surface flows in the Santa Cruz River between Roger and Ina Roads would likely provide sufficient subsurface flow from the channel into the TRM pit restoration area. Alternatively, the Ina Road Wastewater Treatment Facility is situated nearby and could provide effluent directly to the TRM pit with the addition of some infrastructure.
- Post Establishment (5 years plus): A water estimate has not been completed for this time frame.

Primary Source

This project area has no reclaimed water connection. Treated effluent from the Santa Cruz River is the only source supplemented by storm flow.

Project Timeline

Planning and design for restoration at this site could be completed by 2015.

Sponsor Name and Capability

The project sponsor is Pima County Flood Control District. The restoration/recharge features are components of the TRDN Restoration Feasibility Study. For that study, the Federal partner is the U.S. Army Corps of Engineers. Actively participating non-federal partners are Pima County Regional Flood Control District and the Town of Marana.

Degree of consistency with CEP selection guidelines

- Environmental: This project preserves and enhances existing riparian areas, improves habitat and connectivity, and promotes native plants.
- Economic: Constructed recharge provides economic incentive to utilize CEP water. The project is situated strategically near to the source of the effluent.
- Social Equality: The project would offer access to green space, which would enhance surrounding communities.
- Water Resource Availability and Support for Project: The area currently receives effluent discharges. This project is a component of the TRDN Feasibility Study and received input from the City of Tucson, Town of Marana, and Pima County Regional Flood Control District.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

Public meetings were held as part of the larger TRDN Restoration Feasibility Study.

Jurisdiction in which the Project Occurs

This project occurs on County owned property within the Town of Marana jurisdiction.

ORANGE GROVE POND

Profile of Site

Location

Orange Grove Pond is located along the Anza National Historic Trail, south of Orange Grove Road and east of Silverbell Road.



Description of Habitat and Topography

- **Plants and Plant Communities:** Existing plant communities were typical of hydro-riparian species including willow, cottonwood, tamarisk, and mesquite until recently when the area stopped having visible open water. Tamarisk and other non-native vegetation are now dominant. The site is designated as Important Riparian Area (IRA) on Pima County's Riparian Classification Maps, with an underlying hydro and mesoriparian classification (Class H).
- **Wildlife:** There is an excellent wildlife connection to the east and Santa Cruz and Rillito Rivers, and good connections to the west with East Idle Hour Wash and multiple small unnamed washes. The pond has been a bird-watching area for many years, but the pond inlet has become filled/blocked and no longer receives reclaimed water from the Santa Cruz. Wildlife populations include lizards, toads, 156 bird species recorded on eBird (Western Palm Warbler on rare occasion) and mammals, with foraging areas for larger mammals—coyote, javelina, and bobcat. There also are foraging and potential nesting areas for raptors.
- **Hilly, Flat, Wash, or Other Terrain:** There are hydrological connections through East Idle Hour Wash and multiple small unnamed wash systems from the west and into the Santa Cruz River. Conveyance across Silverbell Road is largely at grade. Surrounding open space is associated with low-density residential development and Saguaro National Park.

Existing Access—Public Use

There is vehicular access.

Site Potential

This project is smaller in scale and relatively feasible, since it is in the river channel.

Proposed Habitat—Desired

Mesquite bosque may be useful on the slopes down to the pond, and there could be some benefit

related to removal of tamarisk. Earthwork is needed to re-contour the area for safe public access and better habitat conditions. The place where effluent used to enter is silted in and would need modification. One solution is to have effluent flow in at one place and flow out at another, avoiding stagnant water. However, stormwater may tend to block the inflow with sediment and silt in the pond itself, which may need to be addressed in some manner.

Proposed Recreational Features

A constructed trail would be needed to the site.

Proposed Recharge Features

Opportunities exist for this project to be built in a way that could permit it to function as a constructed groundwater recharge facility.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): The site receives regular flood flows, making it more ecologically sustainable than a site that would depend only on effluent or reclaimed water. Scarce water could be used for re-vegetation, with stormwater filling the pond on a seasonal basis. Effluent is already physically available at the site, but there is no allocation for the environmental flows necessary to maintain the pond component.
- Post Establishment (5 years plus): A dedicated water source would be needed to maintain the pond unless another option is selected.

Reclaimed Water Source

This site is on the reclaimed water system that has no extra capacity.

Project Time

Planning and design is likely within the next five years.

Sponsor Name and Capability

The Regional Flood Control District would be the sponsor, and possibly others interested in constructed groundwater recharge. The District purchased the Orange Grove Pond area for future restoration.

Degree of Consistency with CEP Selection Guidelines

With respect to the task force's selection guidelines, the following information is relevant to this site.

- Environmental: There are environmental benefits from the restoration and maintenance of habitat, which will enhance wildlife use and provide for river bank protection.
- Economic: One economic return relates to greater property values in the future for those homes that are near the riparian areas.
- Social Equity: Trails could offer an opportunity for interested hikers.
- Water Resource Availability and Support for Project: There is limited water due to competing needs.

Relevant Information

Engagement of Neighborhood or Other Organizations

No adjacent neighborhood group has been identified, although the Tucson Mountains Association does address west side matters of interest.

Jurisdiction in which the Project Occurs

The project site is in Pima County, and is under the jurisdiction of the Flood Control District.

SANTA CRUZ RIVER

(Sweetwater Drive to Ina Road)

Profile of Site

Location

This site is located along the Santa Cruz River between Sweetwater Drive and Ina Road.

Description of Current Habitat and Topography

- **Plants and Plant Communities:** Existing plant communities are typical of hydro-riparian species including willow, tamarisk, blue palo verde, and mesquite. The area has abundant native vegetation and invasive species. The area is designated as an IRA on Pima County's Riparian Classification Maps, with an underlying hydro and mesoriparian classification (H).
- **Wildlife:** From the effluent discharge north, there is some wetland habitat that attracts small birds, including the Yellow-bellied Sapsucker and Summer Tanager. About 230 species of birds have been reported to eBird for this reach of the Santa Cruz River.
- **Hilly, Flat, Wash, or Other Terrain:** The river bed flows north and meanders with steep banks on either side.

Existing Access—Public Use

There is a paved bike trail as well as hiking trails down to the river along with equestrian access at Columbus Park, which includes ample parking.

Site Potential

Proposed Habitat—Desired

Recent acquisition of the sand and gravel operations will enable development of concepts for riparian habitat restoration. With the replacement of the Roger Road Treatment Facility and reduced water flow (see below), the amount of vegetation along the river between Sweetwater Drive and Ina Road may result in loss of woody riparian trees in favor of invasive salt cedars.⁵ A CEP allocation along the Sweetwater Drive to Ina reach water for irrigation of plantings could reduce some of these adverse biological effects. Orange Grove Pond is within this reach, which could provide for linkages to other riparian habitat.

Proposed Recreational Features

No additional features identified.

Proposed Recharge Feature

The reclaimed water infrastructure currently has no extra capacity. However, two documents refer to the availability of effluent in the Santa Cruz River that could be a source of water for this site. The Regional Optimization Master Plan (ROMP), November 2007, describes restoration of riparian habitat along the Santa Cruz River. It calls for the Agua Nueva Water Reclamation Facility (Water Campus) to have an average capacity of 32 mgd, with Ina Road to have an average capacity of 50 mgd. The plan at that time recommended approximately 2 to 7 mgd of effluent water including consumptive and evaporative losses, direct precipitation, constructed ground water recharge, and channel losses. The Water for the Environment Technical Paper prepared under Phase 2 of the Water/Wastewater Infrastructure, Supply and Planning Study (WISP) also discussed the effluent dominated Santa Cruz River. A subsequent county and city memorandum of September 1, 2009 transmitting the Water Conservation Technical paper, elaborates on this matter and the use of Conservation Effluent Pool water.

⁵ C.H. Huckelberry, Memorandum, Property Values, The Santa Cruz River and Conservation Effluent Pool, May 28, 2013, page 3.

