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**A CLASS I AND CLASS III CULTURAL RESOURCE SURVEY FOR  
THE PROPOSED LIBERTY-COOLIDGE 230-KV TRANSMISSION  
LINE REALIGNMENT, IN SUPPORT OF THE SOUTH MOUNTAIN  
LOOP 202 ALIGNMENT, IN THE GILA RIVER INDIAN COMMUNITY,  
THE UNINCORPORATED COMMUNITY OF LAVEEN AND THE CITY  
OF PHOENIX, MARICOPA COUNTY, ARIZONA**

**John M. McCool and Chris Loendorf**

**Contributions by Lynn Simon**

In support of the **Technical Studies**  
to the **Environmental Impact Statement**

**South Mountain Transportation Corridor  
in Maricopa County, Arizona**

Arizona Department of Transportation  
Federal Highway Administration  
in cooperation with  
United States Army Corps of Engineers  
United States Bureau of Indian Affairs



Version 1.3/October 2012

ADOT Project No. 202L MA 054 H5764 01L  
Federal Aid No. NH-202-D(ADY)





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**A CLASS I AND CLASS III  
CULTURAL RESOURCE SURVEY FOR THE PROPOSED WESTERN  
TRANSMISSION LINE REALIGNMENT, IN SUPPORT OF THE SOUTH  
MOUNTAIN LOOP 202 ALIGNMENT, IN THE GILA RIVER INDIAN  
COMMUNITY, THE UNINCORPORATED COMMUNITY OF LAVEEN AND  
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**Abstract:** This report presents the results of Class II and Class III survey completed for the proposed Western transmission line realignment, for the South Mountain Loop 202 Alignment freeway corridor in the South Mountain Transportation Corridor Study Area. National Register eligibility and management recommendations are provided for all cultural properties examined.



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TRANSMISSION LINE REALIGNMENT, IN SUPPORT OF THE  
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**CRMP Technical Report 2012-04**

2012



# THPO AND SHPO REPORT ABSTRACT

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**AGENCY:** Western Area Power Administration

**PROJECT TITLE:** A Class I and Class III Cultural Resource Survey for the Proposed Liberty-Coolidge 230-kV Transmission Line Realignment, in Support of the South Mountain Loop 202, in the Gila River Indian Community, the Unincorporated Community of Laveen and the City of Phoenix, Maricopa County, Arizona

**DATE OF REPORT:** October 2012

**GRIC-CRMP REPORT NUMBER:** CRMP Technical Report No. 2011-04

**ADOT TRACS No:** 202L MA 054 H5764 01L

**PROJECT FUNDING:** FHWA Federal Aid Project No. NH-202-D(ADY)

**PROJECT DESCRIPTION:** This report presents results of a Class I and Class III archaeological survey of a proposed realignment for portions of the Western Area Power Administration (Western), Liberty to Coolidge electrical transmission line within Maricopa County. These segments are located in District 6 of the Gila River Indian Community (GRIC), and immediately north of the community boundary in Laveen. Additionally, the line may also be moved between Broadway Road and Lower Buckeye Road, west of 59<sup>th</sup> Avenue, in Phoenix. The Class I and Class III survey was conducted by the GRIC Cultural Resource Management Program (CRMP; Project No. 2011.18s1), at the request of Scott Stapp, Senior Environmental Planner, HDR. The work was carried out in accordance with the National Environmental Policy Act (NEPA), and Section 106 of the National Historic Preservation Act (NHPA) as part of the environmental review process required for undertakings involving federal funds or that take place on federal lands. Chris Loendorf, PhD, Project Manager, GRIC-CRMP administered the survey. Field personnel for the project included John McCool (Crew Chief), Ashley Bitowf (Archaeological Technician I), and Emery Manuel (Archaeological Technician I).

**LOCATION:** The project area for this undertaking includes the entirety of the proposed 98-acre Liberty-Coolidge 230-kV Transmission Line realignment. The plat locations of the current project are: Sections 2 and 3 of Township 2 South, Range 2 East and Sections 20, 21, 28, 33, and 34 of Township 1 South, Range 2 East (USGS Laveen 7.5' topographic quadrangle) and Section 19 of Township 1 South, Range 2 East (Fowler 7.5' topographic quadrangle).

**SURVEYED ACRES:** 98.6 acres total; 37.7 acres outside GRIC, 60.9 acres within GRIC

**LAND STATUS:** Tribal, Allotted (on GRIC); Private (in Laveen and Phoenix)

**NUMBER OF SITES:** 7

**PREVIOUSLY RECORDED SITES:** AZ T:12:52 (ASM), AZ T:12:112 (ASM), GR-1002, GR1003, GR-1081

**PREVIOUSLY UNRECORDED SITES:** GR-1569, GR-1571

**NRHP ELIGIBLE SITES:** AZ T:12:52 (ASM), AZ T:12:112 (ASM), GR-1002, GR- 1003, GR-1081, GR-1569

**INELIGIBLE SITES:** GR-1571

**COMMENTS:**

- Avoidance or data recovery investigations are recommended for the six NRHP eligible sites (AZ T:12:52 [ASM], AZ T:12:112 [ASM], GR-1002, GR-1003, GR-1081, GR-1569) in the Liberty-Coolidge 230-kV Transmission Line realignment corridor.
- Avoidance or data testing is recommended for a historically documented prehistoric canal (Canal Rio) that may cross the Liberty-Coolidge 230-kV Transmission Line realignment corridor.
- No further cultural resource investigations are recommended for ineligible site (GR-1571) in the Liberty-Coolidge 230-kV Transmission Line realignment corridor.
- It is recommended that the transmission line be designed to avoid any direct or indirect impacts to the three previously recognized Traditional Cultural Properties (South Mountain, AZ T:12:52 [ASM]; and AZ T:12:112 [ASM]) that occur in the Liberty-Coolidge 230-kV Transmission Line realignment corridor.

# TABLE OF CONTENTS

List of Figures .....	vi
List of Tables.....	vii
CHAPTER 1: INTRODUCTION.....	1
Project Background.....	6
Project Location .....	6
CHAPTER 2: PROJECT SETTING .....	7
Environmental Setting.....	7
Middle Gila River Valley .....	7
Lower Salt River Valley .....	9
Cultural Setting .....	10
Paleo-Indian and Archaic Periods.....	12
Hohokam Pre-Classic .....	12
Hohokam Classic Period.....	13
The Protohistoric .....	13
Akimel O’odham Historic Period .....	14
CHAPTER 3: CLASS I RECORDS SEARCH.....	15
Previous Archaeological Investigations.....	15
Previously Documented Archaeological Sites .....	15
GR-1002 .....	25
GR-1003 .....	27
GR-1081 .....	29
AZ T:12:39 (ASU).....	29
AZ T:12:52 (ASM).....	33
AZ T:12:112 (ASM).....	35
Historically Documented Resources .....	38
Historic Transportation and Communication Routes .....	38
Water Management Features .....	39
Structural Features .....	39
Traditional Cultural Properties.....	39
South Mountain .....	40
Summary .....	40
CHAPTER 4: SURVEY METHODS .....	41
Site Recording and Updating Procedures.....	41
Surface-Collection Strategies .....	42
Rock Pile Recording Strategy.....	43
Analytical Methods .....	43
Isolated Occurrences .....	44
CHAPTER 5: Survey Results.....	45
GR-1569 .....	45
GR-1571 .....	49
Isolated Occurences .....	51
CHAPTER 6: SUMMARY AND RECOMMENDATIONS .....	53
REFERENCES CITED .....	57
APPENDIX A: ARTIFACT DATA.....	75
APPENDIX B: SUMMARY OF ROCK PILE TYPOLOGY .....	79

## LIST OF FIGURES

---

Figure 1.1 Map of Gila River Indian Community and southwest Phoenix metropolitan area showing the project vicinity. ....	1
Figure 1.2. Map of the northern portion of the realignment corridor in Phoenix between Broadway and Lower Buckeye road west of 59 <sup>th</sup> Avenue.....	2
Figure 1.3. Map of the southern portion of the realignment corridor within the Gila River Indian Community and Laveen. ....	3
Figure 1.4. Map of the southern portion of the realignment corridor on the Gila River Indian Community near Pecos Road. ....	4
Figure 2.1 Surficial geomorphological map of the southern part of the realignment corridor.....	8
Figure 2.2. Chronological periods and phases defined for the study area.....	11
Figure 3.1. Previous archaeological investigations within ½ mile of the Liberty-Coolidge 230-kV Transmission Line realignment corridor.....	16
Figure 3.2. Previously recorded sites within ½ mile of the Liberty-Coolidge 230-kV Transmission Line realignment corridor. ....	17
Figure 3.3. Map of GR-1002. ....	26
Figure 3.4. Map of GR-1003 .....	28
Figure 3.5. Map of GR-1081 .....	30
Figure 3.6. AZ T:12:39 (from Bostwick and Rice 1987: 66).....	31
Figure 3.7. AZ T:12:112 (from Shaw 2000) .....	32
Figure 3.8. Map of AZ T:12:52 .....	34
Figure 3.9. Map of AZ T:12:112. ....	36
Figure 3.10. Overview of AZ T:12:112, Feature 1 in foreground.....	37
Figure 3.11. Bladed disturbance adjacent to AZ T:12:112, looking east. ....	37
Figure 5.1. Previously unrecorded sites and Isolated Occurances.....	46
Figure 5.2 Map of GR-1569. ....	47
Figure 5.3. Photograph of GR-1569. ....	48
Figure 5.4. Map of GR-1571 .....	50
Figure 5.5. Photograph of GR-1571 .....	51

## LIST OF TABLES

---

Table 1.1. Transmission line structures within the realignment corridors. ....	6
Table 3.1. Previous Archaeological Projects within ½ mile of the Liberty-Coolidge 230-kV Transmission Line Realignment Corridor. ....	18
Table 3.2 Previously Recorded Sites within ½ Mile of the Liberty-Coolidge 230-kV Transmission Line Realignment Corridor. ....	21
Table 5.2. Isolated Occurrences by Township and Range .....	52
Table 6.1. Summary and Eligibility Recommendations for Sites Recorded Within the Liberty- Coolidge 230-kV Transmission Line Realignment Area .....	54
Table A.1. Historic Glass Recovered .....	76
Table A.2. Historic Metal Recovered.....	77
Table A.3. Non-Indigenous Ceramics Recovered.....	78
Table A.4. Indigenous Ceramics Recovered .....	78
Table A.5. Lithics Recovered.....	78
Table B.1. Abbreviated Summary of Doak et al. 1997 .....	79

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# CHAPTER 1: INTRODUCTION

This document presents Class I and Class III survey results for the proposed Western Area Power Administration (Western), Electrical Liberty-Coolidge 230-kV Transmission Line realignment (Figure 1.1) located both inside and outside of the Gila River Indian Community (GRIC), Maricopa County, Arizona. Realignment of the transmission line would be necessary for construction of the proposed South Mountain Freeway. Western is one of the power marketing administrations within the U.S. Department of Energy, therefore the realignment of the transmission line necessitates compliance with section 106 of the National Historic Preservation Act. Project funding is provided through the Federal Highway Administration (FHWA). Other agencies involved in this undertaking include the Arizona Department of Transportation (ADOT), the Bureau of Indian Affairs (BIA) and the GRIC. Portions of the realignment located within the GRIC include both tribal and allotted lands in District 6 of the community. Segments of the realignment corridor that are not within the GRIC fall on adjacent private lands in the Unincorporated Community of Laveen and a non-contiguous area of private land roughly 6.25 miles to the north, between Broadway and Lower Buckeye road west of 59<sup>th</sup> Avenue in the City of Phoenix. Construction associated with the realignment of the Liberty-Coolidge 230-kV Transmission Line has the potential to adversely affect historic properties within the realignment corridor. The realignment corridors include a 98-acre area where the Liberty-Coolidge 230-kV Transmission Line may be reposition as part of the proposed E1 or E2 alignments for the South Mountain Loop 202 project (Figures 1.2, 1.3, and 1.4).

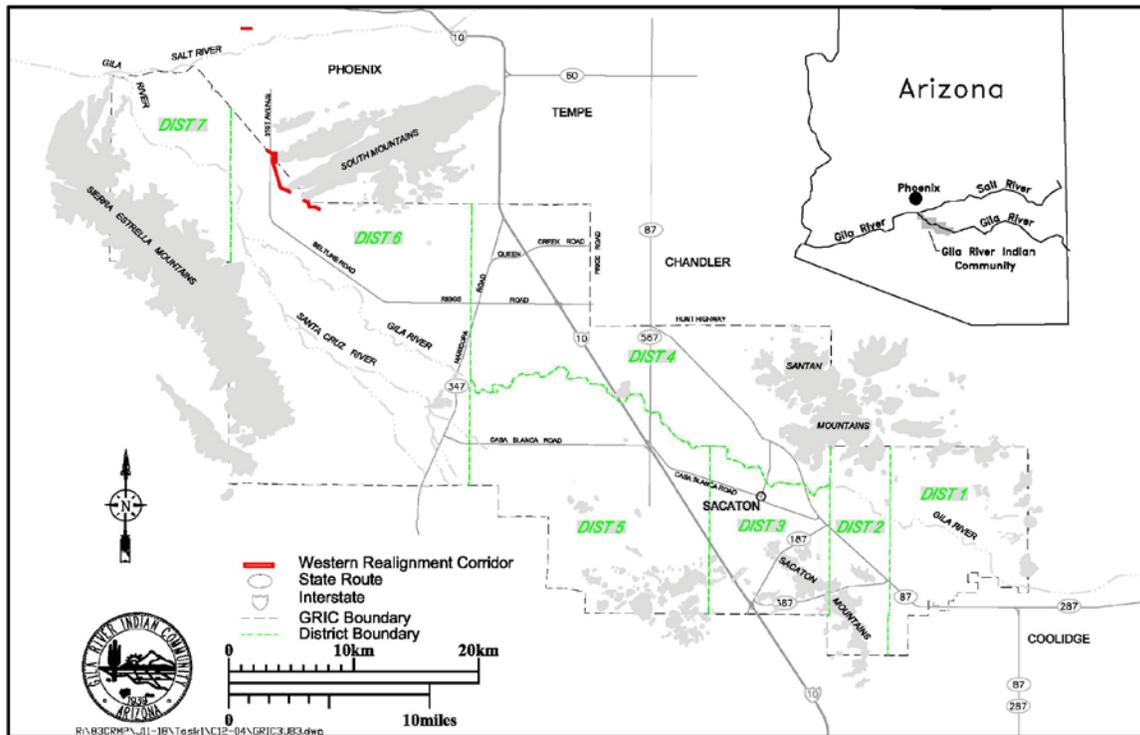
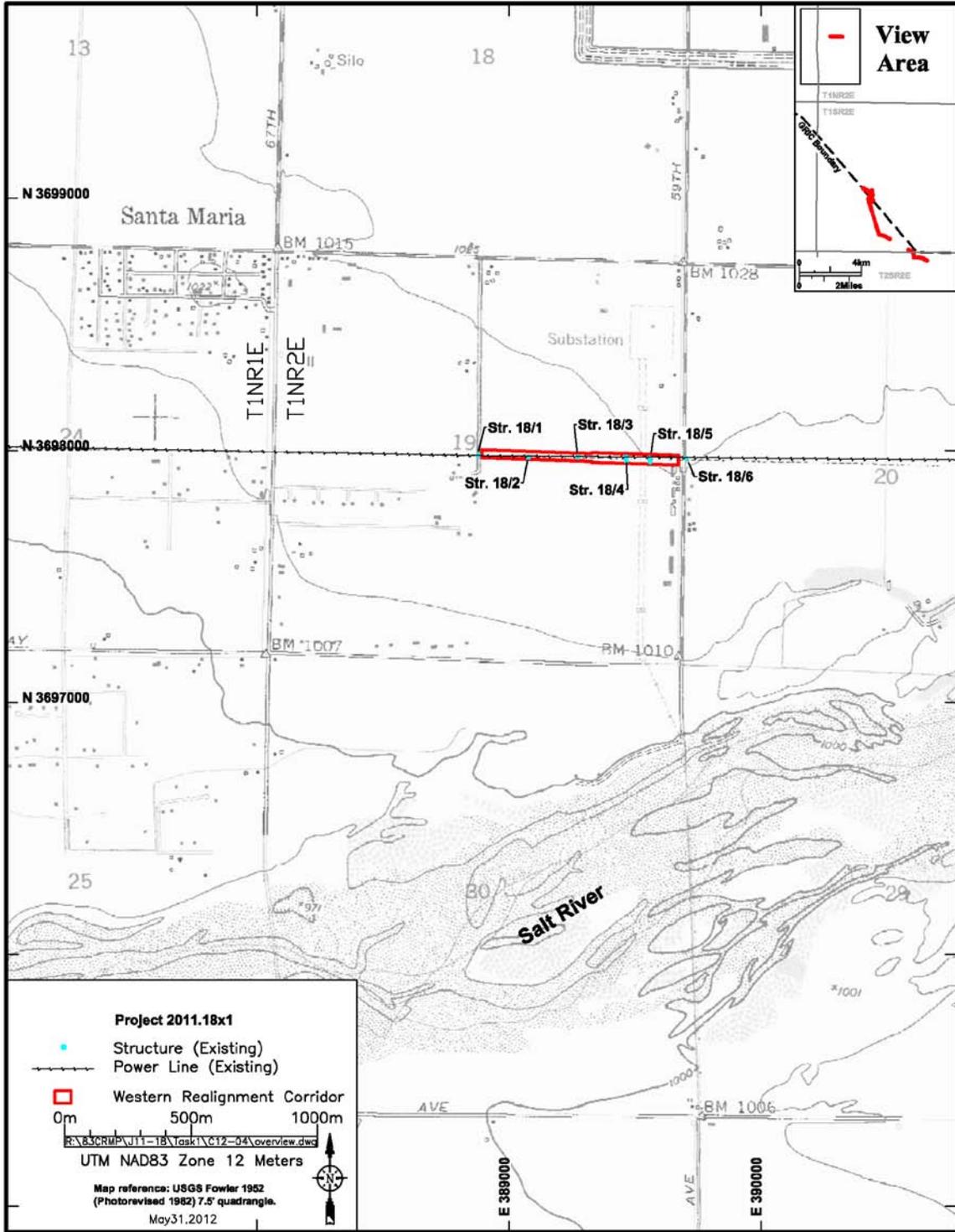


