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SETTLEMENT AND POPULATION AT PIEDRAS NEGRAS, GUATEMALA

A Thesis in

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by

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Abstract

My dissertation examines the relationship between settlement and population at Piedras Negras, Guatemala. This Classic Maya center developed from a small village into a major polity over the course of a thousand years. Excavations from within the site conducted by the University of Pennsylvania (1931-1937) and the Projecto Piedras Negras (1997-2000, 2004) have greatly expanded our knowledge of the center and its surrounding areas.

Mapping crews have discovered over 500 structures in the site core, and an additional 250 structures within two kilometers of the center. Numerous test pits were placed throughout epicentral Piedras Negras to define the chronology of the center and to better understand its change and development over time. In addition, several patio groups were completely excavated to understand their development through time.

A model of population change and center development can be derived from the information collected via excavations. Epicentral Piedras Negras had a very low population during most of its existence which only peaked to a maximum of 2600 inhabitants during the Chacalhaaz ceramic phase (AD 750-825). During this same period, the polity of Piedras Negras had a maximum population of 50,000 people with a density of 15 people per square kilometer.

Agricultural practices based on a medium fallow system could have supported the inhabitants of Piedras Negras (the center) without the use of any intensive agricultural features due to its low population. The lack of agricultural terracing generally supports this conclusion.

A study of the remains of patio groups indicates that there are differences in the material culture between epicentral patio groups (or the remains of households) and differences between rural patio groups and epicentral patio groups. These differences suggest that differential access to material goods occurred within the social structure of the ancient center.

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Dedicated to my wonderful and supporting wife
Julianne D. Nelson
who remembers every moment
and to my son
Nathaniel Rhys Nelson
who thankfully will not remember any of this
and in memory of my sanity
I miss it.

Chapter 1

Introduction

This dissertation focuses on the urban development of Piedras Negras, (Figure 1.0) a Classic Maya center located on the eastern banks of the Usumacinta River in northwestern Guatemala (Figure 1.1, Figure 1.2 and Figure 1.4). This primary center's development will be charted using the remains collected from test pits and residential structures excavated between 1997 and 2000 as part of the Proyecto Piedras Negras. Research consisted of large-scale lateral excavations of house mounds combined with an extensive test pitting program throughout the center to better understand how Piedras Negras developed. In addition, the history of the area is well-known from abundant stelae recording the deeds of its rulers, so the archaeological work can be united with historical records.

My database is unusually extensive. My dissertation material includes 210 test pits from twenty different operations, and the remains of 10 different buildings (Figure 1.3). The area excavated from all operations is 1,897 m^2 and includes over 3,000 kilograms of ceramics, 2,700 figurine fragments, 165 grinding implements, and more than 6,000 pieces of stone tools. The database spans 1,000 years of human development from humble village origins to political dominance, and subsequent collapse and abandonment.

The large amount of cultural material recovered from widely spaced excavations permits a detailed study of the chronology and the spatial development of the site. More importantly, a center is more than buildings on a landscape. It is a place where people interacted and lived. While individuals are difficult to "observe" archaeologically, their physical remains and the remains of their residences are recoverable. Included in this body of work are descriptions and analyses of residential groups that were excavated with an eye towards reconstructing households and charting their individual life-cycles.

RESEARCH OBJECTIVES: URBAN DEVELOPMENT OF PIEDRAS NEGRAS THROUGH EPICENTRAL RESIDENTIAL HOUSEHOLD ANALYSIS

My dissertation concerns the development of Maya "centers" and the social differentiation found within them. Here, I purposely avoid the term "city" because Piedras Negras does not have the high population density and internal complexity that denotes "city" in the conventional sense (Sanders and Webster 1988, Webster and Sanders 2001). While this center never achieved true urban status, it still faced the challenges of immigration, population growth (and decline), land allocation, and all of the human variables that cities face albeit on a much smaller scale than Teotihuacán, for example. Essentially, I am looking at the growth of Piedras Negras *around* its rulers.

Figure 1.0 Mesoamerica with pre-Hispanic centers mentioned in text

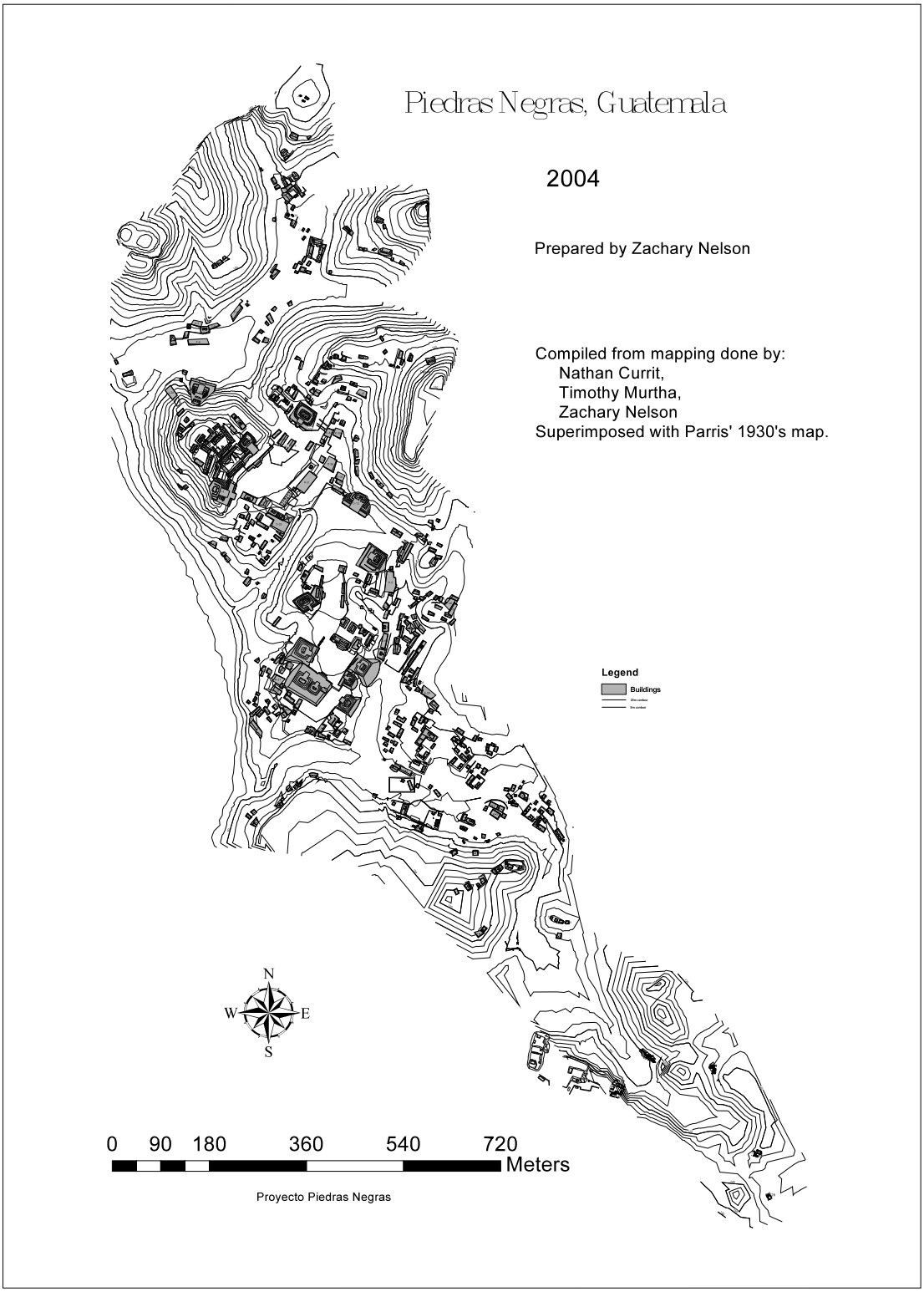


Figure 1.1 Piedras Negras

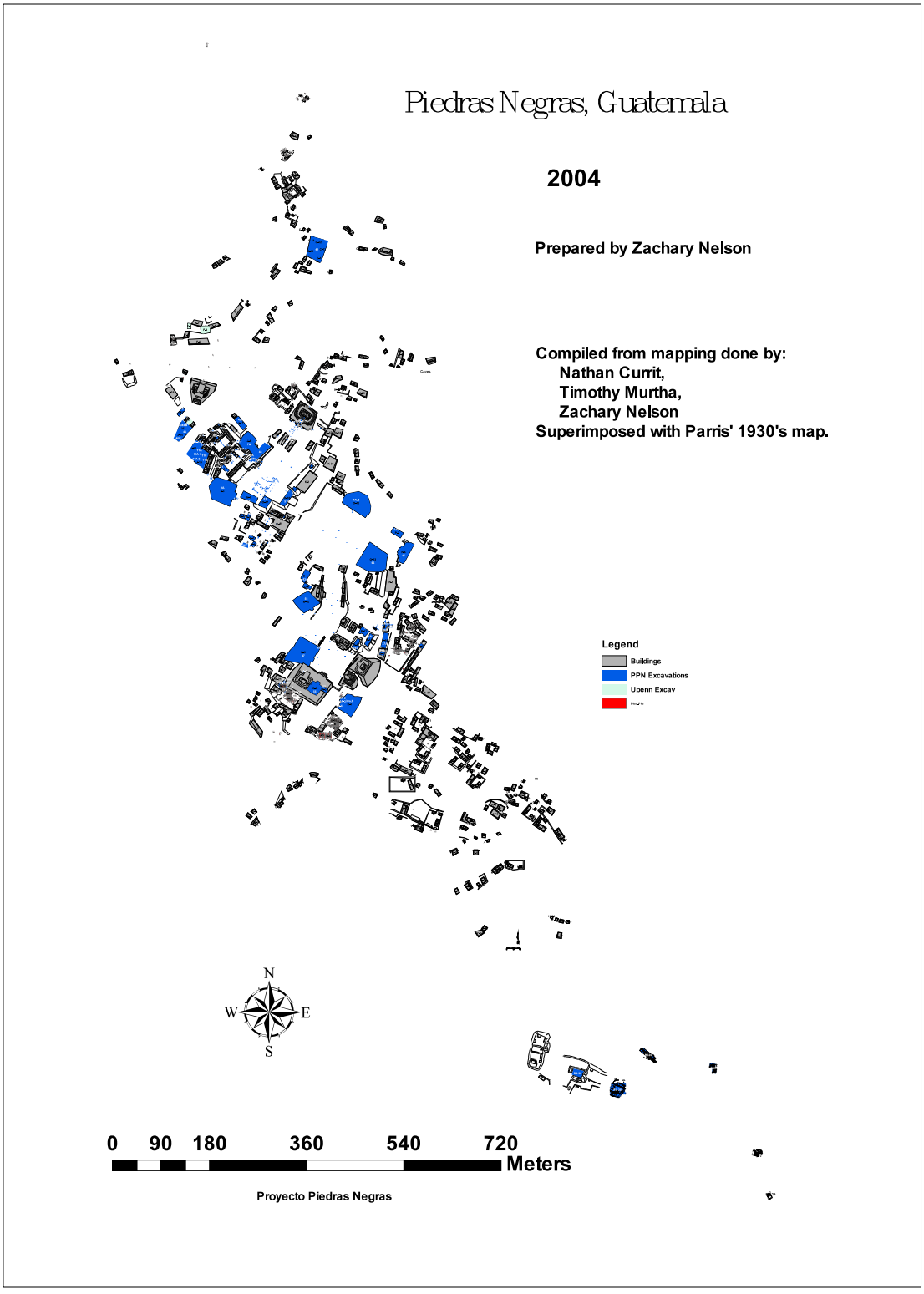


Figure 1.2 Excavations within Piedras Negras

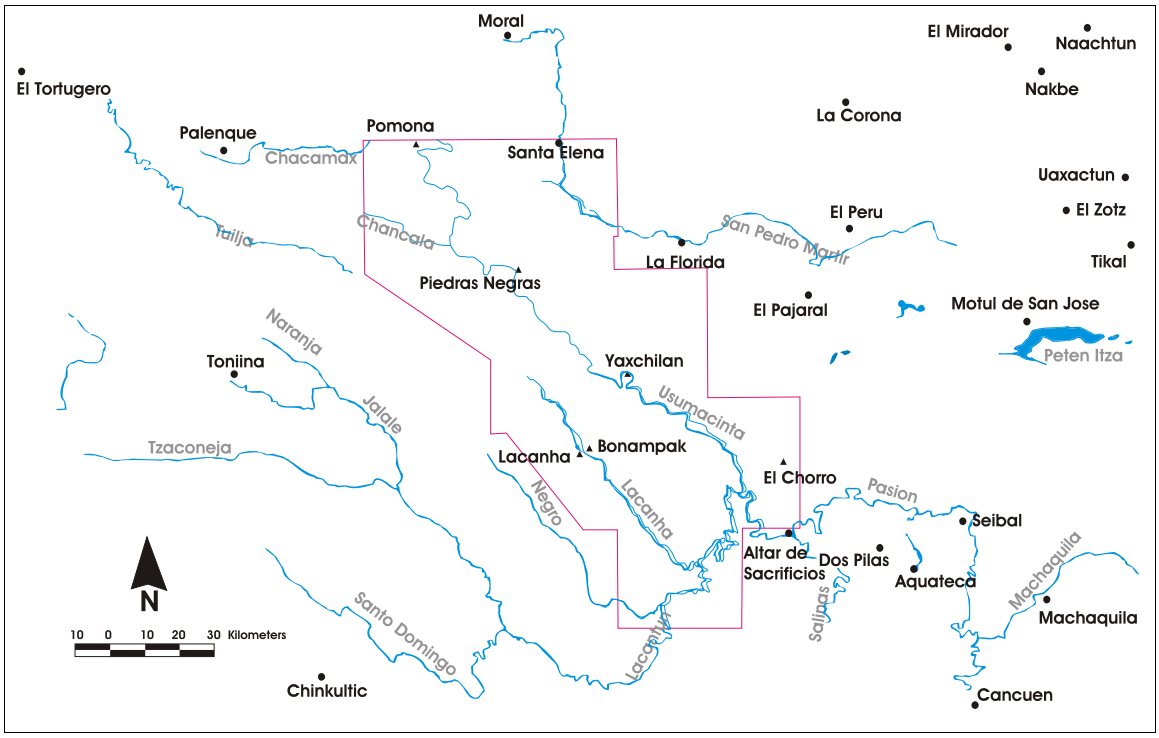


Figure 1.3 Map of Usumacinta drainage

Kingship is the *axis mundi* of Maya society (Houston and Stuart 1996) around which society pivots. The rulers of Piedras Negras changed, rebuilt, or expanded the center throughout its life (Golden 2002, Houston et al. 2001) but they are not the focus of this dissertation. I emphasize instead urban development (of a particularly Maya sort) at Piedras Negras, Guatemala from its inception as a dynastic center to its decline (roughly 500BC - 930AD; see also Houston et al. 2003).

I use urban development here to mean the formation processes on the landscape by which humans aggregate in large, dense, internally complex communities. This topic is complicated, so I limit myself to a few basic issues:

1. How did Piedras Negras grow and develop spatially on the landscape?
2. Can specific periods of growth be tied to specific rulers?

Specifically, I use ceramics recovered from test pits as a means of dating the epicentral settlement through time. Test pits placed in all major groups from Piedras Negras yielded datable ceramics that tie specific structures to the ceramic chronology. This in turn allows structures to be assigned populations by ceramic phase, permitting a conservative population estimate by phase. In addition, I investigate whether the Late Classic Maya needed intensive agriculture to sustain their estimated population, and whether the lack of agricultural intensification could have hastened the collapse of Piedras Negras.

I tie the historic records of the Maya to activities within the center, and to the regional activities of other polities to show how individual rulers from Piedras Negras affected their polities, especially on the non-elite household level. In addressing these questions, I use the physical remains of residences as a basic unit of analysis. Residential archaeology is a

developing facet of Maya archaeology. Surveys and excavations at Aguateca (Inomata and Stiver 1998), Cerén (Sheets 1992, Zier 2000), Copán (Gonlin 1993, 1994; Webster and Gonlin 1988; Webster, Gonlin, and Sheets 1997), Kaminaljuyú (Stenholm 1979), K'axob (McAnany and López 1999), Quirigua (Ashmore 1988), Tikal (Haviland 1981), and Uaxactun (Ricketson and Ricketson 1937), and other centers have uncovered evidence of Classic Maya household activities. My research continues this trend, using recent evidence from the middle Usumacinta drainage of the Maya lowlands.

Piedras Negras is located in northwest Guatemala on the east side of the Usumacinta River. It is a compact Maya center almost a square kilometer in size with a building density of 517 structures per square kilometer. Like many Maya centers, settlement is generally oriented around plazas, without a formal grid system. Structures are located above the high water mark and in and around the numerous hills that comprise this karstic region of Mesoamerica. In contrast to Copán, overall settlement is highly nucleated. Piedras Negras is the core settlement zone of the area, with settlement quantity dropping precipitously outside of its immediate environs. An unusual feature of the settlement is the presence of eight sweat baths (a ninth sweat bath is located just outside of the center to the south) which were used for purification rituals.

Piedras Negras is also the capital of the kingdom of Piedras Negras. The kingdom, or polity, covers several thousand square kilometers and includes many smaller villages and hamlets. References to Piedras Negras in this dissertation refer to the site of Piedras Negras and not to the polity of Piedras Negras unless otherwise noted.

MAYA CENTRAL PLACES

> You cannot make a city of ten men, and if there are a hundred thousand it is a city no longer. But the proper number is presumably not a single number, but anything that falls between certain fixed points. (Aristotle, *Nicomachean Ethics*)

Cities are prominent places in the modern world. The study of their emergence, variety, and attributes yields important information about the nature of human settlement. While social scientists study modern urbanism, including city-planning, organization, and evolution (Fleming 1998; Jacobs 1993; Kasarda and Crenshaw 1991; Kemper 1991, 1993; Low 1996; Mannion 2002; Sanjek 1990), archaeologists investigate the emergence of cities and examine their manifestation in pre-Industrial societies (Allchin and Erdosy 1995, Cowgill 2004, Gates 2003, Keith 1999, Marcus and Flannery 1996, Possehl 1990). The identification, character, and development of cities in prehispanic Mesoamerica has been the subject of some debate (Blanton 1981; Marcus 1983; Sanders and Santley 1983; Sanders and Webster 1988; Smith 1989; Webster and Sanders 1989; Chase et al. 1990; Cuidad Ruiz et al. 2001, Sanders et al. 2003). The central issue is whether the ancient Maya lived in cities or some other kind of “central place”. Other issues include the degree to which Maya settlements were heterogeneous in their social and economic activities and if they were comparable to great centers in highland Mexico, e.g., Teotihuacán or Tenochtitlan.

There is no universal definition of a city. Aristotle defines cities by their populations (*Nicomachean Ethics*) and high self-sufficiency (*Politics*, Book 2:II); but there are other ways of defining a city. “For sociological purposes a city may be defined as a relatively large, dense, and

permanent settlement of socially heterogeneous individuals" (Wirth 1938:8). Perhaps a common attribute of cities is that they are full of strangers (Jacobs 1961). "Urbanized places are higher order settlements in a region of interrelated people and settlements, and provide centralized functions on a continual basis" (Stark 2003: 405). Cowgill posits that there should be a clear distinction between urban and rural settlements or the settlement is non-urban (2004:527).

Maya urban forms are characterized by their higher-order settlements. I approach this topic by examining the typology used in Mesoamerica for city classification, then identifying the general characteristics of Maya centers and how well they fit the typology. In general, I prefer to use the term "center" to denote concentrated settlement at Piedras Negras rather than "city" because"center" has neutral connotations. Because population and population density are important issues in discussions about cities, I will provide estimates for Piedras Negras in a later chapter.

URBAN TYPES

City classification for prehispanic Mesoamerica has generally followed Fox's typology of city types: regal-ritual, administrative, and mercantile (1977). Regal-ritual centers are those whose primary purpose is ideological and political (Fox 1977: 41, Sanders and Webster 1988: 523). A regal-ritual center primarily exists to serves the needs of a king and his household (or it is the household). In this sense, "king" may also refer to deities and their mortal representatives. The focus of the settlement is centered on the ruler (or temple) and his needs. Sanders and Webster describe this type as a consuming center where raw materials and food are brought into the center from outlying areas (1988:524). The population is under several thousand while the center itself is essentially "an expanded household of the ruler" (1988:524) without a clear urban/rural distinction in population (1988:525).

Administrative cities follow Wirth's definition of a city. They have a large population with heterogenous activities in a dense settlement pattern. Lifestyle varies between urban and rural dwellers with the city dwellers encompassing a greater range of specialized activities including administration and full-time specialization. Professionals, including officials and military, are supported by taxation from the rural areas (Sanders and Webster 1988:525). The large population permits anonymity and degrees of class structures, and high demand for goods and services.

Mercantile cities are those that create wealth via the production of riches without a strong centralized government. These may be centers of trade, rather than producers of items for trade.

MAYA SETTLEMENTS

Maya central places are considerably different than Western ideas of cities. While Aristotle would recognize that the population size of Piedras Negras generally fit his notion of a city (10 < Piedras Negras < 100,000) its dispersed nature would be incompatible with the centralized (and fortified) nature of Greek city-states. Likewise, the Spanish conquistadores noticed the differences between Mexica settlement and Maya settlement (Webster and Sanders 2001: 43, 53). Mexica settlement fit their expectations of an Old World city in ways that the Maya settlement did not. Maya settlement is characterized by structures arranged around central patios with tens of meters of space between each patio group. Patio groups are arranged in non-linear fashion within the center and not according to definitive grids. A distinct lack of streets in

a Maya settlement is immediately noticeable by Western eyes. Further, settlement can extend for hectares around the social/ritual core of the center without any appreciable change in density and only minor variation in building size and architectural complexity. The lack of an urban/rural boundary in settlement has made it difficult to define the limits of a center, and stands in stark contrast to Teotihuacán, or the fortified city-states of medieval Europe.

The heart of Maya settlement is the king's palace and associated mortuary temple/ritual complexes. The palace complex is something that Spaniards recognized from their familiarity with court systems. The monumental architecture of the court is easy to pick out on any map of Maya settlements. It is arranged around large plazas with mortuary temples on either side. Often, the living quarters of the king and his family lie next to pyramids commemorating his familial line. Stelae marking the history of the king's family line the plazas and increase the sense of history that the center possesses.

Houses of other nobles may be situated nearby, and can have significant architectural embellishments themselves (Webster 1989); but the real focus of the center is on the palace and the ruler. Noble houses are also arranged around patio groups, and often resemble the king's palace but on a smaller scale.

Depending on the particular Maya settlement, various types of other structures and activities have been documented. Caracol has prominent sacbes or causeways that connect the epicenter to outlying smaller communities. Piedras Negras has prominent sweat-baths. Copan and Tikal have men's ceremonial houses. Many Maya centers have ball courts for public (and private) spectacles. Colha has impressive quantities of workshop debris from large-scale production of chert implements. Agricultural intensification also occurs around prominent centers, although this enterprise may be locally organized.

ISSUES AND EGOS

This brief description of Maya settlement patterns gives a general feel for the homogenous aspects and some of the heterogeneous functions that have been archaeologically verified at these centers. The settlement data suggest that Maya centers fit into Fox's regal-ritual typology. However, Mayanists have been somewhat reluctant to embrace this titular category (Barnhart 2001, Chase et al. 1990). If the typology consisted solely of the title "regal-ritual city" than there would be no problem. It is the associated criteria (and implications) that have caused distress.

Sanders and Webster present their criteria for regal-ritual centers in "The Mesoamerican Urban Tradition" (1988). Criteria include the center as primarily a consuming unit, population under a few thousand people, little variation in architectural forms within the center, settlement within the center is mainly for rulers and their clients, ruler household similar in function to rural households, and little differences between rural and urban settlements (1988:524). Further, the state itself has "relatively weak, decentralized authority at its top" (1988:534).

The implication of this model for some Mayanists is that somehow the Maya were inferior to the Mexicans in their population densities. If Maya did not have cities, then were their settlements urban? If Maya settlements were not urban, then were they organized into states or chiefdoms? Attempts to imply that Maya were not organized in the same fashion and the same level as their northern Mexican neighbors somehow demean their accomplishments.

An Alternative Form

An alternative to regal-ritual that has been partially embraced for Mesoamerican settlements is the "Garden-city" concept (Killion 1992, Stark 2003). Essentially, this model proposes that Maya settlement had an ecological component that incorporated space within settlements for gardens and small fields. The emphasis of this model is to do away with Wirth's criteria of population density and substitute instead an urban planning aspect without the urbanism.

Rather than juggling definitions, I understand Maya "centers" to be low density entities that do not conveniently fit into a definition of "city". Settlement can stretch for kilometers without distinguishing between urban and rural categories. Maya central places, while relatively large, are not generally dense over great areas – a theme I examine in Chapter 8. If population density is a criteria of "city", then many Maya polities did not have cities and, by extension, were not urban entities. Because population and population density is important to general definitions of cities, I will develop a population estimate for Piedras Negras in a later chapter.

REGAL STATES

Hirth notes that city identification via settlement survey requires archaeologists "to treat *spatial* boundaries as *social* boundaries" (2003:59, emphasis in original). The city is not an autonomous entity. It relies on networks with other settlement clusters both small and large for its support. Social networks move goods into and away from pre-industrial cities in a web of increasing complexity. Regional studies can identify some of these networks and bridge the gap between highland and lowland cities. Instead of treating cities as its own entity, Hirth recommends examining settlement from an emic view (2003).

The epigraphic record is silent on words that specifically describe a Maya center (Houston et al. 2003: 215). For the ancient Maya, geography was not as important in this regard as sociality. Central places were important because of who lived there. Studies of contact period documents provide examples of how indigenous people conceived the center: altepetl and cah .

Altpetl

The Nahau view of their settlements was not based on an urban/rural dichotomy. The political organizing structure was the altepetl. "In fundamental terms it represents a royal household and the corresponding land, territory and people of a particular ruler (tlatoani)" (Hirth 2003:61). Altepetls were subdivided into smaller units of calpulli and chinamitl and could be united into larger units known as tlayacatl. Members of the altepetl did not see themselves as city-dwellers or rural peasants, but as members of the same socio-political unit although there were clear class distinctions within each altepetl. "The linguistic evidence equates 'city' with the entire city-state rather than a special large community within the altepetl" (Hirth 2003:61). Because membership was associated with a particular ruler, non-contiguous parcels of land could be tied to different altepetls within the same valley (Sanders et al. 2001).

Cah

Maya legal documents refer to a social unit known as the cah (Restall 1997). Cah refers to the community of which an individual is a member. It also refers to the geographic area that

the cah, through its members, controls. Membership in the cah is given at birth and is part of the identity of the individual along with the chibal or patronym.

> Within a given cah, members of a chibal - those of the same patronym - formed a kind of extended family, most of whose members seem to have pursued their common interests wherever possible through political factionalism, the acquisition and safeguarding of land, and the creation of marriage-based alliances with other chibalob of similar or higher socioeconomic status. (Restall 1997:17)

These two units, patronym and community, formed the basis of Maya identity for contact period Maya.

Both of these indigenous views lead back to cities as part of a continuum of settlement without a singular identity. Maya centers were not conceived as separate from the socio-political entity they were part of and in many cases they embodied the polity. For lack of a better word, I refer to this regional unit as the regnal state or just polity. Major settlements within the regnal state were dependent on the king for existence and when kingship failed major settlements were abandoned within a couple of generations. From this perspective, examining the attributes of the royal court and its surrounding settlement is more constructive than examining the city apart from the court; for the king and his court are the ultimate centers of the city and its polity. In this sense, court has two basic meanings: First, a court consists of people with whom the ruler associates on a frequent or regular basis. This definition is purposefully vague because servants and slaves, as well as administrators and ambassadors might be court-members. Second, a court is the place where the king dwells or has his seat of authority. These two definitions encapsulate the social and geographical meanings of court.

ROYAL COURTS

The existence of Mesoamerican royal courts has been well-documented for several centuries. Spanish accounts of the conquest detail aspects of court life among the Maya and Mexica as the conquistadores traveled through the land (Cortés 1986) as do some indigenous records (Restall 2001). The Spanish noticed that regions were hierarchically organized with overlords and minor lords and each ruler possessed his own palace located in the center of the settlement. The palace structures were arranged around patios. Despite these prominent accounts, the archaeology of the Mesoamerican royal court is still under-developed (Webster 2001:133).

For the ancient Maya, court structures are only beginning to be excavated as royal palaces rather than using “palaces” as a convenient label (Satterthwaite 1943a:17, Inomata and Houston 2001a and 2001b). The distinction is important because archaeological methodology changes when structures are identified by function and contextualized with nearby structures, i.e., the palace complex (Webster 2001:140-141). An aid to understanding royal courts in their own right has been the decipherment of historical records which denote the presence of kings, royal families, and other personages associated with the court (Houston and Stuart 2001).

Summary

As we shall see, settlement at Piedras Negras is almost entirely focused on the regal court. The ruler is the personification of the kingdom and his court facilities are the embodiment of Piedras Negras. Kingship is not the focus of this dissertation, but kingship and their court

settings are essential to understanding Maya settlement. Maya settlement clusters around the king's court in a low density fashion that can incorporate hundreds of square kilometers without marked changes in building density and without an urban/rural divide. The lack of site boundaries in Maya settlement has made assessing their urban-ness difficult for archaeologists. In reality, Maya did not have cities. They had polities or regnal states with clusters of settlement inside them analogous to conquest period Nahau and Maya social structure. Regional investigation and interpretation will bring these differences into focus.

DISSERTATION ORGANIZATION

The bulk of this monograph is descriptive. Test pit descriptions are necessary to the reconstructions; each is discussed in detail, but relegated to Appendix A. The large-scale excavations of individual patio groups and buildings are presented in Appendix B.

Chapter 2 examines the regional setting including its geology, climate, vegetation, and animal life. It includes descriptions of the archaeological setting of the center and the archaeologists who have worked at Piedras Negras and presents the history of Piedras Negras as recorded on its many monuments.

Chapter 3 deals with methodological issues. Most of the excavations used in this dissertation were not excavated by the author, which presents some difficulties in tying things together.

Chapter 4 discusses the Piedras Negras Map. This document was created under adverse conditions by several key investigators. Mappers generally get little credit for their efforts, but their products are the necessary field guide to the area.

Chapter 5 is devoted to descriptions of large-scale horizontal exposures of patio groups from the U group at Piedras Negras. The remains of two households were completely exposed, and provide a detailed glimpse into ancient Maya living conditions.

Chapter 6 develops the residential material culture of the center, based upon composites created from test pits and large-scale excavations by ceramic phase. As essential building blocks of the center, households are inherently heterogenous entities with multiple responses to outside pressures. This chapter examines Mesoamerican household reconstructions with a detailed analysis of relevant excavated households from the Maya Lowlands, including comparison with rural sites from Piedras Negras.

Chapter 7 is about population and agriculture at Piedras Negras. Population estimates are derived from inhabited structures per ceramic phase, and their relationship to swidden agriculture is assessed.

Chapter 8 wraps up the dissertation with the conclusions, thoughts on how this study should have been done in a perfect world, and what to do next.

Chapter 2

Piedras Negras: Its Environment and Archaeological History

ENVIRONMENT

The landscape surrounding Piedras Negras conditioned its character and growth. Piedras Negras lies within the Middle Usumacinta watershed (see Figure 1.1 and Figure 1.3 and Rands 1973). The landscape consists of a series of parallel valleys created by tectonic pressure (Aliphat 1994). The Usumacinta river lies in such a folded valley, and has been gradually cutting through the ancient strata, exposing bands of cherts from earlier deposits. Limestone is the principal underlying geologic feature of the landscape and it has been intensely weathered over the ages. As water moves through the limestone formations it erodes the softer portions of the limestone leaving caves and creating sinkholes. Over time, the entire landscape has become gradually "pitted" with steep hillsides and generally narrow valleys (Figure 2.0).

Piedras Negras has a tropical climate with temperatures averaging between 20 and 30 degrees Celsius. Precipitation averages 1,963.8 mm per year with marked dry and wet seasons (Aliphat 1994). The vegetation consists of tropical forest. Piedras Negras lies within the protected area of the Parque Nacional Sierra del Lacandón (see Figure 2.0), which allows the forest to remain mature. Plant life of the area is astounding in terms of diversity and form. A study in the Bonampak area reported 472 plant species in a single hectare (see Aliphat 1994:81) and Piedras Negras is comparable in this regard.

Animal resources are also present and protected in the area. I have seen indirect evidence for larger mammals such as jaguars, panthers, wild pigs, several types of deer and direct evidence of various rodents, land crabs, various snakes, lizards, crocodiles, tortoises, and a host of insect life. The bones of some of these species have been recovered from excavations (Emery 1998, 1999, 2001). The protection offered by the Defensores de la Naturaleza, who maintain the park against human encroachment, has allowed animal life to flourish.

As one might expect, the key resource is the river. The Usumacinta river drains the Mexican states of Chiapas, Tabasco, and parts of Campeche and on the Guatemala side it drains most of Alta Verapaz and western Petén on its way to the Gulf of Mexico. The annual discharge from this one river was measured at the Boca del Cerro as 55,832 million m^3 (Aliphat 1994:48). Around Piedras Negras, the river can widen from an estimated 80 meters to 150 meters, and can fluctuate 20 meters in height during the year. This fluctuation and rapids make river travel extremely dangerous. Portage routes might have been necessary for ancient travel and communication among settlements might have been impossible during certain times of the year. Riverine resources such as fish, fresh-water crustaceans, turtles, and other aquatic species would have been available year-round. More importantly, the river supplied water to the inhabitants of the area, thus Piedras Negras was never dependent on chultunes or wells for drinking water. There is also no evidence for irrigation.

Piedras Negras lies near several bajo regions that could be seasonally inundated (or nearly inundated) by the river (Figure 2.1). These areas measure 3 ha and could have provided agricultural land for the initial settlement of the region, while the rolling topography of the karst

landscape probably provided additional space for maize to grow, even on steep slopes, as is common throughout Mesoamerica today (see Chapter 7). A band of exposed chert along the river bank provided raw material for stone tools.

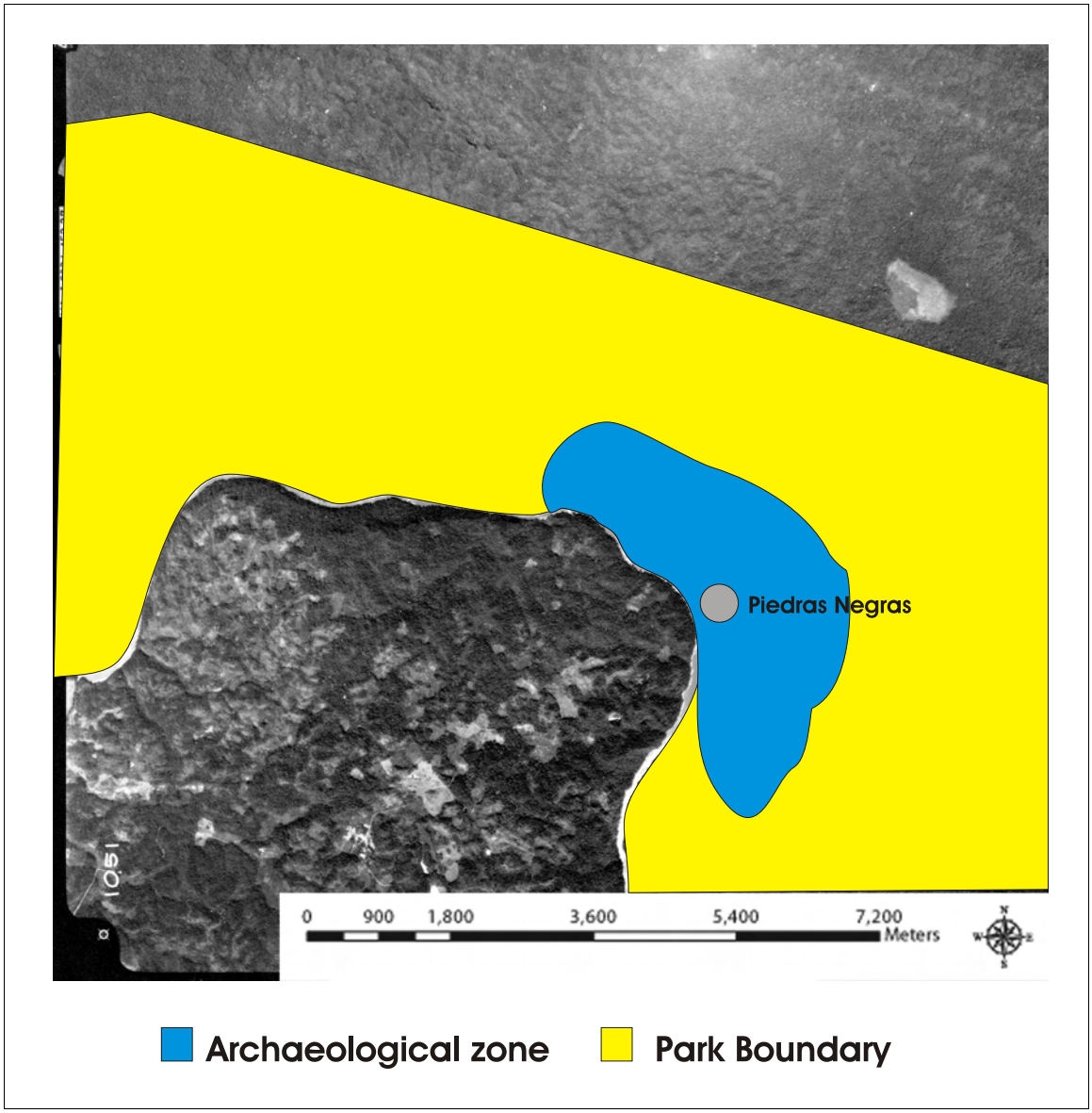


Figure 2.0 Parque Sierra del Lacandón

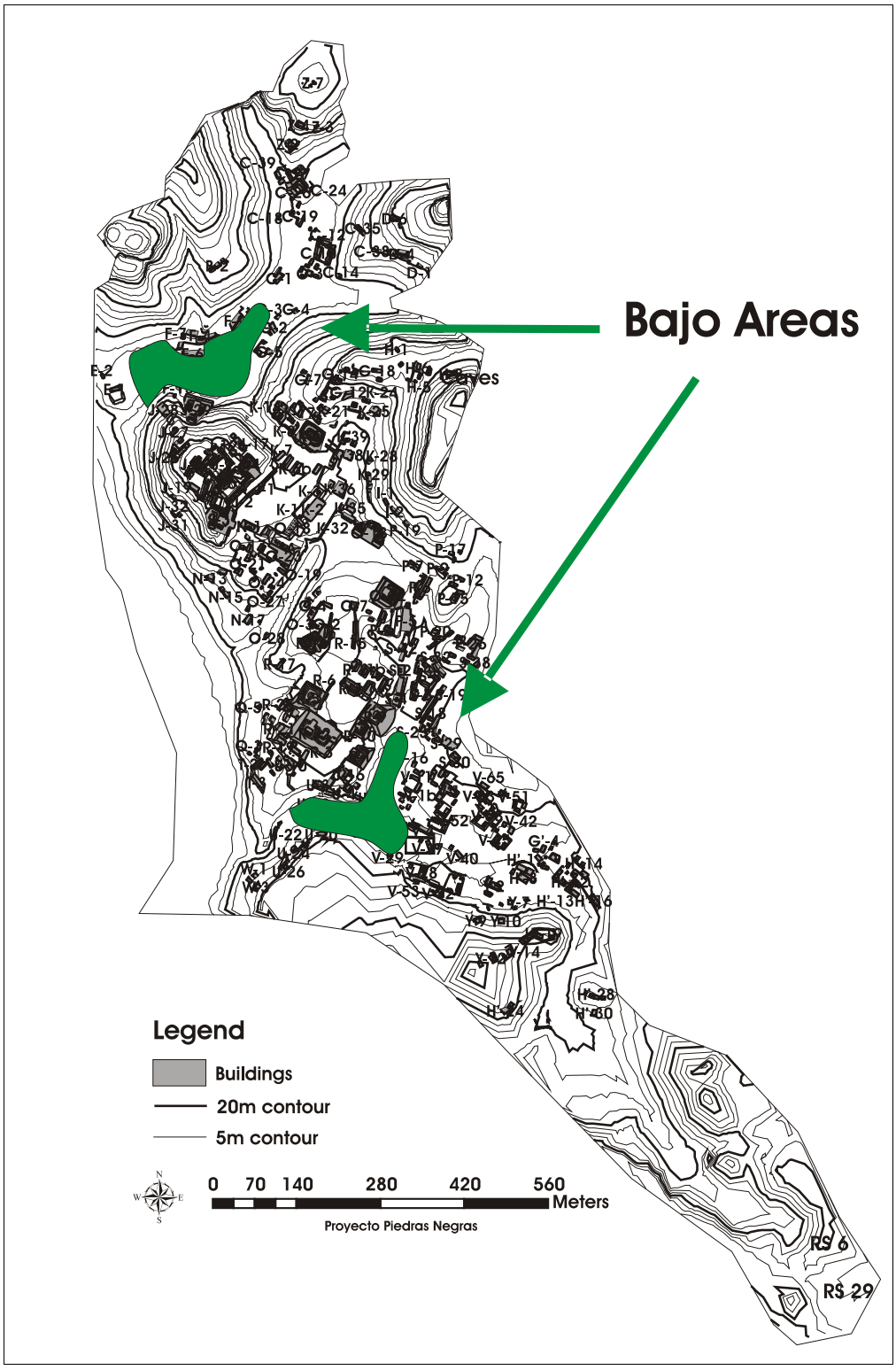


Figure 2.1 Bajo regions within Piedras Negras

EARLY RESEARCH AT PIEDRAS NEGRAS

The modern history of Piedras Negras begins in the 1890's with Ludovic Chambon (1994 [1892]: 89-92; Golden 2002:4) who named the ruins after a woodcutting station. Shortly thereafter, Teobert Maler learned of the ruins from loggers and visited the area (Figure 2.2) with his photographic equipment. His publication of the ruins and monuments (1901) spurred additional interest in the site. Sylvanus Morley documented the monuments of Piedras Negras (see Morley 1938) between 1910-1920 and used his influence to bring an archaeological project to the area. The University of Pennsylvania (Penn) began work at Piedras Negras in 1930 with the initial visit of J. Alden Mason, while the actual field work began in 1931 and continued each year until 1937, with a final season in 1939 (Satterthwaite 1943:1).

The initial field work was under the direction of Mason (1931-1932) and thereafter was directed by Linton Satterthwaite, Jr. until the close of the project. The focus of their efforts was on the monumental architecture of the site core. They explored most of the site core with

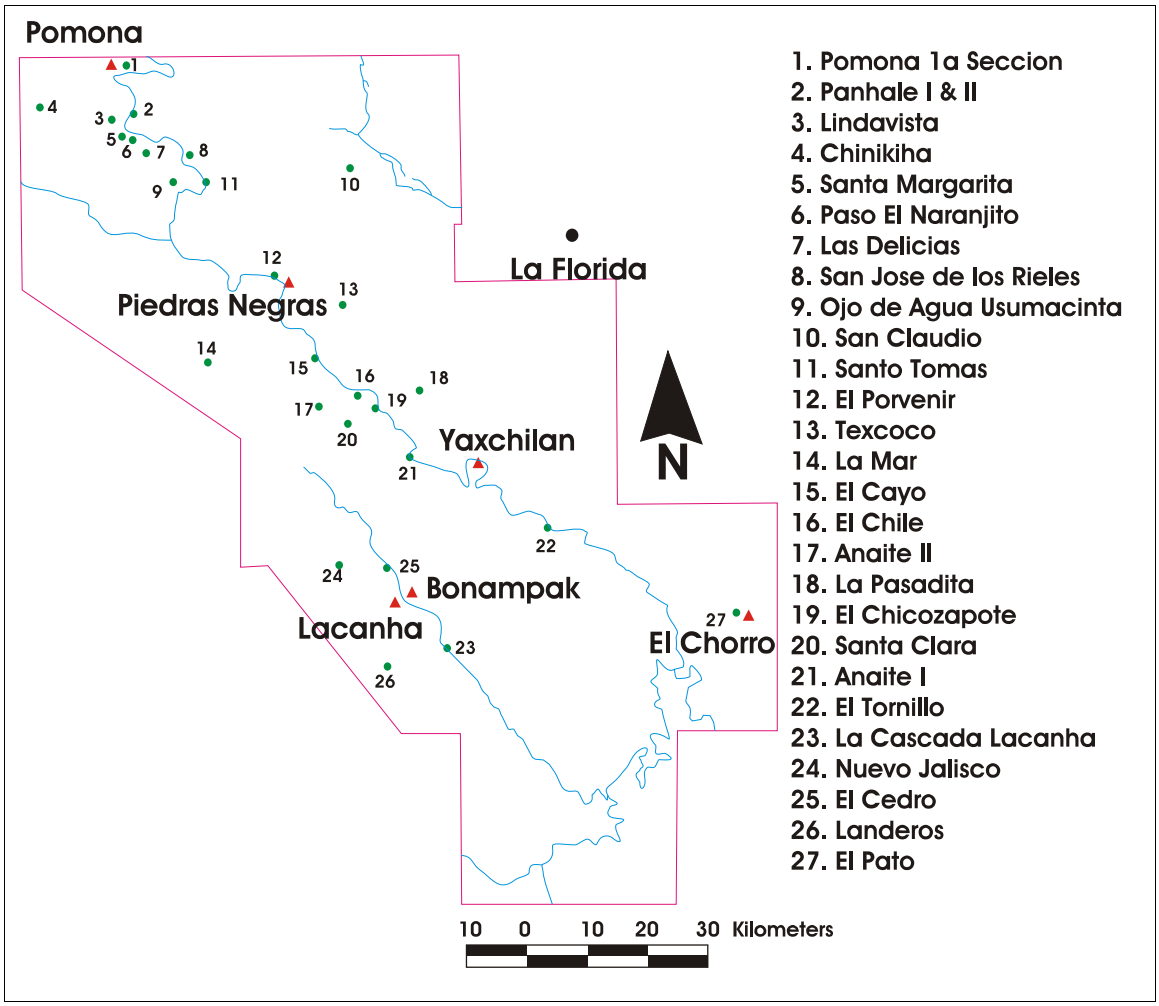


Figure 2.2 Usumacinta Sites (After Anaya 2001:49)

trenches and detailed horizontal exposures of major buildings. Unfortunately, their work has never been completely published and some of the early published notes are out of print and hard to find (many now reprinted in Weeks et al. 2004). They did leave quite a body of material in preliminary form and short articles about their work (Anonymous 1932, 1933, 1934, 1935; Mason 1932a, 1938; Mason et al. 1934; Satterthwaite 1933, 1935, 1936a, 1936b, 1936c, 1937a, 1937b, 1938, 1940, 1941, 1943a, 1943b, 1946, 1954, 1965).

Despite the lack of comprehensive volumes about the excavations, many notable dissertations and theses were derived from the Piedras Negras material. Mary Butler published an early version of the ceramic material (1935), followed by William Coe's (1959) dissertation on artifacts and their contexts, and Ann Schlosser (1978) worked on the figurine collection. One of the most important works on the artifacts of Piedras Negras is George Holley's dissertation on ceramics (1983), using a type-variety approach. This work has established the chronology of the site, which formed the basis of understanding cultural change through time for the entire center. His typologies are now being modified by Rene Muñoz with the new information gathered by the Proyecto Piedras Negras.

Dissertations and theses are not the only sources of information on Piedras Negras. Many articles have been published on Piedras Negras, in particular its history as recorded by the Maya on stelae. Tatiana Proskouriakoff was a key figure in historicizing the center. Her work with the dates carved into the monuments led to the hypothesis that they recorded human life events and turned the Maya from esoteric astronomers into flesh-and-blood dynasties (see Proskouriakoff 1950, 1960). Prior to her discovery, published articles on the monuments of Piedras Negras focused on their calendrical information rather than on the unknown people who commissioned them (Andrews 1942; Beyer 1937, 1939a, 1939b, 1940; Ludendorff 1940; Shellhas 1934; Thompson 1943, 1944; Villacorta Calderon 1933a, 1933b). Now all of the known monuments from the site have been translated (Teufel 2004). Knowledge of the history of the area has already been used to create models of polity interaction and their shifting borders over time (Anaya 2001). Maya polities probably did not have rigid borders, their boundaries were generally more fluid encompassing social groups tied to the polity rather than strict geography (Webster and Houston 2003: 431).

The lack of focus on small structures is a major shortcoming of the Penn work. They ignored many small structures in their map-making, and excavated none. In their defense, this oversight was normal for the period; and they were planning on rectifying this error with future work (Weeks et al. 2004: 7, Footnote 4). Large structures, and especially complex architecture, were the chosen targets of early archaeologists in their search for impressive places. Only recently have humbler remains been given attention, as a needed counterpoint to the top-down reconstructions of past society.

PROYECTO PIEDRAS NEGRAS

Archaeological work at Piedras Negras ceased in 1939. World war, and then civil war in Guatemala made work in the area unfeasible. Once civil hostilities officially ceased in 1996, renewed interest in working at Piedras Negras became a reality with the advent of the Proyecto Arqueológico de Piedras Negras. This project, under the direction of Stephen Houston (then at Brigham Young University) and Héctor Escobedo (then associated with Universidad del Valle

de Guatemala) began in 1997 and concluded field operations in 2004. The project personnel conducted extensive large-scale excavations (Figure 2.3), placed test-pits throughout the site, and surveyed in its periphery in order to understand its formation and history in greater detail. The research interests were quite varied, but there were many over-arcing themes.

Mortuary Pyramids

The large pyramids of the Maya, like those of Egypt (Pratchett 1989), have always attracted attention due to their association with elite ritual and burials. Hector Escobedo investigated many of the pyramids with the hopes of correlating glyphic evidence of past rulers with their mortal remains. Burial 13, discovered in front of O-13, appears to the remains of Ruler 4. This axial burial had an abundance of jade and other offerings, as well as evidence of re-entry and post-mortem burnings. These features are mentioned in the epigraphic texts, like Panel 3, leading to a strong correlation between archaeological and written records.

In 1998, Hector Escobedo cleared the remaining architecture of O-13 (parts had been destroyed by J. Alden Mason) and cleaned the open trenches left by Penn excavations. Deep excavations at Piedras Negras are dangerous due to the loose rubble fill used to create the core of the buildings. Even with the use of scaffolding, it was too dangerous to really penetrate O-13 and many of the other excavations in pyramids could not be excavated to bedrock. A large cache of 129 eccentrics, along with items of jade, hematite, shell and animal skeletons was recovered from O-13.

R-5 was also excavated by Escobedo to find the burial of Ruler 1 as described on Panel 4, which came from the summit of the structure. Fine stucco heads were uncovered on the summit, one found by Penn and another by Escobedo's team. While the burial was not forthcoming due to the danger presented by the loose fill, several caches were discovered and Middle Preclassic sherds were recovered from deep units.

R-3 had been trenched by Penn, and in 2000 the trench walls were cleaned and drawn by Mark and Jessica Child. They extended the trench into Preclassic levels. The early stages of this building represent the earliest structures known in the region. Work during this season also included Escobedo's excavations into R-2 which had also been excavated by Penn, but apparently never documented. A limited excavation of R-16 and O-12 also helped date these large pyramids and recovered several caches.

R-8 was excavated by the Childs in 2000, with the hope of retrieving Early Classic material. Their excavation recovered the mortal remains of two individuals, one a probable Early Classic king, and the other a later sacrifice during a possible tomb reentry.

K-5 was the focus of excavations in 2004, with the eventual hope of uncovering a royal queen mentioned in epigraphic records. Despite widespread test pits in and around K-5, the burial was not found. These excavations documented the architecture of the pyramid, and found Early Classic structures (Balché ceramic phase) buried under the West Group Plaza.

Acropolis

Stephen Houston and Charles Golden directed excavations at the Acropolis, or palace area of the site. Court 3's excavation in 1997 uncovered early Classic buildings with a different orientation than the surface structures. Work during the 1998 season involved deep excavations within the courtyards, where disturbance to standing architecture was minimized. The Acropolis

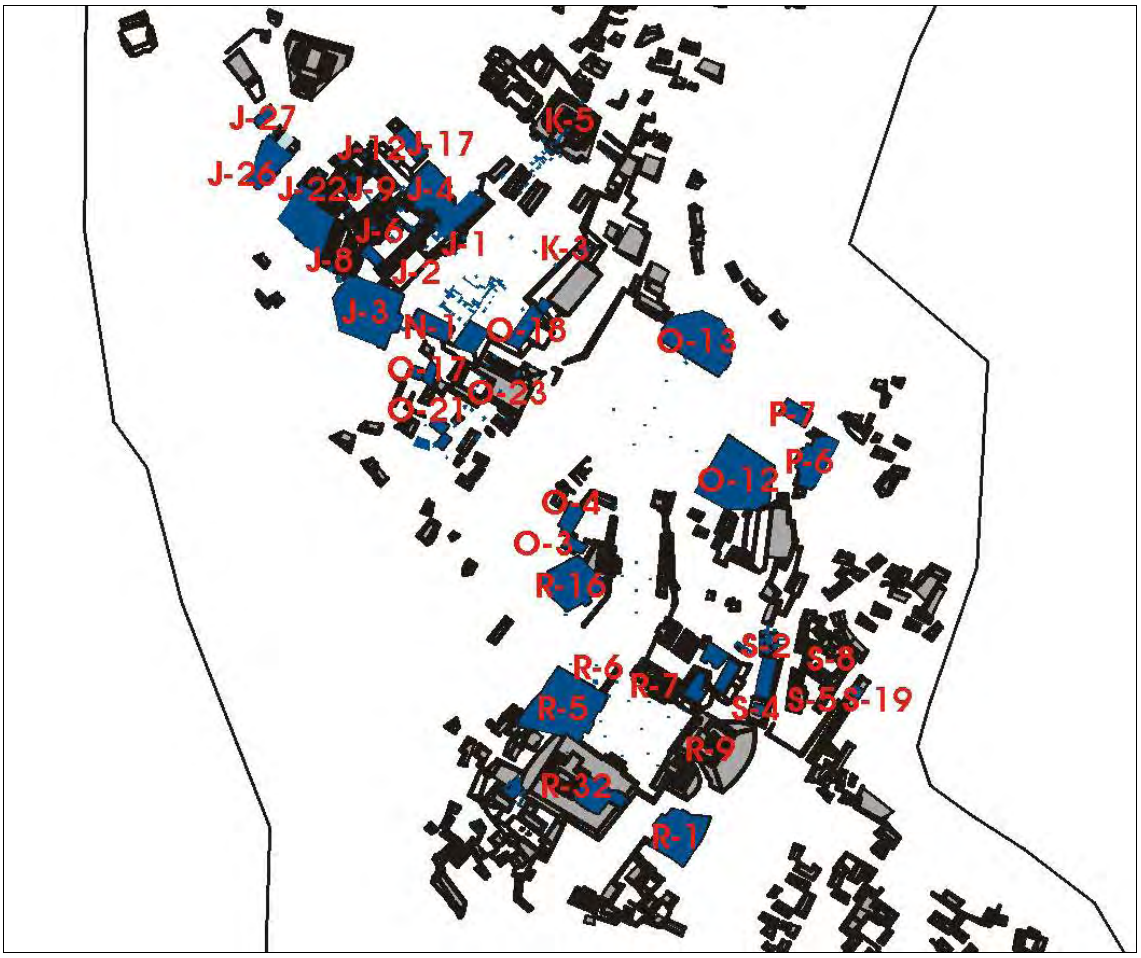


Figure 2.3 Epicentral Piedras Negras showing excavations

had a strong Early Classic component (Balché) that was comprehensively buried by the mass of Late Classic construction (Yaxché/Chacalhaaz). The 1999 season included the penetration of the J-1 platform upon which sit J-4, stelae 1-8 and J-7. Under this enormous plaza were the remains of several Early Classic structures with different orientations. The labor investment in the creation of J-1 and the rest of the Acropolis point to a new, massive architectural regime that united a series of independent structures into a huge conglomeration of palace space. Renovation continued throughout the history of kingdom, with different architectural styles replacing the Early Classic orientation.

Work during the 2000 season in the Acropolis focused on areas that had not been touched by Penn. Charles Golden and Fabiola Quiroa excavated residential terraces and mounds behind the Acropolis on the river side. Ernesto Arredondo and Stephen Houston excavated test pits in Court 1 (J-6, J-5), Court 2 (J-9, J-11, J-12, J-13) and the area around J-21, J-22 and J-23. The 2000 field season excavations of J-24, revealed an Early Classic component, and is posited to have been the Late Classic successor to the servant area. J-11 excavations revealed that the Court 2 orientation has remained unchanged since the Early Classic, despite the later Yaxché architectural shifts. A new panel, Panel 15, was discovered at the base of J-4. This comparatively

large panel was found face down in Ernesto Arredondo's excavations. The erosion on the panel indicates that it had been exposed to the elements for some time before the principal figure's face was vandalized, and the panel was loosened from the summit. The panel depicts Ruler 2's parentage, his accession to the throne, and his wars (unfortunately the details are too eroded on that part of the panel). The patron of the panel is Ruler 3, who perhaps had J-4 built to honor his father.

West Group

Lilian Garrido oversaw trenches placed in the West Group, at the foot of the Acropolis. Her excavations have uncovered vestiges of Early Classic buildings that had been leveled to create the West Group Plaza. These structures are believed to have been the palace during the Early Classic, before a shift upwards to the top of the hill occurred. The courtyards and buildings of the early complex were finely covered with plaster and the buildings seem to have been made of bajareque (waddle and daub). The remains of the buildings were used to level the plaza once the buildings were destroyed. This large destruction event occurred near the end of the Early Classic, but prior to the Balché ceramic complex.

James Fitzsimmons excavated in the N/O sectors of the map in an area believed to have housed the servants for the palace complexes. His excavations focused on N-7, N-10, and O-17. These excavations, while complex, did not settle the issue of building function. O-17 appears to have been an unfinished structure with a throne fragment mentioning Ruler 2. Further excavations by Fitzsimmons occurred in O-14, O-16, K-1, K-3, and K-7. K-3 housed the burial of a royal prince complete with 38 jade beads and disks, a Rain God scepter, and texts written on a stingray spine.

Sweat baths

Mark Child, with help from Jessica Child, excavated the sweat baths of Piedras Negras. His work concentrated on trench and horizontal exposures in and around J-17, N-1, O-4, P-7, R-13, S-2, S-4, and S-19 and ancillary structure O-3 and P-6. Ceramic dating of the sweat baths indicate that R-13 (Nabá) was followed by P-7 (Late Nabá/Early Balché), S-4 and S-2 (Yaxché), S-19 (Early Chacalhaaz) and J-17 (Chacalhaaz). Their architectural form is well-engineered, with fire boxes for heated rocks and drains for the water. P-7 even has a cistern on the building to collect rain water. A previously unknown sweat bath was found above a rural site by David Webster, in an overhanging limestone cavern. This ninth sweat bath was excavated by the Childs in 2000.

Residential Excavations

Each field season increased the number of individual test pits placed within the mapped area of Piedras Negras. These test pits form the core of this dissertation and their detailed descriptions are included in the Appendices. Excavations of house mounds within Piedras Negras also form an important part of the project and their descriptions are provided in chapter 5 and the Appendices as well.

Residential excavations not discussed in this dissertation include the C-13 patio group that yielded the burial of a sajal along with an eroded text. Excavations in this area were directed by Alejandro Gillot, Zachary Hruby, Sarah Jackson, and Rene Muñoz over two field seasons.

This group is interesting due to its long history (Early Classic to Late Classic) and the evidence of shifting use and space. Enigmatic deposits of clay figurines, burials, and caches point to different functions that a single structure may encompass.

Periphery

Jennifer Kirker, Amy Kovak, and David Webster surveyed 3-4 square kilometers outside of the core zone of Piedras Negras. They documented 85 sites with a total of 254 structures to the north and south of Piedras Negras. With help from Timothy Murtha, they later excavated 27 test pits in 19 of the newly discovered mounds. An important finding of the survey was the lack of extensive agricultural terracing or related features in the region. Much of the surrounding settlement also appears to date to the Late Classic period (Yaxché and Chacalhaaz ceramic phases) but deep excavations by Dave Webster and Kovak found at least one rural site with Balché materials. Excavations under the direction of Webster and Kovak horizontally stripped five mound groups lying to the south of the center (Figure 2.4). These mounds were all in the same valley, and may have formed their own "neighborhood" or community.

Artifacts and Burials

Individual specialists are also evaluating the material collected during the project. Arturo René Muñoz (University of Arizona) is writing his dissertation on the ceramics of Piedras Negras. Zachary X. Hruby (University of California, Riverside) is studying the lithics for his doctoral thesis. Figurines will be written up by Rhonda Taube. Burials have been examined by Andrew Scherer (now at Wagner) and Lori Wright; and the faunal remains are in the very capable hands of Kitty Emery.

Soil Survey

Richard Terry, J. Jacob Parnell, Fabián Fernández with the assistance of Joshua Andersen (2000), Benjamin Crozier (1999), Emily Elmer (1999), Perry Hardin (1997), Christopher Jensen (2000), and Nicholle Townsend (1998) applied field techniques for rapidly detecting chemical concentrations of phosphorus in soil samples to select areas. Phosphorus is a necessary chemical for plant life, and can be found in concentrated patches where food remains have decayed. Test pits placed in areas tested to be high in phosphorus yielded high quantities of ceramics and other midden material, thereby aiding archaeological research on the chemical level. Soil profiles were also excavated both within and outside of the center to facilitate our understanding of the agricultural practices of the ancient Maya.

Consolidations

A standing sweat bath (P-7), a possible mortuary pyramid (K-5), and parts of the Acropolis were consolidated during the project. The contract with the Guatemalan government required 20% of each season's funds to be spent on reinforcing standing architecture at the site. These buildings had their walls and staircases renewed with new mortar and stones where the originals were degraded. Buildings were not reconstructed, for their original lines were often unknown, but standing architecture was reinforced. The sweat bath, in particular, was so well renewed by the consolidation work that we fired it up on several occasions during the project.

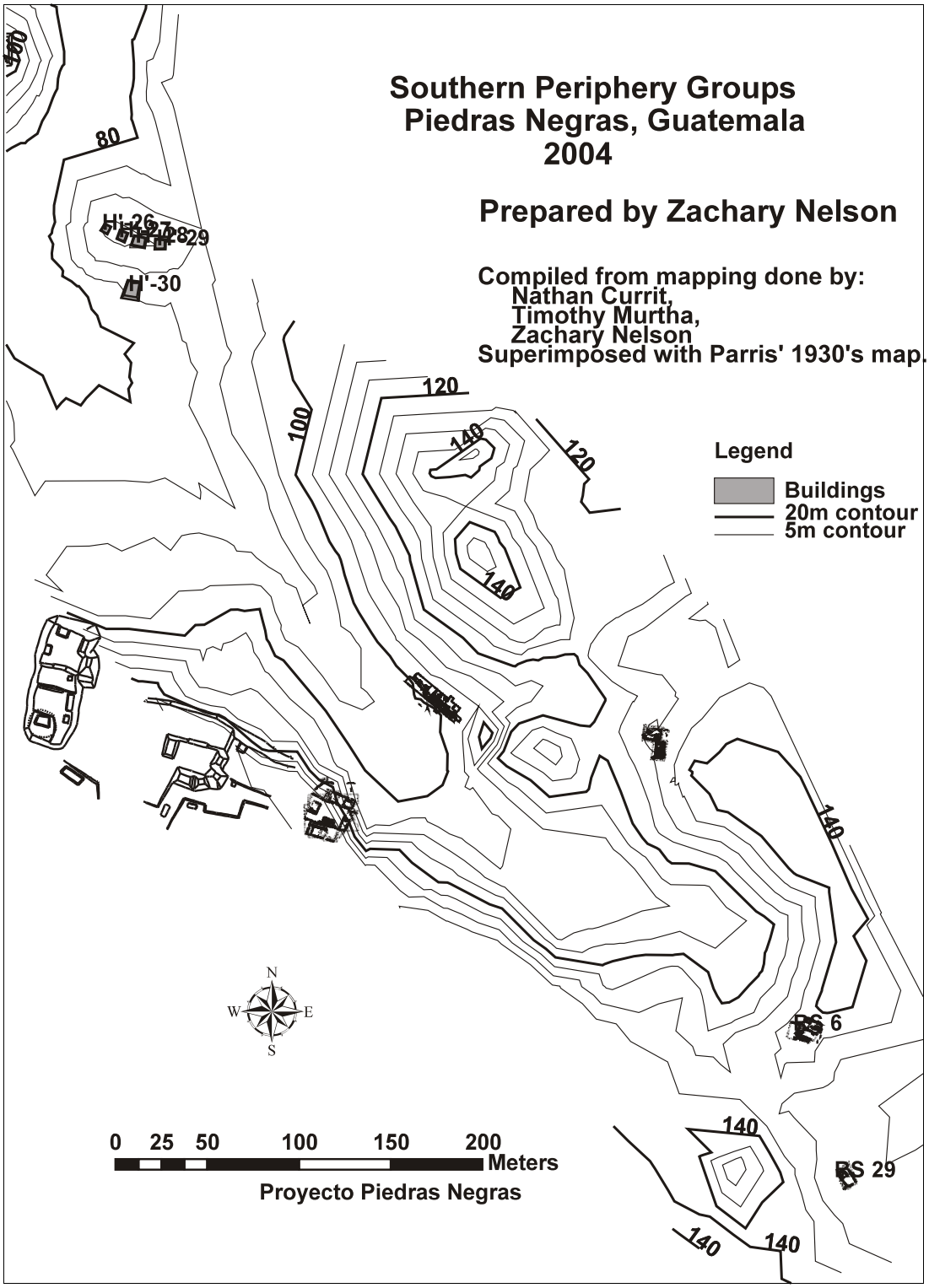


Figure 2.4 Periphery excavations

Results

Excavations in the site core focused on the acropolis, mortuary temples, non-royal elite groups, sweat baths, and the more modest homes of the local elite (see Escobedo and Houston 1997-2000 for detailed descriptions; see Houston and Escobedo 1998; Houston et al. 1998, 1999, 2000 for individual field season summaries). In addition, surveys extended the site map beyond the confines of the site-center and into the heavily populated "sub-urban" zones surrounding the monumental architecture (Nelson 1999). Peripheral survey, chemical soil signatures, and household excavations added another dimension of information about the area.

PUBLIC LIVES OF THE TURTLE LORDS

While archaeology has enhanced our knowledge of the material remains of Piedras Negras, the historical inscriptions of the center allow its rulers to speak on their own behalf. Enough inscriptions have been uncovered to provide an extensive look into the lives of the Turtle Lords (a title used by many of Piedras Negras's rulers). The biographical sketches of the rulers provided below are not meant to be exhaustive because other recent works have explored their lives in detail (Martin and Grube 2000, Teufel 2004). The purpose of these sketches is to provide context into the rise and waning of the center's fortunes by tying the activities of its leaders to the archaeological evidence recovered from the area (Table 2.0).

Ancient Maya social structure is still not fully understood. Hieroglyphic texts show gradations between titles that represent differences in status or social structure (Lucero 1999). At the top of ancient Maya society is the K'uhul Ajaw or Holy Lord. He is the king of the polity (Matthews 1991) and the most often mentioned figure on monumental architecture. He combines both political and religious functions into one person (Houston and Stuart 1996) and is endowed with more "essence" than others within the polity (Houston and Stuart 2001) reminiscent of Hawaiian chiefs. Kings are also "other" in the sense of possessing connections with foreign gods or attributes (Stone 1989, Stuart 2000). Subordinate to him are other ajaws or lords. These may be leaders within the community, such as heads of other lineages or children of the king. The heir to the throne is the cho'k ajaw or youthful lord. This title is known from monumental art, even if the heir does not assume the throne. Royal women are referred to as ix-ajaw or female lord (Wagner 2003). They are generally portrayed, if at all, as behind the scenes participants in rituals (Reents-Budet 1994); except at rare cases where royal women commissioned sculpture and were commemorated in their own right (YAX Lintel 24, 25, and 26).

Beneath the ajaws are the sajals, often glossed as lieutenants. Sajalob (plural) are portrayed as great warriors and govern outlying areas within the polity. Other titles include ba-sajal or head sajal, which indicates that sajalob were organized along a hierarchy within a polity. Sajalob might have nominally govern a portion of the polity, but that does not mean that they were far from the politics of courtly life, or that they did not have a domicile or land holdings within the capital. The extent of the Piedras Negras polity was roughly a 40 kilometer radius around the center. This distance could have been walked in a couple of days. The most active border of the kingdom was much closer to the capital (the southern border with its interface with Yaxchilán) and communication between the "boundary" and Piedras Negras would have been easier and probably frequent. Sajal and ajaw were not rigid titles. An individual could assume

both titles, probably depending on circumstance, social position, social status, and a host of unknown variables.

There are other titles mentioned in hieroglyphic texts, referring to scribes (Coe and Kerr 1997, Jackson and Stuart 2001), musicians, priests, sculptors and other as yet undeciphered offices. These are associated with the activities of the king, but their relationship in any kind of hierarchical schema is that of subordination to the ruler. These lesser titles probably include individuals who associated with the royal family on occasion, but who might not live in close association. Palace courtiers and minor officials might also be included in this category (Clark and Houston 1998).

The presence of titles in ancient Maya texts indicates a general range of social tiers or specific positions. One theory of Maya society is based upon a simple dichotomy between elites and non-elites (Chase and Chase 1992 for discussions of elite theories). Elites are the rulers and prominent people in society who lived in large houses, possessed fine material goods, had large quantities of possessions and generally ruled society. Elites oversaw the administrative functions of life. Non-elite society consists of the simple farmers in small buildings who supported the elites. This dichotomy does not seem reasonable given the variations that are present in size, shape, artifact quantity, artifact types, and architecture elements that are present in Maya centers. While there are definitely differences between structures and patio groups, a simple either/or explanation does not fit the available facts (Houston 2000: 164).

Mythic Time (Before 400 AD)

Piedras Negras Rulers, like many other Maya kings or "ajaw", claim to have first inhabited the area millennia ago. Retrospective dates on the Late Classic Altar 1 assert that the first king ruled in 4691 BC, and another at 3114 BC (Martin and Grube 2000: 140). These dates are considered "mythic" rather than historical, and probably represent attempts by Late Classic kings to establish their right to rule by linking themselves to prior creation events. Another date on the same altar mentions an early king at 297 AD (8.13.00.00.00), which might be closer to historical reality (Martin and Grube 2000: 140). A Piedras Negras king is mentioned in Yaxchilán texts (Lintel 11, Hieroglyphic Staircase 1-I) as a visitor during the enthronement of Yoaat Balam I in 320 AD. Yaxchilán lies about 40 kilometers upstream from Piedras Negras, and is the main challenger to Piedras Negras's control of the Usumacinta (Figure 2.2).

Table 2.0 Ruler Correlated with Ceramic Phase

AD	*Piedras Negras King*	*Ceramic Phase**
		Hol (600-300 BC)
		Abal (300 BC-175 AD)
		Pom (175-350 AD)

AD	*Piedras Negras King*	*Ceramic Phase**
ca. 423-454	Ruler A	Nabá (350-550 AD)
ca. 454-508	Ruler B	
510-?	Turtle Tooth	
514-518	Ruler C	
518-529?	Unknown	
529?-561	Ruler D	
561-603	Unknown	Balché (550-625 AD)
603-639	Ruler 1	
639-686	Ruler 2	Yaxché (625-750 AD)
687-729	Ruler 3	
729-757	Ruler 4	
758-766	Ruler 5	Chacalhaaz (750-825 AD)
767-780	Ha' K'in Xook	
781-808?	Ruler 7	
		Kumché (825-900/1000 AD)

*Ceramic Phases were developed by Holley (1983) and are being further refined by Rene Muñoz at the University of Arizona.

Early Rulers (400 - 600 AD)

The next known rulers are also featured on lintels from Yaxchilán. This inauspicious beginning is almost prophetic, because the last ruler of Piedras Negras is also known from Yaxchilán inscriptions. Ruler A (K´an-Ahk "A", ruled ca. 423-454 AD, see Table 2.1) from Piedras Negras is only known due to interaction with Moon Skull of Yaxchilán (Lintel 49). Likewise, Ruler B (K´an-Ahk "B", ruled ca. 454-508 AD) lost a sub-lord to Bird-Jaguar II during another altercation between these two centers (Martin and Grube 2000: 141). While the text is sketchy, it does appear that Piedras Negras was independent of Yaxchilán at this time (Teufel 2004: 83). Regional events include a visit of Tikal personages to Yaxchilán (07 Aug 504) and Yaxchilán's extension of its influence over Bonampak (Figure 2.5).

Table 2.1 Early Classic Rulers

Actual Name	Name from Schele 1991	Name from Montgomery 1994	Name from Martin and Grube 2000
Early Ruler ca. 297 AD (Alt. 1)			
K´an-Ahk "A" ca. 423-454 AD (YAX, Lintel 49)	Turtle Shell	Ruler B/"Turtle Shell"	Ruler A ?[K´AN]-AHK
K´an-Ahk "B" ca. 454-508 AD (YAX, Lintel 37)	Turtle Shell	"Turtle Shell"	Ruler B ?[K´AN]-AHK
Ya-T859-Ahk ca. 510 AD (Panel 2)	Ah Cauac K´in	Ah Cauac Ah K	Turtle Tooth ya-? a-ku
Ruler "C" ca. 514-518 AD (Panel 12, Alt. 1)	Ruler C	Ruler C	Ruler C
Ruler "D" ca. 529?-561 AD (Panel 12)	Ruler D	Ruler D	

Adapted from Teufel 2004: 78

Turtle Tooth (ya-? a-ku) reigned for an unknown amount of time around 510 AD. He is the first known Lord of Piedras Negras to use the title k'in ajaw or "Sun Lord," a phrase almost synonymous with Piedras Negras kingship. His reign is interesting for two main reasons. One, it further depicts the bellicose nature of interaction between Piedras Negras and Yaxchilán (Knot-eye Jaguar I captured a lord under him). Second, there is evidence that Piedras Negras was subordinate to an outside political power (Anaya et al. 2001, Zender and Guenter 2002, Martin and Grube 2000: 141, Teufel 2004: 85). Panel 2 shows Turtle Tooth receiving a ko'haw, or Mexican style helmet, overseen by a foreign king, Tajoom Uk'ab' Tuun with Teotihuacán and Calakmul connections. The exact nature of their relationship is hard to understand, but Teotihuacán imagery on later monuments indicates a familiarity at Piedras Negras with Teotihuacán design and costumes, and that relationship continues into the reign of Ruler C. The fascination with Teotihuacán imagery and symbols within the Maya realm has always generated interest among scholars (see Braswell 2003 for some excellent summaries). While the true nature and extent of the interaction may never be known, I think that part of the fascination may be attributable to the sheer size of Teotihuacán. A Piedras Negras ruler during the Early Classic probably reigned over 5,000 people, including the rural population (see Chapter 7). Teotihuacán would have seemed very urban, and very powerful to the Maya with its tens of thousands of inhabitants.

Ruler C (ca. 514-518 AD) is best known from Panel 12, a contemporary monument showing him standing in front of four captive kings from nearby centers. Knot-eye Jaguar I of Yaxchilán kneels in the company of a lord from Wa-Bird Site, with perhaps a lord from Bonampak and another center. Martin and Grube make the case that Ruler C is performing a scattering ritual as the vassal of another king (2000: 141) who they identify as Tajoom Uk'ab' Tuun, perhaps of Calakmul. Whatever the relationship, Piedras Negras at this time was carving out a name for itself among the other minor polities of the Usumacinta drainage.

Ruler D (ca. 529?-561 AD) is described in Teufel (2004: 91-94), but not in Martin and Grube. The evidence for Ruler D is scant. There are a couple of stela fragments at Piedras

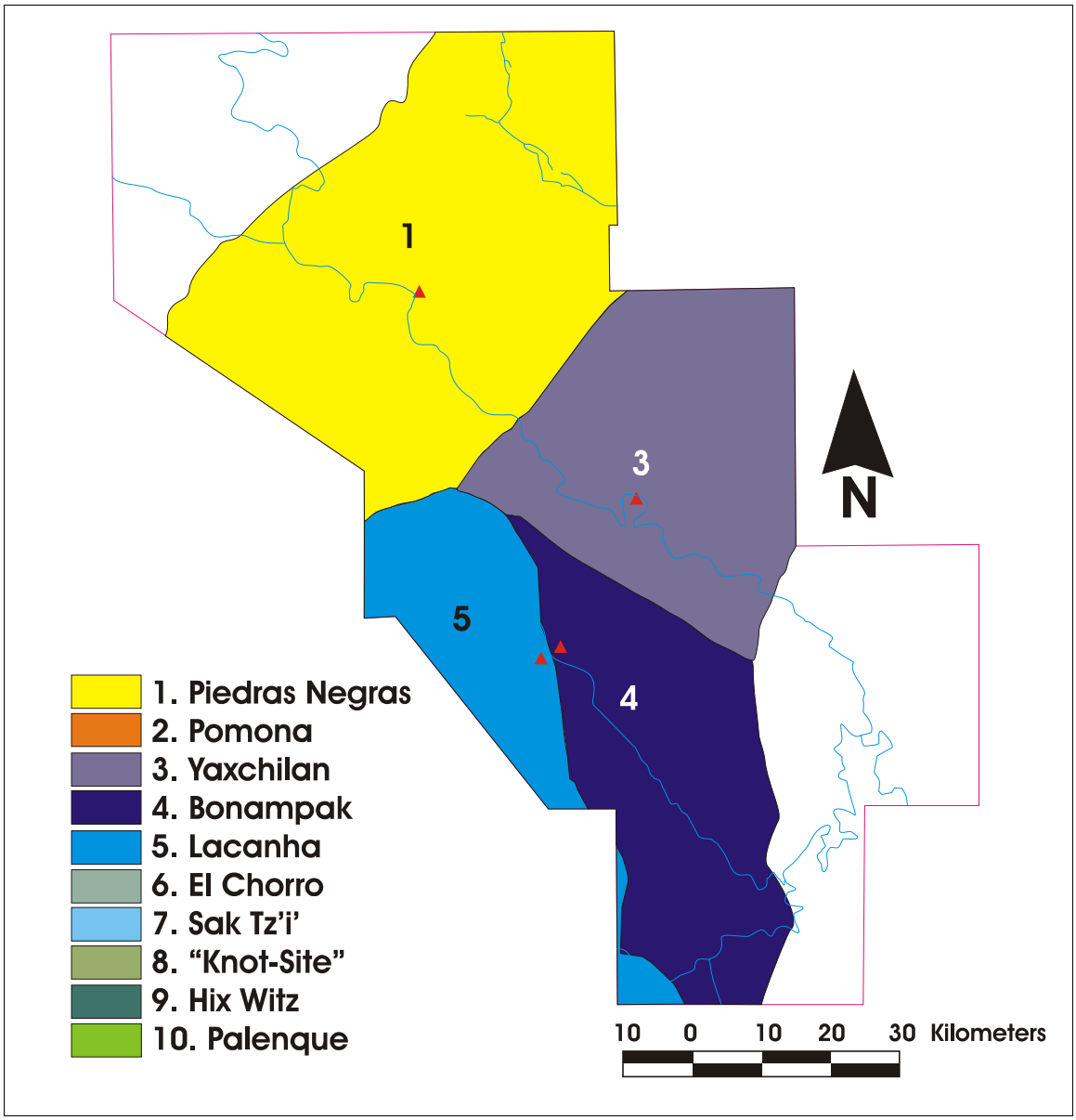


Figure 2.5 Usumacinta Polities AD 416-537 (After Anaya 2001:62)

Negras with a partial name of a ruler, and references from Pomoná of tribute passing hands during this time period. The paucity of dates from this period may indicate political setbacks rather than a disinterest in stela erection. Stela 12's reference to Piedras Negras paying tribute to Pomoná corresponds closely with the end of the Nabá ceramic phase and widespread destruction of the early Acropolis and the Early Classic West Group palace complex (Houston et al. 2001). If Piedras Negras were despoiled by enemies at the end of the Nabá period, then the subsequent drop in settlement during the Balché phase (see Chapter 7) takes on new meaning as subsequent rulers strove to turn the center from memory of its defeat into a royal center (Golden 2002:355). It is quite likely that the destroyed royal palace was not renewed for several decades (Houston et al. 2001), leaving a visual reminder of the desecration of the center, and providing an impetus to rebuild.

Late Classic Rulers (600 - 800 AD)

After Ruler D, there was a hiatus in monumental sculpture, then an unbroken series of Holy Lords ruled at Piedras Negras for the next two hundred years (Table 2.2). This well-documented series of kings creates a detailed view of the Late Classic confrontation and challenges to Piedras Negras's rule on the Usumacinta.

Table 2.2 Late Classic Rulers

Actual Name	Name from Proskouriakoff 1960	Name from Houston 1983	Name from Martin and Grube 2000
Ruler "1" (603-639 AD) K´inich Yoonal Ahk	Ruler 1	Ruler 1	Ruler 1 K´inich Yo´nal Ahk I
Ruler "2" (639-686 AD) Moo ?Ha-Chak K´an-Ahk	Ruler 2	Ruler 2	Ruler 2 ?CHA:K ?- [K´AN]AHK
Ruler "3" (687-729 AD) K´inich Yonal Ahk	Ruler 3	Ruler 3	Ruler 3 K´inich Yo´nal Ahk II
Ruler "4" (729-757 AD) T267-Nal Ahk ?Ek´-Ha K´an-Ahk	Ruler 4	Ruler 4	Ruler 4 ?-na-a-ku ?-HA´? ?[K´AN]AHK
Ruler "5" (758-766? AD) ?Ik´ Nah Chak-T1080 Yoonal Ahk	Ruler 5	Ruler 5/6	Ruler 5 Yo´nal Ahk III
	Ruler 6		
Possible Ruler "6"? (766?-767? AD) [---]-K´an-Ahk			

Actual Name	Name from Proskouriakoff 1960	Name from Houston 1983	Name from Martin and Grube 2000
Ruler "6" (767-780? AD) Ha K´in Xok			Ruler 6 Ha´ K´in Xook
Ruler "7" (781-795? AD) Aj Hun-T29:563b Nak K´inich Ya-T1083	Ruler 7	Ruler 7	Ruler 7 AJ-1-?-na-ku K´INICH-ya-[?]AHK

Adapted from Teufel 2004: 95

Ruler 1 (K'inich Yo'nal Ahk I; ruled 603-639) harkened back to Teotihuacán in his stela representations. He is often portrayed wearing a Teotihuacán War Serpent costume (Martin and Grube 2000: 142) as his captives kneel by his feet. Another motif in his art is that of "niche" scenes in which the Holy Lord sits on an elevated throne surrounded by the heavens. The pictorial niche is cut into the stela and ringed with the ruler's exploits. Although there is no recorded birth date for Ruler 1, because he died as a 2 Katun Ajaw (meaning he survived into his second twenty year period of life) his birth can be placed between 580 and 600 AD, but he was probably born closer to 600 AD (Houston et al. 2000). Either date implies that he began ruling as a young man, and spent most of his life as the Holy Lord of Piedras Negras. Ruler 1's parentage is also unknown, although his mother may have come from Hix Witz (Teufel 2004:98).

Ruler 1 ascended to the throne of Piedras Negras on 9.08.10.06.16 (14 November 603). His reign is generally uneventful. He celebrated the period endings with monumental sculpture, and the only captives identified with his reign include K'ab' Chan Te' who was a lord (ajaw) of Sak Tz'i', and Ch'ok Balam, an *aj k'uhuun* of the K'ul Ajaw of Palenque both pictured on Stela 26 (dating to 11 November 624). He was probably responsible for maintaining the South Group Plaza area as a ritual focus of the center rather than the defunct Early Classic version of the Acropolis (Golden 2002:365). Ruler 1 died on 03 February 639 and he was buried in R-5 shortly thereafter. Regional events during the reign of Ruler 1 include Bonampak winning a war against Lacanha (22 Sep 614) and a fight between Palenque and Pomoná (04 Apr 611)(Figure 2.6).

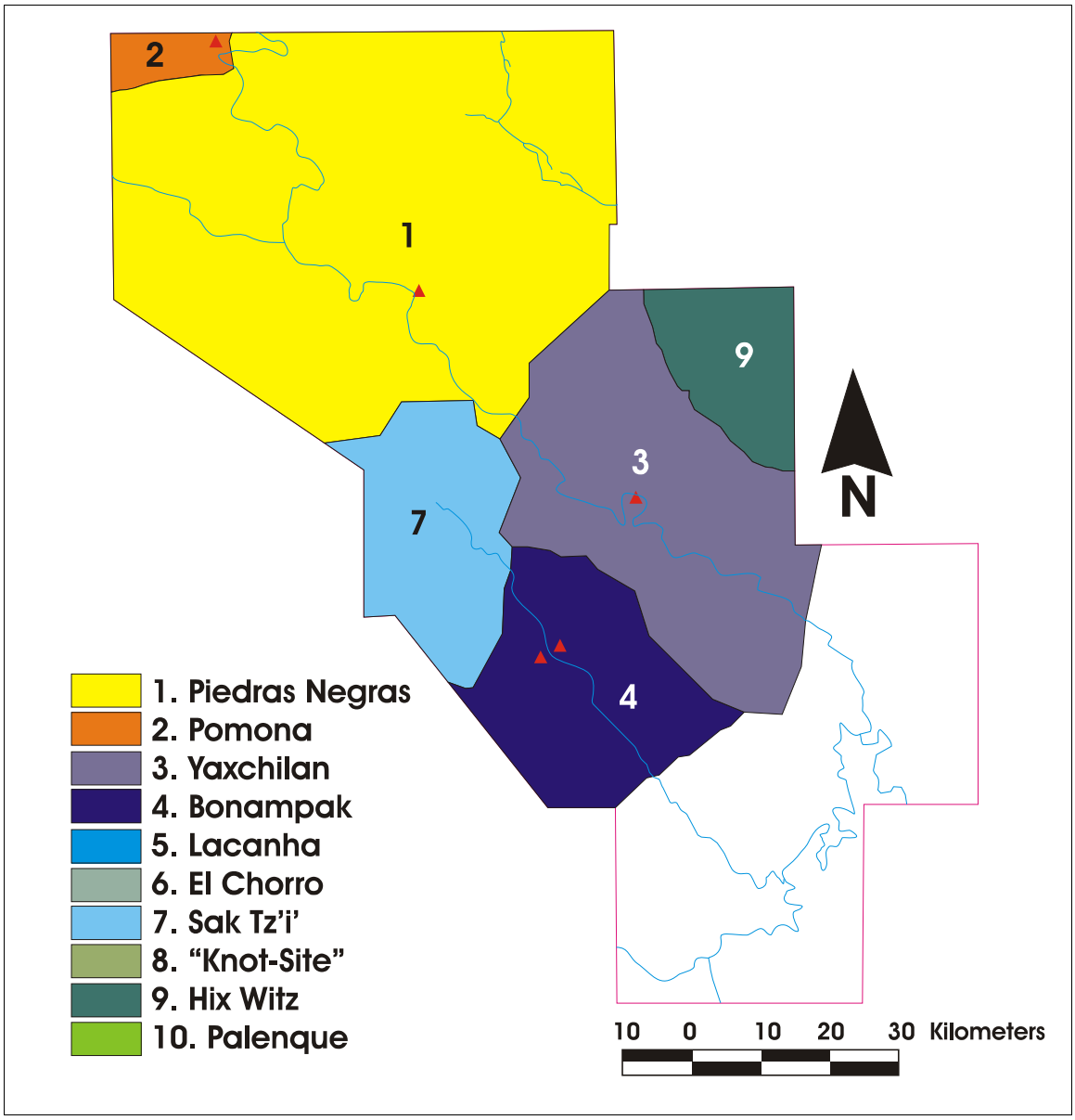


Figure 2.6 Usumacinta Polities AD 599-624 (After Anaya 2001:65)

Ruler 2 was the son of Ruler 1. He was born on 9.9.13.4.1 6 Imix 19 Sotz´ (22 May 626 AD) to "Lady Bird Headdress" from Hix Witz (Teufel 2004:109). He ascended to the throne of his father on 12 April 639 and reigned until his death on 15 November 686. He had two wives, one named Sak Moo ("Lady White Bird") and another whose name is yet undeciphered inscribed on Stela 33, G3-4 (Teufel 2004: 110). Important events during the reign of Ruler 2 include receiving a ko'haw in 667, much like Turtle Tooth received years earlier. Panel 2 captures the moment with six youthful from Lacanha, Bonampak, and Yaxchilán kneeling in front of a Piedras Negras Lord, probably Turtle Tooth and an heir. This image may represent a hearkening

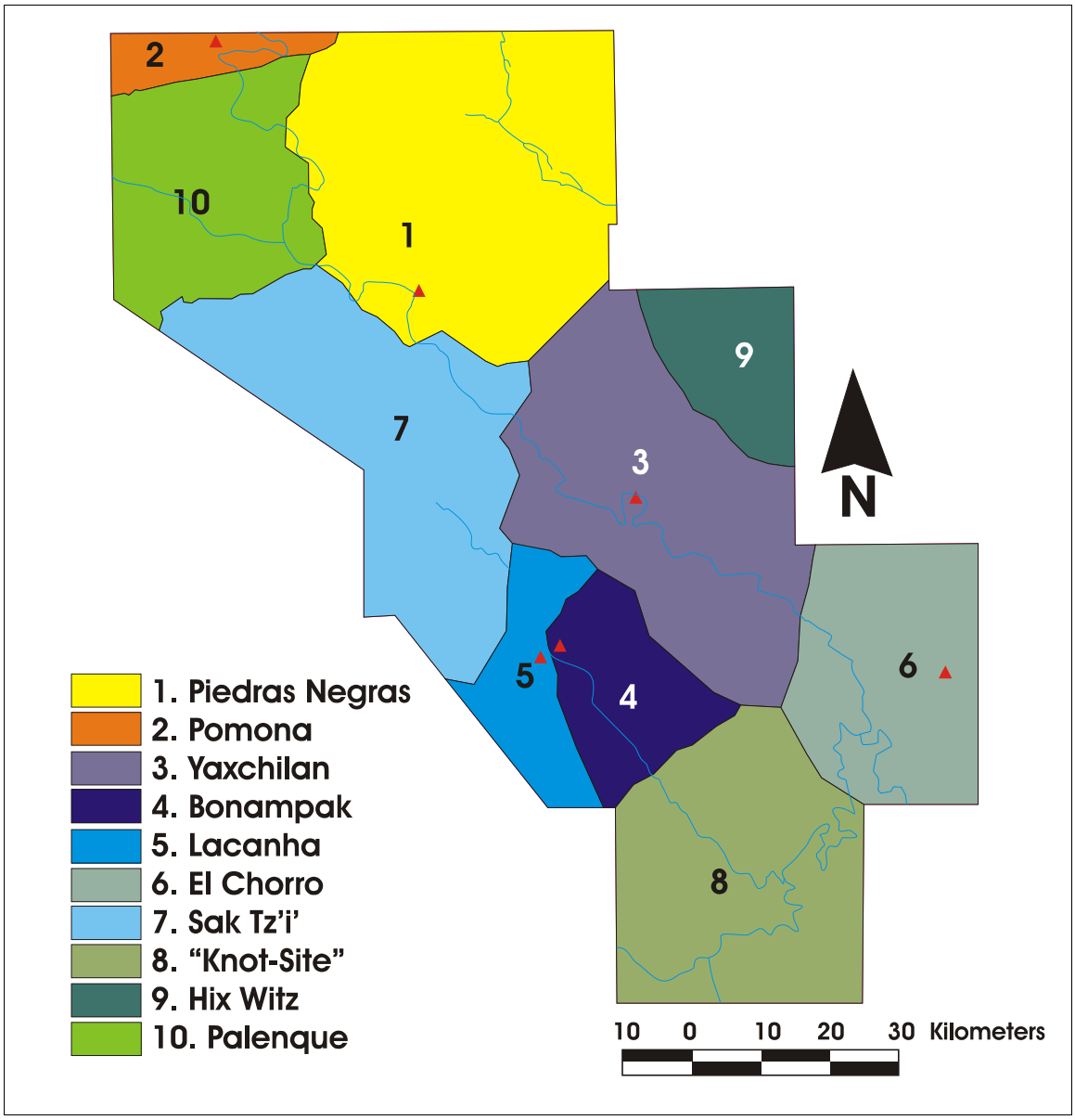


Figure 2.7 Usumacinta Polities AD 641-669 (After Anaya 2001:69)

back to the glory days when all of the Usumacinta basin was under the control of Piedras Negras; or it might represent an idealized power structure that is being put into place by Ruler 2. Calakmul is somehow involved in the ceremony as the giver of the helmet, suggesting that Piedras Negras joined its confederacy (Martin and Grube 2000: 144). That relationship was probably re-ratified, or formalized, in 685 with the presentation of the ko'haw helmet as recorded on the Hellmuth Panel.

Calakmul's interest in the region is easy to understand. Tikal was extending its reach into the area via Palenque, and so Calakmul needed to create support in the region to foil Tikal's

forces. I imagine that when the war palanquin of Itzam Balam III of Palenque was captured by Nu-Bak-Chak, the Holy Lord of Tikal on 07 August 659 (Anaya 2001), that Calakmul began preparations to include Piedras Negras in its alliances. Stela 35 hints at a fire ritual involving a Calakmul personage on 9.11.09.08.06 (10 February 662), just a few years later.

Ruler 2 was also successful in warfare. Together with Lord K'ab Chan Te of Sak Tz'i', he skirmished against the Rabbit Stone place in 641 AD. Then, in 648 AD he "led" his forces against an as yet unknown site. Other battles during his reign included one against the "Wa-Bird-Site" (662 AD), which resulted in a captive, perhaps female. He also had a war in 669, perhaps against El Cayo, resulting in more captives and an important subsidiary site (Anaya 2001). He also received tribute from the Lord of Hix Witz (Panel 7) indicating that the Piedras Negras polity was quite vibrant (Figure 2.7). His domestic activities included rebuilding the Acropolis as he shifted emphasis away from the South Group to his new palace structures (Golden 2002:367). The monumental architecture in and around the J-sector were a tribute to his ability, and his son's ability, to mobilize labor and materials while maintaining the safety of the center. His building program consisted of entirely new architecture built over the remains of the Early Classic palace complex. Ruler 2 did not just build a new palace, he reconfigured the royal court design with a complete break from prior architecture (Golden 2002:355). The West Group Plaza was also remodeled during his reign with an emphasis on K-5 and its adjoining structures. Stelae involving Ruler 2 were placed in and around R-5, K-5, K-6, J-4 and O-13. Just before his death, he supervised a prenuptial ceremony involving a princess from Naaman, K'atun Ajaw, and his son Winik-Balam.

Regional events during the life of Ruler 2 demonstrate the volatile nature of life along the Usumacinta. Sak Tz'i' warred with Bonampak and Rabbit Stone (La Mar) from 14 - 17 April 641 (with Ruler 2's help). Yaxchilán's Lord Yaxun-Balam III captured the Lord of Hix Witz on 30 July 647. Palenque captured a Pomoná Lord on 7 August 659. Yaxchilán's Lord Itzam-Balam III captures a Lord of Maan on 22 February 681 AD. Finally, new Holy Lords acceded to rule Palenque (due to the death of Hanab-Pakal), and Bonampak just three years prior to Ruler 2's death at the age of 61 (Arroyo 2001). The presence of Panel 15 in front of J-4 suggests that Ruler 2 was interred there.

Ruler 3 (K'inich Yo'nl Ahk II) was born on 29 December 664 (9.11.12.07.02) to Ruler 2 and Lady White Bird. He married Lady K'atun Ajaw of Namaan five days after his father's death (Martin and Grube 2000: 145). He acceded to the throne on 2 January 687, taking his grandfather's name as his own. The reign of Ruler 3 appears to be one of limited power (Martin and Grube 2000: 146). The line of stela he caused to be erected in front of J-4 reflect quarter K'atun intervals rather than grandiose personal deeds. Further monumental architecture and remodeling episodes of the Acropolis also took place (Golden 2002:368, Houston 2004). He also took a second wife, a woman from Palenque, just shortly before his death. The actual date (and circumstances) of his death are unknown, but Ruler 4 acceded to the kingship in November of 729.

Despite being perceived as a weak lord, Ruler 3 does portray himself with captives on some of his stelae (4, 7, and 8) and he "captured" a sajal under Itzamnaaj Balam III of Yaxchilán in 726 AD. He also supervised the installation into office of another sajal named Chak Tok' Tun in 697 AD. If Ruler 3 was not busy making war, then the other polities nearby made up for it

during his reign. Itzam-Balam II was very busy expanding his domain with captives taken from several unknown sites in 710, 713 (Buk-Tun), 725 (Site R?), and 729 AD (Lacanha). Yaxchilán apparently lost an ajaw to Dos Pilas in 723 AD. Tonina captured a Palenque lord in 711 AD, only to be subservient to Bonampak in 715 AD (Anaya 2001). These events demonstrate that war was a constant part of the cultural milieu within the Usumacinta region. Structures associated with Ruler 3 include J-4, J-5, O-12 and R-5. He was buried in Patio 1 of the Acropolis in front of J-3 (Burial 5). His burial in a patio rather than under a mortuary pyramid may reflect some kind of political instability in the royal lineage (Houston 2004) (Figure 2.8).

Ruler 4 was born on 9.13.9.14.15 (18 November 701 AD). The names of his parents are

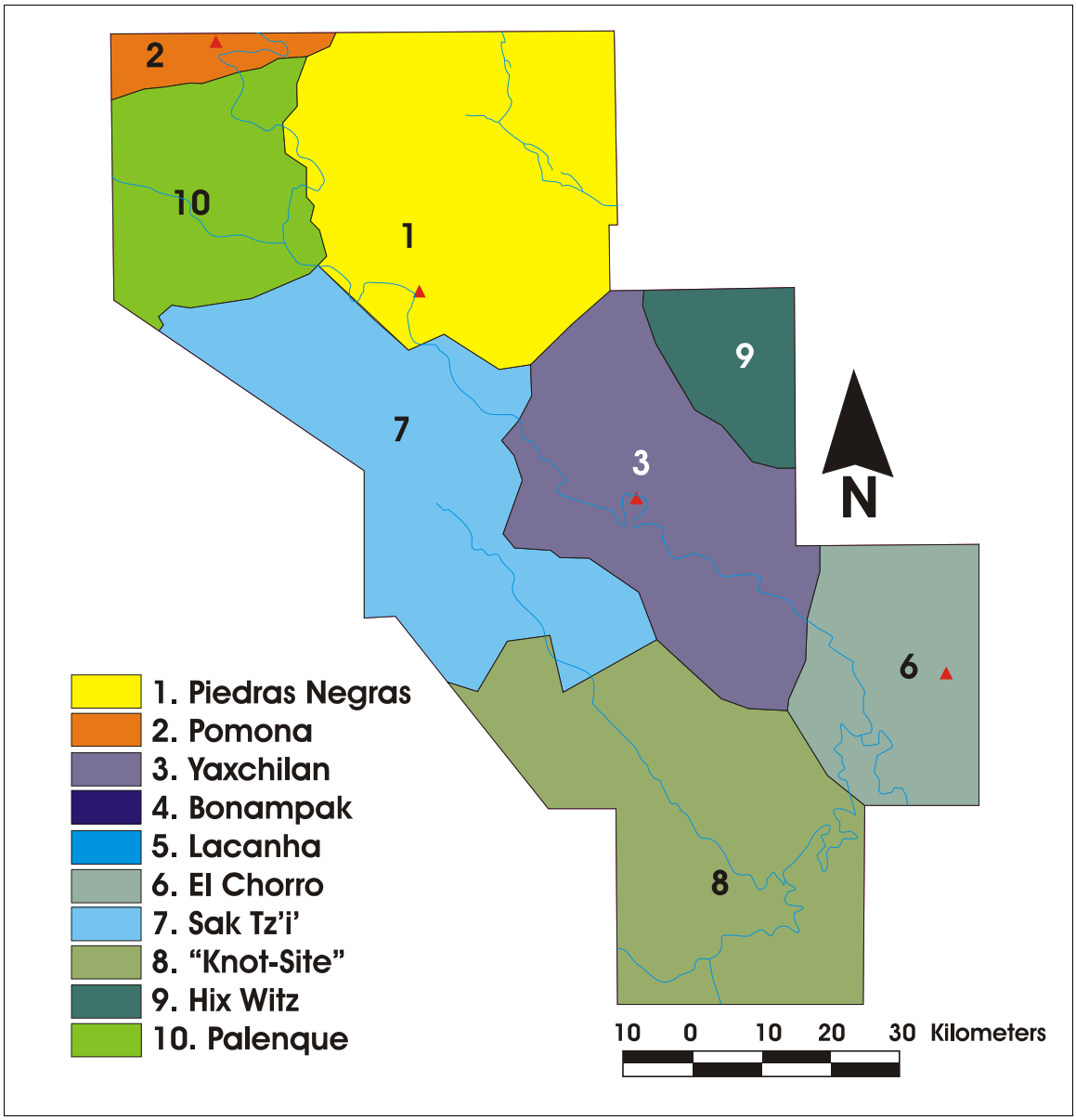


Figure 2.8 Usumacinta Polities AD 669-722 (After Anaya 2001:74)

still unknown, although there is a monument showing Ruler 4 scattering copal to his deceased mother , who is dressed in Teotihuacán clothing, on 9.15.14.09.13 (25 December 745, Stela 40). The sudden appearance of Ruler 4 in the dynastic records might indicate that with the death of Ruler 3 and no apparent male heirs, the office of king shifted to another bloodline. Ruler 4 acceded to the Holy Lordship on 9 November 729 AD. During his reign which lasted 28 years (he died on 26 November 757), few wars were mentioned on the stela and only a single captive is shown on one of his stelae (9). Unlike some of his predecessors, Ruler 4 did not actively expand the polity. His relationships with his sajalob in surrounding sites seem to have been maintained. Both Rabbit Stone (La Mar) and El Cayo sajalob are presented on stela. However,

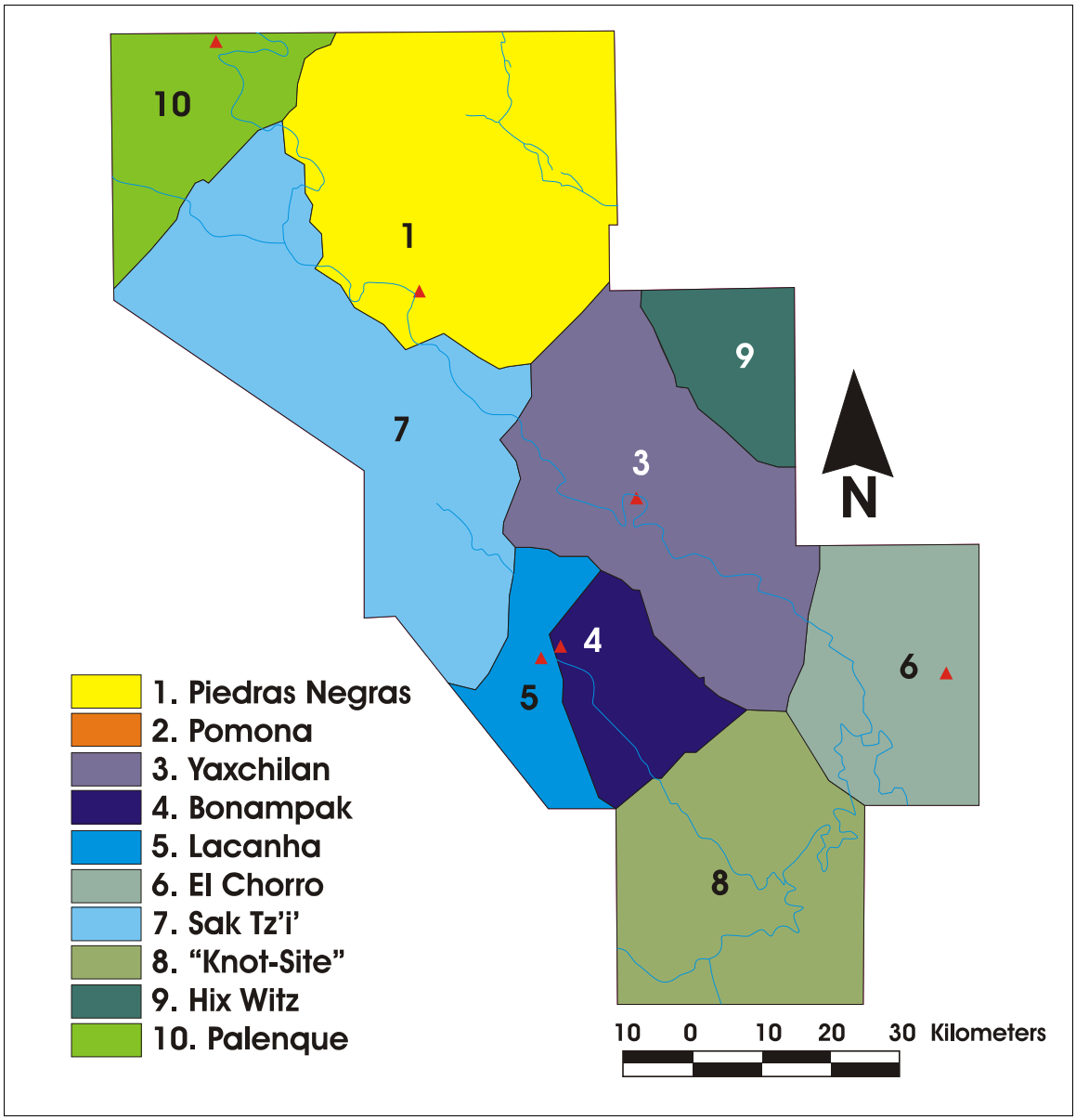


Figure 2.9 Usumacinta Polities AD 750-759 (After Anaya 2001:76)

Panel 3 does portray Ruler 4 as an active leader. This panel shows Ruler 4 (as portrayed retrospectively by Ruler 7) as hosting dignitaries from around the region for his first K'atun celebration as ruler in 749 AD. Although many of the names have been lost, visiting rulers included a group from Yaxchilán.

