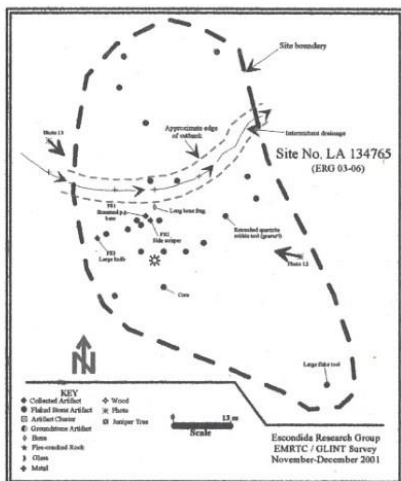


A CULTURAL RESOURCES INVENTORY of 472 ACRES in SOCORRO COUNTY, NEW MEXICO

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THE ARCHAEOLOGY OF THE EMRTC/GLINT PROJECT AREA



by
ROBERT DELLO-RUSSO, PhD

**ESCONDIDA RESEARCH GROUP
SOCORRO, NEW MEXICO**



ERRATA

A Cultural Resources Inventory of 472 Acres in Socorro County, New Mexico - The Archaeology of the EMRTC/GLINT Project Area

(Dello-Russo 2002)
NMCRIS Investigation No.77057

The projectile point base found at site LA 134764 (FS3) and identified in Figure 14f as a Plainview/Bajada type, is more likely a Scottsbluff type from the Cody Complex (Bruce Huckell, pers. comm. 2002; Robert Weber, pers. comm. 2002). The presence of this point at site LA 134764 still implies a Late Paleoindian occupation there, however.

Other references to this point should be changed accordingly. These include:

- Discussion of site LA 134764, page 27
 - Table 6, page 44
 - Discussion of the point (as LA 134764.3), page 48
 - LA Site Record for site LA 134764
-

ESCONDIDA RESEARCH GROUP



Cultural Resource Management and Consulting

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in SOCORRO COUNTY, NEW MEXICO**

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Robert D. Dello-Russo, Ph.D.

Submitted to

Energetic Materials Research and Testing Center
New Mexico Institute of Mining and Technology
Socorro, New Mexico

Submitted by

Escondida Research Group
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ABSTRACT

In late November and early December of 2001, Escondida Research Group (ERG) of Socorro, NM completed a Class III cultural resources inventory of the Geosynchronous Light Imaging National Testbed (GLINT) project area, as proposed by the Energetic Materials Research and Testing Center (EMRTC) in Socorro, New Mexico. This inventory occurred in Township 3 West, Range 2 South, Section 3, NMPM.

During the inventory, ten (10) new archaeological sites (LA 134760-134769) and 16 isolated occurrences (IOs) were documented. It is likely that nine of these sites, which are flaked stone or flaked-and-ground stone artifact scatters, represent occupations of the area during the Paleoindian, Early Archaic, and Middle Archaic periods. Paleoindian components are most possible at LA 134761 and LA 134764, while an Early Archaic component is likely at LA 134765. Middle Archaic components are most likely at LA 134760, LA 134761, LA 134764 and LA 134767. Other sites, including LA 134762, LA 134763, LA 134768 and LA 134769, had no temporally diagnostic artifacts and are probably associated with pre-ceramic occupations (pre-AD 200). The remaining site, LA 134766, is an Historic period abandoned "windmill" location that was probably utilized sometime between AD 1912 and AD 1945.

It is recommended by ERG that all of the sites, except LA 134764 and LA 134765, be considered as potentially eligible for inclusion in the National Register of Historic Places (NRHP). It is further recommended that both LA 134764 and LA 134765 be considered as eligible for inclusion in the NRHP. Because four of the aforementioned sites would have been impacted by construction of the GLINT facility as it was originally conceived, ERG has recommended that the entire facility (Heliostat Array, Receiver Complex, Access Roads) be relocated to a revised location. Specific details of this relocation are provided in the text of the report. ERG suggests that, if these management recommendations are followed, the GLINT facility as proposed by EMRTC should be given an archaeological clearance. It is further recommended that an archaeological monitor be present during some or all of the subsurface excavations related to the construction of the GLINT facility.

TABLE of CONTENTS

ABSTRACT.....	i
TABLE of CONTENTS.....	ii
LIST of FIGURES	iii
LIST of TABLES	iii
ACKNOWLEDGMENTS.....	iv
INTRODUCTION	1
DESCRIPTION and LOCATION of the PROPOSED UNDERTAKING	1
DESCRIPTION and LOCATION of the CULTURAL RESOURCES INVENTORY ...	3
REGIONAL CULTURE HISTORY	4
Paleoindian Period.....	4
Archaic Period	5
Formative Period - Basketmaker II to Pueblo II	6
Pueblo III and IV Periods	7
Historic Period.....	8
ENVIRONMENTAL CONTEXT	10
Structural Geology.....	10
Soils Geology.....	11
Climate.....	12
Fauna and Flora.....	12
INVENTORY METHODS	13
Records Searches.....	13
Transect Definition, Field Conditions, and Schedule of Field Work	13
Site and Isolated Occurrence Definitions	14
Documentation of Sites and IOs	14
BACKGROUND RESEARCH.....	15
RESULTS of CURRENT INVENTORY	17
Newly Documented Archaeological Sites.....	17
Isolated Occurrences.....	38
Projectile Points and Other Noteworthy Flaked Stone Tools.....	38
DISCUSSION	50
Summary of Inventory Findings	50
Site Formation Processes in the Project Area.....	50
EVALUATIONS of SIGNIFICANCE	51
Archaeological Sites	51
Isolated Occurrences.....	54
DETERMINATION of EFFECT and MANAGEMENT RECOMMENDATIONS	54
REFERENCES	59

LIST of FIGURES

Figure 1. Location of Cultural Resources Inventory and Proposed GLINT Project.....	2
Figure 2. Locations of Archaeological Sites in GLINT Project Area.....	20
Figure 3. Plan View of Site LA 134760.....	21
Figure 4. Plan View of Site LA 134761.....	23
Figure 5. Plan View of Site LA 134762.....	25
Figure 6. Plan View of Site LA 134763.....	26
Figure 7. Plan View of Site LA 134764.....	28
Figure 8. Plan View of Site LA 134765.....	30
Figure 9. Plan View of Site LA 134766.....	32
Figure 10. Plan View of Site LA 134767.....	33
Figure 11. Plan View of Site LA 134768.....	35
Figure 12. Plan View of Site LA 134769.....	36
Figure 13. Locations of Isolated Occurrences (IOs) in GLINT Project Area.....	42
Figure 14. Projectile Points Recovered from GLINT Project Area.....	43
Figure 15. Flaked Stone Tools Recovered from GLINT Project Area.....	45
Figure 16. Original GLINT Location Compared to Archaeological Site Locations.....	55
Figure 17. Original GLINT Location Compared to Revised GLINT Location.....	58

LIST of TABLES

Table 1. Original Locational Data for Major Components of the GLINT Project.....	3
Table 2. Locational Data for ERG Cultural Resources Inventory Area.....	4
Table 3. Previously Recorded Archaeological Sites Near the Project Area.....	16
Table 4. Data for Archaeological Sites in the GLINT Project Area.....	18
Table 5. Data for Isolated Occurrences (IOs) Located in the GLINT Project Area.....	39
Table 6. Metric and Other Data for Projectile Points in GLINT Project Area.....	44
Table 7. Metric and Other Data for Flaked Stone Tools in GLINT Project Area.....	46
Table 8. Summary of Archaeological Sites and Suggestions for NRHP Eligibility.....	52
Table 9. Original and Revised Locational Data For GLINT Facility.....	57

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Thanks one and all,
Robert Dello-Russo, PhD
Principal Investigator

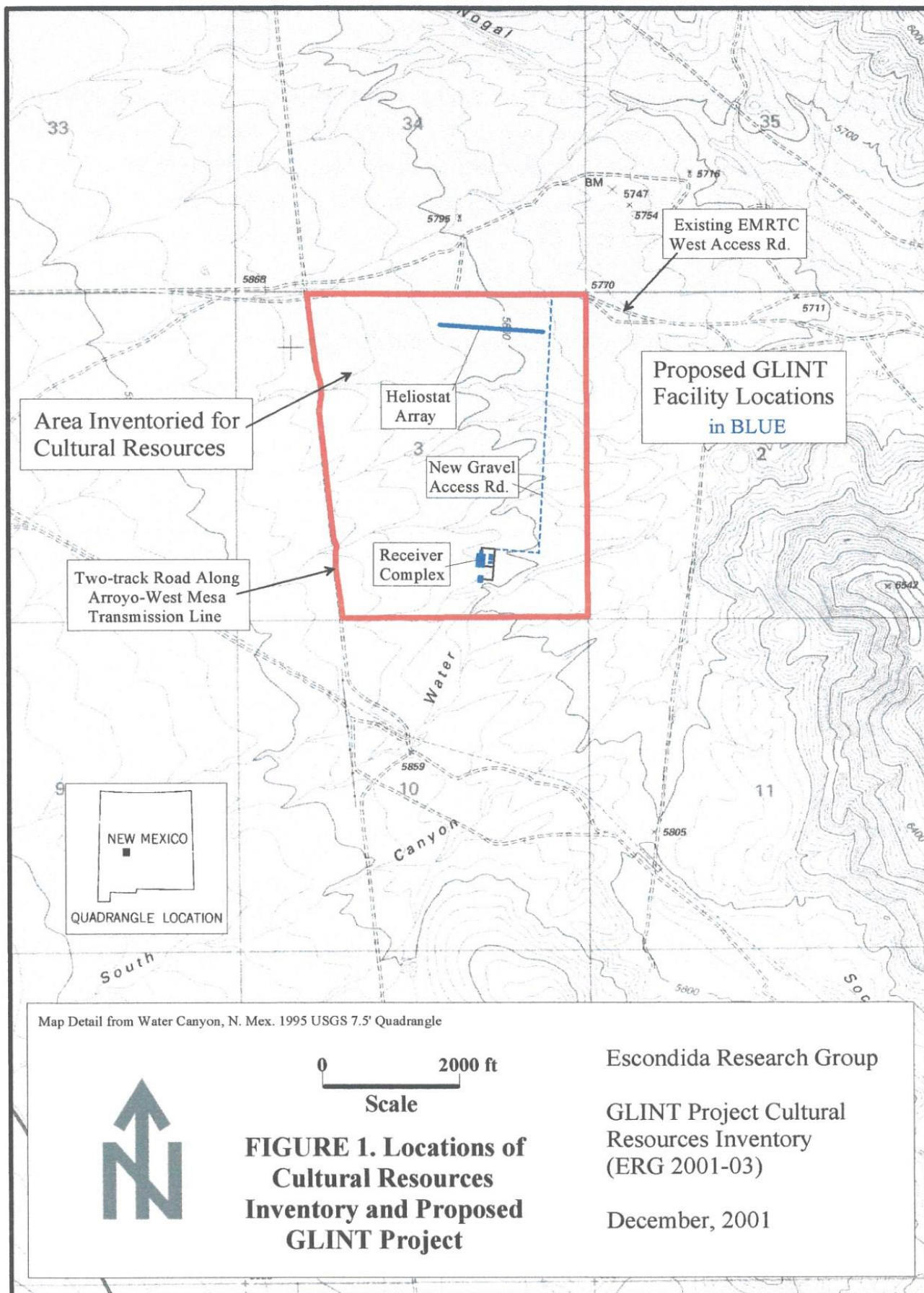
INTRODUCTION

In October of 2001, Mr. Dave Collis, Associate Director for the Energetic Materials Research and Testing Center (EMRTC) in Socorro, New Mexico, contacted Escondida Research Group (ERG) and requested a budget estimate for completion of a cultural resources inventory at the construction site for the proposed Geosynchronous Light Imaging National Testbed (GLINT) project. Administrative efforts related to the inventory were completed following that request and inventory field work commenced on November 20, 2001. All field work was completed by December 4, 2001, after a brief break due to inclement weather. Descriptions of the proposed undertaking, previous archaeological findings in the area around the undertaking, and the methods and results of the cultural resources inventory are provided in the following document. Suggestions concerning the eligibility of each cultural property to the National Register of Historic Properties (NRHP) and management recommendations for the proposed GLINT Project are found at the end of the report.

DESCRIPTION and LOCATION of the PROPOSED UNDERTAKING

The proposed GLINT Project is to be located in Township 3 South, Range 2 West, Section 3, NMPM in Socorro County, New Mexico (see Figure 1). This location is west of the Socorro Mountains on a portion of a large bajada (piedmont) slope that trends down from the Magdalena Mountains on the west to Water Canyon on the east. This area can be found on the Water Canyon, N. Mex. 1995 USGS 7.5' topographic quadrangle.

The GLINT facility will consist of a large Heliostat Array, a Receiver Complex, and an associated access road (Figure 1). The locational data for the proposed facility are provided below in Table 1. The Heliostat Array is to be located at the extreme north end of the facility and will be oriented along an east-west axis. The array measures approximately 498 m (1635 ft) in length and 10 m (33 ft) in width and thus covers an area of approximately 0.50 ha (1.24 ac). The Receiver Complex is to be located at the extreme south end of the facility and will be in the same orientation as the heliostat array. The complex consists of a receiver building, a gravel parking area to the east of the receiver building, a control building south of the parking area, and evapo-transpiration beds and a septic tank located south of the receiver building. In all, the receiver



complex measures approximately 44 m (145 ft) east-west by 84 m (276 ft) north-south and covers an area of about 0.37 ha (0.92 ac). These components are connected with gravel roads that join a larger gravel access road which, in turn, runs from the receiver complex past the east end of the heliostat array to the existing EMRTC West Access Road. This new gravel access road will be about 720 m (2364 ft) long and 8 m (26 ft) wide and will cover an area of about 0.58 ha (1.41ac).

Table 1. Original Locational Data for Major Components of the GLINT Project.

Installation	Corner or End Point	Lat / Long		UTM (Zone 13)	
		North	West	Easting	Northing
Receiver Bldg.	1	N34°04'27.3"	W107°01'55.6"	312483	3772056
	2	N34°04'27.4"	W107°01'56.9"	312447	3772061
	5	N34°04'24.8"	W107°01'55.5"	312480	3771977
	6	N34°04'24.9"	W107°01'57.3"	312438	3771984
Heliostat Array	East End	N34°05'2.5"	W107°01'44.4"	312292	3773170
	West End	N34°05'3.3"	W107°02'3.9"	312791	3773137

DESCRIPTION and LOCATION of the CULTURAL RESOURCES INVENTORY

Figure 1 also illustrates the boundaries of the block area (approximately 472 acres) in T3S R2W Section 3 that was inventoried by ERG around the proposed GLINT facility location. This area extends from the existing EMRTC West Access Road on the north to the east-west line between Sections 3 and 10 on the south end, with an average elevation of 5828 ft (1775 m). The east edge of the inventoried parcel is the north-south line between Sections 2 and 3, while the west edge is the access road that parallels the El Paso Electric Company Arroyo-West Mesa

transmission line in the western third of Section 3. Locational data for the inventory area are provided in Table 2.

Table 2. Locational Data for ERG Cultural Resources Inventory Area.

Corner	T3S R2W Section 3	UTM Coordinates (Zone 13)		Elevation (ft ASL)
	Aliquot Parts	Easting (m)	Northing (m)	
NW	NE1/4 NW1/4 NW1/4	311693	3773344	5859
NE	NE1/4 NE1/4 NE1/4	312973	3773318	5797
SE	SE1/ SE1/4 SE1/4	312945	3771728	5797
SW	SW1/4 SE1/4 SW1/4	311814	3771750	5847

REGIONAL CULTURE HISTORY

Paleoindian Period

The investigation of the Paleoindian period remains poorly developed in the region around the project area. Archaeological collections from the Paleoindian period are often dominated by large bifacial lithic weapons and tools (predominantly projectile points and knives). Because these artifacts represent the typical Paleoindian remains found throughout the region many researchers characterize this period as one dominated by big-game hunting. Stratified Paleoindian sites are not common and, for the most part, Paleoindian materials occur as surface finds.

Typical Paleoindian site contexts in the region around the project area include deflated and eroded portions of sand dunes (Hurt and McKnight 1949), as seen at the Ake Site in the Plains of San Augustine (Beckett 1980), as well as the open plains, the foothills of mountainous areas, and on topographic features near marshes and ponds (Berman 1979). The Mockingbird Gap Site is also found in a dune setting near Chupadero Wash, east of Socorro (Weber and Agogino 1968). Site types found in such places include processing sites, armament sites, and base camps (Judge 1973).

The various Paleoindian cultures represented in the region include: Clovis (9500 to 9000 BC); Folsom-Midland (8800 to 8300 BC); Belen; and the Cody Complex (7000 to 6000 BC) (Irwin-Williams and Haynes 1970). Belen artifacts may represent a regional expression of the Cody Complex (R. Weber, personal communication). The most comprehensive study of Folsom-related materials in the region, completed by James Judge (1973) in the central Rio Grande Valley, documented 15 Folsom sites and 14 Folsom localities. A Paleoindian Scottsbluff or Milnesand point has been documented in the Socorro Mountains just northeast of the current project area (Gossett and Gossett 1990:82), and a Folsom point base, made of Edwards Plateau chert, has been documented just south of the Socorro Mountains (Dello-Russo 1997).

Archaic Period

Two Archaic cultural traditions are reported for the study area: the Cochise, thought to be the forerunner of the Mogollon culture; and the Oshara, purported ancestors of the Anasazi. The assignment of a given surface scatter of lithic artifacts to one Archaic tradition or the other is based solely on the presence of projectile points thought to be culturally and temporally diagnostic. Research by Broster and Harrill (1982) on the Acoma Reservation revealed the presence of 46 Oshara and 32 Cochise points, which suggests the existence of both traditions in the area. In contrast, Cochise points strongly dominated the assemblage of projectile points found in the Socorro Mountains (Gossett and Gossett 1990). However, "the distinctiveness of the Oshara and Cochise point styles has never been formally assessed, nor has the evidence supporting the date ranges attributed to the various types been critically examined" (O'Hara and Elyea 1985:75). Other researchers have also expressed doubts about the validity of such distinctions (Chapman 1980; Steven Shackley, personal communication 1998).

