

**Arizona Water Protection Fund  
Application Cover Page  
FY 2019**

<b>Title of Project:</b> El Rio Preserve Riparian Restoration Project											
<b>Type of Project:</b> <input checked="" type="checkbox"/> Capital or Other <input type="checkbox"/> Water Conservation <input type="checkbox"/> Research	<b>Stream Type:</b> <input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral										
<b>Your level of commitment to maintenance of project benefits and capital improvements:</b> <input type="checkbox"/> < 5 years <input type="checkbox"/> 5-10 years <input type="checkbox"/> 11-15 years <input checked="" type="checkbox"/> 16-20 years											
<b>Applicant Information:</b> Name/Organization: Town of Marana Address 1: 11555 W. Civic Center Dr. Address 2: City: Marana State: AZ ZIP Code: 85653 Phone: 520-382-1968 Fax: 520-382-2641 Tax ID No.: <span style="background-color: black; color: black;">XXXXXXXXXX</span>	<b>Inside an AMA:</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>  <b>If yes, which AMA:</b> <input type="checkbox"/> Phoenix <input checked="" type="checkbox"/> Tucson <input type="checkbox"/> Prescott <input type="checkbox"/> Pinal <input type="checkbox"/> Santa Cruz  <b>Type of Application:</b> <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation										
<b>Contact Person:</b> Name: Jim Conroy/Janine Spencer Title: Director of Parks & Recreation/Environmental Projects Mgr. Phone: 520-382-1968/520-382-2658 Fax: 520-382-2641 e-mail: jconroy@maranaaz.gov/ jspencer@maranaaz.gov	<b>Any Previous AWPB Grants:</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  <b>If yes, please provide Grant #(s):</b>										
<b>Arizona Water Protection Fund Grant Amount Requested:</b>  \$191,813.00  If the application is funded, will the Grantee intend to request an advance: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>Matching Funds Obtained and Secured:</b> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Applicant/Agency/Organization:</u></th> <th style="text-align: right;"><u>Amount (\$):</u></th> </tr> </thead> <tbody> <tr> <td>1. Applicant</td> <td style="text-align: right;">\$151,701.00</td> </tr> <tr> <td>2.</td> <td></td> </tr> <tr> <td>3.</td> <td></td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>Total: 151,701.00</b></td> </tr> </tbody> </table>	<u>Applicant/Agency/Organization:</u>	<u>Amount (\$):</u>	1. Applicant	\$151,701.00	2.		3.		<b>Total: 151,701.00</b>	
<u>Applicant/Agency/Organization:</u>	<u>Amount (\$):</u>										
1. Applicant	\$151,701.00										
2.											
3.											
<b>Total: 151,701.00</b>											
Has your legal counsel or contracting authority reviewed and accepted the Grant Award Contract General Provisions? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A											
<b>Signature of the undersigned certifies understanding and compliance with all terms, conditions and specifications in the attached application. Additionally, signature certifies that all information provided by the applicant is true and accurate. The undersigned acknowledges that intentional presentation of any false or fraudulent information, or knowingly concealing a material fact regarding this application is subject to criminal penalties as provided in A.R.S. Title 13. The Arizona Water Protection Fund Commission may approve Grant Awards with modifications to scope items, methodology, schedule, final products and/or budget.</b>											
Starla Anderson, Deputy Finance Director	520-382-1932										
<b>Typed Name of Applicant or Applicant's Authorized Representative</b>	<b>Title and Telephone Number</b>										
	9/5/18										
<b>Signature</b>	<b>Date Signed</b>										

## Executive Summary

### Goals

The goals of the El Rio Preserve Riparian Restoration Project are to improve wildlife habitat and increase biodiversity by removing non-native, invasive species and planting native vegetation in this unique riparian area.

The 104-acre El Rio Preserve is located on the Lower Santa Cruz River and owned by the Town of Marana. The site was an old ADOT borrow pit that has become an ephemeral wetland where 238 bird species have been documented on [eBird.org](http://eBird.org), including rarities. El Rio was identified by Dr. Paul Beier, NAU, as an important wildlife linkage between the Tortolita and Tucson Mountains. Marana designated El Rio as a preserve in 2015, thus protecting this natural area. El Rio is one of the riparian sites important for sustaining migratory birds and wildlife along the Santa Cruz River.

Due to its urban location and its position along the Santa Cruz, there are many existing problems that are hampering the restoration of this riparian area, including the following: El Rio Preserve is currently a backwater of trash and invasive species such as tamarisk, Russian thistle, buffelgrass, poison hemlock, and Johnson grass; neighbors complain of stagnant water, unsightly trash and mosquitos brought in during floods; erosion has caused sloughing of the banks on the perimeter of El Rio Preserve

### Progress to Date

The Town of Marana is committed to the restoration and beautification of the El Rio preserve and has been actively addressing the aforementioned problems. The Town has:

- Worked with the Arizona State Forestry Department and developed an Invasive Species Management Plan to prioritize the removal of non-native, invasive species.
- Removed 160 cubic yards of trash from El Rio Preserve.
- Has an Inter-Governmental Agreement with Pima County Regional Flood Control District to control flooding in El Rio and surrounding residential neighborhoods, which will:
  - Return more water to the Santa Cruz, acting as a water conservation measure.
  - Prevent contaminated flows from surrounding urban areas from reaching the Santa Cruz River
  - Reduce the influx of non-native, invasive species seeds that wash in from the river during flood events.
- Completed a cultural resources survey
- Met with the US Army Corps of Engineers and ADEQ
- Tucson Audubon Society created a monitoring plan
- Recently completed engineering and landscape plans for El Rio, which makes this project shovel-ready

### Strategies

The Town of Marana would greatly appreciate support from the Arizona Water Protection Fund to continue return this riparian area to its natural beauty. The Town is requesting funding for the following:

- 1) Develop a Storm Water Pollution Prevention Plan (SWPPP)
- 2) GPS and remove non-native, invasive plant species
- 3) Plant low-water use native trees and shrubs in water harvesting basins
- 4) Install a drip irrigation system using non-potable water from the local irrigation district, to supplement stormwater flows when needed

With funding from the Arizona Water Protection Fund, Marana's goals are to restore an important riparian area where wildlife connectivity and habitat will be enhanced, where people can enjoy nature, and where schools have an accessible outdoor classroom.

## El Rio Preserve Riparian Restoration Project Overview

### Background

El Rio Preserve is 104 acres in size, located along the west bank of the Santa Cruz River in Marana, Arizona. The site is located in the floodplain off the main river channel. El Rio was severely degraded by use as an Arizona Department of Transportation borrow pit. Currently, lowland vegetation consists mainly of non-native tamarisk (*Tamarix* sp.), Johnson grass (*Sorghum halepense*), buffelgrass (*Pennisetum ciliare*), giant reed (*Arundo donax*) and cocklebur (*Xanthium strumarium*). Native plants in the preserve include: velvet mesquite (*Prosopis velutina*), Goodding's willow (*Salix gooddingii*), and a few cottonwoods (*Populus fremontii*). Elevation at the site is approximately 2,100 ft.

The Town of Marana bought the property in 2003, and Council designated it as a preserve in 2015, to be maintained by the Parks and Recreation Department. The unconsolidated bank protection along the river side of the borrow pit partially broke through during heavy flooding of the Santa Cruz in 2014, and completely washed out in 2016, temporarily creating a large lake.

This beautiful lake attracted waterfowl, rare bird species and birders from many states. The site has since acted as an ephemeral wetland, attracting 238 bird species, including rarities like sandhill cranes, along with many wildlife watchers. El Rio is included in the book "Finding Birds in Southeast Arizona, 8<sup>th</sup> ed." (Tucson Audubon Society 2015). It was also identified as an important wildlife linkage by Paul Beier, Northern Arizona University (2006) and Arizona Game & Fish Department (2008).

### El Rio Riparian Restoration Project work completed or in progress currently:

- Marana paid \$13,459 to a University of Arizona graduate student to develop a 104 ac. Master Plan
- Marana received a \$35,000 grant from the Water Infrastructure Financing Authority with a Town match of \$43,150 and contracted design and landscape plans for the site, which are complete
- Tucson Audubon received \$9,900 Partners for Fish & Wildlife Grant and planted a pollinator garden
- Pima County Regional Flood Control District (PRFCD) has scheduled bank protection for the site, at their expense of approximately \$1,500,000
- Marana has held several meetings with biologists, neighbors, and environmental groups for input
- Cortaro-Marana Irrigation District is currently creating plans for irrigation water access for the project and Marana will spend approximately \$113,892 for the design and construction of the turnout
- Marana is landscaping approximately 8 acres by the access point, with native plants and irrigation
- Tucson Audubon Society provided a monitoring plan for vegetation and avian species
- AZ Game & Fish Department wants to stock Gila topminnow/ desert pupfish once the ponds are done
- AZ State Forestry Department developed an Invasive Plant Management Plan for the site

The purpose of this proposal is to request funding to support the removal of invasive species, planting/seeding of native plants, constructing water harvesting basins, and installing drip irrigation on approximately 30 acres.

The Master Plan project includes two lined ponds, two trails, an observation deck, benches, interpretive signs, and a ramada. These recreational features are not included in this grant request, but will be completed in future phases of the project. They will be completed as phases, due to the estimated construction costs.

Threats to the Santa Cruz River: The Bureau of Reclamation Lower Santa Cruz Basin River Study, Plan of Study (2015) states that "Key areas in the Lower Santa Cruz River (LSCR) Basin are experiencing groundwater declines due to lack of access to renewable supplies in conjunction with drought conditions. Subsidence and the loss of riparian habitat have already occurred." This loss of groundwater and surface water in the Santa Cruz River will result in less riparian species diversity and numbers. The Arizona Cooperative Fish and Wildlife Research Unit report, Surface Water Depletion and Riparian Birds (2009) states, "if long-term drought conditions continue and/or groundwater levels fall to a point where surface water is reduced, populations of breeding birds and migratory species are likely to decline." The El Rio Riparian Restoration Project will add to the protected

riparian areas along the Santa Cruz River that will benefit riparian species. Examples of Species in Decline (Latta et. al 1999) that have been recorded at El Rio Preserve include:

- Verdin (*Auriparus flaviceps*): Habitat loss and urbanization are major threats
- Phainopepla (*Phainopepla nitens*): Loss of woodlands and agricultural clearing are related to their decline
- Bell's vireo (*Vireo bellii*): Loss of riparian habitat due to agriculture, urbanization, exotic plants, brown-headed cowbird (*Molothrus ater*) parasitism, and water management, (USFWS 2006)
- Lucy's Warbler (*Oreothlypis luciae*): Reduced mesquite bosques, groundwater pumping, floodplain development, invasive plant species and off-road vehicle activity pose threats.

#### **Goals**

- Enhance and restore riparian vegetation
- Improve wildlife habitat, increase biodiversity, and maintain the wildlife linkage
- Create a natural area amenity for the community and a living lab for local classrooms

#### **Objectives**

- Remove non-native species, prioritized according to the Invasive Species Management Plan
- Plant/seed native species to reduce re-growth of invasive plants, increase species diversity, vegetation structure and canopy cover
- Increase habitat for birds and other wildlife
- Reduce fire hazard, erosion, and sedimentation
- Reduce mosquito infestations and stagnant water
- Monitor restoration progress and use adaptive management as needed

#### **Statement of Problem/Causes**

- This riparian area-wetland has been degraded by use as a borrow pit and by high-velocity, scouring floods
- Invasive species predominate due to floods carrying seeds and sediment deposits onto the site
- The Town receives complaints from neighbors regarding trash, smelly stagnant water, and complaints to police about off-road vehicles, shooting close to a subdivision, homeless camps, etc.
- Water quality is compromised as runoff and sediment from the surrounding urban areas flow into El Rio Preserve and then into the Santa Cruz River.

#### **Statement of Solutions**

- PRFCD's restoration of the bank separating El Rio Preserve from the Santa Cruz River will alleviate frequent flooding, sedimentation, erosion, and reduce mosquito problems (Bank protection is not part of this grant request, but is necessary for implementation of the riparian restoration project)
- Town will record locations of non-native species and treatment dates, per the Invasive Species Management Plan (Arizona Department of Forestry and Fire Management 2018) to reduce fire danger and improve habitat. After initial clearing of invasives, on-going hand work will be needed to treat invasives
- Plant and seed native species, per the landscape plans, to increase the diversity of vegetation and wildlife
- Create an attractive riparian area to for use by school groups and others
- Construct three water catchment basins to collect runoff and prevent erosion, per engineering plans.
- Install a drip irrigation system using non-potable water from the Cortaro-Marana Irrigation District

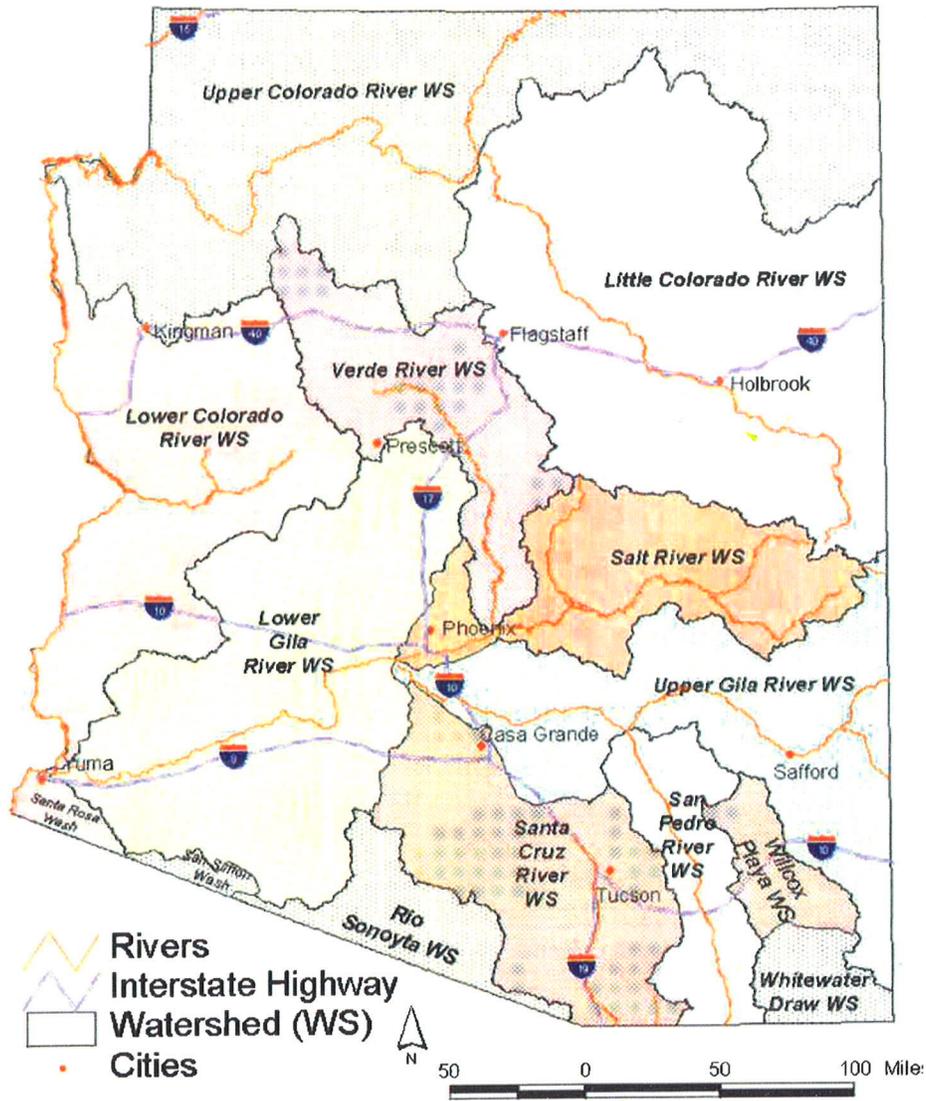
#### **Statement of Project Years of Benefit**

This project should benefit riparian habitat and wildlife for decades to come. As part of the agreement between the Town and the Arizona Department of Forestry; the Invasive Species Management Plan must be implemented for 10 years and monitoring and control of invasive species will be an on-going process that the Town is committed to continuing on a long-term basis.

**Project Location & Environmental Contaminant Information  
FY 2019**

<b>Project Location Information</b>			
1. County: <u>Pima</u>	2. Section(s): <u>8, 17</u>	3. Township: <u>12S</u>	4. Range: <u>12E</u>
5. Watershed: <u>Santa Cruz</u> <span style="float: right;"><u>1505030109</u></span> 6. 8 or 10 Digit Hydrologic Unit Code (HUC): <u>Julian Wash, Upper Santa Cruz River</u> 7. Name of USGS Topographic Map where project area is located: <u>Marana</u> 8. State Legislative District: <u>11</u> (Information available at: <a href="http://azredistricting.org/districtlocator/">http://azredistricting.org/districtlocator/</a> ) 9. Land ownership of project area: <u>Town of Marana</u> 10. Current land use of project area: <u>Empty space</u> 11. Size of project area (in acres): <u>104 DIRECT</u> 12. Stream Name: <u>N/A (Adjacent to Santa Cruz River)</u> 13. Length of stream through project area: <u>N/A - it's an ephemeral wetland</u> 14. Miles of stream benefited: <u>_____ miles N/A</u> 15. Acres of riparian habitat: <u>≈ 30 acres</u> will be: <input checked="" type="checkbox"/> Enhanced <input type="checkbox"/> Maintained <input checked="" type="checkbox"/> Restored <input type="checkbox"/> Created			
16. General description and/or delineation for the area of impact of the project within the watershed. <u>West of the Santa Cruz River, south of Avra Valley Road, Marana, AZ</u>			
17. Provide directions to the project site from the nearest city or town. List any special access requirements: <u>From Tucson, take I-10 north to Twin Peaks exit. Go west on Twin Peaks and turn right (north) on Coachline Blvd. + go approx. 1.6 mi. on Coachline to the parking lot + ramada on the north side of the road. The site is north of this parking lot</u>			
<b>Environmental Contaminant Location Information</b>			
1. Does your project site contain known environmental contaminants? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:			
2. Are there known environmental contaminants in the project vicinity? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If yes, please identify the contaminant(s) and enclose data about the location and levels of contaminants:			
3. Are you asking for Arizona Water Protection Fund monies to identify whether or not environmental contaminants are present? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			

## Arizona Watershed Map FY 2019



**Title of Project:** EL RIO RIPARIAN RESTORATION PROJECT, MARANA AZ

**Location** (include UTM's & Township/Range/Section):

T12S R12E Sec. 8 (SE 1/4); and Sec 17 (NE 1/4)  
 (Location must include at least one Section delineation for large scale projects)

# El Rio Preserve, Santa Cruz Watershed

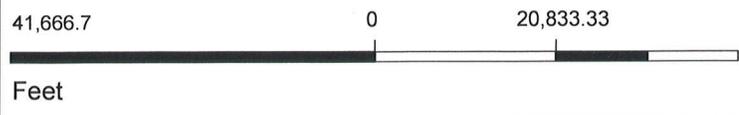


## Legend



## Notes:

8/17/2018



This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map are subject to Pima County's ITD GIS disclaimer and use restrictions.

## EL RIO RIPARIAN PRESERVE RESTORATION PROJECT

### SCOPE OF WORK

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**Task #1: Obtain all permits needed, including but not limited to: AZPDES Stormwater Pollution Prevention Plan (SWPPP), SHPO clearance, NEPA compliance, ESA Section 7 consultation with Fish & Wildlife Service, ADEQ Quality Pesticide General Permit and NOI, and an AZPDES Permit.**

**Task Description:** Prepare and submit a SWPPP for approval and pothole for possible utility lines. Per meeting with Corps of Engineers, no 404 Permit is needed and a meeting with the ADEQ resulted in no permit needed. A Biological Assessment-Evaluation, including accessing the online AZ Game & Fish and US Fish & Wildlife Service online project has been completed (see attached memos and reports).

**Task Objective:** To prevent stormwater discharges that enter Arizona surface waters or a Municipal Separate Storm Sewer System (MS4) leading to Arizona surface waters, on more than one acre. The utility potholing will identify any utility lines that must be avoided or moved in the area of ground disturbance. Other permits will be acquired.

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager, will oversee development of a SWPPP by the contracted construction firm. Janine Spencer-Glasson Environmental Projects Manager and Jim Conroy, Parks and Recreation Director, will oversee obtaining other permits

**Deliverable Description:** Copies of permits and authorizations

**Deliverable Due Date:** Prior to any ground disturbance, March-April 2019

**Task Cost:** \$2,800

### **Task #2: Submit Restoration Work Plans**

**Task Description:** Through a previous Water Infrastructure Finance Authority matching grant, we have complete grading and landscaping plans. The plans include water harvesting basins, a native seed and plant list, areas of invasive species removal and areas with plants to be left in place, an irrigation system design and layout, and recommended planting methods.

**Task Objective:** Provide construction-level engineering and landscaping plans for removal of large patches of invasives and replacement with native plant species, as well as an irrigation system to supplement water harvesting basins.

**Responsible Personnel:** Kurt Schmidt, Construction Manager; Janine Spencer-Glasson, Environmental Projects Manager; Jim Conroy, Parks and Recreation Director; and Dave Herman, Parks Superintendent.

**Deliverable Description:** Engineering and landscape plans

**Deliverable Due Date:** April 2019

**Task Cost:** \$0 (shovel-ready plans are completed and paid for)

### **Task #3 Implementation:**

#### **3A. Preparation for Grading**

**Task Description:** Utility Potholing, Erect Temporary Traffic Control Devices, Construction Mobilization, Construction Survey and Layout

**Task Objective:** Determine presence of utilities that may need to be moved or avoided during construction. Prepare site for safe traffic movement, and survey for construction and layout.

**Responsible Personnel:** Kurt Schmidt, Construction Manager

**Deliverable Description:** Include results in annual report and final report

**Deliverable Description:** Quarterly, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$36,300

### **3B. Clearing and Grubbing**

**Task Description:** Clearing and grubbing areas to remove invasive species

**Task Objective:** Areas cleared of non-native species that are too dense to remove by hand, in accordance with the Arizona State Forestry Department's Invasive Species Management Plan for El Rio Preserve (2017, attached). This will be an on-going effort, with hand pulling and spraying to treat weed re-sprouts and areas suitable for hand work. Approximately 30 acres cleared of non-natives during March – April 2019

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager; Janine Spencer-Glasson, Town of Marana Environmental Projects Manager; Jim Conroy, Parks and Recreation Director; Dave Herman, Parks and Recreation Superintendent will supervise a contracted company. Parks personnel will monitor and hand-remove or spray re-sprouts.

**Deliverable Description:** Quarterly, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$5,000

### **3C: Landscape Grading**

**Task Description:** Grading at a finer level, for water harvesting basins, installation of an irrigation system, and creation of native species seeding and planting areas, on approximately 30 acres, once Pima County Regional Flood Control District has completed bank protection in late 2020.

**Task Purpose/Objective:** Create areas for native seeding and planting, along with water harvesting and irrigation. Grade areas to be seeded or planted, and for water harvesting and irrigation system

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager; Jim Conroy, Parks and Recreation Director; and Dave Herman, Parks and Recreation Superintendent will supervise a contracted company

**Deliverable Description:** Interim, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$5,000

### **3D: Create Landscape Check Dams**

**Task Description:** Create landscaping check dams to retain stormwater - within a closed basin not in the river channel (totaling approx. 420 linear feet)

**Task Purpose/Objective:** Reduce erosion and maintain water in planted areas

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager; Jim Conroy, Parks and Recreation Director; and Dave Herman, Parks and Recreation Superintendent will supervise a contracted company

**Deliverable Description:** Interim, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$1,000

**3E: Install Irrigation System**

**Task Description:** Install drip irrigation system with automatic controls for approx. 25 acres

**Task Purpose/Objective:** Install drip irrigation system to water plants for the first two years, and then to supplement seasonal rainfall and water collected in stormwater basins. Also, plant vegetation outside of the reach of the drip irrigation system with water gel packs.

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager; Jim Conroy, Parks and Recreation Director; Dave Herman, Parks and Recreation Superintendent will supervise a contracted company

**Deliverable Description:** Interim, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$19,686

**3F: Seed with Hydroseed Native Seed Mix (Class II)**

**Task Description:** Seed 26 acres with Class II native hydro-seed mix per landscaping plans

**Task Purpose/Objective:** Replant areas where non-native plants were removed, on remote portions of the site that won't be connected to the irrigation system.

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager; Dave Herman, Parks and Recreation Superintendent will supervise a contracted company

**Deliverable Description:** Interim, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$65,000

**3G: Plant Trees, Shrubs, and Cacti**

**Task Description:** Plant native trees and shrubs and plant cacti on the upper banks out of the floodplain on approximately 25 acres

**Task Purpose/Objective:** Replace non-native plants with native species that will increase wildlife habitat and biodiversity.

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager; Jim Conroy, Parks and Recreation Director; and Dave Herman, Parks and Recreation Superintendent will supervise a contracted company

**Deliverable Description:** Interim, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$25,865

**3H: Apply Woody Mulch in Planting Basins**

**Task Description:** Apply approximately 37,506 sq. ft. of woody mulch

**Task Purpose/Objective:** To conserve water in planted and seeded areas and to reduce weed growth

**Responsible Personnel:** Dave Herman, Town of Marana Parks and Recreation Superintendent will supervise a contracted company

**Deliverable Description:** Interim, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$18,706

### **3I: Install Browser Cages**

**Task Description:** Install browser cages on tender plant species

**Task Purpose/Objective:** After planting, install browser cages on plants likely to be vulnerable to herbivory. 307 browser cages installed around plants with tender leaves

**Responsible Personnel:** Kurt Schmidt, Town of Marana Engineering Dept. Construction Manager; Dave Herman, Parks and Recreation Superintendent will supervise a contracted company

**Deliverable Description:** Interim, annual and final reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$2,456

### **Task #4: Site Monitoring**

**Task Description:** Monitor Vegetation Condition, Photo Points, and Bird Surveys

**Task Purpose/Objective:** Per the Tucson Audubon Society Monitoring Proposal; evaluate condition of vegetation percent cover, density, and condition for three years. Establish eight photo points for quarterly photographs to record progress of seeding and plantings for two years. Perform avian point counts quarterly for three years. If needed, adaptive management will be implemented to improve condition of vegetation, etc. Monitoring will begin one year prior to planting, in order to record baseline data for comparison. Monitoring will be performed for three years, approximately March 2019 – March 2022.

**Responsible Personnel:** Janine Spencer-Glasson, Town of Marana Environmental Projects Manager; Jim Conroy, Parks and Recreation Director; Dave Herman, Parks and Recreation Superintendent will oversee the monitoring performed by Tucson Audubon and their volunteers

**Deliverable Description:** Quarterly and annual reports with photos

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$13,500.00

### **Task #5: Incidental Expenses, and Prepare Annual and Final Reports, Final Presentation to AWP**

**Task Description:** Report on Tasks 3 and 4 on an annual basis

**Task Purpose/Objective:** Describe and document progress. Incidental costs cover unexpected occurrences, (ex. finding utilities that must be relocated prior to grading). These costs do not cover administrative or overhead costs.

**Responsible Personnel:** Janine Spencer-Glasson, Town of Marana Environmental Projects Manager and Dave Herman, Parks and Recreation Superintendent and Jim Conroy, Parks and Recreation Director, will oversee the monitoring performed by Tucson Audubon and their volunteers

**Deliverable Description:** Quarterly and annual reports and final report with photos and final presentation

**Deliverable Due Date:** April, August, December of 2019, 2020, 2021

**Task Cost:** \$10,000

**El Rio Preserve  
Marana, Arizona  
Location Map**



**El Rio Preserve**

**P** Parking

AVRA VALLEY RD

10

COACHLINE BLVD

SILVERBELL RD

TWIN PEAKS RD





FILE T:\2015\1015052 04 - El Rio Program Restoration\GD

CMID WATER TURN-OUT



REMOVAL NOTES

(Empty box for removal notes)

CONSTRUCTION NOTES

- 1 6" CONC PATH
- 2 HAND PLACED GROUTED RIPRAP
- 3 WILDLIFE FENCE  
SEE LANDSCAPE PLANS
- 4 STABILIZED AB TRAIL  
12' WIDE (10' MIN), 4" THICK
- 5 CONC FORD WALL  
DET 5, SHT G1.3
- 6 SEDIMENT BASIN  
DET 3, SHT G1.3
- 7 PROPOSED POND  
DET 4, SHT G1.3

EXCLUDED FROM AWPFF GRANT APP.

\* FUTURE USE OF DRY WELLS UNDETERMINED AT THIS PHASE, FURTHER EVALUATION REQUIRED

REFERENCE NOTES

- 1 FUTURE BANK PROTECTION BY OTHERS - FINAL ALIGNMENT WILL BE DETERMINED WHEN BANK PROTECTION GOES INTO DESIGN IN AUGUST 2018
- 2 FUTURE BANK PROTECTION EASEMENT BY OTHERS - FINAL EASEMENTS TO BE DETERMINED IN IGA BETWEEN DISTRICT AND MARANA



OWNER:  
TOWN OF MARANA  
ENVIRONMENTAL PROJECTS MANAGER  
11555 W CIVIC CENTER DRIVE  
MARANA, AZ 85653  
CONTACT: JANNIE SPENCER  
P: 520.382.2679

CIVIL ENGINEER:  
DIBBLE ENGINEERING  
177 NORTH CHURCH AVE  
SUITE 711  
TUCSON, AZ 85701  
CONTACT: GREG VEGA, PE  
P: 520.495.4065

LANDSCAPE ARCHITECT:  
WHEAT DESIGN GROUP  
500 NORTH TUCSON BLVD  
SUITE 130  
TUCSON, AZ 85716  
CONTACT: LAURA MIELCAREK, RLA  
P: 520.884.7911

**EL RIO RIPARIAN RESTORATION**  
10190 N COACHLINE BLVD, TUCSON, AZ 85743

**DRAINAGE IMPROVEMENTS**

Issued for	Rev	Date



Project No: 1015052.04  
 Date 03/2018  
 Drawn: GDW  
 Checked: GDW



0' 60' 120' 240'

SCALE: 1" = 120'



SITE PLAN - OVERALL MASTER PLAN

Drawing Title

Scale 1" = 120'

Dwg No C1.1

## STATE HISTORIC PRESERVATION OFFICE Review Form

In accordance with the State Historic Preservation Act (SHPO), A.R.S. 41-861 *et seq.*, effective July 24, 1982, each State agency must consider the potential of activities or projects to impact significant cultural resources. Also, each State agency is required to consult with the State Historic Preservation Officer with regard to those activities or projects that may impact cultural resources. Therefore, it is understood that **recipients of state funds are required to comply with this law** throughout the project period. All projects that affect the ground-surface that are funded by AWPf require SHPO clearance, **including those on private and federal lands.**

The State Historic Preservation Office (SHPO) must review each grant application recommended for funding in order to determine the effect, if any, a proposed project may have on archaeological or cultural resources. To assist the SHPO in this review, the following information **MUST** be submitted with each application for funding assistance:

- A completed copy of this form, and
- A United States Geological Survey (USGS) 7.5 minute map
- A copy of the cultural resources survey report if a survey of the property has been conducted, and
- A copy of any comments of the land managing agency/landowner (i.e., state, federal, county, municipal) on potential impacts of the project on historic properties.  
NOTE: If a federal agency is involved, the agency must consult with SHPO pursuant to the National Historic Preservation Act (NHPA); a state agency must consult with SHPO pursuant to the State Historic Preservation Act (SHPA),  
**OR**
- A copy of SHPO comments if the survey report has already been reviewed by SHPO.

**Please answer the following questions:**

1. Grant Program: AZ Water Protection Fund Grant
2. Project Title: El Rio Riparian Restoration Project
3. Applicant Name and Address: Town of Marana, 11555 W. Civic Center Dr.  
Marana AZ 85653
4. Current Land Owner/Manager(s): Town of Marana
5. Project Location, including Township, Range, Section: T12S, R12E, Sec. 8 & Sec 17
6. Total Project Area in Acres (or total miles if trail): 104ac
7. Does the proposed project have the potential to disturb the surface and/or subsurface of the ground?  YES  NO
8. Please provide a brief description of the proposed project and specifically identify any surface or subsurface impacts that are expected: \_\_\_\_\_  
Remove invasive species, Plant/seed native plants,  
construct water harvesting basins, and install  
(grading)  
drip irrigation system.

9. Describe the condition of the current ground surface within the entire project boundary area (for example, is the ground in a natural undisturbed condition, or has it been bladed, paved, graded, etc.). Estimate horizontal and vertical extent of existing disturbance.  
Also, attach photographs of project area to document condition: Pit excavated ~ 20' deep by ADOT - for borrow pit
10. Are there any known prehistoric and/or historic archaeological sites in or near the project area?  YES  NO
11. Has the project area been previously surveyed for cultural resources by a qualified archaeologist?  YES  NO  UNKNOWN

**If YES, submit a copy of the survey report. Please attach any comments on the survey report made by the managing agency and/or SHPO**

12. Are there any buildings or structures (including mines, bridges, dams, canals, etc.), which are 50-years or older in or adjacent to the project area?  YES  NO

**If YES, complete an Arizona Historic Property Inventory Form for each building or structure, attach it to this form and submit it with your application.**

13. Is your project area within or near a historic district?  YES  NO

**If YES, name of the district:**

**Please sign on the line below certifying all information provided for this application is accurate to the best of your knowledge.**

Janine A. Spencer-Glasson 1 8/21/16  
Applicant/Signature /Date

Janine A. Spencer-Glasson  
Applicant Printed Name

FOR SHPO USE ONLY	
SHPO Finding:	
<input type="checkbox"/> Funding this project will not affect historic properties.	
<input type="checkbox"/> Survey necessary – further GRANTS/SHPO consultation required ( <i>grant funds will not be released until consultation has been completed</i> )	
<input type="checkbox"/> Cultural resources present – further GRANTS/SHPO consultation required ( <i>grant funds will not be released until consultation has been completed</i> )	
SHPO Comments:	
For State Historic Preservation Office:	Date:

**STATE OF ARIZONA  
HISTORIC PROPERTY INVENTORY FORM**

Please type or print clearly. Fill out each applicable space accurately and with as much information as is known about the property.

**PROPERTY IDENTIFICATION**

For properties identified through survey: Site No. \_\_\_\_\_ Survey Area: \_\_\_\_\_

Historic Names (enter the name(s), if any that best reflect the property's historic importance):

ADOT Gravel Pit / Coachline Gravel Pit

Address: \_\_\_\_\_

City or Town: Marana  Vicinity County: Pima Tax Parcel No.: 226010170, 226030130 226030120

Township: 12S Range: 12E Section: 8, 17 Quarters: SE 1/4 Acreage: 104  
NE 1/4

Block: N/A Lot(s): N/A Plat (Addition): N/A Year of plat (addition): N/A

UTM Reference - Zone: 12 Easting: 487198 Northing: 3584102.7

USGS 7.5' quadrangle map: Marana

ARCHITECT: N/A  not determined  known Source: \_\_\_\_\_

BUILDER: N/A  not determined  known Source: \_\_\_\_\_

CONSTRUCTION DATE: N/A  known  estimated Source: \_\_\_\_\_

**STRUCTURAL CONDITION**

No structures - this was a gravel pit

- Good (well maintained; no serious problems apparent)
- Fair (some problems apparent) Describe: \_\_\_\_\_
- Poor (major problems; imminent threat) Describe: \_\_\_\_\_
- Ruin/Uninhabitable

**USES/FUNCTIONS**

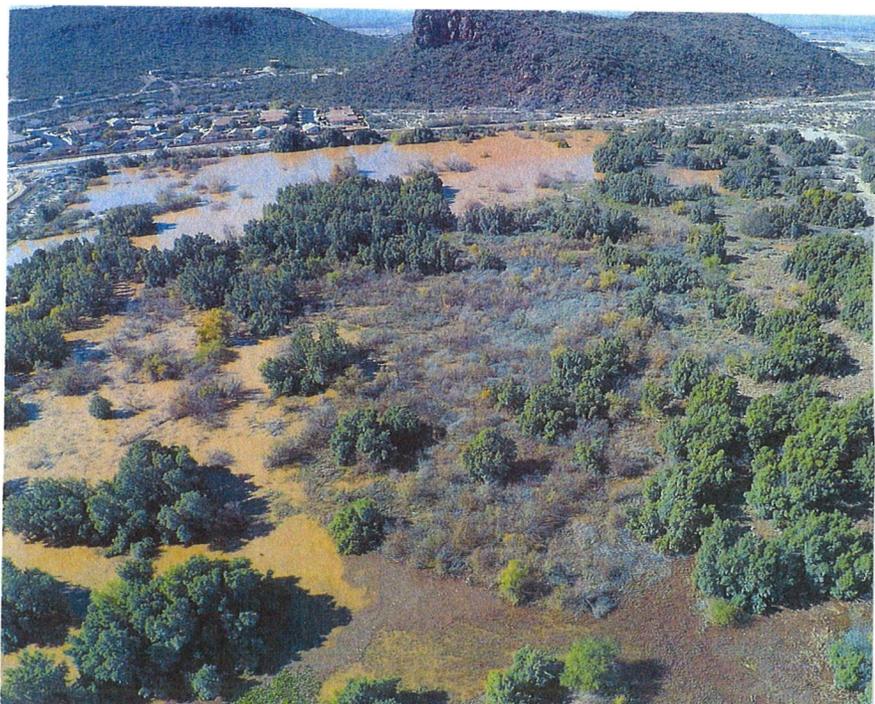
Describe how the property has been used over time, beginning with the original use:

ADOT Borrow Pit - 1960's  
Vacant/unused - 1970  
Town bought 2003  
Sources: 2  
Marana, AZ

**PHOTO INFORMATION**

Date of photo: 2017 (Drone photo)  
View Direction (looking towards): X

(See additional photo sheet)



**SIGNIFICANCE**

*To be eligible for the National Register, a property must represent an important part of the history or architecture of an area. The significance of a property is evaluated within its historic context, which are those patterns, themes, or trends in history by which a property occurred or gained importance. Describe the historic and architectural contexts of the property that may make it worthy of preservation.*

A. HISTORIC EVENTS/TRENDS – Describe any historic events/trends associated with the property: \_\_\_\_\_ N/A

B. PERSONS – List and describe persons with an important association with the building:  
\_\_\_\_\_ No Buildings on parcels

C. ARCHITECTURE – Style: \_\_\_\_\_  no style N/A

Stories: \_\_\_\_\_  Basement Roof Form: \_\_\_\_\_

Describe other character-defining features of its massing, size and scale: \_\_\_\_\_

**INTEGRITY**

*To be eligible for the National Register, a property must have integrity (i.e. it must be able to visually convey its importance). The outline below lists some important aspects of integrity. Fill in the blanks with as detailed a description of the property as possible.*

Location -  Original Site  Moved: Date: \_\_\_\_\_ Original Site: \_\_\_\_\_

**DESIGN**

Describe alterations from the original design, including dates: \_\_\_\_\_

**MATERIALS**

*Describe the materials used in the following elements of the property:*

Walls (structure): \_\_\_\_\_

Walls (sheathing): \_\_\_\_\_

Windows: \_\_\_\_\_

Roof: \_\_\_\_\_

Foundation: \_\_\_\_\_

**SETTING**

Describe the natural and/or built environment around the property: \_\_\_\_\_

How has the environment changed since the property was constructed? \_\_\_\_\_

**WORKMANSHIP**

Describe the distinctive elements, if any, of craftsmanship or method of construction: \_\_\_\_\_

**NATIONAL REGISTER STATUS (if listed, check the appropriate box)**

Individually Listed;  Contributor;  Non-contributor to \_\_\_\_\_ Historic District

Date Listed: \_\_\_\_\_  Determined eligible by Keeper of National Register (date: \_\_\_\_\_)

**RECOMMENDATIONS ON NATIONAL REGISTER ELIGIBILITY (opinion of SHPO staff or survey consultant)**

Property  is  is not eligible individually.

Property  is  is not eligible as a contributor to a listed or potential historic district.

More information needed to evaluate.

If not considered eligible, state reason: No Buildings



**EL RIO RIPARIAN RESTORATION**  
**Phase 1 - Landscaping (Breakout Costs)**  
**ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST (100%)**



**\* ITEMS HIGHLIGHTED INCLUDED IN AWP** Dibble Project No. 1015052.04 **ALL OUTSIDE LABOR COSTS -**  
 September 4, 2018 **CONTRACTED WORK**

**GRANT SCOPE DESCRIPTION**

LINE NO	BID ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	2010001	Clearing and Grubbing	1	LS	\$5,000	\$5,000
2	5150005	Utility Potholing, Depth < 12'	1	EA	\$300	\$300
3	6010400	CIP concrete landscape wall (30" H)	140	LF	\$135	\$18,900
4	6010400	CIP concrete seating tier (16" H)	215	LF	\$110	\$23,650
5	7010001	Furnish/Install/Maintain Temporary Traffic Control Devices	1	LS	\$8,400	\$8,400
6	8020011	Landscape grading	1	LS	\$5,000	\$5,000
7	8030024	Stabilized granite (7/8" minus)	17,248	SF	\$3	\$51,744
8	8030025	Desert cobble	2,100	SY	\$5	\$10,500
9	8030030	Rock mulch (angular 4"- 8")	153	CY	\$36	\$5,508
10	8030043	Landscape check dams	20	CY	\$50	\$1,000
11	8030081	Woody mulch (bottom of depressed planting areas)	37,412	SF	\$0.50	\$18,706
12	8030142	Decorative Boulders (2' x 3')	81	EA	\$75	\$6,075
13	8030143	Decorative Boulders (3' x 4')	60	EA	\$100	\$6,000
14	8050004	Seed mix (class ii)	26	ACRE	\$2,500	\$65,000
15	8061314	Tree (24" treepot) (agency provided)	181	EA	\$70	\$12,670
16	8061315	Shrub (5 gallon) (agency provided)	530	EA	\$20	\$10,600
17	8061316	Cactus (agency provided)	106	EA	\$20	\$2,120
18	8061614	Barrel cactus (agency provided)	19	EA	\$25	\$475
19	8061700	Landscape pruning	40	HR	\$100	\$4,000
20	8061701	Browser cages	307	EA	\$8	\$2,456
21	8080001	Landscape irrigation system	1	LS	\$3,540	\$3,540
22	8080051	Irrigation gel system	2,484	EA	\$6.50	\$16,146
23	8080666	Prefabricated booster pumping station	0	EA	\$7,200	\$0
24	8100001	AZPDES / NPDES	1	LS	\$2,800	\$2,800
25	9010001	Mobilization	1	LS	\$22,000	\$22,000
26	9020208	Wildlife fence	0	LF	\$2	\$0
27	9020209	Maze gate	0	EA	\$3,000	\$0

28	9140030	Ramada	0	EA	\$20,000	\$0
29	9140031	Trash receptacle	2	EA	\$900	\$1,800
30	9140033	Bicycle rack	4	EA	\$500	\$2,000
31	9140034	Kestrel box	2	EA	\$550	\$1,100
32	9140035	Premanufactured bench	6	EA	\$1,800	\$10,800
33	9250001	Construction Survey & Layout	1	LS	\$5,600	\$5,600
34	9300003	Incidental Items (Force Account)	1	LS	\$10,000	\$10,000
35	9310006	Exposed aggregate concrete	1,811	SF	\$7	\$12,677
36		Tree hugger bench	1	EA	\$3,000	\$3,000
37		Dog waste station	1	EA	\$800	\$800
38		Wayfinding signage	11	EA	\$600	\$6,600
39		Interpretive signage	5	EA	\$1,200	\$6,000
40		Concrete picnic table	0	EA	\$2,000	\$0
41		Solar bollard light	0	EA	\$500	\$0
42		Bird Blind	0	EA	\$7,500	\$0
43		Observation Deck and Access Ramp	939	SF	\$45	\$42,255
44						
					<b>Sub-total</b>	<b>\$405,222</b>
					No Contingency (0%)	\$0
					<b>Total Engineer's Estimate</b>	<b>\$405,222</b>

AWPFE GRANT ] \$191,813.00  
 (ADMIN. COSTS = IN-KIND MATCHING

**EL RIO PRESERVE - TOWN OF MARANA MATCHING IN-KIND FUNDS**

<b>Staff and Hours</b>	<b>Annual Direct Labor &amp; Outside Services Costs</b>	<b>Annual Capital Outlay &amp; Equipment Costs</b>	<b>Annual Administrative Costs</b>	<b>3 Year Project Total - Labor &amp; Outside Services Costs</b>	<b>3 Year Project Total - Administrative Costs</b>	<b>Total In-kind Matching Funding</b>
Project Coordinator, Janine Spencer-Glasson 16 hrs./mo. - Half time in field, plant surveys, bird surveys, etc.	2,849.00		2,850.00	8,547.00	8,550.00	
Construction Manager, Kurt Schmidt - 44 hrs./mo. Oversight of construction process, contract management, supervise field personnel			21,240.00		21,240.00	
Parks & Recreation Director, Jim Conroy 2hrs./ mo - project oversight for compliance with Town standards			1,200.00		3,600.00	
Parks Maintenance Superintendent, David Herman 8 hrs./mo. -In field monitoring of site conditions and needs	33,001.00			99,003.00		
Senior Maintenance Associate, Dale Stevens 16 hrs./mo - Continued weed control, checking plants and irrigation, etc.	3,587.00			10,761.00		
<b>Totals</b>	<b>39,437.00</b>		<b>25,290.00</b>	<b>118,311.00</b>	<b>33,390.00</b>	<b>151,701.00</b>

## El Rio Preserve Key Personnel

Name	Position	Contact Information	Organization Affiliation
<b>Janine Spencer-Glasson</b>	Project Coordinator	<a href="mailto:jspencer@maranaaz.gov">jspencer@maranaaz.gov</a> (520) 382-2658 11555 West Civic Center Dr. Marana AZ 85653	Town of Marana
<b>Kurt Schmidt</b>	Construction Manager	<a href="mailto:kschmidt@maranaaz.gov">kschmidt@maranaaz.gov</a> (520) 382-2692 11555 West Civic Center Dr. Marana AZ 85653	Town of Marana
<b>Jim Conroy</b>	Director of Parks and Recreation	<a href="mailto:jconroy@maranaaz.gov">jconroy@maranaaz.gov</a> (520) 382-1968 13251 North Lon Adams Rd. Marana AZ 85653	Town of Marana
<b>Dave Herman</b>	Superintendent of Parks and Recreation	<a href="mailto:dherman@maranaaz.gov">dherman@maranaaz.gov</a> (520) 382-1955 13251 North Lon Adams Rd. Marana AZ 85653	Town of Marana

**James M. Conroy**  
**Resume**  
**Director Parks and Recreation Department**  
**Town of Marana**

**Career Experience**

**Director Parks and Recreation Department, Town of Marana**  
**November 2017 to Present**

Responsible for Parks and Recreation services, programs, events, and facilities for the Town of Marana, Parks and Recreation Department. Marana is a fast growing suburban / rural community of approximately 45,000 residents north of Tucson, Arizona.

- Directly oversees the Recreation Division, Park Maintenance Division and Administrative Services for the Town's Parks and Recreation Department.
- Established a vision for the Parks and Recreation Department that is intended to enhance a healthy life style for Residents of Marana; this includes the increase in overall recreation services, expansion of both parks and recreation amenities, development of innovative park maintenance operations, increase utilization of recreation centers, park facilities, trail systems, recreation programs and natural resources programing to attract people to Marana.
- The Parks and Recreation Department, includes 45.50 FTE's, 40 full time staff and 27 Part-Time positions.
- Management of an annual budget of \$4.8 million and multiple multimillion-dollar capital projects annually.
- Regularly evaluate staff structure and operational efficiencies to allow for the most effective delivery of services and maximize department resources.
- Facilitate the development (with Town's Legal Department) of all new Facility Use Agreements, Inter-governmental Agreements (IGA), and Memorandums of Understanding (MOU).
- As a Town Department Head, I work as an active member of the Town's Executive Leadership Team.
- Participate in Town-wide initiatives including attending all Town Council meetings, working with the Citizen's Forum, attending and presenting at Chamber of Commerce activities, special events, employee appreciations, etc.
- Customer Service follow-up, monitor all customer service concerns/complaints and personally follow up with residents when necessary.
- Public Engagement, attend public meetings on-going throughout the year.
- Builds relationships with a wide variety of Community Partnerships to maximize the Parks and Recreations Department's ability to provide services i.e. MUSD, Pima Community College, Northwest Fire Department, University of Arizona, Tucson Audubon Society, Pima County Flood Control District, Pima County Library Department etc...
- Oversee and manage the Town of Marana's, Parks and Recreation Department's, Strategic 10 Year Master Plan process. Participate in the development of an RFP and selection process for a consultant to produce this Master Plan. This current Master Plan process is focused on 2020.

**Chief Operating Officer, Green Valley Recreation Inc. (GVR)**  
**October 2014 to October 2017**

Responsible for the Recreational services and Facilities maintenance for a private membership base of 23,000 adults living in Green Valley Az.:

- Responsible for the 14 Recreations Centers and 13 Community pools, approximately a physical plant of 30 million dollars in facility assets.
- Annual Budget of approx. 10 million dollars
- One hundred and five (105) FTE staff in the overall company. I oversee approx. 70 full time equivalent positions in both Facilities Maintenance staff and Recreational services staff.
- I report directly to the CEO who reports to a Board of Directors made up of 12 Directors
- Responsible for the oversight and management of customer service company wide
- Work very closely with local Public Safety leaders i.e. Green Valley Fire Chief and Pima County Sheriff's Dept. District Commander on numerous community projects.
- Over 1,300 Leisure Classes offered
- Oversight of Southern Arizona Senior Games with approx. 1000 athletes competing 30 individual sports, this program is receiving the 2016 State Award for Best Program for Active adults, to be presented on Aug. 9, 2017 at the Annual State Parks and Recreation Conference.
- I oversee and actively manage the Green Valley Recreation Inc. Long Range Strategic 10 Year Master Plan. This was a Master Plan process that started in the Fall of 2014. I was responsible for developing an RFP process to hire an Architecture firm to conduct this planning process. After a competitive recruitment process, WSM Architect's, (Tucson based firm) were awarded the contract. I have been the direct point of contact working with WSM over the last approx. 2 ½ years; through the Assessment of Facilities phase, Public engagement phase and now the implementation phase.
- Incident follow up program, I personally follow up with anyone of our 20,000 plus constituents who are involved with any type of incident/accident on our properties, ranging from an injury while participating in a sport activity to tripping and falling in one of our recreation facilities.

**Parks & Recreation East District Administrator, Tucson Parks and Recreation,  
August 2005 to October 17, 2014**

Responsible for planning, organizing and directing facilities, parks and staff for Tucson Parks and Recreation East District in an area of 125 square miles:

- Forty-seven (47) developed parks comprised of 997.56 acres, 225.41 of which are turf acres,
- Three Regional Centers (Clements, Randolph, Udall), One Neighborhood Center (Freedom)
- Two Thousand, Two Hundred (2,200) Leisure Class Offered – 7,543 enrolled participants
- Citywide Adult Softball Program – 3,165 registered participants
- Annual district budget of \$10,416,180.
- Eighty-Three (83) permanent Civil Service positions and twenty (29) non permanent positions.
- The District responds to four Council Offices, Wards 2, 4, 5, and 6.
- See Addendum to Resume: Accomplishments, skills and work experience associated with essential duties of Director of Community Services References

**Parks Superintendent, Tucson Parks and Recreation,  
May 2000 to August 2005**

## Education and Training

**2007 Graduated for the National Parks and Recreation Association (NRPA), Parks Management Maintenance School at Lake Arrowhead (two year program).**

**2008 Graduated from the ASU School of Public Administration's, Certified Public Manager's Program**

### **Recreation Administration and Management**

- B.S. Recreation Administration from State University of New York (SUNY) at Brockport, 1978
- A.A. Recreation Administration from Hudson Valley Community College (SUNY system), 1976
- National Recreation and Park Association (NRPA) Pacific Southwest Maintenance Management School 2yr program completed in November 2002, UCLA Conference Center Lake Arrowhead, California
- APRA Conferences: Attended Annual APRA State Conferences and have been a participant, presenter and organizer, *1984 – 2014*
- Facility Design and Management Workshop, Athletic Business Conference, Las Vegas, Nevada, *1987*
- National Parks and Recreation Association (NPRA) Conference, Salt Lake City, Utah  
Participant and Researcher  
*1997*

**February 26, 2014 completed "Reclaimed Water Site Tester Training"**

### **Recreation Curriculum Development and Teaching**

- Pima College (Fall 1996 – Winter 1999): Certified by Arizona State Regents to teach at the Community College level. During the three years, I taught six semesters of 'Recreation Leadership/School Child Programming'.
- The School Age Child Care project and Dewitt Wallace Foundation – Reader's Digest Fund (*1994*): I attended the 'MOST Initiative Planning year Retreat' at Wellesley College in Massachusetts, 4 days.

### **Leadership/Management Training**

- 'The Seven Habits of Highly Effective people' (City of Tucson – 1999) including additional classes in 'experiential team building' and 'personality preferences' for a total of seven days
- Cultural Awareness Training (City of Tucson – 1997) 2 days
- Team and Project Management Core Certification Program (City of Tucson – 1996) 10 days
- Performance Evaluations; Grievance Procedures; Time Management; Conflict Management; Stress Management (City of Tucson, 1984 – 1988)
- Fred Harvey Management Training Program (1979 – 1981): Two year full-time class room and experiential management training program
- Situational Leadership (Fred Harvey Company - 1981) 3 days
- CPM – Certified Public Manager (May 2004)  
Completed the year long CPM program through the Arizona State University School of Public Administration.

### **Customer Service Training**

- Legendary Service Training (City of Tucson) **2013**
- KASET Customer Service Training (City of Tucson) **2012**

**Janine Spencer**

Tucson, AZ 85742

Email:

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**QUALIFICATIONS SUMMARY:**

- Extensive experience in natural resource management and habitat restoration and preservation
- Skilled in coordinating with the public, local, state and federal entities for conservation planning
- Proven ability to achieve land management goals in compliance with environmental regulations
- Accomplished public speaker, effective writer, experienced at public outreach and grant writing

**EDUCATION**

- MA in Wildlife Management, Prescott College
- BS in Biology, Oregon State University

**RELEVANT EXPERIENCE**

**Environmental Projects Manager, Jan. 2014 – to present. Town of Marana, AZ**

- Habitat management and restoration projects for wildlife linkages, native plantings, and urban bat habitat installations, and coordinate with other departments to conserve cultural resources
- Wrote Land Management Plan for nature preserve and coordinating riparian restoration
- Manage invasive species program, coordinate volunteer invasive species removal events
- Negotiate protection and enhancement of natural open space on development projects
- Promote and implement citizen science project with US Fish & Wildlife and AZ Game & Fish
- Ensure compliance with the Endangered Species Act, Clean Water Act, National Historic Preservation Act regulations

**Environmental Project Coordinator, Oct. 2007 to Jan. 2014. Town of Marana, AZ**

- Wrote a proposal to Regional Transportation Authority for \$3.6 million for wildlife crossing structures; and a proposal for \$80,000 for bat roost structures- both of which were approved
- Organized and ran meetings with stakeholders to develop a Habitat Conservation Plan
- Mapped potential threatened & endangered species habitat, using GIS and ArcMap
- Presented at local government and national meetings on wildlife conservation programs
- Created online invasive plant species identification web page and
- Designed interpretive signs for preserves, trails and parks
- Develop contract specifications, evaluate contractor proposals, manage contracts for projects

**Environmental Project Manager/ Sr. Biologist, Feb. 2005 – Oct. 2007. Environmental & Engineering Consultants - Tucson, AZ**

- Prepared documents for NEPA, ESA, the Clean Water Act, Native Plant Protection compliance
- Organized and performed habitat analysis and surveys for threatened and endangered species
- Wrote proposals, supervised other biologists, coordinated schedules, tracked budget

**Self-Employed Biological Consultant, Sept. 1999 – Oct. 2005. Prescott, AZ**

- Contracted services to the Salt River Project (a water and energy supplier in Phoenix, AZ) as team member in formal consultations with USFWS to develop a Habitat Conservation Plan and contacted landowners to create conservation easements and management recommendations
- Researched and wrote Avian Management Indicator Species abstracts, including natural history, abundance and trend data for the USDA Forest Service, Tonto National Forest, Phoenix, AZ
- Contracted with the Bureau of Land Management, Phoenix, AZ, for cactus ferruginous pygmy-owl habitat evaluation and surveys with final maps and natural resource management plans
- Wrote proposals and contracted for various private companies for biological evaluations, wildlife habitat evaluations, wetland delineation and 404 Permitting

## **ADDITIONAL EXPERIENCE**

### **Volunteer, Pionus Parrot Research Foundation (PPRF), Feb. -July 2005. Mindo, Ecuador**

- Prepared a grant proposal and study plan in conjunction with the PPRF, which was funded
- Developed plan to study parrot crop depredation and volunteered in Ecuador on project

### **Threatened & Endangered Species Coordinator, Oct. 1996 – Sept. 1999. AZ Army National Guard, Phoenix, AZ**

- Habitat evaluation, designed routes for bird and desert tortoise surveys
- Land Condition Trend Analysis, wrote annual reports with natural resource management plans
- Surveyed plant transects and trapped small mammals

### **Wildlife Specialist I, April 1995-Oct. 1996. Arizona Game and Fish Department - Phoenix, AZ**

- Supervised field crew for willow flycatcher surveys and nest monitoring, participated in surveys
- Maintained database and performed statistical analysis of state-wide survey results
- Performed statistical analysis of habitat characteristics related to nesting success

## **PRESENTATIONS (Partial list)**

- Presentation to the Regional Transportation Authority requesting \$3.6 million for wildlife crossing structures and \$80,000 for bat structures, which were approved – 2012 and 2013
- Presentation at National Association of Environmental Professionals on the Marana HCP -2009
- Represent Town of Marana for televised appearances, provided interviews for newspaper on bat conservation projects

## **TRAINING/CONFERENCES (Partial list)**

- IAP2 Public Involvement, Planning, and Communications Course (1 week) 2008. Tucson, AZ
- ArcGIS© Class by ESRI (1 week) 2008. Flagstaff, AZ
- Effective Public Involvement Webinar, 2008. Noyes & Assoc.
- Wildlife Linkage Design Training, 2009. Northern AZ University (2 days). Tucson, AZ
- Riparian Restoration Conference, (2 days) 2007. Yuma, AZ

## **VOLUNTEER ACTIVITIES**

- Member of Technical Committee for development of Town of Oro Valley Environmentally Sensitive Lands Ordinance
- Important Bird Area, elegant trogon, and Christmas Bird Count surveyor for Tucson Audubon
- Volunteer on bat mist-netting for endangered lesser long-nosed bat

## **Kurt Schmidt**

Marana Municipal Complex  
11555 W. Civic Center Drive  
Marana, Arizona 85653

(520) 382-2692

kschmidt@maranaaz.gov

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### **Project Manager/Construction Manager, April 2007 - Present**

Town of Marana Engineering Services, Capital Improvement Program Division

- Essential Functions  
**Project Manager** duties include overseeing design projects by procuring and managing consultants; reviewing and tracking consultant work for compliance with project scope; tracking project budget; accepting review of project design deliverables; and approving design changes and RFIs. **Construction Manager** duties include overseeing construction processes; negotiating and managing contracts; tracking the budget; overseeing the construction budget and reviewing pay applications; coordinating with the project team including inspectors; completing project closeout and warranty processes.
- Notable Projects
  - Adonis Subdivision Drainage Improvements
  - ARRA Pavement Rehabilitation for Marana, Sandario, Tangerine, and Twin Peaks Roads
  - Avra Valley Road Pavement Reconstruction (Phase II)
  - Cracker Barrel Road Restoration
  - Ina Road Right Turnbays onto Thornydale
  - Ina Road Sidewalk – Thornydale to Meredith
  - McDuff Road Reconstruction
  - Moore Road Improvements – Thornydale to Dove Mountain
  - Pavement Preservation Program 2008-09 – Sunflower Subdivision (Phase 2)
  - Silverbell Road Sidewalk – Twin Peaks to Cortaro
  - Tangerine Farms Road
  - Thornydale Road Improvement – Orange Grove to CDO Wash
  - Thornydale/Tangerine Intersection Improvements
  - Thornydale Road Improvements – Camino del Norte to Saguaro Ranch
  - Tiffany Loop Drainage Improvements
  - Marana Municipal Complex Concrete Flatwork Repairs
  - Marana Public Safety Facility
  - CAP Canal Trailhead Improvements
  - Twin Peaks Shared Use Path Access
  - 6-Inch Water Main Replacement at Union Pacific Railroad Milepost 262.09
  - Hartman 8-Inch Water Main Extension
  - Honea Heights Colonia Septic to Sewer Conversions
  - Marana Regional Airport Septic/Leach Wastewater Treatment Disposal System
  - Marana Water Reclamation Facility Expansion – Phase 1
  - Ora Mae Harn Park Private Sanitary Sewer Improvements
  - Palo Verde Water Plant
  - Picture Rocks Reservoir Replacement
  - Tangerine/Downtown Sewer Conveyance System

### **Education**

- Bachelor of Science – Major: Construction Management; Minor: Business  
John Brown University; Siloam Springs, Arkansas

# DAVID F. HERMAN, CGCS, CPSI

TUCSON, ARIZONA 85743

PHONE [REDACTED]

## SUMMARY OF QUALIFICATIONS

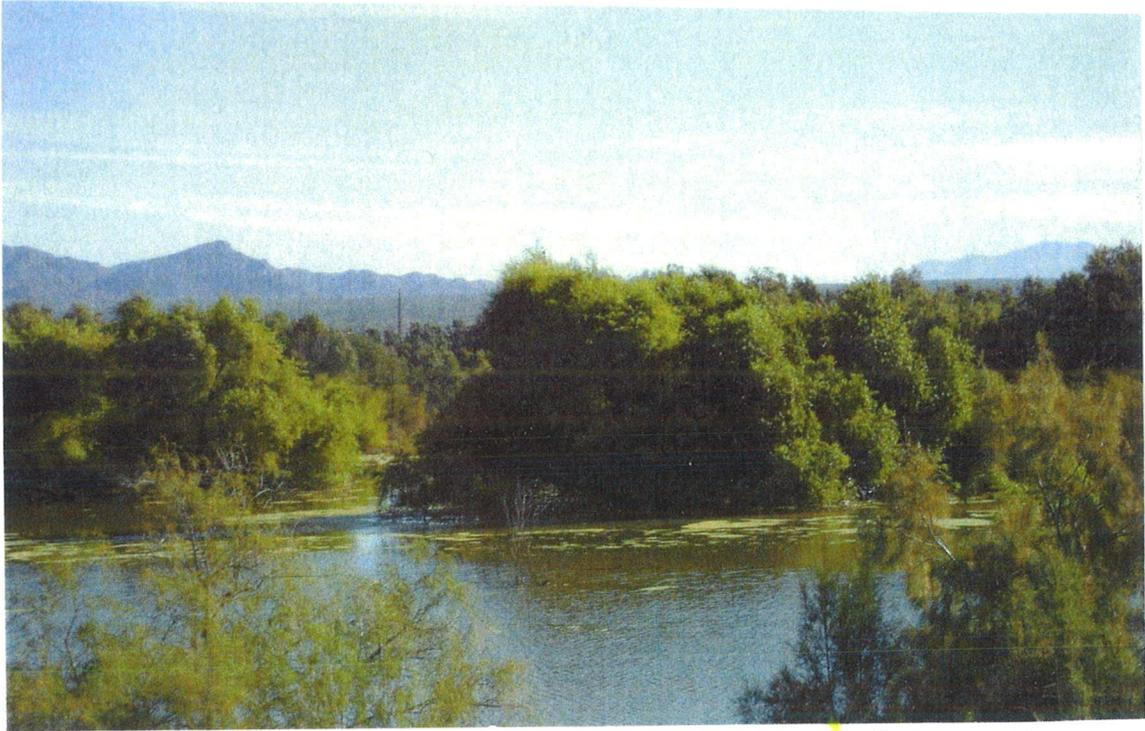
- Demonstrated success as a **Parks Superintendent, Certified Golf Course Superintendent and Turf Equipment Manager** in all aspects of plant management for both private and public sectors.
- Solid background of Southwestern turf, including the grow-in of Bentgrass and Bermuda greens, and overseeding with Ryegrass / *Poa trivialis*. Sprigging Bermuda to repair worn turf instead of costly Sod.
- Involved in **Golf and Grounds Management** for over 26 years and serving as interim Golf Administrator before TCG privatization with green industry experience encompassing over 39 years.
- Extensive experience in the utilization of effluent irrigation water as it relates to Turf, Xeriscapes and Trees in a desert urban environment.