Other regional activities during the reign of Ruler 4 include a Hix Witz lord visiting Yaxchilán and taking part in rituals there (Ruler 4's burial included a pyrite disk with an incised head of a Hix Witz lord). Copán established a marriage allegiance with Palenque. Calakmul oversaw vision serpent rituals at Yaxchilán. Yaxchilán sacrificed a Lakamtun lord. Dos Pilas captured a Yaxchilán ajaw. Pomoná might have been under the thumb of Palenque. Yaxchilán

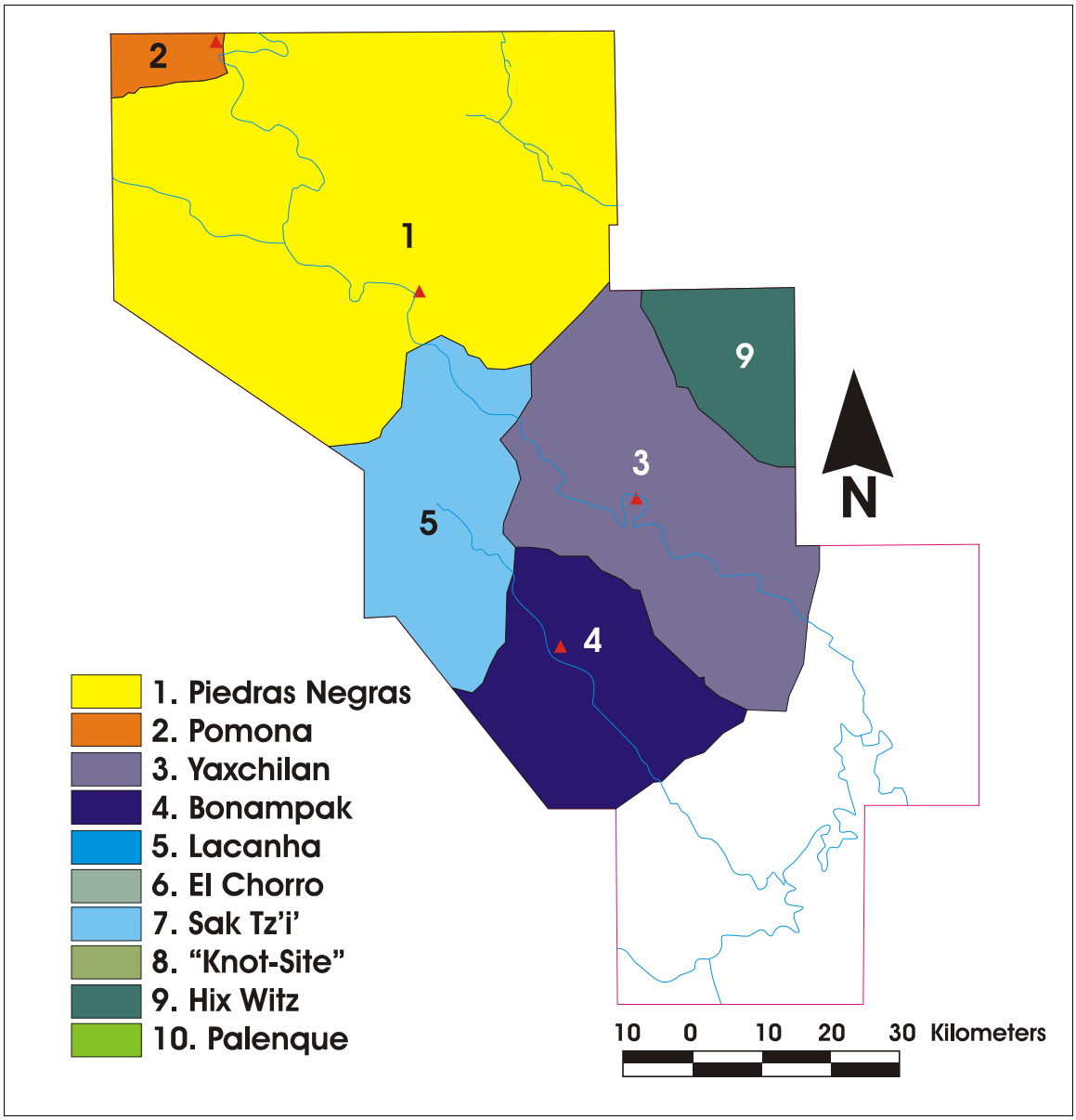


Figure 2.10 Usumacinta Polities AD 763-772 (After Anaya 2001:80)

captured a sajal of Wak'ab (Figure 2.9). Ruler 4 died on 26 November 757. He was buried in front of O-13 (Burial 13). Other buildings that were important to Ruler 4 include J-3, and O-12.

Ruler 5 is somewhat enigmatic in that his birth date and his father's name are unknown. His mother is described as K'uhul Ixik on Stela 14, but the father's information is either missing or too damaged to read (Teufel 2004: 198). However, shortly after the death of Ruler 4, Ruler 5 acceded to the office of Holy Lord of Piedras Negras on 10 March 758 (9.16.06.17.01). His short reign only covered eight years, but his monuments (Stelae 14 and 16) show a growing dependance on the use of subsidiary sites in the region to buttress his support. Martin and Grube (2000: 151) make the case that the prevalence given to sajals from subsidiary sites outside of Piedras Negras in monuments within Piedras Negras (like La Mar's sajal on Stela 16 thought to have been Ruler 6) marks a change in the political dynamics of the area. Perhaps Ruler 5 needed more outside support to maintain his claim as the Holy Lord. Another sajal, from El Cayo, was not even invested in his office by Ruler 5, but by Aj Sak Maax from Sak Tz'i'! This suggests that significant changes were made in the social order of the polity from previous leaders. This may be due to the large growth in settlement as there were more people negotiating status and power within the kingdom.

Ruler 5's death date is also unknown. Sometime after 9.16.15.00.00 (15 February 766) and before the accession of Ruler 6 (Ha' K'in Xook) on 9.16.16.00.04 (14 February 767) Ruler 5 died and was buried in a yet undetermined grave. His stela are associated with O-13, so he may have been laid to rest close to Ruler 4's burial mountain.

Regionally, Yaxchilán may have warred against the Piedras Negras polity in 759, resulting in a captive k'inil ajaw falling in Yaxchilán's hands (La Pasadita Lintel 2). But it is not clear that Yaxchilán was fighting against Piedras Negras (Teufel 2004: 199). There are no other wars noted during this period, but that does not mean that the region was at peace (Figure 2.10).

Ruler 6's place was originally given to a misidentified sajal in Proskouriakoff's king list, however Ha' K'in Xook's reign was overlooked by Proskouriakoff, so Ha' K'in Xook can be considered "Ruler 6". (Teufel identifies a year long reign between Ruler 5 and Ha' K'in Xook as a strong possibility for another Ruler 6 (2004: 204-205), but this identification appears rather tenuous.) Ruler 6's birth date is unknown. He is believed to have been a son of Ruler 4 and a brother to Ruler 5. He acceded to the kingship on 14 February 767, and either died or abdicated the office on 24 March 780 AD (9.17.09.05.11). He erected Stelae 13, 18 and 23 around O-12 and O-13. His stela do not show representations of captives. Ruler 6 was present at the burial of a sajal in El Cayo, but the lord of Sak Tz'i' installed the new sajal into office. Regionally, there does not seem to have been much bellicose action in the area during this short reign.

Ruler 7 is the last king known from Piedras Negras and he commissioned some of the finest pieces of Piedras Negras sculpture, in particular Panel 3 and Throne 1. Ruler 7 was born on 7 April 750 (9.15.18.16.07) to Lady Bird and an unknown father (although probably related to Ruler 4). He acceded to the office of Holy Lord on 31 May 781 AD (9.17.10.09.04) and ruled until his capture at the hands of Yaxchilán's lord K'inich Tatb'u Skull in 808 AD (Stuart 1998). He remodeled the Acropolis to suit his needs, beginning with narrow corridors, a fine throne, and a private sweat bath, J-17 (Houston 2004:275-276).

The military conquests of Ruler 7 began in 787 with the capture of a sub-lord from Wa-Bird site. Then several wars against Pomoná were fought, resulting in the capture of several prominent lords. The wars with Pomoná were fought in collaboration with La Mar (Rabbit Stone) then under the direction of Parrot Chaak (Martin and Grube 2000: 153). Other regional occurrences during the reign of Ruler 7 include the capture of an ajaw from Sak Tz'i' by Bonampak in 787 AD and later Tonina displayed a captive from Sak Tz'i' in 790 AD.

After the capture of Ruler 7 by Yaxchilán, the kingdom rapidly disintegrated. Although Yaxchilán was successful in its final defeat of Piedras Negras, it too was abandoned shortly thereafter. The last stela from Piedras Negras perhaps date to 9.19.00.00.00 (24 June 810 AD) on Altar 3 but it is not clear who commissioned it. Sak Tz'i' survived the collapse of both Piedras Negras and Yaxchilán, with a final Stela dating to 10.01.14.09.17 or 29 March 864 AD (Randall Stela, Anaya 2001).

SUMMARY

Piedras Negras' strategic location along the Usumacinta river gave it access to water and riverine resources while the relentless cutting of the river exposed pockets of chert for making tools. The forest surrounding today is probably similar to what existed when the center was inhabited, a mixture of secondary and tertiary growth with pockets of climax tropical forest. The animal life was probably similar also, but with fewer large mammals due to hunting pressures.

Pockets of early ceramics exist in the center, but it is during the Early Classic that the historical polity of Piedras Negras appears. History-bearing stelae enumerate the deeds of its holy lords across centuries of successful reigns. The success of the rulers is a barometer of the success of the polity and the growth of population across the center. After the death of Ruler 7 at the hands of its traditional enemy, Yaxchilán, population declined and the center was engulfed by forest.

Two archaeological projects are responsible for our knowledge of the material culture of the center. The first was sponsored by the University of Pennsylvania in the 1930's and the second jointly by Brigham Young University and the Universidad del Valle de Guatemala. These long-term projects opened the center for the modern world and have provided literally tons of material for studies about the ancient Maya.

Chapter 3

Research Design and Methods

Research design is an important component of any project. It sets the procedures, outlines the assumptions under which the research was carried out, and provides a way of evaluating the effectiveness of the research. Unfortunately there is no formal research design behind my dissertation. This dissertation is an amalgamation of data gathered by various archaeologists who worked with the Proyecto Piedras Negras during its field seasons and thereafter left the project. The data gathered by these archaeologists has been woven into a post-hoc research project designed to maximize the overall themes of the data - a systematic sampling of the site center. The inherited data were given to me for inclusion in my dissertation by the director of the project, Stephen Houston, and include 25 of the 64 operations (39%) excavated by the Proyecto Piedras Negras. The advantage of combining this information into a single research project is that the sheer size of the sample provides center-wide coverage of Piedras Negras. The inherited data include excavations within every major group, thereby providing insights into nearly every patio group constructed by the Maya within Piedras Negras. My individual contributions to this body consist of a field season mapping *terra incognita* along the southern edge of the center (Nelson 1999) and a large-scale horizontal exposure of a patio group (Nelson 2001).

DATA SET

My data set begins with the map of the center. A digitized map of Piedras Negras has been created as part of the Project (see Chapter 4). This map has been updated with all of the new structures surveyed during the project. All of the test pits included in this dissertation have been added to the map, as well as most of the units excavated by the Projecto Piedras Negras. Many of the data come from test-pitting operations placed throughout the center. These operations were under the direction of several different archaeologists. They were instructed to place test pits in areas that would yield artifacts and help redefine the chronological sequence of the center. The 200+ exploratory test pits are widely scattered, and each test pit generally recovered several kilograms of ceramic material and other artifacts. Their distribution is non-random, in that each archaeologist had a reason for the placement of each test pit.

Along with test pit excavations, I inherited several large-scale excavations of single buildings and patio groups. These excavations are particularly important because they provide greater coverage of a single inhabited zone than test pits alone, conveying a deeper understanding of the buildings, and the people who created, modified, and finally abandoned them. These excavations are both intensive, i.e., excavations proceeded to bedrock where possible, and extensive, i.e., excavations included areas between structures and patio space. The most important of the large-scale excavations PN 33A-F, was excavated by E. Christian Wells and me. The other large-scale excavations are included in the Appendix B. It is important to emphasize that these excavations of patio groups are the first comprehensive excavations of household mounds in the Usumacinta area. This dissertation does not pretend to be the final

publication of the large-scale excavations, which will require their own monograph. They are included here in an abbreviated form to provide necessary examples of residential life and as a counterpoint to the test pit excavations.

GENERAL METHODS

The descriptions of each unit (located in Appendix A) have been standardized for easy reference. Each operation is described generally, followed by individual test pit descriptions. Extensions to a test pit come next, even though their unit number often comes out of order. Then any burials from the unit(s) are described. Tables sometimes clarify the nature (and depth) of the excavations and these are used extensively for inter-unit comparisons with a quick reference to the unit's ceramic chronology and any features discovered in the unit. Blank spaces in the table reflect data that I could not discover for the unit.

Documentation for Proyecto Piedras Negras units focuses on a lot approach. Lots are defined as a "feature" of interest, generally a soil layer with its associated cultural material. Units may encompass many different lots, with each lot being numbered from 1 to infinity, depending on the depth and complexity of the unit. Operations are geographic areas that encompass many different units. Operations are sub-divided by letter designators denoting excavations in different areas defined by the operation. For example, PN 2A-1-3 denotes that an excavation within the bounds of Piedras Negras (PN) in the geographic area defined by operation 2, there was a suboperation focused on a particular area (A) and this unit (1) was the first excavation in the area. The lot number "3" signifies that this particular layer or feature was the third to be defined. Many of the test-pits were excavated in arbitrary 20 cm levels, so PN 2A-1-3 could indicate the cultural material derived from the soil strata located 60-80 cm below ground surface or a datum.

I need to emphasize here that cultural material was found in virtually every unit. In the unit descriptions I do not include references to artifacts recovered unless they are highly significant. Lab procedures for the excavated artifacts began with washing and drying while still in the field, followed by data collection of standard measurements (length, width, depth, and weight) all recorded in the metric system.

The ceramics from all units were analyzed under the direction of Rene Muñoz, a graduate student at University of Arizona. His dissertation will include detailed comments on the ceramic methods employed at Piedras Negras. The quantity of ceramic material recovered from Piedras Negras was enormous. The material was washed, marked, and sorted by surface treatments. Then each group was separated into preliminary types, starting with the Preclassic. Each type was then sorted into sub-types based on their respective attributes. These sub-types were then described with careful examination of previously reported types and varieties. The final descriptions of the types and their varieties was then accomplished with ample help from drawings, photos, chronological (relative and absolute) controls, descriptive notes, profiles, and a close examination of the sherds. Obviously, this brief summary does not do justice to the thousands of hours of ceramic analysis performed by A. René Muñoz, Mary Jane Acuña, Griselda Pérez, and students from the Universidad de San Carlos, Guatemala. Here, I use the ceramic analysis results to date lots within individual excavations. The database that I received from Rene includes chronological information for each lot with dateable ceramics, and he indicates whether the ceramic assemblage from that lot was mixed or pure.

Piedras Negras is not Pompeii. It was abandoned gradually, and its inhabitants removed their prized possessions. There are few sealed deposits of undisturbed material, and much of the data comes from structural fill and other potentially mixed contexts. I use the ceramic chronological data as if it represents an accurate depiction of habitation and use, with the caveat that while structural fill may include material that has been transported for other contexts, it was probably not transported very far, and it still provides a general indication of time depth within the locale.

Test pits were generally placed either abutting structures or in the middle of the patio. When test pits are placed abutting a structure, then I assume that the material recovered from the unit accurately reflects the chronology of the structure. I recognize that some structures may significantly pre-date the trash deposits around them, but the evidence that I have limits my interpretation of their foundation. Likewise, I use test pits placed in patios as chronological controls for the structures around the patio. This is more problematic because the initial settlement in the patio may have been a single building, but this method respects the limit of the available data at my disposal. In this way, I have "determined" the number of structures that were in use during a given ceramic phase, and can, from there, estimate the population of Piedras Negras.

Chapter 4

Mapping Piedras Negras

A good map helps the investigator avoid pitfalls while interpreting the landscape. For archaeologists, the most common map types are essentially models of buildings (or features) with their surrounding topography. The purpose of the map is to orient work in the field, to show spatial relationships among features, and to help identify where things were found. In the future, archaeologists will doubtless return to the area and recreate the map adding in geological details, and individual tree resources. Caves and crannies will appear in 3-D models on the surface of the map. Individual artifacts could be picked out of the virtual surface. The purpose of the map will remain essentially the same, however: to denote complex spatial relationships between humans and their environments.

PREVIOUS MAPS OF PIEDRAS NEGRAS

The first published map of Piedras Negras was a general sketch of some of the structures and stelae locations by Maler (1901, Plate 33) with hints as to the topography of the area. Ricketson made a new sketch of the area in 1921 when he visited with Morley, a visit that stimulated the University of Pennsylvania's efforts (Satterthwaite 1943:19). Fred P. Parris was the architect behind the map created by that project especially in its early years, 1931-33, with Tatiana Proskouriakoff adding more details and structures in 1939 (Satterthwaite 1943; Figure 4.0). Thus the map of the center was, of necessity, a group effort.

The primary datum for Parris's map was located at "the lowest point on the incised circular band on the Sacrificial Rock" (Satterthwaite 1943: 22) while the initial contour was fixed at 9.8 meters below it. This was considered the low water mark for the Usumacinta river, and the river can rise 20 meters above this point, effectively flooding portions of Piedras Negras. The corresponding point on my map has the coordinate: Easting 499,900.74; Northing 499,338.96; Elevation 54.75 meters.

Parris's map consisted of 26 squares of 200 meters square, each named for a letter of the alphabet. Inside each lettered square the identified structures were numbered, generally clockwise. A building designation consisted of a letter and a number combination (K-5) to which building phases could be added to refer to specific construction episodes (K-5-1st) and minor construction phases (K-5-1st-B). The drawback of this system is that is does not allow for future expansion of the map, as Satterthwaite noted (Satterthwaite 1943: 24). Because letter assignments for the entire alphabet have already been assigned, there is no provision for adding additional 200 meter square units around the center. In order to extend the map with a similar system, newly discovered buildings will need to be assigned names by either using a different system, or by re-using alphabetic names. I have opted in my map to reuse alphabetic names with an apostrophe indicating the new series (A', B', C', etc., pronounced A-prime, B-prime, etc.) although this method is just another stop-gap (Figure 4.1). A way of dealing with this problem would be to rename all the buildings in the site and recreate the grid entirely with larger squares and a grid system with alphabetic characters running east-west and numbers running north-south.

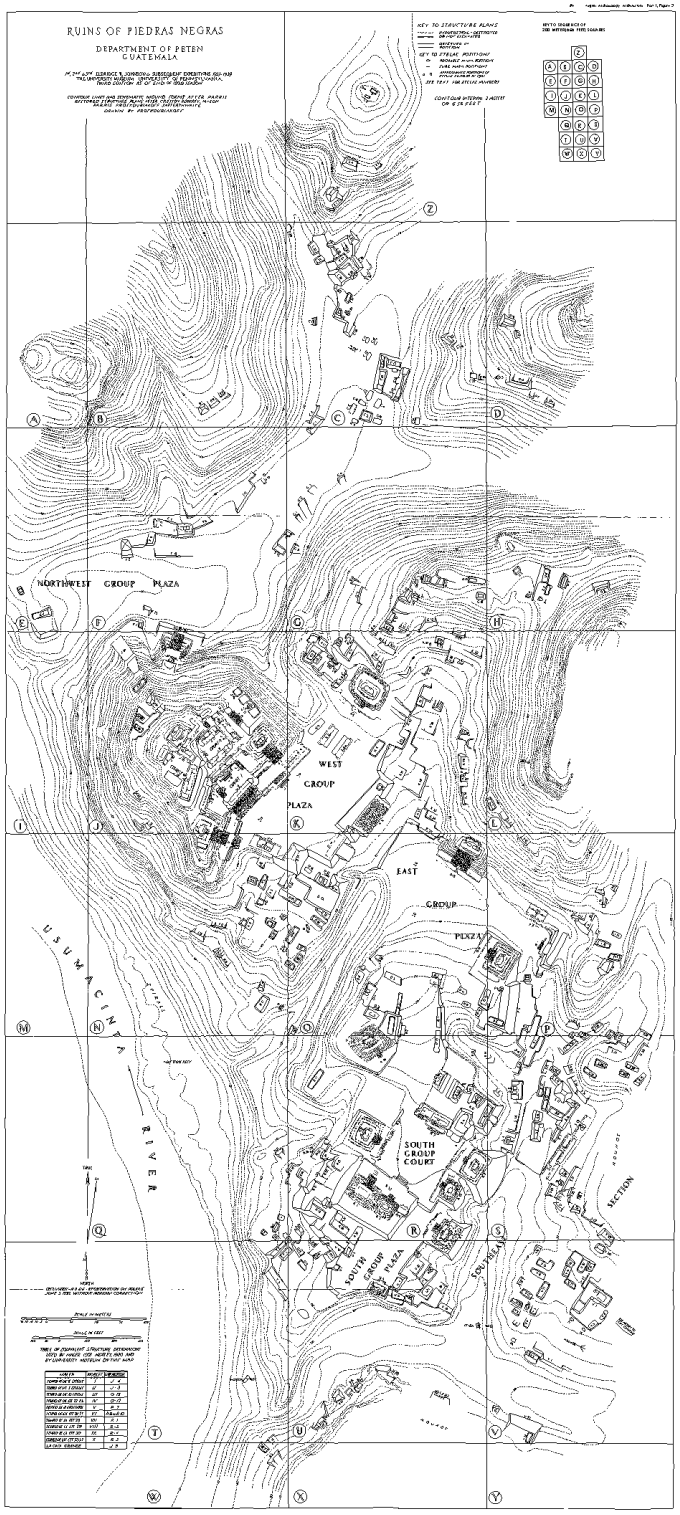


Figure 4.0 Parris's Map of Piedras Negras

Individual buildings would be named by their grid location (A1) and then building number (A1-1). Renaming the buildings would generate considerable confusion; therefore, this has not been done. The buildings and contours were originally measured with a transit and tape, no mean feat in a tropical forest. Triangulations of the buildings generated the best possible map under the circumstances.

PROYECTO PIEDRAS NEGRAS

An objective of the Proyecto Piedras Negras was to extend the Penn map of the center into other areas and to incorporate the smaller, perhaps residential, platforms overlooked by the original team into it. This work was carried out by several project members between 1997-2000 including Nathan Curritt, Timothy Murtha, and me. Nathan Curritt established the grid for the modern map and mapped in most of the 1998 excavations. Timothy Murtha mapped further to the south and northeast, effectively tying in David Webster's and Amy Kovak's "rural" excavations. I mapped some of the southern periphery of the site (Nelson 1999) and am primarily responsible for the new map.

Grid

The new map is created with a grid system oriented to magnetic north. The origin of the grid is placed 5k south and 5k west of a Guatemalan surveyor point located at the base of K-5, 5TT12-1982, slightly to the left of the main exposed stairway when facing the building, on current ground level below the mask. The Instituto Geografica (Geographic Institute of Guatemala) has no coordinate data

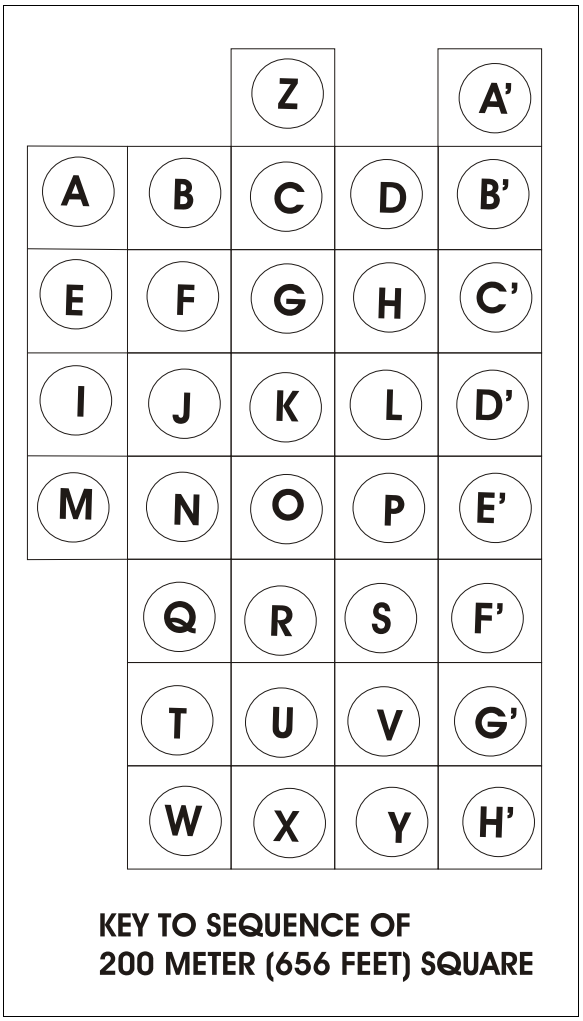


Figure 4.1 Map Grid Plan

on this surveying point. It was originally placed to mark the height of dam water should the Usumacinta River be dammed to create hydroelectric power. Since then, that idea has been modified enough that the datum coordinates became irrelevant and subsequently lost. The five kilometers from K-5 to the origin point ensures that all grid squares will be positive numbers within Piedras Negras itself, and the map can expand easily in all directions, thereby facilitating adding mounds and excavations outside of the Piedras Negras core. The altitude of each point on the map is also determined from referencing this same point on K-5, with the point itself artificially placed at 100.00 m above sea level. The grid of the original map was based upon 200 m squares, lettered A through Z. Because my survey included areas outside of this original grid, I decided to begin a new lettering sequence patterned after the original one. Accordingly, A' to H' run north to south on the east side of the map (Figure 4.1).

Methods and Equipment

The same equipment was used during each field season. A Topcon Total Station with laser sights generated accurate measurements along three coordinates, N, E, and Z (altitude). The Total Station used line-of-sight laser targeting to record the edges of the mounds in collaboration with a prism on a pole which reflected the laser back to the source. A series of stations, or stakes with known geographic coordinates, was placed throughout the center, each visible from the last one (Table 4.0, Figure 4.2). These stakes were generally of hard wood, with blue survey tape around their tops, and a metal ID tag tacked into the stake. On the ID tag were noted the X, Y, and Z coordinates of the stake, the name of the station, the date it was placed, and the initials of the surveyor. Blue flagging tape was placed around three nearby trees so that the stake was in the center of the triangle formed by the trees. From each stake, topographic points were taken in sufficient quantities to form a spider-web of lines radiating from the stake and circling back into it. Architectural data were also gathered for each mound, with a hand-drawn sketch using tape and compass preceding the gathering of architectural data with the Total Station to facilitate coordinating architectural data with 3D computer points.

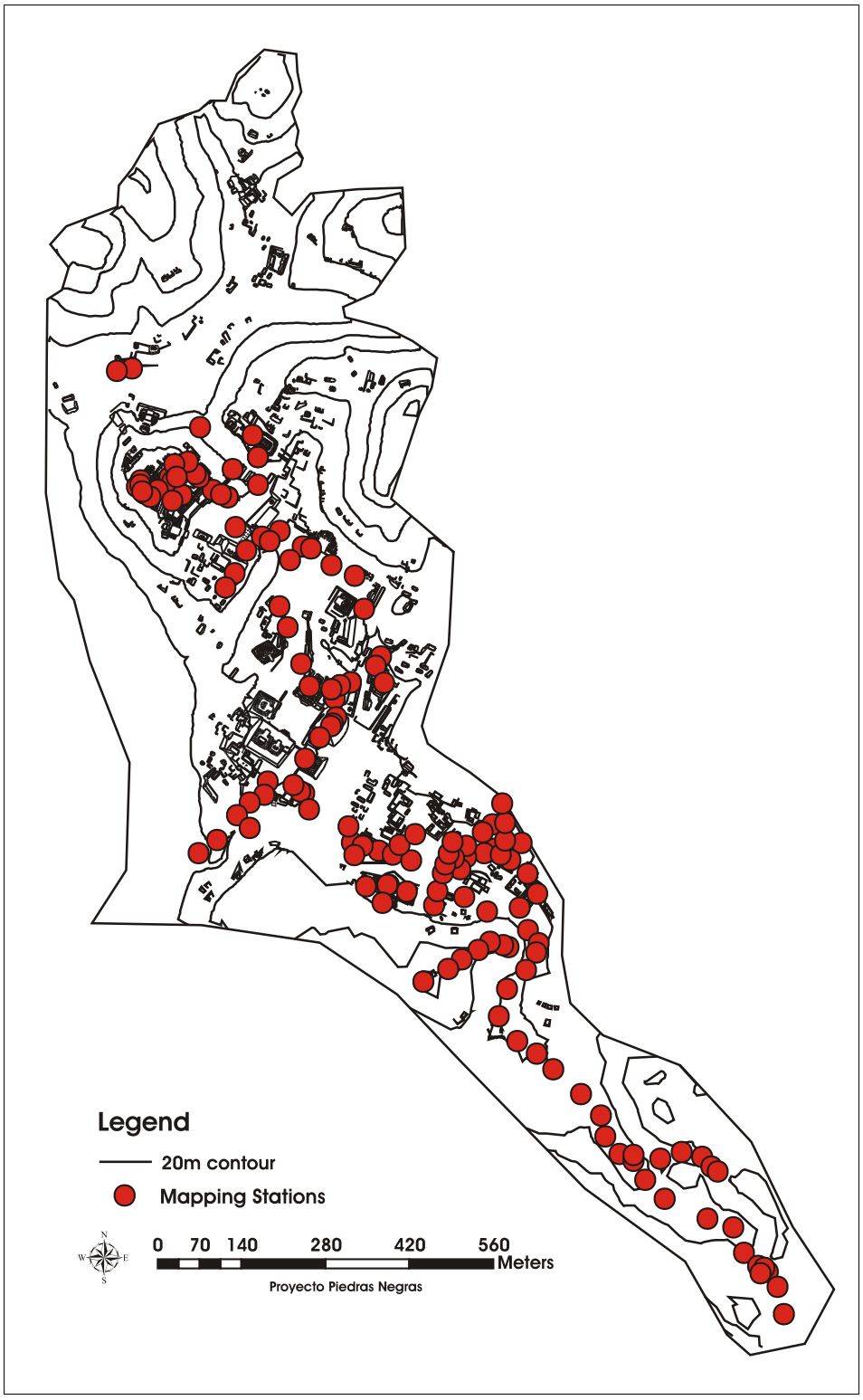


Figure 4.2 Mapping Station Placement

The information gathered by the Total Station was then transferred via a serial cable to a Mark VI data collector. This machine stored all the points recorded by the Total Station for each day. At the end of each day, the information was downloaded to a laptop computer and plotted using SiteMap, Minicad, AutoCad and ArcGIS. (The actual sequence of software was Notepad, WordPerfect, QuattroPro, Minicad, CorelDraw, AutoCad, and ArcGIS.) This allowed errors or discrepancies to be detected and fixed in the field, and helped the operator to see areas where more information was needed. As part of the objectives of the season, a contour map of the area surveyed was generated that included the surveyed mounds. The new information was then added to Parris's Piedras Negras map.

Results

The first result of the new survey was the discovery of distance errors in the original Piedras Negras map. The distances between mounds and sometimes the size of mounds were inaccurate. These errors should not detract from the efforts of the original crew, for their map is largely correct, and given the time period and the conditions under which they worked their efforts are incredible. Still, their map should be used only for placement of buildings, rather than for distances between buildings.

The error in Parris's map is approximately 20 meters, resulting in distances that are shorter than reality. In some areas, there is simply not enough space on the map to include new buildings because of the shortened distance. This created some problems when merging the new data being gathered with the old Penn map. I finally decided to take the digitized version of the Penn map (digitized by the Brigham Young University Geography Department) and situate it with the proper coordinates along a main north-south line (K-5 origin to large ceiba tree) to conform with my coordinates. Then I added my new data to the map. The map is not entirely free of errors, but closer to reality. I did not simply place the buildings in their true configuration for two reasons. First, I did not initially have enough architectural survey points to correctly place the previously mapped structures on the new map. Second, and more importantly, I do not have enough contour information to correctly place structures and contours in that section in a reliable context. Perhaps with better satellite photography more refinements will become possible. In the meantime, I compromised somewhat on reality to get the features generally right, without the time-consuming work of completely remapping Piedras Negras.

The second result is the addition of more than 90 new mounds to the known map, mainly in the southeast corner of the old map (Figure 4.3), increasing the previous map's number of known structures by 25%. These mounds vary in height, width, and orientation. Most appear to be residential groups rather than ceremonial structures. A description of each group follows with each mound group referenced by its letter-number analogous to the original Piedras Negras map. Because most of the surveying concentrated on mapping "undiscovered country", only five buildings from the original map have been modified: V-3, V-24, V-25, V-27, and V-28.

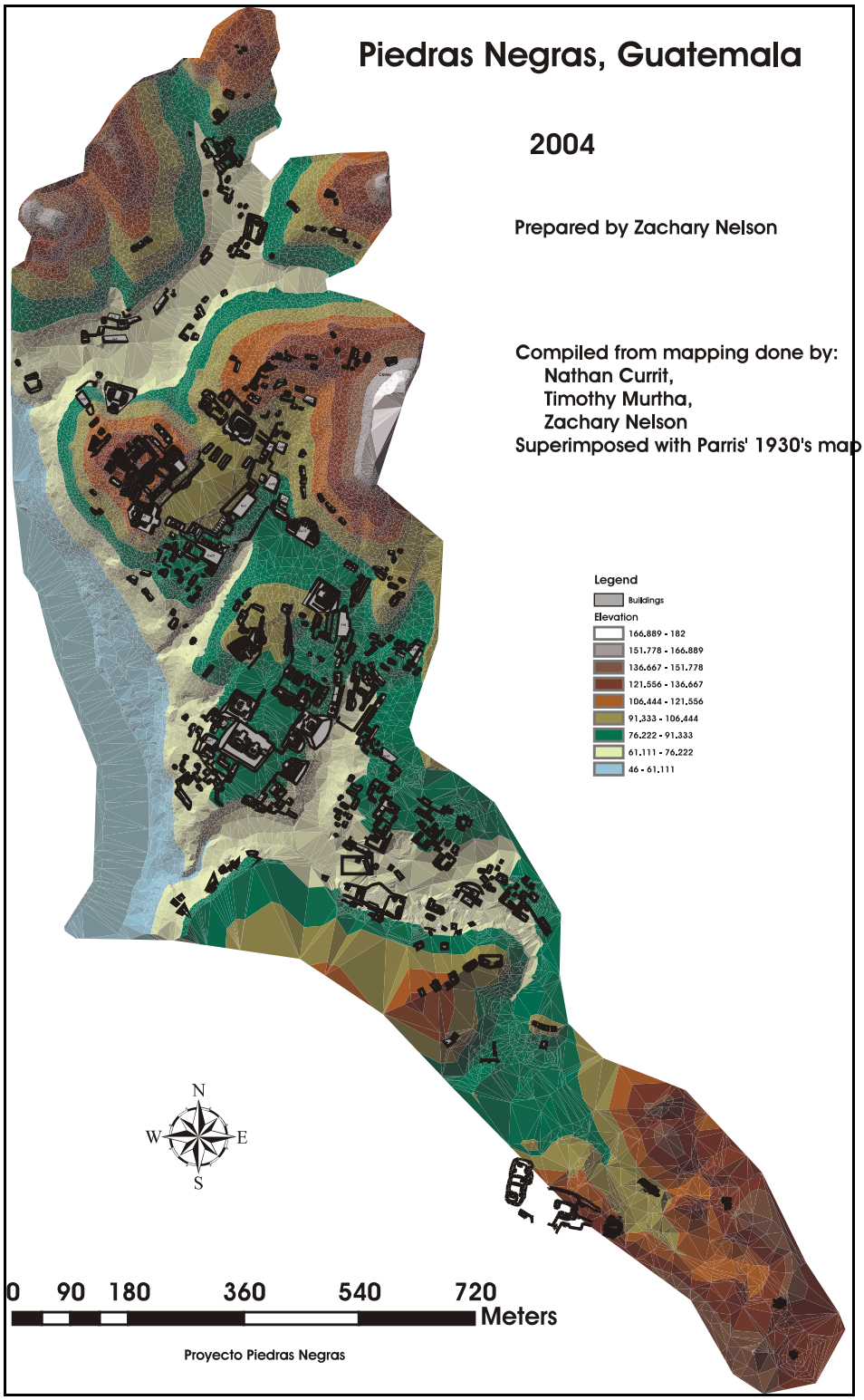


Figure 4.3 Piedras Negras

DESCRIPTIONS OF NEW MOUND GROUPS

The area added to the map was concentrated in the southeast section of the center, mainly in the V sector (Figure 4.4), Y sector (Figure 4.11), G' sector (Figure 4.14), and H' sector (Figure 4.15) of the Piedras Negras Map.

V-27 to V-35: This area had been mapped by the original Penn crew, but this patio group has been redrawn with much greater precision. The original map showed 3 buildings for this area, which number has been increased to 8. This mound group includes a possible ceremonial structure while the other mound groups discovered this season appear to be residential. This complex has several visible tiers of architecture. The northern edge of this group is delimited by a ravine (Figure 4.5).

V-36 to V-40: The current map shows a large platform in the bajo, between this mound group and the Penn V-group (Figure 4.6). This platform probably would have connected the mound group and the V complex. On the platform are several structures which are quite difficult to distinguish. They are covered by underbrush and only a few rocks betray their existence. It is likely that they consist of ancillary buildings related to the large V-27 to V-35 complex.

V-41 to V-47 consists of large mounds in a secluded area just east of the known V group buildings (Figure 4.7). Each large building in this group may consist of several rooms but this is problematic due to the underbrush. The platform architecture is clearly visible and consists of several tiers of dressed stone.

V-48 to V-51 form a plaza complex surrounded by four mounds with complicated architecture on their summits (Figure 4.8).

V-52 and V-54 are a complex architectural unit that may have been mapped by Penn. The building density in the area makes it difficult to properly gauge which buildings they might have identified (Figure 4.9).

V-57 to V-67 are a series of mounds along the northeastern edge of the V-group (Figure 4.10). The pattern of the mounds suggests a series of organic growing episodes constrained by land requirements around several principal buildings.

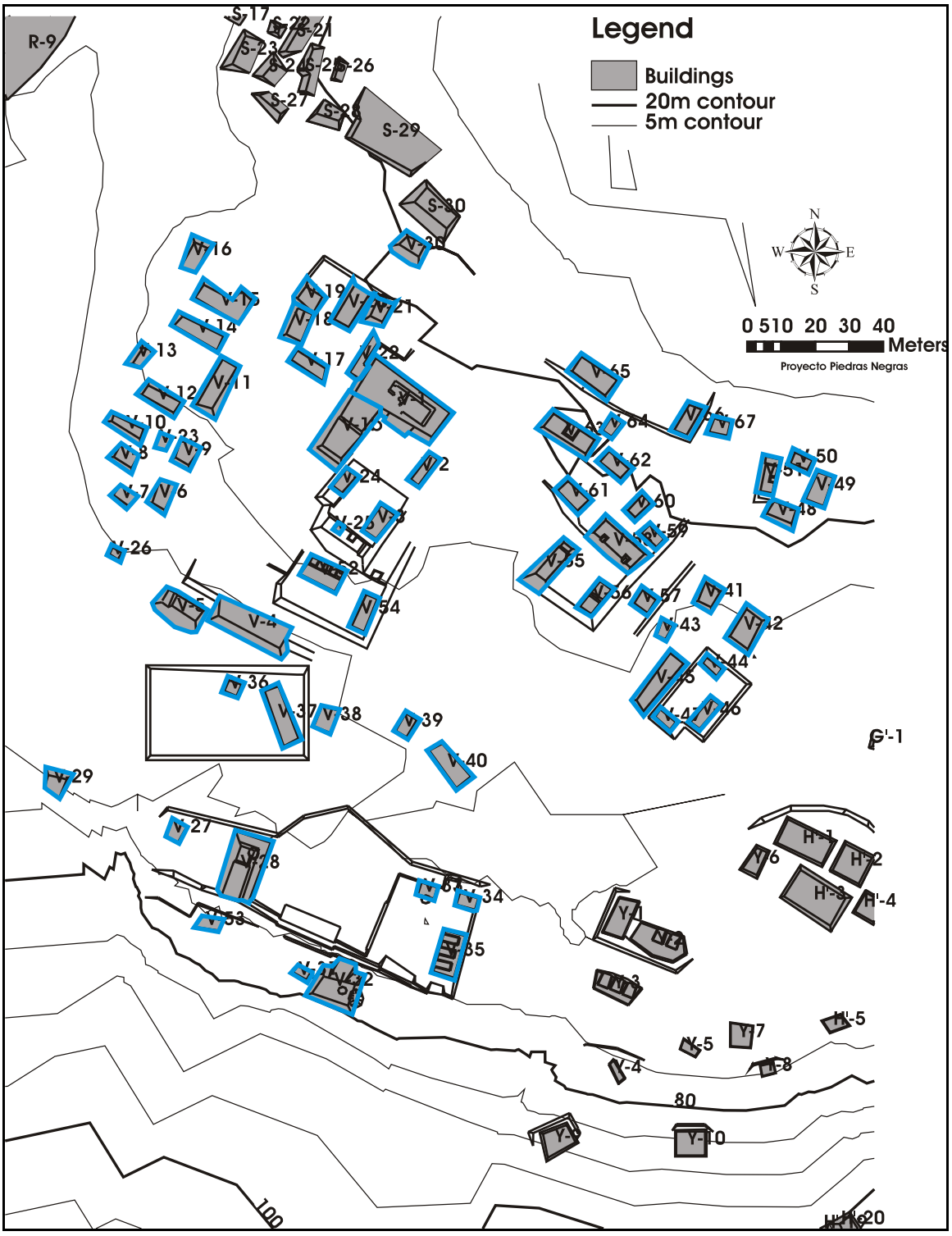


Figure 4.4 V Sector

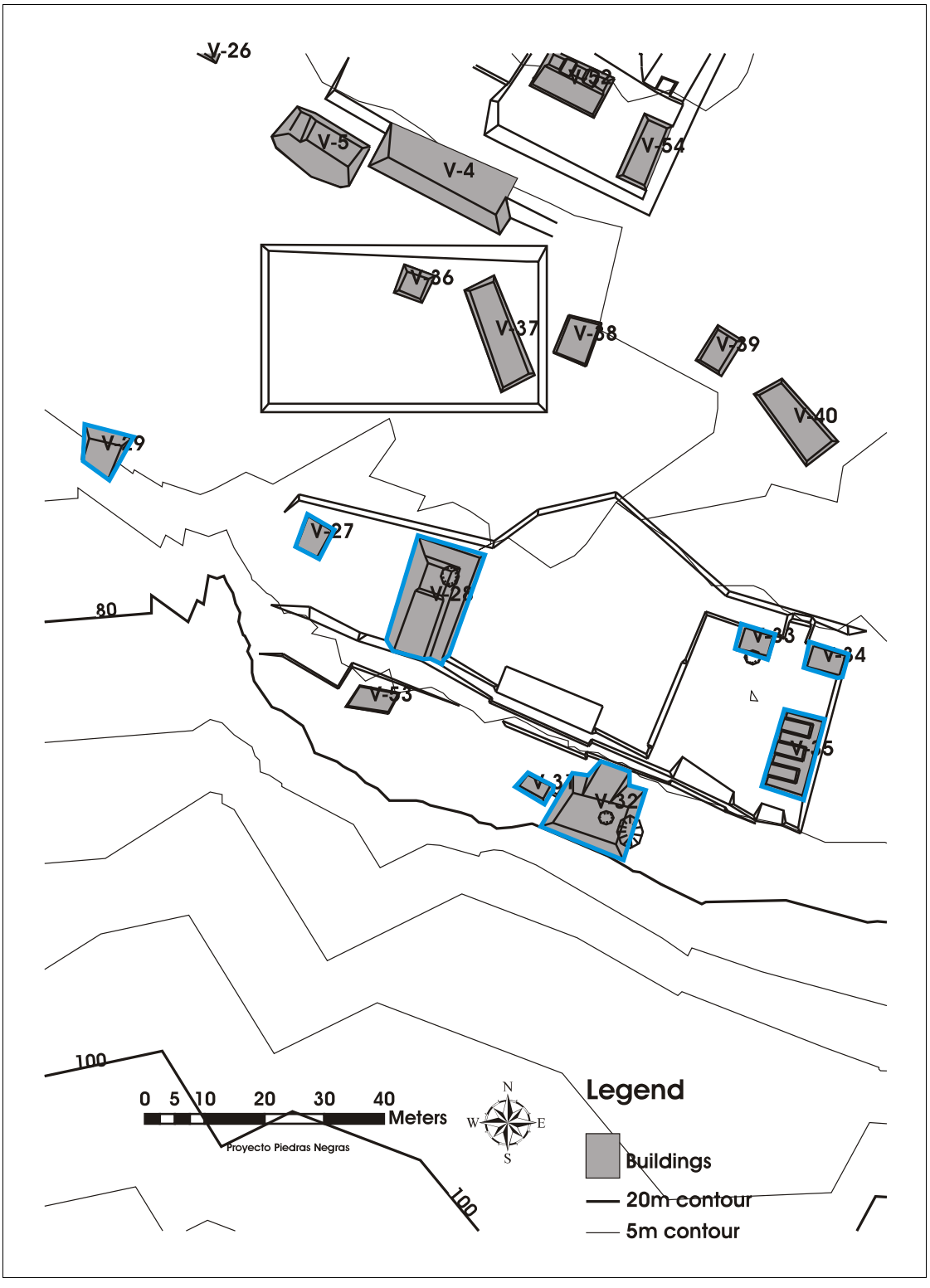


Figure 4.5 V-27 to V-35

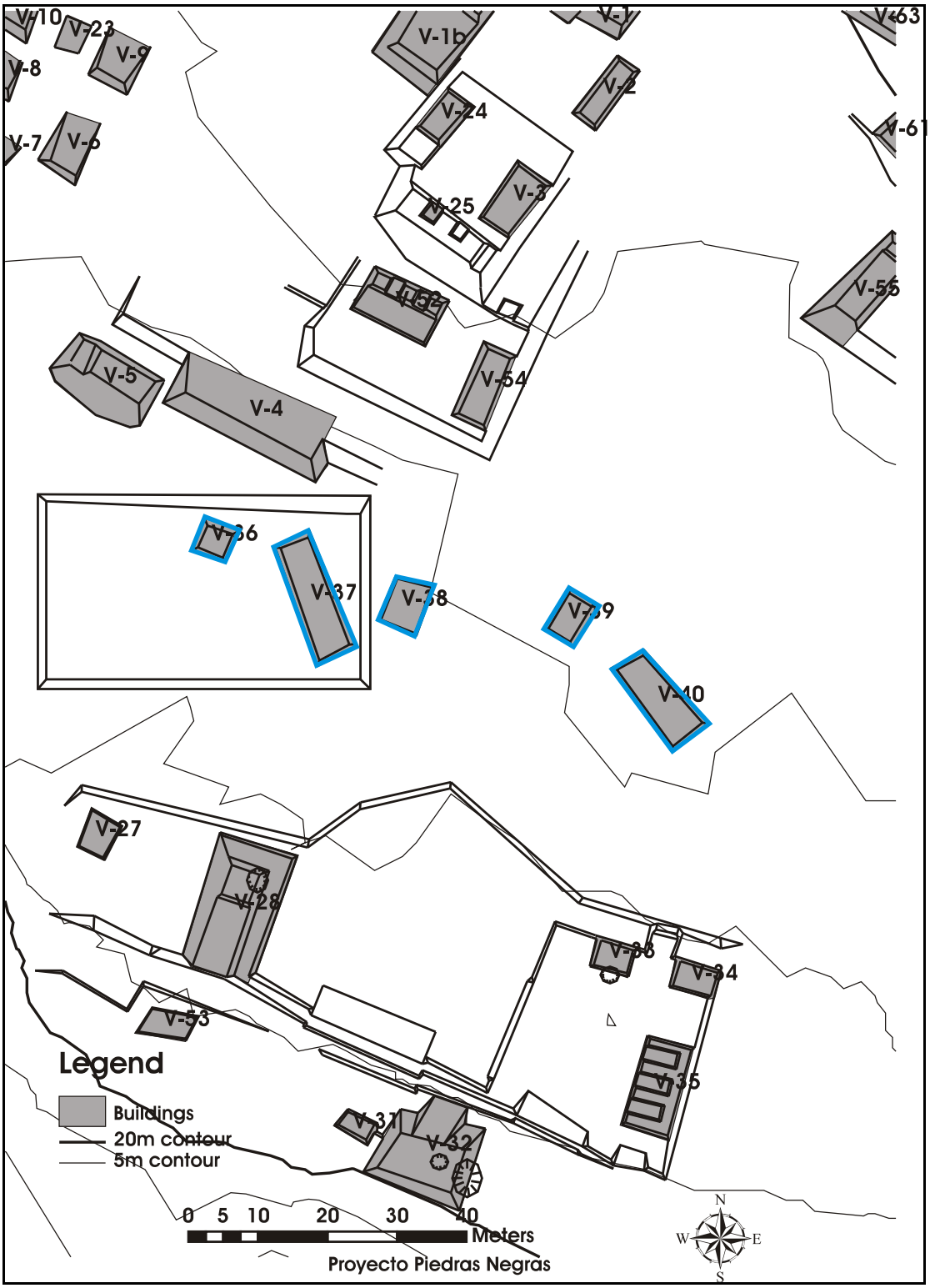


Figure 4.6 V-36 to V-40

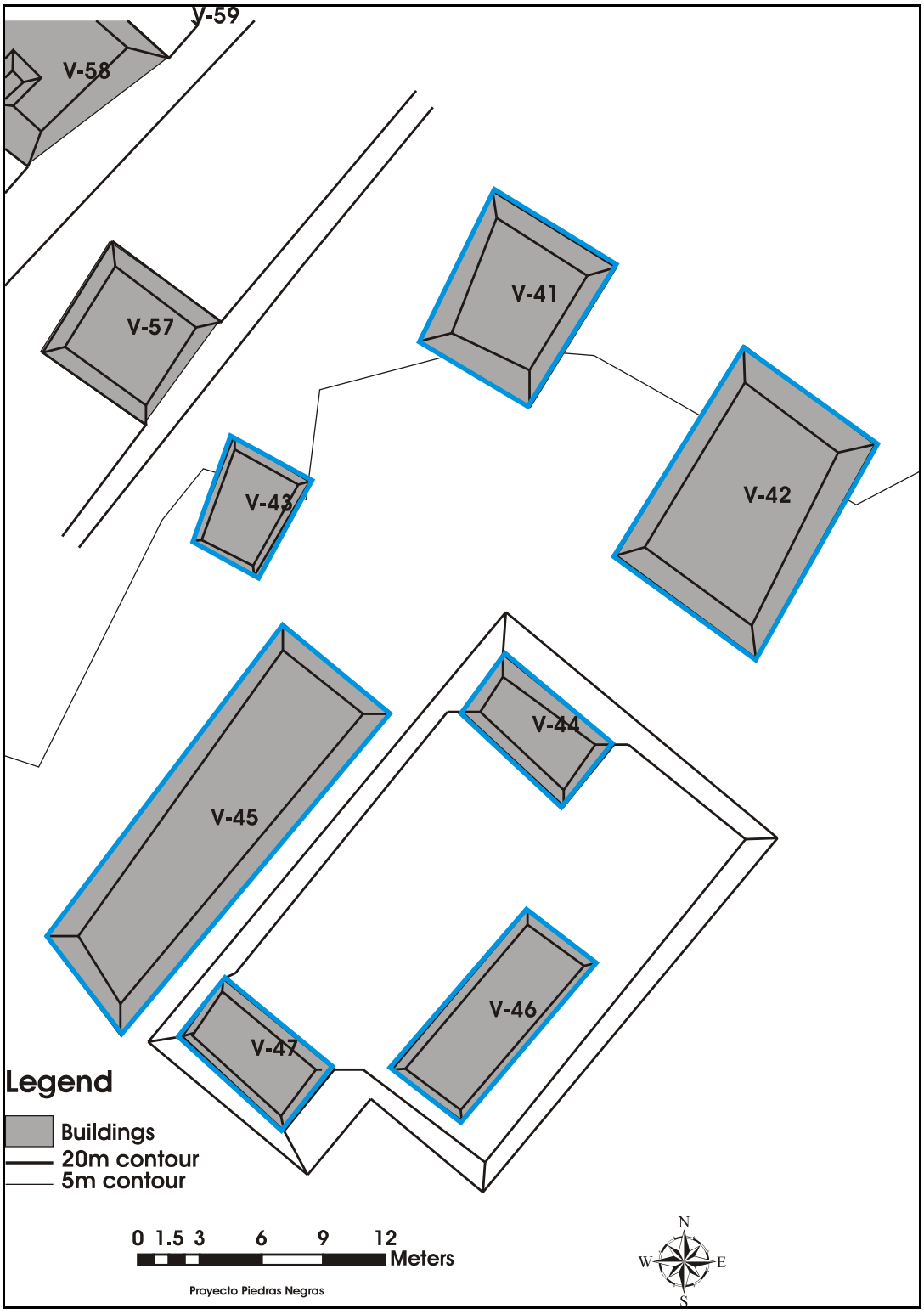


Figure 4.7 V-41 to V-47

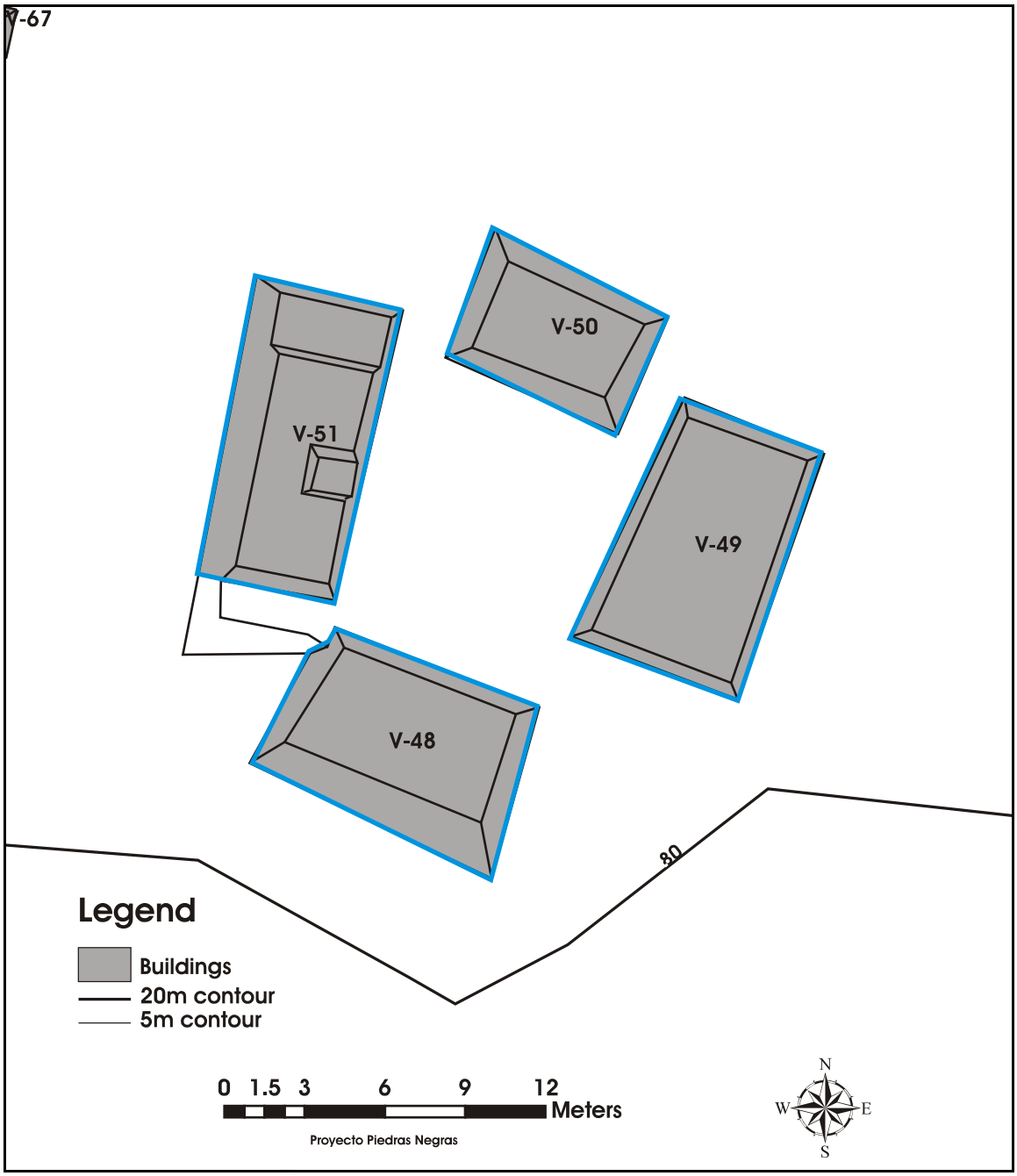


Figure 4.8 V-48 to V-51

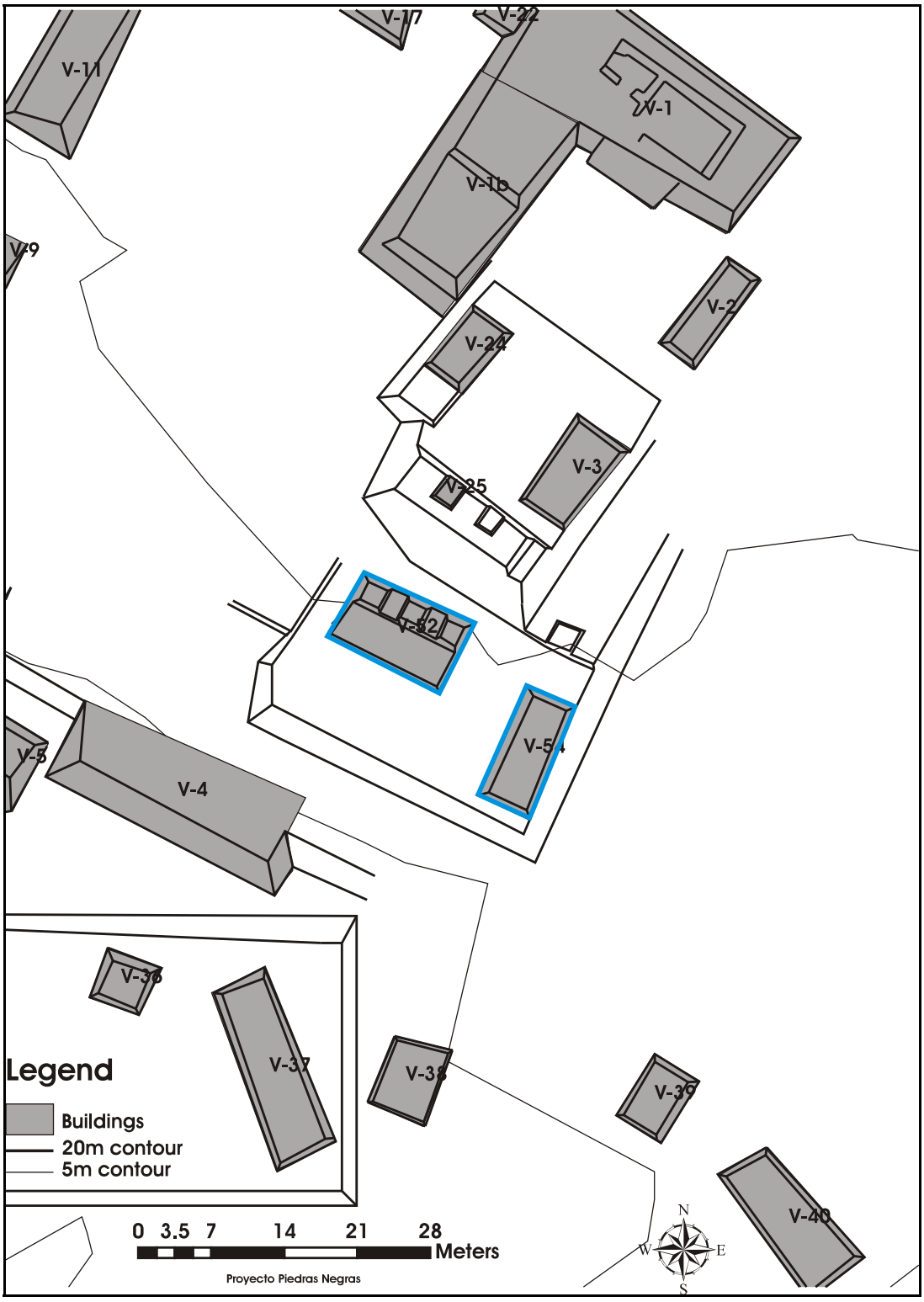


Figure 4.9 V-52 to V-54

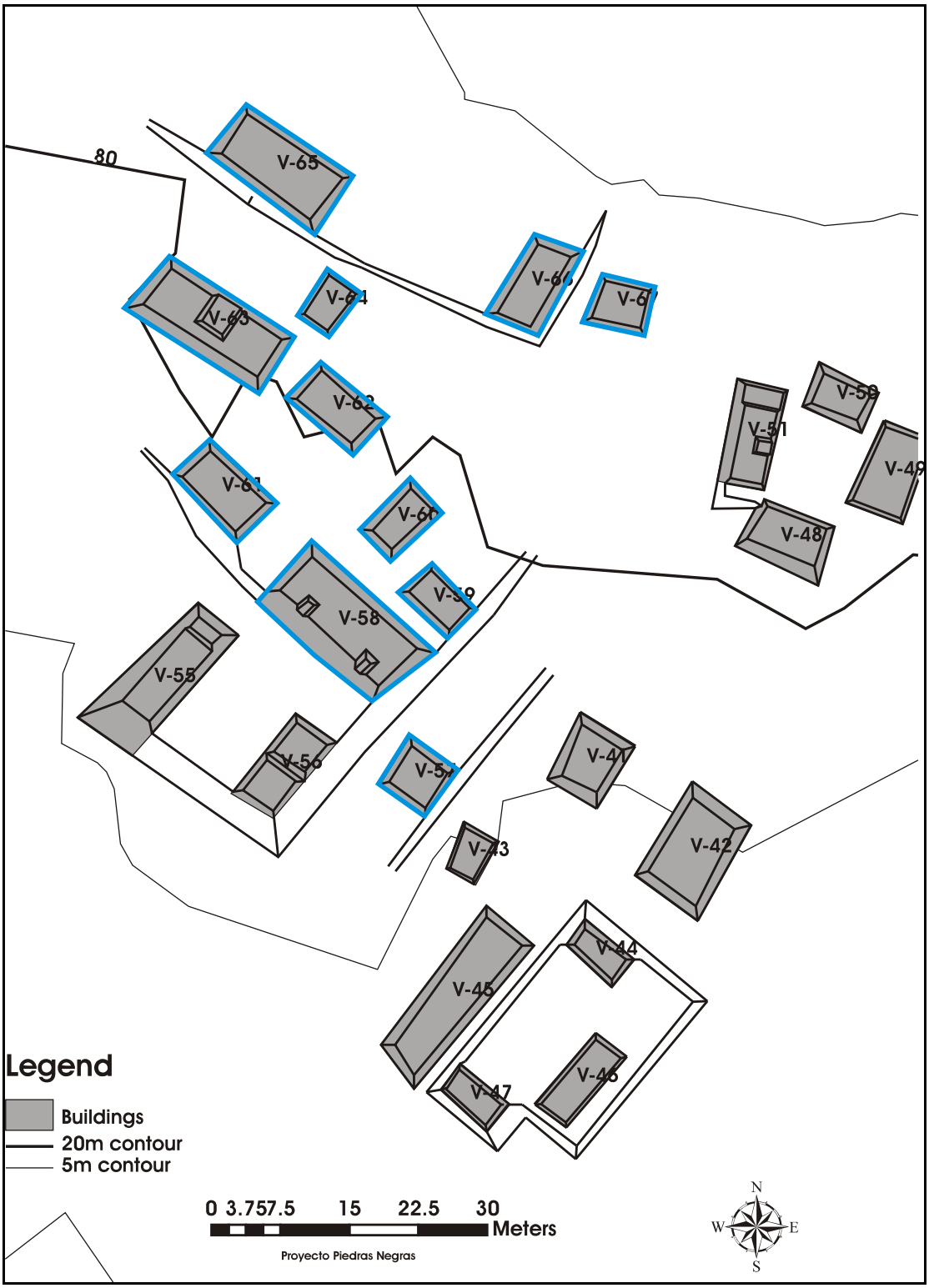


Figure 4.10 V-57 to V-67

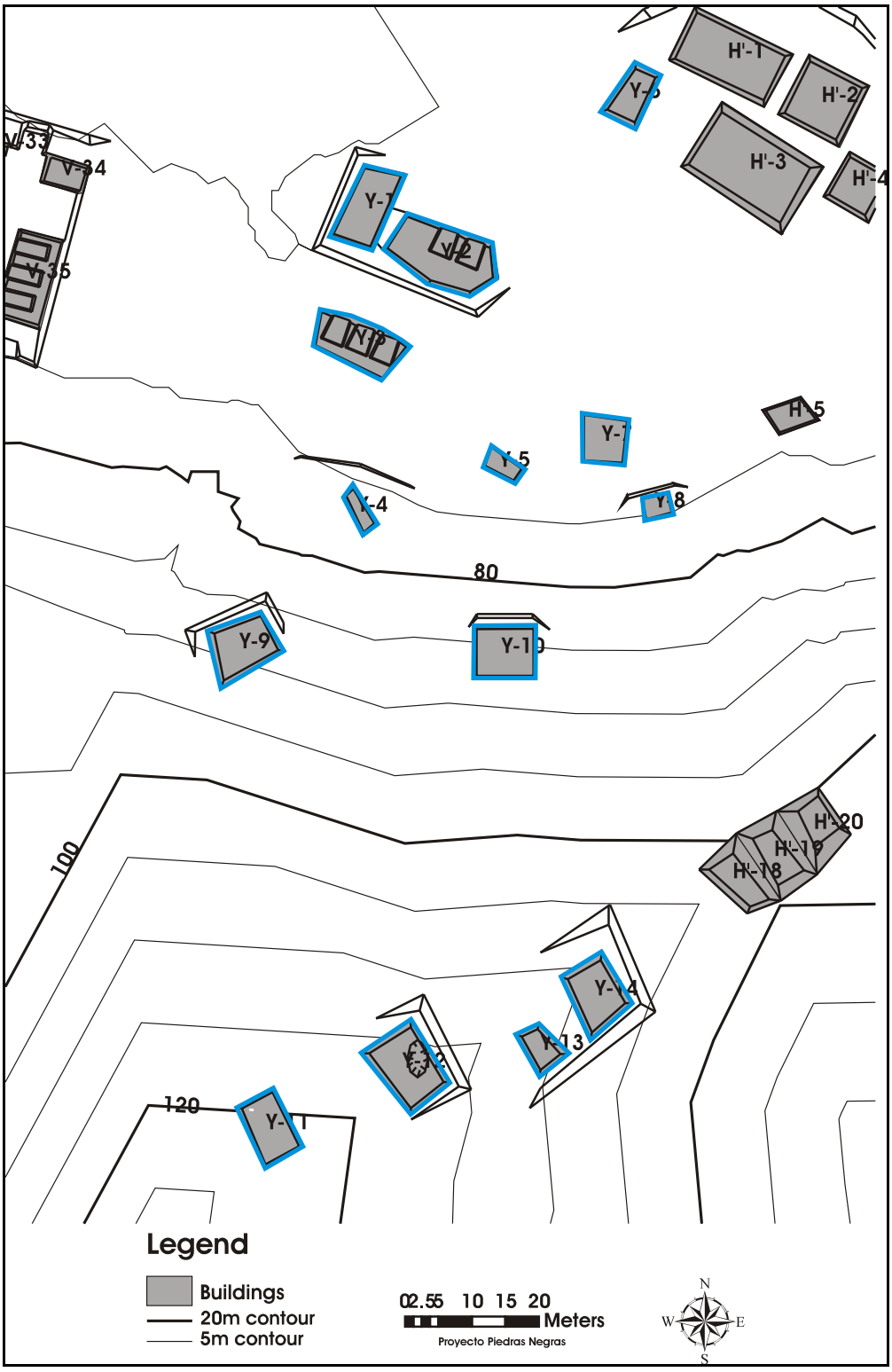


Figure 4.11 Y Sector

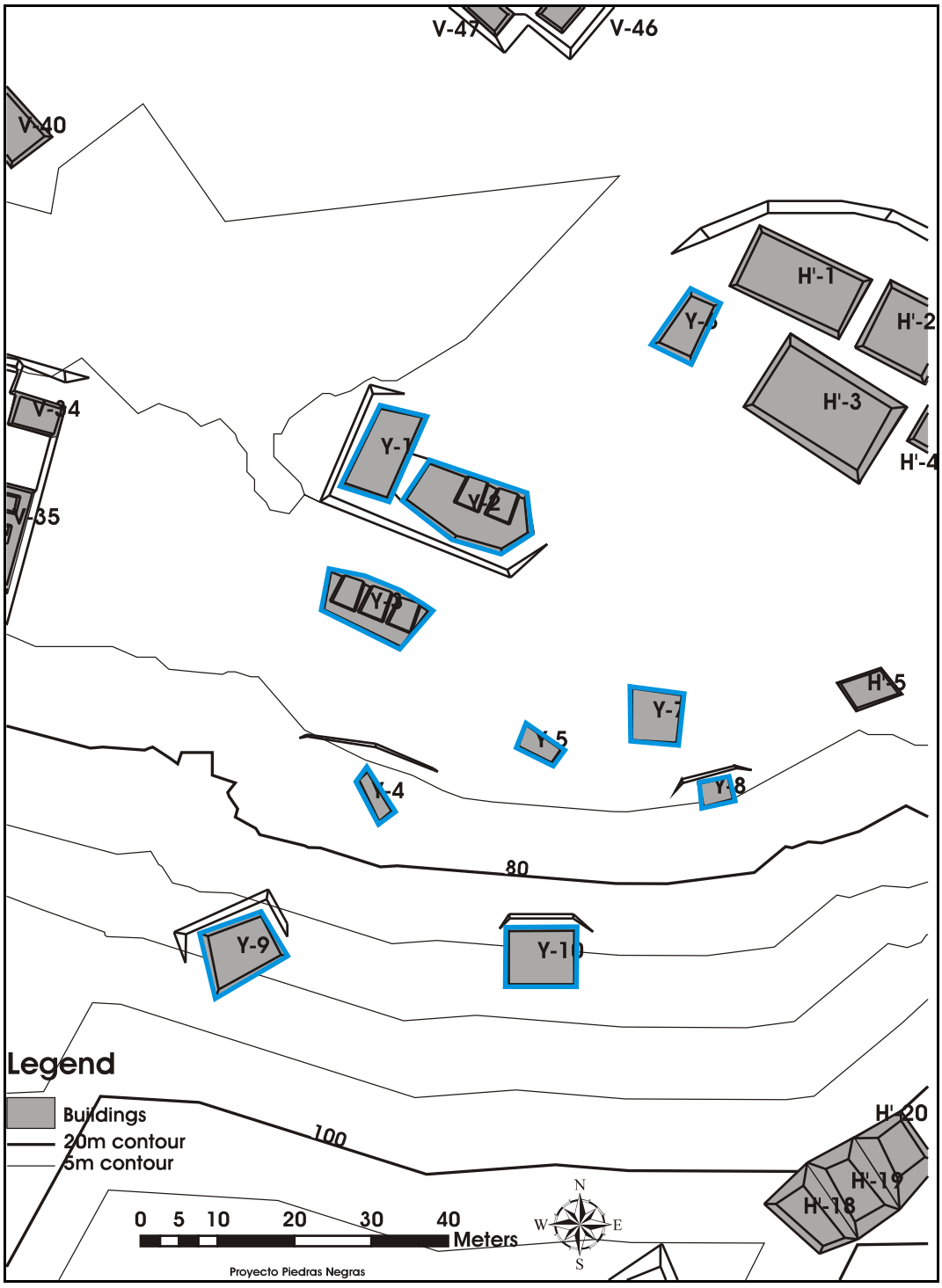


Figure 4.12 Y-1 to Y-10

Y-1 to Y-10 and H'-5: These are small, generally individual buildings built on the southern hill side (Figure 4.12).

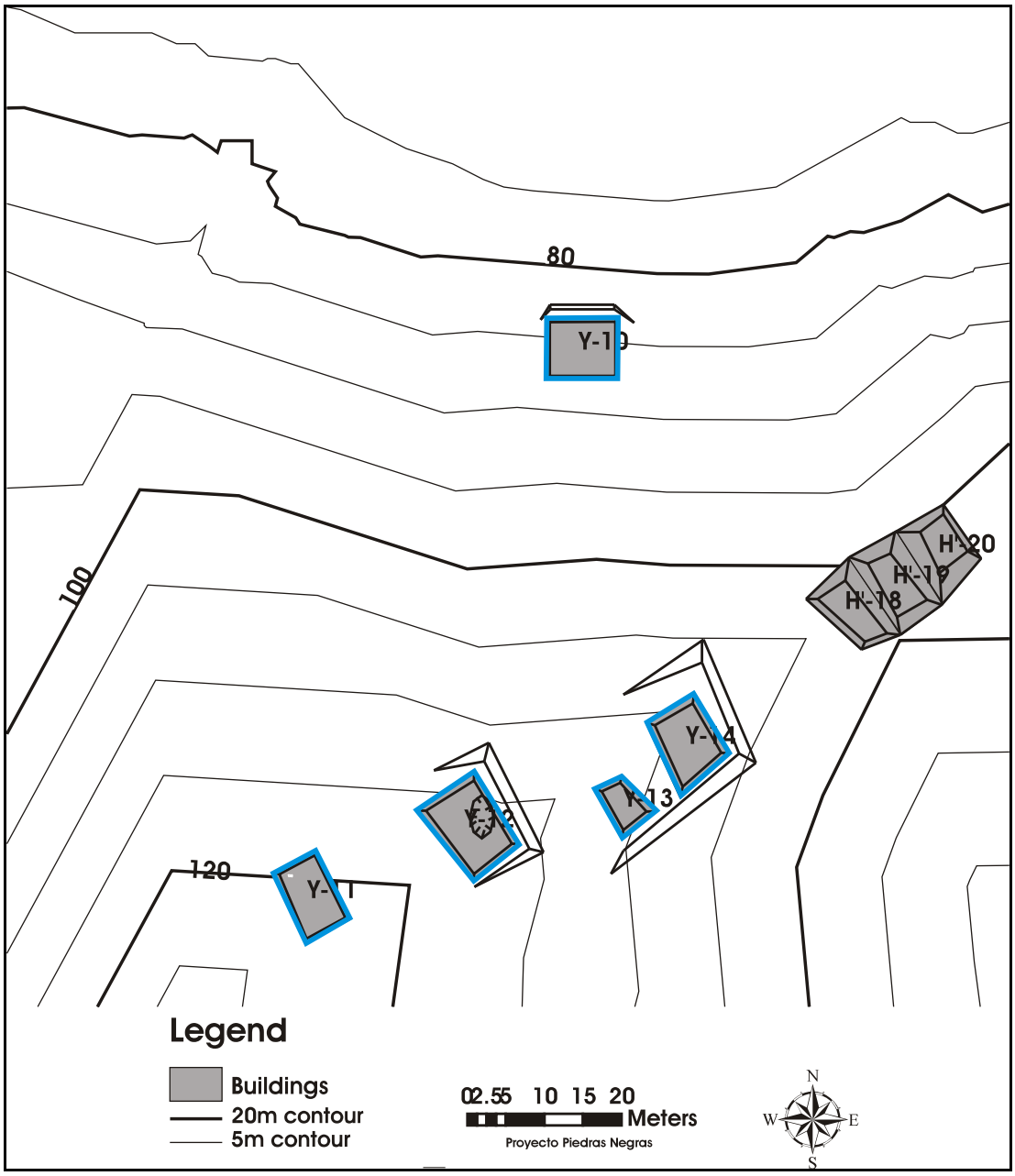


Figure 4.13 Hill Top Groups

H'-18 to H'-20, Y-11 to Y-14: This plaza group lies 20 m above the valley floor on the crest of a hill (Figure 4.13). The house mounds are about 1 m high, and show visible architecture in the form of cut stones. These mounds are situated at about the same altitude as the Acropolis, but lie to the south. More platforms were located on the same hill heading west toward the river, but these were not surveyed.

The majority of the buildings mapped are situated close to each other along a dry arroyo. Many are on the southern bank of the arroyo which passes beneath the turtle petroglyph. It is possible that the turtle petroglyph served as an entrance to Piedras Negras, so there might have been anciently a path that followed the banks of the arroyo to the east. A reconnaissance up the arroyo and its surrounding area discovered regularly spaced settlement for another kilometer with a steep drop-off thereafter but that area was not surveyed due to equipment failure during the 2004 season.

In general, the architecture of the area around the turtle petroglyph is quite fine, suggesting that this area might have housed elites or prosperous members of the society. The mounds are fairly large with a large amount of visible architecture around the buildings, especially on the platforms. These mounds all appear to be residential rather than ceremonial based upon size, distance from the main site, and general construction.

The individual mound groups in the suburb follow:

H'-1 to H'-4, Y-6: This small group is planted on the south side of a dry stream. There is a platform under them which protects the bank from crumbling. These are large mounds in area, but do not extend very high (Figure 4.16).

G'-1 to G'-10, H'-6: These mounds are closest to the southern stream bank and to the turtle glyph. They are badly eroded, but enough remains to discern their individual dimensions (Figure 4.17).

G'-11 to G'-13, H'-7 to H'-17: This complex consists of quite fine architecture (Figure 4.18). The stones are rather large and close fitting. The mounds themselves are also quite high, some are in excess of two meters. Unfortunately, there is a large looter's pit in H'-15 which has destroyed over half of the mound. It is difficult to determine what the looters found - if anything.

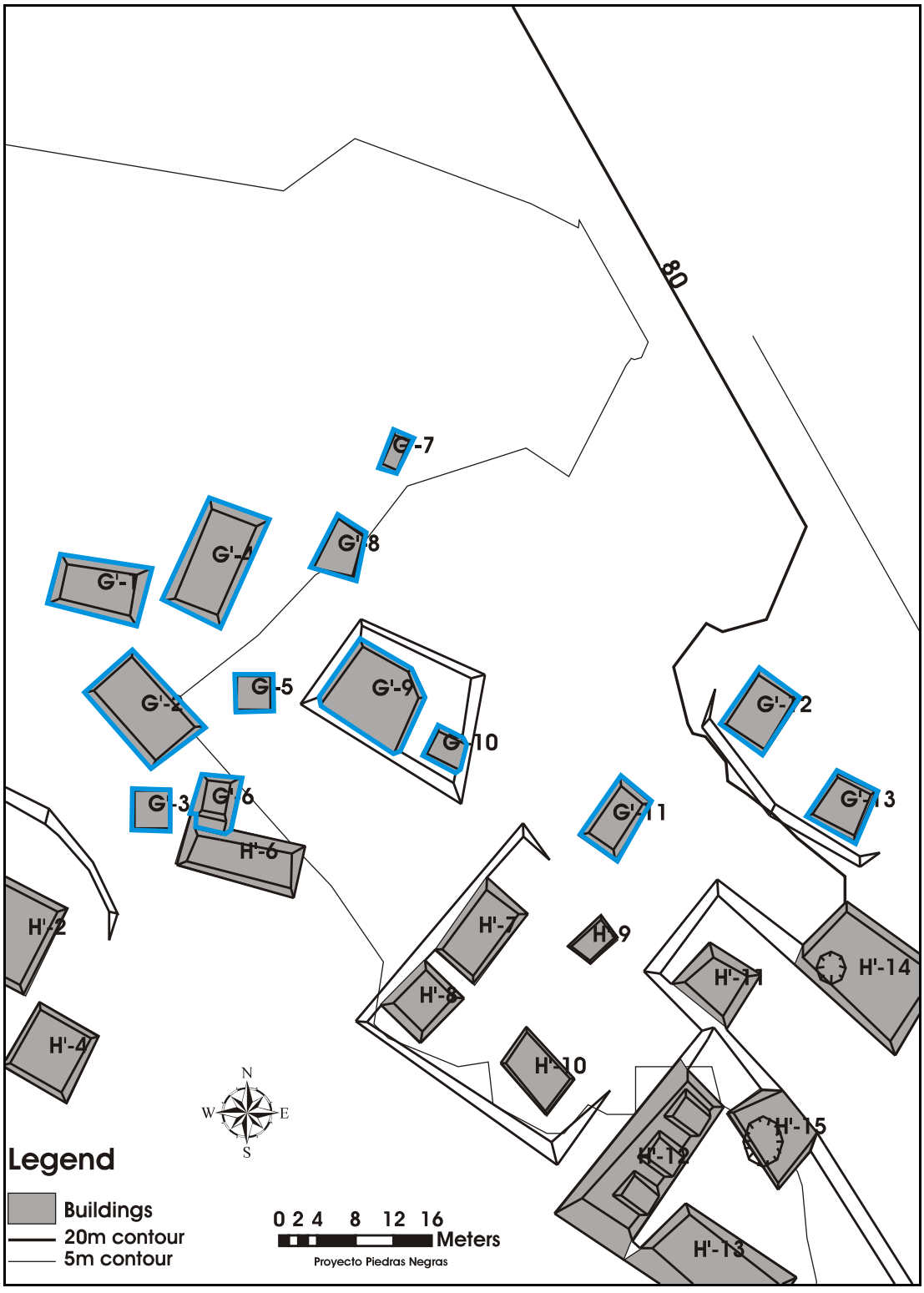


Figure 4.14 G' Sector

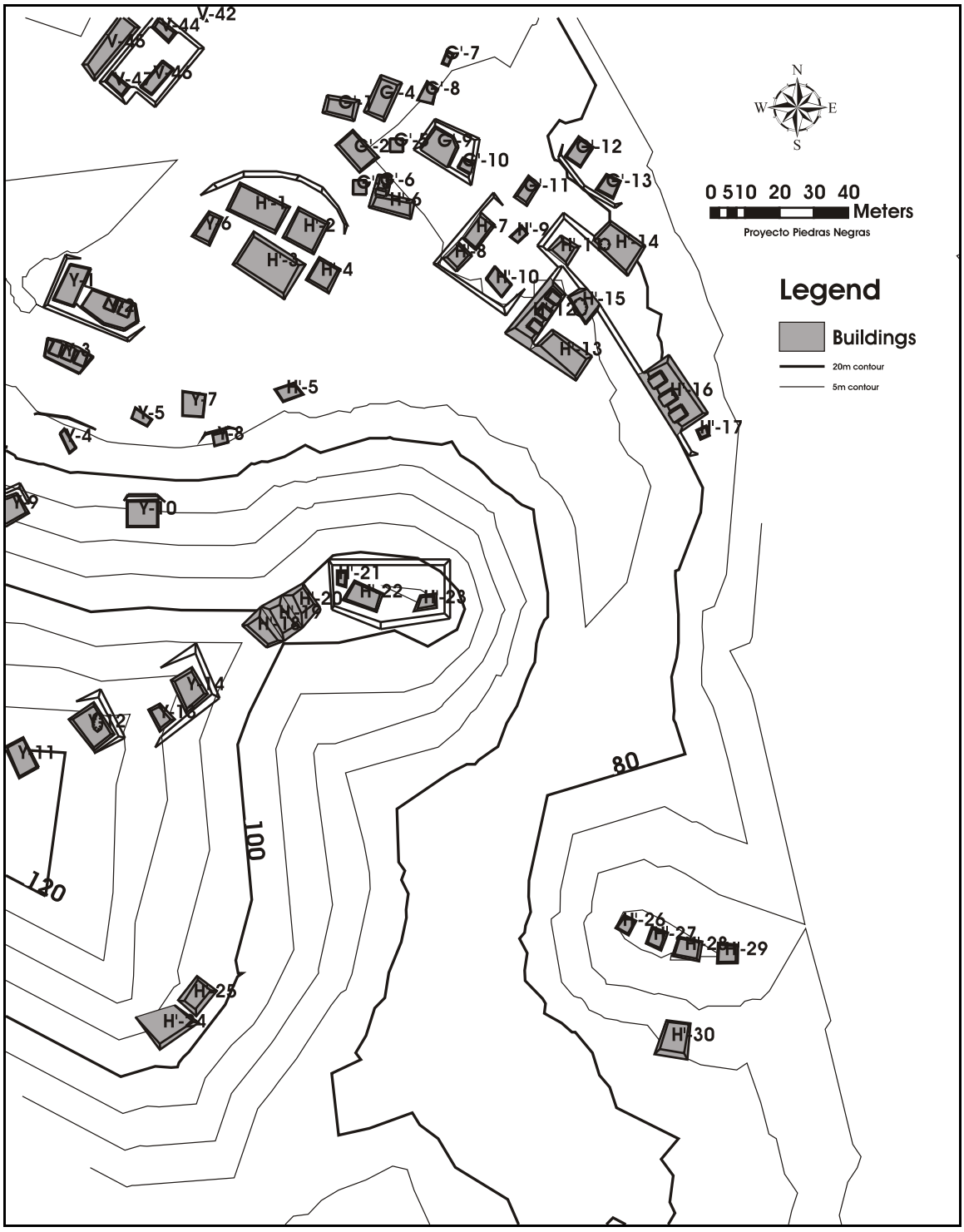


Figure 4.15 H' Sector

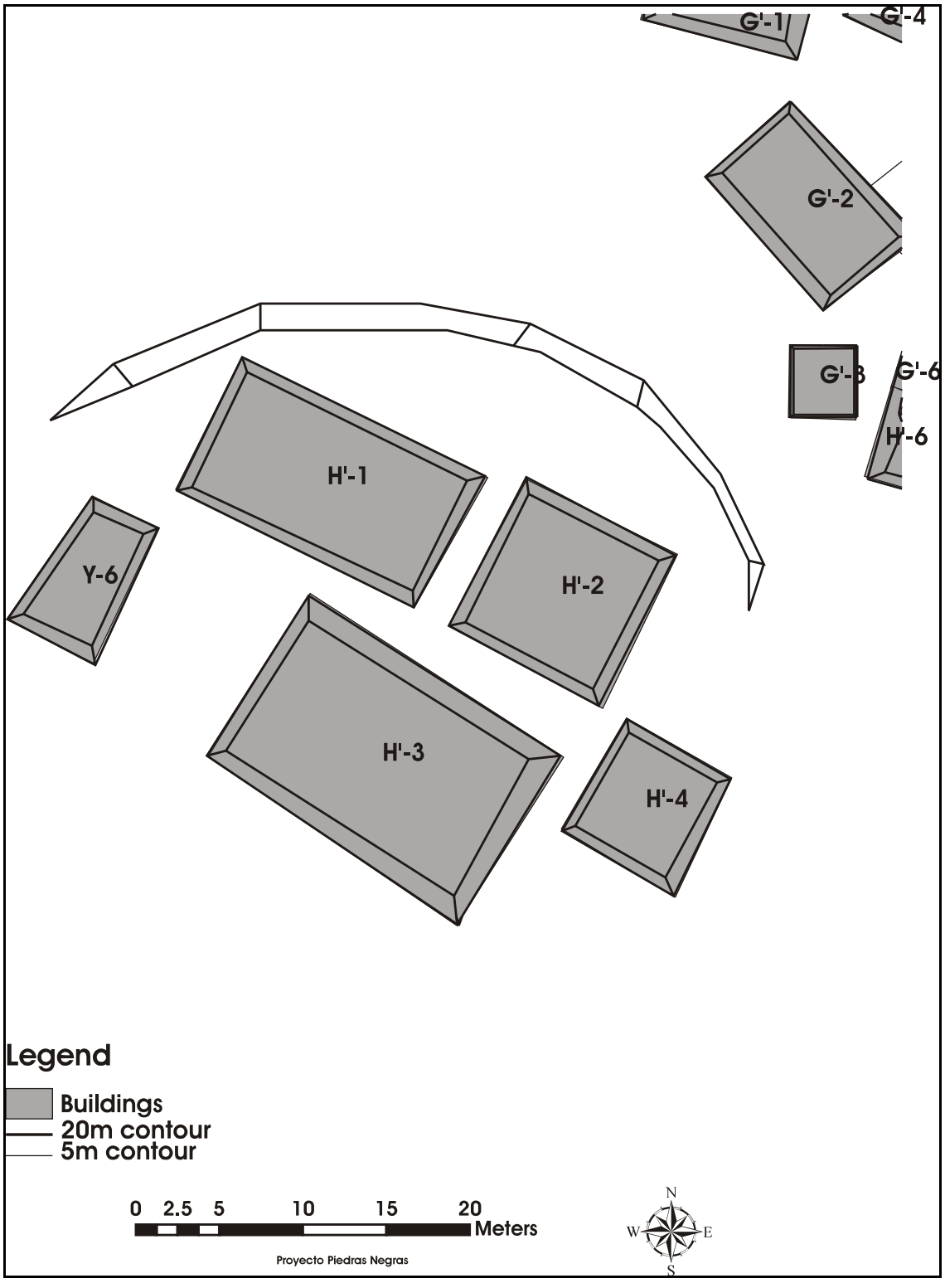


Figure 4.16 H'1 to H'-4 and Y-6

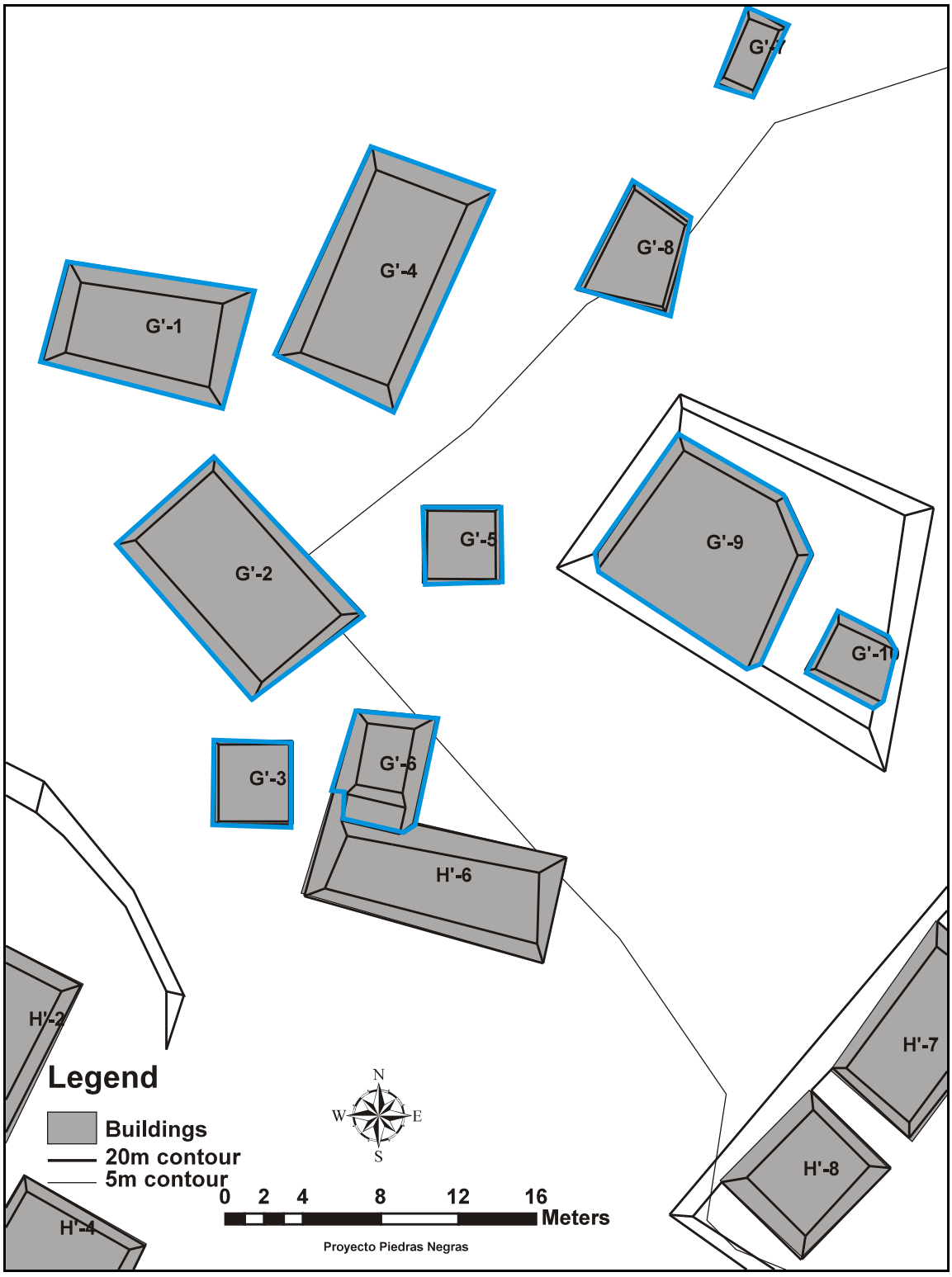


Figure 4.17 G'1 to G'10

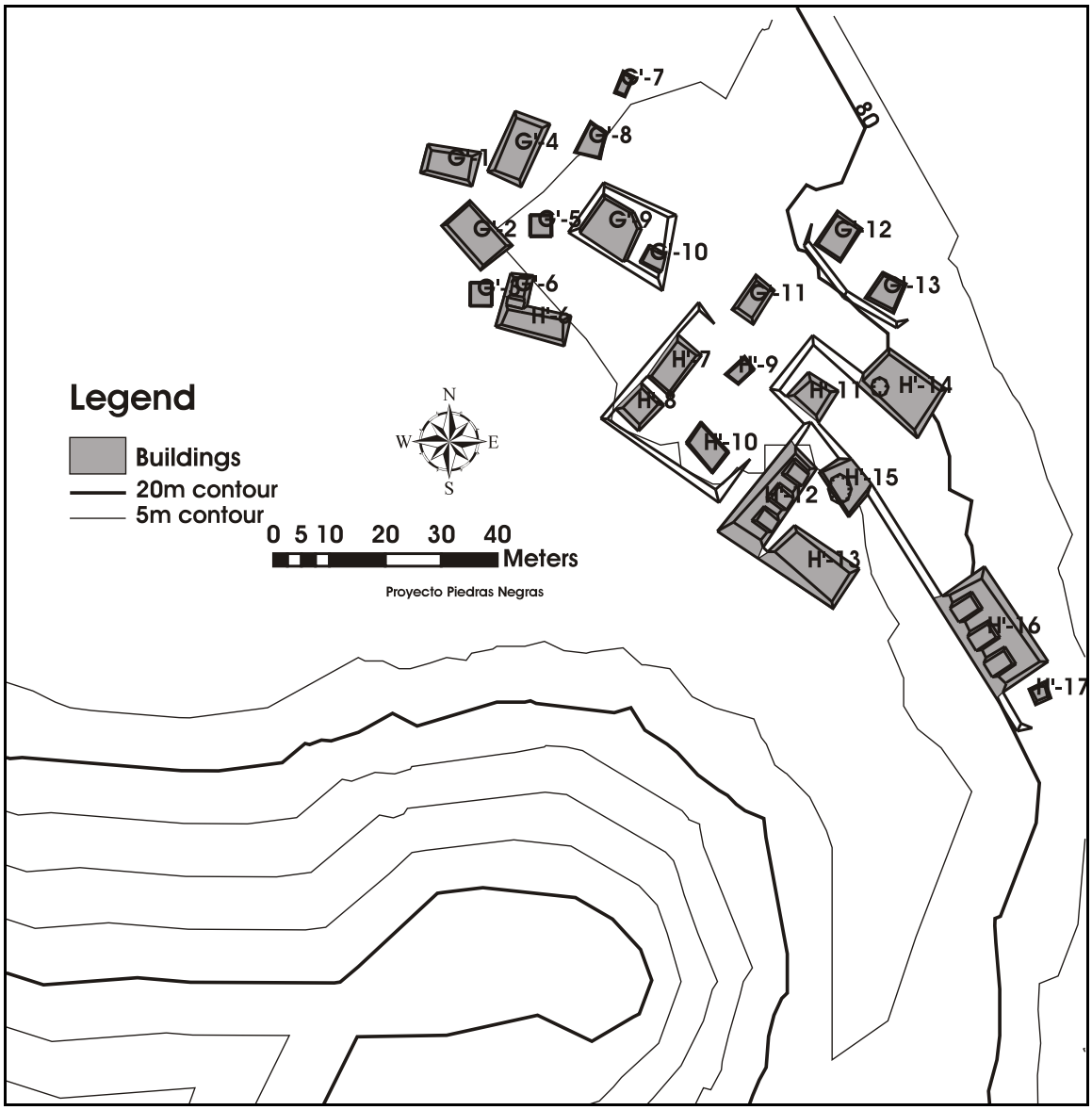


Figure 4.18 H'-7 to H'-17, G'-11 to G'-13

Other Buildings

During the course of excavation and clearing, some other buildings have been discovered and added to the map. These are typically small platforms believed to have served as ancillary structures next to the more impressive architecture that they are associated with. These buildings are: J-33, J-34, J-35, R-35, R-36, R-37, U-28, U-29 and Z-8.

GIS AND DIGITAL MAPS

Modern maps are often generated by computer software, and can include more details than traditional paper maps. Geographers have expanded their capabilities in creating maps with the advent of Geographic Information Systems (GIS). Basically, a digital map has features, such as buildings, linked to databases, such as ceramic phase, which in turn allow the digital map to be searched, modified, and its features simulated according to the researcher's interests. This technology changes maps from descriptive entities into manipulable research tools.

Archaeological use of GIS generally falls under data mining, predictive modeling, and dynamic simulation (Anaya 2001: 28, see also Berry 1995). Data mining consists of the retrieval of information from databases in specific relationships. I use data mining practices to locate obsidian artifacts (database information) from test pits (spatial component) in particular time periods (temporal database). Predictive modeling can give a spatial location to a predicted outcome. It maps geography to inputs to generate plausible locations of interest. The third use is dynamic simulation. This is real-time simulation of variables into the digital map to see how the variables change the map's features. This allows the researcher to interact with the map's attributes and features to pinpoint sources and quantities of change within a model. This dissertation focuses mainly on data mining principles to track the changes that occurred over time and space within Piedras Negras.

Linking Artifacts to Digital Map Model

The steps involved in moving from a paper map to a digital version of the same are myriad. The paper map needs to be either traced by hand into the computer or scanned and then traced into a vector (digital) format. Once the map has been changed into vector format, attributes need to be assigned to each feature of the map, which is usually done either in Autocad or a geographic modeling software like ArcGIS. Features are objects represented spatially on the map, such as buildings or contour lines. ArcGIS allows features to be linked in databases to attributes which can include names, elevations, artifact types, etc. The combination of features and attribute data is what makes the digital map interactive. Attributes can be searched and manipulated and then the desired result can be shown spatially with the corresponding features highlighted on the digital map.

Design of PPN GIS Map and Datasets

The Proyecto Piedras Negras digital map that I have created includes several different kinds of features and databases. The initial plan map created by Parris and company was digitized by members of the Geography Department of Brigham Young University. As previously mentioned, the surveying performed under the auspices of the Proyecto Piedras Negras was added to the map, creating an integrated whole. Buildings were assigned names in

their attribute tables and contours were assigned elevations thus creating a digital topographic map of Piedras Negras.

Archaeologists are interested in more than just topography. Nathan Curritt spent one field season mapping the excavations of that year with the Topcon Total Station. Each mapped test pit was then added to the digital map. Subsequently, I added every test pit included in this dissertation to the digital map, and more generally showed the location of other operations within the center. The utility of this work is that an individual unit may be shown with its adjacent map features. The location of test pits is useful information for recreating archaeological contexts, but archaeologists are interested in the contents of the test pits as well as their location.

Databases of artifacts from the units included in this dissertation have also been added to the digital map of Piedras Negras. I created a database of the ceramic information provided by Rene Muñoz and tied this to the test pit data. This allowed me to search by ceramic attributes within the test pits and find those with a particular ceramic attribute. Likewise, I have created databases for other major artifact categories including bajareque, chert, disks-malacates, figurines, groundstone, obsidian, pumice, and river rocks. These databases can be cross-linked (test pits containing manos and pumice for example) or can be searched singly. The data included in each database largely pertain just to my operations, because I do not have permission from other investigators to include their data. However, because my operations include 39% of the operations from the Proyecto Piedras Negras, a considerable portion of the artifact data from the center can be referenced in the digital map.

SUMMARY

The original University of Pennsylvania map of Piedras Negras has been greatly augmented via laser-guided survey of the southeastern edge of the center. The original map contained errors in the placement of structures, but those errors are mitigated in the current version of the Piedras Negras map included with this document. As someone who has surveyed in and around Piedras Negras, I have the utmost respect for those who created the Penn map. Theirs was not just a labor of love, it was a work of art.

Additional surveying by the Proyecto Piedras Negras has added over 90 mounds (structures) to the map. These buildings are mainly clustered in the southeastern corner of the map and represent only some of the known buildings that were created for the benefit of the center's inhabitants. All of the excavations from the Project have been included on the digital map, as well as links to databases containing the artifacts from the operations included in this dissertation.