As defined by Sayles and Antevs (1941), the Cochise tradition is comprised of three stages: Sulphur Springs (7500 to 3500 BC), Chiricahua (3500 to 1500 BC), and San Pedro (1500 to 250 BC). Radiocarbon-dated Archaic sites in the region include the Wet Leggett site (Martin et al. 1949), Bat Cave (Dick 1965), and Tularosa Cave (Martin et al. 1952).

The definitive work on the Oshara Tradition was done by Irwin-Williams (1973). The Oshara Tradition includes six stages: Jay (5500 to 4800 BC), Bajada (4800 to 3200 BC), San Jose (3000 to 1800 BC), Armijo (1800 to 800 BC), En Medio (800 BC to AD 400), and Trujillo (AD 400 to 600).

By far, the most common location for Archaic sites is above the margins of former lake terraces, although their susceptibility to wind erosion and deflation has allowed numerous

Archaic sites to become the targets of collectors, especially on the Plains of San Augustin (Berman 1979). Other locales for Archaic sites are around springs, along arroyo banks, and on remnant terraces and ridges.

According to Berman (1979:18), seven types of remains characterize regional Archaic sites: rockshelters and caves, various combinations of chipped stone scatters, ground stone, and fire-cracked rock, as well as isolated artifacts and dwellings. Berman (1979) reported only a single known Archaic pit structure (found at the Wet Leggett site), but since that time many others have been found, especially around the Rio Puerco, north of the project area (Gerow and Hogan 1990; Anschultz and Doleman n.d.), west of Bernalillo, New Mexico (Brandi 1993), and possibly around Arroyo del Coyote on Kirtland Air Force Base near Albuquerque (Hoagland and Dello-Russo 1995a, 1995b; Verhaaren and Dello-Russo 1995). A majority of the former sites are associated with the Middle-to-Late Archaic. Significant botanical and faunal remains from Archaic occupations have been studied at Bat Cave (Dick 1965), Tularosa Cave (Martin et al 1952) and Lemitar Shelter (Anzalone 1973).

Formative Period - Basketmaker II to Pueblo II

This period in the prehistory of the Southwest is thought to date from about AD 200 to AD 900/1000, and is distinguished by the appearance of pottery, more substantial pithouse architecture, ceremonial structures, above-ground structures, distinctive lithic assemblages, and an increased focus on cultivated plant foods. Researchers studying the Mogollon culture have generally applied a temporal-cultural framework that includes several Formative phases (Haury 1936). These phases include: Pine Lawn (150 BC to AD 500), Georgetown (AD 500 to 700), San Francisco (AD 700 to 900), and Three Circle (AD 900 to 1000). Researchers studying the Anasazi employ a parallel set of conventions established by the Pecos conference, including: Basketmaker II, Basketmaker III, Pueblo I, and Pueblo II. In the Rio Abajo area, Marshall and Walt (1984) describe several Formative phases, including: the San Marcial Phase (AD 300 to 800); the Tajo Phase (AD 800 to 1000); and the Early Elmendorf Phase (AD 950 or 1000 to 1100).

Early work by Mera (1940, 1943) and later efforts by Danson (1957) constitute a large portion of the Formative-related research in the region. While few sites dating to this period are known in the Cibola National Forest, many such sites have been located on elevated landforms, ridges and gentle slopes across lands not in the Cibola Forest. In addition, some pithouse villages have been reported in the vicinity of major and tributary drainage valleys (Berman 1979).

As with the Archaic, the Formative prehistory of the region is characterized by the presence of both northern (Anasazi) and southern (Mogollon) traits, although for Formative occupations the north-south distinction has been made with gray and brown ceramics, respectively. By the Pueblo II period sites began to appear on non-elevated landforms and across more diverse settings in general. More emphasis on surface structures, an increased use of water-control devices, and the development of regionally distinctive black-on-white pottery types also characterize this time.

Archaeological investigations of the lower Rio Salado area, reported on by Wimberly and Eidenbach (1980), revealed a substantial Basketmaker III presence, located primarily at the confluence of major tributaries and channels. Ceramic assemblages observed at Basketmaker III sites include an equal mix of Cibola Graywares and Brownwares, which Wimberly and Eidenbach interpreted as indicating a combined Anasazi-Mogollon influence.

As part of their research design, Wimberly and Eidenbach attempted to evaluate earlier hypotheses by Ford et. al. (1972) concerning prehistoric occupation of the Lower Puerco and Salado. Due to the limited amount of survey in the region at the time, some provisions of the original hypotheses (i.e., arguments for the migration of Chacoan tradition peoples into the area after AD 1050) were difficult to evaluate. However, they did propose that: 1) the early ceramic sites in the area were probably occupied before AD 900; 2) the Pueblo I sites are continuations of the Basketmaker III presence; 3) the Pueblo II sites have a tendency to be located at a distance from drainage channels on elevated benches, hills and small mesas; 4) the later Pueblo III populations moved to headward river locations and major upland tributaries to the northwest; and 5) the Pueblo IV and later populations, in evidence at the confluence of the Rios Salado and Grande, actually represented native groups that had returned from the Salado headwaters.

Pueblo III and IV Periods

In the Pecos classification, the Pueblo III period dates approximately to the span of time between AD 1100 and AD 1300, while the Pueblo IV period occurred around AD 1300 to 1540. These correspond to the Late Elmendorf Phase and the Ancestral Piro Phase, respectively, in the Rio Abajo region (Marshall and Walt 1984). While some Pueblo III sites are located in valley bottoms, others in the region are often located on ridges and benches above drainages, and generally lie between 7000 and 8000 ft elevation (especially in the Datil and Gallinas Mountains). Large Pueblo IV sites, such as the Gallinas Spring site, have been reported along the Salado drainage, in the foothills south of the Alamo Reservation, and in the Rio Grande Valley. It was previously thought that a significant portion of the area was abandoned during

Pueblo III and Pueblo IV times. However, numerous aggregated pueblo sites in the region are now known to have been inhabited from AD 1300 until well beyond the time of Spanish contact in AD 1540. Of those puebloan sites occupied after AD 1300, most are recognized by the presence of Glaze A through Glaze D ceramic rim forms (Marshall and Walt 1984:135). This period is also characterized by the coalescence of populations into large plaza villages and an expansion of sites into areas previously unoccupied. There is some evidence to suggest that Apache peoples frequented parts of the region prior to the historic period (Berman 1979).

Historic Period

In the Rio Abajo region, the Colonial Piro Phase, which is recognized by the presence of local Glaze E and F forms, dates from AD 1541 to 1680 (Marshall and Walt 1984:139). Several sites, such as the La Jara site (LA 786) located northwest of the project area, exhibit fortifications, suggesting a defensive need on the part of pueblo inhabitants. Marshall and Walt (1984) speculate that the population growth of this period was, in part, the result of intrusive colonization by displaced Basin and Range and Plateau populations.

After the arrival of the Spanish, and until ca. AD 1675, some pueblos in the area saw continued occupation. Two large villages in the foothills south of the Alamo Reservation, Bear Mountain pueblo (LA 285) and Pueblo Magdalena (LA 284), are thought to represent the consolidation of disparate groups that had abandoned the Rio Grande Valley. These two pueblos alone may have housed up to one-third of the entire Colonial Piro population in the region (Marshall and Walt 1984:141). The area was generally abandoned by AD 1680, the time of the Pueblo Revolt.

The Navajo were probably part of the large-scale migration of Apacheans to the Southwest but the date of arrival of these southern Athabascans into the region is a source of debate (Kelley 1982). The early Spanish colonists, who entered the area in the mid-16th century, called the Athabascan peoples Apaches, and those living to the west of the Rio Grande, Apaches de Navajo (Brugge 1984) but exactly when the Navajo became distinct from other Apacheans is unknown.

The subsistence pattern of the early Navajo was probably based on horticulture combined with hunting and gathering. Early Spanish records indicate that the Navajo were farming by the early 1600s (McNitt 1972; Wozniak 1988), but whether the Navajo adopted horticulture from the Puebloan peoples or from horticulturalists in the Midwest prior to their arrival in the Dinétah is still subject to debate (Bailey and Bailey 1986). Betancourt (1980) uses the presence or

absence of horticulture as the basis for distinction between the Navajo and other Athabascan (Apachean) peoples.

Documented Navajo presence in the Alamo region, northwest of the project area, dates from AD 1708 (Betancourt 1980:35) and forked stick hogan remains -- a Dinetah Phase (AD 1500 to 1696) habitation structure (Hester 1962; Kelley 1982) -- have been identified in the pinyon-juniper country on top of mesas near the present-day Alamo Reservation (Walt 1989; Abbink 1986). In contrast, the presence of Apaches in the region has been dated to at least AD 1626 when Friar Alonzo de Benavides mentions *Apaches de Xila* being camped some 14 leagues west of his own camp at Senecu (a Rio Grande Piro pueblo; Betancourt 1980:33). Walt (1989) has identified sites described as collapsed forked stick hogans in association with pre-1700 Acoma ceramics, circular masonry storage buildings, and large amounts of burned corn. According to Walt (1989), these assemblages suggest a Navajo habitation distinct from the Gila Apache or other Apachean groups.

Despite the uncertainty regarding affiliations of early sites, by the 1740s the combined pressures of the Ute to the north and the Spanish to the east were forcing increased numbers of Navajo from the Dinetah (Abbink 1986; Bailey and Bailey 1986). During the Spanish Colonial period (1598 to 1821), Navajo mobility increased due to the acquisition of the horse from the Spanish. By about 1750, numbers of Navajo settled near the pueblos of Acoma and Laguna and "the archival record firmly establishes the Navajo in the area of the western pueblos and Gila Apache" (Abbink 1986). The Ladron Mountains became a famous refuge for Navajos after staging raids on the Spanish settlements of the Rio Grande. Walt notes documented raids in 1708, 1778, 1835, and 1840, and has also noted that there is a gap in the archaeological record for 18th Century Navajo sites (most likely attributable to a limited number of surveys) in the Alamo area (Walt 1989). The possibility exists, however, that many of the Alamo Navajo moved further southwest towards the Gila and Datil Mountains to escape either Spanish slave raiding, Apachean aggression, or Spanish retaliation. In addition increasing numbers of Spanish ranchers were moving into the area as a result of the escalating land grant process, displacing Navajo and Apache peoples with the support of the Spanish Colonial forces.

By 1800, as part of the resettlement process after the Pueblo Revolt, numerous expeditions by Spanish explorers and traders passed through the Rio Abajo region along the Camino Real, leaving behind evidence of their passage in the form of missions, small camps along the route, and historic artifacts at some of the pueblos (Earls 1987). Numerous Spanish

land grants were occupied, and villages along the Rio Grande and estancias in outlying areas were established.

The Mexican Secession, at the end of the Mexican-American War in 1848, opened the Southwest to U.S. citizens anxiously seeking new lands for livestock ranches, mining ventures, and homestead properties. In the early 1800s a U.S. military presence was established at Fort Craig and Fort Conrad, and by the 1860s Navajos were seeking refuge from U.S. troops and the Apaches in some parts of the region (Datil Mountains; Schroeder 1963). Incursions between Confederate and Union forces occurred during the Civil War at the Battle of Valverde, near Fort Craig. With the construction of a railroad from Socorro to Magdalena and a smelter near Park City in the late 1800's, Socorro became a prominent industrial and shipping location in New Mexico.

ENVIRONMENTAL CONTEXT

Structural Geology

The current project area is situated in the La Jencia Basin, which is northwest of Socorro, New Mexico, and is bounded by the Magdalena and Bear Mountains to the west, Ladron Mountains to the north and the Socorro and Lemitar Mountains to the east (Machette 1988:3-4). The mountains surrounding the basin consist mainly of Precambrian, Paleozoic, Oligocene, and Miocene rocks that now form moderate to steep west-tilted blocks. A major episode of block faulting in this area formed a large north-trending horst, the ancestral Magdalena Range. Sediment eroded from the range accumulated in subsiding basins on its east, north and west margins and the resulting bolson deposits (the Miocene Popotosa Formation), range from coarse-grained fanglomerates, mudflows, and lahars to fine-grained gypsiferous playa deposits. The floor of the Popotosa basin contained one or more large playas whose deposits are now present within and adjacent to the Ladron, Lemitar, Socorro, and Magdalena Mountains.

The La Jencia basin formed as a result of the uplift and subsequent tilting of the surrounding mountain ranges, with the resulting basin being elongated from north to south and probably structurally deepest at its southwest corner. This latter point is not far from the current project area. At the south end of the basin, basalt erupted from two vents east of the Sedillo Hill Reservoir, flowed eastward through Socorro Canyon, and spilled onto the flood plain of the ancestral Rio Grande near Socorro. The small modern playa near the center of the basin (and just north of the current project area) is a remnant of the once internally drained La Jencia basin.

This playa now lies on the modern drainage divide between the north and south subbasins of the La Jencia that drain to the Rio Grande. North of this divide, the relict constructional floor of the La Jencia basin is still widely preserved and is marked by a well-developed calcic soil ... and by local travertines ... that form mesas above the deeply incised canyons of La Jencia Creek and the Rio Salado (Machette 1988:5).

Soils Geology

Machette (1988:5) suggests that most of the materials present in the La Jencia basin (as seen in trenches and natural exposures) are of Holocene to middle Pleistocene age, although some remnants of possible early Pleistocene alluvial fans are scattered around the basin. Materials eroded from the eastern sides of the Magdalena and Bear Mountains during large-scale summer thunderstorms are carried by ephemeral streams and are subsequently deposited on the piedmont slope in small alluvial fans and in the arroyos as channel-filling deposits. Most of the material presently being deposited in the basin probably is eroded from soils and alluvium exposed on the piedmont slope adjacent to the mountains.

A soils trench (Trench 1), excavated along the east edge of the Magdalena Mountains along the La Jencia fault and west of the current project area, has been described by Machette (1988). Because of the increased precipitation along the eastern side of the Magdalenas, the boundary between calcareous (pedocal) and non-calcareous (pedalfer) soils is extended eastward into the basin. Where undisturbed, the ground surface in this area has a thin, weak desert pavement consisting of slightly varnished, pebble-size angular clasts. Soils in Trench 1 include: 1) Soil D, a weakly developed soil formed on a young colluvial deposit, and considered to be of Holocene age (post-5000 ybp). This soil is 30-40 cm thick; 2) Soil E, a relict soil in some places and a much less developed buried soil in others. This soil, which varies in thickness between 20 cm and 220 cm, is also considered to be of Holocene age, although somewhat older than Soil D; and 3) Soil F, a possible buried soil formed in parent materials. It is at least 50 cm thick and is considered to be either of lower Holocene or Upper Pleistocene age (Machette 1988:74-75). It is unclear at this point whether the aforementioned profile description should be extended east and downhill into the current project area. If the soil profile in the project area is similar, then it is possible that early Holocene and/or Late Pleistocene cultural deposits could be completely or partially buried there.

As described by Johnson (1988), the current project area is comprised of Puertecito-Cascajo-Rock Outcrop and Millett-Sedillo-Motoqua soils. The former soil group is found

primarily on hill and knolls, is generally shallow, well-drained, and is formed in alluvium and/or colluvium derived from volcanic tuff. Surface layers are typically brown or dark brown gravelly loams, underlain by pale brown to dark brown gravelly sandy loams and then by either reddish brown gravelly clay loams or yellowish brown gravelly sandy loams. These soils make up the upper elevation portions of the current project area.

The latter soil group is found on bajada, fan terraces, hills and ridges, is generally shallow-to-deep, well-drained, and is formed in alluvium derived from tuff, lava, and/or granite. Surface layers are typically brown gravelly fine loams and sandy loams, underlain by brown gravelly loams, reddish brown gravelly clay loams, or brown very gravelly sandy clay loams. The substratum are generally pink-light brown gravelly sandy loams. These soils make up the lower elevation portions of the project area.

In addition, the floodplain of Water Canyon is comprised of a Glenberg-Riverwash soil association, while the floodplain of the major, intermittent tributary to Water Canyon in the project area is comprised of a Puertecito-Rock Outcrop soil association. As noted, major piedmont or bajada slopes and ridges that make up most of the project area are comprised of a Millett-Sedillo soil association (Johnson 1988:27-35).

Of particular interest in the current project area are indications that a high water table or cienega environment was present during prehistory. Some of these extremely dark sediments are present at the base of an arroyo cutbank to the northwest of site LA 134764 and just south of site LA 134765. Its depth of burial suggests a possible Early Holocene age for the deposit. The dark colors of the sediment are the result of its organic content, rather than staining by carbon/charcoal (as would be associated with a buried thermal feature).

Climate

The average annual precipitation in the vicinity of the current project area is between 10 and 13 inches, while the average annual air temperature is between 47 and 57 degrees F and the average frost-free period ranges from 145 to 180 days.

Fauna and Flora

Fauna in the region surrounding the current project area can potentially include mule deer, mountain lion, pronghorn antelope, coyote, bobcat, gray fox, ringtail, porcupine, desert cottontail, Gunnison's prairie dog, and other smaller mammals, mourning dove, meadowlark, horned lark, Couch's spadefoot toad, side-blotched lizard, prairie and rock rattlesnakes.

Major plants in and along the drainages can include sideoats grama, blue grama, black grama, little bluestem, alkali sacaton, vine-mesquite, sand dropseed, Apache plume, and oneseed juniper. Other plants might include New Mexico feathergrass, cane bluestem and hairy mountain mahogany. A deteriorated community would see an increase in blue grama, broom snakeweed, cholla cactus, and oneseed juniper. On the bajada slopes, the major potential plants could include blue grama, black grama, galleta, sideoats grama, New Mexico feathergrass, wolftail, and bottlebrush squirreltail. A deteriorated plant community in this setting would include an increase in blue grama, galleta, ring muhly, sand dropseed, threeawn, and broom snakeweed. Based on these theoretical possibilities, it appears that most of the project area has deteriorated as a result of overgrazing by cattle. Grass has been obliterated in places, particularly around watering areas. Cattle trails are numerous and deep, and manure piles are dense and widespread where they occur. Cholla cacti and broom snakeweed are quite prevalent.

INVENTORY METHODS

Records Searches

Prior to the start of field work, the author reviewed the National Register of Historic Places (NRHP) and the State Register of Cultural Properties (SRCP) for registered cultural resources in or within a one-mile radius of the inventory area. None were found. In addition, the author completed an electronic records search of the New Mexico Cultural Resource Information System (NMCRIS) database at the Archaeological Records Management Section (ARMS) in Santa Fe, on November 19, 2001. Finally, a search of archaeological records at the Socorro Field Office of the USDI Bureau of Land Management was completed, in-person, on November 19, 2001. Both records searches looked for previously recorded archaeological sites within the one-mile radius. Six (6) sites were found and details about these sites, and the projects during which they were found, are presented in the following section on "Background Research".

