**PIMA PINEAPPLE CACTUS SURVEY**
**OF THE PROPOSED ROSEMONT PROJECT WATERLINE ALIGNMENT**

**PREPARED FOR:** Rosemont Copper Company

**PREPARED BY:** WestLand Resources, Inc.

**DATE:** March 11, 2009

**PROJECT NO.** 1049.10 350 350

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## 1. INTRODUCTION

WestLand Resources, Inc. (WestLand) was retained by Rosemont Copper Company to survey for Pima pineapple cactus (PPC; *Coryphantha scheeri* var. *robustispina*) along an approximately 15.77-mile-long proposed waterline as part of the proposed Rosemont Project. A 120-ft wide area was surveyed along the

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United States Dept of Agriculture
Forest Service
300 W. Congress, 6th Floor
Tucson, Arizona 85701

**FROM:** Brian Lindenlaub

**RE:** Rosemont Holdings and Vicinity

**ATTACHMENTS:**

| Copies | Originals | | |
|---|---|---|---|
| 1 | | Pima Pineapple Cactus Survey | |
| 1 | | Lesser Long-Nosed Bat Survey | |
| 1 | | Agave Survey | |
| 1 | | CD with all reports in PDF format | |
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**cc:** Kathy Arnold, Rosemont
Tom Fergason, SWCA
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proposed waterline extending from just east of the Town of Sahuarita to the western base of the Santa Rita Mountains[1] (the Survey Area, Figure 1).

## 2. SPECIES STATUS

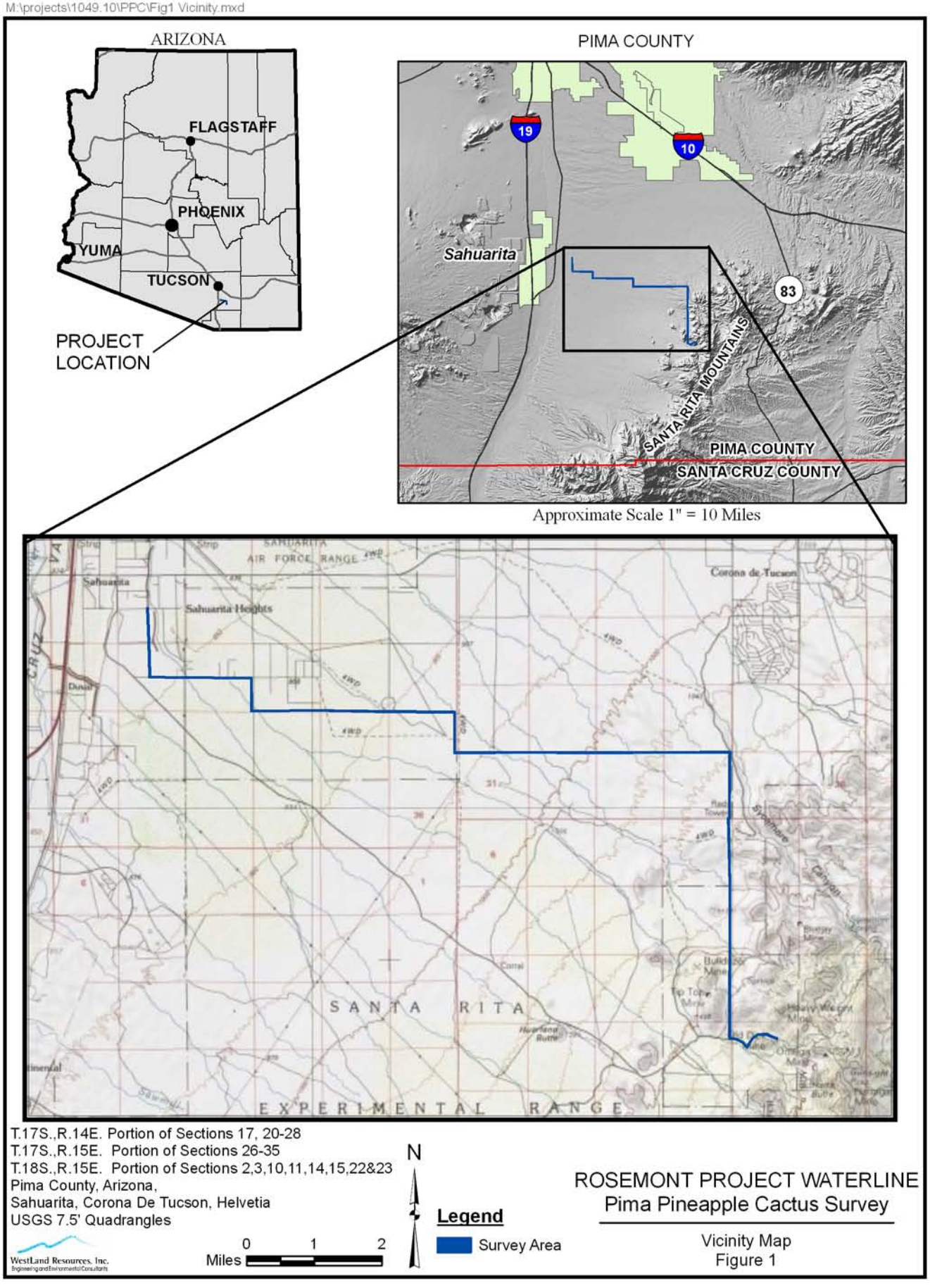
The PPC is listed by US Fish and Wildlife Service (USFWS) as endangered (58 FR 49875, 09-23-93) under the Endangered Species Act (ESA). There is no designated critical habitat or proposed critical habitat for PPC.