Table 4.0: Station Placement

Number	Name	Y	X	Z	Description
0	a01	499597.331	500127.619	88.774	Between R-8 and R-14
1	a02	499565.339	500130.287	93.436	In passage between R-8, R-14 and R-9
2	a03	499555.441	500124.584	95.085	On R-9, in North Room
3	a04	499551.016	500121.200	93.729	On R-9, in South Room
4	a05	499532.638	500103.151	93.458	On R-10
5	a06	499496.919	500078.838	83.317	In front of R-1, S of fallen stela near trail
6	a07	499356.591	500156.714	66.251	On trail from Big Ceiba across bajo
7	a08	499342.813	500201.483	69.146	In bajo E of trail, 46 m
8	a08b	499351.302	500174.633	68.205	between a8 and a7 unmarked
9	a08c	499336.008	500160.153	66.334	unmarked on trail S
10	a08d	499383.423	500150.984	65.886	unmarked on trail N
11	a09	499286.588	500218.330	70.971	Patio V-28, V-32
12	a10	499286.442	500215.555	71.195	Patio V-28, V-32
13	a11	499275.171	500247.995	72.581	Patio V-33, V-34, V-35
14	a12	499283.550	500179.742	75.176	On terrace above trail from big ceiba across the bajo by cliffs west of building 1
15	a13	499255.867	500207.778	78.210	SW corner V-31
16	b01	499252.305	500294.021	72.389	51 m From A-11 along trail going east on south side of trail
17	b02	499265.639	500344.480	71.912	52 m From B-1 along trail going east on north side of trail by old ant hill
18	b03	499241.181	500382.154	74.477	45 m From B-2 along trail going east on south side of trail
19	b04	499247.851	500436.490	73.369	55 m From B-3 along trail going east on south side of trail junction at which trail continues straight and turns south (towards Amy BS25)
20	b05	499271.486	500465.596	78.117	38 m From B-4 along trail going east on south side of trail past the mounds
21	b06	499275.311	500299.092	71.351	N of B1 beside building

Number	Name	Y	X	Z	Description
22	b07	499356.510	500440.358	74.115	28 m from F4 East (100deg) North of the turtle carving.
23	b08	499346.663	500395.588	70.088	21 m from F4 SW (230deg) down in arroyo south bank
24	b09	499338.990	500377.186	70.797	20 m from B8 SW (245deg) on south bank
25	b10	499332.931	500347.578	71.889	30 m from B9 W (260deg) on north bank
26	b11	499311.902	500337.718	69.619	23 m from B10 S (200deg) on south bank
27	b12	499305.531	500308.315	70.260	30 m from B11 W (260deg) on north bank, NE of B6
28	b13	499336.410	500224.407	69.986	24 m E (100deg) from A8, N of A10
29	b14	499326.853	500255.527	70.888	32 m 105deg from B13, N (0deg) of A11
30	b15	499386.827	500391.345	79.416	21 m W (260deg) from F5
31	b16	499373.944	500374.756	74.562	21 m W (235deg) of B15
32	b17	499351.073	500347.128	73.195	35 m SW (230deg) of B16
33	b18	499331.222	500326.907	73.243	28 m SW (225deg) of B17
34	c01	499211.057	500450.656	75.586	40 m from B-4 along trail going south on west side of trail.
35	c02	499188.574	500468.552	75.490	29 m from C-1 along trail going south on east side of trail.
36	c03	499173.557	500464.316	75.292	15 m from C-2 along trail going south on east side of trail.
37	c04	499144.024	500447.094	75.703	34 m SSW (210deg) of C3 on trail to Amy, east of trail
38	c05	499112.441	500415.949	76.960	44 m SW (225deg) of C4 SW of trail
39	c06	499066.899	500401.724	79.002	48 m S (195deg) from C5 SW of trail
40	c07	499025.443	500432.893	78.211	51 m SE (140deg) from C6 SW of trail
41	c08	499004.496	500464.789	80.106	38 m E (120deg) from C7 SW of trail near big tree
42	c09	498978.537	500492.798	81.017	38 m E (138deg) from C8 NE of trail
43	c10	498937.144	500539.256	85.040	62 m E (130deg) from C9 NE of trail near Yax-Nich

Number	Name	Y	X	Z	Description
44	c11	498901.083	500572.371	87.965	49 m SE (140deg) from C10 NE of trail
45	c12	498866.594	500580.033	91.093	35 m S (170deg) from C11 SW of trail near rock outcrop
46	c13	498836.992	500603.325	93.675	38 m SE (140deg) from C12 SW of trail W of Amy
47	c14	498825.514	500626.866	95.923	26 m E (115deg) from C13 SW of trail SW of Amy
48	c15	498794.000	500646.000	98.000	36 m SE (150deg) from C14, past Amy's up trail
49	c16	498762.000	500679.000	102.000	46 m SE (130deg) from C15, up trail on North side
50	c17	498729.000	500750.000	107.000	79 m SE (115deg) from C16, up trail on North side
51	c18	498714.000	500793.000	112.000	46 m SE (105deg) from C17, up trail on North side
52	c19	498672.000	500811.000	119.000	47 m SE (160deg) from C18, Base of Amy 98 "Miko"
53	c20	498650.000	500835.000	136.000	36 m 110deg uphill from C19 on Miko site
54	c21	498640.000	500851.000	136.000	19 m 120deg from C20, on SE corner of Miko site
55	c22	498615.000	500867.000	127.000	31 m 145deg from C21, downhill from Miko
56	c23	498570.000	500878.000	126.000	46 m S (160deg) on South side of trail across from "Cuchara"
57	Cavers	498835.518	500626.583	96.339	23 m E of C13 at base of Amy, ground-level
58	chr1	499439.252	500076.483	78.192	PN 33A-E
59	chr2	499442.290	500070.081	78.877	PN 33A-E
60	chr-zn1	499412.453	500084.696	74.048	S of U-16 overlooking the bajo
61	d00	499933.842	499949.059	99.925	Metal stake south of Altar A-1
62	d01	499938.656	499938.133	100.000	wooden stake 2 m north of Altar A-1
63	d03	499945.330	499924.457	105.069	Between J-1 and J-4
64	d04	499966.245	499901.699	127.192	Top of J-4 (in Trench)

Number	Name	Y	X	Z	Description
65	d05	499971.854	499895.601	126.004	Top of J-4 (in Trench)
66	d06	499991.980	499882.851	112.819	By J-15
67	d07	499966.116	499851.389	121.934	S side of J-11, in patio
68	d08	499960.128	499856.384	120.493	N J-9 in patio
69	d09	499988.360	499859.956	121.056	Between J-11 and J-12
70	d10	499947.120	499828.756	128.622	Corner of J-21 and J-18
71	d11	499939.690	499810.458	128.032	NE corner J-19
72	d12	499961.323	499804.097	133.603	Near J-20
73	d13	499951.143	499797.522	133.382	SW corner of J-20
74	e01	499181.970	500418.241	102.611	54 m up the hill on west side of trail from C-3.
75	e02	499185.380	500409.291	105.936	10 m up the hill (west) from E-1 on a mound.
76	e03	499191.362	500387.316	103.720	22 m west of E-2 near a beehive.
77	e04	499177.474	500367.290	101.804	24 m west of E-3 going uphill near a large rotten log.
78	e05	499161.628	500339.783	110.016	32 m west of E-4 going uphill
79	e06	499145.516	500317.650	116.538	28 m west of E-5 going uphill
80	e07	499124.343	500275.586	127.226	48 m west of E-6 going uphill
81	f01	499304.561	500449.697	78.585	36 m from B5 335deg mag N. East of trail
82	f02	499327.306	500421.487	76.014	36 m from F1 310deg mag N. East of trail
83	f03	499336.385	500404.722	73.654	19 m from F2 300deg (w). Where trail intersects with turtle arroyo
84	f04	499360.165	500412.245	73.351	25 m from F3 due North-north side of arroyo, west of trail
85	f05	499389.206	500412.521	76.861	29 m from F4 due North on west side of trail
86	f06	499421.660	500407.750	81.924	33 m from F5 due North on west side of trail
87	f07	499320.071	500312.311	72.006	15 m from B12 N (20deg)
88	f08	499338.178	500318.456	73.231	20 m from F7 N (20deg)

Number	Name	Y	X	Z	Description
89	f09	499358.137	500324.899	74.452	20 m from F8 N (20deg)
90	f10	499352.701	500236.037	70.573	20 m N (40deg) from B13
91	f11	499371.094	500261.741	72.132	44 m N (5deg) of B14
92	g01	498828.936	500671.684	105.418	46 m E (80) uphill from Amy (C14) toward D Webster
93	g02	498839.995	500707.219	115.029	38 m 60deg from G1 uphill
94	g03	498832.453	500741.049	120.356	35 m 100deg from G2 uphill
95	g04	498816.146	500757.157	128.683	24 m 100deg from G3 on mound
96	g05	498807.800	500767.314	130.702	13 m 120deg from G4, D. Webster Primary Datum
97	h01	499867.000	500006.000	89.000	32 m 250deg from Nate3 on west side of trail
98	h02	499844.000	499980.000	89.000	34 m 220deg from H1 on west side of trail
99	h04	499806.000	499961.000	90.000	22 m 200deg from H3 on top of O-21?, west of trail
100	h05	499783.000	499945.000	86.000	28 m 215deg from H4
101	i01	499458.747	500015.867	82.247	from A-6 (R-1) SE of trail, 73 m 240deg
102	i02	499436.245	500009.878	82.256	E of trail to camp, 23 m 190deg
103	i03	499423.198	499986.229	77.698	27 m 240deg de i2, w of trail arrive at camp
104	i04	499402.737	499964.917	75.803	30 m 230deg de i3, in camp e of lab
105	i05	499381.287	499986.229	72.012	25 m 195deg de i4, above kitchen east side trail
106	i06	499361.210	499931.525	66.189	29 m 215deg de i5, sse of gringo dining area
107	Miko1	498647.000	500845.000	137.000	Building corner on Miko site (Dave Webster knows which)
108	Miko2	498638.000	500839.000	136.000	Primary Datum on Miko (actually 9cm at 210deg from datum)
109	nate12	499624.404	500154.583	82.897	Below and East of R-13
110	nate13	499619.069	500136.833	88.791	East side of R-13
111	nate14	499613.072	500122.432	89.324	Between R-8 and R-13

Number	Name	Y	X	Z	Description
112	NC00	500000.000	500000.000	100.000	Frente al mascaron (K-5)
113	NC01	499954.000	500000.000	100.000	46 m desde pt. 0
114	NC03	499877.000	500036.000	86.000	43 m
115	NC04	499851.000	500074.000	83.000	46 mdesde pt. 3. Almost at O-13 (Same as Shelby 7)
116	NC05	499848.000	500088.000	83.000	14 m tras la estela en O-13, frente al tunel
117	NC06	499820.000	500122.000	84.000	44 m entre O-13 y P-7
118	NC07	499802.000	500161.000	85.000	43 m
119	NC08	499747.000	500177.000	85.000	58 m right hand of sweat bath P6
120	NC09	499667.000	500205.000	78.000	84 m dolor de cabaze (S-19)
121	NC10	499652.000	500196.000	78.000	18 m
122	NC11	499623.000	500210.000	77.000	32 m En el grupo S, frente al templo S-11 (Same as 14 Shelby)
123	NC12	499624.000	500155.000	83.000	55 m
124	NC13	499619.000	500137.000	89.000	18 m East of R-13
125	NC14	499613.000	500122.000	89.000	16 m frente a R-13
126	NC15	499618.000	500086.000	90.000	37 m
127	NC16	499655.000	500072.000	92.000	40 m
128	NC17	499716.000	500049.000	96.000	65 m O-2a
129	NC18	499751.000	500035.000	95.000	38 m
130	NC1b	500000.000	500000.000	100.000	frente al mascaron 47 m
131	NC20	499828.000	500053.000	82.000	45 m al otro lado de O-13
132	NC21	499860.000	500019.000	85.000	47 m
133	NC23	499883.000	499962.000	98.000	26 m donde trabaja Lilian
134	NC24	499933.000	499949.000	100.000	51 m
135	NC25	499938.000	499938.000	100.000	12 m
136	NC26	499980.000	499957.000	99.000	46 m
137	NC30	500050.000	499903.000	81.000	21 m
138	NC31	500148.000	499789.000	69.000	en la milpa 150 m

Number	Name	Y	X	Z	Description
139	NC32	500144.000	499764.000	68.000	26 m
140	NC33	499453.000	500059.000	81.000	estaca metalica backsight Aux. no. 4 of cap. 3 27 m llegando al encampamento
141	NC34	500037.000	499991.000	105.000	saliendo de pt 27 arriba hacia los K 39 m
142	NC36	499937.000	499873.000	111.000	in front of Steve and Mónica's stuff al lado de J-4. Backsight = pt 35 29 m plaza 1
143	NC37	499967.000	499864.000	121.000	en el lado sureste de la plaza 2 de la acropolis. Backsight is pt. 35 31 m
144	NC37b	499945.000	499832.000	128.000	casi a plaza 3 39 m
145	NC38	499934.000	499820.000	129.000	En el mero patio de la plaza 3 de la acropolis 16 m
146	NC39	499954.000	499803.000	134.000	Al lado de J-20 26 m
147	NC40	499927.000	499857.000	113.000	New backsight for pt 36 en plaza 1 de la acropolis 18.5 m
148	NC-CiP	499943.000	499806.000	131.000	Carlos intermediat point 12 m
149	sr	499338.955	499900.737	54.749	On top of Sacrificial Rock at bottom of carving

Chapter 5

House-mound Excavations

U SECTOR: OPERATION 33

Lying to the southeast of the South Group Court, and just off the South Group plaza on the east are several patio groups. They form a discrete spatial unit bounded on the north by the R-3 mortuary temple, on the west by the elevated platform called the South Group plaza, and on the south and east by a natural escarpment. Access to this group was probably from the north and west, following the natural contours of the land. These patio groups are believed to have formed a “neighborhood” or a discrete social entity within the community. For this reason, this area was chosen for large-scale excavations in the hope of identifying communal features and understanding household heterogeneity within Piedras Negras. Excavations in this area were conducted by Wells (1998-1999) and myself (2000) during three field seasons (Figure 5.0).

There are ten structures arranged in loose patio formations. Of these, five (U-5, U-6, U-8, U-16, and U-17) were completely exposed by archaeologists and another two (U-19 and U-29) were test-pitted. The buildings lie on four possibly natural terraces, named from the most elevated to the least: Garcia, Heredia, Sajqui and Asig. (They were named for Wells’s 1998 excavation team.) In addition, each patio was given a letter designation by Wells to further identify it, A through K. Two structures were added to the map, U-28 and U-29, because they were overlooked by the original surveyors (Figure 5.1).

PN33A-E

E. Christian Wells excavated a patio group in the U-sector (Wells 1998b, 1998c, 1999) composed of three main buildings, U-8 (on the north), U-16 (to the west), U-17 (on the south) in the general style of a Tikal Plaza Plan 2 (Becker 1971) or Quirigua Pattern 3 (Ashmore 1981).

His excavation methodology was complete horizontal exposure of the patio group, including associated patios and ambient spaces, coupled with extensive vertical excavation of all units, preferably to bedrock. The presence of large trees and time limitations precluded bedrock excavations in some areas. The usual size of the excavation unit was 2x2 meters with occasional changes made to facilitate excavations, because rock alignments and walls often do not fall nicely into the proper excavation unit. The materials recovered were processed in the lab in the same way as all other archaeological material. Most material was screened in the field, with a 1/4" sieve, but there may be a slight bias for larger artifacts. In addition to the normal recovery of archaeological remains, float and soil samples were taken from nearly every unit for subsequent analysis. The soil samples were analyzed at Brigham Young University by Dr. Richard Terry and his students (Wells et al. 2000, Parnell et al. 2002).

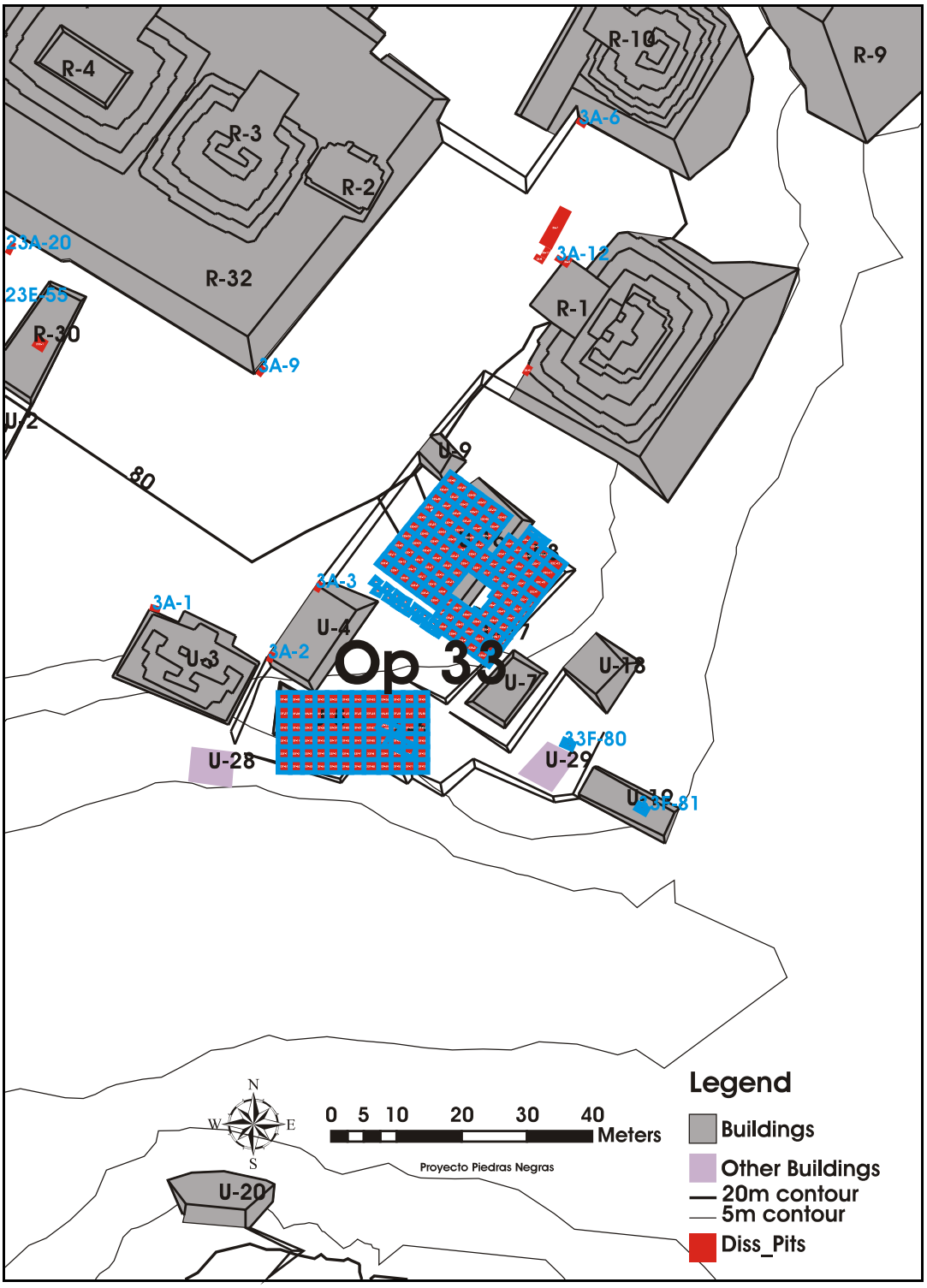


Figure 5.0 Operation 33, showing individual excavation units

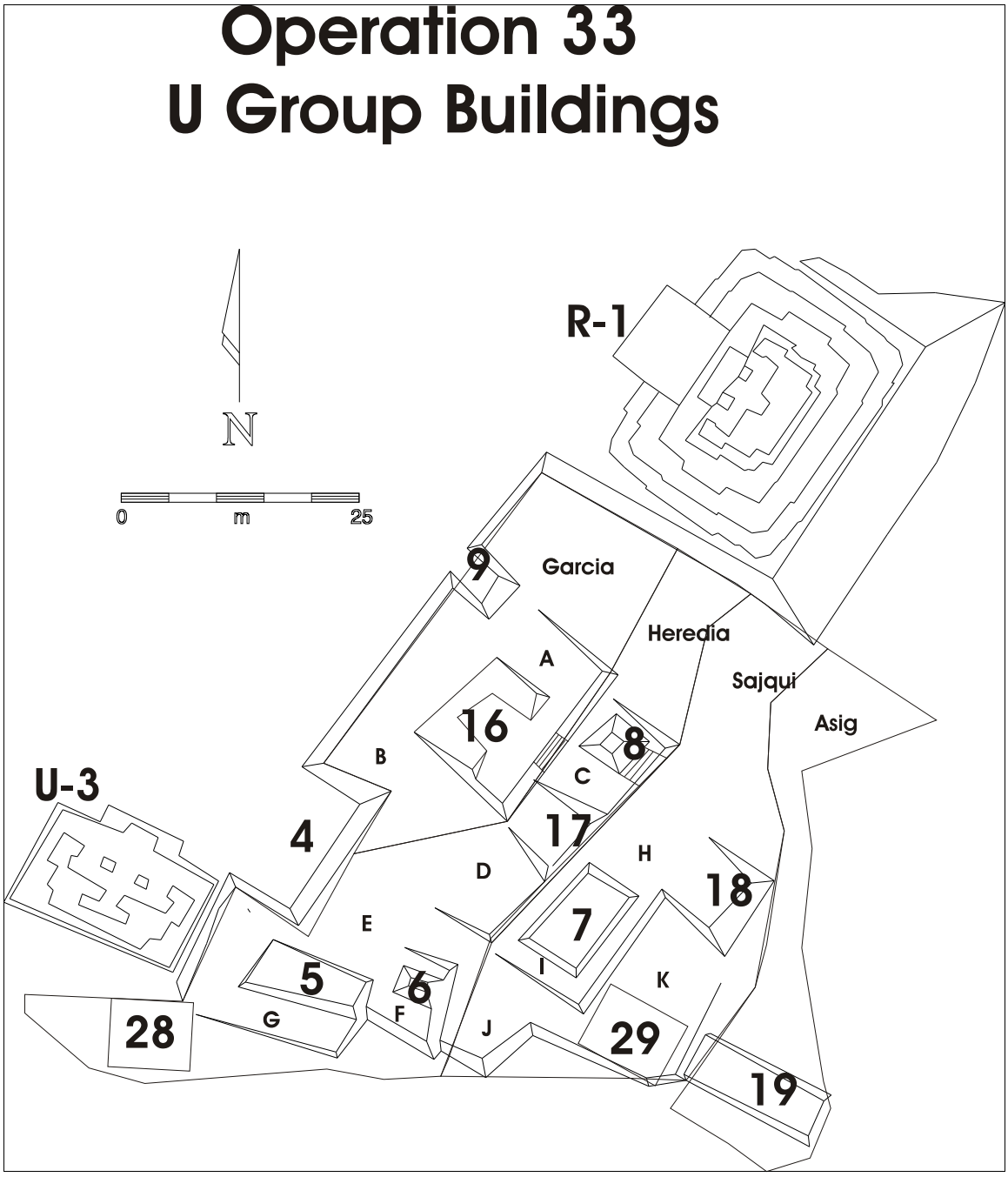


Figure 5.1 Plan map of U group neighborhood

PN 33A

This suboperation consisted of 17 test pits placed in a straight line across the patios B and D, to the west of U-16 and along the western wall of U-17 (Figure 5.3). The purpose of these units was to understand the formation of the Garcia terrace and the construction of the patios. The size of an individual test pit was generally 1x1 meter and they were placed in a checker-board fashion along the line in order to maintain the profile of the trench. In this way a 2 by 14 meter trench transected the patios. Units 1-13 were placed in Patio B, and units 14-17 were placed in patio D. All units were excavated to bedrock.

The essential finding of this suboperation is that the limestone bedrock had been shaped into a flat walking surface by the inhabitants. Patio B has two different levels, with a small step leading from one to another (Figure 5.16). Patio D likewise had evidence of being a flat surface in antiquity. There is also some evidence of water management, i.e., a small ditch leading from the southwest corner of U-17 into patio D (PN33B-3).

An interesting feature of patio D was the discovery of a cache/burial located near the northwest corner of U-17. This cache (PN 33A-16-3) consisted of four vessels with a possible cremation inside one of the vessels (Figure 5.2). Vessel #1 contained ash and a jade bead, this vessel was placed inside Vessel 2, which was then placed inside Vessel 3 with Vessel 4 inverted over Vessel 3. The cache (or burial) was discovered 44 cm below the actual ground surface in a small hole cut into the bedrock.

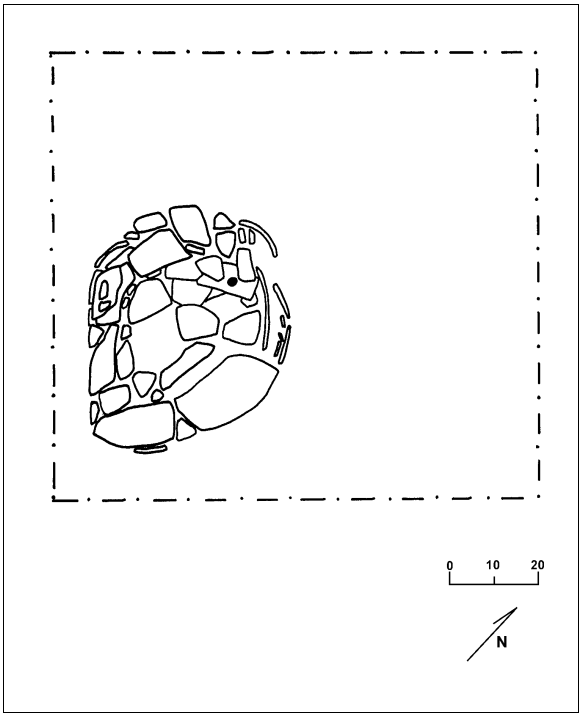


Figure 5.2 Offering U-17-1, PN 33A-16-3 (From Wells 1998b:224)

It appears that the terraces were artificial constructs cut into the bedrock and that the buildings were then constructed over the naked surface. This degree of pre-construction activity indicates that the initial inhabitants had some control over labor. Artifacts discovered in this suboperation consisted mainly of ceramics, figurines, lithic material and very little bajareque. The ceramics date to the Yaxché phase as the earliest, with predominately Chacalhaaz types found throughout the units. PN 33A-6 had some Kumché phase material, thus, taken altogether, the ceramic evidence indicates that the patios were created, used, and abandoned between the Yaxché (or possibly earlier) and Kumché ceramic phases.

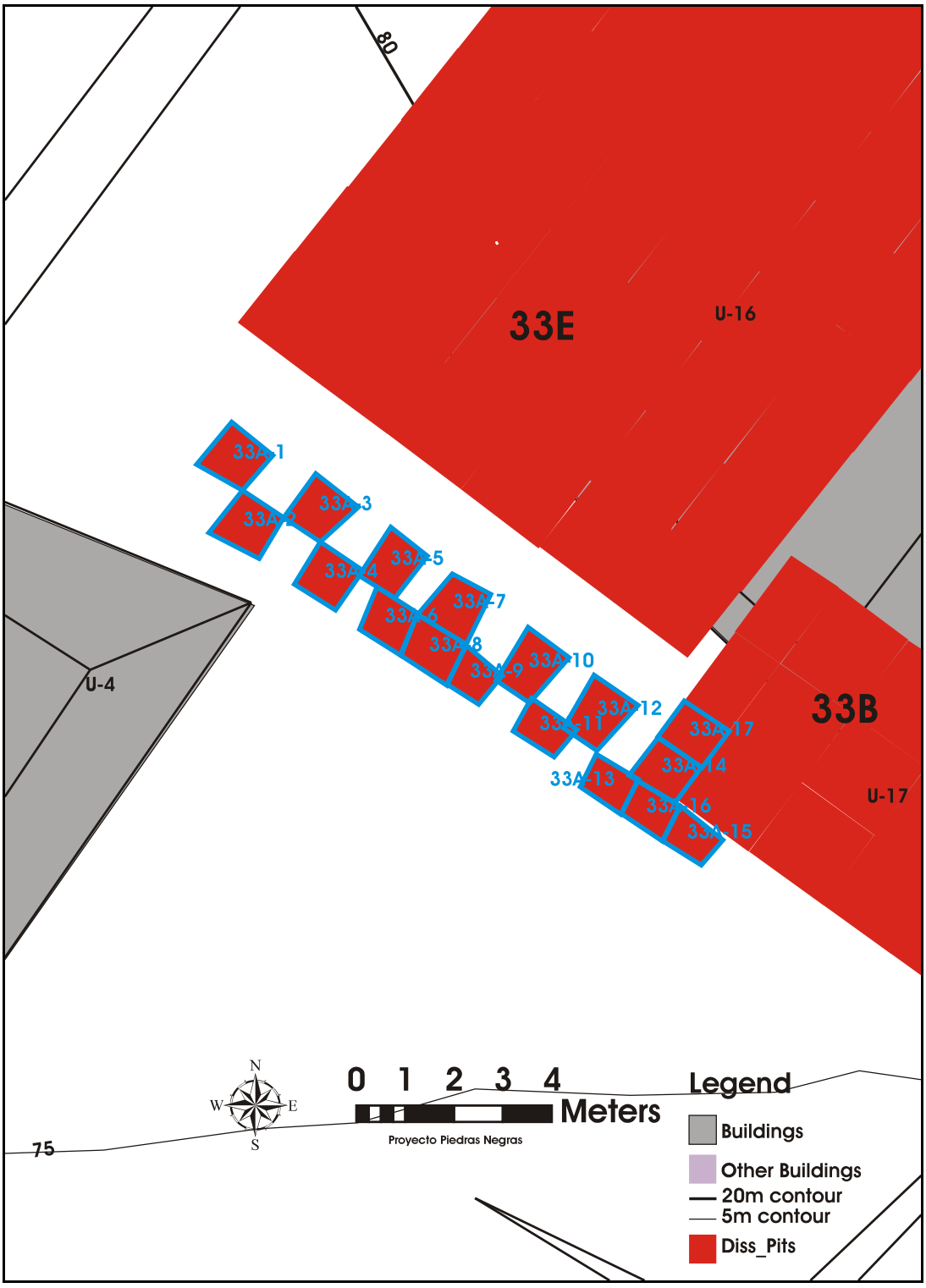


Figure 5.3 Sub-operation 33A

PN 33B

PN 33B focused on structure U-17 and its adjoining patio D (on the west, Figure 5.4). This suboperation consists of 28 units placed during the 1998 season, and another 8 units excavated during the 1999 season, all under the direction of Christian Wells. The excavations recovered a wealth of ceramic and other artifacts throughout the excavation, and revealed the architectural sequence for U-17. Units 1-5 were placed along the south side of the structure in Patio D, units 7-9 and 14 were placed along the eastern side of the building, units 10-13 and 15-28 were placed within the structure. Units 6, 28, 31, and 32 examined the west side of U-17-2nd. Unit 29 uncovered the main axis of Bench 1 of U-17-1st. Unit 30 uncovered Bench 2 of U-17-1st. Finally, units 33 an 34 were placed on the north side of U-17-sub. Bedrock was reached in units 1-9, 14, 22, 23, 28, 29, 30 and 33.

Patio D measures approximately 8 m east-west and has a step dividing it into two parts, 5.20 m downslope from Patio B. Along the south-western corner of U-17, there are three steps cut into the bedrock rising up to the second level of Patio D, towards patio B. The lowest step is 40 cm high and 48 cm wide, then the middle step is 20 cm high and 64 cm wide, and the top step is 48 cm tall. Two burials were discovered in the patio (Burial 40 and 41) in cists cut into the bedrock. These burials were placed just to the west of structure U-17, near the northern border of patio D.

U-17 underwent three renovations during its use-cycle. The initial building is called U-17-sub, which was renovated into U-17-2nd, and then further changed into U-17-1st (Figure 5.15).

U-17-sub

The initial building (U-17-sub) was a small, low (one course of stone about 20 cm high) platform, perhaps with a perishable superstructure. Little of this structure was actually recovered, and there is some suspicion that some of the well-cut stones used in this construction were removed later on and used in later constructions. A part of the structure, found around Burial 46, measured 0.30 x 2.00 m.

U-17-2nd

This phase of the structure measured 3 m x 5.50 m and 1.60 m tall and was covered by later remodeling. The northwest and southwest corners of the U-17-2nd platform were uncovered, lengthwise it measures 2.14 m north-south with an upper terrace that measures 1.68 m north-south. Along the length of the west side, the platform rises 0.12 m, even though the platform rises 0.21 m along the facade (or north side). This suggests that there once existed a north stairway. Burial 72 was found in the west side of this structure.

U-17-1st

U-17-1st was the last construction episode of the building. The platform of the structure measured 6 m x 10 m and was 40 cm tall on the west side and 160 cm tall on the east side. The only other features were two benches. Bench 1 is a T-shaped bench placed along the western wall of the structure. It measures 1.59 m x 4 m and only 20 cm of its original height is preserved.

On either side of the bench is a small room, each measuring 1.13 x 1.62 m. Bench 1 appears to lie along the same line as the central axis of U-8 and Burial 61 was found under it. The second bench lies just a meter away to the northeast, and is also T-shaped. It measures 1.7 m x 2.70 m with only 30 cm of its original heigh remaining. Small rooms appear to lie on either side of this bench as well, but they are not so well preserved. These rooms measure 1.08 m x 1.44 m. Burial 46 was discovered under bench 2.

Along the eastern side of the building is a terrace that measures 1.50 x 6.00 m and 96 cm tall. In the extreme north of the terrace the excavation revealed two equal sized steps leading into the structure measuring 0.78 x 0.80 meters and 43 cm tall. Along the south eastern corner of the building was another set of stairs, leading into Patio C. These steps were also of equal dimensions and measured 0.50 x 1.44 m and were 20 cm tall.

Middens were discovered along the western wall of the structure, inside Patio D, which would have been an area outside the patio surface.

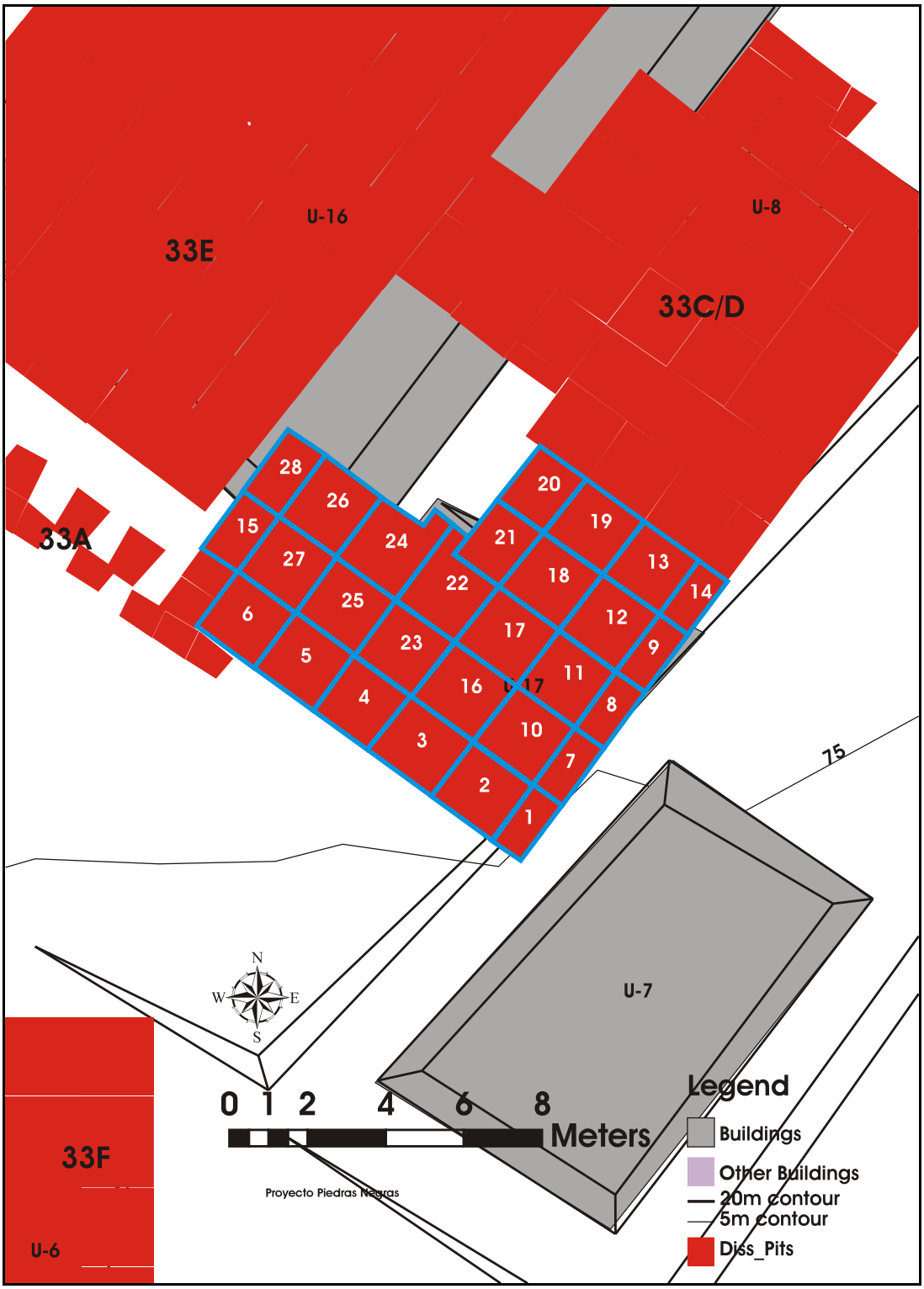


Figure 5.4 Sub-operation 33B

BURIALS

Burial 40 (PN 33B-5-2) was discovered along the northwest side of Structure U-17 in a cist cut into bedrock (Figure 5.5). The cist measured 1.55 x 0.40 m with 19 cm of space inside. It was not covered with lajas. The skeleton appears to be a sub-adult, possibly female, placed in an extended position facing east, lying on the right side. The skeletal remains are in poor condition. Artifacts associated with this burial include a chert tool, 5 broken obsidian pieces, and a small quartzite stone. These were found near the pelvis of the child. Possibly associated with the burial was a rodent tooth (tepescuintle?), some sherds and a burned bone but these are less certain because the burial was not covered. The burial is located 51 cm southwest of Burial 41, and about 20 cm from the U-17 platform with the head away from the platform and abutting an unknown rock alignment that extends into Patio D.

Burial 41 (PN 33B-6-2) is the skeletal remains of an adult individual found parallel to Structure U-17 along the building's north-west side and 57 cm from the structure (Figure 5.6). The burial was placed in an extended position on its back, orientated 60 degrees west of north. The cist was carved into the bedrock and covered with six lajas. It measures 1.65 x 0.50 m and 23 cm tall. Although the surroundings of the cist were bedrock, the walls were lined with stones. Overall preservation was fair. Strangely the feet were removed post-mortem and placed higher up in the cist (possibly there was not enough room inside for them). One of the teeth had a pyrite disk inlay. No artifacts were positively associated with the burial.

Burial 46 (PN 33B-22-3) consists of a single adult burial located under bench 2 of U-17 (Figure 5.7). This individual was placed into a cist over bedrock. The cist measured 1.55 x 0.50 m with 34 cm of height inside and was covered with six lajas. The individual was placed under the central axis of the bench with the head directly under the axis, the body was extended lying on the back with the face looking up. No artifacts were positively identified with the burial, but some were found in the cist's fill including a shark's tooth, 2 fragments of obsidian, 2 pieces of chert and a jute shell.

Burial 61 (PN 33B-29-3) consists of a single adult located underneath the central axis of bench 1 of U-17-1st (Figure 5.8). This individual was placed inside a cist cut into the bedrock which measures 1.83 m (north-south) x 0.33 m wide, that had 18 cm of interior vertical space. The cist was covered with lajas and had no artifacts associated with the burial. The individual had been placed in an extended dorsal position with the head towards the north, and the face looking up. The body was oriented 30 degrees Azimuth.

Burial 72 (PN 33B-6-3) consists of a single sub-adult located beneath the surface of U-17-2nd inside a cist cut into bedrock (Figure 5.9). The cist measures 1.45 m (north-south) x 0.35 m wide with 16 cm of interior vertical space. It was covered with lajas with no artifacts associated with the burial. The sub-adult was placed in an extended dorsal position with the head to the north and the face looking up. The body was orientated 30 degrees Azimuth.

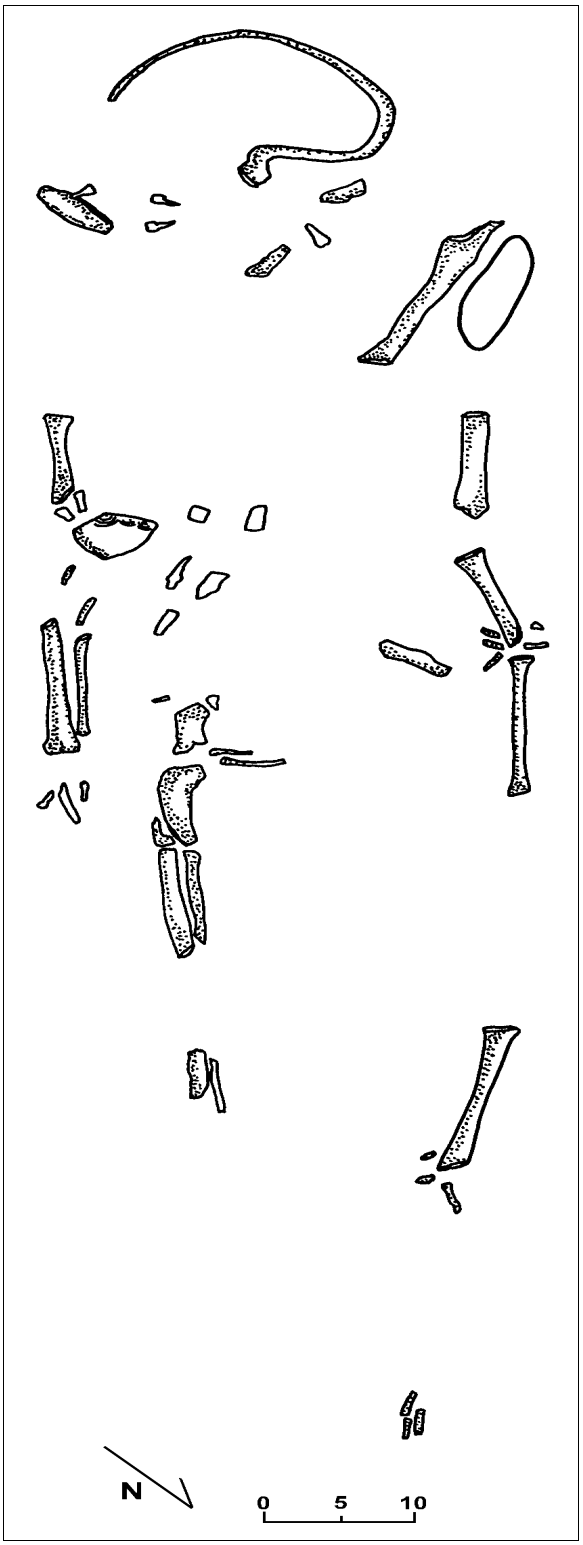


Figure 5.5 Burial 40 (From Wells 1998b:227)

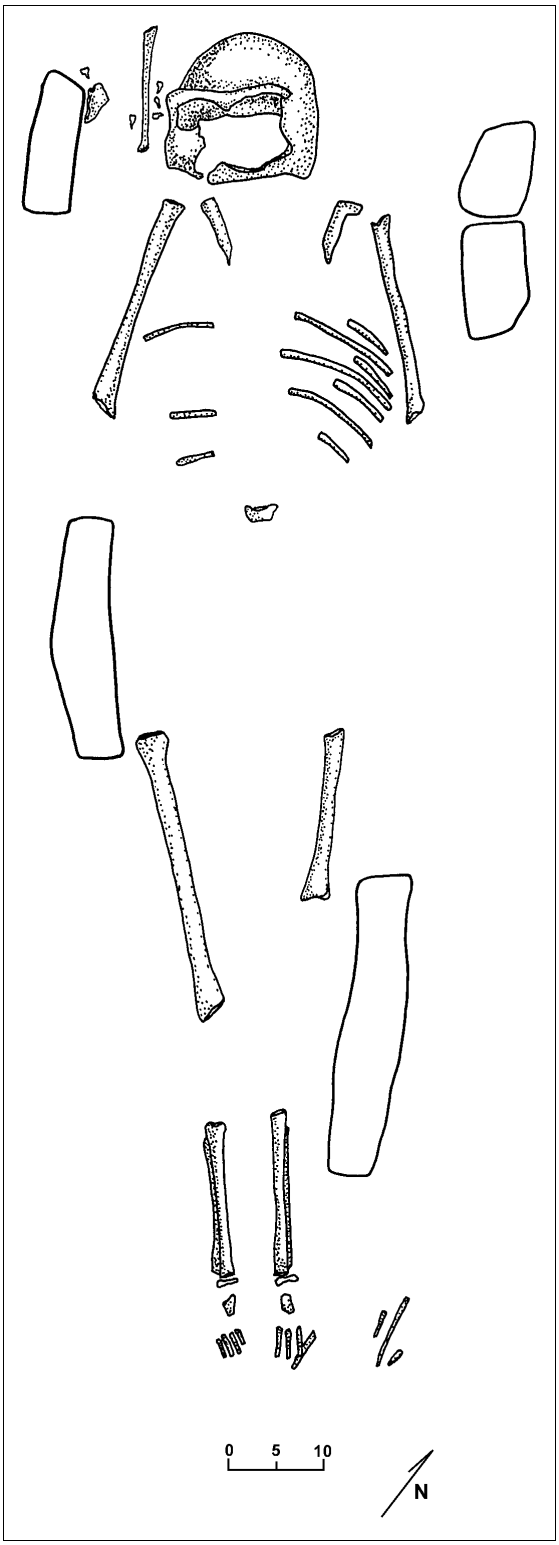


Figure 5.6 Burial 41 (From Wells 1998b:228)

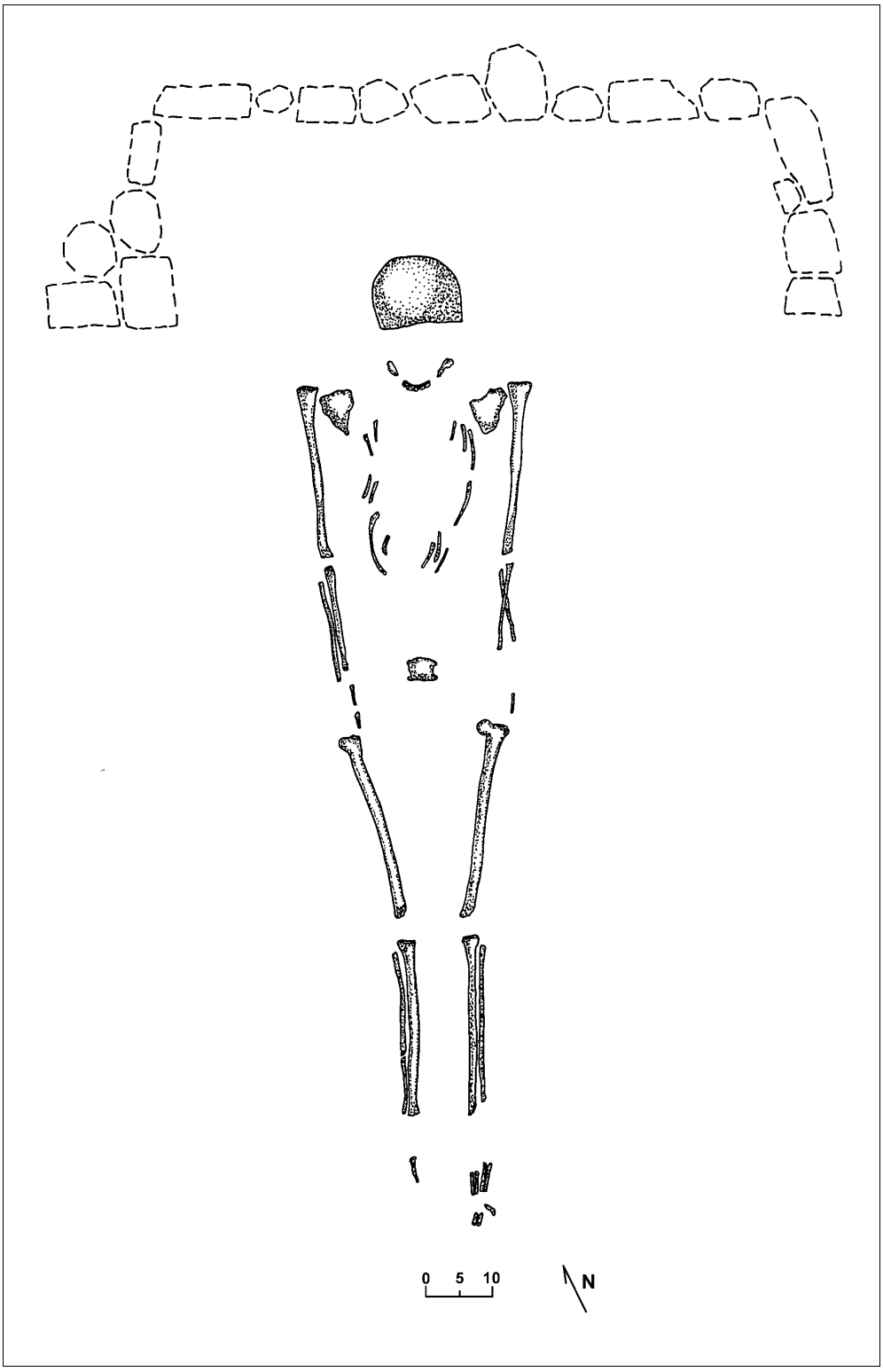


Figure 5.7 Burial 46 (From Wells 1998b:231)

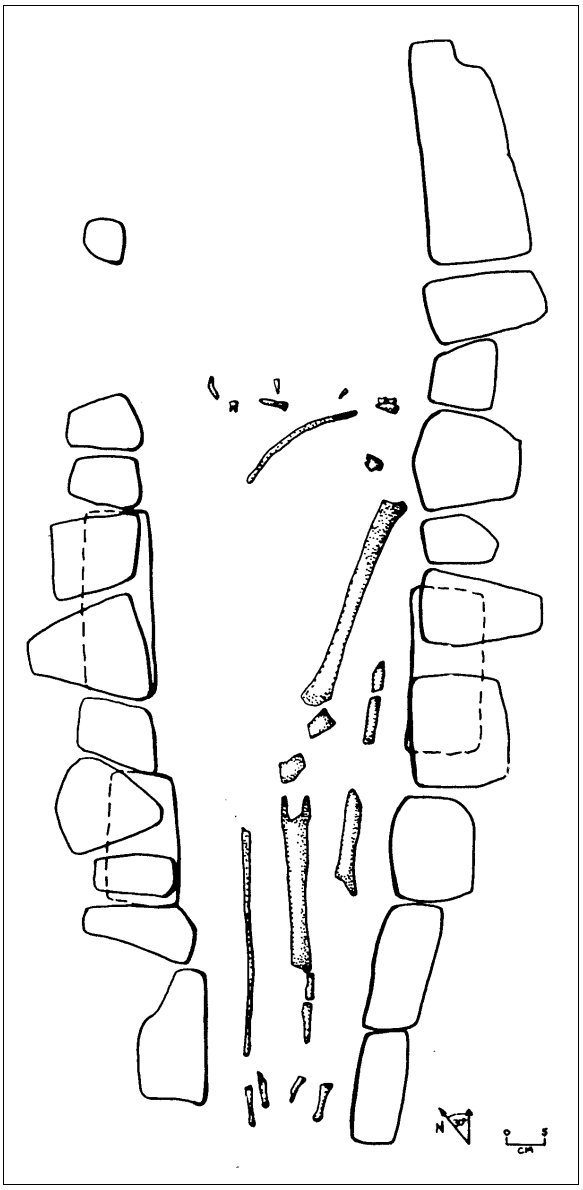


Figure 5.8 Burial 61 (From Wells 1999a:91)

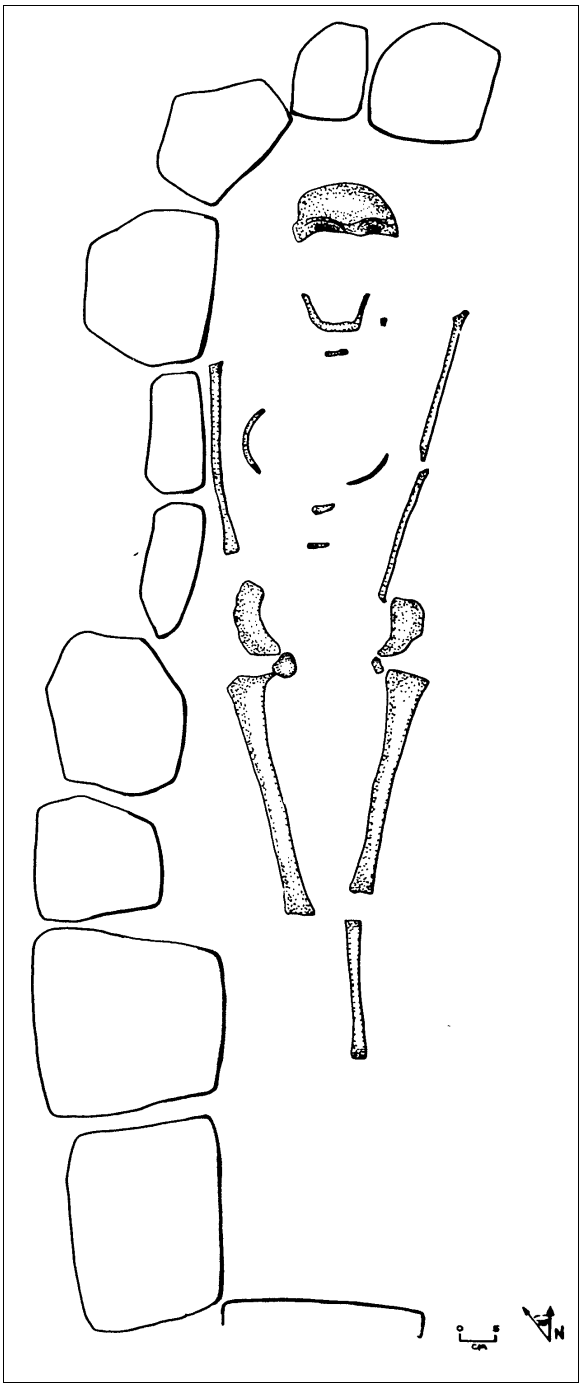


Figure 5.9 Burial 72 (From Wells 1999a:90)

PN 33C

PN 33C focused on the patio between U-17 and U-8 (Figure 5.11). This patio is bounded on the north by U-16, on the east by U-8, and on the southwest by U-17. As such, it was probably the principal floor surface of the group and would have been frequently walked on and through. During the 1998 season, 16 units were placed in the patio and another four units were placed in the 1999 season, all under the direction of Christian Wells. Units 1-6 investigated the center of the patio, units 7, 8, 15, and 16 investigated the east side of the patio and bench 3. Units 9-12 uncovered the staircase in the northeast of the patio, while units 13 and 14 helped to understand the base of U-16's staircase. Units 17 and 18 investigated the south side of U-8-sub. Unit 19 was placed along the east side of U-8-sub while unit 20 examined the west side of U-8-1st. Bedrock was uncovered in units 13, 14, 17-20. A large quantity of artifacts of various kinds was found in this area.

Patio C-sub

The early version of patio C lies under the surface of the later version. It was 30 cm lower than the current surface of the patio, and extended farther along its southeastern edge. On this side the patio was delineated by a small line of worked stones placed over the smoothed bedrock (which may have been an even earlier patio surface) that was 43 cm below the surface of the patio.

U-16-sub is found within this patio phase. This building lies 38 cm below the present ground surface and is defined by two walls which were uncovered (2.40 x 3.00 meters) and a staircase with two steps (0.40 x 0.40 meters) along the south. The platform walls themselves are 40 cm wide and 30 cm tall but were not placed on bedrock. They sit between 10 and 30 cm above bedrock and run under the staircase of U-16-2nd (Figure 5.17).

U-8-sub also has a section lying under Patio C (Figure 5.14). This platform was also found at 38 cm below ground surface. The uncovered portion of the walls (6.30 m east-west x 3.00 m) measure 40 cm wide and are 30 cm tall and they were placed 40 cm above bedrock. This platform runs underneath U-8. To the west of U-8 was discovered an offering associated with the dedication of U-8-1st, four vessels smashed on the platform of U-8-2nd (Figure 5.10). The vessels were discovered along the principal axis of U-8 and were of various forms: Santa Rosa - Horqueta, Santa Rosa - Negra, Hematite Red monochrome, and Naranjo Bruñido with an incised “mat” sign on the base.

Patio C

The current form of the patio was raised 30 cm higher than the previous form to cover the basal stones of earlier architecture. These buried platforms were probably retained to hold in the fill with which the platform was created. To the southeast, the old limit of Patio C was left as a step onto the new surface, leaving exposed 33 cm of the old surface.

Patio C measures 5.40 x 9.40 meters and has two small terraces to the south. The lowest one measures 43 cm wide and is 43 cm tall. The second one is 28 cm tall. There are three large stairs leading to U-8 on the south of the structure, the top two stairs measure 0.80 x 5.80 meters while the bottom (lowest) stair is centered within the staircase and only 2 m long. Each stair rises

approximately 25 cm. The architecture is of good work and the stones are well-formed. This staircase also gives access to the patio in addition to U-8.

Another architectural feature of the patio is Bench 3, situated along the southern edge between U-17 and U-8. This bench, oriented 105 degrees E of Azimuth, is another T-shape bench and measures 1.4 m wide and 4.30 m long with only 10 cm of preserved height. The bench also has two small rooms on each side, which measure 0.92 x 1.40 meters. Below the bench lie two stairs which measure 0.60 m wide and 1.80 meters long and 28 cm high, which connect to the lower terraces.

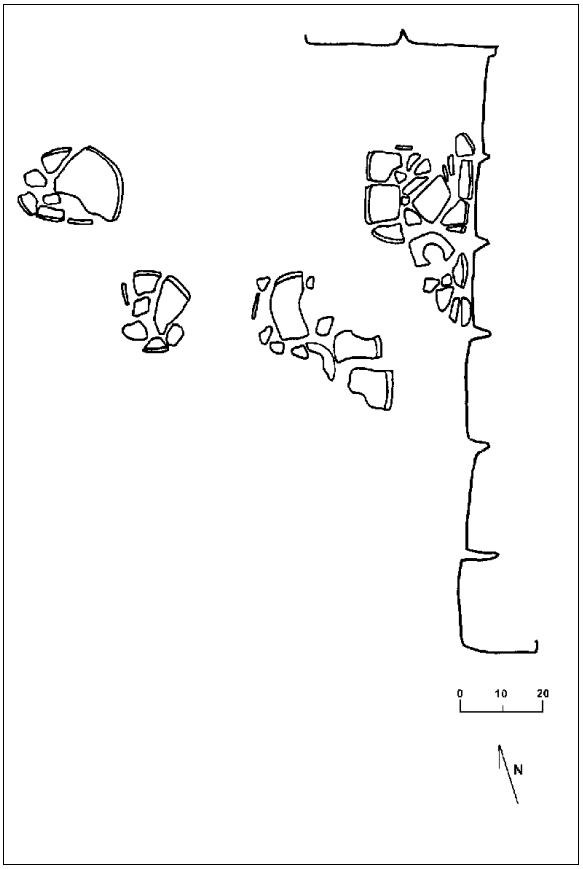


Figure 5.10 Offering U-8-1, PN 33C-4-3
(From Wells 1998b:234)

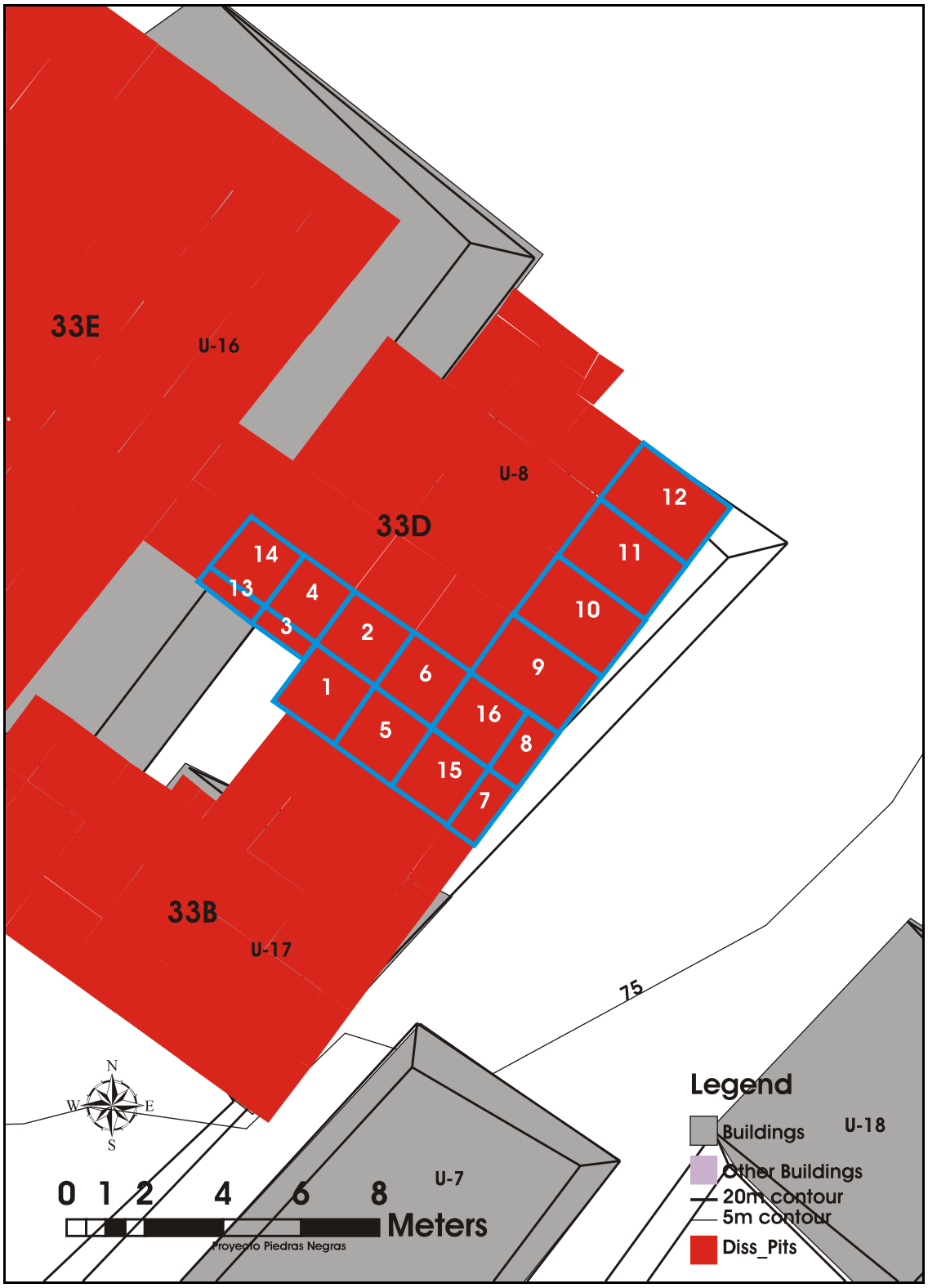


Figure 5.11 Sub-operation 33C

PN33D

This suboperation focused on U-8 (Figure 5.12). Wells placed 18 units in and around this structure during the 1998 season and several more during the 1999 season. Units 1-3 and 6-8 were placed on the structure. Units 4, 5, 9, 10, 14, and 15 were placed on the north side of the terrace. Units 11-13 were placed in the platform between U-8 and the staircase of patio C. Units 16-18 were placed along the west side of the structure. Bedrock was uncovered in units 2, 3, 5, 10 and 15.

U-8-sub

The west wall of U-8-sub sits 2.30 m east of U-16-1st's east facade. This wall segment measures 35 cm high with two courses of stone, 24 cm wide and 32 cm above bedrock. U-8-sub (orientated 30 degrees Azimuth) was partially placed under U-8. Three walls have been uncovered showing 6.3 m running east-west, and 3.0 m running north-south. The walls measure 40 cm wide x 30 cm high and sit 40 cm above the bedrock and continue under U-8.

U-8-2nd

U-8-2nd measures approximately 5.20 x 8.04 meters and its original height is hard to estimate because only the foundation still exists. This does provide some evidence as to its architecture, for the building had straight sides with rounded corners. Underneath the central axis of the building (and the structure) was found Burial 43, placed in a cist cut into bedrock.

U-8-1st

This building phase measures 4.00 x 4.92 meters and currently rises 89 cm above Patio C (Figure 5.18). Wells found no evidence of a superstructure for this building. There is a formal staircase consisting of four steps with each step measuring 2.00 m long with a depth of 20 cm and 23 cm tall. The finishing stones are of good quality, but the interior fill is of rough stones.

Other Features

A small platform 4.72 (east-west) x 5.40 meters (north-south) and 50 cm tall was discovered along the east side of U-8-1st and probably butted up against the building. Also, the border of the Heredia terrace was found about 2 meters north of structure U-8, and is 40 cm tall.

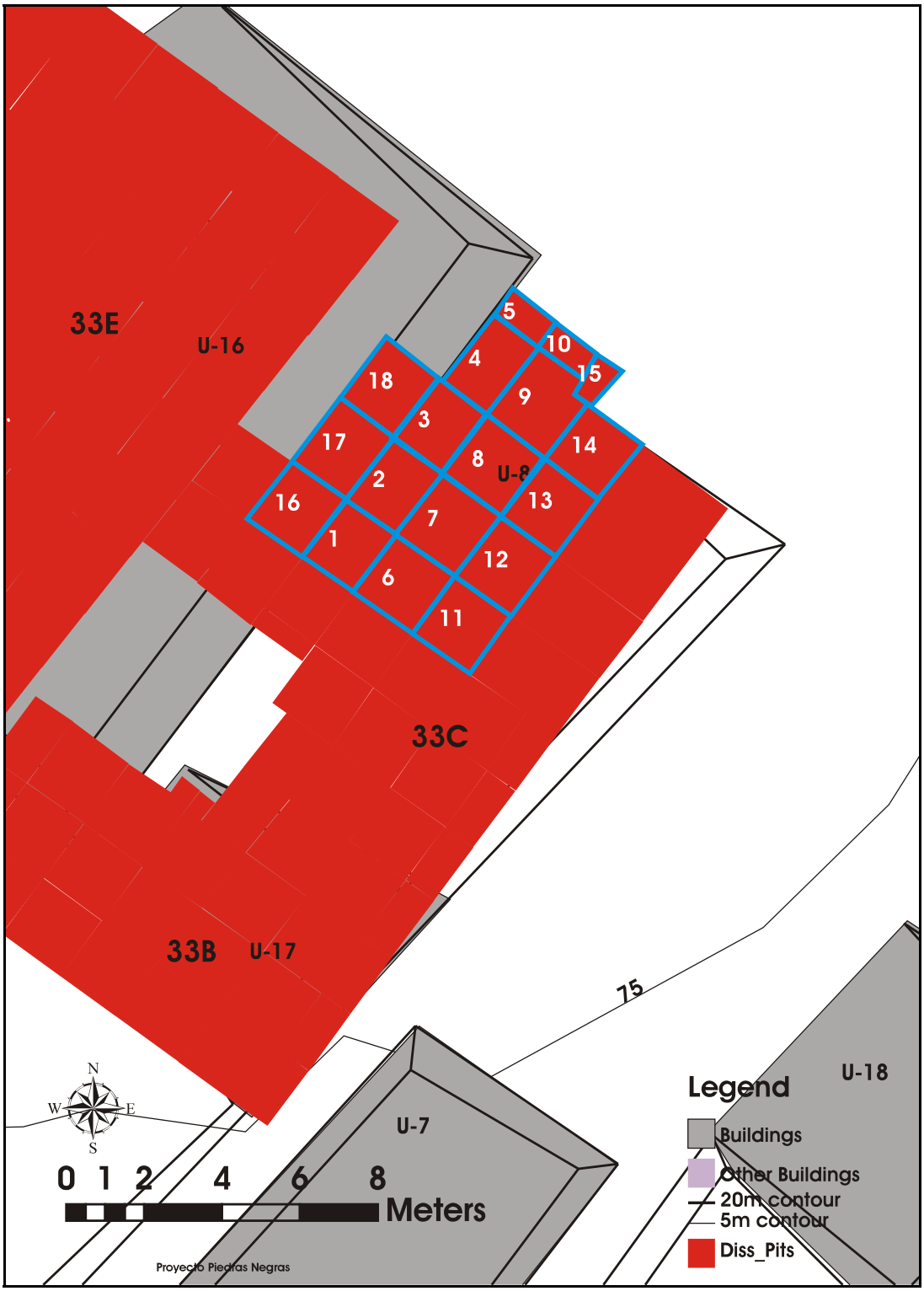


Figure 5.12 Sub-operation 33D

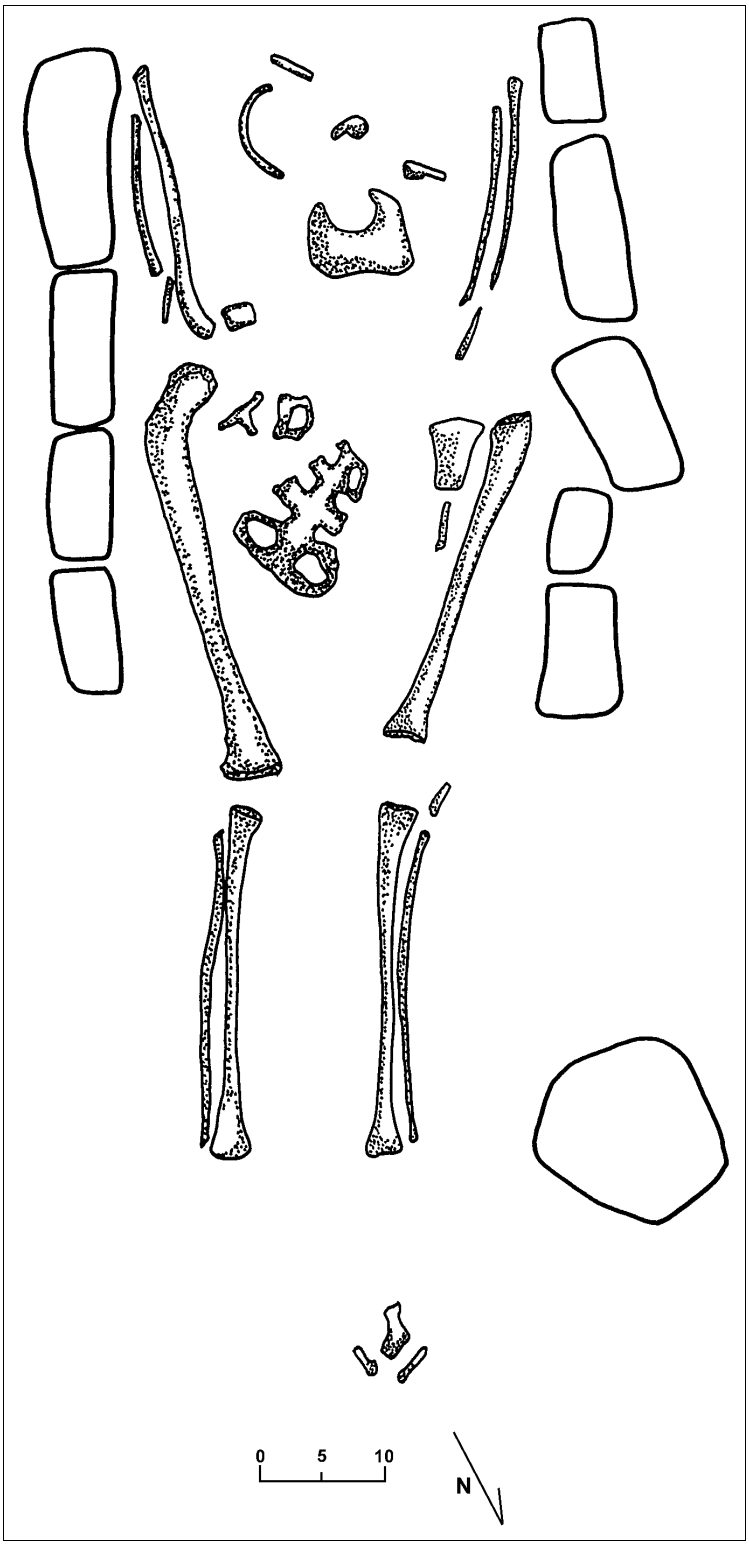


Figure 5.13 Burial 43 (From Wells 1998b:237)

BURIALS

Burial 43 (PN 33D-3-2) was found along the central axis of structure U-8 and just inside bedrock (Figure 5.13). The cist measures 1.51 m (north-south) by 0.42 m (east-west) with 20 cm of interior height. The body of an adult, possibly male, was placed into the rock-lined cist and covered with six lajas. The body had been placed in an extended position on its back with the face looking up and the head towards the south, oriented at 60 degrees Azimuth. The feet of the individual actually were outside of the structure. No artifacts were associated with the burial. Oddly enough, no skull was found with the bones, but the rest of the skeleton was intact.

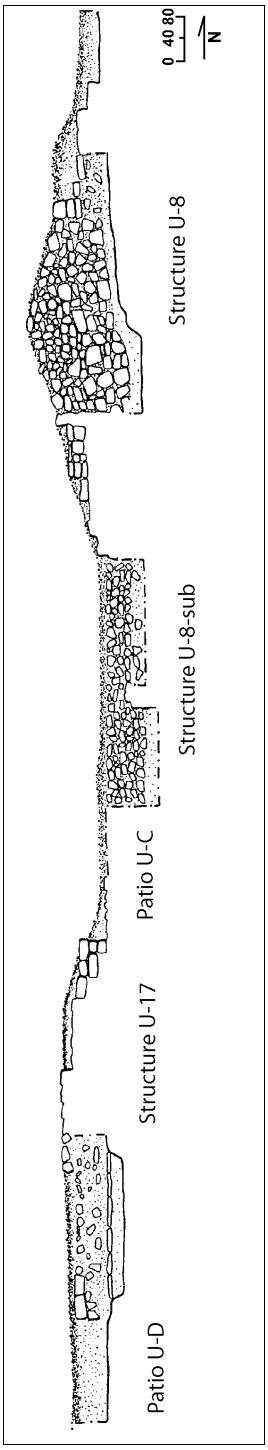


Figure 5.14 Profile of Excavations PN 33 B, C, D (From Wells 1998b:222)

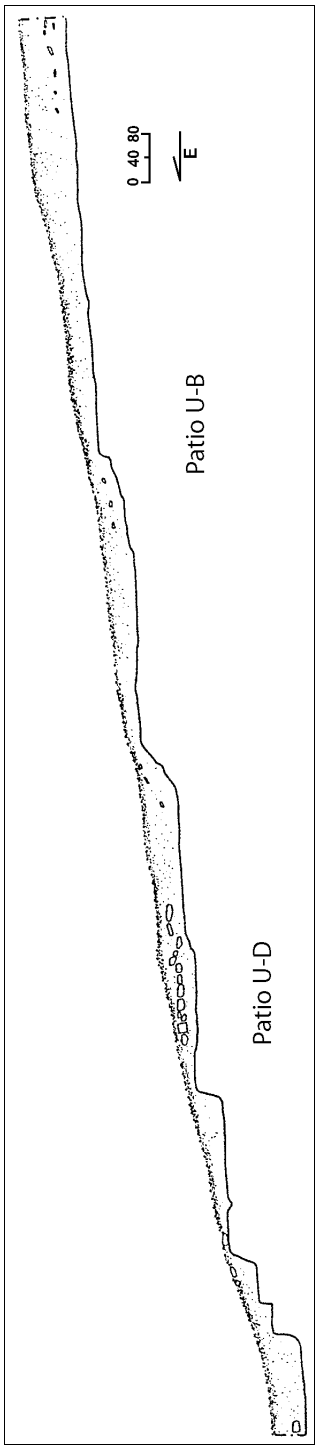


Figure 5.16 Profile of Excavation PN 33A and B, along Patios U-B and U-D (From Wells 1998b:223)

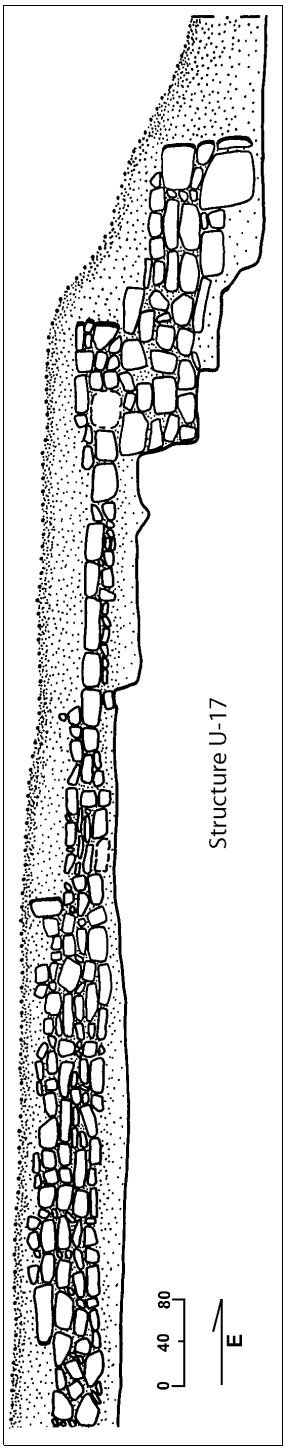


Figure 5.15 Profile of Structure U-17, PN 33B (From Wells 1998b:225)

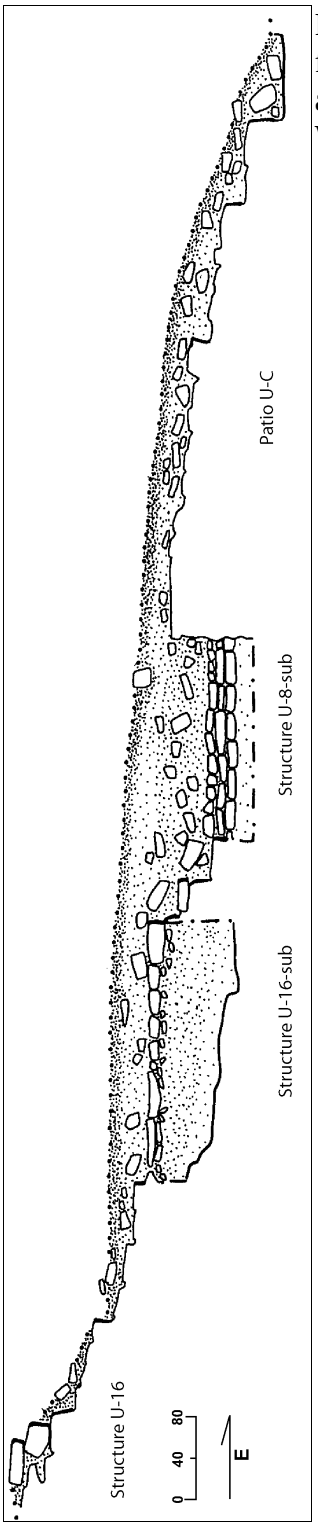


Figure 5.17 Profile from Structure U-16 along Patio U-C (From Wells 1998b:233)

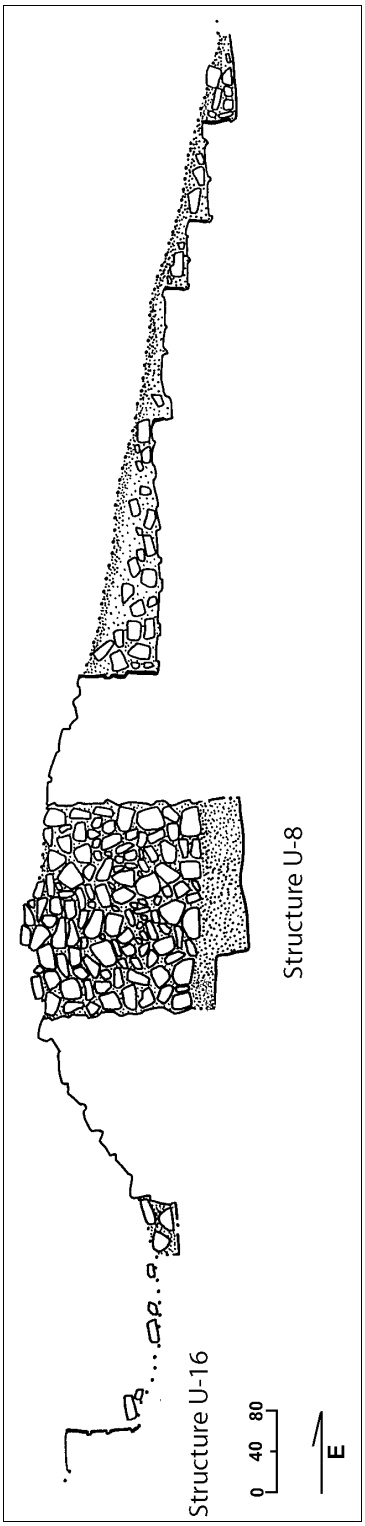


Figure 5.18 Profile of U-8, PN 33D (From Wells 1998b:235)

Summary

The patio group changed several times from its inception to its final form. The earliest constructions (Figure 5.19) show modest initial structures. The second phase already has a bench in place and larger structures (Figure 5.20). The early Chacalhaaz form of the patio (Figure 5.21) hides much of the previous constructions, while the final form (Figure 5.22) has fine architecture and spacious paved patios between the structures.

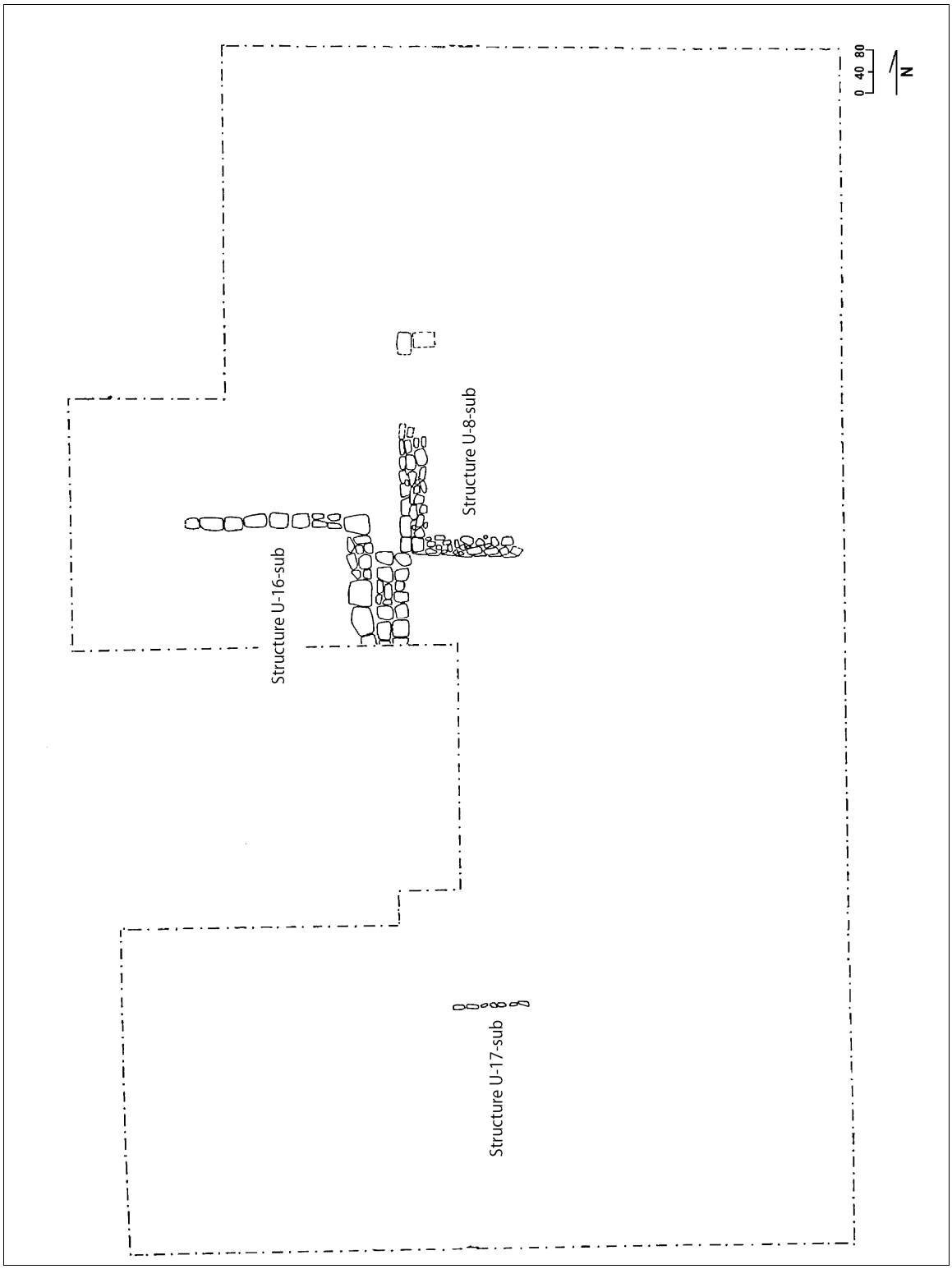


Figure 5.19 Patio Group Construction Stage 1: Early Yaxché (From Wells 1998b:239)

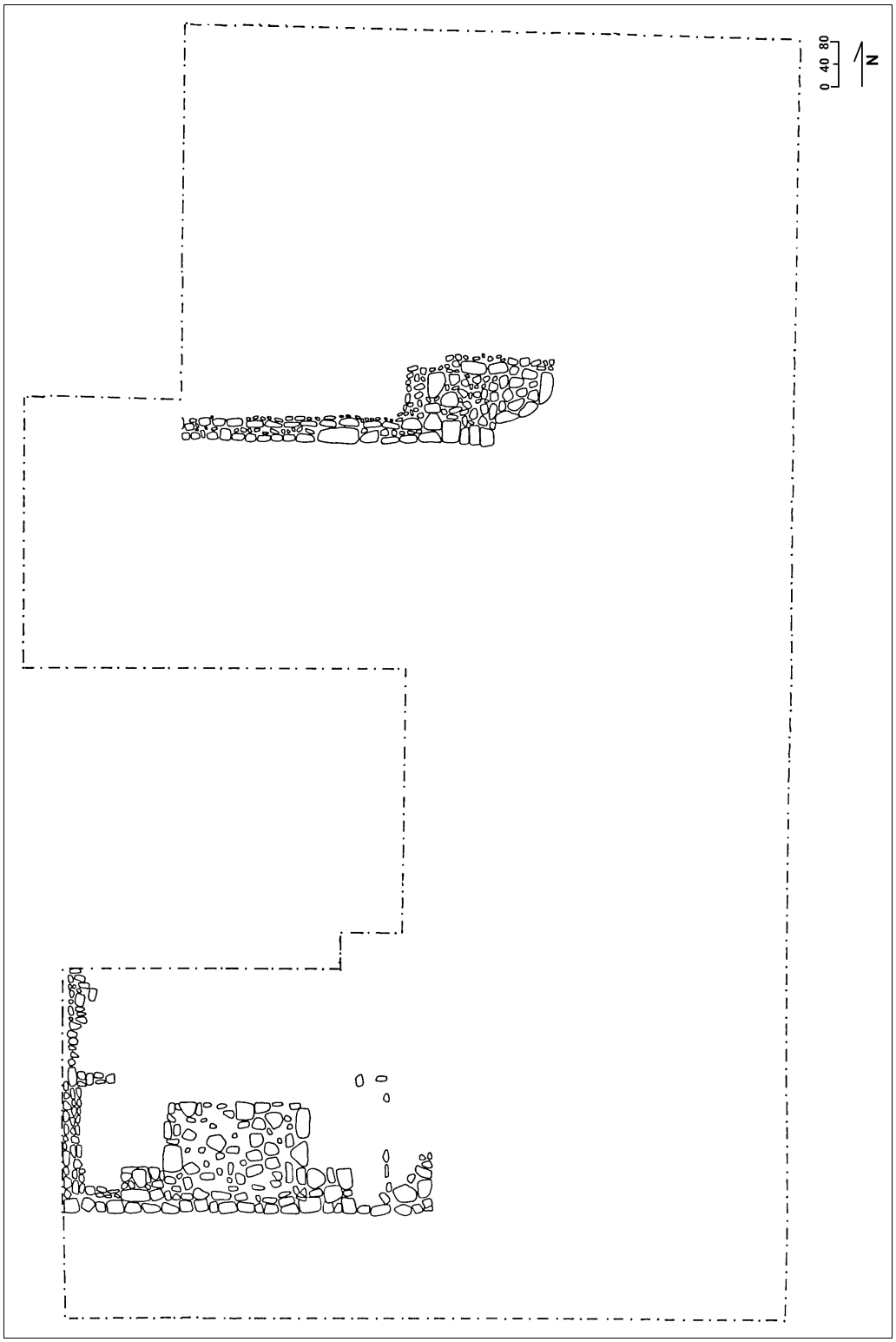


Figure 5.20 Patio Group Construction Stage 2: Late Yaxché (From Wells 1998b:240)

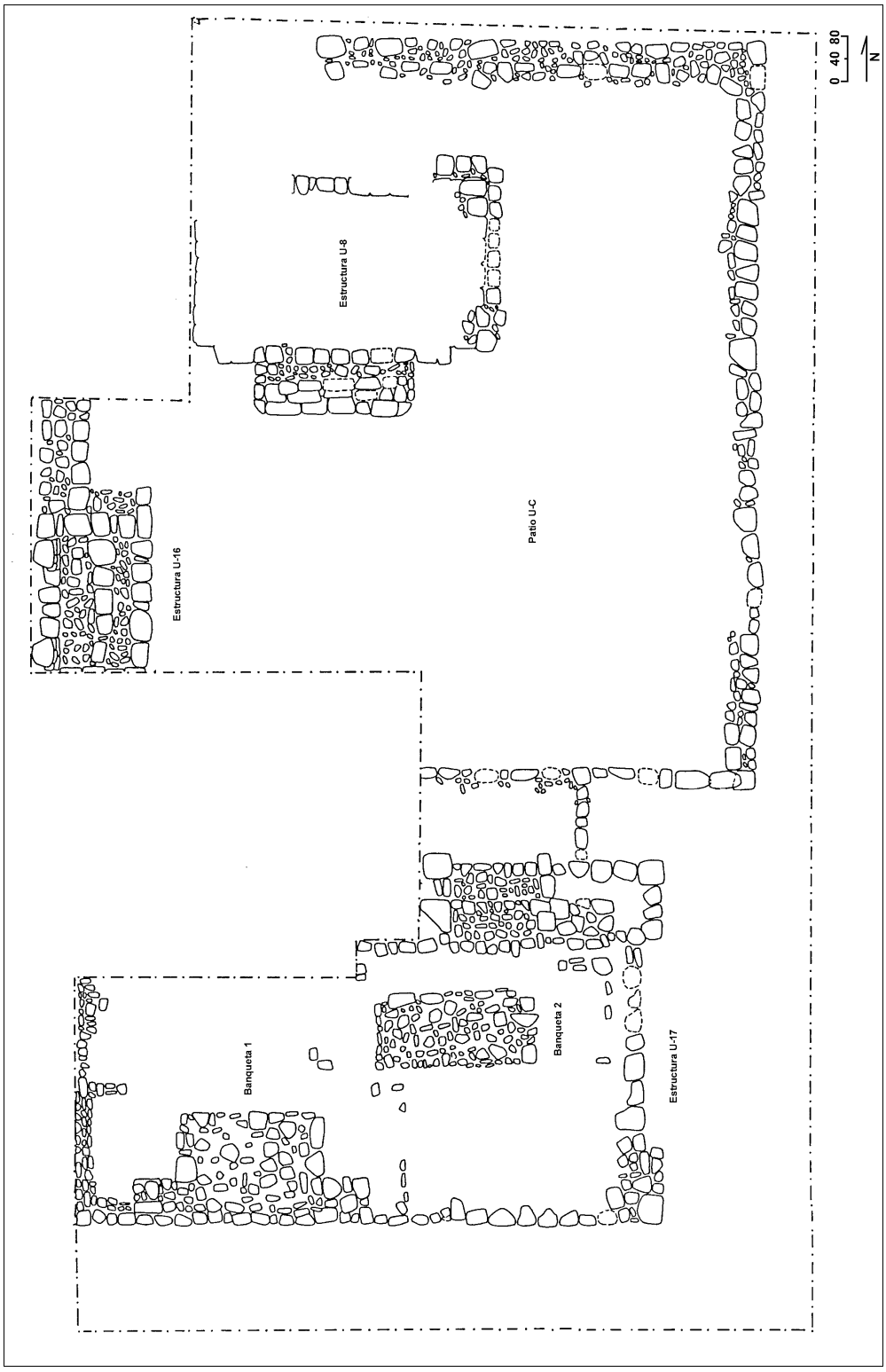


Figure 5.21 Patio Group Construction Stage 3a: Early Chacalhaaz (From Wells 1998b:241)

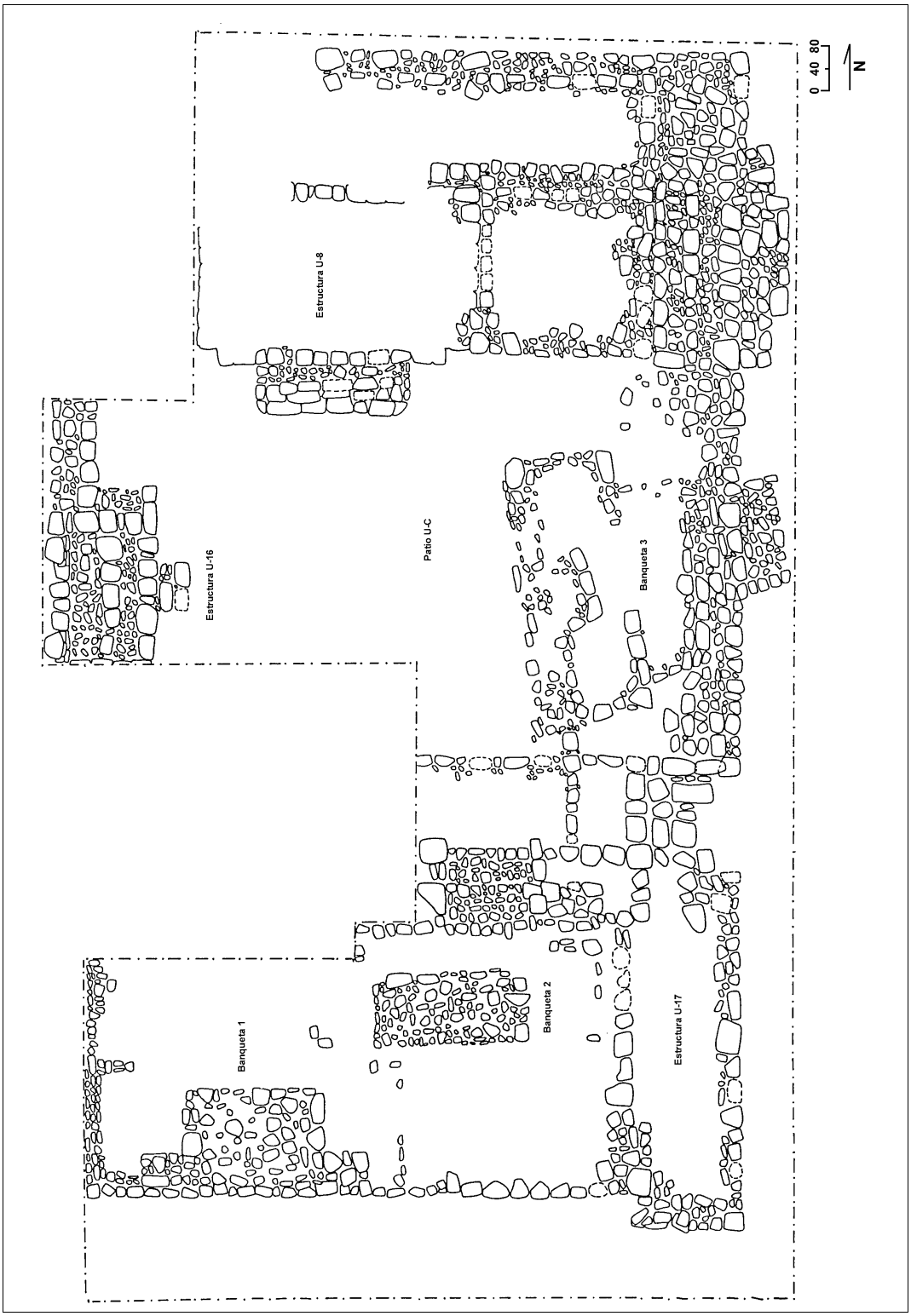


Figure 5.22 Patio Group Construction Stage 3b: Late Chacalhaaz (From Wells 1998b:242)

PN 33E

PN 33E focused on structure U-16 (Figure 5.23). Excavations primarily during the 1999 field season completely uncovered the structure and delved deeply into it in search of its antecedents. Two U-16-sub structures exist inside U-16-1st, underneath the central room with the benches. This phase has two main construction episodes, both dating to the Yaxché ceramic phase (Early and Late).

U-16-sub-2nd

U-16-sub-2nd is a low platform, 6.00 m (north-south) x 2.60 m (east-west) with a current height of 15 cm and a single course of stone remaining. This platform has a small bench along its western edge that measures 3.20 m (north-south) x 2.40 m (east-west) and that once had a small staircase on the eastern side of the platform.

U-16-sub-1st

U-16-sub-1st maintained the same general form of U-16-sub-2nd only bigger (Figure 5.29). It is higher and extends both to the north and east. The platform was raised 13 cm by the addition of another course of stone. Then a low staircase was added along the northwest corner of the new platform. Finally, the bench expanded, assuming an "L" shape that measures 1.55 m (north-south) by 4.50 m (east-west).

U-16-1st

U-16-1st was a large platform measuring 15 m north-south x 10 m east-west with a smaller platform tacked onto the north measuring 5 m north-south x 10 m east-west (Figure 5.24). On top of this base, which is almost a meter high, sits another elevated platform on the west side that rises about 50 cm (Figures 5.25, 5.26, 5.27, and 5.28). In the middle of this elevated platform is a room with three benches, each measuring 2 x 1.5 x 0.40 meters. On each exterior wall of the room were placed small platforms that measured 3 m^2 and 20 cm high.

The main staircase has four steps rising up to the U-16 platform and another step on top of the platform. The first step placed on the surface of Patio C measures 1.25 m (north-south) x 0.60 m (east-west) and 34 cm above bedrock. The second and third steps measure 3 m (north-south) x 0.60 m (east-west). The fourth step is similar in size to the first and measures 1.25 m (north-south) x 0.60 m (east-west). The height of each step is approximately 20 cm. The staircase is made of good quality stone that had been shaped anciently. There are two balustrades on top of the staircase (60 cm^2 x 38 cm high) which guide the visitor along a low platform (10 cm higher than the platform's base) and are aligned with a small staircase which gives access to the room containing the three benches. The platform itself is faced with high quality stones, and rises 1.05 meters above the surface of Patio C.

Along the southeastern side of the main U-16 platform, the surface was "paved" with thin lajas. The northwest corner of the same platform is also "paved," but by smoothing the bedrock in this area. The northern, smaller platform also incorporates the bedrock in its construction and has two steps which follow the natural surface of the bedrock, each rising almost 50 cm. To the west, there are four small rooms with natural bedrock serving as the floor of each one. The

excavations here suggest that these may have been storage rooms, perhaps for ceramic pots and other domestics (see Andrews and Fash 1992).

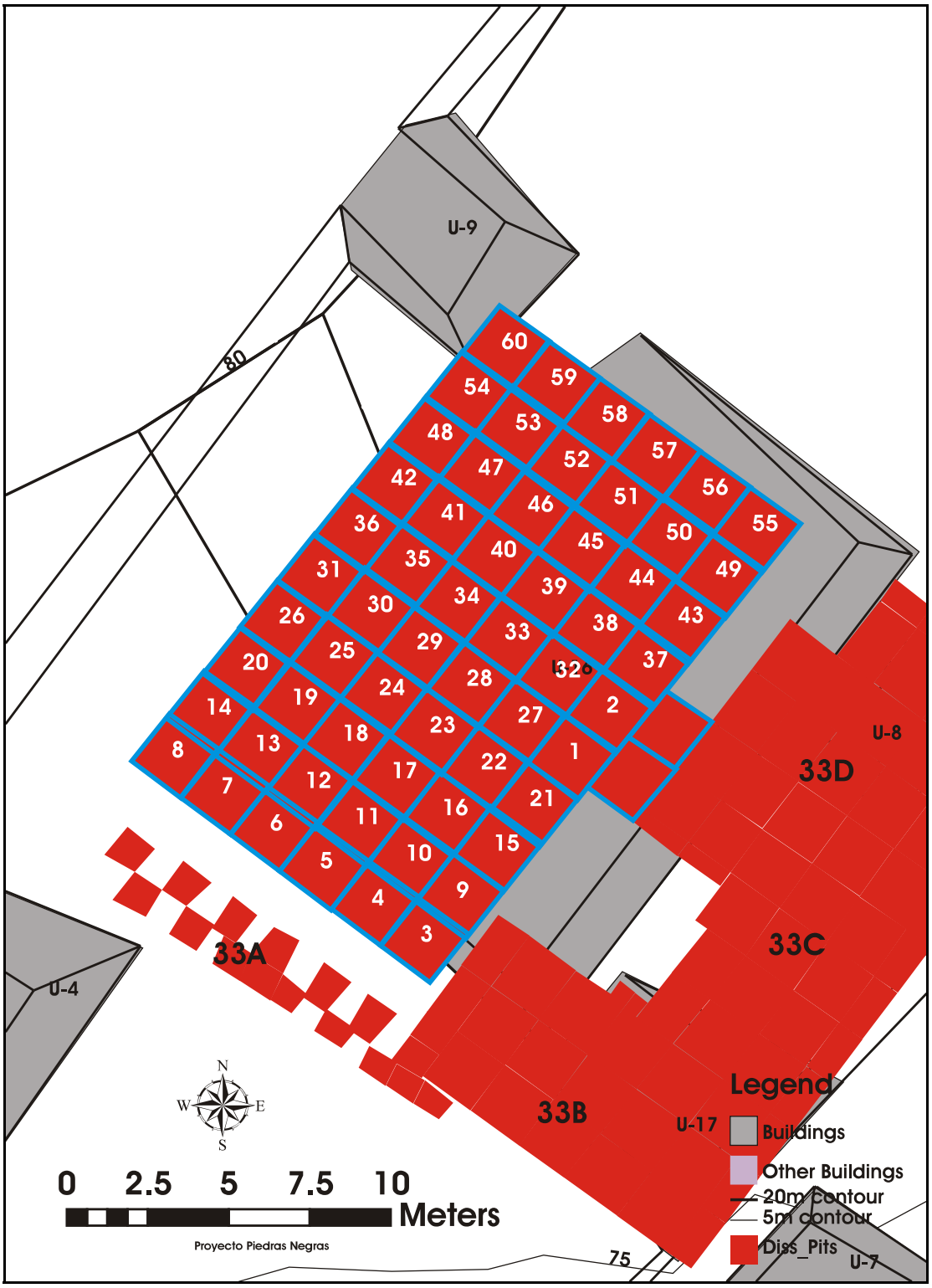


Figure 5.23 Sub-operation 33E

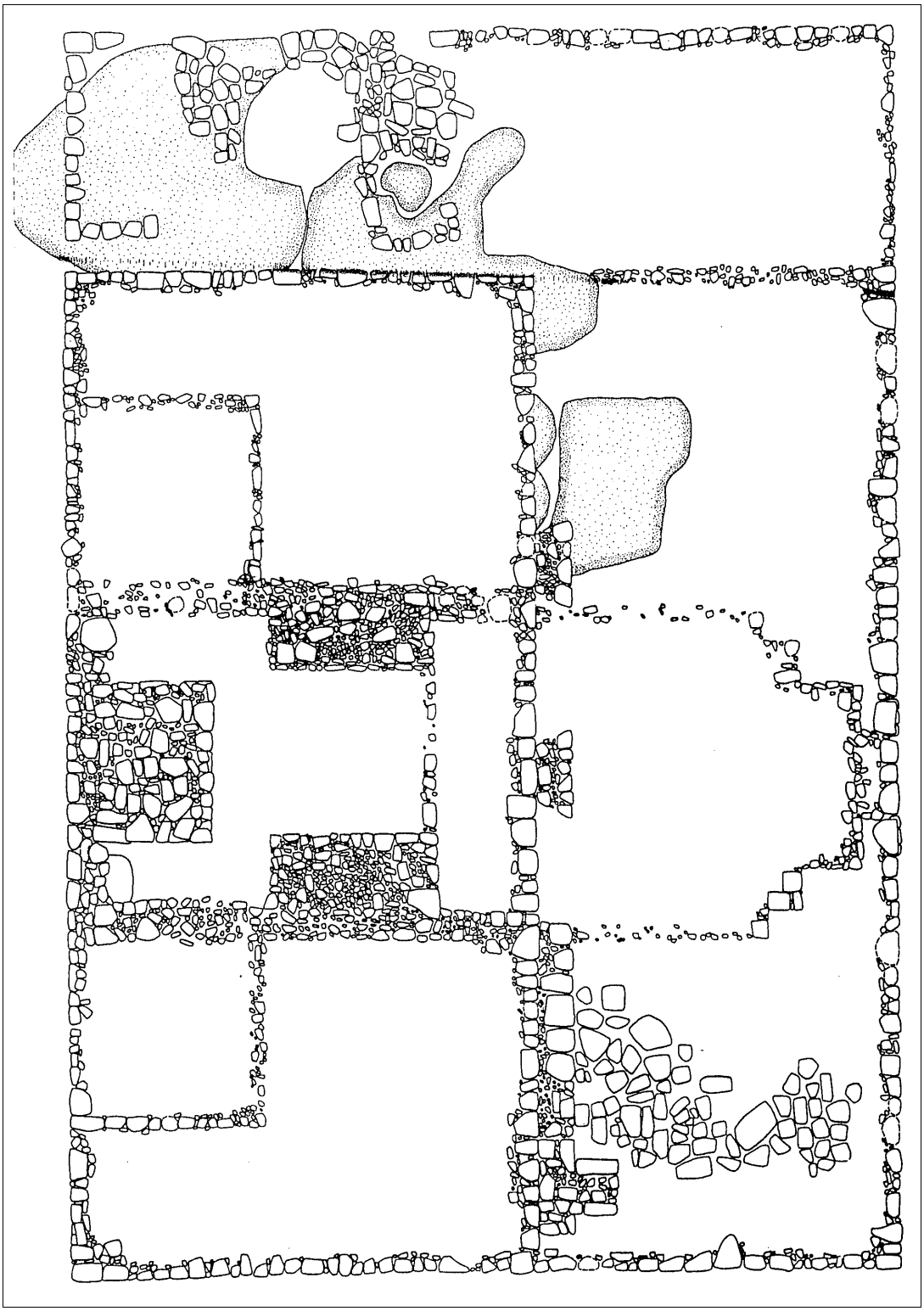


Figure 5.24 Plan of U-16-1st after excavation (From Wells 1999a:92)

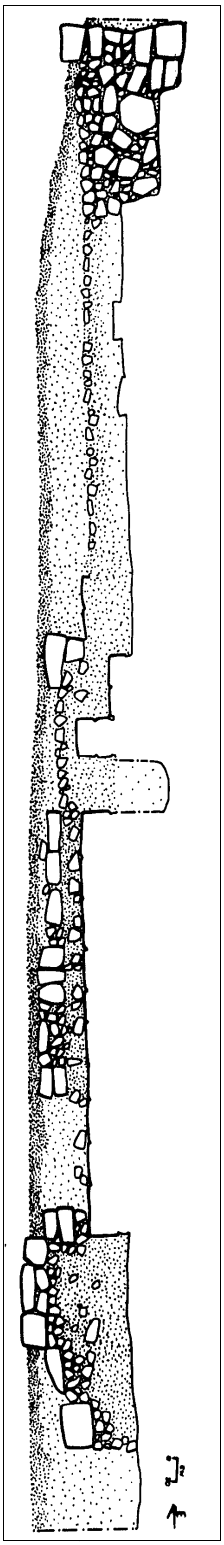


Figure 5.25 North-South Profile of U-16-1st (From Wells 1999a:93)

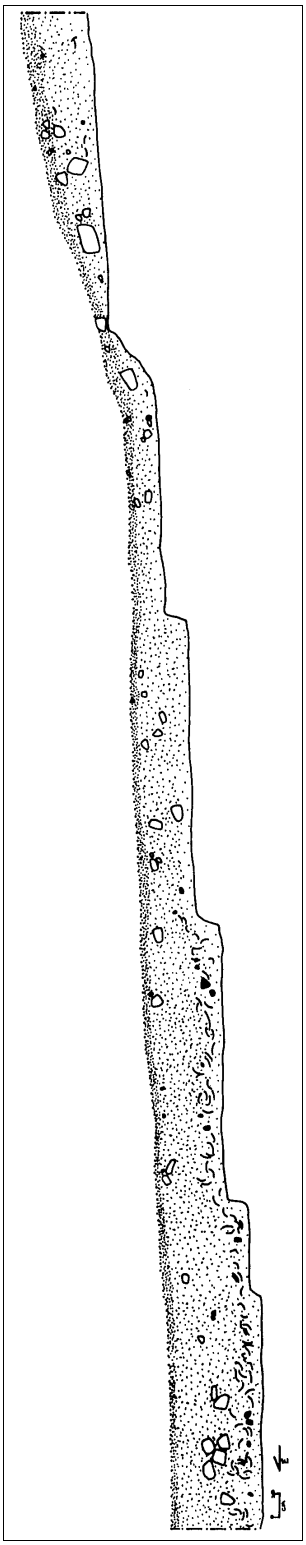


Figure 5.26 North-South Profile of the patio associated with U-16-1st (From Wells 1999a:94)

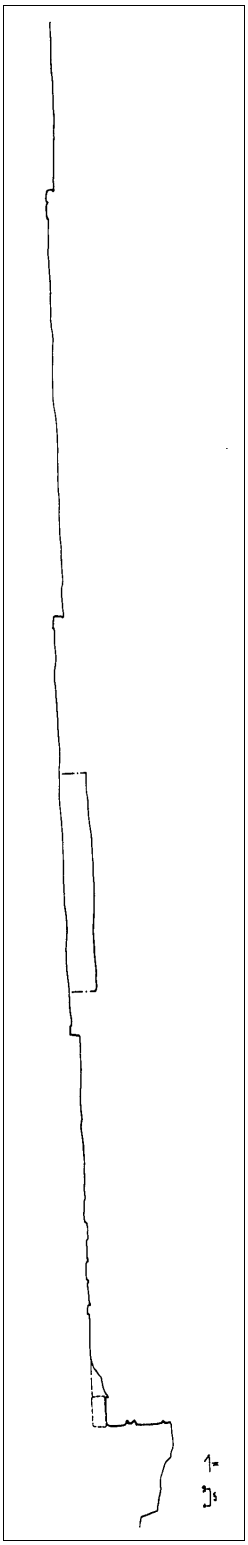


Figure 5.27
Transverse section along the East side of Structure U-16-1st (From Wells 1999a:96)

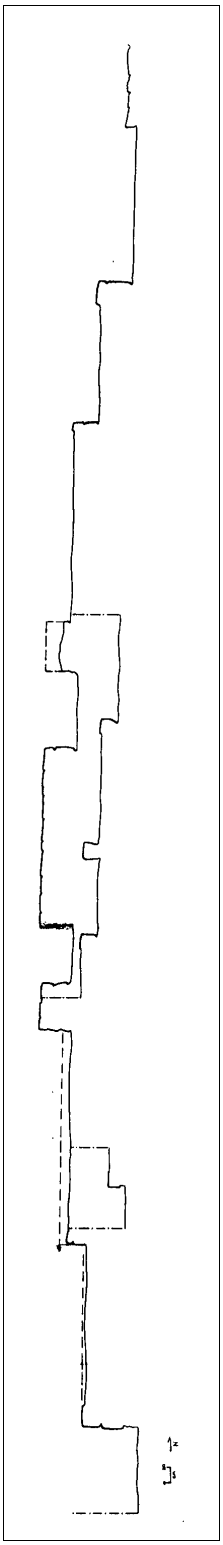


Figure 5.28
Transverse section along the West side of Structure U-16-1st (From Wells 1999a:95)

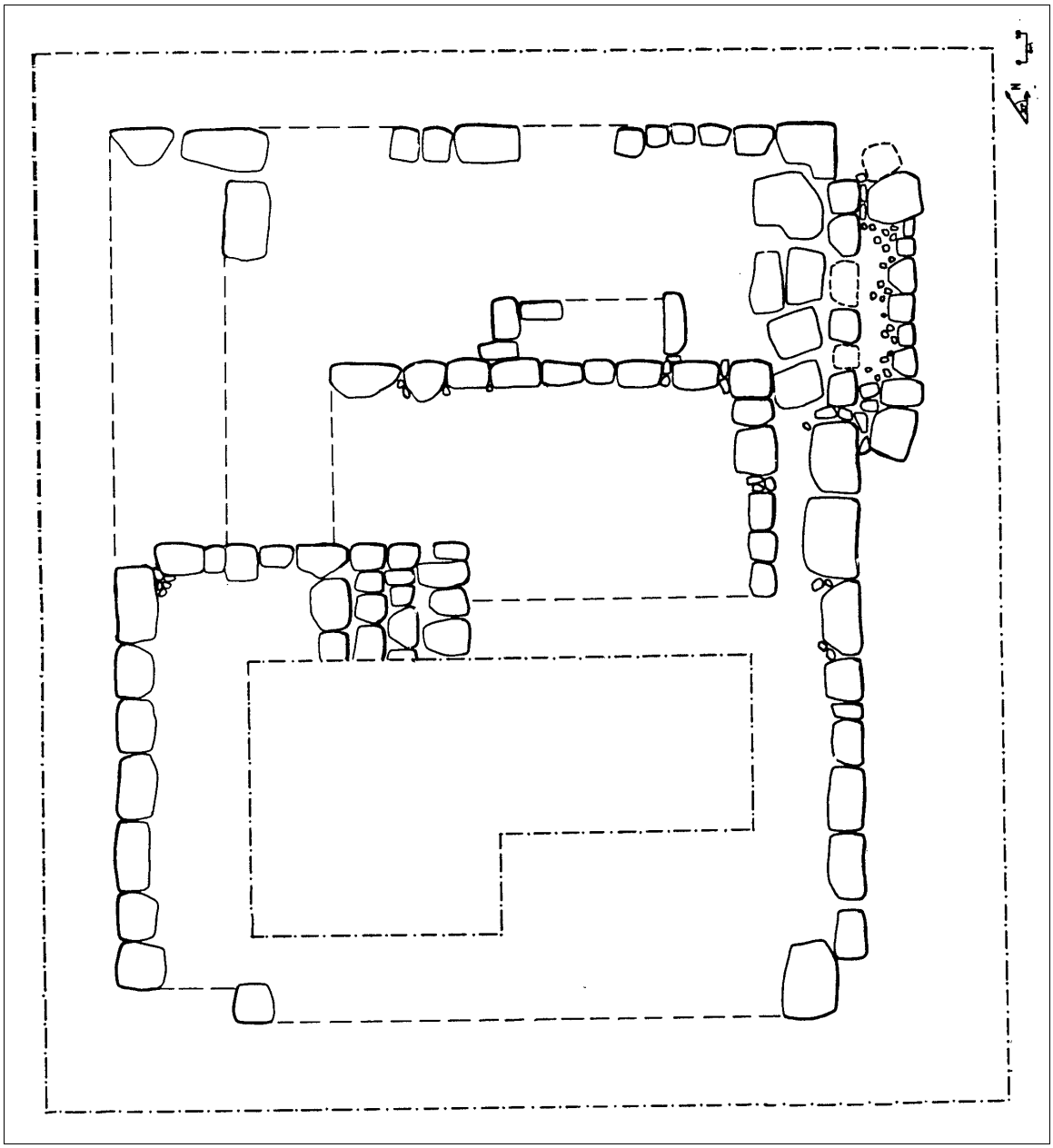


Figure 5.29 Structure U-16-sub (From Wells 1999a:97)

BURIALS

Burial 48 (PN 33E-26-1) consists of 13 disarticulated bones found in a midden along the west side of U-16-1st. There were no burial facility or artifacts definitely associated with the bones.