Transect Definition, Field Conditions, and Schedule of Field Work.

This cultural resource survey consisted of a 100% (Class III) pedestrian inventory that was completed by two archaeologists walking east-west, parallel transects. The transects averaged approximately 15 m (50 ft) in width. Transect walking started at the southern end of the 472 acre inventory area. Walking each day began at about 9:00 AM and ended at about 3:00 PM, in order to insure the best lighting. Ground surface visibility at other times of the day was poor, largely due to the lengthy and irregularly shaped shadows cast by vegetation. Field work for the project began on November 20, 2001 and ended on December 4, 2001, with a break

between those dates for bad weather. Weather in general varied from warm, sunny, and breezy to cold, cloudy and very windy.

Site and Isolated Occurrence Definitions

In order to maintain some methodological consistency, and to provide a basis for management decision, definitions of archaeological manifestations are necessary. Basically, making a distinction between sites and isolated occurrences in the field involves assessments of the size, spatial and locational integrity, and content of artifact distributions. For the purposes of this project, the following definitions were used:

Isolated Occurrence (IO) - cultural manifestations characterized as a single class of artifact, numbering fewer than ten, in an area less than 100 sq m (10-by-10-m), or artifacts found in a setting where the original spatial setting of the artifacts appears to have been destroyed.

Site - cultural manifestations that minimally represent: 1) at least ten artifacts of one class in an area less than 100 sq m; or 2) two or more artifacts of more than one artifact class in an area less than 100 sq m; or 3) the presence of a cultural feature.

It should be noted that these definitions are only general guidelines for the evaluation of cultural resources in the field. As with all typologies or classification schemes, real world manifestations do not always fit neatly into boxes. Problematic situations, where a cultural manifestation may be defined as either a site or an IO, are often reconciled by the archaeologist in the field for reasons that should be made explicit in the report.

Documentation of Sites and IOs

Upon discovery of materials thought to represent an IO, a brief and intensive search of the area is initiated. If the item or items remain as isolates they are recorded by noting their physical attributes (artifact type, portion, material type, color, and thickness dimension), and their locational attributes (GPS coordinates, topographic setting, elevation, and surrounding soil and vegetation). Artifacts considered to be temporally or culturally diagnostic are described in greater detail and, in some cases, collected.

Cultural manifestations that qualify as archaeological sites are visited a second time, during which an intensive search is conducted for surface artifacts and features. All artifacts and features located are pinflagged. Using a Garmin "GPS-Map76" hand-held Global Positioning

System (GPS), the site is mapped in the field, noting all cultural features, all or a representative sample of the flagged artifacts, and physical features surrounding the site (eg. drainages, roads, and fences). Finally, descriptive inventories of artifacts and features, narratives of salient site attributes, and photographs and/or illustrations, where appropriate, are completed.

BACKGROUND RESEARCH

Prior to the current archaeological inventory, twelve (12) previous inventories and one documentation of a right-of-way barricade violation were completed in the region surrounding the current project area, during which six (6) sites were found within a one-mile radius of the project area. None of the sites were found in the current project area. Some of the previous inventories, and the nearby sites found by them, are detailed in Table 3 and discussed below.

Although eight (8) archaeological site numbers are reported in Table 3, three of the sites (LA 39437, LA 113468, and LA 126236) are all numbers for portions of the abandoned bed of the Atchison, Topeka & Santa Fe railroad (Magdalena branch). The latter two sites may actually be the exact same portion of the bed, as their UTM coordinates are virtually the same.

Other sites found in the area include both Historic period, Middle Archaic period, and Unknown prehistoric period manifestations. Of particular interest is site LA 39400, which is a very extensive Middle Archaic camp that is adjacent to nearby Nogal Canyon arroyo and covers an area of approximately 250,000 sq m. (although the original site map shows a site that covers about 105,000 sq m). The site extends south and west from Nogal Canyon arroyo and comes within 450 m of the NE corner of the GLINT project area. While NMCRIS data indicate that this site has eight (8) hearths, the original site record indicates the presence of 50 hearths and 50 pieces of groundstone. These findings suggest that archaeological sites from the Historic and Archaic periods could be expected in the current inventory area, and that Middle Archaic sites may be most prevalent.

Most of the inventories reported in Table 3 were linear surveys, including those for powerlines (Kemrer 1998), the existing EMRTC west access road (Sleeter 1988), telephone cable (Gilbert 1979), US Highway 60 overlays (Michalik 1998), and fencing along US Highway

Table 3. Previously Recorded Archaeological Sites Near the Project Area.

Site No.	UTM (Zone 13)		Site Type	Cultural / Temporal Affiliation	NMCRIS Activity No.	Report Reference
	East	North				
LA 21172	309700	3770230	Single residence	Anglo / Euro-American AD 1920-1950	8242 60740 63642	Gilbert (1979) Michalik (1998) Wilcox and Simpson (1999)
LA 39398	313140	3774620	Lithic scatter	Unknown 9500 BC - AD 1993	18372 27476 32670	Gossett and Gossett (1987) Gossett et al (1989) Gossett and Gossett (1990)
LA 39399	313780	3774180	Lithic scatter w/ possible hearth Glass scatter	Unknown 9500 BC- AD 1993 Anglo/Euro-American AD 1912-1945	18372 27476 32670	Gossett and Gossett (1987) Gossett et al (1989) Gossett and Gossett (1990)
LA 393400	313180	3773900	Dense lithic scatter / 50 hearths, 50 groundstone	Middle Archaic 3000 BC-1800 BC	32670	Gossett and Gossett (1990)
LA 39416	314380	3774440	Rock structure	Historic AD 1539-1993	32670	Gossett and Gossett (1990)
LA 39437	314260	3769605	AT&SF R.R. bed ? Transportation	Anglo / Euro-American AD 1846-1912	??	Sleeter (1988)
LA 113468	311817	3771341	AT&SF R.R. bed Transportation	Anglo / Euro-American AD 1846-1912	63517 (Proj. No. 61891)	Kemrer (1998)
LA 126236	311820	3771360	AT&SF R.R. bed Transportation	Anglo / Euro-American AD 1846-1912	63517 (Proj. No. 61891)	Kemrer (1998)

60 (Wilcox and Simpson 1999). Block inventories by Gossett and Gossett (1987 and 1990) covered 265 acres and 8618 acres, respectively and documented five (5) sites/0 IOs and 122 sites/665 IOs, respectively. These findings indicate that the densities of cultural resources in the area can be expected to range from one site every 50 acres to one site every 71 acres and approximately one IO every 13 acres. Using these figures, the current GLINT project area (472 acres) is expected to produce a maximum of 9 or 10 sites and 36 IOs.

Other inventories conducted in the vicinity of the current project area, in which no cultural resources were documented, include: 1) an archaeological clearance for nine drill pads (Geery 1977; BLM report 2-77-13); 2) an inventory of soil pits completed by the Socorro Office of the BLM in 1976 (no citation available; BLM report 2-77-2); 3) a survey of 20 proposed drilling sites (Dunham 1977; BLM report 2-77-14); 4) a survey of eight proposed geothermal gradient holes (Hicks 1977; BLM report 2-77-22); and 5) documentation of a right-of-way barricade violation (purportedly at archaeological site LA 66790, although this site is not located in Socorro County; O'Brien 1989).

RESULTS of CURRENT INVENTORY

The cultural resources inventory completed by ERG documented ten (10) new archaeological sites and 16 isolated occurrences (IOs). The sites are listed with ERG field numbers in Table 4. Locations of the newly documented archaeological sites are illustrated in Figure 2. All the sites and IOs are discussed in the following narrative sections and plan view illustrations of each site are provided as well.

Newly Documented Archaeological Sites

LA 134760

This site is a prehistoric flaked stone artifact scatter that represents the remains of a probable hunting/butchering location occupied sometime during the Middle Archaic period (3000-1800 BC). The site covers an area of approximately 3600 sq meters, although the majority of it appears to cover half that area (Figure 3). The site is located on the edge of a high terrace just north of the Water Canyon floodplain in a juniper savannah setting at approximately 5810 ft. elevation.

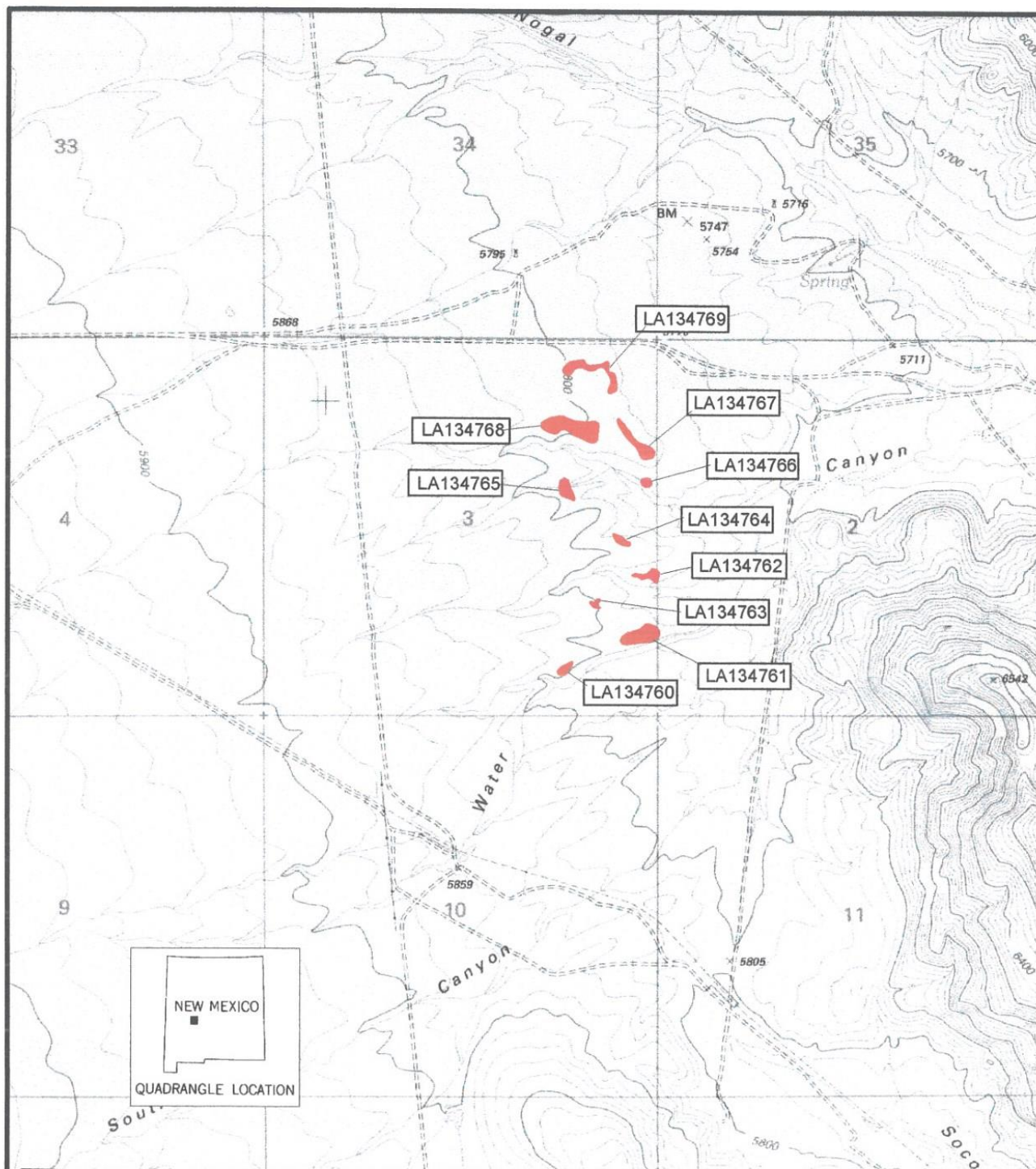
The artifact scatter is comprised of debitage (flakes, utilized flakes, retouched/utilized flakes, sharpening flakes, biface-thinning flakes) - of yellow and/or red silicified rhyolite (84%), gray basalt, gray chert, chalcedony, yellow quartzite, gray-orange speckled andesite(?), and

Table 4. Data for Archaeological Sites in the GLINT Project Area.

LA Site No.	Temp Site No.	Locational Data (UTM 13S)		Locational Data T3S R2W S3	Dimensions		Cultural / Temporal Affiliation(s)
		East	North		Length (m E-W)	Width (m N-S)	
LA 134760	03-01	312550	3771931	ne-sw-se	72	62	Middle Archaic (3000-1800 BC)
LA 134761	03-02	312903	3772070	ne-se-se	168	92	Unspecific Paleoindian (9500-5500 BC) Middle Archaic (3000-1800 BC)
LA 134762	03-03	312915	3772339	ne-ne-se	122	66	Unspecific Archaic (5500 BC-AD 200)
LA 134763	03-04	312736	3772432	sw-ne-se	45	37	Paleoindian -to- Archaic (9500 BC - AD 200)
LA 134764	03-05	312911	3772517	ne-ne-se	74	55	Late Paleoindian (8000-6600 BC) Middle Archaic (3000-1800 BC)

Table 4. Data for Archaeological Sites in the GLINT Project Area (cont'd).

LA Site No.	Temp Site No.	Locational Data (UTM 13S)		Locational Data T3S R2W S3	Dimensions		Cultural / Temporal Affiliation(s)
		East	North		Length (m E-W)	Width (m N-S)	
LA 134765	03-06	312596	3772695	se-sw-ne sw-se-ne	63	88	Early Archaic (4800-4000 BC)
LA 134766	03-07	312926	3772725	se-se-ne	46	37	Historic (AD 1912 and 1945)
LA 134767	03-08	312923	3772830	ne-se-ne ne-ne-ne sw-ne-ne	152	165	Middle-to-Late Archaic (3200 BC - AD 200)
LA 134768	03-09/10/11	312610	3772957	nw-se-ne / sw-ne- ne / se-nw-ne / ne- sw-ne	233	110	Paleoindian-to-Archaic (9500 BC-AD 200)
LA 134769	03-12/13/14	312739	3773195	sw-ne-ne nw-ne-ne ne-nw-ne	285	146	Paleoindian-to-Archaic (9500 BC-AD 200)



Map Detail from Water Canyon, N. Mex. 1995 USGS 7.5' Quadrangle



0 2000 ft
Scale

**FIGURE 2. Locations of
Archaeological Sites in
GLINT Project Area**

Escondida Research Group

GLINT Project Cultural
Resources Inventory
(ERG 2001-03)

December, 2001

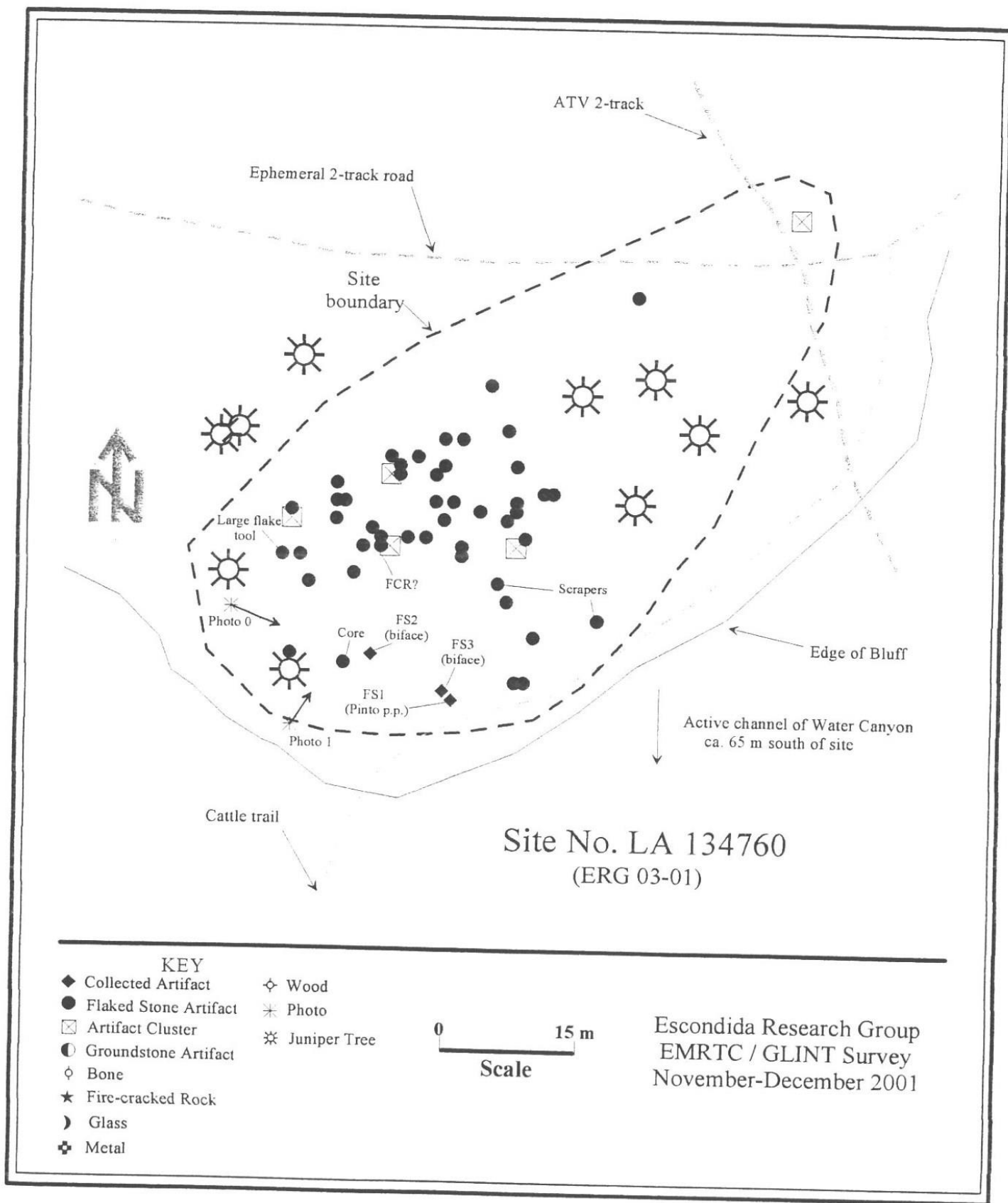


Figure 3. Plan View of Site LA 134760.

brown quartzitic sandstone - and tools, including a possible end scraper, a side scraper, bifaces (cores/knives; FS2 and FS3), a utilized irregular core, a very large chert flake tool, and a complete chalcedony, shouldered/bifurcated stemmed projectile point (FS1) that is a probable Pinto or San Jose style, indicative of a Middle Archaic occupation. The tool/debitage assemblage suggests that hunting- and butchering-related activities occurred at this location. Fire-cracked rock has also been tentatively identified, suggesting the possibility of a buried thermal feature. No groundstone artifacts were identified and no surface cultural features were located.