## EMPLOYMENT EXPERIENCE

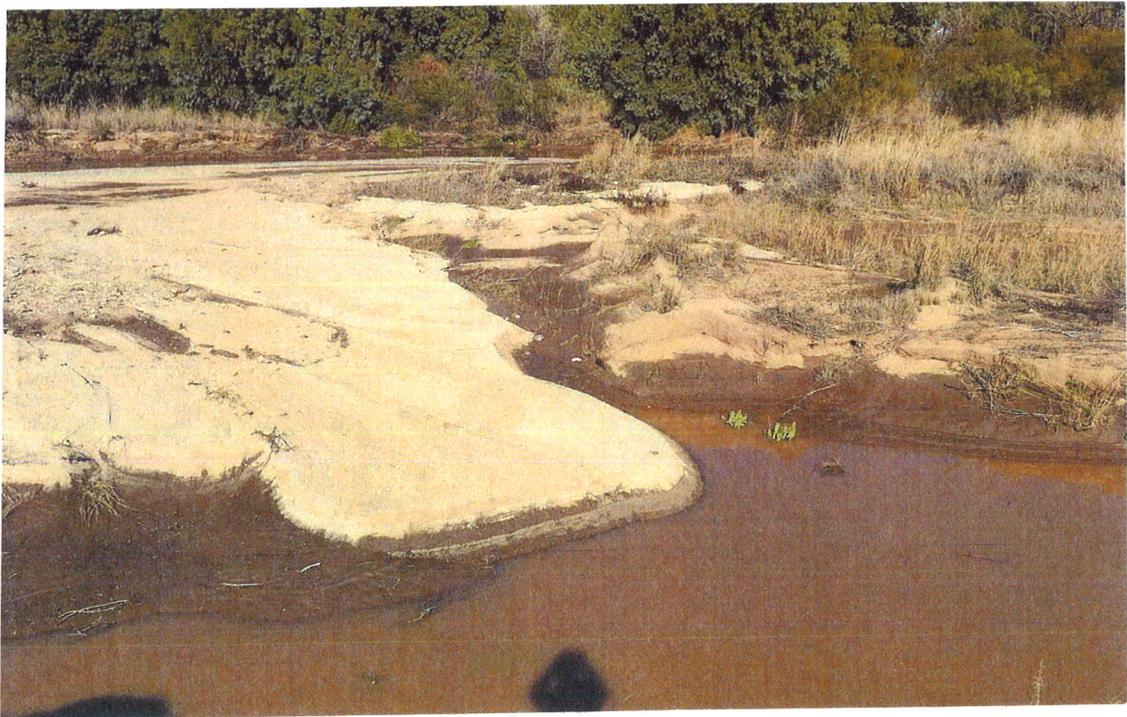
- 5/17 to Present **Parks Superintendent** Jim Conroy Director Parks & Rec  
Town of Marana Parks & Recreation, Marana, Arizona **Town of Marana**  
Responsible for all maintenance and construction of parks for the Town of Marana. Supervise Parks Maintenance Supervisors and Irrigation Control Technician. Chairman of Tree City USA and Town ISA Certified Arborist Municipal Specialist with a Tree Risk Assessment Qualification.  
**Special Accomplishment:** Opened Tangerine Sky Community Park and Splash Pad to rave reviews.
- 3/15 to 4/17 **Landscape Manager:** Luis Rocha Associate Director  
University of Arizona Facilities Management Grounds Services – **State of Arizona**  
Arborist, Irrigation, Plant Health; Develop facility projects, both renovation and new construction. Supervise Irrigation Crew Chief along with Arborist Crew Chief and their staffs. Direct Plant Health weed and mosquito control. Consult on Turf grass management and organize all employee CEU training.  
**Special Accomplishment:** Changed work culture of my departments giving support and encouragement
- 11/07 to 3/14 **Parks & Golf Area Supervisor:** Mike Hayes Deputy Director Parks & Rec/ Golf  
Tucson City Golf, City of Tucson Parks & Rec. / Golf Division, Tucson, Arizona - **City of Tucson**  
Responsible for all maintenance activities at Randolph Golf Complex and Fred Enke Golf Courses. Supervise all Parks Equipment Mechanics. Interim Golf Administrator for 3 years until privatization.  
**Special Accomplishment:** Sprigging 419 Tiffway Bermuda grass in areas decimated by years of Rye grass overseeding and returned them to full coverage of turf on Dell Ulrich. Elevated sprinkler heads covered by 12 inches of topdressing sand at Dell Ulrich's driving range to enhance growth of seed planted in divots providing a better hitting surface without the use of mats. Restored water in 16 Lake by sealing leaking soil and installing fountain / aeration system.
- 6/96 to 6/07 **Director of Greens & Grounds:** Heritage Highlands HOA Board of Directors  
Heritage Highlands Golf & Country Club, Marana, Arizona - **Semiprivate**  
Construction, grow-in and maintenance of an 18 hole Arthur Hills design golf course. Responsible for Club House and community common areas.  
**Special Accomplishment:** Opening an upscale golf course to rave reviews in just six months after first turf was planted. Voted best new 1997 retirement course in Arizona. Resurfaced 19 SR-1020 Bentgrass greens to Mini Verde ultra-dwarf Bermuda over eight weeks in the summer of 2006.

## EDUCATION & TRAINING

- 3/96 **Graduate:** Rutgers University, Professional Golf Turf Management School 3.64 GPA
- 1995 to 1998 **Instructor:** GCSAA Technician training seminars on **Preventive Maintenance of Turf Equipment**  
**GCSAA** Certified Golf Course Superintendent, Class A Superintendent (101649)  
**City of Tucson:** Cross-Connection Specialist Tucson Water Backflow tester, Reclaimed Site Tester, Supervisory Core Series Graduate Spring Cohort 2013, Certified Playground Safety Inspector.  
**Arizona Department of Agriculture:** Qualified Applicator (1985), Certified Pesticide Applicator (880743)  
**ISA** Certified Arborist & Certified Arborist Municipal Specialist W/ TRAQ (WE-11507AM)  
**Professional Affiliations:** International Society of Arboriculture, Western Chapter of ISA, Arizona Community Tree Council, Irrigation Association, Nat'l Recreation & Parks Association, Arizona Parks & Recreation Association, Golf Course Superintendent Association of America, Cactus and Pine GCSA of Arizona – Past Board Member



Oct. 2016



Jan. 2017

**PHOTOS FROM EL RIO RIPARIAN RESTORATION SITE**



Berm breached by Santa Cruz River August 9, 2016



River running into El Rio Preserve through eroded channel January 9, 2016

**PHOTOS FROM EL RIO RIPARIAN RESTORATION SITE**



3 Tons of trash were cleaned up after flooding January 22, 2018



Erosion and fresh ORV tracks July 1, 2015

PHOTOS FROM EL RIO RIPARIAN RESTORATION SITE



Black-crowned night heron © Andrew Core



Broad-billed hummingbird © Andrew Core

PHOTOS FROM EL RIO RIPARIAN RESTORATION SITE



Hooded Oriole © Andrew Core



**PHOTOS FROM EL RIO RIPARIAN RESTORATION SITE**

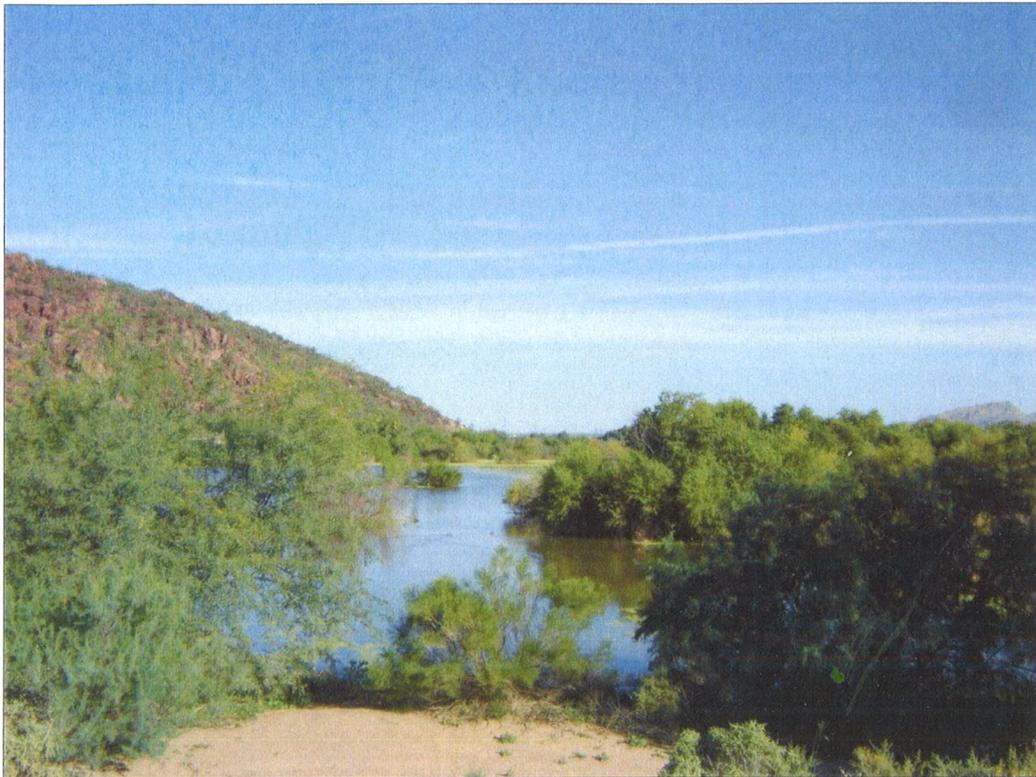


White-fronted goose and snow goose © Andrew Core



Tucson Audubon Society volunteers at parking lot on pollinator garden planting day 7-14-2018

PHOTOS FROM EL RIO RIPARIAN RESTORATION SITE

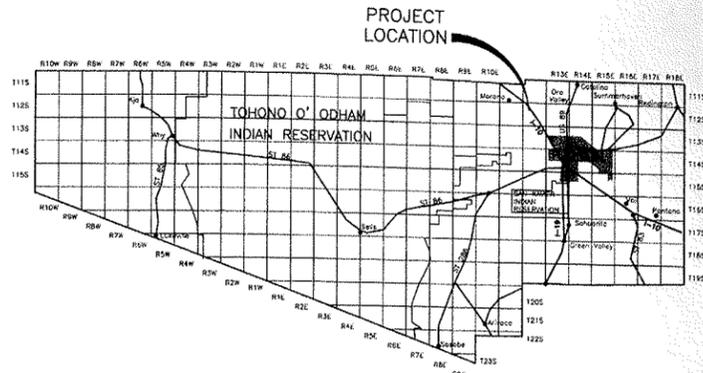


El Rio Preserve October 6, 2016



Dry pond April 17, 2018

# EL RIO RIPARIAN RESTORATION FOR THE TOWN OF MARANA, AZ 10190 N COACHLINE BLVD PHASE 1 APRIL 2018



VICINITY PLAN



2018

**MAYOR**  
ED HONEA

**VICE MAYOR**  
JON POST

**TOWN MANAGER**  
JAMSHEED MEHTA

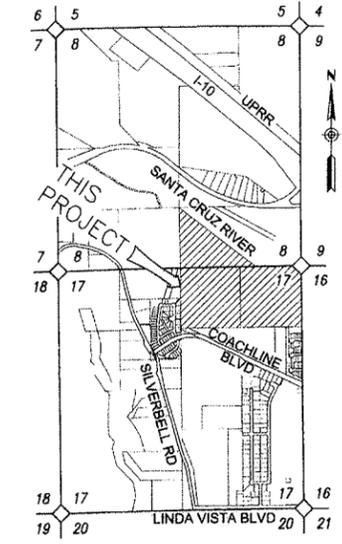
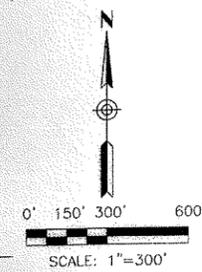
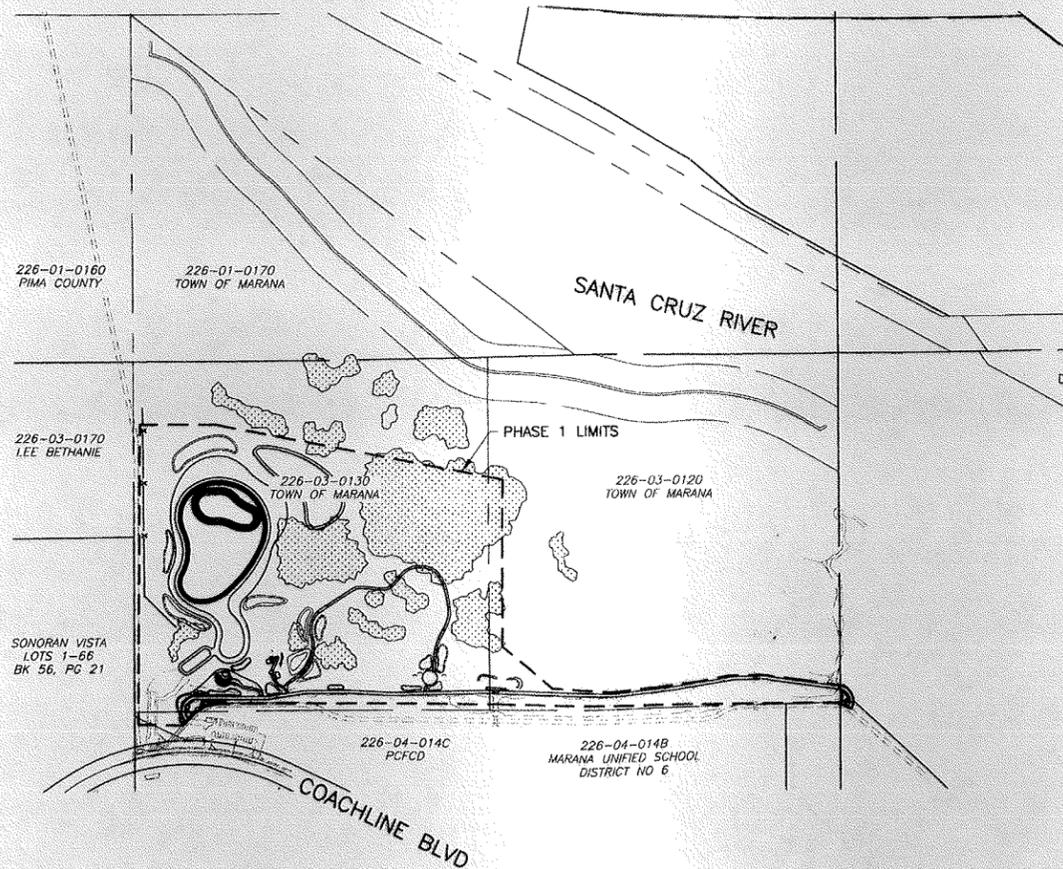
**TOWN COUNCIL**  
COUNCIL MEMBER - DAVID BOWEN  
COUNCIL MEMBER - PATTI COMERFORD  
COUNCIL MEMBER - JOHN OFFICER  
COUNCIL MEMBER - HERB KAI  
COUNCIL MEMBER - ROXANNE ZIEGLER

**AS-BUILT CERTIFICATION**

"I HEREBY CERTIFY THAT THE AS-BUILT ANNOTATIONS PROVIDED ON THESE DRAWINGS WERE BASED ON AN AS-BUILT SURVEY CONDUCTED UNDER MY SUPERVISION AND ACCURATELY DEPICTS EXISTING FIELD CONDITIONS TO THE BEST OF MY KNOWLEDGE AND BELIEF."

REGISTERED LAND SURVEYOR \_\_\_\_\_ DATE \_\_\_\_\_

REGISTRATION NUMBER \_\_\_\_\_ EXPIRES \_\_\_\_\_



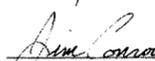
LOCATION MAP  
A PORTION OF SECTIONS 8 AND 17,  
TOWNSHIP 12 SOUTH, RANGE 12 EAST,  
G&SRM, PIMA COUNTY, ARIZONA  
SCALE: 3" = 1 MILE

**SHEET INDEX**

SHEET	DESCRIPTION
G1.0	COVER SHEET
G1.1	LEGEND & ABBREVIATIONS
G1.2	GENERAL NOTES
G1.3	MISCELLANEOUS DETAILS
C1.1	SITE PLAN - OVERALL MASTER PLAN
C1.2	SITE PLAN - PHASE 1
C2.1	GRADING PLAN
C3.1	HORIZONTAL CONTROL PLAN
C4.1-C4.2	SITE CROSS SECTIONS
LP1.0-LP9.7	LANDSCAPE PLANS & DETAILS
IR1.0-IR3.1	LANDSCAPE IRRIGATION PLANS
SM1.1-SM1.2	STORMWATER MANAGEMENT PLANS

APPROVED  5-9-18  
TOWN OF MARANA - TOWN ENGINEER, P.E. DATE

APPROVED  5/8/18  
PIMA COUNTY REGIONAL FLOOD CONTROL DISTRICT DATE

APPROVED  5/8/18  
MARANA PARKS & RECREATION DIRECTOR DATE



**Dibble Engineering**  
177 N. Church Avenue  
Suite 711  
Tucson, AZ 85701  
P 520.495.4000

No	Revisions	Engineer	Date

No	As Built	Engineer	Date



**TOWN OF MARANA**  
ENGINEERING DEPARTMENT  
11555 WEST CIVIC CENTER DRIVE  
MARANA, ARIZONA 86563

SCALE: HORIZ AS SHOWN VERT N/A SHEET: G1.0



OWNER:  
TOWN OF MARANA  
ENVIRONMENTAL PROJECTS MANAGER  
11555 W CIVIC CENTER DRIVE  
MARANA, AZ 85653  
CONTACT: JANINE SPENCER  
P: 520.382.2679

CIVIL ENGINEER:  
DIBBLE ENGINEERING  
177 NORTH CHURCH AVE  
SUITE 711  
TUCSON, AZ 85701  
CONTACT: GREG VEGA, PE  
P: 520.495.4065

LANDSCAPE ARCHITECT:  
WHEAT DESIGN GROUP  
500 NORTH TUCSON BLVD  
SUITE 150  
TUCSON, AZ 85716  
CONTACT: LAURA MELCAREK, RLA  
P: 520.884.7911

**EL RIO RIPARIAN RESTORATION**  
10190 N COACHLINE BLVD, TUCSON, AZ 85743  
**DRAINAGE IMPROVEMENTS**

**WHEAT DESIGN GROUP**  
LANDSCAPE ARCHITECTS  
500 N TUCSON BLVD, SUITE 150, TUCSON, ARIZONA 85716  
T: 520-884-7911 | WWW.WHEATDESIGNGROUP.COM

Project No.:	1015052.04
Designed:	AS, CM Date: 03/2016
Drawn:	AS, CM Date: 03/2016
Checked:	LM Date: 03/2016

PRELIMINARY  
NOT FOR CONSTRUCTION  
OR RECORDING

**Plant Material Schedule**

Drawing Title: \_\_\_\_\_  
Scale: N/A  
Dwg No. LP3.0



HYDROSEED MIX C - DESERT SCRUB

SYMBOL	BOTANICAL NAME	COMMON NAME	ATTRIBUTE	PLS RATE LBS/ACRE	TOTAL QUANTITY
GRASSES					
	Bouteloua curtipendula	Sideoats Grama	P,W	3.0	
FORBS & FLOWERS					
	Baileya multiradiata	Desert marigold	P,C/W	1.5	
	Cassia covessii	Desert Senna	P,W	2.0	
	Eschscholtzia Mexicana	Mexican Poppy	A,C	3.0	
	Lupinus sparsiflorus	Desert Lupine	A,C	2.0	
	Phacelia campanularia	Bluebells	A,C	2.0	
	Psilostrophe cooperi	Paper Flower	P,C/W	2.0	
	Sphaeralcea ambigua	Globe Mallow	P,C/W	2.0	
	Zinnia acerosa	Desert Zinnia	A,C	1.0	
SHRUBS & TREES					
	Acacia constricta	Whitethorn Acacia	P,W	1.0	
	Acacia greggii	Catclaw Acacia	P,W	1.5	
	Calliandra eriophylla	Sonoran Fairy Duster	P,C/W	1.0	
	Cercidium microphyllum	Foothills Palo Verde	P,W	1.5	
	Encelia farinosa	Brittle Bush	P,C/W	3.0	
	Ericameria laricifolia	Turpentine Bush	P,C/W	1.0	
	Larrea tridentata	Creosote Bush	P,W	4.0	

PHASE 1:  
8.5 AC  
PHASE 2:  
34.5 AC  
TOTAL:  
43.0 AC

HYDROSEED MIX B - WOODLAND

SYMBOL	BOTANICAL NAME	COMMON NAME	ATTRIBUTE	PLS RATE LBS/ACRE	TOTAL QUANTITY
GRASSES					
	Aristida purpurea	Purple Threeawn	P,W	3.0	
	Bouteloua curtipendula	Sideoats Grama	P,W	3.0	
	Digitaria californica	Arizona Cottontop	P,W	0.5	
	Sporobolus cryptandrus	Sand Drop Seed	P,W	1.0	
FORBS & FLOWERS					
	Baileya multiradiata	Desert marigold	P,C/W	1.5	
	Cassia covessii	Desert Senna	P,W	2.0	
	Eschscholtzia Mexicana	Mexican Poppy	A,C	3.0	
	Lupinus sparsiflorus	Desert Lupine	A,C	2.0	
	Phacelia campanularia	Bluebells	A,C	2.0	
	Plantago insularis	Desert Indian Wheat	A,C	4.0	
	Psilostrophe cooperi	Paper Flower	P,C/W	2.0	
	Sphaeralcea ambigua	Globe Mallow	P,C/W	2.0	
	Zinnia acerosa	Desert Zinnia	A,C	1.0	
SHRUBS & TREES					
	Atriplex canescens	Four Wing Saltbush	P,W	1.0	
	Acacia greggii	Catclaw Acacia	P,W	1.5	
	Cercidium floridum	Blue Palo Verde	P,W	1.5	
	Encelia farinosa	Brittle Bush	P,C/W	3.0	
	Ericameria laricifolia	Turpentine Bush	P,C/W	1.0	
	Lycium andersonii	Wolfberry	P,W	1.5	

PHASE 1:  
13.50 AC  
PHASE 2:  
11.0 AC  
TOTAL:  
24.50 AC

HYDROSEED MIX A - RIPARIAN

SYMBOL	BOTANICAL NAME	COMMON NAME	ATTRIBUTE	PLS RATE LBS/ACRE	TOTAL QUANTITY
GRASSES					
	Aristida purpurea	Purple Threeawn	P,W	3.0	
	Bouteloua curtipendula	Sideoats Grama	P,W	3.0	
	Digitaria californica	Arizona Cottontop	P,W	0.5	
	Sporobolus cryptandrus	Sand Drop Seed	P,W	1.0	
	Muhlenbergia rigens	Deer Grass	P,W	1.0	
FORBS & FLOWERS					
	Eschscholtzia Mexicana	Mexican Poppy	A,C	3.0	
	Helianthus annuus	Common Sunflower	A,W	2.0	
	Lupinus sparsiflorus	Desert Lupine	A,C	2.0	
	Phacelia campanularia	Bluebells	A,C	2.0	
	Plantago insularis	Desert Indian Wheat	A,C	4.0	
	Psilostrophe cooperi	Paper Flower	P,C/W	2.0	
	Sphaeralcea ambigua	Globe Mallow	P,C/W	2.0	
	Zinnia acerosa	Desert Zinnia	A,C	1.0	
SHRUBS & TREES					
	Ambrosia salsola	Burrobrush	P,W	1.5	
	Bebbia juncea	Sweetbush	P,W	1.5	
	Celtis pallida	Desert Hackberry	P,W	1.5	
	Celtis reticulata	Western Hackberry	P,C/W	1.0	
	Isocoma tenuisecta	Burroweed	P,C/W	1.5	
	Populus fremontii	Cottonwood	P,C/W	3.0	
	Sapindus saponaria var. drummondii	Western SoapBerry	P,C/W	1.0	
	Salix gooddingii	Goodding's Willow	P,C/W	1.0	

PHASE 1:  
5.0 AC  
PHASE 2:  
2.5 AC  
TOTAL:  
7.5 AC

PLS=Pure Live Seed  
Attribute Key: A=Annual; P=Perennial; C=Germinates and thrives in the cool season; W=Germinates and thrives in the warm season; C/W=Germinates and thrives in the cool and warm seasons. The cool season in Tucson typically occurs September through March.

PLANT MATERIAL LEGEND 3  
DESERT SCRUB

SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MIN. H/ CALIPER	OUTLETS/ EMITTER/ TOTAL GPH
	Acacia greggii Catclaw Acacia	37	104	15 Gal	5'/0.5"	
	Cercidium microphyllum Foothills Palo Verde	20	99	15 Gal	4'/0.5"	

SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MATURE SIZE H X W	OUTLETS/ EMITTER/ TOTAL GPH
	Ambrosia deltoidea Triangle-Leaf Bur-sage	31	116	5 Gal	3' X 3'	
	Calliandra eriophylla Sonoran Fairy Duster	43	128	5 Gal	3' X 3'	
	Dalea pulchra Bush Dalea	29	114	5 Gal	4' X 5'	
	Larrea tridentata Creosote Bush	52	222	5 Gal	6' X 5'	

SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MATURE SIZE H X W	OUTLETS/ EMITTER/ TOTAL GPH
	Echinocactus fasciculatus Hedgehog Cactus	45	87	5 Gal	1' X 3'	
	Ferocactus wislizenii Fishhook Barrel	31	73	5 Gal	2' X 3'	
	Opuntia engelmannii Engelmann's Prickly Pear	58	100	3 PAD MIN. ROOTED	4' X 5'	
	Opuntia versicolor Cholla	28	70	5 Gal	6' X 5'	

- PLANTING NOTES:
- Soil shall be ripped prior to planting or seeding. Plants shall not be planted in compacted soil.
  - Ideal planting window is during monsoon season when ambient humidity is high. If planting can not be done during monsoon season, plant during winter dormancy.
  - Irrigation gel system (Dry H2O or equivalent) instructions are as follows:
    - Pre-soak plant pit by filling it with water.
    - Place one horizontal carton at bottom of pit.
    - Place plant in center of pit.
    - Partially backfill with clean native soil to support carton ensuring top of carton will be flush with finish grade.
    - Install tubes evenly around plant. Place carton at slight angle so open end makes contact with root ball. Refer to plant detail for quantity of cartons.
    - Finish backfilling the pit to finish grade.
    - Water plant thoroughly.
  - Irrigation gel system requirements are as follows: 5 per tree, 3 per shrub, 1 per accent.
  - Irrigation gel system for trees and shrubs will require maintenance during dry season, per direction of Landscape Architect. Maintenance shall include replacement of Dry H2O cartons around plant. Succulents will require no additional Dry H2O maintenance after the initial application.
  - Irrigation gel system may not be required for succulents if plant installation occurs immediately prior to or during monsoon season, per direction of Landscape Architect.
  - Existing trees to remain in place undisturbed as feasible.
  - Provide browser cages for vulnerable plants.

PLANT MATERIAL LEGEND 2  
WOODLAND

SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MIN. H/ CALIPER	OUTLETS/ EMITTER/ TOTAL GPH
	Celtis reticulata Western Hackberry	5	24	15 Gal	5'/0.5"	
	Cercidium floridum Blue Palo Verde	22	60	15 Gal	5'/0.5"	
	Chilopsis linearis Desert Willow	11	31	15 Gal	5'/0.75"	
	Acacia greggii Catclaw Acacia	41	92	15 Gal	5.5'/0.5"	

SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MATURE SIZE H X W	OUTLETS/ EMITTER/ TOTAL GPH
	Anisacanthus thurberi Desert Honeysuckle	46	73	5 Gal	3' X 4'	
	Atriplex canescens Four Wing Saltbush	37	64	5 Gal	5' X 8'	
	Celtis pallida Desert Hackberry	14	41	5 Gal	5' X 8'	
	Dodonaea viscosa Hopbush	18	45	5 Gal	6' X 8'	
	Lycium andersonii Wolfberry	13	40	5 Gal	5' X 8'	
	Muhlenbergia rigens Deer Grass	21	48	5 Gal	3' X 4'	
	Zizyphus obtusifolia Graythorn	21	48	5 Gal	5' X 8'	

SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MATURE SIZE H X W	OUTLETS/ EMITTER/ TOTAL GPH
	Opuntia engelmannii Engelmann's Prickly Pear	14	41	3 PAD MIN. ROOTED	4' X 5'	
	Opuntia versicolor Cholla	9	36	5 Gal	6' X 5'	

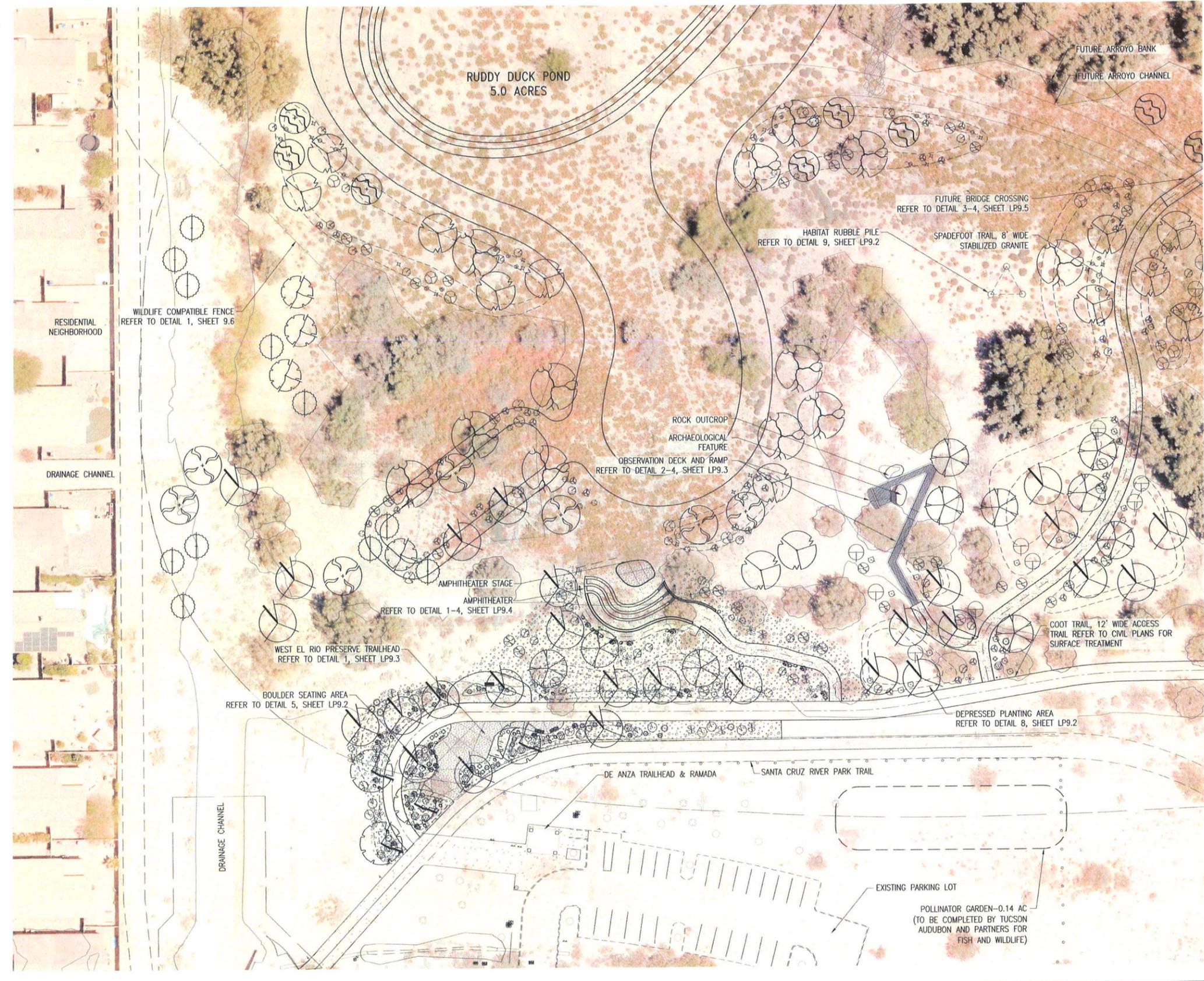
PLANT MATERIAL LEGEND 1  
RIPARIAN

SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MIN. H/ CALIPER	OUTLETS/ EMITTER/ TOTAL GPH
	Celtis reticulata Western Hackberry	13	30	15 Gal	5'/0.5"	
	Populus fremontii Cottonwood	20	36	15 Gal	5'/0.5"	
	Salix gooddingii Goodding's Willow	15	31	15 Gal	5'/0.75"	
	Sapindus saponaria var. drummondii Western SoapBerry	15	28	15 Gal	5'/0.5"	

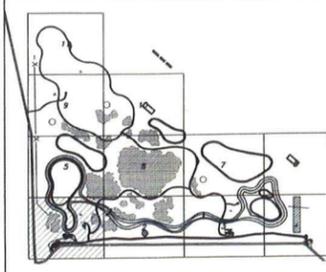
SYMBOL	BOTANICAL NAME COMMON NAME	QTY PHS 1	QTY TOTAL	CONTAINER SIZE	MATURE SIZE H X W	OUTLETS/ EMITTER/ TOTAL GPH
	Atriplex canescens Four Wing Saltbush	25	47	5 Gal	5' X 8'	
	Celtis pallida Desert Hackberry	17	39	5 Gal	5' X 8'	
	Cephalanthus occidentalis Buttonbush	12	34	5 Gal	5' X 8'	
	Lycium andersonii Wolfberry	31	54	5 Gal	5' X 6'	
	Muhlenbergia rigens Deer Grass	35	57	5 Gal	3' X 4'	
	Muhlenbergia parteri Bush muhly	48	70	5 Gal	2' X 3'	
	Ruellia nudiflora Wild Petunia	19	41	5 Gal	2' X 2'	
	Siphonoglossa longiflora Longflower Tubetongue	12	34	5 Gal	2' X 3'	
	Vitis orizonica Canyon Grape	12	34	5 Gal	8' X 8'	

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FILE:W\El\_Rio\_Preserve-17801-bata\Sheet\_Files



↑ WATER SOURCE = IRRIGATION LINE TURN-OUT



**PLANT MATERIAL LEGEND - TREES**

LEGEND 1 - RIPARIAN

SYMBOL	BOTANICAL NAME COMMON NAME
	<i>Celtis reticulata</i> Western Hackberry
	<i>Populus fremontii</i> Cottonwood
	<i>Salix goodingii</i> Gooding's Willow
	<i>Sapindus saponaria</i> var. <i>drummondii</i> Western Soapberry

LEGEND 2 - WOODLAND

SYMBOL	BOTANICAL NAME COMMON NAME
	<i>Celtis reticulata</i> Western Hackberry
	<i>Cercidium floridum</i> Blue Palo Verde
	<i>Chilopsis linearis</i> Desert Willow
	<i>Acacia greggii</i> Cat Claw Acacia

LEGEND 3 - DESERT SCRUB

SYMBOL	BOTANICAL NAME COMMON NAME
	<i>Acacia greggii</i> Catclaw Acacia
	<i>Cercidium microphyllum</i> Foothills Palo Verde

**HARDSCAPE MATERIALS SCHEDULE**

SYMBOL	ITEM	DETAIL
	Depressed Planting Area	8/LP9.2
	Existing Vegetation to Remain in Place	N/A
	Stabilized Granite	1/LP9.2
	Desert Cobble	6/LP9.2
	Rock Mulch	
	Boulders	4/LP9.2
	Premanufactured Bench	2/LP9.1
	Trash Receptacle	4/LP9.1
	Dog Waste Station	5/LP9.1
	Bicycle Rack	3/LP9.1
	Wayfinding Signage	
	Interpretive Signage	
	Kestrel Box	3/LP9.2
	Habitat Rubble Pile Group	9/LP9.2



**OWNER:**  
TOWN OF MARANA  
ENVIRONMENTAL PROJECTS MANAGER  
11555 W CIVIC CENTER DRIVE  
MARANA, AZ 85653  
CONTACT: JANNIE SPENCER  
P. 520.382.2679

**CIVIL ENGINEER:**  
DIBBLE ENGINEERING  
177 NORTH CHURCH AVE  
SUITE 711  
TUCSON, AZ 85701  
CONTACT: GREG VEGA, PE  
P. 520.495.4065

**LANDSCAPE ARCHITECT:**  
WHEAT DESIGN GROUP  
500 NORTH TUCSON BLVD  
SUITE 150  
TUCSON, AZ 85716  
CONTACT: LAURA MELCAREK, RLA  
P. 520.884.7911

**EL RIO RIPARIAN RESTORATION**  
10190 N COACHLINE BLVD, TUCSON, AZ 85743  
**DRAINAGE IMPROVEMENTS**

**WHEAT DESIGN GROUP**  
LANDSCAPE ARCHITECTS  
500 N TUCSON BLVD, SUITE 150, TUCSON, ARIZONA 85716  
T: 520 884 7911 WWW.WHEATDESIGNGROUP.COM

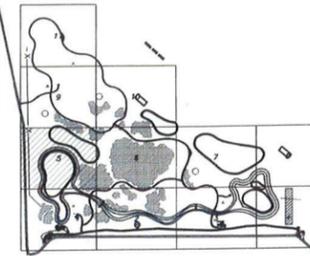
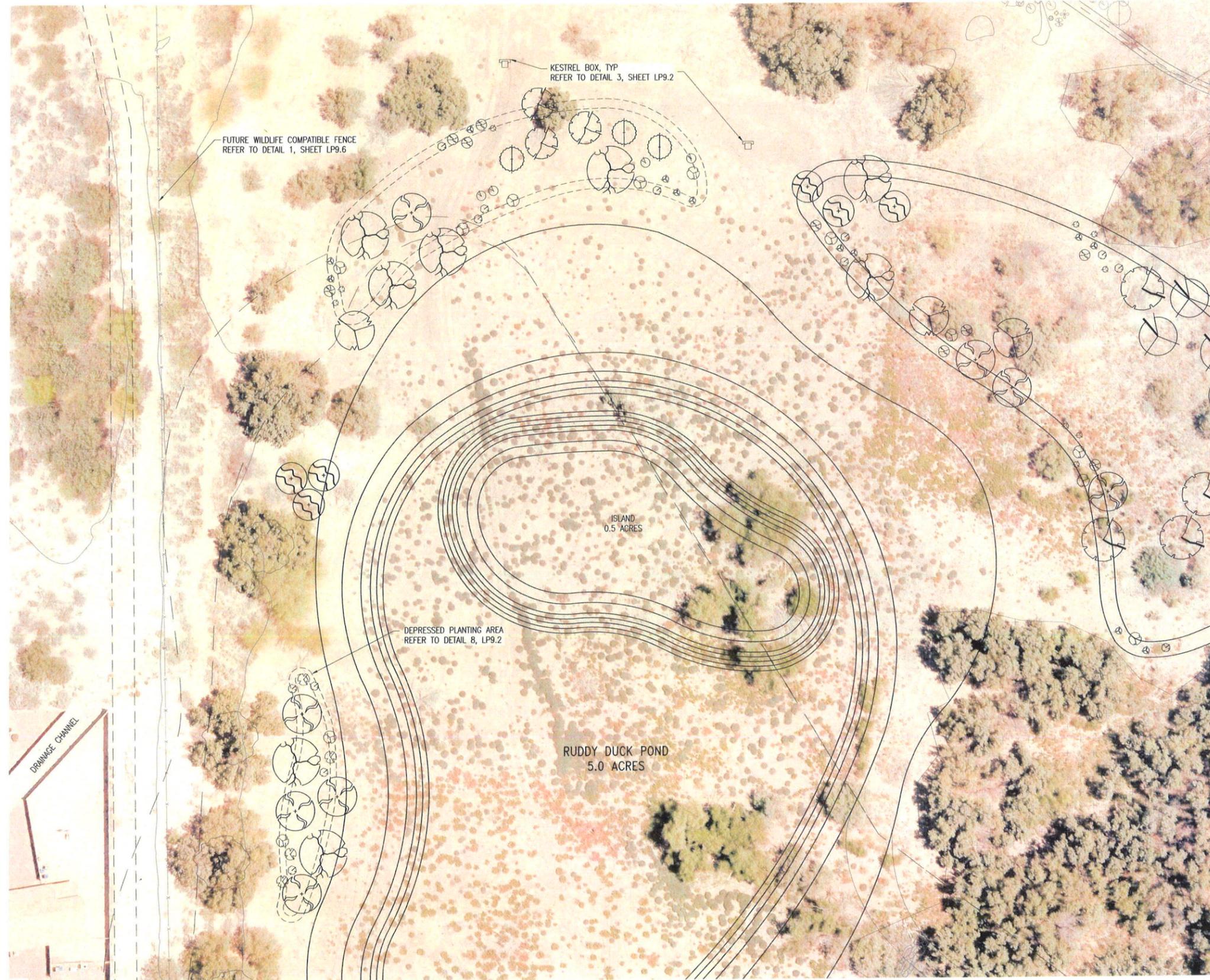
Project No: **1015052.04**  
Designed: AS, CM Date: 03/2018  
Drawn: AS, CM Date: 03/2018  
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Landscape Plan  
Drawing Title  
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Dwg No. LP5.0



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**MARANA AZ**

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**PLANT MATERIAL LEGEND - TREES**

LEGEND 1 - RIPARIAN

SYMBOL	BOTANICAL NAME COMMON NAME
	<i>Celtis reticulata</i> Western Hackberry
	<i>Populus fremontii</i> Cottonwood
	<i>Salix gooddingii</i> Goodding's Willow
	<i>Sapindus saponaria</i> var. <i>drummondii</i> Western SoapBerry

LEGEND 2 - MESQUITE WOODLAND

SYMBOL	BOTANICAL NAME COMMON NAME
	<i>Celtis reticulata</i> Western Hackberry
	<i>Cercidium floridum</i> Blue Palo Verde
	<i>Chilopsis linearis</i> Desert Willow
	<i>Acacia greggii</i> Catclaw Acacia

LEGEND 3 - DESERT SCRUB

SYMBOL	BOTANICAL NAME COMMON NAME
	<i>Acacia greggii</i> Catclaw Acacia
	<i>Cercidium microphyllum</i> Foothills Palo Verde

**HARDSCAPE MATERIALS SCHEDULE**

SYMBOL	ITEM	DETAIL
	Depressed Planting Area	8/LP9.2
	Existing Vegetation to Remain in Place	N/A
	Stabilized Granite	1/LP9.2
	Desert Cobble	6/LP9.2
	Rock Mulch	
	Boulders	4/LP9.2
	Premanufactured Bench	2/LP9.1
	Trash Receptacle	4/LP9.1
	Dog Waste Station	5/LP9.1
	Bicycle Rack	3/LP9.1
	Wayfinding Signage	
	Interpretive Signage	
	Kestrel Box	3/LP9.2
	Habitat Rubble Pile Group	9/LP9.2



**EL RIO RIPARIAN RESTORATION**  
10190 N COACHLINE BLVD, TUCSON, AZ 85743

**DRAINAGE IMPROVEMENTS**

**WHEAT DESIGN GROUP**  
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Project No.: **1015052.04**

Designed: AS, CM Date: 05/20/17  
Drawn: AS, CM Date: 05/20/17  
Checked: LM Date: 05/20/17

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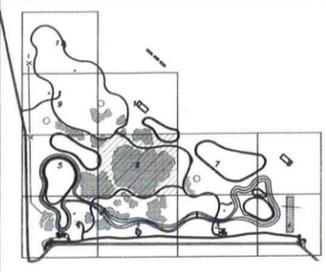
Landscape Plan

Drawing Title

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**MARANA AZ**

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	<i>Salix gooddingii</i> Goodding's Willow
	<i>Sapindus saponaria</i> var. <i>drummondii</i> Western SoapBerry

**LEGEND 2 - WOODLAND**

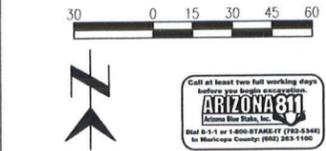
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**LEGEND 3 - DESERT SCRUB**

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**HARDSCAPE MATERIALS SCHEDULE**

SYMBOL	ITEM	DETAIL
	Depressed Planting Area	8/LP9.2
	Existing Vegetation to Remain in Place	N/A
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	Boulders	4/LP9.2
	Premanufactured Bench	2/LP9.1
	Trash Receptacle	4/LP9.1
	Dog Waste Station	5/LP9.1
	Bicycle Rack	3/LP9.1
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	Interpretive Signage	
	Kestrel Box	3/LP9.2
	Habitat Rubble Pile Group	9/LP9.2



**EL RIO RIPARIAN RESTORATION**  
10190 N COACHLINE BLVD, TUCSON, AZ 85743

**DRAINAGE IMPROVEMENTS**

Issued for: \_\_\_\_\_  
Revised for: \_\_\_\_\_

**WHEAT DESIGN GROUP**  
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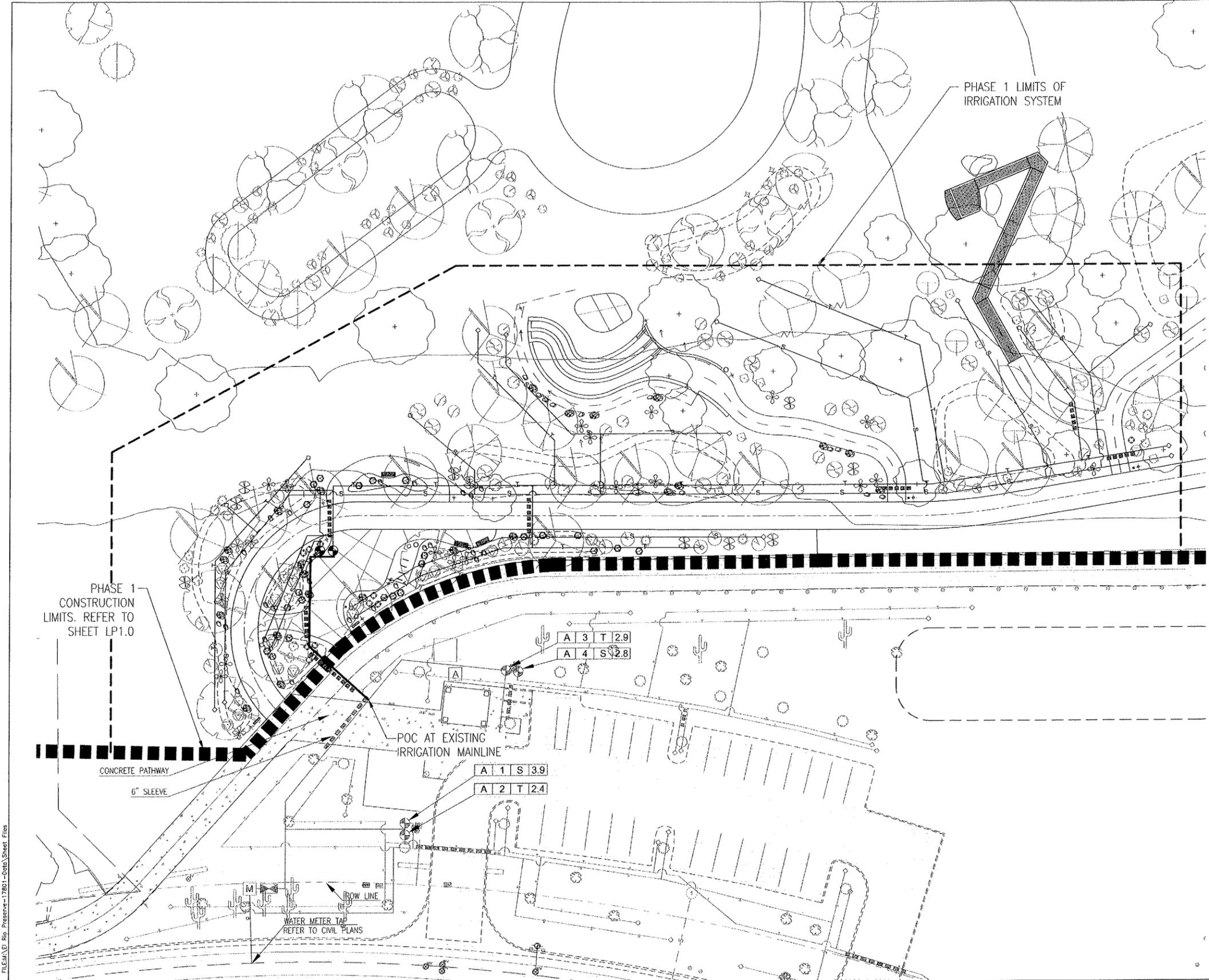
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Designed: AS CM Date: 07/20/17  
Drawn: AS CM Date: 07/20/17  
Checked: LM Date: 07/20/17

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OR RECORDING

Landscape Plan

Drawing Title: \_\_\_\_\_  
Scale: 1"=30'  
Dwg No: LP8.0





IRRIGATION SCHEDULE		
SYMBOL	ITEM	SIZE
A	Solar Controller (Wall Mount) Existing - 4 Stations in use for Anza Trailhead	6-STA
M	Existing Water Meter	5/8"
⊠	Reduced Pressure Backflow Prevention Assembly (Existing)	3/4"
Ⓜ	Master Valve Assembly	1 1/2"
⊕	Control Valve (Remote) (Electric) with Filter and Pressure Regulator	1"
⊗	Mainline Isolation Ball Valve Assembly	1 1/2"
◊	Lateral End Cap Assembly	
—	Unconnected Pipe Crossing	
—	Mainline Pipe Sch 40 PVC	1"
—T	Lateral Line (Tree), Sch 40 PVC	3/4"
—S	Lateral Line (Shrub), Sch 40 PVC	3/4"
	Sleeve, 4" Sch 40 PVC	2"
	Sleeve, 4" Sch 40 PVC	4"
Not Shown	Emitter Assembly (Multi-port)	N/A
A-1	Valve Call-out	
1.0	A-1 - Controller Station I.D.	N/A
T	1.0 Valve Flow (GPM)	
T	1" - Size	
T	T - Tree or Shrub	

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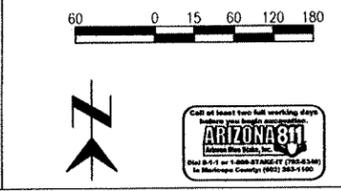
**EL RIO RIPARIAN RESTORATION**  
10190 N COACHLINE BLVD, TUCSON, AZ 85743

**DRAINAGE IMPROVEMENTS**

Project No.: 1015052.04

Designed: AS, CM Date: 09/20/17  
Drawn: AS, CM Date: 09/20/17  
Checked: LM Date: 09/20/17

- IRRIGATION NOTES:**
- Irrigation plans are schematic. Actual pipe and equipment shall be located in landscape areas inside disturbed area and shall be located in the field and approved prior to installation.
  - Source water pressure at point-of-connection to be as shown on plans. System is designed for 20 psi minimum at last emitter. Contractor to verify operating pressure prior to installation.
  - Trees and shrubs/cacti will be stationed separately.
  - All sleeves shall be as noted on plans. Sleeves shall be Schedule 40 PVC unless otherwise noted. Extend all sleeves 12" beyond pavement or stabilized path edge.
  - All control wire to have a separate 2" conduit under paved surfaces.
  - Contractor shall repair any damage to existing irrigation system.



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**Irrigation Plan**

Drawing Title

Scale 1"=30'

Dwg No. IR1.0

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March 27, 2018

AZ Department of Environmental Quality and Town of Marana Meeting

RE: El Rio Preserve Riparian Restoration Project and Water Quality

Present: Lavinia Wright, Jacqueline Maye, Swathi Kasanneni, and Andy Koester, ADEQ;  
John Kmiec, Jim Conroy, Paula Bluemer and Janine Spencer, Marana

The El Rio Preserve is an old ADOT borrow pit of approximately 103 acres, along the west side of the Santa Cruz River. The 90% plans, provided by email and at the meeting, include connecting to the Cortaro-Marana Irrigation District (CMID) pipeline to the south of the property and conveying water to maintain the pond that dries out occasionally. The CMID water source is untreated groundwater. Pima County is designing bank protection between the river and the preserve, and construction will begin early fall of 2019. Phase I of the project will include a settling pond leading to a 5-acre lined pond, drywells, a trail, a wildlife viewing area, benches, invasive species removal, per the plan developed with the State Forestry Dept., water harvesting basins, planting native species, and an irrigation system to supplement water harvesting.

There are 238 species of birds recorded at the site and it is important riparian habitat. Partners for Fish & Wildlife has provided grant funding for a pollinator garden at the trailhead parking lot. The 54-mile Tucson Loop Trail connects to El Rio Preserve.

The existing natural pond appears to be mostly impermeable; however, when we deepen part of the pond to 5-6 feet we may reach a permeable layer, so the pond may be lined with ESS13 pond liner [by Seepage Control Co. – also used for Tempe Town Lake], or a similar product. It would take about 15 ac-ft. to fill the 5-acre pond, and water would be added a couple of times per year to replace evaporation.

The AZ Game and Fish Dept. (AZGFD) has jurisdiction over wildlife in Arizona, unless it is listed as threatened or endangered by the US Fish and Wildlife Service. There are no records of federally listed species on site. [The Town is performing two years of yellow-billed cuckoo and SW willow flycatcher clearance surveys prior to construction of bank protection.] AZGFD has approached to Town with the intent of stocking the pond with native Gila topminnows, which were recently found in the upper Santa Cruz River. If the pond is stocked with native fish, AZGFD will monitor water quality related to fish survival.

May 27, 2018  
El Rio Preserve

Town staff met with Kevin Grove, US Army Corps of Engineers, in Tucson [Jan. 19, 2017]. Mr. Grove stated that since the El Rio Preserve was within a floodplain area, but no longer connected with the Santa Cruz River, the Corps would not take jurisdiction over the area inundated by overflows from the Santa Cruz River (see attached memo from that meeting).

Through discussion among the group, it was determined that the pond liner will eliminate any subsurface connection to the Santa Cruz River. ADEQ said that adding enough water to keep a small amount in the pond during the dry season, prior to bank protection, would not be likely to flow into the river and would not be a concern. It was recommended that Marana keep record of storm event, photos, and record the amounts and timing of any water additions. No monitoring or permits will be necessary.

BMPs include the County bank protection, which will not include any conveyance to the river. Per the 90% plans developed through a grant from the Water Infrastructure Financing Authority, there will be water harvesting basins and 3 drywells on the site.

ADEQ recommended the concrete-lined drainage channels that run into El Rio Preserve should be added to the cartography for Marana's MS-4 Permit. El Rio acts as a retention basin during storms.

It was recommended by ADEQ that the Town model what storm flow would be required to flood El Rio to the point that it overflowed into the river. [Update – I spoke with Dibble Engineering, and this will be possible once Pima County Flood Control is far enough along in their design process to determine the height of the bank protection.]



**TOWN OF MARANA  
BIOLOGICAL ASSESSMENT AND EVALUATION**

**for the**

**EL RIO PRESERVE RIPARIAN RESTORATION PROJECT**



JANUARY 10, 2017

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## 1. PROJECT LOCATION

The subject property is vacant land located in the floodway of the Santa Cruz River, known as the El Rio Open Space Preserve. The property is an abandoned gravel pit, now owned by the Town of Marana, Pima County, which consists of three parcels. The legal description is as follows: NE4 NE4 40 Ac Sec. 17 -12-12; NW 4 NE4 40 Ac Sec.17-12-12; and Tri Pcl. in SW Cor S2 SE4 24.93 Ac Sec 08-12-12 (Fig. 1). The site acts as a water retention basin during floods and the two southern parcels are often inundated for extended periods. The elevation ranges from 2,070 to 2,080 feet and there are berms along the eastern and southern boundaries.

Throughout this Biological Evaluation, the term "project limits" is used to represent the construction footprint (area of disturbance), while the term "project area" also includes surrounding lands, outside but adjacent to the project limits. The term "project vicinity" is used to denote a more expansive landscape context.

## 2. PROJECT DESCRIPTION

This is a riparian restoration project, intended to ensure that quality riparian/wetland habitat is maintained year-round. Currently, wetlands are ephemeral, dependent on flooding from the Santa Cruz River, through a breach in the gravel pit berm that was compromised during storms in 2014, and invasive species predominate. The site floods periodically, and becomes a backwater of trash, woody debris, and seeds from invasive species such as Sahara mustard (*Brassica tournefortii*) tamarisk (*Tamarix* sp.), buffelgrass (*Pennisetum ciliare*) and cocklebur (*Xanthium strumarium*) and Mexican paloverde (*Parkinsonia aculeate*). It also becomes a breeding area for mosquitos and adjacent subdivision residents complain of insects and smelly, stagnant water.

The primary goals for this site are to: (1) create a natural preserve to maintain and improve the site as wildlife habitat and linkage; (2) eliminate off-road vehicle and other non-sanctioned uses (for example, shooting, archery, paintball, dumping); (3) avoid disturbance to cultural resources in the area; (4) monitor invasive non-native species and remove except for the large tamarisk, as described below; (5) control mosquitos (6) create an area where citizens can enjoy nature and where school classrooms can visit as part of their nature and biology studies; (7) manage fire threats; and (8) maintain the berm that separates El Rio Open Space from the Santa Cruz River in order to create an area with permanent ponds and more native vegetation.

Elements of the riparian restoration plan and proposed improvements will include:

- Restoring the berm that separates the project site from the river
- Removing some invasive species and planting/seeding native vegetation
- Constructing water harvesting basins and berms and for the pond(s)
- Constructing two lined ponds (2 ac each, with depth varying from 10 inches to 6 feet) with solar water recirculating devices to eliminate mosquito problems
- Building a natural trail through the site, a half-mile ADA-accessible pathway
- Adding interpretive signage describing water harvesting techniques and the importance of riparian habitat
- Installing bird-watching blinds, benches, picnic tables, and a ramada on the uplands

Structures will be minimal so they can be replaced or repaired when large storm events occur. Fencing will be installed, with U-chicane gates to allow only pedestrian access. Ground disturbance will impact approximately 50 acres of the site. A Preliminary Concept Plan is located in Appendix D. Construction access will be from an existing dirt road at the southeast corner of the property. Vegetation removal will only include removal of non-native Sahara mustard, tamarisk, buffelgrass, and cocklebur. Large tamarisk trees will be preserved as wildlife habitat until a plan is developed to replace tamarisk, in phases, with native trees and shrubs. A 404 Clean Water Permit will be necessary for this work. A cultural resources survey is also being completed by a consulting firm.

Since more than one acre of soil will be disturbed, a 402 permit will be obtained through ADEQ and a stormwater pollution prevention plan (SWPPP) will be created and implemented. The disturbance is within ¼ mile of the Santa Cruz River, an impaired water, so ADEQ will review and approve the SWPPP.

### **3. LOCATION DESCRIPTION**

El Rio Preserve is located along the Santa Cruz River in the Town of Marana, Pima County, Arizona. It is north of Tucson, and west of I-10, just north of Coachline Road and east of Silverbell Road. The floodplain was initially degraded when ADOT used the site as a borrow pit. There are subdivisions on the southeast and western borders of the project site, and the Santa Cruz River borders the eastern and northeastern perimeters. The site is bounded to the west by the Tucson Mountains, to the east by the Santa Cruz River. Three large drainage canals empty stormwater into the site, which acts as a retention basin. When the area floods, stagnant water, invasive species, mosquitos, erosion, trash and sedimentation become a problem.

The Town purchased the property in 2003, and Town Council designated it as a Preserve in 2015. The non-engineered berm between El Rio and the Santa Cruz River first washed out in 2014 and the repaired berm washed out again in 2016.

El Rio Preserve is in the Arizona Upland subdivision of the Sonoran desertscrub biotic community (Brown and Lowe 1980). Lowland vegetation in the old borrow pit consists mainly of non-native tamarisk, cocklebur and Johnson grass, with some velvet mesquite (*Prosopis velutina*) and native willow (*Salix gooddingii*). Upland vegetation includes mesquite, paloverde, four-wing saltbush (*Atriplex canescens*), and desert broom (*Baccharis sarothroides*).

Soils include Gila sandy loam, Gila loam, Grabe loam, Grabe silty clay loam and rock land. Between floods, the area dries completely, making it difficult for native species to survive the prolonged cycles of inundation and drying.

Figure 1. Location Map



#### 4. SPECIES IDENTIFICATION

The following list of species from the U.S. Fish and Wildlife Service (USFWS) threatened, endangered, proposed, and candidate species listed in Table One was generated from the IpaC website (<https://ecos.fws.gov/ipac/>). No designated or proposed critical habitat is located in or near the project limits.

**Table 1. Species that may occur in the project area.**

Common Name	Scientific Name	Status
California least tern	<i>Sterna antillarum browni</i>	Endangered
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Threatened
Lesser Long-nosed Bat	<i>Leptonycteris curasoae yerbabuena</i>	Endangered
Northern Mexican Gartersnake	<i>Thamnophis eques megalops</i>	Threatened

Species included in the USFWS list, but excluded from further evaluation are addressed in Table Two. This project will have no effect to the species listed in this table.