Figure 1.1 Map of Gila River Indian Community and southwest Phoenix metropolitan area showing the project vicinity.



**Figure 1.2. Map of the northern portion of the realignment corridor in Phoenix between Broadway and Lower Buckeye road west of 59<sup>th</sup> Avenue.**

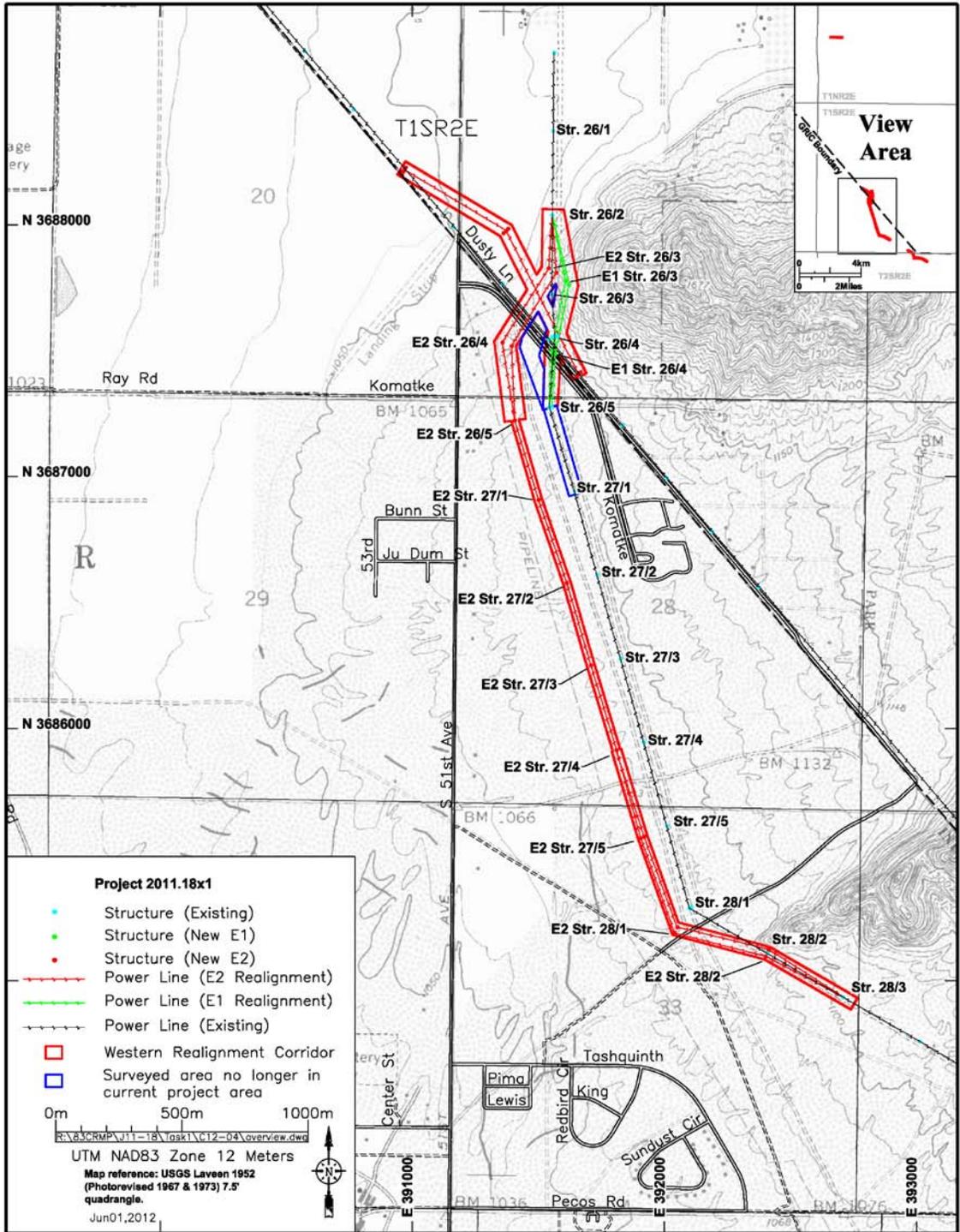
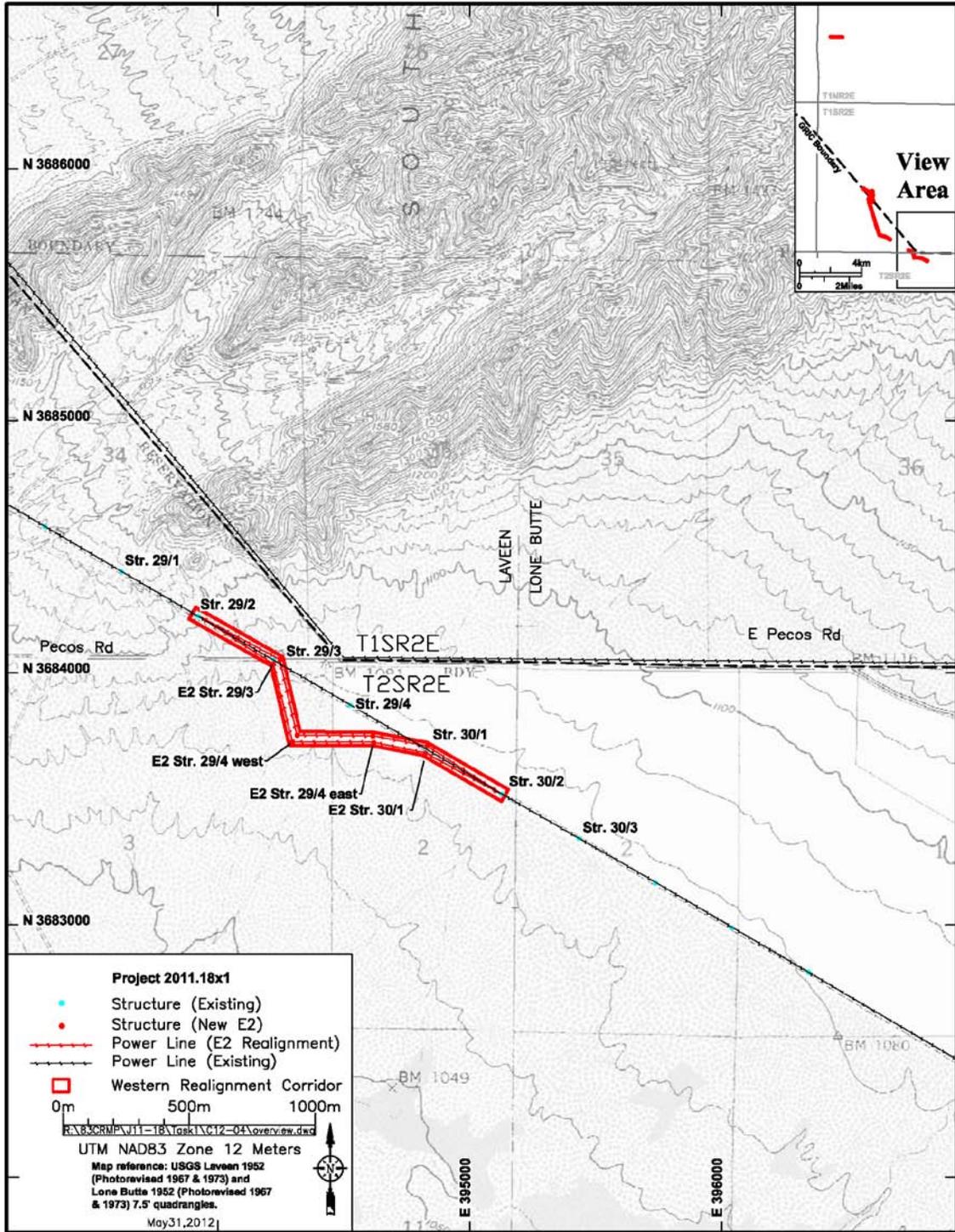


Figure 1.3. Map of the southern portion of the realignment corridor within the Gila River Indian Community and Laveen.



**Figure 1.4. Map of the southern portion of the realignment corridor on the Gila River Indian Community near Pecos Road.**

Construction within the realigned transmission corridor could involve new locations for transmission line structures, which may involve leveling pads for structure placement and equipment access with extension of outriggers. Additional subsurface disturbance could involve the use of tracked vehicles. Access road construction and/or upgrades and maintenance to existing roads may also be necessary. This work could involve construction of water bars to reduce erosion, construction or replacement of cattle guards, placement or replacement of gates, spreading dirt/gravel within roadways, blading, and grading. Aside from direct impacts to cultural properties, road improvements could facilitate access to the area, which may result in increased vandalism to any cultural remains within the corridor.

Most of the proposed realignment corridor has been previously surveyed for cultural resources, and this document presents an overview of the results of these surveys. However, these investigations were largely conducted more than 10 years ago, and in some instances may no longer conform to current standards for survey and documentation. Therefore, the entire realignment corridor was resurveyed for this undertaking.

According to Section 106 of the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C.470f), the inclusion of federal funds and Western's acquisition of tribal land for a new right-of-way necessitates that the lead Federal agency take into account the adverse effect of a proposed undertaking on historic properties that are included or eligible for inclusion in the National Register of Historic Places (NRHP; 36 CFR Part 800). To fulfill these requirements, Scott Stapp, Senior Environmental Planner at HDR, requested that GRIC-CRMP provide the technical services and equipment necessary for the cultural resources assessment.

Assessment of possible adverse affects to historic properties that may result from the proposed undertaking included a Class I records search in addition to the Class III pedestrian survey of the entire realignment corridor. Dr Chris Loendorf, GRIC-CRMP Project Manager, administered and managed the records search and survey. The majority of the Class III survey was conducted by GRIC-CRMP field members between September 26 and 29, 2011 (GRIC-CRMP Project No. 2011.18s1). Previously active agricultural fields were surveyed on January 23, 2012. Repositioning of the corridor on engineering drawings received by GRIC-CRMP in May, 2012 resulted in changes to the Class III survey area for the E1 alignment. As a result, one site (GR-1570), recorded during the initial survey, now falls outside of the realignment corridor, and additional fieldwork was necessary, which was completed on June 29, 2012. Personnel for the field work included John McCool (Crew Chief), Ashley Bitowf (Archaeological Technician I), Emery Manuel (Archaeological Technician I) Ernie Rheame (Archaeologist I) and Letricia Brown (Archaeological Technician I).

The Class I records search resulted in the identification of five previously recorded sites within the- Liberty-Coolidge 230-kV Transmission Line realignment corridor. All of the sites (AZ T:12:52 [ASM], AZ T:12:112 [ASM], GR-1002, GR-1003, and GR-1081) have been recommended as eligible for the NRHP under Criterion D. One of the sites (AZ T:12:112 [ASM]) is a Historic O'odham shrine that was also recommended as eligible for inclusion on the NRHP under Criterion A (Shaw 2000). The site consists of a mound, a cleared area, a trail, a wagon road, and a petroglyph. AZ T:12:112 (ASM) was determined to have been miss-plotted when it was initially recorded as AZ T:12:39 (ASU; Bostwick and Rice 1987). AZ T:12:52 (ASM) is a village site with platform mounds and a canal (Bostwick and Rice 1987; Effland 1984; Darling 2005; Grafil 2000; Midvale n.d.; Turney 1924, Cogswell 2002). Two of the sites (GR-1002 and GR-1003) consist of dry farming agricultural features (Ensor and Doyel 1997; Woodson et al. 2004). One site (GR-1081) contains petroglyphs and an artifact scatter (Bostwick and Rice 1987; Ensor and Doyel 1997; Ditzler 1977; Wood 1972; Burden 2002).

In addition to the previously recorded sites, two previously unidentified cultural properties were documented as part of the Class III survey of the area. One of the sites (GR-1569) is a dry farming agricultural field. The other site (GR-1571) are historic artifact scatters.

## PROJECT BACKGROUND

The proposed undertaking involves realignment of the Western Liberty-Coolidge 230-kV Transmission Line within District 6 of the GRIC, and immediately north of the community boundary in Laveen. Two realignment options currently exist for the Western Liberty-Coolidge 230kV Transmission line in the southern area. The first is related to the E1 alignment of the 202 highway. Four transmission line structures (Table 1.1) will be relocated if this option is selected (see Figure 1.3). The second option is contingent on the selection of the E2 alignment of the 202 highway. Thirteen transmission line structures will be relocated if the E2 alignment is selected (see Figure 1.3 & 1.4). The relocation of transmission line structure 29/4 will result in two new structures referred to here as 29/4E and 29/4W. The locations of access roads have not been determined, but they will be planned in a manner to minimize effects to historic properties. Additionally, a segment of the existing transmission line, located in the area between Broadway Road and Lower Buckeye Road, west of 59<sup>th</sup> Avenue, in Phoenix, may be raised in height. No new tower structures will be required. As such, no new access roads will be needed. This area was surveyed because of the potential to operate construction equipment while raising the height of the lines.