The sediments at the site consist of light brown, gravelly silt loams with an incipient desert pavement that are at least 8-10 cm deep (based on a pin flag probe). Accordingly, the potential for shallowly buried cultural materials at this site is thought to be moderate, although this assessment should be tested before a determination of NRHP eligibility is made, particularly because of the possible FCR found at the site.

LA 134761

This site is an extensive, open flaked stone and groundstone artifact scatter that covers an area of approximately 12,400 sq m (Figure 4) and probably served as a short-term processing camp during the San Jose/Middle Archaic period (3000-1800 BC). It may also have been occupied at some time during the Paleoindian period (9500-5500 BC; see discussion below). The site is located on a high bluff above and north of the Water Canyon floodplain in a grassland setting at 5785 ft elevation.

The flaked stone assemblage at this site consists ofdebitage (flakes, biface thinning flakes, angular debris, utilized and/or retouched flakes), irregular cores, bifaces and biface fragments, a spurred end-scraper (FS2), and one obsidian San Jose style projectile point fragment (FS1). These artifacts are made of a variety of materials including red and/or yellow silicified rhyolite (majority), brown silicified rhyolite, various cherts, obsidians, basalt, chalcedony, brown quartzitic sandstone, quartzites, and petrified wood. The spurred end-scraper is made of an apparently exotic, mottled orange chert and may suggest a Paleoindian occupation at the site. Alternately, it may have been scavenged and utilized by the Middle Archaic site occupants. The groundstone assemblage includes at least 8 slab metate fragments (that may have been fire-cracked) and one fire-cracked mano fragment adjacent to the spurred end scraper. A number of other fire-cracked rock fragments were also noted, suggesting the presence of a buried hearth(s). The total number of artifacts at the site is probably over 800 and suggests either a lengthy occupation, an occupation by numerous individuals, or several occupations.

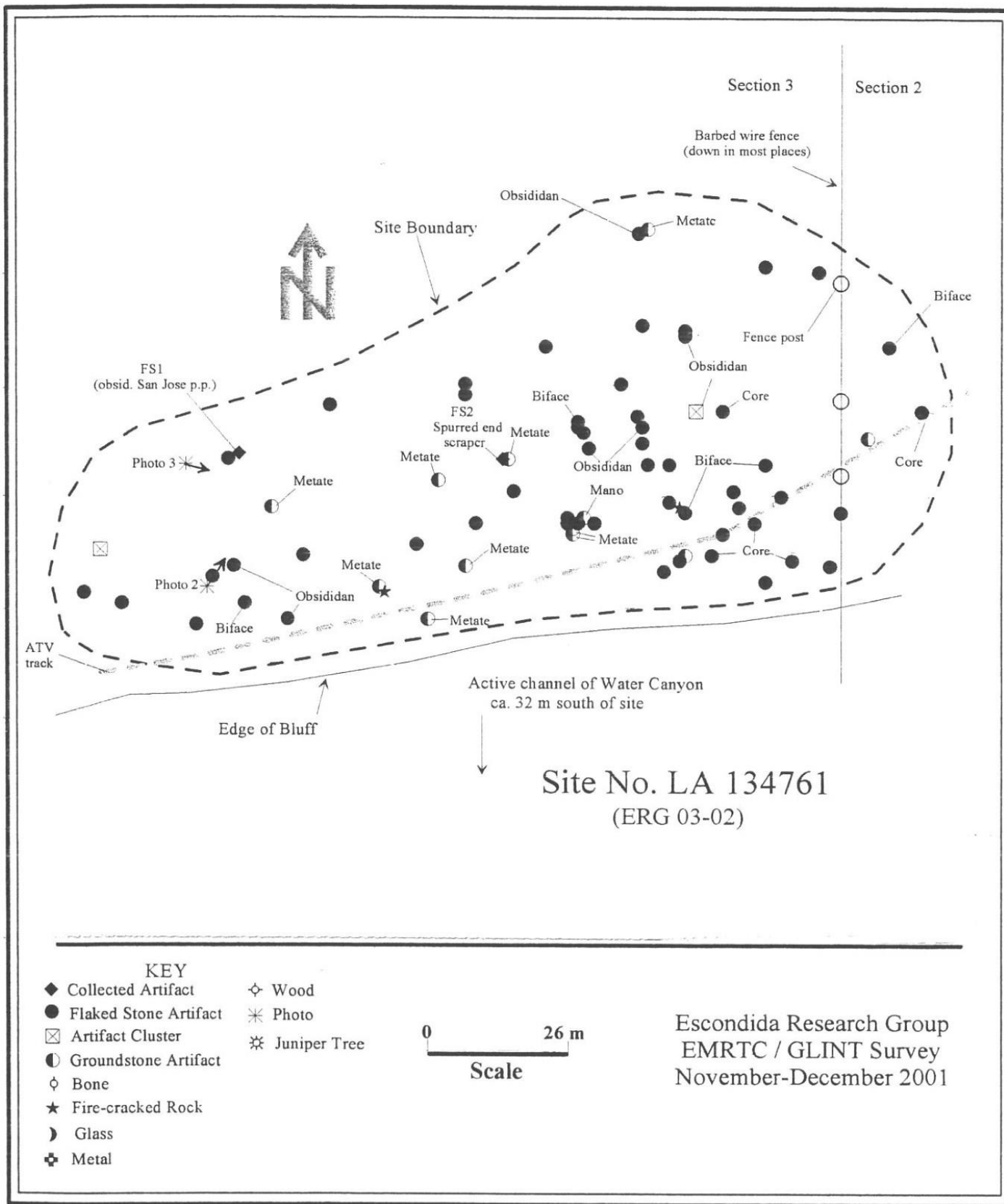


Figure 4. Plan View of Site LA 134761.

The presence of fire-cracked rocks and artifacts suggests that buried thermal features are present at the site. The orange-brown loams at the site are at least 20 cm deep in some places and also support the idea that buried materials could be present. Accordingly, this site should be tested before a determination of NRHP eligibility is made.

LA 134762

The site is a dispersed, open flaked stone and ground stone artifact scatter that covers an area of approximately 6450 sq m on a gentle, southeast-facing hill slope at 5770 ft elevation in a grassland setting (Figure 5). Functionally, the site probably represents the remains of a small, temporary processing location or camp. No temporally diagnostic artifacts were noted, so it is currently unknown at what point in prehistory this site was occupied. The nature of surrounding sites, the presence of groundstone, and the lack of ceramics suggest that the site was occupied sometime during the Archaic period (5500 BC-AD 200).

The flaked stone artifact assemblage at this site is relatively small, yet diverse, numbering around 22, and including numerous utilized flakes and other flakes, an exhausted irregular core, a cobble chopper, a broken uniface (FS1) and a scraper/knife (FS2) made on a large chert flake. The small groundstone artifact assemblage includes one quartzitic sandstone 1-sided cobble mano and one possible slab metate fragment (although, because it is made of rhyolite, this interpretation is somewhat ambiguous). The flaked stone materials are dominated by red silicified rhyolite, with a few cherts, and a chalcedony. Several possible FCR were observed, suggesting the possibility of a buried thermal feature at the site.

An intermittent drainage courses from west to east about 25 m south of the site and is pulling sediments from the southeast portion of the site downhill. This sediment movement may be exposing buried cultural materials or moving others and, although no cultural features were observed, there is still some potential for shallowly buried thermal features in the light brown, silty loam that comprises the sediments of the site. Accordingly, testing should be undertaken at this site before an NRHP assessment is made.

LA 134763

This site is a small, flaked stone artifact scatter that covers an area of approximately 1330 sq m and is moderately dense in places (Figure 6). The site is located on the top and two sides of a low, broad ridge that is flanked by intermittent drainages on both the north and the south. The ridge slopes gently down from the west-southwest to the east-northeast and the site occupies a grassland setting at about 5800 ft elevation. The site probably represents the remains of a small

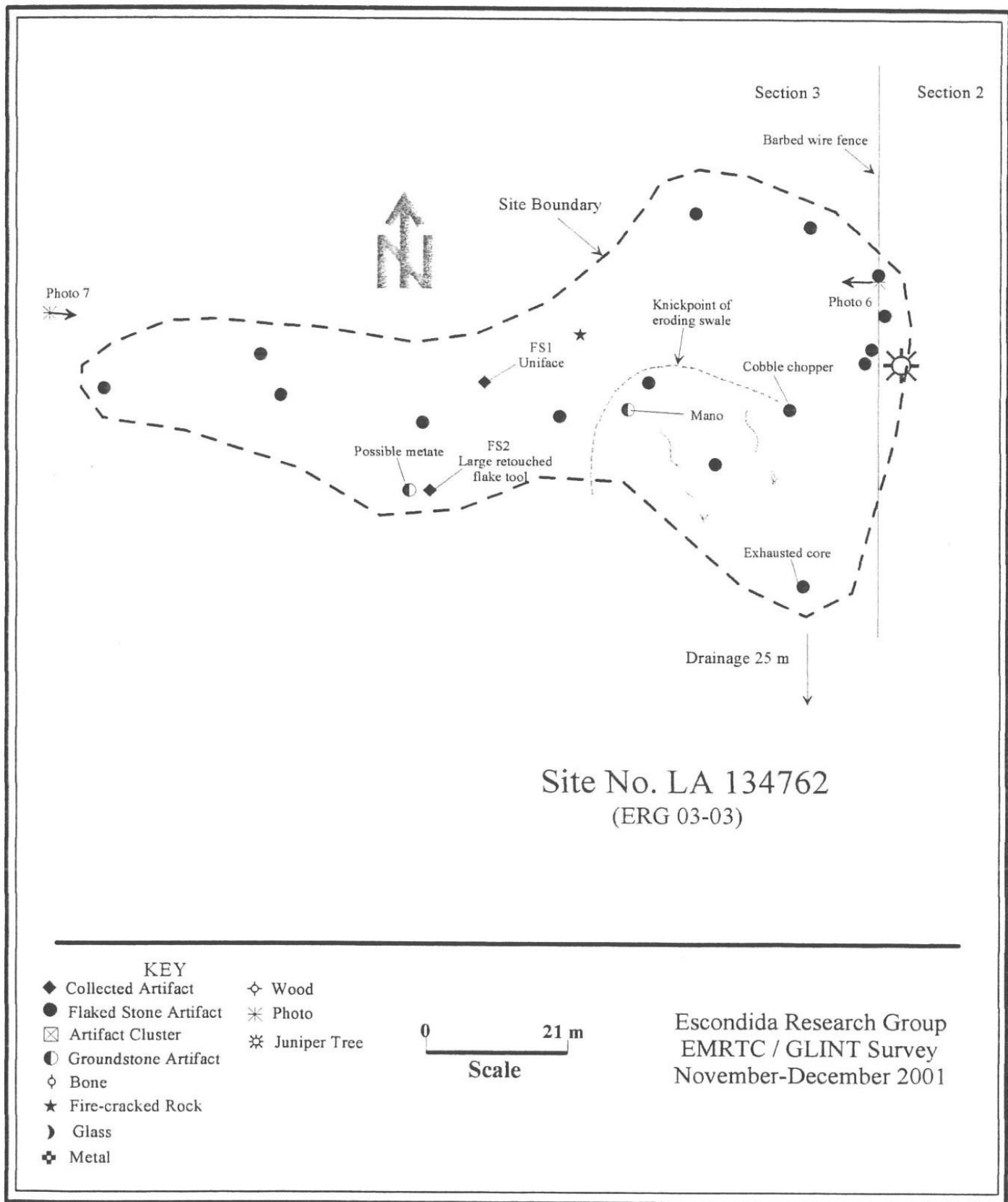


Figure 5. Plan View of Site LA 134762.

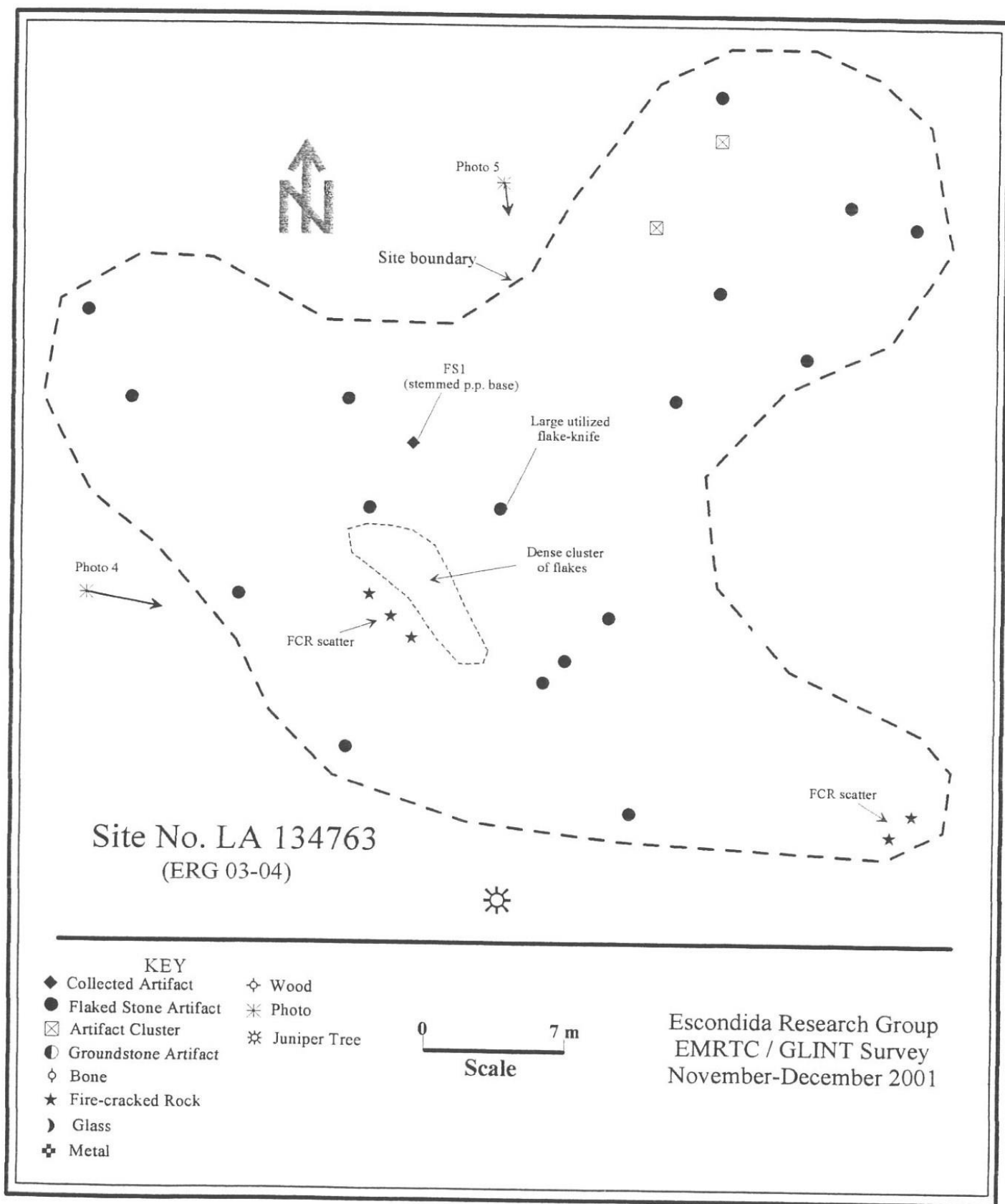


Figure 6. Plan View of Site LA 134763.

hunting/processing-related camp occupied for a short time at some point between the Paleoindian period and the Archaic period (9500 BC - AD 200).

The flaked stone artifact assemblage at this site is small ($N > 45$) and includes mostly flakes and utilized flakes, at least one flake tool (knife), and one possible stemmed projectile point base (FS1). The artifacts are distributed relatively evenly across the site, except in two places in the northeast portion of the site where there are two small clusters, and in the center of the site where a large, dense cluster is found. While the flake assemblage is made up of red, yellow, and brown silicified rhyolites and a few brown cherts, the projectile point base is made of a brown and white speckled clastic material similar to a locally available silicified breccia. It is possible that the fragment is the remains of an unknown Paleoindian point although this assessment is by no means secure. While no ground stone or ceramic artifacts were noted at the site, the presence of two FCR scatters suggests the presence of thermal features.

The depositional setting and the results of a pinflag probe indicate a modest potential for shallowly buried cultural deposits. The presence of two FCR scatters suggests the possibility of a buried thermal feature. Accordingly, this site should be tested before an assessment of NRHP eligibility is made.

LA 134764

This site is a small, open flaked stone artifact scatter that probably represents the remains of both a Late Paleoindian (Plainview / Belen / Cody?) occupation (8000-6600 BC) and a Middle Archaic (San Jose) occupation (3000-1800 BC) during which hunting/processing-related activities were undertaken. The site covers an area of approximately 3250 sq m and is located on a northeast-facing, gentle hillslope immediately above a small, intermittent drainage that trends from the west-southwest to the east-northeast (Figure 7). The site is found at an elevation of approximately 5780 ft in a grassland context.