**Table 2. Species excluded from further consideration**

Common Name	Scientific Name	Status	Exclusion Justification
Jaguar	<i>Panthera onca</i>	Endangered	Recent sightings in Arizona recorded at 5,200 and 5,700 feet (1586 and 1739 meters).
Sonoran Pronghorn	<i>Antilocapra americana</i>	Experimental, Non-essential Population	Prefer open grass-shrub lands without tree cover.
Sonoyta mud turtle	<i>Kinosternon sonoriense longifemorale</i>	Proposed Endangered	Sonoyta mud turtle has been reduced to a single reservoir, Quitobaquito Springs, at Organ Pipe Cactus National Monument in the U.S. and occurs in 4 locations in Mexico

## 5. SPECIES EVALUATION

### California Least Tern

#### Life History Information

Habitat consists of seacoasts, beaches, bays, estuaries, lagoons, lakes and rivers, breeding on sandy or gravelly beaches and banks of rivers or lakes, rarely on flat rooftops of buildings. This species nests in a shallow scrape in sand, soil, or pebbles on the ground.

Least Tern populations have declined by about 88% between 1966 and 2015, according to the North American Breeding Bird Survey. The North American Waterbird Conservation Plan estimates a continental population of 60,000-100,000 breeding birds, and lists it as a Species of High Concern (Cornell Lab of Ornithology website accessed 11-30-2016 at: [https://www.allaboutbirds.org/guide/Least\\_Tern/lifehistory](https://www.allaboutbirds.org/guide/Least_Tern/lifehistory)). Habitat loss or degradation associated with dams, channelization, water diversion and other changes in vegetation resulting from controlled water flow have eliminated most historical least tern habitat. Coastal or shoreline nesting habitat continues to be replaced by urban development and other human activities, which also increases their vulnerability to predation.

#### Survey History (if applicable)

A least tern was documented at El Rio Open Space on May 22, 2015, by Tyler Loomis, and recorded on the ebird website. The website was accessed on November 30, 2016 at:

<http://ebird.org/ebird/GuideMe?cmd=decisionPage&getLocations=hotspots&hotspots=L350281&yr=all&m=> ). No formal surveys have been completed for this species.

#### Habitat Evaluation and Suitability

Currently, wetland habitat at El Rio Open Space is seasonal and therefore suitable for least terns only when there is water and feeding opportunities. The project limits periodically dry out completely during dry seasons, so nesting is unlikely.

#### Analysis and Determination of Effects

The proposed project may affect, but is not likely to adversely affect the California least tern. The least tern was incidentally observed at this site by a birder in 2015. This proposed riparian restoration project will enhance potential habitat by ensuring that surface water and native vegetation is available year-round. Fish (non-native) are present in the adjacent Santa Cruz River for tern foraging. Grading and forming lined ponds will increase noise and disturbance of the area for approximately six months. Staging will occur at the southwest corner of the project, above the gravel pit. There are currently unsanctioned trails through the site; installing a perimeter fence and creating designated pathways is expected to reduce human disturbance in sensitive areas on the site.

## **Western Yellow-billed Cuckoo**

### Life History Information

Yellow-billed Cuckoos inhabit wooded riparian habitat with dense cover and water nearby. In the Southwest, yellow-billed cuckoos are rare breeders in riparian woodlands of willows (*Salix* sp.), cottonwoods (*Populus fremontii*) and dense stands of mesquite to breed, at elevations ranging from 90 to 6,710 feet in Arizona. They tend to forage on caterpillars, frogs, lizards, ants, beetles, wasps, flies, berries and fruit (AZGFD 2002).

Suitable habitats west of the Continental Divide, is limited to narrow, and often widely separated, riparian cottonwood-willow galleries; salt cedar is also used by cuckoos. Dense understory foliage appears to be an important factor in nest site selection (USFWS accessed 10-31-2011). In addition to cottonwood-willow galleries, cuckoos in Arizona can be found in larger mesquite bosques. They are rarely observed as transients in xeric desert or urban settings (ibid.)

### Survey History (if applicable)

The site is heavily birded and is an Important Bird Area survey site; however, no yellow-billed cuckoos have been reported here to date. Surveys will be completed for yellow-billed cuckoos at El Rio Open Space in 2017, according to current protocol.

### Habitat Evaluation and Suitability

The El Rio site is located between two subdivisions, but has some dense tamarisk with willows interspersed that may be suitable for migrating cuckoos but is not ideal for breeding. Currently, the site only has water at or near the surface intermittently. The project limits periodically dry out completely during dry seasons, so nesting is unlikely.

### Analysis and Determination of Effects

The proposed project may affect, but is not likely to adversely affect the yellow-billed cuckoo. This proposed riparian restoration project will enhance potential habitat by ensuring that surface water and native species habitat is available year-round.

Grading and forming lined ponds will increase noise and disturbance of the area for approximately six months. Staging will occur at the southwest corner of the project, above the gravel pit. There are currently unsanctioned trails through the site; installing perimeter fencing and creating designated pathways is expected to reduce human disturbance in sensitive areas on the site.

## **Lesser Long-nosed Bat**

### Life History Information

The Lesser Long-nosed bat is considered an important pollinator of various agave species and

columnar cacti. Their spring migration from central Mexico northward is thought to follow the sequential blooming of certain flowers from south to north. They roost in desert grassland and shrubland up to the oak transition; mainly in caves and mine tunnels (AZGFD 2011).

They inhabit elevations below about 3,500 feet (1,068 m) from April to at least July/August. Range expands to include areas up to about 5,500 feet (1,678 m) from about July to late September or October. Based on records in the Heritage Data Management System, elevation ranges from 1,190 - 7,320 ft. (363 - 2,233 m; *ibid.*).

#### Survey History (if applicable)

No surveys have been completed at El Rio for lesser long-nosed bats since there is no suitable habitat present.

#### Habitat Evaluation and Suitability

Suitable habitat is not present at this site. There are saguaro in the nearby Tucson Mountains, suitable for foraging bats; however, there are no columnar cacti or agave within the El Rio project limits. The nearest known roost sites are in the Santa Catalina Mountains.

#### Analysis and Determination of Effects

The proposed El Rio Riparian Restoration Project will have no effect on the lesser long-nosed bat or its habitat.

### **Northern Mexican Garter Snake**

#### Life History Information

The Northern Mexican garter snake is associated with perennial water throughout south-central and southeastern Arizona, far western New Mexico in the U.S., and south to Oaxaca, Mexico. It is found in the Lower and Upper Sonoran Life Zones, at elevations from 1,739 to 6,152 ft. (530 to 1875 m). It is usually found within 50 ft. (15 m) of permanent water in areas of lush vegetation growth. Riparian areas, ponds, and cienegas are important habitats for the Mexican garter snake. It is most abundant in densely vegetative habitat (AZGFD 2012).

The northern Mexican gartersnake is considered a riparian obligate except when dispersing, and occurs mainly in the following general habitat types: (1) mid-elevation wetlands or stock tanks with highly organic soils, (2) large riparian woodlands and forests along rivers and (3) streamside broadleaf deciduous gallery with little-to-no ground cover (*ibid.*).

#### Survey History (if applicable)

This snake has not been documented within three miles of the project limits, according to the AZGFD Habitat Data Management System (HDMS). The current distribution of this species within the U.S. is believed to be constrained to the middle/upper Verde River

drainage, middle/lower Tonto Creek, and the Cienega Creek drainage, as well as in a small number of isolated wetland habitats in southeastern Arizona.

In 2007, AZGFD performed a reptile and amphibian survey on the Lower Santa Cruz River and found some bullfrogs in pools, as well as 20 checkered garter snakes, but no Mexican garter snakes (D. Abbate, AZGFD pers. comm.).

#### Habitat Evaluation and Suitability

Potentially suitable habitat occurs along the Santa Cruz River sections that have permanent water due to effluent flow, although AZGFD HDMS has no known records of occurrence. The El Rio project limits are currently only wet ephemerally; drying out during parts of the year, which makes the area unlikely to support the garter snake that is found near permanent water sources.

#### Analysis and Determination of Effects

The proposed activity will have no effect the Northern Mexican garter snake because it is not documented in the area and currently habitat is not suitable due to lack of water during parts of the year. The riparian restoration project will provide permanent water in lined ponds; however, thick vegetation such as reeds, cattails, etc. will not be planted because of the mosquito problems in the area, so this garter snake species is unlikely to occur after the project is completed.

### **6. MITIGATION MEASURES**

Surveys for yellow-billed cuckoo will be completed in 2017, according to protocol.

This project is planned to enhance riparian habitat, which will benefit species such as the yellow-billed cuckoo, California least tern, and potentially, the Mexican garter snake.

- Areas of non-native vegetation will be removed and native plants will be planted or seeded. Stormwater harvesting methods will be utilized to capture water for the plantings and will be supplemented with a drip irrigation system
- Permanent surface water will be constructed which will be beneficial to wildlife that use the regionally-identified wildlife linkage
- Fencing the perimeter will reduce unsanctioned off-road vehicle use and other illegal activities, which will protect the area for wildlife
- A number of unofficial trails through the site will be closed, and one well-defined trail will be created with a natural surface, to reduce impacts to wildlife

## 7. COORDINATION

Cheri Boucher, AZGFD, sent letter of support, dated November 30, 2016.  
AZGFD Online Review Tool accessed on November 15, 2016.

Ross Timmons, AZGFD, sent letter of support, dated January 4, 2014.

Scott Richardson, U.S. Fish and Wildlife Service  
U.S. Fish and Wildlife Service IPaC Trust Resources Report accessed on November 16, 2016

## 8. LITERATURE CITED

Arizona Game and Fish Department. 2012. Northern Mexican garter snake (*Thamnophis eques megalops*) Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.

Arizona Game and Fish Department. 2011. Lesser long-nosed bat (*Leptonycteris yerbabuenae*) Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 9 pp.

Arizona Game and Fish Department. 2004. Tumamoc globeberry (*Tumamoca macdougallii*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

Arizona Game and Fish Department. 2002. Western yellow-billed cuckoo (*Coccyzus americanus*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.

Brown, D.E. and C. Lowe. 1980. Biotic communities of the Southwest. Gen. Tech. Report RM-78. Fort Collins, CO. Map plus 342 pp.

The Cornell Lab of Ornithology. accessed November 16, 2016.  
[https://www.allaboutbirds.org/guide/Least\\_Tern/lifehistory](https://www.allaboutbirds.org/guide/Least_Tern/lifehistory)

US Fish and Wildlife Service. IPaC - Information for Planning and Conservation (<https://ecos.fws.gov/ipac/>): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process. Generated November 16, 2016 08:50 AM MST, IPaC v3.0.9.

## 9. SIGNATURE

This Biological Evaluation has been prepared and submitted by:

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Janine A. Spencer-Glasson, MA  
Environmental Projects Manager  
Town of Marana

## APPENDIX A

### I. State Sensitive Species

The Arizona Game and Fish Department (AGFD) on-line environmental review tool was accessed to determine special status species known to occur in the project vicinity. As part of the environmental review process, a Project Evaluation Request Form was emailed AZGFD at: [pep@azgfd.gov](mailto:pep@azgfd.gov) on November 16, 2016. The form requested any specific concerns, suggestions or recommendations the agency may have related to the project.

The AGFD on-line environmental review tool included a list of special status species known to occur within the project vicinity, and AZGFD returned a response letter stating that the agency supports the project, with no further recommendations.

The online review tool also stated that one or more listed, proposed, or candidate species or Critical Habitat have been documented in the vicinity of the project, and recommended that the U.S. Fish and Wildlife Service be contacted.

The AZGFD online review tool further indicated that Sonoran Desert tortoises have been documented within the vicinity of the project, and recommended review of the AZGFD Tortoise Handling guidelines. Maintaining wildlife linkages corridors and planning to retain opportunities for wildlife permeability were recommended.

#### AZGFD Special Status Species and Special Areas Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGC N
<i>Aquila chrysaetos</i>	Golden Eagle	BGA		S		1B
<i>Chionactis occipitalis klauberi</i>	Tucson Shovel-nosed Snake	SC				1A
Coyote - Ironwood - Tucson Linkage Design Wildlife Corridor						
<i>Glaucidium brasilianum cactorum</i>	Cactus Ferruginous Pygmy-owl	SC	S	S		1B
<i>Gopherus morafkai</i>	Sonoran Desert Tortoise	CC A	S			1A
Tucson - Tortolita - Santa Catalina Mts. Linkage Design Wildlife Corridor						
<i>Tumamoca macdougallii</i>	Tumamoc Globeberry		S	S	SR	

Golden eagles, Sonoran desert tortoise, and cactus ferruginous pygmy-owls were likely located in the Tucson Mountains just to the west of El Rio Preserve, but are highly unlikely to occur in the project limits, since the site is an old, lowland gravel pit with riparian habitat that currently consists mainly of non-native species.

One of the goals of the proposed riparian restoration project is to protect and enhance the wildlife linkage corridors mentioned in the online review tool, through removal of some invasive non-native species, planting native species, and creating a permanent water source. This will improve habitat for species associated with riparian vegetation and wetlands.

## **II. Protected Native Plants**

Tumamoc globe-berry is a small, inconspicuous vine that has lobed leaves, produces a small red fruit, and grows from a cluster of tuberous roots. The plant blooms at night during monsoon season, with pale yellow-green flowers. The foliage gives off an unpleasant smell when crushed. The Tumamoc globe-berry occurs in xeric situations, in the shade of a variety of nurse plants along gullies and sandy washes of hills and valleys in Sonoran desertscrub and Sinaloan thornscrub communities (AZGFD 2004). Some growth can occur in April-June (depending on tuber size), but most growth occurs in response to summer rains. The El Rio Project limits are not xeric, and therefore, no surveys have been performed.

## **III. Migratory Birds - Migratory Bird Treaty Act Compliance**

This riparian restoration project is intended to improve riparian habitat through the removal of non-native, invasive species; planting/seeding of native species; the addition of permanent, circulating ponds; and perimeter fencing. These improvements are expected to be beneficial to migratory and nesting birds such as the Bell's vireo (*Vireo bellii*), snowy egrets (*Egretta thula*), great egrets (*Ardea alba*), white-faced ibis (*Plegadis chihi*), grey hawks (*Buteo plagiatus*), ash-throated flycatchers (*Myiarchus cinerascens*), brown-crested flycatchers (*Myiarchus tyrannulus*), common yellowthroat (*Geothlypis trichas*), Townsend's warbler (*Setophaga townsendi*), yellow-breasted chat (*Icteria virens*), and a total of over 200 bird species have been documented at El Rio Preserve, as recorded on the Cornell Laboratory of Ornithology website: <https://ebird.org/ebird/hotspot/L350281> (Appendix B).

## APPENDIX B – Birds Recorded at El Rio Open Space 1900-2016

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El Rio Open Space Preserve (Coachline Gravel Pit) area  
Date Rang: 1/1 - 12/31, 1900-2016

236 species	
1 Greater White-fronted Goose	51 Red-tailed Hawk
2 Snow Goose	52 Ferruginous Hawk
3 Canada Goose	53 Virginia Rail
4 Wood Duck	54 Sora
5 Gadwall	55 Common Gallinule
6 American Wigeon	56 American Coot
7 Mallard	57 Black-necked Stilt
8 Blue-winged Teal	58 American Avocet
9 Cinnamon Teal	59 Semipalmated Plover
10 Northern Shoveler	60 Killdeer
11 Northern Pintail	61 Spotted Sandpiper
12 Green-winged Teal	62 Solitary Sandpiper
13 Canvasback	63 Greater Yellowlegs
14 Redhead	64 Willet
15 Ring-necked Duck	65 Lesser Yellowlegs
16 Lesser Scaup	66 Marbled Godwit
17 Bufflehead	67 Baird's Sandpiper
18 Common Goldeneye	68 Least Sandpiper
19 Hooded Merganser	69 Pectoral Sandpiper
20 Common Merganser	70 Western Sandpiper
21 Red-breasted Merganser	71 Long-billed Dowitcher
22 Ruddy Duck	72 Wilson's Snipe
23 Gambel's Quail	73 Wilson's Phalarope
24 Pied-billed Grebe	74 Red-necked Phalarope
25 Eared Grebe	75 Bonaparte's Gull
26 Western Grebe	76 Franklin's Gull
27 Neotropic Cormorant	77 Heermann's Gull
28 Double-crested Cormorant	78 Ring-billed Gull
29 American White Pelican	79 California Gull
30 Great Blue Heron	80 Least Tern
31 Great Egret	81 Rock Pigeon
32 Snowy Egret	82 Eurasian Collared-Dove
33 Tricolored Heron	83 Inca Dove
34 Cattle Egret	84 Common Ground-Dove
35 Green Heron	85 White-winged Dove
36 Black-crowned Night-Heron	86 Mourning Dove
37 White-faced Ibis	87 Yellow-billed Cuckoo
38 Black Vulture	88 Greater Roadrunner
39 Turkey Vulture	89 Barn Owl
40 Osprey	90 Western Screech-Owl
41 Golden Eagle	91 Great Horned Owl
42 Northern Harrier	92 Lesser Nighthawk
43 Sharp-shinned Hawk	93 Common Poorwill
44 Cooper's Hawk	94 Vaux's Swift
45 Bald Eagle	95 White-throated Swift
46 Common Black Hawk	96 Black-chinned Hummingbird
47 Harris's Hawk	97 Anna's Hummingbird
48 Gray Hawk	98 Costa's Hummingbird
49 Swainson's Hawk	99 Broad-tailed Hummingbird
50 Zone-tailed Hawk	100 Rufous Hummingbird

## APPENDIX B – CONTINUED - Birds Recorded at El Rio Open Space 1900-2016

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El Rio Open Space Preserve (Coachline Gravel Pit) area  
Date Rang: 1/1 - 12/31, 1900-2016

101 Broad-billed Hummingbird	151 Marsh Wren
102 Belted Kingfisher	152 Bewick's Wren
103 Acorn Woodpecker	153 Cactus Wren
104 Gila Woodpecker	154 Blue-gray Gnatcatcher
105 Yellow-bellied Sapsucker	155 Black-tailed Gnatcatcher
106 Red-naped Sapsucker	156 Ruby-crowned Kinglet
107 Ladder-backed Woodpecker	157 Western Bluebird
108 Northern Flicker	158 Hermit Thrush
109 Gilded Flicker	159 American Robin
110 American Kestrel	160 Gray Catbird
111 Merlin	161 Curve-billed Thrasher
112 Peregrine Falcon	162 Bendire's Thrasher
113 Prairie Falcon	163 Crissal Thrasher
114 Olive-sided Flycatcher	164 Northern Mockingbird
115 Western Wood-Pewee	165 European Starling
116 Willow Flycatcher	166 American Pipit
117 Hammond's Flycatcher	167 Cedar Waxwing
118 Gray Flycatcher	168 Phainopepla
119 Dusky Flycatcher	169 Northern Waterthrush
120 Pacific-slope Flycatcher	170 Black-and-white Warbler
121 Black Phoebe	171 Orange-crowned Warbler
122 Eastern Phoebe	172 Lucy's Warbler
123 Say's Phoebe	173 Nashville Warbler
124 Vermilion Flycatcher	174 MacGillivray's Warbler
125 Ash-throated Flycatcher	175 Common Yellowthroat
126 Brown-crested Flycatcher	176 American Redstart
127 Tropical Kingbird	177 Northern Parula
128 Cassin's Kingbird	178 Yellow Warbler
129 Western Kingbird	179 Yellow-rumped Warbler
130 Loggerhead Shrike	180 Black-throated Gray Warbl
131 Bell's Vireo	181 Townsend's Warbler
132 Plumbeous Vireo	182 Hermit Warbler
133 Cassin's Vireo	183 Wilson's Warbler
134 Hutton's Vireo	184 Painted Redstart
135 Warbling Vireo	185 Yellow-breasted Chat
136 Common Raven	186 Rufous-winged Sparrow
137 Horned Lark	187 Chipping Sparrow
138 Northern Rough-winged Swallow	188 Clay-colored Sparrow
139 Purple Martin	189 Brewer's Sparrow
140 Tree Swallow	190 Black-throated Sparrow
141 Violet-green Swallow	191 Lark Sparrow
142 Bank Swallow	192 Lark Bunting
143 Barn Swallow	193 Fox Sparrow
144 Cliff Swallow	194 Dark-eyed Junco
145 Verdin	195 White-crowned Sparrow
146 Brown Creeper	196 Golden-crowned Sparrow
147 Rock Wren	197 White-throated Sparrow
148 Canyon Wren	198 Vesper Sparrow
149 House Wren	199 Savannah Sparrow
150 Winter Wren	200 Song Sparrow

## **APPENDIX B – CONTINUED - Birds Recorded at El Rio Open Space 1900-2016**

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El Rio Open Space Preserve (Coachline Gravel Pit) area  
Date Rang. 1/1 - 12/31, 1900-2016

- 201 Lincoln's Sparrow
  - 202 Swamp Sparrow
  - 203 Canyon Towhee
  - 204 Abert's Towhee
  - 205 Green-tailed Towhee
  - 206 Spotted Towhee
  - 207 Hepatic Tanager
  - 208 Summer Tanager
  - 209 Western Tanager
  - 210 Northern Cardinal
  - 211 Pyrrhuloxia
  - 212 Rose-breasted Grosbeak
  - 213 Black-headed Grosbeak
  - 214 Blue Grosbeak
  - 215 Lazuli Bunting
  - 216 Indigo Bunting
  - 217 Varied Bunting
  - 218 Painted Bunting
  - 219 Dickcissel
  - 220 Red-winged Blackbird
  - 221 Western Meadowlark
  - 222 Yellow-headed Blackbird
  - 223 Brewer's Blackbird
  - 224 Great-tailed Grackle
  - 225 Bronzed Cowbird
  - 226 Brown-headed Cowbird
  - 227 Hooded Oriole
  - 228 Bullock's Oriole
  - 229 Scott's Oriole
  - 230 House Finch
  - 231 Purple Finch
  - 232 Pine Siskin
  - 233 Lesser Goldfinch
  - 234 Lawrence's Goldfinch
  - 235 American Goldfinch
  - 236 House Sparrow
- © Cornell Lab of Ornithology

**APPENDIX C – SITE PHOTOS**

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Looking due north from southern boundary 12-7-2016



Looking northwest from southern boundary 10-6-2016



Erosion and illegal off-road vehicle tracks, northeast boundary 7-1-2015



Looking southwest 7-1-2015





# El Rio Preserve Riparian Restoration Project

## *IPaC Trust Resources Report*

Generated November 16, 2016 08:50 AM MST, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



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Wetlands .....	<u>9</u>

# IPaC Trust Resources Report



NAME

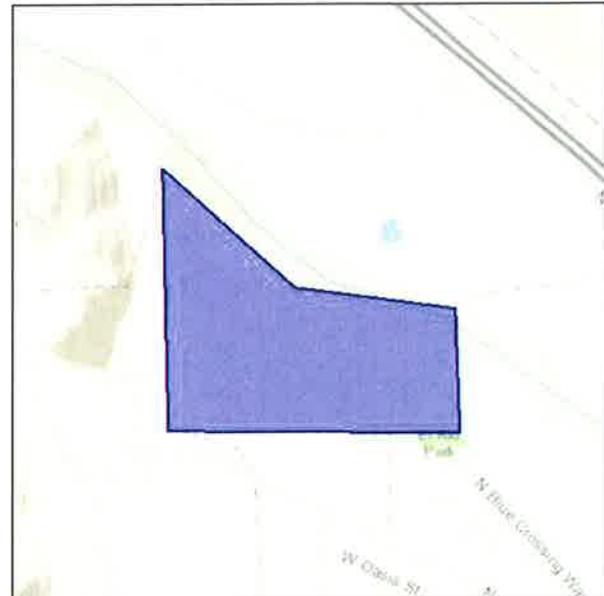
El Rio Preserve Riparian Restoration Project

LOCATION

Pima County, Arizona

DESCRIPTION

This site was previously a gravel borrow pit adjacent to the Santa Cruz River. Riparian restoration will include restoring the berm between the Santa Cruz River and El Rio Preserve; planting/hydro-seeding native species, using water harvesting methods to supplement irrigation water, removal of



some invasive species, creating 1-2 perennial, lined ponds, natural-surface trail, bird blind, benches, possibly 2 picnic tables in NW corner which is more upland.

Jurisdictional delineation and cultural resource clearance surveys are scheduled with a consulting firm. Marana received a Water Infrastructure Financing Authority grant for engineering, water harvesting and landscaping designs.

IPAC LINK

<https://ecos.fws.gov/ipac/project/EXHP5-VEI6V-CHROB-YZ3YY-OOWYG4>

## U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

**Arizona Ecological Services Field Office**

9828 North 31st Ave

#c3

Phoenix, AZ 85051-2517

(602) 242-0210

## Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

**This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.**

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

**A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.**

The list of species below are those that may occur or could potentially be affected by activities in this location:

### Birds

**California Least Tern** *Sterna antillarum browni* Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B03X](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B03X)

**Yellow-billed Cuckoo** *Coccyzus americanus* Threatened

CRITICAL HABITAT

There is **proposed** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B06R](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B06R)

## Mammals

**Jaguar** *Panthera onca* Endangered

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?spcode=A040](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A040)

**Lesser Long-nosed Bat** *Leptonycteris curasoae yerbabuenae* Endangered

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?spcode=A0AD](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0AD)

**Sonoran Pronghorn** *Antilocapra americana* Experimental Population, Non-Essential  
*sonoriensis*

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?spcode=A009](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A009)

## Reptiles

**Northern Mexican Gartersnake** *Thamnophis eques megalops* Threatened

CRITICAL HABITAT

There is **proposed** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?spcode=C04Q](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C04Q)

**Sonoyta Mud Turtle** *Kinosternon sonoriense longifemorale* Proposed Endangered

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?spcode=C067](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=C067)

## Critical Habitats

**There are no critical habitats in this location**

## Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.<sup>[1]</sup> There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern  
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds  
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data  
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The following species of migratory birds could potentially be affected by activities in this location:

<b>Bald Eagle</b> <i>Haliaeetus leucocephalus</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008</a>	
<b>Bell's Vireo</b> <i>Vireo bellii</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX</a>	
<b>Bendire's Thrasher</b> <i>Toxostoma bendirei</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IF">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IF</a>	
<b>Black-chinned Sparrow</b> <i>Spizella atrogularis</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IR">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0IR</a>	

<b>Blue-throated Hummingbird</b> <i>Lampornis clemenciae</i> Season: Breeding	Bird of conservation concern
<b>Brewer's Sparrow</b> <i>Spizella breweri</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HA">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HA</a>	Bird of conservation concern
<b>Burrowing Owl</b> <i>Athene cucularia</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0NC">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0NC</a>	Bird of conservation concern
<b>Chestnut-collared Longspur</b> <i>Calcarius ornatus</i> Season: Wintering	Bird of conservation concern
<b>Common Black-hawk</b> <i>Buteogallus anthracinus</i> Season: Breeding	Bird of conservation concern
<b>Costa's Hummingbird</b> <i>Calypte costae</i> Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JE">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JE</a>	Bird of conservation concern
<b>Elegant Trogon</b> <i>Trogon elegans</i> Season: Year-round	Bird of conservation concern
<b>Elf Owl</b> <i>Micrathene whitneyi</i> Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GV">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GV</a>	Bird of conservation concern
<b>Gila Woodpecker</b> <i>Melanerpes uropygialis</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EH">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EH</a>	Bird of conservation concern
<b>Gilded Flicker</b> <i>Colaptes chrysoides</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EG">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0EG</a>	Bird of conservation concern
<b>Golden Eagle</b> <i>Aquila chrysaetos</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DV">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DV</a>	Bird of conservation concern
<b>Lawrence's Goldfinch</b> <i>Carduelis lawrencei</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0J8">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0J8</a>	Bird of conservation concern
<b>Le Conte's Thrasher</b> <i>toxostoma lecontei</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GE">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GE</a>	Bird of conservation concern
<b>Lewis's Woodpecker</b> <i>Melanerpes lewis</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HQ">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HQ</a>	Bird of conservation concern

<b>Loggerhead Shrike</b> <i>Lanius ludovicianus</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0FY">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0FY</a>	Bird of conservation concern
<b>Long-billed Curlew</b> <i>Numenius americanus</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B06S">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B06S</a>	Bird of conservation concern
<b>Lucy's Warbler</b> <i>Vermivora luciae</i> Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0DL">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0DL</a>	Bird of conservation concern
<b>Mccown's Longspur</b> <i>Calcarius mccownii</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0HB">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0HB</a>	Bird of conservation concern
<b>Mountain Plover</b> <i>Charadrius montanus</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B078">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B078</a>	Bird of conservation concern
<b>Northern Beardless-tyrannulet</b> <i>Camptostoma imberbe</i> Season: Breeding	Bird of conservation concern
<b>Peregrine Falcon</b> <i>Falco peregrinus</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0FU">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0FU</a>	Bird of conservation concern
<b>Prairie Falcon</b> <i>Falco mexicanus</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0ER">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0ER</a>	Bird of conservation concern
<b>Rufous-crowned Sparrow</b> <i>Aimophila ruficeps</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0MX">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0MX</a>	Bird of conservation concern
<b>Rufous-winged Sparrow</b> <i>Aimophila carpalis</i> Season: Year-round	Bird of conservation concern
<b>Short-eared Owl</b> <i>Asio flammeus</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0HD">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0HD</a>	Bird of conservation concern
<b>Sonoran Yellow Warbler</b> <i>Dendroica petechia</i> ssp. <i>sonorana</i> Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0F7">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0F7</a>	Bird of conservation concern
<b>Sprague's Pipit</b> <i>Anthus spragueii</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0GD">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?scode=B0GD</a>	Bird of conservation concern

**Swainson's Hawk** *Buteo swainsoni*

Season: Breeding

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B070](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B070)

Bird of conservation concern

**Willow Flycatcher** *Empidonax traillii*

Season: Breeding

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B0F6](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0F6)

Bird of conservation concern

## Wildlife refuges and fish hatcheries

**There are no refuges or fish hatcheries in this location**

## Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

### DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

### DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

### DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

## Freshwater Pond

[PUB](#)

## Riverine

[R2UB](#)

[R2US](#)

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>



# Arizona Environmental Online Review Tool Report



## ***Arizona Game and Fish Department Mission***

***To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.***

**Project Name:**

El Rio Preserve Riparian Restoration Project

**User Project Number:**

PK-021

**Project Description:**

Riparian restoration to include restoring the berm between the Santa Cruz River and El Rio Preserve, planting/hydro-seeding native species using water harvesting methods to supplement irrigation, some removal of non-native species, creating 1-2 permanent lined ponds, a natural trail, bird blind, wildlife viewing spots, a few benches, and possibly a picnic table on high ground on the NW corner.

**Project Type:**

Habitat Conservation and Restoration, Management of nongame species

**Contact Person:**

Janine Spencer

**Organization:**

Town of Marana

**On Behalf Of:**

OTHER

**Project ID:**

HGIS-04487

***Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.***

**Disclaimer:**

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

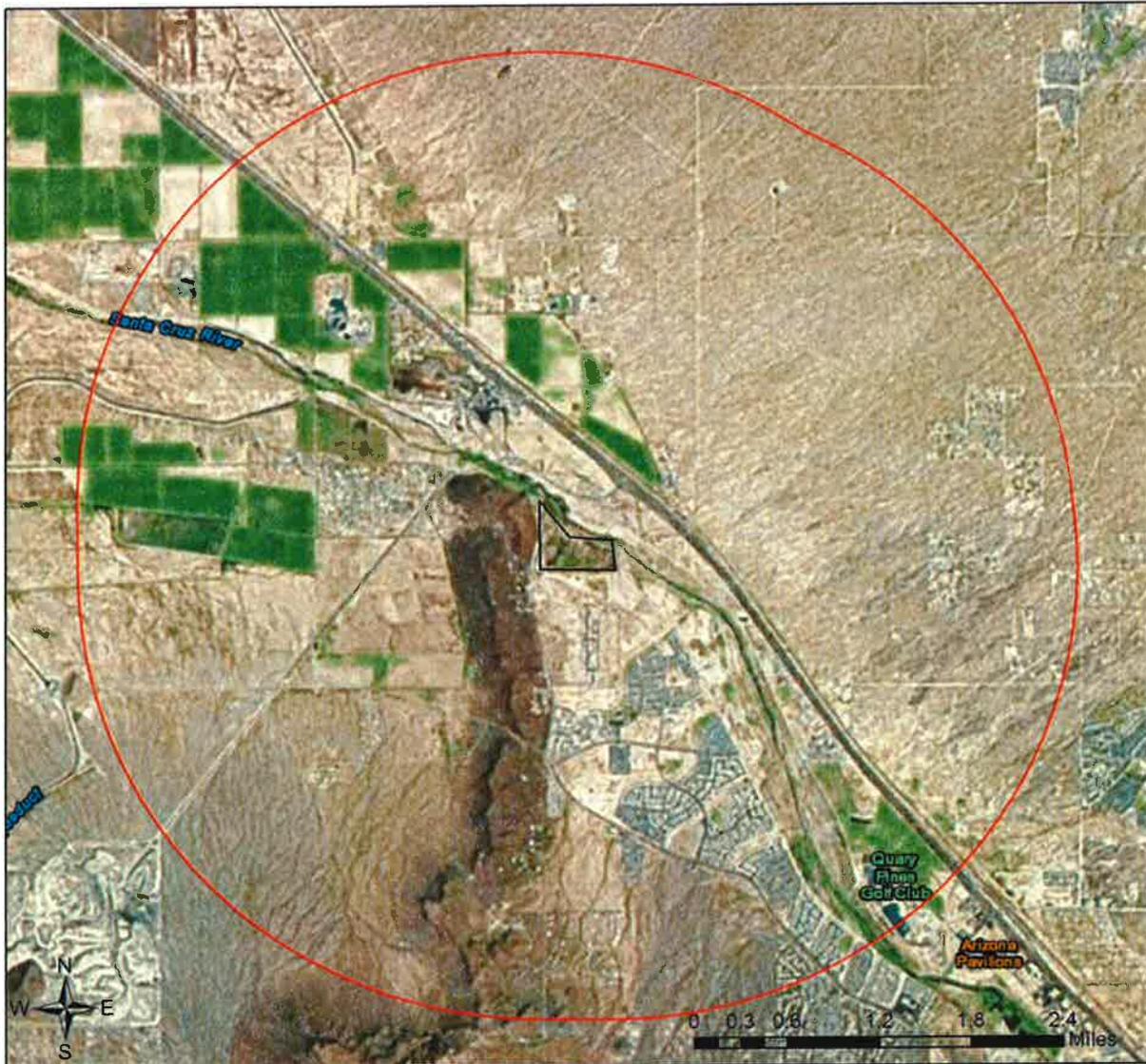
**Locations Accuracy Disclaimer:**

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

**Recommendations Disclaimer:**

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:  
**Project Evaluation Program, Habitat Branch**  
**Arizona Game and Fish Department**  
**5000 West Carefree Highway**  
**Phoenix, Arizona 85086-5000**  
**Phone Number: (623) 236-7600**  
**Fax Number: (623) 236-7366**  
**Or**  
**[PEP@azgfd.gov](mailto:PEP@azgfd.gov)**
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

## El Rio Preserve Riparian Restoration Project Aerial Image Basemap With Locator Map



-  Project Boundary
-  Buffered Project Boundary

Project Size (acres): 80.34

Lat/Long (DD): 32.3941 / -111.1365

County(s): Pima

AGFD Region(s): Tucson

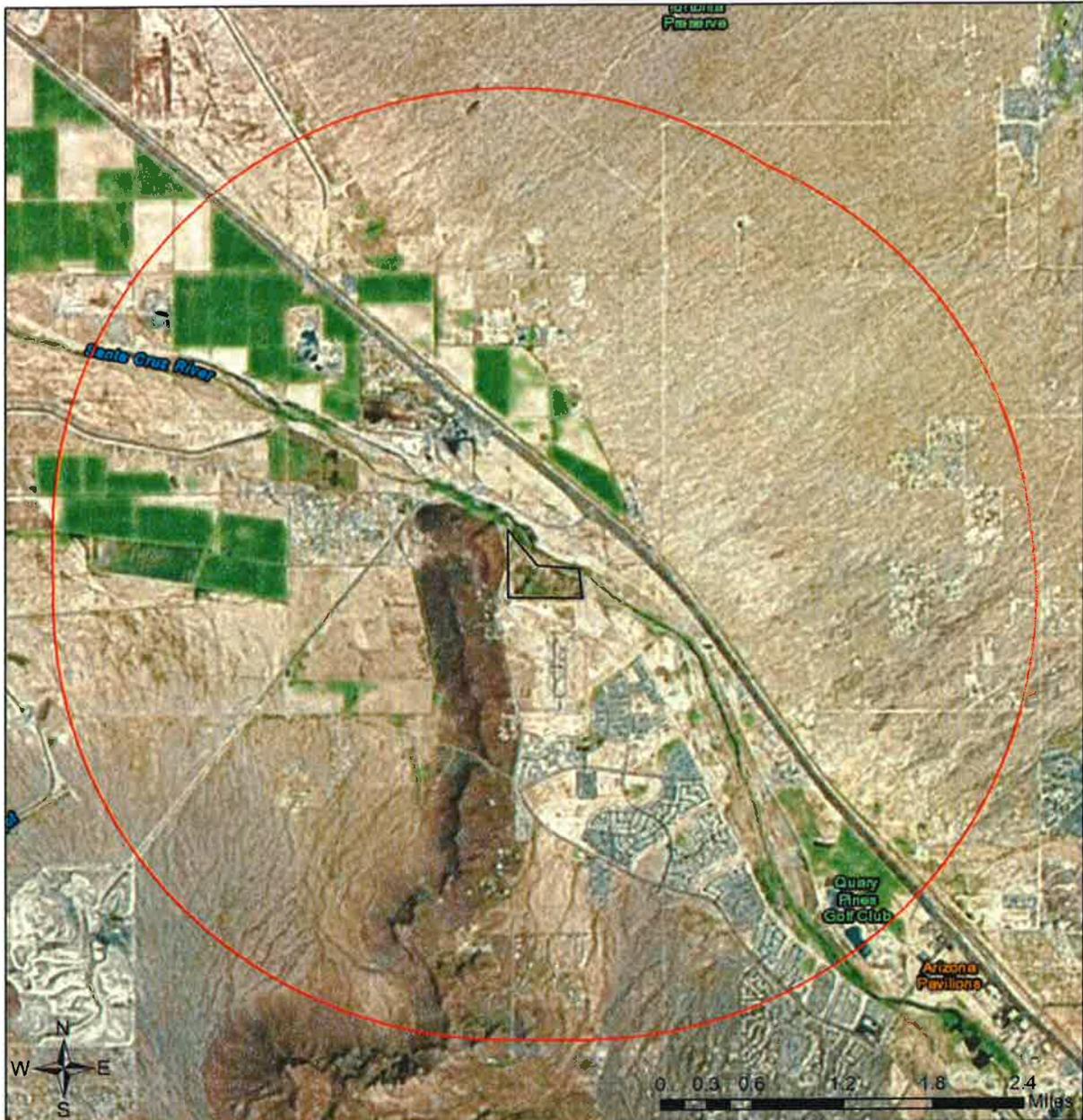
Township/Range(s): T12S, R12E

USGS Quad(s): MARANA

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong).



## El Rio Preserve Riparian Restoration Project Web Map As Submitted By User

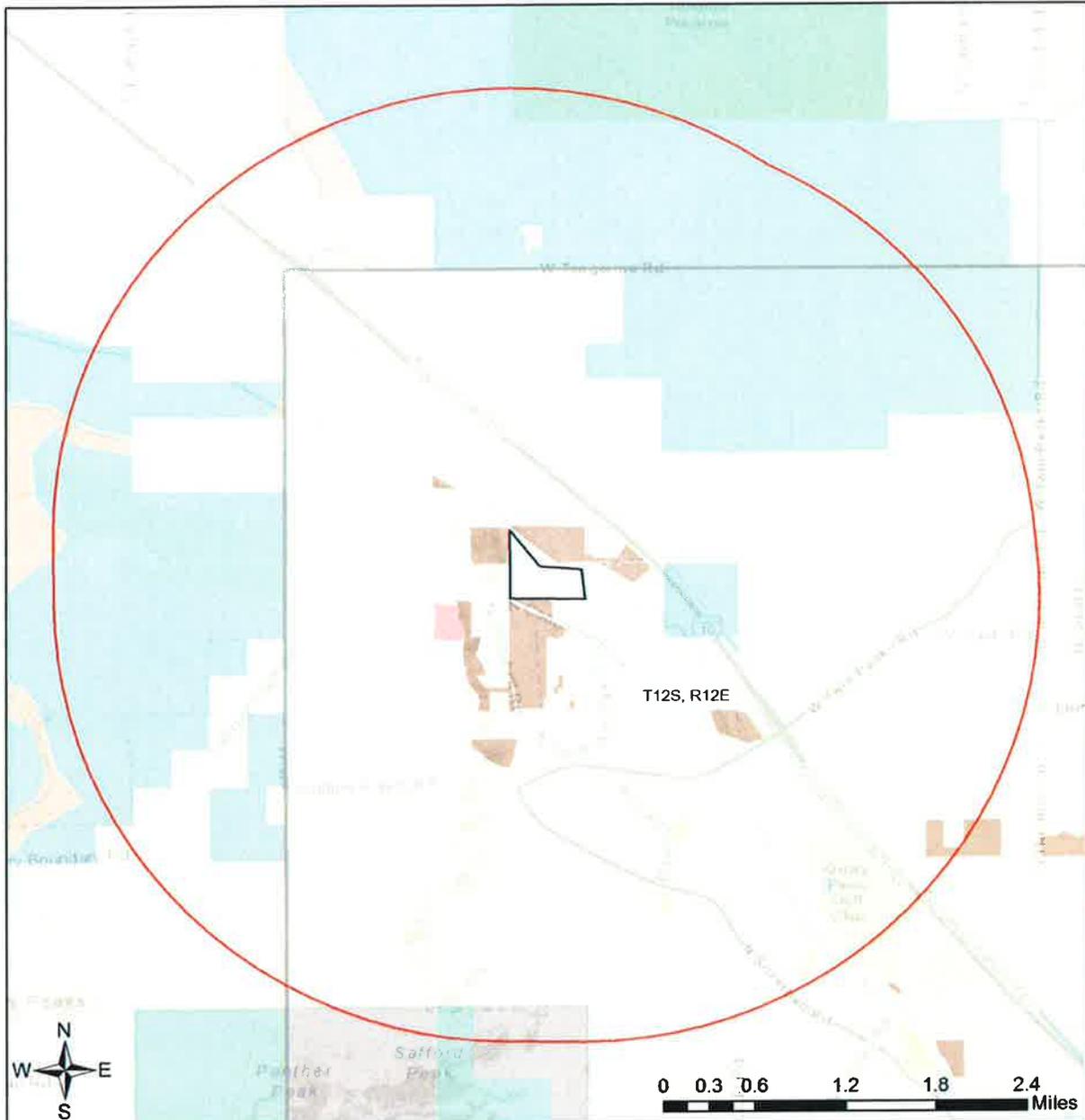


- Project Boundary
- Buffered Project Boundary

Project Size (acres): 80,34  
Lat/Long (DD): 32.3941 / -111.1365  
County(s): Pima  
AGFD Region(s): Tucson  
Township/Range(s): T12S, R12E  
USGS Quad(s): MARANA

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community  
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## El Rio Preserve Riparian Restoration Project Topo Basemap With Township/Ranges and Land Ownership



- |                           |                          |
|---------------------------|--------------------------|
| Project Boundary          | Mixed/Other              |
| Buffered Project Boundary | National Park/Mon.       |
| Township/Ranges           | Private                  |
| AZ Game and Fish Dept.    | State and Regional Parks |
| BLM                       | State Trust              |
| BOR                       | US Forest Service        |
| Indian Res.               | Wildlife Area/Refuge     |
| Military                  |                          |

Project Size (acres): 80.34  
 Lat/Long (DD): 32.3941 / -111.1365  
 County(s): Pima  
 AGFD Region(s): Tucson  
 Township/Range(s): T12S, R12E  
 USGS Quad(s): MARANA

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

**Special Status Species and Special Areas Documented within 3 Miles of Project Vicinity**

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Aquila chrysaetos</i>	Golden Eagle	BGA		S		1B
<i>Chionactis occipitalis klauberi</i>	Tucson Shovel-nosed Snake	SC				1A
Coyote - Ironwood - Tucson Linkage Design	Wildlife Corridor					
<i>Glaucidium brasilianum cactorum</i>	Cactus Ferruginous Pygmy-owl	SC	S	S		1B
<i>Gopherus morafkai</i>	Sonoran Desert Tortoise	CCA	S			1A
Tucson - Tortolita - Santa Catalina Mountains Linkage Design	Wildlife Corridor					
<i>Tumamoca macdougallii</i>	Tumamoc Globeberry		S	S	SR	

Note: Status code definitions can be found at <https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/>

**Species of Greatest Conservation Need  
 Predicted within Project Vicinity based on Predicted Range Models**

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
<i>Aix sponsa</i>	Wood Duck					1B
<i>Ammospermophilus harrisi</i>	Harris' Antelope Squirrel					1B
<i>Anaxyrus retiformis</i>	Sonoran Green Toad			S		1B
<i>Anthus spragueii</i>	Sprague's Pipit	C*				1A
<i>Antrostomus ridgwayi</i>	Buff-collared Nightjar		S			1B
<i>Aquila chrysaetos</i>	Golden Eagle	BGA		S		1B
<i>Aspidoscelis stictogramma</i>	Giant Spotted Whiptail	SC	S			1B
<i>Athene cucularia hypugaea</i>	Western Burrowing Owl	SC	S	S		1B
<i>Botaurus lentiginosus</i>	American Bittern					1B
<i>Buteo regalis</i>	Ferruginous Hawk	SC		S		1B
<i>Chilomeniscus stramineus</i>	Variable Sandsnake					1B
<i>Chionactis occipitalis klauberi</i>	Tucson Shovel-nosed Snake	SC				1A
<i>Colaptes chrysoides</i>	Gilded Flicker			S		1B
<i>Coluber bilineatus</i>	Sonoran Whipsnake					1B
<i>Corynorhinus townsendii pallescens</i>	Pale Townsend's Big-eared Bat	SC	S	S		1B
<i>Crotalus tigris</i>	Tiger Rattlesnake					1B
<i>Crotaphytus nebrius</i>	Sonoran Collared Lizard					1B
<i>Cyananthus latirostris</i>	Broad-billed Hummingbird		S			1B
<i>Cyprinodon macularius</i>	Desert Pupfish	LE				1A
<i>Dipodomys spectabilis</i>	Banner-tailed Kangaroo Rat			S		1B
<i>Euderma maculatum</i>	Spotted Bat	SC	S	S		1B
<i>Eumops perotis californicus</i>	Greater Western Bonneted Bat	SC		S		1B
<i>Falco peregrinus anatum</i>	American Peregrine Falcon	SC	S	S		1A
<i>Glaucidium brasilianum cactorum</i>	Cactus Ferruginous Pygmy-owl	SC	S	S		1B
<i>Gopherus morafkai</i>	Sonoran Desert Tortoise	CCA	S			1A

**Species of Greatest Conservation Need  
 Predicted within Project Vicinity based on Predicted Range Models**

<b>Scientific Name</b>	<b>Common Name</b>	<b>FWS</b>	<b>USFS</b>	<b>BLM</b>	<b>NPL</b>	<b>SGCN</b>
<i>Haliaeetus leucocephalus</i>	Bald Eagle	SC, BGA	S	S		1A
<i>Heloderma suspectum</i>	Gila Monster					1A
<i>Incilius alvarius</i>	Sonoran Desert Toad					1B
<i>Kinosternon sonoriense sonoriense</i>	Desert Mud Turtle			S		1B
<i>Lasiurus blossevillii</i>	Western Red Bat		S			1B
<i>Lasiurus xanthinus</i>	Western Yellow Bat		S			1B
<i>Leopardus pardalis</i>	Ocelot	LE				1A
<i>Leptonycteris curasoae yerbabuenae</i>	Lesser Long-nosed Bat	LE				1A
<i>Lepus alleni</i>	Antelope Jackrabbit					1B
<i>Macrotus californicus</i>	California Leaf-nosed Bat	SC		S		1B
<i>Melanerpes uropygialis</i>	Gila Woodpecker					1B
<i>Melospiza lincolni</i>	Lincoln's Sparrow					1B
<i>Melospiza aberti</i>	Abert's Towhee		S			1B
<i>Micruroides euryxanthus</i>	Sonoran Coralsnake					1B
<i>Myotis occultus</i>	Arizona Myotis	SC		S		1B
<i>Myotis velifer</i>	Cave Myotis	SC		S		1B
<i>Myotis yumanensis</i>	Yuma Myotis	SC				1B
<i>Nyctinomops femorosaccus</i>	Pocketed Free-tailed Bat					1B
<i>Panthera onca</i>	Jaguar	LE				1A
<i>Passerculus sandwichensis</i>	Savannah Sparrow					1B
<i>Perognathus amplus</i>	Arizona Pocket Mouse					1B
<i>Perognathus longimembris</i>	Little Pocket Mouse					1B
<i>Peucaea botteri arizonae</i>	Arizona Botteri's Sparrow			S		1B
<i>Peucaea carpalis</i>	Rufous-winged Sparrow					1B
<i>Phrynosoma solare</i>	Regal Horned Lizard					1B
<i>Phyllorhynchus browni</i>	Saddled Leaf-nosed Snake					1B
<i>Poeciliopsis occidentalis occidentalis</i>	Gila Topminnow	LE				1A
<i>Progne subis hesperia</i>	Desert Purple Martin			S		1B
<i>Setophaga petechia</i>	Yellow Warbler					1B
<i>Sonorella papagorum</i>	Black Mountain Talussnail					1B
<i>Tadarida brasiliensis</i>	Brazilian Free-tailed Bat					1B
<i>Troglodytes pacificus</i>	Pacific Wren					1B
<i>Vireo bellii arizonae</i>	Arizona Bell's Vireo					1B
<i>Vulpes macrotis</i>	Kit Fox					1B

**Species of Economic and Recreation Importance Predicted within Project Vicinity**

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Callipepla gambelii	Gambel's Quail					
Odocoileus hemionus	Mule Deer					
Pecari tajacu	Javelina					
Puma concolor	Mountain Lion					
Zenaida asiatica	White-winged Dove					
Zenaida macroura	Mourning Dove					

**Project Type: Habitat Conservation and Restoration, Management of nongame species**

**Project Type Recommendations:**

No specific recommendations pertaining to your project type are available at this time. Please contact Project Evaluation Program directly.

***The Department requests further coordination to provide project/species specific recommendations, please contact Project Evaluation Program directly. PEP@azgfd.gov***

**Project Location and/or Species Recommendations:**

HDMS records indicate that one or more native plants listed on the Arizona Native Plant Law and Antiquities Act have been documented within the vicinity of your project area. Please contact:

Arizona Department of Agriculture  
1688 W Adams St.  
Phoenix, AZ 85007  
Phone: 602.542.4373  
<https://agriculture.az.gov/environmental-services/np1>

HDMS records indicate that one or more listed, proposed, or candidate species or Critical Habitat (Designated or Proposed) have been documented in the vicinity of your project. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at <http://www.fws.gov/southwest/es/arizona/> or:

**Phoenix Main Office**  
2321 W. Royal Palm Rd, Suite 103  
Phoenix, AZ 85021  
Phone: 602-242-0210  
Fax: 602-242-2513

**Tucson Sub-Office**  
201 N. Bonita Suite 141  
Tucson, AZ 85745  
Phone: 520-670-6144  
Fax: 520-670-6155

**Flagstaff Sub-Office**  
SW Forest Science Complex  
2500 S. Pine Knoll Dr.  
Flagstaff, AZ 86001  
Phone: 928-556-2157  
Fax: 928-556-2121

HDMS records indicate that Sonoran Desert Tortoise have been documented within the vicinity of your project area. Please review the Tortoise Handling Guidelines found at: <https://www.azgfd.com/wildlife/nongamemanagement/tortoise/>

Analysis indicates that your project is located in the vicinity of an identified wildlife habitat linkage corridor. Project planning and implementation efforts should focus on maintaining adequate opportunities for wildlife permeability. For information pertaining to the linkage assessment and wildlife species that may be affected, please refer to: <http://www.corridordesign.org/arizona>. Please contact your local Arizona Game and Fish Department Regional Office for specific project recommendations: <https://www.azgfd.com/Agency/Offices>.



**Meeting Summary**  
**El Rio Riparian Restoration Project**  
**Town of Marana, Pima County, Arizona**

**Date:** Thursday, January 19, 2017

**Location:** Pima County Regional Flood Control District

**Attendees:**

Pima County RFCD | Mike Cabrera

U.S. Army Corps of Engineers | Kevin Grove, Travis Bone

Town of Marana | Janine Spencer, Kumar Raut, Mohammad El-Ali

WestLand Resources | Kimberly Otero, Brian Lindenlaub

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## **Discussion Summary**

The purpose of the meeting was to solicit input from the U.S. Army Corps of Engineers (Corps) on possible waters of the U.S. and potential permitting obligations for the project under Section 404 of the Clean Water Act (CWA).

The scope of the project was presented (see attached map). Project activities are designed to restore and enhance the El Rio area by replacing non-native plants with native riparian plants, creating two persistent ponding areas, and maintaining the ponds. The Town of Marana has identified several potential sources to purchase water. The project area currently is characterized by wetland and non-native vegetation and some extent of hydric soils and ponding created by the breach in the existing berm which allowed flow from the Santa Cruz River to enter and pond in the area.

The Corps noted that because the site, which is within a floodplain area, is no longer connected with the Santa Cruz River, the Corps would not take jurisdiction over the area inundated by overflows from the Santa Cruz River. In addition, in a previous jurisdictional waters determination, the Corps had confirmed that the stormwater channels that discharge to the project area are non-jurisdictional. As such, the Corps determined that there were no waters of the U.S. within the proposed project site and the Town would not be required to obtain authorization for the project under Section 404 of the CWA.

No further coordination with the Corps on this project is required.

Attachment: Map

Q:\Jobs\1600's\1627.06\PM\Meeting Notes\2017\_01\_19 El Rio Corps Mtg.docx

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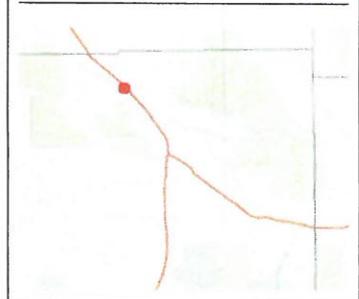
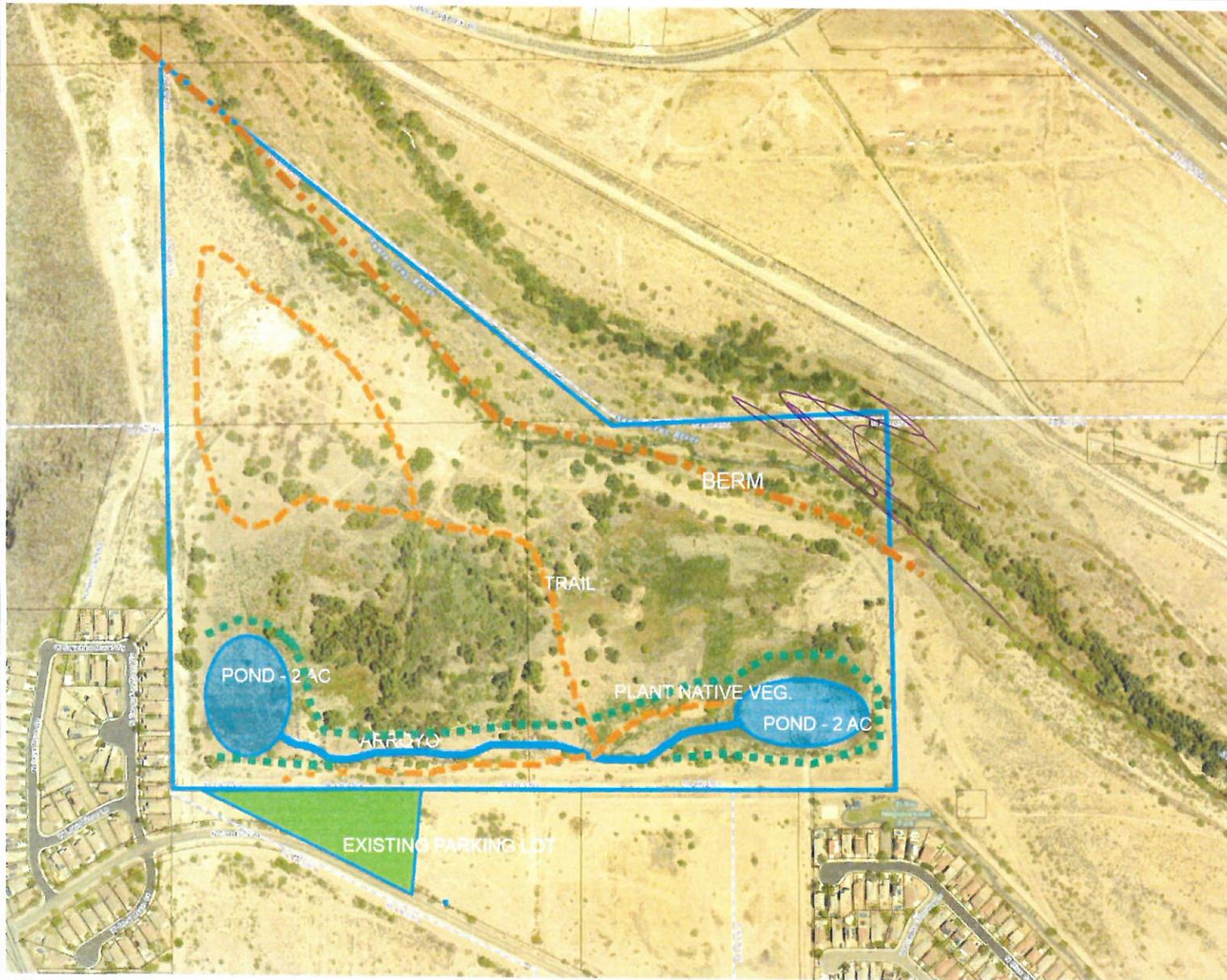
**ENGINEERING AND ENVIRONMENTAL CONSULTANTS**

4001 E. Paradise Falls Drive • Tucson, Arizona 85712 • 520•206•9585

# Conceptual Plan - El Rio Preserve, Town of Marana

## Legend

Parcels



Notes: T12S R 12E Portions of Sec. 8 and 17, Pima County AZ

1,076.3      0      538.17

Feet



This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map are subject to Pima County's ITD GIS disclaimer and use restrictions.

1/18/2017



## Coalition for Sonoran Desert Protection

300 E. University Blvd., Suite 120  
Tucson, Arizona 85705  
p (520) 388-9925 • f (520) 791-7709  
[www.sonorandesert.org](http://www.sonorandesert.org)

Arizona Center for Law  
in the Public Interest  
Arizona Native Plant Society  
Bat Conservation  
International  
Cascabel Conservation  
Association  
Center for Biological  
Diversity  
Center for Environmental  
Connections  
Center for Environmental  
Ethics  
Defenders of Wildlife  
Desert Watch  
Empire Fagan Coalition  
Environmental and Cultural  
Conservation Organization  
Environmental Law Society  
Friends of Cabeza Prieta  
Friends of Ironwood Forest  
Friends of Madera Canyon  
Friends of Saguaro National  
Park  
Friends of Tortolita  
Gates Pass Area  
Neighborhood Association  
Genius Loci Foundation  
Native Seeds / SEARCH  
Northwest Neighborhood  
Alliance  
Protect Land and  
Neighborhoods  
Safford Peak Watershed  
Education Team  
Save the Scenic Santa Ritas  
Sierra Club – Grand Canyon  
Chapter  
Sierra Club – Rincon Group  
Sky Island Alliance  
Sky Island Watch  
Society for Ecological  
Restoration  
Sonoran Permaculture  
Guild  
Southwestern Biological  
Institute  
Tortolita Homeowners  
Association  
Tucson Audubon Society  
Tucson Herpetological  
Society  
Tucson Mountains  
Association  
Wildlands Network  
Women for Sustainable  
Technology

**Janine Spencer**  
Environmental Projects Manager  
Town of Marana  
11555 W. Civic Center Dr.  
Marana, AZ 85653

### **RE: Town of Marana’s Application for a Grant for the El Rio Riparian Restoration Project**

Dear Ms. Spencer,

The Coalition for Sonoran Desert Protection is excited to be involved with the Town of Marana’s plans for the El Rio Riparian Restoration Project. We fully support your application for a grant to assist with this project in the years ahead. Throughout our involvement with your Habitat Conservation Planning process and a variety of development proposals over many years, we have long expressed the belief that Marana is home to a rich and important diversity of Sonoran Desert wildlife. Restoring and enhancing the El Rio Open Space into a healthy wetlands area for native wildlife is a worthwhile endeavor with numerous benefits.

First and foremost, the El Rio Open Space is located within a highly threatened wildlife linkage between the Tucson Mountains and the Tortolita Mountains. Bisected by Interstate 10, a six-lane divided and elevated highway, this wildlife linkage is the most constrained and threatened linkage in our region. In 2006, this linkage was identified as one of the 16 “most highly threatened” wildlife linkages in the state of Arizona by the Arizona Wildlife Linkage Assessment, a project spearheaded by the Arizona Game and Fish Department, Arizona Department of Transportation, and a coalition of NGOs.<sup>1</sup> Subsequently, a detailed corridor design for this linkage was completed by Dr. Paul Beier at Northern Arizona University as part of the Arizona Missing Linkages project.<sup>2</sup>

The only place we have identified for a possible future expansive wildlife crossing in this wildlife linkage - at the current Avra Valley Road exit - is located very near the El Rio Open Space. Restoring the El Rio Open Space into a wetlands would provide much-needed healthy wildlife habitat within this larger wildlife linkage, along with providing

<sup>1</sup> For more information on the Arizona Wildlife Linkages Assessment, see <https://www.azdot.gov/business/environmental-planning/programs/wildlife-linkages>.

<sup>2</sup> For more information on the Arizona Missing Linkages Project, see <http://corridordesign.org/linkages/arizona>.

an important link to the nearby Santa Cruz River. Wildlife from Saguaro National Park to the south (in the Tucson Mountains) and, eventually, wildlife from Tortolita Mountain Park to the north-east (managed by Pima County) will benefit from this new wetlands preserve as they travel between these mountain ranges and beyond. In addition, a variety of bird species which already use habitat along the Santa Cruz River would be expected to use this area. Indeed, a high diversity of bird species has already been identified using the El Rio Open Space parcel.

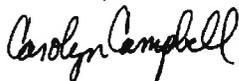
As a Coalition of 35 member groups, we are experienced with engaging in strong and long-lasting partnerships with local governments, state agencies, and other NGOs and we welcome the opportunity to partner with the Town of Marana on this project. Since 2012, the Coalition has managed a large volunteer-driven remote wildlife camera project to document wildlife presence and diversity in our region's threatened wildlife linkages. Our first focus area was the wildlife linkage between the Tortolita Mountains and the Santa Catalina Mountains. We now have over 30 volunteers monitoring 17 cameras in this linkage and we have captured tens of thousands of beautiful photos of local Sonoran Desert Wildlife over the past four years.

In December 2015, we launched a new project area in the Tucson-Tortolita Mountains wildlife linkage when we deployed five new wildlife cameras, including one camera located in the El Rio Open Space parcel. We will be deploying five additional cameras in the next couple months as we finalize access agreements with private property owners. We are partnering with the Town of Marana on the use of the El Rio Open Space for one of our wildlife cameras and appreciate the Town's willingness to allow our volunteers access to the parcel to monitor and maintain this camera moving forward.