**Table 1.1. Transmission line structures within the realignment corridors**

Area	Alignment Option	Transmission Line Structure Number
North	n/a	Str. 18/2; Str. 18/3; Str. 18/4 & Str. 18/5
	E1	Str. 26/2; Str. 26/3; Str. 26/4 & Str. 26/5
South	E2	Str. 26/2; Str. 26/3; Str. 26/4; Str. 26/5; Str. 27/1; Str. 27/2; Str. 27/3; Str. 27/4; Str. 27/5; Str. 28/1; Str. 28/2; Str. 28/3; Str. 29/2; Str. 29/3; Str. 29/4E; Str. 29/4W; Str. 30/1 & Str. 30/2

## PROJECT LOCATION

The project area for this undertaking is located on land both within and outside of the boundary of the GRIC. The southern portion of the project area is situated in District 6 of the GRIC east of 51<sup>st</sup> Avenue and includes contiguous land outside the GRIC in Laveen, north of Komatke Lane. The northern segment of the project lies off the GRIC west of 59<sup>th</sup> street north of Broadway and south of Lower Buckeye Road in Phoenix. Four transmission line structures are present with in the northern portion of the realignment corridor (structures 18/2, 18/3, 18/4 & 18/5). As mentioned above, no new transmission line structures will be necessary in the northern portion of the realignment corridor. The legal location of the project is Sections 2 and 3 of Township 2 South Range 2 East, Sections 20, 21, 28, 33, and 34 of Township 1 South Range 2 E (USGS Laveen 7.5' topographic quadrangle), and Section 19 of Township 1 North Range 1 East (USGS Fowler 7.5' topographic quadrangle).

## CHAPTER 2: PROJECT SETTING

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### ENVIRONMENTAL SETTING

For the purposes of discussing environmental setting, the study area is divided into two primary geographic zones: the lower Salt Valley and the middle Gila Valley. These zones represent geographic subdivisions of south-central Arizona based on dominant drainage areas and constitute convenient spatial units for summarizing the present-day environment of the study area. The physiography, hydrology, climate, and floral and faunal communities of each zone are briefly discussed below. Although a few observations are included on past environment and the transformation to the modern environment, the reader is directed to other sources for a more thorough treatment of these subjects (for example, Berry and Marmaduke, 1982; Castetter and Bell, 1942; Dobyns, 1981; Doelle, 1976; Gasser, 1976; Gasser and Kwiatowski, 1991; Hackenberg, 1983; Rea, 1983, 1997; Russell, 1908; Teague and Crown, 1984a; Wilson, 1999).

#### Middle Gila River Valley

The southern portion of the realignment corridor occurs within the physiographic region known as the middle Gila Valley. The middle Gila Valley stretches approximately 120 km (75 miles) from North and South Butte (collectively known as “the Buttes”), located approximately 26 km (16 miles) east of Florence, to the confluence of the Gila and Salt rivers (Doyel et al. 1995; Gregory and Huckleberry 1994; Waters and Ravesloot 2000, 2001). The valley is bisected by its namesake, the Gila River. Up until the construction of the Coolidge Dam in 1928, the Gila River was one of the largest perennial rivers in the American Southwest and a provider of vital resources to the original inhabitants of the region.

Topographically the southern portion of the realignment corridor is situated along and just across the northern boundary of the GRIC, north of the Gila River and west and south of the foothills of the South Mountains Range (Figure 2.1). Rising to an elevation of 700 meters (2,330 ft), the South Mountains Range is composed of Proterozoic igneous and metamorphic rocks along its western half and more recent Miocene igneous rocks on the eastern half (Reynolds 1988).

This portion of the realignment corridor is situated primarily on Pleistocene fan (Pf) sediments. Following the corridor from the north to the south the project starts on a Bedrock outcrop of the South Mountain Range and quickly transitions on to the Pleistocene fan (Pf). The Pleistocene fan (Pf) in the realignment corridor is cut by a network of shallow dendritic washes and a few deeper arroyos. Desert pavements have developed along portions of the Pleistocene fan (Pf) between wash channels. They are particularly well developed on the eastern end of the southern project area before the landform transitions from Pleistocene sediments (Pf) onto the Holocene fan (Hf) (Waters 1996). Together the Pleistocene and Holocene fans form a gently sloping bajada spreading from the foothills of the South Mountain Range towards the Gila River. Bajada slopes are ideal landforms for upland, non-irrigation agriculture practices that make use of controlling runoff water from rainfall (Foster 2002); likely an important impetus for pre-historic land use in the realignment corridor.

The climate of the middle Gila Valley is hot and arid (Sellers and Hill 1974; Sellers et al. 1985). The mean annual temperature is 21°C (70°F), with July maximum temperatures

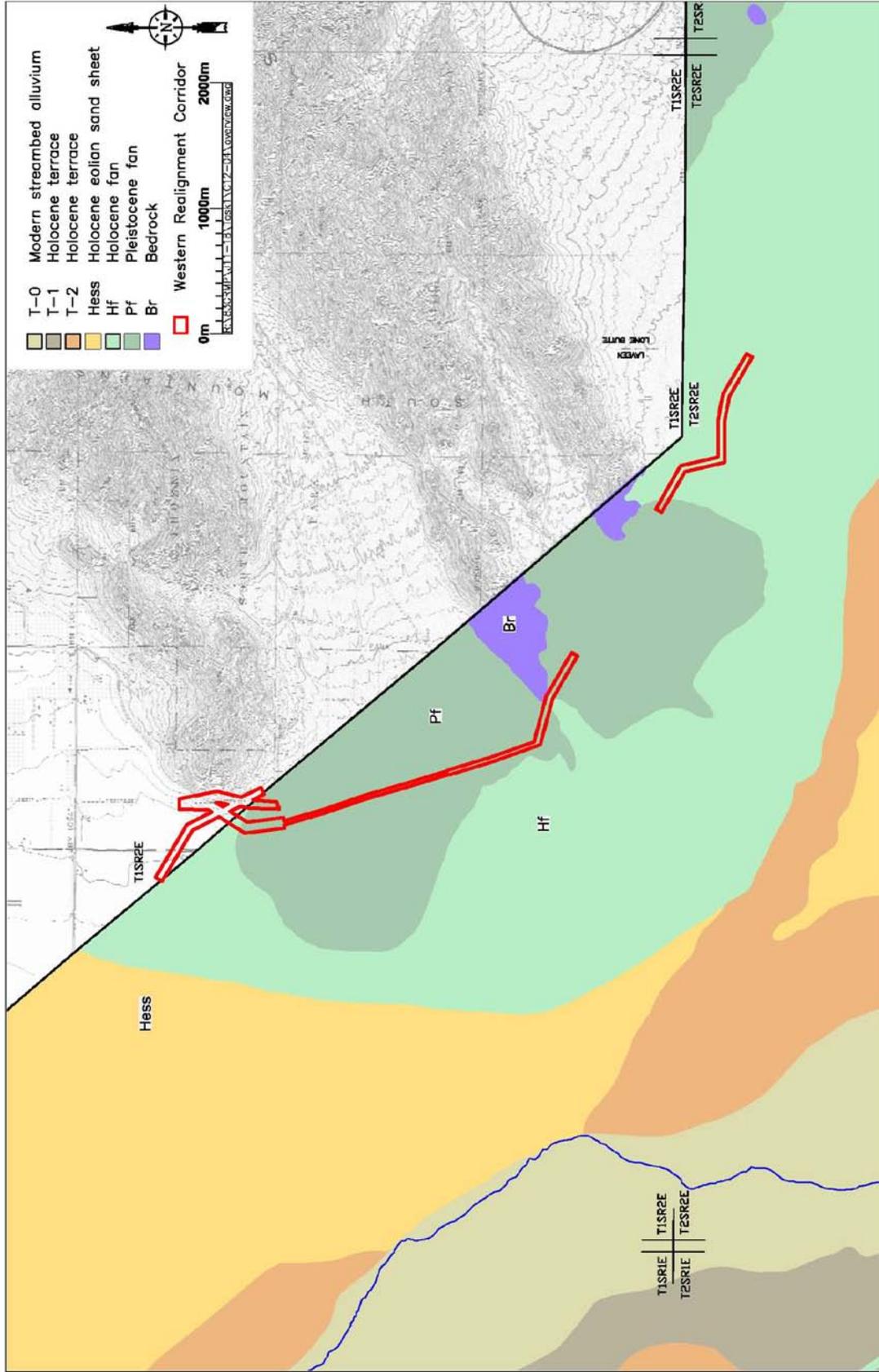


Figure 2.1 Surficial geomorphological map of the southern part of the realignment corridor.

averaging 41°C (106°F) and January minimum temperatures averaging 1°C (34°F; Camp 1986). The wettest months are typically July and August, during which afternoon thunderstorms develop and produce heavy, but localized, rainfall. A second period of precipitation occurs in the winter when large storm systems from the Pacific Ocean enter the region. Rainfall associated with these storms is typically gentle and widespread. The months of April, May, and June are the driest. Occasionally, late summer or early autumn tropical storms from the eastern mid-Pacific migrate over Arizona and may contribute considerable rainfall to the region (Smith 1986). Generally, however, the middle Gila Valley is a water-deficient region, with evapotranspiration almost always exceeding precipitation (Waters 1998).

Vegetation in and near the realignment corridor crosscuts both the Lower Colorado River Valley and Arizona Upland subdivisions of the Sonoran Desert scrub biotic community (Brown 1994; Brown and Lowe 1980). The upper mountain elevations are within the Arizona Upland subdivision, and the lower elevations are within the Lower Colorado River Valley subdivision. Vegetation in and along the southern realignment corridor appear to be largely undisturbed, however agricultural development at the eastern end of the southern portion of the realignment corridor has led to the introduction of a dense stand of Tamarisk.

Vegetation is characterized by shrubs, such as creosotebush (*Larrea tridentata*), pincushion cactus (*mammillaria* spp.), wolfberry, and bursage (*Ambrosia deltoidea*), along with mesquite, palo verde, and ironwood (*Olneya tesota*), and saguaro cactus (*Carnegiea gigantea*), barrel cactus (*Ferocactus wislizenii*), ocotillo, and cholla cacti (Turner and Brown 1994:180–221).

A wide range of animals presently or formerly populated the middle Gila Valley. Beaver (*Castor* sp.), muskrat (*Ondatra zibethicus*), otter (*Lontra canadensis sonora*), skunk (*Mephitis* sp.), raccoon (*Procyon* sp.), gophers (*Thomomys* sp.), squirrels (*Ammospermophilus* sp., *Spermophilus* sp.), and a number of species of fish used to occupy riparian zones along the Gila River (Berry and Marmaduke 1982; Doelle 1976; Rea 1998; Russell 1908). Large and medium animals that are or were present throughout the middle Gila area include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), bighorn sheep (*Ovis canadensis*), antelope (*Antilocapra americana*), coyote (*Canis latrans*), badger (*Taxidea taxus*), and gray wolf (*Canis lupus*) (Doelle 1976:10–11; Russell 1908). Bird species are and were numerous, including red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), turkey vulture (*Cathartes aura*), great-horned owl (*Bubo virginianus*), Gila woodpecker (*Melanerpes uropygialis*), cactus wren (*Campylorhynchus brunneicapillus*), and Gambel's quail (*Callipepla gambelii*) (Rea 1983). Reptiles inhabiting the area include desert tortoise (*Gopherus agassizii*), Sonoran mud turtle (*Kinosternon sonoriense*), rattlesnakes (*Crotalus* sp.), and a number of other snakes, iguanas, and lizards,

## Lower Salt River Valley

The northern portion of the realignment corridor lies north of the Salt River outside of the GRIC. The Salt River is the principal tributary of the Gila River joining it at the southwestern end of the Phoenix Basin. The approximate 71 km (44 mile) stretch between the Verde River and Gila River confluences is known as the lower Salt River Valley (Doyel 1995). This portion of the valley shares a number of geologic and environmental similarities with the middle Gila Valley. Prominent bedrock features include the Phoenix, McDowell, Usery, and South mountains and the smaller Papago and Tempe buttes along the river in the central portion of the lower valley. Elevations range from 287 m (941 ft) at the Salt–Gila confluence to 1,255 m (4,116 ft) at the summit of the McDowell Mountains. Paired terraces along the Salt River between Tempe and

Roosevelt Dam include the Lehi, Blue Point, Mesa, and Sawick (Péwé 1978). At present, the Salt River Valley is largely composed of alluvial fan-pediment surfaces sloping toward the river. Before the construction of Roosevelt Dam in 1911, the Salt River was characterized by perennial streamflow except in the driest months when water moved beneath permeable portions of the riverbed (Abbot, 2000).

Topographically the northern realignment corridor is located north of the Salt River and east of the Agua Fria River within the Phoenix basin. Area sediments are dominated by Holocene and Pleistocene alluvial deposits (Reynolds 1988). This segment of the realignment corridor falls on the border between a developed neighborhood to the south and active agricultural fields to the north.

Not surprisingly, the climate of the lower Salt Valley shows little difference from that of the middle Gila Valley. Climactic data for the city of Phoenix shows a mean annual temperature of 22.2° C (72° F), with July maximum temperatures averaging 40.3° C (104.4° F) and January minimum temperatures averaging 5° C (41° F). Mean annual rainfall is 19.3 cm (7.6 in; Sellars and Hill, 1974). Like the Middle Gila Valley, rainfall is biseasonal but typically summer dominant, with high intensity thunderstorms providing the most moisture in July and August. The secondary period of precipitation occurs in the winter when Pacific frontal systems spread gentle rainfall across the region. April, May, and June are the driest months.

The expansion of modern agricultural fields and subsequent encroachment of the Phoenix metropolitan area has greatly affected the extent of the lower Salt River Valley's original vegetative regimes. However, examples of the Lower Colorado River Valley and Arizona Upland subdivisions of the Sonoran Desertscrub community can still be found along this portion of the Salt River (Brown, 1994; Brown and Lowe, 1980). Agricultural expansion and urban sprawl have all but eradicated the extensive mesquite bosques, stands of cottonwood and desert willow, and mixtures of reeds, saltbush, and grasses that once dominated riverine and drainage areas along the Salt River (Abbot, 2000; Rea, 1983, 1997).

Animal communities in the lower Salt Valley were also greatly affected by agricultural intensification and urbanization. The Salt River Valley supports or once supported all of the animal species noted in the middle Gila Valley description. The only addition to that list would be the possible presence of the occasional black bear and mountain lion in mountainous areas in the northern and eastern edges of the lower Salt Valley (Doyel, 1995). Changes brought upon the various vegetative regimes in the Phoenix Basin also had a profound effect on faunal species diversity. The impacts produced by the construction of water control facilities along the Salt mirrored the impacts seen in the Gila River Valley. Most obvious was the loss of riverine habitats that once carried the greatest faunal species diversity.

## **CULTURAL SETTING**

This section briefly summarized the culture history of the project area. Human utilization of Southern Arizona spans the last 11,500 years. Nine main chronological periods (Paleo-Indian, Archaic, Early Formative, Pioneer, Colonial, Sedentary, Classic, Protohistoric, and Historic) are generally recognized, and each is characterized by different social and cultural attributes (Figure 2.2). More detailed overviews can be found in Bayman 2001; Berry and Marmaduke 1982, Bronitsky and Merritt 1986, Crown and Judge 1991, Fish 1989; and Gumerman 1991.