Burial 54 (PN 33E-27-4) was discovered on the east side of U-16-1st and consists of a single adult, possibly female, buried in a cist cut into bedrock (Figure 5.30). The cist measures 1.80 m (north-south) x 0.37 m with 14 cm of vertical interior space. The cist was covered by lajas, including a complete metate placed over the general area of the hips. The adult was placed in an extended dorsal position with the head towards the north and looking up, oriented to 30 degrees Azimuth.

Burial 60 (PN 33E-35-4) was a single adult individual burial discovered inside of the west side of U-16-1st in a cist carved into bedrock (Figure 5.31). The cist measures 1.93 (north-south) x 0.36 m wide with 20 cm of vertical interior space. It was covered with lajas and no artifacts were directly associated with the burial. The burial was that of an adult, placed in an extended dorsal position with the head towards the north and the head facing up, oriented to 30 degrees Azimuth.

Burial 67 (PN 33E-27-3) was discovered on the east side of U-16-1st and consists of a single sub-adult, possibly female, buried in a cist cut into bedrock. The cist measures 1.10 m (north-south) x 0.20 m with 14 cm of vertical interior space. The cist was covered by lajas, including a complete metate placed over the general area of the hips. The sub-adult was placed in an extended dorsal position with the head towards the north and looking up, oriented to 30 degrees Azimuth.

Burial 70 (PN 33E-19-6) was a single adult individual burial discovered on the west side of U-16-1st in a cist carved into bedrock (Figure 5.32). The cist measures 1.72 (north-south) x 0.28 m wide with 17 cm of vertical interior space. It was covered with lajas and no artifacts were directly associated with the burial. The burial was that of an adult, placed in an extended dorsal position with the head towards the north and the head facing up, oriented to 30 degrees Azimuth.

Burial 71 (PN 33E-19-5) was a multiple individual burial discovered on the west side of U-16-1st in a cist carved into bedrock (Figure 5.33). The cist measures 1.74 (north-south) x 0.34 m wide with 24 cm of vertical interior space. It was covered with lajas and no artifacts were directly associated with the burial. The main burial was that of an adult, placed in an extended dorsal position with the head towards the north and the head facing up, oriented to 30 degrees Azimuth. The bones of another individual were found in the southeast corner of the cist, almost outside of it.

Burial 74 (PN 33E-34-4) was a single adult individual burial discovered inside of the northwest corner of U-16-sub-1st in a cist carved into bedrock (Figure 5.34). The cist measures 1.70 (north-south) x 0.40 m wide with 19 cm of vertical interior space. It was covered with lajas and no artifacts were directly associated with the burial. The burial was that of an adult, placed in an extended dorsal position with the head towards the north and the head facing up, oriented to 30 degrees Azimuth.

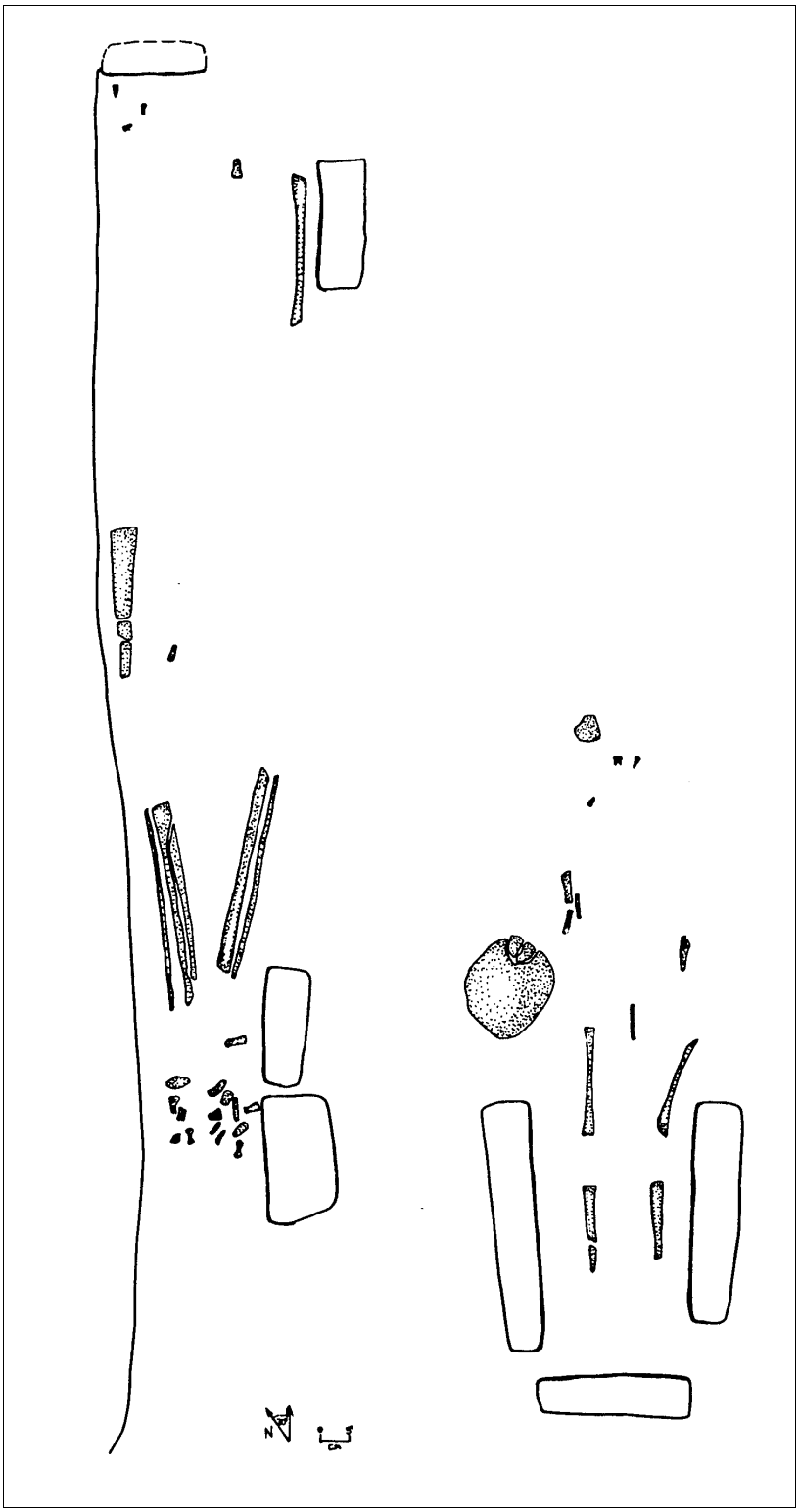


Figure 5.30 Burial 54 (Left) and Burial 67 (Right). (From Wells 1999a: 101)

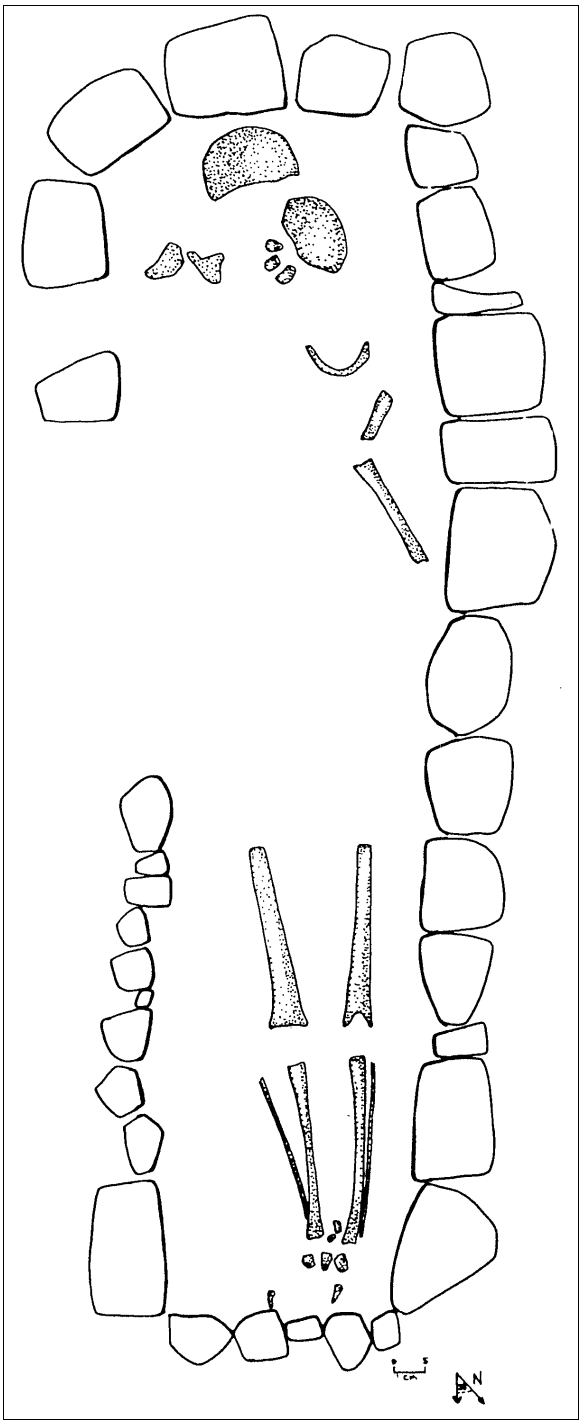


Figure 5.31 Burial 60 (From Wells 1999a:103)

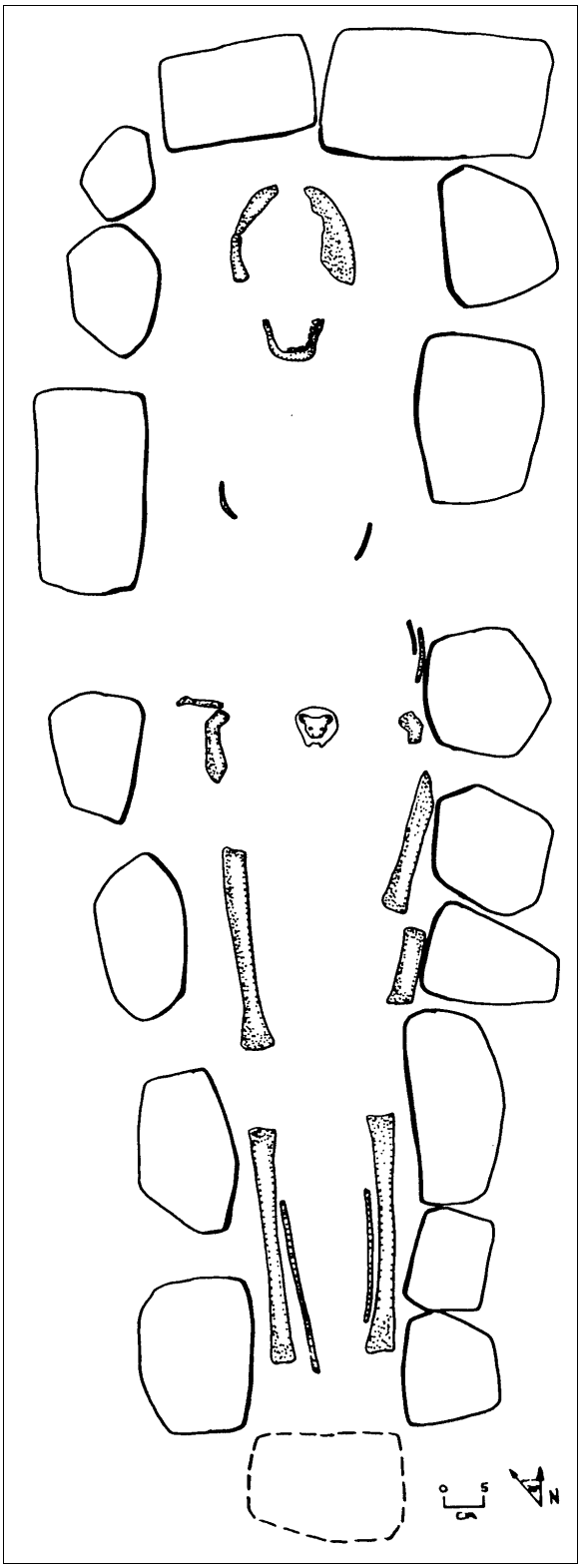


Figure 5.32 Burial 70 (From Wells 1999a:99)

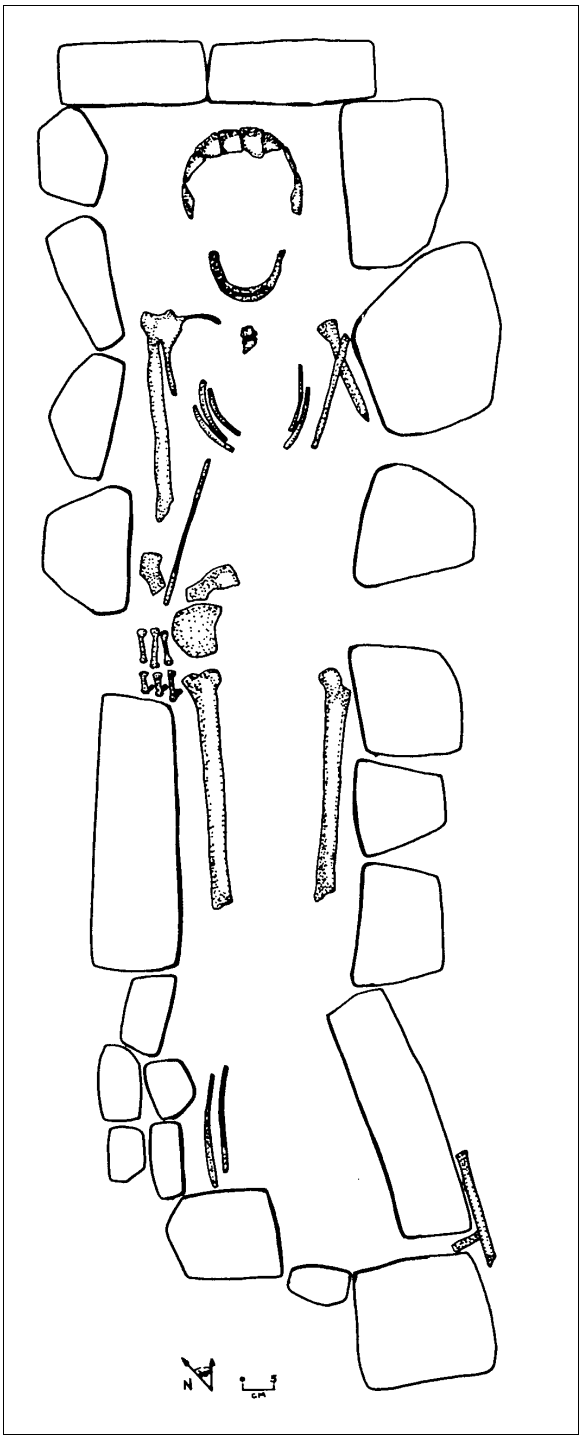


Figure 5.33 Burial 71 (From Wells 1999a:98)

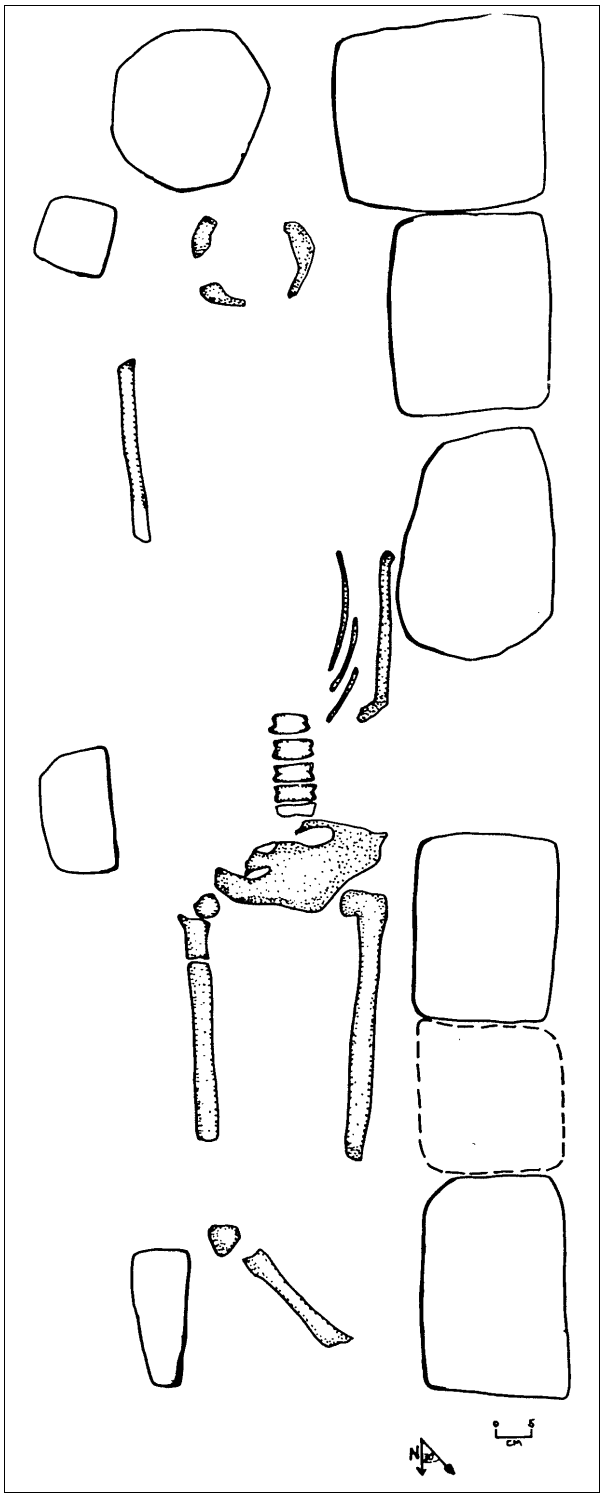


Figure 5.34 Burial 74 (From Wells 1999a:102)

PN 33F

This operation, under my direction during the 2000 field season (2001), laterally exposed two buildings, their associated platforms, and intervening area which overlook and face the seasonally flooded arroyo to the south (Figure 5.35). These buildings, U-5 and U-6, form part of a non-elite patio group (the third building in the group was not excavated and consisted of a low-lying platform). Both of the buildings were completely excavated both laterally and to bedrock, where possible (Figure 5.36). In some areas, trees and the eroding platform of U-4 prevented complete exposure. The operation consists of 68 excavated units, most measuring 2 m by 2 m. Lot designations were based upon arbitrary units, soil changes, and other identified features. All material was screened in the field with a 1/4 inch mesh.

Stratigraphy

The stratigraphy of the operation, in general, consists of an initial organic humus layer, then an eroded floor or living surface (Figure 5.40). This level was followed by construction fill - a mixture of ceramics, soil, rocks, and other material believed to have been scraped up from nearby refuse heaps. Below this level was limestone bedrock. The bedrock consisted of two main types, decomposed and solid. Decomposed bedrock was a soft limestone sand that could be easily cut with a trowel. Solid bedrock was hard, often weathered material that had not decomposed. It may have been the exposed surface of the patio when the buildings were occupied.

U-5 Building History

U-5-Sub-2 was a single room structure during the Yaxché ceramic period. At its inception, it measured 6 by 6 meters on a small platform just slightly larger than the building. The building probably had a waddle and daub (bajareque) superstructure over the simple rock foundation with the entrance facing toward the arroyo to the south. The foundation at this early stage was a mixture of broken rock with very little fill (including ceramics) overlaying the decomposing limestone bedrock. A small, low bench built along the east wall was the only permanent furniture. A possible burial comes from this stage, but was not excavated due to time constraints - the evidence for its existence is the presence of lajas along the west side of the original building. An indoor kitchen area was located near the north-east corner of the building, judging from the blackened condition of the rocks in this area and associated charcoal pieces. The ceramics recovered from this building phase show a mixed assemblage of ceramic types (Balché and Yaxché phases) around and in the construction fill.

U-5-Sub-1 was a lateral amplification of the building on the west side, appending a second room during the Yaxché phase. This expansion effectively doubled the size of the original building (10 x 6 meters), and included two burials in stone lined cysts under the new addition (Burials 106 and 107). The foundation of the second room was fill held in place by a single course of limestone blocks. The platform was also enlarged with a wide area added in front, whose fill was held in place by large, well-cut rectangular stones. Probably at this time the eastern wall of the structure was shored up with well-cut rectangular stones. The ground dips on

this side, so this wall was necessary to hold in the weight of fill and construction material. Two courses of stone were found supporting this wall, one of irregular stone and the outer wall made of cut, regular pieces.

The final renovation, during the Chacalhaaz ceramic phase, added a third room to the west, and a well-made bench along the western outer wall (Figures 5.37 and 5.39). This room was made by leveling the bedrock in some areas, and adding fill in others, to create a level floor. The irregular bedrock areas were then cosmetically faced with a stone course so that the building appeared to have a single stone course holding in the fill. Another addition to the platform in the front was made, but this effort was only half-hearted because the ground naturally slopes upward in this direction, so large limestone blocks could not be placed. Burials associated with this last phase include a small child (Burial 93) in the platform addition, and another uncovered laja set to the back of the room. The bench was located on the western side of the building in the new room. This bench was made with cut blocks over a bedrock foundation. I excavated under the bench to a depth of 50cm to ascertain that there was no burial under the bench itself, but the decomposed limestone was sterile.

This phase also sported a plaster floor which definitely stretched across the two eastern rooms, if not the third. The evidence for the floor consists of a floor preparation level of small pebbles which covered most of the structure (grouting). The superstructure of the building was still waddle and daub with pieces of burned bajareque being found throughout the structure. The building could have been used into the Kumché ceramic phase, because material from this time period was recovered just off the platform to the south, and behind the structure on the north east corner - where the kitchen probably was located.

U-6

Contemporary with U-5 is a small building to the east (Figures 5.38 and 5.39). This single room structure had a different series of renovations; where U-5 had a series of amplifications, U-6 had more modest renovations throughout its life. Originally, U-6-Sub-1 was a single room with a waddle and daub superstructure. The foundation was fill, a mixture of ceramics, soil, and organic material, held in place with a series of well cut stone blocks. This suggests that it was built during the second renovation phase of U-5, or Late Yaxché. The only permanent architectural feature within the building is a large bench made of irregular stone. A modest platform surrounded the building.

The next renovation phase occurred during the Chacalhaaz ceramic phase and linked the two buildings with a small terrace on the north side, cutting through Burial 84. The platform was amplified to the north and east with a second tier of stones added on these sides forming a step above the extended platform. The bench also underwent a curious transformation. Its size was doubled and sub-divided into five compartments. From a single bench, it was transformed into a double-wide. I do not know if the compartments were covered to create a single bench, or if they represent storage containers. Burials associated with this structure include several to the south of the bench (Burials 97, 98, 109), one just off the platform to the south (Burial 85), and one to the north within the platform (Burial 90).

Plaza Excavation

The areas around both buildings were excavated, with particular emphasis on those areas between the two structures. These excavations revealed a generally thin soil deposit over bedrock. The area between U-5 and U-4, a mortuary temple, is interesting because it was once “paved”, i.e., large rectangular rocks were placed between these two structures to serve as a base for the South Group Plaza which is raised almost three meters above U-5's living surface.

Two additional test pits were placed in the area by Nelson. One (PN 33F-80) was in front of structure U-29, and revealed a sequence of patio leveling from Balché times through Chacalhaaz ceramic phase. The other unit was in the center of U-19, revealing that this building was occupied only from Late Yaxché to Chacalhaaz ceramic periods.

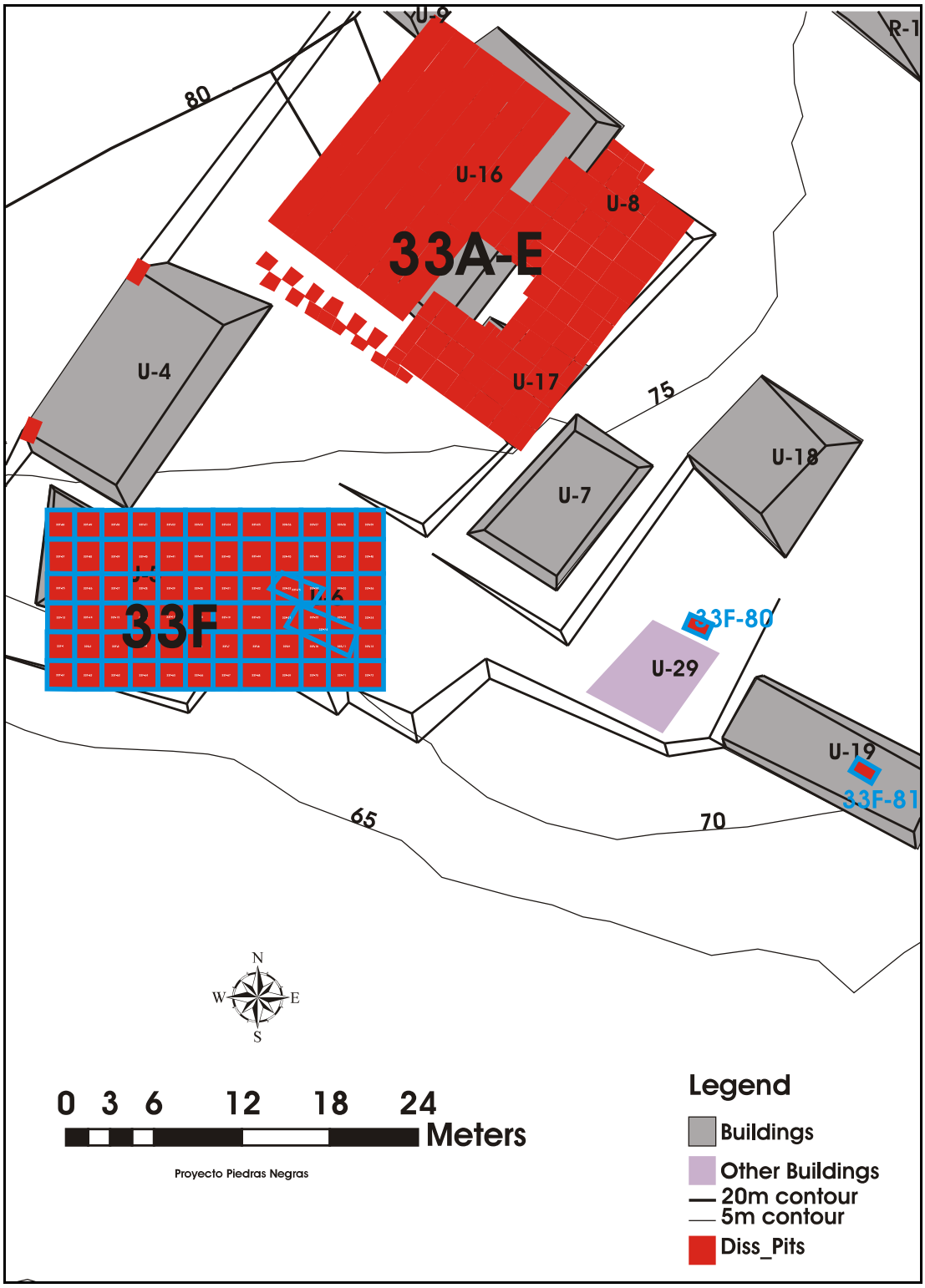


Figure 5.35 Sub-operation 33F

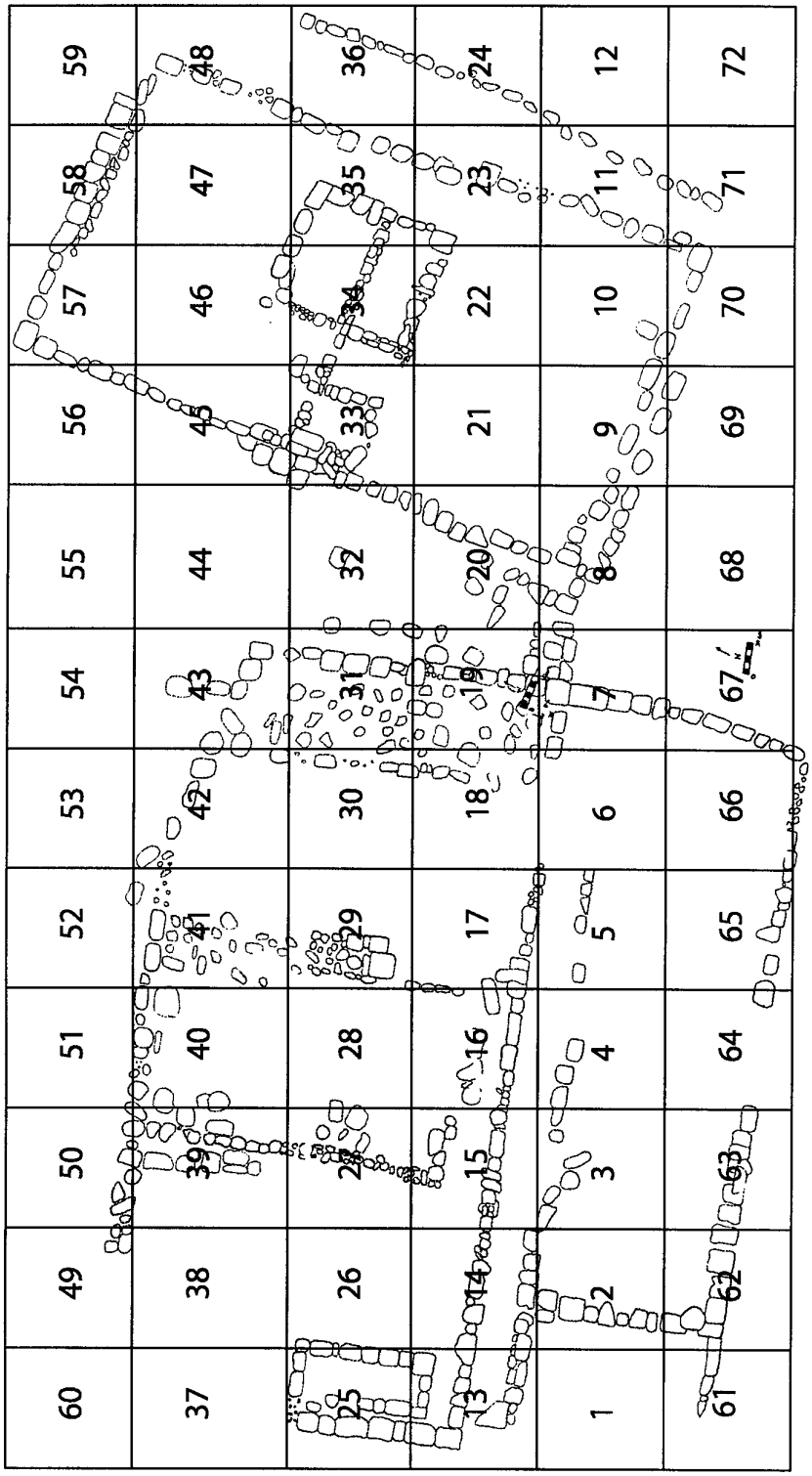


Figure 5.36 Excavation grid plan for PN 33F

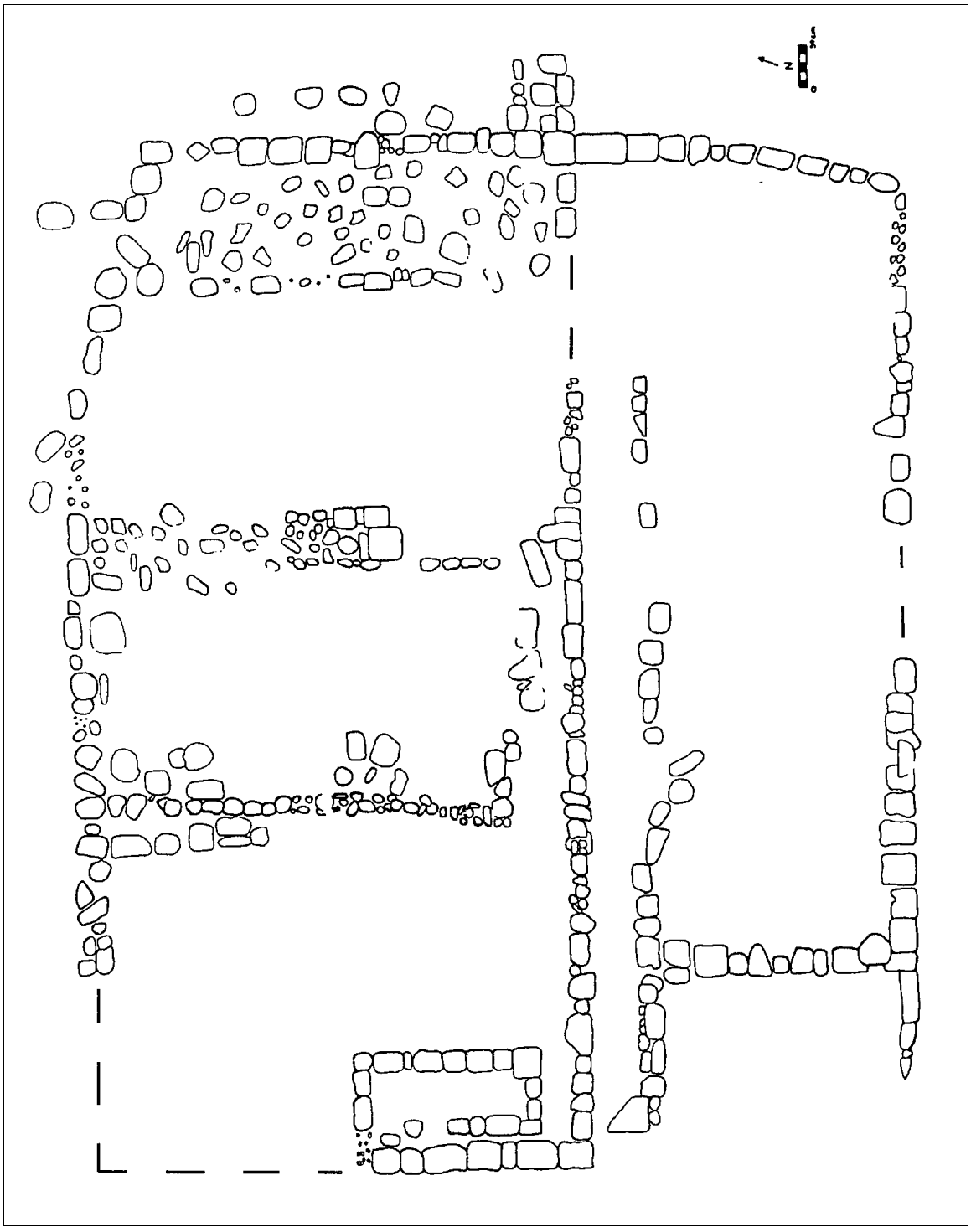


Figure 5.37 Structure U-5 after excavation

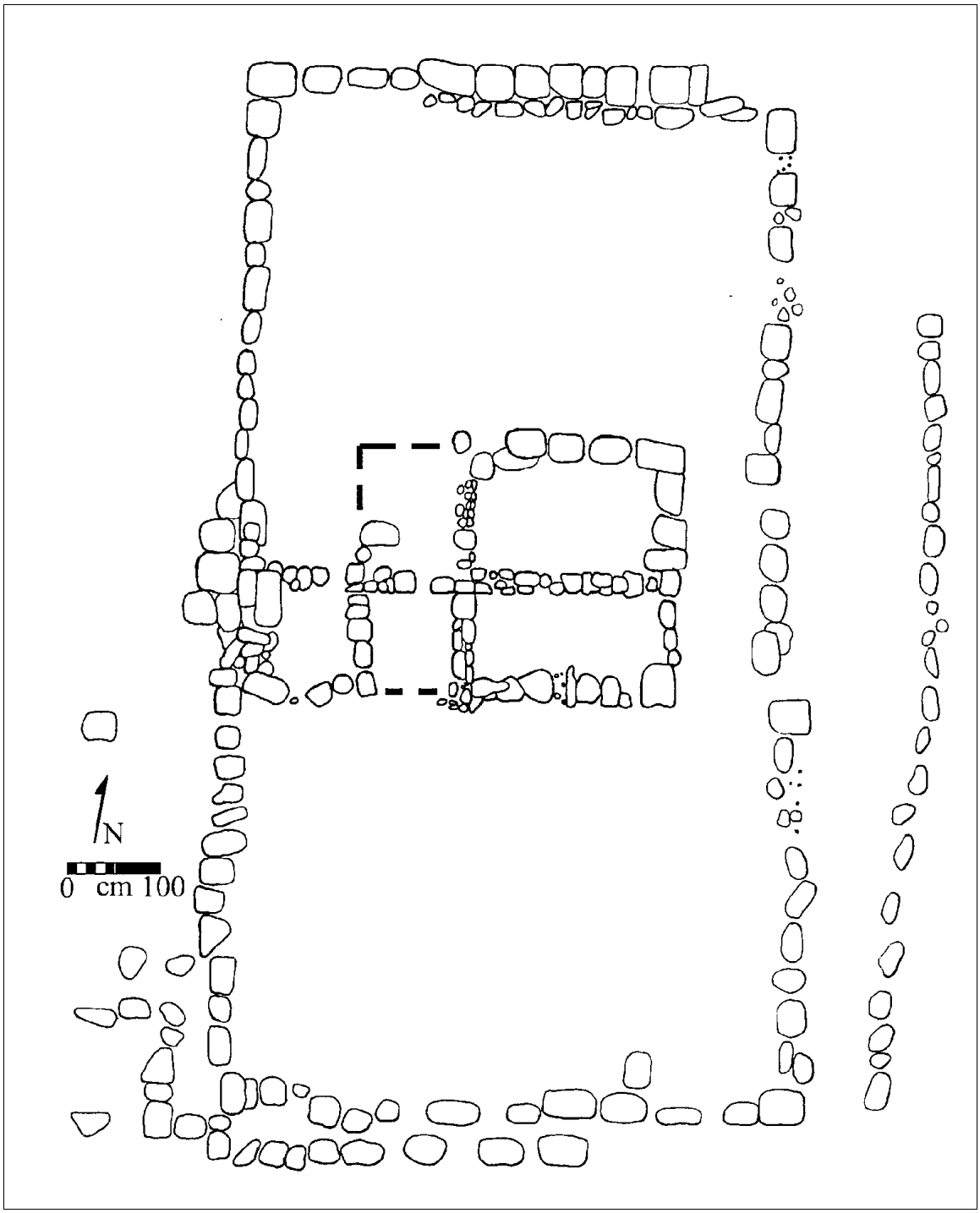


Figure 5.38 Structure U-6 after excavation

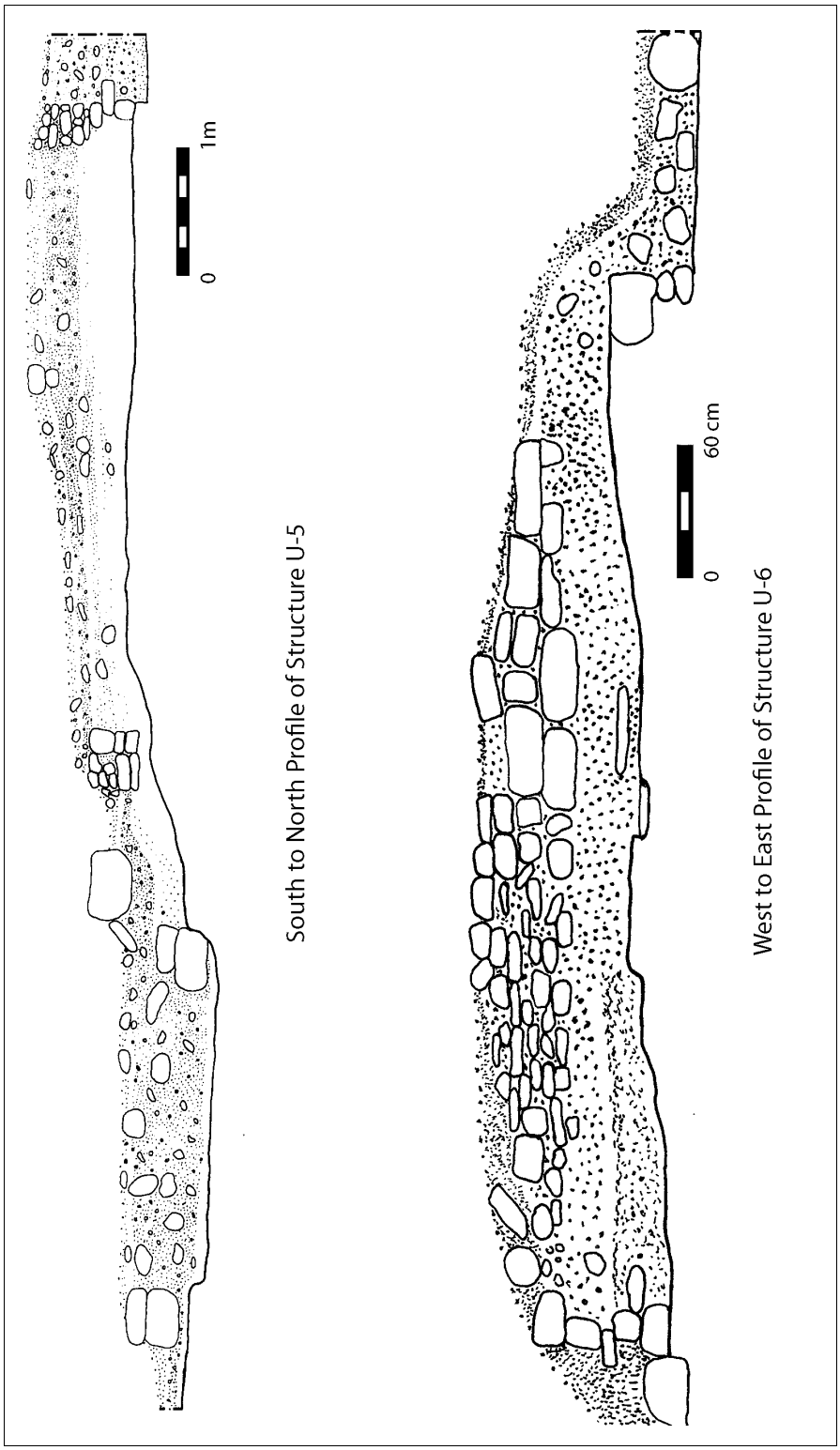


Figure 5.39 Profiles of Structures U-5 and U-6

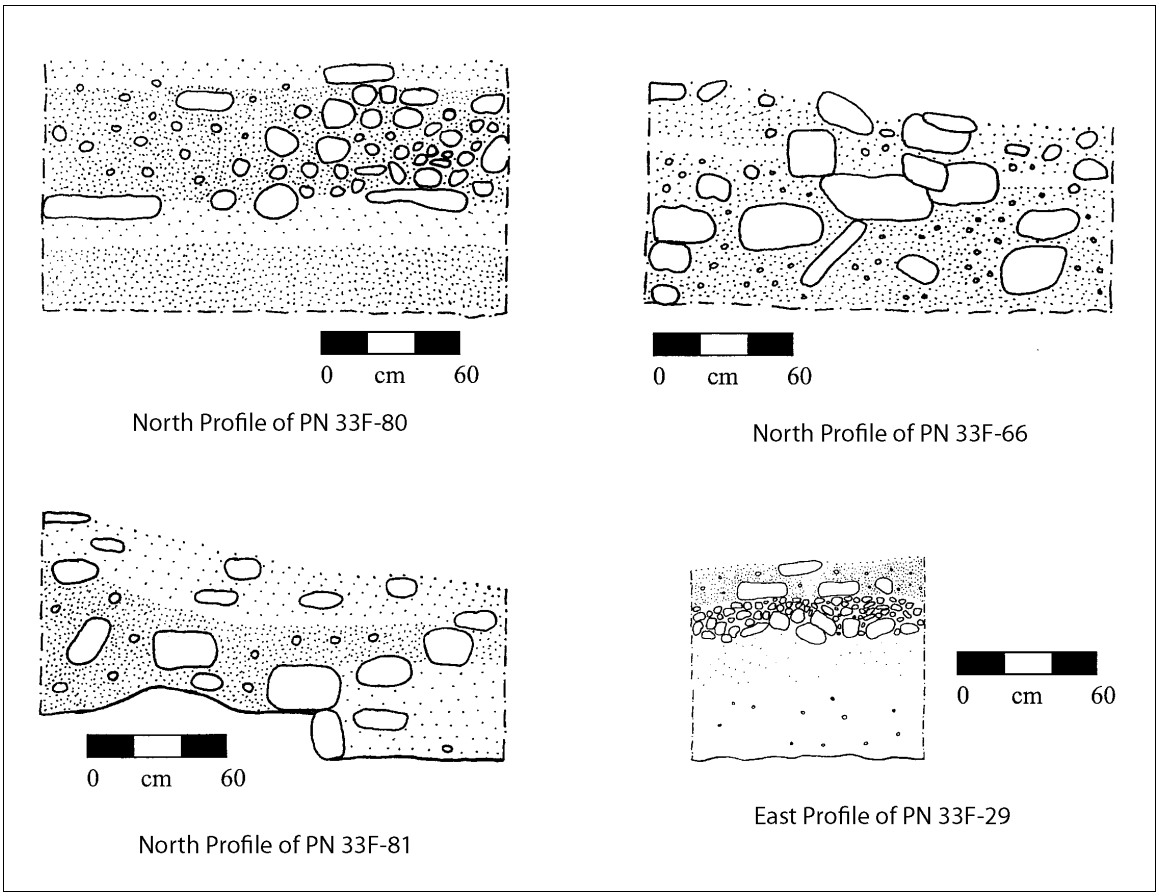


Figure 5.40 Profiles of various units

BURIALS

Burial 84 (PN 33F-44-4) consisted of an adult placed in a partial cist, lying on bedrock (Figure 5.41). The burial was located on the western edge of U-6. No lajas covered the burial, only a hard, brown clay. The preservation of the bones was quite good but only about half were present. The skeleton was missing its legs, which probably had been removed (along with that portion of the cist) to accommodate a later renovation of U-6 and a small terrace that linked U-5 and U-6 together, perhaps during the Chacalhaaz ceramic phase. The body had been placed on his back, in an extended position with the head towards the north. No artifacts were associated with the burial.

Burial 85 (PN 33F-69-4) was discovered on the southern side of U-6 (Figure 5.42). This adult burial did not have a burial facility, and only part of the body was uncovered, that of his head and chest. The body had been placed in an extended dorsal position with the head towards the north. There were no artifacts associated with this burial.

Burial 90 (PN 33F-46-4) was an adult placed inside U-6, on the north side (Figure 5.43). This burial was unusual in that it had a number of artifacts associated with it - several chert flakes placed around the torso, and four bifacial knives also placed around the torso. The body had been placed in a cist and covered with lajas. The dimensions of the cist were 1.20 x 0.48 x 0.15 meters and it was made from irregular stones. The skeleton was in an extended dorsal position with the head towards the north.

Burial 93 (PN 33F-2-3) was that of a small child, badly preserved. The burial was located south of U-5, just off the western edge of the platform but close to the surface (20-23 cm below ground surface) on top of bedrock. The body was placed under some small lajas, but without a formal burial facility. The space occupied by the body measured 0.20 x 0.40 meters. The overall preservation was quite poor, but this appeared to be a casual burial without artifacts or much care in the funerary arrangements.

Burial 97 (PN 33F-74-3) was a sub-adult placed in U-6, to the south-east of the bench. The remains were very poorly preserved and few were recovered. There was a laja placed over the head, but no other evidence of a burial facility. No artifacts were associated with the body.

Burial 98 (PN 33F-74-4) was an adult placed in U-6, along its north-south axis, just to the south of the bench. This adult had been placed in an extended dorsal position with the head towards the north. Associated with this burial were two chert bifacial knives (one over the pelvis), several prismatic blades, a decorated spindle whorl, and (possibly) a figurine fragment. The cist was made of several irregularly spaced rocks covered with lajas. The individual was quite tall, with very well preserved bones.

Burial 106 (PN 33F-28-3) was that of an adult placed in a cist and covered with lajas (Figure 5.44). The burial place was along the west wall of U-5-Sub-1, right above bedrock. The cist measured 1.58 x 0.54 x 0.15 and was made from irregular rocks placed around the body and the lajas placed on top. A single Yaxché vessel was associated with the burial, placed near the feet. The body had been placed in an extended position on the back, with the face towards the sky and the head to the north.

Burial 107 (PN 33F-28-6) was located approximately 0.40 meters to the east of Burial 106, but in its own cist on top of bedrock (Figure 5.45). This adult was buried in a rock-lined cist

created with rectangular limestone blocks. The body was covered with lajas and the burial facility measured 1.40 x 0.50 x 0.13 meters. The body had been placed on the back in an extended position with the head towards the north. No artifacts were associated with the body, although some ceramic sherds were mixed in the soil surrounding the body, and they date to Chacalhaaz time period.

Burial 109 (PN 33F-74-7) was located just to the west of the north-south axis of U-6, and alongside Burial 98. This burial was in very poor condition, due to the presence of a large tree growing over and through it. The recovered bones had been pushed out of their original position by tree roots and into the space occupied by Burial 98. This appears to have been an adult, and was probably placed in an extended dorsal position with the head towards the north.

Summary

The excavations in this area revealed the heterogeneity of households within epicentral Piedras Negras. The household dominated by U-16 is larger, with a richer assemblage of materials than that associated with U-5. The differences between these households are thought to reflect the differences in social status of its members. U-16 represents the remains of a higher status household than U-5. In the next chapter the differences between the households will be detailed, with reference to other similarly excavated “households” from other parts of Mesoamerica.

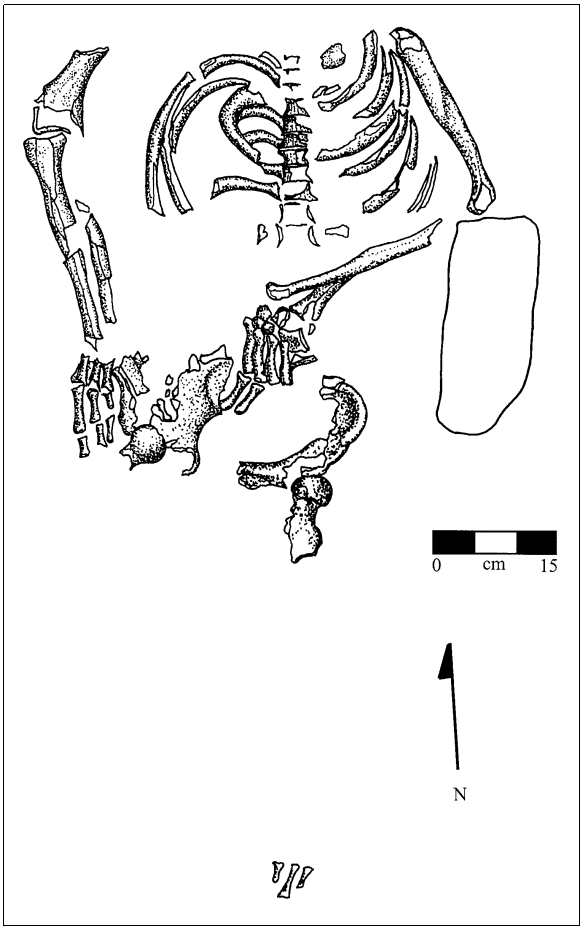


Figure 5.41 Burial 84 (Drawing by Z. Hruby)

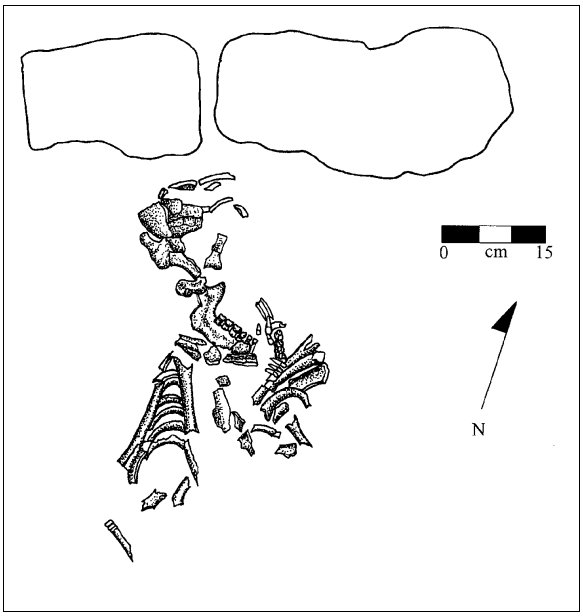


Figure 5.42 Burial 85 (Drawing by Z. Hruby)

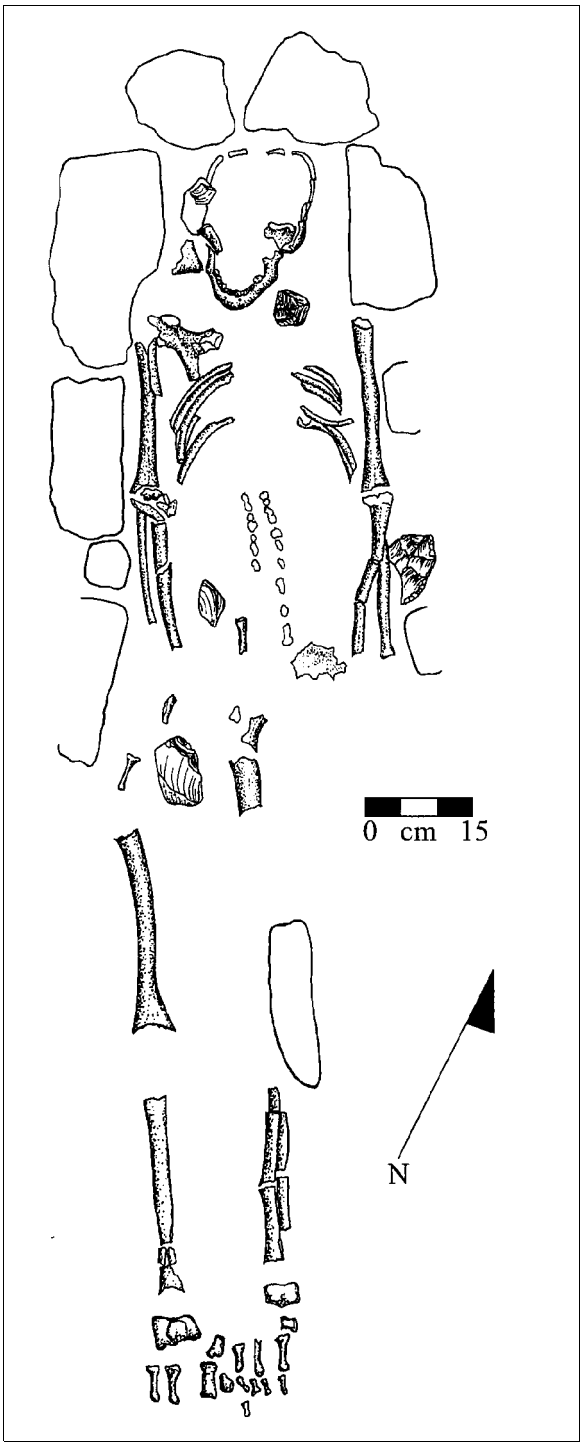


Figure 5.43 Burial 90 (Drawing by Z. Hruby)

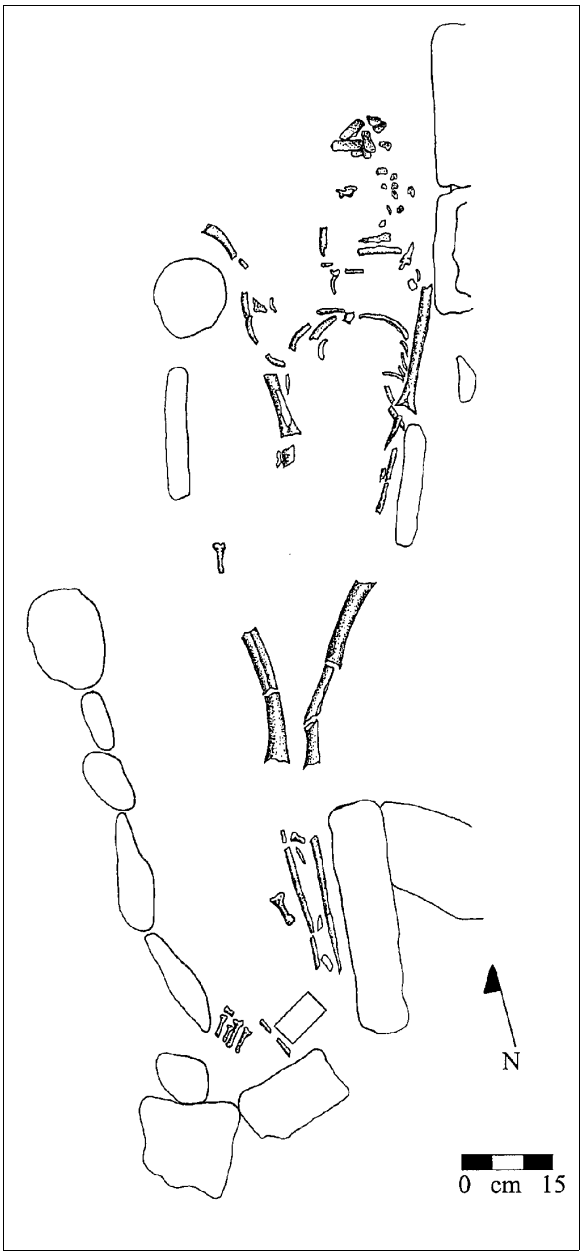


Figure 5.44 Burial 106 (Drawing by Z. Hruby)

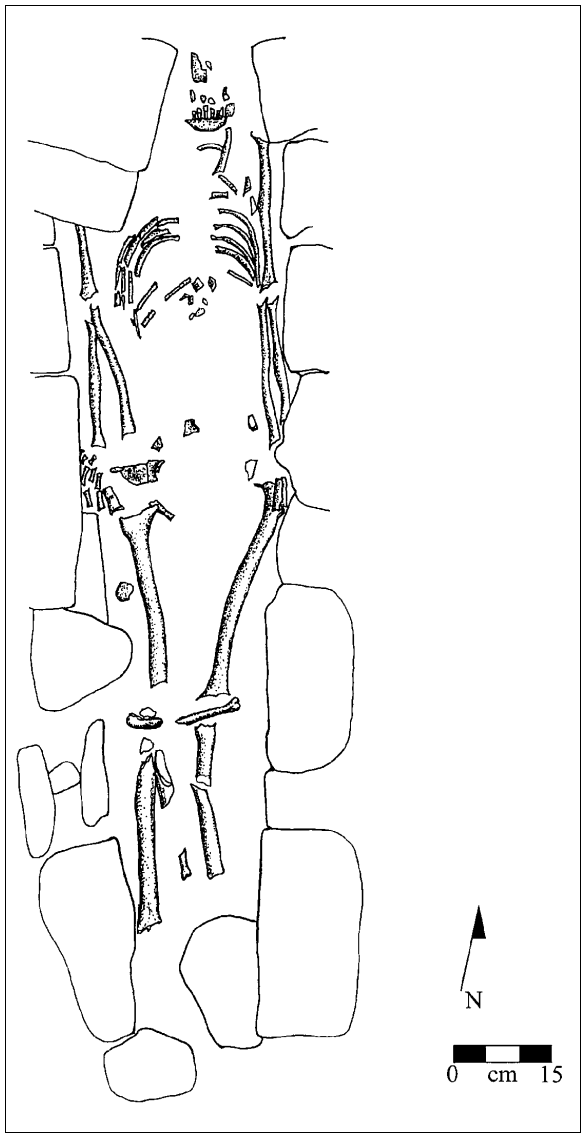


Figure 5.45 Burial 107 (Drawing by Z. Hruby)

Chapter 6

Residential Household Material Culture

Archaeologists study the material culture of past societies. Our assumptions about the past are informed by the presence (or lack) of objects and their spatial patterns revealed via excavations. Preservation in the humid Maya area is generally quite poor, with very few objects made of wood surviving. Durable material goods, such as those made from stone, ceramics, and sometimes bone are the principal material categories that are recovered from archaeological contexts. Preservation bias leaves in doubt the extent of activities associated with other aspects of life, such as gardening, woodworking, bee keeping, cloth manufacturing and dying, paper making, and other activities known from colonial and modern records to be practiced by Maya people. Evidence of tribute, cloth patterns, clothing, and even wall decorations can be gleaned from monuments, ceramic vessels, and figurines, but these are only glimpses into the full range of domestic tools, artifacts, and activities used by the ancient Maya.

HOUSEHOLD ASSEMBLAGES BY PHASE

The two large-scale excavations of patio groups documented in the previous chapter represent the remains of two distinct households. The artifacts recovered from their excavation, and those from test pits and other excavations included in this dissertation, will be used to create a composite assemblage of household material culture by ceramic phase to see how access to artifact types changed over the duration of habitation at Piedras Negras. Material culture of the PN33 households will then be compared to similarly excavated households in other regions to understand the variation in material culture present within Piedras Negras and in other areas of Mesoamerica. Household assemblages from all across the Maya area have an underlying composition which includes ceramics, obsidian, chert, and groundstone as these items were commonly available and characteristic of their technology. The differences among households demonstrate their heterogenous nature as they respond to their unique social and environmental challenges (Bawden 1982, L. Becker 2000, Creed 2000, Hendon 1996:55, Olson 2001, Smith et al. 1999).

It is important to emphasize that Piedras Negras was not a rapidly abandoned site. The inhabitants took their valuables with them when the center was finally abandoned (Lange and Rydberg 1972), so the archaeological record is incomplete. Site formation processes include scavenging behavior, dumping, heavy precipitation, and the action of children, animals, and trees on the abandoned material remains (Cameron and Tomka 1993, Hayden and Cannon 1983, LaMotta and Schiffer 1999, McKee 1999, Schiffer 1987, Staski and Sutro 1991) all of which can move artifacts from their *in situ* position.

Another difficulty in assigning material to phases is that I do not have ceramic dates for 38% of the units in my sample (214/562). Rather than simply assigning the material arbitrarily or by its association with nearby units, I have elected to ignore these undated units for these comparisons. This decreases the overall quantity of artifacts in my tables, but increases the

accuracy of my assessments. Hopefully, the material excluded would not change the overall patterns noted in Tables 6.0 and Figure 6.1.

Hol and Abal Household Assemblages

Ceramics from Preclassic contexts exist at the center (Forsyth and Hruby 1997), but they are few in number and do not provide enough data to create household signatures. Likewise, the only non-ceramic materials associated with Pom ceramics in my data sets consist of river rocks and a stone ball of undetermined function.

Nabá Household Assemblages

Nabá material culture is associated with 69 structures (excluding the royal palace and non-residential contexts). A composite picture of household material culture for this ceramic phase can be developed from all units with material dating to this period. Each household would have access to river rocks, stone balls, obsidian prismatic blades, chert bifaces, chert tools (bifacial knives, choppers, hammerstones, scrapers, fire starters) as well as chert prismatic blades and flakes. Figurine usage includes animal figurines (quetzal, lizard, and some unidentified pieces) as well as human and deity figurines. The range of figurine representations is quite limited with only a few generic forms. Musical instruments are also included among the figurines, mainly as simple ocarinas.

The lithic technology includes percussion and pressure flaking of chert nodules into desired shapes. Chert tools were made using heat treating (as necessary) prior to thinning out blanks from local nodules. Impressive knowledge of shaping lithic material was present from an early date. This is not surprising, because most of the lithic technology was already in place during Olmec times. The first inhabitants of Piedras Negras probably arrived with the necessary techniques to create tools from the local materials. Obsidian, however, is not a local material. The lack of obsidian debitage from this period suggests that obsidian arrived at Piedras Negras in the form of prefabricated prismatic blades, or that few individuals actually knapped their own obsidian. The amount of obsidian apparent during this period is also relatively small (Table 6.0, Figure 6.1).

Table 6.0: Grams of material per structure

Phase	Obsidian	Chert	Figurine	Ceramics	Ratio Chert to Obsidian	Ratio Ceramics to Chert
Pom	0	0	0	65.00	0	0
Nabá	1.35	37.64	10.11	4,180.15	27.99	111.06
Balché	0.71	19.51	17.37	1,305.51	27.48	66.91
Yaxché	2.51	98.62	71.99	5,716.76	39.24	57.97
Chacalhaaz	8.93	155.10	116.03	15,383.64	17.37	99.19
Kumché	3.44	125.60	32.11	3,485.56	36.53	27.75

Balché Household Assemblages

Balché materials are few in number. The number of structures dating to this period is slightly less than in Nabá (49), and they yielded fewer grams of material per unit than Nabá, except in figurine quantity. This suggests that there was more interest in figurine use during this period, perhaps in response to the factors leading to the minor collapse of the center at this time. Figurines of animals found in Balché contexts include an armadillo and toad, while human-deity figurines include representations of the maize god, dwarves, females, warriors with Teotihuacán insignia, and a male wearing a deer headdress.

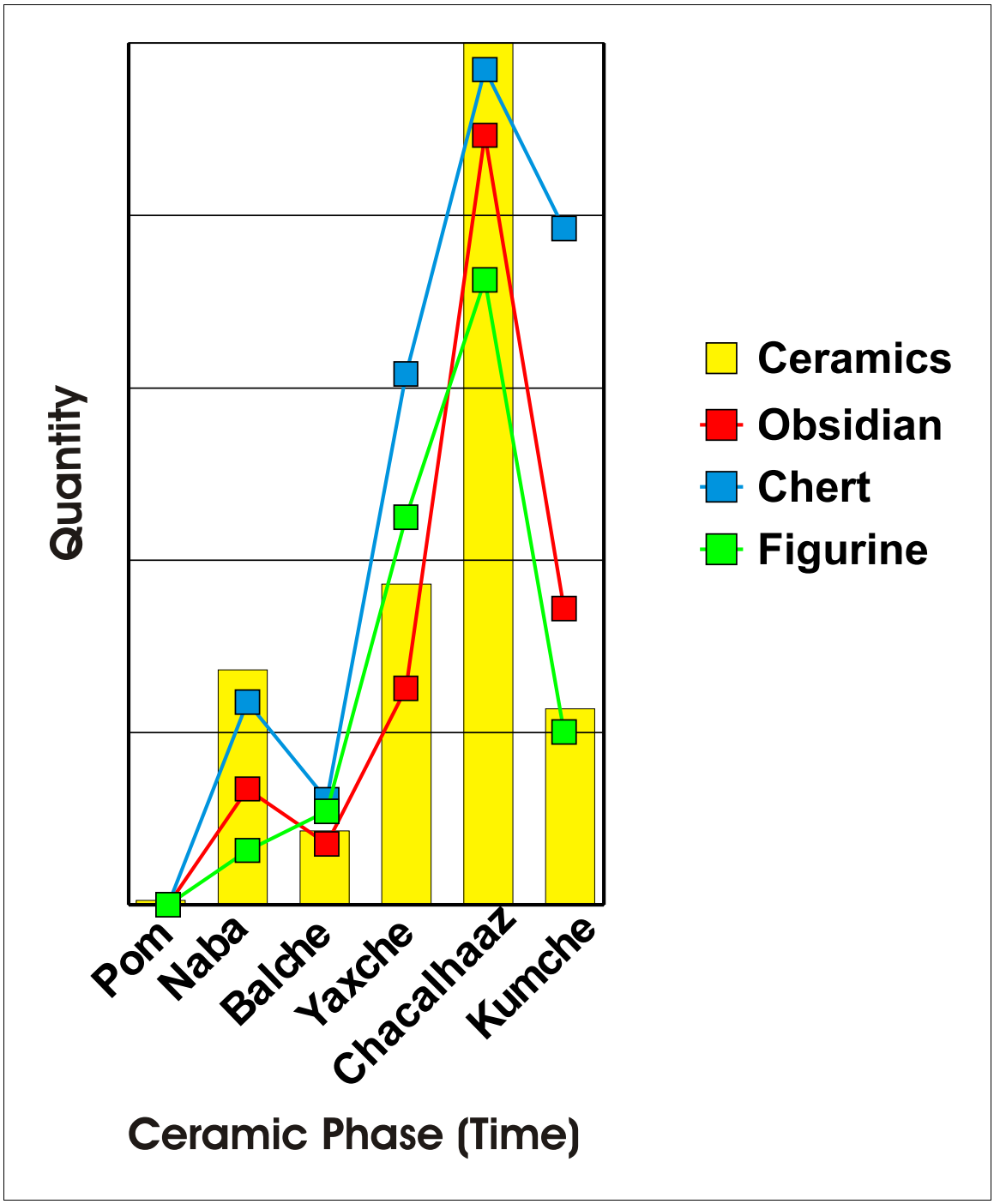


Figure 6.0 Consumption trends per structure (Multiple scale graph)

Diversity in stone tools is also apparent. Laurel leaf bifaces are added to the assemblage of choppers, celts, hammerstones, carving tools, disks, and prismatic blades. Again, the basic

lithic tool kit is still present and not much improved upon. Obsidian tools are limited to prismatic blades.

Other items found around structures include river rocks, beads, malacates (spindle whorls), mirror fragments and needles.

Yaxché Household Assemblages

The Yaxché ceramic period saw a growing population with a wide variety of durable goods. This period includes 74 structures and high quantities of ceramic objects. The average ceramic material per household is quite high (5.7 kilograms) while figurine use has quadrupled over the previous ceramic phase. The diversity of figurines also increased dramatically during this period. Animals represented in figurines include many forest creatures, such as birds, deer, jaguars, monkeys, pigs, and rodents. Dogs are also represented. Human-deity figures include ballplayers, maize god, dwarves, fat god, females, flat Mexican styles, various other gods, ritual clowns, Teotihuacán War serpent warriors, other warriors, and other males. Some of the figurines are whistles, and there were other musical instruments as well.

The lithic assemblage remains much the same, with a projectile point now included with the celts, axes, hammerstones, unifacial drill, fire starter, bifaces, etc. There is evidence for heat treating the chert to improve its quality, as well as evidence for creating chert tools in various parts of the center. Obsidian was also worked at Piedras Negras during this period, with an exhausted core and flakes discovered, along with the normal array of prismatic blades.

Chacalhaaz Household Assemblages

The Chacalhaaz ceramic period corresponds to the pinnacle of settlement at Piedras Negras. Structures in use include 118 buildings, with large quantities of materials recovered from units all over the center. This period had more obsidian, chert, figurines, and ceramic materials per structure than at any other time in the history of Piedras Negras. Diversity is the hallmark, especially in figurine types. Animal representations include bat, bird, conch, deer, dog, eagle, jaguar, lizard, monkey, opossum, owl, quetzal, rodent, toad, turtle, and vulture. Human-deity figurines include many new types as well. The range of forms has greatly expanded to include ball player, birdman, bone head, catwoman, maize god, dangle head, deer head, dwarf, fat god, females, flat Mexican, god, groove head, k'in head, laurels, males, old, pendant head, ritual clown, skull, Teotihuacán warrior, Teotihuacán war serpent headdress, and other types of warriors.

Lithic, bone and ceramic objects also have a greater diversity of forms and functions. Objects recovered that are associated with this ceramic phase include a bark-beater, metates, limestone columns, hammerstones, manos, green stone axes, ceramic balls, beads, ceramic disks, stone disks, eccentrics, incised bones, malacates, mirrors, needles, orejeras, pendants, pumice, rasps, rings, river rocks, stalactites, tubes, and turtle shells.

Chert continues to be used for multiple tools, including bifaces, celt axes, eccentrics, scrapers, carving tools, prismatic blades, disks, pigment stones, projectile points, polishers, hammerstones, and knife bifaces. Obsidian is still being used in residential contexts with the same range of forms as seen in the previous ceramic phase.

Kumché Household Assemblages

The Kumché ceramic phase is the last phase before Piedras Negras was abandoned. All material categories decreased during this phase. Chert quantity per structure is still quite high, perhaps indicating that tool (or weapon) production continued to be important. But the general diversity of goods found within Kumché contexts is low, due in part to the difficulty of distinguishing ceramics for this period, but also, I believe, because the center was in decline and people were leaving Piedras Negras.

The material culture shows a marked uniformity. The diversity of the previous phase is gone. Figurines hearken back to Balché types and forms including a limited range in animal types (jaguar, monkey, owl, and turtle) and an even more limited range in human-deity representations (maize god, dangle head, dwarf, fat god, female, Teotihuacán warrior, Teotihuacán war serpent). Other materials include the ever present river rocks, pumice, ball, disks, needles, stalactite, and various chert implements (eccentrics, bifaces, knives, celt axes, choppers, hammerstones, laurel leaf bifaces, mirrors, teardrop bifaces, and scrapers). Obsidian is present, mainly in the form of prismatic blades.

The material culture at Piedras Negras varies from one ceramic period to another. While the same materials continue to be used in each phase, such as ceramics, obsidian, and chert, their form varies in each ceramic phase. Ceramic and figurine forms are the most dynamic, with new types appearing very frequently. Some tools rarely change form or function and are present in small quantities throughout the life of the center. These items include obsidian prismatic blades, utilitarian serving ware, and chert bifaces. These are core items that do not change until society itself dramatically changes, which it did not. Instead, when the boom period of the Late Classic gave way to the stress of the final ceramic period, those items that were superfluous to the core residential assemblage were removed, leaving behind the bare essentials necessary to maintain life on the eve of the collapse.

PN 33A-E vs PN 33F

Now that the material culture of the site has been described in a general way, the heterogenous nature of the epicentral households will be emphasized. Excavations within Piedras Negras included the complete horizontal exposure of several structures. In particular, the patio groups in the U-Sector of the map were the focus of intensive excavations for three seasons. The excavations were described in the previous chapter. Here I focus on the material remains recovered from those excavations.

Both of these households had their beginnings in the Nabá period, and both were abandoned during the Kumché ceramic period. They had similar trajectories and should have similar artifact assemblages if they had the same social status. The artifacts recovered from these two areas show that these patio groups were not homogenous (Table 6.1).

The patio group that was excavated as PN 33A-E is based around Structure U-16. The patio group excavated as PN 33F has Structure U-5 as its main building. These two distinct patio groups are the physical remains of two different households. U-16's inhabitants were much more successful at accumulating material objects (and presumably prestige and wealth) than those inhabiting U-5, and lived in a larger patio group. The architecture of U-16 was also finer, with more cut blocks facing walls during the last phase, than at U-5. Both households had access to a

wide range material goods (Table 6.1), but the U-16 household received far more goods than the U-5 household.

Table 6.1 PN 33A-F artifact assemblages

Artifact type (grams)	PN 33A-E	PN 33F
Bajareque	1,025.85	2,308.00
Chert	12,595.93	11,280.52
Ceramics	962,170.00	778,040.00
Figurines	12,402.20	4,599.70
Obsidian	1,048.70	715.73
Other	1,002.10	71.65
Pumice	292.20	22.80
Groundstone	64 units	43 units
Jade	2 units	0 units
Animal Bones	430 units	88 units
Excavated Area	430 m^2	300 m^2

Obviously U-5's household was materially “poorer” than U-16's household. But how much poorer? If U-5's patio group were proportionally the same size as U-16's patio group, then the differences in their “wealth” become more apparent (Table 6.2). The area excavated under sub-operation PN 33A-E is 1.43 times larger than the area comprising PN 33F. If U-5's artifact quantities were 1.43 times greater, then U-5 would appear “richer” in terms of its utilitarian goods (i.e., chert, ceramics, groundstone); but it is still “poorer” in its assemblage of more exotic elements like figurines, obsidian, pumice, animal bones (feasting behavior), and jade. The other category is important here too. It contains those artifacts that are uncommon within the operations, such as beads, spindle whorls, worked bones, incised artifacts, hematite mirrors, needles, etc. These kinds of artifacts are proportionally found in far greater amounts in the U-16 patio group than in U-5, by a factor of 10.

Table 6.2 PN 33A-F Proportional Assemblages

Artifact type (grams)	PN 33A-E	PN 33F
Bajareque	1,025.85	3,308.13
Chert	12,595.93	16,168.75
Ceramics	962,170.00	1,115,190.70

Artifact type (grams)	PN 33A-E	PN 33F
Figurines	12,402.20	6,592.90
Obsidian	1,048.70	1,025.88
Other	1,002.10	102.70
Pumice	292.20	32.68
Groundstone	64 units	62 units
Jade	2 units	0 units
Animal Bones	430 units	126 units
Excavated Area	430 m^2	430 m^2

Proportionally, U-5's household was equivalent to U-16's household in much of its material wealth, indicating that it had ample, and proportional access to the more mundane objects of Maya culture. Where the households differ is in their uncommon objects, those few artifacts that signify a more diverse assemblage, and perhaps wealth through their scarcity.

The heterogenous nature of the epicentral residential households is illustrated in this example between two distinct households situated in close proximity in space. U-16 and its patio group (PN 33A-E) had a more heterogenous collection of goods found within its space than that of U-5 and associated structures. The real differences between these groups in terms of material culture is due to the presence in U-16 of uncommon objects, including imports, that indicate access to a wider selection of goods than U-5.

“URBAN” VS “RURAL” HOUSEHOLDS AT PIEDRAS NEGRAS

Excavations of the remains of patio groups within Piedras Negras reveal distinct differences between groups. Another useful distinction is between patio groups within the center, and those in its periphery. David Webster and Amy Kovak excavated five patio groups along the southern edge of the center, within 2.5 kilometers of its epicenter. These were generally small patio groups with one to three structures, with relatively few artifacts, and a short time depth.

In particular, a small patio group that David Webster excavated in 1999 (Webster and Kovak 1999) is an ideal candidate to compare to the U-5 patio group. The excavation operation, RS 27, focused on a hilltop patio with two structures. The soil depth was shallow, and the excavation completely exposed the structures. The excavated area was 154.5 m^2, which is roughly half the size of PN 33F. This excavation will be included in Kovak’s dissertation from Pennsylvania State University, so I will make general comparative statements here and leave the full description of the excavation and its artifacts to her.

The excavator noted in the informe that while each unit generally had some artifacts, the overall quantities were quite low, even lower densities than other peripheral sites. Artifacts recovered from the site include almost 50 kg of ceramic, low quantities of obsidian prismatic

blades, low quantities of chert (mainly in the form of bifaces), 38 figurine fragments, 8 pieces of groundstone, and a hematite mirror fragment.

In contrast PN 33F had large quantities of ceramics, 1,114 pieces of obsidian, 398 chert artifacts, 166 figurine pieces, 43 groundstone fragments, 3 mirror fragments, 3 spindle whorls, and other miscellaneous objects (worked bone and stone artifacts, and a bark-beater).

The differences in material culture between these two patio groups are marked. The low quantity of material recovered from the "rural" sites (and RS 27 is not unusual in this regard) point to profound differences between patio groups within the center and those outside it, even when the patio groups are not that far from the capital of the polity. This suggests that there may be several different kinds of social (or economic) categories at Piedras Negras (see Chapter 8).

PN 33F COMPARED TO RURAL COPÁN RESIDENCES

Rural sites outside the main group at Copán were also investigated by a Pennsylvania State University project to flesh out our understanding of ancient Maya commoner lives and living conditions. Nancy Gonlin's dissertation documents eight rural sites from the Copán valley. These sites were excavated with a horizontal emphasis designed to expose the structures and patios of these small groups completely. The majority of the sites in the Copán valley are type 1, a designation given by Harvard's project at Copán to mounds under 1.25 meters in height with a basal platform constructed of earth fill faced with stone. Type 1 mounds may be single structures or arranged in a patio group (Gonlin 1993:55). I will compare the eight rural sites included in her dissertation (OPs 30, 31, 32, 33, 34, 35, 36, and 38) to PN 33F to see if this patio group has similar characteristics with these well-documented Maya patio groups (Table 6.3). Operation 33 is unusual because it is the remains of a field hut rather than a full-time residence.

Table 6.3 PN 33F vs Copán rural sites, area excavated

Operation	Site	Total Area Excavated (m^2)	Structure Count
PN 33F	U-5/U-6	300	2
Copán 30	11D-11-2	430	6
Copán 31	7D-6-2	496	3
Copán 32	7D-3-1	320	3
Copán 33	34A-12-1	180	1
Copán 34	34A-12-2	272	2
Copán 35	32B-16-1	380	5
Copán 36	34C-4-2	744	5
Copán 38	99A-18-2	212	2

(Modified from Gonlin 1993:336, Table 3.13)

The Copán rural sites are similar to the rural sites from Piedras Negras in that they have generally low quantities of artifacts per site (Table 6.4), with larger quantities of quintessential household goods, such as ceramics, chert, obsidian, and groundstone. The overall quantity of ceramics at these sites is low, compared with PN 33F, although the relative amount of chert and obsidian per site is roughly comparable. Figurine usage at Piedras Negras is incredibly more varied than that at Copán's rural sites. A surprising find is the quantity of jade at the rural sites compared to PN 33F. Copán is relatively closer to the Sierra de las Minas, Guatemala, source of jade than Piedras Negras.

In short, the Copán rural sites do not have the large ceramic assemblage so characteristic of epicentral patio groups at Piedras Negras. Nearly every major category of artifacts pales in comparison to Piedras Negras' artifact assemblage.

Table 6.4 PN 33F vs Copán rural sites, artifact assemblage

	PN 33F	Average per Copán Site	Total from All 8 Copán Sites
Ceramic (kg)	778.04	67.97	543.75
Chert (frags)	398	272	2175
Figurines (frags)	166	0.6	5
Obsidian (frags)	1,114	718	5743
Groundstone (frags)	43	37	299
Bone (frags)	126		8
Other (frags)	19	3.25	26
Jade (frags)	0	1.6	13

(Summarized from Gonlin 1993, Tables 4.1 to 4.24)

PN 33F COMPARED TO CERÉN

Another valuable comparison can be made between U-5's patio group and the patio groups excavated at Cerén, El Salvador. Cerén is the Mesoamerican equivalent of Pompeii (Sheets 1992). An eruption from a volcanic vent that suddenly opened under a nearby river buried the area in volcanic ash. Evidence points to the eruption occurring in August, around 600 AD, after dark. The inhabitants of Cerén managed to flee their village prior to its burial in five meters of volcanic ash (their fate is still unknown) leaving behind their material possessions, which were perfectly preserved by the volcanic ash.

I consider Cerén to be representative of Piedras Negras during the early Pom, or perhaps Nabá ceramic phases. The village consists of a "dozen to a score of households" (Sheets 2000:214) each with function specific buildings. The size of the village is quite small, perhaps a

few hectares, and the population is estimated at 100 people (Sheets 2000:217). Each member of the village would have been known to every other member and most were also probably related. The material culture at Cerén is not purely Classic Maya. El Salvador lies on the fringe of the Maya zone, and the ceramics from the area indicate trade with groups outside of the Maya sphere.

Households at Cerén are defined by patio groups. Each patio group had a minimum of three structures: one for sleeping, a storehouse, and a kitchen. Each patio group (household) was separated by several meters from its neighbors. This space was often filled by a garden area. Individual structures were built with bajareque and covered with thatch. The roofed space extended well beyond the confines of the walls, so outdoor activities could be performed in the shade of the structure. The household assemblage included obsidian blades, several macroblades and scrapers, a jade (greenstone) axe, polychrome ceramics and plainware ceramics, seashells, salt (assumed), hematite pigment cylinders with mica, incensarios, gourds, groundstone, and a few figurines (Sheets 2000). Wooden artifacts are rare.

The variety of goods per household is somewhat larger than the rural structures from both Piedras Negras and Copán. This is not surprising because the abandonment forces are distinct. The full complement of their domestic assemblage is present at Cerén, yet the individual artifact quantities are small enough that they do not really compare to PN 33F in its last occupation (Kumché ceramic phase)(Table 6.5). Without knowing the exact quantities of the average Cerén household assemblage, a direct comparison is difficult. However, the Cerén web site (http://ceren.colorado.edu) does have operation inventories available for download. Operation 2, representing Household 2, has an inventory of 486 non-perishable objects (I removed pollen samples, unidentified plaster casts and other perishable objects from the list). Both Cerén Household 2 and PN 33F Kumché have similar amounts of groundstone. PN 33F has more chert tools, obsidian, and figurines than this Cerén household. What U-5 lacks is jade material. Household 2 has 7 jade beads that were left behind when the inhabitants fled the volcano. If there were jade in U-5's patio group it was removed when the inhabitants moved.

Table 6.5 PN 33F vs Cerén Operation 2, artifacts

Artifacts	PN 33F (Kumché)	Cerén Household 2
Ceramics	34.67 kg	70? Vessels
Chert/Greenstone	23	12
Figurines	35	1
Groundstone	3	4
Obsidian	95	56
Other	2	?
Jade	0	7

Figure 6.1 Obsidian types

THE VISIBLE ECONOMY

The purpose of this section is to present some indicators of inter-regional exchange for Piedras Negras. My intention is not to engage in a full discussion of potential economic types and trade methods, but to show that Piedras Negras did import goods and maintained economic ties with other regions throughout its existence. The intent is not to identify the origin of durable goods found at the center, but to emphasize that certain durable goods were brought into Piedras Negras, sometimes from considerable distances, and that Piedras Negras's inhabitants had access to foreign goods despite the often tumultuous relationships between nearby centers. I divide the economy into two aspects, the visible and invisible economies. My reasoning is that there are certain aspects of ancient Maya society that are more easily identified than others. The visible economy consists of trade activity for which there is ample archaeological evidence. The invisible economy consists of those exchanges that one can infer took place, but for which the archaeological record is mute.

My reconstruction of Piedras Negras's visible economy is limited by the strength of the archaeological evidence. Some objects preserve better than others, and hence are more likely to be recovered. A prime example and a definite import into the center was obsidian. All of the obsidian recovered at Piedras Negras was imported. I do not have data on source analysis for the various types, but physical characteristics suggest that several different sources are represented; and hence the artifacts took somewhat different paths into the center. In particular, El Chayal and Pachuca obsidian are easy to pick out due to their characteristic colors, dull gray and golden-green respectively (Figure 6.1).

Ceramics were also imported into Piedras Negras. Some regional ceramic styles were emulated at Piedras Negras using local material, but often fine-paste ceramics were brought into the center. The exact quantity of imported ceramics per period is unknown, but fine orange wares and fine gray wares, to name just two conspicuous ceramic types, were not locally manufactured.

Other imports include jade. Jade objects at Piedras Negras were probably not shaped within the center, but rather were brought in pre-formed as specialty items. Likewise, some

metates were imported for use as special grinding stones for non-maize materials. Rhyolite and basalt metates have been recovered, both of which could have been brought from the Sierra de las Minas along with the jade. Pumice is another import, although conceivably the small amounts recovered could have floated down the river. Some of the figurines could also have been imported, but many of them were probably manufactured within the kingdom of Piedras Negras.

Chert is a local material used extensively for tools. How access to the chert-bearing quarries was controlled, or how the internal makeup of distribution within the polity functioned, is not a concern of this chapter. I emphasize here only that chert was locally abundant.

THE INVISIBLE ECONOMY

Some goods undoubtedly used at Piedras Negras are not archaeologically visible. Cotton was probably present and perhaps even grown nearby. Depictions of cloth on figurines do not have the appearance of bark cloth, and only two bark-beaters have been found, both from domestic contexts (Nelson 2003). Spindle whorls have been found in household contexts, and their size and shape are indicative of cotton thread, rather than other kinds of thread (Smith and Hirth 1988). The archaeological record is otherwise silent on cotton at Piedras Negras. This is an example of the invisible economy. We know from Contact sources that cotton procurement was a major enterprise of the Aztec tribute systems (Villanueva 1985), but little is known about Classic Maya textile production.

Another aspect of the invisible economy is tribute. Tribute is often shown on ceramic polychrome vases as sacks of goods placed around the Lord's throne. Many different kinds of goods were moved across the landscape as tribute, including archaeologically visible ones, but here focus on cacao. Cacao is portrayed as the quintessential kingly drink on Mayan ceramics, the beverage of gods and god-impersonators. Bags of cacao beans were required as tribute (Houston 2000:173) but they leave few archaeologically recoverable remains.

Summary

These comparisons are highlight the diversity and quantity of objects found in excavated patio groups in different areas of Mesoamerica. In terms of material goods, the epicentral patio groups from Piedras Negras have a greater quantity of artifacts than rural sites around Piedras Negras, the rural sites of Copán, and Household 2 from Cerén. These comparisons indicate that there is a substantial difference between household remains within Piedras Negras as compared to those outside the center when patio groups in both locales have been excavated with similar strategies. The differences between the sites demonstrate the essential heterogenous nature of the domestic sphere, even among non-elite households living on the fringe of Maya centers.

Chapter 7

Population and Agriculture

This chapter examines the relationship between population and maize production at Piedras Negras. Population and agricultural production are interrelated phenomena for sedentary societies. In tropical environments food storage is of limited duration due to high humidity and pests. Many aboriginal populations practice swidden agriculture, which is a sustainable form of agriculture when sufficient land is available for field rotation. In high population areas, swidden farming could be intensified with the use of terraces, shorter fallow seasons, and increased use of fertilizers (human wastes or kitchen debris; Murtha 2002). I assume that the prehispanic inhabitants of Piedras Negras depended on a swidden system with fallow periods.

The main purpose of this chapter is to develop a maximum population estimate for epicentral Piedras Negras during the Late Classic population boom, and other estimates for each individual ceramic period. My method is straightforward and purposely simplistic to demonstrate the low overall population of the center even when its population was at its greatest.

A secondary purpose is to develop an estimate of production potential for a 10-13 km radius around Piedras Negras. I will then compare these numbers and see if the estimated population for the center could be supplied by a 10-13 km^2 catchment. I use this radius because this distance is reported from ethnographic accounts of swidden farmers as the outside distance that farmers would return to their homes after working on their fields rather than spend the night (Redfield and Villa 1934:7, Reina 1967, see also Chisholm 1967). Distances farther than this would require the use of out-buildings, thereby complicating the archaeological record with the addition of other structures. For agricultural production the difficulty of ingress to Piedras Negras has worked to our advantage as the soil chemistry of the area has recovered from the demands of the Late Classic period allowing comparisons between the newer natural forest and older worked soils via the soil profiles and test pits that have been dug in the surrounding areas (Fernández et al. nd). The conjunction of modern mapping and soil analysis should provide a realistic perspective concerning the agrarian aspects of this ancient center and the soils that support it.

THE DIFFICULTY OF USING STRUCTURES AS PROXY

Key to estimating ancient demography is understanding the processes of life and death in pre-modern societies. Unfortunately, there is still no easy way of relating skeletal populations to their living contemporaries (Wood et al. 1992). Poor preservation of material in tropical environments limits the recovery of burial material and plays havoc with the skeletal remains of the Maya (Wrobel et al. 2002). For these and other reasons, archaeologists have relied on other indicators as proxy for ancient populations. Building quantity, in particular, has become the usual unit for estimating past populations (Rice and Culbert 1990), i.e., number of occupied structures per ceramic phase.

Buildings are poor indications of population because they are fixed structures that do not change with the same resilience as human populations. They can be renovated and thereby increase in physical size, but this increase can be attributed to more causes than an increase in household size, such as renovation due to increased status within the community, more storage space, to take advantage of breezes or shade, for craft work to occur under cover, etc. These reasons will rarely be known by archaeologists and can skew population estimates made on the basis of roofed space alone. For these reasons, Casselberry (1974) suggests that population estimates based on roofed space need to be confined to societies with similar cultural practices, and cannot be applied indiscriminately.

Other difficulties with buildings as proxy measures is that buildings may be abandoned or reused at different times within the same ceramic complex. This leads to double-counting and large population estimates. A household that abandons a patio group because the head of the patio group died (a custom known from Post-Contact sources; Landa 1978:57) would likely build a new home nearby if land where available. Both residences would have overlapping ceramic assemblages and would appear to archaeologists to be two different households. Likewise, an abandoned house could be remodeled by a household and their old home abandoned. Further, some buildings are "invisible" and "hidden." Invisible buildings are those with no surface features. Hidden buildings are buildings whose visible surface features were overlooked by mapping crews and both types cause underestimation of the actual number of buildings within the area (Johnston 2002).

The final difficulty with building proxies is that not all structures were domiciles. A single household could have several buildings that were used for different purposes: one building would be sleeping quarters, another a food preparation and storage building, while another building could be used for rituals or ancestor worship. At Cerén, a single household patio group used three (or more) buildings for their domestic activity (Sheets1992, Folan et al. 2000). Conversely, a patio group might represent an extended family with an aged parent's house and their children's houses (and households) grouped together. In this case, each building should be counted as containing a separate household. Even with all these problems, building counts still serve as one of the best indicators of past population levels.

POPULATION ESTIMATES FOR PIEDRAS NEGRAS

My maximal population estimate for Piedras Negras, the center, derives from a combination of methodologies that overlap, under the assumption that converging estimates using different measures will give a reasonable estimate of past population levels. The basic formula multiplies structure counts by household size to generate a maximal model of population. This is a very simplistic formula used to illustrate the overall small scale of population at this center (see Webster and Freter 1990 and Webster et al. 2000 for more complex methods). I could manipulate the data in other ways to create a more realistic model of population, but my purpose is served by even a simple equation.

Structure Counts

502 structures are located within the currently mapped 0.97km^2 epicenter area of Piedras Negras. These structures are divided into 463 residential buildings, or 105 patio groups,

including palace structures as large extended patio groups. The actual number of buildings within the epicenter is probably undercounted by 1-2%, because of hidden buildings that were not mapped by Penn crews in the 1930. No invisible structures were discovered in the course of extensive horizontal excavations throughout the center, so I will not inflate my structure count to account for them.

Contemporaneity is another problem. For a maximal population estimate, I will assume (erroneously) that all the households are contemporaneous. (This assumption is not made in the individual ceramic phase population estimates below.) Excavations at Piedras Negras included in this work retrieved datable ceramic material from 29 of the patio groups (40%), associated with 136 of the structures (27% of known structures). Population estimates for individual ceramic periods will use only those buildings and patios actually dated to that ceramic period.

Disuse and reuse could be significant. The problem with building disuse is that ceramic periods are broad intervals of time and an abandoned building might look inhabited if people used it as a neighborhood dump (Hayden and Cannon 1983, Schiffer 1987) because ceramics from a later period were added to the building's assemblage when it was not occupied during that period.

Household Size

Central to any discussion of population is the step from structure number to the number of people living in each structure or patio group, i.e., household size (Robichaux 2001). The number that researchers use depends on their view of sedentary life during the century that they are trying to estimate and how it compares to current living populations. Perhaps the most common measure for the Maya Lowlands is Redfield and Villa Rojas's estimate from Chan Kom, Yucatan, 5.6 individuals per household (1934:91). Although the population of Chan Kom was a pioneer population with many young households (and doubling about every 17 years; Webster et al. 2000:159), this estimate has some general validity, when compared to the range of other pre-Industrial societies around the world (Table 7.0, Table 7.1). Worldwide, even "simple" and "joint" households have remarkably similar average scales (see Hajnal 1982). I use 5.6 people per household because it is widely cited (Rice and Culbert 1990), so that my derived values are directly comparable to other researchers' estimates. Some researchers have raised or lowered their estimates based upon other ethnographic and census records, like Sanders (1962-1963) using 4.0 individuals from 16th century Mexican census records; or Haviland (1972) and Steggarda (1941:128) using 4.9 from modern Yucatan ethnographies. Higher estimates include D. Puleston's 10 person/house from Noh Petén at contact (1973:177). Even higher numbers have been postulated, under the premise that the majority of the Classic Maya lived in large extended or polygynous households (but see Hajnal 1982). However, here it is important to emphasize the difference between households as patio group and household as structure.

Table 7.0: Estimates for household size, from census records.

Location		Census Year	Person/ Household	Source
Cozumel Island	Q. R.	1570	11.43	Roys et al. 1940
Temaza		1579	9.35	Roys et al. 1940
Pencuyut	Yucatan	1583	8.42	Roys et al. 1940
Tizimin-Boxchen	Yucatan	1583	9.89	Roys et al. 1940
Dzonotchuil		1583	8.66	Roys et al. 1940
Tecay		1583	7.48	Roys et al. 1940
Tixcacauche		1583	8.32	Roys et al. 1940
SW Campeche	Mexico	1615		Weeks 1988
IchBalché			7.2	Weeks 1988
Tzuctok			8.0	Weeks 1988
Chunhaz			4.5	Weeks 1988
Chacuitzil			8.48	Weeks 1988
Ichmachich			9.0	Weeks 1988
Average			7.04	Weeks 1988
Chinautla	Guatemala	1727		Reina et al. 1984
Barrio 1			11.17	Reina et al. 1984
Barrio 2			13.58	Reina et al. 1984
Barrio 3			10.48	Reina et al. 1984
Barrio 4			7.19	Reina et al. 1984
Average			10.97	Reina et al. 1984
Chan Kom	Yucatan	1934	5.6	Redfield and Villa Rojas 1934:91
Xcacal, Q.R.	Mexico	1945	6.3	Villa Rojas 1945
Mexico		1970	6.0	De Roche 1983:188
***** Average for all Mesoamerican Census = 8.525 *****				

(Maya household sizes from Ringle and Andrews 1990: Table 11.7, p. 243)

Table 7.1 World-wide household comparisons

Location		Census Year	Persons/ Household	Source
Tuscany	Italy	1427	5.1	Klapisch 1977:275
Middlesex	England	1599	4.75	Laslett1977a:61
Yokuchi	Japan	1676	7.0	Laslett1977a:61
Wurttemberg	Germany	1687	5.77	Laslett1977a:61
Rhode Island	United States	1689	5.85	Laslett1977a:61
Nishinomiya	Japan	1713	4.95	Laslett1977a:61
Lesnica	Poland	1720	5.4	Laslett1977a:61
Belgrade	Serbia	1733	4.95	Laslett1977a:61
Pas-de-Calais	France	1778	5.05	Laslett1977a:61
Aross-in-Mull	Scotland	1779	5.25	Laslett1977a:61
Parma	Italy	1782	4.16	Laslett1977a:61
Tallensi	Africa	1933	7.86	Goody 1977:112
Zaria	Africa	1950	6.7	Goody 1977:112
LoDagaba	Africa	1950	7.0	Goody 1977:112
LoWiili	Africa	1950	11.1	Goody 1977:112
Lamba	Africa	1967	5.5	Goody 1977:112
Sujuma	Africa	1967	7.1	Goody 1977:112
Mambwe	Africa	1967	5.2	Goody 1977:112
Lala	Africa	1967	4.8	Goody 1977:112
Dominica	West Indies	1970	5.6	Goody 1977:114

Table 7.2: Site size and structure quantity - ordered by total structure per square kilometer

Site	**Survey Location**	**Area surveyed (km^2)**	**Total Structures/km^2**
Nohmul	Central	4.0	58
Lubaantun	Central	1.0	90
Uaxactun	Central	2.0	112
Belize Valley	Rural	5.0	118
Quirigua	Central	3.0	145
Sayil	Central	2.4	220
Tayasal	Central	4.0	221
Tikal	Central	9.0	235
Seibal	Central	1.6	275
Caracol	Central	2.26	300
Las Quebradas	Central	0.9	315
Santa Rita	Central	0.3	400
Dos Aguadas	Central	0.22	414
Komchen	Central	1.0	500
Piedras Negras	*Central*	*0.97*	*517*
Palenque	Central	2.2	673
Copán	Urban Core/ Central	0.6	1449

(Adapted from Rice and Culbert 1990, Table 1.1; Sharer 1994:470; and Barnhart 2001:73)

Methodologically counting 5 people per household is very different than 5 people per structure (Figure 7.0). Using patio groups as the base measure of a household, 5 people per household would equal 5 people. Using individual structures as equal to a household, then a patio group with four structures would equal 20 people, a 400% increase. My preference is to use a higher number (10) when counting by patio group, which is higher than the average number of persons per household from Mesoamerican census records prior to 1600 (see Table 7.0) and the

Figure 7.0 Structure counting methods

usual 5.6 when counting individual structures with a decrease in building quantity to account for non-residential buildings such as storage facilities or detached kitchens. I realize that Chan Kom households would include several structures per household, equivalent to patio groups, but there is a tendency in the literature to use this number as equivalent to *structure* rather than *patio group* (A. Chase 1990, D. Chase 1990, Culbert et al. 1990, Ringle and Andrews 1990, Tourtellot et al. 1990).