The PPC is reported to occur from 2,300 to 4,500 feet (700 to 1,400 meters) in elevation (EES 1992) in Pima and Santa Cruz counties, southern Arizona, and northern Sonora, Mexico (Benson 1982; Phillips and Phillips 1981). The known range of PPC in Arizona is from the Baboquivari Mountains east to the Santa Rita Mountains in Santa Cruz and Pima counties. Most of the known locations are in the Altar and Avra valleys, Santa Cruz River Basin, and the alluvial fans of the Sierrita, Santa Rita, Empire, Coyote, and Pajarito mountains (AGFD 2001), and two documented populations are known in northern Sonora, Mexico (USFWS 1998). The PPC does not occur in mountainous areas including the Sierrita, Baboquivari, Santa Rita, Quinlan, Coyote, Atascosa, Pajarito, Cerro Colorado, San Luis, and Tumacacori mountains. The species has not been found in riparian areas such as the Santa Cruz River floodplain or the Sonoita Creek drainage of Arizona (58 FR 49875).

The PPC is generally found on Sonoran desertscrub alluvial fans and semidesert grassland ridges (Mills 1991). In rolling hilly habitats, the species has been found mainly on flat hilltops and rarely on slopes or in drainages separating the hilltops. Although PPC occur most commonly on flat ridgetops with little (less than 10 percent) slope, Mills (1991) reported some plants on south-facing hillsides (mid to upper slope) with slopes up to 15 percent (Mills 1991). Mills (1991) also reported that they found no plants on north-facing slopes of any significant size, despite intensive surveys. However, PPC have been found on a northern slope with approximately 25 percent grade (S. Hart, WestLand Resources, Inc., personal observation) but this is uncommon. Substrate composition is likely an important factor in determining PPC distribution, although we are not aware of any studies that conclusively identify important substrate factors. Substrates in which PPC occur are described as rocky to sandy or silty soils in alluvial valleys or on shallow-sloped (less than 10 percent grade) hillsides (Mills 1991) and White House sandy loam series (Roller 1996). They are not known to occur in very sandy or very rocky soils, in deeper soils along drainages, or in soils with high clay content (Mills 1991).