YEAR	PERIOD		PHASE	
A.D. 1900	HISTORIC	Late	American Era	Blackwater
A.D. 1800		Early	Hispanic Era	
A.D. 1700	PROTOHISTORIC		-	Bachi
A.D. 1600	<i>Boundary not well defined</i>			
A.D. 1500	CLASSIC		Polvorón?	-
A.D. 1400			Civano	
A.D. 1300			Soho	
A.D. 1200			Santan	
A.D. 1100	SEDENTARY		Sacaton	-
A.D. 1000			Santa Cruz	
A.D. 900	COLONIAL		Gila Butte	-
A.D. 800			Snaketown	
A.D. 700	PIONEER		Estrella/Sweetwater	-
A.D. 600			Vahki	
A.D. 500	EARLY FORMATIVE		Red Mountain	-
A.D. 400				
A.D. 300				
A.D. 200				
A.D. 100	<i>Undefined Boundary</i>			
<<<<<<	ARCHAIC	Late Archaic	-	-
100 B.C.		Early Agricultural		
500 B.C.		Middle		
1000 B.C.		Early		
2000 B.C.	PALEO-INDIAN		-	-
3000 B.C.			-	-
5000 B.C.			-	-
7000 B.C.			-	-
9000 B.C.			-	-
10,000 B.C.			-	-

Figure 2.2. Chronological periods and phases defined for the study area.

## Paleo-Indian and Archaic Periods

Occupation during the Paleo-Indian period (ca. 10,000–8,500 B.C.) and Early Archaic periods (ca. 8,500–5000 B.C.) remains poorly defined in the study area (Huckell 1984a, 1984b). The first definitive evidence of human habitation along the middle Gila dates to the Middle Archaic period. Recent work on the GRIC (Bubemyre et al. 1998; Neily et al. 1999; Woodson and Davis 2001) has documented Middle Archaic period sites, and numerous surface finds of projectile points suggest the widespread use of the Phoenix Basin during this time period (Loendorf and Rice 2002).

Beginning around 1500 B.C., the first agricultural villages appeared in the Sonoran Desert (Huckell 1995; Mabry 1998a; Matson 1991; Diehl 2003; Sliva 2003). Similar pre-ceramic semi-sedentary horticultural settlements have not as yet been identified in the middle Gila River Valley. It is likely, however, that any Early Agricultural period settlements within the study area were located along Holocene terraces with potential for floodwater agriculture, and these remains are therefore deeply buried in alluvium. The succeeding Early Ceramic period (roughly A.D. 1 to A.D. 550) is characterized by small seasonally occupied hamlets, and the initial production of plain ware (around A.D. 1), and red ware (around A.D. 450) ceramics (Doyel 1993; Mabry 1998b, 2005; Wallace et al. 1995; Whittlesey and Ciolek-Torrello 1996). However, ceramics were not as widely used as they were at later Hohokam sites, and the range of types produced was comparatively limited (Whittlesey and Ciolek-Torrello 1996). Specialization in ceramic production began around A.D. 450 when potters in the eastern South Mountain vicinity fabricated most of the vessels used along the lower Salt River (Abbott 2009).

## Hohokam Pre-Classic

Based on the many antecedents that have been identified, researchers have developed a consensus favoring *in situ* development of the Hohokam from Archaic populations (Bayman 2001; Cable and Doyel 1987; Doyel 1991; Wallace 1997; Wallace et al. 1995; Wilcox 1979). The Pioneer period of the Hohokam sequence traditionally included the Vahki, Estrella, Sweetwater, and Snaketown phases (Gladwin et al. 1937; Haury 1976). However, researchers now agree that the Vahki phase is more consistent with Early Formative developments in southern Arizona, and they place the beginning of the Pioneer period around A.D. 550/650 with the introduction of decorated ceramics in the Estrella phase (Ciolek-Torrello 1995; Mabry 1998b; Wallace et al. 1995; Whittlesey 1995). For the next five centuries, residents of the lower Salt River appear to have received most of their decorated ceramics from the middle Gila River (Abbott 2009:552). The Hohokam tradition initially appeared in the Phoenix Basin and was characterized by the development of large-scale irrigation agriculture, red-on-buff pottery, a distinctive iconography, exotic ornaments and artifacts, a cremation mortuary complex, and larger as well as more complex settlements (Fish 1989; Howard 2006).

During the Colonial period (ca. A.D. 700–900), village structure became more formalized and groups of houses were arranged around central courtyards where a variety of extramural activities were undertaken (Howard 2000; Wilcox et al. 1981). Villages were comprised of several courtyard groups that were organized around a large central plaza, which was a place for communal gatherings and frequently included a cemetery (Abbott and Foster 2003:25; Fish 1989:20; Howard 2006; Wilcox et al. 1981). The geographic range of the Hohokam expanded during this period, and ballcourts appeared (Bayman 2001; Wilcox and Sternberg 1983). Agricultural intensification occurred in the subsequent Sedentary period, a time when

marketplaces may have emerged and the ballcourt system reached its maximum extent with over 230 courts spread across much of central and southern Arizona (Abbott et al. 2007; Abbott 2009; Bayman 2001; Dean 2003; Howard 2006; Marshall 2001a).

## **Hohokam Classic Period**

The transition between the Pre-Classic and Classic periods was marked by many dramatic changes in Hohokam society (Bayman 2001; Doyel et al. 2000:222). During this interval, between roughly A.D. 1100 and 1200, the Hohokam regional system appears to have weakened (Abbott et al. 2007). Transitions in Hohokam cultural traditions that occurred at this time include a shift in burial practices from cremation to inhumation, semi-subterranean pit-houses were replaced with surface structures, courtyard groups were enclosed with compound walls, a reduction occurred in red-on-buff manufacture while red ware pottery production increased, and extensive alterations occurred in regional exchange networks (Abbott 2009; Abbott et al. 2007; Bayman 2001; Crown 1994; Doyel 1980, 1991). The Classic period has been divided into the Soho (around A.D. 1150/1200–1300) and Civano (around A.D. 1300–1450) phases. The Soho phase saw the construction of platform mounds, a type of communal architecture that replaced the ballcourt system, which fell from use near the end of the Sedentary period (Abbott 2003; Abbott et al. 2007; Bayman 2001; Elson 1998).

The end of the Classic period around A.D. 1450 was marked by the collapse of the platform mound system and the abandonment of Hohokam sites along the lower Salt River and in the Tonto Basin (Hegmon et al. 2008; Ravesloot et al. 2009). Considerable debate exists regarding the cause or causes of this population decline, as well as the relationship between the Hohokam and subsequent people (i.e., Akimel O'odham) who lived in the area (Bayman 2001; Reid and Whittlesey 1997; Hegmon et al. 2008; Ravesloot et al. 2009). Researchers generally agree that Hohokam populations along the lower Salt began to decline in the 1300s, and have offered many explanations for why this occurred including salinization of fields, epidemics, overpopulation with resulting environmental impacts, conflict with the Apache, warfare within Hohokam society, rigidity traps, and various aspects of climatic conditions such as flooding or drought (Abbott 2003; Bayman 2001; Dean 2000; Ezell 1983; Haury 1976; Graybill et al. 2006; Grebinger 1976; Hegmon et al. 2008; Meegan 2009; Mindeleff 1897:13; Ravesloot et al. 2009; Redman 1999; Reid and Whittlesey 1997; Tainter 1988:46-47; Weaver 1972; Wilcox 1991). These explanations are not mutually exclusive, and as will be further explored in the following research, it appears that a combination of factors lead to the dramatic changes that occurred between the Classic and early Historic periods.

## **The Protohistoric**

The Protohistoric period (ca. A.D. 1500–1700) is generally defined as the time between the end of the Hohokam Classic period and Spanish contact (Wells 2006; Whittlesey et al. 1997:185). In contrast to the prehistoric periods and phases, the Protohistoric is defined based on an external event (the arrival of Europeans in the New World) rather than changes in material culture of the region. As a result, the Protohistoric period remains poorly defined throughout southern Arizona. Furthermore, there is a small sample of excavated material, poor chronometric control, and a cohesive interpretive framework does not exist for these remains (Ravesloot and Whittlesey 1987; Wilson 1999; Wells 2006).

## Akimel O'odham Historic Period

The Historic period is traditionally defined to encompass the time between A.D. 1694 to 1950 for which written records exist. The first definitive European contact occurred in A.D. 1694 when Father Kino visited the Akimel O'odham villages along the middle Gila River (Ezell 1961, 1983; Russell 1908; Wilson 1999; Darling et al. 2004). The Akimel O'odham did not experience intensive colonial contact during the Hispanic era (A.D. 1694–1853), and exchanges instead were limited to parties traveling through the territory or community members visiting settlements to the south. Nevertheless, the Akimel O'odham were affected by introduced European elements such as new cultigens (e.g., wheat), religious practices, livestock, metal, and especially disease (Ezell 1961, 1983; Shaw 1994, 1995; Wells 2006).

The American era (A.D. 1853–1950), began in 1853 with the Gadsden Purchase, when southern Arizona became part of the United States (cf. Ezell 1983). Prior to this time, Euroamerican contacts with the Akimel O'odham in the middle Gila Valley had already increased as a result of the Mexican-American War in the 1840s (Dejong 2009). New markets were developed to supply grain to the military as well as to immigrants heading for California, and the Akimel O'odham experienced a period of prosperity (Dejong 2009; Doelle 1981; Ezell 1983; Hackenberg 1983; Russell 1908). Thereafter, interaction between Native American groups and Euroamerican settlers became increasingly tense, and the U.S. Government adopted a policy of pacification and reservation confinement of Native Americans (Spicer 1962). The GRIC was established in 1859.

The following years saw the arrival of large numbers of Euro-American migrants to upstream locations along the Gila as well as along the lower Salt River (Dejong 2009). Uncertainty and variable crop yields led to major settlement reorganizations, including the movement of some Akimel O'odham and Pee Posh to the lower Salt River (Webb 1959:45–46). The establishment of agency headquarters, churches and schools, and trading posts at Casa Blanca and Sacaton during the 1870s and 1880s led to the growth of these towns as administrative and commercial centers at the expense of others (Wilson 1999; Webb 1959:49–52). By 1898 agriculture had nearly ceased within the GRIC, and although some Akimel O'odham drew rations, woodcutting was the principal livelihood (Shaw 1994:122). The first allotments within the GRIC were established in 1914. Each male who was the head of a household was assigned a 10-acre parcel of potentially irrigable land located within districts watered by the Santan, Agency, Blackwater, or Casa Blanca projects on the eastern half of the reservation. In 1917, the allotment size was doubled to include a secondary usually non-contiguous ten-acre tract of grazing land.

The most ambitious attempt to rectify the economic plight of the Akimel O'odham in the early 1900s was the San Carlos Project Act, which authorized the construction of a water storage dam on the Gila River (Pfaff 1994, 1996). However, the San Carlos Project failed to revitalize the O'odham farming economy and never provided sufficient water to the community (Hackenberg 1983). Over the years, the U.S. Government placed severe acculturative pressures on the Akimel O'odham that caused changes in nearly every aspect of their lives. Since World War II, however, the Akimel O'odham have experienced a resurgence of interest in tribal sovereignty and economic development. The community has now become a self-governing entity, developed several profitable enterprises in fields such as telecommunications and has built several casinos. The tribe has also worked to revitalize their farming economy by constructing a water delivery system across the reservation (Ravesloot et al. 2009).

## CHAPTER 3: CLASS I RECORDS SEARCH

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The initial phase of the current work consisted of checking site files from Arizona State Museum (ASM), the State Historic Preservation Office (SHPO), Arizona State University (ASU), AZSITE, and the GRIC-CRMP for any previous archaeological investigations and documented archaeological sites within 0.5 miles (0.8 km) of the realignment corridor (Figures 3.1 and 3.2). Historic maps and documents were also examined for additional cultural resources within the realignment corridor. Although these resources have not been classified formally as archaeological sites, they are still considered relevant for addressing the cultural history of the GRIC.

### PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

The current investigation determined that 47 previous archaeological projects have occurred within 0.5 miles of the realignment corridor (Table 3.1). Early archaeological investigations in the realignment corridor include survey and testing of sites along the Southern Pacific pipeline in the mid-1950s (McConville and Holskamper 1955a, 1955b), and an extensive survey of the Gila River Indian Community conducted between 1970 and 1972 (Ayres 1975; Wood 1972).

The passage of several federal laws in the late 1960s and early 1970s provided a mandate and more adequate funding for investigations and protection of archaeological resources. As a result, cultural resource management (CRM) programs were implemented. These programs have accounted for a substantial portion of archaeological research in the realignment corridor. For instance, small projects have been undertaken for the existing Santa Fe and El Paso natural gas company pipelines (Irwin 1991; Neily 1991b); and the Bureau of Reclamation funded Pima-Maricopa Irrigation Project area (Ensor and Doyel 1997; Neily et al. 1999, 2000).

Also of note are three projects related to the upgrade and redesign of the existing Liberty-Coolidge 230-kV Transmission Line (Eftland 1984; Eftland and Green 1985; Quilian 1986). In the late 1970's Western proposed upgrading their existing Phoenix to Coolidge and Phoenix to Maricopa transmission lines from 115 kV to 230kV. The two lines crossed several significant cultural resources, including the site of Snaketown. Installation of the original transmission lines was completed in the 1940's before federal laws were passed mandating protection of natural and archaeological resources. As a result, no efforts were made at the time to mitigate damages to archaeological sites. An environmental assessment completed during the proposed upgrade recommended replacing the existing Phoenix to Coolidge and Phoenix to Maricopa transmission lines in order to avoid further damage to these resources (Fuller Associates 1980). Eventually one of three alternatives was selected to become the existing transmission line corridor (DOE 1983). These investigations encompassed nearly the entire Western Electrical Liberty-Coolidge 230-kV Transmission Line realignment corridor.

### PREVIOUSLY DOCUMENTED ARCHAEOLOGICAL SITES

Previous archaeological efforts in the study area have identified 38 prehistoric and/or historic sites within 0.5 mile of the project area (Table 3.2.) This list includes only historic properties previously recorded as sites and does not include Traditional Cultural Properties (TCP). These resources consist of artifact scatters (n=17), fields with dry farming agricultural features (n=10), trails with associated features (n=3), and a shrine site with possible dry farming

## CHAPTER 4: SURVEY METHODS

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Survey efforts were guided by methods based on the research design developed for surveys within the GRIC (Doyel and Green 1995). This research design outlines basic guidelines for survey methods, site-recording procedures, surface-collection strategies, and isolated-occurrence recording.

The survey within the realignment corridor was conducted by a three person GRIC- CRMP field crew walking parallel transects spaced at intervals of 20 meters. Crew members on the two outside transects carried GPS units. A Garmin GPS with WAAS enabled was used to ensure that the survey area was completely covered. A Topcon differential GPS was loaded with a shape file of the realignment corridor to help orient the crew and was used to log IOs and site datums.

### **SITE RECORDING AND UPDATING PROCEEDURES**

Archaeological sites were defined according to guidelines established in the ASM Site Recording Manual (ASM 1993) and a subsequent update by Fish and Fish (1994). Based on these guidelines, a site consists of 30 or more artifacts of a single artifact type within a 15-meter area, 20 or more artifacts of at least two artifact types within a 15-meter area, one or more features in temporal association with artifacts, or two or more temporally associated features with no artifacts.

Areas that meet these definitions and were separated by greater than 100 meters of intervening space were recorded as separate sites. Alternatively, such areas spaced less than 100 meters apart were recorded as loci of the same site. Loci were generally defined as spatially or temporally discrete clusters of artifacts or features or both. They may also be arbitrarily defined using modern disturbances such as roads and canals to create boundaries, since separations in the distribution of artifacts and features often occur at such points.