Roof or Floor Areas

Another population estimate is possible using floor space or roof areas as proxy for people. Developed by Naroll (1962) for use in egalitarian societies, this formula calculates the population of the household as 1/10 of the total square meters of the household. Clarke (1971) increases the amount of space per individual for Puebloan dwellings: pop = 1/3 total square meters of household. Casselberry (1974) further refines the formula for multifamily or extended family housing: pop = 1/6 total floor space (in square meters). D. Puleston (1973) used Naroll's formula at Tikal, and found it predicted that the average house contained 5.4 people, very similar to the Chan Kom data (Rice and Culbert 1990:18).

Maximum Population Estimate

Initial estimates for epicentral Piedras Negras during the Late Classic show a wide range in population, but indicate the overall small size of the center's population.

Maximum: 502 buildings x 5.6 people/structure = 2811 people. This estimate includes mortuary temples, ball courts, sweat baths and every single structure as contemporaneously occupied so it over-estimates the population considerately.

More realistic: 463 structures x 5.6 people/structure = 2593 people + Royal household population (60) = 2653. This estimate assumes that all structures in a patio group were residential and that each structure had 5.6 people. Obviously non-residential buildings were removed from this estimate. I believe this is also an over-estimate, but probably closer to the "real" population. Bigger structures are not given more population, and some non-residential structures are given population, so they both probably even out. I also assume that the royal palace's population is roughly 10 times the size of the average household.

Minimum: 105 patio groups x 10 people/patio group = 1050 people. I use a higher estimate for each patio group, based upon swidden farmers and their household size from across Mesoamerica. If I were to apply the Chan Kom standard, then the population at its peak would be 588, which seems too low to maintain the center.

Roof Area: U-5 is 3 m deep and 17 m long, or 51 m^2. Naroll's formula; population = floor space/10 m^2 = 5.l people for this structure. U-6 is 4 m x 7 m = 28 m = 2.8 people for this structure. Thus, the total patio population for U-5 group would be 7.9 people according to

Naroll. This is slightly greater than the constant I used, so my minimum estimate is definitely a minimum.

Obviously the maximum estimate could be changed by adding in hidden structures (+1-2%), or by removing non-residential structures (20% to 60%), or correcting for possible non-contemporaneous buildings (-20%) or even by increasing the area of Piedras Negras via additional mapping (+20%). However, I do not think that the overall population of the center will be significant increased over 2650 inhabitants, nor do I think that the population was less than 500 people for the Late Classic.

Thus, the population range at Piedras Negras during the Late Classic period was probably between 1050 and 2600 people -- with 2800 people as an extremely high over-estimate. Another way of estimating population would be to divide the structures into types, such as single unit, two structure patio, 3-4 structure patio group, and complex groups of greater than 4 structures, then assign a different size "household" constant to each type which will give a more variable estimate. I did not use this method here, because I think that I am already including enough non-residential structures in my estimate to "balance" out any variation in household size between larger patio groups (or even larger buildings) and smaller ones. Additionally, my estimate assumes that every structure was occupied contemporaneously, which is certainly not true, so I feel justified in accepting 2600 as a high, inflated maximum. This means that Piedras Negras had a maximum population density of 2680 people per square kilometer (2600/0.97), and a structure density of 517 buildings per square kilometer (506/0.97). (See Table 7.2 for comparisons with other Maya sites.)

POPULATION PER CERAMIC PERIOD

Maximum population estimates hide the growth and development of the center over time. Epicental Piedras Negras was not first established on the landscape with 2600 inhabitants, but attained that number over centuries. The examination of where ceramics occur during each phase shows an underlying pattern of boom and bust cycles from the Early Classic to the Late Classic periods.

Methods

The ceramic data from all of the units included in this dissertation[1] were assigned their respective phases by the project ceramicists. I took their data and plotted the distribution of the ceramics by period on the Piedras Negras map. Then I assigned structures to the test pits based on their proximity. Test pits located in the center of a plaza were assigned all the buildings in the plaza under the assumption that the plaza construction was contemporaneous with the construction of its constituent buildings. Then the building data were counted by ceramic phase and tallied (Table 7.3). Initial settlement of the area was small, and each new settlement was

[1] I do not have access to all ceramic data from the Proyecto Piedras Negras, so I am generalizing using only data recovered from the 562 excavation units included in this dissertation.

counted for each phase. Some structures did not have ceramic data for a phase (situationally abandoned) and then were re-occupied later (renewed settlement). Permanent abandonment of a structure also occurred, as noted by no additional ceramic phase data. The total structure count for each phase was then tallied and used to provide population data (Table 7.4) and the area occupied by each ceramic phase was also noted.

The ceramic periods encompass different time lengths (Table 2.0). The Pom period covers 175 years, and the Nabá period is even longer with 200 years. Balché, Chacalhaaz, and Kumché ceramic phase are all the same length (75 years); while Yaxché encompasses 125 years. The differences in time depth may affect the amount of perceived settlement during that phase, although this is mainly a problem with Nabá and Yaxché ceramic periods as they are larger and better attested than the Pom phase. The differences in the length of time might make the drop in population for the Balché period less pronounced if the ceramic phases were standardized to each cover 75 years (Pom = 2 occupied structures, Nabá = 25 occupied structures, Yaxché = 44 occupied structures). However, this practice would only heighten the difference between Chacalhaaz and all other ceramic periods. Unfortunately, there is no way of knowing which method represents the real settlement pattern at Piedras Negras.

Table 7.3 Settlement per ceramic period

	Settlement		Abandonment		Residential Occupations	Inhabited Area (km^2)
	New	Renewed	Situational	Permanent		
Pom	6	0	0	0	6	0.03
Nabá	63	0	0	0	69	0.74
Balché	7	0	23	3	49	0.58
Yaxché	18	18	12	0	74	0.90
Chacalhaaz	37	15	1	7	118	0.97
Kumché	3	3	0	97	27	0.71
Total	136	36	36	107	136	

Results

Early Classic Pom ceramic phase materials were associated with six structures, mainly clustered around the R group (Figure 7.1). Proportionally, this is the equivalent of 22.2 structures were all buildings in Piedras Negras excavated (502 total structures / 136 structures with datable ceramics in this dissertation = 3.7; 6 Pom structures x 3.7 = 22.2 Pom structures at Piedras Negras). If each of these structures were inhabited by an average household of 5.6 people, then the population of Piedras Negras during this phase is 124.3 people. The area yielding Pom ceramics encompasses 0.03 km^2, indicating the spatially compact nature of the settlement.

The Nabá ceramic phase had a wider distribution of ceramics indicating a major change in the population of the area (Figure 7.2). Nabá ceramics are found associated with 69 structures,

with an estimated population of 1,430 individuals (Table 7.4). The area of the site with Nabá ceramics is 0.74 km^2, or a third less than Piedras Negras at its maximum population during the Late Classic. New settlement during this phase involves 63 new structures. The jump in population from Pom to Nabá represents an Early Classic boom, which was followed by a minor population collapse.

Balché ceramics are not nearly as numerous at Piedras Negras. Initially, I thought this was due to the difficulty of separating them out from other ceramic phases (Holley 1983). Now I see their relatively low distribution (49 structures with an estimated population of 1015.3 individuals) as real (Figure 7.3). The area associated with this ceramic phase is also lower, 0.58 km^2, also indicating that a change has occurred from the previous ceramic phase to this one. Seven new structures were occupied in this phase, while 23 structures were situationally abandoned, and three were permanently abandoned.

Yaxché ceramics are quite plentiful across the site. They are found in association with 74 structures in the materials included in this dissertation, with an estimated human population of 1533.3 individuals (Figure 7.4). The area that they are found in also increased to 0.90 km^2, which is a new high both in area and population. Renewed settlement occurred with 18 structures and an equal number of new settlement within the center. Even so 12 structures were situationally abandoned during this phase.

Chacalhaaz ceramics were found associated with 118 structures in this study (Figure 7.5). Their distribution across Piedras Negras extends over the entire area of the mapped site (0.97 km^2). The estimated population during this period is 2445 individuals. This number is lower than the maximum estimated population for Piedras Negras (2,811), and close to my previous realistic estimate above (2,653). New settlement included 37 structures, and 15 abandoned structures were re-inhabited. A single structure was situationally abandoned during this ceramic phase while seven others were permanently abandoned.

Kumché ceramics are not nearly so plentiful (Figure 7.6). They are found associated with 27 structures and spread over an area of 0.71 km^2. The estimated population of the period is 559.4 individuals. Even with this low distribution, three structures were newly settled and three more were re-inhabited during this phase. On the other hand, 97 structures were permanently abandoned, a true collapse of population (Figure 7.7).

Table 7.4 Population estimate for Piedras Negras

	Inhabited Buildings	Proportional* Building Count	Population (x5.6)	Inhabited Area (km^2)
Pom	6	22.2	124.3	0.03
Nabá	69	255.3	1429.7	0.74
Balché	49	181.3	1015.3	0.58
Yaxché	74	273.8	1533.3	0.90
Chacalhaaz	118	436.6	2445.0	0.97
Kumché	27	99.9	559.4	0.71

	Inhabited Buildings	Proportional* Building Count	Population (x5.6)	Inhabited Area (km^2)
Total	136	502.0	2811.2	

*Proportional Building Count (502 total structures / 136 structures with datable ceramics in this dissertation = 3.7; 3.7 x Buildings per Ceramic Phase)

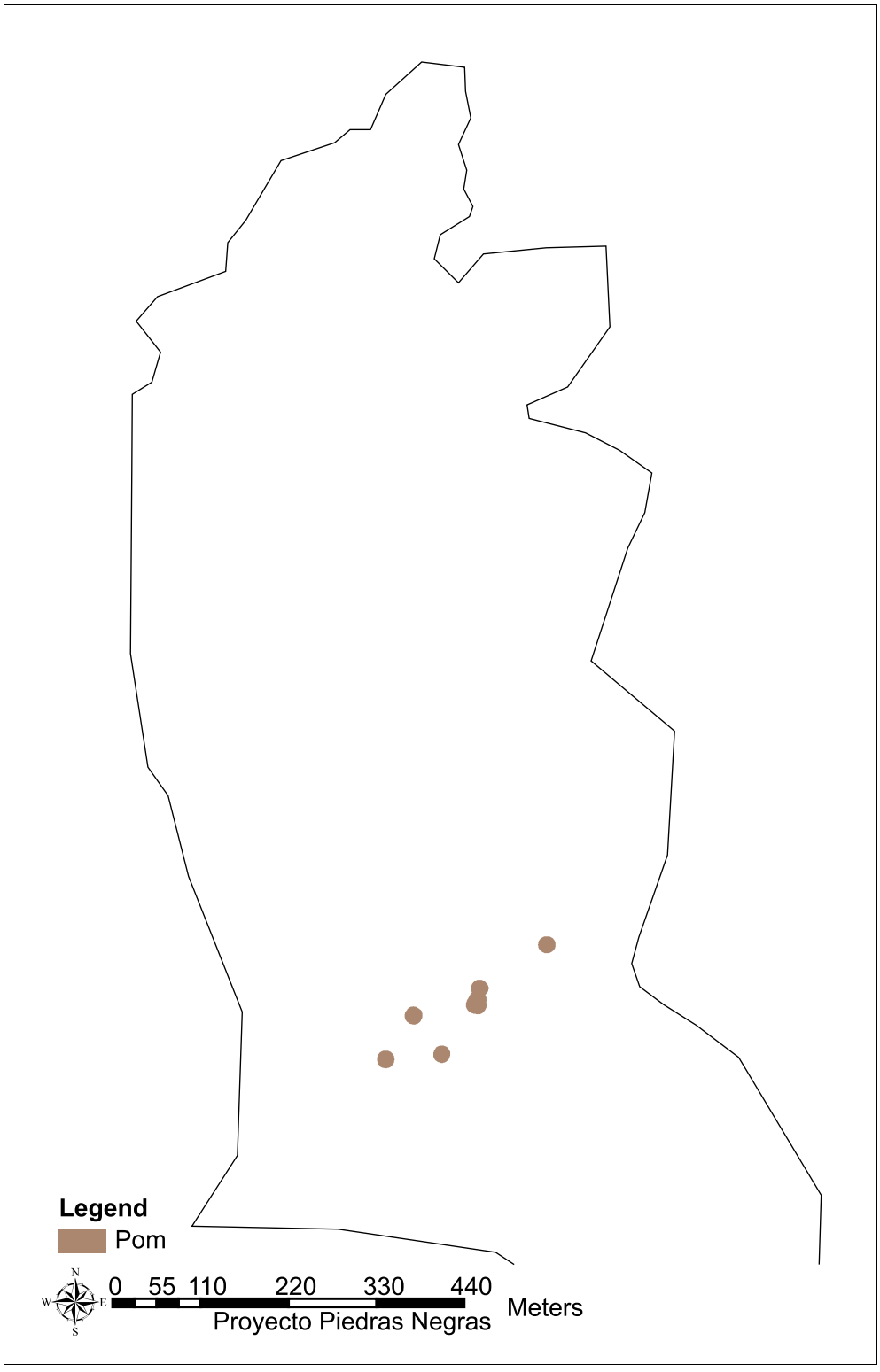


Figure 7.1 Pom ceramic locations

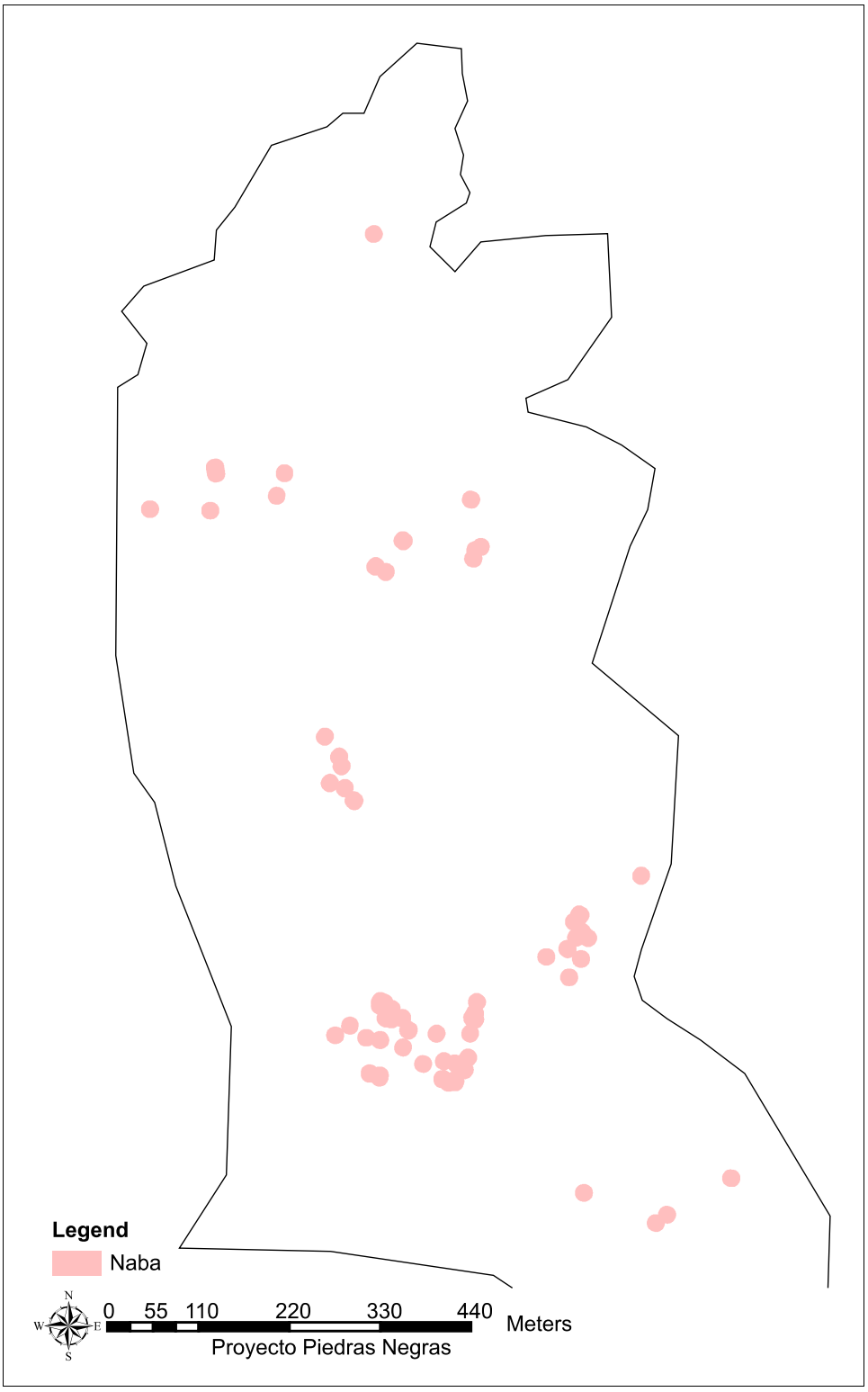


Figure 7.2 Nabá ceramic locations

Figure 7.3 Balché ceramic locations

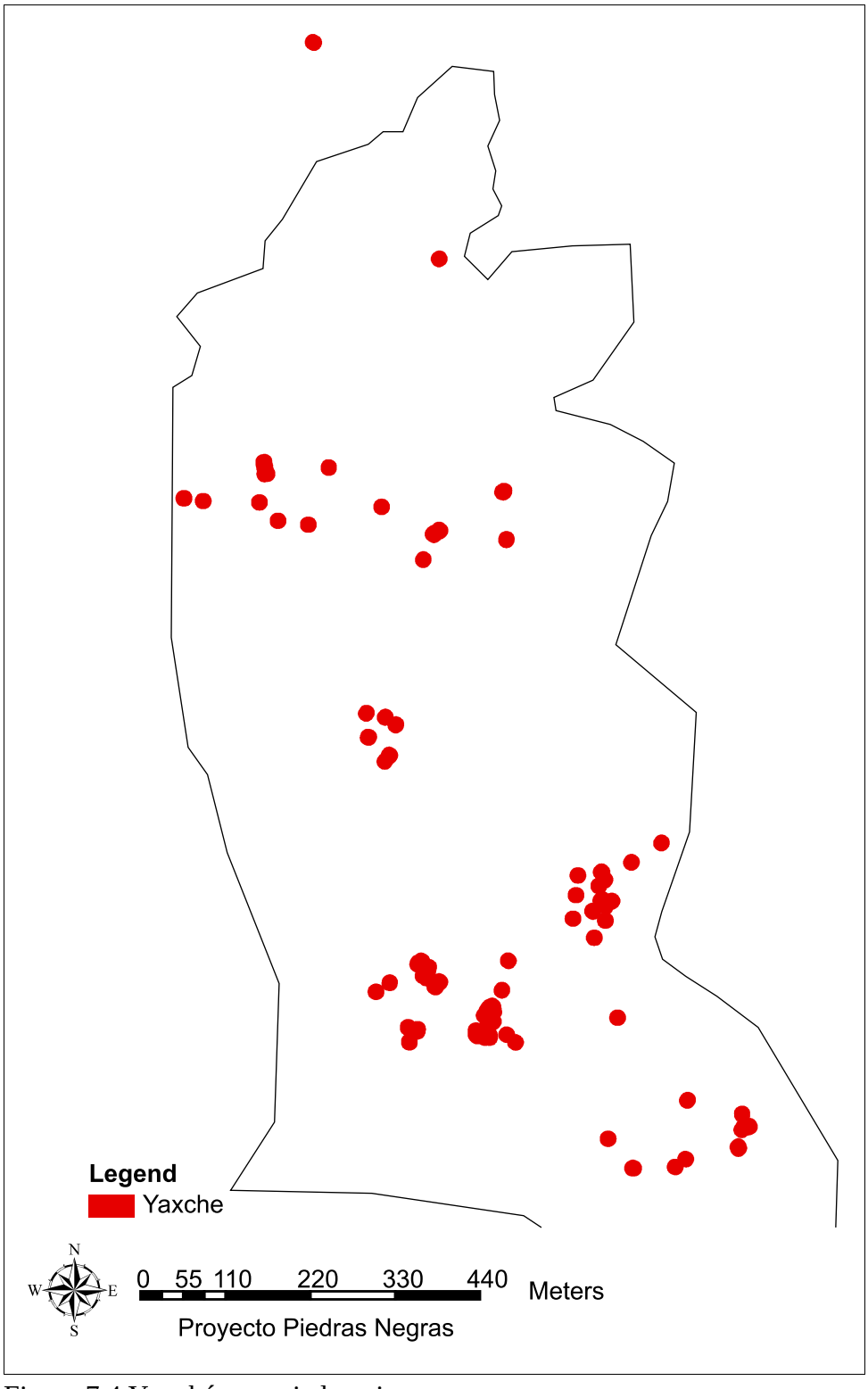


Figure 7.4 Yaxché ceramic locations

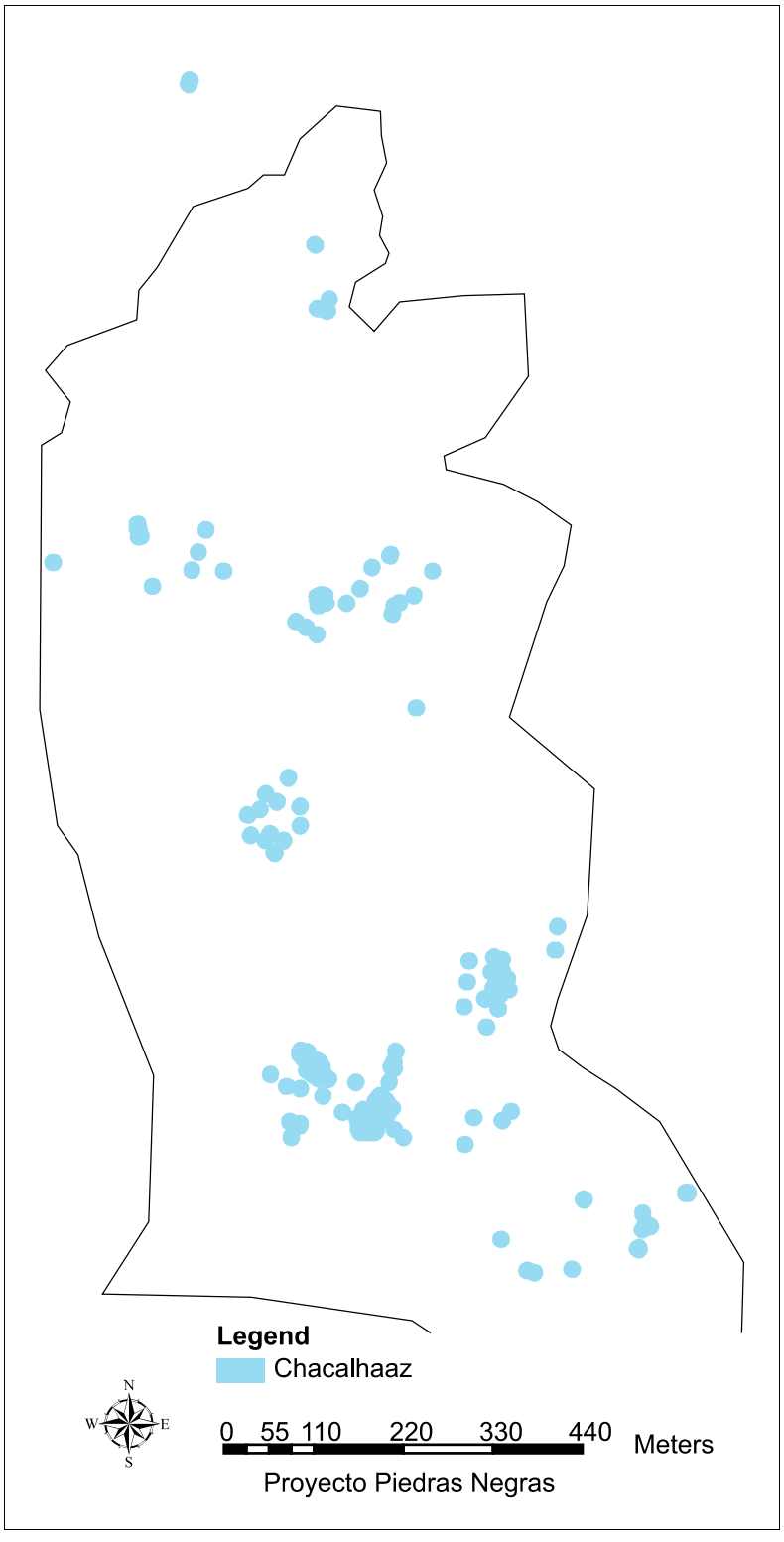


Figure 7.5 Chacalhaaz ceramic locations

Figure 7.6 Kumché ceramic locations

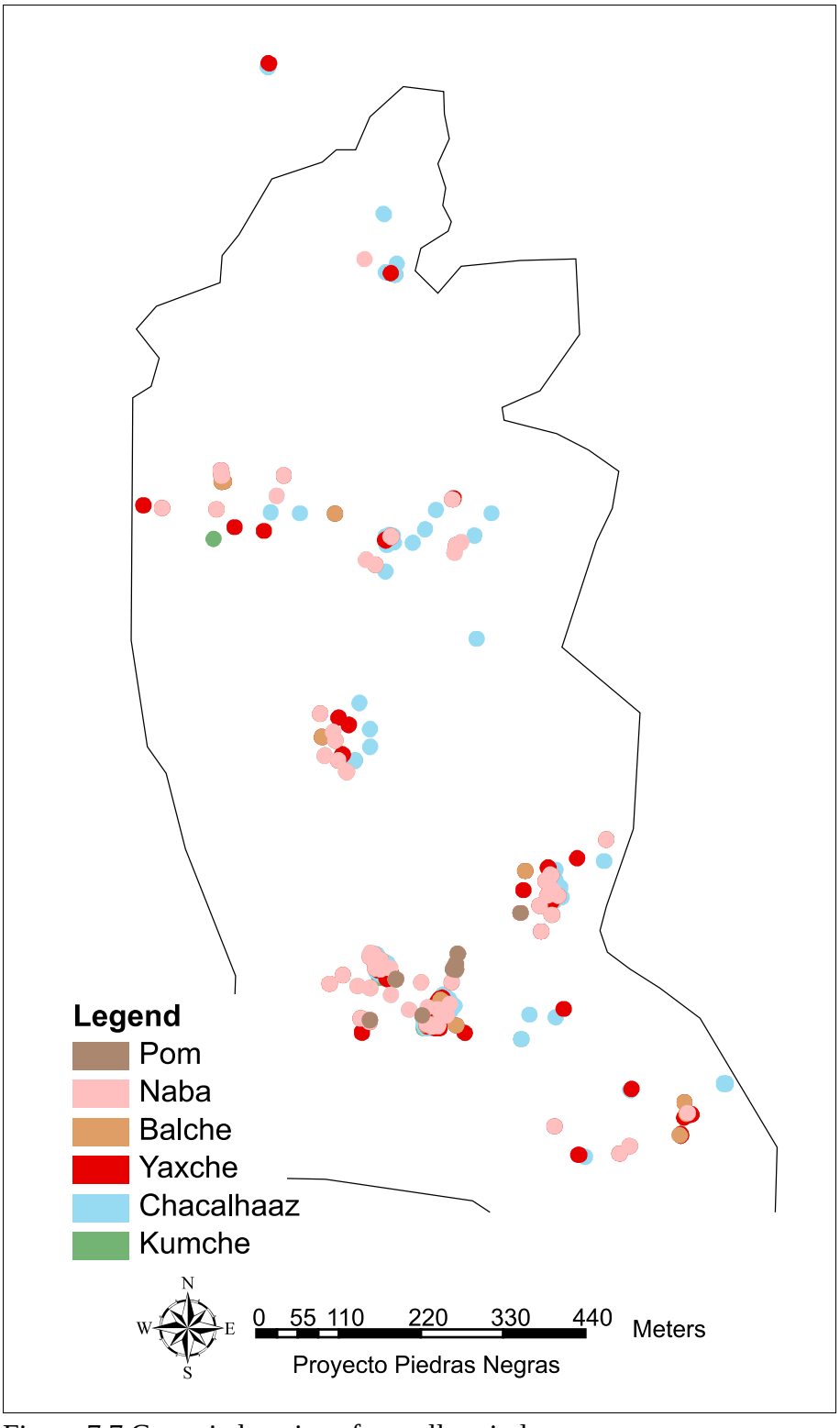


Figure 7.7 Ceramic locations from all periods

GROWTH AND DEVELOPMENT

The original settlement pattern at Piedras Negras is deeply buried. Deep trenches in the South Group reveal hints of early settlement debris in the form of Preclassic ceramics, yet the size and nature of the settlement is difficult to discern. Doubtless it was small, perhaps consisting of a few households within easy walking distance of each other.

The Pom phase settlement was limited to six structures (from the ceramics in this dissertation) clustered around the South Group Plaza (Table 7.5). Three of the Pom loci were occupied for most of the center's existence, these are S-4, S-5 (represented by a test pit placed in front of these structures, PN 2H-3), and U-4 (from unit PN 3A-2). What they have in common is their location on the edge of the South Group Plaza. I think that the initial "hamlet" of Piedras Negras underlies the deep artificial surface of this plaza. The hamlet was later buried to make room for the mortuary pyramids right over the ritual core of the original habitation.

The hamlet of Piedras Negras was situated near the beach (the preferred modern entrance to the center), yet far enough inland from the river so that it was never flooded. The inhabitants' houses would probably not have been visible from the river, and they were located close to bajo areas that would have created fertile conditions for their maize. Essentially, this early hamlet would have been very similar to Cerén, El Salvador (Sheets 1992).

The Nabá phase is when documented population builds. I call the first structure to be occupied in the area the pioneer settlement. Sometimes the pioneer structure was short-lived and permanently abandoned (C-32). More often, a structure was inhabited during one period, then abandoned for a time, and re-inhabited (situational abandonment). During the Chacalhaaz ceramic period, nearly every structures was inhabited even if it had been previously abandoned.

Some structures were continuously occupied from the Nabá period through the Kumché ceramic phase, or for most of the life of Piedras Negras. These structures are important in that they are the remains of survivor households. The survivors include N-6, N-7, N-8, O-21, NW Plaza, S Group Plaza, U-4, U-5, and U-16 (Table 7.6, Figure 7.8). Other structures might be included were they completely excavated. For example, U-5 would not have made the list if it had been merely test-pitted instead of completely stripped because the early occupation was found in its center, not along an outside wall in a midden. As the buildings were enlarged through time, some of the earliest material was hidden under later construction.

Settlement in the U group has been continuous since the early days of the center. This is important because it indicates that the households included here (U-16 and U-5) may be founding lineages. Founding lineages are those familial lines that would have formed the basis of house societies, or even nobles through the passage of deep genealogical distance. Yet despite the time depth invested in these locations, U-5 was still a modest structure from Nabá through to Kumché ceramic periods. The assemblage from this structure is perceived as less "wealthy" than its neighbor even though both groups have their beginnings in the Nabá ceramic phase. Continuous settlement apparently did not make the inhabitants of U-5 "wealthy", their household apparently just managed to survive year by year, but not to really prosper in the same way as that of U-16.

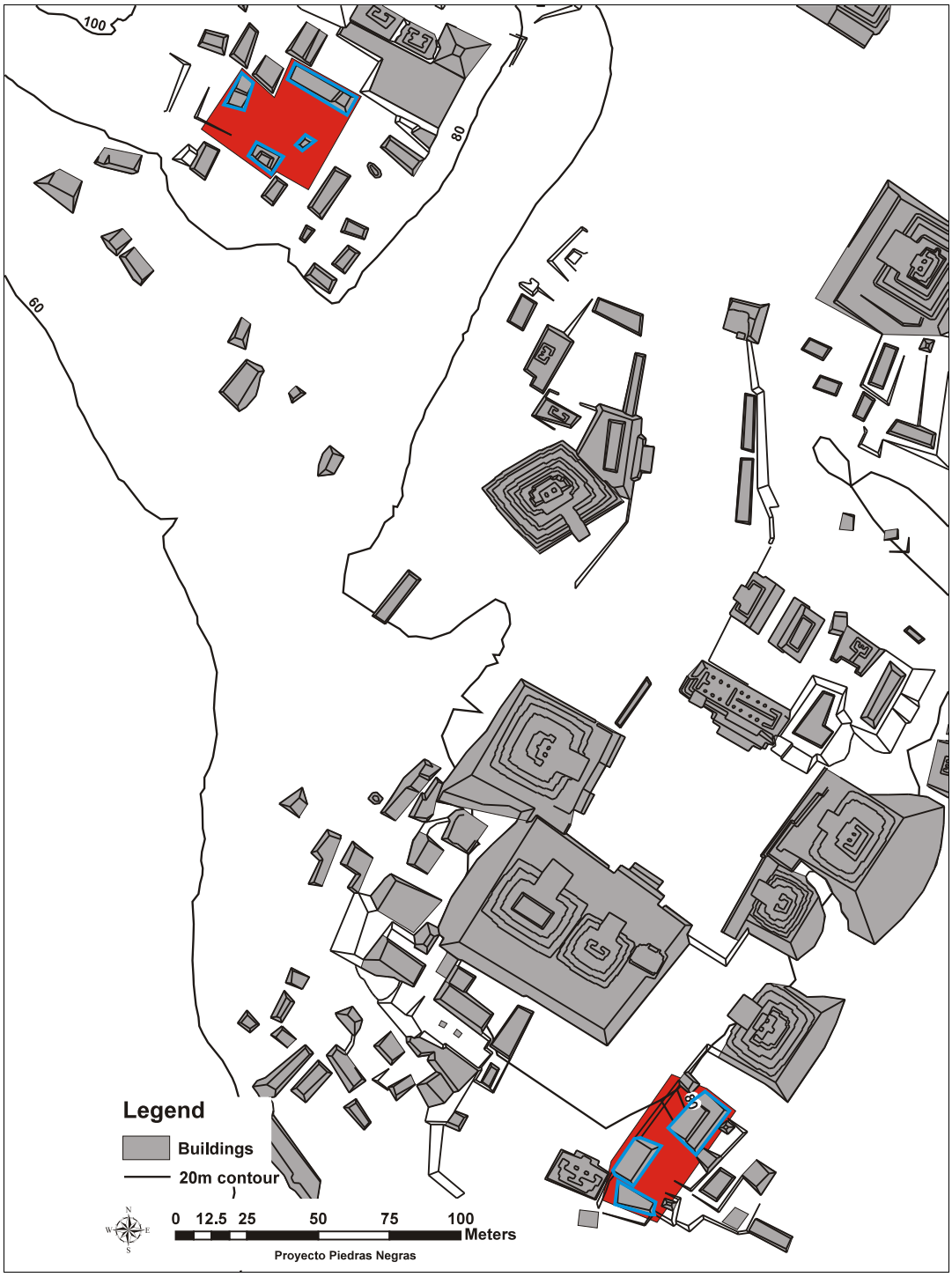


Figure 7.8 Survivor households (In red)

ABANDONMENT OF CENTER SYSTEMS

A general indicator of prosperity within an occupied zone is the number of abandoned or unused buildings. A thriving village would draw people into it, but one that is withering would have empty plots if land were available elsewhere to settle. A small number of empty dwellings is common in any settlement, but large numbers suggest that people are moving elsewhere.

The ceramic record from Piedras Negras indicates that there was a large situational abandonment of Piedras Negras during the Balché period (Table 7.5, Table 7.6) with almost a third of the structures uninhabited. This appears to have been a minor collapse of the polity, which is also documented for other Maya centers as an Early Classic hiatus or mini-collapse (Moholy-Nagy 2003, Willey 1974). This particular collapse may be unusual in that, according to Anaya's polity size maps (2001:65, reproduced as Figure 2.4) this period represents the greatest size of Piedras Negras's polity during its existence (Table 7.6).

I think that Balché was actually an expansion period around Piedras Negras' hinterlands. It was during this time period (550-625 AD) that Piedras Negras "seeded" settlement in the zone, effectively creating a buffer around its core with small communities. This explains the apparent paradox of low population at Piedras Negras and its large polity size. This experiment may not have been very successful. Settlement during the Yaxché period includes 18 structures that had renewed occupations. I posit that this was households returning to Piedras Negras from the outside settlements. Yaxché was the beginning of the Late Classic population expansion, and many other polities were expanding their borders as well, decreasing the holdings of Piedras Negras. It may be that some outlying settlements were abandoned and the residents were given land within the capital.

Table 7.6 Settlement and polity size per ceramic period

	Settlement		Abandonment		Phase Settlement	Polity Size[1]
	New	Renewed	Situational	Permanent		
Pom	6	0	0	0	6	1420[A]
Nabá	63	0	0	0	69	2839
Balché	7	0	23	3	49	3608
Yaxché	18	18	12	0	74	1920
Chacalhaaz	37	15	1	7	118	3449
Kumché	3	3	0	97	27	1774[A]
Total	136	36	36	107	136	

[1] Polity size (km^2) from Anaya's polity maps (2001)

[A] Estimated

The second great expansion occurred during the Chacalhaaz ceramic phase. Piedras Negras the polity was almost as large as during the Balché phase, and the center was full of households. Then the real collapse occurred. Collapse of the center during the Kumché ceramic phase resulted in the abandonment of 97 of the 118 inhabited structures. Only 27 structures were left. Piedras Negras reverted back to its village state for perhaps another generation before even these households left the area. The final collapse occurred relatively slowly. Excavations from permanently abandoned structures do not show the same range of artifacts that are found in rapidly abandoned contexts (Sheets 1992). The inhabitants took their possessions away with them and there is no marked increase in burials or random skeleton placements to suggest either epidemics or warfare. Piedras Negras was abandoned by its people much like Yaxchilán, Tikal, and a host of other Maya centers around 900-1000 AD. The possible causes of these collapses are numerous and have been debated since the initial discovery of Maya ruins (see Webster 2002). The point that I want to stress is that there were two population collapses at Piedras Negras, the first during the Balché ceramic phase and the second during or following the Kumché ceramic phase.

AGRICULTURAL PRODUCTION

Now that the population patterns of the center are known during each ceramic phase, could the land immediately around Piedras Negras support a population of this size under swidden agriculture? I emphasize swidden agriculture because no definitive intensified agricultural features have been located around Piedras Negras, despite systematic survey in the area. Further, although the term "swidden" hides enormous agricultural variability in practice (Kass and Somarriba 1999:14, Coomes and Burt 2001), here I use this term to refer to an 8 year "medium" fallow system with multiple fields using "slash and burn" field cleaning techniques. My point is not to stress the variety of fallows available, but to show that a fallow system could be sustainable at Piedras Negras even during its maximum occupation due to its low population.

I assume that each milpero or swidden farmer plants 2.5 hectares of land each year (6.25 acres) on average in maize to provide for the household using stone tools. Sanders and Santley suggest a household of five can only really cultivate 1.3 - 2.0 hectares a year rather than the 2.5 I am allocating (1983:245 but see Cowgill 1962 for a higher estimate) so this exercise should give high estimates for land use. Each milpero would want 20 hectares[2] (50 acres) of land for an ideal eight year fallow schedule (Reina 1967, Folan et al. 2000, Kass and Somarriba 1999). Using the maximal estimate of 500 structures (or 500 households of 5.6 people), then 10,000 (500*20) hectares of decent land around Piedras Negras are needed to support the population. The more reasonable estimate of 2600 people would equal 463 households and would require 9,260 hectares of land. If the number of hectares cultivated yearly is lower than 2.5, then more land will lie fallow and productivity will be more sustainable. I am not removing from my estimate

[2] Carr's modern Q'eqch'í informants living within the Sierra de Lacandon park laid claim to 43.8 hectares on land per household for their swidden lifestyle, each household planted 5 ha. in maize, and averaged 6.5 individuals per household (2004:176).

that percentage of the population that would be non-food producers (such as nobles or full-time craftsmen) because the intent is to create a maximum estimate of land use.

The first step in determining if there is sufficient land available to cultivate consists in understanding the regional topography (Figure 7.9). I began with a digitized 20km by 20km square contour map centered on Piedras Negras (courtesy of Brigham Young University's Geography Department) which gives a radius of 10-13 kilometers around the center (Figure 7.10). Next I used ArcInfo 8.0 to convert the contours into a digital elevation map of the area. Then, I used the same program to create a slope map of the area, divided into six classes of slope (Figure 7.11; see Murtha 2002 for a similar example):

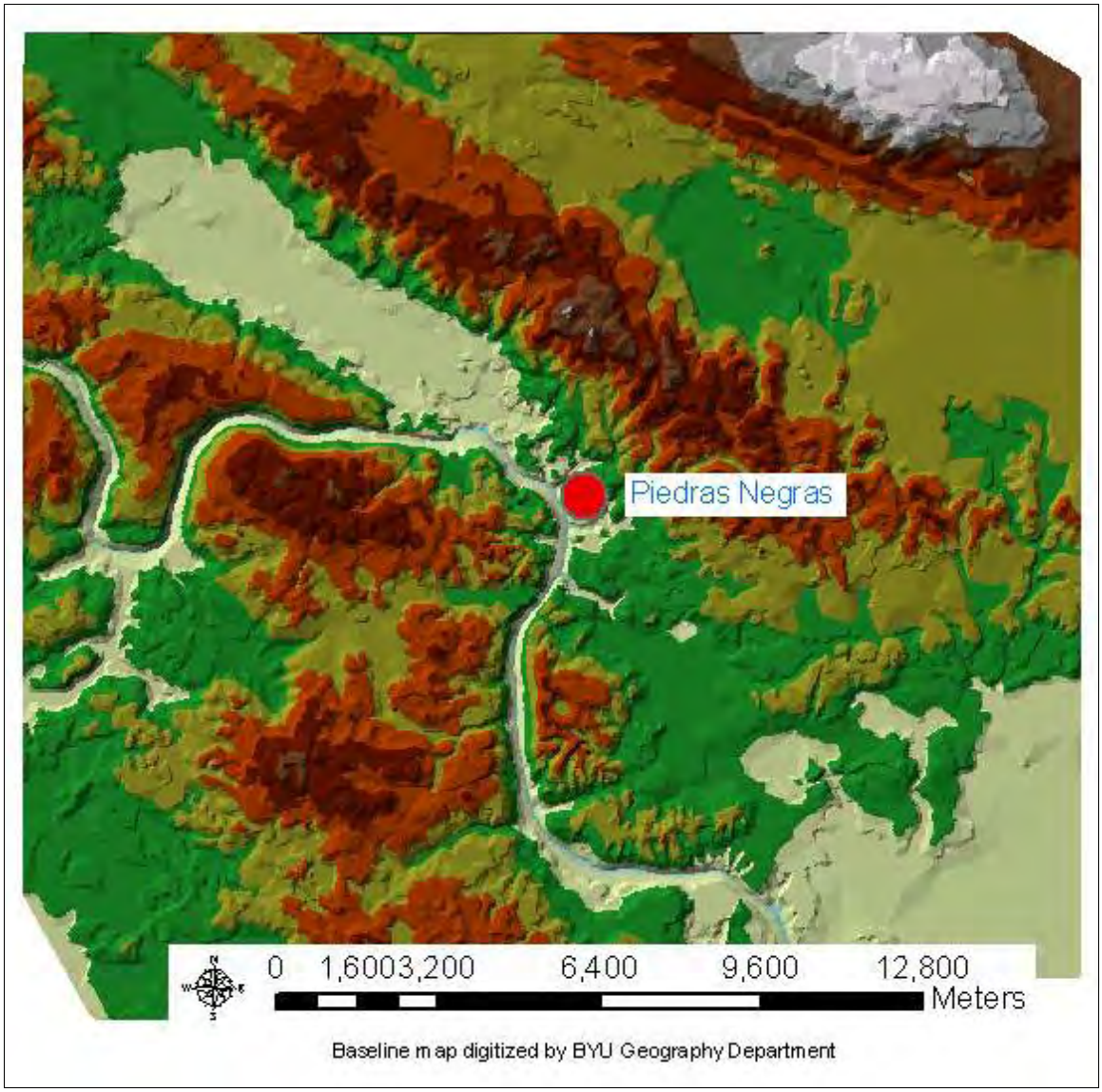


Figure 7.9 Regional map of Piedras Negras area

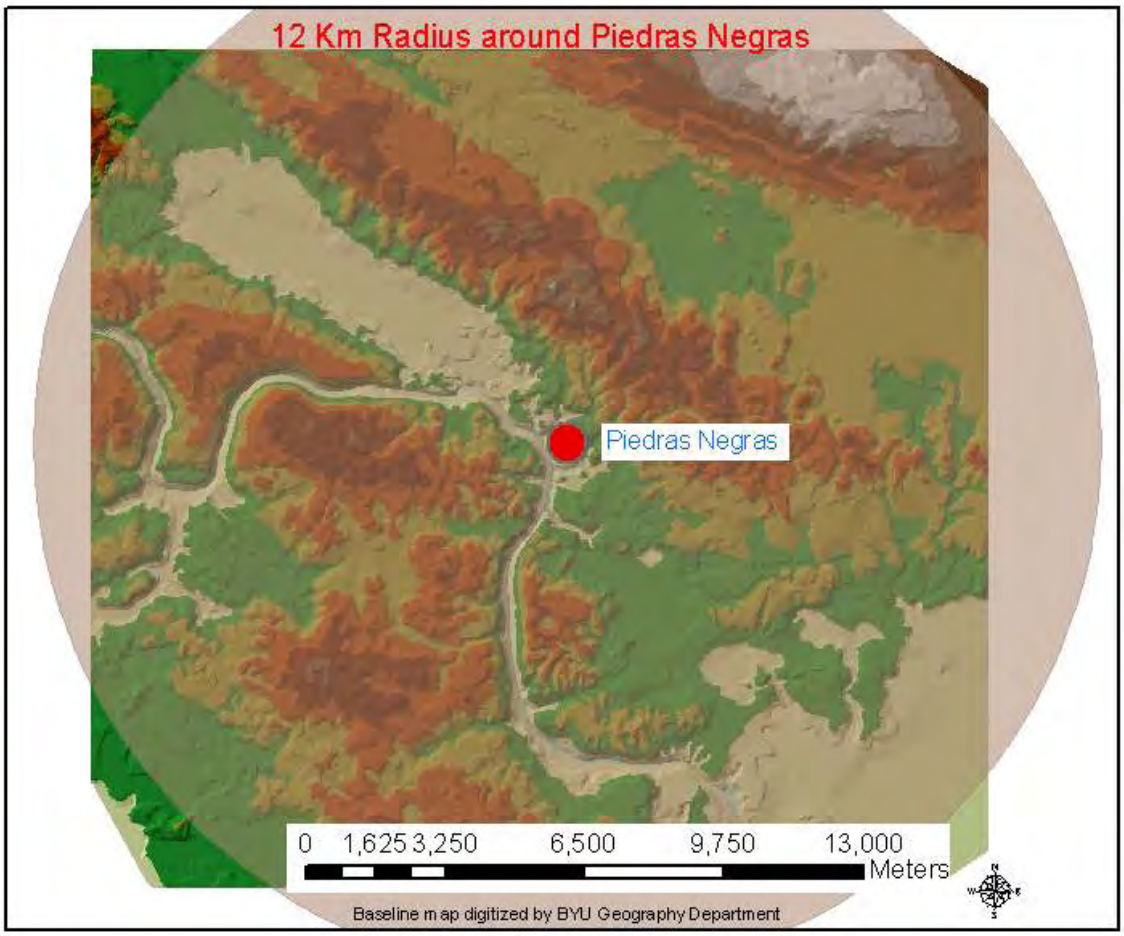


Figure 7.10 Walking distance to Piedras Negras (12 km radius)

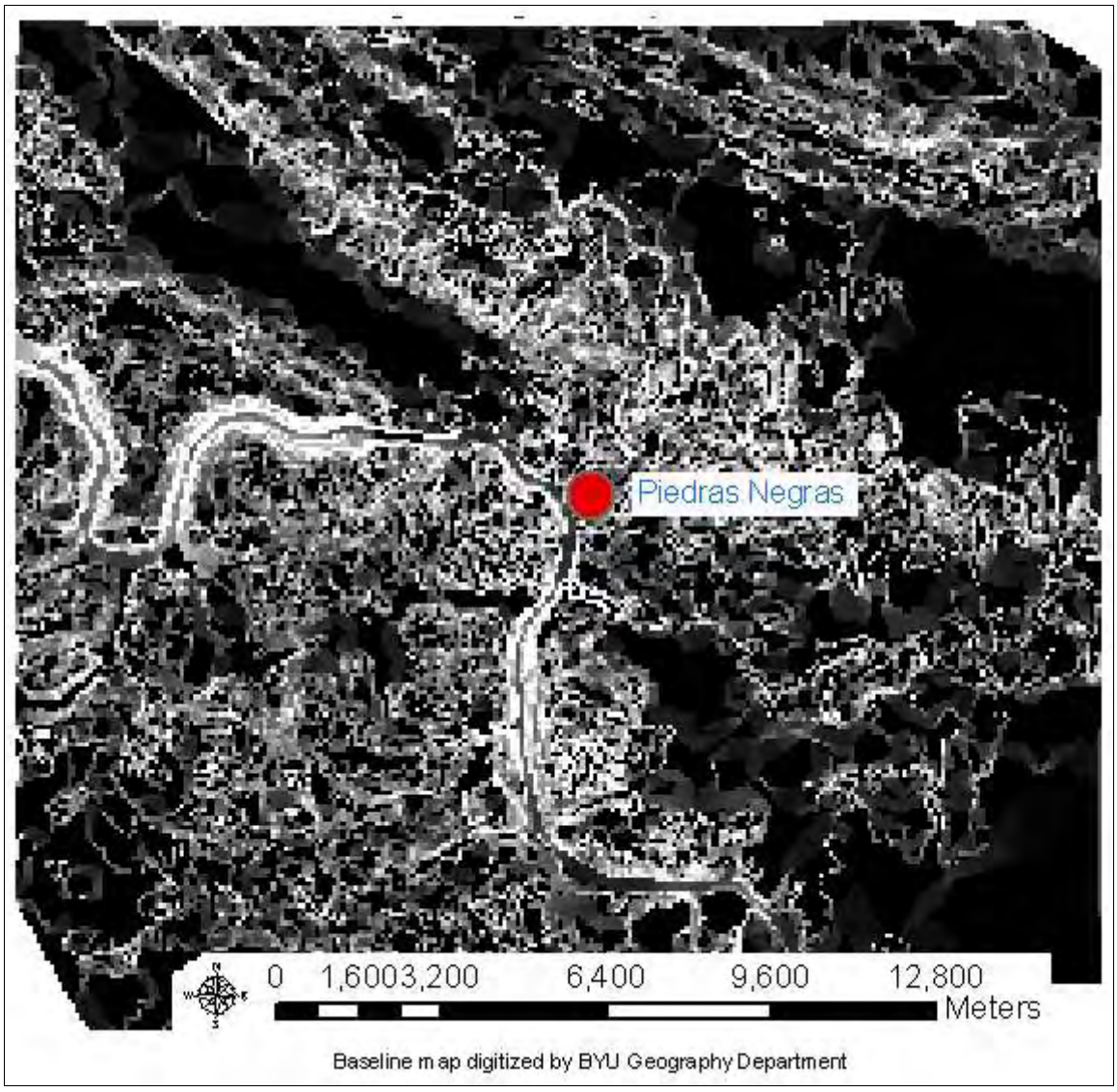


Figure 7.11 Slope map of area (Dark is flat, light is steep)

Class 1: Slope = 0 - 0.01 degrees
Class 2: Slope = 0.01 - 4 degrees
Class 3: Slope = 4.01 - 8 degrees
Class 4: Slope = 8.01 - 12 degrees
Class 5: Slope = 12.01 - 20 degrees
Class 6: Slope = > 20 degrees

Slope classes were chosen to facilitate direct comparison of this data with those using the computer program *Erosion Productivity Impact Calculator* (or *EPIC),* which was developed by the USDA (available at http:// www.brc.tamus.edu/epic) to simulate crop production under different conditions (Murtha 2002, Wingard 1992). Slope will affect the agricultural production

of the land in different ways. The first class has no slope, there will be little erosion and the land will remain productive with careful cropping, provided that it does not have drainage problems. Each successive increase in slope degree affects the agricultural productivity of the land by removing necessary nutrients and particles due to erosion. If the milperos at Piedras Negras needed to use classes 3-6 for agriculture, their production each year would decrease as the soils are removed from the hills during the seasonal torrential rains, coupled with soil disturbance through clearing.

Next, I calculated the area of each slope type. For this exercise, I did not include every possible unit of land on the landscape. I removed land that was located on the other side of the Usumacinta river (Mexico's side) as daily movement might be impossible during parts of the year even though this land was always part of the Piedras Negras Polity. I also removed areas with severe karstic uprises ("mountainous areas") as these areas would probably be used only as a last resort (Figure 7.12). Then I tallied the amount of land that remained:

Class 1: Slope = 0.00 - 0.001 degrees = 9,201.10 hectares
Class 2: Slope = 0.001 - 4 degrees = 2,169.04
Class 3: Slope = 4.001 - 8 degrees = 2,332.95
Class 4: Slope = 8.001 - 12 degrees = 1,279.28
Class 5: Slope = 12.001 - 20 degrees = 1,725.50
Class 6: Slope = > 20 degrees = 1,041.06

Ignoring class 6, the total available land equals 16,707.88 hectares. This means that swidden farming could easily accommodate the maximum population estimate for the center of Piedras Negras by using only classes 1 and 2, and that the milperos could still live within a two hours walk of their fields (10-13 km) with each farmer possessing eight fields of four hectares in size.

A caveat is necessary here. I am assuming that the population outside of Piedras Negras and within the 10 km area is small enough not to throw off the numbers significantly. Jennifer Kirker's rural survey focused on the periphery around Piedras Negras. She discovered 89 sites (or patio groups) within 2.5 km radius of Piedras Negras. The total structure count from these sites is 254 buildings, or roughly half the quantity of structures within Piedras Negras. This additional population would need their own milpas to farm, and would require 5,160 hectares of land. These milpas could be accommodated without using class 6 land.

My personal belief is that the patio group is roughly equivalent to "household unit" rather than each structure representing a single household. If each patio group is assigned 20 ha. of land, then the 105 patio groups at Piedras Negras and the 89 patio groups from Kirker's survey plus an additional 641 as yet undiscovered patio groups within the 10-13 km radius could all be accommodated on the landscape without any problems (89+105+641 = 835 household units X 20 ha. per milpa = 16,707 ha.). This is the real reason that no intensive agricultural terracing or other practices were found, the population in the area was low enough that the Maya really had no need of them.

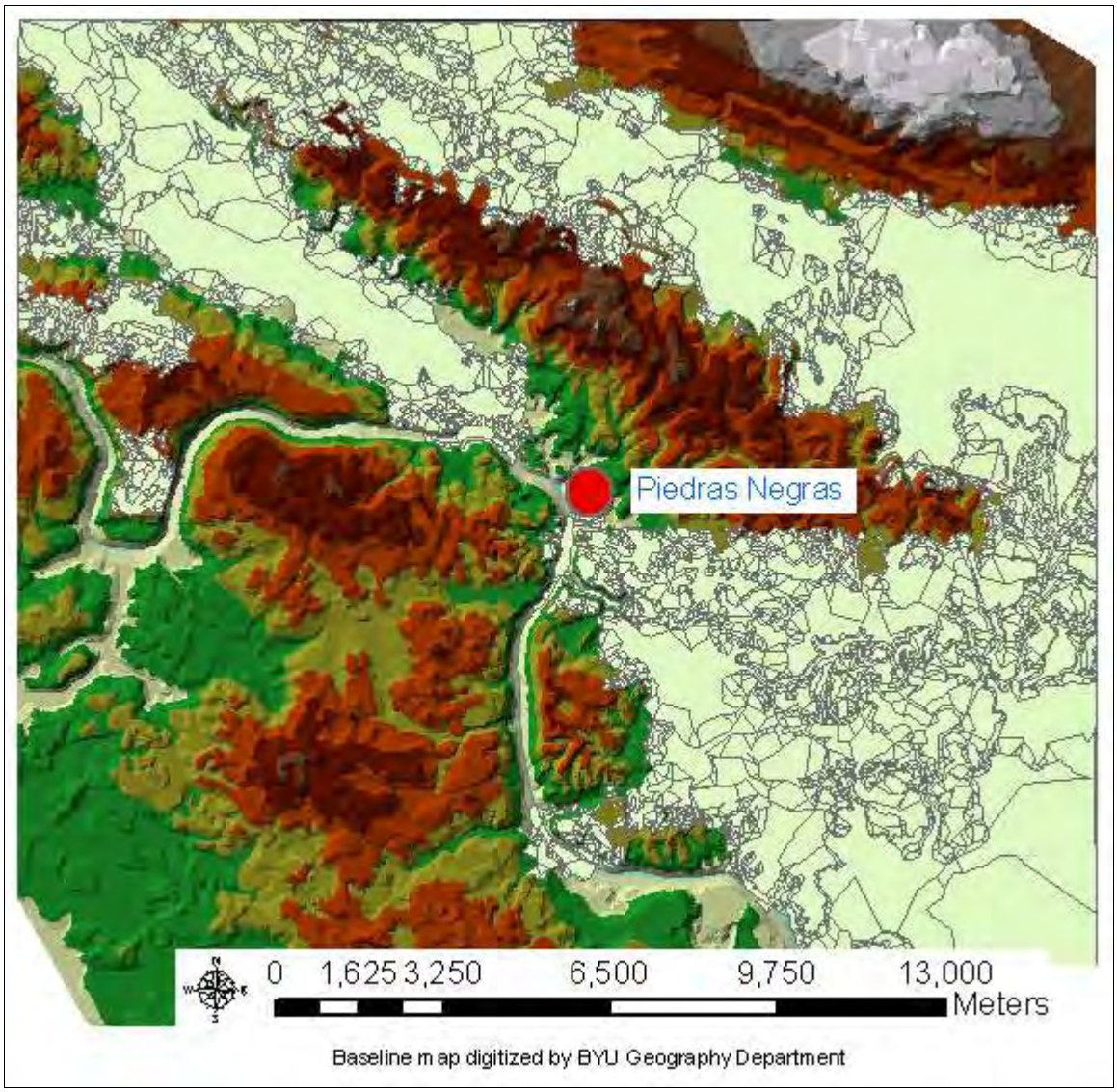


Figure 7.12 Available agricultural land (In off-white)

POPULATION OF THE PIEDRAS NEGRAS POLITY

The extent of the kingdom (or polity) of Piedras Negras has been calculated by Anaya (2001). He modeled the extent of the kingdom from hieroglyphic sources and considered the natural terrain in his calculations to build a more realistic model of interaction than one based solely upon glyphic sources. I use his polity areas to calculate the amount of land available for agriculture, as a rough estimate of the carrying capacity, or maximum population for the polity. This estimate is very tentative, and probably too high by a significant margin.

I model the ceramic period with the highest population to provide a maximal estimate of population for the kingdom. The Chacalhaaz period at Piedras Negras had the highest population, and the corresponding extent of the Piedras Negras polity during 763-772 AD will be

used for this estimate (Figure 7.13). At this time, Piedras Negras was the largest polity in the region (as modeled by Anaya 2001) with an area of 3,449 square kilometers. Assuming that the land suitable for farming was proportionally equivalent for the Piedras Negras polity as in the previous section, then 53% of the polity would have suitable land (classes 1-5) for agricultural purposes. The 182,226 hectares of useful land would support 9,111 households with a 20 hectare/8 year fallow system. This means that the population of the polity could be as high as 51,023 people with 15 people per square kilometer. The capital of the polity, Piedras Negras, only had 5% (1/20th) of the population of the polity.

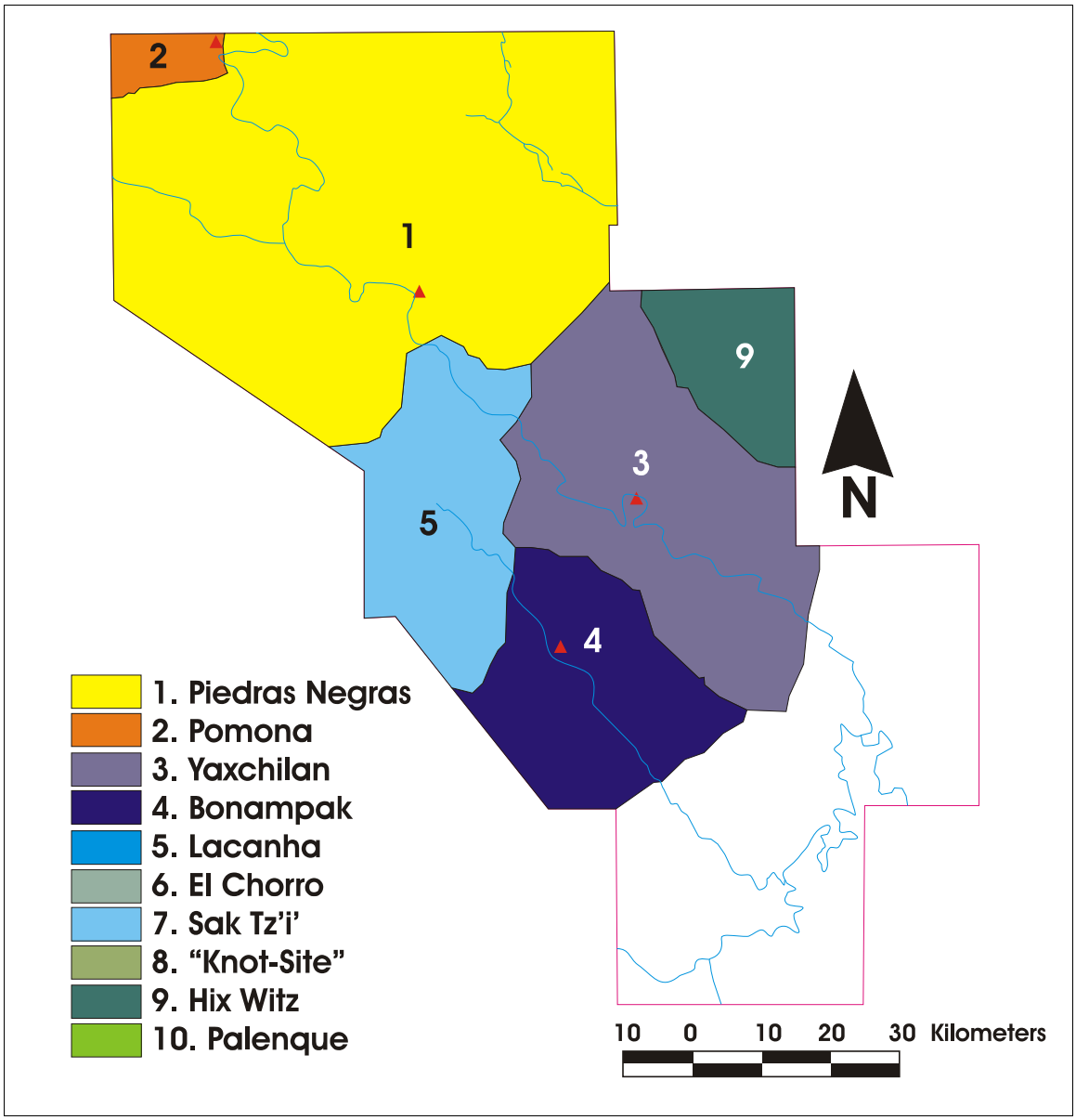


Figure 7.13 Usumacinta Polities AD 763-772 (After Anaya 2001:80)

CONCLUSION

In conclusion, the Late Classic population of epicentral Piedras Negras, was not large, probably consisting of approximately 2600 individuals at its maximum. Population growth shows a cycle of boom and busts. The populace relied on maize as the chief ingredient in its diet, which could have been grown locally in sufficient quantities using a comparatively stable medium-fallow system. An analysis of the land slope around the center suggests that the maximum population of Piedras Negras could have been supported by swidden agriculture with an appropriate land rotation system.

Table 7.5 Inhabited structures per ceramic phase

Pom	Nabá	Balché	Yaxché	Chacalhaaz	Kumché	Index
			C25	C25	C25	C25
				C26		C26
				C28		C28
	C32					C32
	C33					C33
	E1		E1			E1
	E2		E2	E2		E2
			F1	F1		F1
	F2	F2		F2		F2
	F6		F6	F6		F6
	F8		F8	F8		F8
		G'1	G'1	G'1		G'1
				G10		G10
				G11		G11
				G13		G13
				G14		G14
	G16	G16	G16	G16		G16
	G17	G17	G17	G17		G17
				G19		G19
		G'2	G'2	G'2		G'2
	G'3	G'3	G'3	G'3		G'3
			G'6	G'6		G'6
				G9		G9
		H'4	H'4	H'4	H'4	H'4

Pom	Nabá	Balché	Yaxché	Chacalhaaz	Kumché	Index
					J28	J28
			J29			J29
	K10	K10	K10	K10		K10
	K12			K12		K12
				K15		K15
	K16		K16	K16		K16
				K17		K17
				K20		K20
	K23	K23	K23	K23		K23
				K24		K24
	K26			K26		K26
				K29		K29
				K30		K30
				K8		K8
	K9	K9	K9	K9		K9
	N10	N10	N10	N10		N10
	N11	N11		N11		N11
	N2	N2	N2		N2	N2
	N3	N3	N3		N3	N3
	N4	N4	N4		N4	N4
	N5	N5		N5	N5	N5
	N6	N6	N6	N6	N6	N6
	N7	N7	N7	N7	N7	N7
	N8	N8	N8	N8	N8	N8
	N9	N9		N9		N9
				O16		O16

Pom	Nabá	Balché	Yaxché	Chacalhaaz	Kumché	Index
				O17		O17
				O18		O18
				O19		O19
				O20		O20
	O21	O21	O21	O21	O21	O21
			O22	O22		O22
			O23	O23		O23
	O24		O24	O24	O24	O24
				O25	O25	O25
	O26	O26		O26		O26
				O30	O30	O30
			Outside PN	Outside PN		Outside PN
	P26	P26	P26	P26		P26
	Plaza NW Group	Plaza NW Group	Plaza NW Group	Plaza NW Group	Plaza NW Group	Plaza NW Group
Plaza S Group	Plaza S Group	Plaza S Group	Plaza S Group	Plaza S Group	Plaza S Group	Plaza S Group
	Q1	Q1	Q1	Q1		Q1
	Q2	Q2	Q2			Q2
	Q3	Q3	Q3	Q3		Q3
	Q4	Q4	Q4	Q4		Q4
R1	R1		R1	R1		R1
R10	R10		R10	R10		R10
	R18		R18	R18	R18	R18
				R19		R19
	R20	R20	R20	R20		R20

Pom	Nabá	Balché	Yaxché	Chacalhaaz	Kumché	Index
	R29	R29	R29	R29		R29
R30	R30					R30
	R31		R31	R31		R31
	R32	R32		R32	R32	R32
					R35	R35
					R36	R36
	R37	R37	R37	R37		R37
				S10		S10
	S11		S11	S11	S11	S11
			S12	S12		S12
	S13		S13	S13		S13
		S14	S14	S14		S14
	S17		S17	S17		S17
	S18	S18	S18	S18		S18
	S19		S19	S19		S19
		S2	S2	S2		S2
				S32		S32
			S35			S35
			S36			S36
				S39		S39
S4	S4	S4	S4	S4		S4
				S40		S40
				S41		S41
				S44		S44
S5	S5	S5	S5	S5		S5
				S6		S6

Pom	Nabá	Balché	Yaxché	Chacalhaaz	Kumché	Index
		S7		S7		S7
	S8		S8	S8		S8
	S9		S9	S9		S9
	T2	T2	T2			T2
				Turtle		Turtle
	U10	U10		U10		U10
	U11	U11		U11		U11
	U13	U13		U13		U13
	U14	U14		U14		U14
	U15	U15		U15		U15
	U16	U16	U16	U16	U16	U16
	U17		U17	U17	U17	U17
			U19	U19		U19
	U2			U2		U2
		U29	U29	U29		U29
	U3			U3		U3
U4	U4		U4	U4	U4	U4
	U5	U5	U5	U5	U5	U5
	U6	U6	U6	U6	U6	U6
	U8			U8		U8
				V11		V11
				V12		V12
				V13		V13
				V14		V14
			V17	V17		V17
			V18	V18		V18

Pom	Nabá	Balché	Yaxché	Chacalhaaz	Kumché	Index
			V20	V20		V20
			V22	V22		V22
	V28		V28	V28		V28
			V32	V32		V32
			V35	V35		V35
			V45	V45		V45
				V6	V6	V6
					V7	V7
					V8	V8
	Y2	Y2	Y2			Y2
	Y3	Y3	Y3	Y3		Y3
				Z1		Z1
				Z2		Z2

Chapter 8

Conclusions and Comparisons

The ancient Maya kingdom of Piedras Negras once occupied a central political role along the Usumacinta River in what is now northwestern Guatemala. Its rulers dominated an area larger than Rhode Island and wrote their histories on massive stone monuments. The region was dotted with other polities whose leaders fought to expand and maintain their own territory during periodic warfare. Eventually the kingdom of Piedras Negras was overcome and its capital sacked by the forces of Yaxchilán. Soon thereafter the center was abandoned and the forest began to claim its buildings. Six hundred years later Piedras Negras was rediscovered to the Western world when loggers reported its existence to antiquity-minded explorers. After some initial reconnaissance, archaeologists from the University of Pennsylvania began a project within the site center of Piedras Negras. They discovered the history of the site and explored its massive pyramids. Sixty years later the Projecto Piedras Negras began canvassing the center with test pits, extensive excavations, and its periphery with survey and excavation. Six years ago I began mapping the southern edge of the center.

The site of Piedras Negras covers more area than previously thought. My work along the south arroyo coupled with additional mapping by Timothy Murtha added 90 new structures to the Penn map, with potentially dozens more still undiscovered. Settlement within the center was dispersed over almost a square kilometer, with the area to the east of the center still inadequately surveyed for small residential groups.

Patio groups are the physical remains of households. While this dissertation does not pretend to address household issues in depth, some general statements are necessary. The Maya used multiple buildings for their domestic activities. Sleeping quarters are separate from the kitchen and storage areas. A rationale for separate areas is that heating the sleeping quarters is generally unnecessary during the year; and maintaining this area separate reduces the chance of accidentally burning down the principal structure. Further, this arrangement separates kitchen smells and residues from living quarters. Comparisons among epicentral patio groups reveal heterogenous activities and diversity of material goods. In particular, figurines were quite plentiful in the epicenter while chert and obsidian provided the necessary tool-stone for daily activities. Rural households in the Piedras Negras area also have some heterogeneity in recovered artifacts, but generally lack the diversity and quantity of material remains present in the epicentral households. Even a small epicentral household at Piedras Negras has more material goods and a greater diversity of them than rural households in Copán, Honduras or Cerén, El Salvador.

While patio group excavations provide a better glimpse into the past than test pits, test pit excavations are cheaper, easier, and give information on artifact patterns over time. The material culture retrieved from over 200 test pits placed throughout the site has been used to date their nearby structures via ceramic chronology. This information has then been used to develop population estimates for each ceramic phase and to better understand the dynamics of settlement within the site which, were quite episodic.

Piedras Negras experienced two population collapses. The first collapse during the Balché ceramic phase can be attributed to households leaving Piedras Negras to "seed" outlying areas. These small villages claimed unoccupied territory for Piedras Negras and increased its holdings. The second collapse marks the end of the Piedras Negras kingdom. People fled the zone and never returned. The abandonment of the center was unhurried, since the inhabitants removed their belongings from their houses, and permanent.

The collapse could be seen as the failure of the king to maintain or protect his polity, but there was obviously more than warfare occurring. Piedras Negras was the victor and loser in many previous wars, so the final abandonment of the center related to more than just warfare.

The maximum population of Piedras Negras was approximately 2600 inhabitants, with the true population probably closer to 1800. The overall low population means that Piedras Negras, for all its impressive monumental architecture and stelae, was always a small place. The inhabitants would have been able to know the faces, if not the names of its permanent members; and probably most of the families in the area were linked by kinship relationships.

Swidden agricultural production using a medium fallow of eight years could have supported the estimated population of the area and its rural inhabitants without serious degradation of the soil due to erosion within a 10-13 kilometer radius of Piedras Negras. If swidden agriculture were the main form of food production in the kingdom or polity of Piedras Negras, then the kingdom could have supported at its maximum extent perhaps 51,000 inhabitants with an average density of 15 people per kilometer. This means that population was not concentrated within the zone into dense settlements characteristic of modern cities. Further, it implies that the wars between polities were generally low-scale events. The maximum number of armed men that Piedras Negras would have been able to muster from their entire kingdom would have been only 12,000-15,000 or about a quarter of the overall population. I suspect that most battles, while fierce, involved armies of less than 2,000 each.

PIEDRAS NEGRAS IN A MESOAMERICAN CONTEXT

The focus of this dissertation has been on Piedras Negras, with little comparative information about the general size and character of other Mesoamerican centers. It is now appropriate to place Piedras Negras into a wider Mesoamerican context with regard to other "urban" patterns, especially in terms of population size and density (Figure 9.0).

Piedras Negras

Piedras Negras is a quintessential Maya regal-ritual center (Webster and Houston 2003:427). Settlement in the epicenter is clustered around the ritual core. The most prominent architecture is the Acropolis or royal palace complex. This large hill was modified into the royal palace with associated mortuary temple complexes. Below the Acropolis is a large plaza in which the entire population of the center could have gathered. Around the palace (and down the hill) lie other mortuary temples and ritual architecture. The ritual core of the center measures approximately 42 hectares (Webster and Houston 2003: 433) while the epicenter measures 97 hectares. This means that almost half of epicentral Piedras Negras was directly devoted to ritual and political space.

The rest of the epicenter consists of patio groups irregularly spaced around the ritual core. Area of the patio groups varies from 178 m^2 to 2,000 m^2, not including the Acropolis and

temple complexes. Variation in the patio groups accurately reflects the variation in structure size across the epicenter with buildings ranging in size from 4 m^2 to 650 m^2 (again, excluding the palace and ritual complexes). The mean area for any particular building at Piedras Negras is 131.57 m^2 while the mean patio group area including structures is 839 m^2. There is a clear continuum of structure and patio group size within the epicenter. Patio groups in the Piedras Negras periphery, average 891 m^2 while average building size is less than 30 m^2. Patio group size is almost equivalent between the epicenter and its periphery, with slightly larger plazas outside of the epicenter coupled with much smaller buildings. These differences can be understood by the presence of in-fields and gardens in peripheral patio groups[3].

Piedras Negras at its height would appear to be a very prosperous center. While I doubt that there were many full-time craftspeople, many of its inhabitants would be farmers who knew an additional skill, such as flint-knapping, figurine making, plastering, fishing, or weaving. I suspect that exploitation of forest and tree resources were "skills" that some households possessed more so than others. What kept the center running was that it was the abode of a Holy Lord, and was the capital of the Yokib kingdom. When the Holy Lord died at the hands of Yaxchilan, then the essence that held the community together also died. Shortly thereafter, the center was abandoned.

Now that the general settlement pattern of Piedras Negras has been explicated, it is time to move further afield for a comparative framework. I have chosen several prominent Maya centers to serve as counterpoints to my description of Piedras Negras. These include Calakmul, Caracol, Copán, Palenque and Tikal. A comparison with the site of Teotihuacán serves to illustrate the very real differences between highland Mexico and lowland Maya. Brief descriptions of each site is given below with their urban characteristics.

Calakmul

Calakmul is a major Maya center located in Campeche, Mexico. Its emblem glyph is known throughout the Maya region, and occurs at Piedras Negras. The map of the center includes 30 km^2, with 6,345 structures. Broader survey indicates that Calakmul's area is closer to 240 km^2 with an estimated 50,000 inhabitants (Folan et al 2004) or 208 people per square kilometer. The Calakmul state includes 5, 000 km^2. The epicenter consists of 20 km^2 with an estimated population of 20,000 people (assuming that 45% of the structures were actually domiciles). Much of the center is built on an artificial dome rising from a bajo area. While the epicentral of the center possesses the most elaborate architecture, there are areas outside the epicenter that have complex architecture where nobles lived, creating zones of densely packed structures with vaulted roofs. Public structures are located roughly in the center of the settlement in a 1.75 km^2 area that includes 975 structures with zones of settlement around them that diminishes in architectural complexity and building density the further one moves from the epicenter. Epicentral structures include palaces, mortuary temples, ball courts, and 120 stelae (Folan et al 2004). Calakmul is connected with other nearby centers via a network of causeways (sacbeob), indicating a regional integration of the area to an extent unknown at Piedras Negras.

[3] Another explanation is that patio size was essentially standardized at Piedras Negras.

Agricultural land is believed to have been located in the bajo regions immediately surrounding the center, with some smaller plots and gardens interspersed between patio groups inside the center. The inhabitants of Calakmul often marked the spatial limits of their house-plot with lines of stones, a practice that is unknown at Piedras Negras and which indicates a greater emphasis on territoriality. Water management in the form of aguadas is a common feature at Calakmul although aguadas were probably used for drinking water rather than irrigation.

Caracol

Caracol, Belize, has been under continuous excavation for the last two decades by Arlen and Diane Chase. Survey of the area around epicenter Caracol shows little drop-off in settlement density for over seven kilometers, making it one of the larger Maya settlements. The map of the center includes 4,404 structures within the 16 km^2 area that comprises central Caracol (Murtha 2002:80). The state of Caracol is believed to encompass 177 km^2 (a radius of 7.5 km around the epicenter) with between 55,000 - 83,000 inhabitants (Murtha 2002:143). This estimate gives a population density range of 312 - 474 people/km^2. The epicenter is integrated to its periphery by means of causeways that extend 12 kilometers from the core (Murtha 2002:14) to secondary settlements with monumental architecture. The epicenter is dominated by Ca'ana, a pyramidal complex over 40 m tall.

Caracol was an active polity, and even defeated Tikal and Naranjo (Houston 1991). While its emblem glyph was not dispersed throughout the Maya sphere, the polity rivaled both Tikal and Calakmul in its size and internal complexity. Its citizens relied on agricultural intensification in the form of terraces to grow their foodstuff, and recent work by Timothy Murtha indicates that there were sufficient terraces and lands available to support the large population (Murtha 2002).

The overall settlement pattern is dispersed and unplanned. Patio groups are irregularly spaced around the countryside with sufficient space between them to support small plots of land and terraces. The dispersed nature of the settlement may have actually protected those living there from the unhealthy aspects of pre-industrial cities due to its low settlement density (Chase et al. 2001).

Copán

Copán is another well-known Maya center. The center lies within the Copán Pocket, an area of alluvial soil, and settlement is concentrated around the prime agricultural soils. The site of epicentral Copán (Main Group) covered roughly 15-20 ha during the Classic period. The urban core of the center extended perhaps 1 km^2 and included 1035 structures with an estimated 1300-1800 structures at its peak (Webster 1999:20). The structures are spread throughout the Pocket, and large elite patio groups are also distributed throughout the area, with a general clustering around the epicenter. The population of the polity is maximally estimated at 28,000 inhabitants. These individuals would have lived in the 1425 sites and 4,507 structures mapped in the Copán settlement survey (Webster et al. 2000:155). Copán probably dominated an area of 400-500 km^2, and certainly influenced affairs even further away. Quirigua and Pusilhá were one-time dependencies of the Copán kingdom, and a host of smaller centers nearby were certainly under the control of Copán elites.

The layout of the center is similar to other Maya centers. The epicenter is dominated by palace complexes, temples, and plazas with many stelae celebrating the prowess of the king. The urban core is also residentially orientated with well-defined patio groups of different sizes and architectural complexity. The Urban Core is quite dense with 12,000 people in 1 sq km (Webster et al. 2000:177). Despite the dense settlement, most of the inhabitants of the center were probably full or part-time agriculturalists rather than craftsmen. Very little evidence of full-time craft specialization has been discovered at Copán, despite intense archaeological investigation for over thirty years. The outlying areas have a dispersed settlement pattern with more structures around areas of good soil. Small fields and gardens were probably grown between the patio groups (Webster et al. 2000:186).

Palenque

Palenque was an infrequent rival of Piedras Negras, and is one of the most famous Maya centers due to its impressive architecture, hieroglyphic inscriptions, and kingly burials. Its area covers 2.2 km^2 with 1,481 structures (Barnhart 2001:73). This gives a density of 673 structures per sq km. Palenque's location on a plateau may account for its settlement density as there was nowhere else to conveniently settle. The plains below the center are lightly settled, and probably were used for agriculture. Most of the 7,500 people who lived at Palenque were probably full-time farmers who would have walked the few kilometers to their fields each day. Evidence for full-time craftsmen is scarce; only two workshops have been documented for Palenque and their output is still unknown (Barnhart 2001:96).

Terraces are present at Palenque, but their use was limited to control erosion rather than for agriculture. Likewise water management features were present to curb runoff into appropriate areas to protect the center from flooding. These impressive features are thought to have been administered by elites as a form of city-management (Barnhart 2001:97-100). In its layout, much of the center is devoted to ritual space for the king and his court. Large palaces and mortuary complexes with plazas and stelae dominate the epicenter. Smaller patio groups are located around the plateau giving the impression of unplanned sprawl, very similar to other Maya centers.

Tikal

Tikal is perhaps the best known of all Maya centers. Its impressive architecture, numerous stelae, and extensive archaeological investigation have made this site famous. It is also a very large Maya center. The epicenter covers 9 km^2 with a density of 235 structures/km^2 (Culbert et al., 1990: 116). This is the heart of the center, with large palaces and mortuary temples. The plazas are often lined with stelae and commemorate the dynastic lineage of its rulers. Outside the epicenter settlement density falls to 181 structures/km^2 in a 7 km^2 area. This area is characterized by patio groups placed irregularly around the epicenter in a dispersed fashion. The area between the patio groups could have been used for small gardens or arboreal resources. These two areas are what is often considered the site of Tikal, with an estimated population of 13,275 at 5 people per structure and 21.5% of structures uninhabited (Culbert et al. 1990:116). Culbert et al claim that the area between the earthworks adds another 104 km^2 with a structure density of 112 mounds/km^2 (Culbert 1990:116) although this interpretation of the earthworks has changed (Webster et al 2003). The population of this area is estimated to be

45,720 inhabitants (Culbert et al. 1990:116) or a grand total of 58,995 inhabitants for "Greater Tikal"

Culbert et al. also provide population estimates for a 10 km radius around Tikal that includes 194 km^2 of rural space in addition to the 120 km^2 already mentioned (1990:116-117). Settlement in this area is estimated at 39 structures/km^2 and 29,696 individuals. They further estimated the polity of Tikal as a 25 km radius around the epicenter with a general density of 50 structures/km^2. This area would include 1,963 km^2 and a population in excess of 425,000 (Culbert 1990:117).

Teotihuacán

Teotihuacán was one of the greatest cities of pre-Hispanic Mesoamerica. It covered approximately 20 km^2 and was dominated by its center ritual space. The enormous Pyramid of the Sun, Pyramid of the Moon, and the Ciudadela alone cover more than 16 ha (Cowgill 1997:130). The Avenue of the Dead and the "East" and "West" avenues divide the city into quarters. The building density of the center is high, with walled apartment complexes holding entire barrios. The complexes are oriented to the Teotihuacán framework of 15.5 degrees east of true north, but have widely divergent floor plans (Cowgill 1997:137). In contrast to the previous Mesoamerican centers, it is doubtful that infield gardens and plots were possible in Teotihuacán due to its highly concentrated architecture. Roads run between apartment complexes and separate individual complexes.

> Millon (1973) estimated the Xolalpan Phase population by using sizes, layouts, and inferred uses of rooms in excavated apartment compounds to infer that a 60 x 60-m compound would have housed about 60 to 100 people. His surface survey indicated that over 2000 such compounds were occupied during Xolalpan times. Making allowances for those larger or smaller than 60 x 60 m, he arrived at an estimate of 100,000 to 200,000 for the whole city, with 125,000 a reasonable middle value (Millon 1992, p. 344). Architectural data for other phases are less clear, so Cowgill (1974, 1979) extrapolated the Xolalpan estimate by comparing quantities of phased sherds collected by the Mapping Project, with adjustments for estimated phase durations, assuming that per capita sherd production remained approximately constant. (Cowgill 1997:133)

Teotihuacán dominated much of the Basin of Mexico, which is an area of approximately 7,000 km^2 and also had lasting influence within the Maya zone (Braswell 2003) and at Piedras Negras.

Most Teotihuacanos probably were full-time agriculturists and worked fields relatively close to the center. Although there is ample evidence of obsidian production and debris, an analysis of one workshop indicates that its main craftsman could also have worked part-time (Nelson 2000).

Summary

These basic descriptions of several prominent Mesoamerican centers show a general homogeneity in settlement pattern for the Lowland Maya sites, with Teotihuacán clearly different. Lowland Maya settlement is obviously clustered around the epicenter of the site. Patio groups dominate the area with plenty of space between them for gardens or small agricultural plots. Palenque is unique in not having space for gardens due to its location on a plateau, and Teotihuacán was built around a different urban aesthetic. Teotihuacán is more classically urban

in its plan. The city is divided into quadrants with roads separating blocks. Abundant workshop debris is evident within its walls, as are areas with foreign architecture. The density of structures and people within Teotihuacán make this center different than other included in this sample. While Tikal, Calakmul, and Caracol are somewhat comparable to Teotihuacán in area, they never achieved the influence of Teotihuacán within the larger Mesoamerican sphere. Teotihuacán was clearly different from these other sites. Piedras Negras is more similar to the other Lowland Maya centers than Teotihuacán in its layout and also in its general density. Piedras Negras when compared to other Mesoamerican centers is actually small. It personifies the king and his court, as a regal-ritual center should.

COMPARATIVE POPULATION ESTIMATES

The above descriptions of Mesoamerica centers detail individual investigators population estimates for their center. These estimates all use different formulas for calculating population which makes it difficult to really compare the population density and absolute population and different conceptions of what should be included in spatial terms of any particular center. In order to adequately compare their populations, each center's statistics need to be reduced to common formula, just like each center's area was placed on a common scale (Figure 8.0).

I have tried to place each of these center's population within a common framework (Table 8.0). Because of the differing methods used by investigators and admitted differences in the urban form of some of the centers, the population estimate that I have calculated is very provisional. I use the entire site structural density, and not just the epicenter, for these comparisons. I have also chosen to use Chan Kom's 5.6 people/household as a standard unit. I understand this number to refer to patio groups, rather than individual structures, so I have divided the number of structures per sq km by 4, assuming that each patio group is comprised of four structures. This gives me the number of patio groups per sq km, and I have assigned each patio group 5.6 inhabitants. The resulting population from this intellectual exercise is far lower than anyone expects for some of the major sites mentioned.

Admittedly, this exercise lacks all of the nuances of population estimation that have been developed over the years, but does allow each center to be directly compared to each other in terms of population and population density. Teotihuacán is clearly a different entity than any of these other Mesoamerican centers. It is no surprise that it would have a more complex administration than the Maya centers, as postulated by Sanders and Webster.

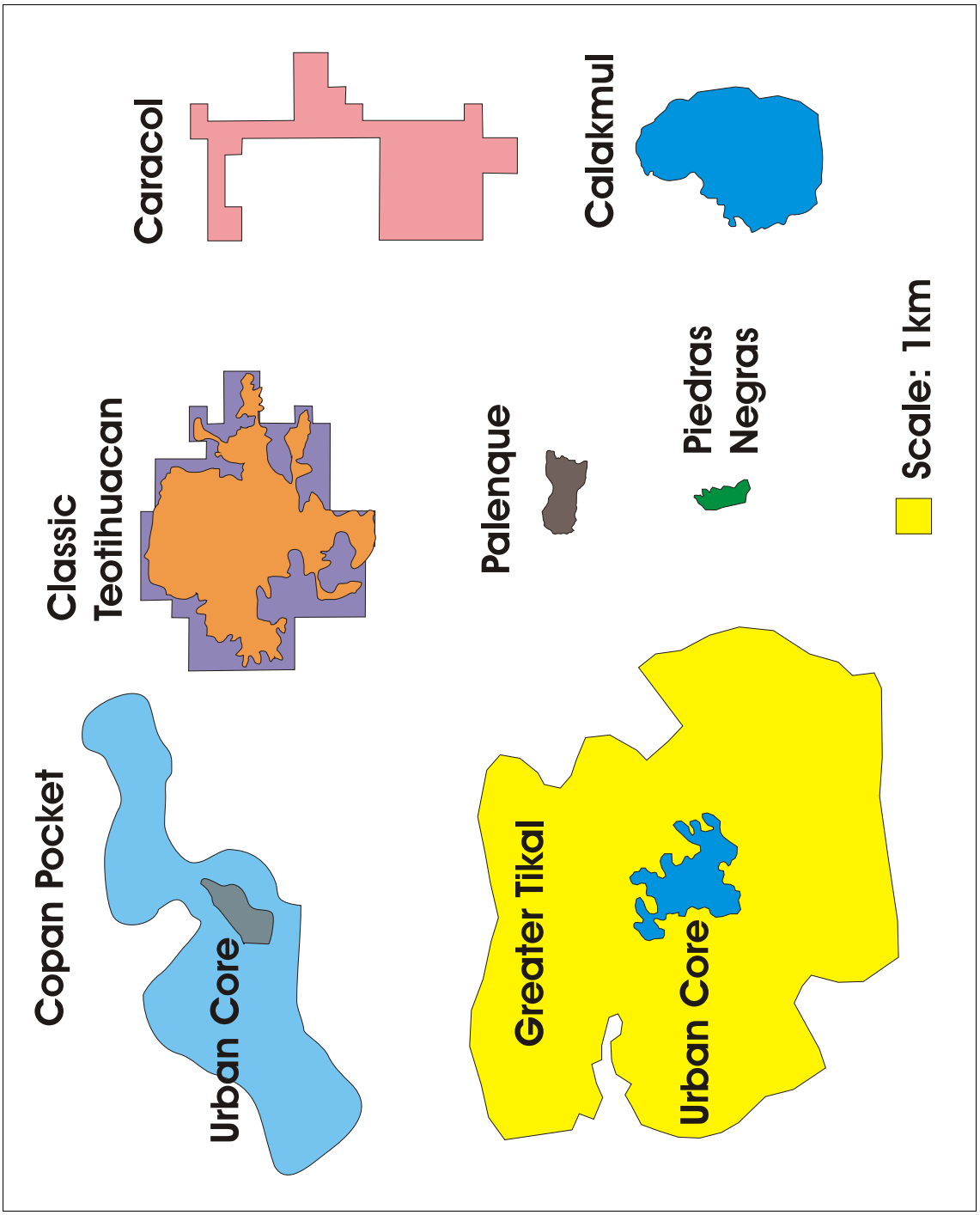


Figure 8.0 Comparative size of Mesoamerican centers

Table 8.0 Population at several Mesoamerican centers

	1. km mapped	2. Structures	3. Str/km2	4. Patio Groups/ km2	5. Pop/ km2	6. Site Pop
Piedras Negras	0.97	502	517	130	728	706
Calakmul	30	6345	212	53	297	8910
Caracol	16	4404	275	69	386	6176
Copán	1.5	1300	866	217	1215	1823
Palenque	2.2	1481	673	169	946	2081
Tikal	16	3382	211	53	297	4752
Teotihuacán*	20	2000	100	429*	2402	48040

* Teo Apartment complexes are approximately 4.29 times larger than the average patio size at Piedras Negras, so patio groups per sq km = 2000/20 = 100 x 4.29.

1. From above descriptions in text
2. Estimated from descriptions in text or #3 x #1
3. From descriptions in text or #2 / #1
4. #3 / 4 buildings per patio
5. Chan Kom's 5.6 x #4
6. #5 x #1

Concluding Remarks

Our new understanding of Piedras Negras derives from the archaeological investigations of the Projecto Piedras Negras. The test pits and excavations included here were excavated by myself and several colleagues. The benefit of combining the efforts of other investigators into one dataset is that the amount of data increases dramatically, and the coverage of the area improves. The disadvantage is that each investigator has his own methodology in choosing sites to work and also excavations. Where documentation is insufficient, the excavator can rely on memory to help recover attributes of the excavation. I could not do that. In a perfect world, I would have directed the placement of the test pits myself, excavated them myself, and would have created a research design that incorporated the data into a seamless whole. However, this particular research project was somewhat post-hoc in its inception.

The data from the Projecto Piedras Negras and those from the University of Pennsylvania's excavations have created wonderful opportunities for archaeologists to better understand the nuances of life within this ancient center. Future work in the area will also aid in clarifying the nature of society and the interactions between subsidiary sites in the region.

Appendix A

Test Pit Surveying

TEST PIT DESCRIPTIONS

One of the objectives of the Proyecto Piedras Negras was a better understanding of the center's chronology via an extensive test pitting program. The operations described in this section were part of the test pitting program and include units placed in and around structures throughout the mapped areas of the center. The operations that focused on a single structure, or large-scale excavations, will be described in their own section as their objective and methods were different than those dedicated to test pits.

It is important to note that much of the information presented here is not from my own excavations. These excavations were under the direction of several different investigators, who each had their own idiosyncratic approaches to excavating and reporting strategies. I have culled these descriptions from three main sources (where available): Reports submitted to the Instituto de Antropología e História, Guatemala (Escobedo and Houston 1997, 1998, 1999, and 2001); lot forms from each operation; and field notes of each excavation. In each operation description I cite the published report once, but I want to emphasize that I am synthesizing the excavator's work even without multiple (and constant) references for each operation.

The descriptions of each test pit have been standardized for easy reference. Each operation is described generally, followed by individual test pit descriptions. Extensions to a test pit come next, even though their unit number often comes out of order. Then any burials from the unit(s) are described. Tables sometimes clarify the nature (and depth) of the excavations and these are used extensively for inter-unit comparisons with a quick reference to the unit's ceramic chronology and any features discovered in the unit. Blank spaces in the table reflect data that I could not discover for the unit.

Documentation for Proyecto Piedras Negras units focuses on a lot approach. Lots are defined as a "feature" of interest, generally a soil layer with its associated cultural material. Units may encompass many different lots, with each lot being numbered from 1 to infinity, depending on the depth and complexity of the unit. Operations are geographic areas that encompass many different units. Operations may be sub-divided by letter designators denoting excavations in different areas defined by the operation. For example, PN 2A-1-3 denotes that an excavation within the bounds of Piedras Negras (PN) in the geographic area defined by operation 2, there was a suboperation focused on a particular area (A) and this unit (1) was the first excavation in the area. The lot number "3" signifies that this particular layer or feature was the third to be defined. Many of the test-pits were excavated in arbitrary 20 cm levels, so PN 2A-1-3 could indicate the cultural material derived from the soil stratum located 60-80 cm below ground surface or a datum.

I need to emphasize here that cultural material was found in virtually every unit. In these descriptions I do not include references to artifacts recovered unless they are highly significant. By far, the largest category of artifact recovered was ceramics, as is common in Mesoamerican archaeology.

OPERATION 2

This operation, under the direction of Mónica Urquizú and Alfredo Román, investigated the chronology and cultural sequence associated with the platforms in the S group (Urquizú and Román 1997, Figure F.1). They placed 12 test pits in this area, generally in front of buildings or in the center of plazas (or patios). It is assumed that the plaza construction is contemporaneous with the buildings surrounding it, if not slightly younger than its associated buildings, so each test pit serves as a general indicator of the chronology of the patio group. Further work in this area is discussed under Operation 15 (below).

SUBOPERATIONS

PN 2A

This suboperation consists of a single 2x1 meter test pit (PN2A-11) placed in the center of the plaza created by S-39, S-40, and S-41 (Figure A.1). This test pit was excavated to bedrock, located at 50-60 cm below ground surface, and yielded a large quantity of Chacalhaaz phase ceramics and other residential debris along with the remains of two adults of undetermined sex in a secondary burial (Burial 12).

The stratigraphy of the unit has three different layers: (1) A stratum of brown organic material with bits of pumice; (2) A stratum of brown sandy material mixed with small pieces of limestone (containing the burial); and (3) a light brown layer with tiny limestone grains on top of bedrock.

Burial 12 (two individuals) was found in lot 2, approximately 28 cm below ground surface (Figure A.2). The bodies were originally placed flexed and lying on their left side with the heads toward the east. The general preservation of the skeletons was moderate, with mainly the long bones preserved. Mortuary offerings included ceramic sherds and possibly other cultural material preserved in and around the body, now included with the lot 2 material.

PN 2A-11

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	1	0-20	7.5 YR 3/2	Chacalhaaz	
11	2	20-40	7.5 YR 3/2		Burial 12
11	3	40-60	10 YR 7/6		

PN 2B

This suboperation consisted of a single 2x1 meter test pit (PN 2B-10) located in the plaza between structures S-35 and S-36. It was excavated to bedrock, which was encountered at 60 cm below ground surface on the northeast, and 1.20 m on the southwest side of the unit. Material recovered from this unit appears to date to the Yaxché period in the earlier levels. The artifact density was quite low for this entire unit.

The stratigraphy of the unit consisted of two main strata. The first was a layer of brown earth with pumice particles and limestone pieces. The second stratum was similar to the first but with a lighter, yellowish tone to the mix.

PN 2B-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-20	10 YR 5/3		
10	2	20-40	10 YR 5/3	Yaxché	
10	3	40-70	10 YR 5/3		
10	4	70-120	10 YR 6/6	Early Yaxché	

PN 2C

This suboperation consists of a single 2x1 meter test pit (PN 2C-12) located in the plaza created by S-38, S-39, and P-27. The excavation proceeded to bedrock, which was discovered at a depth of roughly 1 meter below surface level. The soil stratum had two components, one of which was brown sandy soil near the surface and another stratum of brown soil that continued to bedrock. A rock alignment was discovered 30 cm below the surface that corresponded to a terrace feature of P-27.

PN 2C-12

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
12	1	0-20	10 YR 5/4	Chacalhaaz	
12	2	20-40	10 YR 5/4	Chacalhaaz	Buried Terrace
12	3	40-60	10 YR 5/4	Yaxché	
12	4	60-80	10 YR 5/4	Balché	
12	5	80-110	10 YR 5/4	Balché	

PN 2D

This suboperation consisted of a single 2x1 meter test pit (PN 2D-7) located in the center of the plaza composed of S-8, S-9, S-10, S-11, and S-13. This test pit showed that the patio is built on top of bedrock with a thin soil layer, perhaps purposely placed in some areas, to even out irregularities in the bedrock. The first soil layer was organic humus followed by a sandy brown soil with small pieces of limestone.

PN 2D-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-20	10 YR 3/2	Chacalhaaz	
7	2	20-40	10 YR 5/3	Yaxché/Late Chacalhaaz	
7	3	40-60	10 YR 7/4	Sterile	

PN 2E

This suboperation consisted of a single 2x1 meter test pit (PN 2E-9) located between S-11 and S-32. This test pit had little in material remains, but proved that these buildings were located on a natural hill leveled with a little additional fill. The soil was composed of an organic humus layer followed by a light brown soil layer with small limestone inclusions.

PN 2E-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-20	10 YR 3/2		
9	2	20-40	10 YR 5/2	Chacalhaaz	

PN 2F

This suboperation consists of two 2x1 meter test pits (PN 2F-6, PN 2F-8) excavated to bedrock. PN 2F-6 was placed in the center of the plaza between S-44 and S-6 (Figure A.3). This unit had several different strata, including several floors. A floor was detected at 96 cm below surface, composed of brown soil with fine pumice particles, and another was detected around 110 cm. These floors probably are related to plaza surfaces rather than interior living areas. Another stratum begins at 180 cm below surface. This layer is characterized by large irregular limestone blocks, perhaps representing the oldest fill of the plaza. Unfortunately, no artifacts were associated with the earliest layers of this test pit.

PN 2F-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-20	10 YR 3/2	Sterile	
6	2	20-40	10 YR 3/2		
6	3	40-60	10 YR 6/2	Chacalhaaz	
6	4	60-80	10 YR 6/2	Chacalhaaz	
6	5	80-100	10 YR 3/2	Balché/Yaxché	Floor
6	6	100-120	10 YR 6/3	Balché/Yaxché	Floor

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	7	120-140	10 YR 6/3	Balché/Yaxché/Chacalhaaz	
6	8	140-160	10 YR 6/3		
6	9	160-180	10 YR 6/3	Sterile	Floor
6	10	180-220	10 YR 4/2	Sterile	
6	11	220-300	10 YR 6/8	Sterile	

PN 2F-8 is located in the plaza in front of S-2 (a sweat bath further excavated by Mark and Jessica Child, REF). This test pit had a rich organic layer of humus followed by a layer of lighter brown soil mixed with small limestone fragments. This second layer extends to 1.20 meters below the surface, when the soil changes to a darker brown, still with significant amounts of limestone mixed into it. There are four floor or platform surfaces discovered in this pit. The first layer was found at 50 cm below surface, the second at 80 cm, the third at 104 cm and the last at 120 cm below the surface. These floors were created from pumice particles and river rocks, which could indicate that they were originally plastered and that the plaster has decomposed into its component pieces with the river rocks being used as grouting, or the preparatory material to which the plaster was attached.

PN 2F-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-20	10 YR 3/2	Chacalhaaz	
8	2	20-40	10 YR 5/2	Chacalhaaz	
8	3	40-60	10 YR 5/2	Chacalhaaz	Floor
8	4	60-80	10 YR 5/2	Early Chacalhaaz	Floor
8	5	80-100	10 YR 5/2	Early Yaxché	Floor
8	6	100-120	10 YR 5/2	Balché	Floor
8	7	120-140	10 YR 5/2	Sterile	

PN 2G

This suboperation consisted of a single 2x1 meter test pit (PN 2G-5) located in the center of the plaza defined by structures S-5, S-6, S-7, S-8, and S-9 (Figure A.4). The humus layer is composed of organic material mixed with small limestone rocks. The first floor was discovered at 20 cm and is composed of uncompacted limestone and dark soil. The next floor, located at 45 cm below surface, has larger limestone rocks and light brown sandy soil. The third floor appeared at 130 cm below ground surface and is similar to the previous floors. The material

under the third floor is platform fill with little cultural material. The next floor layers are 160 and 186 cm below ground surface. In the eighth lot the test pit was divided in half, and the eastern side was excavated through a layer of dark brown soil with some limestone rocks. This stratum continues to bedrock.

PN 2G-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-20	10 YR 3/2	Chacalhaaz	
5	2	20-40	10 YR 8/1	Chacalhaaz	Floor
5	3	40-60	10 YR 5/2	Chacalhaaz	Floor
5	4	60-100	10 YR 5/2	Balché/Yaxché	
5	5	100-130	10 YR 5/2	Balché	Floor
5	6	130-150	10 YR 5/2	Nabá/Balché/Yaxché	
5	7	150-180	10 YR 5/2		Floor
5	8	180-200	10 YR 2/2	Sterile	Floor
5	9	200-250	10 YR 2/2		

PN 2H

Unit 1 (PN 2H-1) was placed 2.5 meters from the staircase of S-17. This 2x1 meter test pit had an initial organic layer with small limestone rocks. The plaza floor was found at 30 cm below ground surface. This floor is composed of fine limestone grains and light brown soil. The brown soil continues underneath this layer mixed with limestone rocks until bedrock.

PN 2H-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-30	10 YR 3/2	Yaxché/Chacalhaaz	
1	2	30-55	10 YR 6/2	Yaxché/Chacalhaaz	Floor
1	3	55-75	10 YR 6/2	Yaxché	
1	4	75-100	10 YR 6/3	Nabá/Balché/Yaxché	
1	5	100-120	10 YR 6/3	Balché/Yaxché	

Unit 2 (PN 2H-2) was located 22.50 meters to the west of 2H-1 in the edge of the platform around S-17 (Figure A.5). This 2x1 meter test pit had an initial organic layer with small limestone rocks. The humus layer is very similar to the next natural layer of brown earth with

small loose rocks. This very deep layer had very few artifacts associated with it. A possible floor was discovered at 85 cm below surface level. This floor was 5 cm thick, and was composed of a fine cap of light brown earth with tiny limestone and pumice fragments. Beneath this layer the darker soil resumed. Lot 7 had another floor at 135 cm below surface. This floor was identified by its light brown color and its sandy texture. Beneath this prepared surface was another layer characterized by irregular limestone rocks mixed with the soil. The last stratum was a dark brown soil layer which extended to bedrock.

PN 2H-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 6/3	Pom/Nabá/Yaxché	
2	2	20-40	10 YR 6/3	Chacalhaaz	
2	3	40-60	10 YR 6/3	Yaxché	
2	4	60-80	10 YR 6/3		
2	5	80-100	10 YR 6/3		Floor
2	6	100-120	10 YR 6/3	Sterile	
2	7	120-140	10 YR 5/2		Floor
2	8	140-220	10 YR 5/2	Balché/Yaxché	
2	9	220-260	10 YR 5/2	Balché	
2	10	260-280	10 YR 5/2	Nabá/Balché	
2	11	280-300	10 YR 5/2		
2	12	300-320	10 YR 5/2		
2	13	320-350	10 YR 5/2		

PN 2H-3 is a 2x1 meter test pit located 2.5 meters west of the S-18 stairway. This unit had several different strata in a building matrix that extended over four hundred years of occupation. The humus layer was an organic mixture of soil and small rocks. Below this level was another small layer of organic material mixed with sand. The next stratigraphic layer had a lighter brown soil with more sand and small rocks. This layer was cut off by a floor composed of sand and small limestone rocks 5-8 cm deep and 50 cm from the ground surface. Another floor at 60 cm was made of small river rocks and limestone. The natural stratigraphy consists of sandy, light brown soil with small limestone inclusions. The third floor was discovered at 124 cm and had a composition similar to those already mentioned. These floors are also harder, i.e, more compacted, than the surrounding matrix. The light brown soil continues to bedrock.

PN 2H-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-20	10 YR 4/2	Chacalhaaz	
3	2	20-40	10 YR 6/3	Chacalhaaz	
3	3	40-60	10 YR 6/3	Yaxché/Chacalhaaz	Floor
3	4	60-80	10 YR 6/3	Yaxché	Floor
3	5	80-100	10 YR 6/3	Early Yaxché	
3	6	100-120	10 YR 6/3	Balché	Floor
3	7	120-140	10 YR 6/3	Balché/Yaxché	Floor
3	8	140-160	10 YR 6/3	Nabá	
3	9	160-170	10 YR 5/3		

This unit (PN 2H-4) consisted of a 2x1 meter test pit placed in front of S-19. This test pit was excavated to bedrock, encountered at 130 cm below surface. The stratigraphy consisted of an organic humus layer followed by a layer of sandy brown earth mixed with irregular limestone blocks, which continued with some lighter mixing down to bedrock.