While there is existing effluent, the supply will decrease the end of 2013 or early 2014 when ROMP improvements are complete and the Water Campus is operational. Some retention of water in this area may be merited. This reach of this project site is approximately five miles long as the crow flies and longer as the stream meanders. It includes Orange Grove Pond, which makes it a large project area. The project may require some modifications to the stream channel to increase the infiltration of effluent, and make more water available to trees in the river bed. The use of CEP water could assure some level of stream flow. The Sweetwater Wetlands to Camino del Cerro includes hydro riparian area along the effluent flow. Additionally the west bank of the river is not channelized and may be a good candidate for restoration of mesquite bosque and perhaps a mesoriparian community on the slope down to the river.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): To be determined as noted under project timeline.
- Post Establishment (5 years plus): To be determined as noted under project time line.

Reclaimed Water Source or Effluent

In channel treated effluent.

Project Timeline

Planning and design likely will occur over the next five years.

Sponsor Name and Capability

The Regional Flood Control District and possibly others interested in constructed groundwater recharge. One option that could be considered relates to modifications of the channel that would increase infiltration of effluent, and make more water available to trees in the river bed.

Degree of Consistency with CEP Selection Guidelines

With regard to the the task force's selection guidelines, the following information is provided.

- Environmental: There are environmental benefits from the restoration and maintenance of habitat, which will enhance wildlife use and provide for river bank protection.
- Economic: One economic return relates to greater property values in the future for those homes that are near the riparian areas.
- Social Equity: Trails offer an opportunity for interested hikers.
- Water Resource Availability and Support for Project: There is limited water due to competing needs.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

No adjacent neighborhood group has been identified, although the Tucson Mountains Association does address west side matters, and may be interested in supporting habitat restoration and further strengthening of wildlife linkages to the Sweetwater Preserve.

Jurisdiction in which the Project Occurs

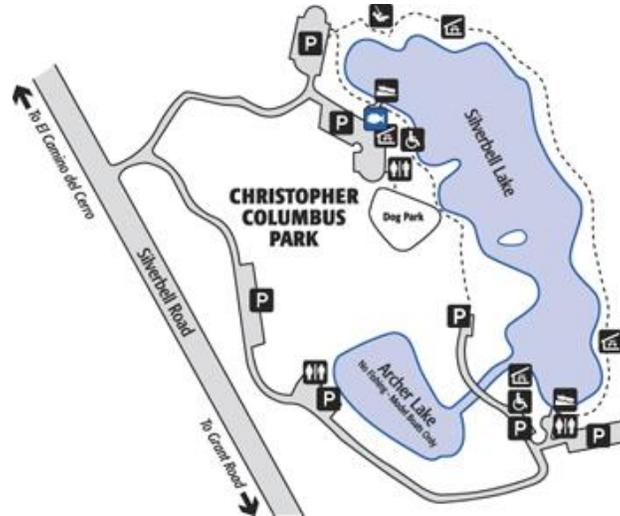
This site is in Pima County.

CHRISTOPHER COLUMBUS PARK

Profile of Site

Location

Columbus Park is a large, regional-size park located on the northwest side of the city at Silverbell Road and El Camino del Cerro (4600 North Silverbell Road). There are baseball fields, picnic tables, ramadas, a dog park, two lakes, and a designated model airplane area with several paved and grass landing pads.



Description of Current Habitat and Topography

- Plants and Plant Communities: Mesquites, palo verdes, pines, eucalyptus, and willow trees are found at the park, and mature pines are located on the raised terrain around the east side of the model airplane pads. There is a lake outflow area that supports mesquite bosque type habitat.
- Wildlife: The park has a recreational and urban fishing lake where native waterfowl can be seen. The lake is stocked with fish by Arizona Game and Fish. There is an excellent wildlife connection to the east of the Santa Cruz River, and there are connections to the west with Roger and Trails End Washes. Additionally, there is a fair amount of adjacent open space with large residential lots and the Sweetwater Preserve (especially with the addition of Sweetwater Canyon to the Preserve). Wildlife populations include lizards, toads, and small birds and mammals, and there are foraging areas for larger mammals—coyote, javelina, and bobcat. The park has foraging and potential nesting areas for raptors.
- Hilly, Flat, Wash, or Other Terrain: There are two lakes at the park. Silverbell Lake (13 acres) receives water from a well with high nitrates. Archer Lake is supplied with reclaimed wastewater. The site is relatively flat with the exception of gentle slopes in wash areas, steep river banks, and a raised terrain area around the model airplane pads.

Existing Access—Public Use

There is vehicular and bicycle access to the park.

Site Potential

The project offers an opportunity to expand the riparian habitat next to a lake. The strip between the lakes and the river, where the new multi-use trail runs, is a candidate for riparian restoration. In the interior of the park area, because of a high level of recreational use, landscaping with native plants would be feasible, but would not be the same as habitat restoration. With regard to aquatic vegetation along the edge of the lake, which is regularly removed for angler access to avoid mosquito-breeding areas, emergent vegetation could be left in place on a part of the lake margin. This would provide more habitat for birds and wildlife. Mosquito issues can be reduced based on experience at the Sweetwater Wetlands.

Water Need

- Establishment (2-5 years with drought provision): To be determined.
- Post Establishment (5 years plus): To be determined.

Reclaimed Water Source or Effluent

This site is on the reclaimed water system that has no extra capacity. However, if the existing drip irrigation system in the park could be renovated, more riparian habitat may be feasible without using a lot more water.

Project Timeline

To be determined if a sponsor is forthcoming.

Sponsor Name and Capability

None identified at this point.

Degree of Consistency with CEP Selection Guidelines

The following findings are associated with the group's selection guidelines.

- Environmental: For the riparian area that could be restored (strip between the river and the lake), there would be improved wildlife habitat and a better connection to the river.
- Economic: If more habitat could be restored for birds and wildlife, enhanced recreational opportunities would be available for observation and enjoyment by visitors to the park. Surveys have demonstrated that bird watching is an economically important activity. This major park could be optimized for wildlife watching
- Social Equity: There is substantial public use at the park due to the wide range of recreational activities available (model airplane pads, dog park, fishing, boating, picnic facilities, softball fields, etc.).
- Water Resource Availability and Support for Project: Water is not readily available from the reclaimed water line, although a more efficient irrigation system may be feasible and offer more water for wildlife habitat and related opportunities for visitors.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

The Tucson Mountains Association is the oldest resident organization in the State of Arizona. They are active in many efforts to preserve and restore open space on the west side. This resident group was involved in the general plan update for Columbus Park a few years ago, and may be interested in supporting habitat restoration and further strengthening of wildlife linkages to the Sweetwater Preserve.

Jurisdiction in which the Project Occurs

Columbus Park is operated by the City of Tucson.

TUCSON ORIGINS OASIS

Re-creation of the Historical Mesquite Bosque at Tucson’s Birthplace

Profile of Site

Location

The project site is the west bank and floodplain of the Santa Cruz River at the base of Sentinel Peak (‘A’ Mountain), west of downtown Tucson (please see map on next page). In this location archaeologists have documented more than four thousand years of continuous occupation and cultivation, and the longest history of irrigation in North America. During prehistoric and historic times, until the late 19th century, this irrigated agricultural oasis was bordered by a mesquite bosque (riparian gallery forest) along the banks of the river. Because of its historical authenticity, high visibility near downtown Tucson, and accessibility by multiple transportation modes, this is an ideal location for this project. The entire project area is within publicly owned properties, including City of Tucson properties and Right-of-Ways, and the County-owned Mission Garden property operated by the nonprofit Friends of Tucson’s Birthplace.

Description of Current Habitat and Topography

- **Plants and Plant Communities:** The current plant communities in the project site are dominated by mesquite and palo verde trees, native desert shrubs and grasses, and some invasive varieties of trees, shrubs, grasses, and weeds. Historically, this area was irrigated agricultural fields with cottonwood and desert willow trees following canal alignments, and a mesquite bosque (riparian forest) along the river banks.
- **Wildlife:** Wildlife species include coyote, cottontail, jackrabbit, various rodents, lizards, roadrunner, and birds of prey.
- **Hilly, Flat, Wash, or Other Terrain:** The terrain of the project site is the flat, formerly active floodplain of the Santa Cruz River.