Given our diverse membership and focus on engaging the community on issues of Sonoran Desert conservation, we are also able to publicize this type of project to our member groups and their individual members. This could include requests for volunteers, publicizing special events, and simply getting the word out about this special new natural area in our community that would benefit both people and wildlife.

Please let us know if there is anything else we can do to assist with your grant application and your plans for restoring the El Rio Open Space into a thriving new wetlands area.

Sincerely,



Carolyn Campbell  
Executive Director

**A Cultural Resources Inventory of Approximately 90  
Acres for the Proposed El Rio Riparian Restoration  
Project, Marana, Pima County, Arizona**

---

Town of Marana

Prepared by:  
Erina Gruner

Reviewed and submitted by:  
Fred Huntington

Cultural Resources Report 2016-73  
ASM Accession No. 2016-0486

December 30, 2016  
Project Number: 1627.06



WestLand Resources



## **STATEMENT OF CONFIDENTIALITY**

Disclosure of the locations of historic properties to the public may be in violation of both federal and state laws. Applicable United States laws include, but may not be limited to, Section 304 of the National Historic Preservation Act (16 U.S.C. 470w-3) and the Archaeological Resources Protection Act (16 U.S.C. §470hh). In Arizona, applicable state laws include, but may not be limited to, Arizona Revised Statute Title 39, Section 125.



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## STATE HISTORIC PRESERVATION OFFICE REPORT ABSTRACT

**REPORT TITLE:** A Cultural Resources Inventory of Approximately 90 Acres for the Proposed El Rio Riparian Restoration Project, Marana, Pima County, Arizona

**REPORT DATE:** December 30, 2016

**PROJECT NAME:** El Rio Riparian Restoration Project

**PROJECT LOCATION:** Marana, Arizona

**PROJECT LOCATOR UTM:** N 3584135 E 487151

**PROJECT SPONSOR:** PSOMAS

**SPONSOR PROJECT NUMBER(S):** N/A

**LEAD AGENCY:** Army Corps of Engineers

**OTHER INVOLVED MUNICIPALITIES:** Town of Marana

**APPLICABLE REGULATIONS:** National Historic Preservation Act, Section 106 (1966, as amended); The Clean Water Act, Section 404 (1972, as amended)

**FUNDING SOURCE:** Town of Marana

**ASLD ROW APPLICATION NUMBER:** N/A

**DESCRIPTION OF THE PROJECT/UNDERTAKING:** The Town of Marana plans to grade an area (the “project area” or “the proposed project”) along the Santa Cruz River near the Sonoran Vista residential development to minimize flood risk to constructions in the vicinity. Concomitantly, the Town of Marana proposes to create and manage a riparian habitat for recreational use (the El Rio Riparian Restoration Project). The project will be undertaken by PSOMAS, a private engineering firm, and the Town of Marana. In November 2016, WestLand Resources, Inc. (WestLand), was contracted by PSOMAS to perform a Class III Cultural Resources Inventory, pursuant to Section 106 of the National Historic Preservation Act (1966, as amended) and a Preliminary Jurisdictional Determination (PJD), pursuant to Section 404 of the Clean Water Act (1972, as amended) for this project.

This report represents the results of the cultural resources inventory, carried out December 1, 2016. The project area encompasses a parcel that totals approximately 90 acres, 56 of which were surface-stripped during a 1960s-era gravel mining operation. Systematic pedestrian survey of the remaining 34 acres was necessary to fulfill the requirements of the Section 106 process. Survey of the acreage resulted in the documentation of one historic archaeological site that is recommended ineligible for inclusion on the National Register of Historic Places (NRHP). In consultation with the Arizona State Museum (ASM), the Historic-era gravel pit was designated archaeological site AZ AA:12:1162(ASM). No further treatment is recommended for AZ AA:12:1162(ASM); however,

one previously recorded NRHP determined-eligible (SHPO 2008) site—a locus and feature associated with Los Morteros (AZ AA:12:57[ASM])—abutting the west margin of the project area may be impacted by grading. WestLand recommends avoidance of extant features associated with the site and monitoring within the boundaries of Los Morteros, should the proposed project move forward. In addition, a previously recorded Classic period Hohokam cemetery area (AZ AA:12:88[ASM])—disturbed by the gravel pit operation and perhaps altogether removed—is presently underwater, buried by flood deposits and covered by riparian vegetation. The projected boundary of AZ AA:12:88(ASM), places the site within the eastern portion of the project area boundary, an area that also functioned as a borrow pit for the gravel operation. The site is currently not visible, but remnants remain as scattered artifact concentrations (secondary in nature) observed along a levee just east of the borrow pit area. It is assumed this site may have been part of Los Morteros at one time, and little-to-nothing of it may remain intact; however, monitoring for additional burials in the site vicinity is recommended during future grading efforts in the project area.

**PROJECT AREA/AREA OF POTENTIAL EFFECTS (APE):** The project area includes 90 acres of land owned by the Town of Marana and situated along the southwestern bank of the Santa Cruz River. Much of this acreage—approximately 56 acres—is unsurveyable as a result of previous disturbances associated with the excavation of borrow pits for a gravel operation. This acreage is also presently underwater.

**LEGAL DESCRIPTION:** T12S, R12E, portions of Sections 8 and 17

**USGS QUADRANGLE(S):** Marana, AZ USGS 7.5' quadrangle

**LAND JURISDICTION:** Town of Marana

**TOTAL ACRES:** 90

**ACRES SURVEYED:** 34

**ACRES NOT SURVEYED:** 56

**CONSULTANT FIRM/ORGANIZATION:** WestLand Resources, Inc.

**PROJECT NUMBER:** 1627.06

**PERMIT NUMBER(S):** 2016-23bl

**DATE(S) OF FIELDWORK:** December 1, 2016

**NUMBER OF IOS RECORDED:** 11

**NUMBER OF SITES RECORDED:** 3

**ELIGIBLE SITES:** 1

**INELIGIBLE SITES:** 2

**UNEVALUATED SITES:** 0

**SITES NOT RELOCATED:** 1

**Site summary table**

Land Jurisdiction	Identification Status	Site No.	Eligibility Status/ Criterion/Criteria	Recommended Treatment
Town of Marana	Previously Recorded	AZ AA:12:88(ASM)	Recommended ineligible	Monitor the area surrounding the site boundary plot for burials during construction
Town of Marana	Previously Recorded	AZ AA:12:57(ASM)	Determined eligible (SHPO 2008)	Avoid associated features in the project area and monitor within the site boundary during construction
Town of Marana	Newly Recorded	AZ AA:12:1162(ASM)	Recommended ineligible	No further work is necessary
Town of Marana	Previously Recorded/Deaccessioned	AZ AA:12:58(ASM)	Not relocated	This site number has been deaccessioned and subsumed by the boundary for Los Morteros, however, at one time it was recorded as a 25-acre habitation with petroglyphs. It is listed here only because the site number is referenced in previous reports and in possible association with AZ AA:12:88(ASM). No further work is necessary with regards to this site.

**COMMENTS:** In December 2016, WestLand carried out work in support of a PJD, assessing the potential of the current property. The results of this delineation and determination are ongoing at this time; however, a Section 404 (The Clean Water Act, 1972) permit may be required, along with oversight and consultation with the Army Corps of Engineers. The cultural resources inventory presented here is in support of this permitting process, as well as grant funds sought from the Water Infrastructure Finance Authority of Arizona.

## INTRODUCTION AND PROJECT BACKGROUND

The Town of Marana plans to grade an area (the “project area” or “the proposed project”) along the Santa Cruz River near the Sonoran Vista residential development to minimize flood risk to constructions in the vicinity (**Figure 1**). Concomitantly, the Town of Marana proposes to create and manage a riparian habitat for recreational use (the El Rio Riparian Restoration Project) with grant funds sought from the Water Infrastructure Finance Authority of Arizona (WIFA). The project will be undertaken by PSOMAS, a private engineering firm, and the Town of Marana. In November 2016, WestLand Resources, Inc. (WestLand), was contracted by PSOMAS to perform a Class III Cultural Resources Inventory, pursuant to Section 106 of the National Historic Preservation Act (1966, as amended) and a Preliminary Jurisdictional Determination (PJD), pursuant to Section 404 of the Clean Water Act (1972, as amended) for this proposed project. This report represents the results of the cultural resources inventory, carried out December 1, 2016<sup>1</sup>. The project area encompasses a parcel (owned by the Town of Marana) that totals approximately 90 acres, 56 of which were surface-stripped during a 1960s-era gravel mining operation and therefore not subject to the current cultural resources inventory<sup>2</sup> (**Figure 2**). Systematic pedestrian survey of the remaining 34 acres was necessary to fulfill the requirements of the Section 106 process.

Survey of the acreage resulted in the documentation of one historic archaeological site that is recommended ineligible for inclusion on the National Register of Historic Places (NRHP). In consultation with the Arizona State Museum (ASM), the Historic-era gravel pit was designated archaeological site AZ AA:12:1162(ASM). No further treatment is recommended for AZ AA:12:1162(ASM); however, one previously recorded NRHP determined-eligible (SHPO 2008) site—a locus and feature associated with Los Morteros (AZ AA:12:57[ASM])—abutting the west margin of the project area may be impacted by grading. WestLand recommends avoidance of extant features associated with the site and monitoring within the boundaries of Los Morteros, should the proposed project move forward. In addition, a previously recorded Classic period Hohokam cemetery area (AZ AA:12:88[ASM])—disturbed by the gravel pit operation and perhaps altogether, removed—is presently underwater, buried by flood deposits and covered by riparian vegetation. The projected boundary of AZ AA:12:88(ASM) places the site within the eastern portion of the project area boundary, an area that also functioned as a borrow pit for the gravel operation. The site is currently not visible, but remnants remain as scattered artifact concentrations (secondary in nature) observed along a levee just east of the borrow pit. It is assumed this site may once have been part of Los Morteros and little-to-nothing of it may remain intact; however, monitoring for additional burials in the site vicinity is recommended during future grading efforts in the project area.

<sup>1</sup> The results of the PJD may federalize the project area, making it subject to Army Corps of Engineers oversight during the Section 404 permitting process (Clean Water Act 1972, as amended).

<sup>2</sup> Following consultation with the Town of Marana and review of historic aerial maps, the two polygons depicted on Figure 2 were determined to be highly disturbed and not subject to this cultural resources inventory.

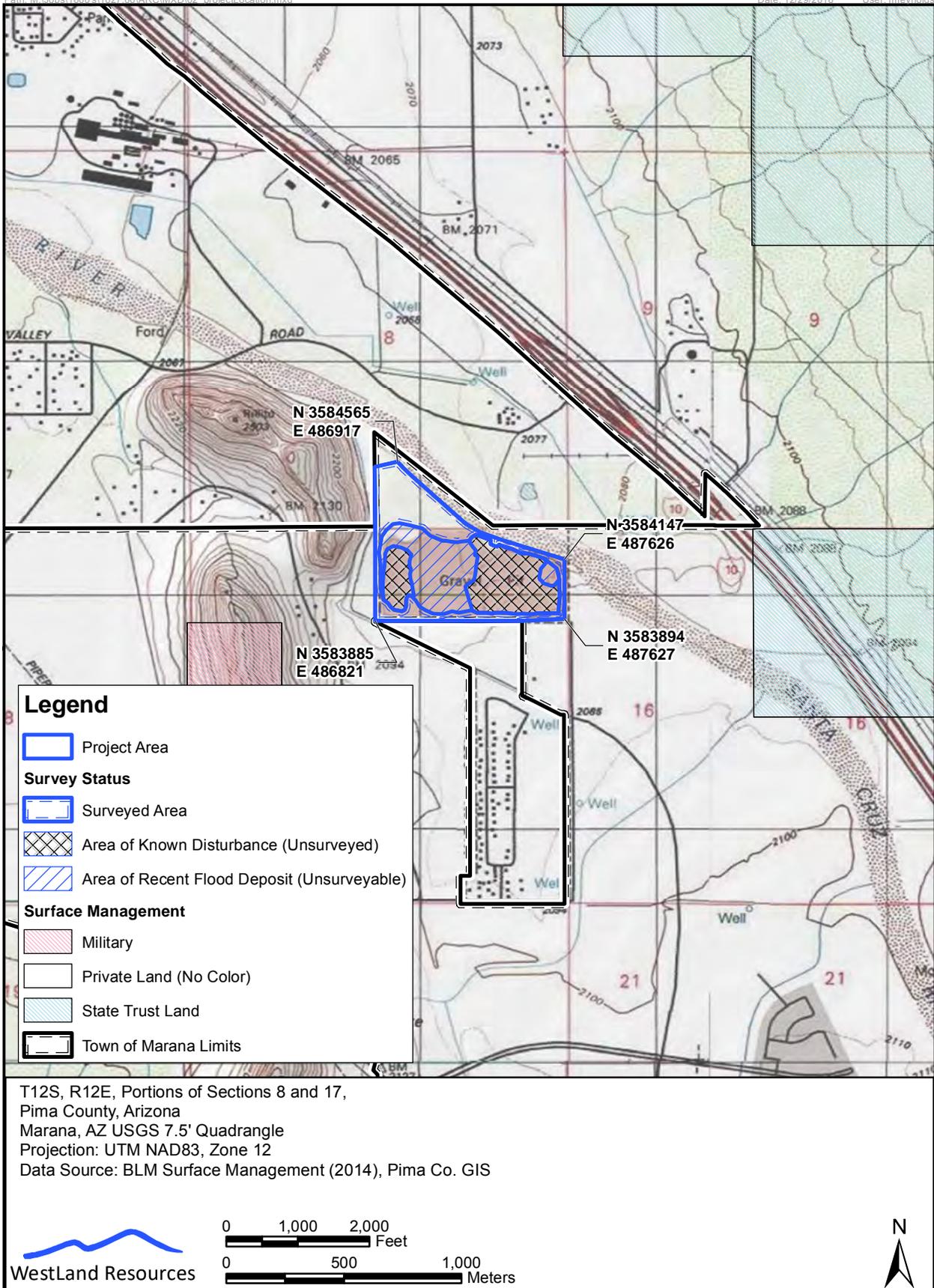


Figure 2. Project location showing surface management

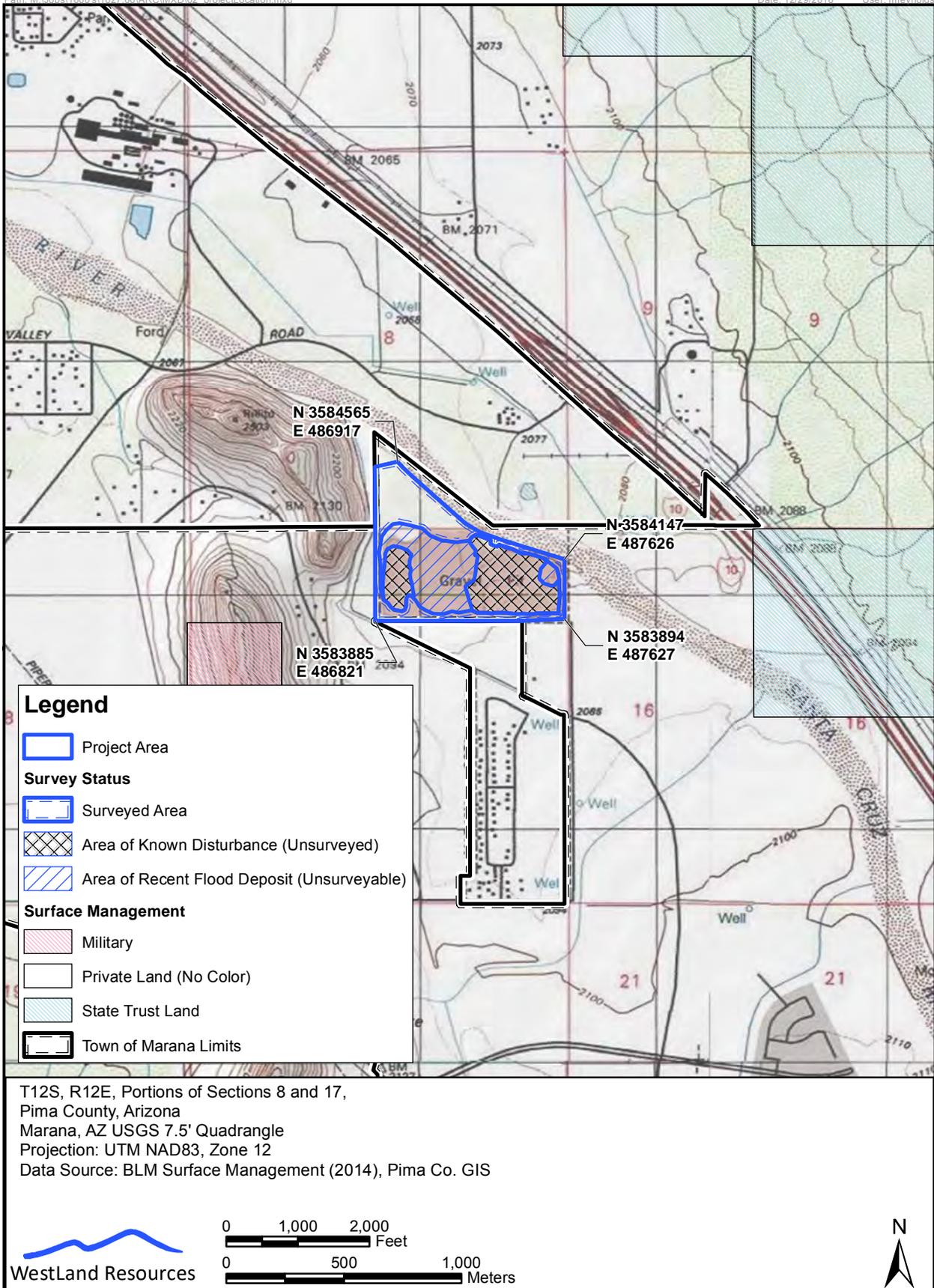


Figure 2. Project location showing surface management

## ARCHAEOLOGICAL RESEARCH AND RECORDS SEARCH

Prior to fielding the project, WestLand conducted a Class I records search of existing archaeological projects, site records, and historical maps and records for the project area (see [Appendices A and C](#)). A search of records in the ASM AZSITE database revealed that two archaeological surveys had been conducted within the project area: the Northern Tucson Basin Survey, a National Science Foundation–funded survey of the Northern Tucson Basin conducted between 1981 and 1984 (Fish et al. 1992), and an unspecified compliance project completed by the ASM for the Bureau of Reclamation in 1980 (McCarthy 1982). An additional 35 survey and excavation projects were conducted within a 1-mile radius of the project area between 1955 and 2014, primarily as compliance for road, drainage, and railway infrastructure ([Table A.1](#) [Appendix A]).

Two sites were recorded within the project area: AZ AA:12:88(ASM), a Classic period Hohokam cemetery area, and AZ AA:12:57(ASM) (Los Morteros), a 445-acre complex of habitation, agricultural, and processing areas occupied during the Late Archaic through Early Agricultural periods, then reoccupied during the Hohokam Rillito through Tanque Verde phases. A third site, AZ AA:12:58(ASM), at one time was located within the current project area. Recorded in 1963 as a 25-acre village site with petroglyphs, this site was deaccessioned and subsumed by the boundary of Los Morteros as recently as 2003. It is thought that this site and AZ AA:12:88(ASM) were in large part removed by the gravel pit operation during the 1960s.

AZ AA:12:57 (Los Morteros) is an extensive multicomponent village located along the slopes and base of Rillito Peak. Features dating to the Hohokam occupations of the site include terraced garden and habitation areas (trincheras), a ball court, and numerous pithouses, processing areas and petroglyph clusters. Ceramic dates show peak occupations during the Rillito phase of the Colonial period and the Tanque Verde phase of the Classic period. The area encompassed by Hohokam occupations subsumes smaller loci dating to other periods, including Late Archaic/Early Agricultural camps and historical Euroamerican and Yaqui houses. Detailed description of Los Morteros and the Marana community is presented in the [Culture History](#) section of this report.

The other two sites, which at one time or another were given discrete numbers (AZ AA:12:58[ASM] and AZ AA:12:88[ASM]), are nonetheless associated with Colonial and Classic period Hohokam occupations of Los Morteros and the Marana community. Descriptions of the location of AZ AA:12:58(ASM) are ambiguous, but it seems to have encompassed an area that was nearly entirely destroyed by an Arizona Department of Transportation (ADOT) materials pit (the “gravel operation”) in the 1960s. The site description indicates that remaining cultural features along the southern edge of the pit were later subsumed by the site boundary of Los Morteros (AZ AA:12:57[ASM]). AZ AA:12:88(ASM) consisted of a two inhumations with associated artifacts, both of which were excavated in 1973 (ASM 2003b). The inhumations were

located on the edge of the gravel pit, and it is unclear whether or not additional features could be present or were previously removed by the excavation of the gravel pit.

An additional 34 sites were recorded within a 1-mile radius of the project area (**Table A.2 [Appendix A]**). Most of these are associated with the prehistoric Hohokam occupation of the area. However, historical homesteads, mining features, and infrastructure are also common in this area, and at least two sites in the area—AZ AA:12:486(ASM) and AZ AA:12:143(ASM)—have a Late Archaic/Early Agricultural Period component.

### **HISTORICAL MAP REVIEW**

The following historical maps and records were reviewed as part of the Class I record search (see **Appendix C**):

- 1947 USGS 15' Cortaro quadrangle (USGS 1947) (**Figure C.1 [Appendix C]**)
- 1957 USGS 15' Cortaro quadrangle (USGS 1957) (**Figure C.2 [Appendix C]**)
- 1967 USGS Marana 7.5' quadrangle (USGS 1967) (**Figure C.3 [Appendix C]**)
- General Land Office (GLO) plat for Township 12 South, Range 12 East (Roskrige 1896) (**Figure C.4 [Appendix C]**)
- Bureau of Land Management (BLM) accession # AZAZAA 008968; 1906 Homestead patent for Sotero Ruelas (BLM 1906)

In addition, historical aerial imagery of the project area was examined for evidence of features in the project area. High-quality aerial photos are available for the years 1956 (entity ID A550810020140) and 1966 (entity ID IVBMX00010124) through the U.S. Geological Survey (USGS) Earth Explorer website (**Photos C.1 and C.2 [Appendix C]**).

Historical map review shows that the area surrounding the project area has been developed since the territorial period. An 1896 GLO map shows that the settlement of Marana was well-developed by the territorial period, comprising over a dozen households. Most of these appear to have been Mexican American families (family names that appear on the map include Molina, Aguirre, and Alvarez). The town was connected to Tucson to the south and Phoenix to the north by the Southern Pacific railroad. The map plots the homestead of Sotero Ruelas within the project area, and mapped features include a house, canal, fenced area of range land, and graded access road (see **Figure C.4 [Appendix C]**). The southern half of the fenced enclosure and the house appear to be in an area that would have been obliterated by later gravel mining operations. A second unnamed road runs northwest-southeast through the project area before joining the Silverbell Road to the south.

The earliest detailed USGS map available for the area dates to 1947. By this time, houses within the project area appear to have been abandoned. Graded access roads flank the project area boundaries to the east and west. The Southern Pacific railroad line, just east of the project area, was now paralleled by the Casa Grande Highway to the west. Numerous wells along this portion of the Santa Cruz River floodplain suggest that the primary use of this area was agricultural. A 1957 USGS map does not show major changes to the project area or the surrounding lands. By 1967, Interstate 10 had had been constructed paralleling the Casa Grande Highway to the west. A large portion of the project area had been converted into a borrow pit, where gravel was mined for highway construction. The ASM site card (ASM 2003a) for the now deaccessioned AZ AA:12:58(ASM) states that the gravel mine was used from 1963 to 1969, with occasional use through 1983. Based on examination of 1966 historical aerial photos, the northern portion of the project area appears to have been covered by mesquite bosque during this period. However, canals or roads are visible within cleared areas.

## PHYSIOGRAPHIC CONTEXT

The project area is located along the western bank of the Santa Cruz River, along the river floodplain and first alluvial terrace. Rillito Peak, an andesitic plug, flanks the project area to the west. The slopes of Rillito peak were terraced prehistorically, creating numerous garden and habitation areas that were used during the Hohokam Colonial and Classic periods. The Tucson Mountains define the western boundary of the project area. The extraordinary density of prehistoric settlement in this area is due to a historically high water table, where shallow bedrock constricts the Santa Cruz River at the northern end of the Cortaro Basin (Wallace and Holmlund 1983:138). The floral regime of the area falls within the Arizona Upland subdivision of the Sonoran Desertscrub biotic community (Turner and Brown 1994) **(Photo 1)**. Review of historical maps and photos shows that portions of the project area were covered by mesquite bosque; this was likely also the case prehistorically. The northern portions of the project area, which were never impacted by the gravel mining operation, support seasonal wetlands along braided channels of the Santa Cruz River **(Photo 2)**. Paleobotanical remains recovered from Los Morteros indicate that hydroriparian plant species also grew in this area prehistorically (Wallace and Holmlund 1993:11), suggesting that *cieneegas* may have been present along the Santa Cruz River prior to channelization during the historical period.



**Photo 1. Sonoran Desertscrub plant community along the slopes of Rillito Peak, which flanks the project area to the west. View southwest**



**Photo 2. Riparian plant community in a channel along the margins of the Santa Cruz River. View northeast**

The project area has been dramatically altered in the past half century by the excavation of a gravel borrow pit for the construction of Interstate 10 in the 1960s and a subsequent breach of retaining walls along the Santa Cruz River in 2014, which flooded the excavated area, creating a wetland area colloquially known as “Lake Marana.” Standing water is still present in this area; however, levels have been dropping since 2015, when the Santa Cruz River shifted its course towards the eastern bank (Davis 2015). During the PJD, WestLand biologists determined that borrow pits from the former mining operation were now covered with between 1 to 12 inches of alluvial deposits (Breck Jacoby, personal communication December 13, 2016). Lake Marana has created a hydrioriparian habitat that currently supports lush vegetation and migratory bird species.

## CULTURE HISTORY

### PALEOINDIAN AND ARCHAIC PERIODS

#### The Paleoindian Period

As isolated Clovis and Folsom points found scattered across southeastern Arizona attest, this region was traversed by Paleoindians, a migratory, nomadic hunting people who roamed across North America at the end of the Pleistocene epoch. Two diagnostic characteristics of Paleoindians are 1) large fluted, lanceolate projectile points and 2) the association of these points with the fossil remains of now extinct animals, particularly mammoth (*Mammuthus* spp.) and ancient bison (*Bison antiquus*) (Reid and Whittlesey 1997:30–37). While originally conceptualized as purely “big-game hunters,” Paleoindians are now known to have exploited plant resources in ways akin to later Archaic peoples (Mabry 1998; Reid and Whittlesey 1997).

#### The Early Archaic Period

The transition from the Paleoindian period to the Archaic period correlates to a change in the environment that distinguishes the Holocene epoch from the preceding Pleistocene epoch. Whereas Paleoindian cultures are characterized as big-game hunters, Archaic cultures are perceived as generalized hunters and gatherers (Mabry 1997:4) who used a broad spectrum of faunal resources and diverse local plant foods. The transition probably was not abrupt, and some archaeologists have suggested that the two subsistence strategies overlapped temporally and possibly spatially (Faught and Freeman 1998:50). Nevertheless, 8500 B.C. is taken as the starting point of the Archaic period as it was around this time that a ground stone tool industry consisting of handstones and netherstones became common across the Southwest (Huckell 1996:306, 327). Evidence of Early and Middle Archaic occupations in southeastern Arizona is sparse.

Only a handful of sites with Early or Middle Archaic components have been excavated in southeastern Arizona, all of which are rockshelter sites and ephemeral encampments (Clark and Lyons 2012:349). However, evidence from other areas of the Southwest cast light on probable developments during this interval. Recent investigation into the adoption of maize across the Southwest puts the current threshold for the use of this plant at about 2100 B.C., during the late Middle Archaic period (Mabry 2005). This development set the stage for cultural innovation during the Late Archaic period.

#### The Late Archaic Period

An increase in site frequency during the Late Archaic period suggests significant population growth (Berry 1982; Matson 1991). This period is also characterized by a proliferation of local

stylistic traditions and contracting resource-procurement catchments, suggesting the establishment of autonomous social units with defined territories (Shackley 1996). However, networks of alliances fostered rapid transmission of ideas and goods, as indicated by the nearly synchronous adoption of maize across widely separate regions of the Southwest (Gregory 1999:8–9; Irwin-Williams 1979:38). Similarly, the widespread exchange of marine shell jewelry (Howard 1987; L. Huckell 1993; Vokes 1998a, 1998b) and shared stylistic patterns in the material culture (Huckell 1984a, 1984b, 1988; Irwin-Williams 1979:38) attest to the existence of an exchange network.

In southern Arizona, Late Archaic period sites have generally been found on the floodplains and terraces along rivers and in the bajada/montane transition zones (Altschul et al. 1997; Huckell 1988, 1990; Roth 1992, 1996; Vanderpot 1997; Whalen 1971). These settlement locations would have provided ready access to a rich variety of valley and mountain resources (Roth 1992, 1996:39). Between these two nodes of settlement are strings of smaller sites and isolates, representing resource-procurement and processing sites within a broader territory.

In southern Arizona, the roots of the great irrigation societies of the Formative period emerged as early as 1000 B.C. along the floodplain of the Santa Cruz River. Recent excavations here (Mabry and Davis 2008) uncovered small canals dating to this period. By 880 B.C., villages of up to a hundred habitations show evidence of communal food production and storage and public architecture (Freeman 1998; Gregory 2001; Huckell 1990; Mabry and Archer 1997). While we cannot assume that these structures were simultaneously occupied, the number of houses indicates a permanence of settlement that differs from the preceding periods. An attachment to “place” is also manifested by the repeated and enduring use of particular settlements with formal cemeteries (Mabry 1998). Emerging social difference is evident in the layout of some of these sites: for example, pit structures at the Santa Cruz Bend site (Mabry 1997:2) and Coffee Camp (Halbirt et al. 1993:87–91) show a “big house/small house” dichotomy indicative of hierarchies within settlements.

## **FORMATIVE PERIOD**

The Formative period is differentiated from the Archaic period by the addition of pottery to the material culture repertoire. The Formative period in southern and central Arizona is typically considered synchronous with the tenure of the Hohokam culture.

### **The Early Formative Period**

Similarities in settlement locations and flaked and ground stone industries and the practice of a mixed agriculture and foraging subsistence strategy support the thesis of continuity between the Late Archaic period cultures and the Formative period pottery-making, sedentary agricultural cultures across the southern Southwest (Bowen 1976; Cable and Doyel 1987; Ciolek-Torrello 1998; DiPeso 1956, 1979; Doyel 1995; Elson and Lindeman 1994; Gilman 1995; Haury 1957,

1986; Hayden 1970; Johnson 1960; McGuire and Villalpando C. 1993; Roth 1996; Sayles 1945; Schroeder 1957; Wallace et al. 1995). In the Phoenix and Tucson Basins, incipient irrigation agriculture developed into extensive canal systems (Henderson 1989). In the middle Gila River Valley, there began to emerge a unique group of people recognizable as the Pioneer period Hohokam. During most of the Early Formative period, this group seems to have been no more influential than any other contemporary group in the Tucson Basin and other localities. But this balance rapidly shifted, and the Early Formative period ends with the ascension of the Hohokam as a prominent and influential cultural tradition.

### **The Middle Formative Period**

During the Middle Formative period, Hohokam sites become more numerous, and the culture's sphere of interaction expanded from the Salt/Gila core into adjacent areas like the lower San Pedro River Valley. The initial spread of this tradition occurred during the Snaketown phase of the Pioneer period of the Hohokam cultural sequence, sometime between A.D. 700 and 800. Deaver and Altshuler (1994) attribute the change to a shift from primarily relying on dry or floodwater farming to fully adopting irrigation agriculture, which encouraged expansion into non-riverine environments.

This expansion was marked by the widespread trade of red-on-buff pottery decorated in a distinctive hachured style. The spread of the Colonial period Hohokam cultural pattern soon followed characterized by a ball court ceremonialism, a cremation death ritual, and an iconography emphasizing the representation of animal and human forms. Between A.D. 800 and 950, the Hohokam culture ruled supreme over most of southern Arizona. During this 150-year period, many of the low-lying river valleys along the Gila River and its tributaries were "colonized" and established as Hohokam settlements. A ball court network linked peripheral areas to the large riverine village sites in the Phoenix Basin, promoting regular interaction and market exchange. This network was of sufficient vigor that relatively large quantities of Gila River Red-on-Buff pottery, among other goods, reached populations as far away as Paloparado (DiPeso 1956), some 180 km to the south.

During the later part of the Middle Formative period, the influence of the Hohokam cultural system on populations in southern Arizona began to diminish. The export of red-on-buff painted pottery from the Gila River to outlying areas slowed dramatically around A.D. 950 (Wallace 1988; Wilcox 1987). In its place, a number of local ceramic series evolved that imperfectly emulated Hohokam Sedentary-style decoration, but were clearly produced from local clays with a non-Hohokam technology (Deaver 1989a, 1989b; Greenleaf 1975; Wallace 1986). Across southern Arizona, ball courts had been largely abandoned as integrative features by about A.D. 1000, and widespread shifts in settlement location and configuration occurred (Ferg 1984).

## The Late Formative Period

Changes of the post-A.D. 950 period are sufficiently dramatic to suggest that the populations of southern Arizona were once again functioning as independent political and economic systems by the middle of the tenth century A.D. In southern Arizona, local systems flourished at the expense of regional systems, and within localities, districts were abandoned and new communities and community centers were established. Influential local systems included northern Mexico, the middle and lower San Pedro River Valleys, the Papaguería, and the Tucson Basin. These new sociopolitical and economic relationships can be inferred from the patterns in the indigenous and exotic ceramics in archaeological assemblages. In the Tucson Basin, Tanque Verde Red-on-brown was produced with a vigor not reflected by its Gila Basin counterpart, Casa Grande Red-on-buff. In addition, the influx of pottery from the San Pedro River Valley, the Tonto Basin, and the Cibola region (Wallace and Holmlund 1984:176–177) suggests that a more sustained interaction with peoples to the southeast and northeast was taking place.

The beginning of the Late Formative period is signaled by the appearance and rapid spread of a new architectural style consisting of above-ground rectangular rooms. Construction techniques included walls built with adobe “turtlebacks” (i.e., puddled adobe masses), adobe reinforced by wooden posts or cobbles, and dry-laid masonry. Initially, above-ground rooms co-existed with the old-style brush-and-earth-walled pit structures characteristic of the Middle Formative period. But by A.D. 1200, above-ground architecture was the dominant form of dwelling and storage space.

Changes in settlement structure soon followed, including the concept of enclosing space with walls to create private compounds. The effect was to partition space and formalize the relationship between the compounds and other important features within the larger settlement, such as cemeteries, middens, and public buildings. This newly developed village structure consisted of several residential compounds loosely focused on a platform mound surrounded by a compound wall (Reid and Whittlesey 1997:251–252). It is thought that this arrangement reflects a change in polity that became necessary as a result of population increases and interaction between culturally diverse groups, especially where arable land was at a premium.

The Late Formative period ends sometime around A.D. 1450 with the disappearance of the Late Formative period cultures in southern Arizona from the landscape and the abandonment of the major Formative period settlements in the Salt and Gila River Valleys, in the Tucson Basin, and in the rest of southern Arizona. Various competing theories have arisen to explain this cultural change. In the Hohokam core along the Salt and Gila Rivers, soil salinization as a result of intensive irrigation, overpopulation leading to resource depletion, raiding and warfare, internal strife, and degradation of irrigation systems due to floods and droughts, have all been proposed (e.g., Abbott 2003; Ackerly 1982; Andrews and Bostwick 1997). In areas of southern Arizona that were not dependent on a similar level of social organization or extensive networks of irrigation canals, other factors may have been at work. Little hard evidence is available. What is clear is that

when the Spanish first entered the southwestern United States less than a century later, the large Late Formative period settlements across southern Arizona were long abandoned and the history of these prehistoric cultures had already passed into the folklore of the native peoples that the Spanish encountered.

### **The Marana Community**

The project area is located in the southern portion of an area of the Tucson Basin known as the Marana Community (AZ AA:12:251[ASM]). This community represents a Late Preclassic/Early Classic period cluster of sites focused on the major civic and monumental architecture of the Marana Platform Mound site. This site is surrounded by a group of interrelated villages, agricultural fields, and resource-extraction and processing locales. Together, the platform mounds and their associated sites form what could be considered a territory. Peripheral sites in geographically “isolated” regions persisted during the Early Classic period, but platform mound communities came to dominate the Tucson Basin landscape. Within and among the platform mound communities in the Tucson Basin and elsewhere, diverse systems of commodity exchange and communal interaction developed. First delineated during the Northern Tucson Basin Survey, the community of Marana encompasses an area of nearly 200 square kilometers located at the geographic midpoint between the Santa Cruz River and the Tortolita Mountains (Fish et al. 1992:Figure 3.2; Madsen et al. 1993). The platform mound site at the Marana Community is situated along the western toe slope of the Tortolita range, covering an area measuring 1.5 by 0.5 km (Bayman et al. 2013:3). The Marana Community was densely settled but essentially had no immediate access to irrigable farmland. Scholars posit that this resulted in the development of a comprehensive system of subsistence exchange with an emphasis on site craft manufacture (Bayman et al. 2013:1–17). The occupants of Los Morteros were certainly involved in goods exchange and interaction with villages in the larger community area.

### **Los Morteros**

Los Morteros was primarily occupied during the Rillito (A.D. 850–950), Rincon (A.D. 950–1150), and Tanque Verde (A.D. 1150–1300) phases of the Tucson Basin Hohokam cultural sequence (Lange and Deaver 1989; Wallace 1995). The presence of particular types of pottery suggests that the site was occupied as early as the Snaketown phase (A.D. 700–800) and may have experienced some type of occupation or use in the Tucson phase (A.D. 1300–1450). Over the course of the 450 to 750 years during which the site was occupied, the settlement pattern changed significantly. During the Rillito phase (A.D. 850–950), the residential core of the occupation appears to have been centered on the ball court in the preserved portion of the site, situated on county lands at the southern end of the central two-thirds of the site. Rillito phase components were also noted to the south, along the margins of the Santa Cruz River floodplain. These may have been small, scattered, perhaps seasonal farming settlements (Lange and Deaver 1989; Wallace 1995:777).

During the following Early Rincon subphase (A.D. 950–1000), settlement appears to have expanded across the site, with the establishment of village segments to the south of the core area in an area with limited small-scale settlement during the preceding Rillito phase. Settlement during the Middle Rincon subphase (A.D. 1000–1100) reached its maximum areal extent and consisted of a series of 17 to 21 village segments strung out along what is essentially the western margin of the Santa Cruz River floodplain. These village segments appear to have been largely autonomous settlements consisting of clusters of houses associated with large communal cooking features (hornos) and cemeteries.

Toward the end of the Middle Rincon subphase and into the Late Rincon subphase (about A.D. 1080–1150), a drastic and abrupt shift in the settlement pattern occurred, with the wholesale abandonment of many of the Middle Rincon village segments, particularly those south of Linda Vista Boulevard; a shift in the settlement location to the northern portion of the site area (Lange and Deaver 1989; Wallace 1995:794–795); and the occupation of the hillside *trincheras* settlement loci of Linda Vista Hill and Rillito Peak (Downum 1995; Wallace 1983). Portions of this later community, including two Tanque Verde Phase pithouses, have recently been excavated in the area of the Puerto del Azotado trailhead, near the southwestern corner of the project area (Hooper 2016). Apparently, a significant Classic period component was also present in the now-abandoned ADOT materials pit (ASM 2000, 2003a, 2003b). This component has been largely destroyed, but AZ AA:12:88(ASM) and AZ AA:12:89(ASM) likely represent remnants of this settlement cluster. The entire settlement area appears to have been abandoned during the Tanque Verde phase (Wallace 1995:797–799).

## **THE PROTOHISTORIC AND SPANISH PERIODS**

The Protohistoric period in Sothern Arizona remains poorly understood. What is known is based on Historic period documentation of indigenous land use and limited archaeological evidence. During the Protohistoric period, the project area fell within the territory of the Sobaipuri, an O’odham group ancestral to the Tohono. Sobaipuri settlements are documented in the travel journals of Eusebio Kino and Juan Mateo Manje, who explored the area in the 1690s (summarized in Clark and Lyons 2012:40–42). They describe an agricultural people who practiced irrigation farming, constructed bent-pole houses, and lived in moderately sized villages along the San Pedro River and Aravaipa Creek. Sobaipuri settlements in the Tucson area were situated along points of the river where high bedrock sills forced water to the surface. One such settlement, San Clemente, was documented by Kino in the vicinity of the project area, at Point of Mountains (Rillito Peak). The settlement was described as a *rancheria* of about 20 houses (Doelle 1984).

Following the death of Padre Kino in 1711, much of the mission system in the Pimería Alta fell into disrepair for the next 50 years (Bolton 1984). The arrival of Father Bernard Middendorf, a Jesuit, in the Tucson area in 1757 reestablished a Spanish presence there, and by the early 1770s, a mission church—San Agustín—had been built at the base of Sentinel Peak near the Sobaipuri

village sTjulshon (Dobyns 1964, 1976). In 1776, the Presidio of Tucson was established along the eastern bank of the Santa Cruz River opposite the newly constructed church by an Irishman, Hugo O'Connor (Dobyns 1964). Defensive and residential structures were built in what is now downtown Tucson, and soldiers from the presidio at Tubac were moved north to Tucson to defend it against Apache raiding, which had become a serious problem in the region (Dobyns 1964). Spanish colonists and Native American farmers were attracted to the area by the fertile farmland, the water provided by the Santa Cruz River, and the relative safety offered by the presidio (Dobyns 1976; Officer 1987). Following Mexico's independence from Spain in 1821, Mexican settlers continued to arrive and farm the Tucson Basin. The San Agustín Mission appears to have been abandoned by 1831 (Elson and Doelle 1987). However, the inhabitants of the region continued to rely on the Tucson presidio for protection (Officer 1987).

### he American Period

The Treaty of Guadalupe-Hidalgo, signed in 1848 following the conclusion of the Mexican-American War, ceded that portion of (what is now) Arizona lying north of the Gila River to the United States. In 1853, the Gadsden Purchase expanded Arizona from the Gila River south to the present-day Mexican border. Although the lands included in the Gadsden Purchase had been used for ranching in the past, Arizona's ranges were now open for ranching activities on a large scale. The increase in population in California since 1849 had resulted in a significant beef market, and Arizona became a thoroughfare for cattle driven from Texas to California. Within Arizona itself, military garrisons and a growing mining industry also provided a need for beef (Morrisey 1950:151–152).

In 1863, the Arizona Territory was established after successful lobbying by Charles D. Poston. A year before, in 1862, the National Homestead Act offered land tracts of 160 acres at \$1.25 per acre or 80 acres at \$2.50 per acre for land within a railroad grant (Stein 1990:4). This began a series of homesteading acts that sparked a boom in homesteading in Arizona between 1910 and 1940 (Stein 1990). The Southern Pacific Railroad arrived in 1880, bringing with it a flood of Anglo-American settlers. The surrender of Geronimo and defeat of the Apache in 1886 initiated boom times in the region, with mining and cattle ranching as the main industries of growth (Sonnichsen 1987).

In historical times, the south Marana area was an important way station along the trails that crossed the desert between Tucson and the Gila River. The name of the area at that time, Charco de los Yumas, conveys the importance of the spot as a watering hole. With the arrival of the Butterfield stage line, a permanent station (Point of the Mountain or Pointer Mountain station) was established within the Los Morteros site boundary in the late 1850s (Stein 1993). This was the only center of occupation in the vicinity for some time, until the area was homesteaded in the 1890s by Sotero Ruelas and others (Stein 1993:104).

By the early 1900s, the growth of nearby Rillito led to more residents arriving in the vicinity. During the early to mid-1900s, a small Yaqui community known as “Puerto” was established in the north-central part of the site near the modern intersection of Coachline Boulevard and Silverbell Road. Part of this community, including two framed lumber houses and a jacal structure, was excavated by Desert Archaeology, Inc. (DAI), in 2002 (Castalia 2002). Historical maps indicate that residences were replaced by farmland or range and around the project area by the mid-twentieth century. By 1963, construction of Interstate 10 removed a large swathe of the project area surface as gravel was mined in the ADOT materials pit (the gravel operation). The pit continued to be used throughout the 1960s and intermittently until the 1980s, when flooding shut down mining operations (Wallace 1995).

## **HISTORIC CONTEXTS**

Previous archaeological research in the area suggests that significant sites and features within the project area will likely be associated with the Middle Sedentary-Classic period Hohokam occupation of the Marana Community. Site records indicate that Classic period occupation of this area was particularly intensive, although many features associated with this occupation have been destroyed by the ADOT materials pit (the gravel operation). Additionally, there is some possibility that significant features relating to historical period Yaqui and Mexican American occupations may remain in the project area. However, available documentary evidence suggests that surface indications of historical features with a high research significance (i.e., Yaqui houses and the Sotero Ruelas house) have likely been razed by subsequent farming and quarrying. Research themes for the El Rio Survey therefore concentrate on the prehistoric occupation of the area.

### **Late Prehistoric Social Organization and Site Structure at Los Morteros**

The portions of Los Morteros (AZ AA:12:57(ASM) that fall within the project area represent a dramatic shift in the settlement structure of Los Morteros, when populations that were formerly dispersed over an extensive area contracted into smaller settlements along the eastern slope of Rillito Peak. Previous survey of this part of Los Morteros documented extensive Middle and Late Rincon phase occupations at trincheras sites immediately west of the project area, as well as a substantial Classic period component within and around the project area. Remaining Sedentary and Classic period features within the project area could contribute to our understanding of changing settlement structure, social organization, and demographics during the later occupations of Los Morteros.

### **Prehistoric Subsistence in the Marana Community**

One of the more interesting themes to emerge from previous work in the Marana Community is the complex exchange networks and ecological adaptations that enabled a high population density in an area where prehistoric occupants could not practice irrigation agriculture. The project area

is located on the periphery of Rillito Peak, a landform known for its prehistoric terraced gardens and high density of plant processing features, including the eponymous mortar boulders for which Los Morteros is known. Additionally, the floodplain to the east of the site is situated in an area with a naturally high water table and therefore potential for prehistoric *ak-chin* field systems and well features. Prehistoric processing and agricultural features within the project area could expand our knowledge of the diversity of subsistence practices utilized by the prehistoric occupants of this area.

### **Classic Period Mortuary Patterns and Human Osteology**

Previous work at AZ AA:12:88(ASM) included the removal of two Classic period inhumations (ASM 2003b). These inhumations were associated with a larger Classic period occupation of the area, which was previously designated AZ AA:12:58(ASM)—now subsumed by Los Morteros (AZ AA:12:57[ASM])—and may be part of a larger cemetery area. Should additional inhumations be present within the project area, they could inform research regarding mortuary custom, demographics, and pathology among the Classic period occupants of the Marana community. **F**

**Figure 3** summarizes the cultural chronology for the Tucson Basin and neighboring regions of Arizona.

	Cultural Stages	Hohokam			Dragoon		Middle San Pedro Valley	San Simon		Papagueria	Trincheras		
		Period	Tucson Basin <sup>1</sup>	Phoenix Basin <sup>2</sup>	Tuthill <sup>3</sup>	Vanderpot and Altschul <sup>4</sup>	Altschul <sup>5</sup>	Sayles <sup>6</sup>	Vanderpot and Altschul <sup>4</sup>	Haury <sup>7</sup>	Bowen <sup>8</sup>	McGuire and Villalpando <sup>9</sup>	
1700	<b>HISTORIC</b>												
1600	<b>PROTO-HISTORIC</b>												
1500							Upper Pimas					Santa Teresa	
1400	<b>LATE</b>	Postclassic	Tucson	Polvorón	Tucson	Tucson	Babocomari			Sells	Phase IV	El Realto	
1300		Classic	Tanque Verde	Soho	Undefined	Tanque Verde	Tanque Verde						
1200	<b>MIDDLE</b>	Sedentary	Rincon	Sacaton	Tanque Verde	Tres Alamos	Preclassic period	Encinas	Encinas	Vamori	Phase III	Altar	
1100			Colonial	Rillito	Santa Cruz	Cascabel		Cascabel					Phase II
1000		Pioneer	Cañada del Oro	Gila Butte	Cascabel	Undefined	Early Formative period	Cerros	Galiuro	Undefined	Phase I Cochise	Atil	
900			Snaketown	Snaketown									
800	<b>EARLY</b>	Early Ceramic	Tortolita	Vahki	Undefined	Undefined	Pinalaño	Pinalaño & Dos Cabezas	Peñasco	Undefined	Atil ?		
700			Agua Caliente	Red Mountain									
600	<b>EARLY</b>	Early Agricultural	Cienega	SAN PEDRO STAGE	SAN PEDRO STAGE	SAN PEDRO STAGE	Peñasco	San Pedro	San Pedro	Late Archaic	Archaic	Cochise Archaic	
500													San Pedro
400													Unnamed
300	<b>MIDDLE</b>	CHIRICAHUA STAGE					MIDDLE ARCHAIC						
200		Occupation Gap ?											
100	<b>EARLY</b>	SULPHUR SPRING STAGE					EARLY ARCHAIC						
B.C.	<b>PALEO-INDIAN</b>	<ol style="list-style-type: none"> <li>1. After Dean 1991, Deaver and Ciolek-Torrello 1995, Mabry 1998, Wallace 2012</li> <li>2. After Dean 1991, Mabry 1998, Haury 1976, Henderson 2002, Wallace 2004</li> <li>3. Tuthill 1947</li> <li>4. Vanderpot and Altschul 2007</li> <li>5. Altschul 1994</li> <li>6. Sayles 1945, 1983</li> <li>7. Haury 1975</li> <li>8. Bowen 1972</li> <li>9. McGuire and Villalpando 1993</li> </ol>											
11000		PALEOINDIAN											

**Figure 3.** Cultural chronology for the Tucson Basin and surrounding regions

## **SURVEY METHODS**

WestLand's survey methods were influenced by the nature of the expected archaeological resources and the character of the landscape. A pedestrian archaeological survey was conducted within the project area using standard field survey procedures. Crew members aligned abreast at 20-m intervals walked parallel transects back and forth across the project area until the entire project area had been examined for archaeological resources. Topographic maps, surveying compasses, global positioning system (GPS) units, and pin flags were used to ensure complete coverage. Field methods focused on collecting basic information about individual artifacts, features, and sites, including their age, cultural affiliation, and presumed function. Basic metric data were also recorded.

Due to the topography of the project area, some areas could not be assessed by pedestrian transect survey. Therefore, these areas were not transected. Areas that were inundated during the 2015 flood remain covered by water or by thick deposits of alluvial silts that obscure the ground surface. Inundated and recently inundated areas include all of the former gravel operation borrow pits and graded areas, encompassing approximately 62 percent of the project area. Areas that could not be surveyed as a result of floodwater or flooding events and deposits or thick riparian vegetation stands are shown in **Figure 4**.

In addition, the survey methods were influenced by the expectation that sites are often masked or obscured by ongoing modern land use. A review of historical maps and aerial photographs was performed prior to the field survey to help identify Historic period features that might still exist as archaeological sites. Field observations were recorded on standardized forms.

### **ASM SITE CRITERIA**

Evidence of past human activities exists on the landscape in the form of objects, sites, districts, buildings, and structures. The archaeological survey anticipated finding three categories of archaeological resources: artifacts, artifact scatters, and features. The first two categories consist of portable objects left behind on the landscape by various activities. The third is made up of nonportable, purposeful constructions, excavations, and deposits.

The ASM provides guidelines that identify what is minimally considered an archaeological site. Upon initial discovery of an archaeological artifact, artifact scatter, or feature, the archaeological survey team converged on that find to determine whether other associated archaeological materials were present. Once fully defined, ASM guidelines (1995) were applied to determine whether the archaeological find should be designated and recorded as an archaeological site.



T12S, R12E, Portions of Sections 8 and 17,  
 Pima County, Arizona  
 Projection: UTM NAD83, Zone 12  
 Data Source: 2012 Pictometry Orthophoto

**Legend**

-  Project Area
- Survey Status**
-  Surveyed Area
-  Area of Known Disturbance (Unsurveyed)
-  Area of Recent Flood Deposit (Unsurveyable)



  
 WestLand Resources



**Figure 4.** Unsurveyable areas due to flooding events and/or areas of previously known disturbance

According to the ASM, a site is any:

1. Physical remains of past human activity that are at least 50 years old.

Additionally, sites should consist of at least one of the following:

2. 30+ artifacts of a single class (i.e., 30 sherds, 30 lithics, 30 tin cans) within an area 15 m (50 ft) in diameter, except when all pieces appear to originate from a single source (i.e., one ceramic pot, one core, one glass bottle).
3. 20+ artifacts which include at least 2 classes of artifact types (i.e., sherds, ground stone, nails, glass) within an area 15 m (50 ft) in diameter.
4. One or more archaeological features in temporal association with any number of artifacts.
5. Two or more temporally associated archaeological features without artifacts.

Per current ASM requirements (Todd Pitezal, personal communication August 3, 2016), no historical linear infrastructure was recorded as a site unless abandoned or no longer maintained for its original use. However, linear infrastructure, when present, was recorded as a discrete feature within larger historical archaeological sites.

Resources satisfying these minimum criteria were designated as archaeological sites and recorded as specified in the ASM site recording manual (ASM 1993). Archaeological resources that did not meet these criteria were designated as nonsite isolated occurrences. Within the boundaries of the archaeological sites, WestLand archaeologists used various methods to assess surface artifact density. When there are fewer than 100 artifacts at a site, all the artifacts are tallied and divided by the total site area. When there are greater than 100 artifacts at a site, the number of artifacts within one or more observation units of a prescribed shape and size (e.g., 2-by-2-m square, 2-m-diameter circle) is tallied and divided by the area. Site recording generates the following records: written descriptions, photographs, and electronic data collection with a Trimble GeoExplorer. A digital Primary Site Datum (PSD) is established for each site. UTM coordinates are electronically recorded for each PSD with submeter accuracy and initialized to the NAD83 CONUS datum. Site boundaries are established by the distribution of artifacts and features. Within each archaeological site, the locations of any features and diagnostic tools are mapped. For each newly discovered site, an ASM site number is obtained from the ASM Site Files Office (University of Arizona, Tucson) and an ASM site card is completed and returned to the ASM for entry into their site files records and database (AZSITE).

## **ISOLATED OCCURRENCES**

This category includes all archaeological resources that are not identified as archaeological sites. The location of each isolated occurrence is recorded with a handheld GPS unit. To the extent possible, each isolated occurrence is categorized into a conventional typological category and attributed to an archaeological culture, chronological period, and activity. Examples are resource procurement, transportation, ranching, and mining.

Isolated occurrences can be individual artifacts, artifact scatters, and features. By definition, these are considered archaeological when they are more than 50 years old. Many artifacts of glass, metal, and synthetic material lack clear diagnostic characteristics to indicate their age. Because these are abundant around modern settlements and in areas frequently visited for hunting, camping, and other forms of recreation, it is impractical to map and record all glass, metal, and synthetic materials. These industrial-age artifacts are identified as archaeological resources only when clear diagnostic evidence establishes that they are over 50 years old. If these artifacts are related to the defined themes of Euroamerican land use, then items that can be linked specifically to these activities are mapped and documented at the discretion of the field director in consultation with the principal investigator. Similarly, many individual man-made features whose ages are uncertain are present on the landscape. Some commonly encountered examples are cairns, rock clusters, small rock rings, mining features, ranching features, trails, and roads. Even though the age of these features may be ambiguous, they are related to the theme of Euroamerican land use and are mapped and recorded in consultation with the Arizona State Historic Preservation Office (SHPO). Some of these may be diverse groups of artifacts and features that meet all the ASM criteria for an archaeological site except for the determination of age. These are identified as isolated occurrences because their age is unknown.

## **FINDINGS AND FIELD NUMBERS**

Archaeological resources found during a survey are designated as sites, isolated occurrences, features, or artifacts. WestLand also designates study units and reference points to assist in documentation. All the archaeological resources found, study units, and reference points are assigned a unique field number (FN) from 1-n in a master field log. The FNs are recorded on all documentation and link the documentary record to a specific point, object, site, or area within the project area. The assigned FN is also used as the field site number, isolate number, artifact number (within sites), feature number (within sites), unit number, and reference point number. Whereas the FN master list is a set of sequential numbers, when the FNs are categorized by site, feature, artifact, isolate, study unit, and reference point categories, they are not sequential within these subsets. All FNs are resequenced in the final report and are presented in sequential order with each site on maps and documentation within the report.

## **ARTIFACT AND FEATURE DOCUMENTATION**

Data on artifacts and features are consistently collected, regardless of whether the artifact or feature is associated with a site or considered an isolated occurrence. Artifacts are described and classified into typological categories based on material, form, and manner of decoration. Artifacts representative of each type are photographed. Glass, metal, and other industrial-made artifacts are similarly classified. Key diagnostic traits are recorded, and any diagnostic markings or embellishments are photographed and transcribed.

Archaeological features are documented in a consistent manner. Features are classified into quasifunctional categories, described, and measured. Descriptions include notes on the form, composition, material, and construction technique. All features are photographed.

## **SURVEY FINDINGS**

Two previously recorded sites, 1 newly documented site, and 11 isolated finds were recorded during the current survey. These are discussed below.

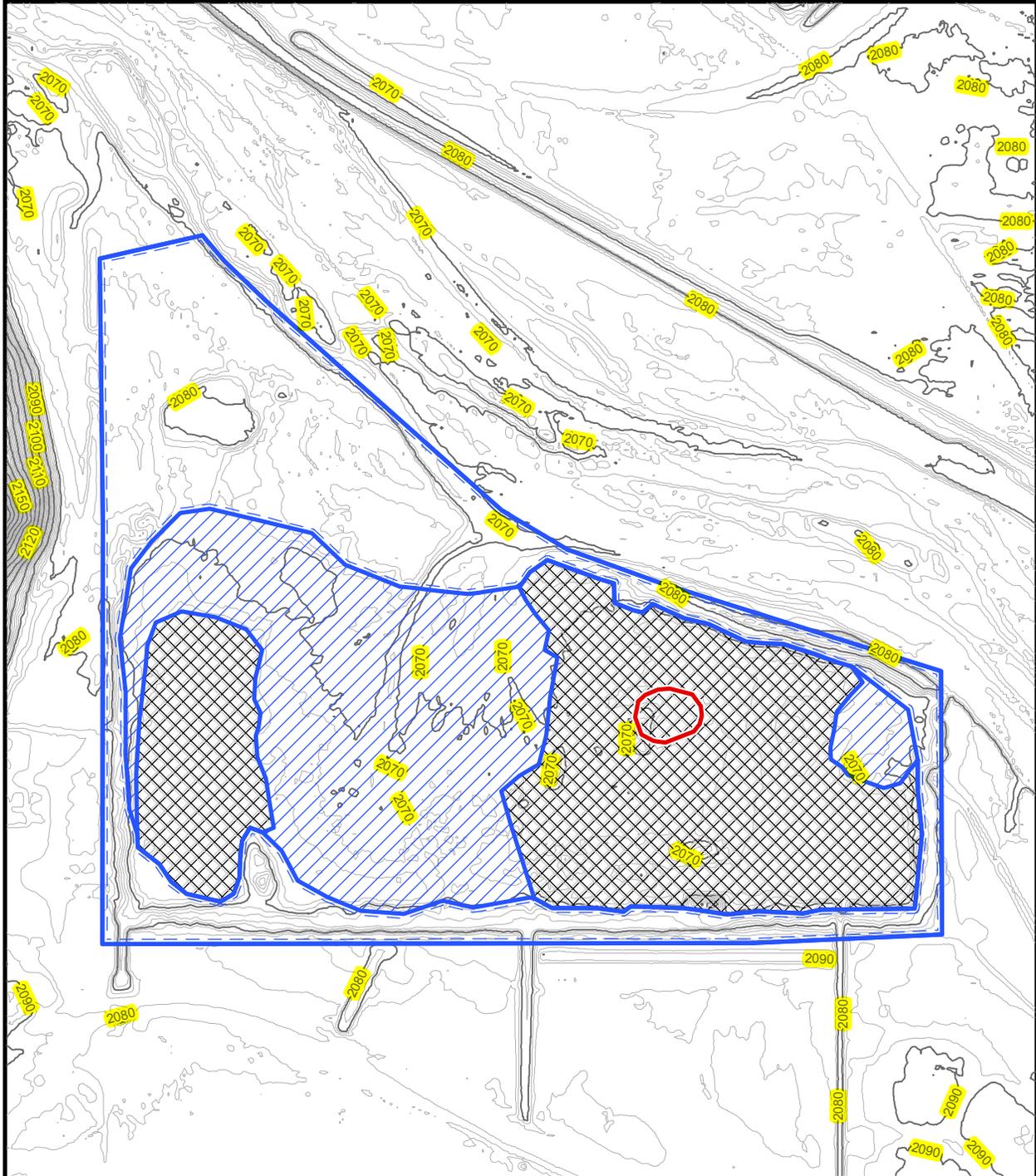
**SITE DESCRIPTIONS****AZ AA:12:88(ASM)****OTHER SITE NUMBER:** N/A<sup>3</sup>**WESTLAND FIELD SITE NUMBER:** N/A**CULTURAL AFFILIATION:** Hohokam**AGE:** Classic period (1150–1450 A.D.)**TYPE:** Inhumation features**DIMENSIONS:** 51 × 63 m (2547 m<sup>2</sup>)**ELEVATION:** 2,086 feet amsl**NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY RECOMMENDATION:** Ineligible

**SITE DESCRIPTION:** AZ AA:12:88(ASM) was initially recorded by Bruce Huckell in 1973. The ASM site card (ASM 2003b) states that two Classic period inhumations were observed along the edge of a gravel borrow pit (now referred to as AZ AA:12:1162[ASM]). These inhumations were subsequently removed by Tom Mulinski. One inhumation contained no artifacts; the other contained a Gila Red bowl and bone awl. Although both inhumations were removed, the excavators posited that additional intact features may remain on the eastern margin of the borrow pit. Therefore, a site number was retained.

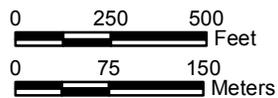
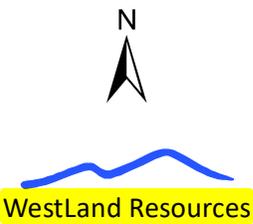
The site was rerecorded in 1980 by Sharon Urban as a historical gravel pit with unspecified destroyed archaeological remains—a description that may describe the secondary deposits of artifactual materials WestLand archaeologists observed as isolated features (IOs 1, 2, and 3) along the northern and eastern margins of the borrow pit during the current cultural resources inventory (**Figure B.1** [Appendix B]). These isolated concentrations fall outside the site boundary currently on file with ASM (**Figure 5**). The last recording of the site was conducted by SWCA Environmental Consultants, Inc. (SWCA), in 2003. At that time, the recorder noted that intact features may exist east of the site boundary along the edge of the borrow pit (ASM 2003b).