PN 2H-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-20	10 YR 5/1	Chacalhaaz	
4	2	20-60	10 YR 5/2	Chacalhaaz	
4	3	60-130	10 YR 8/2	Sterile	

Summary

The purpose of this operation was to date the initial and final use of patio groups in the S sector of the center. Twelve test pits were located in and around buildings in this sector and were excavated to bedrock. These test pits reveal surprising time depth in some areas, and show that people were adding patio constructions to the S group from the Nabá period clear through Chacalhaaz periods, over an interval of four hundred years.

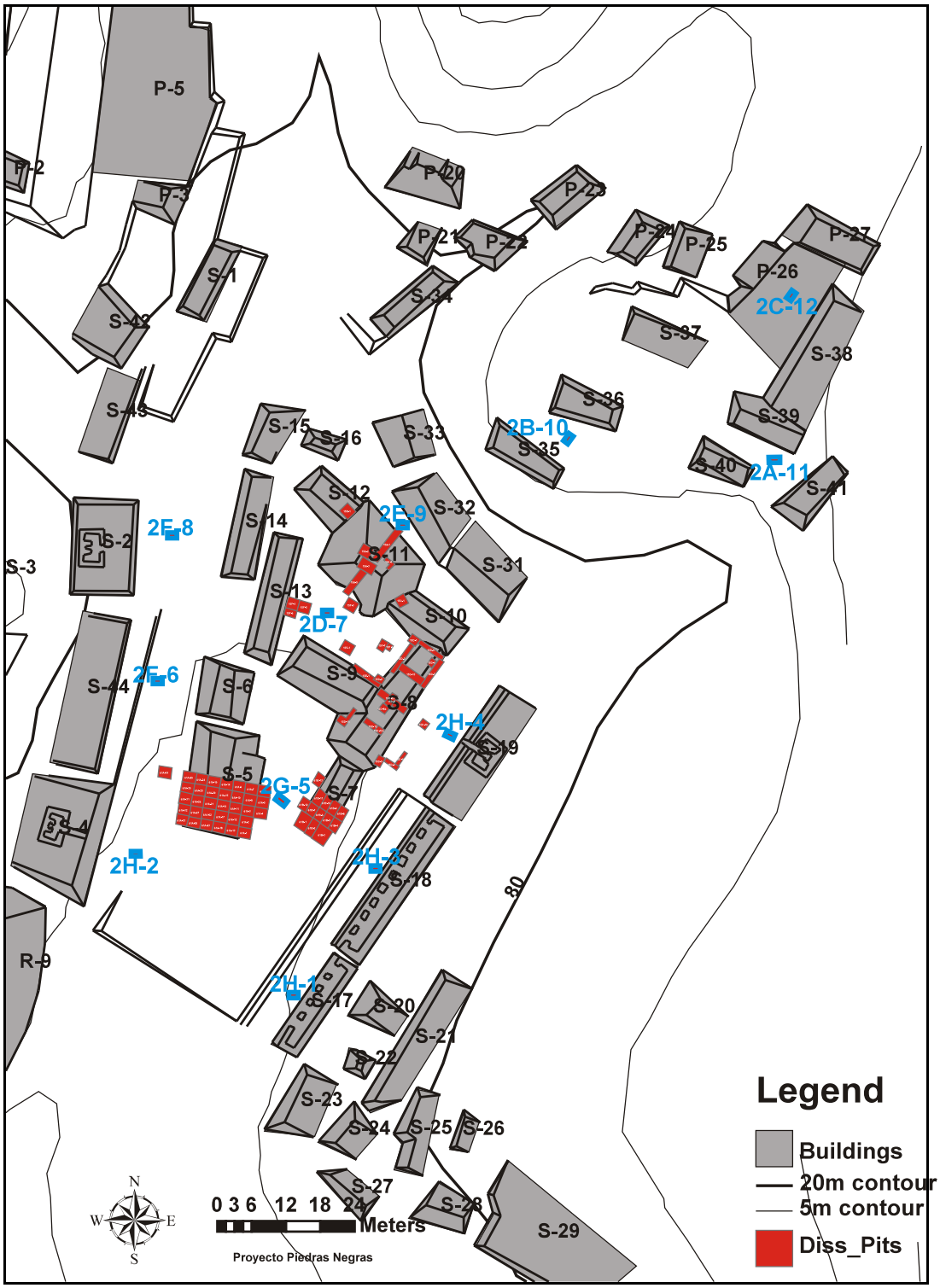


Figure F.1 Operation 2

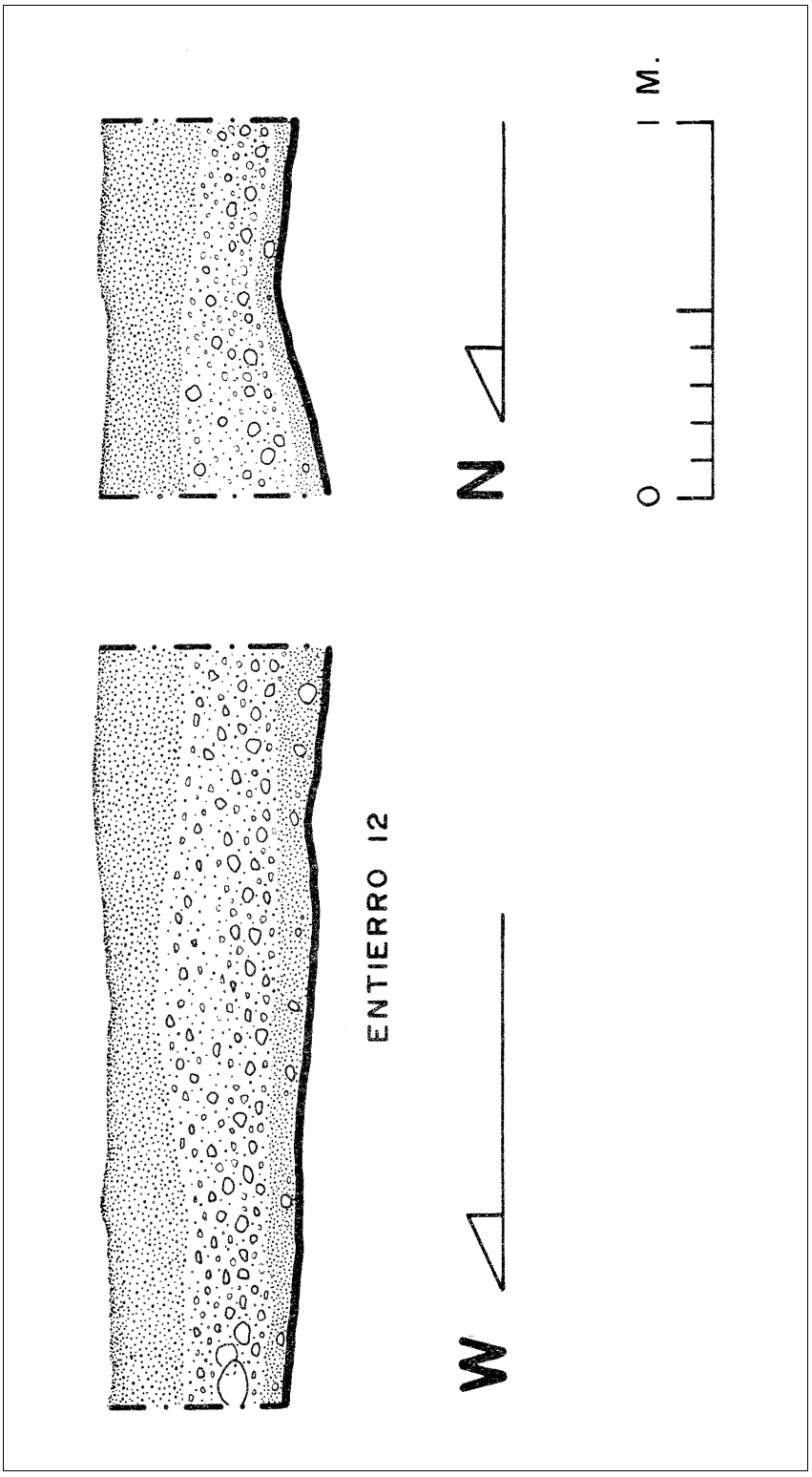


Figure F.2 PN 2A-11, North and East Profiles (From Urquizú and Román 1997:25)

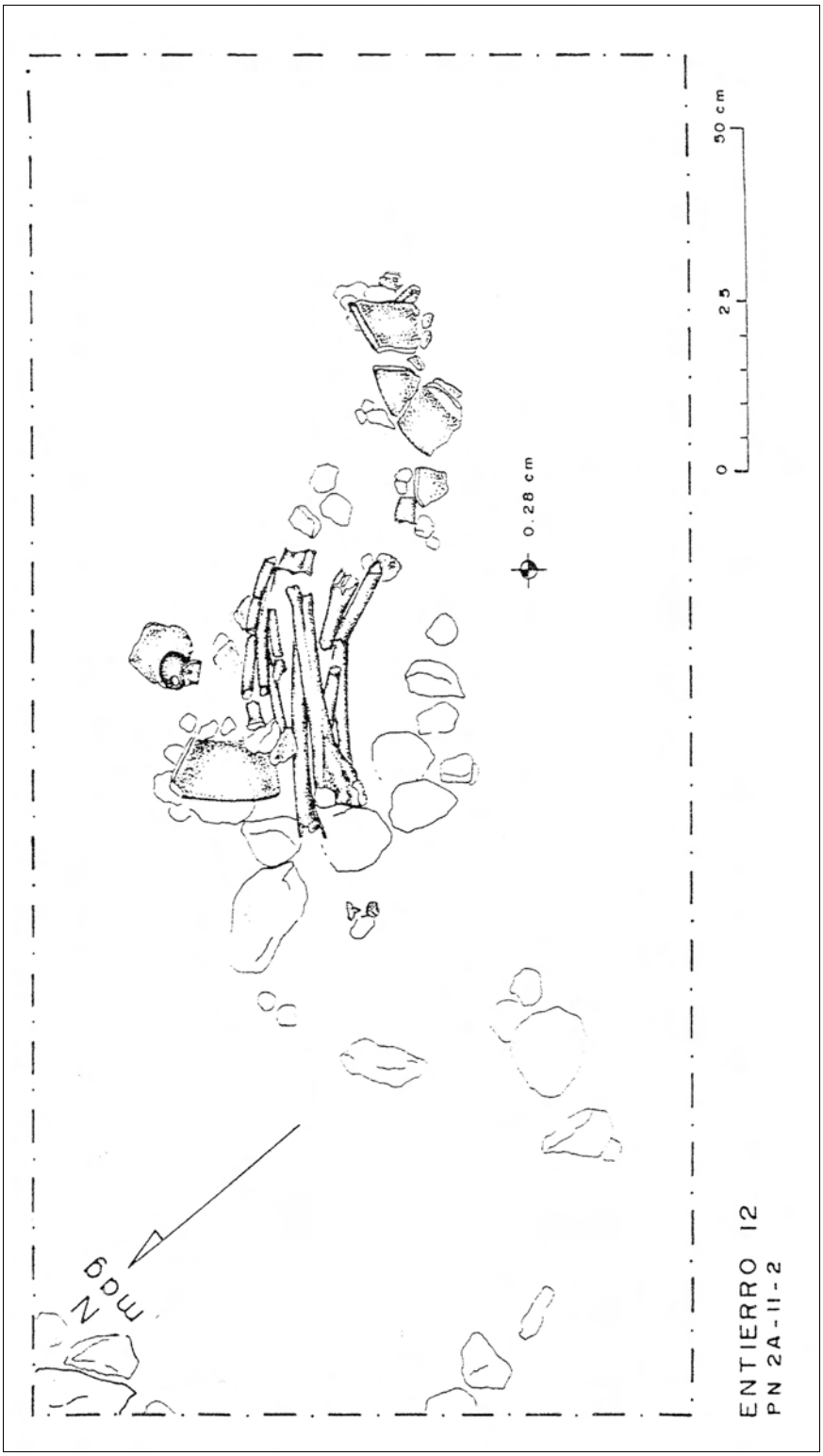


Figure F.3 Burial 12 (From Urquizú and Román 1997:26)

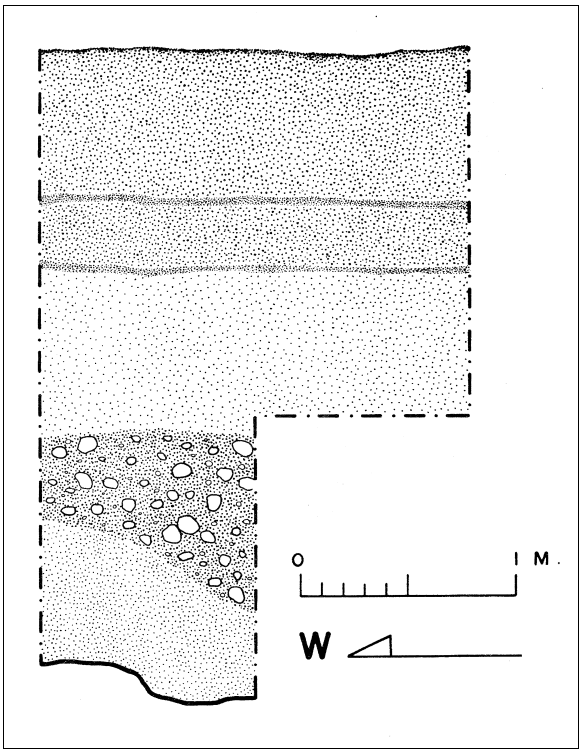


Figure F.4 PN 2F-6, North Profile (From Urquizú and Román 1997:27)

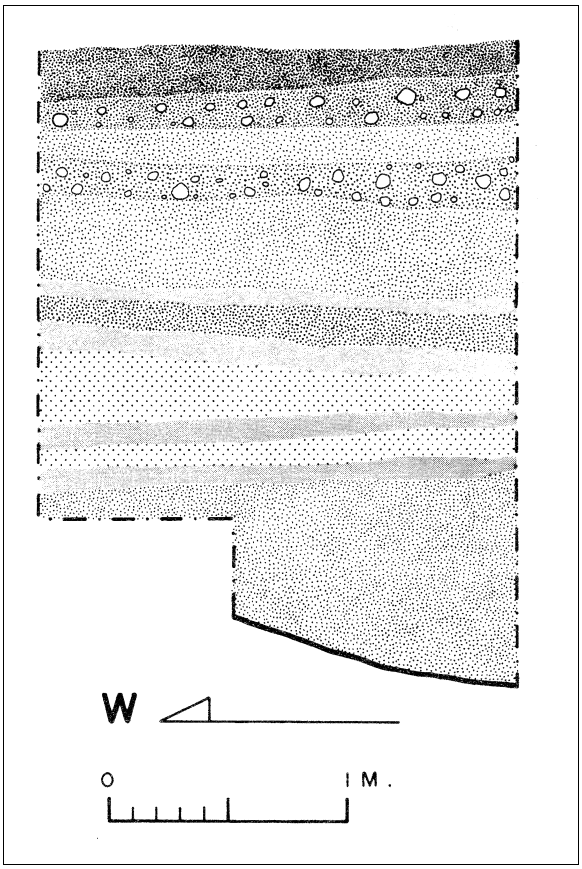


Figure F.5 PN 2G-5, South Profile (From Urquizú and Román 1997:28)

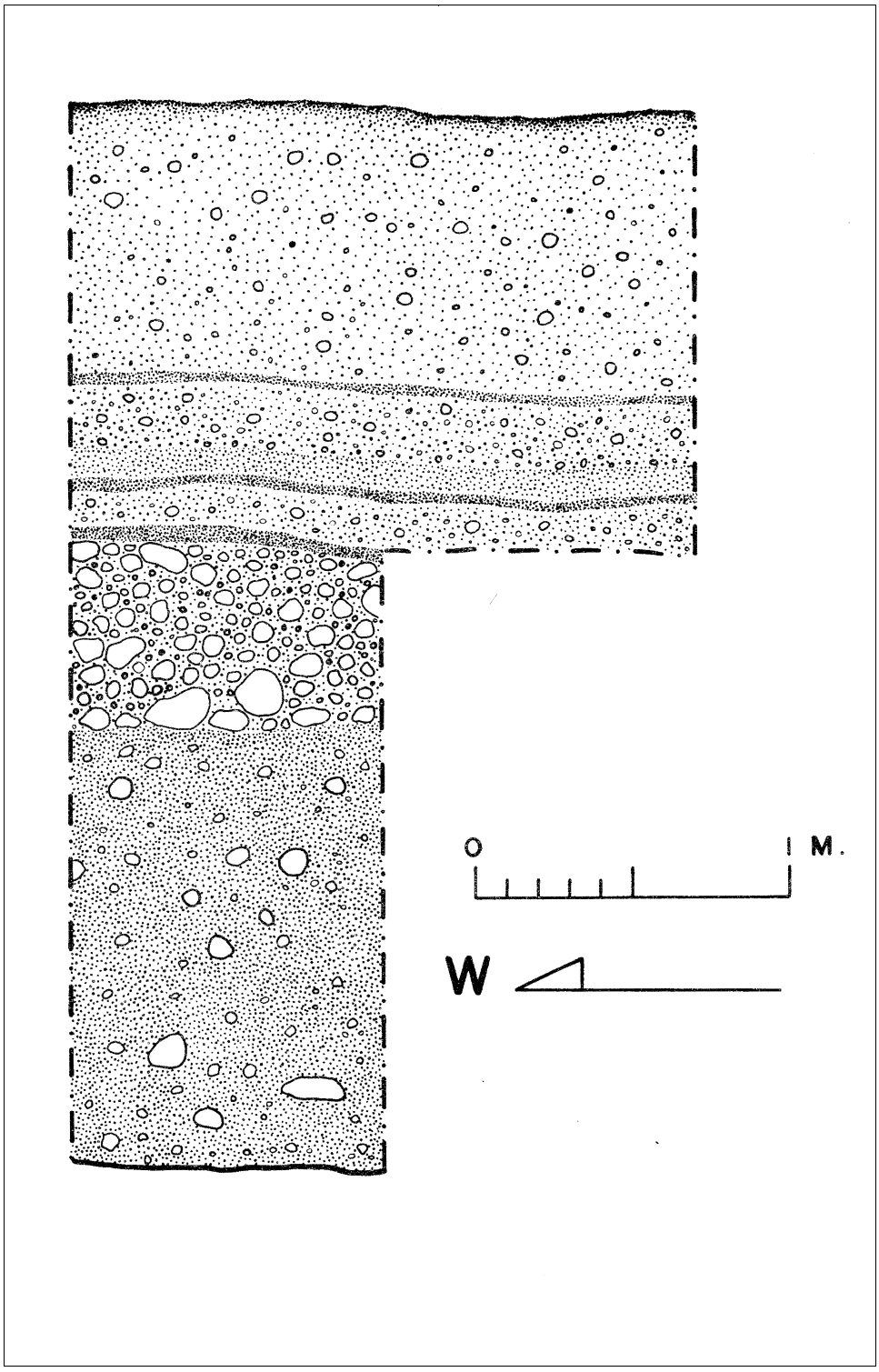


Figure F.6 PN 2H-2, North Profile (From Urquizú and Román 1997:29)

OPERATION 3

The goal of this operation was to define the chronology of the South Plaza (Figure A.6). This plaza is defined by the buildings U-1, U-2, U-3, U-4, U-9, R-1, and R-30. These buildings are irregularly spaced around the plaza, suggesting to the excavator, Nancy Monterroso, a disorganized approach to plaza development (Monterroso 1997a:31). Thus, twelve test pits were placed in and around these buildings to better understand their development (Figure F.7).

PN 3A-1

Unit 1 is a 2x1 meter test pit located in the northwest corner of U-3. The stratigraphy of this test pit consisted in a thin layer of humus, followed by a thicker layer of possible fill composed of large rocks mixed with sand and brown soil (Figure A.7). The third layer is a four centimeter thick stucco floor that is slightly angled from one side of the pit to the other. After this floor, a layer of building fill with large rocks, sand, and light soil all mixed together. The final layer was fill mixed with disintegrated limestone.

PN 3A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-10		Chacalhaaz	
1	2	10-100	10 YR 3/3	Nabá	
1	3	104-108			Floor
1	4	108-117	10 YR 7/3	Nabá	
1	5	117-140		Nabá	

PN 3A-2

Unit 2 is a 2x1 meter test pit located in the southwest corner of U-4. The initial stratigraphy was a thin layer of organic humus, followed by a substantial layer of fill composed of irregular sized limestone blocks and brown soil.

PN 3A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-10		Chacalhaaz	
2	2	10-205	10 YR 8/3	Pom/Nabá	

PN 3A-3

Unit 3 is a 2x1 meter test pit placed in northeast corner of U-4. The initial stratigraphy was a thin layer of organic humus, followed by a substantial layer of fill composed of irregular sized limestone blocks and brown soil.

PN 3A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-10		Chacalhaaz	
3	2	10-150	10 YR 3/3	Nabá/Balché/Chacalhaaz	

PN 3A-4

Unit 4 is a 2x1 meter test pit placed in southwest corner of R-1. The objective of this test pit was to determine the chronology of R-1, especially as it compared with U-3 and U-4, and to better understand the process of plaza growth. The first layer was the organic humus layer, followed by a layer of fill composed of limestone rocks and brown earth. Underneath this layer was a layer of brown clayish soil.

PN 3A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-10		Chacalhaaz	
4	2	10-100	10 YR 3/3	Nabá	
4	3	100-190	10 YR 4/3	Hol/Abal/Nabá	

PN 3A-5, PN 3A-12

Unit 5 is a 2x1 meter test pit placed in the northwest corner of R-1's main staircase, north of the fallen stela (Figure A.8). The first layer was an organic humus, as is common in these excavations. The next layer was a floor made from small limestone rocks mixed with brown earth and sand. After this layer, the next stratum consisted of brown-gray earth with some larger rocks thrown in. This is probably construction fill for the platform. This layer continues into the next lot (3A-5-4). Between lot 4 and 5 there appeared a small layer of limestone which could be a floor. Under this was another layer of brown earth and small rocks down to bedrock.

PN 3A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-30			
5	2	30-50	10 YR 3/3	Chacalhaaz	Floor
5	3	50-90	10 YR 5/3	Nabá	
5	4	70-130	10 YR 5/3	Pom/Nabá/Chacalhaaz	
5	5	130-200		Hol/Abal/Nabá	Floor

PN 3A-6

Unit 6 is a 2x1 meter test pit placed in the southwest corner of R-10's platform. The first layer was an organic humus layer with small rocks mixed into the brown earth. This layer was followed by a layer of dark earth with some larger rocks mixed in comprising lot 2. Lot 3 was similar, but a little less compact. Lot 4 had more regular sized rocks than the previous layers. These last layers probably represent the fill of the platform.

PN 3A-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-20		Chacalhaaz	
6	2	20-50	10 YR 3/3	Pom/Nabá	
6	3	50-90	10 YR 3/3	Abal/Nabá/Balché/Chacalhaaz	
6	4	90-180	10 YR 3/3	Nabá/Yaxché	

PN 3A-7

Unit 7 is a 2x1 meter test pit placed in front of R-1, just north of the main staircase (Figure A.9). Due to the presence of an early classic burial, this test pit was extended to 2x7 meters. The first layer is the humus layer, composed of brown organic material. The next layer consisted of brown earth mixed with large limestone rocks that formed the roof of the burial cist. The third lot consists of the material removed from the cist along with the remains of Burial 11.

The northeast corner of the excavation contained a stone alinement running north-south that could form part of an earlier structure associated with R-10. Bedrock was found at 1.0 meter below ground surface. The fourth lot contained a brown clayish fill sitting on bedrock.

Burial 11 (PN 3A-7-3) contained an adult skeleton in a burial cist (Figure A.10). The burial cist consists of a ring of stones demarking an area 3 meters long and 0.70 meters wide. The stones were generally irregularly shaped, except for the ones on the east which had some evidence of smoothing. The remains of an adult woman were recovered. She was orientated north-south with the head towards the south in an extended position. Although the bones were generally poorly preserved, some of the long bones and cranium were recovered. On top of the face a four-legged Metapa trichrome plate had been placed as a burial offering.

PN 3A-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-20		Chacalhaaz	
7	2		7.5 YR 3/2	Abal/Nabá/Balché	
7	3		7.5 YR 3/3	Pom/Nabá	Burial 11
7	4	-100	10 YR 3/5	Hol/Abal	

PN 3A-8

Unit 8 was a 1x1 meter test pit placed along the axis of R-1 inside the plaza at a distance of 8 meters from the building, and roughly 1 meter south of the previous unit. It's purpose was to see if more burials could be found along the axis of the building. The first layer was an organic humus layer. The second layer was a destroyed floor made of medium sized rocks and brown earth. The third layer consisted of fill composed of large rocks and brown earth. The fourth layer contained more fill material with large rocks, brown earth, sand and decomposed limestone and then bedrock.

PN 3A-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-14		Pom/Nabá	
8	2	14-18	10 YR 3/3	Abal	Floor
8	3	18-50	10 YR 3/3	Pom/Nabá	
8	4	50-76	10 YR 4/4	Abal	

PN 3A-9

Unit 9 is a 2x1 meter test pit located just off the southeast edge of platform R-32. The first layer was humus. The next layer was fill made of brown earth and limestone rocks. Bedrock was fairly close to the surface.

PN 3A-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-20		Chacalhaaz	
9	2	20-50	7.5 YR 3/3	Abal	

PN 3A-10

This 2x1 meter unit is located on the southeastern corner of U-2's platform. The purpose of this test pit was to better understand the chronology of the west side of the plaza. The first stratigraphic layer is humus. The second lot is composed of fill (brown earth mixed with medium to large rocks). The third stratum continues with fill, as does the fourth.

PN 3A-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-10			
10	2	10-50	10 YR 3/3	Chacalhaaz	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	3	50-100	10 YR 4/3		
10	4	100-130		Abal/Nabá/Yaxché/Chacalhaaz	

PN 3A-11

This unit connects PN 3A-7 and PN 3A-8. It measures 1.55x1 meter. The purpose of this test pit was to gather better data on the earliest settlements of Piedras Negras in pure deposits. The first layer was composed of humus, and the second was floor fill. The third stratum was a brown earth layer mixed with some large stones similar to PN 3A-7-3. The last layer had the same characteristics as PN 3A-7-4.

PN 3A-11

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	1	0-10		Abal/Yaxché/Chacalhaaz	
11	2	10-20	10 YR 3/3		Floor
11	3	20-100	10 YR 4/9	Abal/Nabá	
11	4	-100	10 YR 4/4	Abal	

PN 3A-12

PN 3A-12 is an extension to PN 3A-5 by an area of 1x1 meters to the southwest. The first layer was a humus layer. Lot 2 was floor fill composed by medium size rocks and brown earth. Lot 3 was a floor layer with large rocks and brown earth. Lot 4 was very similar. Lot 5 was a limestone floor which measured 10 cm in depth. This floor was previously located in PN 3A-5-4,5. Lot 6 is a fill layer of brown earth and small rocks that is the same preclassic deposit as PN 3A-11-4.

PN 3A-12

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
12	1			Chacalhaaz	
12	2		10 YR 3/3	Chacalhaaz	Floor
12	3		10 YR 3/3		
12	4		10 YR 3/3	Nabá	
12	5			Pom/Nabá	Floor
12	6			Pom/Nabá	

Summary

These test pits serve as a general indicator to the age of the South Group Plaza. This enormous area is artificially built up from the bedrock with the addition of fill composed of earth and rocks. In some areas the bedrock was much lower than in others, suggesting a need to fill in the intervening areas as the plaza built and spread through time. The Early Classic component of these test pits is also important, because much of the center's Early Classic occupation has probably been destroyed by later construction activities, so every early sample is useful.

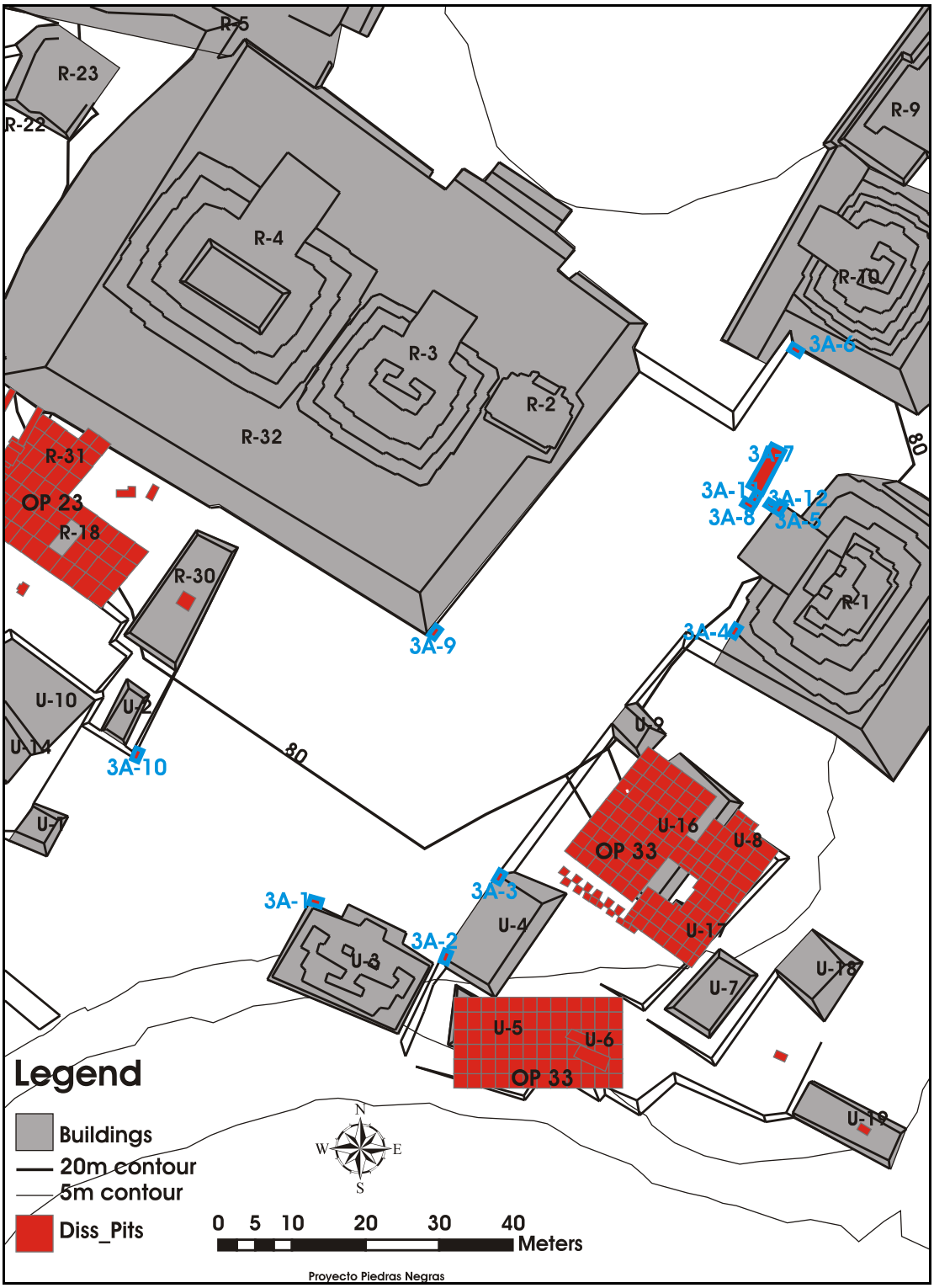


Figure F.7 Operation 3

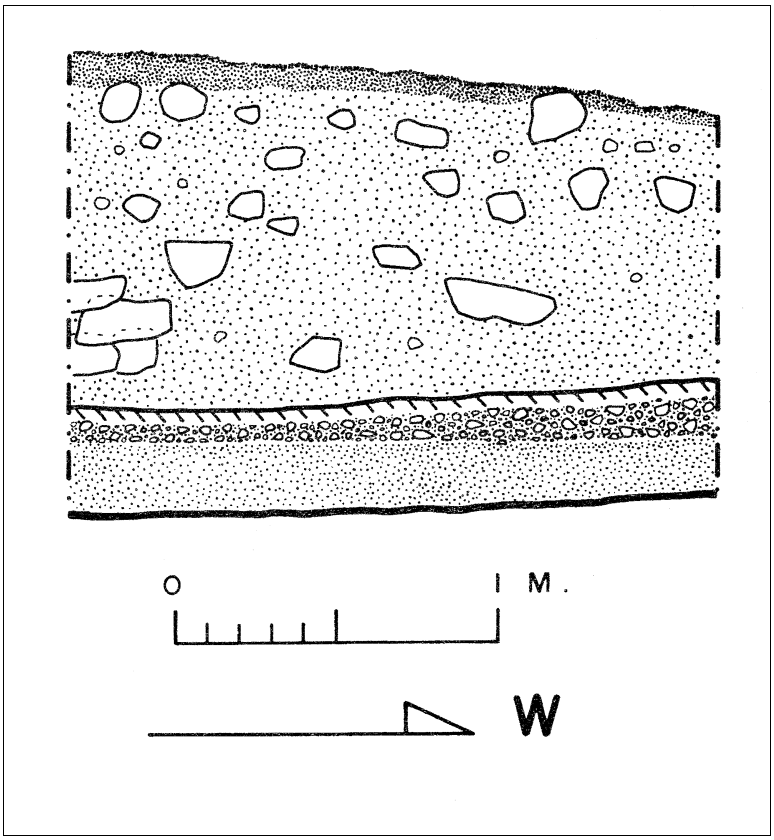


Figure F.8 PN 3A-1, South Profile (From Monterroso 1997a:35)

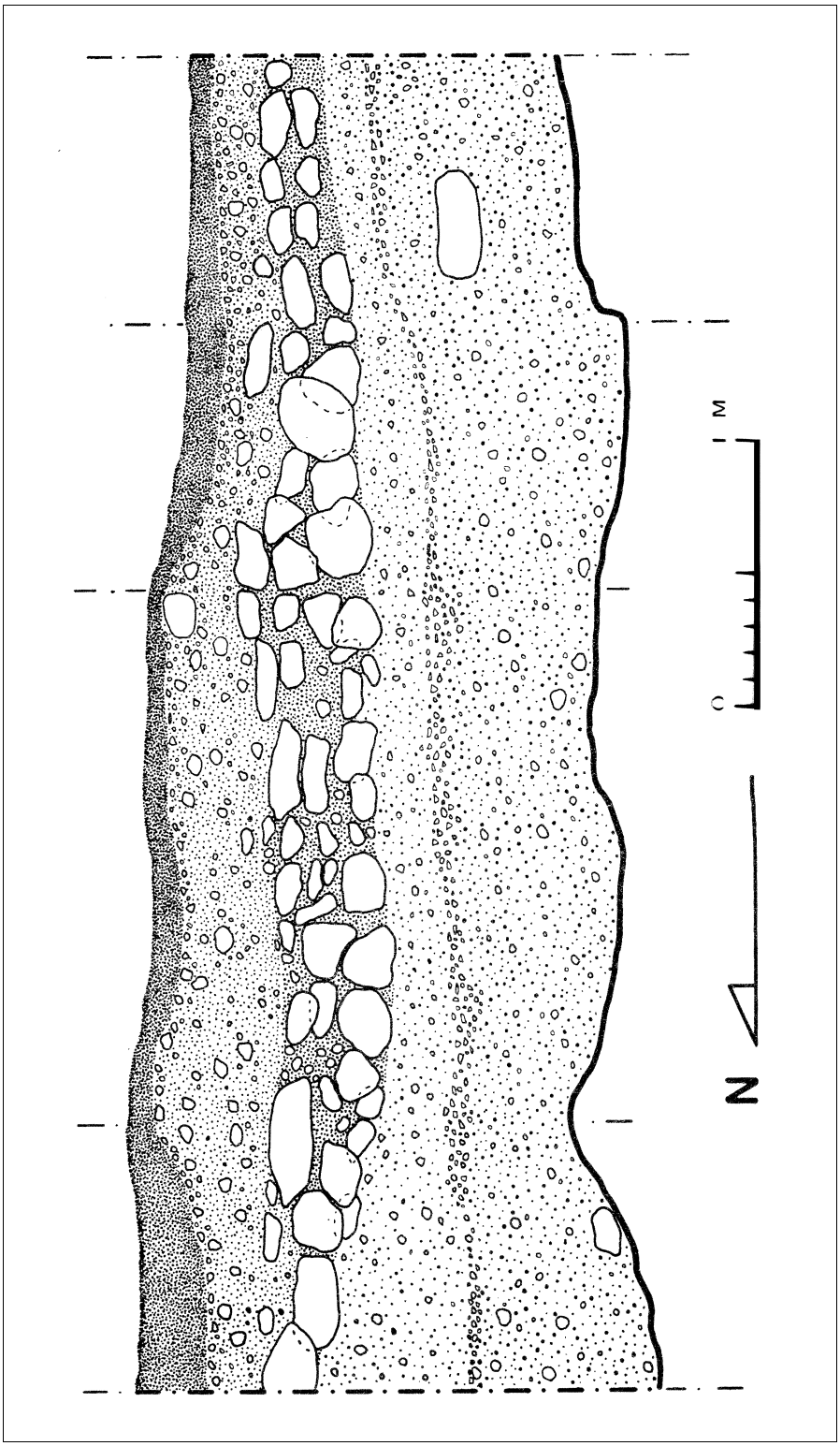


Figure F.9 PN 3A-5 Profile (From Monterroso 1997a:36)

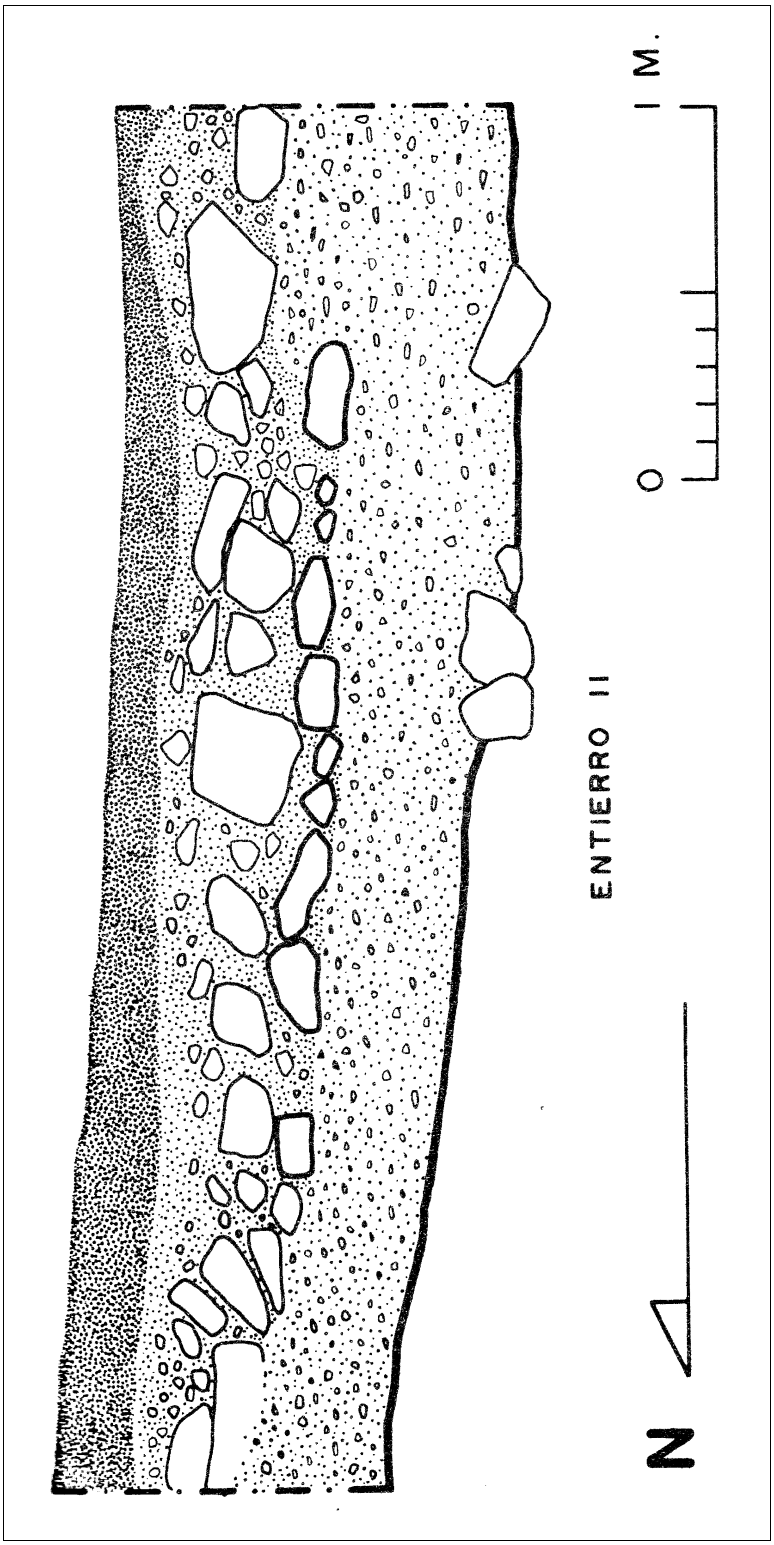


Figure F.10 PN 3A-7, East Profile (From Monterroso 1997a:37)

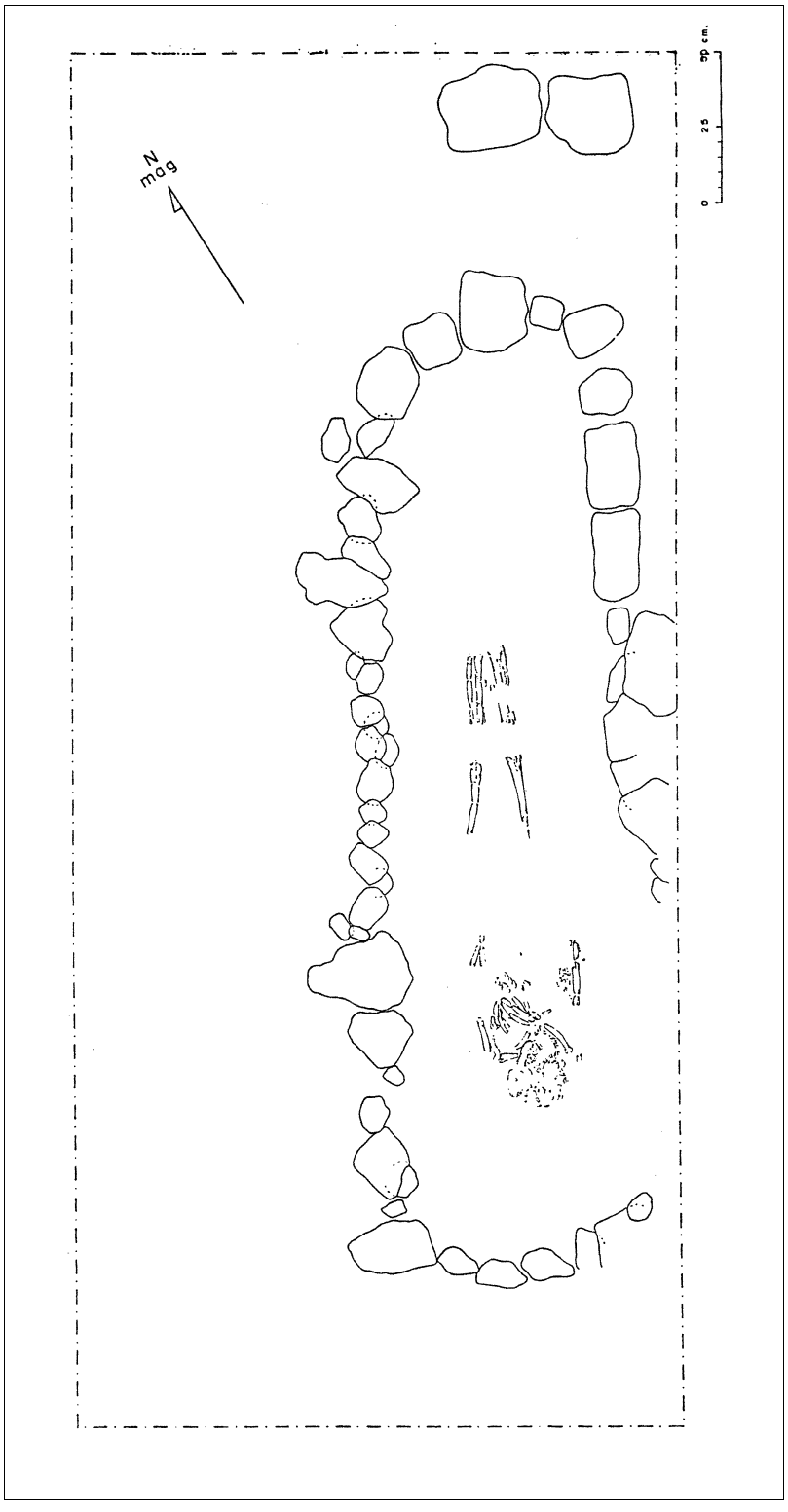


Figure F.11 Burial 11 (From Monterroso 1997a:38)

OPERATION 6

The purpose of this operation was to explore the southern sector of the center via a small series of test pits under the direction of Mónica Urquizú (1997a). She placed 10 test pits in this residential area in association with buildings or platforms to better understand the chronology and activities of these ancient mounds, most of them excavated to bedrock (Figure F.12). There is some confusion within the ceramic and photo database between this operation and the operation involving J-4 under the direction of Héctor Escobedo. Apparently, both operations started as Op. 6, and the J-4 operation was changed to Op. 7 at some point, but the tags on the artifact bags and photo registry were not always updated with that change.

SUBOPERATIONS

PN 6A

This suboperation consists of a single 2x1 meter test pit (PN6A-1) placed in the platform surrounding V-27 and V-28 (Figure A.12). The humus layer was composed of organic material and large irregular limestone rocks. The second lot consisted of a light brown earth mixed with very large limestone rocks, corresponding to platform fill. Lot 3 is very similar to the preceding stratum. Lot 4 is a continuation of the same stratigraphic layer. Lot 5 is a light brown clayish material that was quite compact. The depth of this artificial fill perhaps reflects the need to be above the flood waters of the seasonally inundated arroyo on which this platform sits.

PN 6A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/3	Chacalhaaz	
1	2	20-40	10 YR 5/2	Chacalhaaz	
1	3	40-100	10 YR 5/2		
1	4	100-280	10 YR 5/2	Yaxché	
1	5	280-330	10 YR 5/4	Balché/Yaxché	

PN 6B

This suboperation consists of a single 2x1 meter test pit (PN6B-2) placed in the platform supporting V-17 through V-22. The humus layer was composed of organic material and limestone rocks. The second layer constitutes platform fill being slightly more sandy and lighter in color than the previous layer. This patio group is sitting right on the bedrock, taking advantage of a natural (though small) elevation.

PN 6B-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 3/2	Chacalhaaz	
2	2	20-40	10 YR 5/2	Chacalhaaz	

PN 6C

This suboperation, consisting of five test pits was meant to corroborate excavations made by the University of Pennsylvania with regard to V-1 (Satterthwaite 1952). Accordingly, the area was cleaned and the open trenches left by the Penn crowd was documented. One trench through V-1 was 17x1.7 meters along the north-south axis of the building and through its stairs. The rooms of V-1 had open test pits (2x3 meters) which were also cleaned. Structure V-3 had a trench placed through it and an open test pit in front of it.

Unit 5 is a 2x1 meter test pit (with an additional extension) in the center of V-1's plaza (Figure A.13). The initial layer was composed of organic material and limestone rocks. The second layer had darker earth with more limestone rocks. In the extreme west side of the unit was found the top of a bench on the platform. The third layer was composed of light brown earth and limestone. A floor was discovered at 53 cm below ground surface composed of bajareque lying beneath the bench. The fourth layer revealed more of this floor, uncovering ceramic sherds that had been burned (presumably) while lying on this floor. The fifth layer consisted of natural clay on top of the bedrock that had been flattened to serve as a preparation level for the burned clay. In the ceramic database, this unit is also referred to as PN 6B-5.

PN 6C-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-20	10 YR 3/2		
5	2	20-40	10 YR 2/2	Chacalhaaz	Bench
5	3	40-60	10 YR 5/2	Chacalhaaz	Burned Floor
5	4	60-80	2.5 YR 5/8	Yaxché	
5	5	80-90	10 YR 3/1	Pom/Nabá	

PN 6C-6 is a 1.5x1 meter test pit placed in the plaza of V-1, four meters to the west of PN 6C-5 and against the structure. The first layer was an organic material and limestone fragments. Underneath this layer the wall of a possible platform was uncovered which abuts against the wall of Structure V-1. The soil was a light brown. The third layer was excavated to the burned floor level. Bedrock was not reached in this test pit.

PN 6C-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-20	10 YR 3/2	Kumché	
6	2	20-40	10 YR 5/2		Wall
6	3	40-60	10 YR 5/2	Balché/Yaxché	Burned Floor

PN 6C-7 is a 1x1 meter test pit placed in the plaza of V-1, seven meters to the east of PN 6C-5 and against the southwest corner of structure V-2. The first layer was an organic material and limestone fragments. In the second layer was found the wall of the first platform on which sits V-1, V-2, and V-3. This platform is oriented 280 degrees along an East-West axis. The wall unites with the wall of structure V-2. The soil matrix was brown earth and limestone. The third layer hit the burned clay layer at 80 cm and stopped.

PN 6C-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-20	10 YR 3/2	Chacalhaaz	
7	2	20-40	10 YR 5/2	Chacalhaaz	Wall
7	3	40-80	10 YR 5/2	Nabá/Balché/Yaxché/Chacalhaaz	Burned Floor

PN 6C-8 is a 1x1 meter test pit placed in the plaza of V-1, 6.5 meters to the north of PN 6C-5 and against the middle of V-1's stairway (Figure A.14). The first layer was an organic mixture of earth, roots, and small rocks. The second layer quickly reached the burned floor layer and stopped.

PN 6C-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-20	10 YR 3/2	Chacalhaaz	
8	2	20-40	10 YR 5/2	Nabá/Balché/Yaxché	Burned Floor

PN 6C-9 is a 1x1 meter test pit placed in the plaza of V-1, eleven meters to the south of PN 6C-5. The first layer was an organic mixture of humus and limestone fragments. The second layer was a brown soil with small rocks that arrived at the level of the burned floor and stopped (Figure A.14).

PN 6C-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-20	10 YR 3/2	Chacalhaaz	
9	2	20-40	10 YR 5/2	Yaxché	Burned Floor

PN 6D-3 began as a 2x1 meter test pit placed southwest of Structure V-17. The first layer was a humus layer. The second layer was basically decomposed bedrock without any cultural material. This test pit shows the shallow soil layer in this area.

PN 6D-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-20	10 YR 3/2	Chacalhaaz	
3	2	20-40	10 YR 7/6	Sterile	

PN 6E-4 is a 2x1 meter test pit located between structures V-6 and V-8. The first layer is humus with some limestone. The second layer is very similar to the first. The third and fourth lot consists of light brown earth with more limestone pieces. This is equivalent to plaza fill. The texture is somewhat sandy and compact.

PN 6E-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-20	10 YR 3/2	Kumché	
4	2	20-40	10 YR 3/2	Kumché	
4	3	40-60	10 YR 5/2	Chacalhaaz	
4	4	60-80	10 YR 5/2	Sterile	

PN 6F-1 is a 2x1 meter test pit located in the plaza of structures V-11 through V-14. The initial stratum contained organic material mixed with small limestone pieces. The second layer had light brown earth and small rocks that pertained to the platform fill. The third layer was decomposed bedrock.

PN 6F-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/2	Chacalhaaz	
1	2	20-40	10 YR 5/2	Chacalhaaz	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	3	40-60	10 YR 7/4	Sterile	

Summary

This operation explored the southern sector of the center via a series of test pits within a residential area. These test pits showed that the ancient inhabitants went to extreme efforts to build up artificial platforms in some areas of this sector, while placing their buildings on bedrock in other areas. These constructions are quite late in the ceramic sequence of Piedras Negras.

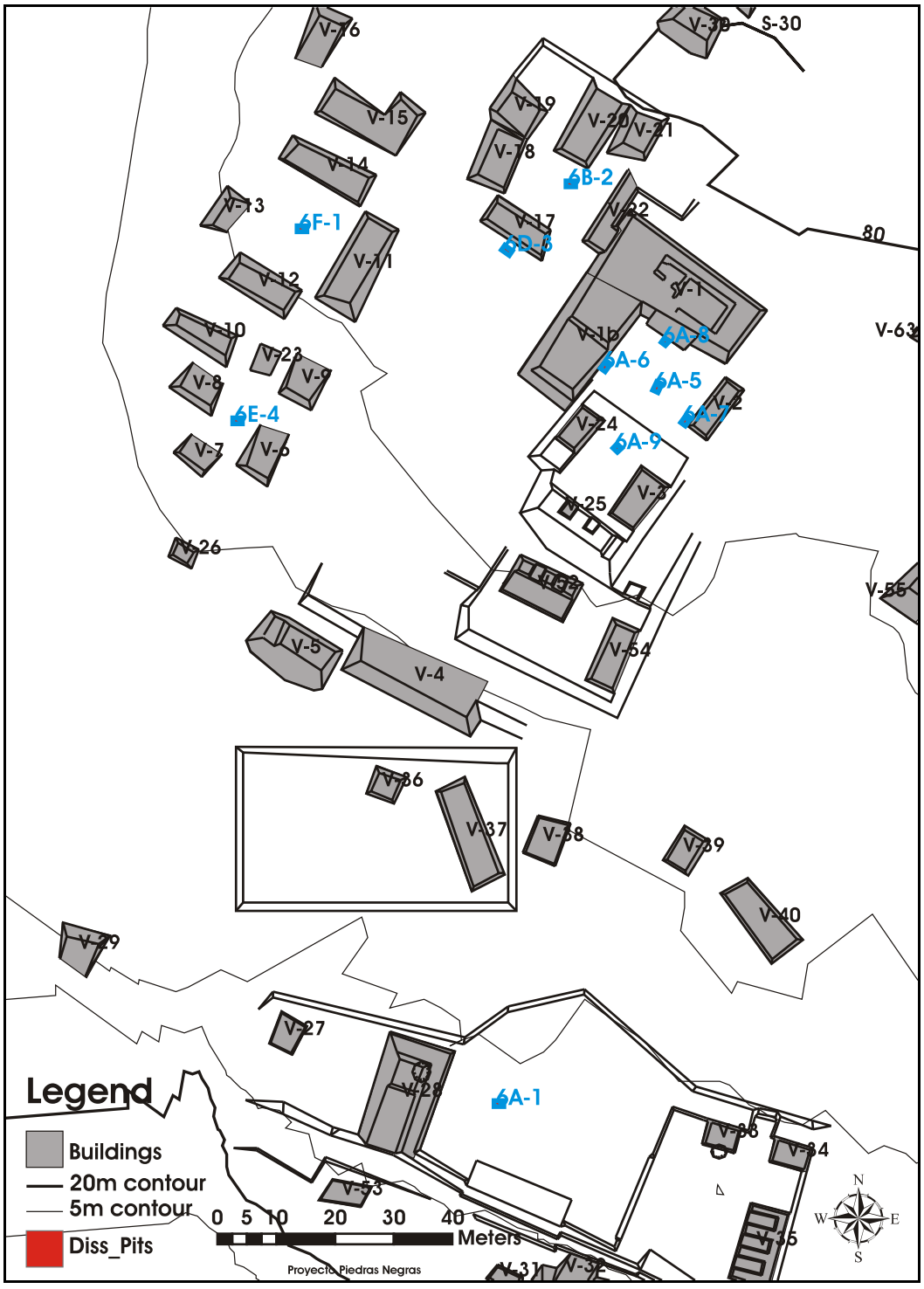


Figure F.12 Operation 6

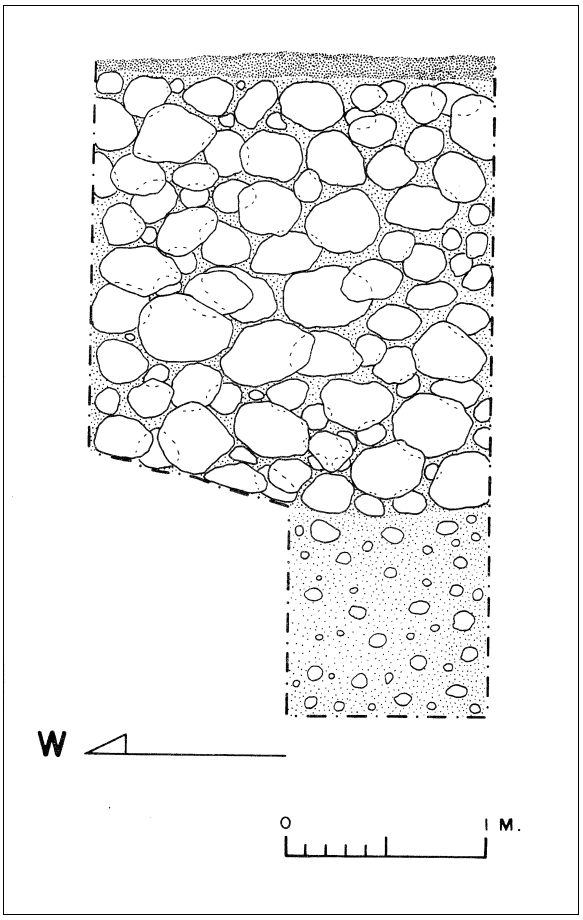


Figure F.13 PN 6A-1, North Profile (From Urquizú 1997a:63)

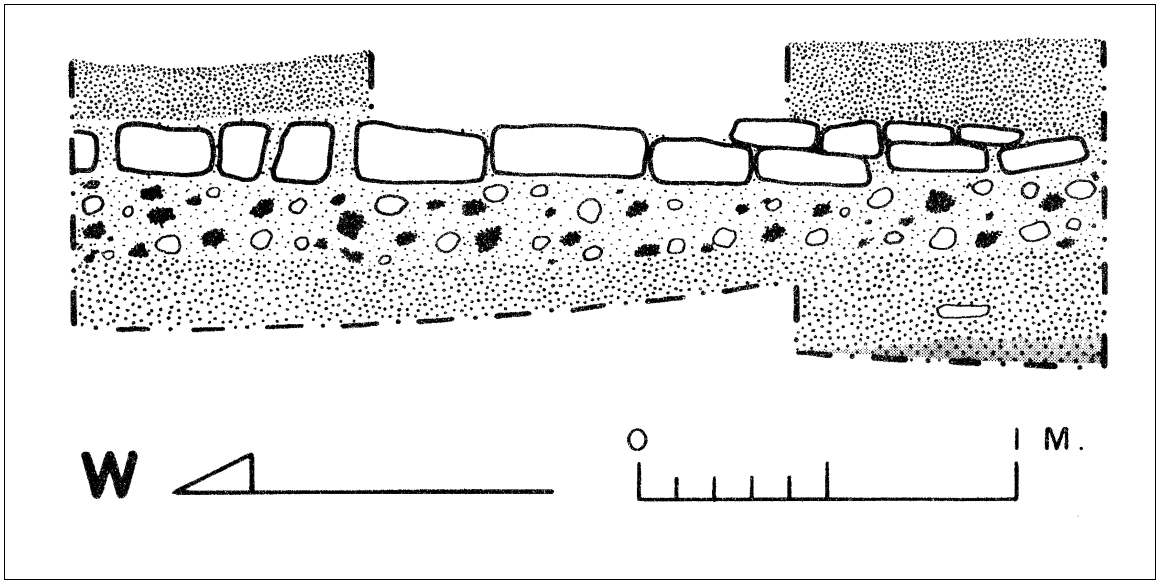


Figure F.14 PN 6C-5, East Profile (From Urquizú 1997a:64)

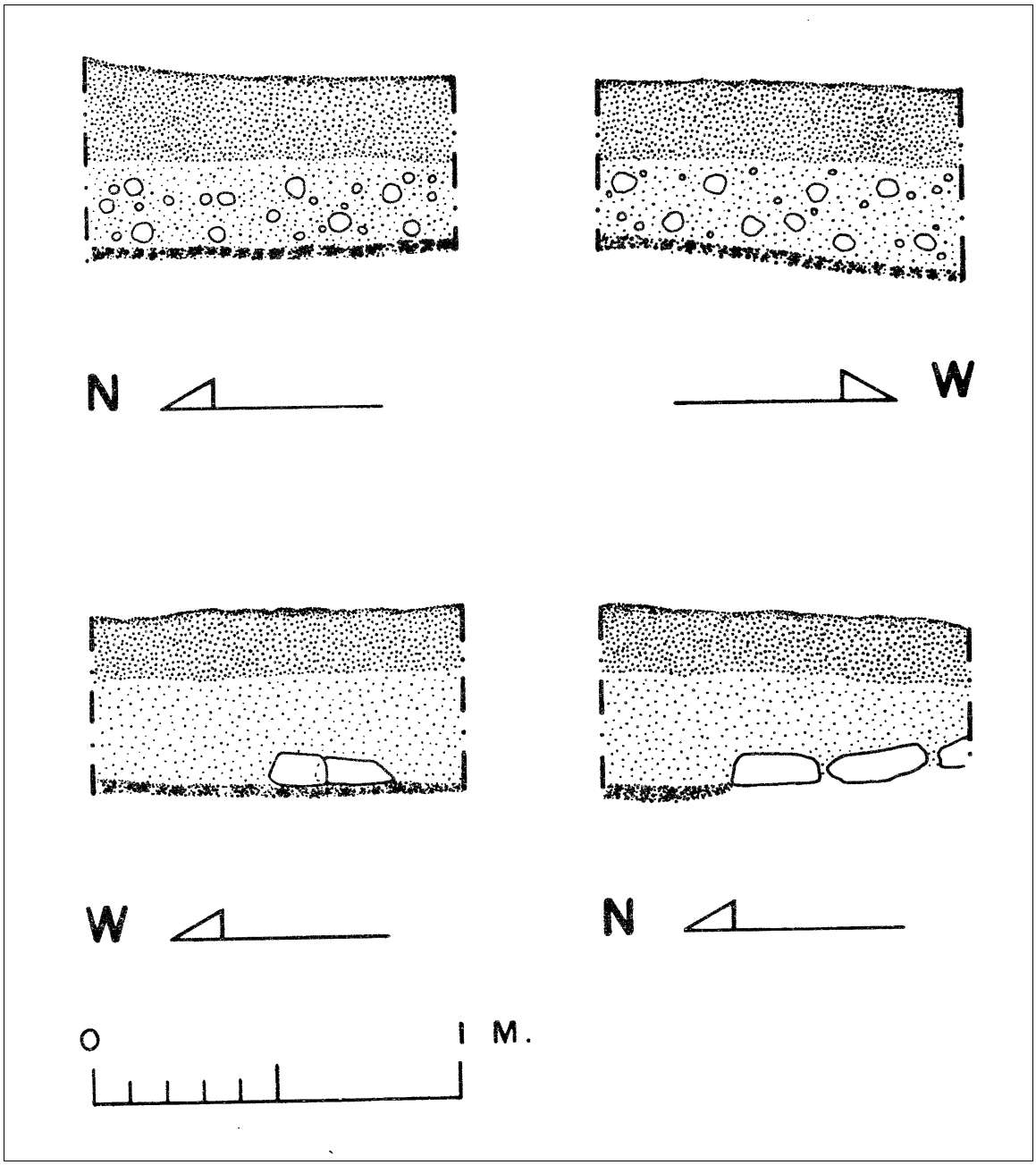


Figure F.15 PN 6C-8 (Top) and PN 6C-9, Profiles (From Urquizú 1997a:65)

OPERATION 8

This operation consisted of three test pits placed below (8A-1) and within niches (8B-1,2) associated with the turtle petroglyph to the southeast of the center (Figure F.16). The petroglyph lies above a dry arroyo that is probably seasonally inundated and could serve as an entrance to the center. The carving shows a glyph "8 ? Ahau" which probably corresponds to 9.130.0.0.0 (692 AD). Charles Golden directed these excavations in 1997 (Golden 1997a).

SUBOPERATIONS

PN 8A

This 2x1 meter test pit was placed at the base of the turtle petroglyph within the dry arroyo (Figure A.16). The first layer was a thin organic layer, followed by a gray-brown soil horizon with many limestone river rocks. The third layer was very similar to the second. Bedrock was not discovered in this test pit due to the instability of the walls of the test pit. Recovered materials were water-worn, and indicate that some of the materials were washed down from upstream.

PN 8A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-12			
1	2	12-150		Chacalhaaz	
1	3	150-232		Chacalhaaz	

PN 8B

This operation consisted of two test pits placed in the niches below the turtle petroglyph. Only a couple of sherds were removed from these niches (Chacalhaaz), so there is no clear evidence of its time depth or whether the niches were man-made.

Summary

Operation 8 was an attempt to better understand the turtle petroglyph located on the southeast side of the center. This attempt places the turtle inside the Chacalhaaz period, but without a very good context. The test pit did show that the arroyo has a potentially deep deposit of materials imbedded in a generally unstable sand matrix.

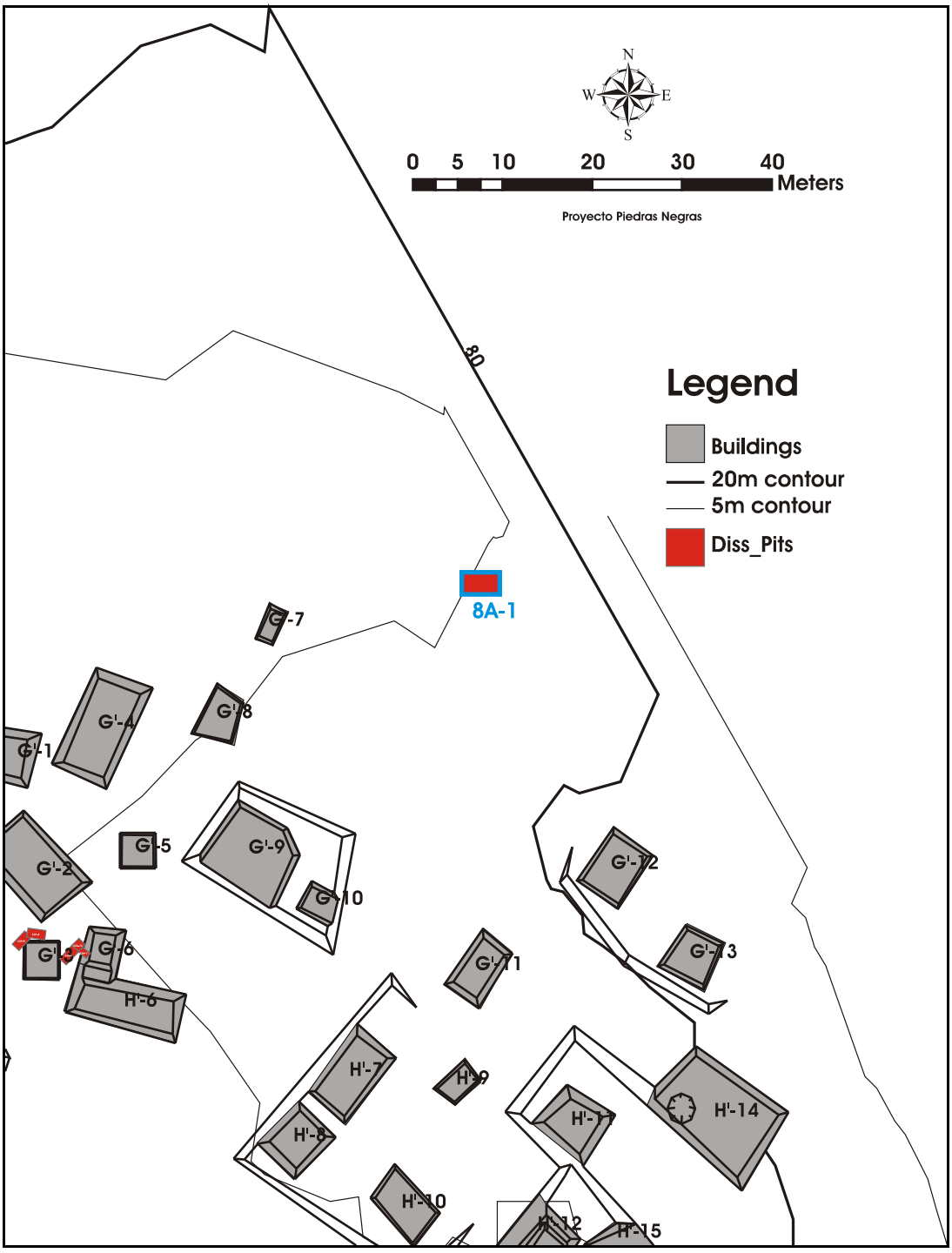


Figure F.16 Operation 8

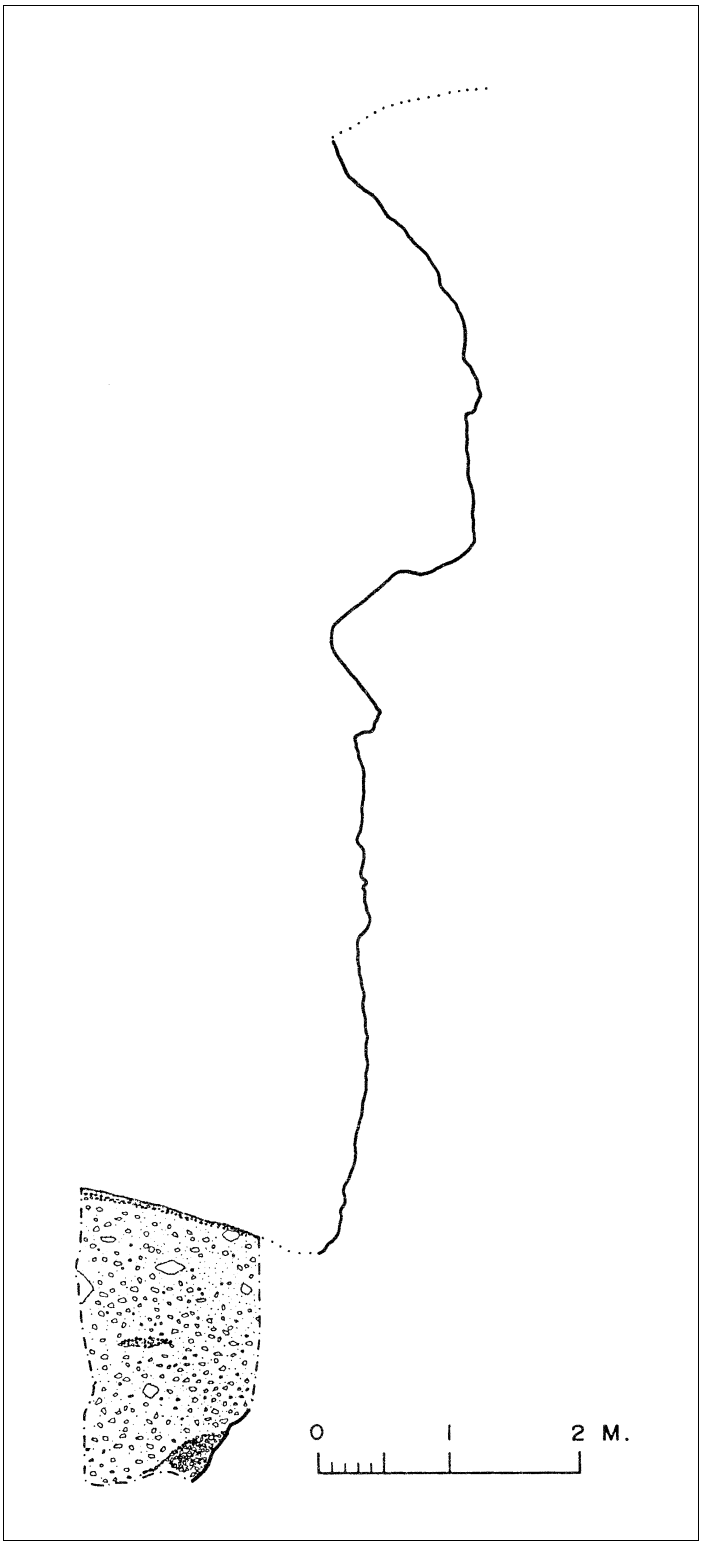


Figure F.17 PN 8A-1, Profile under turtle petroglyph
(From Golden 1997a:73)

OPERATION 10

This operation concentrated on the O sector of the center, in an area just south of the Acropolis, or royal palace (Figure F.18). Part of the objectives of this operation was to define the chronology of the mound groups in this area, and to better understand their relationship with the royal palace. This operation included a total of fourteen test pits under the direction of Mónica Urquizú (1997b).

SUBOPERATIONS

PN 10A

This is a 2x1 meter test pit located in front of O-16 and at the foot of O-17. The initial stratum consisted of organic material with large limestone blocks. The next layer had lighter brown soil with more limestone ending with bedrock.

PN 10A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/2	Chacalhaaz	
1	2	20-65	10 YR 5/2	Chacalhaaz	

PN 10B

This is a 2x1 meter test pit located in the center of O-23 (platform). The first stratigraphic layer was an organic material mixed with sand, giving it a lighter color than usual. The second layer was similar in color but with the addition of larger limestone rocks resting on bedrock.

PN 10B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/3	Chacalhaaz	
1	2	20-50	10 YR 3/3	Chacalhaaz	

PN 10C

This single unit is a 2x1 meter test pit placed between O-19 and O-20. The first layer was composed of organic material mixed with sand, quite soft in texture. This was followed by another layer similar to the first. Finally, bedrock was reached at 40 cm below ground surface. The second layer represents platform fill by using a garbage dump (midden or basurero) to even out the topographic undulations in the area, which identification is based on the large amount of material that was recovered.

PN 10C-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-20	10 YR 3/3	Late Chacalhaaz	
3	2	20-40	10 YR 3/3	Chacalhaaz	

PN 10D

This is a 2x1 meter test pit located in the plaza composed by O-24, O-25, and O-30. The first layer was composed of black earth mixed with light brown sand of a soft texture. The second layer was similar to that of the first.

PN 10D-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-20	10 YR 3/3	Kumché	
4	2	20-40	10 YR 3/3	Late Chacalhaaz	

PN 10E

This unit was a 2x1 meter test pit located in the plaza created by N-11, O-25, O-26, and O-27. This unit was later expanded at accommodate Burial 14. The first layer was composed of black earth mixed with fine light brown sand, as was the second layer. The third layer was similar but with the addition of an alinement of three metates running east-west at 66 cm below ground surface. In layer four some human bones were discovered under the metates, so the pit was extended to approximately 2x2.5 meters to better uncover the burial, which comprises unit 5 (Figure A.18).

Burial 14 is believed to be an adult female. (Figure A.21) She was located at 95 cm (to 104 cm) below ground surface with an orientation east-west with the head towards the east. The skeleton had very good preservation and was in an extended position, face up. The legs were crossed at the ankles. The body was placed in a hole excavated into bedrock. The cist measured 2.7 meters long in the east-west direction and 1.4 meters north-south.

PN 10E-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/3	Chacalhaaz	
1	2	20-40	10 YR 3/3	Chacalhaaz	
1	3	40-60	10 YR 3/3	Chacalhaaz	
1	4	60-80	10 YR 3/3	Chacalhaaz	
1	5	80-100	10 YR 5/2	Balché	Burial 14

PN 10F

This suboperation has two units, 10F-1 and 10 F-2. 10F-1 is located behind O-24 and N-10. Its first layer is composed organic material mixed with a dark gray clay. The second layer continues with the natural stratigraphy of the first and also has a fine layer of grayish ash. The third layer is similar to the anterior layers but with more limestone fragments and part of the midden found in 10F-2. Layer 4 continues with the same stratum as does layer 5. In this layer the eastern side of the pit has hit bedrock, while the western side of the pit still contains part of the midden and hits bedrock at 1.50 meters below ground surface.

PN 10F-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/1	Chacalhaaz	
1	2	20-40	10 YR 6/3	Yaxché	
1	3	40-60	10 YR /63		
1	4	60-80	10 YR 6/3	Yaxché	
1	5	80-150	10 YR 6/3	Yaxché	

PN 10F-2

This unit started as a 2x1 meter test pit, but was later extended to 3 x 2.6 meters due to the presence of a series of large rocks found in the test pit (Figure A.20). The first layer was clayish brown soil with a light concentration of organic material, which was very similar to the second lot. The third layer sported more of the same clay-soil mixture and a midden filled with artifacts to help fill in the area. The fourth layer had brown earth with limestone pieces and less of the midden. Layer five continued with more of the same, and found a rock alignment to the east. This rock alignment measures 2.9x1.3 meters, and possibly it pertains to an early small building associated with O-24.

PN 10F-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 3/1	Chacalhaaz	
2	2	20-40	10 YR 3/1	Chacalhaaz	
2	3	40-60	10 YR 3/1	Late Yaxché	
2	4	60-80	10 YR 6/3	Yaxché	
2	5	80-100	10 YR 5/2	Yaxché	Rock alignment
2	6	100-120	10 YR 5/2	Yaxché	

PN 10G

This is a 2x1 meter test pit located in the plaza composed by N-7, N-9, and N-10. The first layer consisted of organic material and dark brown clay. The second layer was a mixture of brown earth with lots of limestone rocks. Architectural features in this layer include a bench located 33 cm below ground surface which was made from cut limestone blocks arranged in a single tier. The soil matrix is the same below and above the bench. The bench could serve as a kind of containment for fill, they have been encountered in the U-1 plaza (PN 6C), behind O-24 (PN 10F), south of N-6 (PN 10L), and now here.

PN 10G-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/1	Chacalhaaz	
1	2	20-130	10 YR 2/2	Balché	Bench

PN 10H

This suboperation had two test pits located in the N group. The first test pit (PN 10H-1) was a 2x1 meter test pit located in the center of the plaza defined by N-5, N-6, N-7, N-8, and O-21. The first stratigraphic layer was a mixture of organic material and dark brown clay. The second layer is probably plaza fill composed of brown earth with many large limestone rocks. The third layer is similar to the previous layer but with even more large rocks. The last layer is a mix of decomposed limestone bedrock and clay (Figure A.19).

PN 10H-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/1	Kumché	
1	2	20-90	10 YR 2/2		
1	3	90-120	10 YR 2/2	Balché	
1	4	120-130	10 YR 3/1	Sterile	

PN 10H-2 is a 2x1 meter test pit located in the plaza defined by N-5, N-6, N-7, N-8, and O-21; and lies at the southeast corner of structure N-5. The first stratigraphic layer was a mixture of organic material and dark brown clay. This location was selected due to the presence of a high concentration of phosphates in a chemical signature map created by Dr. Perry Hardin (Brigham Young University). The initial stratigraphic layer contained organic material and brown soil. The second layer is composed of light brown soil with limestone fragments. A bench feature was discovered at 30 cm below ground surface with a single tier of stone oriented north-south.

PN 10H-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 3/2	Chacalhaaz	
2	2	20-130	10 YR 3/2	Chacalhaaz	Bench

PN 10I

This is a 2x1 meter test pit located between O-21 and O-22. The initial stratigraphic layer was a smooth, sandy light brown soil with some organic material. This same mixture continued in the second stratum with a higher quantity of limestone rocks. The third level included decomposed limestone just above bedrock.

PN 10I-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 3/3	Chacalhaaz	
2	2	20-40	10 YR 3/3	Yaxché	
2	3	40-94	10 YR 7/4	Sterile	

PN 10J

This is a 2x1 meter test pit located behind structure O-22. The first stratum had a mixture of black earth and some light brown earth. Underneath this level, at 22 cm below ground surface, there was another bench running north-south as has been found elsewhere in this sector. The soil matrix was brown earth with limestone fragments over bedrock.

PN 10J-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/2	Chacalhaaz	
1	2	20-60	10 YR 5/2	Yaxché	Bench

PN 10K

This is a 2x1 meter test pit located in the center of the plaza defined by N-2, N-3, and N-4. The first layer had organic material. The second layer had a light brown soil with fine limestone pebbles. The third layer had grayish clay mixed with burned clay and carbon flecks.

PN 10K-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 4/2	Kumché	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	2	20-60	10 YR 5/2	Yaxché	
1	3	60-90	10 YR 5/8	Balché	

PN 10L

This is a 2x1 meter test pit located along the south side of N-6. This location was chosen based upon a high concentration of phosphates in a chemical prospecting activity under the direction of Dr. Perry Hardin (Brigham Young University). The initial stratum had organic material, limestone fragments and brown earth. This area appears to be a midden, and the trash helped raise the level of the platform. In order to uncover more of the midden, an amplification of another meter was made. In the next layer at 22 cm below ground surface, another bench was uncovered which probably served as an earlier foundation to N-6, running east-west and composed of a single tier of stones. The third layer is a hard, compacted stratum of dark brown clay mixed with small limestone fragments over it. A floor was discovered at 1.16 meters below ground surface over a minor layer of dark brown clay, just above bedrock.

PN 10L-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/2	Chacalhaaz	
1	2	20-50	10 YR 2/2	Yaxché	Bench
1	3	50-130	10 YR 2/2	Balché	Floor

Summary

This operation uncovered an abundance of cultural remains situated in several middens around buildings. This cultural trash was used to raise the height of the platform and to cover old features, such as the ubiquitous benches or rock alignments, found throughout the N and O sectors. These architectural features probably relate to earlier construction phases or might be containment features for the trash. They are generally a single tier of stone that extends past the limits of the test pit. Most of the occupation of this sector appears late in the history of the center and probably relates to the remodeling of the Acropolis.

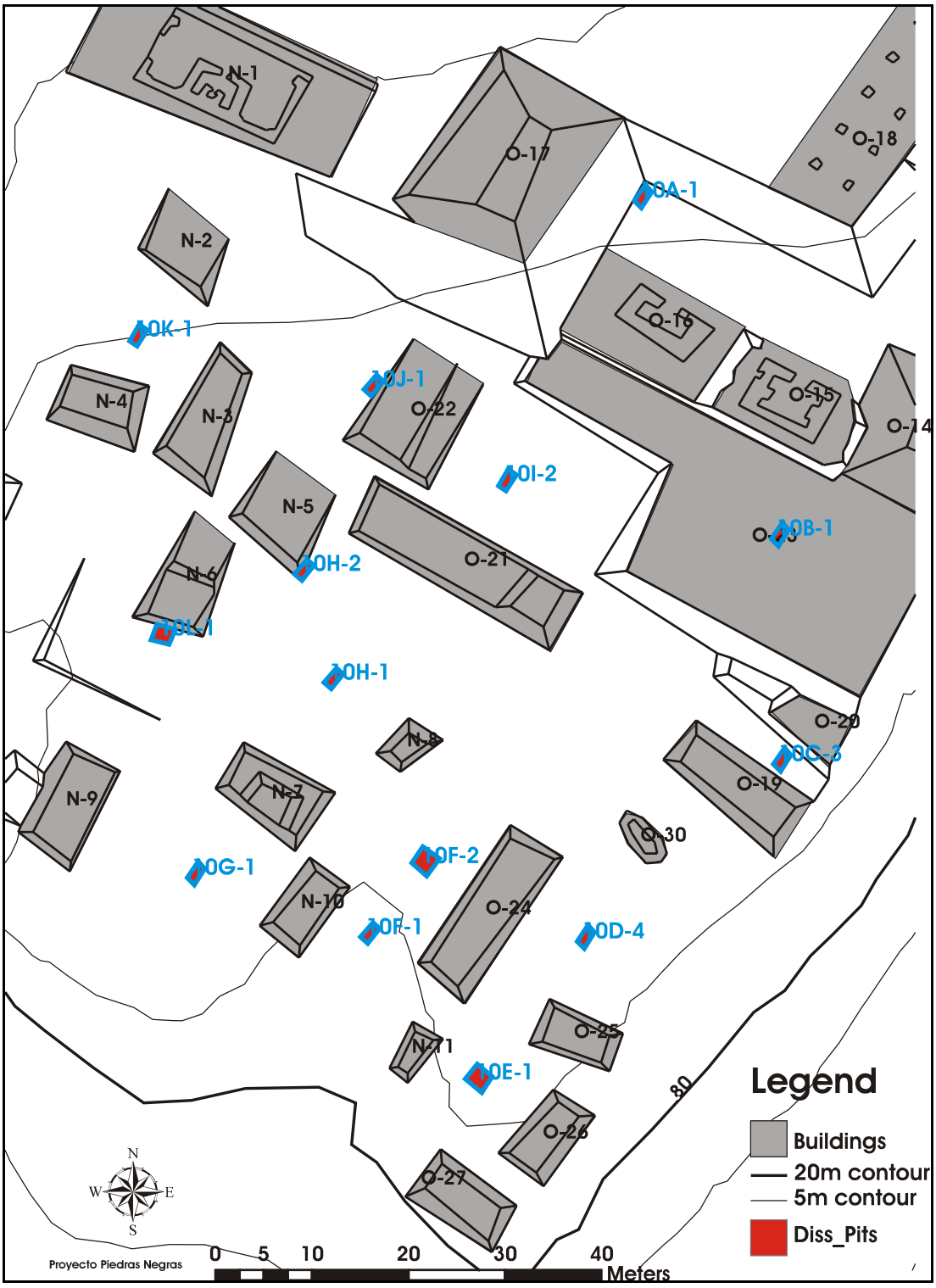


Figure F.18 Operation 10

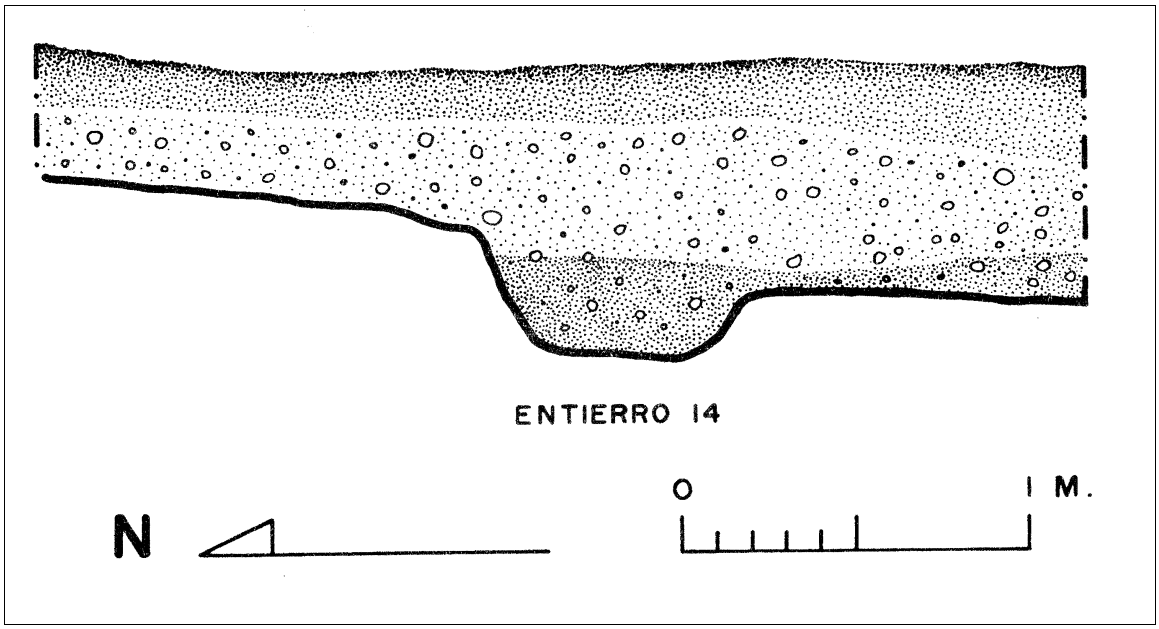


Figure F.19 PN 10E-1, East Profile (From Urquizú 1997b:85)

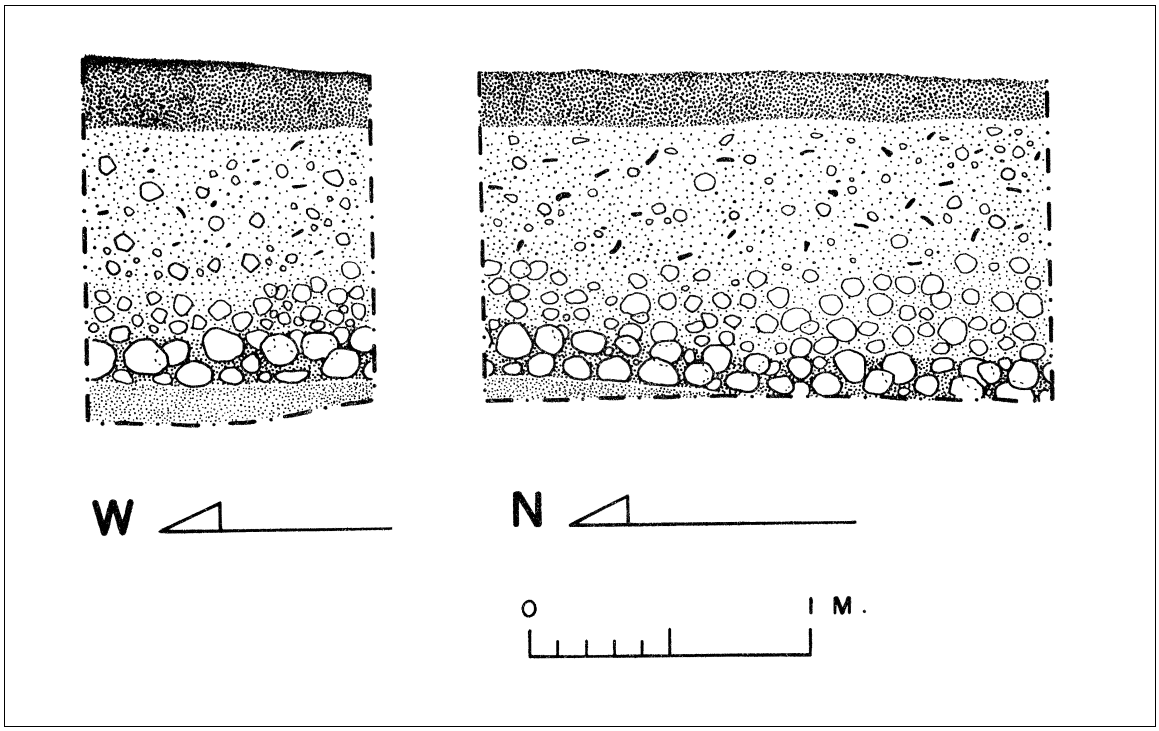


Figure F.20 PN 10H-1, North and East Profiles (From Urquizú 1997b:89)

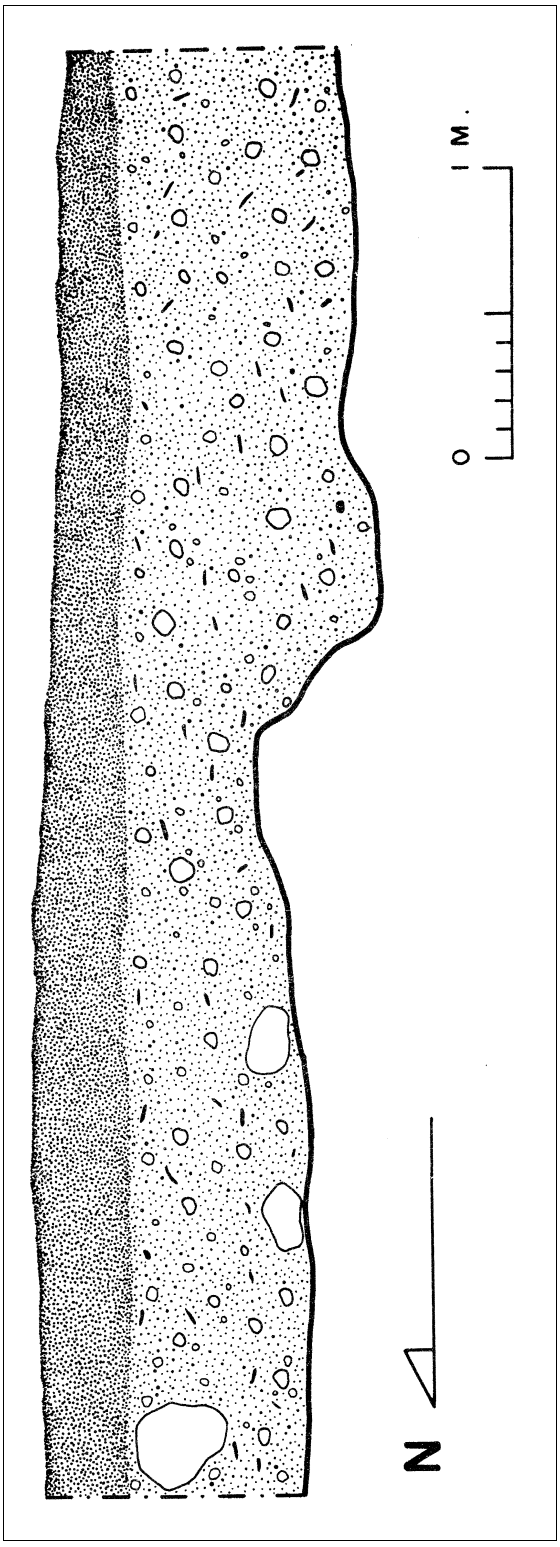


Figure F.21 PN 10F-2, East Profile (From Urquizú 1997b:87)

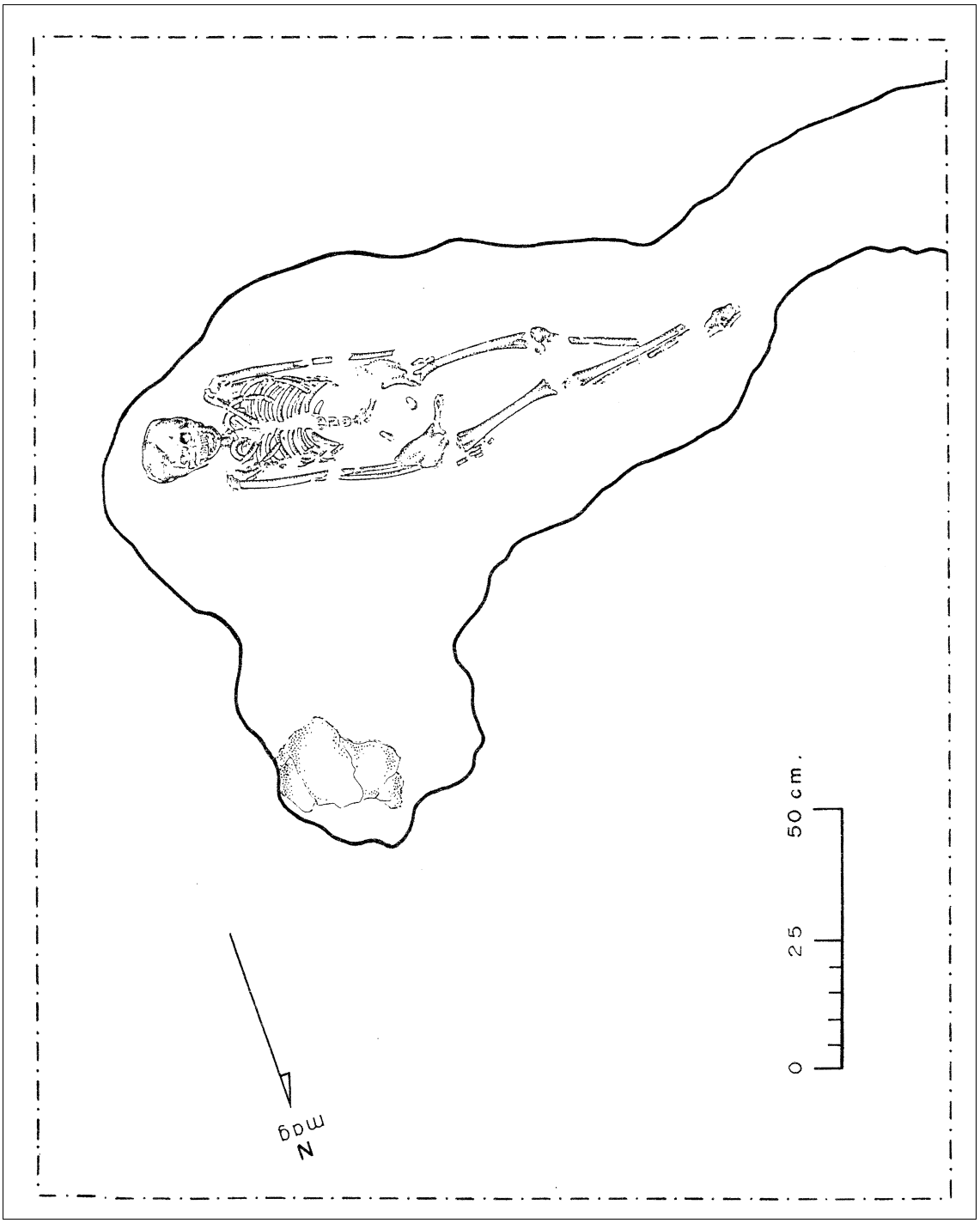


Figure F.22 Burial 14 (From Urquizú 1997b:86)

OPERATION 14

This operation is focused on the northwest plaza area of the center. This area lies in a seasonally swampy area located just north of the Acropolis (Figure F.23). Excavations under the direction of Nancy Monterroso in this area took place during the 1997 field season (1997b). She placed ten test pits in and around the few structures of this area to better understand its chronological sequence. Most of these test pits were placed so that their combined profiles would create a cross-section of the plaza, useful in an area without previous excavations.

SUBOPERATIONS

PN 14A-1

This 2x1 meter test pit was placed at the foot of J-29 along its main north-south axis. The first layer was humus. The second layer was fill mixed with medium sized rocks on the north, towards the lower elevations. In the south side of the unit, there was bedrock at a higher level.

PN 14A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20			
1	2	20-60	10 YR 4/2	Yaxché	

PN 14A-2

This 2x1 meter test pit is located 23 meters north of PN 14A-1, and forms the midpoint of the cross-shape test pit program. The first unit was of brown clay, as was the second. The third unit was a darker clay matrix. The fourth unit was a compact, sterile light brown clay. The fifth unit was darker again, and the sixth unit was lighter in color. Bedrock was not reached (Figure A.23).

PN 14A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 4/3	Chacalhaaz	
2	2	20-110	10 YR 4/3	Chacalhaaz	
2	3	110-130	10 YR 3/3	Sterile	
2	4	130-150	10 YR 3/3	Sterile	
2	5	150-160	10 YR 3/2	Sterile	
2	6	160-200	10 YR 4/3	Sterile	

PN 14A-3

This 2x1 meter unit was placed 46 meters north of J-29 along the same axis as PN 14A-1 and PN 14A-2. The first unit was humus, followed by brown clay. The third unit was brown earth mixed with some limestone rocks. The presence of the rocks suggests that there was an architectural feature here. The next couple of layers consisted of brown clay. Bedrock was not reached.

PN 14A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-4		Sterile	
3	2	4-42	10 YR 5/3	Chacalhaaz	
3	3	42-130		Sterile	
3	4	130-160	10 YR 3/2	Sterile	
3	5	160-200	10 YR 3/3	Sterile	

PN 14A-4

This unit is a 2x1 meter test pit placed 79 meters north of J-29 along the same axis as PN 14A-1 through 3. The first layer was humus, followed by a brown clay layer then another brown clay layer with some small limestone rocks mixed in.

PN 14A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-8			
4	2	8-34	10 YR 4/3	Balché/Chacalhaaz	
4	3	34-122	10 YR 4/3	Nabá/Balché/Yaxché	

PN 14A-5

This 2x1 meter unit was placed on the northwest corner of F-1. The first stratum was of brown clay. In the next layer this same material was mixed with small limestone fragments. The third stratum had a darker clay mixture, but with more small rocks. The fourth layer was composed of natural brown clay as was the fifth layer. Bedrock was not reached.

PN 14A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-20	10 YR 3/2	Chacalhaaz	
5	2	20-70	10 YR 4/2	Yaxché	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	3	70-90	10 YR 4/3	Yaxché	
5	4	90-120	10 YR 3/2	Sterile	
5	5	120-150	10 YR 1/3	Sterile	

PN 14A-6

This 2x1 meter test pit was placed in the plaza in front of J-28. The first layer was brown earth. The second layer was dark brown clay, followed by a layer of limestone mixed with brown clay. This test pit was not excavated to bedrock.

PN 14A-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-36		Kumché	
6	2	36-80	10 YR 4/3	Kumché	
6	3	80-140	10 YR 4/3	Sterile	

PN 14A-7

This 2x1 meter test pit was placed approximately 176 meters west of PN 14A-2, or fairly close to E-1. This unit was to define the west section of a cross-section of the northwest plaza with the next “arms” of the section moving closer to PN 14A-2. The first layer was a thin layer of humus, followed by brown clay which extends to an unknown depth.

PN 14A-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-8			
7	2	8-60	10 YR 4/3	Yaxché	
7	3	60-95	10 YR 4/3	Sterile	
7	4	95-130	10 YR 4/3	Sterile	

PN 14A-8

This 2x1 meter test pit lies 75 meters east of PN 14A-7 and approximately 40 meters north of J-28. The first layer was humus, which was followed by brown earth. Next was a layer of brown clay and limestone inclusions. The next layers were mainly natural clay. Bedrock was not reached.

PN 14A-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-6			
8	2	6-56	10 YR 4/3	Yaxché	
8	3	56-96	10 YR 4/3	Balché	
8	4	96-136	10 YR 4/3	Balché	
8	5	136-150	10 YR 4/3	Nabá	
8	6	150-160	10 YR 4/3	Sterile	

PN 14A-9

This 2x1 meter test pit is located 75 meters east of PN 14A-8 along an east-west line. The first lot consisted of a thin layer of humus. This was followed by a layer of brown earth, then a layer of brown clay and small limestone rocks. Afterwards, there were two strata of natural clay. Bedrock was not reached.

PN 14A-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-6		Chacalhaaz	
9	2	6-36	10 YR 4/3	Chacalhaaz	
9	3	36-66	10 YR 4/3	Chacalhaaz	
9	4	66-80	10 YR 4/3	Sterile	
9	5	80-100	10 YR 4/3	Sterile	

PN 14A-10

This 2x1 meter test pit was the furthest east along the east-west line. The first layer was humus, the second was brown clay. The third unit had a mixture of brown clay with limestone fragments. The fourth stratum had a brown soil component mixed with the clay. The last level was natural clay material. Bedrock was not reached.

PN 14A-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-6		Kumché	
10	2	6-30	10 YR 4/3	Kumché	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	3	30-80	10 YR 4/3	Balché	
10	4	80-100	10 YR 4/3	Yaxché	
10	5	100-80	10 YR 4/3	Sterile	

Summary

This operation showed a different sequence than other places within the center. Bedrock was not easily found, and there were relatively few limestone rocks found. Much of the material is clay, perhaps deposited by the river overflowing its banks and other sedimentary forces.