Each site was assigned a GR (Gila River) number. A datum, consisting of an aluminum tag attached to a section of white PVC pipe placed in the ground, was established at each site. Information on the tag includes the GR site number, date, and locus designation (if applicable). The location of the datum was then recorded with a GPS unit. For newly recorded sites and revisions to previously documented sites, a site map was prepared using a GPS unit and the site was photographed. Surface features and artifact densities were recorded with the latter defined as follows: low-density artifact scatters contain from 10 to 50 artifacts per 25 square meters; medium-density artifact scatters contain from 50 to 200 artifacts per 25 square meters; and high-density artifact scatters contain above 200 artifacts per 25 square meters.

Previously documented sites in the realignment corridor were also examined for possible updates to the existing site description. Anthropogenic and natural disturbances to sites were also evaluated to determine if NRHP contributing elements have been altered or threatened in any way. Site updates were entered onto existing site records and possible mitigation recommendations were made when necessary.

An ASM site form was completed for each site, along with a feature log, collection strategy form, and artifact diversity form. Site types were assigned based on 22 possible types previously outlined in the GRIC survey research design (Doyel and Green 1995). Photographs were taken at

each site in color digital (600 dots per inch) format. Sites were plotted on the appropriate USGS 7.5' topographic quadrangle and aerial photograph.

Analyses of artifacts are designed to derive preliminary temporal and functional characterizations of the recorded sites, and are used as a basis for assessing temporal variability among individual features and loci within sites. The analytical procedures used for the classifications of various artifact types are also presented below.

## **Surface-Collection Strategies**

No artifacts were collected from areas outside the GRIC (in Laveen and Phoenix), so artifact documentation procedures were completed in the field. For sites located within the GRIC, crews utilized three surface-collection strategies during the site recording: general, quantitative, and diagnostic. Selection of a specific strategy is based on the number and distribution of artifacts as well as the presence of temporally diagnostic artifacts, such as identifiable prehistoric decorated ceramic types or historic artifacts with a maker's mark. For sites with fewer than 100 artifacts, such as small artifact scatters with a low probability of containing subsurface cultural deposits or features, the field crews map the point proveniences of diagnostic artifacts and "general" site collections are made for the non-diagnostic artifacts.

"Quantitative" collections are typically made at sites with greater than 100 artifacts. The objective for the quantitative collections is to obtain at least 100 artifacts from each site. At sites with dispersed scatters or non-contiguous activity loci, a maximum of three quantitative collection units per site—or per locus if two or more loci were present—is set as a standard to obtain the requisite 100 artifacts in a timely manner. At larger sites with multiple loci, artifact concentrations, or features, quantitative collection units also are judgmentally placed within each of these areas to further define the functional and temporal character of the site. Only one site encountered (GR-1570) during this undertaking contained greater than 100 artifacts, however, quantitative units were placed at all of the sites in order to obtain at least a small subsample of artifact diversity and type.

Each quantitative collection unit encompasses a 2-meter diameter circle, estimated using two nails attached to a 1-meter length of string. For prehistoric sites, these units are placed in the areas of highest artifact density or on features, such as trash mounds. For historic sites, the units are placed in areas with the highest density of indigenous O'odham artifacts, with the expectation that the spatially associated European American artifacts might provide some temporal association. Quantitative collection units are numbered sequentially for each feature or within each non-feature locus. Artifacts are separated and bagged by material type for each feature and locus.

"Diagnostic" collections consist of judgmental grab samples from identified features and loci. These collections are made after quantitative collections are completed at both prehistoric and historic sites. The diagnostic collections provide additional sources of temporal information to supplement temporally diagnostic artifacts derived from the quantitative collection units. Temporally diagnostic artifacts and unique items that are potentially indicative of site function include prehistoric and O'odham decorated ceramics, rim sherds, projectile points, tabular knives, worked shell, and historic artifacts with a maker's mark. Obsidian is always collected in anticipation of future sourcing studies (Darling 2000).

## Rock Pile Recording Strategy

One of the three sites recorded during this project (GR-1569) contained upland dry agricultural features in the form of five rock piles. Normally, dry agricultural fields are extensive and include a large number of features. During Phase III survey projects, the recording of dry agricultural sites is generally limited to defining the boundary of the agricultural fields and sampling a small number of the features to obtain morphological information. However, GR-1569 is rather small so field crews mapped all five of the rock pile features on the site map and recorded information on the range of rocks sizes represented and the rock piles' length, width, and heights. The results are included in Table 5.2.

Determining whether a cluster of rocks is the remnant of a rock pile can be quite difficult. Natural processes may cause rock piles to “deflate” or disperse, making feature identification difficult. For this reason, Cantley (1991) developed a polythetic set of criteria for identifying rock pile features. According to Cantley (1991:32), rock pile features should include the following elements:

1. A number of rocks larger than a fist, approximately 500 cubic centimeters in volume.
2. Vegetation within the cluster of rocks. For example, Doak et al. (1997) observed that from 38 percent to 66 percent of rock piles included vegetation growing within them.
3. Additional likely rock pile features in the vicinity.
4. Rocks from different mineralogical sources.
5. Occur in areas where natural rock clusters would not be expected.

Several scholars have devised typologies of rock pile features (Doak et al. 1997; Purcell et al. 1997), which Foster (2002:45–49) summarizes into nine types (some have subtypes). Appendix B: Table B.1 provides an abbreviated outline and description of the rock pile typology. Although large rock pile features have been recorded, Fish et al. (1992:76) found that rock pile features seldom exceed 1.5 m in diameter and 0.75 m in height. Linear rock alignments present similar identification problems, especially along the edges of an active drainage where natural processes may generate lines of rocks and other debris.

## ANALYTICAL METHODS

Artifacts that were collected from the GRIC were subjected to Stage 1 analyses (Appendix A). These analyses are designed to yield basic temporal and functional groupings of artifacts, primarily to characterize the expected occupation span, site type, and range of functions represented at the respective recorded sites from which they were obtained.

For the Stage 1 ceramic analyses, variables such as ceramic ware and type, if applicable, were recorded. Artifact type was also recorded for special artifacts, such as spindle whorls and figurines. Stage 1 analyses of flaked- and ground-stone artifacts include basic sorts as to flake, tool, and material types. Finally, historic artifacts were identified as to form and contents (if applicable), material type, and manufacturer and production date range (if known).

Artifacts encountered in portions of the survey that lie outside of the GRIC were documented in the field. These were limited to Historic artifacts and lithic artifacts. Historic

artifacts were analyzed with criteria developed by the Intermountain Antiquities Computer System (IMACS 2012). Lithic artifacts were classified by artifact type only.

Surface collections were only undertaken at GR-1569, GR-1570, and GR-1571. One quantitative unit (QU) was collected at GR-1570 and GR-1571, and two were collected at GR-1569. GR-1569 and 1571 both contained fewer than 100 artifacts. All of the surface artifacts were collected at GR-1569 as they fell within the boundary of the two QUs. At GR-1571, a QU and a site-wide diagnostic collection were made. This was deemed a sufficient sample of the artifacts present at the site so field crews did not collect all artifacts present on the ground surface. In addition to the QU at GR-1570, a site-wide diagnostic collection was completed.

## **ISOLATED OCCURRENCES**

Isolated occurrences (IOs) are defined as individual artifacts or features and dispersed non-site scatters with less than 30 artifacts that did not meet the ASM definition of a site. These finds could include more than one artifact type. On this project IOs were numbered consecutively by township, range, and section, and then described and the location was recorded with the TopCon GPS . Isolated artifacts encountered during the survey were not collected.

## CHAPTER 6: SUMMARY AND RECOMMENDATIONS

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This report documents the results of a Class I records search and a Class III archaeological survey that were conducted by GRIC CRMP for the proposed realignment of the Liberty-Coolidge 230-kV Transmission Line. Realignment of the transmission line would be necessary if either the E1 or E2 alternative of the South Mountain Freeway is constructed. The realigned portions of the transmission line are located within District 6 of the GRIC and immediately north of the community boundary in Laveen, Arizona. Additionally, the line may also be moved between Broadway Road and Lower Buckey Road, west of 59<sup>th</sup> Avenue, in Phoenix. These investigations were requested by Scott Stapp, Senior Environmental Planner at HDR, and carried out in accordance with the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA) as a part of the environmental review process required for undertakings involving federal funds or that take place on federal lands. This report has provided the methods employed in this investigation, the results of this work, and cultural resource management recommendations for the proposed undertaking.

Work within the realigned transmission line corridor may adversely affect historic properties. This work could include new locations for transmission line structures, which may involve leveling pads for structure placement and equipment access with extension of outriggers. There also may be additional subsurface disturbance caused by geotechnical investigations and the placement of anchors for pulling in conductor or cable along with midspan movement, which could involve tracked vehicles. Additional work in the corridor could involve access road construction, and/or upgrade and maintenance including improvements to existing roads. This work could involve construction of water bars to reduce erosion, construction or replacement of cattle guards, placement or replacement of gates, spreading dirt/gravel within roadways, blading, and grading. In addition to direct impacts to cultural resources, any road improvements could facilitate access, which may result in increased vandalism to any cultural remains within the corridor.

The Class I records search revealed that nearly the entirety of the 98-acre realignment corridor has been surveyed for cultural resources as part of previous archaeological investigations. However, most of these investigations are more than ten-years-old and do not comply with current SHPO and THPO standards. Therefore, the entire realignment corridor was re-surveyed as part of this investigation using current standards.

The records search determined that five previously recorded archaeological sites occur within the realignment corridor (Table 6.1). All of the sites (GR-1002, GR-1003, GR-1081, and AZ T:12:52 [ASM], and AZ T:12:112 [ASM]) have been recommended for inclusion to the NRHP under criterion D. Two of the previously recorded sites (AZ T:12:52 [ASM] and AZ T:12:112 [ASM]) are TCPs that were also recommended for inclusion on NRHP under criterion A (Brodbeck 2006). AZ T:12:112 (ASM) was determined to have been miss-plotted when initially recorded as AZ T:12:39 (ASU). The South Mountains are also recognized as a TCP by the members of the GRIC.

In addition to the sites and TCPs a historically documented canal (Canal Rio) that crosses the realignment corridor has also been recorded. Additional data are needed to determine if the Canal Rio alignment contributes to the eligibility of AZ T:12:52 (ASM) under Criterion D. Construction within the 98-acre transmission realignment may adversely affect these cultural resources and avoidance or further archaeological investigations are recommended for this cultural property.

**Table 6.1. Summary and Eligibility Recommendations for Sites Recorded Within the Liberty-Coolidge 230-kV Transmission Line Realignment Area**

Site Number	Previously Recorded	Site Type	Culture	Land Ownership	NRHP Status	Management Recommendation	Nearest Existing Transmission Line Structure	Nearest New Transmission Line Structure
GR-1002	Previously	Dry farming agricultural features: rockpile; historic and prehistoric artifact scatter: multiple artifact types, modern intaglios	Hohokam / undefined; Pee Posh / Historic	Tribal	Eligible	Avoidance or Minimize Disturbance and Data Recovery	Str. 27/4 (in site) Str. 27/5 (90m east)	E2 Str. 27/3 (95m north), E2 Str. 27/4 (in site), E2 Str. 27/5 (in site), E2 Str. 28/1 (300m south)
GR-1003	Previously	Agricultural features: rockpiles	Hohokam; Late Classic	Tribal	Eligible	Avoidance or Minimize Disturbance and Data Recovery	Str. 27/5 (162m northeast), Str. 28/1 (24m east)	E2 Str. 27/5 (122m north), E2 Str. 28/1 (in site), E2 Str. 28/2 (330m east)
GR-1081	Previously	Artifact Scatter: multiple artifact types; Rock art	Hohokam; Late Formative	Tribal	Eligible	Avoidance or Minimize Disturbance and Data Recovery	Str. 28/2 (23m southwest)	E2 Str. 28/1 (306m west), E2 Str. 28/2 (34m west & 45m southwest)
GR-1569	Currently	Dry Farming Agricultural Site; rock piles	Hohokam	Tribal	Eligible	Avoidance or Minimize Disturbance and Data Recovery	Str. 26/5 (155m northeast), Str. 27/1 (209m southeast)	E2 Str. 26/5 (47m north), E2 Str. 27/1 (175m south)

*Continued*

**Table 6.1. Summary and Eligibility Recommendations for Sites Recorded Within the Liberty-Coolidge 230-kV Transmission Line Realignment Area (Continued)**

Site Number	Previously vs Currently Recorded	Site Type	Culture	Land Ownership	NRHP Status	Management Recommendation	Nearest Existing Transmission Line Structure	Nearest New Transmission Line Structure
GR-1571	Currently	Historic Artifact Scatter	O'odham; Historic	Tribal	Ineligible	No Further Work	Str. 26/3 (195m northeast), Str. 26/4 (175m east)	E2 Str. 26/3 (240m northeast), E2 Str. 26/4 (60m southwest)
AZ T:12:52 (ASM)	Previously	Village with platform mounds and canal	Hohokam / Colonial to Classic	Private	Eligible	Avoidance or Minimize Disturbance and Data Testing	Str. 18/2 (120m west), Str. 18/3 (in site), Str. 18/4 (in site), Str. 18/5 (in site)	N/A
AZ T:12:112 (ASM)	Previously	Shrine site; containing mound, trail, and cleared area	O'odham; late to middle Historic	Private	Eligible	Avoidance or Minimize Disturbance and Data Recovery	Str. 26/3 (63m south southwest)	E2 Str. 26/3 (45m northeast & 68m east), E1 Str. 26/3 (110 & 122 m east)
Canal Rio	Previously	Prehistoric Canal	Hohokam	Private	Additional Data needed	Avoidance or Minimize Disturbance and Data Recovery	Str. 18/3 (in site), Str. 18/4 (in site), Str. 18/5 (in site)	N/A

Class III survey of the Liberty-Coolidge 230-kV Transmission Line realignment corridor resulted in the identification of two previously undocumented archaeological sites (see Table 6.1). One of the sites (GR-1569) is recommended to be eligible for inclusion on the NRHP under Criterion D. As a result avoidance or data recovery is recommended for GR-1569. The other site (GR-1571) consists of historic trash deposits that are recommended to not be eligible for inclusion to the NRHP and no further work is therefore considered necessary.

Prehistoric petroglyphs were found at two sites (AZ T:12:112 [ASM] and GR-1081) within the Liberty-Coolidge 230-kV Transmission Line realignment corridor. GRIC community members consider petroglyphs to be a significant component of traditional culture and history. Additionally, a shrine site that is actively used by community members is located within the boundaries of AZ T:12:112 (ASM) has also been recognized as a TCP by GRIC community members. Pueblo del Alamo (AZ T:12:52 [ASM]) and the South Mountains are also considered to be TCPs of the members of the GRIC. The realigned portion of the Liberty-Coolidge 230-kV Transmission Line would pass in close proximity to or directly through these TCPs, which potentially could disrupt significant cultural traditions. As a result it is recommended that all adverse affects to these TCPs are avoided, which could involve the development of a TCP enhancement plan.

As a final observation, cultural features within the realignment corridor are part of “fragile pattern” areas in desert landscapes (Altschul and Rankin 2008, Hayden 1965). Historic or prehistoric fragile pattern landscapes include a wide variety of largely surficial cultural properties, which are therefore easily impacted by disturbances related to vehicular traffic or other adverse affects. These features include non-irrigation agricultural areas (rock piles, linear alignments, and other water management features), trails and associated remains, culturally sensitive sites such as shrines, rock art, dispersed surficial artifact scatters, and others. Construction activities and access routes associated with maintenance of the Liberty-Coolidge 230-kV Transmission Line therefore represent a potential substantial impact. Furthermore, we recommend using photo-simulation as a tool to better understand indirect effects, such as visual impacts, to historic properties, especially TCP’s. Additionally, the opening of new routes into these sensitive areas may lead to increased visitation and resulting impacts that are unrelated to the direct function or upkeep of the transmission line.