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<sup>3</sup> AZ AA:12:58 (ASM)—deaccessioned and subsumed by the revised boundary of Los Morteros AZ AA:12:58[ASM] in 2003—is at times referenced in possible association with AZ AA:12:88(ASM) (ASM site card 2003a). Additionally, AZ AA:12:88(ASM) was at one time, encompassed by the boundary of Los Morteros. However, the 2003 aforementioned site boundary revision reduced the size of Los Morteros and AZ AA:12:88(ASM) maintained its original, discreet location (ASM site card 2003b). All site boundaries within in the project area were likely associated with the occupation of Los Morteros.



2ft Contour lines derived from Pima Co. DEM



### Legend

-  Project Area
-  Site Boundary
- Survey Status**
-  Surveyed Area
-  Area of Known Disturbance (Unsurveyed)
-  Area of Recent Flood Deposit (Unsurveyable)

Figure 5. AZ AA:12:88(ASM) site map

AZ AA:12:88(ASM), as presently understood, may constitute a small part of a larger Classic period habitation component associated with Los Morteros (see AZ AA:12:57[ASM]) and was included within Los Morteros site boundaries in earlier site descriptions (ASM 2000, 2003a). The area has also been recorded under the site number AZ AA:12:58(ASM), but this site designation was retired when the habitation area was determined to have been destroyed by gravel mining operations (ASM 2003a). AZ AA:12:58 was described as a Tanque Verde phase village encompassing the area where AZ AA:12:88 is currently located and likely describes the same cultural manifestation noted by Urban and SWCA.

AZ AA:12:88(ASM) was revisited by WestLand archaeologists on December 1, 2016. As a result of the recent breach of retaining walls along the Santa Cruz River and the subsequent flooding of the borrow pit, the site surface is now completely covered by several feet of alluvial silt and some water, with stands of lush riparian vegetation (**Photo 3**). Considering the nature of recently excavated and likely contemporaneous Classic period components immediately south of the current project area, occurring at a maximum depth of 1.5 m, features within the center of the gravel pit where AZ AA:12:88(ASM) is plotted were likely destroyed by the mining operation (John Hooper, personal communication December 13, 2016). However, numerous artifacts consistent with the phase assignment of this site were found in disturbed contexts in an earthen berm 80 m north of the site boundary (see IO 1). These were presumably scraped from the surface of the borrow pit when the mine was in use and used to construct flood control berms around the mining operation. Scattered artifacts and fire-affected rock were also recorded eroding from cuts along the eastern boundary of the gravel pit, approximately 200 m east of the site boundary (see IOs 2 and 3).

**CONDITION:** The density of artifacts recorded in the area surrounding the gravel pit suggests that the Classic period site, which was located within the gravel mining operation, was likely substantial. However, the gravel mining operation and subsequent flooding has eliminated all visible surface features and likely destroyed subsurface deposits. Based on the depth of contemporaneous deposits nearby, the gravel mining operation may have destroyed all cultural materials within the recorded boundary of AZ AA:12:88(ASM). However, it should be noted that the current site boundary on file with ASM likely does not encompass the entirety of the area described in previous site recordings, which references intact deposits along the eastern wall of the pit. Nondiagnostic artifacts recorded by WestLand along the eastern margin of the borrow pit (IOs 1 and 2) may indicate intact deposits that are associated with this site but not encompassed by the current site boundary.



**Photo 3. Site overview of AZ AA:12:88(ASM), showing recent alluvial deposits covering the site surface, view to the west**

**INTERPRETATION:** Based on previous site descriptions, AZ AA:12:88(ASM) is interpreted as a cemetery area that was likely associated with the Classic period occupation of Los Morteros. Two inhumations were recovered from the site in the 1970s. Existing documentation suggest that most of the site has been destroyed by historical mining operations, and no in situ artifacts or features were observed within the current site boundaries. However, the inundation of the site area in 2015 makes assessing its condition or research potential impossible at this time.

**NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY EVALUATION:** The integrity of this site based on available data is poor and, as stated, much of the site has likely been destroyed. WestLand therefore recommends AZ AA:12:88(ASM) ineligible for inclusion on the NRHP. However, based on the documented presence of inhumations at the site and the suggestion of additional intact features in its vicinity, WestLand recommends monitoring for additional burials during future proposed construction efforts in the areas surrounding the site boundary, especially east and north of the eastern most gravel pit.

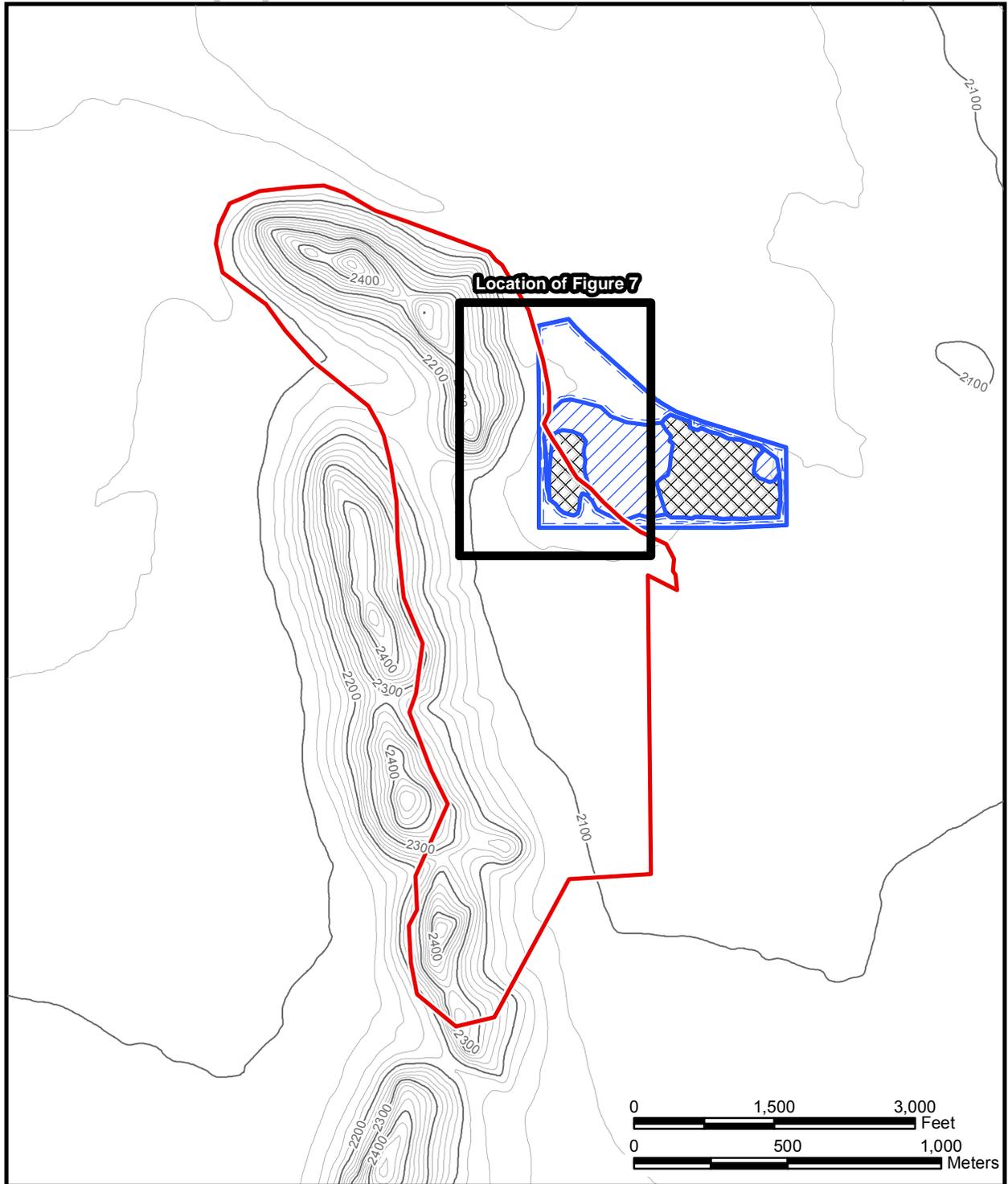
**AZ AA:12:57(ASM)****WESTLAND FIELD SITE NUMBER:** N/A**CULTURAL AFFILIATION:** Hohokam**AGE:** Hohokam Pioneer through Classic periods (700–1450 A.D.)**TYPE:** Village**DIMENSIONS:** 2,745 × 884 m (1,802,280m<sup>2</sup>) (approximately 445 acres)**ELEVATION:** 2,080 feet amsl**NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY RECOMMENDATION:** Eligible (D)

**SITE DESCRIPTION:** AZ AA:12:57(ASM), or Los Morteros, is an extensive multicomponent prehistoric site. The site is located along the western slopes and foothills of Rillito and Beacon peaks (**Figure 6**) and encompasses various loci, including trincheras, Rincon through Tanque Verde phase habitation clusters, processing areas, petroglyph clusters, and a ball court village. This site description addresses only the loci and features at Los Morteros that fall within the project area and those areas immediately adjacent. For a more complete description of Los Morteros, see the **Culture History** section of this report and Hooper (2016).

**PREVIOUS WORK:** Portions of AZ AA:12:57(ASM) north, west, and south of the project area were recently recorded by DAI (Whitney 2014), who identified three loci (**Figure 7**).

DAI Locus 1 is located immediately south of the project area. Whitney (2014) describes this area as a medium- to high-density artifact scatter covering approximately 3,600 m<sup>2</sup>. The entire area was previously part of a mid-twentieth century agricultural field, and disking has removed any evidence of surface features. They interpret this locus as the possible remains of a Hohokam courtyard group dating the Middle Rincon, Late Rincon, or Tanque Verde phase.

DAI Locus 2 is the southernmost of two loci located immediately west of the project area. This locus consists of a rockshelter, a concentration of 14 boulders with grinding features and petroglyphs, and 2 artifact scatters. The locus was initially documented by Wallace (1980a, 1980b) as the “MB cluster.” According to Wallace, the rockshelter included possible stratified deposits with ground stone fragments, shell, and cremated bone. Wallace additionally documented debitage, red ware sherds, plain ware sherds, and historic trash scattered among the petroglyph and mortar features but did not define discrete artifact concentrations. In their 2013 recording, DAI noted that visitors appeared to have removed many artifacts from the rockshelter and its surroundings. They also documented two additional artifact concentrations on the flats east of Rillito Peak. Artifacts dated to the Middle Rincon, Late Rincon, or Tanque Verde phase (Whitney 2014:42).



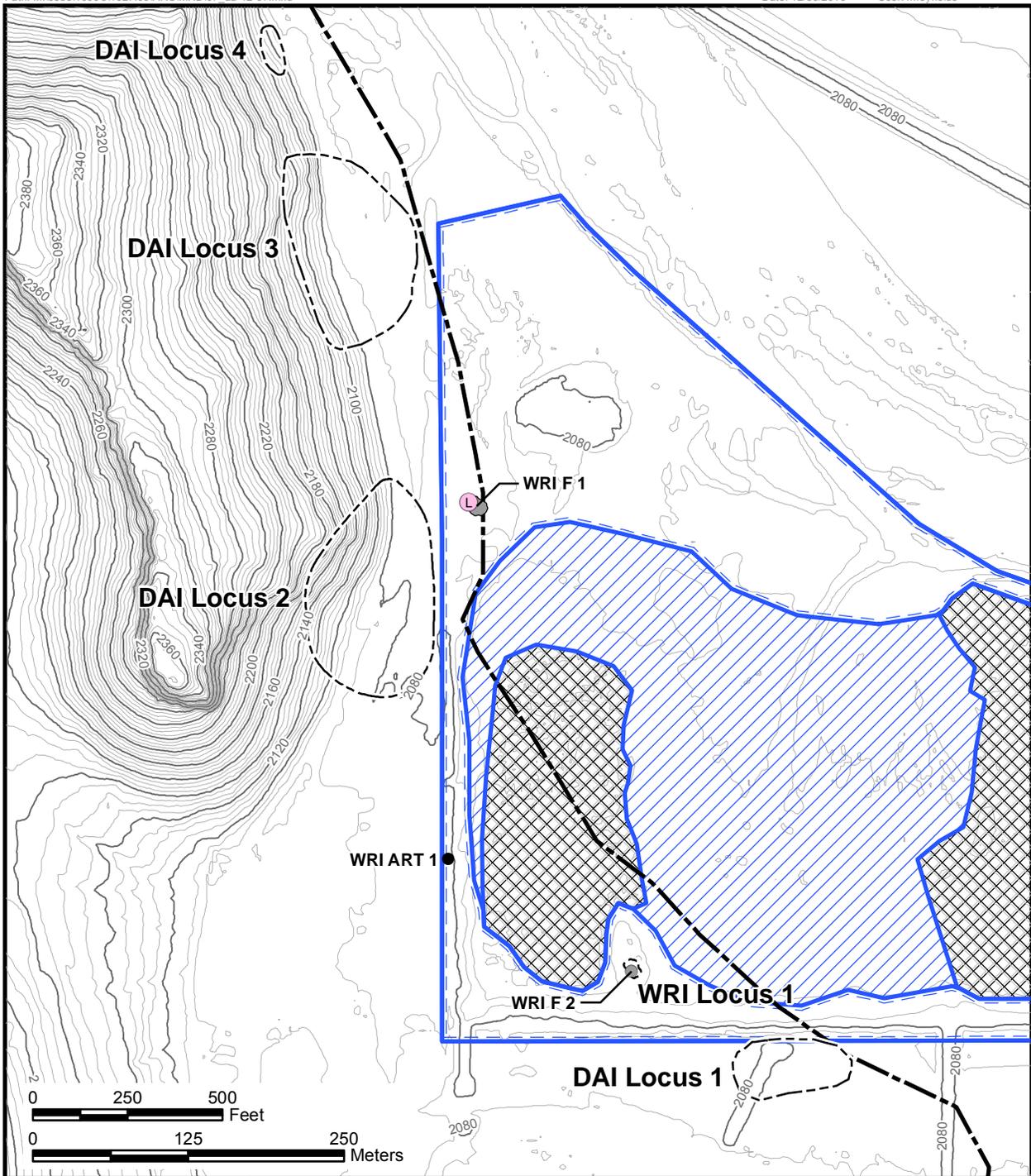
20ft Contour lines derived from USGS NED



### Legend

- |                  |   |
|------------------|---|
| Project Area     | <b>Survey Status</b>                        |
| AZ AA:12:57(ASM) | Surveyed Area                               |
|                  | Area of Known Disturbance (Unsurveyed)      |
|                  | Area of Recent Flood Deposit (Unsurveyable) |

Figure 6. AZ AA:12:57(ASM) site map



5ft Contour lines derived from Pima Co. DEM

**Legend**

- Project Area
- Site Boundary
- Survey Status**
- Surveyed Area
- Artifact
- Feature
- Looter's Pit
- Feature
- Locus
- Area of Known Disturbance (Unsurveyed)
- Area of Recent Flood Deposit (Unsurveyable)



**Figure 7.** Detail of Los Morteros (AZ AA:12:57[ASM]) showing Desert Archaeology, Inc. (DAI), loci relative to features documented by WestLand Resources (WRI) for the El Rio Riparian Restoration Project

DAI Locus 3 is located north of DAI Locus 2, also along the western boundary of the El Rio project area. This locus comprises an artifact scatter covering approximately 12,100 m<sup>2</sup>, a fire-cracked rock scatter, and a possible structure. The locus also incorporates several clusters of petroglyph and grinding features located on boulders along the slope of Rillito Peak. In their recent recording, DAI noted a possible wall alignment that may be the remains of an aboveground cobble masonry room on the flats east of the Rillito Peak slope. They additionally recorded a disturbed roasting feature in this area, along with a dense concentration of Tanque Verde phase artifacts and scattered Hispanic period historical artifacts.

During archaeological data recovery within the Puerto del Azotado trailhead, near the southwestern corner of the project area and west of DAI Locus 1, WestLand discovered an additional locus of occupation (Locus 156) that appears to date to the Tanque Verde phase. Exploratory trenching resulted in the discovery of two Tanque Verde phase pithouses in this area, one of which was completely excavated (Hooper 2016).

**TOPOGRAPHIC AND ENVIRONMENTAL SETTING:** The proposed impact area for the El Rio Riparian Restoration Project overlaps the western periphery of the Rillito Peak area of Los Morteros. Features in this area of the site lie along a sandy, gently sloped grade abutting the eastern flank of the peak (Feature 1, also called WRI F 1) (see Figure 7) and on a small, isolated rhyolite plug immediately south of the western borrow pit (Feature 2, also called WRI F 2, associated with WRI Locus 1) (see Figure 7). The area of Los Morteros that falls within the project area is dissected by incised drainages and covered by sparse creosote bush, wolfberry, and saltbush. Much of this area appears to have been brushed or dragged at some point in the past, creating irregular linear berms. Additionally, parts of the flooded western ADOT borrow pit (the gravel operation) fall within the site boundary.

**FEATURES:** WestLand recorded two features in the current project area—one (Feature 1) along the western margin of the project area in the eastern site area and one (Feature 2) associated with WRI Locus 1 in the southeastern corner of the project area and purportedly documented on the AZ AA:12:58(ASM) site card (ASM 2003a) (see Figure 7). Areas of the site within the project area where features were recorded are in close proximity to DAI loci; Feature 1 is approximately 50 m east of DAI Locus 2, and Feature 2, associated with WRI Locus 1, is approximately 90 m northwest of DAI Locus 1.

Feature 1 (also called WRI F 1) appears to be a small adobe or jacal structure that has been looted. Two walls (indicated by adobe melt) have been exposed and include a north-south alignment that is approximately 4 m long and an east-west alignment that is approximately 5.2 m long. The walls are approximately 15 cm thick. The feature is surrounded by an irregular mounded area, approximately 15 m in diameter. This mound may contain additional buried architecture. A looter's hole in the northwest corner does not appear to be recent; it is partially filled with sediment (Photo 4). A spoil pile consisting of six sherds was observed beside the looter's pit. Sherds included a piece of a spalled

Roosevelt Red ware bowl and a fragment of a Tanque Verde Red-on-brown bowl, suggesting the feature may be associated with Hohokam Classic period use (**Photo 5**).

WRI Locus 1 is a small, prehistoric artifact scatter surrounding a small, columnar rhyolite plug. This landform was itself heavily modified by the addition of numerous mortars, cupules, grinding slicks, and possible vandalized petroglyphs and therefore was designated Feature 2 (also called WRI F 2). Feature 2 is referenced on the AZ AA:12:58(ASM) site card as “a bedrock spire left standing in the southern part of the pit” with a “thick Tanque Verde phase deposit at its base” (ASM 2003a). This description suggests that diagnostic artifacts were once present within WRI Locus 1 but, based on observations by WestLand archaeologists, have been scavenged or otherwise disturbed.

Feature 2 is a natural rhyolite plug measuring approximately 10 m north-south by 5 m east-west by 4.5 m tall. It includes 4 deep mortars of varying sizes; 4 shallow, round grinding slicks; and approximately 70 cupules (**Photo 6**). Additionally, the western face of the boulder has three spalled and chiseled areas that likely represent the remnants of vandalized petroglyphs. The size and location of the mortars are presented in **Table 1**. Cupules cover virtually the entire top and upper half of the sloping northern face of the rock. They average approximately 0.5 cm in depth and 2–4 cm in width.



**Photo 4. Feature 1, view north**



**Photo 5. Classic period sherds from Feature 1**



**Photo 6. Mortars and cupules on the top of Feature 2 (WRI Locus 1 AZ AA:12:57[ASM])**

**Table 1. Mortars recorded on Feature 2 (WRI Locus 1 AZ AA:12:57[ASM])**

Mortar Location	Diameter (cm)	Depth (cm)
Sloping northern side of boulder, eastern mortar	25	25
Sloping northern side of boulder, western mortar	24	23
Top of boulder, western mortar	25	25
Top of boulder, eastern mortar	25	30

The artifact scatter (WRI Locus 1) associated with Feature 2 contains approximately 40 micaceous plain ware sherds, 4 basalt flakes, and 1 chert flake. Heavy foot traffic in this area has fragmented the artifacts; most sherds were 2 cm or smaller in size. All appeared to be Gila variety Gila plain ware, a type that was used throughout the occupation of Los Morteros.

**MATERIAL CULTURE:** Isolated sherds and flakes within the boundaries of Los Morteros were not point-located. However, WestLand recorders noted isolated sherds and flakes in many areas of the mapped site boundary. Recorders additionally point-located one ornament: Artifact 1, a *Glycymeris* shell with a pierced umbo (Photo 7). This artifact, which measures 2.8 × 2.0 cm, was found along a modern footpath close to DAI Locus 2.

**Photo 7. Pierced Glycymeris shell (WRI ART 1)**

**CONDITION:** The portions of Los Morteros that fall within the project area have been severely impacted by modern use of the site. The ground surface along the eastern perimeter of the site has been bladed and is impacted by road construction. The gravel mining operation and modern recreational use have impacted the artifact scatter within WRI Locus 1. Both Features 1 and 2 appear to have been vandalized. Feature 1 and WRI Locus 1 are in poor condition. Feature 2 is in fair condition despite evident vandalism, and less accessible mortars and cupules on the top of the spire remain intact.

**INTERPRETATION:** Features documented by WestLand are consistent with the Middle Rincon-Tanque Verde phase features documented in the surrounding area by previous recorders. Feature 1 is interpreted as a small room or room block dating to the Tanque Verde phase. The low artifact density in the area surrounding the feature does not suggest a substantial habitation component, and the walls may belong to a field house or storage feature. However, it should be noted that the feature is adjacent to a public footpath and has clearly been looted. Significant artifact collection has likely occurred in this area.

WRI Locus 1 is an example of a type of activity area documented in great numbers along the slopes of Rillito Peak by Wallace (1980, 1983) and Whitney (2014): a processing area with mortars, cupules, and petroglyphs. Wallace (1983:173–4) notes that these features frequently co-occur and interprets the petroglyphs as territorial markers associated with desirable processing stations. Their morphology and location near water suggests that desert legumes such as mesquite were the most likely resources processed in these features (Wallace 1983; Vanderpot 1997). No satisfactory explanation has been advanced for the use of cupules. However, their co-occurrence with mortars suggests that they are a byproduct or tool of the same suite of resource processing activities. Sherds in WRI Locus 1 are nondiagnostic; however, previous descriptions of the locus also assign it to the Tanque Verde phase.

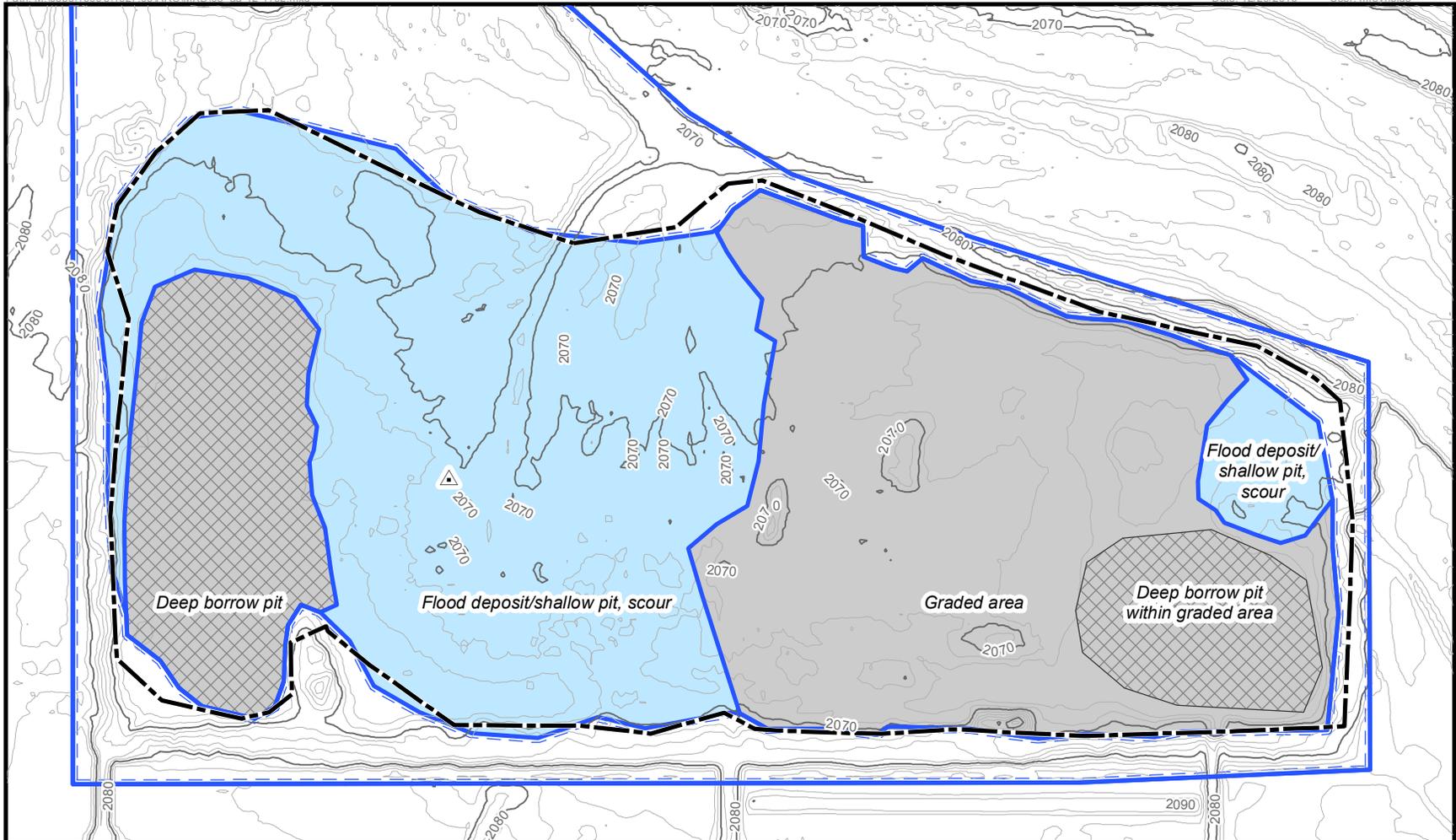
**NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY EVALUATION:** AZ AA:12:57(ASM) was determined eligible for inclusion on the NRHP by the Arizona SHPO in 2008, based on Criterion D. Recently documented features in the project area (WRI Features 1 and 2) are evaluated as contributing features. **Feature 1 can potentially contribute to our understanding of Classic period settlement and site structure.** WRI Locus 1 and Feature 2 can contribute to research regarding prehistoric subsistence patterns. All recorded features have suffered significant impacts, but intact subsurface deposits are likely. **Monitoring site areas within the project area is recommended, should the proposed project move forward.**

**AZ AA:12:1162(ASM)****WESTLAND FIELD SITE NUMBER:** WRI 27**CULTURAL AFFILIATION:** Euroamerican**AGE:** Late Historic period–modern (1963–1980s)**TYPE:** Gravel operation (also known as the ADOT materials pit)**DIMENSIONS:** 760 × 631 m (230391 m<sup>2</sup>)**ELEVATION:** 2,080 feet amsl**NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY RECOMMENDATION:** Ineligible

**SITE DESCRIPTION:** AZ AA:12:1162(ASM) comprises the 1960s-era gravel mining operation that removed prehistoric components in the southern half of the project area (**Figure 8**). This site boundary overlaps the recorded boundaries of AZ AA:12:57(ASM) and encompasses the boundary of AZ AA:12:88(ASM). However, for management purposes, this late historical component was not added to the boundary of either site. The operation was associated with ADOT construction and improvement of Interstate 10 and was active from approximately 1963 until as late as the 1980s (ASM 2003a).

Based on aerial photography, the boundaries of the graded area associated with the operation appear to have reached their maximum extent by 1966 (**Photo 8**). Abandoned roads and canals in the northern half of the project area are also visible in this photograph. The graded area (the mine) includes most of the southern half of the project area and measures 364 m north-south by 758 m east-west. Based on the thickness of what is considered to be the native ground surface or intact upper soil horizon, as observed along the eastern edge of the gravel operation footprint (**Photo 9**), the entire graded area appears to have been excavated to a minimum depth of 1.5 m, with the exception of a small area omitted around a small rhyolite outcrop in the southwest corner (see AZ AA:12:57[ASM], WRI Locus 1, Feature 2). Two deeper borrow pits are present within the graded area—a western borrow pit measuring approximately 280 m north-south by 120 m east-west and an eastern borrow pit measuring approximately 103 m north-south by 150 m east-west. Both deeper borrow pits have held standing water since the 2015 breach of the retaining wall north of the gravel pit, along the Santa Cruz River and likely seasonally for years prior. The entire graded area is presently infilled with alluvial silts, riparian vegetation, and standing water (see **Figure 8**).

**TOPOGRAPHIC AND ENVIRONMENTAL SETTING:** Historical aerial photography shows that the area that later became the gravel mine was an open flat, dissected by substantial drainages running northeast to the Santa Cruz River and that the area likely flooded periodically historically (see **Photos C.1 and C.2** [Appendix C]).



2ft Contour lines derived from Pima Co. DEM

### Legend

Project Area

Site Boundary

#### Survey Status

Surveyed Area

Primary Site Datum

Area of Known Disturbance (Unsurveyed)

Deep Borrow Pit

Area of Recent Flood Deposit (Unsurveyable)



0 250 500 Feet

0 75 150 Meters

WestLand Resources

Figure 8. AZ AA:12:1162(ASM) site map



**Photo 8. Detail of 1966 USGS aerial imagery of the project area, showing gravel pit and historical linear infrastructure**



**Photo 9. Eastern edge of the historical gravel pit, showing depth of excavation from the native ground surface; view to the north**

During its years in operation, gravel mining removed between 1 and 2 m of the native ground surface, resulting in the shallow scour that is periodically filled with water during seasonal flooding and characterizes the site. The operation flooded significantly in the 1980s, resulting in its final closure (ASM 2003a). In 2015, a breach of the northern retaining wall resulted in historically high water levels within the scour and pits, creating a wetland habitat. Since this time, water levels have receded, leaving large areas of mud flat within the confines of the scour. Vegetation in these areas includes dense groves of tamarisk with scattered cottonwood trees, tall stands of riparian grasses, burdock, mallows, and Russian thistle. Standing water remains in the two deep borrow pits that are situated in the southwestern and southeastern corners of the mine. These water features expand with seasonal precipitation.

**MATERIAL CULTURE:** Although mid- to late-twentieth century trash is present throughout the project area, no material culture can be concretely associated with the gravel mining operation. Isolated features such as waste piles of lumber, baling wire, and concrete materials observed along the eastern edge of a historic road—traversing the northwest portion of the project area (see [Figure B.1](#) [Appendix B])—may be associated with the operation or may represent unassociated wildcat dumping episodes ([Tables 2 and 3](#) and [Table B.2](#) [Appendix B]).

**CONDITION:** The condition of the gravel pit has been impacted since its abandonment, as episodic flooding has caused the pit to fill with sediment.

**INTERPRETATION:** AZ AA:12:1162(ASM) is a late historical borrow pit used into the modern period that was excavated by ADOT for material during the construction and expansion of Interstate 10. The operation began in the mid-1960s and continued until flooding of the borrow pit closed down the operation in the 1980s.

**NATIONAL REGISTER OF HISTORIC PLACES ELIGIBILITY EVALUATION:** AZ AA:12:1162(ASM) is a historical site associated with the construction of Interstate 10 and therefore might possibly be considered eligible under Criterion A for its contribution to the development of the Interstate Highway System. However, the nearby segment of Interstate 10 is a marginally historical-to-modern (built during the mid- to late-1960s) maintained and in-use element of that system that has never been designated as a site, and the borrow pit is not integral to the roadway, being a tangential operation. The site also lacks further research potential (Criterion D), only persisting as a large excavated area with no potential for scientific research. Future investigations of this feature will not contribute to our understanding of the history and development of the highway system, and the site is therefore recommended ineligible for inclusion on the NRHP.

## ISOLATED OCCURRENCES

A total of 11 isolated occurrences of artifactual materials or features were recorded during the current cultural resources inventory (see [Figure B.1](#) and [Table B.2](#) [Appendix B]). These are discussed by temporal association.

### Prehistoric Isolated Finds

Three prehistoric isolated occurrences (IOs 1, 2, and 3) were documented within the project area along a levee or retaining wall due east of the eastern gravel pit. These features were recorded as artifact concentrations but are secondary deposits in nature and are likely associated with the disturbance to AZ AA:12:88(ASM)—the previously described area that may, at one time, have been part of the larger occupation of Los Morteros.

The most significant artifact concentration is designated IO 1. This concentration of artifacts has been deposited along and within an earthen retaining wall on the margins of the northeastern edge of the gravel pit ([Photo 10](#)). The retaining wall is roughly 2.5 m tall and 3 m wide. Approximately 200 prehistoric artifacts are scattered in an area spanning 160 m of the retaining wall. As stated, all artifacts are clearly in a secondary context, and the natural ground surface north of



**Photo 10. IO 1, berm with prehistoric artifact concentrations; view to the northwest**

the wall is largely devoid of cultural materials. Given the location of this artifact concentration—80 m north of a known Classic period cemetery area (AZ AA:12:88[ASM])—it is likely that the retaining wall was created some time during the gravel pit’s operation by surface scraping construction material from the area where the archaeological site would have been.

Artifact types within the retaining wall are consistent with the Hohokam cultural assignment of the destroyed archaeological site. Recorded artifacts include basalt and metasedimentary debitage and fire-affected rock, red ware and micaceous plain ware ceramics, and Tucson Basin Red-on-brown ceramics of an indeterminate type. Two pieces of uncalcined bone were also noted within the berm, but both were too small to identify as human or faunal.

IO 2 is approximately 130 m southeast of IO 1 and consists of two basalt flakes—a primary and a secondary flake. Both artifacts were found eroding out of a 5-m section of the eastern retaining wall of the gravel pit. Lastly, IO 3 is characterized as three pieces of rhyolite fire-affected rock observed eroding from the eastern gravel pit wall. These artifacts may represent intact deposits associated with AZ AA:12:88(ASM); however, this inference is speculative, given the highly disturbed context of this portion of the project area. Nevertheless, should the proposed project proceed, archaeological monitoring in this area is recommended.

### Historical Isolated Finds

Seven historical period isolated features were recorded within the project area. Isolated features include two canal features, three road features, a cattle tank, and two small borrow pits. Dimensions and descriptions are presented below in **Tables 2 and 3**.

**Table 2. Historical or undiagnostic linear features (isolated finds)**

IO No.	Dimensions	Description
4	6 feet wide × 3 feet deep × 370 feet long	Unimproved canal. Feature is not depicted on historical maps and could be historical or prehistoric. Feature follows the general course of a natural drainage but appears to have been excavated rather than incised.
5	4 feet wide × 2 feet deep × 179 feet long	Unimproved canal. Feature terminates at a major drainage running north to the Santa Cruz River. A section of displaced 3-foot galvanized piping was recorded at this terminus, suggesting the canal take-off was originally improved. The western half of this feature has been covered by aeolian sands.
6	6 feet wide × 976 feet long	Graded undrained dirt road, approximately 0.5 feet below ground surface. Road runs southeast-northwest and terminates at a pump well. Road currently runs over a large asphalted pad but does not appear on 1966 aerial imagery and is therefore not considered historical. The trajectory of the road follows the course of a ranch road depicted on an 1896 GLO plot. It is still in use.
7	8 feet wide × 147 feet long	Graded undrained dirt road segment, approximately 1 foot below ground surface. Road runs northwest, slightly north of IO 5, and presently terminates in an asphalted road that does not appear on historical aerial imagery. A pre-1930s bottle base (colorless glass, no basal stippling) was found along the road. Road appears to still be used intermittently.

**Table 3. Historical pits (isolated finds)**

IO Number	Dimensions	Description
8	~15 feet north-south by 20 feet east-west	Oval earthen berm cattle tank; berms are 3 feet high
9	23 × 25 feet	Borrow pit, excavated ~1.5 feet deep
10	30 × 30 feet	Borrow pit, excavated 2–3 feet deep

Many undiagnostic road and canal features within the project area were not recorded because they do not appear on historical aerial imagery and are presumably associated with post-1966 gravel mining operations. Unimproved road and canal features in areas that are too wooded in historical aerial imagery to assess the presence or absence of features are presumed to be potentially historical and therefore were recorded. Features found in association with historical artifacts were also recorded.

In addition to historical isolated features, one historical isolated artifact was recorded. This artifact (IO 11) (**Photo 11**) is a coiled length of doubled single-strand barbed wire, of a type known as Glidden's Coils Concertina Military Wire Variation, reissue Patent No. 6914, 1876 (U.S. Patent Office 1895:685, Clifton 1970:145).



**Photo 11. IO 11, Glidden's Coils Concertina Military Wire**

## Discussion

Road and canal isolated occurrences within the northern portion of the project area are likely associated with late-nineteenth and early-twentieth century farming, beginning with the establishment of the Sotero Ruelas homestead in the 1880s. Based on historic map review, one road feature (IO 6) (**Photo 12**) likely dates to this period (see **Figure C.4** [Appendix C] and **Figure B.1** [Appendix B]). The 1896 GLO map, which shows this road, also depicts an associated fenced area of range land with a canal running through it. IO 11, a type of barbed wire used during the late nineteenth century, is likely all that remains of this enclosure.



**Photo 12. IO 6, nineteenth century road associated with the Ruelas homestead, view to the south**

The canal feature (IO 5) (**Photo 13**) that runs along the southeast quarter of Section 8 does not appear to correspond to the nineteenth century canal depicted on 1896 GLO maps, which runs along the northern edge of the northeast quarter of Section 17. Therefore, it is impossible to assign it to a particular time period—it may be either historical or modern. Galvanized piping indicates that the feature was improved by later twentieth-century farming operations. IO 8, the earthen berm

cattle tank, may or may not be associated with the historical homestead—it may be a more recent feature. Other road and canal isolated features are likely associated with early- and mid-twentieth-century farming of the area. However, they are not depicted on historic maps. Unimproved historic road features continued to be used during post-1960s gravel mining operations and appear to still be used today for recreation and foot traffic.



**Photo 13. IO 5, possible nineteenth century canal, view to the east**

## RESEARCH SYNTHESIS

Two previously recorded prehistoric sites, AZ AA:12:57(ASM) and AZ AA:12:88(ASM), were revisited for the El Rio Riparian Restoration Project survey. One of these sites, AZ AA:12:88(ASM), was buried in sediment and could not be evaluated for NRHP eligibility based on onsite observations. However, based on the extent of disturbance previously documented in the site area, WestLand recommends the site ineligible for inclusion on the NRHP. The second site, known as Los Morteros (AZ AA:12:57[ASM]), has been previously determined eligible under Criterion D by the Arizona SHPO in 2008. Survey of the project area identified two contributing features within this site boundary (see [Figure 8](#)). Both features appear to relate to the Classic period occupation of Los Morteros and hold the potential to inform future research regarding the terminal occupation of the Marana community. Additionally, WestLand recorders documented one late historical gravel mining operation, designated AZ AA:12:1162(ASM). This site is recommended ineligible for inclusion on the NRHP.

The current survey also identified three prehistoric isolated features and eight historical isolated finds (see [Figure B.1 and Table B.2](#) [Appendix B]). Prehistoric isolated finds are concentrated in an earthen berm and along the periphery of the eastern borrow pit associated with gravel operation, AZ AA:12:1162(ASM). These appear to be secondary deposits of artifact-rich soil associated with surface-scraping that likely destroyed most of AZ AA:12:88(ASM), though there are possible remnant in situ deposits associated with this site along the eastern wall of the borrow pit (see earlier discussion of IOs 2 and 3). Historic period isolated finds include seven isolated features and one isolated artifact. Three historical period isolated finds could not be associated with any specific occupation of the site.

Four of the historical period isolated finds (IOs 5, 6, 8, and 11) could possibly be associated with the late nineteenth-century Sotero Ruelas homestead. However, subsequent use of the landscape has destroyed features (e.g., the ranch house and associated outbuildings) associated with this homestead, and this inference cannot be substantiated. Further, the ubiquitous nature of dirt roads, canals, and cattle tanks precludes attributing these features directly to the establishment of the Ruelas homestead. Because these isolated, possibly historical roads and irrigation features cannot definitively be assigned to any particular time period or associated with any particular historical or modern event or process, none have been designated as sites.

## MANAGEMENT SUMMARY

Survey of the El Rio Riparian Restoration project resulted in the documentation of 1 newly recorded archaeological site (AZ AA:12:1162[ASM]) and 11 isolated finds. Two previously recorded prehistoric archaeological sites were also revisited, and their condition and eligibility were assessed.

All isolated artifacts and features are recommended ineligible for inclusion on the NRHP, and no further work is recommended with regards to these finds should the proposed project move forward. AZ AA:12:1162(ASM) is also recommended ineligible based on lack of research potential and integrity (see Tables B.1 and B.2 [Appendix B]). No further work is recommended.

AZ AA:12:88(ASM), a previously recorded Classic period site with two known inhumations within the project area, was buried during 2015 flooding and possibly removed altogether during the operation of the ADOT materials pit in the 1960s (AZ AA:12:1162[ASM]). The site boundary as it is currently shown in AZSITE is within the extent of the historical gravel pit, and features in this area have likely been destroyed. However, previous recordings suggest that the site boundary on file with the ASM may not be accurate and that prehistoric features and artifact scatter may have extended along undisturbed area on the northeastern and eastern edges of the gravel borrow pit. This cannot be substantiated at this time because of the disturbed nature of the site and inundation of the area by flood deposits. Isolated finds along the eastern wall of the borrow pit (IOs 2 and 3) support the supposition that intact prehistoric features may remain in this area; however, secondary deposits of prehistoric artifacts in dump piles to the north (IO 1) also indicate that damage to the site has been severe. Inasmuch, the site is recommended ineligible for inclusion on the NRHP based on lack of integrity. That being said, WestLand recommends monitoring in the areas around the site boundary's plot, in the event additional burials are present.

AZ AA:12:57(ASM), or Los Morteros, was also revisited and evaluated for potential impacts. This site has been determined eligible for inclusion on the NRHP by the Arizona SHPO in 2008. Two features, including one surrounded by an artifact scatter, could be impacted by proposed grading, should the project move forward (see Figures 6 and 7), and monitoring within the site boundaries is recommended if future construction efforts are carried out in the project area. WestLand did not find surface artifacts or features that would require extending the boundaries of AZ AA:12:57(ASM) beyond the boundary designated by DAI's recent survey of this area (see Whitney 2014). However, it should be noted that the boundary of this site has been expanded and contracted repeatedly over several decades of recording and that, based on earlier designations, the entire project area would fall within the boundaries of Los Morteros.

Based on these findings WestLand recommends that contributing features and loci within AZ AA:12:57(ASM) be avoided during grading and an archaeological monitor should be present if construction proceeds within the site boundary. These include WRI Locus 1 and Features 1

and 2 (also called WRI F 1 and WRI F 2) (see Figure 7 and Figure B.1 (Appendix B)). Owing to the high density of prehistoric features, ambiguity of recorded site boundaries, and documented presence of prehistoric burials within the project area, WestLand further recommends that an archaeological monitor be present during grading near the purported boundary of AZ AA:12:88(ASM) to ensure that proper documentation and mitigation will occur if buried features or human remains are uncovered (see Figure 5 and Figure B.1 (Appendix B)). Should human remains be uncovered during the proposed construction, all work should cease until the remains are assessed by qualified personnel, in accordance with Arizona Revised Statute §41-865.

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# APPENDIX A

## ARCHAEOLOGICAL RECORDS SEARCH

Table A.1. Previous archaeological surveys within the project area and vicinity

Table A.2. Known archaeological sites within the project area and vicinity

Figure A.1 Previous archaeological surveys within 1.6 km (1 mile) of the project area

Figure A.2 Previously recorded archaeological sites within 1.6 km (1 mile) of the project area

Class I References

**The following information is considered sensitive; may be protected under federal, state, and local laws; and may be removed from the report.**

**Table A.1. Previous archaeological surveys within the project area and vicinity**

Agency Project No.	Project Name	Reference
1980-249.ASM	Tucson Aqueduct Phase A - CAP	McCarthy (1982)
1981-174.ASM	The Northern Tucson Basin Survey: Phase I	Fish et al. (1992); Madsen et al. (1993)
1955-3.ASM	Southern Pacific Pipeline Survey	Komserska and Breternitz (1955)
1987-222.ASM	U.S. Telecom Buried Fiber Optic Cable	O'Brien et al. (1987)
1990-173.ASM	ADOT I-10 Corridor Survey	Bernard-Shaw (1991)
1991-111.ASM	Lower Santa Cruz Levee Survey	Harry (1991)
1992-62.ASM	Rillito Loop	Adams and Macnider (1992a)
1994-417.ASM	Linda Vista Hill Survey	Slaughter (1994)
1994-472.ASM	Avra Valley Survey	Slaughter and Bierer (1994)
1995-395.ASM	Santa Cruz Levee	Rieder (1995)
1995-428.ASM	La Puerta del Norte Survey	Rieder (1995)
1996-219.ASM	Southern Pacific Railroad Survey	Ecology and Environment Inc. (1996)
1999-519.ASM	Saguaro Springs Survey	Riggs (1999)
1999-587.ASM	PBNS Level 3 Fiber Optic Line	Doak (1999) Hesse (2000)
2000-276.ASM	In-Maranda 0.23 Acre Tower Site Plus Roadway Survey (00SVS#26) Project	Jones and Dart (2000)
2000-592.ASM	Dove Mtn. Offsite Sewer (ASLD # 18-105008)	Stephen (2000)
2000-723.ASM	AT&T NexGen/Core Project Link 3 Class 3 Survey	Kearns et al. (2001)
2001-420.ASM	Realignment of Line No. 1007 in the Saguaro Springs Development Area	Rogge et al. (2001)
2001-580.ASM	TEP Pole Replacement	Fuller (2001)
2002-124.ASM	Town of Marana Santa Cruz River Trail Phase II paved path cultural resources survey (02SVS#11)	McKee and Dart (2002a)
2002-128.ASM	Town of Marana Santa Cruz River Trail Phase I and II Dirt Path Cultural Resources Survey	McKee and Dart (2002b)
2003-1070.ASM	EPNG Tucson Class III Survey	Hesse and Gutierrez (2004)
2003-1264.ASM	I-10 Geotech Monitoring	Terhune and Garcia (2007)
2003-367.ASM	Arizona Portland Cement 105-Acre Expansion Survey	Lyon and Lascaux (2002)
2003-456.ASM	I8 Power Pole Replacement Localities	Knoblock and Hathaway (2002)
2003-589.ASM	Continental Ranch Reservoir Survey	Swartz (2003)

**Table A.1. Previous archaeological surveys within the project area and vicinity**

Agency Project No.	Project Name	Reference
2003-910.ASM 27	Cultural Resources Survey of the 360Networks Fiber Optics Lines	Railey et al. (2001)
2004-679.ASM 28	AT&T NexGen/Core Project	Baker (2004)
2005-207.ASM 29	Saguaro Springs Off-Site Survey	Levstik (2005)
2005-490.ASM 30	Trico Cascada Project	Barr (2005)
2005-706.ASM 31	Corriente	Doak et al. (2004)
2005-877.ASM 32	MUSD Transportation Facility	DeJongh and Dart (2005)
2006-928.ASM 33	AT&T NexGen/Core Project	Freuden (2006)
2007-721.ASM 34	Avra Valley and I-10 Survey	Jones (2006)
2008-355.ASM 35	EPNG Line 1007 FERC Reports & Baseline Studies	Hesse and Barr (2009); Hesse et al. (2009)
2014-459.ASM 36	TEP Demoss-Petrie Substation to Northloop Survey	Hooper and King (2014)
2014-470.ASM 37	Town of Marana Proposed Sewer Alignment	King (2014)

Note: The projects in the project area are listed first.

**Table A.2. Known archaeological sites within the project area and vicinity**

Site No. (ASM)	Site Type	Age and Cultural Affiliation	Reference	NRHP Eligibility
AZ AA:12:57 1	Village	Late Archaic Native American, Rillito through Tanque Verde Phase Hohokam	Huntington (1986); Wallace (1995)	Eligible (D)—SHPO 2008
*AZ AA:12:58 2	Petroglyphs with artifact scatter (village)	Tanque Verde Phase Hohokam	ASM site card (2003a)	Not evaluated
AZ AA:12:88 3	Cemetery	Hohokam Classic period	ASM site card (2003b)	Not evaluated
AZ AA:12:54 4	Artifact scatter (Resource procurement/processing)	Ceramic period Native American	Doak et al. (2003)	
AZ AA:12:61 5	Artifact scatter (possible habitation locus)	Ceramic period Hohokam	Terhune and Garcia (2007)	
AZ AA:12:73 6	Habitation Locus	Sedentary period (Early-Middle Rincon Phase) Hohokam	Slaughter and Bierer (1994)	
AZ AA:12:77 7	Artifact Scatter (possible habitation locus)	Classic period (Tanque Verde Phase) Hohokam	Rogge et al. (2001)	
AZ AA:11:131 8	Road	Late Historic (1900-1950)	Hesse (2001)	

**Table A.2. Known archaeological sites within the project area and vicinity**

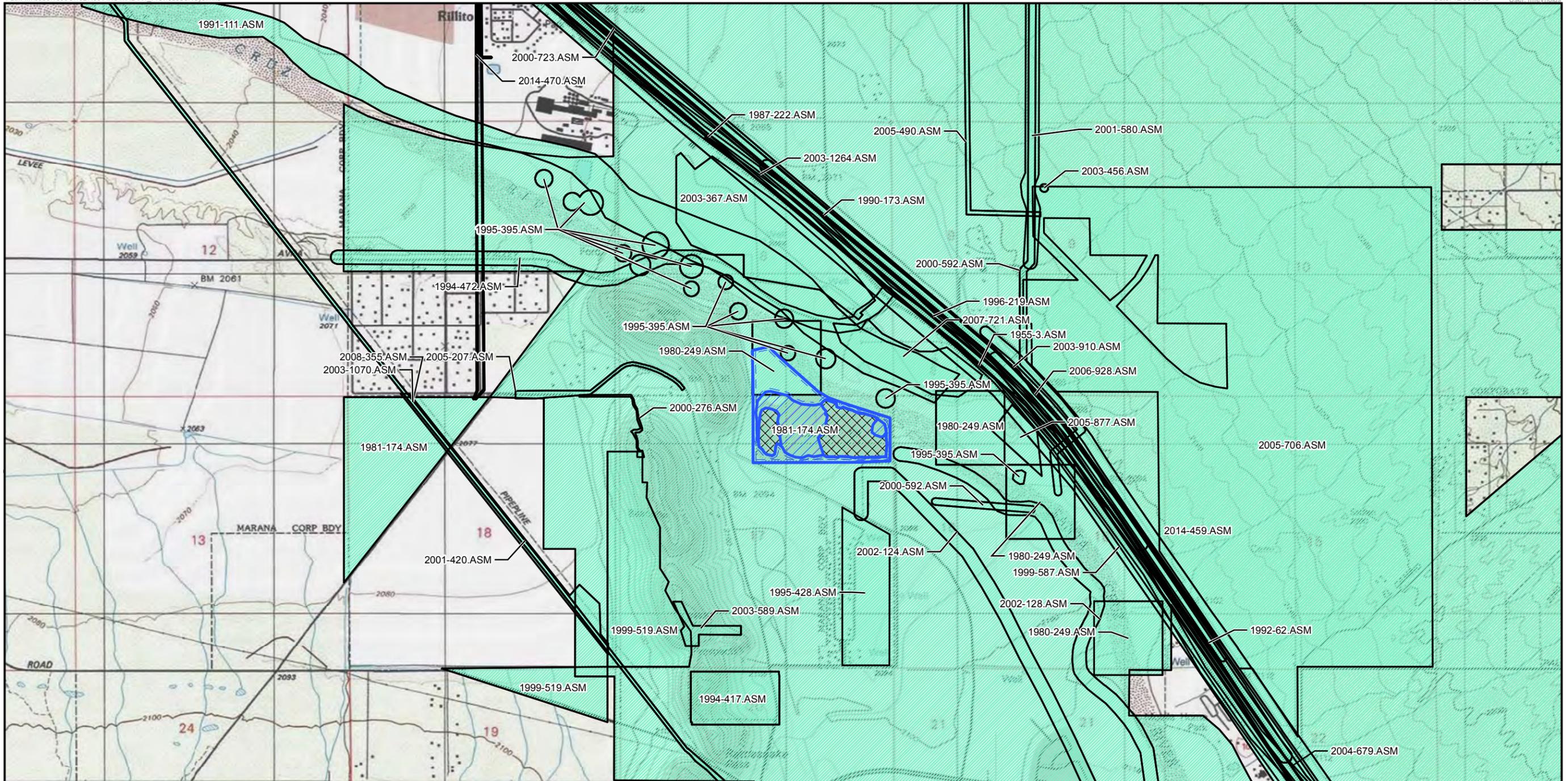
Site No. (ASM)	Site Type	Age and Cultural Affiliation	Reference	NRHP Eligibility
AZ AA:12:141 9	Artifact scatter (possible habitation locus)	Ceramic period Hohokam	ASM site card	
AZ AA:12:142 10	Artifact scatter (possible habitation locus)	Ceramic period Hohokam	ASM site card	
AZ AA:12:143 11	Hohokam agricultural features and Late Archaic camp site	Late Archaic Native American, Colonial period	ASM site card	
AZ AA:12:256 12	Habitation locus	Colonial/Sedentary period Hohokam	Terhune and Garcia (2007)	
AZ AA:12:262 13	Artifact scatter with hearth feature	Ceramic period Hohokam	Whitaker (2007)	
AZ AA:12:27 14	Historic mining features	Historic Euroamerican	ASM site card	
AZ AA:12:373 15	Homestead	Historic Euroamerican/ Mexican American	Madsen et al. (1993)	
AZ AA:12:374 16	Homestead	Historic Euroamerican/ Mexican American	Madsen et al. (1993)	
AZ AA:12:377 17	Homestead	Historic Euroamerican/ Mexican American	Shelley (1994)	
AZ AA:12:431 18	Petroglyph and rock features	Prehistoric Native American	Madsen et al. (1993)	
AZ AA:12:432 19	Artifact scatter with features	Sedentary period Hohokam	Madsen et al. (1993)	
AZ AA:12:433 20	Mining features with prehistoric terracing and artifact scatter	Historic Euroamerican, Ceramic period Hohokam	Madsen et al. (1993)	
AZ AA:12:486 21	Archaic camp with Hohokam artifact scatter	Late Archaic Native American, Colonial period Hohokam	Terhune and Garcia (2007); Adams and Macnider (1992b)	
AZ AA:12:861 22	Artifact scatter with rock piles	Classic period Hohokam	Kroeber (1929)	
AZ AA:12:871 23	Railroad	Late Historic Euroamerican	Jones (2006)	
AZ AA:12:901 24	Canal	Late Historic Euroamerican	Jones (2007)	
AZ AA:12:904 25	Road	Late Historic Euroamerican	Jones (2007)	
AZ AA:12:935 26	Artifact scatter (resource processing)	Ceramic period Hohokam	Doak et al. (2003)	
AZ AA:12:936 27	Artifact scatter (resource processing)	Ceramic period Hohokam	Doak et al. (2003)	
AZ AA:12:937 28	Artifact scatter (resource processing)	Colonial/Sedentary period Hohokam	Doak et al. (2003)	

**Table A.2. Known archaeological sites within the project area and vicinity**

Site No. (ASM)	Site Type	Age and Cultural Affiliation	Reference	NRHP Eligibility
AZ AA:12:938 29	Artifact scatter (possible short term habitation)	Ceramic period Hohokam	Doak et al. (2003)	
AZ AA:12:939 30	Artifact scatter (resource processing)	Ceramic period Hohokam	Doak et al. (2003)	
AZ AA:12:952 31	Road	Territorial period Euroamerican	Doak et al. (2003) Rogge et al. (2005)	
AZ AA:2:118 32	Highway	Late Historic Euroamerican	Wright (1992); Lindeman et al. (2012)	
AZ Z:2:40 33	Railroad	Territorial period Euroamerican	Bruder et al. (1990); Lindeman et al. (2012)	
AZ AA:12:1038 34		Data entry in AZSITE not complete		
AZ AA:12:1067 35		Data entry in AZSITE not complete		
AZ AA:12:1154 36		Data entry in AZSITE not complete		
AZ AA:12:1155 37		Data entry in AZSITE not complete		

**Note:** The sites **in the project area** are listed first.

\*This site has been deaccessioned and subsumed by the boundary of Los Morteros (AZ AA:12:58[ASM]).