Existing Access—Public Use

The proposed project area is within City of Tucson properties and Right-of-Ways, and the County-owned Mission Garden property; all of it is publicly accessible by multiple modes of transportation. The Mission Garden has regular open hours, and has public parking and paths that meets the accessibility standards of the Americans with Disabilities Act (ADA). The project area is also within easy walking distance from a new SunLink streetcar stop. Once the Mission Garden is complete there will also be a relatively high amount of pedestrian traffic to the site.

Site Potential

Proposed Habitat—Desired

This project will provide reclaimed water to supplement rainfall and runoff in order to: 1) re-create the mesquite bosque (riparian forest) that historically grew on the banks of the Santa Cruz River, and 2) irrigate a screen of native trees between the Mission Garden and Mission Road, and between the Mission Garden and the surrounding landfill to the south and east. Additionally, plant material that is native to mesquite bosques in northern Sonora will be used.

Analysis of Site and Project Description

Provision of a reclaimed water supply to the site is part of a larger project called the Tucson Origins Oasis. This project will be a demonstration of ancient, historical, and contemporary water management and agriculture located at the site of Tucson’s birthplace, and will show how food security and sustainability in a desert city can be increased through a combination of

heritage plants, traditional knowledge, and contemporary technologies. It will also provide a model for revival of local agriculture in an urban setting, mitigation of the urban heat island effect in a residential neighborhood, and conservation of local heirloom cultigens.



The adjacent channel of the Santa Cruz River flowed year-round until the late 19th century, and was the basis of the agricultural oasis of Tucson that existed for more than four thousand years. Discharging reclaimed water from the City water system into this channel is technically feasible, but would require expensive infrastructure and significant ongoing costs for water use and compliance with complex federal regulations. The Tucson Origins Oasis project will instead use diverse alternative water sources, including both potable and reclaimed water distributed through a drip irrigation system; harvested runoff from Sentinel Peak ('A' Mountain); and perched groundwater from a monitoring well within the Mission Garden that is scheduled to be abandoned by Tucson Water.

This proposed Conservation Effluent Pool (CEP) project will provide reclaimed water to re-create the mesquite (*Prosopis velutina*) bosque that grew on the banks of the Santa Cruz River until the late 19th century. Lt. Col. Philip St. George Cook's report on the 1846 march of the Mormon Battalion during the Mexican-American War described "... a dense forest of mesquite two feet in diameter..." between the village of Tucson and the San Xavier Mission. During his 1851-52 survey to establish a new boundary between the U.S. and Mexico, John Russell Bartlett described "...a fine grove of large mezquit near the river..." in the same area.

Planting and irrigating a total of 400 mesquite trees will create a visibly lush and shady setting on the west bank of the river between Mission Lane and the Luis Gutierrez Bridge, along the north and south edges of Mission Lane, and bordering the eastern edge of the Barrio San Agustín neighborhood. The seed pods of the mesquite trees will be used to demonstrate indigenous and contemporary techniques for harvesting and processing this wild, native food staple.

Adding a reclaimed water supply will also diversify the water sources for the partially completed 4-acre Mission Garden that demonstrates the long agricultural history of Tucson, including plantings of Native American wild foods and crops; reconstructions of an orchard, vineyard, and fields that were in this location during the Spanish period; timeline gardens highlighting plants introduced during earlier and later periods; and demonstration beds for teaching sustainable backyard gardening in the city.

In 2012, a Community Challenge Grant from the Arizona State Forestry Division funded the installation of a drip irrigation system within the Mission Garden, and also the re-creation of an authentic Spanish Colonial Period orchard with 100 heirloom Kino Heritage Fruit Trees. The drip system installed in the Mission Garden during that project is a dual system that currently delivers only potable water, but has a separate backflow valve and separate pipes for reclaimed water when it becomes available.

The CEP reclaimed water delivered to the Mission Garden will be used to irrigate 150 native desert trees (mesquite, palo verde, acacia, desert willow, ironwood, hackberry) planted outside of the walls to screen the view and noise of traffic on Mission Road, and views of the landfill to the south and east. If the reclaimed water system has sufficient capacity at this location, then reclaimed water could also be purchased separately from the CEP allocation in order to irrigate a half-acre area within the Mission Garden walls that is planted in native wild plants (agaves, cacti, and desert shrubs) that were important food resources for Native Americans living in the Sonoran Desert.

In another element of the Tucson Origins Oasis project, a stepped series of rock-walled terraces will be constructed on the lower slopes of Sentinel Peak overlooking the Mission Garden to demonstrate the indigenous Native American terrace cultivation technique using slope runoff, as evidenced by the prehistoric trincheras (rock-walled terraces) of nearby Tumamoc Hill, within direct sight of the project area.

A new HAWK pedestrian crossing with a signal light will be constructed across Mission Road-Mission Lane intersection to provide connectivity between the Mission Garden and the Sentinel

Peak agricultural terraces, to the rest of Sentinel Peak Park operated by the City, and to the Santa Cruz River Park operated by the County.

Neighborhood engagement is also part of the Tucson Origins Oasis project. Native desert trees and local heirloom varieties of fruit trees (Kino Heritage Fruit Trees), grape vines, fruiting cacti, and other edible perennial plants being cultivated in the Mission Garden will be made available to plant in the adjacent residential neighborhood of Barrio San Agustín. Modifications will be made to street edges and yards to capture runoff to irrigate these plantings, which will increase shade, reduce the urban heat island effect, and provide additional food sources to the residents of this low-income neighborhood. Plants and water harvesting improvements will be provided to neighborhood residents that request them, and training in edible plant cultivation and water harvesting will be provided to them as an ongoing outreach program.

The Tucson Origins Oasis project will also include innovative research. It will provide opportunities to design research programs and collect data relevant to topics such as:

- Sustainable water management and permaculture food production through combinations of traditional knowledge and new technologies
- Mitigation of urban heat island effects
- Increasing food security of urban residents
- Conservation of heirloom cultivars.

Water Need

- Establishment (5 years with drought provision): The CEP reclaimed water requirement is estimated to be 1.58 acre-feet annually during the establishment period. This total includes .43 acre-feet (140,400 gallons) per year for the Mission Garden, which will provide enough reclaimed water to irrigate 150 native trees screening the view and noise of traffic on Mission Road on the west, and views of the landfill to the south and east. The remaining 1.15 acre-feet (374,400 gallons) per year will be used for the mesquite bosque, which will provide enough reclaimed water to irrigate 400 mesquite trees planted along the west bank of the Santa Cruz River, along both sides of Mission Lane, and along the eastern edge of Barrio San Agustín. These reclaimed water requirements assume that trees will be irrigated with 24 gallons each (three 2-gallon/hr drip emitters for four hours) on a weekly basis between May and September, and biweekly the rest of the year.
- Post Establishment (5 years plus): The CEP reclaimed water requirement is estimated to be .49 acre-feet (158,400 gallons) annually during the post-establishment period. As the trees become established in the mesquite bosque, and along the edges of Mission Lane and the eastern edge of the neighborhood, they will be able to transition to rainfall and runoff for their normal water supplies. The .5 acre-feet per year of CEP water during the post-establishment phase will supplement those water supplies, with the 550 native trees receiving 24 gallons each on a monthly basis. During drought-related interruptions in the CEP water supply, the plants will be drip irrigated with the existing potable water supply.

Reclaimed Water Source or Effluent

An existing reclaimed water line located at the intersection of Avenida del Convento and Cushing Street will be extended 1,800 feet south to Mission Lane and then west to the Mission Garden. Metered by a new water valve meter station, this pipeline extension will supply a drip irrigation system. The extension of reclaimed water pipes to reach the project area may be subsidized by Tucson Water.

Project Timeline

Planning, design, construction, and tree planting for this project could be completed by 2015.