## REFERENCES CITED

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- Abbott, D. R.  
2000 *Ceramics and Community Organization among the Hohokam*. University of Arizona Press, Tucson.
- 2009 Extensive and Long-Term Specialization: Hohokam Ceramic Production in the Phoenix Basin, Arizona. *American Antiquity* 74:531–557.
- Abbott, D. R. (editor)  
2003 *Centuries of Decline During the Hohokam Classic Period at Pueblo Grande*. University of Arizona Press, Tucson.
- Abbott, D. R., and M. S. Foster  
2003 Site Structure, Chronology, and Population. In *Centuries of Decline During the Hohokam Classic Period*, edited by D. R. Abbott, pp. 24–47. The University of Arizona Press, Tucson.
- Abbott, D. R., A. M. Smith, and E. Gallaga  
2007 Ballcourts and Ceramics: The Case for Hohokam Marketplaces in the Arizona Desert. *American Antiquity* 72(3):461–484.
- Adams, K.A.  
1990 *An Archaeological Assessment of a Portion of the Santa Fe Pacific Pipeline, Gila River Indian Community*. Archaeological Consulting Services, Ltd., Tempe.
- Adams, K. R.  
2002 *Archaeobotanical Studies and Paleoenvironmental Reconstructions, Gila River Indian Community, Arizona*. P-MIP Technical Report No. 2002-03. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Aguila, L.  
1999 *A Cultural Resources Survey of a Proposed El Paso Natural Gas 2039 Line Relocation / Replacement, Laveen, Maricopa County, Arizona*. Archaeological Consulting Services, Ltd. Tempe.
- Altschul, J. H., and A. G. Rankin (editors)  
2008 *Fragile Patterns: The Archaeology of the Western Papagueria*. SRI Press, Tucson.
- Arizona State Museum (ASM)  
1993 *Arizona State Museum Archaeological Site Recording Manual*. Arizona State Museum, University of Arizona, Tucson.
- Ayres, J. E.  
1975 *Archaeological Reconnaissance of the Gila River Indian Reservation, Final Report*. Arizona State Museum, University of Arizona, Tucson.
- Bayman, J. M.  
2001 The Hohokam of Southwest North America. *Journal of World Prehistory* 15(3):257–311.

- Berry, C. F., and W. M. Marmaduke  
1982 *The Middle Gila Basin: An Archaeological and Historical Overview*. Northland Research, Inc., Flagstaff.
- Black, F. M. and M. K. Woodson  
2006 *A Cultural Resources Assessment Of Four Construction Sites for the El Paso Line 1124 Pipeline Integrity Project from the Casa Grande Station to the South Mountain Meter Station, Pinal And Maricopa Counties, Arizona*. CRMP Technical Report No. 2006-22. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Bostwick, T. W. and G. E. Rice  
1987 *A Cultural Resource Inventory for the Southwest Loop Freeway Project*. OCRM Report No. 66. Tempe: Office of Cultural Resource Management, Department of Anthropology, Arizona State University, Tempe.
- Brodbeck, M.  
2006 *An Evaluation of Traditional Cultural Properties for the 202L, South Mountain Transportation Corridor EIS & L/DCR Project, Maricopa County, Arizona*. HDR Cultural Resource Report 06-01. HDR Engineering, Inc., Phoenix, Arizona.
- Brodbeck, M., and R. B. Neily  
1997 *An Archaeological Survey of the Santan Extension (Broadacres) Management Area, Pima-Maricopa Irrigation Project (P-MIP), Gila River Indian Community, Arizona*. P-MIP Report No. 3. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Brodbeck, M., R. B. Neily, and S. R. James  
2000 *A Supplemental Cultural Resource Survey in the Santan Extension (Broadacres) and Maricopa Management Areas, Pima-Maricopa Irrigation Project (P-MIP), Gila River Indian Community, Arizona*. P-MIP Technical Report No. 00-01. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona
- Bronitsky, G., and J. D. Merritt  
1986 *The Archaeology of Southeast Arizona: A Class 1 Cultural Resource Inventory*. Cultural Resource Series Monograph No. 2 Bureau of Land Management, Phoenix.
- Brown, D. E. (editor).  
1994 *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press, Salt Lake City.
- Brown, D. E., and C. H. Lowe.  
1980 *Biotic Communities of the Southwest*. USDA Forest Service General Technical Report RM-78, 1-page map. Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.
- Bubemyre T., M. Brodbeck, and R. B. Neily.  
1998 *A Cultural Resources Survey of the Borderlands Area, Gila River Indian Community, Maricopa County, Arizona*. CRMP Technical Report No. 97-23. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.

- Burden, D.  
 2002 *A Class I Overview of the South Mountain Freeway Corridor Study Area, Maricopa County, Arizona*. CRMP Technical Report No. 2002-09. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Cable, J. S., and D. E. Doyel.  
 1987 Pioneer Period Village Structure and Settlement Pattern in the Phoenix Basin. In *The Hohokam Village: Site Structure and Organization*, edited by D. E. Doyel, pp. 21–70. American Association for the Advancement of Science. Glenwood Springs, Colorado.
- Camp, P.  
 1986 *Soil survey of the Gila River Indian Reservation, Arizona, part of Maricopa and Pinal counties* (draft). Manuscript on file, Soil Conservation Service Office, Chandler, Arizona.
- Cantley, G. J.  
 1991 *Archaeology of a Rockpile Field in the Santan Mountains, Arizona*. Unpublished M.A. Thesis, Department of Anthropology, Arizona State University, Tempe.  
 1993 *An Historic Property Survey of Pecos Road Borrow Pit*. Bureau of Indian Affairs, Phoenix Area Office, Phoenix.
- Castetter, E. F., and W. H. Bell  
 1942 *Pima and Papago Indian Agriculture*. Inter-American Studies I. University of New Mexico Press, Albuquerque.
- Chenault, M. L. and D. H. Greenwald.  
 1990 *Archaeological Testing of a Portion of Pueblo del Alamo, Site AZ T:12:18 (ASU)*. Cultural Resources Report No. 90-X. SWCA, Inc., Environmental Consultants.
- Ciolek-Torrello, R.  
 1995 The Houghton Road Site, the Agua Caliente Phase, and the Early Formative Period in the Tucson Basin. *Kiva* 60:531–574.
- Clark, Tiffany C. and T. K. Henderson.  
 2001 *Archaeological Investigations along the Sixty-seventh Avenue and Baseline Road Watermains, Phoenix, Arizona*. Technical Report No. 2001-13. Desert Archaeology, Inc., Tucson.
- Cogswell, J.W.  
 2002 *Cultural Resources Survey of 30 Acres Near the Corner of 59th Avenue and Broadway Road, Maricopa County, Arizona*. Northland Research, Inc. Technical Report No. 02-80. Tempe.
- Crary, J. S.  
 1993 *Archaeological Survey of the Picacho to Toltec and GRIC to Phoenix Segments of the Santa Fe Pacific Pipeline, Pinal and Maricopa Counties, Arizona*. Archaeological Consulting Services, Tempe.
- Crown, P. L.  
 1994 *Ceramics and Ideology: Salado Polychrome Pottery*. University of New Mexico Press, Albuquerque.

- Crown, P. L., and W. J. Judge (editors)  
 1991 *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest*. School of American Research Press, Santa Fe.
- Czaplicki, J. S.  
 1980 *Letter Report Regarding Survey for the Provident Energy Company Oil Pipeline Right-of-Way*. ASM Survey Project No. 1980-124. Ms. On file. Arizona State Museum, Tucson.
- Darling, J. A.  
 2000 *Obsidian Sourcing Studies, Research Design & Analysis Plan*. P-MIP Technical Report No. 00-08. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- 2005 *A Class III Cultural Resource Survey of Five Alternative Alignments in the South Mountain Freeway Corridor Study Area, Maricopa County, Arizona*. CRMP Technical Report 2004-05. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Darling, J. A., and R. L. Greenspan  
 2004 *Archaeological Monitoring of Two Anomaly Repairs along the KMFP Phoenix-Tucson, 6" (LS-53/54) pipeline, District 6, Gila River Indian Community*. CRMP Technical Report No. 2004-09. Cultural Resource Management Program, River Indian Community, Sacaton, Arizona.
- Darling, J. A., J. C. Ravesloot, and M. R. Waters  
 2004 *Village Drift and Riverine Settlement: Modeling Akimel O'odham Land Use*. *American Anthropologist* 106: 282–295.
- Dean, J. S.  
 2000 *Salado*. University of New Mexico Press, Albuquerque.
- Dean, R. M.  
 2003 *People, Pests, and Prey*. Ph. D. Dissertation, Department of Anthropology, University of Arizona, Tucson.
- DeJong, D. H.  
 2009 *Stealing the Gila: The Pima Agricultural Economy and Water Deprivation, 1848–1921*. The University of Arizona Press, Tucson.
- Department of Energy (DOE)  
 1983 *Liberty-Coolidge 230-kV Transmission Line, Arizona*. Draft Environmental Impact Statement, U.S. Department of Energy. Western Area Power Administration, Boulder City, Colorado.
- Diehl, M. W.  
 2003 *The Organization of Resource Use in a Desert Landscape: The Early Agricultural Period in Southern Arizona*. Anthropological Papers No. 34. Center for Desert Archaeology, Tucson.
- Ditzler, K. H.  
 1977 *An Archaeological Clearance Survey of 4 Relocated Project 15-12 House Lots, Gila River Housing Authority, Gila River Indian Community, Pinal County, Arizona*.

Archaeological Clearance Investigation (OCRM-77-129). Office of Cultural Resource Management, Department of Anthropology, Arizona State University, Tempe.

Doak, D. P., G.R. Seymour, S. B. Bierer, and L. Myers

1997 Site Descriptions. In *The Sanchez Copper Project: Archaeological Investigations in the Safford Valley, Graham County, Arizona*, edited by G. R. Seymour, R. V. N. Ahlstrom, and D. P. Doak, pp. 4.1–4.17. SWCA Archaeological Report No. 94-82, Volume 1, SWCA. Tucson, Arizona.

Dobyns, H. F.

1981 *From Fire to Flood: Historic Human Destruction of Sonoran Desert Riverine Oases*. Ballena Press Anthropological Papers No. 20. Ballena Press, Socorro, New Mexico.

Doelle, W. H.

1976 *Desert Resources and Hohokam Subsistence: The Conoco-Florence Project*. Archaeological Series No. 103. Arizona State Museum, University of Arizona, Tucson.

1981 The Gila Pima in the Late-Seventeenth Century. In *The Protohistoric Period in the North American Southwest, A.D. 1450–1700*, edited by D. R. Wilcox and W. B. Masse, pp. 57–70. Anthropological Research Papers No. 24. Department of Anthropology, Arizona State University, Tempe.

Doyel, D. E.

1980 Hohokam Social Organization and the Sedentary to Classic Transition. In *Current Issues in Hohokam Prehistory: Proceedings of a Symposium*, edited by D. E. Doyel and F. Plog, pp. 23–40. Anthropological Research Papers No. 23. Arizona State University, Tempe.

1991 Hohokam Cultural Evolution in the Phoenix Basin. In *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*, edited by G. J. Gumerman, pp. 231–278. Amerind Foundation New World Studies Series No. 1. Amerind Foundation, Dripping Springs, Arizona, and University of New Mexico Press, Albuquerque.

1993 *Prehistoric Non-Irrigated Agriculture in Arizona: A Historic Context for Planning*. Estrella Cultural Research Paper No. 3. Phoenix.

1995 Cultural and Environmental Background. In *Archaeological Excavations at Pueblo Blanco: The MCDOT Alma School Road Project*, vol. 1, edited by D. E. Doyel, A. T. Black, and B. S. Macnider, pp. 1–20. Cultural Resources Report No. 90. Archaeological Consulting Services, Ltd., Tempe.

2000 The Santan Phase in the Phoenix Basin. In *The Hohokam Village Revisited*, edited by D. E. Doyel, S. K. Fish, and P. R. Fish, pp. 221–244. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Fort Collins, Colorado.

Doyel, D. E., J. S. Crary, G. Gage, and K. J. Jensen

1995 *A Class One Overview for the Proposed Sand Carlos Irrigation Project Joint Works Rehabilitation*. Archaeological Consulting Services, Ltd., Tempe.

- Doyel, D. E., and M. Green  
 1995 *Research Design and Work Plan for Archaeological Survey of the Gila River Indian Reservation*. Archaeological Consulting Services, Ltd. Tempe, Arizona.
- Effland, R. W., Jr.  
 1984 *Archaeological and Historical Cultural Resource Assessment for the Western Area Power Administration Liberty to Coolidge Rebuild Project*. Cultural Resources Report No. 16. Archaeological Consulting Services, Ltd., Tempe.
- Effland, R. W. and M. Green  
 1985 *Archaeological and Historical Cultural Resource Investigations for the Western Area Power Administration Liberty to Coolidge Rebuild Project*. Cultural Resources Report No. 25. Archaeological Consulting Services, Ltd., Tempe.
- Elson, M. D.  
 1998 *Expanding the View of Hohokam Platform Mounds: An Ethnographic Perspective*. The University of Arizona Press, Tucson.
- Ensor, B. and D. E. Doyel, (editors)  
 1997 *Archaeological Survey in Districts 6 and 7, Gila River Indian Community. Volume 2: Site Descriptions*. Cultural Resources Report No. 98. Archaeological Consulting Services, Ltd., Tempe.
- Ezell, P. H.  
 1961 *The Hispanic Acculturation of the Gila River Pimas*. Memoir No. 90. *American Anthropologist* 63(5), Part 2, October 1961.
- 1983 A History of the Pima. In *Southwest*, edited by A. Ortiz, pp. 149–160. Handbook of North American Indians, vol. 10, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.
- Fish, P. R.  
 1989 The Hohokam: 1,000 Years of Prehistoric in the Sonoran Desert. In *Dynamics of Southwest Prehistory*, edited by Linda S. Cordell and G.J. Gumerman, pp. 19–63. Smithsonian Institution Press, Washington, DC.
- Fish, S.K. and P.R. Fish  
 1994 Revised Site Definition Policy. Arizona State Museum, University of Arizona, Tucson.
- Fish, S. K., P. R. Fish, and J. H. Madsen (editors)  
 1992 *The Marana Community in the Hohokam World*. Anthropological Papers of the University of Arizona, No. 56. University of Arizona Press. Tucson.
- Foster, M. S.  
 2002 Non-Irrigation Agricultural Water Management Techniques and Property Types. In *Prehistoric Water Utilization and Technology in Arizona: Background for Historic Contexts, A Component of the Arizona Historic Preservation Plan*, edited by M. S. Foster, M. K. Woodson, and G. Huckleberry, pp. 41–90. Arizona State Parks. Phoenix.
- Foster, M. S., M. K. Woodson, G. Huckleberry  
 2002. *Prehistoric Water Utilization and Technology in Arizona*. State Historic Preservation Office, Phoenix.

Fuller Associates

1980 *Environmental Assessment: Liberty to Coolidge (Arizona) Transmission Line Upgrade*. Ms. On file, F.C. Fuller Associates, Carmichael, California.

Gasser, R. E.

1976 Hohokam Subsistence: A 2,000 Year Continuum in the Indigenous Exploitation of the Lower Sonoran Desert. Archaeological Report 11. USDA Forest Service, Southwestern Region, Albuquerque.