The flaked stone artifact assemblage at this site is small and quite diverse, numbering around 35 (although other artifacts are likely buried) and including flakes, numerous utilized flakes, some retouched and utilized flake tools (eg. scraper/knife, possible scraper), biface thinning flakes, sharpening flakes, at least 2 bifaces, a white chert projectile point preform (FS1), a shale or schist (?) knife, a red silicified rhyolite (?) San Jose style projectile point base (FS2), and a yellow silicified rhyolite (?) Paleoindian (possibly Plainview or Belen type) projectile point base (FS3). Other materials in the artifact assemblage (which is dominated by red silicified rhyolites) include white cherts and basalt. The preform may have been associated with

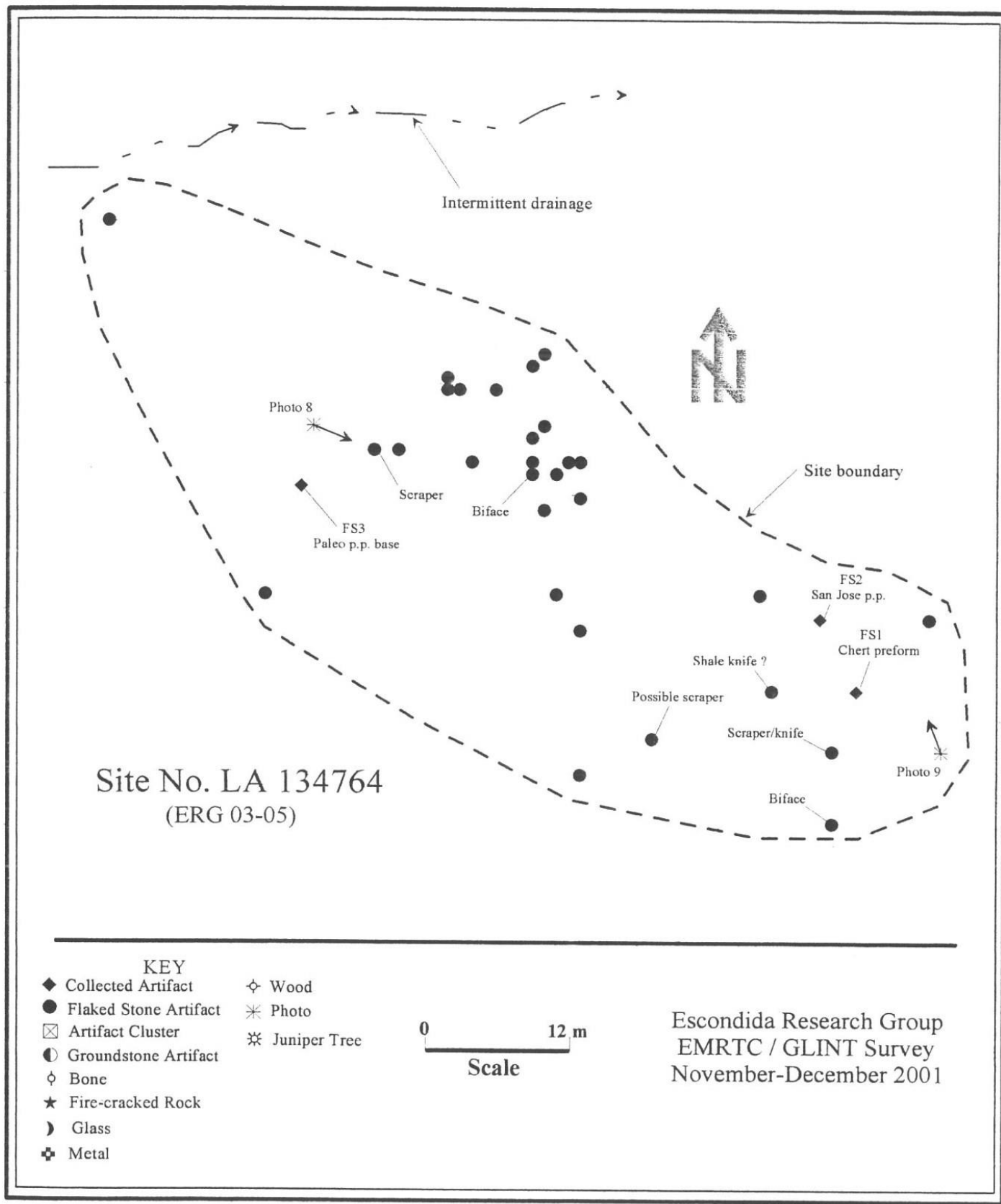


Figure 7. Plan View of Site LA 134764.

the Paleoindian component, as it is lanceolate in profile, with a shallow concave base. The width of the base is virtually identical to that found on the other Paleoindian point base. No ground stone or ceramic artifacts were noted and no surface cultural features were found.

This site can probably provide information on Late Paleoindian (8000-6600 BC) settlement patterns (and possibly other data sets, such as chronology or subsistence, or paleoclimate) in the Socorro region, and possibly on Middle Archaic period occupations as well. The cultural deposits at this site may have been reworked but, based on the geomorphic context of the site, there is a small possibility that the site is shallowly buried and somewhat intact. The site should be tested before an assessment of NRHP eligibility is made.

LA 134765

This site is an open flaked stone artifact scatter (with an associated fragment of a long bone diaphysis) that probably represents the remains of a hunting-processing locus or camp occupied during the Bajada phase of the Early Archaic period (ca. 4800-4000 BC). The scatter covers an area of approximately 4400 sq m at an elevation of 5790 ft. in a grassland setting (Figure 8). The site is located on the upper portion and gentle, northwest-facing slope of a low ridge, as well as a south-facing slope of a second ridge to the north. These two settings are created by a small, intermittent drainage that bisects the site from west to east.

The flaked stone artifact assemblage seen on the surface of this site is small (n=24) yet quite diverse. It includes a number of flakes (made of red, brown, or yellow silicified rhyolite, white quartzite, and cherts), utilized flakes (tan siltstone), some biface thinning flakes (chalcedony), a retouched/utilized cobble spall tool (possible graver?), a yellow silicified rhyolite chunk retouched into a knife (FS3), a very well-made pink rhyolite discoidal scraper (FS2), a purple rhyolite stemmed, indented projectile point base (Bajada style = FS1), and a large, red silicified rhyolite flake tool (knife?). As a whole, the assemblage suggests that the site had a hunting/processing-related function. The fact that a long bone diaphysis fragment was found eroding out of sediments closely associated with the projectile point base provides support for this assessment.

The cultural materials seen on the surface of this site, particularly those close to the small, incised arroyo, are being affected (moved?) by erosion. Other areas uphill of this drainage, with apparently deeper aeolian (?) sediments, have lower surface artifact densities and may have shallowly buried cultural materials there. This site has good potential for providing information on prehistoric lifeways (eg. settlement patterns, subsistence, paleoclimate) during

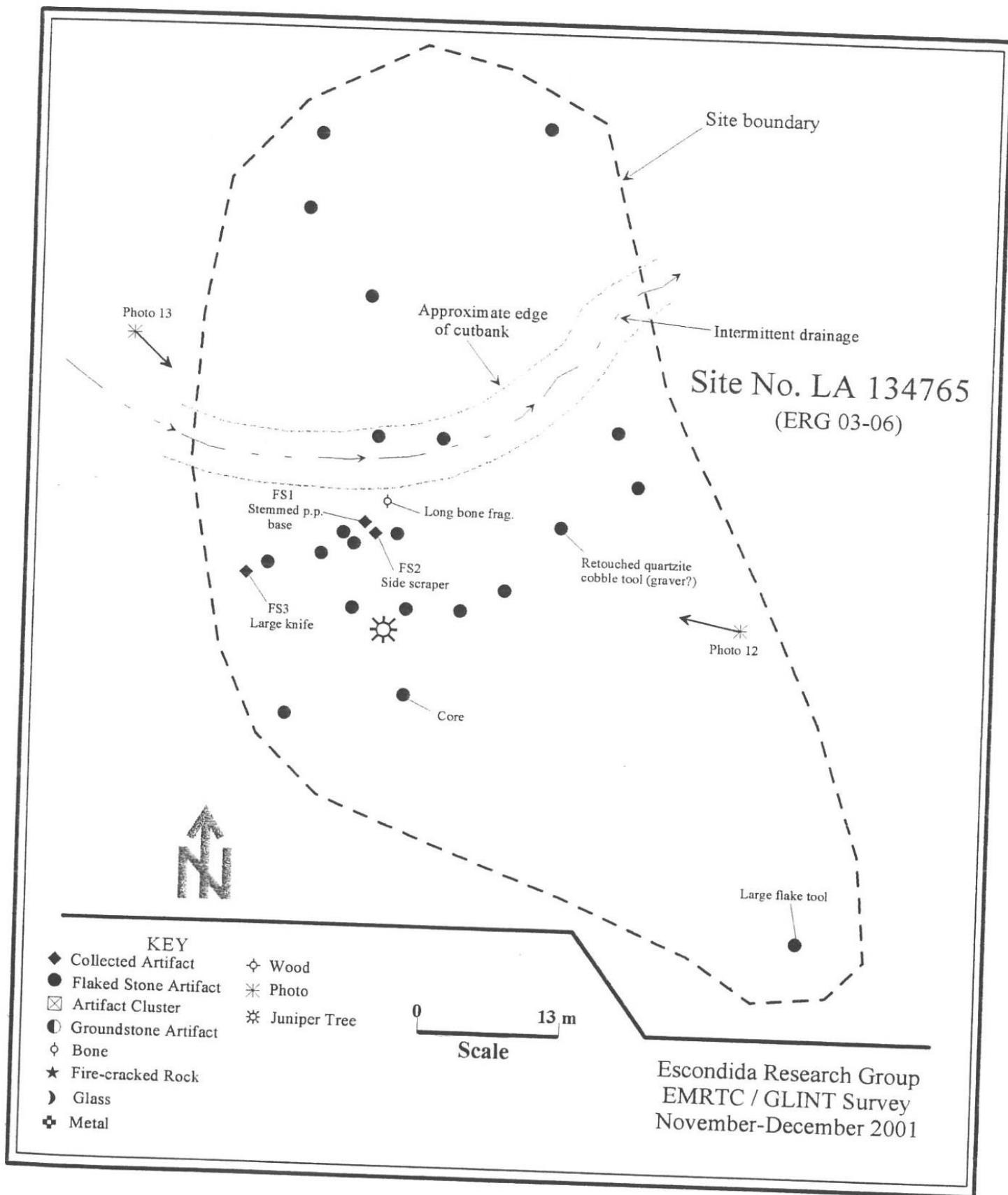


Figure 8. Plan View of Site LA 134765.

the Early Archaic period in the Socorro region, assuming that the majority of the site is currently intact and buried. Accordingly, this site should be tested before an assessment of NRHP eligibility is made.

LA 134766

This site represents the remains of an Historic period "windmill" water pump location with a small, associated earthen & rock check dam and reservoir (Figure 9). The site artifact scatter covers an area of approximately 1360 sq m at 5760 ft elevation. It is located on a low, abandoned floodplain and adjoining ridge slope immediately east-northeast of a small, intermittent drainage in a sparse juniper savannah / grassland environment.

The artifact assemblage at the site includes various glass, metal, and wooden artifacts that, together, suggest a use period for the site sometime between AD 1912 and 1945. The features at the site include the old (hand-dug?) well location with an associated back-dirt pile, and a small reservoir and check dam that were placed in an old, abandoned drainage channel. Most of the artifacts represent items associated with the construction and/or maintenance of the windmill facility, although a couple things are more personal in nature (medicine bottle, food and tobacco tins) and were probably discarded by the rancher who maintained the facility.

Because it is possible that some artifacts are buried in alluvial or colluvial sediments at the site, it is suggested that the site be tested before an assessment of NRHP eligibility is made.

LA 134767

This site is an extensive, open flaked stone artifact scatter that may have functioned as a lithic reduction and biface production location sometime during the Middle-to-Late Archaic period (3200 BC - AD 200). This artifact scatter covers an area of approximately 20,000 sq m at an elevation of 5785 ft (Figure 10). The site is located on a high terrace to the north of a large, intermittent tributary to Water Canyon, in a sparse juniper savannah / grassland setting.

The flaked stone artifact assemblage at this site is extensively distributed over a very large area, although the majority of flaked stone tools seem to occur in the southeast portion of the site. The assemblage is dominated by flakes (at least 10% of which appear to be utilized flake tools), while the remainder of the assemblage is made up of some biface thinning flakes, retouched flakes, biface fragments (one possible graver), irregular cores, and one reworked, San Jose obsidian projectile point base (FS1). The vast majority of artifacts are made of red or yellow silicified rhyolite, with only a few items made of chalcedony.

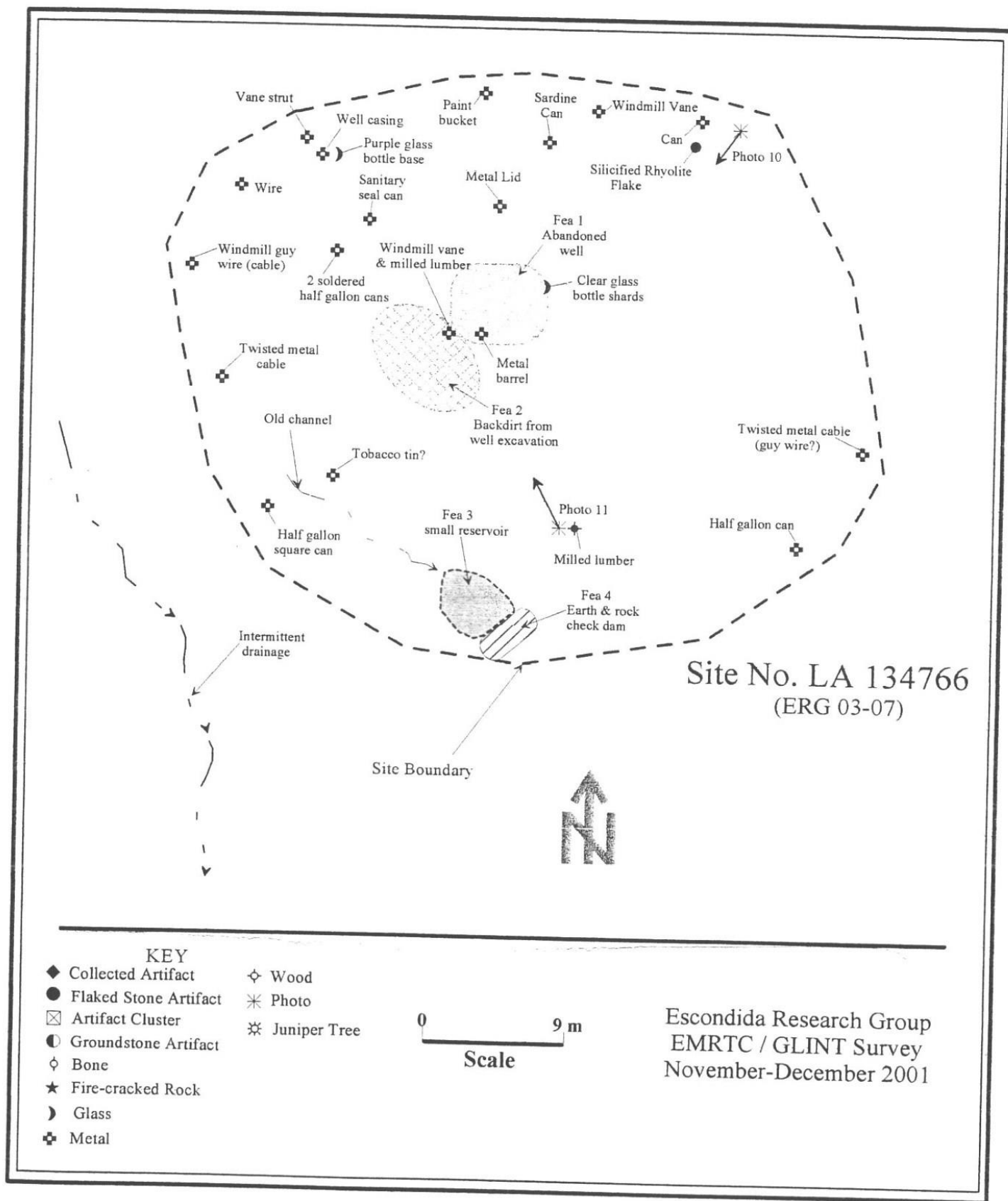


Figure 9. Plan View of Site LA 134766.

The sediments at this site are gravelly, light brown loam. Pin probes suggest at least 20 cm of depth in these sediments and the occurrence of artifacts on the rodent burrow backdirt piles suggests that cultural materials are buried here. Accordingly, this site should be tested before an assessment of NRHP eligibility is made.

LA 134768

This site is an extensive, open flaked stone artifact scatter with no apparent surface features (Figure 11). The artifact scatter covers an area of approximately 20,500 sq m at an average elevation of 5805 ft. The site is located on a high terrace to the north of an intermittent tributary to Water Canyon in a juniper savannah / grassland setting.

The flaked stone artifact assemblage at this site is quite large ($n > 260$) and is comprised mostly of reduction flakes (ca. 88%), with a few biface thinning flakes, and a few utilized flakes (one of which may be a graver). Most of the flake assemblage is made of red silicified rhyolite, followed by yellow silicified rhyolite, other rhyolite, some cherts, and a minor amount of basalt. Other lithic artifacts at the site include a red silicified rhyolite biface/knife, a chert scraper, a retouched biface flake tool, and an additional red silicified rhyolite biface fragment. This assemblage suggests that reduction of bifaces was the dominant activity at the site. Although no temporally diagnostic artifacts were located, it is likely, given the nature of surrounding sites and the lack of both ground stone and ceramic artifacts, that this site was occupied sometime between the Paleoindian and Archaic periods (9500 BC-AD 200).

One Historic period solder-cap can was also observed at the site, and it is assumed that this can was dropped in passing and does not represent an Historic period occupation.

Sediments at the site are deep, grey gravelly terrace loams that were formed in alluvium. Given the old bajada geomorphological context it is possible that some buried cultural materials exist at this site, although it is currently unclear to what depth. Pin probes indicate sediment depths up to 30 cm. Accordingly, archaeological testing is suggested for this site before an assessment of NRHP eligibility is made.