Sponsor Name and Capability

The project sponsor will be the City of Tucson in partnership with the Friends of Tucson's Birthplace. Other partners include the Watershed Management Group, Desert Harvesters, and Trees for Tucson.

Degree of Consistency with CEP Selection Guidelines

With regard to selection guidelines, the following information is provided.

- **Environmental:** This project will re-establish the native plant habitat, enhance wildlife use, and reduce the urban heat-island effect in this area.
- **Economic:** This project will enhance and connect the Mission Garden and adjacent areas of the Santa Cruz River Park and Sentinel Peak Park, leading to increased visitation and use of these public amenities, and making this area a tourism destination that benefits the local economy in terms of jobs, spending, and tax revenues. This project, especially in conjunction with the completion of the Mission Garden, is expected to increase property values for nearby residents and businesses, which is especially key in this area that anchors the western end of the SunLink streetcar route.
- **Social Equity:** The Tucson Origins Oasis project will increase shade, reduce the urban heat island effect, and provide additional food sources to the residents of the low-income Barrio San Agustín neighborhood. It will also provide training in cultivation of edible plants and water harvesting to the residents. The Mission Garden, Santa Cruz River Park, and Sentinel Peak Park are all open to the public, and include parking and other accessibility features that meet the standards of the Americans with Disabilities Act (ADA).
- **Water Resource Availability and Support for Project:** Existing reclaimed water lines are nearby, and significant public and political support for this project is expected.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

Local heirloom varieties of fruit trees and other edible perennial plants being cultivated in the Mission Garden will be offered to residents of the neighborhood of Barrio San Agustín, and the nonprofit Friends of Tucson's Birthplace (FTB) will assist with the plantings. The FTB will work with water harvesting experts (such as the Watershed Management Group) and residents to make modifications to street edges and yards to capture runoff to irrigate these plantings. Native desert trees, heirloom fruit trees, and water harvesting improvements will be provided to residents that request them, and training in cultivation and water harvesting will be provided as an ongoing outreach program by FTB and water harvesting experts.

Support for this project will include a variety of sources, possibly including:

- Subsidized reclaimed water supplied by the Conservation Effluent Pool
- Reclaimed water line extension donated by Tucson Water
- Fundraising for a new water valve meter station by the Friends of Tucson's Birthplace
- Mesquite trees donated by Trees for Tucson
- Water harvesting improvements donated by Watershed Management Group or other experts
- Native crop seeds donated by Native Seeds/SEARCH

- Kino Heritage Trees, grapevines, and native plants donated by Friends of Tucson's Birthplace
- Grants from the University of Arizona, Tohono O'odham Nation, and other sources
- County bond funding

Jurisdiction in which the Project Occurs

The proposed project area is within City of Tucson properties and Right-of-Ways, and the County-owned Mission Garden property.

29th STREET TO AJO: PASEO DE LAS IGLESIAS PHASE 1

Profile of Site

Location

This 325 acre site is located within two miles of downtown Tucson along the Santa Cruz River between 29th Street (otherwise known as Silverlake Road) and Ajo Way.



Description of Current Habitat and Topography

- **Plants and Plant Communities:** Existing plant communities are typical of urban and post agricultural conditions. The area has limited native vegetation, and an abundance of invasive species. The area is designated as IRA on Pima County's Riparian Classification Maps, with an underlying hydro and mesoriparian classification (Class H), and xeroriparian (Class D).
- **Wildlife:** This site has an excellent wildlife connection to the West Branch and Tucson Mountains, and north and south along the Santa Cruz River. The site provides existing habitat for the burrowing owl and horned lizards. The habitat also supports local populations of other lizards, toads, jack rabbits, and small birds and mammals, foraging and potential nesting areas for raptors, and foraging areas for larger mammals—coyote, javelina, and bobcat. The site includes Mesquite Circle Pond, which is one of Tucson's most significant remaining ephemeral amphibian breeding areas, with six species of native toads known to be present.
- **Hilly, Flat, Wash, or Other Terrain:** The river bed meanders with steep banks on either side. The project reach includes the existing Las Milpitas farm, a community farm run by the Community Food Bank on a leased Pima County parcel. This site also possesses significant cultural findings, including some of the earliest and most important historic water control works that are left along the Santa Cruz River. There is a canal segment for the old mill at the base of A Mountain, and the cross cut well field.

Existing Access—Public Use

Public use of trails for passive recreation is encouraged. At this time there are existing trail underpasses on both banks under Silverlake Road. There are temporary pathway sections that connect the Loop, which can be made permanent through the final alignment of this project. Currently, motorized vehicles are able to legally enter the wash, with dumping being a significant problem. When the project site is developed there will be post and cable fencing to restrict motorized access, extensive site cleanup, and both paved and decomposed granite trails for utilizing the site. Additionally, over 10,000 trees, shrubs, and cacti will be added to enhance the habitat and public experience.

Site Potential

Proposed Habitat—Desired

The work at Paseo Phase 1 will include the Mesquite Circle Pond, creation of burrowing owl perches, a lizard salvage enclosure, lizard rock pile habitat, and approximately 16 acres that is good natural habitat and does not need to be augmented with additional plantings or irrigation. The project will attempt to protect these areas by fencing them off. No ground disturbing equipment will be used within them and vehicular, equestrian, and pedestrian access will be minimized or eliminated. Adaptive management efforts to address items such as invasive species, vector, and erosion issues may be implemented. There is the possibility to provide for reintroduction sites for lowland leopard frogs and garter snakes in a quadrant of the project not slated for river park trail connectivity.

Proposed Recreational Features

This project will provide a divided trail to fill in a 1.5 mile gap in the Santa Cruz River Park trail system, as well as offering key linkage for the Loop at the Julian Wash Greenway. Multiple trailheads, and equestrian staging area, restroom ramadas, and interpretive signage will be included when the project is completed.

Proposed Recharge Feature

Water harvesting will be used extensively on site on the top of banks to support the vegetation. However, this is unlikely to impact the aquifer recharge, as the aquifer is currently greater than 100 feet from the channel surface.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): An allocation of CEP water is needed for some of the project's environmental restoration components, such as maintaining vegetation on the river terraces, in and around water harvesting basins, and along the remainder of western and northern historic food plain. The water need is estimated to be 350 acre feet annually.
- Post Establishment (5 years plus): The project has two irrigation systems, one for establishment only areas and one for long term irrigation. The bulk of the project will not have long-term irrigation, with irrigation only for establishment and limited supplemental support during times of severe drought while the system is still operational. Long term irrigation will be supplied along segments of the recreational trail (water for open space and trails will not be provided from a CEP allocation), in two key habitat areas around the 36th street wildlife corridor, and around Mesquite Circle Pond to sustain vegetation for

long term wildlife use and corridor benefit. The cumulative water need is estimated to be 200 acre feet annually.

Reclaimed Water Source or Effluent

The project area has a reclaimed water connection at Silverlake Road. The project involves constructing a reclaimed water line on both banks (with the exception of the area south of the Julian Wash) to utilize reclaimed water.

Project Timeline

The design has been finalized and construction is scheduled between October, 2013 and February, 2015.

Sponsor Name and Capability

The project sponsor is the Pima county Flood Control District. The project construction is fully funded through voter approved bonds and Flood Control District Funding. Paseo Phase 1 also will complement work that the District has been implementing along the west Branch of the Santa Cruz River.

Degree of Consistency with CEP Selection Guidelines

With regard to the the task force's selection guidelines, the following information is provided.