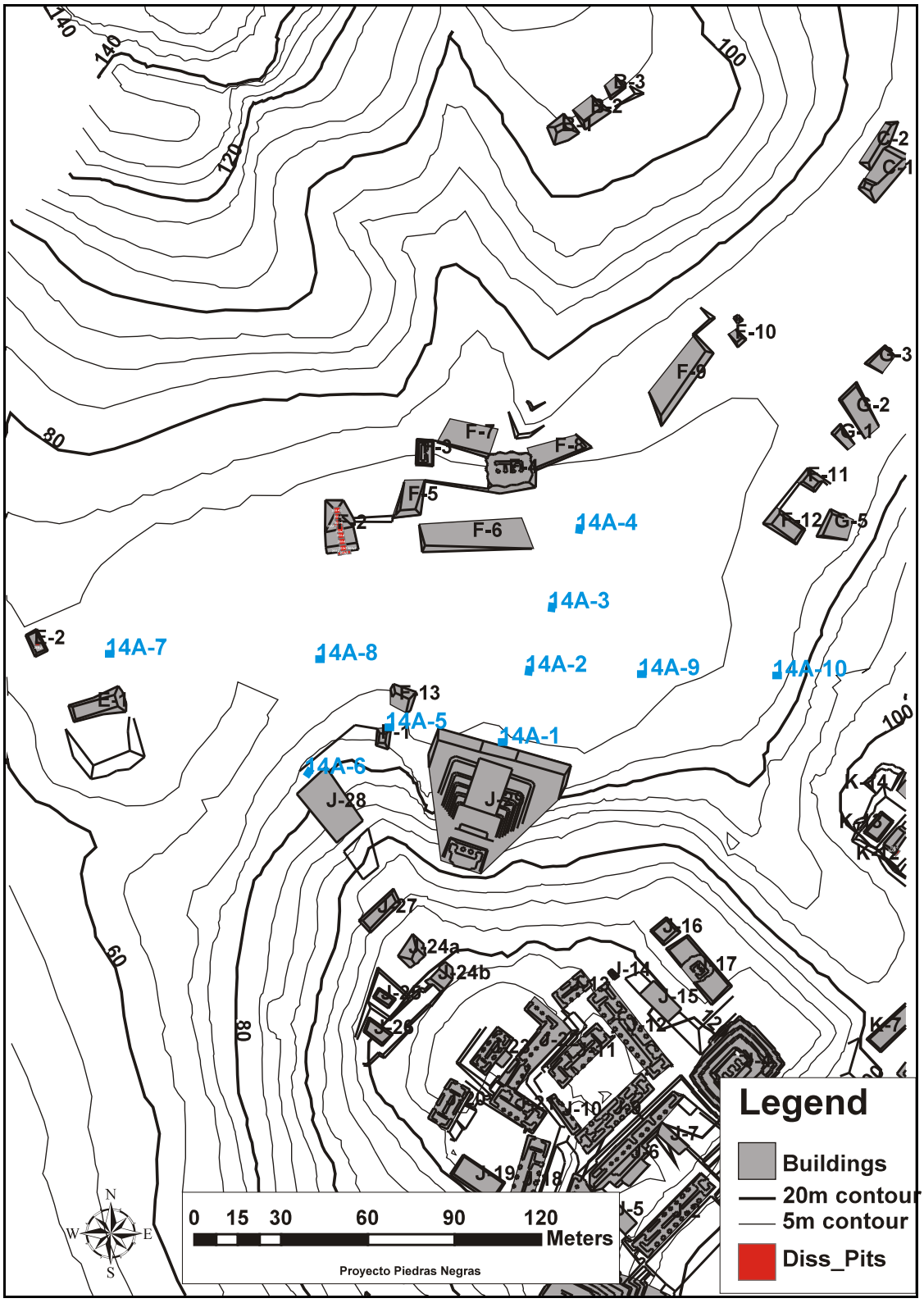


Figure F.23 Operation 14

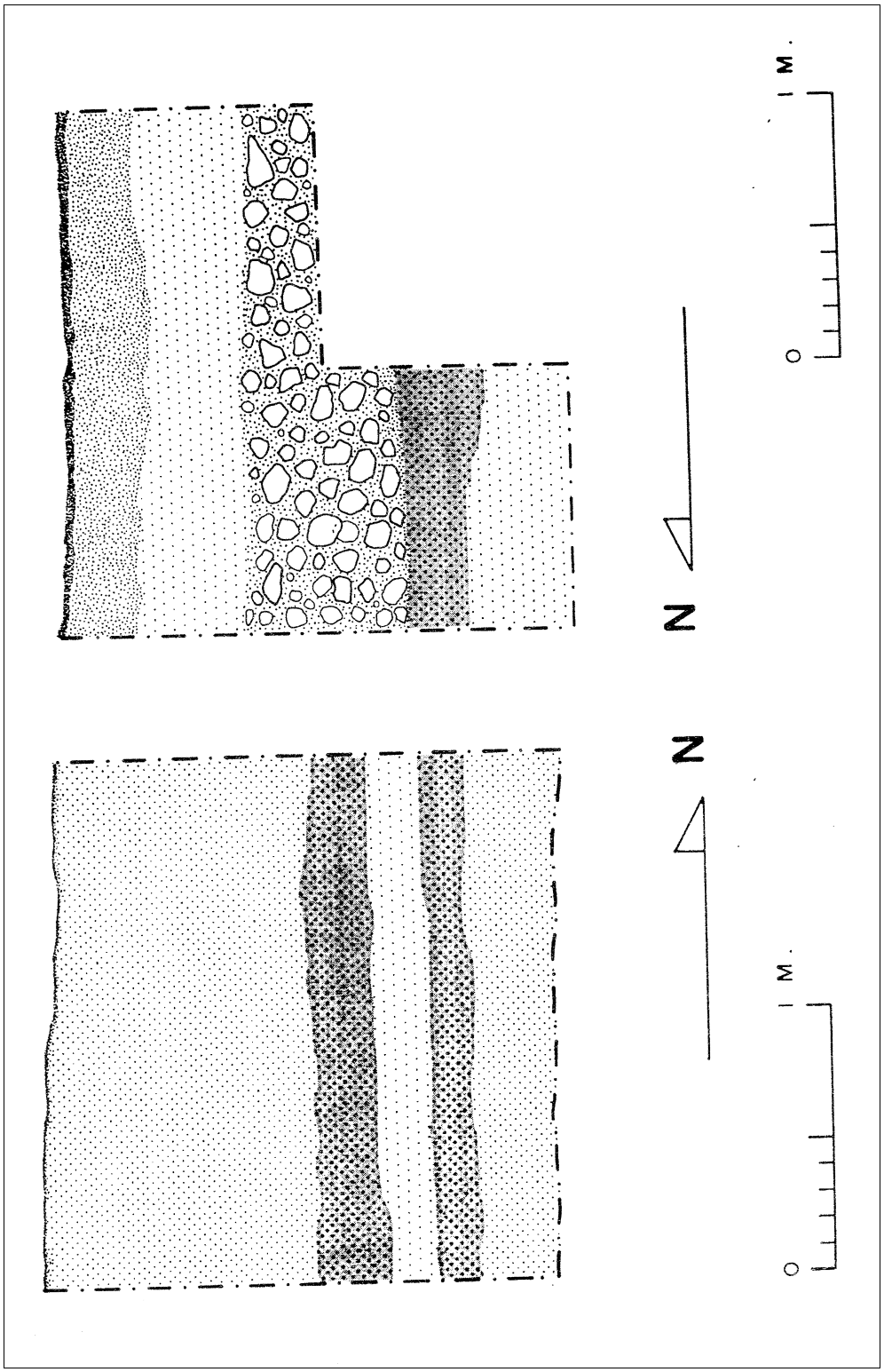


Figure F.24 PN 14A-2 (Left) West Profile, and PN 14A-3 East Profile (From Monterroso 1997b:120)

OPERATION 17

This operation was part of the larger test pitting program of the center. Two test pits were placed in the C sector under the direction of Charles Golden (Golden 1997b). The test pits were not intrusive into buildings, but mainly beside and between them so as to maximize the potential for encountering abundant cultural remains (Figure F.25).

SUBOPERATIONS

PN 17A

This suboperation consisted of a single 2x1 test pit placed on the southeast corner of C-25. The first lot consisted of humus. The second stratum was a thin layer of soil composed of earth and decomposed limestone. In fact, the bedrock is very decomposed, and practically has the consistency of sand.

PN 17A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-33	2.5 YR 3/2	Kumché	
1	2	33-40	10 TR 4/3	Chacalhaaz	

PN 17B

This suboperation consisted of a single 2x1 meter test pit placed between C-32 and C-33. As a consequence of this test pit, Golden decided that these buildings were both lying on the same platform rather than two unconnected buildings. The first level consisted of humus with a strange alignment of worked stones consisting of a corner that went off toward the southwest of the unit. The second stratum was composed of a lighter brown soil with high concentrations of small limestone rocks. The third level was more clayish than the preceding layers. The fourth layer was a 1.10 x 1 meter section of the test pit and consisted of a red-yellow soil that was sterile. Bedrock was not reached (Figure A.25).

PN 17B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-60	2.5 YR 3/2	Balché/Yaxché/Kumché	
1	2	60-95	7.5 YR 5/3	Nabá/Balché	
1	3	95-135	5 YR 2.5/2	Nabá	
1	4	135-245	7.5 YR 5/4	Sterile	

Summary

This operation was quite successful in its objective of dating this section of the center. The ceramics recovered from these two test pits reveal a sequence from Nabá to Kumché or Early Classic to Late Classic for these structures. The depositional context revealed by the test pits indicate the deep nature of the soil in this area, reminiscent of other bajo areas of Piedras Negras where the bedrock is buried by seasonal flooding and the buildup of deep clay deposits.

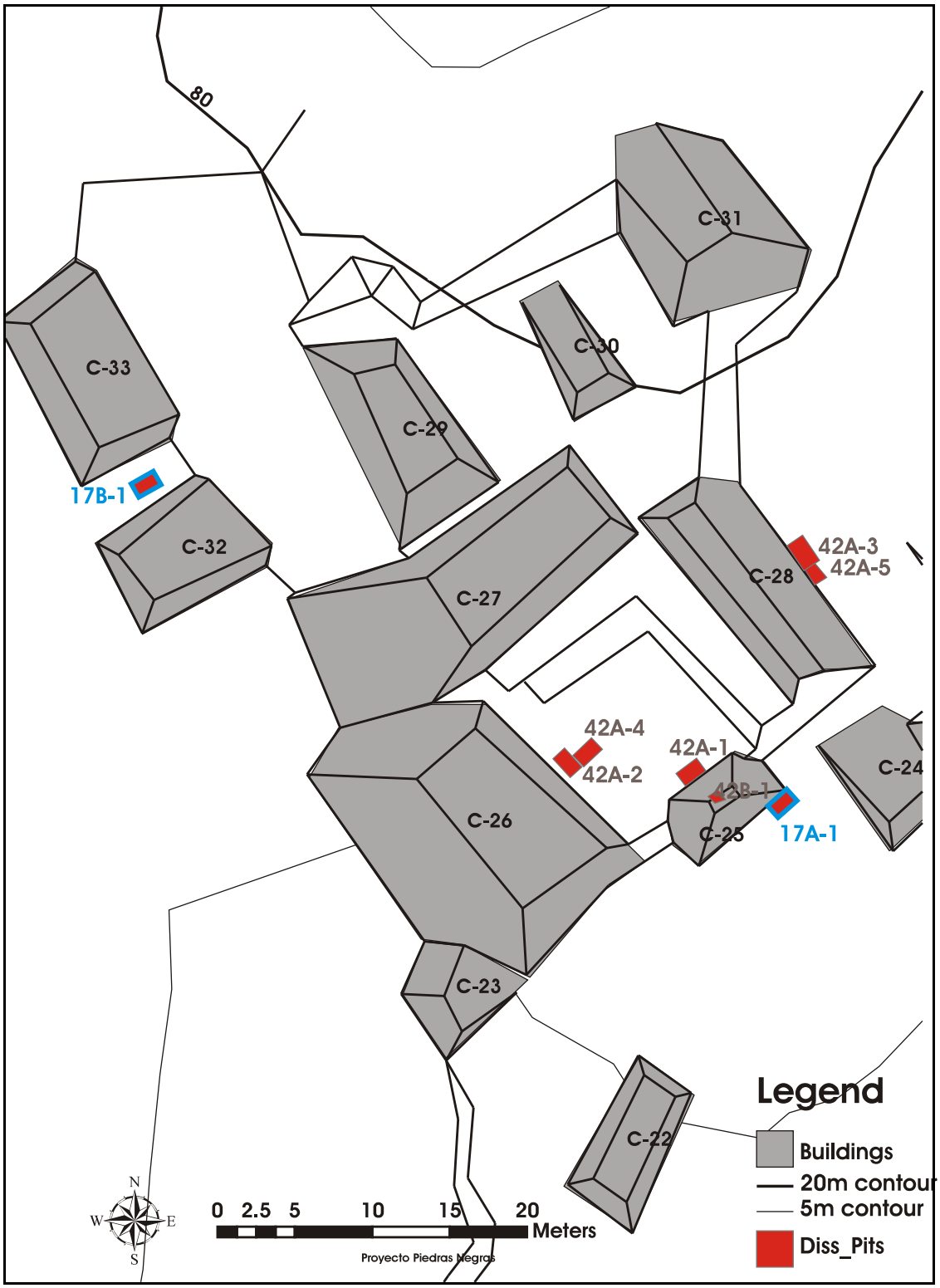


Figure F.25 Operation 17

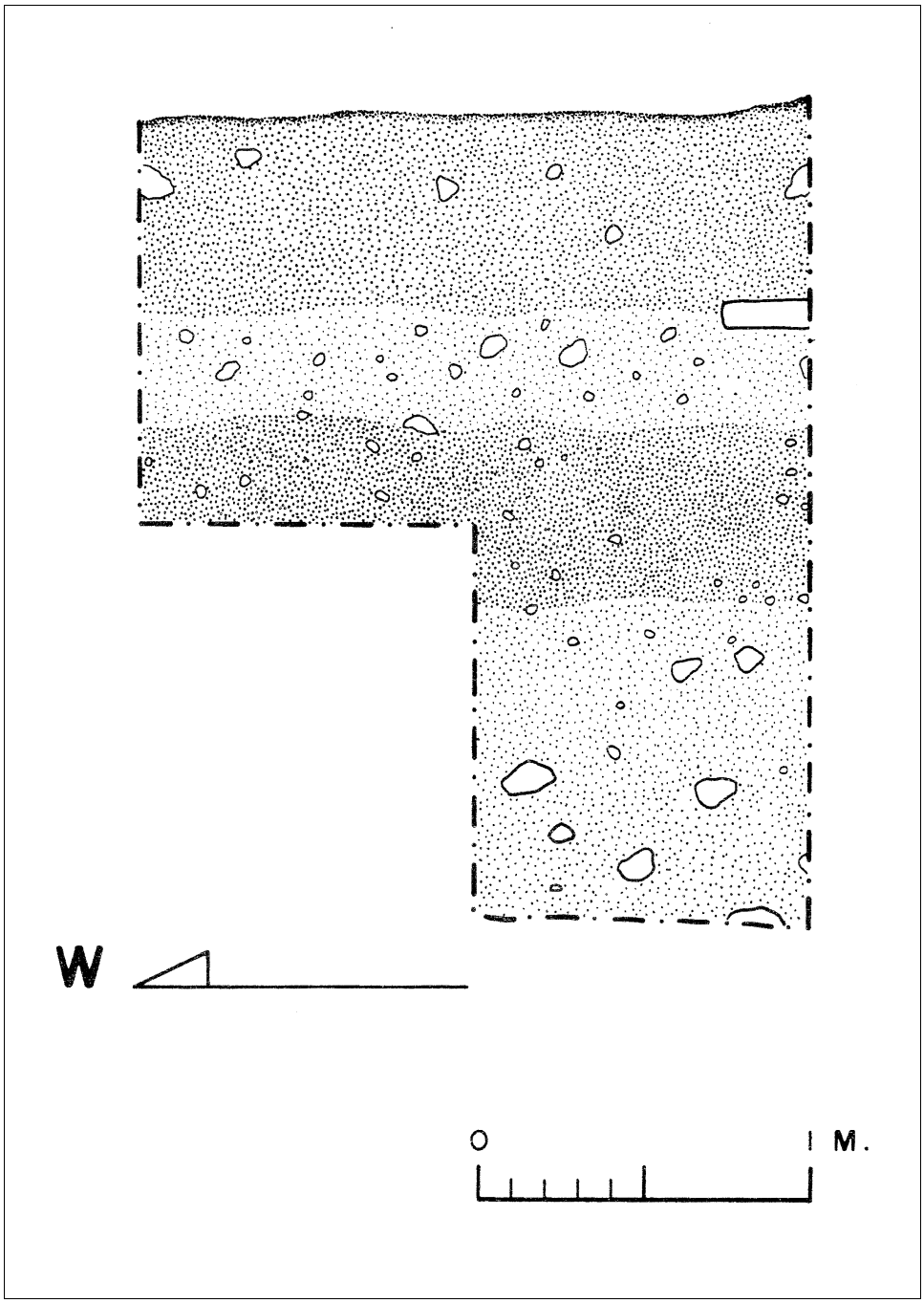


Figure F.26 PN 17B-1, North Profile (From Golden 1997b:139)

OPERATION 19

This operation is defined by sector K (Figure F.27). It consists of a series of test pits located in and around the small residential groups located by K-5. This operation continues the general test pitting program of the center, and these units were excavated under the direction of Charles Golden during the 1997 field season (Golden 1997c).

SUBOPERATIONS

PN 19A

This suboperation is a single 2x1 meter test pit located in the corner between structures K-16 and K-17 (Figure A.27). The first lot was humus. The next stratum was a hard gray-brown layer under which was bedrock. Bedrock was higher in the northeast corner of the unit (25 cm) than in the south west corner (70 cm). This unit discovered a possible midden based upon the large concentrations of cultural material discovered.

Burial 15 (PN 19A-1-3)

A cist was discovered in the center of the unit which housed the remains of a young child (< 2 years old) whose bones were in a poor state of preservation (Figure A.28). Their removal from the hard gray-brown soil matrix was aided by removing the soil and skeleton together and soaking the matrix to soften up the soil. The child had cranial deformation and was located in a rock lined cist in the middle of the unit, just above bedrock. The cist was made from cut and irregular stones that formed a rectangular shape and was covered by two lajas (long, thin pieces of limestone). The skeleton was extended, articulated, and lying with the head towards the south. No offerings were included within the cist, but Golden thought that the soil comprising layer two may have been purposely placed to cover the cist prior to the area being used as a midden.

PN 19A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-35	7.5 YR 2.5/2	Chacalhaaz	
1	2	35-70	10 YR 2/2	Chacalhaaz	Midden
1	3		10 YR 5/3		Burial 15

PN 19B

This 2x1 meter test pit was located along the western side of K-20. The only stratum was a humus layer over bedrock. Bedrock was uncovered at 48 cm in the north side of the unit and at 39 cm below ground surface in the south.

PN 19B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-48	10 YR 4/3	Chacalhaaz	

PN 19C

This was a 2x1 meter test pit located on the east side of structure K-23. The first lot was humus, with a small stone alignment discovered in the profile at 70 cm below surface. This feature could be from an early version of K-23. The second stratum was brown soil mixed with decomposed bedrock. Bedrock was discovered at 1.10 meters below ground surface.

PN 19C-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-80	7.5 YR 2.5/2	Nabá/Balché/Chacalhaaz	Rock Alignment
1	2	80-110	10 YR 5/3	Sterile	

PN 19D

This is a 2x1 meter test pit placed along the east side of K-8. This shallow test pit had a single stratum of humus over the bedrock.

PN 19D-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-44	7.5 YR 2.5/2	Chacalhaaz	

PN 19E

This is a 2x1 meter test pit placed between structures K-29 and K-30. A single layer of humus was noted in this excavation along with jumbled cut stones (due to root action).

PN 19E-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-67	5 YR 5/2	Chacalhaaz	

Summary

This operation revealed the short history of this section of the center. Most of the buildings have a short time depth, being located just above bedrock. The shallow deposits date quite late in the center's history with just K-23 possessing a deeper ceramic sequence.

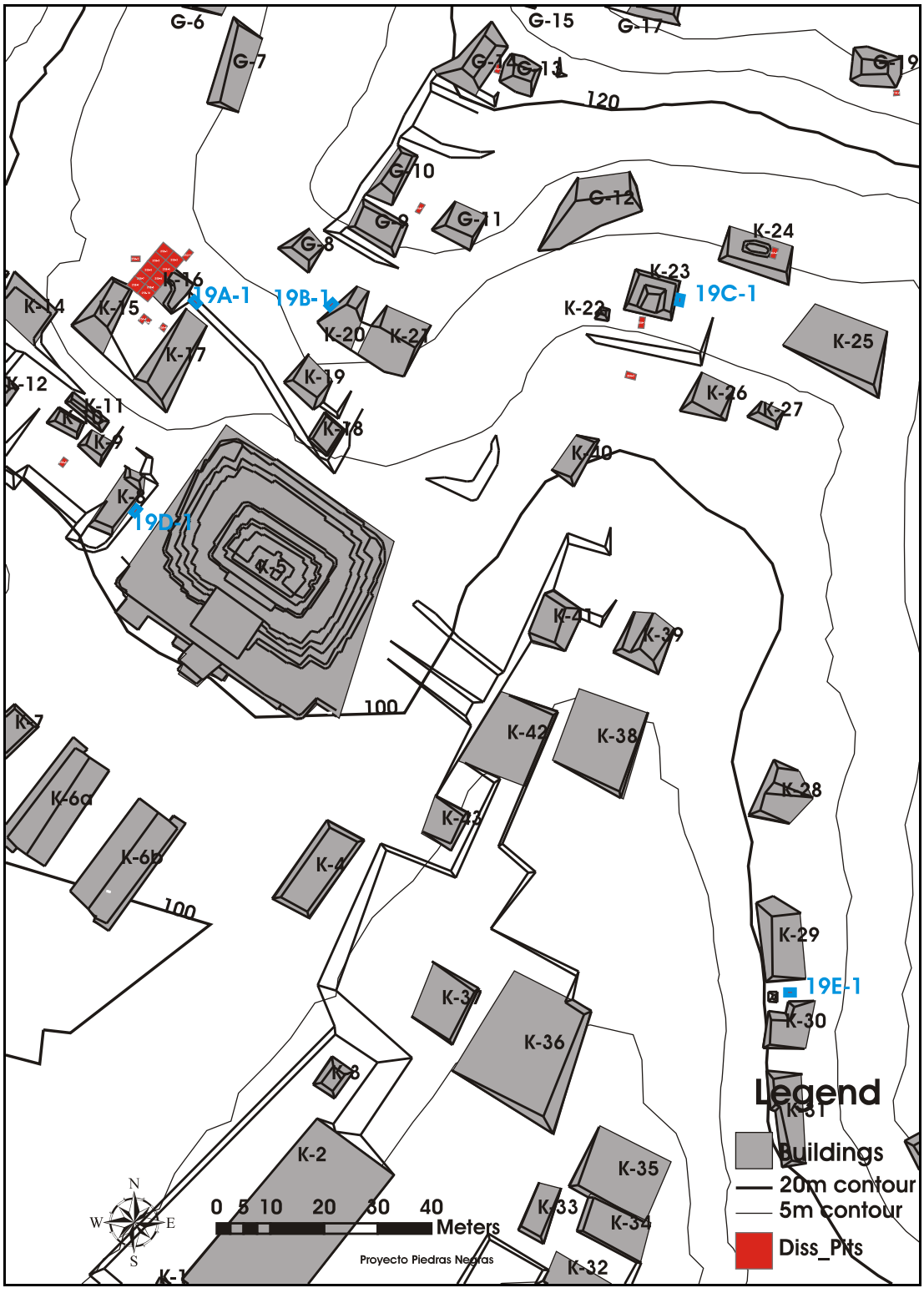


Figure F.27 Operation 19

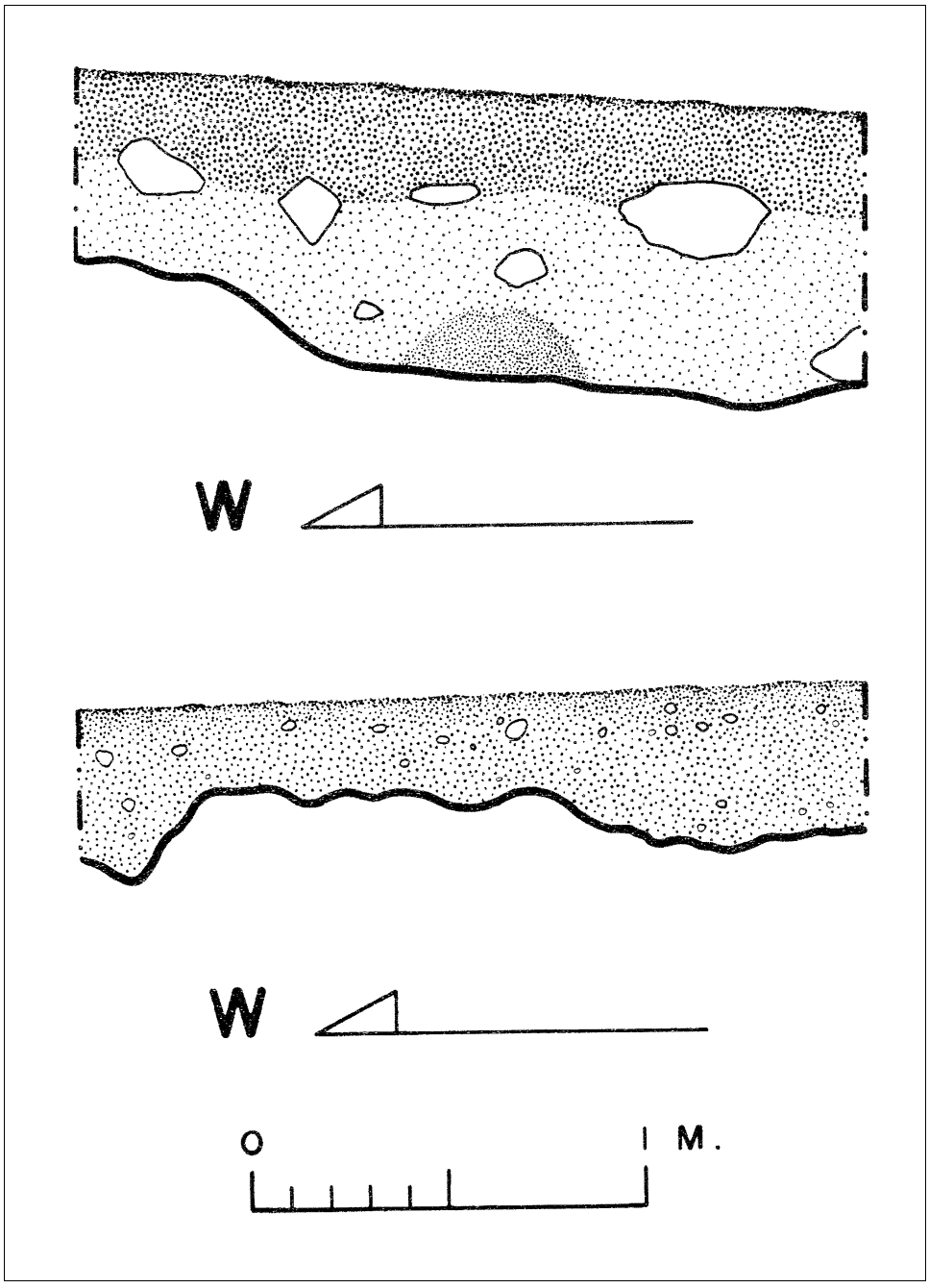


Figure F.28 PN 19A-1 (Top) and D-1, North Profiles (From Golden 1997c:156)

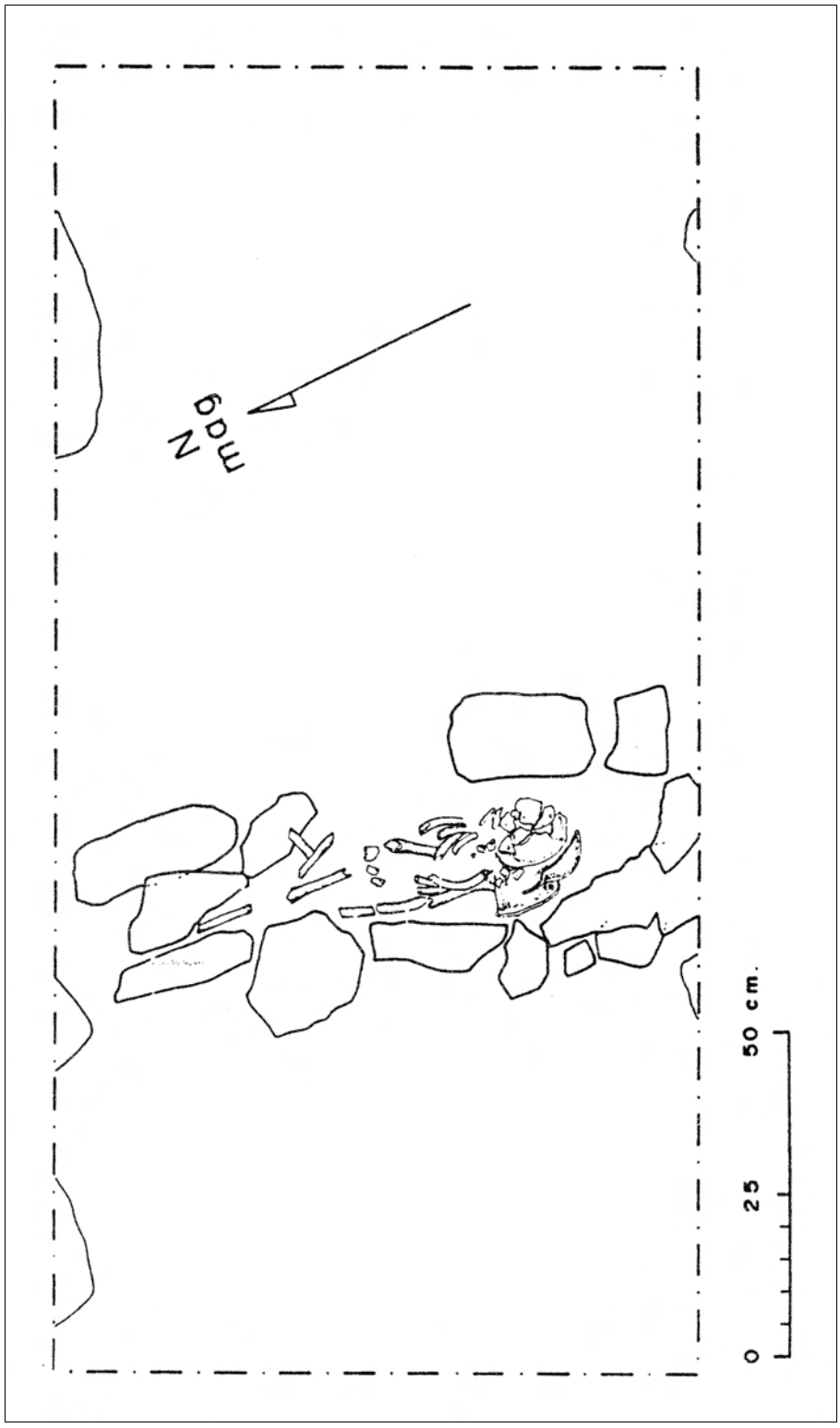


Figure F.29 Burial 15 (From Golden 1997c:157)

OPERATION 20

This operation, under the direction of Mónica Urquizú, continued with the general test pitting of the center with operations in the residential belt of Sectors Q, R, and T (1997d). She placed six test pits in this area (20D-20I) with the expectation of returning and placing another three test pits later (20A-20C) which hope was never realized. These test pits revealed the generally burial-heavy nature of residential groups and yielded important information about the age of this settlement cluster (Figure F.30).

SUBOPERATIONS

PN 20D

This 2x1 meter test pit was located in the center of the plaza formed by structures R-18, R-30, R-31, and the massive platform R-32 (Figure A.30). The unit was amplified to accommodate the removal of Burials 17 and 18. The first stratum consisted of organic material and the second was a light brown soil with limestone pieces. The second layer was anciently the plaza surface (and its associated fill) built on top of bedrock. While excavating the unit, they found human bones in the east profile so a two meter extension was made in that direction which uncovered some of the bones of burial 17.

Burial 17 (PN 20D-1-2) is a primary, articulated skeleton of an adult in an extended, dorsal position orientated east-west with the head towards the east (Figure A.31). This skeleton was missing most of the torso and head, perhaps due to rodent action or just no burial preparation when the body was placed into the fill.

Burial 18 (PN 20D-1-2) was located 50 cm west of Burial 17 placed into a cist cut into the bedrock (Figure A.31). This primary articulated skeleton belonged to an adult who was placed in an extended position in a north-south orientation with the face up and towards the north. This skeleton had more bones present than the previous ones (but not the cranium and other extremities) and the bones were well preserved. The cist around this burial was rectangular and measured 1.06 x 0.46 meters with a depth of 0.60 m cut into the bedrock. No offerings were associated with this burial.

PN 20D-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 4/2	Kumché	
1	2	20-40	10 YR 5/2	Yaxché/Chacalhaaz	Burial 17 & 18

PN 20E

This 2x1 meter test pit was placed behind (south) R-18 between two small mounds that did not appear on the map, but have since been numbered R-35 and R-36. This unit uncovered the door foundations of a small room toward the west, probably part of R-35 which required a small extension to be made. The first lot was humus. The second layer was a light brown soil

with small pieces of limestone mixed together. This layer was located above bedrock. It was within the second layer that two walls appeared on the west side of the test pit, being 50 cm tall, and located over bedrock. The walls marked an entrance to another as yet unexcavated area and ran parallel to each other in an east-west line at a distance of 80 cm apart. Due to time constraints, no further action took place.

PN 20E-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-40	10 YR 3/2	Kumché	
1	2	40-70	10 YR 5/2	Kumché	Door Jamb

PN 20F

This 2x1 meter test pit is located in the plaza composed by U-10, U-11, U-14, and U-15. The first level was a humus layer, followed by a layer of light brown earth with limestone pieces. In this layer, a small rock alignment was uncovered at 50 cm below surface. This single set of stone runs north-south and may represent a bench or support wall. The soil matrix is believed to be part of the fill of the platform. The third lot consisted of light brown earth mixed with limestone fragments and burned clay over bedrock (Figure A.32).

The fourth stratum comprised light brown earth mixed with limestone and burned clay. This stratum lies below Burial 16 (described below). Also, in this stratum was recovered at a depth of one meter below ground surface a limestone cylinder and an incised bone (possible needle) with the phrase “u-bak ts’unun” or “his bone [of/from] hummingbird.” Here hummingbird probably refers to a person who owned this trinket, rather than the artifact coming from a hummingbird. The fifth lot was stratigraphically similar to the preceding lot.

Burial 16 (PN 20F-1-3) was uncovered in the third stratum among the platform fill. The skeleton is that of a young child (< 5 years old), poorly preserved, with the body orientated east-west and the head facing to the west (Figure A.33). This was a primary burial without a burial cist to protect it. To the south and southeast of the burial were various offerings: A Chacalhaaz polychrome bowl, a bone needle, a jade bead (probably from a necklace), river snail shell, and some chert flakes. The offerings are interesting in that other adult burials within the center did not have any offerings and this young child was buried with several offerings, including jade. Presumably, this was the child of an important family.

PN 20F-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-30	10 YR 3/2	Yaxché/Chacalhaaz	
1	2	30-50	10 YR 5/2	Balché/Yaxché	Wall
1	3	50-70	10 YR 5/2	Balché/Chacalhaaz	Burial 16
1	4	70-100	10 YR 5/2	Balché/Chacalhaaz	Incised bone, cylinder

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	5	100-120	10 YR 5/2	Balché	

PN 20G

This 2x1 meter test pit is located in the center of the plaza formed by R-29, U-13, and U-15. The first layer is composed of organic material with limestone inclusions. At 20 cm below ground surface, the excavators found limestone rocks that probably pertained to U-15 debris. These rocks fell toward the east in the unit. The second layer had light brown earth mixed with limestone fragments. The third layer is similar to the second, with bigger rocks. The fourth continued the same kind of stratum with the top of a burial found. The fifth lot contains the burial.

Burial 20 (PN 20G-1-5) was uncovered at a depth of 1.10 m below ground surface (Figure A.34). This skeleton was deposited with the fill/midden of the unit. The excavation of the burial required an extension to the test pit of 0.50x1.00x2.00 meters. This burial is a primary articulated adult in a flexed position with the hands over the torso and the legs flexed at the hips. It is oriented east-west with the head towards the west. There were no offerings, or cist. The bones were well preserved.

PN 20G-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-30	10 YR 3/2	Chacalhaaz	
1	2	30-50	10 YR 5/2	Early Chacalhaaz	
1	3	50-60	10 YR 5/2	Nabá/Balché/Yaxché/Chacalhaaz	
1	4	60-110	10 YR 5/2	Nabá/Chacalhaaz	
1	5	110-?		Nabá/Balché	Burial 20

PN 20H

This suboperation consists of a single 2x1 meter test pit located behind structure T-2, in the plaza that T-2 forms with Q-1, and Q-2. The first stratum was organic material. At 24 cm below ground surface, there appeared a wall consisting of two courses of stone that had a height of 37 cm and ran in an east-west direction. The second lot comprised sandy dark brown soil with some limestone inclusions. This is probably the plaza surface layer with its accompanying construction fill. The third layer has a dark brown soil mixed with burned clay with carbon flecks. A floor made of fine limestone rocks was located at 51 cm below ground surface. This hard floor was 12 cm thick and lies just under this layer of burned material and the wall in the east profile. Underneath the floor was a brown-yellow sandy fill that seemed to be a naturally occurring stratum of decomposed limestone.

PN 20H-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-30	10 YR 4/2	Yaxché	Wall
1	2	30-40	10 YR 3/3	Balché	
1	3	40-50	10 YR 3/1	Nabá	
1	4	50-90	10 YR 5/4		Floor

PN 20I

This suboperation consists of a single 2x1 meter test pit placed in the plaza created by R-29, Q-1, and Q-3. The first layer was humus. Between 35 and 50 cm below ground surface there appeared a bench or stone alignment in the west side of the unit running east-west. The second layer was composed of dark brown earth mixed with burned clay, cultural material and carbon. Another wall was found at 65 cm below ground surface which also ran east-west. The third layer was composed of brown-yellow sand over bedrock.

PN 20I-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-50	10 YR 4/2	Chacalhaaz	Rock alignment
1	2	50-90	10 YR 3/1	Yaxché	Rock alignment
1	3	90-120	10 YR 5/4	Balché	

Summary

These excavations in a residential context show the diversity of cultural activities and materials that can come from test pits. Several burials were encountered, each corresponding to a different degree of burial elaboration and articulation. Also, these test pits show that this area was inhabited for a longer duration than other areas of the center, perhaps because it was somehow associated with the great pyramids of R-2 and R-3. Plazas continue to give buried features, such as architectural alignments and burials that have no surface traces.

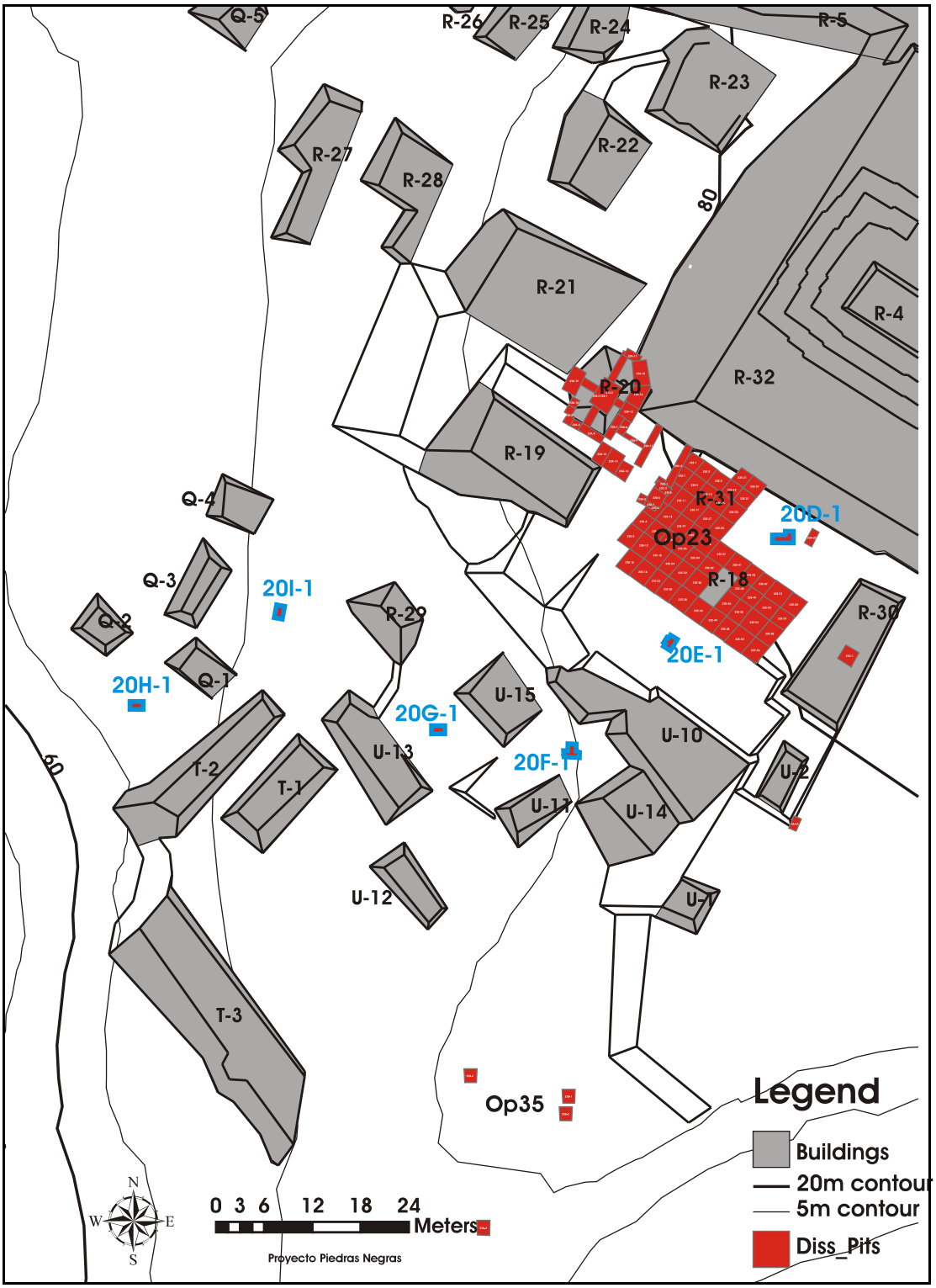


Figure F.30 Operation 20

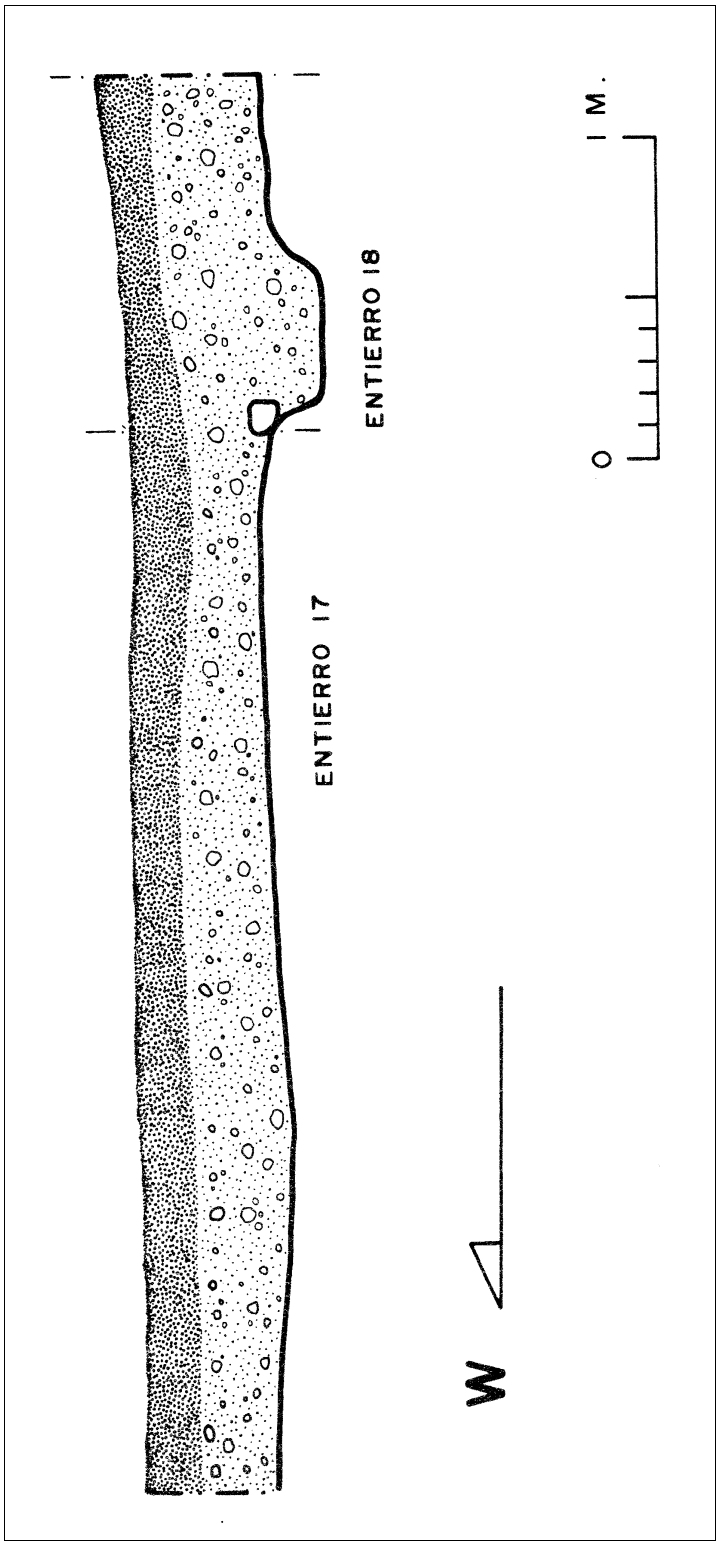


Figure F.31 PN 20D-1, North Profile (From Urquizú 1997c:164)

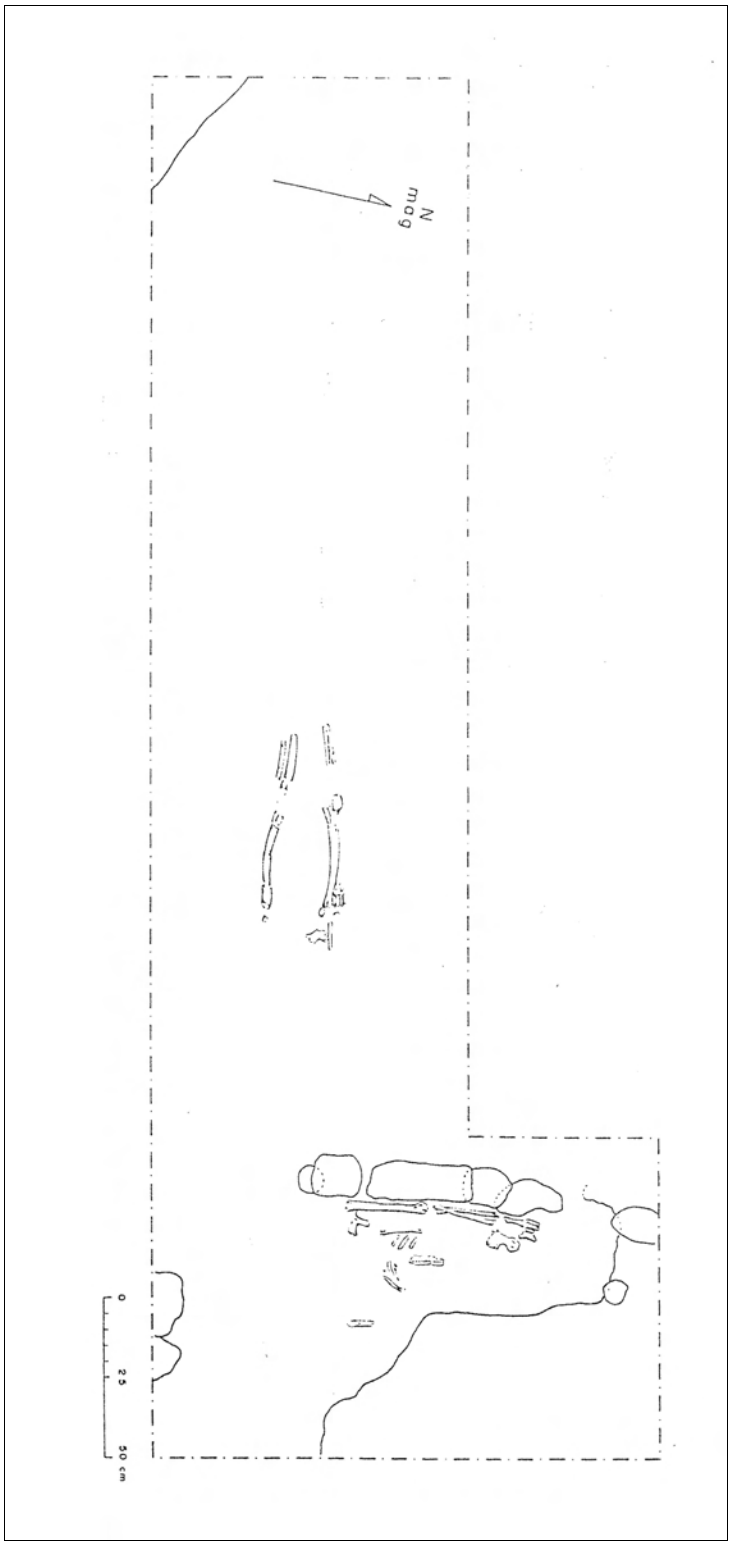


Figure F.32 Burial 17 and 18 (From Urquizú 1997c:165)

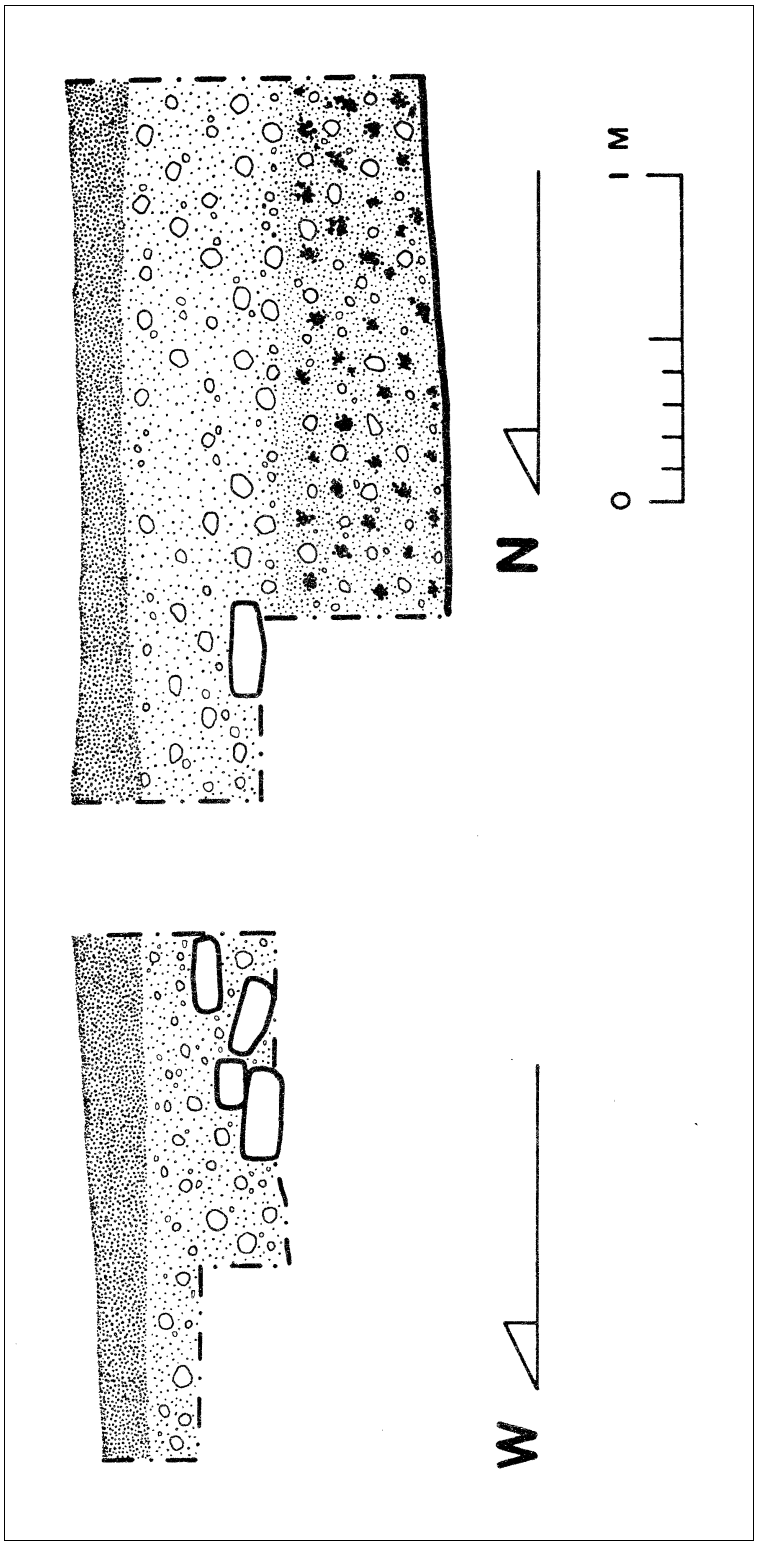


Figure F.33 PN 20F-1, North and West Profiles (From Urquizú 1997c:166)

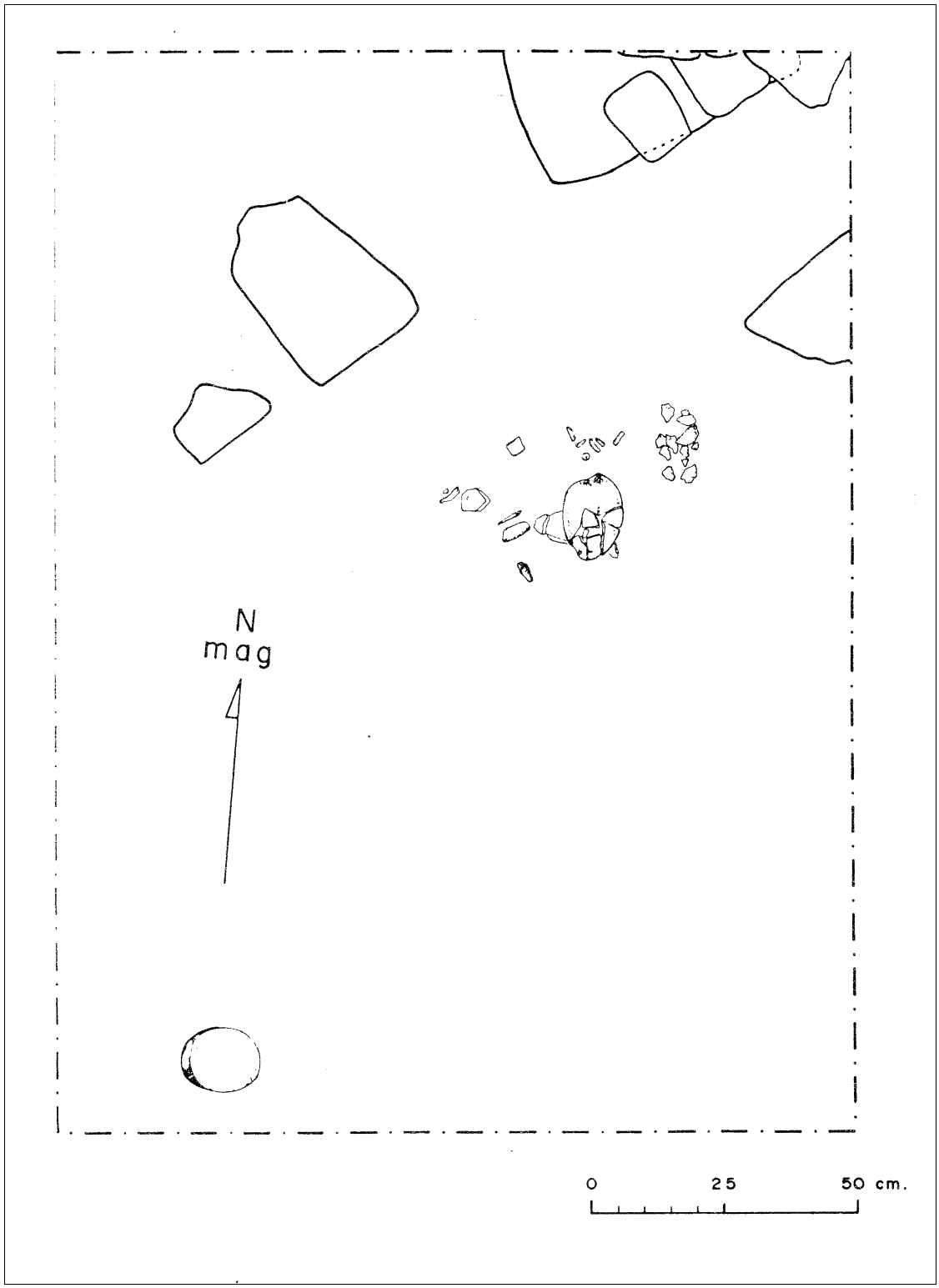


Figure F.34 Burial 16 (From Urquizú 1997c:169)

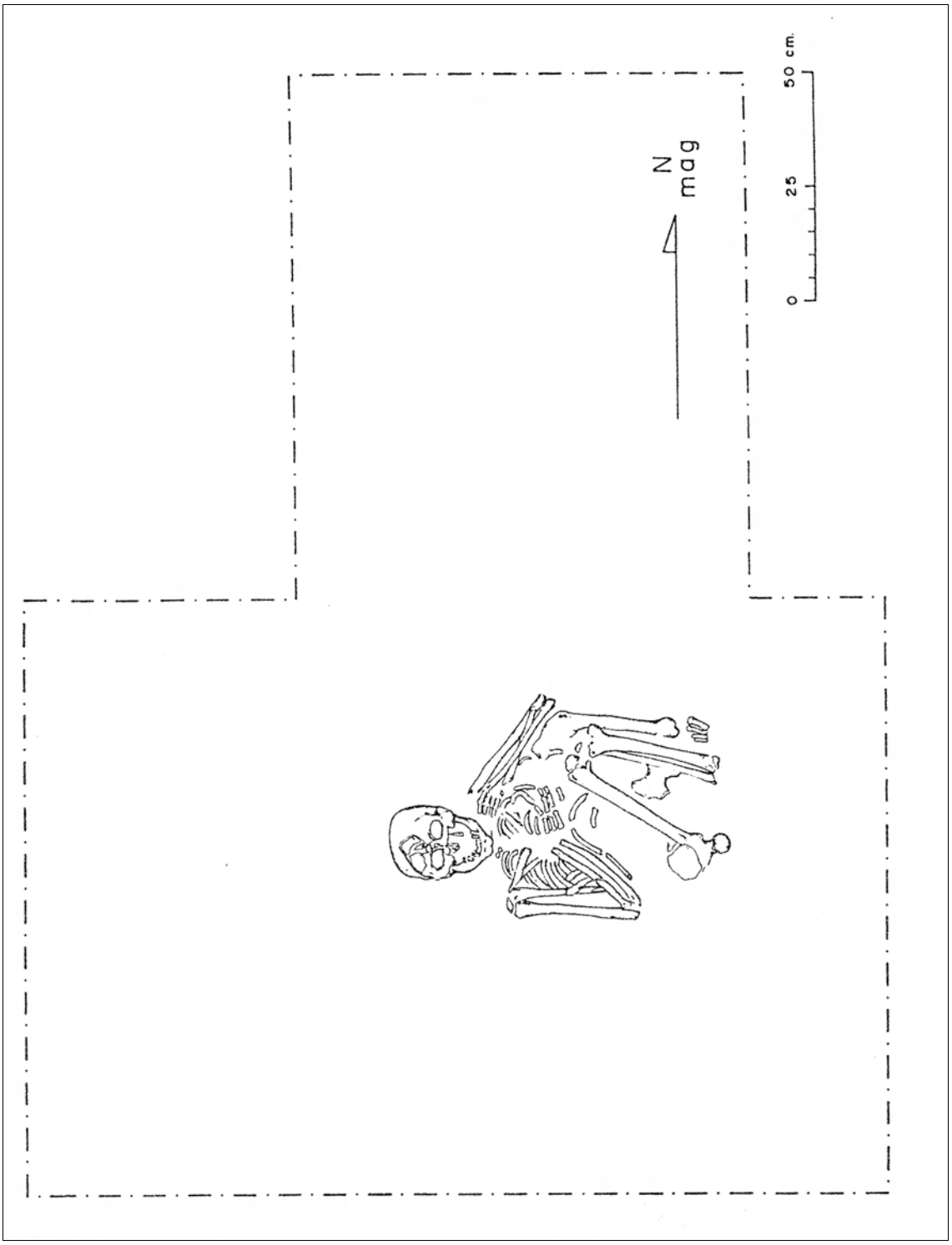


Figure F.35 Burial 20 (From Urquizú 1997c:170)

OPERATION 22

This operation, under the direction of David Wester and Jennifer Kirker during the 1997 season (Webster and Kirker 1997), placed four test pits in the south section of the center in an area that had not been previously included in the map, but has since been included (Nelson 1999, Figure F.36). Their test pits were divided into two suboperations, one in a ceremonial complex (V-31 to V-35) and another suboperation in nearby residential mounds (Y-1 to Y-3). These units give more information about these areas than the single test pit previously located in this area (PN 6A-1).

SUBOPERATIONS

PN 22A

This suboperation originally consisted of two test pits located on the artificial terrace above (and to the south) of V-35. The first unit (PN 22A-1) was a 2x1 meter test pit which was amplified several times to uncover Burial 19. The amplifications were given their own unit number (i.e., PN 22A-3, 4) but represent a contiguous excavation.

The first stratum was humus (Figure A.36). After this a layer of medium brown soil with loose rocks appeared. The third layer was a medium to light brown soil with large limestone rocks above bedrock. A burial was found in the northwest corner of the unit, which required two different 1x1 meter extensions to uncover. PN 22A-3-1 was the material from 0-50 cm below surface and PN 22A-4-1 was 50 cm below surface in their respective squares.

Burial 19 (PN 22A-3,4-2) is the mortal remains of an adult male who was buried face up in an extended position with the with his hands along his thighs (Figure A.39). The skeleton is well preserved and was placed in a rock lined cist which was covered with lajas. The cavity of the cist measures 1.7 meters in length and 0.7 meters at its maximum width. There were no offerings directly associated with the burial, just a few artifacts in a presumed secondary context.

PN 22A-1, 3, 4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-30		Chacalhaaz	
1	2	30-65		Chacalhaaz	
1	3	65-75		Yaxché	
3, 4	2	50-70		Yaxché	Burial 19

PN 22A-2

This 2x1 meter test pit was located along the artificial terrace above and to the south of V-35, and roughly 8 meters east of PN 22A-1. The first layer was a dark brown humus soil with slope wash that had a fine, loose texture. The second stratum was composed of medium brown

soil. The third lot was light brown soil which may have contained an old surface, just above bedrock.

PN 22A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-70		Chacalhaaz	
2	2	70-90		Chacalhaaz	
2	3	87-90		Chacalhaaz	“Floor”

PN 22B

This suboperation consisted of two test pits placed in the area around Y-1, Y-2, and Y-3. The first of these test pits was located on the southern edge of Y-3 along the extent path through this valley, but on a lower terrace than the previous suboperation. The first layer consisted of a dark brown humus layer with roots and rocks. The second layer consisted of medium brown soil with limestone rocks that probably collapsed from the superstructure of Y-3. The third layer was fill in front of the platform wall which was lying on top of natural clay. Bedrock was not reached (Figure A.37).

PN 22B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-40		Chacalhaaz	
1	2	40-70		Yaxché	Platform
1	3	70-94		Balché/Chacalhaaz	

PN 22B-2

This 2x1 meter test pit was located close to Y-1 and Y-2 on the south side of these structures and along the border of the platform. The first layer was humus without limestone cobbles (Figure A.38). The second layer had soil mixed with limestone pebbles and small rocks. This layer probably represents the eroded surface of the plaza and its construction fill. The bottom of this layer is an earthen floor located in the eastern side of the test pit. The third layer was brown earth with limestone pebbles and some clay. The fourth layer was sterile, natural clay beneath the plaza fill.

PN 22B-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-43		Yaxché	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	2	43-63		Yaxché	Floor
2	3	63-97		Balché	
2	4	97-120		Sterile	

Summary

This operation showed an unexpected time depth for the residential structures around the ceremonial area in this southern section of the center. The buildings lying just above the seasonally flooded arroyo (Y-1 to Y-3) were much earlier than the ceremonial center around them. This suggests a buildup of ritual functions through time, and the general increase in action during the Late Classic, especially in the southern area heading toward the Turtle petroglyph.

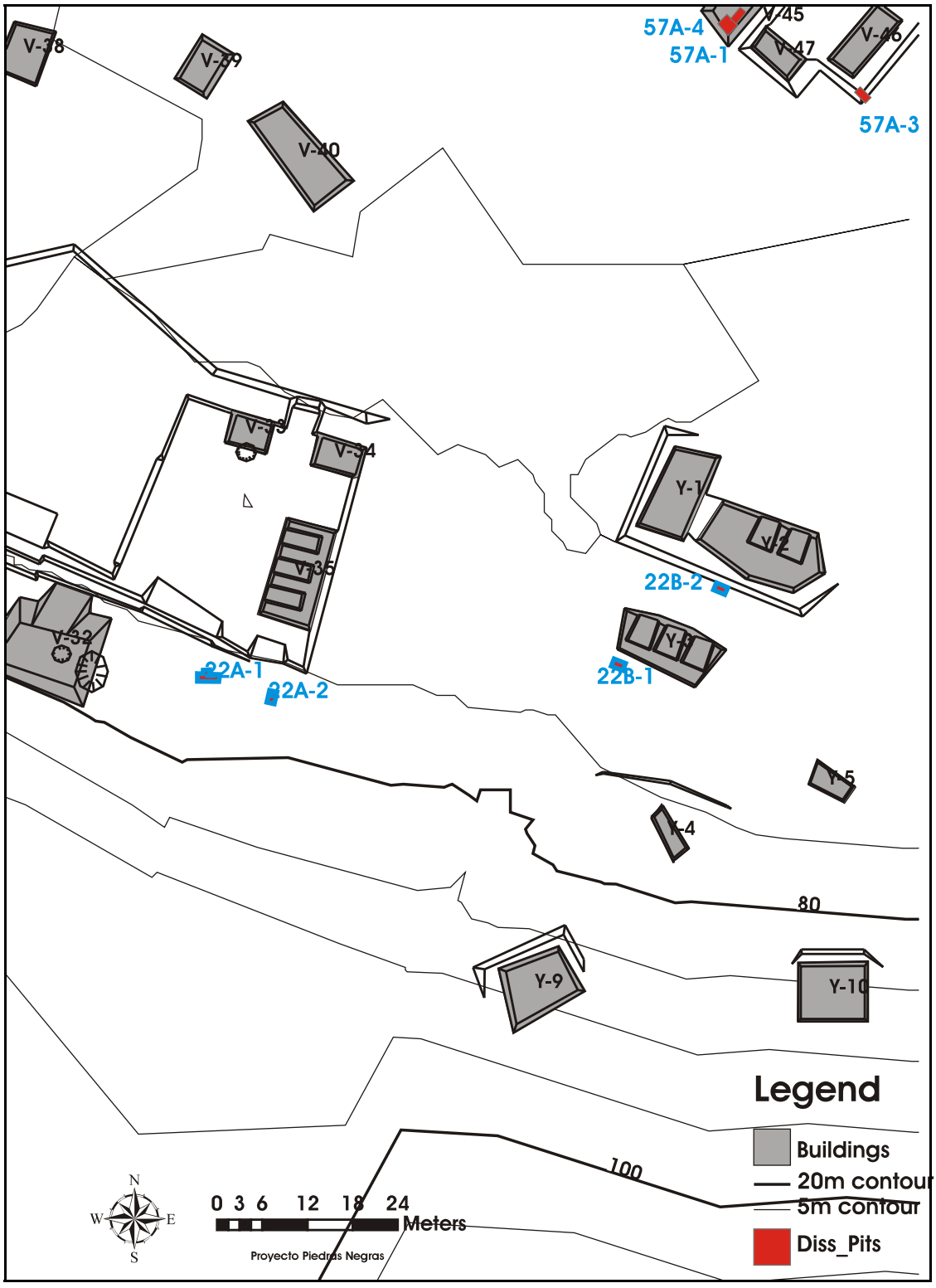


Figure F.36 Operation 22

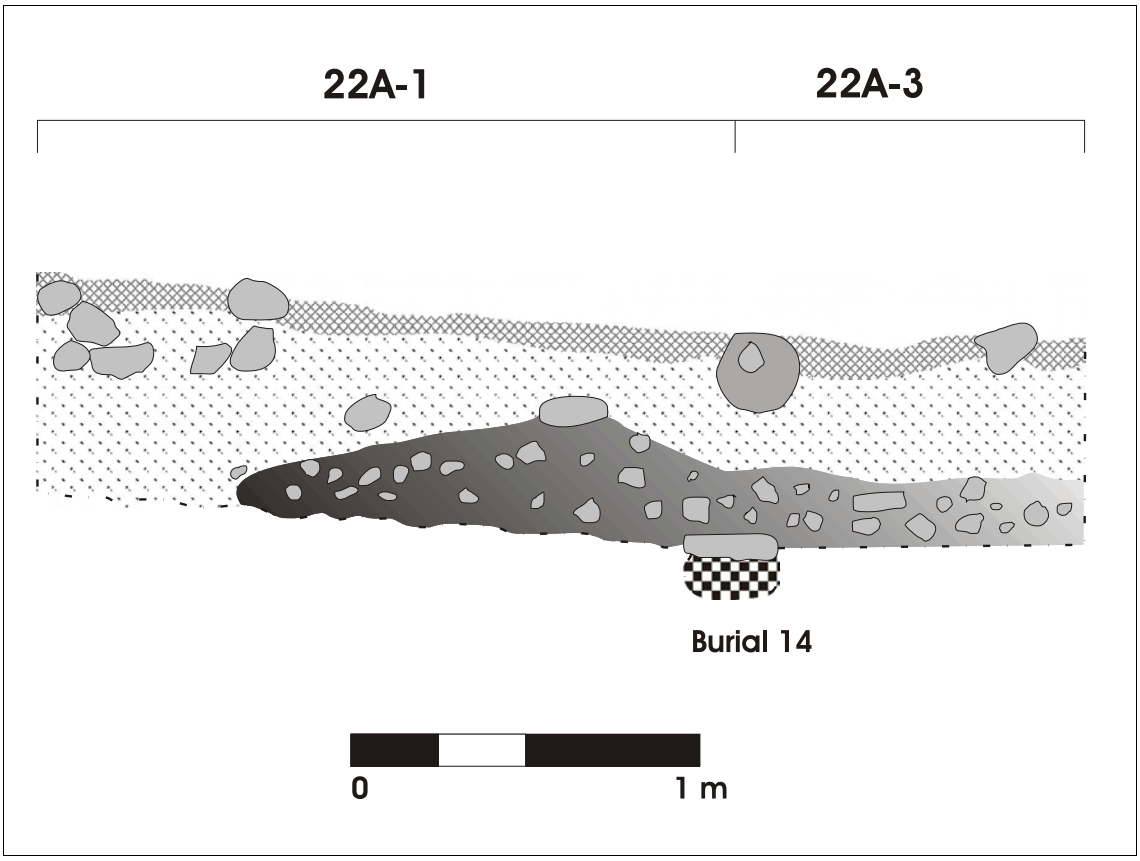


Figure F.37 PN 22A-1, A-3 with Burial 14 (After Webster and Kirker 1997:179)

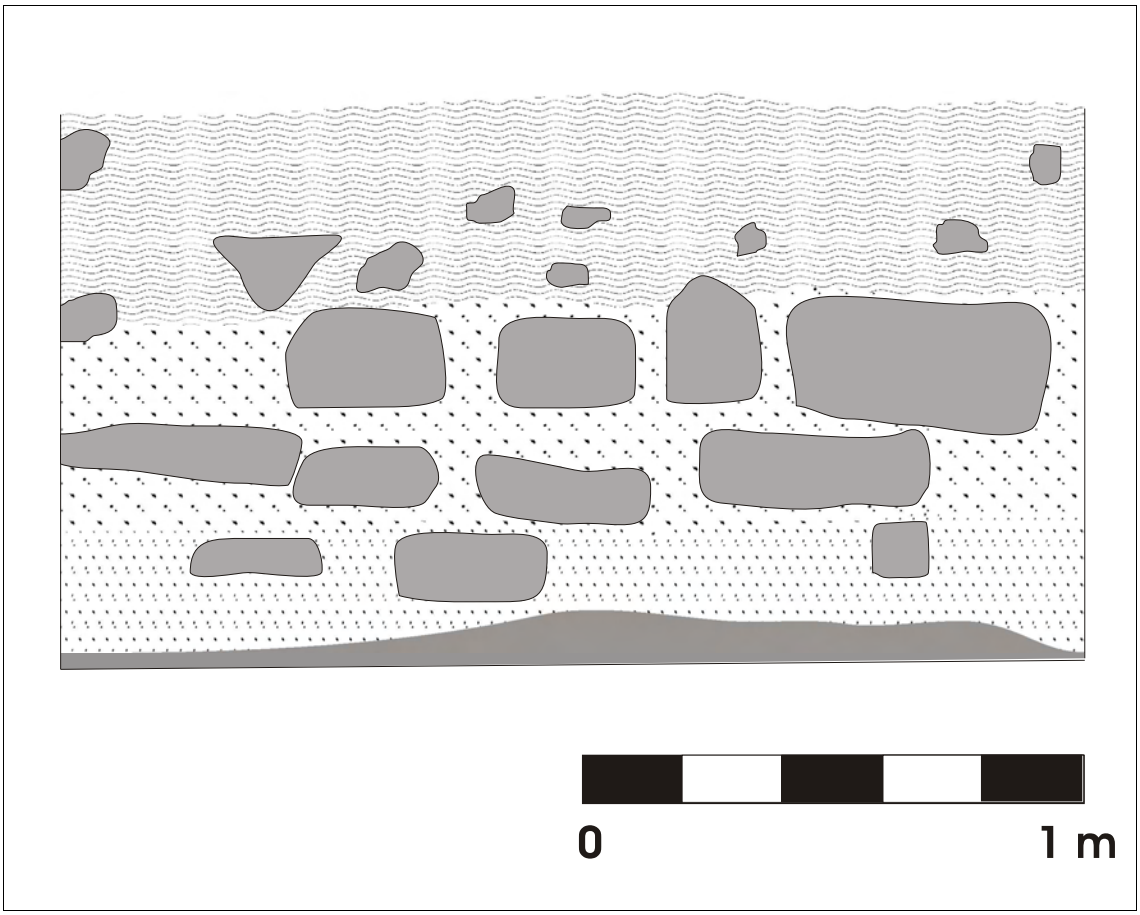


Figure F.38 PN 22B-1, North Profile (After Webster and Kirker 1997:183)

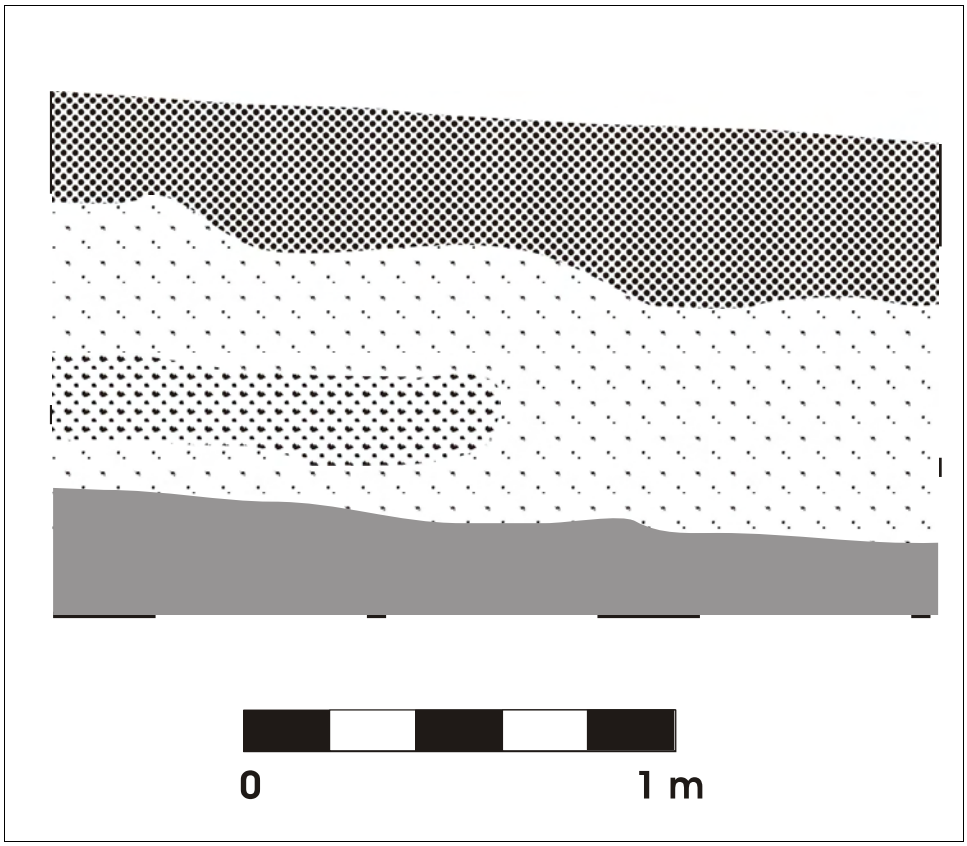


Figure F.39 PN 22B-2, North Profile (After Webster and Kirker 1997:184)

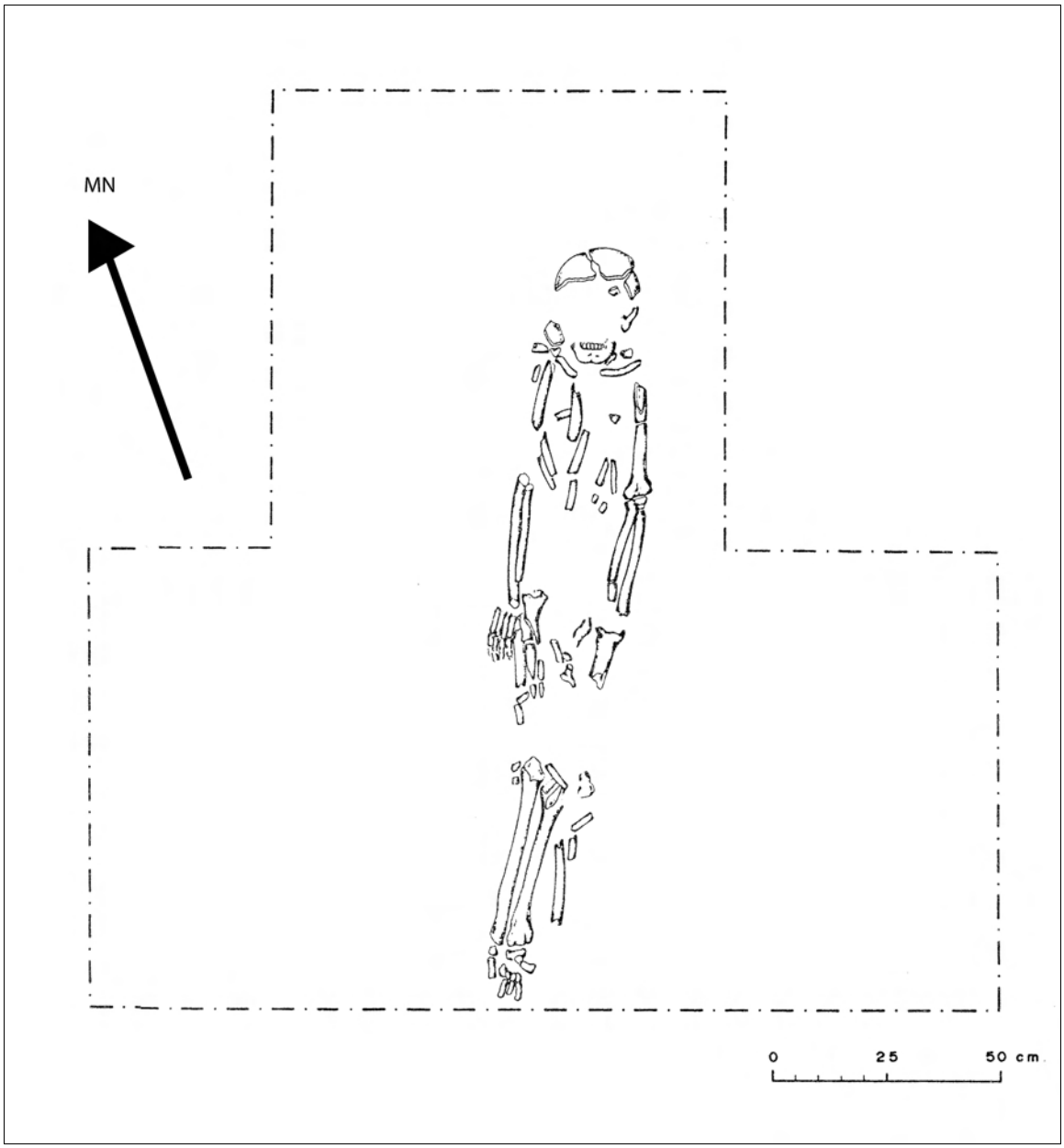


Figure F.40 Burial 19 (From Webster and Kirker 1997:184)

OPERATION 25

The purpose of this operation was to continue with the general test pitting program of the project, and to investigate possible Late Classic structures within the center (Figure F.41). This work was carried out under the direction of Ernesto Arredondo Leiva during the 1998 field season (Arredondo Leiva 1998b).

SUBOPERATIONS

PN 25A

This suboperation focused on the area around K-15, K-16, and K-17 which is a small group located north of the K-5 pyramid. K-16, in particular, was of interest due to its U-shape, an architectural characteristic believed to indicate a special type of Late Classic structure. Seven test pits were placed in and around this group to better understand its function and form.

The first of these test pits, PN 25A-1, was a 2x1 meter test pit located in the patio in front of K-16. Due to the discovery of a possible wall in the test pit, this unit was extended twice with the addition of PN 25A-3 and 4, which are grouped here together for ease of understanding the deposit (Figure A.41). Basically, a small wall was discovered which ran east-west. Further to the west, the wall alignment became two walls with a canal between them. The structure or feature that the wall defines is unknown because it extends beyond the limits of the test pits. It could be similar to the buried walls discovered in the R group, or even “invisible” structures.

The first layer was humus with small limestone fragments. In the second lot, a rock alignment running east-west (Wall) was discovered roughly 60 cm from the north wall of the test pit with the result that the next layer of the unit was divided into two different lots: the north side was lot 2, and the south side of the alignment was lot 3. This division would enable any ceramic differences between the feature to be more easily discovered. Lot 2 had a mixture of sand, small rocks, and light brown soil overlying bedrock. Lot 3 was similar in the south of the unit, with bedrock slightly lower.

PN 25A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-22	10 YR 2/2	Chacalhaaz	
1	2	22-43	10 YR 3/3		Wall
1	3	22-55	10 YR 4/3	Chacalhaaz	

PN 25A-3

This is a 0.60 x 0.5 meter extension to the north section of unit PN 25A-1. This unit follows the rock alignment previously discovered. The first lot was humus. The second lot had large quantities of rocks, like PN 25A-1 and the wall continued to the east over bedrock.

PN 25A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-22	10 YR 2/2	Balché/Chacalhaaz	
3	2	22-60	10 YR 4/3		Wall

PN 25A-4

This 1x1 meter unit was located a couple of meters east of PN25A-1, and 3 to see if the wall continued toward K-17, which it did. Just below the humus layer, appeared two walls separated by a small canal, which feature had not been detected in the previous units. These features were located over bedrock.

PN 25A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-22	10 YR 2/2		
4	2	22-48	10 YR 3/3		Canal, Walls

PN 25A-2

This is a 2x1 meter test pit located west of K-16 with the hope of finding a midden. The first lot was a dark brown organic layer (humus). The second lot was a dark grayish-brown soil over bedrock.

PN 25A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-28	10 YR 2/2	Yaxché/Chacalhaaz	
2	2	28-100	10 YR 3/2	Yaxché/Chacalhaaz	

PN 25A-5

This 2x1 meter test pit is located in the plaza composed of K-8, K-9, K-10, and K-12, more specifically, in front of K-9 and K-10. This unit is in an east-west line with PN 25A-6 and PN 19D-1 to give a better understanding of the construction sequence of the group. The first lot was humus. The top of a north-south running wall was found in this stratum along the east side of the unit. The wall follows the natural slope of the ground, and is composed of large rocks.

The next layer had light brown earth with some river rocks and a high concentration of ceramics. This lot contains material from the west side of the wall. The material is probably platform fill and is just over bedrock in the northern half of the unit. In the southern half, there

appeared more material which was placed with lot 3. Lot 3 continues with the same soil matrix and ends over some collapsed lajas that denote a burial.

Burial 26 (PN 25D-5-4) is a burial that contains the remains of three individuals (Figure A.42). They were placed in a circular hole dug into bedrock that measured 80 cm in diameter and 63 cm deep. At the bottom of the pit was Burial 26b, and 26c. Apparently 26c consists of a few random bones that were found in the unit rather than a separate burial facility. Burial 26b was an adult female and was placed into the hole in a flexed position on the back with the knees and the head at roughly the same height. The hands were over the pelvis and the skeleton is roughly facing north-south. Over this skeleton was placed several stones and dirt to separate this burial from the other placed over it. This suggests that the burials were interred at the same time, with 26b placed less-comfortably than 26a into the pit, perhaps as a marker of higher status for 26a. No burial offerings were found with 26b or 26c.

The principal burial, 26a, was laid on top of the other ones. This male adult burial had lajas covering the top of the burial facility, and soil was purposefully placed to fill in the area between the body and the lajas. The bones were well-preserved and the body had been placed into the pit in a flexed position on the left side with the legs toward the chest and the hands over the pelvis. The general orientation was east-west with the head towards the east. In the mouth was found a pointed bone which passed through the side of the jawbone in a post-mortem process. A possible offering was a feline phalange found among the bones (exact position unknown).

PN 25A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-30	10 YR 2/2	Yaxché/Chacalhaaz	Wall
5	2	30-70	10 YR 4/3	Balché	
5	3	70-103	10 YR 5/3	Balché/Yaxché	
5	4	103-124	10 YR 5/3	Nabá	Burials 26a-c

PN 25A-6

This 2x1 meter test pit lies near the southeast corner of K-12 roughly in line with PN 25A-5 along an east-west axis. The first lot was humus, followed by a brown soil mix that was excavated down to a laja alignment that marked Burial 27. Lot 3 continued the same soil matrix and burial 27, which was just above bedrock.

Burial 27 (PN 25A 7-3, 6-3) required an extension to the unit of 1x1 meter (PN 25A-7, see below). The burial contains the remains of at least three individuals placed in a cist which had been covered by lajas. The dimensions of the cist were 1.70 x 0.45 meters. One of the individuals could have been in an extended position. No definitive ceramic offerings were associated with the burials, however a burned feline phalange was found amidst the bones and some obsidian blades appeared associated. The bones were badly preserved and appeared mixed together.

PN 25A-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-35	10 YR 2/2	Balché/Chacalhaaz	
6	2	35-75	10 YR 4/3	Balché/Chacalhaaz	
6	3	75-83	10 YR 4/3	Nabá/Balché/Yaxché/Chacalhaaz	Burial 27

PN 25A-7

This is a 1x1 meter extension of PN 25A-6 placed along the south end of the unit. Its purpose was to facilitate the removal of Burial 27. The first lot was humus, followed by a brown earthen layer and then the burial layer.

PN 25A-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-22	10 YR 2/2		
7	2	22-70	10 YR 4/3	Nabá	
7	3	70-83	10 YR 4/3		Burial 27

Summary

This suboperation is interesting due to the burial customs that it has uncovered. The known burials in this plaza group were oriented along the east-west axis of K-5. They were multiple burials with perhaps some care being taken for the principal burial and the other burial(s) being placed less carefully into their resting place. Another enigmatic feature is the small canal placed in front of K-16. Because no further excavations were undertaken in this area it will remain a mystery.

SUBOPERATIONS PN 25B AND 25C

PN 25B-1 through 10

This suboperation was supposed to excavate the northwestern half of structure K-16. But due to a lack of time this did not occur. Instead, the excavator was only able to remove the first layer of soil off the building (i.e., humus). The removal of this layer exposed a previously unknown smaller room on the south of the structure, and a round altar on the interior of the "U" on the northwest side (PN 25B-6-1). Some lajas were discovered just north of the altar, along the east-west axis of the building. The ceramic material was all Chacalhaaz with little admixing. The few places where there was some admixing was along the southwest side of the building.

PN 25B-1 to 10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1-10	1	0-10	10 YR 2/2	Chacalhaaz	Altar, Room

PN 25C

This 2x1 meter test pit was placed along the north-south axis of K-16 just beyond the area excavated in 25B. The first lot was humus, followed by a compact brown earthen layer which showed the remains of a small wall that went east-west but ended abruptly inside the unit. The third lot was a lighter color of brown mixed with small limestone rocks and sand just above the bedrock.

PN 25C-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-12	10 YR 2/2	Chacalhaaz	
1	2	12-35	10 YR 3/4	Chacalhaaz	Wall
1	3	35-65	10 YR 4/3	Yaxché/Chacalhaaz	

Summary

These last two operations helped date this structure to the Late Classic, but due to time constraints were not able to penetrate into the structure as much as had been hoped. The few details discovered about K-16, such as a new room to the south, and a circular altar, just add to the general mystery of the functions of this structure.

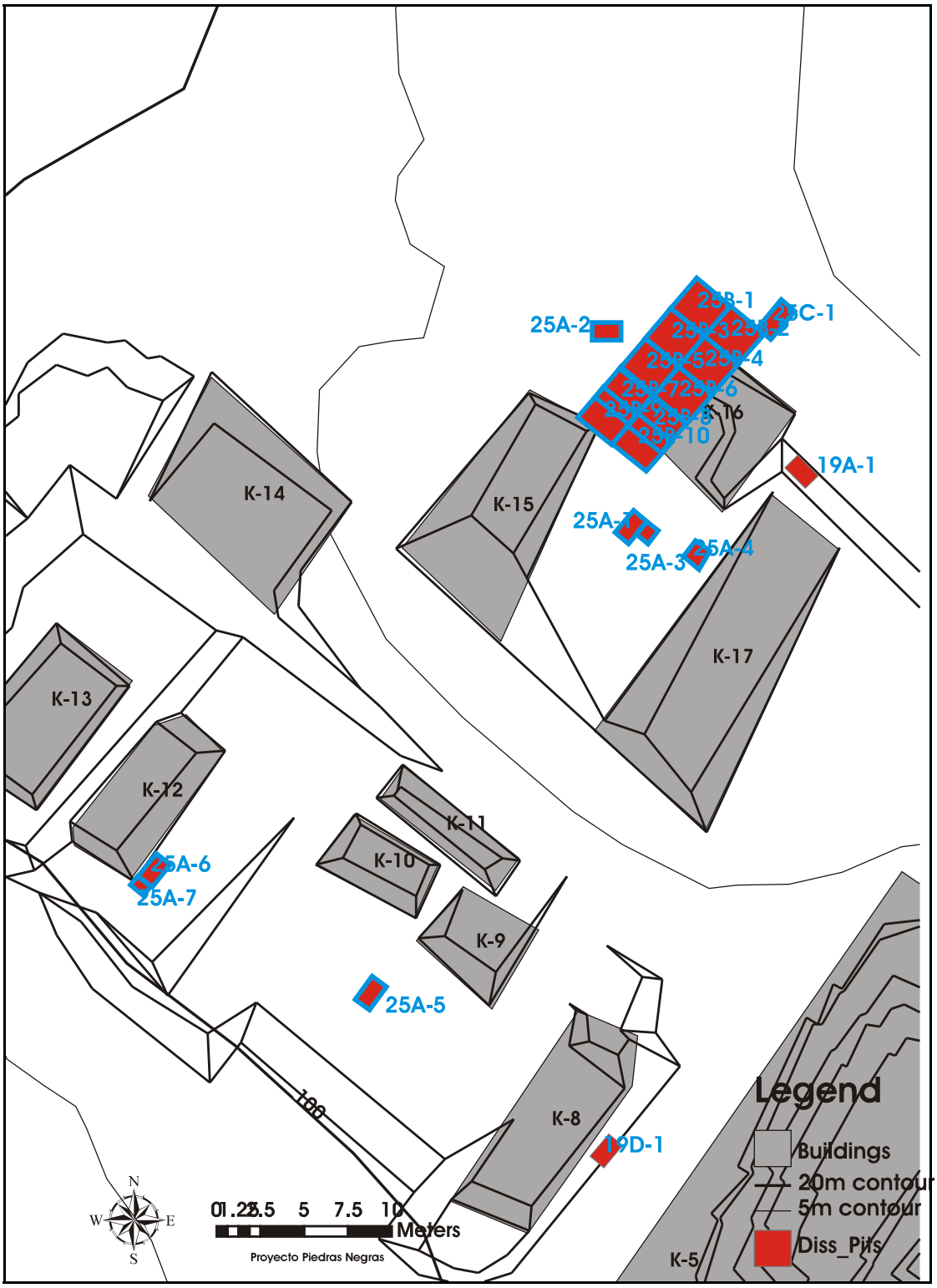


Figure F.41 Operation 25

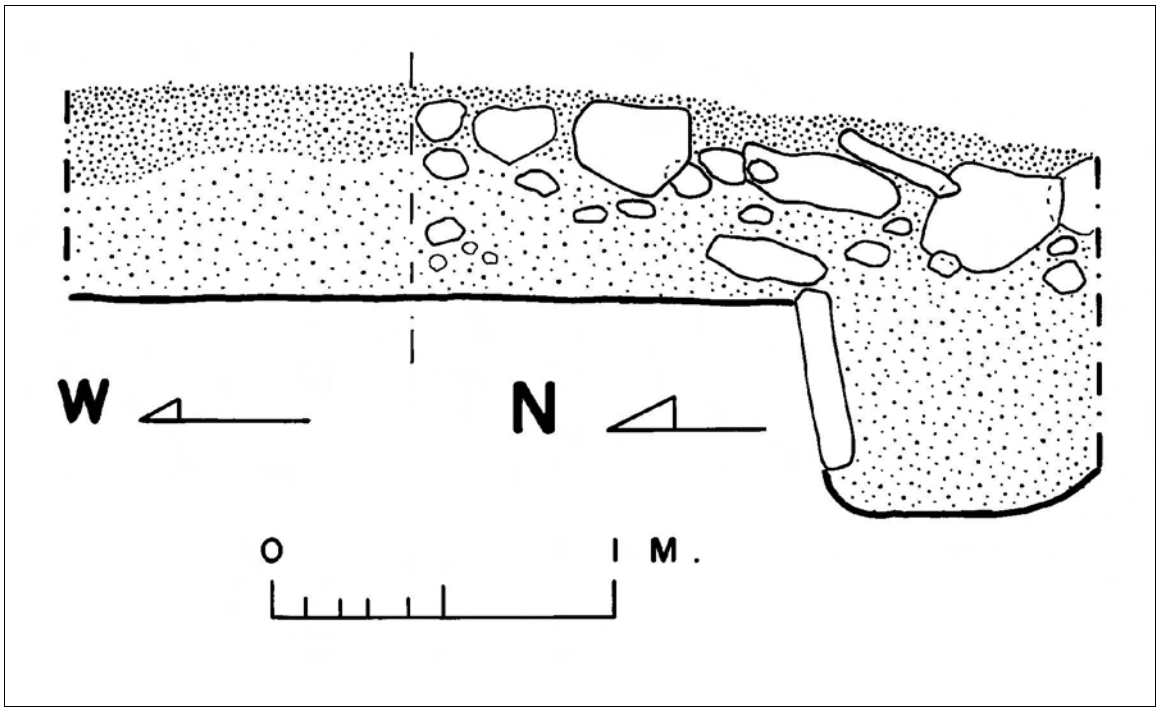


Figure F.42 PN 25 Profile (From Arredondo 1998b:168)

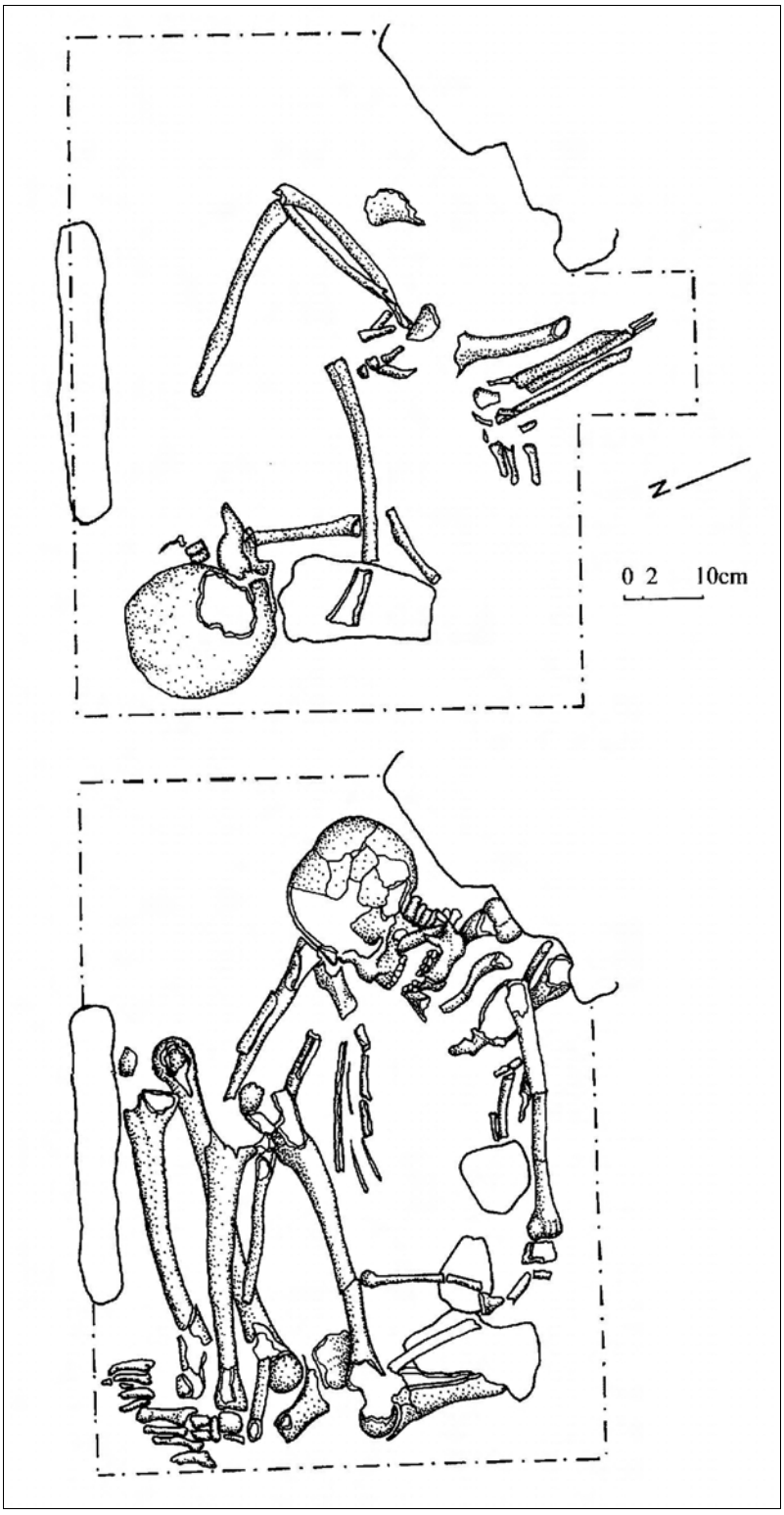


Figure F.43 Burial 26 (From Arredondo 1998b:169)

OPERATION 26

Located across a bajo area to the northwest of the Acropolis, structure F-2 (26A) was excavated by E. Christian Wells in 1998 (see Wells 1998a, chapter 5 this volume). His work in this area complemented the test pits placed by Mónica Urquizú in 1997 (PN 14, Urquizú 1997c) through the bajo area to the south of F-2, as well as excavations by Linton Satterthwaite (1954) in nearby structures. In the same year, Ernesto Arredondo Leiva (1998a) excavated a series of test pits around E-2. The main objective of these excavations was to discover if the buildings had a post-classic or terminal classic component as suggested by Holley (1983) in his ceramic analysis of Piedras Negras.

SUBOPERATION 26B

This suboperation, under the direction of Ernesto Arredondo Leiva (1998a) was focused on structure E-2 with the intent of finding definitive post-classic material from a later occupation believed to have existed in this area of the center. It failed in that regard, but still has given another sample for this study (Figure F.44).

PN 26B-1

This 2x2 meter test pit was located in the center of structure E-2. The first lot was humus, followed by a layer of fill and brown earth with many large rocks. The third layer had a dark brown soil without the large rocks. The fourth layer was dark earth mixed with limestone lying over the bedrock.

PN 26B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-14	10 YR 2/2		
1	2	14-65	10 YR 4/3	Chacalhaaz	
1	3	65-110	10 YR 4/3	Balché/Yaxché	
1	4	110-200		Balché/Yaxché	

Summary

This single test pit helped date structure E-2, and therefore served a very useful purpose.

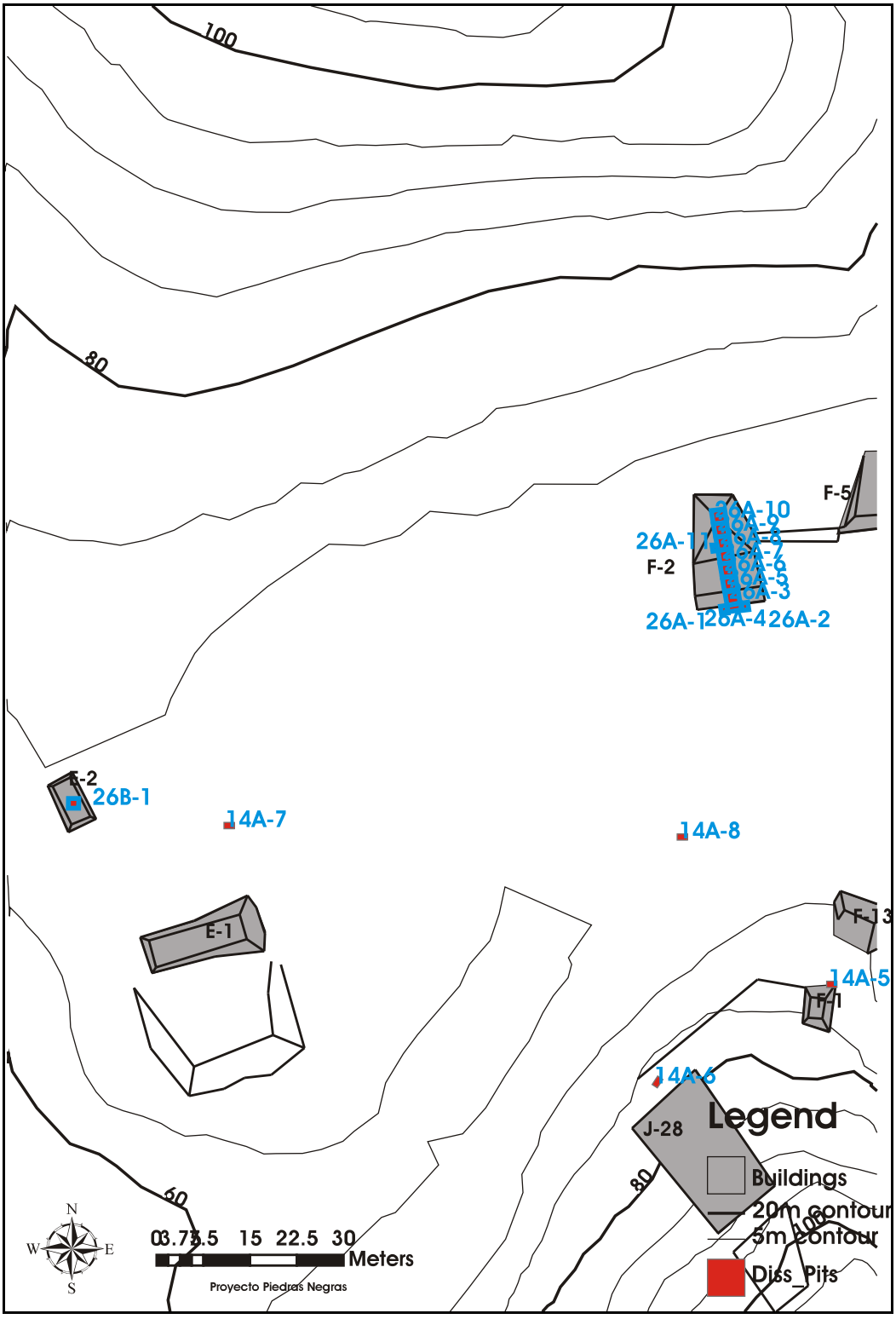


Figure F.44 Operation 26

OPERATION 29

This operation centered on small residential mounds located to the north of K-5, in the G sector of the map (Figure F.45). Two test pits were placed in this area under the direction of Ernesto Arredondo Leiva (1998b).

PN 29A-1

This 2x1 meter test pit was placed in the center of the plaza created by G-9, G-10, and G-11. The first layer was humus under which was found bedrock except in the southern side of the unit, which had a second layer of brown earth just over bedrock.

PN 29A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 2/2	Chacalhaaz	
1	2	20-92	10 YR 3/4		

PN 29A-2

This 2x1 meter test pit was located between G-13 and G-14 (Figure A.45). The first layer was humus. The second stratum consisted of brown earth with some limestone rocks. The western side of the unit has large blocks, creating a wall that exits through the western side of the unit. A compact floor was discovered at 48 cm below ground surface, possibly an earlier plaza surface. Underneath the floor the soil continues much the same until bedrock.

PN 29A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-10	10 YR 2/2	Chacalhaaz	
2	2	10-48	10 YR 4/2	Chacalhaaz	Wall, Floor
2	3	48-75		Chacalhaaz	

Summary

These two test pits show that Late Classic constructions continued on this side of the center. Plazas are being constructed with fill and other materials to level out the irregular spots created by the bedrock beneath. In the second unit, a small rock wall may have held some of the fill in place during the heavy rains, a feature that has been seen several times in these plaza test pits, especially in the R sector.