[1] Crossing T17S, R14E, Sections 17, 20, 21, and borders of Sections 22/27, 23/26, and 24/25; T17S, R15E, borders of Sections 30/31, 29/32, 28/33, 27/34 and 34/35; and T18S, R15E, borders of Sections 2/3, 10/11, and 14/15, and Section 23, Gila and Salt River Meridian

M:\projects\1049.10\PPC\Fig1 Vicinity.mxd




T.17S.,R.14E. Portion of Sections 17, 20-28
T.17S.,R.15E. Portion of Sections 26-35
T.18S.,R.15E. Portion of Sections 2,3,10,11,14,15,22&23
Pima County, Arizona,
Sahuarita, Corona De Tucson, Helvetia
USGS 7.5' Quadrangles

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 1 2
Miles

N

**Legend**

Survey Area

# ROSEMONT PROJECT WATERLINE
## Pima Pineapple Cactus Survey

Vicinity Map
Figure 1

## 3. METHODS

The survey followed guidelines set forth in the USFWS document entitled *Pima Pineapple Cactus 3 Tier Survey Methods* (Roller 1996). Surveyors walked transects approximately 15 feet apart to attain 100 percent coverage of the Survey Area. A single, 100-percent coverage survey was completed between October 7 and 21, 2008, by a WestLand field crew with extensive PPC survey experience.

The boundaries of the Survey Area were entered into a Trimble GPS unit with sub-centimeter accuracy. The unit was carried in the field to guide the survey. In places, the Survey Area straddled fencing along the boundary of private property. In these situations, the private property was not included in the survey but the survey width remained 120 feet, with the fence becoming one boundary.

UTM coordinates (in NAD 27) of all PPC found were entered into the Trimble unit. PPC were tagged with a unique number and the number of stems and general health of each plant was recorded.

## 4. SURVEY AREA DESCRIPTION

The Survey Area is located mainly on alluvium on the west side of the Santa Rita Mountains. The Survey Area passes through undeveloped lands, except for short stretches with residences in a rural setting on one side of the alignment (Figure 2). The Survey Area included dirt roadways over much of its length.

Jackson (1989) mapped the geomorphological units that the Survey Area crosses. The western approximately 7 miles of the Survey Area are generally planar with a gentle but gradually increasing upward slope to the east. This section starts on late Pleistocene–early Holocene soils at the west end, moving east over a mosaic of middle and late Pleistocene through Holocene soils. The next 3.5 miles continue east onto a wide alluvial fan of early Pleistocene (older) origin spilling out of Sycamore Canyon in the Santa Rita Mountains. This surface is easily distinguished in aerial color photography (shown reddish in color) and typified by northwest-trending, steep-sloped ridges and an increasingly steep overall gradient as the base of the Santa Rita Mountains are approached (Figure 2). The Survey Area then turns south and continues on the same surface for close to 2 miles, then for more than 1.5 miles crosses a surface with a similar overall slope and age, but of different origin and with shallower cut ridges. The final approximately 1.75 miles of the Survey Area crosses a small, outlying hill of the mountains protruding from the alluvial material, ending in a steep drainage at the base of the mountains. The low point of the Survey Area is approximately 2,730 feet above mean sea level (amsl) near its western end, and the high point is approximately 4,500 feet amsl near its eastern end.

On Brown's (1994) map of biotic communities of the southwest, the west end of the Survey Area is near the boundary of the semidesert grassland and Arizona upland subdivision of the Sonoran desertscrub biotic communities, crossing eastward within semidesert grassland. The Survey Area crosses through