- **Environmental:** There are positive environmental benefits from the restoration elements. Installation of rain water harvesting earthworks, establishment of native vegetation communities, improvements to the ephemeral toad-breeding pond, installation of raptor perches, and predator resistant wildlife fencing will enhance habitat functionality and wildlife corridors. Many species occurring in and around this urban setting are in decline, and this endeavor offers a unique opportunity for preservation in an urban oasis setting.
- **Economic:** One economic return relates to the site being close to the downtown and urban neighborhoods. A recent analysis of this site by Dr. Rosalind Bark⁶ indicated there will be increased values for homes near the project based on a “bump” that will occur with the presence of riparian habitat from the use of treated effluent (\$38 per house or \$670,000 to \$880,000 in additional tax revenue per year). Additionally, with access to the downtown area, there may be additional pedestrian traffic through the site that could offer more sustainable means of communication, and possibly benefit small nearby restaurants and shops.
- **Social Equity:** Social equity is related to access to green areas by the public, and fostering possible stewardship from adjacent neighborhoods and interested environmental groups. The bulk of the surrounding residences are predominately mobil homes with low income families and seniors. Trails will offer an opportunity for interested hikers.
- **Water Resources and Support for Project:** This project meets the non-Habitat Conservation Plan riparian project requirements outlined in the CEP agreement. Given the resources already committed to this project, and the Flood Control District's environmental restoration plan, this project is feasible in the short term.

⁶Rosalind H. Bank, “Levelling the Playing Field—A Case Study of How Non-Market Values Can Compete in Policy Debates Over Wastewater Allocation in a Semi-Arid Region,” Policy and Society 30, Elsevier, Ltd., 2011.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

Many public and several neighborhood meetings have been held over the past decade as part of the U.S. Army Corps of Engineers Paseo del Las Iglesias Environment Feasibility Study, and several more specially related to final design and construction of the Phase 1 project.

Jurisdiction in which the Project Occurs

In accordance with the City of Tucson and Pima County Regional Flood Control District's Intergovernmental Agreement (IGA) for this project, the City of Tucson will allow the construction of this multi-use ecosystem restoration, recreational river park and bank protection project on 286 acres of City owned land. The Flood Control District will fund and construct the project. Upon completion of the construction, the District will maintain the Julian Wash and Santa Cruz channel and associated bank protection. The District also will oversee and monitor the quality and effectiveness of the ecosystem restoration. Pima County Natural Resources, Parks and Recreation (NRPR) will maintain the pathways, river park facilities, landscape plantings, and irrigation system. The City of Tucson will maintain and monitor Ryland Landfill, and CEP water allocated to this project. CEP water allocated to this project will be used to establish and maintain the ecosystem restoration and recreation/open space of the project.

BRIDGES PROJECT

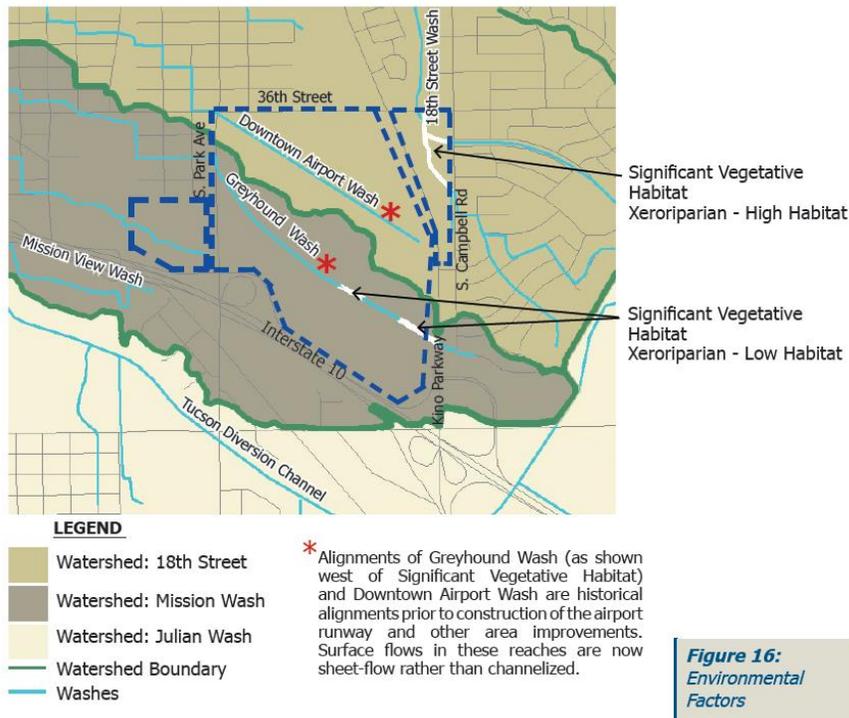
Profile of Site

Location

This site is adjacent to the new Costco (Kino Road and north of I-10). The Bridges project is a 350-acre master-planned mixed-use development with four principal land uses: 1) approximately 1,000,000 square feet of commercial/retail/office land uses and an approximately 350 room hotel, on 128.7 acres, 2) a maximum of 1,084 residential units consisting of single family attached homes, single family detached homes, and apartments, on 117.4 acres, 3) a 53.5 acre research park associated with the University of Arizona, and 4) 50.4 acres of open space and recreation areas.

Description of Current Habitat and Topography

- Plants and Plant Communities: Four significantly-sized off-site watersheds contribute their respective storm flows to the site. The largest of these existing 100-year volumes impacts the triangular portion of the site that is located between Kino Parkway and Campbell Avenue. Two of the off-site watershed outlets flow onto to this triangular property, the collective 100-year volume of which exceeds 1,100 cfs. This flow pattern has resulted in the establishment of a heavily vegetated xeroriparian area on this triangular acreage. The area west of Kino Parkway contains two significant stands of dense vegetation. The larger of these stands is located immediately adjacent to Kino Parkway and is approximately 800 feet long by 100-150 feet wide. The smaller of these two stands is located further westward and is approximately 130 feet long by 400 feet wide. These two stands are separated by a sparsely vegetated corridor of marginally-viable vegetation. The triangular property between Kino Parkway and Campbell Avenue represents the most significant and valuable environmental resource on the overall site.



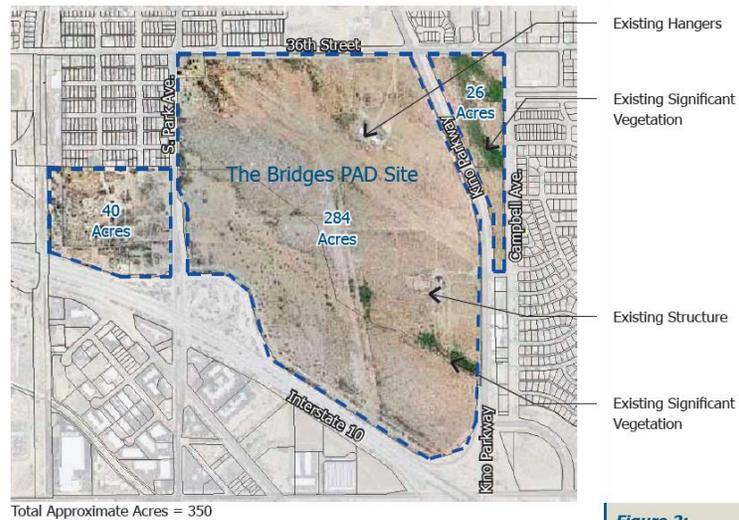


Figure 2:
Existing Features
and Acreage

- Wildlife: No significant wildlife have been noted in the development plan.
- Hilly, Flat, Wash, or Other Terrain: The terrain is largely flat.

Existing Access—Public Use

This site is a commercial and soon to be residential development. It is very accessible to the public.

Site Potential

Proposed Habitat—Desired

No specific habitat proposal known.

Proposed Recreational Features

One of the goals in the Development Plan for the site is “Create an integrated network of open space, public trails, and active/passive recreation opportunities that are available to both on-site residents and the public at large”. See Trail Connection Plan below.



Figure 29:
Trail Connection Plan

Proposed Recharge Feature

None at this time.

Analysis of Site and Project Description

Water Need

- Establishment (2-5 years with drought provision): A small amount of water for more vegetation would go a long way toward expanding well established existing riparian habitat. A very a moderate amount of water could provide this opportunity. Water for open space and trails will not be provided from a CEP allocation.
- Post Establishment (5 years plus): To be determined.

Reclaimed Water Source or Effluent

The infrastructure is in place and water is available.

Project Timeline

To be determined based on interest by a sponsor and potential neighborhood involvement.