Gasser, R. E., and S. M. Kwiatkowski

1991 Food for Thought: Recognizing Patterns in Hohokam Subsistence. In *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*, edited by G. J. Gumerman, pp. 417–459. Amerind Foundation New World Studies Series No. 1. Amerind Foundation, Dragoon, Arizona, and University of New Mexico Press, Albuquerque.

Giacobbe, J. A. and M. McDermott

2003 *The Orme SRP Substation Project: A Cultural Resource Survey for a Proposed Cellular Tower, City of Phoenix, Maricopa County, Arizona*. EcoPlan Associates, Inc. Cultural resources Report 03-624:9. Mesa, Arizona.

Gladwin, H. S., E. W. Haury, E. B. Sayles, and N. Gladwin

1937 *Excavations at Snaketown: Material Culture*. Medallion Papers 25. Gila Pueblo, Globe, Arizona.

Grafil, L. S.

2000 *A Cultural Resources Survey Along 75<sup>th</sup> and Southern Avenues, Maricopa County, Arizona*. Technical Report No. 995034. Logan Simpson Design, Inc., Tempe.

Graybill, D. A., D. A. Gregory, G. S. Funkhouser, and F. Nials

2006 Long-Term Stramflow Reconstructions, River Channel Morphology, and Aboriginal Irrigation Systems Along the Salt and Gila Rivers. In *Environmental Change and Human Adaptation in the Ancient American Southwest*, edited by D. E. Doyel and J. S. Dean, pp. 69–123. University of Utah Press, Salt Lake City.

Gregory, D. A., and G. Huckleberry

1994 *An Archaeological Survey of the Blackwater Area, Vol. I: The History of Human Settlement in the Blackwater Area*. Cultural Resources Report No. 86. Archaeological Consulting Services, Ltd., Tempe.

Grebinger

1976 Salado: Perspectives from the Middle Santa Cruz Valley. *Kiva* 42:39–46.

Gumerman, G. J. (editor)

1991 *Exploring the Hohokam: Prehistoric Desert Peoples of the American Southwest*. Amerind Foundation New World Studies Series 2. University of New Mexico Press, Albuquerque.

Hackenberg, R. A.

1983 Pima and Papago Ecological Adaptations. In *Southwest: Handbook of North American Indians, Vol. 10* edited by A. Ortiz, pp. 161–177. Smithsonian Institution, Washington, DC.

- Hart, D. R.  
 2002 *Cultural Resources Survey of 19 Acres Located at the Intersection of 59th Avenue and Broadway Road, Phoenix, Maricopa County, Arizona*. Northland Research, Inc., Report No. 02-60. Tempe, Arizona.
- Haury, E. W.  
 1976 *The Hohokam: Desert Farmers and Craftsmen, Excavations at Snaketown, 1964–1965*. University of Arizona Press, Tucson.
- Hayden, J. D.  
 1965 Fragile-Pattern Areas. In *American Antiquity*, pp. 272-276. Volume 31, Issues2, Part 1 ed. 2 vols. American Antiquity.
- Hegmon M., M. A. Peeples, A. P. Kinzig, S. Kulow, C. M. Meegan, and M. C. Nelson  
 2008 Social Transformation and Its Human Costs in the Prehispanic U.S. Southwest. In *American Anthropologist* 110(3): 313–324.
- Hohmann, J. W.  
 2003 *A Class III Archaeological Survey of 38 Acres at Lower Buckeye Road and 59th Avenue, Phoenix, Maricopa County, Arizona*. The Louis Berger Group, Inc. Cultural Resource Division Clearance Report No. 455. Phoenix.
- Howard, J. B.  
 1994 A Paleohydraulic Approach to Examining Agricultural Intensification in Hohokam Irrigation Systems. In *Research in Economic Anthropology*, Supplement 7, pp. 263–324. JAI Press, Greenwich.
- 2000 Quantitative Approaches to Spatial Patterning in the Hohokam Village: Testing the Village Segment Model. In *The Hohokam Village Revisited*. Edited by D.E. Doyel, S.K. Fish, and P.R. Fish, pp. 167–196. Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Glenwood Spring, Colorado.
- 2006 *Hohokam Irrigation Communities: A Study of Internal Structure, External Relationships, and Sociopolitical Complexity*. Unpublished Ph.D. Dissertation, Arizona State University, Tempe.
- Huckell, B. B.  
 1984a *The Archaic Occupation Of The Rosemont Area, Northern Santa Rita Mountains, Southeastern Arizona*. Cultural Resource Management Division, Arizona State Museum, University of Arizona, Tucson.
- 1984b The Paleo-Indian and Archaic Occupation of the Tucson Basin: An Overview. *Kiva* 49(3–4):133–145.
- 1995 *Of Marshes and Maize, Preceramic Agriculture Settlements in the Cienega Valley, Southeastern Arizona*. Anthropological Papers of the University of Arizona, Number 59. The University of Arizona Press, Tucson.
- IMACS  
 2012 *Intermountain Antiquities Computer System User's Guide*. University of Utah, Bureau of Land Management, U.S. Forest Service.

Irwin, D.

1991 *An Archaeological Survey of the Santa Fe Pacific Pipeline Phoenix to Williams Air Force Base Right-of-Way, Maricopa, Arizona*. Archaeological Consulting Services, Ltd., Tempe.

Keane, M and A.E. Rogge

1992 *Gold and silver Mining in Arizona 1848-1945: A Cibtext for Historic Preservation Planning*. Dames and Moore Intermountain Cultural Resource Services Research Paper No. 6, Phoenix.

Lite, J. A. and B. W. Stone

1997 *Cultural Resources Survey of Approximately 41.35 Miles of Proposed Gila River Telecommunications, Inc., Right-of-Way and Two Block Parcels on Gila River Indian Community Lands, Maricopa and Pinal Counties, Arizona*. Project Report 96:107. Archaeological Research Services, Inc., Tempe.

Lindly, J.M.

2004 *Archaeological Monitoring of a Sewer Maintenance Project Along 59th Avenue between Broadway and Lower Buckeye Roads, Phoenix, Maricopa County, Arizona*. SWCA Environmental Consultants. SWCA Cultural Resources Report No. 04-126. Phoenix.

Loendorf, C., and G. E. Rice

2002 *Projectile Point Typology, Gila River Indian Community, Arizona*. Anthropological Research Papers No. 2. Gila River Indian Community, Sacaton, Arizona.

Loendorf, C., C.M Fertelmes, S. Tiedens and J. A. Darling

2011 *A Class I Overview And Supplemental Cultural Resource Survey Of The E2 Alternative Alignment With Observations On The E1 (Pecos Alignment), South Mountain Transportation Corridor Project, Gila River Indian Community, Maricopa County, Arizona*. CRMP Technical Report No. 2011-05. Cultural Resource Management Program, River Indian Community, Sacaton, Arizona.

Mabry, J. B.

1998a *Paleoindian and Archaic Sites in Arizona*. Technical Report No. 97-7. Center for Desert Archaeology, Tucson.

1998b *Archaeological Investigations of Early Village Sites in the Middle Santa Cruz Valley*. Anthropological Papers No. 19. Center for Desert Archaeology, Tucson.

2005 *Changing Knowledge and Ideas About the First Farmers in Southeastern Arizona*. In *The Late Archaic Across the Borderlands: from Foraging to Farming*, edited by B. J. Vierra, pp. 41–83. University of Texas Press, Austin.

Marshall, J. T.

2001 *Ballcourt*. In *The Grewe Archaeological Research Project: Volume 2: Material Culture. Part II: Stone, Shell, and Bone Artifacts and Biological Remains*, edited by D. B. Craig pp. 463–518. Anthropological Papers No. 99-1. Northland Research, Inc., Tempe, Arizona.

- Masse, W. B.  
1981 *Prehistoric Irrigation Systems in the Salt River Valley, Arizona*. Science 214(4): 408–415.
- Matson, R. G.  
1991 *The Origins of Southwestern Culture*. The University of Arizona Press, Tucson.
- McAuliffe, J. R.  
1999 The Sonoran Desert: Landscape Complexity and Ecological Diversity. In *Ecology of Sonoran Desert Plants and Plant Communities*, edited by R. H. Robichaux. University of Arizona Press. Tucson.
- McConville, J. T. and Holzkamper, F. M.  
1955a *An Archaeological Survey of the Southern Pacific Pipeline Right-of-Way in Southeastern Arizona*. Ms. On file. Arizona State Museum, University of Arizona.  
  
1955b *An Archaeological Survey of the Southern Pacific Pipeline Right-of-Way in Southeastern Arizona*. *American Antiquity*. 21 (2):204.
- Meegan, C. M..  
2009 *An Nutritional Stress and Depopulation for the Lower Salt-River Valley Hohokam*. Unpublished PH.D. Dissertation, Arizona State University, Tempe.
- Midvale, F.  
n.d. Supplemental Papers. On file, Department of Anthropology, Arizona State University, Tempe.
- Mindeleff, C.  
1897 Casa Grande: Hohokam Indian Ruins Arizona. *New England Magazine*. Preservation Reprint #8296. Wordmax Books, Laurel, Maryland.
- Mitchell, D. R.  
2000 *An Archaeological Survey of 120 Acres for the Foothills Project, Maricopa County, Arizona*. SWCA Cultural Resource Report No. 00-280. SWCA, Inc., Environmental Consultants, Phoenix.
- Mitchell, D.R. and R.F. Ryden  
2000 *Archaeological Survey at Pioneer Concrete's 51st Avenue Site, Maricopa County, Arizona*. SWCA Cultural Resources Report No. 00- 111. SWCA, Inc., Environmental Consultants, Phoenix.
- Morgan, D. P. and J. A. Darling.  
2001 *A Class I And Class III Cultural Resources Assessment of 10 Dumpsites for the Beautification 2001 Project, Maricopa And Pinal Counties, Gila River Indian Community, Arizona*. CRMP Technical Report No. 2001-02. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Morgan, D. P.  
2003 *A Cultural Resources Assessment of Eight Proposed Rehabilitation Tasks on El Paso Natural Gas Pipelines 1203 and 2214 In and Adjacent to the Gila River Indian Community*,

*Maricopa County, Arizona. CRMP Technical Report No. 2003-04. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.*

Neily, R. B.

1991a *Archaeological Survey of the St Johns Mission Tap and Five Valve Locations Along the El Paso Natural Gas Company 2039 Line.* Archaeological Consulting Services, Ltd., Tempe.

1991b *An Archaeological Survey of Existing El Paso Natural Gas Company Pipelines on the Gila River Indian Community, Maricopa and Pinal Counties, Arizona.* Archaeological Consulting Services, Ltd., Tempe.

Neily, R. B., M. Brodbeck, and C. M. Peterson

1999 *A Cultural Resources Survey of Borderlands-West Area, District 6, Gila River Indian Community, Maricopa County, Arizona.* CRMP Technical Report 98-10. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.

Neily, R. B., B. Randolph, S. R. James, and M. Brodbeck

2000 *A Cultural Resource Assessment of the Southwestern Portion of the Santan Management Area, Pima-Maricopa Irrigation Project (P-MIP), Gila River Indian Community.* P-MIP Report No. 10. Gila River Indian Community, Cultural Resource Management Program, Sacaton, Arizona.

O'Brien, P. M., J. S. Bruder, D. A. Gregory, A.E. Rogge, and D. A. Hull

1987 *Cultural Resources Technical Report for the US Telecom Fiber Optic Cable Project from San Timateo, California to Socorro, Texas: The Arizona Segment.* Dames & Moore Phoenix.

Pfaff, C.

1994 *The San Carlos Irrigation Project: An Historic Overview and Evaluation of Significance, Pinal County, AZ.* Bureau of Reclamation Technical Services Center, Denver.

1996 *The San Carlos Irrigation Project--Photographs: Written Historical and Descriptive Data.* Historic American Engineering Record No. AZ-50. National Park Service, Western Region, San Francisco.

Péwé, T. L.

1978 Terraces of the Lower Salt River Valley in Relation to the Late Cenozoic History of the Phoenix Basin, Arizona. In *Guidebook to the Geology of Central Arizona*, edited by D. M. Burt and T. L. Péwé, pp. 1–45. Special Paper No. 2. Arizona Bureau of Geology and Mineral Technology, Tucson.

Quilian, P.

1986 *Interim Report: Liberty to Coolidge Rebuild Project, Archaeological Data Recovery.* Northland Research, Inc., Tempe.

Ravesloot, J. C., J. A. Darling, and M. R. Waters

2009 Hohokam and Pima–Maricopa Irrigation Agriculturalists: Maladaptive or Resilient Societies? In *The Archaeology of Environmental Change*, edited by C. T. Fisher, J. B. Hill, and G. M. Feinman, pp. 232–245. University of Arizona Press, Tucson.

- Ravesloot, J. C., M. K. Woodson, and M. J. Boley (editors)  
 2007 *Testing and Data Recovery, SFPP, LP, East Line Expansion Project, Arizona Portion: Cochise, Pima, Pinal, and Maricopa Counties*. WSA Technical Report No. 2007-04. William Self Associates, Inc., Tucson.
- Ravesloot, J. C., and S. M. Whittlesey  
 1987 Inferring the Protohistoric Period in Southern Arizona. In *The Archaeology of the San Xavier Bridge Site (AZ BB:13:14), Tucson Basin, Southern Arizona*, edited by J. C. Ravesloot, pp. 81–98. Archaeological Series No. 171. Arizona State Museum, University of Arizona, Tucson.
- Rea, A.  
 1983 *Once a River: Bird Life and Habitat Changes on the Middle Gila*. University of Arizona Press, Tucson.  
 1997 *At the Desert's Green Edge: An Ethnobotany of the Gila River Pima*. University of Arizona Press, Tucson.  
 1998 *Folk Mammology of the Northern Pimans*. University of Arizona Press, Tucson.
- Redman, C. L.  
 1999 *Human Impacts on Ancient Environments*. University of Arizona Press, Tucson.
- Reid, J. and S. Whittlesey  
 1997 *The Archaeology of Ancient Arizona*. University of Arizona Press, Tucson.
- Reynolds, S. J.  
 1988 Geologic Map of Arizona. Arizona Geological Survey, Map 26, scale 1:1000000.
- Rice, G.  
 1978 *An Archaeological Survey of 2 Proposed Housing Lots in Projects AZ 15-9 and 15-16, St. John's Mission Area, Gila River Indian Community, Arizona*. Archaeological Clearance Investigation (OCRM-78-157). Office of Cultural Resource Management, Department of Anthropology, Arizona State University, Tempe.
- Russell, F.  
 1908 *The Pima Indians*. Twenty-Sixth Annual Report of the Bureau of American Ethnology, 1904-1905, Smithsonian Institution, Washington, DC.
- Ryden, D. W.  
 1989 *South Mountain Agricultural Area: Historic Resources Survey*. Don W. Ryden AIA/Architects, Inc.
- Schmidt, C. and D. R. Mitchell  
 2004 *A Cultural Resources Survey of a Proposed Telecommunications Tower Site (AZ-0356A) at the Orme Substation in Phoenix, Maricopa County, Arizona*. SWCA Environmental Consultants. SWCA Cultural Resources Report No. 04-318. Phoenix.
- Sellers, W., and R. H. Hill  
 1974 *Arizona Climate*. University of Arizona Press, Tucson.