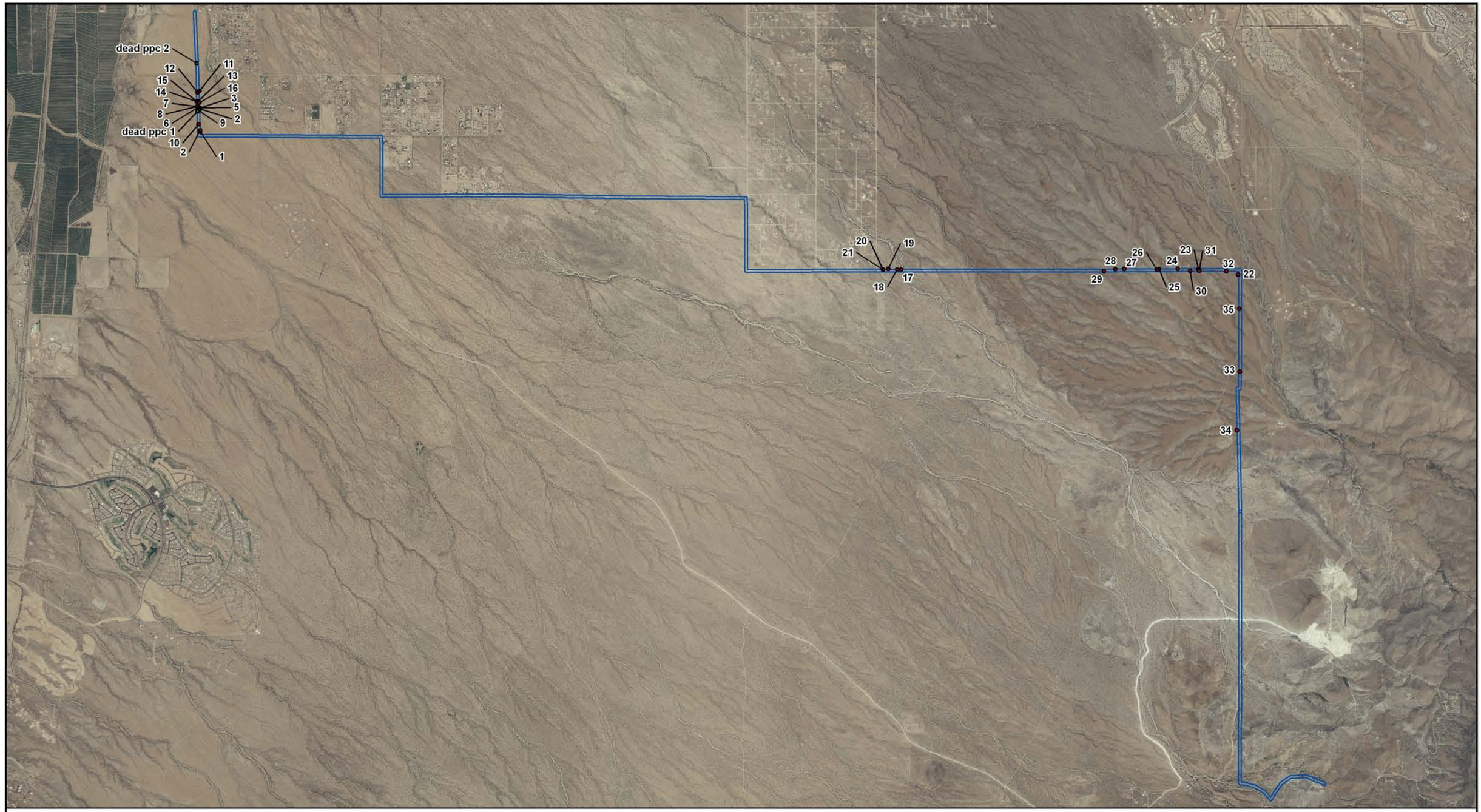



Image Source: NAIP, 2007

WestLand Resources, Inc.
Engineering and Environmental Consultants

N

4,000 2,000 0 4,000
Feet

**Legend**

- Survey Area
- PPC Location

ROSEMONT PROJECT WATERLINE
Pima Pineapple Cactus Survey

PPC Location Map
Figure 2

various vegetation communities, including mesquite–cactus scrub with more Sonoran desertscrub influence; creosotebush (*Larrea tridentata*) flats; relatively densely vegetated xeroriparian areas with velvet mesquite (*Prosopis velutina*), blue palo verde (*Parkinsonia florida*), whitethorn acacia (*Acacia constricta*), and other shrubs; and areas that were likely typical semidesert grassland decades ago, but now support more mesquite, soaptree yucca (*Yucca elata*), and many species of shrubs and sub-shrubs.