LA 134769

This site is a very extensive, open lithic and groundstone artifact scatter with one possible thermal feature (Fea 1). The scatter covers an area of approximately 30,000 sq m at an average elevation of 5790 ft (Figure 12). The site is located on a terrace formed in an old bajada

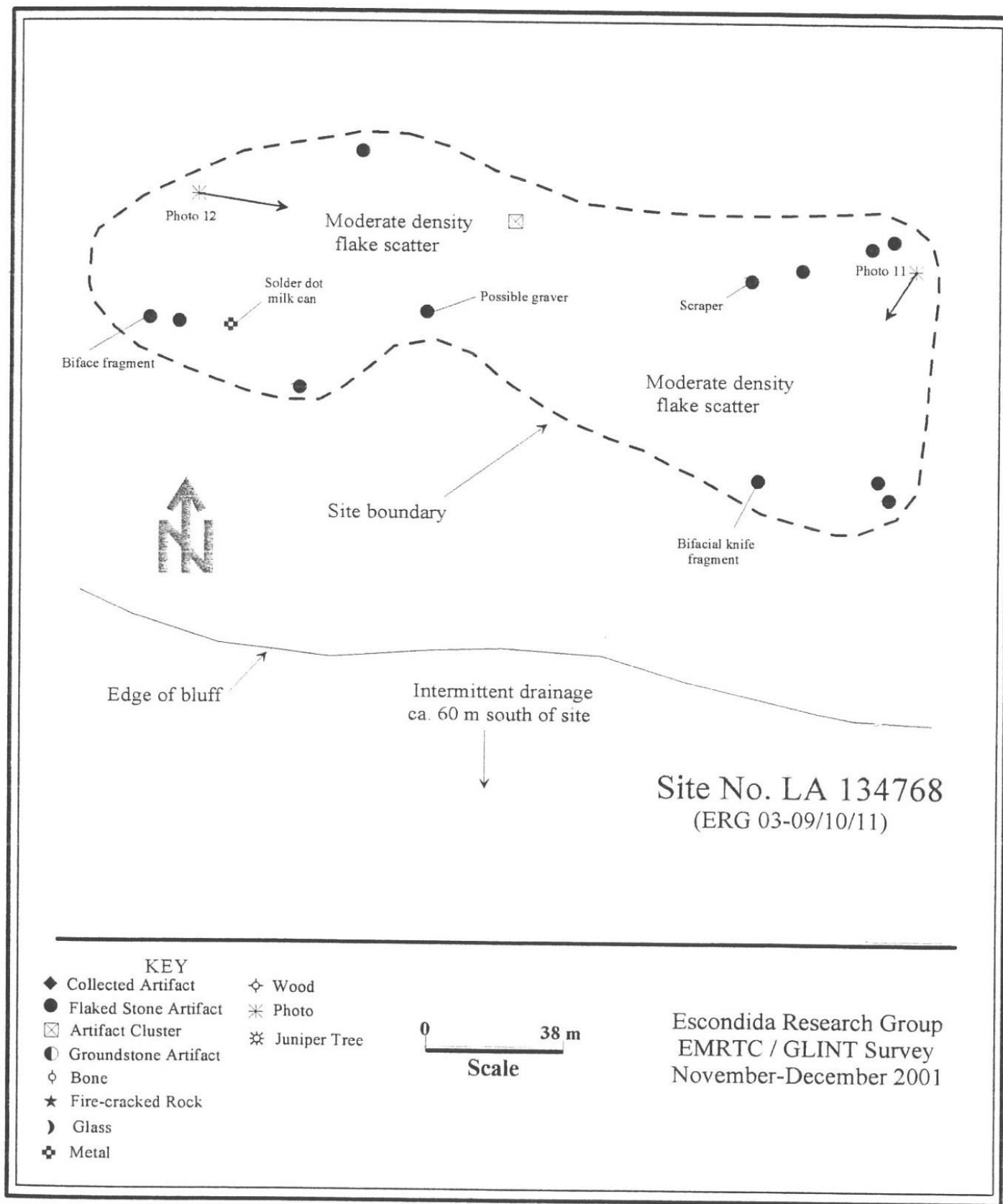


Figure 11. Plan View of Site LA 134768.

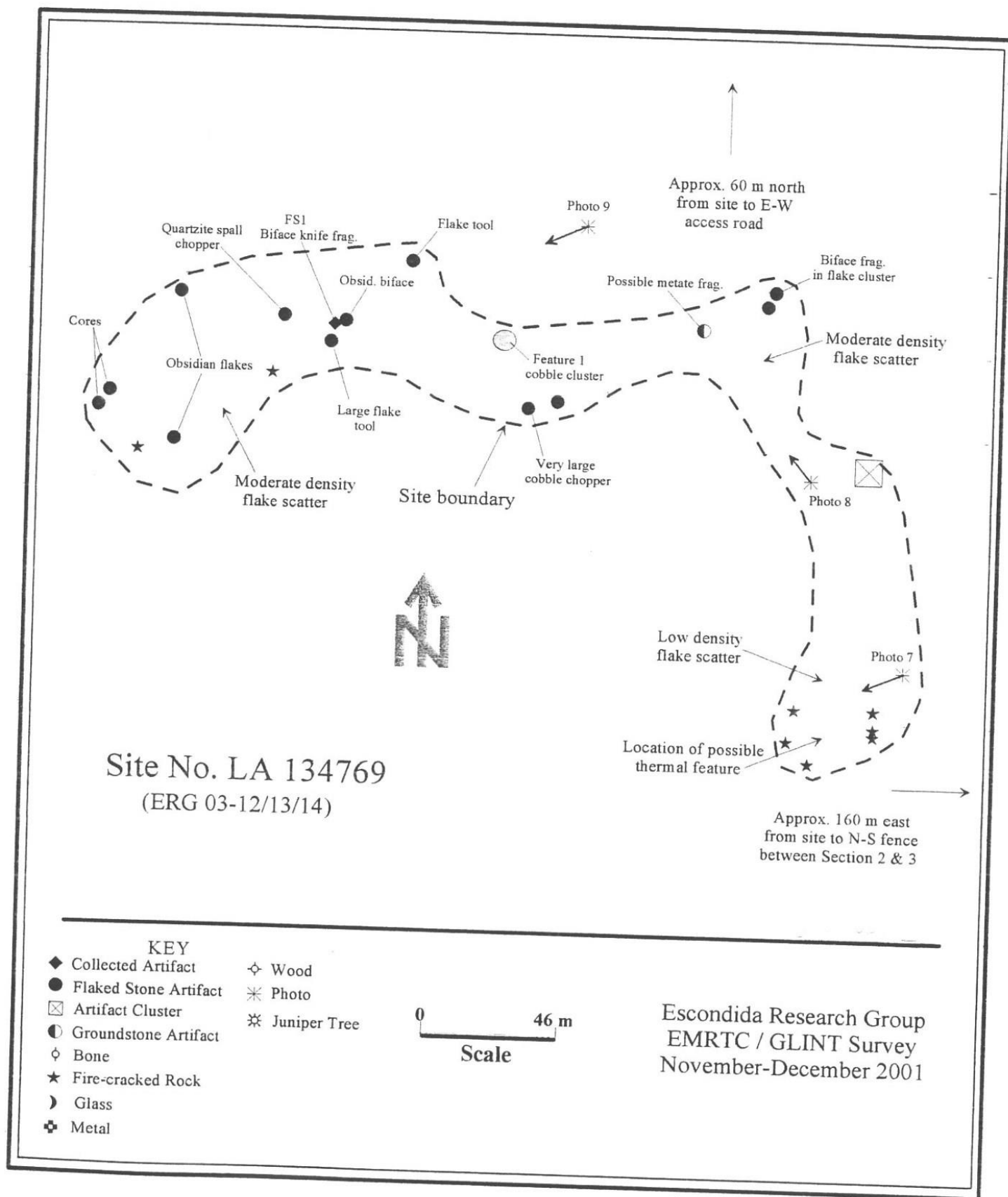


Figure 12. Plan View of Site LA 134769.

landform in a grassland setting. Based on the nature of the artifact assemblage (presence of ground stone and lack of ceramics) it is probable that this site was occupied sometime during the Archaic period and functioned as a locus or camp for lithic reduction, biface production, and some plant processing.

The artifact assemblage at this site occurs in three major clusters with sparse scatters of artifacts between the clusters. The cluster in the south-eastern portion of the site is comprised of about 17-20 flakes (at least one of which appears utilized). In order of frequency, the flakes are made of red silicified rhyolite, chalcedony, white chert, yellow silicified rhyolite, and black chert. Clusters of fire-cracked rock in this area suggest the possibility that at least one thermal feature may be located here in a shallow, buried context.

The second artifact cluster is located in the mid-portion of the site and is comprised of at least 100 artifacts, including approximately 97 flakes (of which at least a few are biface thinning flakes and utilized flakes). The flakes are made of chalcedony, red silicified rhyolite, yellow silicified rhyolite, white-red chert and yellow-brown jasper. Other artifacts include one irregular core fragment, one biface fragment within a cluster of flakes, and one possible ground stone metate fragment.

To the west of this second cluster is an open area with Feature 1, a partially buried cobble cluster that may represent a hearth, along with an extremely large cobble chopper. West of the feature location is the third and most diverse cluster of flaked stone artifacts. This sub-assemblage is comprised mostly of flakes, with one chert irregular core fragment, one quartzite spall/chopper, one obsidian biface fragment, one chert bifacial knife fragment (FS1), a chalcedony core, and one large red silicified rhyolite flake tool. Artifact materials include red silicified rhyolite, yellow silicified rhyolite, brown quartzitic sandstone, red-white chert, chalcedony, other rhyolite, obsidian, and black-white chert. No temporally diagnostic or ceramic artifacts were noted.

The geomorphic context of this site seems similar to the four other sites found during this inventory, in that it is a relatively stable terrace. Sediments at the site are deep, grey gravelly terrace loams that were formed in alluvium. Given the old bajada geomorphological context it is possible that some buried cultural materials exist at this site, although it is currently unclear to what depth. Pin probes indicate sediment depths up to 30 cm. Accordingly, archaeological testing is suggested for this site before an assessment of NRHP eligibility is made.

Isolated Occurrences

As mentioned above, 16 isolated occurrences (IOs) were documented in the EMRTC / GLINT project area. These are summarized in Table 5 and their locations are illustrated in Figure 13. As will be noted, the IOs represent use of the area during the Historic and Recent periods (IO Nos. 1, 5 and 12) and, most likely, during the Unknown prehistoric period (all other IOs, which are flaked and ground stone artifacts). While the temporal periods represented by these findings is not unexpected, the density of IOs is somewhat less than expected.

Projectile Points and Other Noteworthy Flaked Stone Tools

A series of six (6) projectile points or projectile points bases was recovered during the ERG inventory of the GLINT project area. In addition, nine (9) flaked stone tools were recovered (although these represent only a sample of tools found at sites). The points are illustrated in Figure 14 and the flaked stone tools are illustrated in Figure 15. The metric measurements, raw material, artifact type or inferred style, and associated chronological range (if applicable) for each artifact are presented in Table 6 and Table 7. Each Field Sample number (FS No.) represents the number of the site from which the artifact was recovered (eg. LA 134760) with a decimal number appended for the collected artifact itself (eg. LA 134760.1). Narrative discussions of many of the artifacts are provided below.

LA 134760.1 - Pinto projectile point (Figure 14d)

2 CA. 29 mm in photo (Fig 14, p. 43)
30

23.5 → This complete, translucent chalcedony point has a slightly expanding, bifurcated stem, which has a maximum length of 11.1 mm, a neck width of 14.1 mm, and a maximum width of 15.8 mm. Some efforts at basal thinning are apparent. The shallow concavity measures about 2.0 mm deep. The edges and the basal concavity of the stem appear to have little if any evidence of grinding. The blade portion of the point is rather blunt and was probably reworked after breakage.

LA 134760.2- Bifacial knife (Figure 15h)

This mid-stage biface appears, macroscopically, to be made of the same red silicified rhyolite that is found in quarry sites (LA 39420 and LA 55991) located to the southeast (Dello-Russo et al. 2001). There is evidence of bimarginal retouch along one lateral edge, and the acute angle of this edge suggests that it was utilized as a knife. Its cross-section is biconvex.

Table 5. Data for Isolated Occurrences (IOs) Located in the GLINT Project Area.

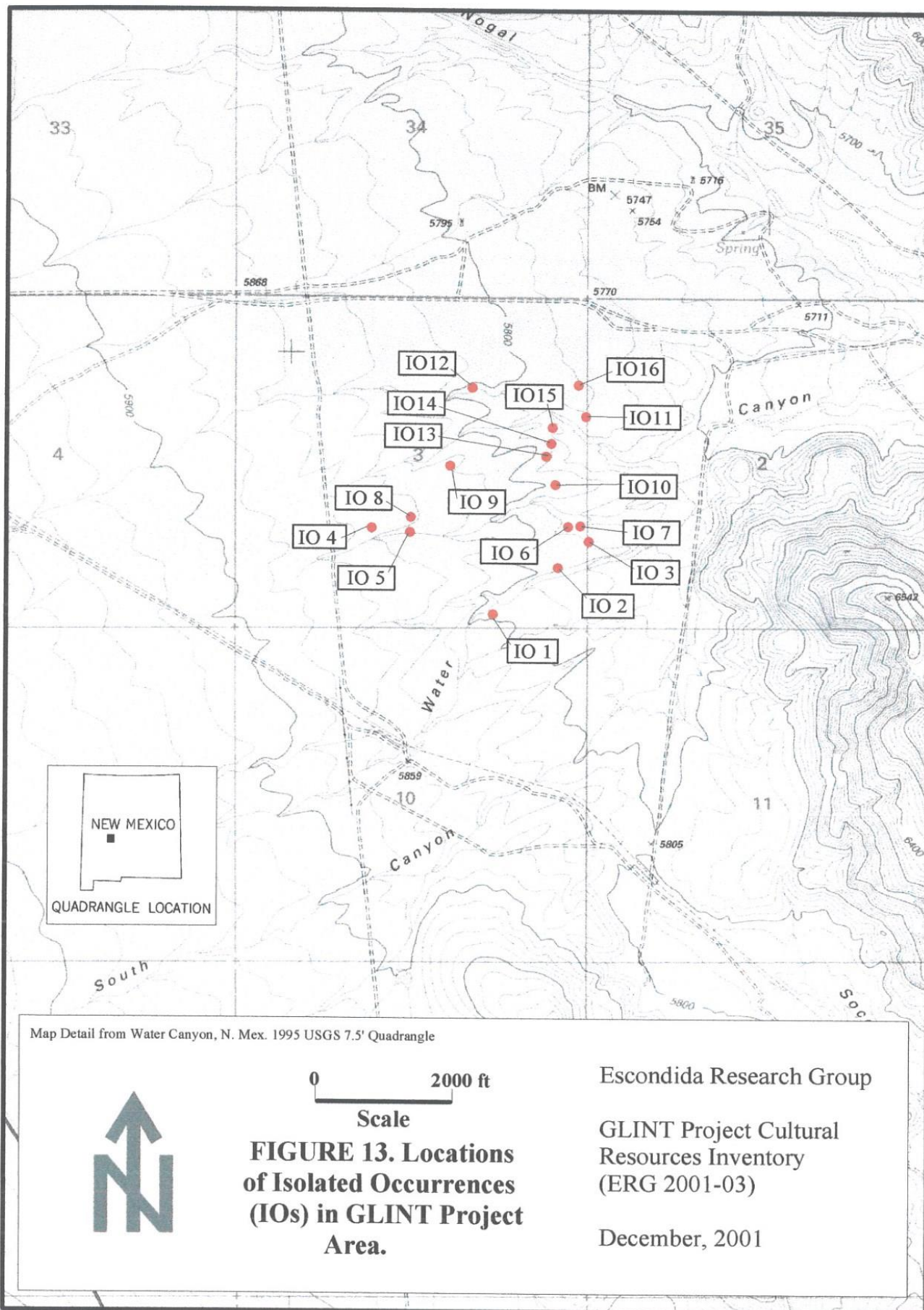
IO No.	Description	Locational Data (UTM / 13S)		Elevation (ft)	Vegetation	Soil / Landform
		East	North			
1	2 solder cap cans (4x3.5in), 1 enamel-ware coffee pot w/ perforator spout screen (6x5") in 10 diameter area	312516	3771822	5797	grasses, thistle, apache plume, snakeweed	gray-brown, silty sand / low abandoned terrace of Water Canyon
2	1 complete, non-cortical, red silic. rhyolite flake / 3 mm thick	312800	3772034	5786	grasses, cholla cactus, snakeweed, yucca, 4-wing saltbush, apache plume	light brown silty loam / bajada slope
3	1 proximal, non-cortical red silic. rhyolite flake / 4 mm thick	312959	3772157	5773	(same as above)	(same as above)
4	1 complete, cortical, purple rhyolite retouched flake / 8x88x23mm	311981	3772238	5848	grasses, snakeweed, cholla cactus, apache plume	light red, gravelly silty loam / open, broad ridge
5	1 solder dot can (3.25x4in) and 1 metal lid (5 in diam)	312138	3772209	5837	cholla cactus, grasses, snakeweed	light red, gravelly silty loam / broad swale
6	4 red silic. rhyolite flakes (2mm, 6 mm, 3mm & 7 mm thick) in 9mx10m area	312881	3772236	5769	juniper / grass savannah	light brown silty loam / south-facing slope
7	1 brown sandstone (mudstone?) slab metate fragment / ground on 1 side / 138x85x18mm	312926	3772238	5764	juniper / grass savannah	light brown silty loam / south facing slope / 10 m south to drainage
8	1 pinkish rhyolite slab metate fragment / ground on 1 side / 175x90x33	312145	3772273	5843	grasses, 4-wing saltbush, cholla cactus, juniper	brown, silty loam / broad ridge

Table 5. Isolated Occurrences (IOs) Located in the GLINT Project Area.

IO No.	Description	Locational Data (UTM / 13S)		Elevation (ft)	Vegetation	Soil / Landform
		East	North			
9	1 complete, non-cortical yellow-red silic. rhyolite flake / 4mm thick	312345	3772536	5822	grasses, apache plume, yucca, snakeweed, cholla cactus, 1 juniper	orange, gravelly silty loam / large fan or bajada
10	10 red silic. rhyolite flakes and flake fragments (7 utilized), 1 black-white chert core flake, 1 yellow silic. rhyolite utilized flake in 29m E-W x 27m N-S area	312818	3772440	5790	grasses, snakeweed, apache plume, cholla cactus, sparse juniper	orange, gravelly silty loam / broad ridge on bajada
11	1 proximal, non-cortical, white chert utilized flake / 4mm thick	312972	3772762	5776	grasses, cholla cactus, sparse juniper, snakeweed	light red-brown silty loam / south-facing shoulder of broad, E-W ridge
12	10 m diameter scatter of recent trash, including >30 sanitary seal cans, coffee cans, 1 clear glass mustard jar	312439	3772897	5801	grasses, cholla cactus	light brown, silty loam / low terrace
13	4 red silic. rhyolite, 1 brown silic. rhyolite, 1 yellow silic rhyolite flakes and flake fragments (3 utilized) in 34m E-Wx22m N-S area	312782	3772581	5783	grasses, cholla cactus, snakeweed	light brown, gravelly loam / top of ridge

Table 5. Isolated Occurrences (IOs) Located in the GLINT Project Area.