T12S, R12E, Portions of Sections 8 and 17,  
 Pima County, Arizona  
 Marana, AZ USGS 7.5' Quadrangle  
 Projection: UTM NAD83, Zone 12

**Legend**

- Project Area
- Previous Project
- Survey Status**
- Surveyed Area
- Area of Known Disturbance (Unsurveyed)
- Area of Recent Flood Deposit (Unsurveyable)

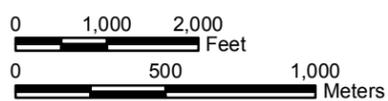
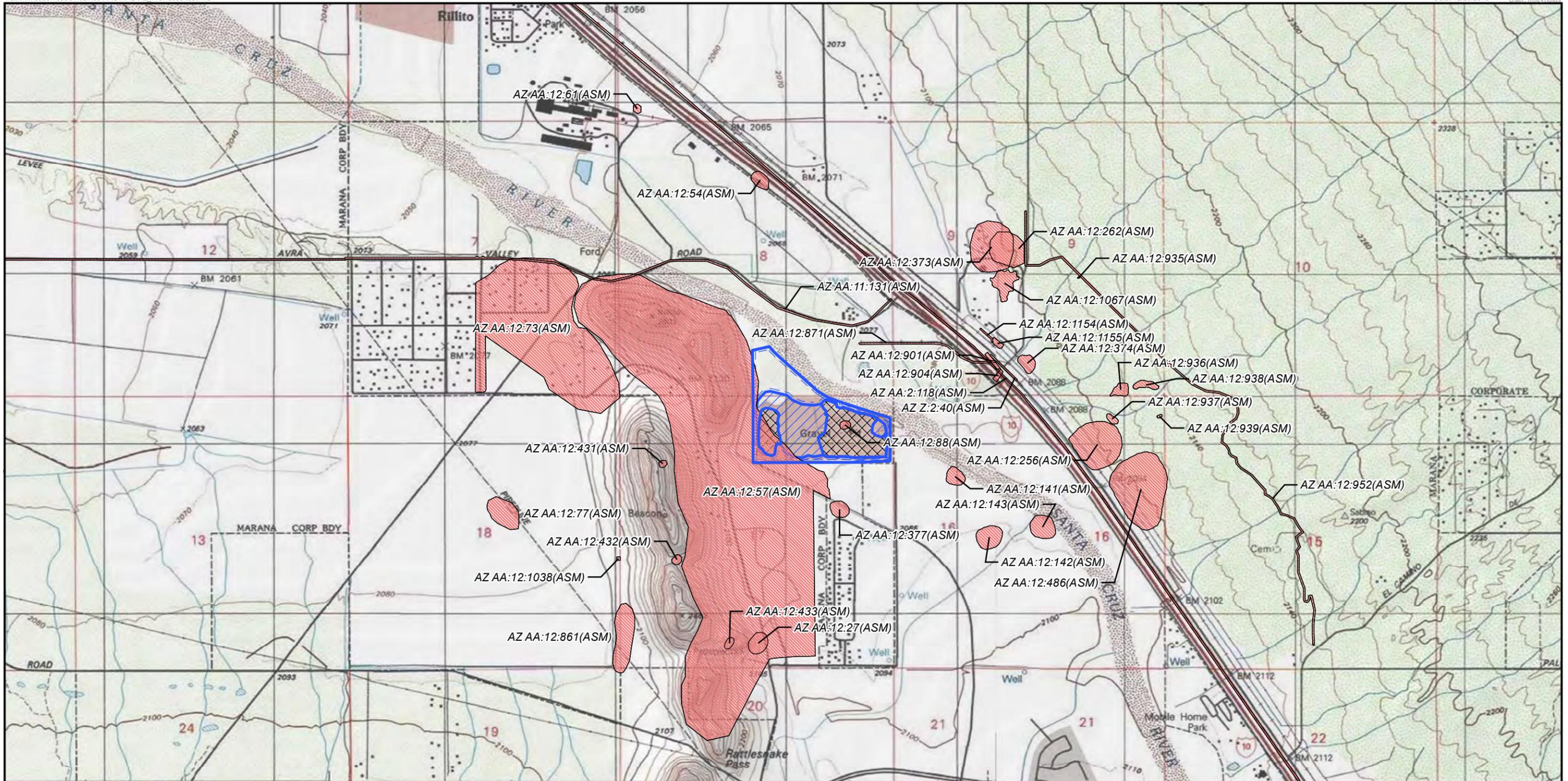
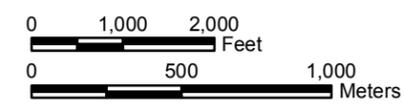


Figure A.1. Previous archaeological surveys within 1.6 km (1 mile) of the project area



T12S, R12E, Portions of Sections 8 and 17,  
 Pima County, Arizona  
 Marana, AZ USGS 7.5' Quadrangle  
 Projection: UTM NAD83, Zone 12



**Legend**

- Project Area
- Archaeological Site
- Survey Status**
- Surveyed Area
- Area of Known Disturbance (Unsurveyed)
- Area of Recent Flood Deposit (Unsurveyable)

Figure A.2. Previously recorded archaeological sites within 1.6 km (1 mile) of the project area

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## **APPENDIX B**

### **RESULTS OF ARCHAEOLOGICAL SURVEY**

Table B.1. Site management summary

Table B.2. Isolated occurrences

Figure B.1. Results of the  
archaeological survey

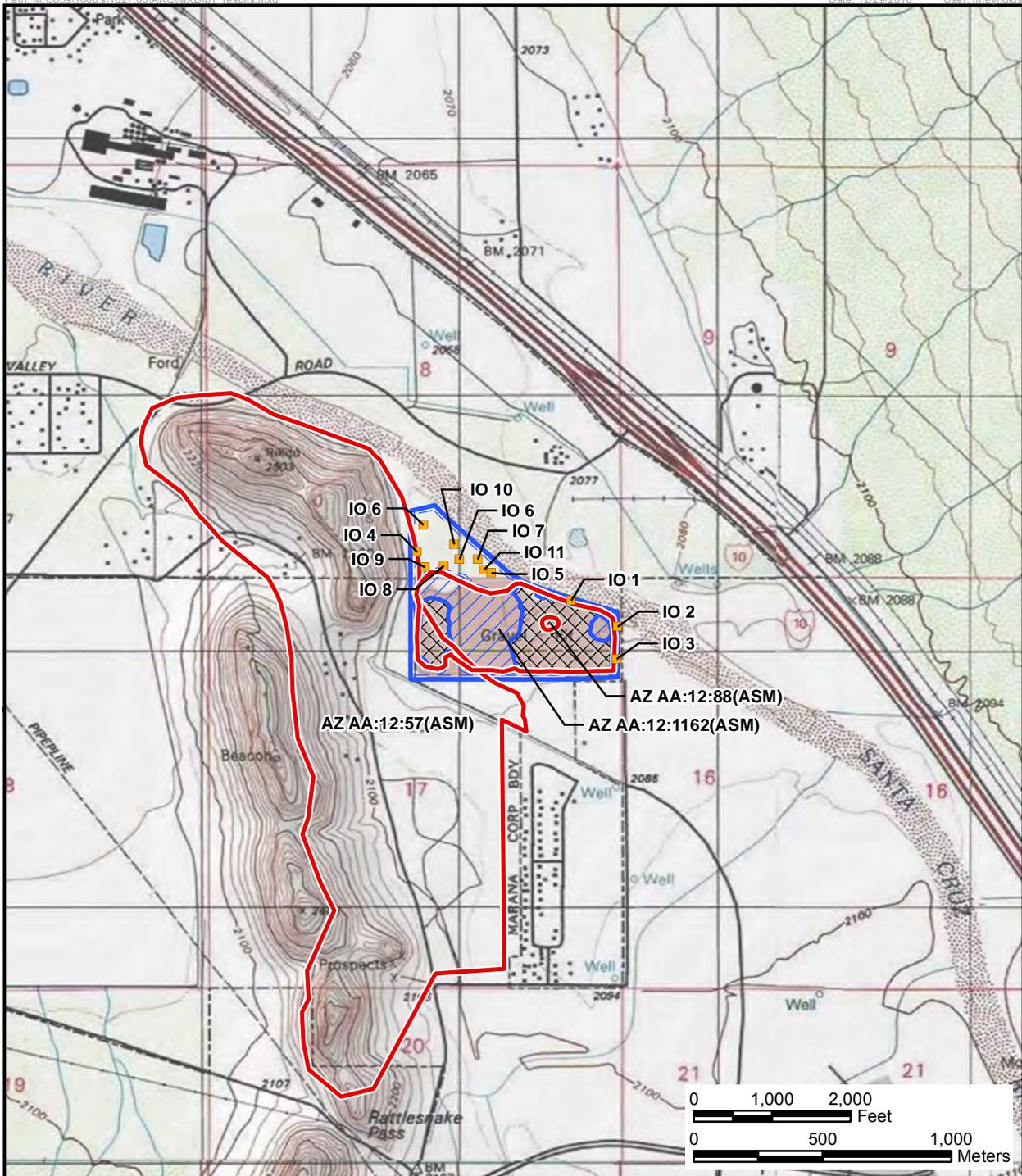
**The following information is considered sensitive; may be protected under federal, state, and local laws; and may be removed from the report.**

**Table B.1. Site management summary**

Site No.	New or Previously Recorded	Land Jurisdiction	Legal Description	Location NAD83, Zone 12		Site Type	Age and Cultural Affiliation	NRHP Eligibility Status	Treatment Recommendation
				Northing	Easting				
AZ AA:12:57(ASM) 1	Previously Recorded	Town of Marana	T 12N R12E, portions of §7, 8, 17 and 20	3583942	486972	Village	Hohokam	Determined eligible (D) SHPO 2008	Avoid associated features in the project area and monitor within the site boundary during construction
AZ AA:12:88(ASM) 2	Previously Recorded	Town of Marana	T 12N R12E, portions of §8 and 17	3584105	487357	Cemetery	Hohokam	Recommended ineligible	Monitor the area surrounding the site boundary plot for burials during construction
AZ AA:12:1162(ASM) 3	Newly Recorded	Town of Marana	T 12N R12E, portions of §17	3584076	487054	Materials Borrow Pit (“gravel operation”)	Euroamerican	Recommended Ineligible	No further work is necessary

**Table B.2. Isolated occurrences**

IO No.	Field No.	Age and Cultural Affiliation	Description	Location NAD83, Zone 12	
				Northing	Easting
1	4	Hohokam Classic period	Concentration of approximately 200 displaced artifacts in an earthen retaining wall, including lithic debitage, sherds, FAR, and bone	3584196	487441
2	2	Unknown Native Archaeological Culture, Prehistoric period	Basalt primary and basalt secondary flake eroding out of the eastern edge of the ADOT materials pit (the “gravel operation”)	3584091	487628
3	1	Unknown Native Archaeological Culture, Prehistoric	Three pieces of rhyolite FAR eroding from the eastern wall of the ADOT materials pit (the “gravel operation”)	3583965	487623
4	17	Euroamerican, Historic period	Unimproved canal. The feature follows the general course of a natural drainage and does not appear on historical maps.	3584383	486854
5	20	Euroamerican, Territorial period-Late Historic period	Unimproved canal. The feature terminates at a major drainage running north to the Santa Cruz River. A section of displaced 3’ galvanized piping was recorded at this terminus, suggesting the canal take-off was originally improved. The feature may be depicted on an 1896 GLO map.	3584299	487135
6	18	Euroamerican, Territorial period–Present	Graded undrained dirt road. The road follows the course of a ranch road depicted on an 1896 GLO plot. Today the road runs southeast-northwest, and terminates at a pump well at the northern end. A non-historical asphalted pad has been built over its central segment. The road is still in use.	3584352	487010
7	22	Euroamerican, Late Historic period	Graded undrained dirt road segment. The road runs northwest from slightly north of IO 5, and presently terminates in a modern asphalted road. A 1920s-1930s bottle base (colorless glass, no basal stippling) was found along the road. The road appears to still be used intermittently.	3584350	487085
8	8	Euroamerican, Territorial period	Oval earth-bermed cattle tank	3584328	486950
9	10	Euroamerican, Late Historic period	Borrow pit	3584323	486877
10	19	Euroamerican, Late Historic period	Borrow pit	3584412	486991
11	23	Euroamerican, Territorial period	Glidden’s Coils Military Concertina Wire	3584312	487107



T12S, R12E, Portions of Sections 8 and 17, Pima County, Arizona  
 Marana, AZ USGS 7.5' Quadrangle  
 Projection: UTM NAD83, Zone 12



**Legend**

- Project Area
- Archaeological Site
- Isolated Occurrence
- Surveyed Area
- Area of Known Disturbance (Unsurveyed)
- Area of Recent Flood Deposit (Unsurveyable)

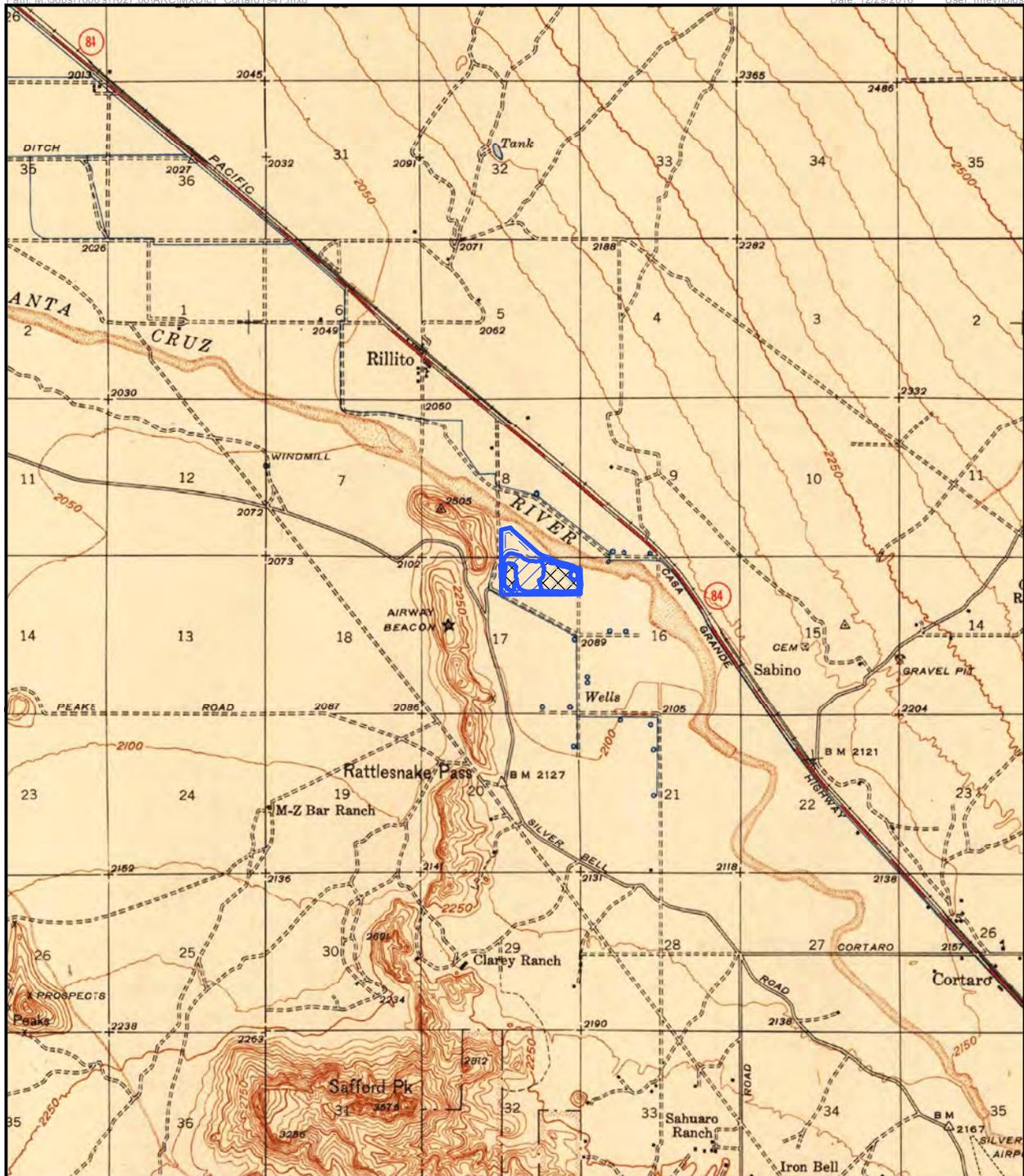


Figure B.1. Results map

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## **APPENDIX C**

### **HISTORICAL MAPS AND PHOTOS OF THE PROJECT AREA**



T12S, R12E, Portions of Sections 8 and 17,  
 Pima County, Arizona  
 Cortaro, AZ (1947) USGS 15' Quadrangle  
 Projection: UTM NAD83, Zone 12

**Legend**

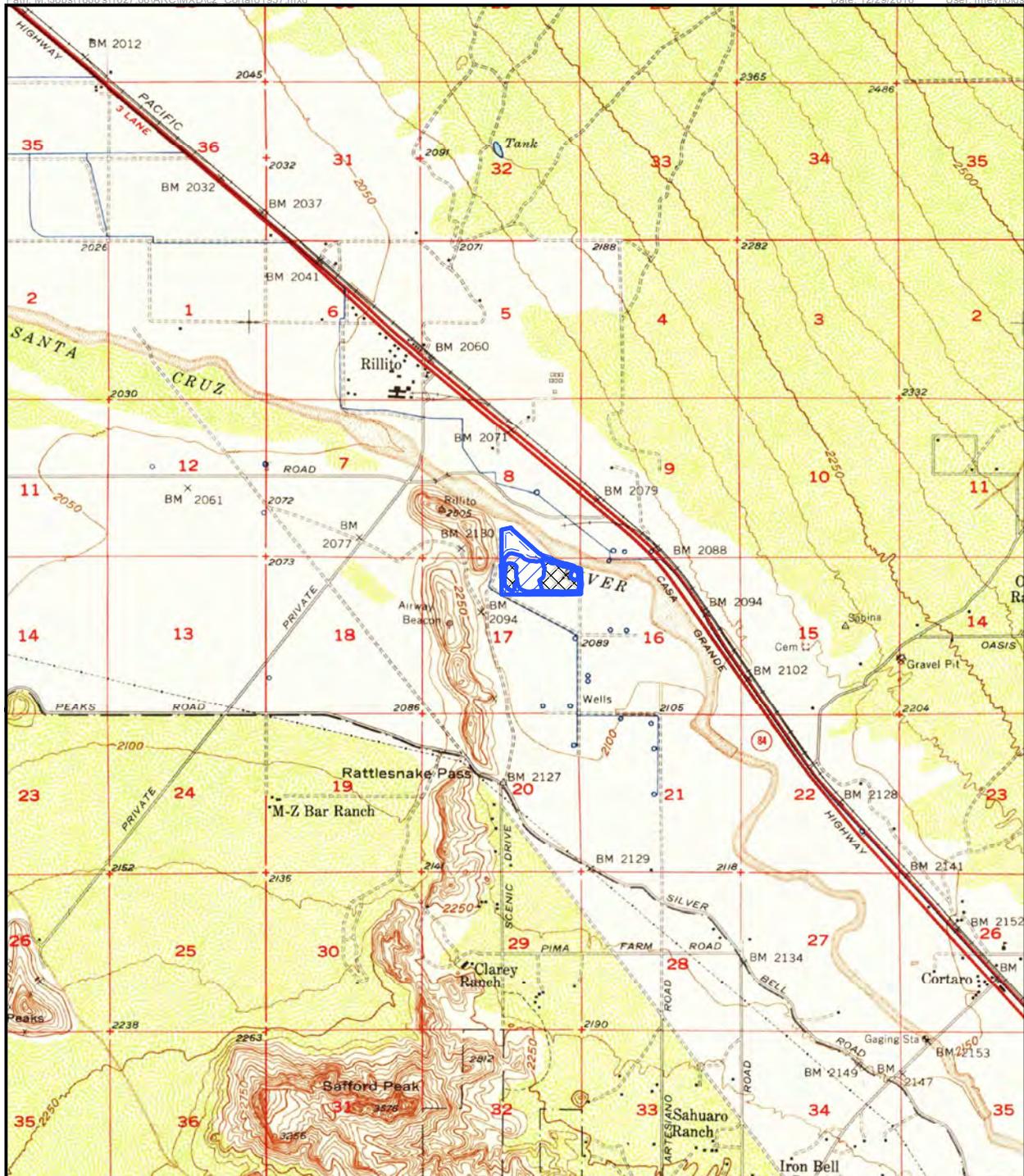
-  Project Area
- Survey Status**
-  Surveyed Area
-  Area of Known Disturbance (Unsurveyed)
-  Area of Recent Flood Deposit (Unsurveyable)



  
 WestLand Resources



Figure C.1. Cortaro 15' Quadrangle (USGS 1947)



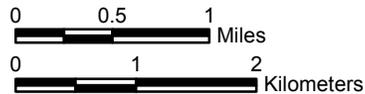
T12S, R12E, Portions of Sections 8 and 17,  
 Pima County, Arizona  
 Cortaro, AZ (1957) USGS 15' Quadrangle  
 Projection: UTM NAD83, Zone 12

**Legend**

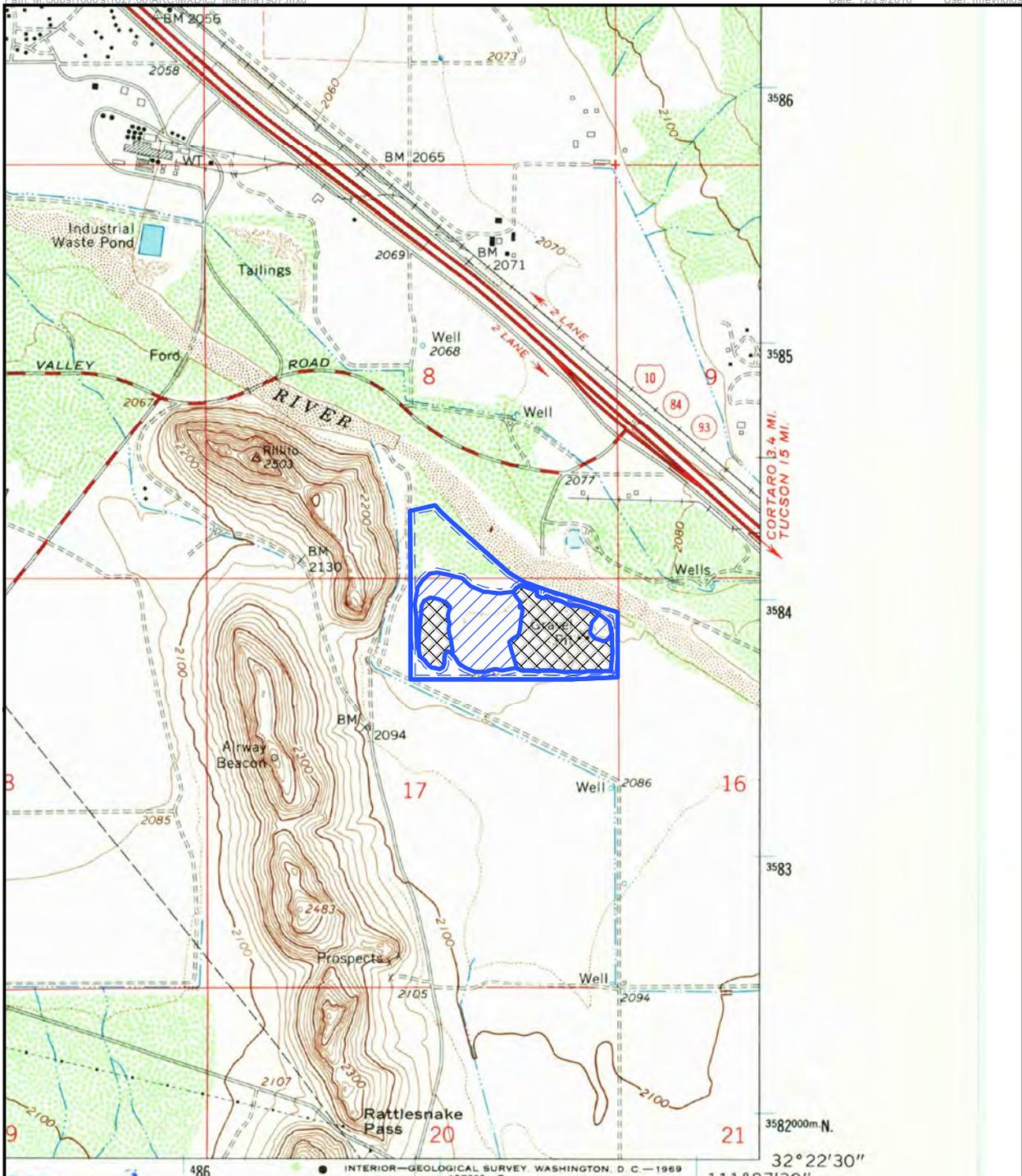
-  Project Area
- Survey Status**
-  Surveyed Area
-  Area of Known Disturbance (Unsurveyed)
-  Area of Recent Flood Deposit (Unsurveyable)



  
 WestLand Resources



**Figure C.2.** Cortaro 15' Quadrangle (USGS 1957)



T12S, R12E, Portions of Sections 8 and 17,  
 Pima County, Arizona  
 Marana, AZ (1967) USGS 7.5' Quadrangle  
 Projection: UTM NAD83, Zone 12

**Legend**

-  Project Area
- Survey Status**
-  Surveyed Area
-  Area of Known Disturbance (Unsurveyed)
-  Area of Recent Flood Deposit (Unsurveyable)



  
 WestLand Resources

0 1,000 2,000  
 Feet

0 500 1,000  
 Meters

Figure C.3. Marana 7.5' Quadrangle (USGS 1967)

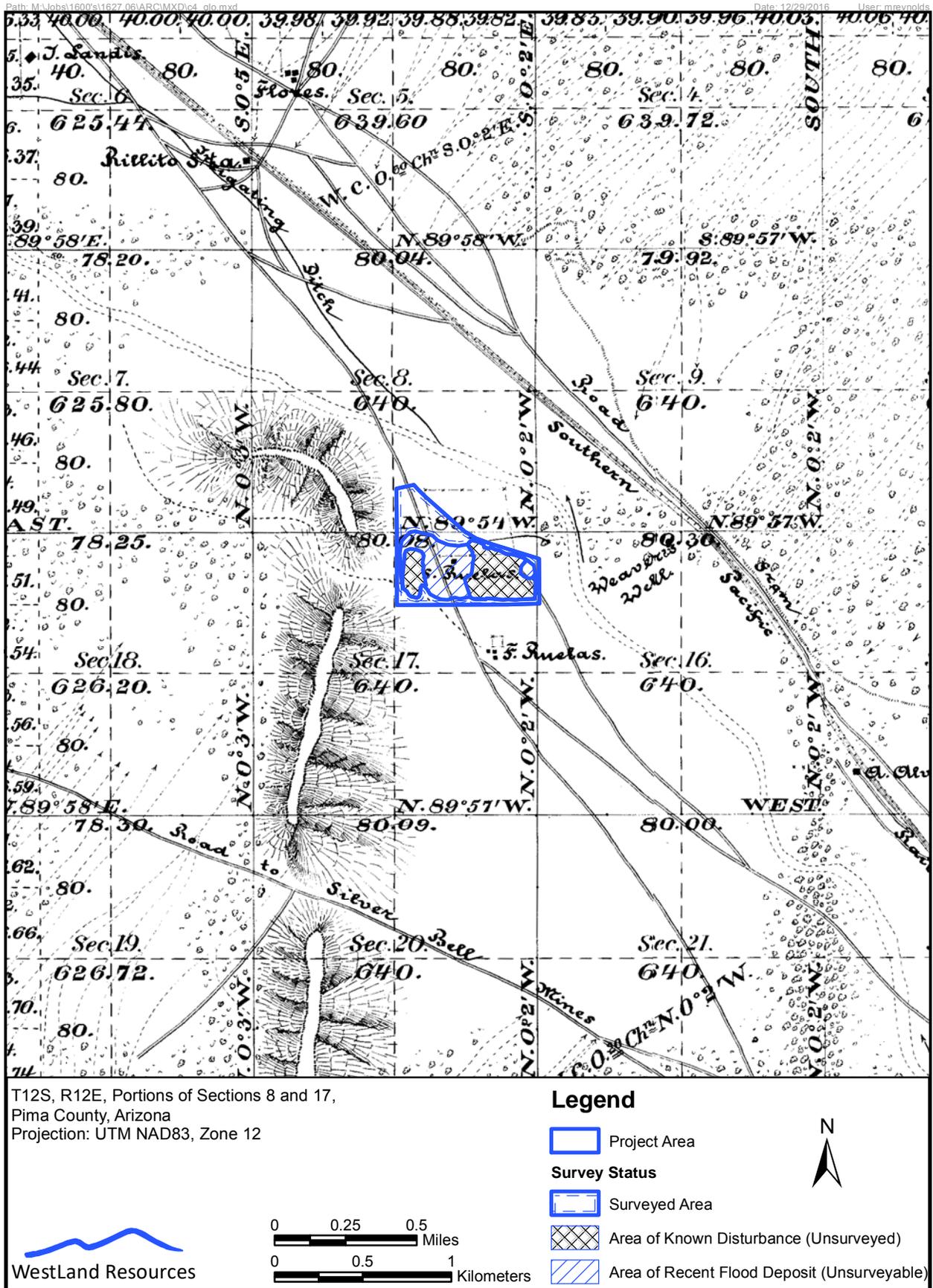
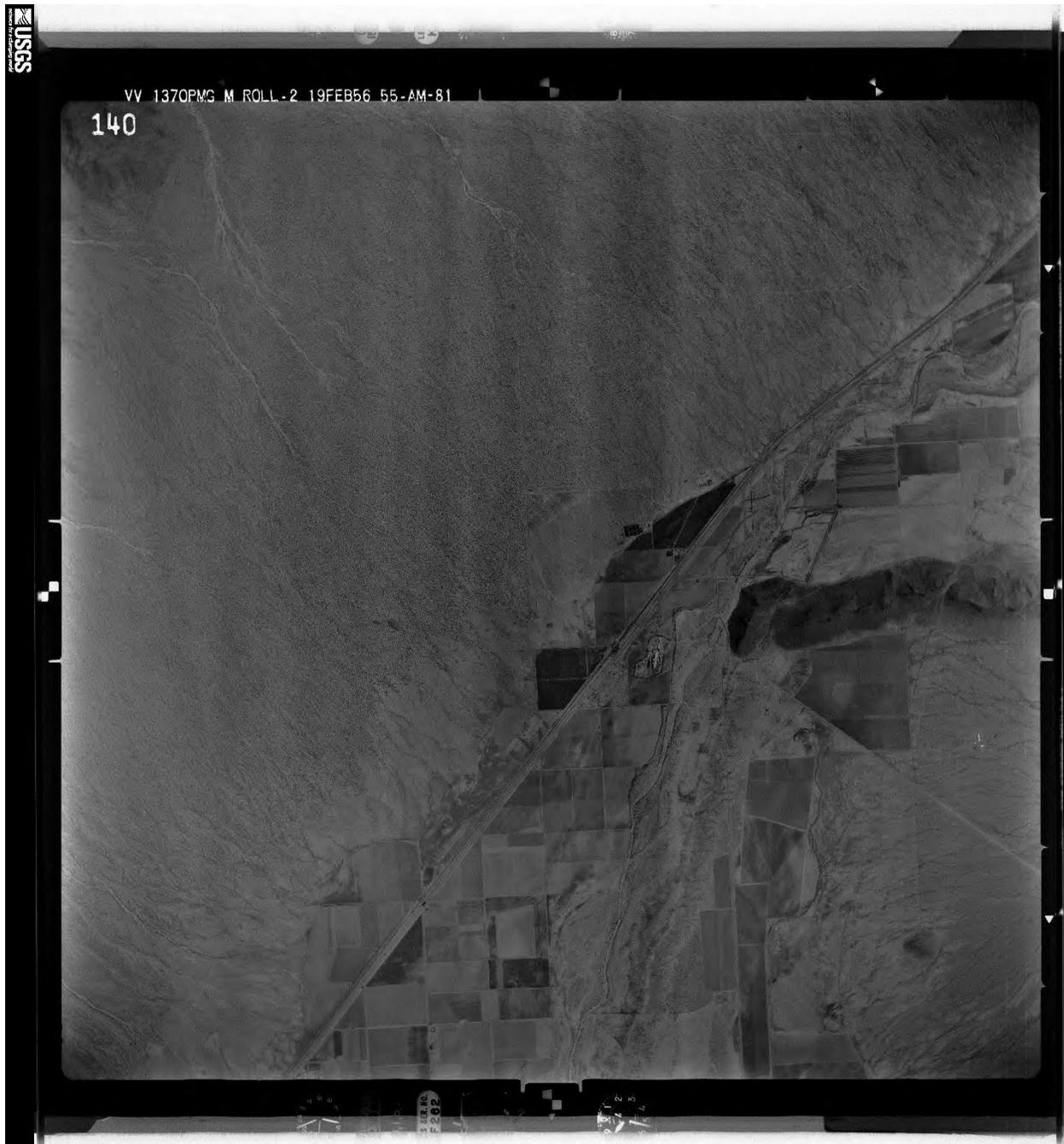


Figure C.4. 1896 GLO map for Township 12 North Range 12 East



**Photo C1. 1956 USGS aerial photograph of the project area (USGS 1956)**

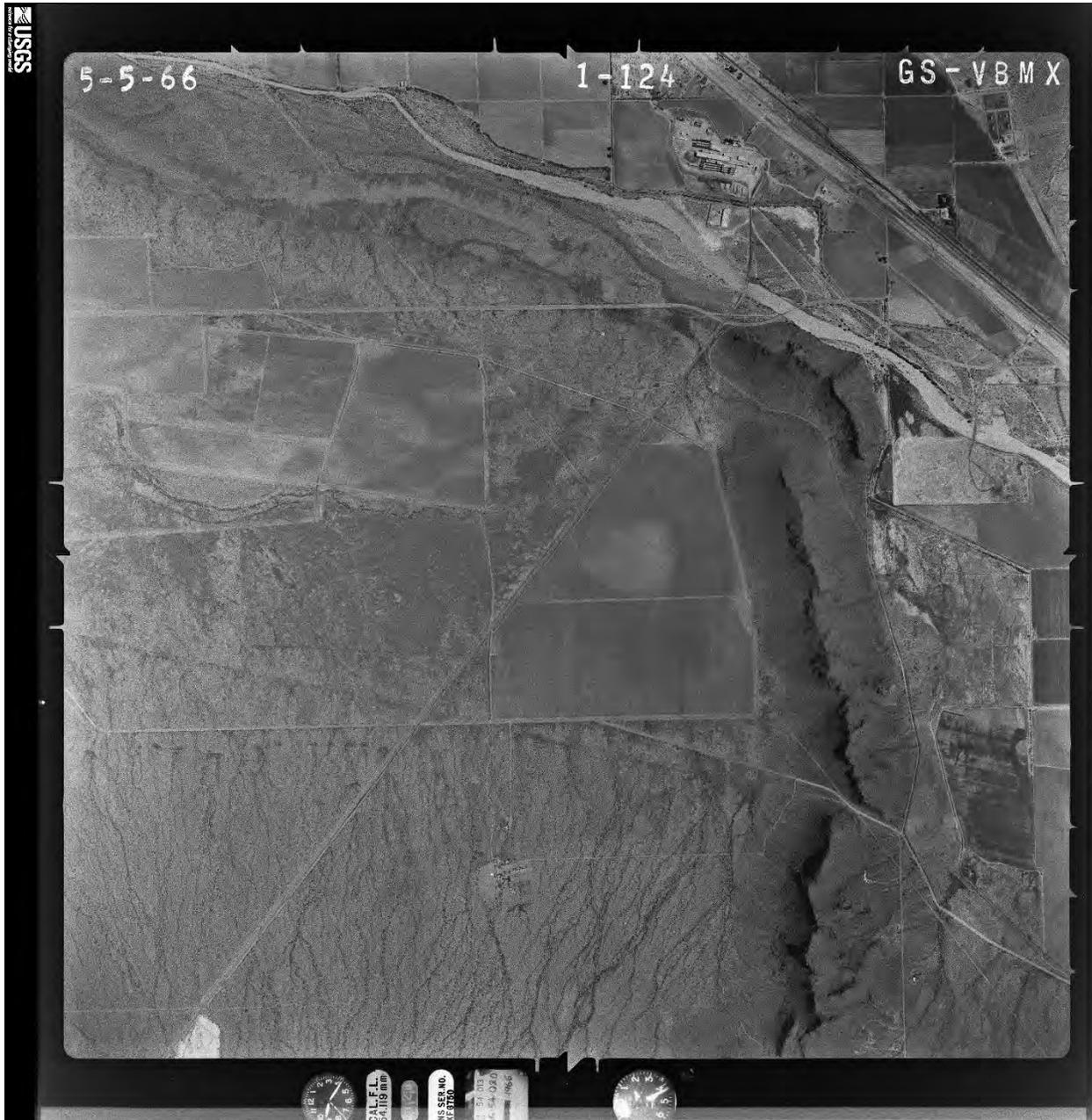


Photo C2. 1966 USGS aerial photograph of the project area (USGS 1966)



# Forest Stewardship Plan

## El Rio Preserve

Owned By

**Town of Marana**

11555 W. Civic Center Dr., Marana, AZ 85653

Plan Start Date

**2/5/2018**



Plan Prepared By

**Willie Sommers, Service Forester**

**Arizona Department of Forestry & Fire Management**

# Forest Stewardship Plan

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Forest Stewardship Plan

APPROVALS & SIGNATURES

El Rio Preserve

Plan Start	2/5/2018
Duration	10 years
Plan Expiration	2/5/2028
Plan Acreage	104 acres

Plan Preparer

I have, to the best of my knowledge, and as a qualified resource professional, prepared this plan in accordance with state and national standards, and consistent with the landowner's primary forest resource management objectives.

Plan Prepared by:

Willie Sommers, Service Forester  
Arizona Department of Forestry & Fire Management  
1110 W. Washington, Suite 100  
Phoenix, AZ 85007

Willie Sommers  
Plan Preparer Signature

1-12-18  
Date

Approved By:

[Signature]  
Steve Millert, Southeast District Manager

1/22/18  
Date

[Signature]  
Andrew Owen, Forest Stewardship Program Manager

Digitally signed by Andrew Owen  
DN: cn=Andrew, o=ADFS, email=andrewowen@azdf.gov, c=US  
Date: 2018.01.18 11:11:10 -0700

\_\_\_\_\_  
Date

Landowner

I have reviewed this Forest Stewardship Plan for my property and I agree, as feasible, to conduct management activities consistent with the plan during the period specified.

[Signature]  
Landowner Signature

1/18/18  
Date

James M Conroy, Marana Parks + Rec. Director  
Landowner Printed Name

JIM CONROY  
Director

TOWN OF MARANA  
Parks and Recreation  
11555 West Civic Center Drive  
Marana, AZ 85653



(520) 382-1968  
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jconroy@MaranaAZ.gov  
MaranaAZ.gov



# Forest Stewardship Plan

## PRIMARY GOALS & OBJECTIVES

El Rio Preserve is approximately 104 acres of riparian/wetland habitat owned by the Town of Marana in Pima County, Arizona. The property borders the Santa Cruz River on the north and east side, and residential development to the south and west. In 2003, the Town of Marana purchased the El Rio Preserve land from the Arizona Department of Transportation (ADOT). ADOT had utilized the property as a gravel pit for highway construction projects such as Interstate 10 which is nearby. The El Rio Preserve is considered a riparian/wetland restoration property, and will undergo many proposed improvements to enhance habitat and improve public access. The following are eight goals and seven landowner objectives for this property:

### GOALS

- (1) Create a natural preserve to maintain and improve the site as wildlife habitat and preserve the wildlife linkages
- (2) Eliminate off-road vehicle and other non-sanctioned uses
- (3) Avoid disturbance to cultural resources
- (4) Monitor and remove invasive non-native species except for large, established tamarisk trees
- (5) Control mosquitos
- (6) Create an area where citizens can enjoy nature and where school classes can visit as part of their biology and science studies
- (7) Manage wildfire threats
- (8) Maintain the berm that separates El Rio Preserve from the Santa Cruz River to create permanent ponds and stands of native vegetation.

To accomplish these goals, the following objectives have been identified as proposed improvements:

### OBJECTIVES

- (1) Restore the berm that separates the preserve from the Santa Cruz River
- (2) Remove invasive species and plant/seed native vegetation
- (3) Construct two ponds (one 5-acre pond with a 0.5-acre island and one 2-acre pond, with depths varying from 1 to 6 feet) using solar-powered recirculating devices to eliminate mosquito problems
- (4) Build a 1-mile natural trail through the preserve and a half-mile ADA-accessible pathway
- (5) Add interpretive signage describing water harvesting techniques and the importance of riparian/wetland habitat
- (6) Install bird-watching blinds, benches, picnic tables and a ramada in the uplands
- (7) Introduce native fish species such as Gila topminnow and Desert pupfish in coordination with the Arizona Game and Fish Department.

## Forest Stewardship Plan

This stewardship plan, while addressing multiple resources, will primarily focus on goals #4 and #7 and objective #2. In addition to detailed descriptions of the proposed improvements, an offering of state and federal funding sources is provided with this management plan.

### PROPERTY DESCRIPTION

#### Owner Contact

Jim Conroy  
Parks and Recreation Director  
Town of Marana  
(520) 382-1968  
[jconroy@maranaaz.gov](mailto:jconroy@maranaaz.gov)

#### Address

10190 N. Coachline Blvd.  
Tucson, AZ 85743  
Pima County, AZ



#### Property Description

Elevation: ~2,100 feet  
NRCS Major Land Resource Area (MLRA):  
040 – Sonoran Basin and Range

#### Legal Description

Sections 8 and 17, Township 12 South, Range 12 East, of the Gila and Salt River Baseline Meridian

<b>Mapped Acres (GIS)</b>	106.4
<b>Surveyed Acres</b>	104
<b>Forested Acres</b>	50
<b>Perennial Stream Length (ft.)</b>	~3,500 feet
<b>Boundary Marked</b>	No

#### Boundary Description

The El Rio Preserve is bordered by the Santa Cruz River to the north and east, and residential development to the south and west.

# Forest Stewardship Plan

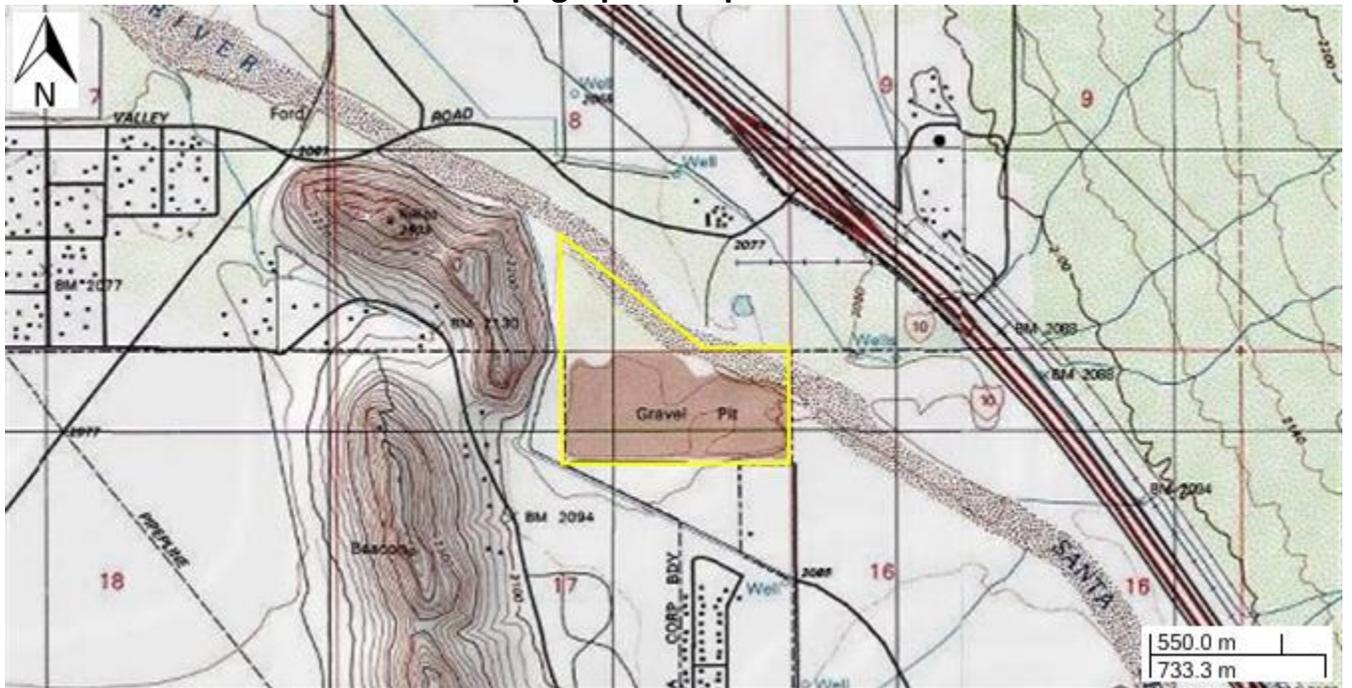
## Property Maps

### Aerial Photo



# Forest Stewardship Plan

## Topographic Map



# Forest Stewardship Plan

## Stands Map



## Point & Line Feature Map



# Forest Stewardship Plan

## Certifications and Restrictions

Is Property in a Tax Abatement Program?	No
Is Property Tree Farm and/or FSC certified?	No
Property is SFI certified?	No
Property is FSC certified?	No
Property is Other 3rd party certified?	No
Farm Service Agency ID	No
Is there a Conservation Easement Restriction for the Property?	No

## Property Resource Conditions

### Aesthetic Quality

El Rio Preserve has considerable aesthetic quality as natural open space closely associated with the Lower Santa Cruz River. The Preserve offers the ability to see a whole host of wildlife species and a variety of birds, including waterfowl. The natural beauty and tranquility of this property can best be sustained through land use planning and the implementation of conservation and restoration practices/projects that address natural resource concerns. Some of the primary resource concerns are seasonal flooding and the spread of non-native and invasive plant species.

### Primary Forest Types

El Rio Preserve contains components of the rare and important Fremont cottonwood (*Populus fremontii*)-Goodding willow (*Salix gooddingii*) riparian gallery forest. Riparian areas and their associated forests are less than 1% of Arizona's total area, and are critical habitat for numerous federally-listed threatened and endangered species. Riparian forest is present along both sides of the active channel of the Santa Cruz River, but relatively few cottonwoods and willows are present. There is at least one group of cottonwood trees on the property, and many willows can be found near open water. Most willows occur in flooded areas that are inaccessible by foot.

Fremont cottonwood is common along streams throughout Arizona, except in the higher elevations. The trees are frequently 50 feet, sometimes even 100 feet tall, and the trunk diameter can be several feet when mature. Goodding willow is Arizona's largest willow species, and is widely distributed in the southern part of the state. In general, this willow can grow to a height of 45 feet and a trunk diameter of 30 inches or more. More common along the active river channel are trees such as Athel (*Tamarix aphylla*), velvet mesquite (*Prosopis velutina*), and Mexican paloverde (*Parkinsonia aculeata*). Athel is non-native, whereas velvet mesquite and Mexican paloverde are native. These trees can reach a large size, and contribute to the riparian forest canopy. Below are photos of some of the larger trees on the property:

## Forest Stewardship Plan



Photos 1 and 2. Left, a cluster of Fremont cottonwood trees (center) and right, an Athel tree.

A plant list was developed and is included as **Appendix A**. The plant list is organized by growth form – trees, shrubs, cactus, grasses and forbs – all of which make up the current plant community. The variation in plants ranges from cactus to aquatic species like cattail. Additional information for each species includes their origin (native or introduced) and distribution (rare, infrequent, or common). A whole host of introduced species are found at El Rio Preserve, some of which are considered highly invasive species. Distribution of each plant species is qualitative, and based on several field visits to the property in the spring and summer of 2017.

### **Archaeological, Cultural & Historic Sites**

Detailed information on archaeological, cultural and historic sites on the subject land is beyond the scope of this management plan and would require professional cultural resources services. The El Rio Preserve has been previously surveyed for archaeological sites, and two sites are present: AZAA:12:57(ASM) and AZAA:12:88(ASM). The locations of these sites are not provided in this document as that information is sensitive and maintained by Town of Marana staff. Important cultural resources and history of the area include prehistoric use of the Santa Cruz River for subsistence, and the Juan Bautista de Anza National Historic Trail.

### **Biodiversity**

In general, biodiversity refers to the variety of life in a habitat or ecosystem. Use by birds is a major consideration for this property. During a one-day/three-person field visit, including the Town of Marana Environmental Projects Manager, a total of 32 bird species were observed (Janine Spencer, email communication, 4/26/17). In addition, they also identified 28 native plant species and 11 non-native/invasive plant species. Moreover, the El Rio Open Space Preserve (Coachline Gravel Pit) Bird List, maintained at [www.ebird.org](http://www.ebird.org), has a total of

## Forest Stewardship Plan

230 species through 9/6/2017. Given the consistent presence of water, and proximity to the Santa Cruz River, the El Rio Property exhibits high floral and faunal (avian) biodiversity.

### Carbon Cycle & Climate Change

Carbon, the sixth element, is the main component of biological compounds and the gas carbon dioxide (CO<sub>2</sub>) is essential to photosynthesis in plants. Concern about increased CO<sub>2</sub> levels in the atmosphere and the potential for climate change has led to an interest in carbon sequestration. Carbon sequestration is the process by which CO<sub>2</sub> is taken up by plants and stored in vegetation biomass and soils. The sequestration (also called sink) of carbon in forests can help offset sources of CO<sub>2</sub> from activities like deforestation, forest fires and fossil fuel emissions.

Many predictive models suggest the Southwestern U.S. will continue in persistent drought conditions, suggesting the climate will become relatively hotter and drier over time. This may have multiple and lasting impacts on individual tree species and landscape-scale forest conditions. Some researchers are evaluating the possibility of forest stand type conversion as the climate patterns change; the historical range of vegetation may adapt and move to non-traditional locations. It is believed that the healthier and more robust an ecosystem, the better it will adapt to changing climate patterns.

Managing for improved land health on the El Rio Preserve property should increase overall productivity of the carbon cycle. Improved land health can be achieved by in large part by controlling the establishment and spread of non-native plant species. There may be short term releases in carbon caused by activities like invasive tree reduction/thinning, but over the long-term, the native woody species will effectively store carbon with minimal release. The goals and objectives of this plan were selected to maintain the carbon storing capabilities with reduced potential to intensively burn.

### Fire & Fuels

Historically, fires in low- to mid-elevation southwestern riparian native plant communities of cottonwood, willow, and mesquite are thought to have been infrequent. The uplands surrounding desert riparian areas are typically sparse, with open spaces between trees/shrubs and minimal fine fuels to carry fire. Under natural hydrologic conditions, riparian forests were intermixed with wetlands, and therefore relatively safe from the threat of wildfire.

With the alteration of river hydrology, and the introduction of saltcedar (*Tamarix* spp.), current conditions in many desert river systems make wildfire a reality. Saltcedar is discussed in more detail in the *Invasive Species* section below, but is a non-native invasive species that now occupies millions of acres of riparian areas throughout the western U.S. Over the past several years, there have been several large riparian area wildfires in Arizona. In August 2015, the Willow Fire along the Colorado River in Mohave County burned approximately 6,780 acres of saltcedar interspersed with mesquite and willow. In June 2015, the Kearny River Fire consumed 1,428 acres of saltcedar and native riparian trees in the Gila

## Forest Stewardship Plan

River bottom near the Town of Kearny in Pinal County. These fires illustrate the challenge that saltcedar poses to riparian area managers. Saltcedar can re-sprout rapidly following fire, so wildfire is not a viable control method. After wildfire, mesquite and willow are able to re-sprout, whereas cottonwood trees are often killed in riparian area wildfires and have to re-establish by seed.

Three factors influence wildland fire behavior: weather, topography, and fuel (see Figure 1 below). While land management activities cannot change weather or topography, fuels can be modified. Fuels consist of live and dead vegetation, such as trees, shrubs, grasses and their debris. On this property, the vegetation type is primarily woody shrubs and trees which are considered heavy fuels. Fuels that have both horizontal and vertical continuity can spread fire rapidly, burn intensely, and may pose a hazard to people in developed areas. For instance, wildfire in a dense saltcedar thicket is likely to exhibit these circumstances.



Figure 1. Fire triangle – fire behavior is influenced by the following: fuel, weather, and topography.

The Pima County Community Wildfire Protection Plan (CWPP), of which Town of Marana is a participant, provides recommended methods of treatment and management strategies for mitigating the potential spread of wildfire. Fuel modification and treatment plans are provided in Table 3.1 (Page 92 and 93) for riparian areas and saltcedar vegetation. In riparian areas, treatments should be limited in scope unless there is a defined fuel hazard (this is due to their high value as wildlife habitat). Riparian area treatments should emphasize removal and control of saltcedar and other invasive trees. Areas of monotypic saltcedar or saltcedar interspersed with other riparian tree species may be treated mechanically or chemically to reduce stem density, canopy, and excessive fuel loading. Slash can be piled and burned, hauled off site, or used for soil stabilization. Having a specific plan for slash is an important, and often overlooked, part of vegetation management activities.

The Arizona Wildfire Risk Assessment Portal (AZ WRAP) is the primary mechanism for the Department of Forestry and Fire Management (DFFM) to share wildfire risk information and create awareness about wildfire issues across the state ([www.arizonawildfirerisk.com](http://www.arizonawildfirerisk.com)). Wildfire risk and threat data layers were developed as part of an assessment covering the 17 western states. AZ WRAP allows the user to identify areas where fire potential exists in relationship to homes and other valued assets. El Rio Preserve was evaluated in this program, and an assessment report was generated.

## Forest Stewardship Plan

An assessment report was generated, based on an area that is approximately 45 acres centered in the property. The report provides two key pieces of information – wildfire threat and fire intensity expressed as flame length. Wildfire threat is a measure of the likelihood of a fire starting and spreading to a location. According to the report, the collective threat for this location is high. **Appendix B** is the assessment report for El Rio Preserve.

Flame length is directly related to fire intensity, and is commonly used as a visual indication. The assessment report notes, in bold, to “*Be advised that if salt cedar is present in your area, the actual fire behavior may be higher than this data shows. Seek guidance from your local Fire Planning Specialist.*” As mentioned earlier in this plan, saltcedar is a unique fuel type, and a challenge for riparian area managers. The fire intensity level at this location is represented by flames that are between 2 and 4 feet in length. Per Table 1, at flame lengths less than 4 feet, people can work near the flames and firefighters can work the flanks and head of these fire using hand tools.

### Fish & Wildlife

To properly manage El Rio Preserve for the benefit of wildlife, careful consideration must be given to the basic habitat requirements of wildlife: food, water, cover and space. It is understood that a whole host of wildlife species use this property for habitat. Species of economic and recreation importance in the area include Gambel’s Quail (*Callipepla gambelii*), Mule Deer (*Odocoileus hemionus*), Javelina (*Pecari tajacu*), Mountain Lion (*Puma concolor*), White-winged Dove (*Zenaida asiatica*), and Mourning Dove (*Zenaida macroura*); however, hunting is not allowed due to proximity to housing developments. This does not include the multitude of birds and waterfowl that use the open water and trees on the property. Some of the birds and waterfowl that visit the property include cormorants, herons, ducks, hummingbirds, and kingbirds.

In terms of food sources, velvet mesquite has considerable wildlife value. The fruit crop of mesquite beans provides an abundant and nutritious food source for numerous species upon ripening in July and August. Mesquite seeds are an important part of the diet for small rodents, and mesquite buds, flowers and seeds are consumed by quail. Mesquite can be found along the outer perimeter of the riparian areas, and is a plant that should be included with future native plantings. Existing mesquite trees that exhibit good form and healthy vigor should be retained during project work on El Rio Preserve.

The development of two ponds (Objective #3) will provide excellent habitat for birds and waterfowl. In addition, once the ponds are established, native fish could be introduced and provide natural mosquito control. Gila topminnow (*Poeciliopsis occidentalis*) and desert pupfish (*Cyprinodon macularius*) are two of 36 species that historically inhabited Arizona’s waters prior to European-American settlement. Both are federally listed as endangered and have recovery plans in place. Part of the recovery plans for these species are to utilize natural and semi-natural habitat to establish populations, and El Rio Preserve could serve this purpose.

## Forest Stewardship Plan

### Forest Health

Riparian forests carry unique sets of forest health issues. Provided below is a description of one forest health issue in this forest type. In general, forest health issues are attributed to insects and diseases, but some parasitic plants, like the true mistletoes are included in the discussion of forest health.

True mistletoes (*Phoradendron* spp.) are not aggressive pathogens and use cottonwoods as host plants. There are eight (8) species of mistletoe in the Southwest, and three (3) species occur on hardwoods. Bigleaf mistletoe (*Phoradendron macrophyllum*) occurs on most riparian hardwood species, except for oaks. Cottonwoods can have bigleaf mistletoe on its branches, which are easily recognized by their thick green stems and thick green leaves that are oval in shape. In winter, when cottonwoods have dropped their leaves and entered dormancy, the evergreen mistletoe is highly visible in the tree canopy. Birds are very fond of the berries of true mistletoe and distribute the seeds in their droppings. When the viscid seeds germinate a modified root penetrates the bark of the host tree and gains access to xylem as a water source. Under periods of severe drought, abundant mistletoe could cause branch dieback or even mortality to individual trees. On the preserve, there was no mistletoe observed on the few cottonwood trees present in a group.

Desert mistletoe (*Phoradendron californicum*) was seen on a mesquite tree located along the west side of the property along the paved pathway (see photo below). This mistletoe is parasitic mostly on leguminous shrubs and trees (*Acacia*, *Prosopis*, *Parkinsonia*), which are common at El Rio Preserve. Treatment options for mistletoe including removing the impacted branch, or entire tree, but are not generally recommended in most cases.



Photo 3. Mistletoe growing on a velvet mesquite tree in El Rio Preserve.

## Forest Stewardship Plan

### History

The El Rio Preserve has an extended history as an area that provided water to early people. At Las Capas, just a few miles south of El Rio Preserve, archaeologists unearthed some of the oldest irrigation canals in North America, the earliest dating to 1250 B.C. Just south is the Los Morteros Site, or “the mortars” named for the numerous mortars on boulders and outcrops that were used to grind and mill mesquite pods, corn and seeds by the Hohokam people. It is believed this site was occupied from about A.D. 850 to 1300. Additionally, in 1775 A.D. Juan Bautista de Anza (1736 – 1788) led his expedition along the Santa Cruz River, and camped for one night at *Llano del Azotado* (present day El Rio Preserve).

In 2003, the Town of Marana purchased the El Rio Preserve land from the Arizona Department of Transportation (ADOT). ADOT had utilized the land as a gravel pit for construction of nearby highways, including Interstate 10. In 2015, the Town of Marana designated the newly acquired area as El Rio Preserve under the administration of the Town’s Parks and Recreation Department. In prior years, a disc golf course was established on this property but flooding has eliminated access to some of the baskets.

### Invasive Species

Invasive species are non-native plants, animals and other organisms which have been introduced (either intentionally or by accident) into areas outside their natural/native range. These non-native species can cause alterations to ecological structure and function and compete with native species for resources (sunlight, soil moisture and nutrients). They may also cause adverse economic and environmental impacts such as a reduction of available forage for wildlife and livestock, increased wildfire risk/severity, degraded waterways and increased soil erosion.

### Saltcedar

As stated in the Pima County Community Wildfire Protection Plan (Page 166), “*The continued degradation of native riparian plant communities from invading tree species is a significant concern to the citizens of Pima County.*” On this property, saltcedar (*Tamarix* spp.) is the main concern as an invasive species. Saltcedar is common to southwestern states like Arizona, Utah, Colorado and New Mexico and is listed as a noxious weed in many western states. Saltcedar is native to Eurasia and Africa, and regularly occurs in riparian areas or drainage washes of natural or artificial water bodies below 7,500 feet elevation.

Depending on the species of *Tamarix*, it can grow as a shrub or tree, and often forms dense thickets. There are three species of *Tamarix*, including *T. chinensis*, *T. parviflora*, and *T. ramosissima* that are deciduous to semi-deciduous, with the differences related to the number of flower petals and other features. Saltcedar produces primarily by seed, but root crowns can quickly produce new shoots after a fire or flood disturbance; heavy infestations of saltcedar are costly and difficult to control. Saltcedar can be controlled using a variety of methods, often used in combination over a period of multiple years. Discussion of treatment

## Forest Stewardship Plan

options and recommendations are provided in the *Stand Descriptions and Management* section.

Also found on the El Rio Preserve are Athel (*Tamarix aphylla*) trees. Athel was introduced from Africa to provide windbreaks for homesteads, crop fields, and railroad tracks, and is now common in central and southern Arizona. While the typical saltcedar is generally bushy in appearance, and considered a shrub or medium tree, Athel becomes a mature evergreen tree with thick, rough grey-brown bark. Athel is referred to Athel pine in Australia, as the needle segments are like pine trees. **Appendix C** is from the National Athel Pine Management Committee of Australia and is titled *Tamarix* species – how to tell the difference; it features *T. aphylla*, *T. ramosissima* and *T. parviflora*.

### Invasive forbs

Three invasive forbs that occur on this property are Sahara mustard, common cocklebur, and poison hemlock. Sahara mustard (*Brassica tournefortii*) is a winter annual forb that flowers from December to May. It can suppress native wildflowers by monopolizing soil moisture as it grows and produces seed long before many native species have begun to flower. Common cocklebur (*Xanthium strumarium*) is a summer annual forb that flowers from July to September, and produces mature fruit with hooked prickles that can attach to clothing or animal fur. This plant, while native to North America, can be especially undesirable near hiking trails and walking paths. Poison hemlock (*Conium maculatum*) is a winter annual or biennial, herbaceous, broadleaf plant that can grow 3 to 8 feet tall. It is reported as invasive in Arizona is listed as a noxious weed in New Mexico. It is a highly toxic, lethal plant with toxins mostly concentrated in the seed, lower stem, and roots. It can be fatally mistaken for edible wild parsnip so extreme care should be taken with this plant.

### Invasive grasses

Additional invasive species observed on the El Rio Preserve include giant reed (*Arundo donax*), red brome (*Bromus rubens*), Bermuda grass (*Cynodon dactylon*), buffelgrass (*Pennisetum ciliare*) and Johnsongrass (*Sorghum halepense*). These are all grass species, and botanically are classified in the grass family of plants (POACEAE). Giant reed is a bamboo-like perennial that can grow to over 30 feet in height. It grows along ditches and riverbanks, or other moist places and reproduces by rhizomes that produce new plants. The concern is that it can form dense stands that are difficult to control, similar to saltcedar. Below are two photos of giant reed taken at El Rio Preserve in August 2017.

## Forest Stewardship Plan



Photos 4 and 5. Left, small patch of Giant reed in an open grass area; right, medium patch (in background) adjacent to flowing water channel.

Red brome, Bermuda grass, buffelgrass and Johnson grass are invasive plants found in the Sonoran Desert of Arizona. Red brome is an annual, meaning it grows, sets seed, and completes its life cycle in one year. It can be very competitive with native species, and in some areas, can serve as fine fuel for wildland fires in the upper elevations of the Sonoran Desert. Bermuda grass is very abundant in the irrigated valleys of southern Arizona, where it can form a sod. It spreads belowground by rhizomes and aboveground by stolons and is well established on this property.

Buffelgrass is a highly competitive perennial bunchgrass and can also displace native species. As it invades, it can be difficult to control and in some areas of southern Arizona it facilitates wildfires. Buffelgrass is an Arizona prohibited/regulated noxious weed due to its considerable spread since being introduced in the 1930s as livestock forage. Johnson grass, while not as invasive as buffelgrass, can grow rapidly on moist sites through fast-growing rhizomes. Johnson grass can be found along the edges of standing water and is a large, coarse, perennial bunchgrass growing to 6 feet in height. It has reddish to purplish-black panicles (seed heads) and flowers from May to October.

### Categorization

Given the high number of invasive plant species on the El Rio Preserve, some categorization is needed to determine an overall management strategy for the next 10 years and beyond. In 2003, over 20 federal and state agencies, academic institutions, and private conservation, professional, and commercial interests from across Arizona joined together to form the Arizona Wildlands Invasive Plant Working Group (AZ-WIPWG). Over a two and a half-year period the group developed a categorized list of invasive non-native plants. This list is useful to help categorize and distinguish the ten (10) invasive plants described above.

## Forest Stewardship Plan

The AZ-WIPWG ranked invasive plants based on their ecological impacts, invasiveness, and distribution in wildlands. Plants ranked *high* have severe ecological impacts, moderate to high rates of dispersal and are usually widely distributed. Plants ranked *low* have minor ecological impacts, low to moderate rates of dispersal, and generally limited distribution. Moreover, plants were given an ‘alert’ designation when deemed capable of invading natural communities. A ‘red flag’ was indicative of an important piece of information not evident in the overall ranking.

Below is Table 1, a summary of the AZ-WIPWG evaluations of nine of the ten (10) species presented above. Common cocklebur was not evaluated as a plant that threatens wildlands in Arizona, although it is considered a weed and occurs throughout the west. In reviewing the table, Athel has an overall rank of low, but has a red flag. The red flag, among other things, notes that Athel can hybridize with other *Tamarix* species.

Sahara mustard, poison hemlock, Bermuda grass and Johnson grass were ranked medium, and poison hemlock has an alert, suggesting it can spread into new areas. Given the toxicity of the plant, as mentioned above, it should be a top priority for removal on El Rio Preserve. The high-ranking species, with the greatest impacts, dispersal and distribution are giant reed, red brome, buffelgrass, and saltcedar. The red flag designation for buffelgrass is related to potential future development of cold tolerance or drought tolerance, and the red flag for saltcedar is related to considerations of providing habitat for southwestern willow flycatchers, an endangered bird species dependent on riparian areas. This habitat information is further discussed in the *Stand Descriptions and Management* section.

Table 1. Summary of Overall rank, Alert and Red Flag Designations for Nine (9) Invasive Non-Native Plants on El Rio Preserve (from *Invasive Non-Native Plants That Threaten Wildlands in Arizona – A categorized developed by the Arizona Wildlands Invasive Plant Working Group*)

Plant name	Overall rank	Alert	Red Flag
Giant reed*	High	-	-
Red brome*	High	-	-
Buffelgrass*	High	-	Yes
Salt cedar*	High	-	Yes
Sahara mustard*	Medium	-	Yes
Poison hemlock*	Medium	Yes	-
Bermuda grass	Medium	-	-
Johnson grass	Medium	-	-
Athel	Low	-	Yes

\* Field guides for managing these species are available from the USDA Forest Service and are provided as Appendices.

## Forest Stewardship Plan

### Landscape Conservation Concerns

In an arid state like Arizona, riparian/wetland areas are quite rare, making them a critical resource and vital wildlife habitat type. The El Rio Preserve is within the context of the Lower Santa Cruz River, which takes in Tucson and Marana, both areas with growing populations. Recent developments have improved the Lower Santa Cruz River, namely, the 2013 upgrade of two water reclamation facilities – Tres Rios and Agua Nueva – located along the river. These facilities release effluent water that is of improved quality after the upgrades to the facilities. Based on a report by Pima County and the Sonoran Institute titled “a living river” for the 2014 water year, all water quality measures improved or remained similar to 2013.

### Man-made Features

One of the key man-made features of the El Rio Preserve is an earthen flood berm along the Santa Cruz River. Twice in the recent past (2014 and 2016), the berm has been breached by flood events that bring large amounts of water into the former gravel pit area. During an initial visit to this property, approximately 60% of the 104 acres were inundated from the recent flood event (see photos below). According to the “a living river” report referenced in the previous section, in 2014 about 28% of measured streamflow came from storm water, most during the summer monsoon. An important project (Goal #8, Objective #1) is to restore and maintain this berm to prevent future flooding from the Santa Cruz River, whether from effluent or storm water.



Photos 6 and 7. The former gravel pit area of El Rio Preserve inundated with flood water from the Lower Santa Cruz River, photos taken on March 7, 2017.

### Neighbor Interaction

With its close proximity to residential development on two sides, the involvement of the community is essential to the success and upkeep of this property. Community engagement

## Forest Stewardship Plan

has been ongoing, with over 400 people responding to an online survey about El Rio Preserve. The objectives that were most important to people were: (1) riparian rehabilitation/flood control, (2) environmental education, and (3) mosquito prevention and trash prevention. In addition to the survey, two stakeholder meetings, a neighborhood meeting (held on 10/24/16), and a meeting with educators – were held to gather information about people’s values and uses of the area.

### Range

This property is not being used for domestic livestock grazing, but consideration has been given to include the grazing of livestock as a vegetation management tool. Depending on the property, and management objectives, livestock such as cattle, goats, and sheep can be used to reduce fine fuels (grasses and forbs), invasive plants, and regrowth on shrubs that are palatable. For instance, goats have been used to browse shrubs to reduce fuel loads, but this requires active herding of the animals and other considerations. Town of Marana staff has talked about using goats to graze cocklebur and small tamarisk plants, especially once poison hemlock is effectively controlled. Grazing of this sort is best achieved by high intensity-short duration grazing, where animals are on the land for a relatively short period of time in moderate numbers.

### Recreation

Recreation is an important consideration in the future improvement of El Rio Preserve. Walking, bird watching and photography will be some of the primary activities promoted through the development of trails/paths and seating areas. Just recently, a parking lot was completed near the southwest corner of the property to allow visitor parking.