## 5. PIMA PINEAPPLE CACTUS SURVEY RESULTS

The 120-ft-wide, 15.77-mile-long Survey Area covers approximately 229 acres. WestLand mapped, tagged, and recorded data on the 35 live PPC that were found during the survey effort. Distribution of the PPC was not uniform along the Survey Area. A cluster consisting of 16 live PPC and two dead PPC was found along the westernmost portion of the Survey Area (Figure 2). Soils within this westernmost portion are of late Pleistocene to early Holocene origin. Approximately 6.5 miles to the east of the first cluster, a group of 5 PPC was found on middle Pleistocene soils just east of the intersection of Camino de Aurelia and South Kolb Road (Figure 2). The other 14 PPC were found dispersed over approximately 2.5 miles of early Pleistocene soils within the Sycamore Canyon alluvial fan, where the alignment makes its final turn to the south (Figure 2). The gaps where no PPC were found are notable, including approximately 6.5 miles between the western and middle clusters, 1.5 miles from the middle cluster to the first PPC on the Sycamore Canyon fan, and the final southeastern 3.5 miles of the Survey Area (Figure 2).

The UTM coordinates, in NAD 27, of all live PPC found during the survey are provided in Table 1.

**Table 1. Locations and Notes for PPC found during the Rosemont Waterline Survey, October 2008**

| PPC Tag No. | UTM Coordinates (NAD 27) | | Notes |
|---|---|---|---|
| | Easting | Northing | |
| 1 | 506158 | 3533168 | No pups, healthy |
| 2 | 506153 | 3533187 | 2 main stems, no pups, healthy |
| 3 | 506152 | 3533475 | 4 pups, 2 fruits, healthy |
| 4 | 506152 | 3533480 | 4 pups, healthy |
| 5 | 506149 | 3533481 | 2 healthy main stems, 4 pups (3 dead) |
| 6 | 506131 | 3533489 | 5 pups, healthy |
| 7 | 506121 | 3533499 | Dead main stem, 6 pups |
| 8 | 506117 | 3533501 | No pups, healthy |
| 9 | 506140 | 3533444 | No pups, 1 fruit, healthy |
| 10 | 506133 | 3533261 | 10 pups, healthy |
| 11 | 506144 | 3533705 | 2 fruits, unhealthy |
| 12 | 506121 | 3533690 | Main stem unhealthy, 4 pups |
| 13 | 506128 | 3533570 | No pups, healthy |
| 14 | 506119 | 3533561 | No pups, healthy |
| 15 | 506113 | 3533565 | 1 healthy stem, 1 dead stem |
| 16 | 506144 | 3533550 | Main stem dead, 3 pups |
| 17 | 515453 | 3531336 | no pups; healthy |

**Table 1. Locations and Notes for PPC found during the Rosemont Waterline Survey, October 2008**

| PPC Tag No. | UTM Coordinates (NAD 27) | | Notes |
|---|---|---|---|
| | Easting | Northing | |
| 18 | 515399 | 3531335 | 1 pup; healthy |
| 19 | 515281 | 3531349 | |
| 20 | 515212 | 3531334 | no pups |
| 21 | 515211 | 3531335 | 7 pups |
| 22 | 519923 | 3531270 | 4 stems 1 dead 3 fruit healthy |
| 23 | 519395 | 3531340 | 7 pups; fair health |
| 24 | 519121 | 3531347 | 2 pups; healthy; 1 fruit |
| 25 | 518874 | 3531346 | 2 pups; healthy; 2 dry fruit remnants |
| 26 | 518842 | 3531336 | 8 pups; healthy |
| 27 | 518412 | 3531347 | 0 pups; healthy |
| 28 | 518293 | 3531339 | main stem dead; 6 pups; healthy |
| 29 | 518143 | 3531316 | 26 pups; healthy; 2 dry-partial fruit; 3 ripe fruit |
| 30 | 519283 | 3531321 | 3 pups; healthy |
| 31 | 519409 | 3531322 | 0 pups; healthy |
| 32 | 519763 | 3531315 | 3 pups healthy 3 fruits |
| 33 | 519944 | 3529983 | 4 stems 2 dead 6 pups |
| 34 | 519905 | 3529206 | 3 pups; healthy |
| 35 | 519938 | 3530817 | 11 pups; healthy |

## 6. LITERATURE CITED

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