IO No.	Description	Locational Data (UTM / 13S)		Elevation (ft)	Vegetation	Soil / Landform
		East	North			
14	1 complete, non-cortical red silic. rhyolite utilized flake / 7mm thick	312817	3772630	5763	grasses, snakeweed, sparse juniper, cholla cactus, mormon tea, apache plume	light brown gravelly loam / northwest-facing slope
15	5 red silic. rhyolite & 4 yellow silic. rhyolite flakes and flake fragments (8 utilized); 1 yellow silic. rhyolite core frag.; 1 red-white chert utilized flake frag; 1 purple rhyolite cobble chopper (unifacially retouched & utilized/ 116x101x24mm); and 1 tan, siltstone utilized flake knife (69x44x11mm) in 48m E-W x 24 m N-S area	312811	3772713	5761	grasses, sparse junipers, cholla and prickly pear cactus, apache plume, snakeweed	light brown, gravelly loam / nose of SW-NE narrow ridge
16	1 Jemez (?) obsidian biface (proj. pt. made on flake ?) fragment / 20x19x4mm	312943	3772904	5779	grasses, snakeweed, cholla and prickly pear cactus, dispersed juniper	light brown, gravelly loam / gently-sloping bajada



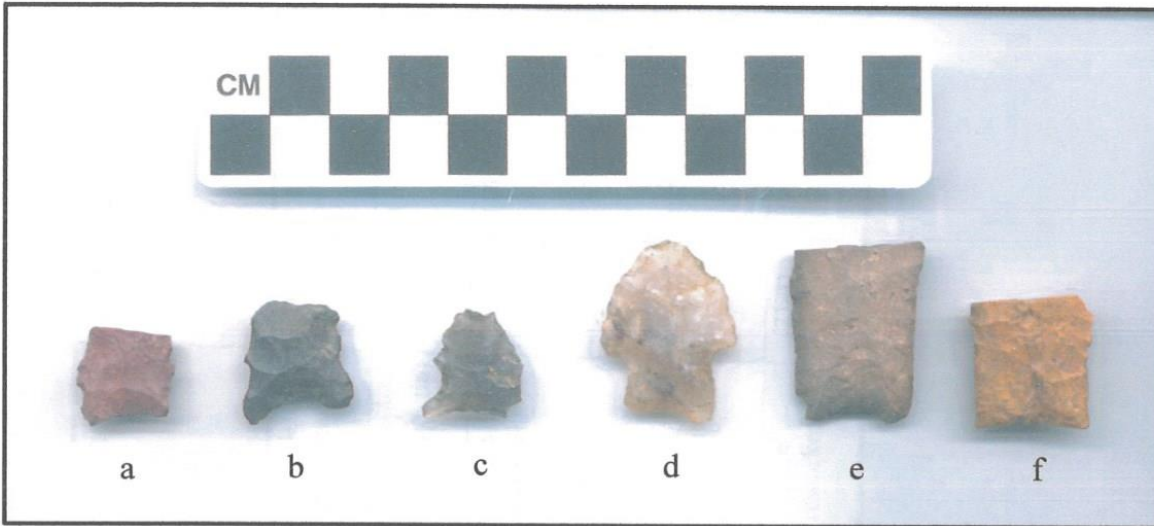


Figure 14. Projectile Points Recovered from GLINT Project Area.

a = San Jose (LA134764.2); b = San Jose (LA134767.1);
c = San Jose (LA134761.1); d = Pinto (LA134760.1);
e = Bajada (LA124765.1); f = Plainview / Belen (LA134764.3)

Table 6. Metric and Other Data for Projectile Points in GLINT Project Area

FS No.	Point Style	Cultural Period Date Range	Material	Portion	Dimensions ¹			UTM Coordinates (Zone 13)	
					L (mm)	W (mm)	T (mm)	East (m)	North (m)
LA 134760.1	Pinto	Middle Archaic 3000 - 1800 BC	Chalcedony	Complete (resharpened)	30.8	23.5	6.3	312551	3771902
LA 134761.1	San Jose	Middle Archaic 3000 - 1800 BC	Obsidian	Mostly complete (broken ear & tip)	(13.6)	(16.8)	4.6	312851	3772071
LA 134764.2	San Jose	Middle Archaic 3000 - 1800 BC	Red Silicified Rhyolite or Jasper	Base (broken ears)	(16.7)	(16.4)	3.8	312936	3772510
LA 134764.3	Plainview/ Belen	Late Paleoindian 8000 - 6600 BC	Yellow Silicified Rhyolite or Jasper	Base	(22.8)	20.9	5.5	312893	3772521
LA 134765.1	Bajada	Early Archaic 4800 - 4000 BC	Purple-Gray Rhyolite	Base	(31.2)	23.0	9.4	312592	3772694
LA 134767.1	San Jose	Middle Archaic 3000 - 1800 BC	Obsidian	Base (reworked)	(21.3)	18.9	4.5	312841	3772934

¹Measurements in parentheses () are incomplete.

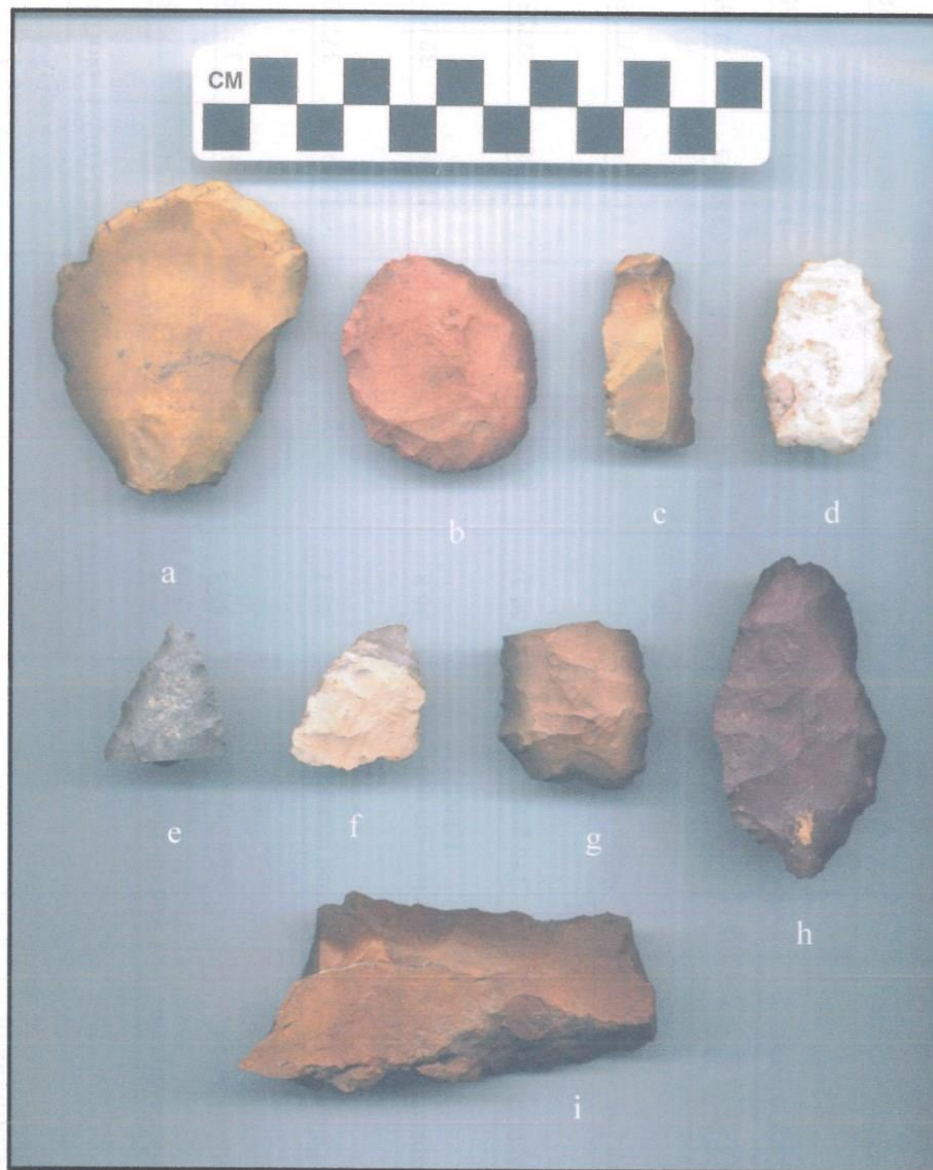


Figure 15. Flaked Stone Tools Recovered from the GLINT Project Area.

a = Large flake scraper/knife (LA134762.2); b = Discoidal scraper (LA134765.2);
 c = Spurred end scraper (LA134761.2); d = Projectile point preform (LA134764.1);
 e = Biface fragment (knife?) (LA134769.1); f = Biface fragment (knife?) (LA134760.3);
 g = Uniface fragment (LA134762.1); h = Bifacial knife (LA134760.2);
 i = Retouched clast knife (LA134765.3).

Table 7. Metric and Other Data for Flaked Stone Tools in GLINT Project Area.

FS No.	Artifact Type	Associated Cultural Component	Material	Dimensions				UTM Coordinates (Zone 13) NAD27	
				L (mm)	W (mm)	T (mm)	East (m)	North (m)	
LA 134760.2	Bifacial knife	Middle Archaic	Red silicified rhyolite or jasper	69.5	38.6	12.2	312543	3771906	
LA 134760.3	Biface fragment (knife?)	Middle Archaic	Gray-tan chert	29.3	27.8	9.5	312552	3771901	
LA 134761.2	Spurred end scraper	Paleoindian?	Mottled orange-tan-green chert	42.7	23.3	7.4	312900	3772070	
LA 134762.1	Uniface fragment	Unspecific Archaic	Gray fine-grained quartzite (chert?)	36.8	34.6	10.6	312894	3772339	
LA 134762.2	Large flake scraper / knife	Unspecific Archaic	Tan-gray chert	64.1	60.3	9.7	312886	3772323	
LA 134764.1	Projectile point preform	Late Paleoindian?	White quartzite	42.1	29.0	9.7	312939	3772504	
LA 134765.2	Discoidal scraper	Early Archaic	Pink rhyolite	45.5	44.8	12.1	312593	3772693	
LA 134765.3	Retouched clast knife	Early Archaic	Yellow silicified rhyolite	93.2	43.8	27.0	312581	3772689	
LA 134769.1	Biface fragment (knife?)	Unspecific Archaic	Dark gray chert	29.1	27.1	8.0	312686	3773206	

LA 134760.3 - Biface (knife?) fragment (Figure 15f)

This light gray and tan chert, mid-to-late stage biface fragment has a slightly asymmetrical shape and a biconvex cross-section. Edge attrition occurs on both lateral edges in the form of nibbles and step fractures. This use wear may be consistent with cutting use on durable materials. The asymmetrical shape also suggests a knife.

LA 134761.1 - San Jose projectile point (Figure 14c)

This small, translucent obsidian projectile point has a relatively broad, expanding stem with most of one ear missing. The remaining ear is about 3.7 mm long and suggests that the maximum basal stem width of the point may have been close to 20.6 mm. The shallow concavity in the base measures about 1 mm deep and appears to have been only slightly ground. Stem width at the top (neck) is 13.3 mm. The ephemeral grinding may continue around the ears and up the short (ca. 5 mm) to the small, protruding spurs or serrations on the sides of the point. One lateral edge portion of the blade also appears to be serrated. A small tip portion of the otherwise short (ca. 9 mm) blade is missing, and the short blade length is probably due to resharpening. The wide, expanded stem and the relatively short blade are indicative of point styles later in the Middle Archaic period (Irwin-Williams 1973:8).

LA 134761.2- Spurred end-scraper (Figure 15c)

This mottled orange, greenish-tan and tan chert artifact is made on a blade-like flake with a strong dorsal ridge and a triangular cross-section. The dorsal side of the distal end of the flake has been steeply retouched (probably repeatedly) to form a scraping edge. Step fracturing on this edge suggests the working of durable materials. Retouch is evident along the distal-lateral edge as well and this, together with the distal retouch, has produced a small spur or graver. There is evidence of attrition along all edges of the artifact and it is possible that the artifact was hafted at the proximal end.

LA 134762.1 - Uniface fragment (Figure 15g)

This fine-grained, gray quartzite (chert?) artifact is broken, yet it retains the ventral surface of the flake (distal end) from which it was fashioned. Evidence of retouch is apparent along all edges of the dorsal surface and on one lateral edge of the ventral surface. Use wear is evident on that edge. Flakes scars on the dorsal surface are indicative of attempts to thin the plano-convex cross-section of the artifact. The dorsal surface also exhibits a high degree of brown patination, which is suggestive of antiquity.

LA 134762.2- Large flake scraper-knife (Figure 15a)

This complete artifact is made from an interesting chert that appears tan-yellow on the ventral surface and grayish-tan on the dorsal surface. It is unclear which surface is patinated. The platform appears to have been prepared and exhibits a very small amount of rounded cobble cortex. Relatively steep retouch on the ventral surface is evident along much of both lateral edges and the distal edge. These retouched edges were probably utilized as scrapers. Only a small amount of dorsal retouch (on part of one lateral edge) is noticeable. The edge created by this latter retouch has been utilized, possibly as a knife.

LA 134764.1- Projectile point preform (Figure 15d)

An interesting attribute of this mottled white quartzite artifact is its morphology, which is closely similar to that of the Plainview/Belen point base found nearby at the same site. The base of this slightly expanding, lanceolate artifact is slightly concave and the width at the base is about 18.9 mm (the Plainview point's width at the base is 19.0 mm). This preform was probably discarded after several failed attempts at thinning the inclusion-ridden quartzite.

LA 134764.2- San Jose projectile point base (Figure 14a)

The material from which this small point base is made appears macroscopically similar to red silicified rhyolites seen in local prehistoric quarries (Dello-Russo et al. 2001). The point is broken on the blade portion, above the hafting area. The very short stem (ca. 7.4 mm) has a very shallow base (ca. 1 mm), one completely broken ear, and one partially broken ear. The concave base exhibits basal thinning flake scars and is slightly ground. The hafting width of the stem is approximately 14.6 mm, which is only slightly larger than that found on LA 134761.1, another San Jose point base. The wide, expanded stem and the relatively short blade are indicative of point styles later in the Middle Archaic period (Irwin-Williams 1973:8).

LA 134764.3- Plainview/Belen projectile point base (Figure 14f)

The material from which this point base is made also appears macroscopically similar to yellow silicified rhyolites seen in local prehistoric quarries (Dello-Russo et al. 2001). The parallel-sided base flares just slightly at the proximal end and exhibits collateral flaking that terminates at a low, vertical ridge on one side. The same collateral flaking on the reverse side is thinned by a narrow and shallow flute that originates from both the basal concavity and from the blade end of the artifact. The basal concavity is quite shallow (ca. 1 mm) and is slightly ground. Grinding is also evident on the lateral edges of the stem for a length of approximately 17 mm. The point is biconvex in cross-section. This point style represents a Late Paleoindian occupation.

LA 134765.1- Bajada projectile point base (Figure 14e)

This artifact represents the stem portion of a large Early Archaic period projectile point made of purple-gray rhyolite. The bifurcated stem has a basal width of 20.0 mm, a mid-stem width of 20.2 mm, an upper stem width of 21.6 mm, and a basal concavity that is slightly more than 2.0 mm deep. The point is broken at the top of the stem where the blade portion begins to flare outward. The point base is biconvex in cross-section and ca. 9.4 mm in maximum thickness. The thickness of the stem in the basal concavity, where basal thinning is evident, is ca. 4.3 mm. Both lateral edges of the stem have been moderately ground, but the basal concavity has not.

LA 134765.2- Discoidal scraper (Figure 15b)

This complete artifact was made on a large, fine-grained, pink rhyolite flake. Dorsal surface retouch is evident along both lateral edges and the distal edge. No retouch is evident on the ventral flake surface. The steepness of the edge angles suggests that the tool was used as a scraper. A high degree of polish along the distal edge suggests that softer materials were worked. This artifact is associated with an Early Archaic occupation.

LA 134765.3- Retouched clast knife (Figure 15i)

This artifact is made of a yellow, silicified rhyolite material that, like other artifacts found in this area, is macroscopically similar to yellow silicified rhyolites seen in local prehistoric quarries (Dello-Russo et al. 2001). The artifact is made from an angular clast that may actually be a very large, irregular flake (one surface is quite smooth and similar to a flake ventral surface). The artifact has about 90% dorsal cortex. One lateral edge exhibits a series of retouch flake scars that form a coarse, serrated sharp edge with some evidence of use wear. The wear suggests that the tool was used to cut (or scrape?) coarse or fibrous materials. The most comfortable manner in which to hold this artifact is with the left hand, as no sharp edges dig into the palm. In fact the edge that rests against the palm, when held with the left hand, has been rounded by the removal of three or four flakes. This artifact is associated with an Early Archaic occupation.

LA 134767.1- San Jose projectile point base (Figure 14b)

This small, opaque obsidian projectile point base is broken on the blade portion of the artifact, above the hafting area. The broken edge was resharpened for possible use as a chisel. Some edge attrition is evident on that edge. The stem is only ca. 2.7 mm long and the hafting width in the stem is ca. 15.0 mm. Portions of this hafting area and the basal concavity appear to have been slightly ground. The widely expanding base, with intact ears, has a maximum width

of 19.2 mm and a basal concavity that is ca. 4 mm deep. This point suggests a site occupation during the Middle Archaic period, although it is possible that the artifact was scavenged and reused by later site occupants.

LA 134769.1- Biface fragment (Figure 15e)

This small, dark gray chert, late stage biface fragment is biconvex in cross-section and it has a slightly asymmetrical triangular shape that suggests its possible use as a knife. Patterns of collateral flaking terminate at vertical ridges on both faces of the artifact, and edge attrition is apparent along both lateral edges. It is also possible that this artifact is a broken projectile point preform.