- Sellers, W. D., R. H. Hill, and M. Sandersonrae  
1985 *Arizona climate: The first one hundred years*. University of Arizona, Tucson, Arizona.
- Shaw, A. M.  
1994 *A Pima Past*. The University of Arizona Press. Tucson.  
1995 *Pima Indian Legends*. The University of Arizona Press. Tucson.
- Shaw, C. W.  
2000 *Class I Inventory and Class III Cultural Resources Survey for the City of Phoenix Waterline Route Around the Western and Southern Edges of South Mountain Park, Maricopa County, Arizona*. Technical Report No. 995051. Logan Simpson Design, Tempe.  
2003 *Cultural resources survey of 210 acres southeast of the corner of 59th Avenue and Lower Buckeye Road, Maricopa County, Arizona*. Northland Research, Inc. Technical Report No. 03-04. Tempe.
- Shepard, K. S. and A. E. Rogge  
1997 *Lower Buckeye Road to Dusty Lane: A Cultural Resource Inventory of 51<sup>st</sup> Avenue through Laveen, Arizona*. Dames and Moore, Phoenix.
- Sires, T. M.  
1986 *Archaeological Clearance Surveys for the Gila River Housing Authority (Maricopa Colony, Komatke, Sacaton, and Sacaton Flats) Gila River Indian Community, Arizona*. Arizona State Museum, University of Arizona, Tucson.
- Sliva, R. J.  
2003 *The Early Agricultural Period in Southern Arizona: Material Culture*. Anthropological Papers No. 35. Center for Desert Archaeology, Tucson.
- Smith, W.  
1986 *The Effects of Eastern North Pacific Tropical Cyclones on the Southwestern United States*. N.O.A.A. Technical Memorandum NWS WR-197, U.S. Department of Commerce., Washington, D.C.
- Southworth, C. H.  
1914–1915 *Gila River Survey, Pinal County, Arizona*. U.S. Department of the Interior, U.S. Indian Service Irrigation, Washington D.C. Map Copies on file, Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Spicer, E. H.  
1962 *Cycles of Conquest: The Impact of Spain, Mexico, and the United States on the Indians of the Southwest, 1533–1960*. University of Arizona Press, Tucson.
- Stein, P. H.  
1994 *Historic Trails in Arizona from Coronado to 1940*. Arizona State Historic Preservation Office, Phoenix.

Stubing, M., C. T. Wenker, and J. Lindy

2000 *Archaeological Testing at Site AZ T:12:117 (ASM) for the Foothills Reserve Development, Phoenix, Arizona*. Report 00-91. SWCA Environmental Consultants, Phoenix.

Tainter, J. A.

1988 *The Collapse of Complex Societies*. Cambridge University Press, Cambridge, United Kingdom.

Teague, L. S., and P. L. Crown (editors)

1984 *Hohokam Archaeology along the Salt-Gila Aqueduct, Central Arizona Project, Volume 7: Environment and Subsistence*. Archaeological Series No. 150. Arizona State Museum, University of Arizona, Tucson.

Telles, C.

1992 *Cultural Resource Survey for Deed of Release of Ditch Easement*. DI-BR-APO-ICRS-92-19. Bureau of Reclamation, Arizona Projects Office, Phoenix.

Turner, R. M and D. E. Brown

1994 Sonoran Desertscrub. In *Biotic Communities: Southwestern United States and Northwestern Mexico*, edited by D.E. Brown, pp. 181–221. University of Utah Press, Salt Lake City.

Turney, O. A.

1924 *Land of the Stone Hoe*. Privately printed, Phoenix.

U.S. Geological Survey (USGS)

1952 *Fowler Quadrangle, Arizona, 7.5' Series*. U.S. Department of the Interior, Geological Survey, Washington, DC.

U.S. Geological Survey (USGS)

1952 *Laveen Quadrangle, Arizona, 7.5' Series*. U.S. Department of the Interior, Geological Survey, Washington, DC.

Wallace, H. D.

1997 Presence or Parlance? The Meaning of “Hohokam” and Concepts of Culture, A.D. 800 to 1050, in Southeastern Arizona. In *The Archaeology of a Land Between: Regional Dynamics in the Prehistory and History of Southwestern Arizona*, edited by H. D. Wallace. Amerind Foundation, Dragoon, Arizona, and University of New Mexico Press, Albuquerque.

Wallace, H. D., J. D. Heidke, and W. H. Doelle

1995 Hohokam Origins. *Kiva* 60:575–618.

Waters, M. R.

1996 *Surficial Geologic Map of the Gila River Indian Community*. P-MIP Technical Report No. 96-1. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.

- 1998 Late Quaternary Geology and Geoarchaeology of the Middle Gila River, Gila River Indian Community, Arizona. Ms. on file, Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- Waters, M. R., and J. C. Ravesloot  
 2000 Late Quaternary Geology of the Middle Gila River, Gila River Indian Reservation, Arizona. *Quaternary Research* 54:49–57.
- 2001 Landscape Change and the Cultural Evolution of the Hohokam Along the Middle Gila River and Other River Valleys in South-Central Arizona. *American Antiquity* 66(2):285–299.
- Weaver, D. E. Jr.  
 1972 A Cultural-Ecological Model for the Classic Hohokam Period in the Lower Salt River Valley. *Kiva* 38:43–52.
- Webb, G.  
 1959 *A Pima Remembers*. University of Arizona Press, Tucson.
- Wells, E. C.  
 2003 *The Archaeology of Dry Farming Agrosystems in the Middle Gila River Basin, Central Arizona*. P-MIP Technical Report No. 2003-14. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.
- 2006 *From Hohokam to O’odham. The Protohistoric Occupation of the Middle Gila River Valley, Central Arizona*. Gila River Indian Community, Anthropological Research Papers, Number 3, Gila River Indian Community, Cultural Resources Program, Sacaton, Arizona.
- Wenker, C. T.  
 1999 *Archaeological Survey of 320 Acres at South Mountain, Maricopa County, Arizona*. SWCA Archaeological Report Series No. 99-157. SWCA, Inc., Environmental Consultants, Phoenix.
- Whittlesey, S. M.  
 1995 Mogollon, Hohokam, and O’otam: Rethinking the Early Formative Period in Southern Arizona. *Kiva* 60:465–480.
- Whittlesey, S. and R. D. Ciolek-Torrello  
 1996 The Archaic-Formative Transition in the Tucson Basin. In *Early Formative Adaptations in the Southern Southwest*, edited by B. J. Roth, pp. 49–64. Monographs in World Archaeology No. 25. Prehistory Press, Madison, Wisconsin.
- Whittlesey, S., R. D. Ciolek-Torrello, and J. H. Altshul (editors)  
 1997 *Vanishing River: Landscapes and Lives of the Lower Verde Valley*. Tucson: SRI Press.
- Wigglesworth, K.  
 1999 *Soil Boring Locations Along Reach WS-ID of the Proposed P-MIP Main Stem Canal, Maricopa Management Area, Gila River Indian Community*. P-MIP Technical Report No. 99-05. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.

William Self Associates, Inc.

2005 *Class III Cultural Resources Survey, SFPP L.P. East Line Expansion Projects, Arizona Portion*. WSA Technical Report No. 2005-1. William Self Associates, Tucson.

Wilcox, D. R.

1979 The Hohokam Regional System. In *An Archaeological Test of the Sites in the Gila-Butte-Santan Region, South-Central Arizona*, edited by G. Rice, D. Wilcox, K. Rafferty, and J. Schoenwetter, pp. 77–116. Anthropological Research Papers No. 18. Arizona State University, Tempe.

1991 Hohokam Social Complexity. In *Chaco and Hohokam: Prehistoric Regional Systems in the American Southwest*, edited by P. L. Crown and W. J. Judge, pp. 253–275. School of American Research Press, Santa Fe.

Wilcox, D. R., and C. Sternberg

1983 *Hohokam Ballcourts and Their Interpretation*. Archaeological Series No. 160. Arizona State Museum, University of Arizona, Tucson.

Wilcox, D. R., T. R. McGuire, and C. Sternberg

1981 *Snaketown Revisited: A Partial Cultural Resource Survey, Analysis of Site Structure, and an Ethnohistoric Study of the Proposed Hohokam-Pima National Monument*. Archaeological Series No. 155. Arizona State Museum, University of Arizona, Tucson.

Wilson, J. P.

1999 *Peoples of the Middle Gila: A Documentary History of the Pimas and Maricopas, 1500s–1945*. Ms. on file, Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.

Wood, D. G.

1972 *Archaeological Reconnaissance of the Gila River Indian Reservation: Phase III*. Archaeological Series No. 16. Arizona State Museum, University of Arizona, Tucson.

Woodbury, R. B.

1961 *A Reappraisal of Hohokam Irrigation*. *American Anthropologist* 63:550–560.

Woodson, M. K.

2003 *A Research Design for the Study of Prehistoric and Historic Irrigation Systems in the Middle Gila Valley, Arizona*. P-MIP Technical Report No. 2003-10. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.

2010 *The Social Organization of Hohokam Irrigation in the Middle Gila River Valley, Arizona*. Unpublished PhD Dissertation, Arizona State University, Tempe.

Woodson, M. K., and E. Davis

2001 *A Cultural Resources Assessment of the Western Half of the Blackwater Management Area, Pima-Maricopa Irrigation Project (P-MIP), Gila River Indian Community, Arizona*. P-MIP Report No. 14. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona

Woodson, M. K., D. Burden, C. Loendorf, and B. Randolph

2004 *National Register of Historic Places Eligibility Testing at Three Sites (GR-1008, GR-1011, GR-1094) Along Main-Stem Canal Reach WS-ID of the Pima-Maricopa Irrigation Project, Maricopa and Broadacres Management Areas, Gila River Indian Community, Maricopa County, Arizona.* P-MIP Technical Report No. 2004-01. Cultural Resource Management Program, Gila River Indian Community, Sacaton, Arizona.

Yunker, B. E., and C. D. Breternitz

2002 *A Cultural Resources Survey of Approximately 25 Acres of Private Agricultural and Residential Land for a Proposed School Site in the Riverside Elementary School District No. 2 near the Southwest Corner of 63rd Avenue and Elwood Street, in Phoenix, Maricopa County, Arizona.* Soil Systems Technical Report No. 02-35. Phoenix.



## APPENDIX A: ARTIFACT DATA

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**Table A.1. Historic Glass Recovered**

Site Number	Locus	Specimen Number	Collection Type	Unit Number	Glass Company	Color	Specific Date	Worked	Min. Count	Comments
1571		2	QU	1		Clear glass		No		Clear glass w/yellow paint?
1571		2	QU	1		Pale pink glass		No		Floral pattern mold
1571		2	QU	1		Brown glass	ca 1929–1950's	No	1	Cork closure 'sani-clor' embossed on shoulder, bleach & washing fluid registered in 1929,
1571		2	QU	1	Kerr Glass Manufacturing Co.	Clear glass	ca 1915–1950's	No	1	Embossed on body "SELF:TRADE MARK REG.PAT, AUG. 31 1915 "MASON" base has "9/9"
1571		2	QU	1	Owens-Illinois Glass Co.	Clear glass	1936	No	1	Finish continuous thread body 'Old Quaker' embossing, "4" on heel
1571		4	Diag	0		Clear glass	1915–1930	Yes		Possible milk bottle base with embossed "CD". Dating based on the color of selenium glass.
1571		4	Diag	0		Purple glass		Yes	1	Partial base fragment bottle?

**Table A.2. Historic Metal Recovered**

Site Number	Locus	Specimen Number	Collection Type	Unit Number	Item	Type	Date	Min Count	Comments
1571		1	QU	1	Can, beer, church key opening	Steel tinplate	1934–1936	3	"ABC SELECT PILSNER TYPE BEER. CORPORATION."
1571		1	QU	1	Can, matchstick filler	Steel tinplate	1915–1985	8	
1571		1	QU	1	Can, sanitary	Steel tinplate	post 1904	2	
1571		1	QU	1	Can, meat, keystrip on side	Steel tinplate	1907–?	2	2 keys & key strips present, embossed on one base can "INSPECCIONADO-APRESADO URUGUAY" (A Class 3 Cultural Resource Survey Five Altrnative Alianments in the Southern Mountain Freeway corridor Study
1571		1	QU	1	Cap, crown, bottle cap	Steel tinplate	post 1892	7	
1571		1	QU	1	Can, meat	Steel tinplate		2	Bayonet openings, sanitary
1571		1	QU	1	Can, sanitary	Steel tinplate		1	Bayonet opening
1571		1	QU	1	Can, fish				Bayonet opening, no key or key attachment present
1571		1	QU	1	Can, coffee, keystrip on side with reclosable lid	Steel tinplate	1920's–1960's	2	Coffee can w/i.d. attached & one lid

**Table A.3. Non-Indigenous Ceramics Recovered**

Site Number	Locus	Specimen Number	Collection Type	Unit Number	Ware Type	Artifact Form	Technique	Date	Comments
1571		3	QU	1	Porcelain	Saucer	Transfer	Post-late 1800s	Partial saucer, blue floral & landscape pattern maker mark is missing

**Table A.4. Indigenous Ceramics Recovered**

Site Number	Locus	Specimen Number	Collection Type	Unit Number	Ceramic Type	Body Form	Vessel Part	Count
1569	B	11	QU	2	Unidentifiable ware type	Indeterminate	Body	11

**Table A.5. Lithics Recovered**

Site Number	Locus	Specimen Number	Collection Type	Unit Number	Artifact Type	Material	Size1 Counts <sup>a</sup>	Size2 Counts	Size3 Counts	Size4 Counts	Total Counts
1569	A	10	QU	1	Secondary flake, simple, non-cortical platform. Some cortex, less than three scars	Slate/shale	0	0	0	1	1

<sup>a</sup>Size 1 < 1.5cm; Size 2=1.5-2.49cm; Size 3=2.49-3.49cm; Size 4 > 3.49cm

## APPENDIX B: SUMMARY OF ROCK PILE TYPOLOGY

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**Table B.1. Abbreviated Summary of Doak et al. 1997**

Rock pile Type	Description
Type 1: Marker Stone	A single stone, or one stone resting entirely on top of another, too insubstantial to have served any purpose other than marking a spot.
Type 2: Very Small Rock pile	A small, tight cluster of 3 or 4 rocks (like a cairn) that is presumably too small to have served as anything more than a marker.
Type 2A: Pot Rest or Basket Ring	Three or four rocks arranged with an open space in center, suitable for holding a vessel with a rounded base upright.
Type 3: Small Rock pile	Three or four rocks in a cluster measuring 1.5 m or less in diameter and having a generally insubstantial appearance
Type 3A: Small Sorted Rock pile	Tight cluster of relatively large cobbles (20 cm to 30 cm in diameter) that measures less than 1 m in diameter. More substantial in appearance than Type 3 rock piles.
Type 3B: Gravel-Mulched Rock pile	Typical Type 3 rock pile with an open space in the center that has gravel spread over it (this type is rare)
Type 4: Compact Rock pile	A fairly compact cluster of stones measuring 1 m to 2 m in diameter, stones are of a fairly consistent size (large cobbles).
Type 4A: Rock Jumble	Similar in size and composition to Type 4, but more densely packed with cobbles such that rocks are resting entirely on rocks rather than on the ground surface.
Type 5: Disrupted Rock pile	Measures between 1 m and 3 m in diameter, has an irregular shape with rocks of varying sizes. These features appear to have been disturbed or dispersed, and originally may have formed a tighter cluster.
Type 6: Dispersed Rock pile	Fairly small (diameter < 20 cm) cobbles spread across the ground surface rather than concentrated in a pile, measures up to 3 m in diameter
Type 7: Large Rock pile	Large concentration of rocks measuring 2 m to 4 m in diameter. Some have mounding at the center of the pile.
Type 8: Very Large Rock pile	Concentrations of cobbles and boulders measuring 4 m or more in diameter. Stones are fairly uniform in size. Displays a more notable degree of mounding in the center than smaller piles.
Type 9: Rock Scatter	Amorphous concentration of small rocks spread over relatively large areas. These features are similar to roasting pits in appearance, though no evidence of burning is visible.