Sponsor Name and Capability

To be determined.

Degree of Consistency with CEP Selection Guidelines

Information related to the task force’s selection guidelines is presented below.

- Environmental: These are habitat remnants, but restoration could create greater connectivity of the existing habitat patches.
- Economic: Restoration could improve property values for businesses and the residents of the planned housing. This property attracts a lot of traffic (e.g., going to Costco) and would be very visible to the community.
- Social Equity: This site is in close proximity to several neighborhoods that the City has identified as priority planting areas due to their lower than average tree canopy, higher ambient temperatures, and socio-economic factors that make residents more vulnerable to heat.
- Water Resource Availability and Support for Project: Water is available, but needs to be considered in light of the creation of a plan for the project.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

The surrounding neighborhoods had to be consulted about the development plan during the development review process.

Jurisdiction in which the Project Occurs

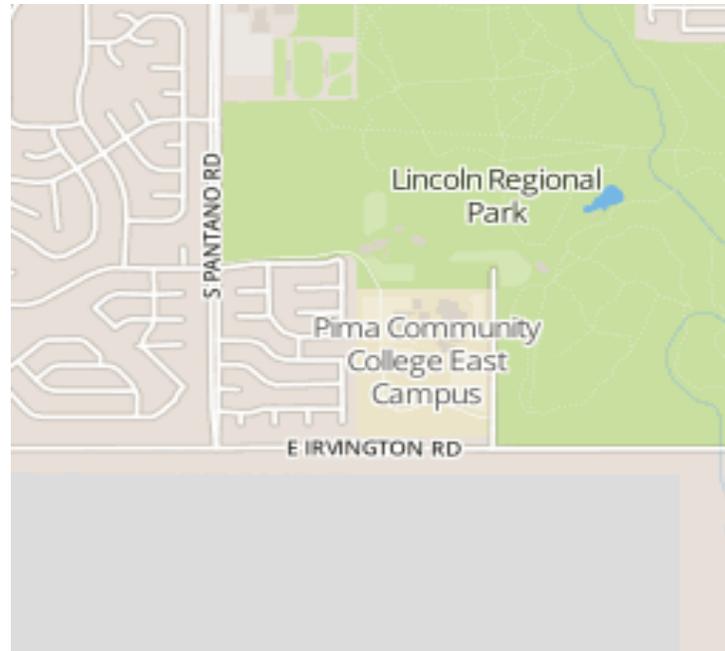
The project is in the City of Tucson.

ATTURBURY WASH

Profile of Site

Location

Atturbury Wash is in Lincoln Regional Park, which is located at 8280 East Escalante Road. It is nestled in a beautiful natural desert landscape totaling 191 acres. Amenities include a four-field softball complex with concessions, swimming pool, soccer fields, and a .6-mile walking path. The site also includes picnic tables, ramadas, a playground, and four sand volleyball courts.



Description of Current Habitat and Topography

- **Plants and Plant Communities:** Most of the natural open space in Lincoln Regional Park is upland creosote-mesquite scrub. There are significant areas of riparian vegetation, especially along the Atturbury Wash floodplain. The vegetation includes netleaf hackberry, mesquite, blue palo verde, desert hackberry, graythorn, and condalia and is kept alive exclusively by rainwater and storm water (groundwater is too deep here for roots to reach it).
- **Wildlife:** The Attrubury Bird and Animal Sanctuary is located within the park and is accessible from Escalante Road. There is a wildlife connection to the south across Irvington Road, which links to the open space on the State Trust lands and Fantasy Island. The conveyance at Irvington Road is a culvert system. Some of the wash south of Irvington (upstream of Irvington) is City of Tucson land in a long-term lease to Davis-Monthan Air Force Base. Local wildlife populations include lizards, toads, and small birds and mammals with ample foraging areas, and the wash occasionally has larger mammals—coyote, javelina and bobcat, and foraging and potential nesting areas for raptors.
- **Hilly, Flat, Wash, or Other Terrain:** The park has a wide floodplain. There are hydrological connections through the Atturbury Wash system from the south that drains to the Pantano Wash. Tucson Audubon Society (TAS) received a grant for the wash that allowed them to

build one-rock dams and other structures based on the rubric of "natural channel design." The structures were placed in the wash and in the wash's floodplain, both in the lower part of the golf course reach and in the Atturbury-Lyman Bird and Animal Sanctuary. The natural channel design work accomplishes three things. The larger one-rock dams in the main wash act as grade-control structures, raising the wash bed slightly and stabilizing the level of channel incision. Second, they are placed in areas experiencing bank erosion, moving water away from stream banks. Third, they tend to push floodwaters onto the floodplain and prevent it from flowing back into the main wash channel, increasing the infiltration of water into the ground.⁷

Existing Access—Public Use

There is vehicular access from East Escalante Road.

Site Potential

Proposed Habitat—Desired

More riparian area is feasible, although this site may have a lower need given high quality riparian resources exist on site. Still, if economically feasible, some water could be used to continue watering Tucson Audubon plants and do more planting.

Proposed Recreational Features

Atturbury Wash Linear Park is another project that is focused on the expansion of the existing trail system in Lincoln Park and passive recreation amenities along the wash.

Proposed Recharge Feature

To be determined.

Analysis of Site and Project Description

Water Need

- Establishment (2-5 years with drought provision): Stormwater flows occur mostly during heavy summer thundershowers. Historically, storm water would have spilled out of the shallow wash bed and spread across the floodplain, flowing slowly and infiltrating into the ground. Erosion problems have resulted in deepening of the main wash channel (incision) and capture of much of the storm water that flowed across the floodplain. Most of the stormwaters now flow fast and deep, leaving the site quickly. This has resulted in die-off of some of the vegetation, which could benefit for a more consistent source of water. A small allocation of 10 to 20 acre feet could help address this requirement.
- Post Establishment (5 years plus): To be determined, but see above.

Reclaimed Water Source or Effluent

The infrastructure is in place, although there currently is no extra capacity for additional users (**red line**). This may change if the status of Fred Enke Golf Course is revised in the future, which could free up some of the water used for grass on the greens. Regarding reclaimed water use on the property, there is an ADEQ permit challenge that is yet to be resolved. However, a line would only have to be extended 700 feet to reach the floodplain of the wash at the point of boundary between the TAS project area and the golf course.

Project Timeline

To be determined.

Sponsor Name and Capability

To be determined.

⁷ Source: Tucson Audubon, Habitat Restoration Program summary of Atturbury Wash project, 2013.

Degree of Consistency with CEP Selection Guidelines

Key points related to this candidate site and the selection guidelines are highlighted below.

- Environmental: Previous habitat restoration along the natural wash channel provides wildlife connectivity, and this area could be enhanced to reinforce this investment.
- Economic: There is a natural trail system used by bird watchers, which creates economic activity in the area due to visitors at the site.
- Social Equity: The site is has residential properties adjacent to the park.
- Water Resource Availability and Support for Project: Water may be available with the extension of a water line, but additional support beyond the TAS project would need to be identified.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

Groves-Lincoln Park Neighborhood Association for decades has worked to preserve the natural open space in Lincoln Park, and may support a project of this nature.