DISCUSSION

Summary of Inventory Findings

The cultural resources inventory completed by ERG for the proposed GLINT facility project area resulted in the documentation of ten (10) new archaeological sites and 16 isolated occurrences (IOs). Nominally, the nine flaked stone or flaked-and-ground stone sites represent occupations of the area during the Paleoindian, Early Archaic, and Middle Archaic periods. Paleoindian components are most possible at LA 134761 and LA 134764, while an Early Archaic component is likely at LA 134765. Middle Archaic components are most likely at LA 134760, LA 134761, LA 134764 and LA 134767. Other sites, including LA 134762, LA 134763, LA 134768 and LA 134769, had no temporally diagnostic artifacts and are most likely associated with pre-ceramic occupations (pre-AD 200). It is possible that Late Archaic and/or Formative period occupations are represented in the project area but no physical evidence of those temporal periods has been found. Of the flaked stone and ground stone artifacts found as isolates, all are more than likely associated with the aforementioned prehistoric periods. The metal cans found as isolates may be associated with the one Historic period windmill site (LA 134766), or with earlier, short-term Historic use of the area.

Site Formation Processes in the Project Area

It is perhaps noteworthy that all the evidence for prehistoric occupation points to use of this particular area during the early-to-middle Holocene. This pattern may reflect cultural reasons for occupation during that period, such as the greater competence of the Water Canyon drainage; the presence of higher water tables, marshes, and/or cienegas; and/or the greater density of game animals. In addition, the pattern of surface manifestations may reflect geomorphological biases in the burial and/or exposure of cultural materials.

The current project area represents a complex geomorphological environment that contains terraces, ridges, gullies, alluvial floodplains and fans. These basically alluvial forms are dynamic and constantly changing. "The reconstruction of alluvial landscapes is ... important because there is a direct relationship between alluvial landscapes and human activity" (Waters 1992:183) and without an accurate understanding of the way in which these various land forms have evolved, it is difficult to evaluate the potential for buried cultural deposits. Clearly, any accurate understanding of the prehistory in the GLINT project area will require the construction of a detailed geomorphological model.

EVALUATIONS of SIGNIFICANCE

During the course of field work, archaeologists from ERG attempted to evaluate, for each of the ten newly documented archaeological sites, those attributes that would enable a given site to provide information important to history or prehistory (Criterion 'd'). Generally, the presence of cultural features, such as hearths, is considered important as they have the potential to generate chronological, subsistence, paleoclimatic, and/or other noteworthy data. The potential for intact, buried cultural deposits can also contribute to a site's significance. Short discussions of each site in the GLINT project area are provided below, and these accompany suggestions about whether each site should be considered eligible for inclusion in the National Register of Historic Places (NRHP). In cases where the potential for eligibility remains unclear, a program of archaeological testing is recommended. Table 8 summarizes the discussions and suggestions.

Archaeological Sites

LA 134760

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). The potential for shallowly buried cultural materials at this site is thought to be moderate, but, particularly because of the possible fire-cracked rock (FCR) found at the site and the implications this has for the presence of buried thermal features, this site should be tested before a determination of NRHP eligibility is made.

LA 134761

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). The presence of fire-cracked rocks and fire-crazed artifacts suggests that buried thermal features might be present at the site. The orange-brown loams at the site are at least 20 cm deep in some places and this depth underscores the possibility that

Table 8. Summary of Archaeological Sites and Suggestions for NRHP Eligibility.

Site Number	NRHP Eligibility	ERG Recommendations
LA 134760	Potentially	Needs Data / Test
LA 134761	Potentially	Needs Data / Test
LA 134762	Potentially	Needs Data / Test
LA 134763	Potentially	Needs Data / Test
LA 134764	Eligible	Needs Data / Test
LA 134765	Eligible	Needs Data / Test
LA 134766	Potentially	Needs Data / Test
LA 134767	Potentially	Needs Data / Test
LA 134768	Potentially	Needs Data / Test
LA 134769	Potentially	Needs Data / Test

buried materials could be present. Accordingly, this site should be tested before a determination of NRHP eligibility is made.

LA 134762

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). An intermittent drainage courses from west to east about 25 m south of this site and is pulling sediments from the southeast portion of the site downhill. This sediment movement may be exposing buried cultural materials or moving others and, although no cultural features were observed, there is still some potential for shallowly buried thermal features in the light brown, silty loam that comprises the sediments of the site. Accordingly, testing should be undertaken at this site before an NRHP assessment is made.

LA 134763

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). The depositional setting and the results of a pinflag probe indicate a modest potential for shallowly buried cultural deposits. The presence of two FCR scatters suggests the possibility of a buried thermal feature. Accordingly, this site should be tested before an assessment of NRHP eligibility is made.

LA 134764

This site is considered by ERG to be **eligible** for inclusion in the National Register of Historic Places (NHRP). This site can probably provide information on Late Paleoindian (8000-6600 BC) settlement patterns (and possibly other data sets, such as chronology, subsistence, or paleoclimate) in the Socorro region, and possibly on Middle Archaic period occupations as well.

The cultural deposits at this site may have been reworked but, based on the geomorphic context of the site, there is a small possibility that the site is shallowly buried and somewhat intact. The site should be tested before an assessment of NRHP eligibility is made.

LA 134765

This site is considered by ERG to be **eligible** for inclusion in the National Register of Historic Places (NHRP). The cultural materials seen on the surface of this site, particularly those close to the small, incised arroyo, are being affected (moved?) by erosion. Other areas uphill of this drainage, with apparently deeper aeolian (?) sediments, have lower surface artifact densities and may have shallowly buried cultural materials there. This site has good potential for providing information on prehistoric lifeways (eg. settlement patterns, subsistence, paleoclimate) during the Early Archaic period in the Socorro region, assuming that the majority of the site is currently intact and buried. Accordingly, this site should be tested before an assessment of NRHP eligibility is made.

LA 134766

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). Because it is possible that some artifacts are buried in alluvial or colluvial sediments at the site, it is suggested that the site be tested before an assessment of NRHP eligibility is made. While no Historic period artifacts may be present in subsurface contexts, the possibility remains that some prehistoric cultural materials may exist there.

LA 134767

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). The sediments at this site are gravelly, light brown loam. Pin flag probes suggest at least 20 cm of depth in these sediments, and the occurrence of artifacts on the rodent burrow backdirt piles suggests that cultural materials are buried here. Accordingly, this site should be tested before an assessment of NRHP eligibility is made.

LA 134768

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). Sediments at the site are deep, grey gravelly terrace loams that were formed in alluvium. Given the old bajada geomorphological context it is possible that some buried cultural materials exist at this site, although it is currently unclear to what depth.

Pin probes indicate sediment depths up to 30 cm. Accordingly, archaeological testing is suggested for this site before an assessment of NRHP eligibility is made.

LA 134769

This site is considered by ERG to be **potentially eligible** for inclusion in the National Register of Historic Places (NHRP). The geomorphic context of this site seems similar to four other sites found during this inventory, in that it sits atop a relatively stable terrace. Sediments at the site are deep, grey gravelly terrace loams that were formed in alluvium. Given the old bajada geomorphological context it is possible that some buried cultural materials exist at this site, although it is currently unclear to what depth. Pin probes indicate sediment depths up to 30 cm. Accordingly, archaeological testing is suggested for this site before an assessment of NRHP eligibility is made.

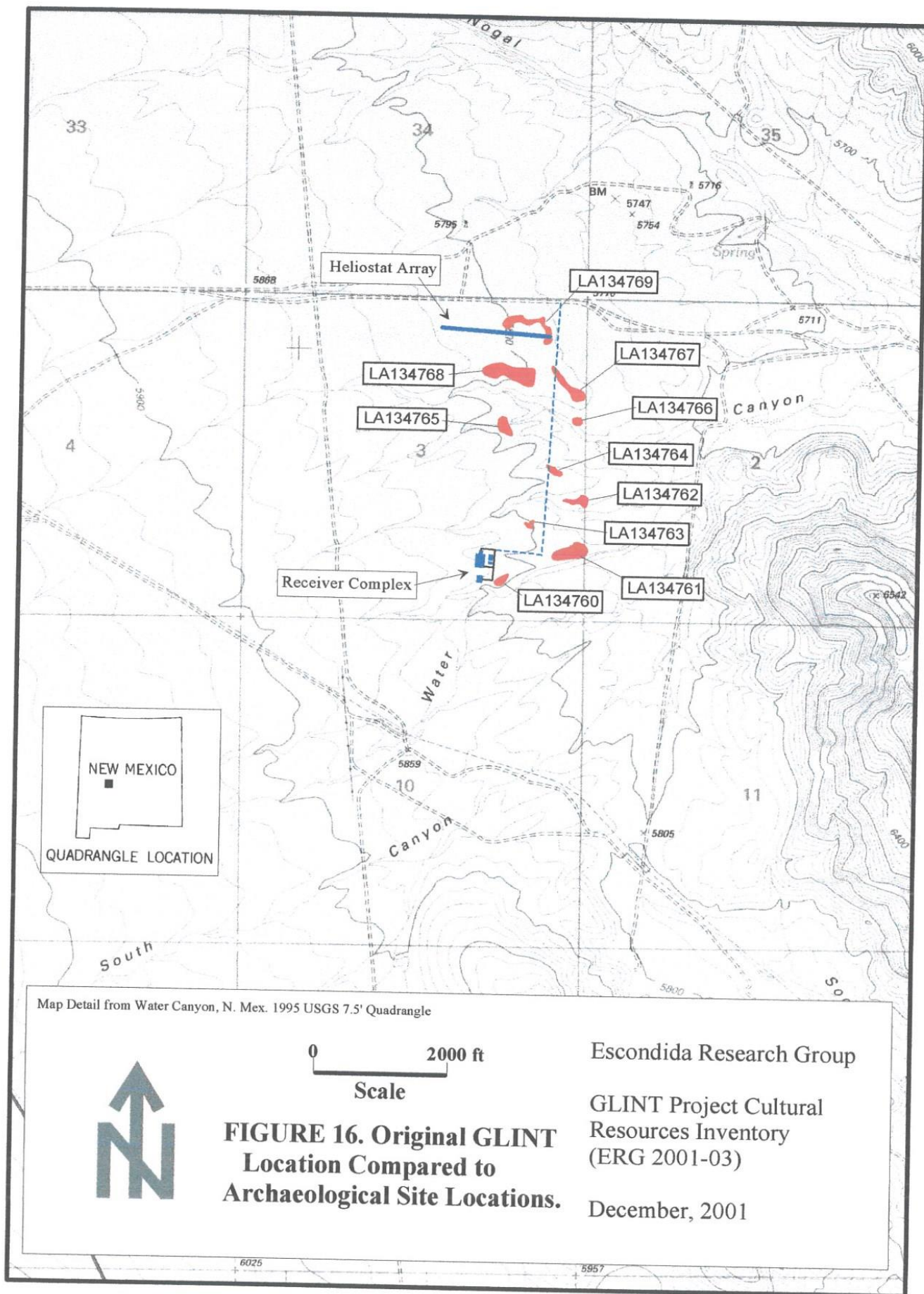
Isolated Occurrences

ERG suggests that all of the isolated occurrences (IOs) should be considered as **not eligible** for inclusion in the NRHP. Their data potential has been exhausted by their documentation and no further evaluation of them is necessary.

DETERMINATION of EFFECT and MANAGEMENT RECOMMENDATIONS

As is apparent in Figure 16, the location of the GLINT facility, as it was originally conceived, would be problematic in terms of its effects on the nearby archaeological sites. Perhaps most significantly, the east end of the proposed Heliostat Array would overlap a relatively large portion of site LA 134769. In addition, the proposed new gravel access road would run through sites LA 134764 and LA 134767. Finally, the smaller gravel road associated with the Receiver Complex comes very close to site LA 134760 and it is likely that construction activities in that area would impact that site. If the GLINT facility were constructed in its original location, there would be multiple negative effects to at least four archaeological sites. Such negative impacts would require mitigative efforts.

Consequently, in a meeting among Dave Collis (EMRTC), Jessy Taylor (EMRTC), Robert Dello-Russo (ERG), and Marcia Thornton (TREX Enterprises), it was determined that the most prudent management strategy would be to move the proposed GLINT facility to a new location. This consisted of moving the Heliostat Array approximately 300 m (1000 ft) directly to the west. So as to retain the same spatial relationships among facility components, the Receiver Complex would also be moved 300 m (1000 ft) directly west. The proposed gravel access road



would be re-routed to follow the existing powerline road along the extreme west edge of the inventoried project area.

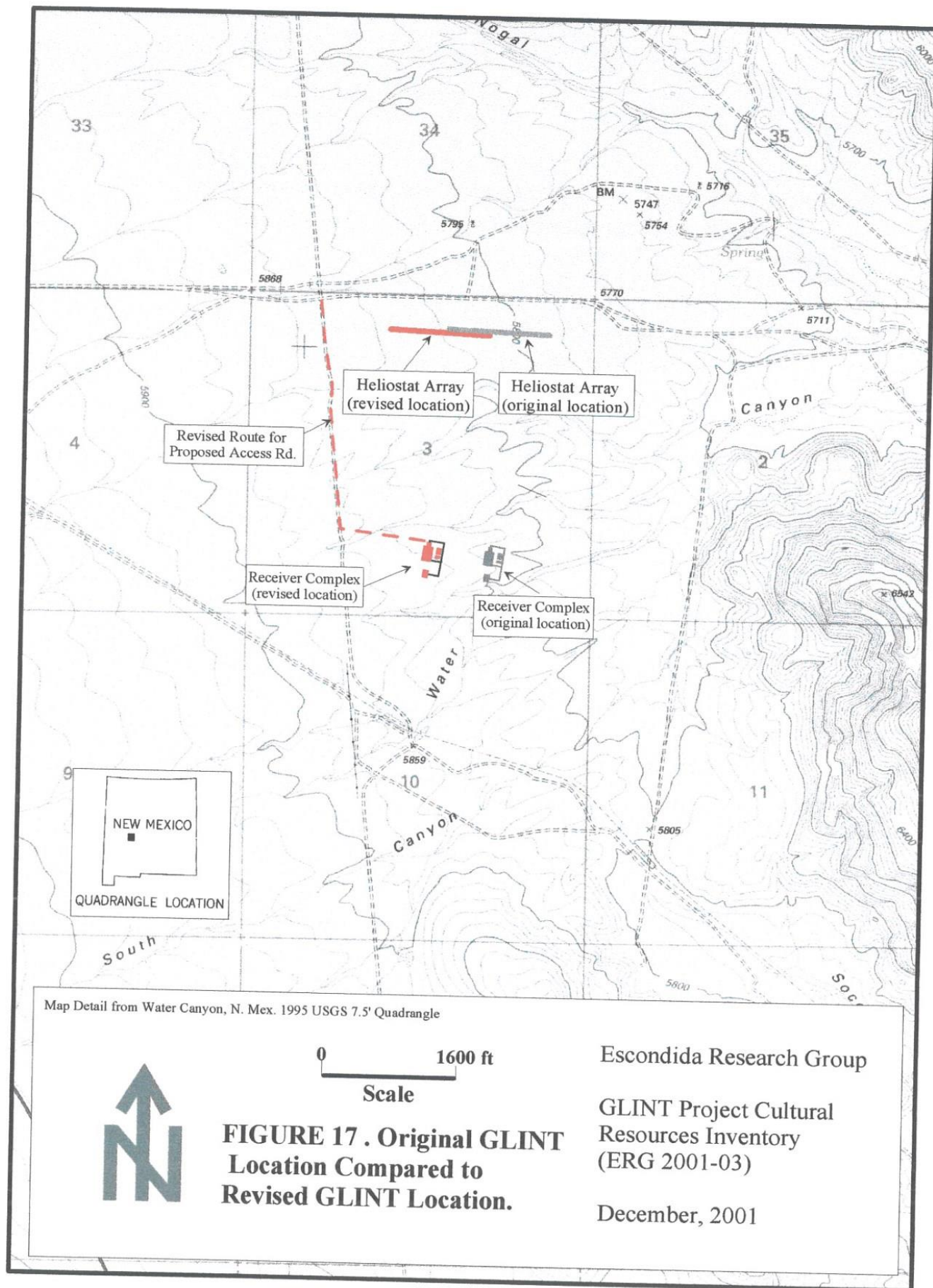
Both the Universal Transverse Mercator (UTM) and the Latitude-Longitude (DMS) coordinates for the original and revised locations of the GLINT facility are presented in Table 9 and both locations are illustrated in Figure 17.

It is suggested by ERG that if the GLINT facility is moved to the revised location, as specified, any potential negative effects of the GLINT facility construction to any of the archaeological sites in the project area will be effectively eliminated. Accordingly, ERG suggests that such a management strategy should allow the undertaking proposed by EMRTC to receive an archaeological clearance.

In addition, because of the geomorphological context in which the GLINT project area is located and the inferred strong potential for buried cultural resources, ERG recommends that a qualified archaeological monitor be present during subsurface excavation activities related to the construction of the GLINT facility. These would particularly include relatively deep excavations for facility foundations, but could also include shallower excavations for buried cables and electrical lines.

Table 9. Original and Revised Locational Data For GLINT Facility.

Location	Installation	Corner or End Point	Latitude / Longitude		UTM (Zone 13)	
			North	West	Easting (m)	Northing (m)
Original Location	Receiver Bldg.	1	N34°04'27.3"	W107°01'55.6"	312483	3772056
		2	N34°04'27.4"	W107°01'56.9"	312447	3772061
		5	N34°04'24.8"	W107°01'55.5"	312480	3771977
		6	N34°04'24.9"	W107°01'57.3"	312438	3771984
	Heliostat Array	East End	N34°05'2.5"	W107°01'44.4"	312292	3773170
		West End	N34°05'3.3"	W107°02'3.9"	312791	3773137
Revised Location	Receiver Bldg.	1	N34°04'27.1"	W107°02'7.3"	312183	3772056
		2	N34°04'27.2"	W107°02'8.8"	312147	3772061
		5	N34°04'24.4"	W107°02'7.4"	312180	3771977
		6	N34°04'24.7"	W107°02'9.1"	312138	3771984
	Heliostat Array	East End	N34°05'02.3"	W107°01'56.2"	311992	3773170
		West End	N34°05'03.1"	W107°02'15.6"	312491	3773137



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