Plans are to develop a ½ mile elevated path (or boardwalk) that is ADA-compatible and a 1-mile walking trail accessible from the parking lot (Goal #6, Objective #4). Large existing trees (like Athel) could be used as shade and focal points for gathering spaces with seating and interpretation. Elevated boardwalks could pass through low-lying areas of periodic water, and mounds and high points provide views and opportunities for shelters and interpretation. Shade will be an important feature of this property, whether natural from trees, or man-made from structures.

### Soils

The USDA Natural Resources Conservation Service (NRCS) offers an online Web Soil Survey ([www.websoilsurvey.nrcs.usda.gov](http://www.websoilsurvey.nrcs.usda.gov)) that provides soil survey information for a specific area of interest. This tool was used to determine the major soil types and their characteristics. Based on the Web Soil Survey, there are three main soil map units:

- (1) Grabe loam,
- (2) Gila loam, 0 to 1 percent slopes, and
- (3) Grabe silty clay loam.

## Forest Stewardship Plan

The first map unit is most common, and represents approximately 38% of the property. The second and third soil types make up about 26% and 22%, respectively. Attached is the Web Soil Survey map and associated soil unit descriptions (**Appendix D**).

Overall, the three main soil map units are similar in their chemical and physical characteristics. They occur on floodplains composed of recent alluvium parent material. Depth to a restrictive feature (such as bedrock) is more than 80 inches, and the natural drainage class is well drained. Interestingly, these soils are prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season. In terms of chemical properties, the soils are non-saline to slightly saline, with a maximum of 10% calcium carbonate in the soil profile. Available water storage in the soil profiles is high, with around 9 to 10 inches per soil type.

### Threatened & Endangered Species

Given the limited area of riparian and wetland habitat in Arizona, this property could serve as important habitat for threatened and endangered species of birds and fish. The Endangered Species Act (ESA) of 1973 defines endangered as “any species which is in danger of extinction throughout all or a significant portion of its range.” Threatened is defined as “any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.” The ESA gives the U.S. Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species and their Endangered Species Program works in cooperation with public and private partners to conserve endangered and threatened species and the ecosystems upon which they depend.

Arizona Game and Fish Department (AGFD) provides an online Environmental Review Tool ([www.azgfd.gov/hgis](http://www.azgfd.gov/hgis)) that is preliminary environmental screening tool for various land management and development projects (including land management plans). This tool utilizes the AGFD Heritage Data Management System (HDMS) that contains information about plant and animal species occurrences that have been reported. As part of the development of this management plan, the subject land was entered into the Environmental Review Tool (entered on 3/13/17). In the report (**Appendix E**), a total of fourteen (14) special status species and special areas are documented within 5 miles of the property.

The special status species are as follows:

Common name:

Pima Indian Mallow  
Golden Eagle  
Yellow-billed Cuckoo  
Fulvous Whistling-Duck  
Cactus Ferruginous Pygmy-owl  
Sonoran Desert Tortoise  
Thornber Fishhook Cactus  
Cave Myotis

Scientific name:

*Abutilon parishii*  
*Aquila chrysaetos*  
*Coccyzus americanus*  
*Dendrocygna bicolor*  
*Glaucidium brasilianum cactorum*  
*Gopherus morafkai*  
*Mammillaria thornberi*  
*Myotis velifer*

## Forest Stewardship Plan

Staghorn Cholla  
Tumamoc Globeberry

*Opuntia versicolor*  
*Tumamoca macdougalii*

Of the special status species listed above, only the Yellow-billed Cuckoo is a federally listed species, and is considered threatened. The Yellow-billed Cuckoo prefers desert riparian woodlands composed of willow, cottonwood, and mesquite for breeding habitat. Population declines of this species are the result of native riparian habitat loss and degradation from human activities. **Appendix F** is a fact sheet (March 2011) on the Southwestern Willow Flycatcher and Yellow-billed Cuckoo from the Lower Colorado Multi-Species Conservation Program. The fact sheets provide detailed descriptions and photos of the prominent features.

The Southwestern Willow Flycatcher, a federally listed endangered species, also prefers desert riparian areas composed of willow, cottonwood, and mesquite for breeding habitat. They commonly arrive in late-April and spend the summer nesting and raising young. With the decline in native willow trees, these birds are now using saltcedar for nest trees. Southwestern Willow Flycatchers prefer large patches of dense vegetation near water, and are unlikely to use El Rio Preserve. Southwestern Willow Flycatcher and Yellow-billed Cuckoo surveys were conducted in 2017, and none were detected. A second year of surveys will be completed in 2018.

The Sonoran Desert Tortoise is listed as Candidate Conservation Agreement (CCA), meaning that there is a formal, voluntary agreement between the USFWS and one or more parties to address the conservation needs for species likely to become candidates for listing. The remaining species are Species of Concern (SC) whose conservation status may be of concern to the USFWS, but doesn't have official status.

And the special areas in the report are:

Bat Colony  
Coyote – Ironwood – Tucson Linkage Design Wildlife Corridor  
Tucson – Tortolita – Santa Catalina Mountains Linkage Design Wildlife Corridor

Bat colonies are likely to occur in the nearby mountains that are a northern extension of the Tucson Mountains and Saguaro National Park. Certainly, the presence of the surface water at El Rio Preserve is used by bat species, which swoop over the water to catch insects, commonly as dusk. The development of two pond sites will provide good habitat for bats, including the Cave myotis (*Myotis velifer*). Cave myotis and Mexican free-tailed bats (*Tadarida brasiliensis*) roost in large numbers in the Ina Road bridge, just a few miles to the south of El Rio Preserve (personal communication, Janine Spencer).

The two wildlife linkage corridors, referenced above, highlight the importance of connections between wildland blocks (or mountain ranges) for focal species in the area. Focal species are species chosen to represent the needs of all wildlife species in the linkage planning area. El Rio Preserve is located within the Tucson – Tortolita Linkage of the Tucson -

## Forest Stewardship Plan

Tortolita – Santa Catalina Mountains Linkage Design Wildlife Corridor. A report to the Arizona Game and Fish Department titled *Arizona Missing Linkages: Tucson – Tortolita – Santa Catalina Mountains Linkage Design* by the School of Forestry at Northern Arizona University (Beier et al. 2006) provides details on the wildlife corridor. The Tucson wildland block includes the Tucson Mountains of the west side of Tucson, and the Tortolita wildland block includes the Tortolita Mountains, a small mountain range north of Tucson. Beier et al. (2006) recommend eradicating non-native invasive plants and increasing native riparian vegetation, among other actions, to improve riparian connectivity.

It is important to note that the above information is not a substitute for having a biologist conduct a field survey of the property (Appendix E, Disclaimer 2, page 2). Further, the occurrence of wildlife species changes with the seasons and environmental conditions. The Environmental Review Tool, in addition to providing documented species within a defined area, provides recommendations and resources available to private landowners. For example, there is a recommendation to minimize the potential introduction or spread of exotic invasive species. Further, there is information about the AGFD's Landowner Relations Program available to private landowners to enhance or restore wildlife habitat. A Biological Evaluation/Assessment was completed by a wildlife biologist and reviewed by the AGFD and the U.S. Fish and Wildlife Service (Spencer January 2017).

For detailed information on species and classifications, please see the appendices at the end of the management plan – Arizona Environmental Online Review Tool Report (Appendix E) and a list of federal, tribal and state status definitions (**Appendix G**) that pertain to the AGFD HDMS.

### **Timber & Wood Products**

The El Rio Preserve does not contain any harvest-grade timber, but has potential to grow productive mesquite trees. Mesquite is a slow burning hardwood excellent for grilling and fuelwood, but will not be harvested. It is advisable to make this known to the public through signage or brochures.

### **Water**

Presently, there are two sources of water to the El Rio Preserve, outside of direct rainfall. The first is storm water drainage from the nearby streets and residential development. There are several storm water drainage channels from adjacent neighborhoods into the property along the west and south sides. Based on site visits, these channels are either lined with concrete or rip rap rock, and most have rock at the outlet to dissipate the energy of the water and prevent scour.

The second source of water is the Santa Cruz River, which has a flowing channel of treated effluent water but also storm water runoff. During flood events, as discussed previously, flood waters have broken through the berm and inundated the property. With this water, sediment, trash and woody debris are deposited on site. Below are two photos from August 2017, showing only a portion of the area covered in debris. Once the berm is restored, the

## Forest Stewardship Plan

flooding on El Rio Preserve should be limited to rare events. It remains to be determined the source of water for the two ponds, one idea is to secure a stable supply of water from a local irrigation district.



Photo 8. Sediment, woody debris and trash deposited from past flood events.

### **Wetlands**

Two lined ponds are planned for development on the El Rio Preserve, one in the southwest corner and one in the southeast corner. As discussed above in the *Recreation* section, a path/trail will be constructed and maintained to provide access to the ponds. A permanent and reliable water source for these ponds will need to be secured, given the high rates of evaporation in a desert environment. Some possible alternatives for water include the local irrigation district or a Town of Marana municipal source.

## Forest Stewardship Plan

### Proposed Forest Management Schedule

Date	Priority	Feature	Activity Practice
5/1/2018	High	Stand-Flood area	Invasive Species Inventories
5/1/2019	Low	Stand-Santa Cruz River	Invasive Species Inventories
9/3/2019	High	Stand-Flood area	Chemical / Mechanical / Physical Invasive Species Control
7/31/2019	Critical	Stand-Flood control berm	Watershed Resources Structural Improvement
5/1/2020	Medium	Stand-Pond 1	Wildlife Habitat Water development
5/1/2021	Medium	Stand-Pond 2	Wildlife Habitat Water development
1/1/2020	Medium	Stand-Flood area	Trail Construction

### General Stand Information

Stand Name	Acres	Key native plant species	Resource Concerns
Flood area	72.77	Mesquite, Goodding willow, Fremont cottonwood	<p>DEGRADED PLANT CONDITION – Excessive plant pest pressure (Invasive species compete with native riparian species)</p> <p>WATER QUALITY DEGRADATION – Excessive sediment in surface waters (flooding from Santa Cruz River and erosion scour)</p>
Santa Cruz River	20.24	Mesquite, Goodding willow, Fremont cottonwood	DEGRADED PLANT CONDITION – Excessive plant pest pressure (Invasive species compete with native riparian species)

# Forest Stewardship Management Plan

## STAND DESCRIPTIONS AND MANAGEMENT

Stand	Flood area		
Acres	72.77	Road Access?	No



**Stand Map**

### Forest Management Schedule

Date	Priority	Activity Type	Activity Practice
5/1/2018	High	Forest Health	Invasive Species Inventories
9/3/2019	High	Forest Health	Chemical/Mechanical/Physical Invasive Species Control
1/1/2020	Medium	Recreation	Trail Construction

### Stand Details

<b>Dominant Cover Species</b>	Athel / Mexican Palo verde / velvet mesquite / Goodding willow
<b>Accessible by Road?</b>	No

### Stand Description

Over the past year, much of this area has been inundated with floodwater from the Santa Cruz River. As the water recedes, invasive species inventories and chemical/mechanical/physical control should occur. The following invasive species should have inventories completed – giant reed, buffelgrass, saltcedar, and poison hemlock. They are the priority for control using a combination of chemical, mechanical and physical control methods.

## Forest Stewardship Management Plan

### Existing Resource Conditions: Flood area

#### Dominant Vegetation

The primary tree species are Athel, velvet mesquite, Mexican palo verde and Goodding willow. Additional species include numerous grasses, forbs, and shrubs such as desert broom, saltbush and several species of cacti in the upper drier parts. Saltcedar is very common, and is mostly small and shrub like along areas that have been, or are recently flooded.

#### Man-made Features

The flood control berm is the focal man-made feature. It was breached in 2014 and 2016 and is slated to be restored to prevent future flooding of El Rio Preserve. The effective repair of this berm will also clear the way for the development of two ponds, trails and other features.

#### Water

Seasonal inundation has been the norm for the past several years, with the berm in disrepair. In early 2017, the property was approximately 60% inundated. Flood flows include sediment, trash, and woody debris.

#### Fish and Wildlife

This property is becoming important wetland habitat for birds and other wildlife species. Some of the types of birds seen include cormorants, herons, sandpipers, ducks and egrets. The larger willow trees are important nesting sites for birds and serve as perches for raptors.

#### Invasive Species

The flood area contains many invasive species, with saltcedar being the most abundant and widely distributed. Other invasive species include buffelgrass, giant reed and poison hemlock, which is highly toxic. These three species were ranked high in Table 1 (page 19) as having severe impacts on ecosystems, plant and animal communities, and vegetation structure. Giant reed and poison hemlock are not widely distributed and should be controlled while infestations are isolated and small. Cocklebur occurs in large patches, and some areas will need to be treated along pathways.

#### Fire

Dense patches of saltcedar pose a high fire threat, and should be treated to break up both vertical and horizontal fuel continuity. Other trees, such as Athel, velvet mesquite, and Mexican palo verde can be selectively trimmed to prevent a surface fire from carrying upward. At present, saltcedar poses the greatest fire threat to this area, and should be controlled when they are seedlings or saplings.

### Desired Resource Conditions: Flood area

# Forest Stewardship Management Plan

## Dominant Vegetation

Large and established Athel trees would be kept for shade and wildlife use. Velvet mesquite, which provides beneficial wildlife food (mesquite beans), would be a significant portion of the tree canopy on the drier sites. Willows, which grow large and provide good nesting sites, would be the primary tree along the edges of water. Cottonwoods, of which there is currently one grouping, would remain in place along the edge of the active river channel.

## Man-made Features

The berm would be restored, and able to control flooding thus minimizing damage to the paths/trails and other amenities like elevated boardwalks and interpretive signs. Very large flood events will still inundate the site; bank protection will be designed through Pima County Regional Flood Control District, and is expected to control up to 25-year flood events.

## Water

Flooding from the Lower Santa Cruz River would be reduced, and a stable water supply is secured for the two pond sites. Both ponds are aerated to control mosquitoes and maintain water quality and dissolved oxygen. Treated effluent would still run in the active channel along the north edge of the property. This would sustain a riparian gallery forest of cottonwoods and willows, with some mesquite present. It is also planned to have water run from the southeast pond to the southwest pond, through an arroyo that is planted with native trees and shrubs. Two walking path bridges will cross the arroyo.

## Recreation

El Rio Preserve provides beautiful views, native vegetation, seating, and interpretation of the unique biological and environmental features of riparian areas and wetlands. School groups and others can enjoy learning about wildlife habitat, water quality, and native and non-native plants and animals and their adaptations.

## Invasive Species

High impact invasive plant species like giant reed, buffelgrass and poison hemlock are eliminated, or present at low levels, and these plant species are monitored and controlled on an annual basis. New infestations of invasive species are documented, and controlled in a rapid response approach.

## Fire

The threat of wildfire is low, due to the planting of native vegetation and designed fuel breaks from the ponds and walking paths. Were a fire to occur, it would be a surface fire with low flame lengths and easily contained using hand crews.

## Management Activities: Flood area

Activity	Invasive Species Inventories
----------	------------------------------

## Forest Stewardship Management Plan

<b>Priority</b>	High
<b>Date Recommended</b>	5/1/2018
<b>Start Year</b>	2018
<b>End Year</b>	2028
<b>Quantity</b>	61
<b>Frequency</b>	Annually

### Activity Description

Invasive species inventories are important for early detection; it is important to recognize invasive plants before they become established. Once a plant has set seed or become established, the effort needed to manage the plant steadily increases. Also, known infestations must be documented and mapped so they can be contained and prevented from spreading to uninfested areas.

Town of Marana staff, along with assistance from other partner agencies or organizations, and/or the DFFM Service Forester, could conduct invasive species inventories annually in late-April or early-May and mid- or late-August. These are the periods when many species are flowering and can be identified and recorded. As stated above, inventories of invasive species should include checking for newly-established invasive plants that were not observed or documented in prior years, and assessing the size or extent of existing populations. An invasive plant reporting form should be developed and utilized for these inventories.

At the very least, an invasive plant reporting form should include the following information:

- Plant identification (genus, species, common name)
- Observer name and date observed
- Location (for instance, GPS coordinates)
- Description of population (number of plants, phenology – are the plants in flower, in fruit, seedlings, etc.)
- Site description
- Control method used\* or planned

\*just a few individuals of a species, if appropriate, could be treated at the time of survey

<b>Activity</b>	<b>Trail Construction</b>
<b>Priority</b>	Medium
<b>Date Recommended</b>	1/1/2020
<b>Start Year</b>	2020
<b>End Year</b>	2021
<b>Quantity</b>	1
<b>Frequency</b>	Once

## Forest Stewardship Management Plan

### Activity Description

Town of Maran staff, or a contractor, will build a 1-mile natural trail and a 0.5-mile ADA-accessible pathway with the preserve. The path/trail could include elevated boardwalks to pass over areas that are inundated, but not subject to high flows.

Activity	Chemical / Mechanical /Physical Invasive Species Control
Priority	High
Date Recommended	9/3/2019
Start Year	2019
End Year	2028
Quantity	20
Frequency	Annually

### Activity Description

This activity calls for the use of chemical, mechanical or physical control methods on invasive plant species. Below is the same information from Table 1 (Page 19) with a new column – treatment recommendation. Two treatment recommendations are provided – Control immediately or Monitor population. Giant reed should be controlled immediately, as it is isolated to distinct patches that are easy to identify and access. Buffelgrass and saltcedar should also be controlled immediately – these are highly invasive species that grow and spread rapidly. Additionally, poison hemlock should be controlled immediately; it is limited in numbers and could be a concern as public use increases. The remaining species should be monitored to determine their extent and best control method(s).

Table 2. Summary of overall rank and treatment recommendation for invasive plants at El Rio Preserve

Plant name	Overall rank	Treatment recommendation
Giant reed*	High	Control immediately
Red brome*	High	Monitor population
Buffelgrass*	High	Control immediately
Saltcedar*	High	Control immediately
Sahara mustard*	Medium	Monitor population
Poison hemlock*	Medium	Control immediately
Bermuda grass	Medium	Monitor population
Johnsongrass	Medium	Monitor population
Athel	Low	Monitor population
Common cocklebur	<i>Not evaluated</i>	Control immediately

## Forest Stewardship Management Plan

\*Field guides for managing these species are available from the USDA Forest Service and are provided as Appendices.

Below is a summary of treatment options for each species listed above, in the order they are listed in the table:

### Giant reed

It is recommended to control this species immediately. As the name implies, giant reed can grow 20 to 30 feet tall and is not easily managed once it reaches this size. In general, hand removal is very difficult on established populations, but digging can be used for small groups of plants (usually < 10 feet tall). Larger groups of plants could be removed mechanically with a backhoe, excavator, etc. but complete root removal is necessary for effective control.

Chemical control is also an option for giant reed control, when infestations are more widespread, or difficult to access with machinery or hand tools. According to the *Field Guide for Managing Giant Reed in the Southwest* (September 2014), provided as **Appendix H**, the most effective treatment to control giant reed is to spray a foliar systemic herbicide when plants are green and actively growing. Further, control efforts will usually require 3 to 5 years of persistent, repeated treatment.

Fortunately, giant reed is not widespread on El Rio Preserve so controlling it is feasible. During August 2017 a survey by the Service Forester recorded eight (8) patches of giant reed. These patches range in size, and a description of each is provided below, along with other information and photos of two small patches. Additionally, a map of the giant reed patches based on GPS points is included as **Appendix I**.

Patch	Description of population	Site description and GPS coordinates (UTM format)	Control method recommended	Photo
1	Large	Along flowing river channel 0487041, 3584416	Mechanical removal or herbicide	N/A
2	Small	Open area surrounded by Bermuda grass 0487176, 3584233	Hand removal	See below
3	Medium	Open area – two patches combined as one 0487260, 3584199	Hand or mechanical removal	N/A
4	Medium	Along flowing river channel 0487286, 3584254	Mechanical removal or herbicide	N/A
5	Small	Along the edge of flood zone 0487444, 3584178	Hand or mechanical removal	N/A
6	Large	Two large patches	Mechanical removal	N/A

## Forest Stewardship Management Plan

		combined as one 0487116, 3584176	or herbicide	
7	Small	Growing under a group of cottonwood trees 0487137, 3584318	Hand removal (no herbicide to protect cottonwoods)	N/A
8	Small	Open area surrounded by sand 0487592, 3584100	Hand removal	See below



Photos 9 and 10. Giant reed patch 2 (left) and patch 8 (right) are recommended for immediate removal with hand tools.

Control of giant reed should be the priority for this property. Left unchecked, these isolated populations could expand as water moves based on flooding and rainfall events. Three of these patches are currently small, and could be removed with hand tools, provided that the root material is also dug out.

### Red brome

At this point, it is recommended to monitor red brome. As an annual, these plants are dependent on fall and winter rains to establish. This exotic grass is now naturalized across the western U.S. and can be a fine fuel fire hazard. As with some of the other invasive species, it is important to detect and eradicate new populations of red brome as early as possible.

**Appendix J** is the *Field Guide for Managing Red Brome in the Southwest*, and it summarizes some management options for red brome under various situations. As the population is monitored by Town of Marana staff, manual methods, such as hoeing for hand pulling of small infestations may be effective to remove red brome plants before they produce seed.

## Forest Stewardship Management Plan

### Buffelgrass

Buffelgrass forms continuous patches on El Rio Preserve, and should receive immediate control to prevent further spread. For buffelgrass, either manual pulling/digging or herbicide application is recommended. Pulling is an effective control method that can be used year-round, but it is easiest when the soil is moist after a rain. Uprooted buffelgrass plants could be bagged and removed from El Rio Preserve, or thatching is an option. Thatching is laying the pulled plants down in a layer over the ground where buffelgrass was pulled, and has been shown to inhibit seedling establishment after the pull

(<https://www.desertmuseum.org/buffelgrass/control.php>, site accessed on 6/14/17).

On larger infestations, glyphosate application is an effective treatment if no desirable species are present. A rate of 2.25 lbs. of ae/ac is recommended in the *Field Guide for Managing Buffelgrass in the Southwest*, provided as **Appendix K**. The concern with glyphosate is the herbicide is non-selective and will kill desirable vegetation, including forbs and woody species if directly contacted during treatment.

### Saltcedar (seedlings/saplings)

Initial emphasis should be placed on young saltcedar plants, seedlings and saplings that can be controlled in the early stages of growth. Hand removal by hoeing or digging can be used to target individual plants in relatively small areas, like around the edges of inundated areas as they dry up. During hand removal, the entire root crown and associated layer roots must be completely removed from the soil. Uprooted material could be bagged and hauled away, or stacked on high dry ground and allowed to decompose. Below are two photos of a profusion of saltcedar seedlings that germinated in late-2017 when the inundated areas dried up.



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Photos 11 and 12. An abundance of saltcedar seedlings in what will become Pond 2 in the southeast corner of the property, photos taken on November 17, 2017.

Herbicides are a primary method of saltcedar control, given the density of plants often encountered in riparian areas. A chemical control method for saltcedar seedlings/saplings less than 5 feet in height is foliar spray. Ground application of 1% Imazapyr solution can be made during weather conditions of low wind, high relative humidity, and low air temperature. After treatment, the top growth should be left alone for at least two years. If herbicides are not the preferred option, goats may be used to suppress young salt cedar plants.

### Saltcedar (shrubs/trees)

Established saltcedar shrubs/trees should be removed from El Rio Preserve as riparian/wetland habitat is enhanced and trails are built. As stated in Goal #4 for the property, the plan is to monitor and remove invasive non-native species except for large, established trees. Athel, also called Athel pines in Australia, are large trees that provide ample shade and can serve as gathering spaces with seating and interpretation. Planning efforts should be made to identify these as “leave trees” during removal efforts. Colored flagging wrapped around the trunk is a temporary means to mark leave trees while contractors or Town of Marana staff are conducting saltcedar removal work.

Control and restoration of saltcedar infested areas over the long term takes an integrated management approach. Often, this includes several types of control methods used in a sequential manner, over a period of multiple years and re-treatment. Prescribed fire is not recommended for long-term management as saltcedar is fire adapted and re-grows rapidly. Mechanical methods to control saltcedar include plant removal using excavating equipment, or clearing saltcedar stands with a bulldozer. Clearing saltcedar stands with machinery often involves repeated applications to control regrowth, if the root system is left intact. Control methods that target the root system provide the most effective control.

Saltcedar can be controlled using either non-chemical or chemical methods. Non-chemical control methods are mowing, chopping and disking using machinery. Herbicides have been used to control saltcedar, either by aerial application or applied directly to cut stumps. Cut stump treatments can be highly effective, if the application occurs without delay after cutting. Included is **Appendix L**, a Weed Report on saltcedar written by the Weed Research and Information Center, University of California. Details on different herbicide types, rates, and timing are provided.

Herbicides are a principal method of controlling established saltcedar plants. A cut-stump method is often used when there is a need to protect non-target vegetation, such as native trees and shrubs. The treatment involves hand cutting or chain sawing the saltcedar trunk or stem(s) as close to the ground as possible, and applying herbicide to the cut stump surface. Herbicide can be applied to the cut stump surface by paintbrush, hand-held spray bottle, or backpack sprayer. The cut surface should be level to reduce runoff of the liquid herbicide, and

## Forest Stewardship Management Plan

any residual sawdust should be removed prior to herbicide application. Both the *Pima County Community Wildfire Protection Plan* and *Field Guide for Managing Saltcedar in the Southwest* (**Appendix M**) recommend an application within 15 minutes of cutting. A blue indicator dye should be added to the spray mixture to show prior treatment of stumps.

### Sahara mustard

Early and effective control of Sahara mustard is important, as a single plant can produce up to 9,000 seeds. Similar to red brome, Sahara mustard uses fall and winter soil moisture and can develop dense stands. In the early growth stage, the plants are a large basal rosette with leaves 3-12 inches long that are deeply lobed and toothed. This is the most effective stage for control efforts. This plant was observed at El Rio Preserve, but in limited areas. Monitoring will be important to detect this species, especially when there has been sufficient fall/winter rainfall. **Appendix N** is the *Field Guide for Managing Sahara Mustard in the Southwest*, and states that physical control methods used consistently and repeatedly are effective.

### Poison hemlock

Poison hemlock only reproduces via seed production, so the plant should be removed before flowering. During a field visit on 5/3/17, Poison hemlock was flowering, so treatment should occur in March or April to be effective. Treatment options include hoeing or digging for smaller, isolated populations; uprooted material should be bagged and removed since it is highly toxic. Protective clothing (long pants, long-sleeved shirt, and gloves) should be worn by volunteers or workers controlling this plant. The *Field Guide for Managing Poison Hemlock in the Southwest* is provided as **Appendix O**.

### Bermuda grass

Common throughout the state, Bermuda grass is hard to eradicate except by frequent cultivation or complete shading. It spreads by aboveground stolons and belowground rhizomes, making it a superior colonizer of open areas of disturbed soil. It is recommended to monitor the population on this property, as opposed to control, since it does provide effective soil stabilization. Any control efforts should be on new populations in areas where native plant establishment is ongoing.

### Johnson grass

According to the U.S Forest Service publication *Invasive Plants and Weeds of the National Forests and Grasslands in the Southwestern Region*, Second Edition, December 2013, one Johnson grass plant can produce up to 295 feet of rhizomes in a single season. Hand-pulling is not an effective control method, especially for large mature plants with extensive rhizomes. Digging is best when the soil is moist and rhizomes are less likely to break during removal. Effort should be made to preventing the production of seed and the spread of rhizome fragments from infested to uninfested areas of El Rio Preserve. Based on field visits, Johnson

## Forest Stewardship Management Plan

grass can be found growing along the perimeter of inundated areas. A good resource on non-chemical and chemical control of Johnson grass is provided as **Appendix P**.

### Athel

Athel was ranked low by the *Arizona Wildlands Invasive Plant Working Group* (see Table 1, page 18) in terms of overall threat to wildlands. Of the 10 invasive plant species, it is of least concern and not targeted for control (see Goal #4, page 5). Instead, the large trees can be left in place for shade and could be pruned as needed near trails and other features. One consideration with Athel, as with all *Tamarix* species, is the tamarisk leaf beetle (*Diorhabda carinulata*) that is expected to spread in Arizona over the next several years. Defoliation of Athel trees would diminish their value as shade and nesting trees.

Saltcedar leaf beetles (*Diorhabda* spp.) were released into the U.S. as biological control agents by the U.S. Department of Agriculture (USDA) and Agriculture Research Service (ARS). They were selected for release because they feed exclusively on *Tamarix* spp., providing direct control. Both adult and immature saltcedar leaf beetles feed on saltcedar and athel, and this could impact the mature athel trees at El Rio Preserve. There are methods for controlling saltcedar leaf beetle infestations on athel. **Appendix Q** discusses curative and preventative cure methods, and the use of insecticides that can be applied to foliage or soil. In the case of soil applications, the tree roots would absorb and circulate the insecticide to the leaves.

### Common cocklebur

Neither grazing or burning is considered an effective control option for cocklebur, and the seeds and foliage contain a compound that can be fatally toxic to livestock (DiTomaso and Kyser 2013). Cocklebur produces large burs covered with hook-tipped prickles that may stick to clothing or animal fur, and therefore needs to be controlled along pathways. This plant reproduces by seed, so control is most effective before the burs develop.

Effective control options for cocklebur include hand pulling on small infestations, and mowing or disking at the early-flowering stage. A secondary mowing treatment may be needed, to control re-sprouts if conditions support further growth. Chemical control is another control option, and **Appendix R** provides rate and timing information for three types of herbicides: (1) growth regulators, (2) aromatic amino acid inhibitors (Glyphosate), and (3) branched-chain amino acid inhibitors.

## Forest Stewardship Management Plan

<b>Stand</b>	<b>Santa Cruz River</b>		
Acres	20.24	Road Access?	No



**Stand Map**

### Forest Management Schedule

Date	Priority	Activity Type	Activity Practice
5/1/2018	High	Forest Health	Invasive Species Inventories

### Stand Details

<b>Accessible by Road?</b>	No
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### Stand Description

This stand is roughly 20 acres of riparian habitat associated with the Santa Cruz River that transports effluent water. As depicted in the stand map, there is additional riparian and floodplain area north of the property boundary. The Santa Cruz River bed is under the jurisdiction of Pima County Regional Flood Control District and is not managed by the Town of Marana.

### Existing Resource Conditions:    **Santa Cruz River**

#### Dominant Vegetation

The dominant vegetation in this stand is saltcedar, with Athel being the largest tree species.

#### Water

Water in the active channel comes from both the Agua Nueva and Tres Rios water reclamation facilities. In 2013, an upgrade to the facilities improved the quality of water released into the

## Forest Stewardship Management Plan

Lower Santa Cruz River upstream of El Rio Preserve. Year-round water supports a band of trees of both sides of the channel.

### Invasive Species

In the absence of cottonwoods and willows, saltcedar and Athel are the most common invasive species.

## Desired Resource Conditions: Santa Cruz River

### Dominant Vegetation

Native riparian vegetation in this stand would consist of seep willow, cottonwood and willow along with cattails in areas that hold water consistently.

### Water

Perennial or near-perennial water flowing through this stand would help promote the native riparian vegetation listed above.

### Invasive Species

Saltcedar and giant reed would not be common if native riparian vegetation was established, but it would still be necessary to monitor and control any new invasive plants.

The desired resource conditions on the Santa Cruz River stand of this property can be secondary to needed work in the flood area stand. Further, any work in this area would fall under the jurisdiction of Pima County Flood Control District. They are currently in the early stages of creating a Santa Cruz River Management Plan, so the management activity recommended below should be considered low priority and optional until the plan is complete.

## Management Activities: Santa Cruz River

Activity	Invasive Species Inventories
Priority	Low
Date Recommended	5/1/2019
Start Year	2019
End Year	2028
Quantity	20
Frequency	Annually

### Activity Description

Town of Marana staff, along with assistance from other partner agencies or organizations, and/or the DFFM Service Forester, could conduct invasive species inventories annually in late-

## Forest Stewardship Management Plan

April or early-May and mid- or late-August. These are the periods when many species are flowering and can be identified and recorded. As stated above, inventories of invasive species should include checking for newly-established invasive plants that were not observed or documented in prior years, and assessing the size or extent of existing populations. An invasive plant reporting form should be developed and utilized for these inventories.

At the very least, an invasive plant reporting form should include the following information:

- Plant identification (genus, species, common name)
- Observer name and date observed
- Location (for instance, GPS coordinates)
- Description of population (number of plants, phenology – are the plants in flower, in fruit, seedlings, etc.)
- Site description
- Control method used or planned

## Forest Stewardship Management Plan

### LINE FEATURES MANAGEMENT

Line	Flood control berm	Santa Cruz River
Length(feet)	0.28	Width(feet)



**Line Feature Map**

#### Management Schedule

Date	Priority	Activity Type	Activity Practice
5/1/2019	Critical	Soil and Water	Watershed Resources Structural Improvement

#### Management Activities: Flood control berm

Activity	Watershed Resources Structural Improvement
Priority	Critical
Date Recommended	7/31/2019
Start Year	2019
End Year	2020
Quantity	1
Frequency	Once

#### Activity Description

This activity is to restore the berm that separates El Rio Preserve from the Santa Cruz River and prevents seasonal flooding. The berm was last breached in early 2017 and shortly thereafter

## **Forest Stewardship Management Plan**

roughly 60% of the property was inundated. Marana was awarded \$35,000 by the Water Infrastructure Financing Authority (WIFA) for grading and landscaping plans around the proposed ponds and arroyo between them. Marana has also applied to Pima County Regional Flood Control District for berm/bank protection and the bank protection project is scheduled by Pima County for design beginning in August 2018 and construction beginning in August 2019 to be completed by 2020. Bank protection will be designed to control at least 25-year flood events. Larger storm events are still expected to inundate the site.

# Forest Stewardship Management Plan

## POINT FEATURES MANAGEMENT

<b>Point</b>	<b>Pond 1</b>	<b>Southwest corner of property (Ruddy duck pond)</b>
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**Point Feature Map**

**Management Schedule**

Date	Priority	Activity Type	Activity Practice
5/1/2020	Medium	Fish and Wildlife	Wildlife Habitat Water development

**Management Activities: Pond 1**

<b>Activity</b>	<b>Wildlife Habitat Water development</b>
<b>Priority</b>	Medium
<b>Date Recommended</b>	5/1/2020
<b>Start Year</b>	2020
<b>End Year</b>	2020
<b>Quantity</b>	1
<b>Frequency</b>	Once

**Activity Description**

Construct a 5-acre pond with a 0.5-acre island in the middle at this location, depending on cost projections. This pond site will be developed into a reliable water source for wildlife, and once established, can be stocked with fish or amphibians in consultation with AGFD and USFWS. The pond would be developed by further excavating the existing low point. It should be noted that

## Forest Stewardship Management Plan

the USDA NRCS conservation practice for a pond (378) can be a useful resource for guidance (**Appendix S**). Vegetation along the perimeter of the pond could include Goodding willow and Fremont cottonwood trees, which will be irrigated, since the pond will be lined at the bottom. Pole planting is an effective strategy to establish these species in areas that have ample soil moisture.

It should be noted that there is a Red river gum (*Eucalyptus camaldulensis*) tree growing along the south end of the Pond 1 site (see photos below). It is native to Australia, and is associated with watercourses there. The tree can grow up to 150 feet tall, and is fast growing. During pond construction, this tree could be kept in place as a focal point or removed in the process. If kept on site, this tree could certainly top 100 feet in height. Tucson's tallest tree is a red river gum just west of the Santa Cruz River on the south side of West Congress Street.



Photos 13 and 14. Left, close-up of the leaves of red river gum; Right, a red river gum tree at the Pond 1 site (photos taken on 8/23/17).

Additionally, there is a small red river gum growing along the east side of the Pond 2 area. This tree could also be kept in place during pond construction and serve as a focal point, or be removed. Removal may be necessary if the tree is within the pond water zone.

<b>Point</b>	<b>Pond 2</b>	<b>Southeast corner of property (Snowy egret pond)</b>
--------------	---------------	--



**Point Feature Map**

**Management Schedule**

<b>Date</b>	<b>Priority</b>	<b>Activity Type</b>	<b>Activity Practice</b>
5/1/2021	Medium	Fish and Wildlife	Wildlife Habitat Water development

**Management Activities: Pond 2**

<b>Activity</b>	<b>Wildlife Habitat Water development</b>
<b>Priority</b>	Medium
<b>Date Recommended</b>	5/1/2021
<b>Start Year</b>	2021
<b>End Year</b>	2022
<b>Quantity</b>	1
<b>Frequency</b>	Once

**Activity Description**

Construct a 2-acre pond at this site. This pond site will be developed into a reliable water source for wildlife and specifically birds, and once established, can be stocked with fish or amphibians in consultation with AGFD and USFWS. The pond would be developed by further excavating the existing low point. It should be noted that the USDA NRCS conservation practice for a pond (378) can be a useful resource for guidance (Appendix S). Vegetation along the perimeter of the pond could include Goodding willow and Fremont cottonwood

## Forest Stewardship Plan

trees, which will be irrigated, since the pond will be lined at the bottom. Pole planting is an effective strategy to establish these species in areas that have ample soil moisture.

## Funding Opportunities

There are funding opportunities available from state and federal agencies, among others, to implement the activities in this plan. Specifically, the invasive species control work and the development of two pond sites could be accomplished with grant funding. The Arizona Department of Forestry and Fire Management's Invasive Plant Grant (IPG) is for the management of invasive noxious plants that threaten forested, woodland, or rangelands areas in Arizona. Below are the details on this grant:

<u>Typical amount</u>	<u>Match</u>	<u>Project length</u>	<u>Due date for application</u>
\$10,000 - \$20,000	50%	1-2 years	November

IPG is offered annually, and eligible applicants include local units of government (counties, municipalities, cities and towns). The 50% match must be from non-federal funds, and the project must be completed within two years. DFFM's Service Forester can assist with the development of a grant application for the treatment of Giant reed, buffelgrass, salt cedar and poison hemlock.

An additional funding source is through the U.S Fish and Wildlife Service's Partners for Fish and Wildlife Program. This grant program could assist with the development of the ponds, and efforts to revegetate with native plants. Through voluntary agreements, the Partners program provides expert technical assistance and cost-share incentives to private landowners to restore fish and wildlife habitats. The landowner is reimbursed after project completion, based on the cost-sharing formula in the agreement. Applications are accepted annually on a rolling basis, and there is no match required (although match can effectively show landowner commitment).

## Summary

Arizona Department of Forestry and Fire Management's Forest Stewardship Program is intended to provide technical assistance and education to forest landowners. The overarching goal is to develop a strategy to set the land in a trajectory to support the healthiest ecosystem possible. The El Rio Preserve property is unique in having a close connection to the Lower Santa Cruz River and its associated riparian area forest. Additionally, it serves as part of the linkage design of a wildlife corridor between two desert mountain ranges.

Overall, the goals and objectives of this plan are directed to enhance and sustain the natural resources of wetlands and riparian areas. Through annual monitoring, control of existing

## **Forest Stewardship Plan**

invasive plant species, the addition of native plants, and two permanent water ponds, the property will support a diverse assemblage of plants and wildlife. Through the creation of two pond sites, and the establishment of desirable native vegetation, this property can provide access to food, cover and water for many wildlife species in the area. Lastly, a trail system and the associated recreational amenities will make this a great public place for outdoor recreation, nature education, and a point of pride for the Town of Marana.

*This plan has been prepared under the Arizona Department of Forestry and Fire Management Landowner Plan Guidelines, USDA/USFS Forest Stewardship Program and the National Association of State Foresters stewardship guidelines. The recommendations were constructed using the most current and available science and best management practices.*

## **References**

Beier, P., E. Garding, and D. Majka. 2006. Arizona Missing Linkages: Tucson – Tortolita – Santa Catalina Mountains Linkage Design. Report to Arizona Game and Fish Department. School of Forestry, Northern Arizona University.



Douglas A. Ducey  
Governor

## Office of the State Forester

### Arizona Department of Forestry and Fire Management



Jeffery C. Whitney  
State Forester

August 24, 2018

Arizona Water Protection Fund Commission  
Arizona Department of Water Resources  
1110 W. Washington, Suite 310  
Phoenix, AZ 85007

Re: Support for the Town of Marana Arizona Water Protection Fund Application

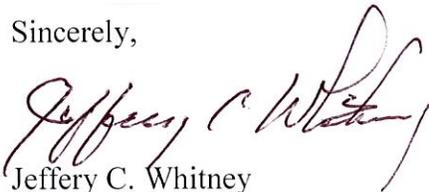
Dear Arizona Water Protection Fund Commission:

The Arizona Department of Forestry and Fire Management (DFFM) has worked closely with the Town of Marana on El Rio Preserve, a 104-acre riparian / wetland property located in the floodplain of the Santa Cruz River. A Forest Stewardship Plan for the property was completed in January 2018 and invasive plant species are among the primary resource concerns. Multiple invasive plant species were identified that cause adverse economic and environmental impacts. Among the species of highest concern are Giant reed, Red brome, Buffelgrass and Saltcedar.

DFFM supports cooperative management of invasive plants that threaten and are capable of transforming plant communities in forests, woodlands and rangelands throughout Arizona. Projects that focus on prevention, control and eradication of invasive plants using an integrated approach are of the utmost importance. With the assistance of state grant funding, the Town of Marana can effectively control invasive plants and make needed changes to enhance this unique property.

The Town of Marana has great plans for El Rio Preserve, with an emphasis on wildlife habitat, native plants and educational opportunities for the public. DFFM is proud to be supportive of this Arizona Water Protection Fund application to protect and restore riparian resources along the Santa Cruz River.

Sincerely,

  
Jeffery C. Whitney  
Arizona State Forester

**Duty ♦ Respect ♦ Integrity**

**Existing Plans, Reports, Information Relevant to the Project  
Summaries and Attached Full-length Reports**

## Summaries of Existing Plans, Reports, and Information Relevant to the Project

- 1) The 100% plans and design for Phase 1 of the El Rio preserve restoration project. The 100% plans and design were completed by Dibble Engineering and Wheat Landscaping firms, with grant funding from the Arizona Water Infrastructure Finance Authority (WIFA). This riparian restoration project will be implemented in phases with a 100% Master plan being used to guide the complete restoration of this riparian habitat. Phase I invasive species removal and native seeding/planting are the tasks the Town is requesting AWPf Grant funding to complete.
- 2) The Cultural Resources Inventory of the El Rio preserve completed by Westland Resources. This Cultural Resources Inventory ensures that this riparian restoration project is in compliance with the United States laws entitled the National Historic Preservation Act (16 U.S.C. 470w-3) and the Archaeological Resources Protection Act (16 U.S.C. §470hh). As well as the Arizona Revised Statute Title 39, section 125.
- 3) Arizona State Historic Preservation Office (SHPO) Review letter completed as part of the WIFA grant compliance requirements. The SHPO Review letter is still applicable for the El Rio preserve project. The SHPO Review letter highlights the survey findings done for the El Rio riparian area by Westland Resources Inc.
- 4) The Forest Stewardship Plan completed by Willie Sommers a Service Forester from the Arizona Department of Forestry & Fire Management. The Forest Stewardship plan identifies numerous non-native and invasive species within the El Rio preserve. Additionally, this plan details the proper management and/or elimination of the non-native or invasive species found within the El Rio riparian area.
- 5) Westland Resources provided a letter summarizing a meeting between the following entities: Pima County Regional Flood Control District, U.S. Army Corps of Engineers, Town of Marana and Westland Resources. The purpose of this meeting was to obtain expertise opinion from the U.S. Army Corps of Engineers on permitting obligations in accordance with Section 404 of the Clean Water Act (CWA) concerning waters of the U.S. The U.S. Army Corps of Engineers determined that CWA permitting was not required for this project.
- 6) The Arizona Department of Environmental Quality (ADEQ) met with Town of Marana representatives to discuss the water shed properties of the El Rio preserve. The attached letter summarizes this meeting as well as ADEQ's recommendations that the Town monitor storm water surges and flooding events in El Rio.
- 7) The Monitoring Plan Riparian Vegetation and Avian Assessment of El Rio Preserve was developed by the Tucson Audubon Society to quantitatively track vegetation and avian species within El Rio during the restoration of the preserve. This monitoring plan will biologically catalog the success of the El Rio riparian restoration.

- 8) A Biological Assessment and Evaluation was completed for the El Rio preserve riparian restoration project for the purpose of identifying endangered or threatened species. This evaluation identified numerous native species that are endangered or threatened and thus should be protected.
- 9) The U.S. Fish and Wildlife Services Online IPaC Project Review tool was completed for the El Rio Preserve Riparian Restoration Project evaluation. The purpose of this evaluation was to identify endangered species and critical habitats.
- 10) The Arizona Game and Fish Department Online Review Tool was completed for the restoration of El Rio Preserve. (Included in Biological Assessment)
- 11) Intergovernmental Agreement between the Cortaro-Marana Irrigation District and the Town of Marana to design and build a turnout to supply water for the El Rio Riparian Restoration Project.
- 12) Water Infrastructure Finance Authority of Arizona letter awarding 1:1 matching grant funding for completion of engineering design and landscaping plans for the El Rio Preserve, dated October 26, 2016.

## El Rio Preserve Key Personnel

Name	Position	Contact Information	Organization Affiliation
<b>Janine Spencer-Glasson</b>	Project Coordinator	<a href="mailto:jspencer@maranaaz.gov">jspencer@maranaaz.gov</a> (520) 382-2658 11555 West Civic Center Dr. Marana AZ 85653	Town of Marana
<b>Kurt Schmidt</b>	Construction Manager	<a href="mailto:kschmidt@maranaaz.gov">kschmidt@maranaaz.gov</a> (520) 382-2692 11555 West Civic Center Dr. Marana AZ 85653	Town of Marana
<b>Jim Conroy</b>	Director of Parks and Recreation	<a href="mailto:jconroy@maranaaz.gov">jconroy@maranaaz.gov</a> (520) 382-1968 13251 North Lon Adams Rd. Marana AZ 85653	Town of Marana
<b>Dave Herman</b>	Superintendent of Parks and Recreation	<a href="mailto:dherman@maranaaz.gov">dherman@maranaaz.gov</a> (520) 382-1955 13251 North Lon Adams Rd. Marana AZ 85653	Town of Marana

## Monitoring Plan Riparian Vegetation and Avian Assessment of El Rio Preserve



*Leaders in conservation  
and education since 1949*

The following proposal for vegetation and avian monitoring program both establishes a baseline habitat condition of the El Rio Open Space and quantifies the results of on-site restoration efforts.

Tucson Audubon suggests the following three surveys: multi-aspect vegetative condition, repeat photography, and avian. For each monitoring type, we outline its specific usefulness to tracking changes on the project that are relevant to project goals and costs for survey implementation, data analysis, and reporting.

Deliverables for each will be a report that accurately conveys baseline conditions, outlines specifics of the protocol for ongoing repeatability of the surveys, compares year to year changes, as well as providing copies of the raw and analyzed data to the project sponsor. This will establish project performance both in the short-term, and make long-term assessment of the project possible.

*Main Office*  
300 E. University Blvd., #120  
Tucson AZ 85705  
TEL 520.629.0510  
FAX 520.623.3476

### 1. **Multi-aspect Vegetation Condition surveys (multi-story percent cover | perennial diversity | perennial species density)**

Within the riparian areas of the project, a multi-storied vegetation community supports the greatest number and density of species. Diverse plant communities tend, within bounds, to support a greater number of species than monocultures. Further, while bare ground is expected within arid ecosystems, large bare areas are more prone to both wind and rain-caused erosion than areas with vegetative cover. Finally, a major component of restoration and revegetation projects includes the management of invasive species which often occur after site disturbance. A list of invasive plant species detected during visits with GPS locations would be provided.

A merged *belt transect + multi-story (under-, mid-, over-) line intercept transect* technique is an efficient method to monitor the habitat functions and constraints listed above. This method provides an accurate assessment of percent cover, as well as density of perennials and non-native, invasive species. This site includes a variety of habitats to be restored, and for accuracy of assessment we propose at least two transects per habitat type. Depending on final decision of the number of relevant habitats to survey, approximately six routes would be established and surveyed twice a year. Transects will be belts, 100m long by 1m wide, located randomly within each habitat type such that they do not cross open water or each other. The best window for conducting these surveys is in late May and again in November when perennials are at their most static form. This minimizes results that only reflect the previous season's rain. Further, annual species are not proposed for inclusion in the surveys as their germination, establishment, and density is purely a function of seasonal rainfall and does not reflect work done at the site. A plant list of all species identified during surveys would also be provided.

Cost: 6 routes (2 upland, 2 open land, 2 forested land), twice a year @ **\$3,000 a year for 3 years is \$9,000**

### 2. **Repeat Photography points**

Photo monitoring points are straightforward to perform and are a powerful and effective tool for communicating project changes, especially to the watching public. They make possible vivid

before/after comparisons and show progress during a project. If approved by the project managers, monuments will be erected at each photo point to ensure accurate photo replication. Photo points will be established at eight points along the project; six will be in the area of restoration and two in the portion of the project without restoration work as a comparison over time. At each point photos will be taken in each cardinal direction from a consistent height with a camera set to the same field of view. Points will be photographed quarterly with photographs each year happening within a week of the first set photo date. Photos will be electronically delivered with names tagging them to each monitoring point and orientation.

Cost: \$500 a year @ **3 years is \$1,500**

### **3. Avian Numbers and Diversity Monitoring**

As a major birding site in southeast Arizona for the last few years that has attracted not only high numbers of aquatic birds but also a surprising number of rarities, being able to track the effects of the project on how birds are utilizing the site, seasonally, is very important. The diversity and density of bird species using the El Rio Open Space before restoration and during the project will be monitored using 10-minute Intensive Point Counts, a standard for the Important Bird Area program in Arizona and used by Tucson Audubon at other restoration projects in the region. This technique not only captures information on shy bird species likely to be missed by the more common 5-minute point count, but also allows for analysis of density of birds on site. Monitoring will take place seasonally to cover crucial seasons in bird life cycle and migration: spring migration, summering, fall migration, and over-wintering for a total of four surveys a year. They will occur within the set survey window each year. After the end of the grant period, efforts will be made to turn the data collection into an ongoing citizen science project using Tucson Audubon volunteers and by encouraging the use of [eBird.org](http://eBird.org) by those birding the project area.

Cost: Avian surveying 4 times a year. \$1,000 a year @ **3 years is \$3,000**. Volunteers could continue to conduct these bird monitoring surveys using Tucson Audubon's extensive base of trained volunteers once the contact work is completed.

**Total for three years for all tasks is \$13,500**

**INTERGOVERNMENTAL AGREEMENT BETWEEN THE  
CORTARO-MARANA IRRIGATION DISTRICT AND THE  
TOWN OF MARANA**

This agreement ("Agreement") is entered into pursuant to Arizona Revised Statutes (A.R.S.) § 11-952 by and between the CORTARO-MARANA IRRIGATION DISTRICT ("CMID"), a political subdivision of the State of Arizona, and the TOWN OF MARANA (the "Town"), an Arizona municipal corporation. CMID and the Town are sometimes referred to collectively as the "Parties" and individually referred to as a "Party."

*RECITALS*

A. The Town is in the process of constructing the El Rio Preserve in the Continental Ranch area (the "Project").

B. The Town wishes to purchase from CMID a supply of Environmental Class Water to be used as the water source for the Project.

C. CMID defines Environmental Class Water as waters used on an environmental project with living organisms (plants), and not for human or animal consumption.

D. CMID owns well facilities and canals in the vicinity of the Project that are capable of supplying Environmental Class Water to the Project.

E. CMID is willing to furnish the Town with a dependable supply of Environmental Class Water for the Project.

F. The Parties find it necessary to enter into an agreement to establish the terms and conditions under which the Parties will fulfill the purposes stated in this Agreement.

*AGREEMENT*

NOW, THEREFORE, based on the foregoing recitals, which are incorporated here as the intention of the Parties in entering into this Agreement, the Parties agree as follows:

1. **Purpose.** The purpose of this Agreement is to establish the duties, obligations, and responsibilities of the Parties concerning this joint and cooperative effort.

2. **Term.** This Agreement shall become effective on the date of the last Party's signature on this Agreement and shall remain in effect until December 31, 2023. The term of this Agreement may be extended by written amendment signed by the Parties.

3. **Termination.** This Agreement may be terminated at any time by either Party upon 90 days' written notice to the other Party.

4. **Source of water.** Water can be supplied from any of the wells that contribute to the CMID pipeline located along the south side of Coachline Boulevard at CMID's discretion.

5. **Water order.** The Town shall notify CMID's office either by telephone or via electronic mail (current email address is [CMID12253@comcast.net](mailto:CMID12253@comcast.net)) of the requested water delivery date, volume, and location (if more than one location has then been established).

6. **Delivery location(s).** CMID shall deliver the water to the Town from its pipeline located along the south side of Coachline Boulevard at one or more locations and with methods mutually agreed upon by CMID's Manager and the Town Engineer.

7. **Delivery coordination.**

A. CMID agrees to notify the Town's Parks and Recreation Director (currently Jim Conroy, at 520-382-1968 and [jconroy@maranaaz.gov](mailto:jconroy@maranaaz.gov)) one to 24 hours before starting a water delivery.

B. CMID agrees not to start a water delivery unless a Town of Marana employee is present.

C. A CMID representative is not required to remain onsite for the duration of a delivery, but CMID shall stop the delivery as soon as possible (and in any event within 90 minutes) after receiving a stop notice via telephone from a Town employee.

D. The Town shall pay CMID a \$50 administrative charge if CMID gives the notification required by subparagraph A of this section and no Town of Marana employee is present at the scheduled delivery start time.

8. **Environmental Class Water supply.** No representations have been made by CMID or the Town as to the characteristics of the Environmental Class Water to be delivered by CMID and the Town understands and accepts the water as non-potable Environmental Class Water.

9. **No supply or reliability warranties.** The Parties acknowledge and agree to all of the following:

A. The supply of Environmental Class Water provided by CMID is interruptible.

B. CMID makes no warranties as to the reliability of either the water supply or the facilities delivering it.

10. **Rate for water service.** CMID shall bill the Town on a monthly basis commencing with the month following the first delivery of Environmental Class Water. The Town shall cause payment to be made within 30 days from the date of billing. Billing shall be deemed made by CMID by placing the bill in the regular mail, and shall

be effective as of the date the bill is deposited in the mail. Bills not paid by the Town when due will bear interest at the rate of 1½% per month on the unpaid balance. The rate and charge by CMID to the Town for Environmental Class Water shall be at the Environmental Class rate of \$121.86 per acre-foot. If CMID revises its Environmental Class rate, CMID will provide to the Town notice of the new rate and notice of the date the new rate becomes effective. Each update will become a part of this Agreement without further action.

**11. Town responsibility beyond delivery location(s).** The Town is responsible for any additional infrastructure, equipment, and property rights required to convey the water from the delivery location(s) described in paragraph 6 above to the Project. Without limiting the foregoing, the Town shall bear the cost to design and construct the connection to the CMID pipeline, to include a meter or metering device, all of which shall be subject to CMID's reasonable approval. Upon request by CMID, the Town shall make a reasonable advance deposit to CMID. CMID may withdraw from this advance deposit CMID's actual reasonable costs for design and construction of infrastructure and equipment provided by or on behalf of CMID pursuant to this Agreement. The amount of the Town's advance deposit shall not exceed \$5,000. CMID may request that the deposit be replenished by the Town as withdrawals occur.

**12. Repair and maintenance.** During the term of this Agreement, CMID will at its own cost reasonably operate, maintain, and repair its water facilities used to deliver water to the delivery location(s) described in paragraph 6 above.

**13. Restrictions on use.** The Town agrees that all water delivered by CMID under this Agreement shall be used only for the purpose of watering landscaping and filling ponds in the El Rio Preserve.

**14. Compliance coordination.** The Parties acknowledge that the Town's ownership and operation of El Rio Preserve may give rise to Town regulatory compliance obligations, including without limitation possible water quality reporting obligations to Arizona Department of Environmental Quality or other regulatory agencies. Within reason and subject to Town reimbursement of CMID costs and out-of-pocket expenses, CMID agrees to cooperate with and give access to the Town as necessary to meet the Town's regulatory compliance obligations. The Town shall be responsible for any costs associated with monitoring or with the installation of monitoring equipment required for Town regulatory compliance.

**15. Not a joint venture, partnership or agency.** The execution of this Agreement is not intended to create a joint venture, agency or partnership relationship among the Parties.

**16. Legal jurisdiction.** Nothing in this Agreement shall be construed as either limiting or extending the legal jurisdiction of CMID or the Town.

**17. No third party beneficiaries.** This Agreement shall not create any right to any person or entity as a third party beneficiary.

**18. Compliance with laws.** The Parties shall comply with all applicable federal, state and local laws, rules, regulations, standards and executive orders, without limitation to those designated within this Agreement. The laws and regulations of the State of Arizona shall govern the rights of the Parties, the performance of this Agreement and any disputes under this Agreement. Any action relating to this Agreement shall be brought in the Pima County Superior Court.

A. *Anti-Discrimination.* The provisions of A.R.S. § 41-1463 and Executive Order Number 99-4 issued by the Governor of the State of Arizona are incorporated by this reference as a part of this Agreement.

B. *Americans with Disabilities Act.* This Agreement is subject to all applicable provisions of the Americans with Disabilities Act (Public Law 101-336, 42 U.S.C. § 12101-12213) and all applicable federal regulations under the Act, including 28 CFR Parts 35 and 36.

**19. Force majeure.** A Party shall not be in default under this Agreement if it does not fulfill any of its obligations under this Agreement because it is prevented or delayed in doing so by reason of uncontrollable forces. The term uncontrollable forces shall mean, for the purpose of this Agreement, any cause beyond the control of the Party affected, including but not limited to floods, earthquakes, acts of God, or orders of any regulatory government officer or court (excluding orders promulgated by the Parties themselves), which, by exercise of due diligence and foresight, such Party could not reasonably have been expected to avoid. Any Party rendered unable to fulfill any obligations by reason of uncontrollable forces shall exercise due diligence to remove such inability with all reasonable dispatch.

**20. Indemnification.**

A. *Mutual indemnity.* To the fullest extent permitted by law, each Party shall indemnify, defend and hold the other Party, its governing board or body, officers, departments, employees and agents, harmless from and against any and all suits, actions, legal or administrative proceedings, claims, demands, liens, losses, fines or penalties, damages, liability, interest, and attorneys', consultants' and accountants' fees or costs, and expenses of whatsoever kind and nature, resulting from or arising out of any act or omission of the indemnifying Party, its agents, employees or anyone acting under its direction or control, whether intentional, negligent, grossly negligent, or amounting to a breach of contract, in connection with or incident to the performance of this Agreement.

B. *Notice.* Each Party shall notify the other via electronic mail as soon as practicable of any change of personnel or email address for any person whose name or email address is mentioned in this Agreement. Each Party shall notify the other in writing within 30 days of the receipt of any claim, demand, suit or judgment against the receiving Party for which the receiving Party intends to invoke the provisions of this paragraph 20. Each Party shall keep the other Party informed on a current basis of its defense of any claims, demands, suits, or judgments under this paragraph 20.

Marana: Town of Marana  
c/o Marana Legal Department  
11555 West Civic Center Drive  
Marana, AZ 85653

C. *Negligence of indemnified Party.* The obligations under this Article shall not extend to the negligence of the indemnified Party, its agents or employees.

D. *Survival of termination.* This Article shall survive the termination, cancellation or revocation, whether in whole or in part, of this Agreement.

21. **Insurance.** Each Party to this Agreement acknowledges that the other Party is either self-insured or fully insured and warrants that its existing insurance fully covers that Party's liability regarding the Project.

IN WITNESS WHEREOF, each Party has caused its undersigned duly authorized representative to sign this Agreement below.

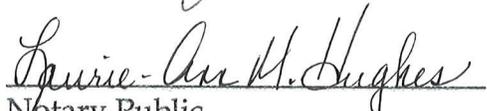
**CMID:**

CORTARO-MARANA IRRIGATION DISTRICT

  
Thomas Hum, President

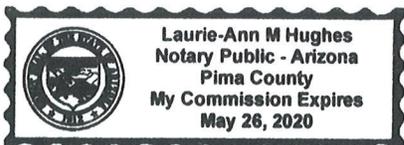
Date: May 8 - 18

ATTEST:

  
Notary Public

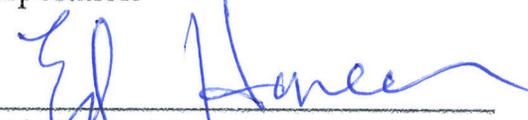
My commission expires:

May 26, 2020



**The Town:**

TOWN OF MARANA, an Arizona municipal corporation

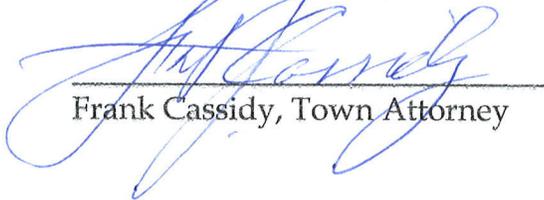
By:   
Ed Honea, Mayor

Date: 5/15/2018

ATTEST:

  
Jocelyn C. Bronson, Town Clerk

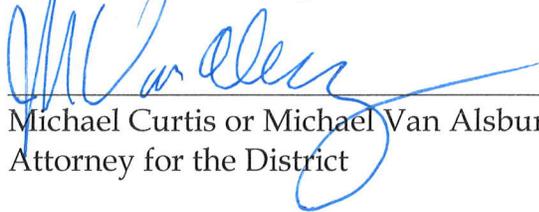
APPROVED AS TO FORM:

  
Frank Cassidy, Town Attorney

*INTERGOVERNMENTAL AGREEMENT DETERMINATION*

The foregoing Agreement between the Cortaro Marana Irrigation District and the Town of Marana has been reviewed pursuant to A.R.S. § 11-952 by the undersigned who have determined that it is in proper form and is within the powers and authority granted under the laws of the State of Arizona to those Parties to the Agreement represented by the undersigned.

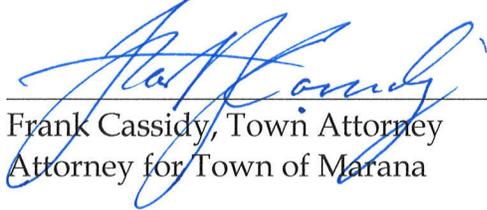
**Cortaro Marana Irrigation District**



---

Michael Curtis or Michael Van Alsburg  
Attorney for the District

**Town of Marana**



---

Frank Cassidy, Town Attorney  
Attorney for Town of Marana

**GOVERNING BOARD**

Tom Carlson, President  
Maribel Lopez, Ed.D., Vice President  
Suzanne Hopkins, Member  
John Lewandowski, Member  
Dan Post, Member



**ADMINISTRATION**

Doug Wilson, Ed.D., Superintendent  
Carolyn Dumler, Ed.D., Assistant Superintendent  
Kristin Reidy, Assistant Superintendent  
Dan Contorno, Chief Financial Officer

August 22, 2018

Town of Marana  
11555 West Civic Center Drive  
Marana AZ 85653

To Whom It May Concern,

I am writing to support the development of outdoor classroom spaces and educational outreach programs that are being created by the Town of Marana at the El Rio preserve nature park. The El Rio preserve is rich in resources that can be utilized by the Marana Unified School District's teachers and students. We envision the El Rio preserve being an outdoor laboratory for students to conduct Environmental Science and Geology experiments. Additionally, Biology classes could use the preserve to learn about biological and ecological diversity within the Sonoran Desert. Furthermore, the El Rio preserve can be used to support our history curriculum, which would be centered on an archeological feature within the preserve that provides insight into the culture and lives of the ancient Hohokam people. As such, I am providing my support for this project.