Jurisdiction in which the Project Occurs

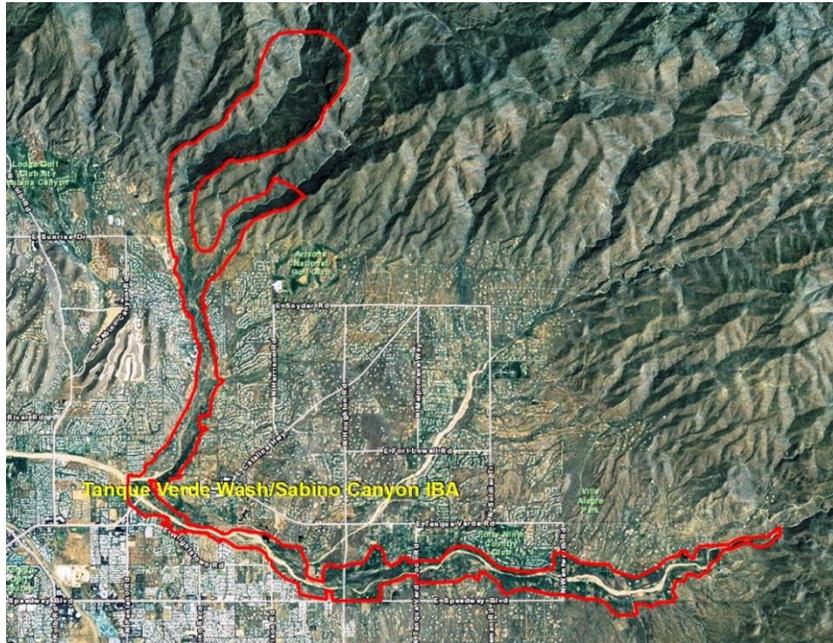
Abraham Lincoln Regional Park is operated by the City of Tucson. Leased City land and State Trust lands provide wildlife connections to the project site.

ISABELLA LEE NATURAL PRESERVE

Profile of Site

Location

The Isabella Lee Natural Preserve is comprised of approximately 60 acres and is located at the confluence of Tanque Verde Creek and Agua Caliente Wash, west of Bonanza Avenue in northeast Tucson.



Description of Current Habitat and Topography

- **Plants and Plant Communities:** The site contains a mix of open successional mesquite – mixed shrub, riparian strand, mesquite woodland, cottonwood-willow, western soapberry, Arizona ash, walnut, hackberry, and other broadleaf plant communities, which receive floodwater from the Tanque Verde Creek and Agua Caliente Wash. The confluence area is designated as an IRA on Pima County’s Riparian Classification Maps, with an underlying hydro and mesoriparian classification (Class H).
- **Wildlife:** The area lies within a landscape linkage between the Rincon Mountains to the east and the Santa Catalina Mountains to the north and the floodplain areas downstream. Several large washes connect with the site providing wildlife corridors into the surrounding area. The habitat supports local populations of lizards, toads, and small birds and mammals, and provides foraging areas and potential homes for larger mammals—coyote, javelina, and bobcat, and foraging and possible nesting areas for raptors. The area supports many species of birds, and is a popular spot to observe raptors, resident species, and migrating neotropical species. Tucson Audubon has indicated this site is an extraordinarily useful place for wildlife.
- **Hilly, Flat, Wash, or Other Terrain:** The site is located at the confluence of two major river corridors. Hydrologic connections occur to the east along the Tanque Verde Wash and to the north via Agua Caliente and Castle Washes. Castle Wash also has a conveyance across Tanque Verde Road through a low culvert, and the Aqua Caliente Wash is spanned by

Tanque Verde and Houghton Road bridges. Both river corridors have intact habitat and mostly low, natural banks. The area topography is gently sloping southwest facing lower bajada, with elevations from 2,545 to 2,565 feet. Two excavated areas exist in the center of the site. These excavations were originally part of a planned sewage treatment facility intended as waste water settling ponds.

Existing Access—Public Use

The site is located in a suburban/semi-rural area and is publically accessible to pedestrian and equestrian users. Regional use of the site consists of equestrian use, hiking, dog walking, mountain biking, and bird watching along the trails.

Site Potential

Proposed Habitat—Desired

Due to the on-going drought conditions and declining groundwater levels, the habitat will benefit from supplemental water. Areas with invasive plant species and previously disturbed areas will benefit from eradication of non-native plants and re-establishment of native species. The old excavated ponds have the potential to be restored to wetlands or open water possibly as reintroduction sites for native fish, lowland leopard frogs, and garter snakes. Preserving a segment of the riparian zone with meso-hydro riparian resource diversity currently on the site would have a long term benefit.

Proposed Recreational Features

A formal trail system that will accommodate equestrian use could be developed to protect restored habitat.

Proposed Recharge Feature

None at this time.

Analysis of Site and Project Description

Water Need

Currently there is a depleted shallow water table.

- Establishment (5 years with drought provision): The requirement is for 200 acre feet annually.
- Post Establishment (5 years plus): It is estimated the water need will be 50 acre feet annually.

Reclaimed Water Source or Effluent

The site is close to a reclaimed water line with capacity for delivery. There may need to be an extension to the project, since the reclaimed water system is somewhat removed from the site.

Project Timeline

Planning and design work should be underway in the next six years.

Sponsor Name and Capability

Pima County Regional Flood Control District would be the sponsor.

Degree of Consistency with CEP Selection Guidelines

With regard to the the task force's selection guidelines, the information is summarized below.

- Environmental: The environmental returns of this project are positive due to the riparian habitat in portions of the site, and potential for riparian restoration along the Agua Calient Wash/Tanque Verde Creek corridors, enhancing habitat connectivity and wildlife movement.

- Economic: Bird watching tourists bring millions of dollars annually to the local economy and this is a well know site for birding.
- Social Equity: The site is accessible to the public for passive recreational use.
- Water Resource Availability and Support for Project: Water resource availability is reasonably available, and political and public support is considered high based on the need to preserve this unique and popular riparian island.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

Tucson Audubon and the Tucson Bird count is actively surveying this site to document the bird use and population fluctuations. Isabella Lee Natural Preserve is known as a “Bird Sanctuary” and lies within the priority IBA (Arizona Important Bird Area: www.aziba.org) of the Tanque Verde Creek.

Jurisdiction in which the Project Occurs

The site is located within the City of Tucson on land owned by Pima County.

CANADA DEL ORO OASIS AREA

Profile of Site

Location

The Canada del Oro Oasis area covers approximately 180 acres along the Canada del Oro Wash between Hardy Road and Lambert Lane within the Town of Oro Valley, northwest of Tucson.

Description of Current Habitat and Topography

- **Plants and Plant Communities:** The site contains a mix of open successional mesquite – mixed shrub, riparian strand, scattered isolated mesquite woodland, and ironwood-blue palo verde plant communities, which receive floodwater from the Canada del Oro Wash and tributaries. The “oasis” area is designated as a mix of Important Riparian Area on Pima County’s Riparian Classification Maps, with an underlying hydro and mesoriparian (Class H) and xeroriparian (Class B and C) classifications.
- **Wildlife:** The area lies within a landscape linkage between the Tortolita Mountains and the Tortolita alluvial fan to the northeast east and the Santa Cruz River. Several large washes connect with the site providing wildlife corridors into the surrounding area. The site provides cover, forage, and water for resident and migratory wildlife. The habitat supports local populations of lizards, toads, reptiles, small mammals, and provides foraging areas and cover for larger mammals – including coyote, javelina, and bobcat. The ironwood-palo verde plant community is habitat for the cactus ferruginous pygmy owl, Sonoran desert tortoise, and the area contains suitable habitat for western burrowing owls. Additionally, the area supports many species of birds, and is a good location to observe raptors, resident species, and migrating neo-tropical species.
- **Hilly, Flat, Wash, or Other Terrain:** The site is located within the Tortolita alluvial fan south and west of the Santa Catalina and Tortolita mountains. Hydrologic connections occur to the north and east along the Big Wash, Rooney Wash, Highlands Wash, and several unnamed tributaries. These tributary washes have conveyance across area roads through bridges, culverts, and at grade crossings. The river corridor through much of this reach has intact habitat and mostly low, natural banks. The river is bank protected upstream along the golf course between La Canada Drive and Lambert Lane. Downstream, the Hardy Road alignment area topography is gently sloping southwest facing lower bajada, with elevations from 2,360 to 2,560 feet.

Existing Access—Public Use

The site is located in a suburban/semi-rural area and is publically accessible to pedestrian and equestrian users. Recreational features include equestrian use, hiking, dog walking, mountain biking, and bird watching along the trails within the site.

Site Potential

Proposed Habitat—Desired

Due to the on-going drought conditions and declining groundwater levels, the habitat will benefit from supplemental water. Areas with invasive plant species and previously disturbed areas will benefit from eradication of non-native plants and re-establishment of native species. The area has the potential to support the candidate species Sonoran desert tortoise, species of concern cactus ferruginous pygmy owl, western burrowing owl, and a number of more common resident and migratory bird species, mammals, and reptiles. The project concept will undergo more definition regarding water application.