Best Regards,

A handwritten signature in black ink, appearing to read "Doug Wilson", written over a white background.

Doug Wilson, Ed.D.  
Superintendent

*Inspiring students to learn today and lead tomorrow.*



August 16, 2018

Ms. Sally Stewart Lee  
Arizona Department of Water Resources  
1110 W. Washington Street, Suite 310  
Phoenix, Arizona 85007

**Subject: El Rio Preserve Project – Arizona Water Protection Fund Grant – Letter of Support**

Dear Ms. Lee:

The Pima County Regional Flood Control District (District) wishes to express our support for the Town of Marana's (Town) El Rio Preserve (Preserve) project in its application to the Arizona Water Protection Fund Grant.

The District has partnered with the Town on the Preserve. The District will design and construct bank protection that will replace the eroded earthen berm along the Santa Cruz River, which is the northern boundary of the Preserve. The bank protection project will help address the influx of invasive species and headcutting from the Santa Cruz River that flows in with each minor storm while still allowing larger storms to flow into the Preserve while maintaining floodplain connectivity. The District will spend approximately \$2M on the project.

The Town has expressed they would utilize the grant funding from the Arizona Water Protection Fund to address invasive species, plant native trees and shrubs and install a non-potable drip irrigation system to supplement stormwater. These elements would further help establish the Preserve as a premier migratory bird and wildlife habitat along the Santa Cruz River.

If you have any questions regarding the importance of this project, please let me know.

Sincerely,

A handwritten signature in blue ink that reads "Suzanne Shields". The signature is fluid and cursive.

Suzanne Shields, P.E.  
Director and Chief Engineer

SS/DB/tj

c: Eric Shepp, P.E., Deputy Director – Regional Flood Control District  
Andy Dinauer, P.E., Deputy Director – Regional Flood Control District  
Deirdre Brosnihan, P.E., Project Manager – Regional Flood Control District



August 16, 2018

Mr. Reuben Teran, Executive Director  
Arizona Department of Water Protection Fund  
Arizona Department of Water Resources  
1110 W. Washington Street, Suite 310  
Phoenix, Arizona 85007

**Subject: El Rio Preserve Project – Arizona Water Protection Fund Grant – Letter of Support**

Dear Mr. Teran:

The Pima County Regional Flood Control District (District) wishes to express our support for the Town of Marana's (Town) El Rio Preserve (Preserve) project in its application to the Arizona Water Protection Fund Grant.

The District has partnered with the Town on the Preserve. The District will design and construct bank protection that will replace the eroded earthen berm along the Santa Cruz River, which is the northern boundary of the Preserve. The bank protection project will help address the influx of invasive species and headcutting from the Santa Cruz River that flows in with each minor storm while still allowing larger storms to flow into the Preserve while maintaining floodplain connectivity. The District will spend approximately \$2M on the project.

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If you have any questions regarding the importance of this project, please let me know.

Sincerely,

A handwritten signature in blue ink, appearing to read "Suzanne Shields". The signature is fluid and cursive, with a large initial "S" and a long, sweeping tail.

Suzanne Shields, P.E.  
Director and Chief Engineer

SS/DB/tj

c: Eric Shepp, P.E., Deputy Director – Regional Flood Control District  
Andy Dinauer, P.E., Deputy Director – Regional Flood Control District  
Deirdre Brosnihan, P.E., Project Manager – Regional Flood Control District



Doug Ducey  
Governor

# ARIZONA STATE PARKS & TRAILS

Sue Black  
Executive Director



Celebrating 60 Years!

February 21, 2017

Sara Konrad, Environmental Program Supervisor  
Water Infrastructure Finance Authority of Arizona  
100 North 15th Avenue, Suite 103  
Phoenix, AZ 85007

Re: Marana, Pima County; El Rio Riparian Restoration Grant; Section 106 Consultation; Water Infrastructure Finance Authority (WIFA); SHPO-2017-0055(135137)

Dear Ms. Konrad:

Thank you for initiating consultation with our office on the above-referenced project, which involves restoring a berm that separates the existing gravel pit from the Santa Cruz River, removing invasive species, constructing water harvesting basins and berms and ponds, building a trail, adding interpretive signage, and installing bird watching blinds and facilities. Because this project will use federal grant funds, it is an undertaking subject to review under 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act (as amended). The area of potential effects (APE) consists of a 104-acre parcel of Town of Marana-owned land within and surrounding the gravel pit. WIFA has requested SHPO concurrence on a “Conditional No Adverse Effect” finding based on the results of a Class III survey completed by Westland Resources Inc. (Westland) entitled, *A Cultural Resources Inventory of Approximately 90 Acres for the Proposed El Rio Riparian Restoration Project, Marana, Pima County, Arizona* (Gruner 2016). Westland documented and evaluated portions of three sites—AZ AA:12:88(ASM), AZ AA:12:57(ASM), and AZ AA:12:1162(ASM)—as well as 11 isolated occurrences (IOs). Our comments are below:

1. SHPO concurs that the IOs are not eligible for inclusion in the National Register of Historic Places (NRHP).
2. AZ AA:12:1162(ASM) is the historic gravel pit, which was used for the construction of Interstate 10. We concur that the site is not NRHP-eligible.
3. AZ AA:12:88(ASM) is a previously recorded Classic period site with at least two known burials. Westland indicates the previously recorded portion of the site, which lies in the gravel pit, has been destroyed, and recommended the site ineligible for inclusion in the NRHP. However, Westland (p. 27) also suggests “the current recorded boundary does not encompass the entirety of the area described in previous site recordings, which references intact deposits along the eastern wall of the pit.” Based on this, we do not concur with WIFA’s determination of eligibility; we recommend instead that the eligibility of the site should remain unevaluated given the possibility of extant portions outside of the gravel pit. We do agree that an archaeologist should monitor for burials in this area during ground-disturbing activities.

4. AZ AA:12:57(ASM) is an important Hohokam site known as Los Morteros, which has been previously determined NRHP eligible (Criterion D). Westland identified two contributing features within the APE and recommended avoidance of the features with archaeological monitoring if ground-disturbing activities occur within the vicinity of the features. We recommend placing a 50-foot wide avoidance buffer around both features and monitoring any ground-disturbing activities in the vicinity of the buffered boundaries.
5. If human remains are encountered during the monitoring, all work must cease within 100 feet of the discovery, and the discovery location must be secured. The consulting firm must promptly notify the Arizona State Museum (ASM) and our office of the discovery, and no work shall proceed at the discovery location without authorization from ASM pursuant to Arizona Revised Statute § 41-844.
6. If cultural resources other than human remains are encountered during the monitoring, all work must cease so the archaeologist can document and evaluate the significance of the discovery. Work shall not resume until consultation with SHPO is completed.
7. Based on the above, SHPO concurs with WIFA's finding of "Conditional No Adverse Effect." If the features associated with Los Morteros cannot be avoided by project activities, consultation with our office should continue on a revised finding of "Adverse Effect."

We appreciate WIFA's cooperation in complying with historic preservation requirements for federal undertakings. Please contact me by telephone at 602.542.7120, or via e-mail at [mwalsh@azstateparks.gov](mailto:mwalsh@azstateparks.gov) if you have any questions or concerns.

Sincerely,



Mary-ellen Walsh, M.A., RPA  
Archaeological Compliance Specialist  
State Historic Preservation Office

1100 W. Washington Street  
Phoenix, AZ 85007



*Tucson Audubon inspires people to enjoy and protect birds through recreation, education, conservation, and restoration of the environment upon which we all depend.*

August 24, 2018

Ms. Janine Spencer  
Environmental Projects Manager  
Town of Marana  
11555 West Civic Center Drive  
Marana, Arizona 85653

Dear Ms. Spencer,

It's a pleasure to write in support of the Town of Marana's planned El Rio Restoration Project.

Tucson Audubon Society values the multi-year collaboration with the Town to restore the borrow pit created during the construction of Interstate 10. When the Santa Cruz River broke through a berm in 2014, the resulting wetland created habitat for birds, both resident and migratory. Likewise, the flood event created a new opportunity for recreational birders to view and enjoy a variety species. Birding generates \$1.4 billion in economic activity in Arizona annually.

Over 200 species of birds have been identified at the El Rio site, and many species are present because of the seasonal wetland. The birding public have observed egrets and herons, shorebirds, geese and almost two dozen species of ducks, white pelican, swallows and swifts, and belted kingfishers, to name just a few. El Rio has become a destination for birds and people alike, and the site has been featured in local news media and Tucson Audubon Society's member magazine, the *Vermillion Flycatcher*.

Members of our organization were delighted when the Town designated the area a preserve in 2015. Tucson Audubon Society has worked with Marana, Pima County, the Regional Transportation Authority, and other interested stakeholders to establish a regional wildlife movement corridor connecting the north end of the Tucson Mountains with the west end of the Tortolita Mountains since the late 1990s. El Rio is a critical piece of the regional puzzle for connecting protected areas and maintaining the unique biological diversity in our region. Our members see the potential for the restoration and creation of high quality riparian and aquatic habitats for fish and wildlife, as well as the creation of an accessible venue for recreation and education.

Tucson Audubon Society stands ready to assist the Town with expertise in ecosystem restoration and creation of new habitat, specifically for the benefit of birds and pollinators. Likewise, consider our organization a partner for creating interpretive signage, for publicizing the project to our constituents, and for implementing public programs.

Please keep us posted on your progress. We look forward to additional collaboration.

Best regards,

Jonathan E. Lutz

**Jonathan Lutz, Executive Director**

300 E. University Blvd., #120 • Tucson, AZ 85705 • TEL 520-209-1814 • FAX 520-623-3476  
CELL 520-415-6447 • [jlutz@tucsonaudubon.org](mailto:jlutz@tucsonaudubon.org)

TUCSONAUDUBON.ORG



# United States Department of the Interior

## Fish and Wildlife Service

### Arizona Ecological Services Office

9828 North 31<sup>st</sup> Avenue

Phoenix, Arizona 85051

Telephone: (602) 242-0210 Fax: (602) 242-2513



AESO/SE

March 7, 2017

Ms. Janine Spencer  
Environmental Projects Manager  
Town of Marana  
11555 West Civic Center Drive  
Marana, Arizona 85653

Dear Ms. Spencer:

The U.S. Fish and Wildlife Service (Service) is providing this letter in support of the Town of Marana's El Rio Riparian Restoration Project. The Service is supportive of the project because of the potential for this project to further the conservation of several threatened, endangered, or otherwise sensitive wildlife species, as well as the habitats upon which they depend. As the agency whose mission includes the protection of species listed under the Endangered Species Act and their habitats and birds protected under the Migratory Bird Treaty Act, we are excited for the conservation benefits of the El Rio Project.

We have reviewed the environmental documents associated with the proposed project and find that they appropriately consider the relevant environmental issues related to this project. We agree with the conclusions of these documents and fully support the preferred alternative. The preferred alternative will provide conservation benefits for listed species such as the yellow-billed cuckoo and, with the implementation of the proposed project, potentially species like the Gila topminnow and northern Mexican gartersnake. The value of the El Rio site to migratory birds has been well known for many years. We applaud the Town of Marana's action to protect this area as a Preserve and current efforts to further enhance the conservation value of this site through the current project proposal.

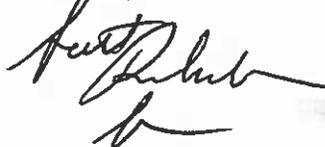
In addition, the location of the El Rio project is critical to maintaining habitat connectivity, not only along the Santa Cruz River corridor, but also in relation to adjacent upland habitats that provide connectivity between the Tortolita Mountains and the Tucson Mountains. The Service is the Federal agency charged with the implementation of the Endangered Species Act and the Migratory Bird Treaty Act and is specifically interested in local land use and planning activities for landscapes and habitats important to the conservation of listed and sensitive species. We appreciate the Town of Marana's efforts over the years to work with the Service in implementing conservation activities supporting our mission to protect and conserve species and their habitats, and we are fully support of this current effort. We especially appreciate the consideration of innovative actions such as the introduction of native fish species to not only restore this important component of the ecosystem, but to also work towards meeting mosquito and other vector control objectives. The educational aspects of this project will showcase the benefits to both species and to the Town of Marana and surrounding community.

Ms. Janine Spencer

2

The resources under the Service's management authority will benefit from the ongoing conservation work being planned and implemented through the El Rio Riparian Restoration Project. We fully support Marana's application for funding for this project and commit our assistance and expertise in helping Marana successfully implement the proposed project. We look forward to working with the Town and all the other community partners involved in this project. Please contact Scott Richardson (520) 670-6150 ( x 242 ) if we can be of any further assistance.

Sincerely,



Steven L. Spangle  
Field Supervisor

cc: Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

C:\Users\scottrichardson\Documents\Misc\Marana.El.Rio.supportlet.3\_7\_2017.sr.doc

# El Rio Preserve Riparian Restoration Project

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## *IPaC Trust Resources Report*

Generated November 16, 2016 08:50 AM MST, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



# Table of Contents

- IPaC Trust Resources Report ..... [1](#)
- Project Description ..... [1](#)
- Endangered Species ..... [2](#)
- Migratory Birds ..... [4](#)
- Refuges & Hatcheries ..... [8](#)
- Wetlands ..... [9](#)

# IPaC Trust Resources Report



NAME

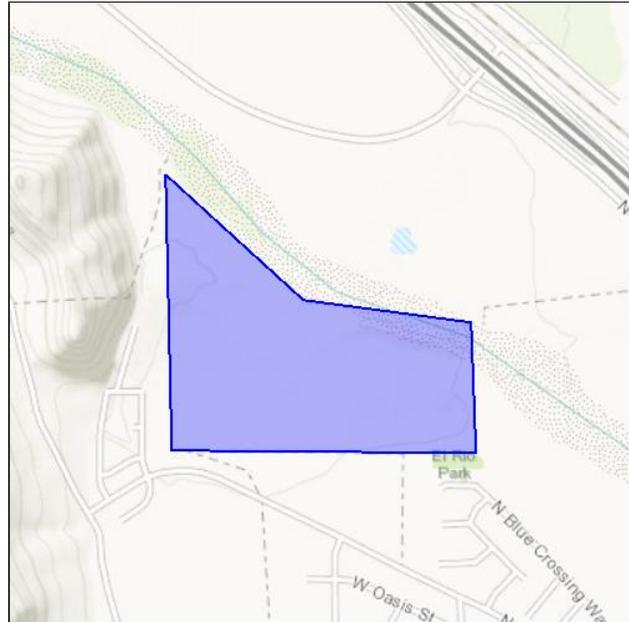
El Rio Preserve Riparian Restoration Project

LOCATION

Pima County, Arizona

DESCRIPTION

This site was previously a gravel borrow pit adjacent to the Santa Cruz River. Riparian restoration will include restoring the berm between the Santa Cruz River and El Rio Preserve; planting/hydro-seeding native species, using water harvesting methods to supplement irrigation water, removal of



some invasive species, creating 1-2 perennial, lined ponds, natural-surface trail, bird blind, benches, possibly 2 picnic tables in NW corner which is more upland. Jurisdictional delineation and cultural resource clearance surveys are scheduled with a consulting firm. Marana received a Water Infrastructure Financing Authority grant for engineering, water harvesting and landscaping designs.

IPAC LINK

<https://ecos.fws.gov/ipac/project/EXHP5-VEI6V-CHROB-YZ3YY-OOWYG4>

## U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

**Arizona Ecological Services Field Office**

9828 North 31st Ave

#c3

Phoenix, AZ 85051-2517

(602) 242-0210

## Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the [Endangered Species Program](#) of the U.S. Fish & Wildlife Service.

**This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.**

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

[Section 7](#) of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

**A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.**

The list of species below are those that may occur or could potentially be affected by activities in this location:

### Birds

**California Least Tern** *Sterna antillarum browni* Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B03X](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B03X)

**Yellow-billed Cuckoo** *Coccyzus americanus* Threatened

CRITICAL HABITAT

There is **proposed** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B06R](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B06R)

## Mammals

**Jaguar** *Panthera onca* Endangered

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=A040](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=A040)

**Lesser Long-nosed Bat** *Leptonycteris curasoae yerbabuenae* Endangered

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=A0AD](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=A0AD)

**Sonoran Pronghorn** *Antilocapra americana* Experimental Population, Non-Essential  
*sonoriensis*

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=A009](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=A009)

## Reptiles

**Northern Mexican Gartersnake** *Thamnophis eques megalops* Threatened

CRITICAL HABITAT

There is **proposed** critical habitat designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=C04Q](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=C04Q)

**Sonoyta Mud Turtle** *Kinosternon sonoriense longifemorale* Proposed Endangered

CRITICAL HABITAT

**No critical habitat** has been designated for this species.

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=C067](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=C067)

## Critical Habitats

**There are no critical habitats in this location**

## Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act](#) and the [Bald and Golden Eagle Protection Act](#).

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.<sup>[1]</sup> There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

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1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern  
<http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Conservation measures for birds  
<http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Year-round bird occurrence data  
<http://www.birdscanada.org/birdmon/default/datasummaries.jsp>

The following species of migratory birds could potentially be affected by activities in this location:

<b>Bald Eagle</b> <i>Haliaeetus leucocephalus</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B008">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B008</a>	
<b>Bell's Vireo</b> <i>Vireo bellii</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0JX">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0JX</a>	
<b>Bendire's Thrasher</b> <i>Toxostoma bendirei</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0IF">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0IF</a>	
<b>Black-chinned Sparrow</b> <i>Spizella atrogularis</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0IR">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0IR</a>	

<b>Blue-throated Hummingbird</b> <i>Lampornis clemenciae</i> Season: Breeding	Bird of conservation concern
<b>Brewer's Sparrow</b> <i>Spizella breweri</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HA">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HA</a>	Bird of conservation concern
<b>Burrowing Owl</b> <i>Athene cunicularia</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0NC">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0NC</a>	Bird of conservation concern
<b>Chestnut-collared Longspur</b> <i>Calcarius ornatus</i> Season: Wintering	Bird of conservation concern
<b>Common Black-hawk</b> <i>Buteogallus anthracinus</i> Season: Breeding	Bird of conservation concern
<b>Costa's Hummingbird</b> <i>Calypte costae</i> Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0JE">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0JE</a>	Bird of conservation concern
<b>Elegant Trogon</b> <i>Trogon elegans</i> Season: Year-round	Bird of conservation concern
<b>Elf Owl</b> <i>Micrathene whitneyi</i> Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0GV">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0GV</a>	Bird of conservation concern
<b>Gila Woodpecker</b> <i>Melanerpes uropygialis</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0EH">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0EH</a>	Bird of conservation concern
<b>Gilded Flicker</b> <i>Colaptes chrysoides</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0EG">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0EG</a>	Bird of conservation concern
<b>Golden Eagle</b> <i>Aquila chrysaetos</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0DV">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0DV</a>	Bird of conservation concern
<b>Lawrence's Goldfinch</b> <i>Carduelis lawrencei</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0J8">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0J8</a>	Bird of conservation concern
<b>Le Conte's Thrasher</b> <i>toxostoma lecontei</i> Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0GE">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0GE</a>	Bird of conservation concern
<b>Lewis's Woodpecker</b> <i>Melanerpes lewis</i> Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HQ">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0HQ</a>	Bird of conservation concern

<b>Loggerhead Shrike</b> <i>Lanius ludovicianus</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY</a>	
<b>Long-billed Curlew</b> <i>Numenius americanus</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06S">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06S</a>	
<b>Lucy's Warbler</b> <i>Vermivora luciae</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DL">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DL</a>	
<b>Mccown's Longspur</b> <i>Calcarius mccownii</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HB">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HB</a>	
<b>Mountain Plover</b> <i>Charadrius montanus</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B078">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B078</a>	
<b>Northern Beardless-tyrannulet</b> <i>Camptostoma imberbe</i>	Bird of conservation concern
Season: Breeding	
<b>Peregrine Falcon</b> <i>Falco peregrinus</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU</a>	
<b>Prairie Falcon</b> <i>Falco mexicanus</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0ER">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0ER</a>	
<b>Rufous-crowned Sparrow</b> <i>Aimophila ruficeps</i>	Bird of conservation concern
Season: Year-round <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0MX">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0MX</a>	
<b>Rufous-winged Sparrow</b> <i>Aimophila carpalis</i>	Bird of conservation concern
Season: Year-round	
<b>Short-eared Owl</b> <i>Asio flammeus</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD</a>	
<b>Sonoran Yellow Warbler</b> <i>Dendroica petechia ssp. sonorana</i>	Bird of conservation concern
Season: Breeding <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F7">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0F7</a>	
<b>Sprague's Pipit</b> <i>Anthus spragueii</i>	Bird of conservation concern
Season: Wintering <a href="http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GD">http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GD</a>	

**Swainson's Hawk** *Buteo swainsoni*

Season: Breeding

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B070](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B070)

Bird of conservation concern

**Willow Flycatcher** *Empidonax traillii*

Season: Breeding

[http://ecos.fws.gov/tess\\_public/profile/speciesProfile.action?sPCODE=B0F6](http://ecos.fws.gov/tess_public/profile/speciesProfile.action?sPCODE=B0F6)

Bird of conservation concern

## Wildlife refuges and fish hatcheries

**There are no refuges or fish hatcheries in this location**

# Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

## DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

## DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

## DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

## Freshwater Pond

[PUB](#)

## Riverine

[R2UB](#)

[R2US](#)

A full description for each wetland code can be found at the National Wetlands Inventory website: <http://107.20.228.18/decoders/wetlands.aspx>

**DOUGLAS A. DUCEY**  
Governor



**VICTOR RICHES**  
Chairman of the Board

**Water Infrastructure Finance Authority of Arizona**

*Arizona's water and wastewater funding source*

100 North 15<sup>th</sup> Avenue, Suite 103, Phoenix, Arizona 85007 | [azwifa.gov](http://azwifa.gov) | (602) 364-1310

October 26, 2016

Ms. Janine Spencer  
Town of Marana  
11555 West Civic Center Drive  
Marana, AZ 85653

Dear Ms. Spencer,

The Water Infrastructure Finance Authority of Arizona (WIFA) is pleased to inform you that your project has been awarded Planning and Design Technical Assistance funding for Fiscal Year 2017.

Project name: El Rio Riparian Restoration Project  
Project number: TACW-010-2017  
Award: \$35,000.00

Congratulations on your successful application. We hope you find this funding helpful in beginning your project. If you have not done so already, you will need to select a contractor/engineer and finalize a scope of work along with your itemized budget, which will be incorporated into your Technical Assistance Agreement.

Please note that this letter is not a Notice to Proceed. The terms and conditions of the technical assistance program, including environmental review requirements, must be met before an agreement is prepared. WIFA cannot reimburse any expenses incurred prior to the execution of your agreement and issuance of a Notice to Proceed letter.

Rodney Held, WIFA Project Manager, will be contacting you to begin preparing your project for funding. You may reach him directly at [rheld@azwifa.gov](mailto:rheld@azwifa.gov) or (602) 364-1325. Please note, Rodney will be out of the office until November 8, 2016.

Sincerely,

A handwritten signature in black ink, appearing to read "Trish Incognito". The signature is fluid and cursive, written over a light blue horizontal line.

Trish Incognito  
Chief Financial Officer

**DOUGLAS A. DUCEY**  
Governor



**TRISH INCOGNITO**  
Executive Director

**Water Infrastructure Finance Authority of Arizona**  
*Arizona's water and wastewater funding source*  
100 North 15<sup>th</sup> Avenue, Suite 103, Phoenix, Arizona 85007 | [azwifa.gov](http://azwifa.gov) | (602) 364-1310

January 26, 2017

Janine Spencer  
Environmental Projects Manager  
Town of Marana  
11555 W. Civic Center Drive  
Marana, AZ 85653

***Notice to Proceed***  
WIFA Technical Assistance Agreement 810057-17

Dear Ms. Spencer,

The Water Infrastructure Finance Authority (WIFA) of Arizona has received a signed Planning and Design Technical Assistance Agreement from the Town of Marana. Enclosed you will find your copy of the signed Agreement.

To request a disbursement of technical assistance funds, the project manager should fill out and sign one of the Disbursement Request forms sent to you by email. When submitting a disbursement requisition you will need to include documentation of the expenses in the form of an invoice or receipt.

Please mail all documents to my attention at the address above. We look forward to working with you on your project. If you have any questions, please contact me at (602) 364-1319.

Sincerely,

A handwritten signature in black ink, appearing to read "Sara Konrad". The signature is fluid and cursive, with a large loop at the end.

Sara Konrad  
Environmental Program Supervisor

**WATER INFRASTRUCTURE FINANCE AUTHORITY**  
**PLANNING AND DESIGN TECHNICAL ASSISTANCE AGREEMENT**

**BETWEEN Town of Marana**

**AND**

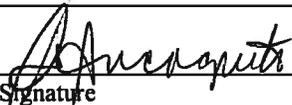
**The Water Infrastructure Finance  
Authority of Arizona (WIFA)**

**THIS AGREEMENT** is made and entered into on this 17 day of Jan, 2017 by and between the Town of Marana herein after referred to as ("Applicant/Recipient"), and the Water Infrastructure Finance Authority of Arizona ("WIFA").

**0.0 Introduction**

- 0.1 WIFA is a body corporate and politic, created by A.R.S. § 49-1201 et seq. WIFA has the authority to provide funding to political subdivisions, any county of less than five hundred thousand persons, Indian tribes and community water systems in connection with the development or financing of waste water, drinking water, water reclamation or related water infrastructure per A.R.S. § 49-1203(B)(16).
- 0.2 The issuance of the technical assistance shall conform to the Arizona grant statutes A.R.S. § 41-2701 et seq.
- 0.3 This document, including agreement terms, Scope of Work (Exhibit A), Budget (Exhibit B), appendices, amendments, the request for technical assistance application ("RFA"), the application, the WIFA Technical Assistance Applicants' Guide, and any modifications approved in accordance herewith, shall constitute the entire contract between the parties and supersede all other understandings, oral or written.

IN WITNESS WHEREOF, the parties hereto agree to carry out the terms of this agreement.


Signature
Trish Incognito
Printed Name
Executive Director, Water Infrastructure Finance Authority
Title
1/20/17
Date


Signature
Gilbert Davidson
Printed Name
Town Manager
Title
1/17/2017
Date

## Technical Assistance Agreement Terms and Conditions

### 1.0 Definition of Terms

- 1.1 "**Applicant**" means a person, firm, or other organization that submits or is considering submitting an application.
- 1.2 "**Application**" means a response submitted pursuant to a Request for Technical Assistance Applications (RFA).
- 1.3 "**Authority**" means the Water Infrastructure Finance Authority (WIFA).
- 1.4 "**Days**" means calendar days unless otherwise specified.
- 1.5 "**Director**" means the Executive Director of WIFA.
- 1.6 "**Gratuity**" means a payment, loan, subscription, advance, deposit of money, services, or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value is received.
- 1.7 "**Manual**" means the WIFA Technical Assistance Applicants' Guide.
- 1.8 "**Recipient**" means an applicant that is awarded a Technical Assistance Agreement.
- 1.9 "**Records**" means all books, accounts, reports, files and other records relating to this Technical Assistance Agreement.
- 1.10 "**Request for Technical Assistance Applications**" (RFA) means the document the Authority utilizes to request applications.
- 1.11 "**Subcontract**" means any contractual Technical Assistance Agreement, express or implied, between the Recipient and another party or between a subcontractor and another party delegating or assigning, in whole or in part, the making or furnishing of any material or any service required for the performance of the Technical Assistance Agreement.
- 1.12 "**Technical Assistance Agreement**" means a written document, signed by an authorized representative of both parties, including the RFA (including the manual referenced in the RFA) and the application (including any revisions requested by the Authority) and any Technical Assistance Agreement Amendments.
- 1.13 "**Technical Assistance Agreement Amendment**" means a written document, signed by an authorized representative of both parties for the purpose of making changes to the Technical Assistance Agreement.

## 2.0 **Technical Assistance Agreement Interpretation**

- 2.1 ***Arizona Law.*** This Technical Assistance Agreement shall be interpreted under Arizona law and, if applicable, under federal law. The Authority is authorized to enter into Technical Assistance Agreements by Arizona Revised Statutes (A.R.S.) Title 49. The Authority is soliciting applications using the process given in A.R.S. Title 41, Chapter 24.
- 2.2 ***Implied Terms.*** Each provision of law and any terms required by law to be in this Technical Assistance Agreement are a part of this Technical Assistance Agreement as if fully stated in it.
- 2.3 ***Language and Marginal Headings.*** Language as used in this Technical Assistance Agreement shall include the plural as well as the singular and the masculine, feminine and neuter genders. Marginal headings are included for ease of reading only and shall have no effect on the construction or interpretation of this Technical Assistance Agreement.
- 2.4 ***Relationship of Parties.*** Neither party to this Technical Assistance Agreement shall be deemed to be the employee or agent of the other party.
- 2.5 ***Lobbying.*** Recipient shall comply with federal lobbying requirements pursuant to 40 CRF 34.100 and Office of Management and Budget (OMB) Circulars A-87 and A-122. Federal grant funds may not be used to influence (or attempt to influence) a federal employee. If non-federal funds have been used to influence (or attempt to influence) a federal employee, the Recipient must submit Standard Form LLL (“Disclosure of Lobbying Activities”).
- 2.6 ***Severability.*** The provisions of this Technical Assistance Agreement are severable. Any term or condition deemed illegal or invalid shall not affect any other term or condition of the Technical Assistance Agreement.
- 2.7 ***No Parol Evidence.*** This Technical Assistance Agreement is intended by the parties as a final and complete expression of their agreement. No course of prior dealings between the parties and no usage of the trade shall supplement or explain any terms used in this document.
- 2.8 ***No Waiver.*** Either party’s failure to insist on strict performance of any term or condition of the Technical Assistance Agreement shall not be deemed a waiver of that term or condition even if the party accepting or acquiescing in the nonconforming performance knows of the nature of the performance and fails to object to it.

## 3.0 **Technical Assistance Agreement Administration and Operation**

- 3.1 ***Drug-free Workplace.*** Recipients are required to certify that they maintain a drug-free workplace. By signing the Technical Assistance Agreement, the Recipient certifies that he or she will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any technical assistance -related activity.
- 3.2 ***Project Period.*** The Authority agrees to reimburse Recipients for work activities performed during the project period ending **April 30, 2018**. The Authority is not required to reimburse Recipient for any work activities initiated prior to execution of this Technical Assistance Agreement or after the project period has elapsed. The Recipient understands that the Authority may terminate this Technical Assistance Agreement (see paragraph 8.5 of this Technical Assistance Agreement), if the project is not initiated within 3 months after entering into this Technical Assistance Agreement. The Authority may extend the project period, if requested by the Recipient by executing a Technical Assistance Agreement Amendment (see 5.1, Technical Assistance Agreement Amendments).

- 3.3 **Points of Contact.** WIFA designates the individual listed below as the Project Manager for budgeting, deliverable, and scheduling issues. Technical correspondence, invoices and reports from the Recipient shall be sent to the person below or a replacement identified by WIFA.

**WIFA Project Manager**

Sara Konrad  
Water Infrastructure Finance Authority  
100 N 15<sup>th</sup> Ave, Suite 103  
Phoenix, AZ 85007  
Phone: 602-364-1319

**Recipient Project Manager**

Janine Spencer, Town Environmental Projects Manager  
Town of Marana  
11555 W. Civic Center Drive  
Marana, AZ 85653  
Phone: 520-382-2600

- 3.4 **Recipient's Representatives.** The Recipient shall designate a "Project Manager" as its Representative. Any proposed changes that are requested for either project contacts or project team members for the awarded technical assistance shall be requested in writing to WIFA. Changes shall not be made without WIFA approval.
- 3.5 **Reports.** No later than 30 calendar days after the completion of the project, the final deliverable identified in the Scope of Work (Exhibit A) must be submitted to the Authority for approval. The Authority will not disburse final payment until the final report and all requirements of the Technical Assistance Agreement have been fulfilled. All remaining technical assistance funds or outstanding technical assistance funds must be reconciled.
- 3.6 **Records and Audit.** Under A.R.S. § 35-214 and § 35-215, the Recipient shall retain and shall contractually require each subcontractor to retain all Records for a period of five years after the completion of the Technical Assistance Agreement. Upon request, the Recipient shall produce a legible copy of any or all such Records. All Records shall be subject to inspection and audit by the Authority, and where applicable the Federal Government, at reasonable times.
- 3.7 **Printing Credit.** Items such as brochures, advertisements, videos, maps, and technical reports developed for the project must be approved by the WIFA Project Manager prior to printing or displaying information.
- 3.8 **Recycled Materials.** To the extent possible, printed materials shall be on recycled paper with the statement, "Printed on Recycled Paper," printed on the cover sheet.
- 3.9 **Nondiscrimination.** Recipient and all subcontractors shall comply with Executive Order 2009-9, which mandates that all persons, regardless of race, color, religion, sex, age, or national origin not mentioned in Order shall have equal access to employment opportunities, and all other applicable state and Federal employment laws, rules, and regulations, including the Americans with Disabilities Act, Code 40 of Federal Regulations (CFR) 7.30, and State Executive Order No. 99-4. Recipient and all subcontractors shall take affirmative action to ensure that applicants for employment and employees are not discriminated against due to race, creed, color, religion, sex, national origin or disability.
- 3.10 **Inspection.** The Recipient agrees to permit access to its facilities and subcontractor facilities at reasonable times for inspection of the materials covered under this Technical Assistance Agreement.

- 3.11 ***Advertising and Promotion of Technical Assistance Agreement.*** The Recipient shall not advertise or publish information for commercial benefit concerning this Technical Assistance Agreement without the prior written approval of the Authority.
- 3.12 ***Ownership of Information.*** Title to all documents, reports and other materials prepared by the Recipient in performance of this Technical Assistance Agreement shall rest in the Authority, except for copyrighted material prepared in advance of this Technical Assistance Agreement by the Recipient at the expense of the Recipient. WIFA and the U.S. Environmental Protection Agency shall have full and complete rights to reproduce, duplicate, disclose, perform and otherwise use all information prepared under this Technical Assistance Agreement, except for copyrighted material as provided in 6.1.3 of this Technical Assistance Agreement. The Recipient shall have full and complete rights to reproduce, duplicate, disclose, perform and otherwise use all information prepared under this Technical Assistance Agreement.
- 3.13 ***Small, Women/Minority Owned Business Utilization.*** Recipients are encouraged to make every effort to utilize subcontractors that are small, women-owned and/or minority owned business enterprises. This could include subcontractors for a percentage of deliverables made under this and subsequent agreements. Recipients who are committing a portion of their work to such subcontractors shall do so by identifying the type of service and work to be performed by providing detail concerning your organization's utilization of small, women-owned and/or minority owned business enterprises. Emphasis should be placed on specific areas that are subcontracted and percentage of agreement utilization and how this effort will be administered and managed, including reporting requirements.
- 3.14 ***Offshore Performance of Work Prohibited.*** Due to security and identity protection concerns, all services under this Contract shall be performed within the borders of the United States. All storage and processing of information shall be performed within the borders of the United States. This provision applies to work performed by subcontractors at all tiers.
- 3.15 ***Immigration Laws and E-Verify Requirement.*** Compliance requirements for A.R.S. § 41-4401
- a. The Recipient and any subcontractor warrants compliance with the Federal Immigration and Nationality Act and all other Federal immigration laws and regulations relating to employees and warrants its compliance with Section A.R.S. § 23-214, Subsection A. (That subsection reads: "After December 31, 2007, every employer, after hiring an employee, shall verify the employment eligibility of the employee through the e-verify program."). The Recipient and its subcontractors shall also maintain Employment Eligibility Verification forms (I-9) as required by the U. S. Authority of Labor's immigration and Control Act, for all employees performing work under the agreement
  - b. A breach of a warranty regarding compliance with immigration laws and regulations shall be deemed a material breach of the contract and the Recipient may be subject to penalties up to and including termination of the Agreement.
  - c. The Authority retains the legal right to inspect the papers of any employee who works on the Agreement to ensure that the Recipient or subcontractor is complying with the warranty under paragraph 8(a).

#### 4.0 **Technical Assistance Funding**

- 4.1 ***Use of Technical Assistance Funds.*** Awarded technical assistance funds shall be used solely for eligible purposes as approved by the Authority. Line item funding is considered estimates of costs, however, the total project cost is considered exact and shall not be exceeded by the Recipient unless otherwise amended.

4.2 ***Funding Disbursement.***

4.2.1 Transferred technical assistance funds shall be deposited by the Recipient in a separate project account carrying the name and number of the project and the funds shall be expended from the account only as authorized under the terms of this Technical Assistance Agreement.

4.2.2 All requests for reimbursement shall be accompanied by reasonable assurance (documentation, receipts, invoices, etc.) that the goods and services for which payment is requested were actually received and performed. The Authority has the right to disallow contributions determined inappropriate or unreasonable.

4.2.3 Payments will be made upon approval by the Authority.

4.3 ***Applicable Taxes.***

4.3.1 Recipient and all subcontractors shall pay all Federal, state and local taxes applicable to its operation and any persons employed by the Recipient. The Recipient shall require all subcontractors to hold the Authority harmless from any responsibility for taxes, damages and interest, if applicable, contributions required under Federal, and/or state and local laws and regulations and any other costs including transaction privilege taxes, unemployment compensation insurance, Social Security and Worker's Compensation.

4.3.2 In order to receive payment under any resulting Technical Assistance Agreement, the Recipient shall have a current IRS-W9 Form on file with the Authority.

4.4 ***Non-Availability of Funds.*** Every payment obligation of the Authority under this Technical Assistance Agreement is conditioned upon the availability of funds appropriated or allocated for the payment of such obligation. If funds are not appropriated, allocated, or available for the continuance of this Technical Assistance Agreement, this Technical Assistance Agreement may be terminated by the Authority at the end of the period for which funds are available. No liability shall accrue to the Authority in the event this provision is exercised, and the Authority shall not be obligated or liable for any future payments or for any damages as a result of termination under this paragraph.

5.0 **Technical Assistance Agreement Changes**

5.1 ***Technical Assistance Agreement Amendments.*** The Technical Assistance Agreement shall be modified only through a Technical Assistance Agreement Amendment. Unauthorized changes to this Technical Assistance Agreement shall be void and without effect, and the Recipient shall not be entitled to any claim under this Technical Assistance Agreement based on those changes.

5.2 ***Subcontracts.*** The Recipient shall not enter into any Subcontract under this Technical Assistance Agreement without consideration for impact on the project. Recipient shall report any Subcontract awards or changes as part of that calendar quarter's narrative report (see 3.5, Reports). The Subcontract shall incorporate by reference the terms and conditions of this Technical Assistance Agreement. The Authority maintains the ability to deny any subcontract such that it does not conform to any term of this agreement.

5.3 ***Assignment and Delegation.*** The Recipient shall not assign any right nor delegate any duty under this Technical Assistance Agreement without the prior written consent of the Authority. The State shall not unreasonably withhold consent. Both parties agree that it is reasonable to withhold consent where the Authority determines that an assignment or delegation would not be advantageous to the State of Arizona or would be contrary to the purposes of the Authority.

6.0 **Indemnification**

6.1 **Indemnification:**

Each party (as "Indemnitor") agrees to indemnify, defend, and hold harmless the other party (as "Indemnitee") from and against any and all claims, losses, liability, costs, or expenses (including reasonable attorney's fees) (hereinafter collectively referred to as "Claims") arising out of bodily injury of any person (including death) or property damage, but only to the extent that such Claims which result in vicarious/derivative liability to the Indemnitee are caused by the act, omission, negligence, misconduct, or other fault of the Indemnitor, its officers, officials, agents, employees, or volunteers.

6.1.1 ***Professional Liability (Errors and Omissions Liability)***

Each Claim                   \$ 500,000  
Annual Aggregate         \$1,000,000

- a. When using a contractor for professional services, the contractor shall provide professional liability insurance. In the event that the professional liability insurance is written on a claims-made basis, the contractor shall warrant that any retroactive date under the policy shall precede the effective date of the contract; and that either continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years beginning at the time work under this contract is completed.
- b. The policy shall cover professional misconduct or lack of ordinary skill for those positions defined in the Scope of Work of the contract.

6.1.2 ***No Obligation in Excess of Appropriations.*** Nothing in this Technical Assistance Agreement shall be construed as obligating the Authority in the expenditure of funds or as involving the Authority in any contract or other obligation of the future payment of money in excess of appropriations authorized by law and budgeted and approved by the Authority.

6.1.3 ***Patent and Copyright.*** The Recipient shall indemnify and hold harmless the State against any liability, including costs and expenses, for infringement of any patent, trademark or copyright arising out of Technical Assistance Agreement performance or use by the State of materials furnished or work performed under this Technical Assistance Agreement. The State shall reasonably notify the Recipient of any claim for which it may be liable under this paragraph. The United States Federal Government does not have the authority to indemnify and hold harmless the State of Arizona.

6.1.4 ***Third Party Antitrust Violations.*** The Recipient assigns to the State of Arizona any claim for overcharges resulting from antitrust violations to the extent that those violations concern materials or services supplied by third parties to the Recipient, toward fulfillment of this Technical Assistance Agreement.

6.2 ***Indemnification of Contractors.*** Notwithstanding any provision of the Agreement to the contrary, the Authority is not authorized to indemnify a Contractor.

7.0 **Authority's Contractual Remedies**

7.1 ***Right to Assurance.*** If the Authority in good faith has reason to believe that the Recipient does not intend to, or is unable to perform or continue performing under this Technical Assistance Agreement, the Authority may demand in writing that the Recipient give a written assurance of intent to perform. Failure by the Recipient to provide written assurance within the number of days specified in the demand may, at the Authority's option, be the basis for terminating the Technical Assistance Agreement.

- 7.2 ***Suspension or Termination.*** The Director may suspend or terminate this Agreement for failure by Recipient or its agents, including its engineering firm(s), contractor(s) or subcontractor(s) to perform. The Agreement may be suspended or terminated for good cause including but not limited to the terms specified in Paragraphs 8.1 to 8.6 herein.
- 7.3 ***Continuation of Work Activities after Termination.*** Termination of this Technical Assistance Agreement does not prohibit the Recipient from independently continuing work on the project, but any such independent continuation is solely the responsibility of the Recipient.
- 7.4 ***Review.*** The Recipient shall be entitled to appeal any suspension or termination to the Director within 15 days after notice of the suspension or termination is received. The Director shall make a determination within 30 days after Recipient's appeal date. Should the Director uphold the suspension or termination, the Recipient shall be entitled to appeal to the Board of WIFA within 15 days after the Director's determination. The Board's determination shall be a final administrative decision that is subject to judicial review.
- 8.0 **Technical Assistance Agreement Termination**
- 8.1 ***Conflict of Interest.*** The Recipient shall comply with standards of conduct pursuant to 40 CFR 31.36 to avoid conflict of interest. Recipients of federal funds may not participate in the selection, award, or administration of a contract if real or apparent conflict of interest would result.
- 8.2 ***Cancellation for Conflict of Interest.*** Pursuant to A.R.S. § 38-511, the State may cancel this Technical Assistance Agreement without penalty or further obligation if any person significantly involved in initiating, negotiating, securing, drafting or creating the Technical Assistance Agreement on behalf of the State is or becomes at any time while the Technical Assistance Agreement or an extension of the Technical Assistance Agreement is in effect an employee of or a consultant to any other party to this Technical Assistance Agreement with respect to the subject matter of the Technical Assistance Agreement. The cancellation shall be effective when the Recipient receives written notice of the cancellation unless the notice specifies a later time. If the Recipient is a political subdivision of the State of Arizona, it may also cancel this Technical Assistance Agreement as provided in A.R.S. § 38-511.
- 8.3 ***Gratuities.*** The Authority may, by written notice, terminate this Technical Assistance Agreement, in whole or in part, if the Authority determines the Recipient or a representative of the Recipient offered employment or a Gratuity to any officer or employee of the State of Arizona for the purpose of receiving favorable treatment, including the making of any determination or decision, concerning this Technical Assistance Agreement. The Authority, in addition to any other rights or remedies, shall be entitled to recover exemplary damages in the amount of three times the value of the Gratuity offered by the Recipient.
- 8.4 ***Suspension or Debarment.*** The State may, by written notice to the Recipient, immediately terminate this Technical Assistance Agreement if the State determines that the Recipient has been debarred, suspended or otherwise lawfully prohibited from participating in any public procurement activity, including but not limited to, being disapproved as a subcontractor of any public procurement unit or other governmental body. Execution of a Technical Assistance Agreement shall attest that the Recipient is not currently suspended or debarred. If the Recipient becomes suspended or debarred, the Recipient shall immediately notify the Authority.
- 8.5 ***Termination for Convenience.*** The Authority reserves the right to terminate the Technical Assistance Agreement in whole or in part at any time, when in the best interests of the State of Arizona without penalty or recourse. In the event of termination under this paragraph, all documents, data and reports

prepared by the Recipient under the Technical Assistance Agreement shall become the property of and be delivered to the Authority. The Recipient shall be entitled to receive reimbursement for work completed and materials accepted before notification of termination. The Authority is under no obligation to continue reimbursement for any work activities undertaken after notification of termination.

8.6 ***Termination for Default.*** The Authority reserves the right to terminate the Technical Assistance Agreement in whole or in part due to the failure of the Recipient to comply with any term or condition of the Technical Assistance Agreement or to acquire and maintain all required insurance policies, bonds, licenses and permits. The Authority shall provide written notice of the termination and the reasons for it to the Recipient.

9.0 **Disputes**

9.1 ***Disputes.*** The parties to this Technical Assistance Agreement agree to resolve all disputes arising out of or relating to this Technical Assistance Agreement through arbitration, after exhausting applicable administrative review, to the extent required by A.R.S. § 12-1518 except as may be required by other applicable state or federal statutes and laws. As appropriate, Arbiters of disputes involving an Indian Nation must have jurisdiction in the State of Arizona and on Indian lands.

**Exhibit A**  
**Scope of Work**

# Dibble Engineering

November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

November 17, 2016

Ms. Janine Spencer

Town of Marana

11555 W. Civic Center Drive

Marana, AZ 85653

Re: Proposed Scope of Services  
El Rio Riparian Restoration

Dear Ms. Spencer:

Please find the following scope of services and associated fee for the El Rio Riparian Restoration Project. We are pleased to prepare the construction documents for the project on behalf of the Town of Marana. Please review this proposal and contact me at 602-957-1155 or [bob.haneline@dibblecorp.com](mailto:bob.haneline@dibblecorp.com) if you have any questions. We are prepared to begin this project once we receive a Notice to Proceed.

Sincerely,  
Dibble Engineering



Robert K. Haneline, P.E., LEED AP  
Practice Leader, Drainage & Flood Control

cc: DFC Proposal File



November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

Page 1

## **Attachment A – Scope of Services**

### **Introduction**

The Town of Marana is preparing to build improvements to a former borrow pit located adjacent to the south bank of the Santa Cruz River near the intersection of I-10 and W. Avra Valley Road (see **Figure 1 - Project Location and Limits**). While a schematic layout plan has been developed by the Town, the Town has contracted with Dibble Engineering (Dibble) to create plans and specifications suitable for obtaining competitive bids for a construction contract to build the improvements.

Following is a description of the tasks anticipated to be completed. The services described herein will be performed for the lump sum fee shown in **Attachment B – Fee**. Landscape Architecture Design and Environmental Services required for the work will be provide to the Town under a separate contract by others.

An anticipated project schedule is also included in **Attachment C**.

### **Standards & Procedures**

All work shall be in accordance with the latest editions of standards from the following jurisdictional agencies:

- Town of Marana Design Standards
- Pima County Regional Flood Control District (PCRFCDD)
- Federal Emergency Management Agency (FEMA), if applicable

# Dibble Engineering™

November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

Page 2



**Figure 1 - Project Location and Limits**

## **TASK DESCRIPTIONS:**

### **Project Management**

#### **Project Management**

Dibble's Project Manager will be knowledgeable of the project and have responsible charge of the progress of each phase of the project. The Project Manager will be the point of contact for the Town and will keep the Town informed of all coordination with outside agencies and other affected parties. The Project Manager will be responsible for all administrative issues, technical direction of the work, scheduling, and budgetary oversight for the project as well as coordination and reporting with the Town's Project Manager. Dibble will send monthly invoices (progress reports) to the Town showing the percent complete of individual tasks and appropriate backup of staff hourly billings to the project. The progress reports will contain a description of the work completed by task during the reporting month, a brief description of the projected work for the following month and a description of any problems or issues encountered.

# Dibble Engineering™

November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

Page 3

Dibble's Project Manager will be responsible for ensuring that Dibble's internal Specific Project Quality Management Plan is followed for this project. Senior engineering staff, not part of the regular design effort of the project, will independently review the design for conformance to design standards, constructability, and quality at each design progress level prior to each milestone submittal to the Town.

### **Meetings & Coordination**

Dibble will conduct monthly progress meetings or conference calls with Town staff intended to inform the Town of the status of the project, discuss any specific challenges and potential solutions, and upcoming submittals. Information needed from the Town or other stakeholders will be identified and solicited. Following is a summary of the meetings included in this scope of services:

- Project kick-off meeting (1)
- Submittal review meetings (3)

Dibble will be responsible for the agenda and meeting minutes for each meeting.

### **Data Research & Collection**

Dibble will review existing drainage studies and any available as-built documents to become familiar with available information pertinent to the characteristics at this location. Dibble will perform a visual site reconnaissance of the project site. The Town will provide right-of-way maps, quarter section and record drawings for Town utilities, if applicable, and record drawings and drainage reports for existing development in this area.

### **Topographic Survey**

Dibble will conduct a topographic survey that identifies features within the project limits (see **Figure 1 - Project Location and Limits**). The survey will include key features within the area having an impact on layout, grading and drainage including surface topography at 1-foot contour intervals, visible utilities, signs, large trees and shrubs, driveways, irrigation structures, and other structures that may influence the construction of the planned improvements. Following are the efforts associated with this task:

- Records Research & Crew Prep
- Horizontal, Vertical & Sectional Control
- Topographic Survey
- Control Sheet Preparation
- Basemap Preparation
- Parcel Research / Linework
- Quality Control

# Dibble Engineering

November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

Page 4

## **Alternatives Analysis (Optional Task)**

### **Site Layout Alternatives**

Dibble will provide up to three (3) alternative schematic layouts of the proposed improvements for the Town to consider.

### **Site Grading Alternatives**

Dibble will provide up to three (3) alternative schematic grading plans that coincide with the schematic layout plans described above.

### **Alternatives Analysis Memorandum**

Dibble will prepare a memorandum for your review which described the alternatives evaluated, their relative advantages and disadvantages, and their estimated construction costs. Dibble will present the memorandum to Town staff for your consideration and comment. Once Town and other stakeholders have provided review comments, Dibble will revise the memorandum and a final version will be submitted for your use.

## **Design Development and Construction Documents**

Dibble will prepare construction plans, specifications, and opinions of probable construction costs for this project in accordance with Town of Marana standards. The following progress submittals will be made. All submittals will be provided electronically in pdf format.

### **Design Development Submittal**

Dibble will provide draft Design Development-level documents, including site layout, site grading and drainage, and a preliminary engineer's probable construction cost. Dibble will then meet with Town staff to solicit their review comments to be included in the subsequent Construction Documents submittal.

### **Construction Documents Submittal**

Dibble will provide draft Construction Documents, including survey control, site layout, site grading and drainage, miscellaneous details, construction notes, erosion control, technical specification (not covered by Town standards or project notes), and a revised engineer's probable construction cost. Dibble will then meet with Town staff to solicit their review comments to be included in the final Construction Documents submittal.

Any project "front end" documentation needed for the project is assumed to be provided by the Town. These can include:

- Project advertisement and bidding documents
- Construction contract general conditions, supplemental conditions and standard special provisions

# Dibble Engineering

November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

Page 5

The Construction Documents plan set in anticipated to include the following:

**PLAN SHEET INDEX:**

Cover (Including Vicinity Map)	1
Standard Notes, Legends, Abbreviations, Quantities & Keynotes	1
Survey Control	1
Site Layout Sheets	2
Site Grading & Drainage Sheets	2
Site Erosion Control Sheets (SWPPP)	1
Miscellaneous Details	1
<b>TOTAL</b>	<b>9</b>

**Post Design Services**

These services are not included in this proposal, but can be provided if requested by the Town.

# Dibble Engineering

November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

Page 6

## Assumptions and Exclusions

### Town of Marana Will Provide The Following:

1. Existing studies, reports, as-built plans and other known record documentation pertinent to the project area
2. Construction bidding & contracting "front end" documents
3. Landscape Architecture and environmental services (under separate proposal by others)

### Exclusions:

1. FEMA Letters of Map Revision or Conditional Letters of Map Revision
2. FLO-2D, HEC-1 or other hydrologic modeling services
3. HEC-RAS or other hydraulic Santa Cruz River modeling services
4. Significant changes to the size of the project limits, as shown in **Figure 1 - Project Location and Limits**
5. Biological assessment/review/design services
6. Dibble understands that Santa Cruz River bank protection and inlet/outlet structure improvements are being designed and built by others. Therefore, no work in the Santa Cruz River is anticipated in this proposal.

**END SCOPE OF WORK**



November 17, 2016

Ms. Janine Spencer

Re: Proposed Scope of Services  
El Rio Riparian Restoration

### Attachment B – Fee

Dibble will provide the services described in **Attachment A – Scope of Services** for the lump sum fee of **\$45,910** for basic services. An optional phase has also been included per your request for the Alternatives Analysis phase if desired.

Project Phase	Fee
Project Management, Meetings & Research	\$ 6,760
Survey	\$ 18,750
Design Development Documents	\$ 7,800
Construction Documents	\$ 12,600
<b>Base Fee</b>	<b>\$ 45,910</b>
Optional Phase - Alternatives Analysis	\$ 5,100
<b>Total Fee with Optional Phase</b>	<b>\$ 51,010</b>

# WHEAT | DESIGN GROUP

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LANDSCAPE ARCHITECTS

November 15, 2016

Janine Spencer  
Environmental Projects Manager  
Town of Marana  
11555 W. Civic Center Drive  
Marana, AZ 85653

**Re: WIFA Grant: El Rio Riparian Restoration Project**

Dear Janine,

We are pleased to submit this Scope & Fee for providing Landscape architectural services for the **WIFA Grant: El Rio Riparian Restoration Project**. We have based this Scope & Fee on the emails and exhibits you have provided. Please refer to the attached Workhour Estimates for a detailed breakdown of services offered.

***Assumptions:***

1. Landscape Architectural services are provided for 16-months, excluding Post Design services.
2. Pima Association of Governments Standard Specifications and Details (2015) will be used.
3. Any Soil testing (Percolation and/or Horticultural Analysis) will be performed by others.
4. Dibble Engineering will provide base files in Microstation or AutoCAD format.
5. Wheat Design Group's hours for performing quality control shall be billed toward the specific tasks.
6. The technical review, checking procedures, and monitoring process shall follow Wheat Design Group's QA/QC plan.
7. This Scope & Fee is for landscape & irrigation for approximately 5 acres; remaining project area will be seeded.
8. Per the WIFA application, "Wheat Design Group will provide detailed landscape and irrigation plans that incorporate stormwater harvesting techniques, with a native plant list, placements of trails, a ramada, benches, interpretive signage, and a bird blind".
9. This Scope & Fee does not include a native plant inventory.
10. Submittals to Town of Marana will be in pdf format. Plotting and/or other reproductions are not included in this Scope & Fee.

**Scope of Work**

**Task 1.0: PROJECT MANAGEMENT**

This task involves administering and recording project documents, invoices, managing project files, and preparing for and attending the meetings listed below:

- Attend one (1) Kick-off Meeting.
- Attend one (1) Comment Resolution Meeting.
- Site Visit.

**Task 2.0: 60% SUBMITTAL**

This task consists of landscape architectural coordination with the Town of Marana and the design team for the 60% Submittal: Plans, Details, Specifications, and Cost Estimate. Design Team will receive comments from the Town of Marana after the 60% Submittal and make necessary revisions.

***Deliverables:***

1. *Landscape Plans and Details.*
2. *Irrigation Plans and Details.*
3. *Specifications and Cost Estimate.*

# WHEAT | DESIGN GROUP

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LANDSCAPE ARCHITECTS

## **Task 3.0: 100% SUBMITTAL**

This task consists of landscape architectural coordination with the Town of Marana and the design team for the 100% Submittal: Plans, Details, Specifications, and Cost Estimate.

### **Deliverables:**

1. *Landscape Plans and Details.*
2. *Irrigation Plans and Details.*
3. *Specifications and Cost Estimate.*

### **Professional Fees:**

The work will be based on the hourly rates provided and based on the hours and tasks listed in the attached Workhour Estimate worksheet. Work beyond this scope will be considered additional services and will not proceed without approval from the Client. Billings for services will be submitted at the end of each month based on a percentage of work completed.

Wheat Design Group has pledged to provide approx. \$1400 in-kind fees/pro-bono work, to be deducted from their billings. This will be used for production of displays for public meetings or interpretive sign design.

### **Direct Expenses:**

Wheat Design Group does not anticipate direct expenses for this project. Mileage (approx. 3 trips to Marana/project site) will be a donated expense.

We very much look forward to working with you on this project.

Sincerely,



Laura Mielcarek, Principal  
Wheat Design Group, Inc.

**Wheat Design Group DERIVATION OF COST PROPOSAL SUMMARY**

PROJECT: **Town of Marana: WIFA Grant- El Rio Riparian Restoration Project**  
 TRACS No.:  
 DBE: Yes #1025  
 PREPARED BY: Laura Mielcarek, Principal  
 CONTRACT TIME: 16 months

DATE: 11/16/16  
 CONTRACT NO.:  
 CONSULTANT: **Wheat Design Group, Inc.**  
 CONTRACT TYPE:

METHOD OF COMPENSATION:

**DIRECT LABOR COST**

Item No.	TASK DESCRIPTION	CLASSIFICATION	No. HOURS	FULLY BURDENED	TOTAL COST
			Hours	RATE	Cost
1	Landscape Architectural Services	Principal Landscape Architect	24	\$142.00	\$3,408.00
		Project Manager	95	\$106.00	\$10,070.00
		A/E	91	\$92.00	\$8,372.00
		Designer	47	\$80.00	\$3,760.00
(A)	Direct Labor		257	Hrs.	<b><u>\$25,650.00</u></b>

**OTHER DIRECT EXPENSES**

	TRAVEL	\$0.00
	PLOTTING	\$0.00
	REPRODUCTIONS	\$0.00
	EXHIBITS FOR OPEN HOUSES	\$0.00
	SPECIALIZED VENDORS-IAS Laboratories	\$0.00
(D)	Other Direct Expenses	= <b><u>\$0.00</u></b>
(E)	OUTSIDE SERVICES & SUBCONSULTANT COSTS	
		Sub Fees
(F)	TOTAL COST FOR ALL SUBCONSULTANT AND OUTSIDE SERVICES	= <b><u>\$0.00</u></b>

**ESTIMATED FEES**

(G)	TOTAL CONSULTANT FEE	= <b><u>\$25,650.00</u></b>
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<b>TASK 3.0a</b>	Production of Displays for Public Meetings or Interpretive Sign Design	<b><u>\$1,400.00</u></b>
	<b>TOTAL CONSULTANT FEE INCLUDING TASK 3.0a</b>	<b><u>\$27,050.00</u></b>

**Wheat Design Group Workhour Estimate by Task**

Description	Principal Landscape Architect	Project Manager	A/E	Designer	TOTAL
<b>1.0 Project Management</b>					
Project Administration (16 months)	0	16	0	0	16
Kick-off Meeting	4	4	0	0	8
Comment resolution meetings (1 Meeting)	0	4	0	0	4
Site Visit	0	5	5	0	10
<b>Subtotal</b>	<b>4</b>	<b>29</b>	<b>5</b>	<b>0</b>	<b>38</b>
<b>2.0 60% Submittal</b>					
Landscape Plans and Details	2	16	20	12	50
Irrigation Plans and Details	2	12	18	8	38
Specifications	4	4	4	0	12
Cost Estimate	1	2	0	6	9
Response to 60% Comments	2	4	4	0	10
<b>Subtotal</b>	<b>11</b>	<b>38</b>	<b>44</b>	<b>26</b>	<b>119</b>
<b>3.0 100% Submittal</b>					
Landscape Plans and Details	2	12	20	12	46
Irrigation Plans and Details	2	8	12	9	31
Specifications	4	6	8	0	16
Cost Estimate	1	2	4	0	7
<b>Subtotal</b>	<b>9</b>	<b>28</b>	<b>42</b>	<b>21</b>	<b>100</b>
<b>TOTAL WORKHOURS</b>	<b>24</b>	<b>95</b>	<b>91</b>	<b>47</b>	<b>257</b>
<b>3.0a Displays for Public Meetings or Interpretive Sign Design</b>					
Production of Displays for Public Meetings or Interpretive Sign Design	1	1	0	15	17
<b>TOTAL WORKHOURS</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>15</b>	<b>17</b>
<b>FULLY BURDENED RATES</b>	<b>\$142.00</b>	<b>\$106.00</b>	<b>\$92.00</b>	<b>\$90.00</b>	
<b>TOTAL</b>	<b>\$142.00</b>	<b>\$106.00</b>	<b>\$0.00</b>	<b>\$1,200.00</b>	<b>\$1,400.00</b>

**Exhibit B**  
**Budget**

**WIFA and Recipient Project Budget and Deliverables**  
*Green Projects*

**Project Name:** El Rio Preserve Riparian Restoration Project  
**Recipient:** Town of Marana

**Tasks to be funded by WIFA**

Task	Description of Task	Budget
1	Project management, meetings and research	00
1	Survey	9,375.00
2	Design development documents (60% and 90% plans)	6,450.00
3	Construction documents	6,300.00
4	Landscape, water harvesting, irrigation plans and specifications	12,825.00
	<b>Total</b>	<b>34,950.00</b>

**Tasks to be funded by Recipient**

*Not required to report – match requirement waived for green projects*

Task	Description of Task	Budget
1	Project management, meetings and research	6,760.00
1	Survey	9,375.00
2	Design development documents (60% and 90% plans)	6,450.00
3	Construction documents	6,300.00
4	Landscape, water harvesting, irrigation plans and specifications	12,825.00
	<b>Total</b>	<b>41,710.00</b>

\*Environmental assessment must be completed and reviewed by WIFA per A.A.C. R18-15-106 prior to disbursement of funds for the design (tasks 2, 3 and 4).

Total Budget: \$76,660.00

WIFA Portion: \$34,950.00

Recipient Match: \$41,710.00

**List of Project Deliverables:**

1. Environmental Information Document
2. Draft and final design development-level documents, including site layout, site grading and drainage, details, constructions notes, erosion control, technical specifications, engineer's probable construction cost.
3. Landscape plans and details
4. Irrigation plans and details
5. Specifications and construction cost estimate