Proposed Recreational Features

A formal trail system that will accommodate equestrian use will be developed to protect restored habitat.

Proposed Recharge Feature

No recharge is proposed at this time.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): The requirement is for 200-300 acre feet annually. Water for open space and trails will not be provided from a CEP allocation.
- Post Establishment (5 years plus): It is estimated the water need will be 50 acre feet annually.

Reclaimed Water Source or Effluent

The site is approximately 2.5 miles east of a reclaimed water line with a current capacity for delivery. There may be need for an extension to the project, since the reclaimed water system is somewhat removed from the site.

Project Timeline

Planning and design work should be underway within the next six years.

Sponsor Name and Capability

The Pima County Regional Flood Control District would be the sponsor.

Degree of Consistency with CEP Selection Guidelines

With regard to selection guidelines, the following information is provided.

- Environmental: The environmental returns of this project are positive due to the high quality riparian habitat in portions of the site, and the potential for riparian restoration along the Canada del Oro Wash corridor, enhancing habitat connectivity and wildlife movement.
- Economic: Bird watching tourists bring in millions of dollars annually to the local economy. This site has the potential to support many bird species, and is close to many well-known sites for birding within the northwest Tucson metropolitan area.
- Social Equity: The site is accessible to the public for passive recreational use. A river park path is currently being designed within this reach of the Canada del Oro Wash connecting with paths up and downstream, and is anticipated to be completed by 2015.
- Water Resource Availability and Support for Project: Water is reasonably available and political and public support for this project is considered high based upon the need to preserve riparian habitat, enhance connectivity, and provide for open space.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

Tucson Audubon and the Tucson Bird Count actively surveys this area to document bird use and population fluctuations. The Oasis area lies within a landscape connection between Catalina State Park, Tortolita Mountain Park, Arthur Pack Park, and the Santa Cruz River identified in the Sonoran Desert Conservation Plan.

Jurisdiction in which the Project Occurs

The Oasis area of the Canada del Oro Wash is located within the Town of Oro Valley on land owned by Pima County.

PANTANO-RINCON CONFLUENCE AREA

Profile of Site

Location

This site is located between the Houghton Road Reservoir and Old Spanish Trail at the confluence of Pantano Wash and Rincon River.

Description of Current Habitat and Topography

- **Plants and Plant Communities:** The site contains a mix of open successional mesquite – mixed shrub, riparian strand, with pockets of mesquite woodland, cottonwood-willow and mixed broadleaf plant communities, which receive floodwater from the Pantano Wash and Rincon Creek. The confluence area is designated as an IRA on Pima County’s Riparian Classification Maps, with underlying classifications of hydro and mesoriparian (Class H), xeroriparian (Class B and C).
- **Wildlife:** The area lies within a landscape linkage between the Rincon Mountains to the east and the Empire and Santa Rita Mountains to the south and the floodplain areas downstream. Several large washes connect with the site providing wildlife corridors into the surrounding areas, including Saguaro National Park and Colossal Cave Park. The site provides cover, forage, and water for resident and migratory wildlife. The habitat supports local populations of lizards, toads, reptiles, small mammals, and provides foraging areas and cover for larger mammals – including coyote, javelina, and bobcat. The area supports many species of birds, including raptors, resident species and migrating neo-tropical species.
- **Hilly, Flat, Wash, or Other Terrain:** The site is located at the confluence of two major river corridors. Hydrologic connections occur to the south along the Pantano Wash, to the east along Rincon Creek and larger tributary washes to the north and east/southeast via Agua Verde and Coyote Washes. Rincon Creek has conveyance across Old Spanish Trail through an at-grade crossing, and the Pantano Wash is spanned by Houghton Road Bridge downstream of the confluence. Both river corridors have mostly low, natural banks but the Pantano Wash has been impacted by gravel mining, and both Pantano and Rincon Creek have been impacted by livestock grazing and agriculture. The area topography is west facing bajada, with elevations between 2,800 to 2,900 feet. Several active and retired sand and gravel mining pits are present along the Pantano Wash near the confluence area.

Existing Access—Public Use

The site is in an ex-urban area and is publically accessible to pedestrian and equestrian users. Recreation includes equestrian use, hiking, mountain biking, and bird-watching along unimproved river corridors and tributary washes. The Pantano River Park is in the planning stages and would provide public access.

Site Potential

Proposed Habitat—Desired

Due to the on-going drought conditions and declining groundwater levels the habitat will benefit from supplemental water. Areas with invasive plant species and previously disturbed areas will benefit from eradication of non-native plants and re-establishment of native species. The abandoned gravel pits have the potential to be restored to wetlands or open water possibly as reintroduction sites for native fish, lowland leopard frogs, and garter snakes. The project concept will address more definition regarding water application.

Proposed Recreational Features

A formal trail system that will accommodate equestrian and mountain bicycling use will be developed to protect restored habitat.

Proposed Recharge Feature

A recharge project near an area golf course will improve groundwater levels in the region. The Regional Flood Control District would address past surface land uses that cause erosion, invasive species, and other issues that negatively impact habitat along the river corridors. A Pantano – Rincon Confluence habitat restoration project would complement the South Houghton Area Recharge Project (SHARP), which will be located near the Fred Enke Golf Course. SHARP will be operational by 2015-2016. The project will encompass 20 acres. The piping for the SHARP recharge area will be expanded to allow for habitat restoration.

Analysis of Site and Project Description

Water Need

- Establishment (5 years with drought provision): The water required is 100 to 200 acre feet annually.
- Post Establishment (5 years plus): After the initial establishment, there will be a need for 50 acre feet annually.

Reclaimed Water Source or Effluent

The site is located east of the planned SHARP groundwater recharge project. An extension of the SHARP water line to the project will be required. This area currently has no extra reclaimed capacity, however, Tucson Water and Pima County are engaged in a jointly funded project to bring more reclaimed water to the Houghton area beginning in Fiscal Years 2016 and 2017. Tucson Water will build SHARP. According to Tucson Water, there will be no increase in the existing pipelines out to the SHARP location, and there will be a limit on how much water can be delivered to the area. Only during late fall to very early spring will there be any capacity in the reclaimed system for SHARP or any new demands. If there is a change in demands for Fred Enke Golf Course, there may be additional capacity; however, the city may need the water for new ball fields at Lincoln Park that may consume that capacity.⁸ The Flood Control District property will have physical access to reclaimed water, but the capacity appears to be very limited related to supporting a new riparian restoration project in the Pantano-Rincon area.

Project Timeline

Planning and design work should be underway within the next five to seven years.

Sponsor Name and Capability

The Pima County Regional Flood Control District would be the sponsor.

Degree of Consistency with CEP Selection Guidelines

With respect to the task force's selection guidelines, the following information is related to this site.

- Environmental: The environmental returns of this project are positive due to the historical high quality riparian habitat in portions of the site and the potential for riparian restoration along the Agua Caliente Wash/Tanque Verde Creek corridors, enhancing habitat connectivity and wildlife movement.
- Economic: Bird watching is a multi-million dollar industry and tourists bring in millions of dollars annually to the local economy, and this is a well-known site for birding among both local and visiting birders.

⁸ Source: Wally Wilson, Chief Hydrologist, Water Resources Management, Tucson Water, June 10, 2013.

- Social Equity: The site is accessible to the public for passive recreational use and a formal trail system will be constructed.
- Water Resource Availability and Support for Project: Water is potentially available and political and public support for this project is considered high based upon the need to restore degraded river corridors in the upper Pantano and Rillito watersheds.

Relevant Information

Engagement of Neighborhood or Other Organization(s)

This project would benefit nearby neighborhoods, and Saguaro National Park and Colossal Cave Park.

Jurisdiction in which the Project Occurs

The Pantano-Rincon confluence is located within the City of Tucson on land owned by Pima County.