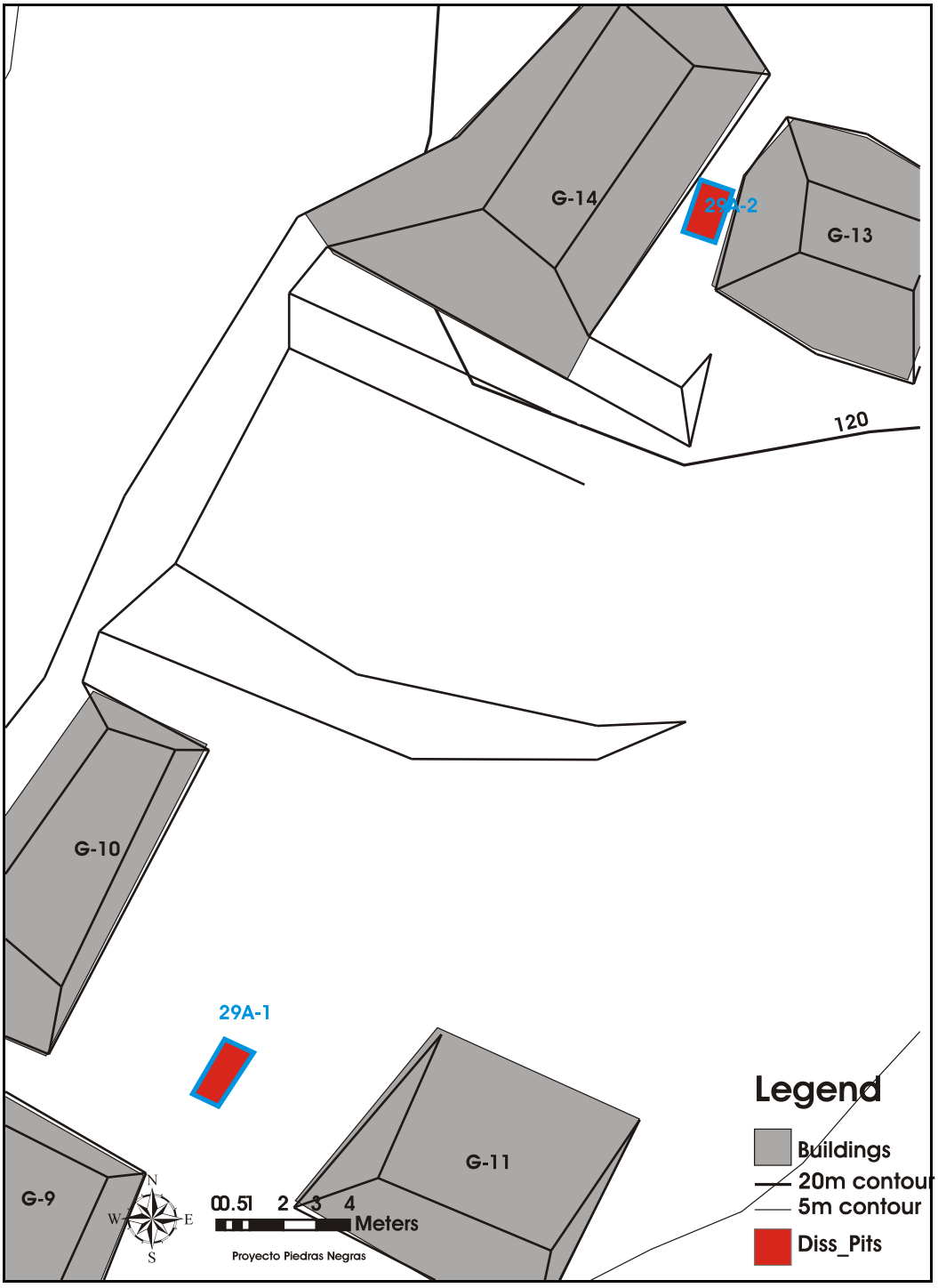


Figure F.45 Operation 29

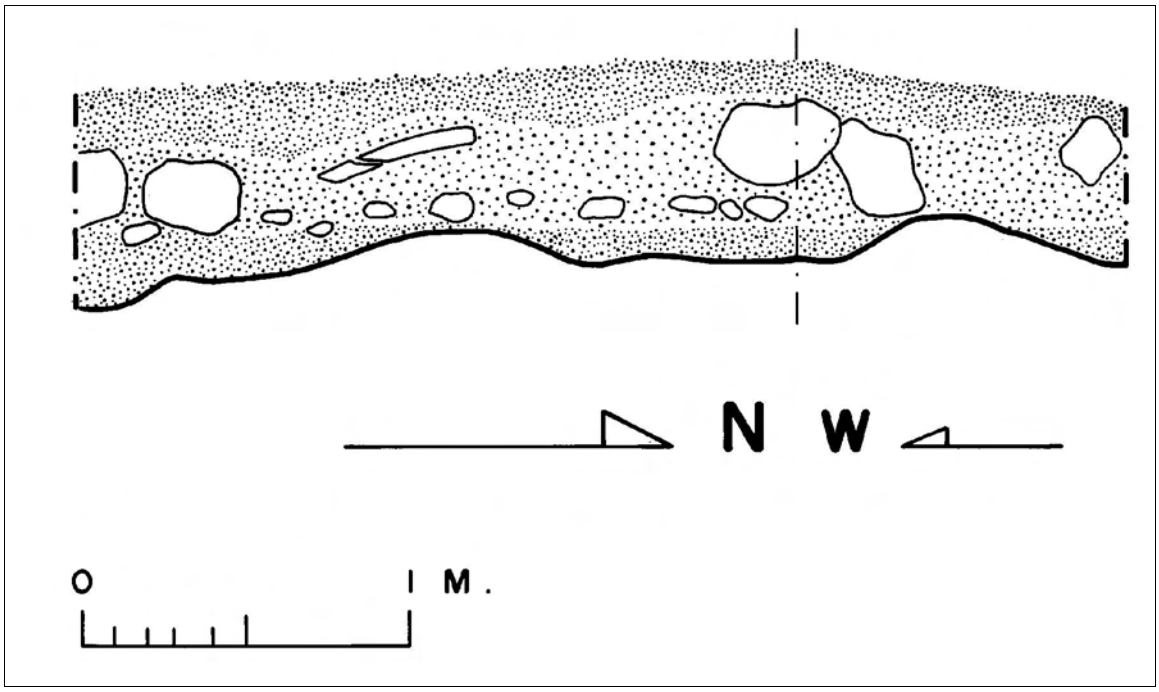


Figure F.46 PN 29 Profile (From Arredondo 1998b:168)

OPERATION 30

The geographic focus of this operation was the area around structures K-23 and K-24 (Figure F.47). Three test pits were placed around these structures to better understand the chronology of the area and to build upon previous work in the area (Golden 1997c). Ernesto Arredondo Leiva (1998b) was in charge of this operation. K-23 is another "U" shaped building which might mean it was constructed late in Piedras Negras' history. A test pit placed in front of this building (on the south) complements previous excavations under the direction of Charles Golden (PN 19C-1) along the west side of the structure.

PN 30A-1

This 2x1 meter test pit was placed on the south side of K-23, and just a little to the west of its north-south axis, due to the presence of a large tree along its true axis. The first lot was humus and the second was a hard light brown soil with clay grains intermixed. The third level was the same color as the previous, but the soil was a finer texture. The fourth layer contained Burial 34 along with the same soil matrix just above bedrock (Figure A.47).

Burial 34 (PN 30A-1-4) consists of the remains of an adult male placed in an extended position on his back, oriented north-south with the head toward the north (Figure A.48). The burial facility consisted of bedrock under parts of the body and soil that had been leveled under other parts of the body. A single large rock was placed in such a way as to cover part of the ribs and an arm, but no cist or lajas were discovered. Offerings include three spindle whorls (which is odd if the burial is male). Overall preservation of the burial is low as the bones are partially decomposed.

PN 30A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-30	10 YR 2/2	Chacalhaaz	
1	2	30-70	10 YR 6/3	Balché/Yaxché/Chacalhaaz	
1	3	70-105	10 YR 6/3	Yaxché/Chacalhaaz	
1	4	105-200	10 YR 6/3	Balché	Burial 34

PN 30A-2

This is a 2x1 meter test pit located downslope (south) of PN 30A-1, and K-23. It is aligned with PN30A-1 but with an east-west orientation rather than a north-south. The first layer was humus, followed by a layer of brown earth and a large quantity of small limestone rocks. This layer sat over bedrock.

PN 30A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 2/2	Nabá/Yaxché/Chacalhaaz	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	2	20-120	10 YR 5/3		

PN 30A-3

This is a 2x1 meter test pit located on the East side of K-24. The first layer was humus, followed by a light brown soil layer with abundant pieces of limestone over the bedrock.

PN 30A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-15	10 YR 2/2	Chacalhaaz	
3	2	15-140	10 YR 5/3	Yaxché/Chacalhaaz	

Summary

In summary, these three test pits give an indication of early habitation around K-23 and later habitation around K-24. The lack of a burial cist is interesting as is the intentional leveling of the burial spot. On the one hand it shows that care was taken for the burial, but not enough so as to provide a more permanent resting place. There could be a different burial custom at work in this area.

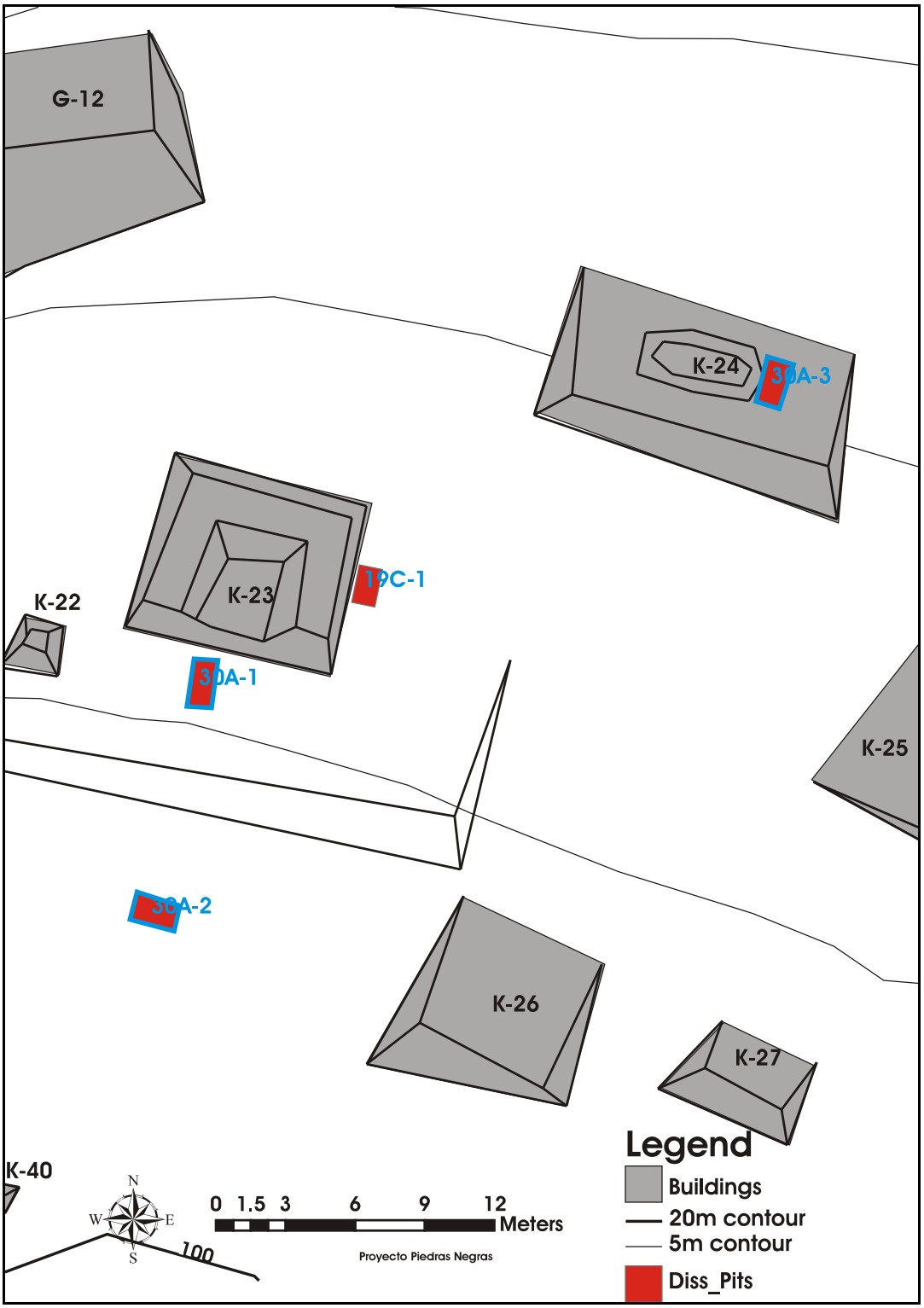


Figure F.47 Operation 30

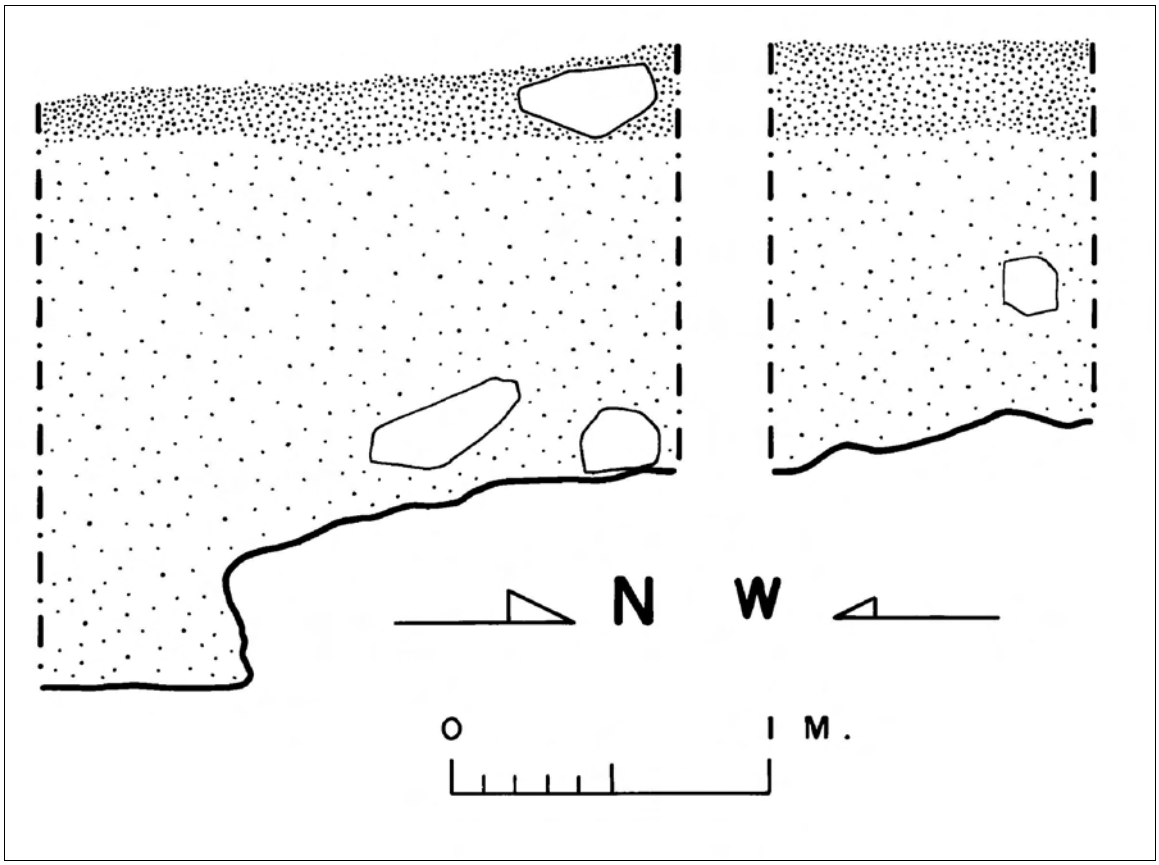


Figure F.48 PN 30A Profile (From Arredondo 1998b:170)

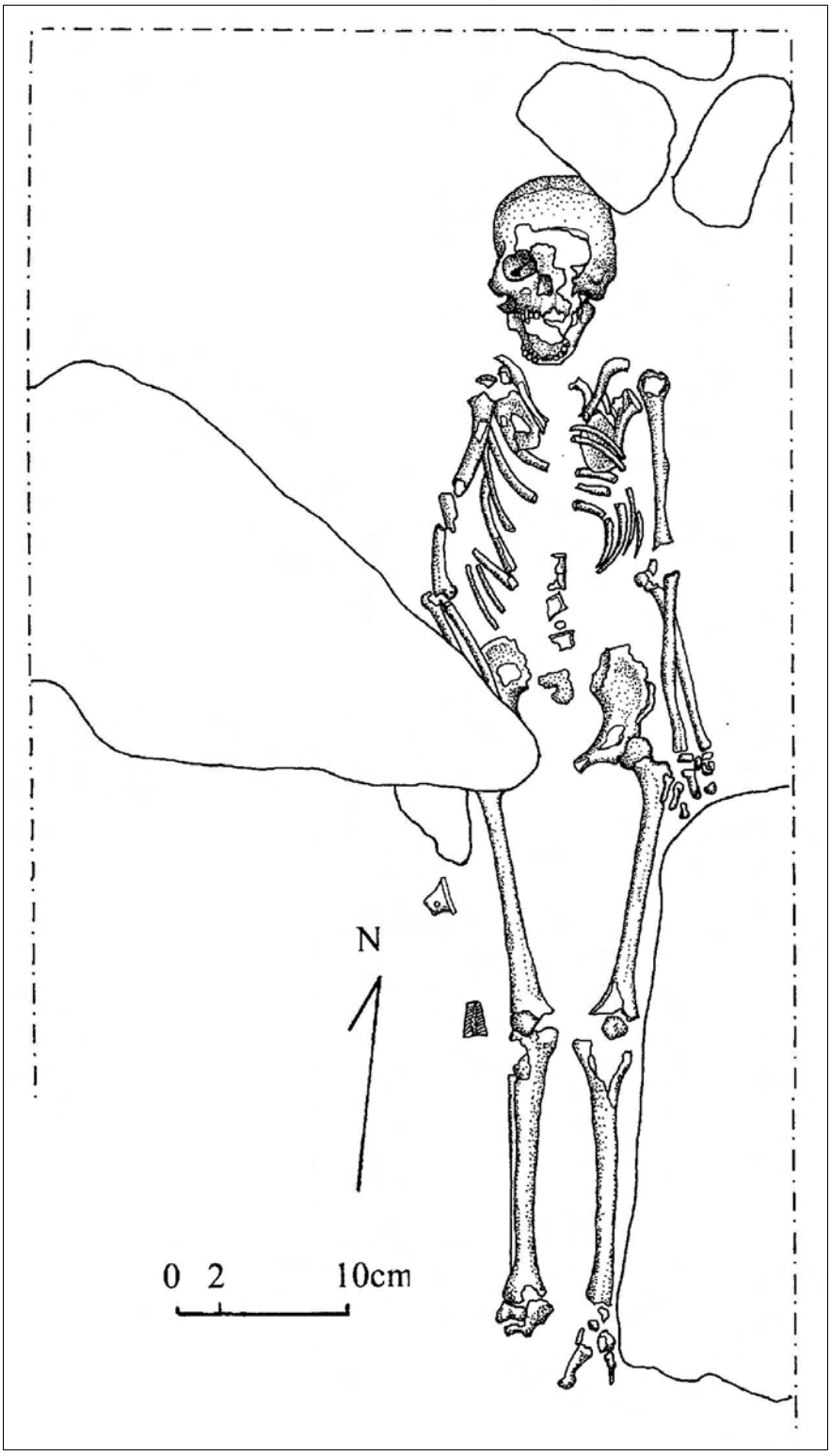


Figure F.49 Burial 34 (From Arredondo 1998b:171)

OPERATION 31

This operation continues the work of Ernesto Arredondo Leiva and the program of test pits within the site (1998b). This operation consisted of four test pits located in the G sector (Figure F.50).

PN 31A-1

This 1x1 meter test pit is located to the southeast of G-19, approximately one meter from its corner. The first stratum was humus followed by a layer of light brown soil with some limestone pieces lying over bedrock.

PN 31A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-55	10 YR 3/2	Chacalhaaz	
1	2	55-100	10 YR 6/3	Chacalhaaz	

PN 31A-2

This 2x1 meter test pit was located in the plaza between structures G-16 and G-17. These structures were thought to be elite residences and the purpose of this unit was to understand the chronology of the plaza group and see what artifacts were hidden in the fill. The top surface layer was humus under which was a compact plaza floor and the top of a small wall. The next layer was composed of light brown soil. The small wall runs north-south and a cist was discovered at the bottom of the layer cut into the bedrock.

Burial 42 (PN 31A-2-3) consists of an infant burial (< 2 years) which was placed in a cist dug out of bedrock and covered with lajas. The cist measures 1.30 x 0.70 meters, which is a very large space for such a small infant. Great care was taken with this burial. The lajas were well formed and aligned and rested on the west side over the small wall previously uncovered. The body was laid in the cist, then the empty space was filled in with earth, and the lajas placed over it. Then more rocks were placed on top of the burial, perhaps making a small altar over it. The body was lying in a north-south orientation with the head towards the north and mouth upwards. There were no offerings associated with the burial.

PN 31A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-22	10 YR 2/2		
2	2	22-53	10 YR 5/3	Yaxché	Plaza floor, Wall
2	3	35-60	10 YR 6/2	Yaxché	Burial 42

PN 31A-3

This is a 2x1 meter test pit with an east-west orientation located in the plaza between G-16 and G-17 and just to the south of PN 31A-4 (Figure A.50). The purpose of this unit was to trace the small wall found in PN 31A-2 and see where it disappears. The first layer was humus with the compact surface being found just under it as well as the top of the wall. The second layer consists of the material to the north of the wall (inside), while lot three is the material to the south (and outside). The corner of the wall was found in this unit and the wall angles toward G-16. So it probably was either a sub-structure to G-16 or a small plaza/terrace in front of the building.

PN 31A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-28	10 YR 2/2	Chacalhaaz	
3	2	28-62	10 YR 5/3	Balché	Floor, Wall, Substructure
3	3	28-62	10 YR 5/3	Yaxché	Outside Substructure

PN 31A-4

This is a 2x1 meter test pit placed along the west side of PN 31A-2, or in front of G-16. The purpose of the unit was to continue to uncover part of the wall and cist. The top layer was humus under which was the compact plaza surface and the top of the wall (towards the south). The second layer was a light brown soil similar to PN 31A-2-2. Bedrock was 30 cm below ground surface at the north and 62 cm at the south of the unit.

PN 31A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-20	10 YR 2/2	Balché/Yaxché/Chacalhaaz	
4	2	20-62	10 YR 5/3	Nabá/Balché/Yaxché/Chacalhaaz	

Summary

These three test pits uncovered a wealth of information about G-16 (Figure A.51). Apparently there was an earlier phase of the building which existed in Balché times. This substructure extended into the plaza more than the current building. At some point this substructure was destroyed and a retaining wall built over its ruins. Burial 42 was placed on the outside of the retaining wall and then the plaza was resurfaced, and eventually abandoned.

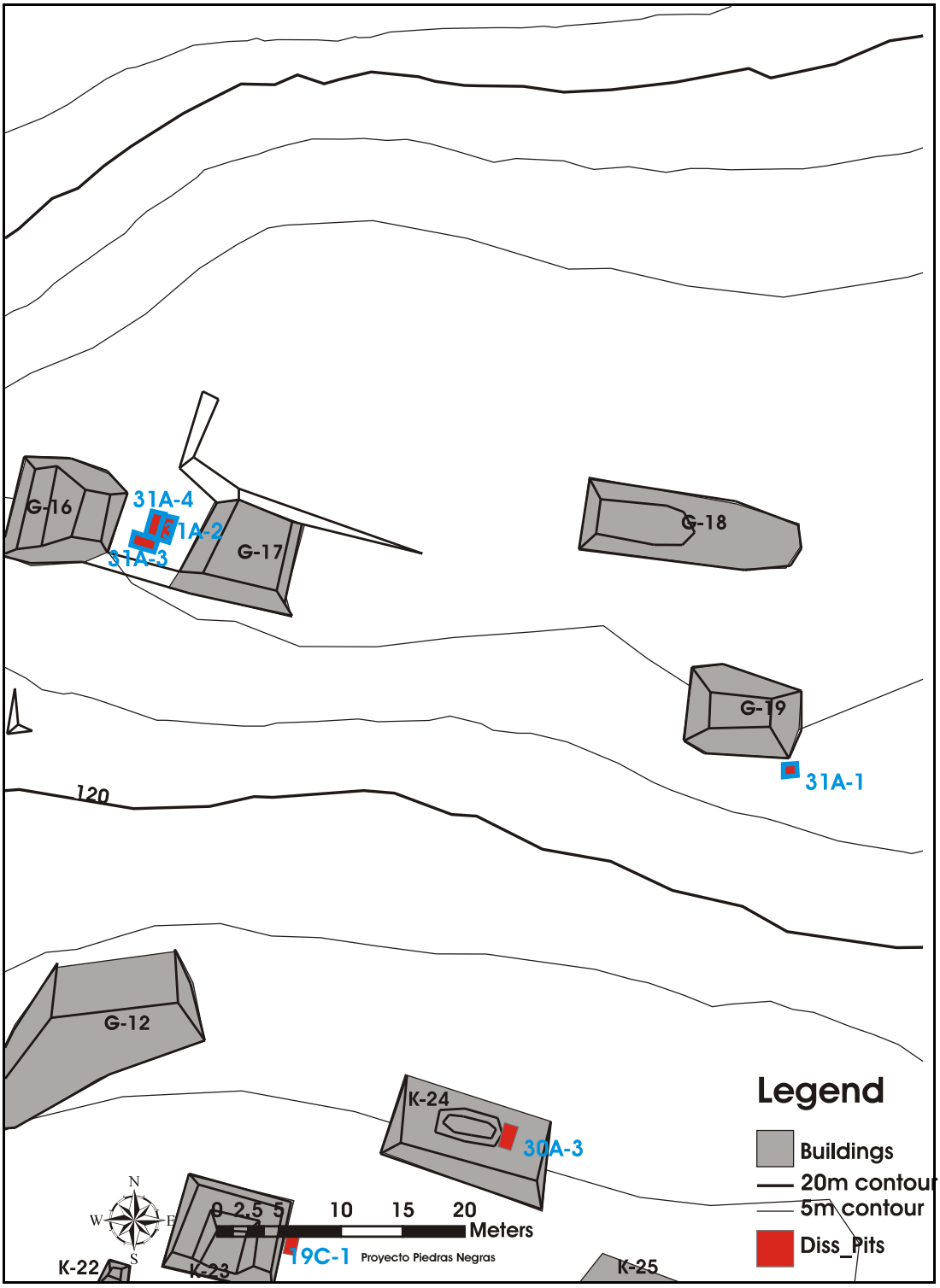


Figure F.50 Operation 31

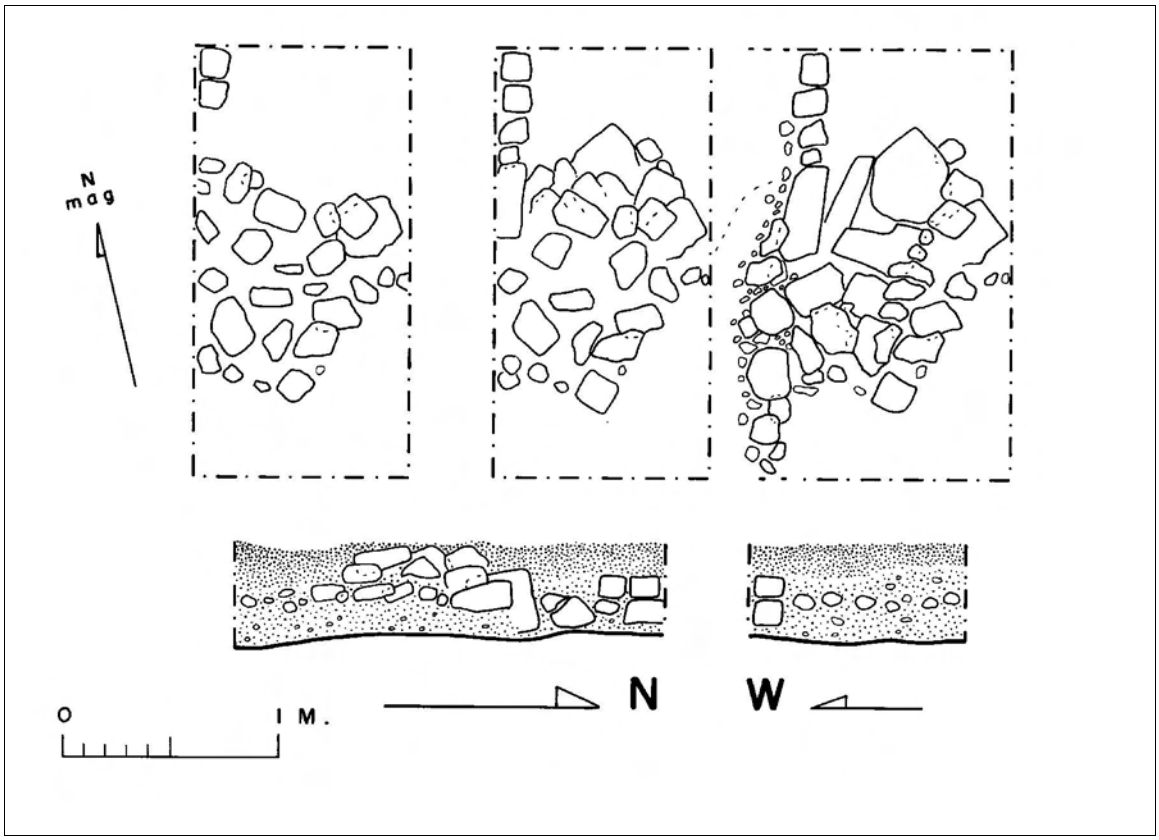


Figure F.51 PN 31A Profiles (From Arredondo 1998b:172)

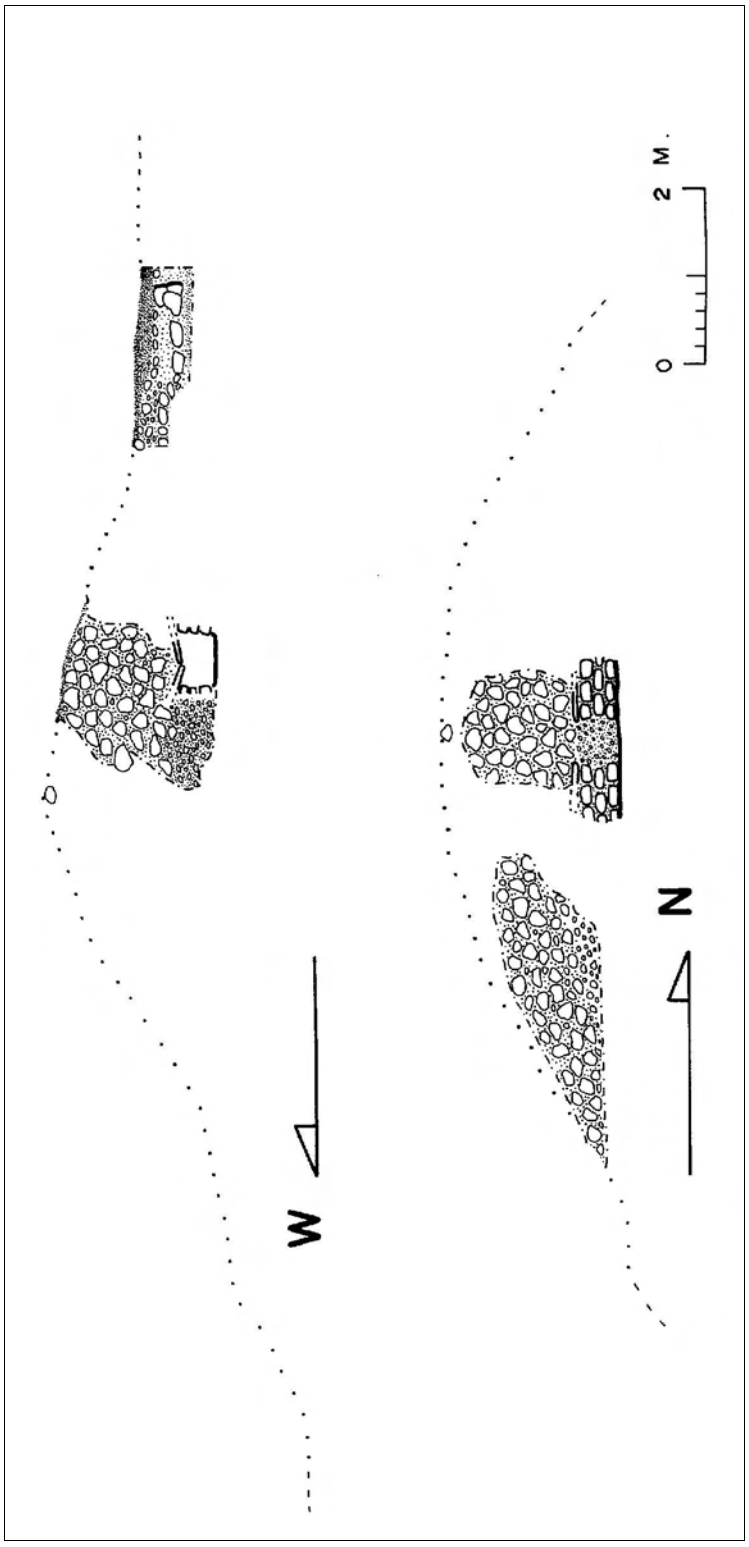


Figure F.52 PN 31, Structure G-16 (From Arredondo 1998b:173)

OPERATION 35

This operation is centered on the area in the northwest corner of the U quadrant (Figure F.53). This area is close to the laboratory of the Proyecto Piedras Negras and had not been previously test pitted. Work under the direction of Rene Muñoz during the 1998 to 2000 field seasons (Muñoz 1998, 1999, 2000) placed two test pits each year in this area to better understand the chronology of the platform upon which the project's camp was situated.

SUBOPERATIONS

PN35A

This suboperation consists of two test pits from the 1998 season. These were situated near the laboratory, and to the east from T-1. The units measured 2x2 meters and were excavated to bedrock in arbitrary 20 cm units. PN 35A-2 was located 20 meters south of PN 35A-1. The first layer was humus followed by a brown earthen soil with few limestone rocks to bedrock.

PN 35A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20		Chacalhaaz	
1	2	20-40		Yaxché/Chacalhaaz	
1	3	40-60		Yaxché/Chacalhaaz	
1	4	60-80		Balché/Yaxché	
1	5	80-100		Balché	
1	6	100-120			
1	7	120-140			

PN 35A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20		Yaxché/Chacalhaaz	
2	2	20-40		Yaxché	
2	3	40-60		Nabá/Yaxché	
2	4	60-80			
2	5	80-100			
2	6	100-120			

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	7	120-140			
2	8	140-150			

Summary

These test pits show that there was more activity to this area than previously believed. The test pits showed that this area, although generally flat and presumed to be natural was actually a built up platform over the bedrock. The early phases from some of the units indicate the long use that this area experienced throughout the history of Piedras Negras.

SUBOPERATION 35B

This suboperation continues test pitting in the T/U sector of the map. Rene Muñoz during the 1999 field season (Muñoz 1999) placed a couple of test pits in this area to excavate a rock alignment that was visible on the surface, near the laboratory.

PN35B-1

The first unit was PN 35B-1 which was a 2x2 meter unit placed roughly 6 meters south of the edge of the South Group Plaza. This unit was placed over a circular outcropping of limestone rocks, that could have had some cultural significance. The first layer was humus. The next layer was soft earth with sand. In the west profile was a rock alignment composed of five rectangular rocks, spaced about 35 cm apart. The next layer had more sand and limestone pebbles. The fourth layer had an eroded floor under it. The fifth stratum was composed of the floor and the fill underneath it. The next layer was eroded bedrock over more compact bedrock.

PN 35B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-10	10 YR 3/2	Chacalhaaz	
1	2	10-30	10 YR 8/3		Rock alignment
1	3	?	10 YR 3/3		
1	4	6 cm thick		Pom/Nabá	
1	5	75 cm thick	10 YR 3/2		Floor & Fill
1	6		10 YR 3/4		

PN35B-2

This 2x2 meter test pit was located next to PN 35B-1. This allowed the excavation to proceed quickly, because it was guided by the profile of the other unit. The first layer was humus, followed by a thicker layer in this unit that ended over the floor. Lot three comprised the

floor and its fill. An earlier platform was discovered in the west profile. This platform was 35 cm high and built directly over bedrock.

PN 35B-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1		10 YR 3/2	Chacalhaaz	
2	2		10 YR 3/4	Yaxché	
2	3			Nabá	Floor, Platform

Summary

The utility of these test pits lie in the Early Classic ceramic sample that came from them. These early lots are rare at Piedras Negras, and demonstrate that this area was inhabited during the entire course of Piedras Negras' existence.

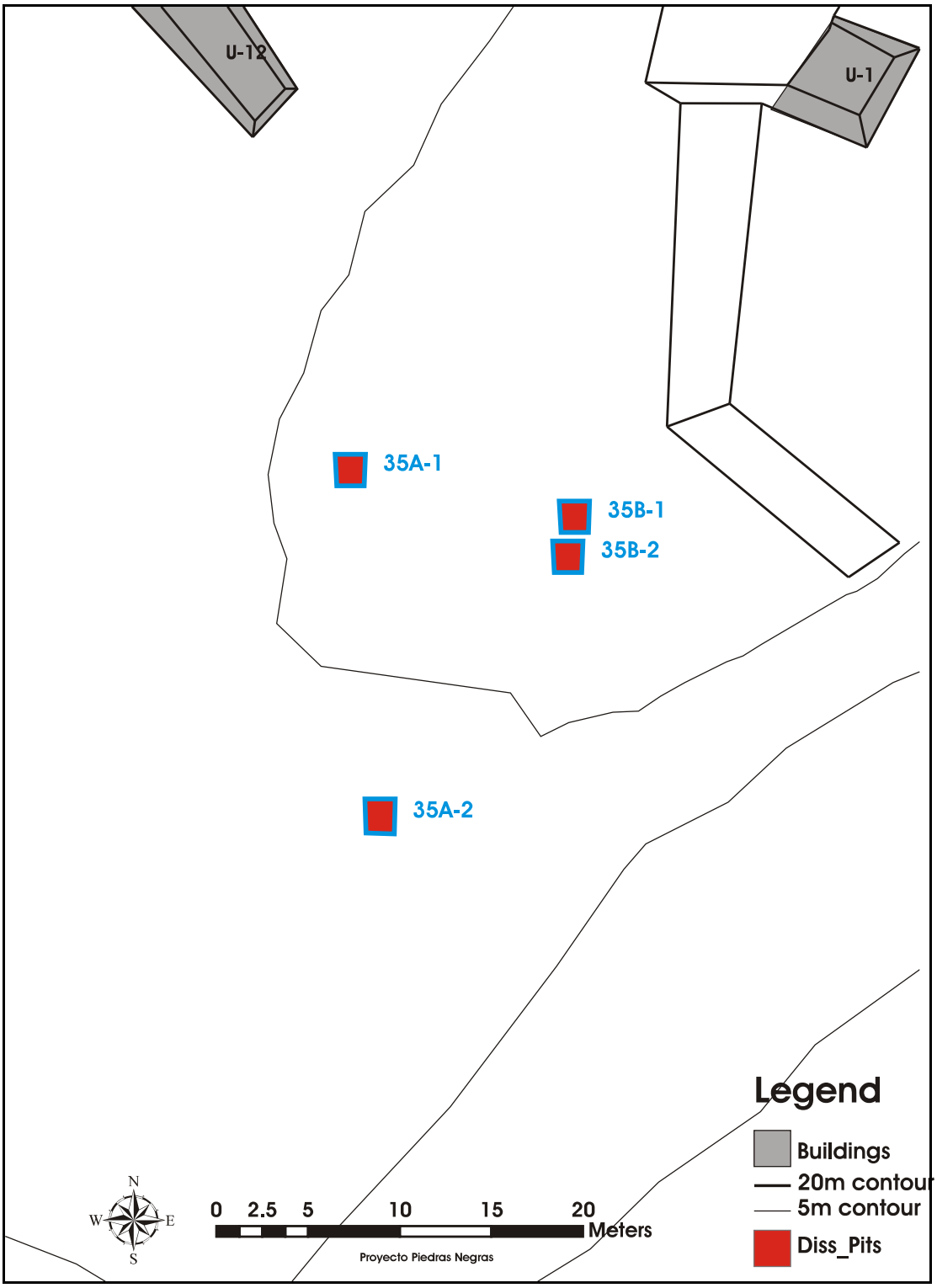


Figure F.53 Operation 35

OPERATION 38

Operation 38 was under the direction of Nicholle Townsend and J. Jacob Parnell (1998). The objective of this operation was to investigate a small, isolated patio group located outside the center (Figure F.54) and verify via chemical soil analysis that there is a relationship between high levels of phosphates in the soil and cultural material (Figure A.54). The exact location of this group can only be estimated, as the investigators did not have access to a GPS unit at the time. The group lies along the extant trail from El Porvenir and also is crossed (to the south) by the road created by the University of Pennsylvania.

PN38A-1

This 2x1 meter test pit is located 1.40 meters to the west of platform 1's wall, but off the platform. The first layer was humus, followed by a layer of brown earth with small limestone rocks. The third layer was mixed with the second, and consisted of yellow clay over bedrock.

PN 38A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-7	10 YR 3/2		
1	2	7-36	10 YR 3/3	Chacalhaaz	
1	3	36-42	10 YR 5/6	Sterile	

PN 38A-2

This 2x1 meter test pit was placed 1.30 meters to the west of platform 2, off the side of the platform. The first layer was humus, followed by a layer of brown earth with small limestone rocks. The third layer was very similar to the second, and then bedrock.

PN 38A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-6	7.5 YR 3/1	Yaxché	
2	2	6-50	7.5 YR 3/2	Chacalhaaz	
2	3	50-62	7.5 YR 3/3		

PN 38A-3

This 2x1 meter test pit was placed 1.9 meters west of platform 2, but off the platform. The first layer was humus, followed by essentially the same stratigraphy as PN 38A-2, i.e., two layers of brown earth mixed with small limestone rocks over bedrock.

PN 38A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-8	7.5 YR 3/1		
3	2	8-26	7.5 YR 3/2		
3	3	26-35	7.5 YR 3/3		

Summary

The relationship between high levels of phosphates and cultural material was not highly correlated in this operation. Little cultural material was recovered, perhaps due to the general lack of material remains in small residential groups outside of the main center at Piedras Negras.

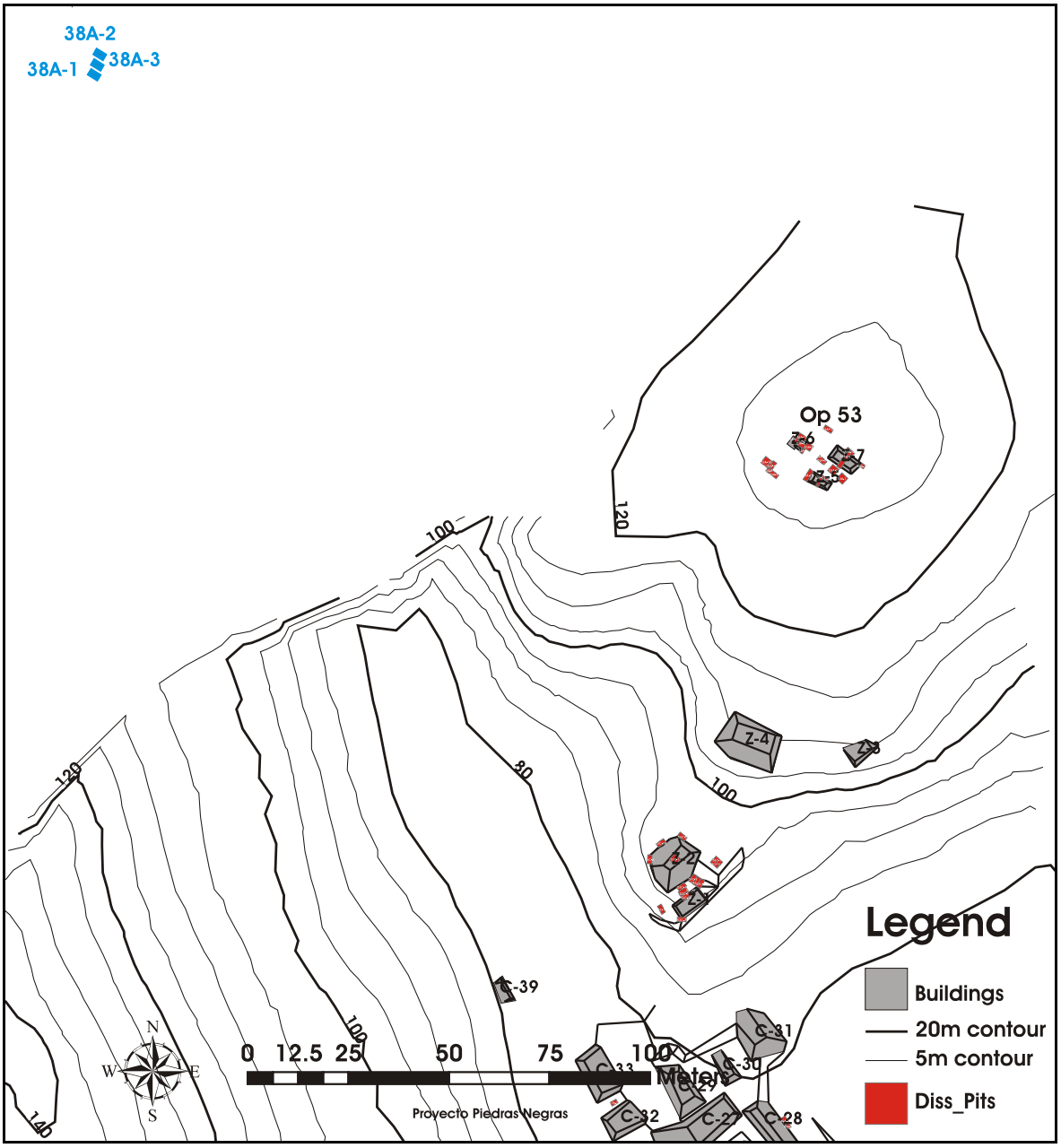


Figure F.54 Operation 38

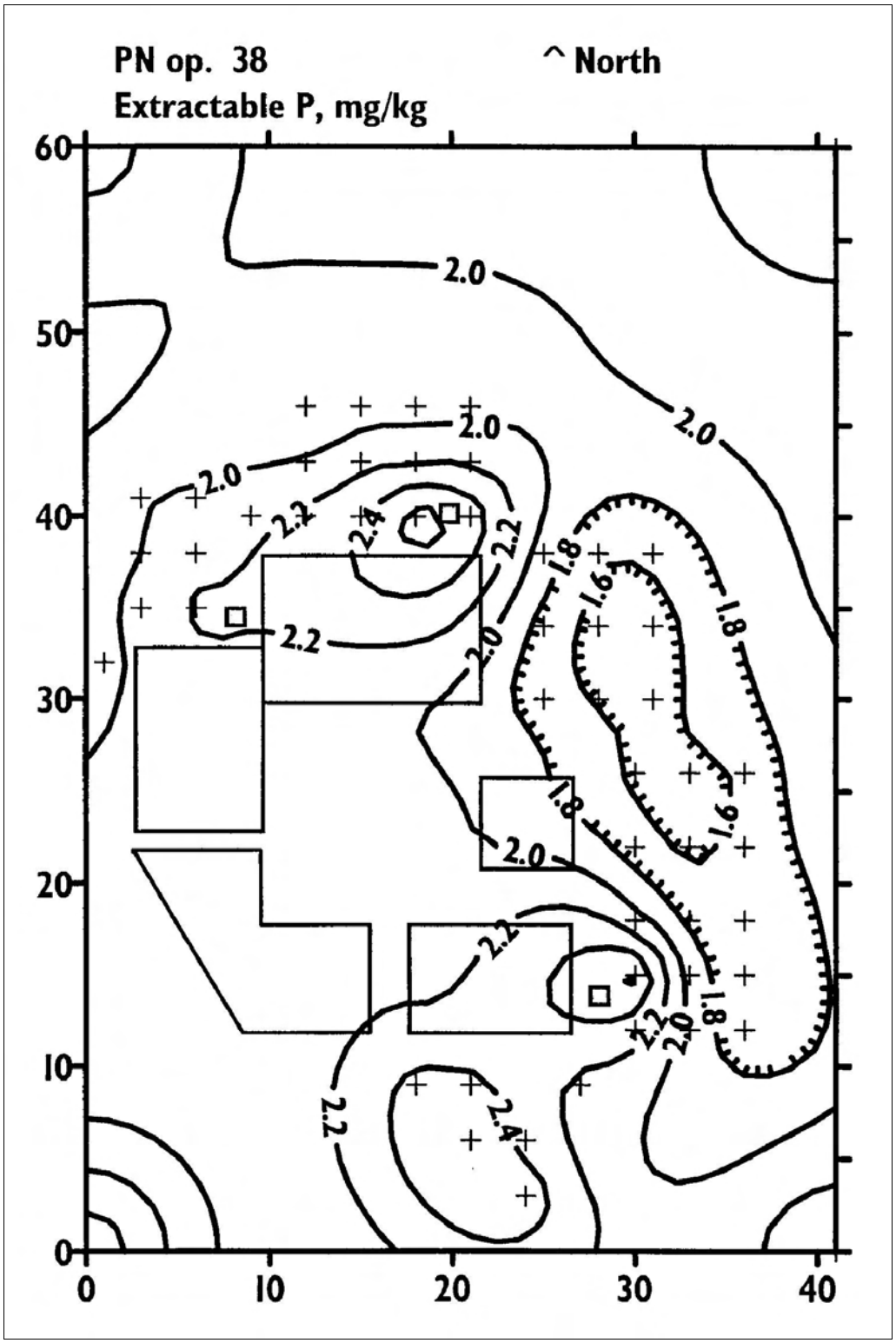


Figure F.55 PN 38, Soil Phosphorus Plan (from Townsend and Parnell 1998:277)

OPERATION 42

This operation was focused on the C quadrant of the map, in particular the buildings C-19 to C-33 (Figure F.56). Six test pits were placed within this area by Ernesto Arredondo Leiva and Alejandro Gillot Vassaux during the 1999 field season (Arredondo and Gillot 1999). These units were placed near buildings to better understand chronology.

SUBOPERATIONS

PN 42A

This suboperation consisted of test pits placed in patios, behind buildings, or just near a structure without actually entering it. PN 42B includes those test pits that were placed in or on top of a structure. PN 42A-1 is a 2x1 meter test pit placed in front of C-25 and along its main axis. This location complements PN 17A-1 which was placed nearby (Golden 1997b). The first layer was humus, followed by a brown earthen layer with small limestone rocks, perhaps the remains of grouting for a plaza surface. The rocks covered a rock alignment that ran southwest to northeast diagonally through much of the pit. The third layer had very large rocks placed over bedrock, perhaps the early plaza surface.

PN 42A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-10	10 YR 3/3		
1	2	10-28	10 YR 5/2	Chacalhaaz	Plaza surface, Rock alignment
1	3	28-40	10 YR 6/3	Early Yaxché	Plaza surface

PN 42A-2

PN 42A-2 was a 2x1 meter test pit placed in front of C-26 following its central axis. (PN 42A-4 was a 2 x 0.8 meter extension located on the east side of PN 42A-2 due to the presence of a burial cist in the eastern wall.) The first layer of PN 42A-2 was humus and the second layer had the same small layer of limestone rocks (grout) as PN 42A-1. At the bottom of this layer was a small wall just over the bedrock.

PN 42A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-10	10 YR 3/2		
2	2	10-62	10 YR 5/3		Plaza surface, Rock alignment

PN 42A-4

PN 42A-4 was a 2 x 0.8 meter extension of PN 42A-2 along its east side due to the presence of a burial cist in the eastern wall. PN 42A-4 also had an initial layer of humus, its

second layer had the same plaza surface of small rocks, and the burial cist of Burial 49 as its third layer with bedrock all around.

Burial 49 (PN 42A-4-3)

Burial 49 is the remains of a two year old child in a cist carved out of the bedrock along the main axis of C-26 in the plaza. The body was laid in a east-west orientation on its back in an extended position. There were no offerings. The cist was formed by rocks placed around the hole dug into the bedrock in a rectilinear pattern and the rocks were covered by two lajas. The cist measured 0.97 x 0.25 meters and 0.12 meters tall.

PN 42A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-10	10 YR 3/2	Chacalhaaz	Plaza surface
4	2	10-50	10 YR 5/3		
4	3	50-68	10 YR 5/3		Burial 49

PN 42A-3

PN 42A-3 was a 2x1 meter test pit placed east of structure C-28 along its east-west axis. This unit is located behind the building, which faces to the west. An extension to this unit (PN 42A-5) was placed immediately to the south to accommodate the removal of Burial 47 and its dimensions were 1 x 0.8 meters.

PN 42A-3 had an initial humus layer followed by a layer of grout consisting in small limestone rocks and the fill beneath it. The third layer was a plaza surface of larger rocks over bedrock. The fourth layer includes the material from inside Burial 47's cist. PN 42A-5 also had an initial humus layer followed by the same stratigraphy as PN 42A-3 and concluded over bedrock.

Burial 47 (PN 42A-3-4) was found along the central east-west axis of structure C-28 with an orientation of 345 degrees azimuth. The burial was orientated north-south. The cist measured 1.5 x 0.24 meters and the burial was of an adult in an extended position with the face up. The head and feet were missing - perhaps due to the bad condition of the bones and the trees growing through the cist. No offerings were associated with the burial.

PN 42A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-12	10 YR 3/2		
3	2	12-32	10 YR 4/2		Plaza surface
3	3	32-80	10 YR 6/2		Plaza surface
3	4	70-80	10 YR 6/2		Burial 47

PN 42A-5

A 1 x 0.8 meter extension to unit PN 42A-5, this test pit was placed immediately to the south to accommodate the removal of Burial 47. The initial humus layer was followed by a layer of grout consisting in small limestone rocks and the fill beneath it. The third layer was a plaza surface of larger rocks over bedrock.

PN 42A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-12	10 YR 3/2	Chacalhaaz	
5	2	12-32	10 YR 4/2		
5	3	32-80	10 YR 6/2	Chacalhaaz	

PN 42B-1

This suboperation took advantage of a looter's pit in C-25 to better understand the occupation of the group. The looters had left two circular holes in the building; one on top (2 meter diameter) and another one to the north-east. The looter's objective was to come upon a possible burial from the two angles but in this they were frustrated by a large thick wall between their excavations, and the presence of a large tree growing directly over the center of the building. The archaeologists cleaned the profiles of the looter's pit, and placed a small test pit (1.8 x 0.5 meter) inside their hole, with the first layer beginning at the bottom of the hole. The only lot went to bedrock, and came upon an earlier construction preceding C-25. The construction was a plaza retention wall. The soil in the lot was similar to PN 42A-1-3.

PN 42B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	132-160	10 YR 6/3		Retention wall

Summary

The result of this operation is a better understanding of the construction of the plaza surrounded by C-25, C-26, C-27, and C-28. There are at least two construction episodes for this plaza group. The test pits placed near C-26 and C-28 show an early platform placed over bedrock, upon which the buildings sit. This platform is probably the same construction discovered under C-25, so C-25 is a later construction. C-25 and the later plaza resurfacing are probably contemporary, which would be the second construction phase. The burials probably belong to the initial construction phase.

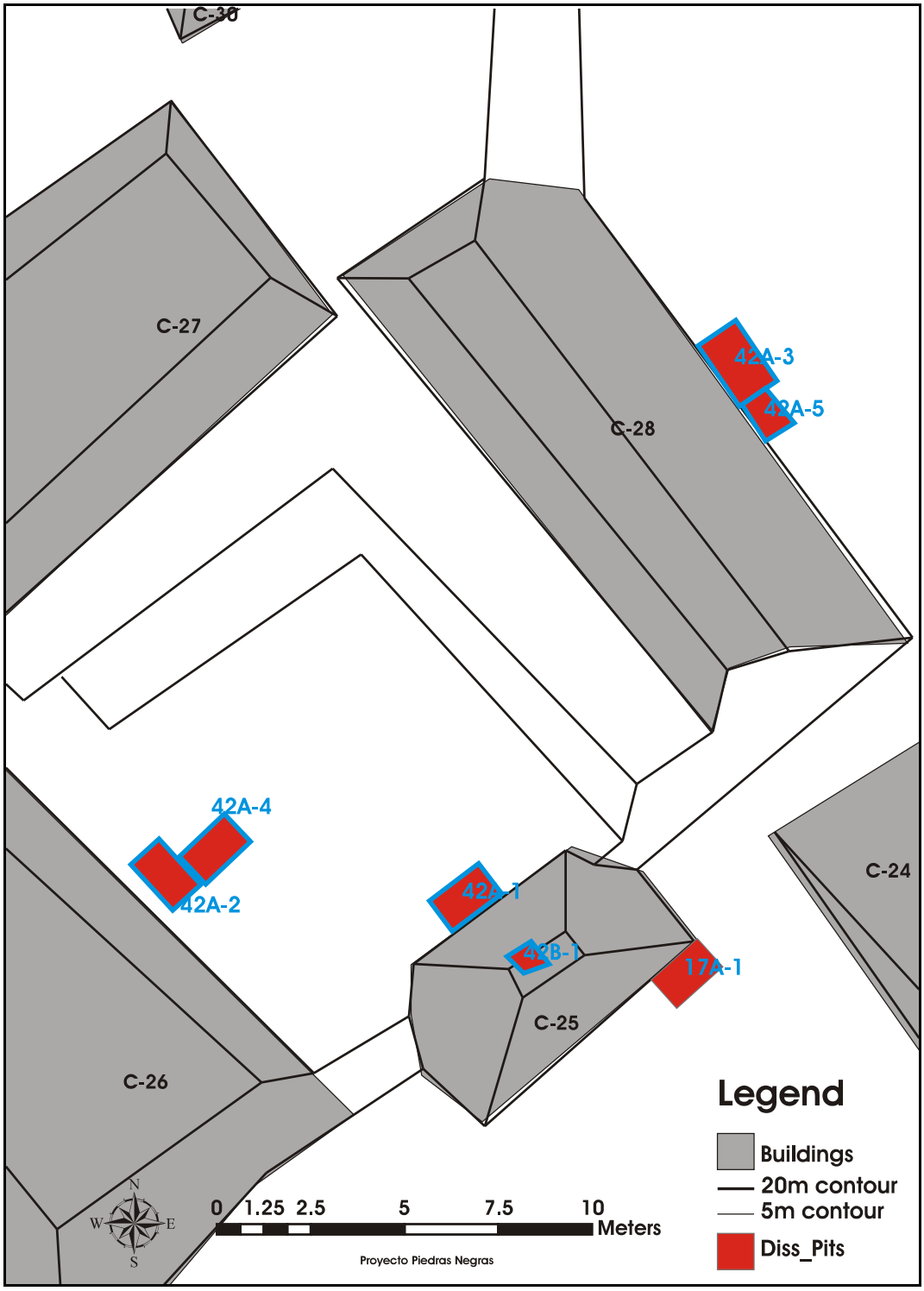


Figure F.56 Operation 42

OPERATION 53

This operation, under the direction of Alejandro Gillot Vassaux (Gillot 2001a), centered on the Z quadrant of the center (Figure F.57). This area is characterized by a karstic hill that rises out of the surrounding area. Because this hill overlooks the countryside, and is situated on the northern extreme of the center, the structures located on its summit are believed to have had a "duty" of watching the ingress of visitors and controlling access to the more vulnerable parts of the polity. In addition, this was an area which had been overlooked by the University of Pennsylvania, so little was known of history and artifact record. A series of test pits was placed in and around the structures of this quadrant to better understand the history and function of these remote buildings. Suboperation A focused on the plaza composed by structures Z-5, Z-6, Z-7, and Z-8. Suboperation B delved inside these structures. Suboperation C focused on the plaza composed by structures Z-1 and Z-2, while suboperation D excavated inside Z-2.

SUBOPERATIONS

PN53A

The goal of this suboperation was to better understand the chronology of the upper mound group through a series of test pits around structures. These units were placed in the plaza comprised of structures Z-5, Z-6, Z-7, and Z-8. These small buildings are located on the summit of a small limestone hill overlooking the northern "border" of the center.

PN 53A-1

This 2x2 meter test pit was located to the south of the plaza. The first layer was humus, followed by a brown earth layer with small limestone rocks. The last layer had a light brown-yellow soil over bedrock (Figure A.57).

PN 53A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 3/2	Sterile	
1	2	20-31	10 YR 4/3		
1	3	31-40	10 YR 6/4		

PN 53A-2

This is a 2x2 meter test pit placed one meter north (but along same orientation) of the previous unit and in between structures Z-5, and Z-7. The first layer was humus, followed by an earthen and limestone pebble mix (grouting?). The last layer was a brownish yellow soil over bedrock.

PN 53A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-10	10 YR 3/2		
2	2	10-22	10 YR 4/3		
2	3	22-45	10 YR 5/4		

PN 53A-3

This is a 2x1 meter test pit placed 1.60 meters northwest of unit 2, with an orientation of 300 degrees northwest. The stratigraphy is very similar the previous units.

PN 53A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-9	10 YR 3/4		
3	2	9-23	10 YR 4/3		
3	3	23-35	10 YR 6/4		

PN 53A-4

This is a 1.50 x 1.50 meter test pit placed in front of structure Z-6. The first layer was humus, followed by a layer of limestone pebbles mixed with brown earth, and then a layer of brownish yellow earth over bedrock.

PN 53A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-15	10 YR 3/4		
4	2	15-33	10 YR 4/3		
4	3	33-50	10 YR 5/4		

PN 53A-5

This was a 0.50 x 1.50 meter extension to the previous unit, located to the south. Between this unit and the previous one, the entire front of Z-6 was excavated. The purpose of this extension was to take advantage of a small midden uncovered in the previous unit to improve the ceramic assemblage for this quadrant. The first layer was humus, followed by brown earth mixed with larger rocks than in the previous unit. The last layer was brownish yellow soil over bedrock.

PN 53A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-5	10 YR 3/4		
5	2	5-20	10 Yr 4/3		
5	3	20-40	10 YR 5/4		

PN 53A-6

This 1.70 x 1.0 meter test pit was placed behind Z-6 along its central axis, with an orientation of 25 degrees to the northwest. Its purpose was to uncover any ceramic midden that might be present behind this structure. The stratigraphy had the same characteristics as the previous units but no midden.

PN 53A-7

This 2x1 meter test pit was placed along the front of Z-8, a small structure lying to the northwest of the previous plaza group (Figure A.57). The first layer was humus, followed by a layer of brown earth with small limestone pebbles. The last layer was a brownish-yellow soil over bedrock.

PN 53A-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-23	10 YR 3/2		
7	2	23-37	10 YR 4/3		
7	3	37-56	10 YR 5/4		

PN 53A-8

This 1x1 meter unit was a small extension to the south of the previous unit, to obtain a better ceramic sample (Figure A.57). The stratigraphy was the same as the previous unit. In both units, there is a cut into the bedrock in front of the structure. This cut contained the utilitarian ceramic found, and some rocks possibly aligned, so another extension was placed nearby.

PN 53A-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-27	10 YR 3/2		
8	2	27-35	10 YR 4/3		
8	3	35-63	10 YR 5/4		

PN 53A-9

This 1.20 x 1.50 meter extension to the previous unit, along its east side was placed to follow a possible rock alignment. The rock alignment turned out to be false, and the stratigraphy is very similar to the preceding units.

PN 53A-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-15	10 YR 3/2		
9	2	15-25	10 YR 4/3		
9	3	25-45	10 YR 5/4		

PN 53A-10

This was a 2x2 meter test pit placed on top of structure Z-8. It had three layers before arriving at the bedrock. The ceramic recovered was both few and badly eroded.

PN 53A-11

This was a 1x1 meter extension to unit 10 along its eastern side to find architecture or anything within this small mound (Z-8), but to no avail. The stratigraphy was similar to the units around it.

PN 53A-12

This 2x1 meter test pit was placed along the northwest corner of Z-6 (Figure A.57). The first layer was humus, then a layer of brown earth with some fill and bajareque from the superstructure of the building. Below this was a layer of brownish yellow earth over bedrock.

PN 53A-12

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
12	1	0-29	10 YR 3/2		
12	2	29-48	10 YR 4/3		
12	3	48-63	10 YR 5/4		

PN 53A-13

This 2x1 meter test pit was located to the northeast of the plaza group but had little cultural material in it. The stratigraphy was similar to the other units.

PN 53A-14

This 2x1 meter test pit was placed along the central axis of Z-7, but on its back. The first layer was humus, followed by a brown soil layer and then another brown layer over bedrock.

PN 53A-14

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
14	1	0-30	10 YR 2/2		
14	2	30-43			
14	3	43-61	10 YR 5/3	Sterile	

PN 53A-15

This was a 3x1 meter test pit placed along the northwest side of Z-5. This unit had the most cultural material of any unit in this suboperation (which still was not a lot of material). The first layer was humus, followed by a dark grayish brown soil layer. The third layer was a dark brown with bedrock in the southern part of the unit at 39 cm below ground level. The fourth layer was basically the same soil matrix as the previous, with bedrock below it.

PN 53A-15

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
15	1	0-23			
15	2	23-33			
15	3	33-46	10 YR 3/3		
15	4	46-75	10 YR 4/3		

PN 53A-16

This test pit placed in the southeast corner of Z-7 had very little cultural remains.

Summary

These test pits showed that this plaza group is built just over bedrock with a very thin layer of cultural material. Little was found in the way of ceramics, or even bajareque, which means that this area was inhabited for a very short duration probably during the Late Classic.

SUBOPERATION 53B

This suboperation consists of four trenches placed into the architecture of structures Z-5, Z-6, and Z-7. These units were placed so as to bisect the main axis of the structure in both a north-south and east-west direction.

PN 53B-1, PN 53B-3

This 3 x 0.80 meter trench was placed along the main axis of structure Z-5 with an orientation of 280 degrees northwest (Figure A.58). The first lot was humus, followed by a layer of structural fill, with a dark gray-brown soil. The northeast side of the unit had a small wall in it, at 30 cm below ground surface. The third layer continued with the grayish soil and the wall

continued downward through a layer of small limestone rocks. The bottom layer was brown earth over bedrock, with the wall lying on the bedrock. This wall is probably Z-5-Sub-1 and probably consists of an earlier construction. An extension was made to this unit to better uncover the wall.

PN 53B-3 is a 1x1.50 meter extension aligned from the southeast corner of the previous unit. This unit had the same basic stratigraphy of the previous unit.

PN 53B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-10			
1	2	10-36			
1	3	36-56			
1	4	56-76	10 YR 4/3		Z-5-Sub-1

PN 53B-2

This 5x1 meter trench was placed over structure Z-7 in an east-west direction with an orientation of 33 degrees to the northeast (Figure A.59). The first layer was humus, followed by a layer of dark gray-brown earth and building fill. The third layer had plenty of rocks and brown earth. In the eastern section of the trench was uncovered an earlier wall to the structure, so part of Z-7-sub-1. The bottom layer had dark brown soil with smaller rocks than the previous layer, over bedrock.

PN 53B-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-22			
2	2	22-36	10 YR 3/2		
2	3	36-82	10 YR 4/3		Z-7-Sub-1
2	4	82-100	10 YR 3/3		

PN 53B-3

An extension of PN 53C-1.

PN 53B-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-19			
3	2	19-40			

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	3	40-56			
3	4	56-76			Z-5-Sub-1

PN 53B-4

This is a 2x1 meter test pit placed on top of structure Z-6 (Figure A.60). The first layer was humus with some large rocks from the structure's fill. The second stratum was grayish brown earth of medium consistency with lots of limestone rocks, perhaps marking an earlier floor. The third layer was yellowish brown earth followed by a layer of dark grayish brown soil over bedrock.

PN 53B-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-15			
4	2	15-38	10 YR 3/4		
4	3	38-59			Z-6-Sub-1
4	4	59-100			

Summary

The units placed inside structures Z-5, Z-6, and Z-7 show that they apparently had two building phases, with an interior wall or buried feature marking the earlier construction. The paucity of cultural remains will continue to be a problem with understanding their function. The structures were in use during the Late Classic, and probably served as residences. The lack of metates and grinding implements, and the general low quantity of cultural remains as well as the small size of the structures suggests that little food was prepared here. The idea that this group served a militaristic role is still possible especially as its cultural inventory is different than other places within the center, and it has fewer artifacts than places outside the center, such as those excavated by David Webster and Amy Kovak (1999).

SUBOPERATION 53C

This suboperation was focused on recovering material from another plaza group in the Z quadrant, that of structures Z-1 and Z-2. These two buildings are located at the base of the hill below the area excavated in the previous suboperation. The goal of these excavations was to better understand the chronology of this group, and also to obtain a comparative sample of cultural material between these two groups. Indeed, more material was recovered from Z-1 and Z-2 than in the previous suboperation.

PN 53C-1, PN 53C-9

This 2 x 1.50 meter test pit was placed to the south of Z-2 along its main axis (Figure A.61). The first layer was humus, followed by a yellowish-brown soil layer that perhaps was a midden. The third stratum consisted of brown soil with limestone rocks of a uniform size, perhaps patio fill. The top of a small wall was discovered running in an east-west direction (145 degrees northwest) towards the southern part of the unit (the base of the wall was discovered in the fifth lot.). The fourth layer was again yellow-brown soil with small limestone rocks. In the northern half of the unit were found three metates, placed upside-down. Two of them were complete. These are thought to be part of a termination rite associated with structure Z-2. The fifth level was a hard compacted earth mixed with the same fill as the previous layer. The base of the wall was sitting on a compact layer of small rocks. The last layer was more yellowish-brown soil over bedrock. This layer revealed some lajas, so an extension was made to the unit, to look for a possible burial (PN 53C-9), but none was forthcoming.

PN 53C-9 was a 1.40 x 1 meter extension to PN 53C-1 along its north profile (Figure A.61). The first layer was humus. Then a layer of dark yellow-brown soil with rocks was uncovered. This layer had the lajas, but no burial. The third layer had brown earth and some rock alignments, like that found in PN 53C-1-5. The fourth layer was dark yellow-brown soil mixed with small limestone rocks. The fifth layer consisted of brown earth. The sixth layer was yellow-brown soil again with bedrock at the bottom.

PN 53C-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-35			
1	2	35-46	10 YR 3/4		
1	3	46-56	10 YR 4/3		
1	4	56-65	10 YR 4/4		
1	5	65-72	10 YR 5/3		Wall
1	6	72-87	10 YR 5/4		

PN 53C-2

This 2x1 meter test pit was placed along the southeast corner of Z-2, with the hope of finding a midden along its edge. The first layer was humus with large rocks, followed by a dark brown soil layer, still with large rocks mixed in. The third stratum was also of brown earth with more rocks. The fourth layer was of dark gray-brown soil with some rocks, definitely platform fill. The last lot was brown earth over bedrock. Due to the high quantity of cultural material found in this unit, two extensions were made, PN 53C-3, 4.

PN 53C-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-24	10 YR 3/2		
2	2	24-40	10 YR 3/3		
2	3	40-50	10 YR 5/3		
2	4	50-69	10 YR 4/2		
2	5	69-76	10 YR 4/3		

PN 53C-3

This unit was a 2 x 0.70 meter extension of the previous unit, to the east. Because the previous unit had quite abundant cultural material, the excavator made this extension, and another one (PN 53C-4). The stratigraphy was very similar to the previous unit with humus, followed by dark earth and rocks. The third layer was brown earth, while the fourth was dark gray-brown. The last layer was brown earth over bedrock.

PN 53C-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-18	10 YR 3/2		
3	2	18-28	10 YR 3/3		
3	3	28-48	10 YR 5/3		
3	4	48-56	10 YR 4/2		
3	5	56-68	10 YR 4/3		

PN 53C-4

This unit was an extension of PN 53C-3, which was an extension of PN 53C-2 (Figure A.62). It measured 2x1 meters and was placed to the east of PN 53C-3. Its purpose was to follow the midden and obtain a better sample of cultural material from this area. The stratigraphy was

similar to the previous unit, with humus followed by a dark brown soil layer. This layer had a wall from Z-1 in it. Then a brown soil layer. The fourth layer was dark grayish brown soil with small rocks in it. The last layer was brown soil over bedrock. The wall was found to be placed over a mixture of brown earth and small rocks.

PN 53C-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-11	10 YR 3/2		
4	2	11-28	10 YR 3/3		
4	3	28-44	10 YR 5/3		
4	4	44-52	10 YR 4/2		
4	5	52-70	10 YR 4/3		Wall

PN 53C-5

This 2x1 meter test pit was placed along the northeast corner of Z-2, with an orientation of 21 degrees northeast. The first layer was humus followed by a dark brown soil layer over bedrock.

PN 53C-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-28			
5	2	28-37	10 YR 3/3		

PN 53C-6

This 2x1 meter test pit was placed along the northwest corner of Z-2. The first layer was humus with rocks. The next layer was a brown earthen layer followed by a dark gray-brown layer over bedrock.

PN 53C-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-40			
6	2	40-51	10 YR 4/3		
6	3	51-78	10 YR 4/2		

PN 53C-7

This 2x1 meter test pit was placed in the southwest corner of structure Z-1, oriented 280 degrees northwest. This unit was placed at the extreme south end of the group, close to the first rocky outcropping of the hill. The first layer was humus with fill and rocks. The next stratum was a thick, dark gray-brown soil with rocks. The third layer was brown earth with smaller rocks than the previous layer. The fourth stratum was a dark gray-brown soil. The fifth layer was brown earth. The sixth was dark brown earth over bedrock.

PN 53C-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-35			
7	2	35-54			
7	3	54-70	10 YR 4/3		
7	4	70-84			
7	5	84-134			
7	6	134-169	10 YR 3/3		

PN 53C-8, PN 53C-10

This test pit is located to the north of Z-1 and measured 2x1 meters with an east-west orientation (295 degrees). The first lot was humus, followed by a dark brown soil layer (Figure A.63). The third stratum was brown earth with large rocks. The fourth layer was dark gray-brown earth. The last layer was also gray-brown soil over bedrock. An extension to this unit was made to the west (PN 53C-10).

PN 53C-10 was a 1.50 x 1.00 meter extension to PN 53C-8 along the western profile. The first layer was humus (Figure A.63). The second stratum was a dark brown soil followed by a layer of brown earth. The fourth layer was a dark gray-brown soil over bedrock.

PN 53C-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-30			
8	2	30-55	10 YR 3/3		
8	3	55-63	10 YR 4/3		
8	4	63-75	10 YR 4/2		
8	5	75-134			

PN 53C-9

An extension of PN 53C-1.

PN 53C-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-25			
9	2	25-36			
9	3	36-53			Wall
9	4	53-85			
9	5	53-100			
9	6	100-129			

PN 53C-10

An extension of PN 53C-8.

PN 53C-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-20			
10	2	20-37	10 YR 3/3		
10	3	37-55	10 YR 4/3		
10	4	55-74	10 YR 4/2		

PN 53C-11, PN 53C-13

This 2x1 meter test pit was placed towards the extreme northeast of the Z group. The first layer was humus, followed by dark brown soil. The third stratum was of brown earth with a medium consistency. The fourth layer was dark gray-brown soil as was the fifth. Underneath this layer was bedrock.

PN 53C-13 is a 2x1 meter extension to PN 53C-11 along its western profile. The first layer was humus. The second was dark brown earth. The third layer was brown earth. The fourth layer was dark gray-brown soil. This extended down another layer and just over bedrock.

PN 53C-11

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	1	0-28			

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	2	28-48	10 YR 3/3		
11	3	48-69	10 YR 4/3		
11	4	69-88	10 YR 4/2		
11	5	88-119			

PN 53C-12

This 2x1 meter test pit was placed along the western side of Z-1. There were six strata and bedrock was reached at 1.22 meters below ground surface. The stratigraphy was similar to PN 53C-7.

PN 53C-13

An extension of PN 53C-11

PN 53C-13

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
13	1	0-27		Chacalhaaz	
13	2	27-40	10 YR 3/3		
13	3	40-60	10 YR 4/3		
13	4	60-76	10 YR 4/2		
13	5	76-85			

PN 53C-14

This 2x1 meter test pit was placed along the north side of Z-2. The first layer was humus followed by a layer of brown earth with a fine consistency. The last layer was dark gray-brown over bedrock.

PN 53C-14

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
14	1	0-20			
14	2	20-34	10 YR 3/4		
14	3	34-43	10 YR 4/2		

Summary

These fourteen units placed within the confines of the group Z-1 and Z-2 stand in marked contrast to the units placed within the previous group (Z-5, Z-6, and Z-7). There is much more cultural material at the bottom of the hill than was evident at the top. The presence of metates also indicate a more “lived-in” residential feel for the bottom group than the top one. This evidence supports the idea that the top group had a specialized function that was not shared by the bottom group.

SUBOPERATION 53D

This suboperation consists of a single 2x2 meter test pit (PN 53D-1) placed on top of structure Z-2. The stratigraphy was composed of generally equal parts soil and rocks clear to bedrock without any other architectural features being uncovered.

PN 53D-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1				
1	2				
1	3	51-72			
1	4				
1	5				
1	6	-196			

Summary

These excavations have clarified the nature of settlement in the Z quadrant. There was a real difference in the quantify of cultural material recovered between the two main groups of this sector. The group located on the top of the hill had very different quantities of material recovered than that located on the bottom of the hill. Their functions may have different as well with the top of the hill representing a strategic outpost, perhaps seasonally occupied, while the bottom of the hill had a permanent occupation complete with the quintessential residential feature, metates.

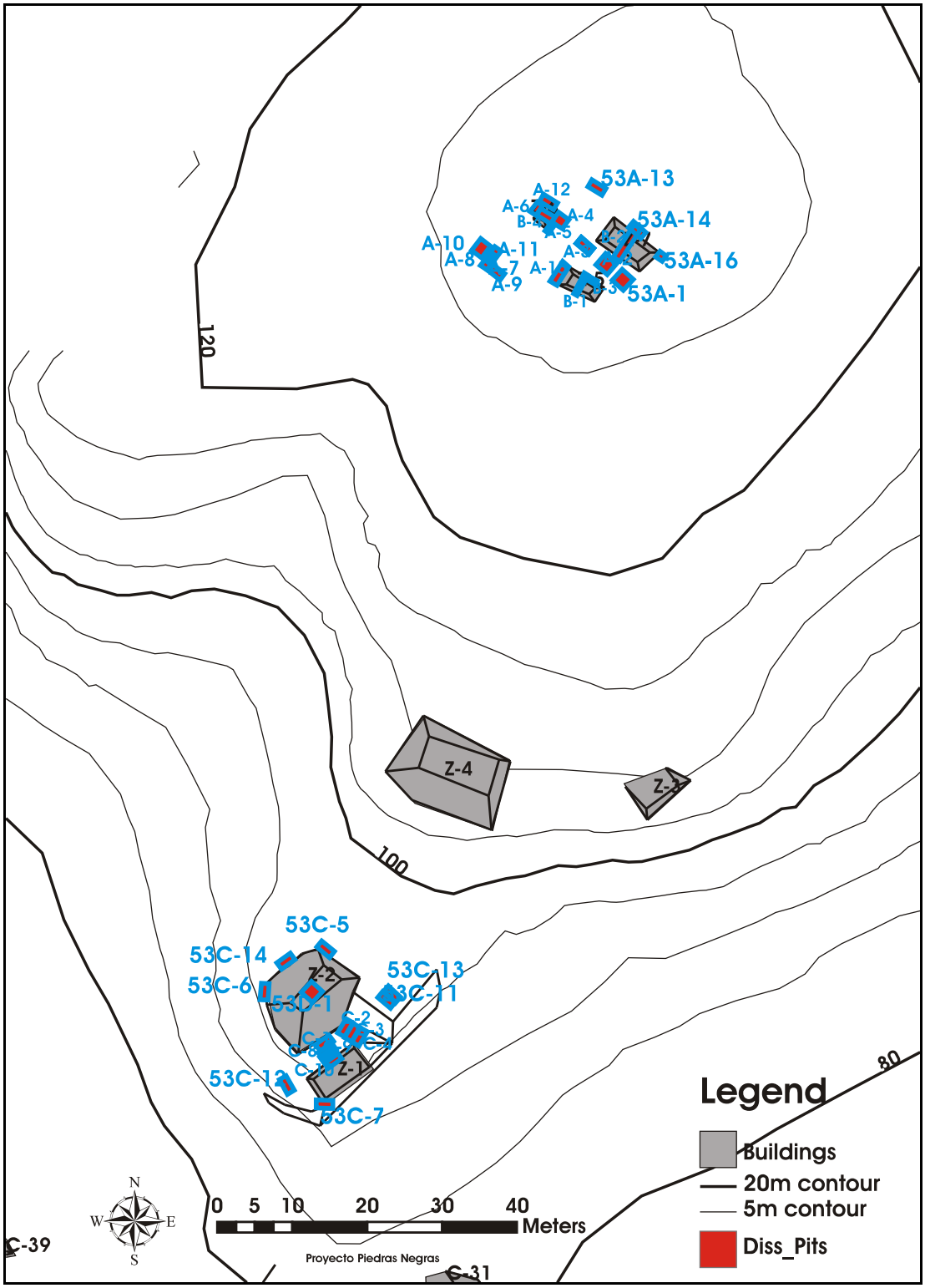


Figure F.57 Operation 53

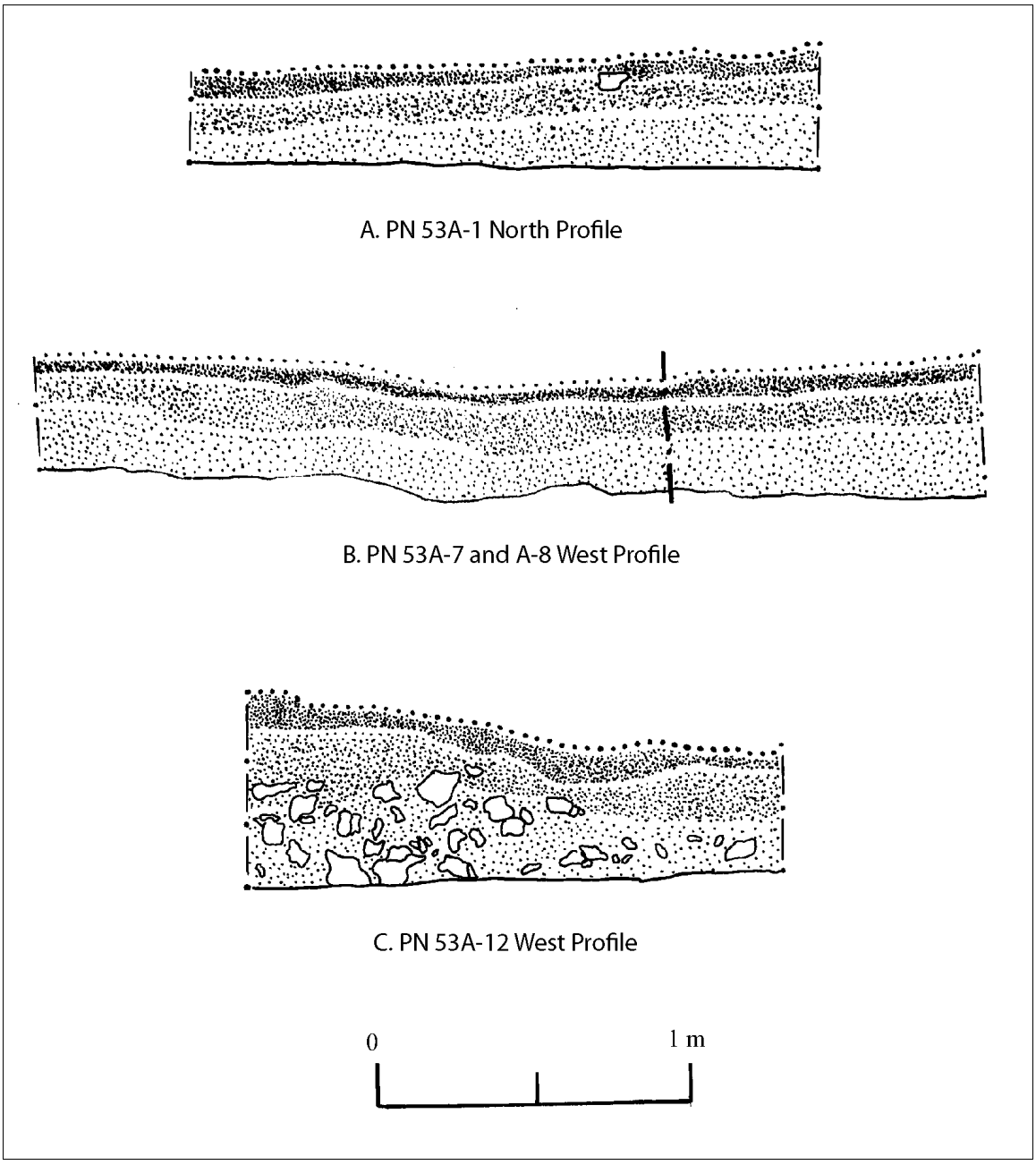
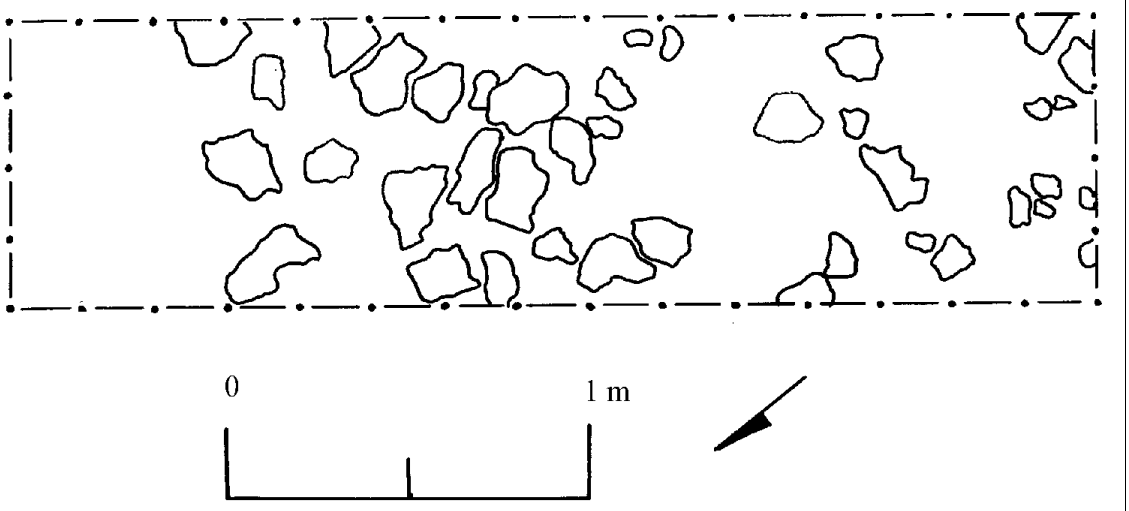
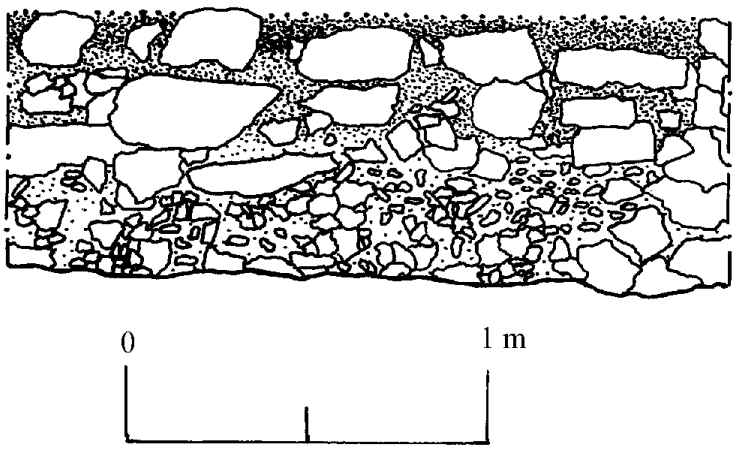


Figure F.58 Various Profiles from PN 53A (From Gillot 2001a:302)



A. PN 53B-1-1 Plan of Excavation



B. PN 53B-1-3 Exposed Wall of Structure Z-5

Figure F.59 Plan and Profile of PN 53B-1 (From Gillot 2001a:303)

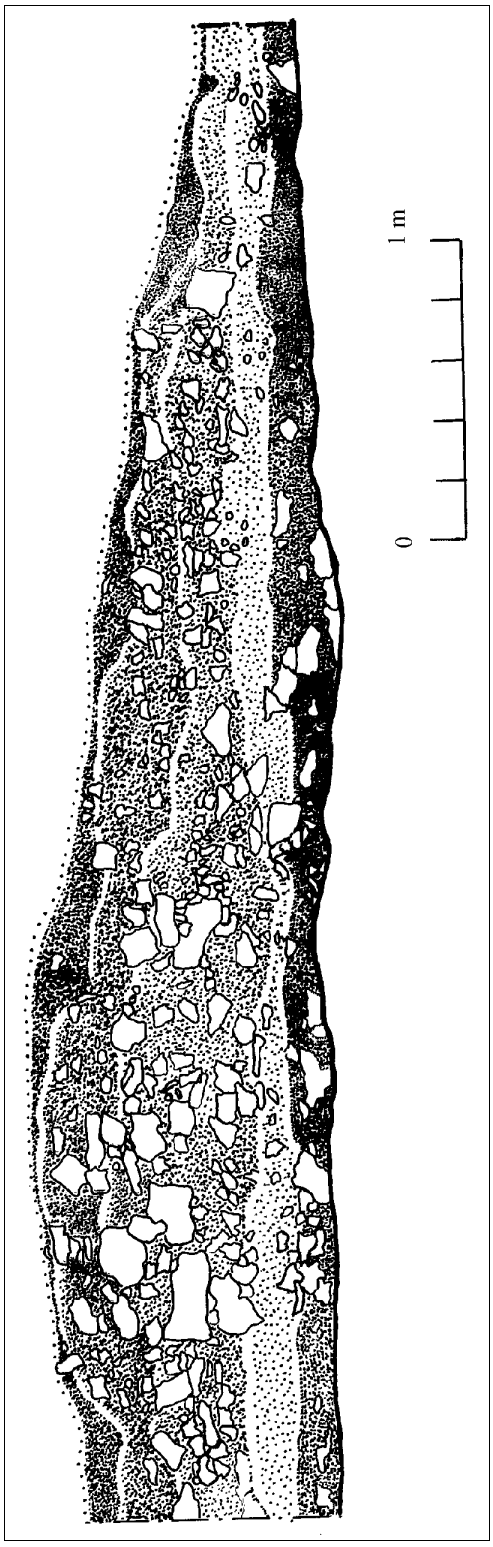


Figure F.60 South Profile of PN 53B-2 (From Gillot 2001a:304)

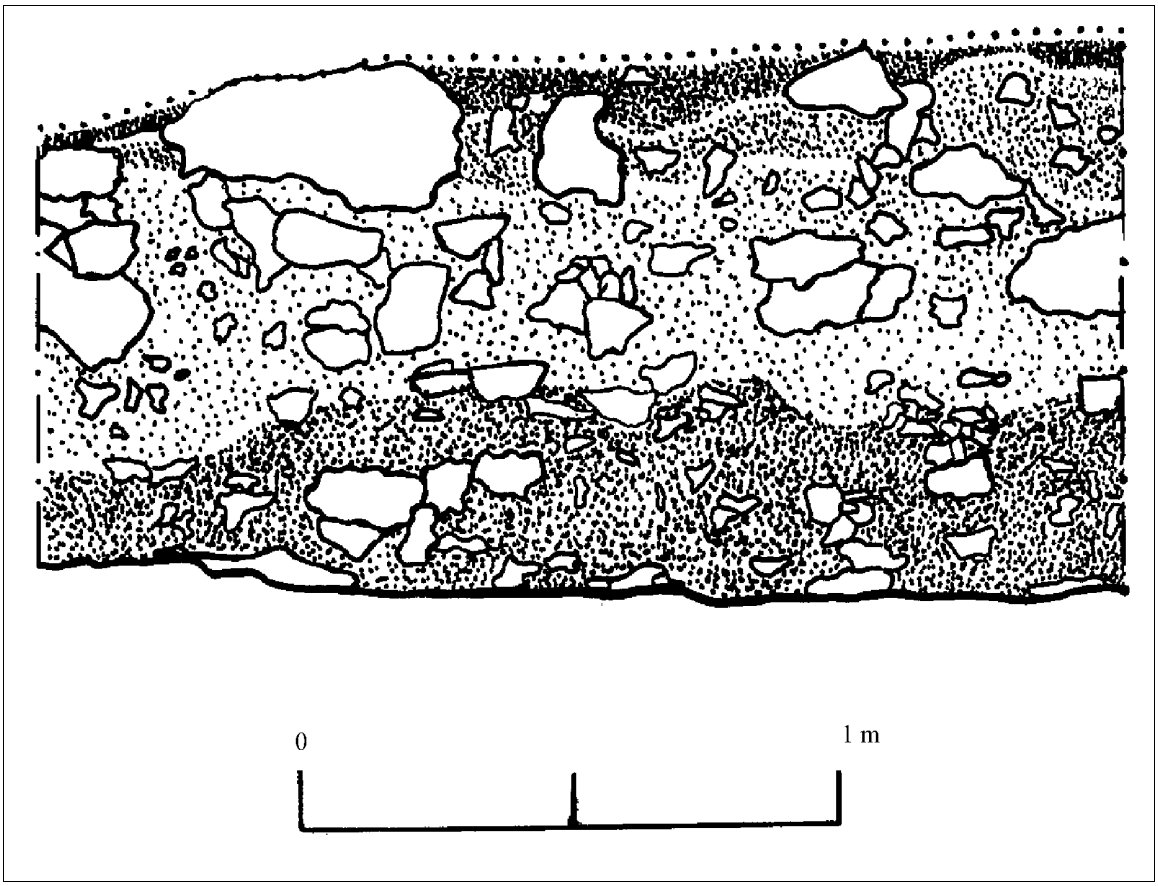


Figure F.61 PN 53B-4, North Profile (From Gillot 2001a:305)

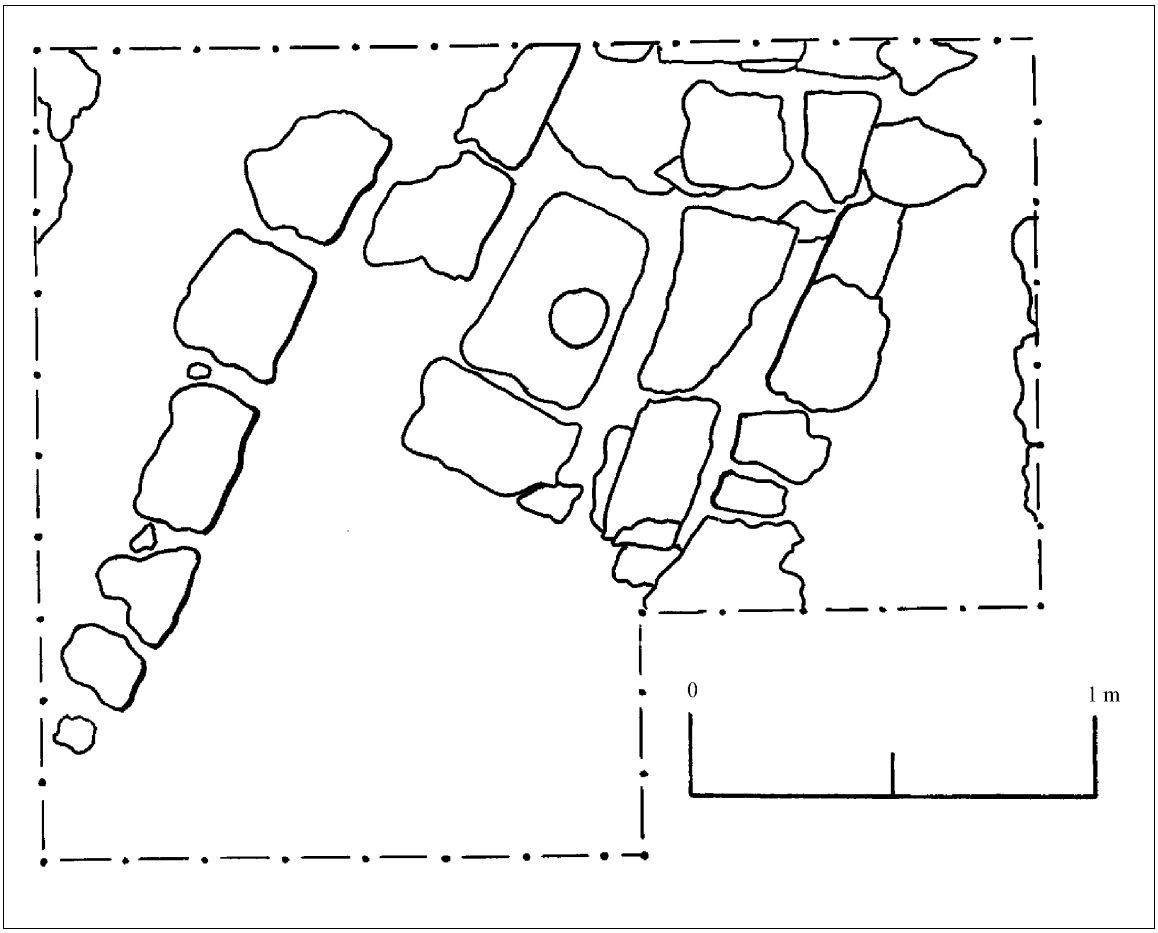


Figure F.62 PN 53C-1 and C-9, Plan of Excavations (From Gillot 2001a:306)

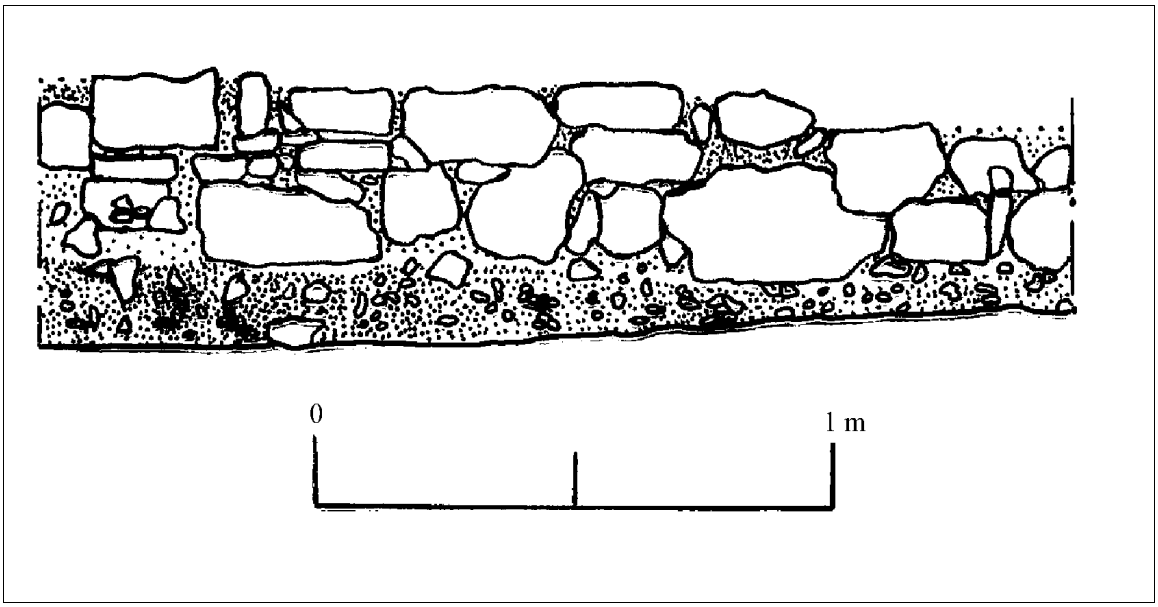


Figure F.63 PN 53C-4, North Profile (From Gillot 2001a:307)

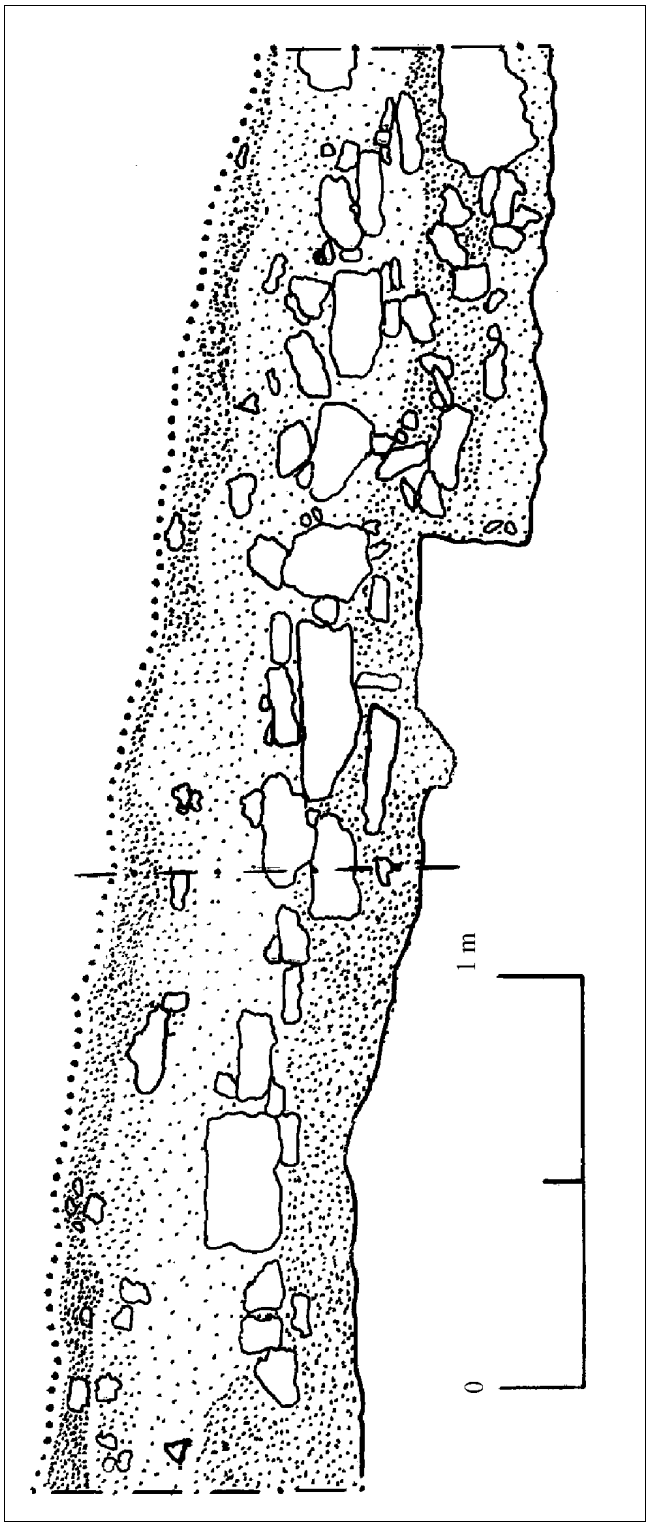


Figure F.64 PN 53C-8 and C-10, North Profile
(From Gillot 2001a:308)

OPERATION 57

This operation was centered on the southern side of Piedras Negras, in the area mapped by Zachary Nelson (1999). The small mound groups in this area were overlooked by the University of Pennsylvania's mapping crew and consist of small clusters of mound groups that have a residential, non-monumental feel. During the 2000 field season excavations in this area under the direction of Alejandro Gillot Vassaux (2000b) were placed in accordance to a phosphate density map of the area created by J. Jacob Parnell in the field. Units were placed in areas where the map indicated a high concentration to test the supposition that high chemical concentrations were related with midden locations (Figure F.65). This assumption appears true.

PN57A-1, PN 57A-4

This 2x2 meter unit was placed according to the soil map at the location of the highest concentrations of phosphate, which was along the platform V-45 (Figure A.65). The first layer was a gray-brown humus mixed with small rocks which were part of the structure's fill (Figure A.66). The second layer was dark brown earth with small rocks. This was a midden with plentiful cultural material. The third layer was dark gray soil with smaller rocks than the previous layers and a possible floor. The fourth stratum was of dark gray-brown soil. In this lot, besides the high concentration of artifacts, was found a wall running east-west with an orientation of 120 degrees northwest, and two sets of lajas covering Burials 86 and 89. The fifth lot was dark gray earth mixed with small limestone rocks. An extension was excavated (PN 57A-4) to accommodate the removal of the burials. The sixth lot, under Burial 86, had a texture change in the soil to a hard, compact consistency. The seventh layer was a brown-gray soil over bedrock.

PN 57A-4 is a 2 x 1.50 meter extension of PN 57A-1 (along its southeast profile) with the purpose of aiding in the removal of Burials 86 and 89. The first lot was humus with large rocks (20 cm diameter). The second layer was dark brown soil mixed into a higher concentration of rocks. The next layer was dark gray soil with a fine consistency. The fourth layer was a dark gray-brown soil which was the structure's fill. In this layer a single human bone was found, which was named Burial 87, at 42 cm below ground surface. The fifth lot was another dark gray soil layer with a high concentration of cultural material. This lot began at the top of the lajas of Burial 89. In plan view there was a small wall (20-24 cm wide) on the east side of the lajas running southwest-northeast. This wall clearly separated the fill from the burials. Also, another wall was discovered in the northeast of the unit, similar to that found in PN 57A-1-4, but belonging to an earlier phase of the structure. Towards the southwest of the unit was more lajas, but due to lack of time these were not uncovered - there probably is another burial there. A forearm human bone was found in the center of the lot, which was named Burial 88. It was mixed in with the fill of the platform. The sixth lot was dark gray earth over bedrock.

Burial 86 (PN 57A-1-5) was that of an infant who was laid upon the soil with two lajas covering the bones (Figure A.67). The preservation was quite poor with only some ribs, arms, and a few vertebra being recovered. No offerings were associated with the burial.

Burial 87 (PN 57A-4-4) a single human bone, possibly a humerus of an adult.

Burial 88 (PN 57A-4-5) a single human bone, possibly a humerus of an adult.

Burial 89 (PN 57A-1-5) was that of another infant slightly older than the previous one (Figure A.68). This burial had a cist constructed of rocks which measured 1 x 0.40 meters and was covered with four lajas. No offerings were associated with the burial and the bones were badly preserved.

PN 57A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-12	10 YR 2/1		
1	2	12-26	10 YR 2/2		
1	3	26-40	10 YR 3/1		Floor
1	4	40-62	10 YR 3/2	Chacalhaaz	Wall
1	5	62-82	10 YR 3/1		Burials 86, 89
1	6	82-101		Yaxché	
1	7	101-112			

PN 57A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-20	10 YR 3/2		
4	2	20-29			
4	3	29-40	10 YR 3/1		
4	4	40-61	10 YR 3/2		Burial 87
4	5	61-97	10 YR 4/2		Walls, V-45-Sub-1, Burial 88
4	6	97-144	10 YR 4/1		

PN 57A-2

This 2x1 meter unit was placed 1.50 meters from V-44's northern corner with an orientation of 290 degrees northwest. This place was the second highest concentration of phosphates in the group. The first layer was humus, followed by a hard layer of dark brown soil. This is a definite midden with a dramatic change between the humus and this layer. The third layer has dark yellow-brown soil mixed with large rocks. Underneath this is a layer of small rocks which could be a platform floor. The midden lies on top of this layer and does not penetrate it. The fourth layer was even harder to excavate through than the previous one, with soil composed of dark brown earth with few rocks. The fifth layer was even harder with a dark yellow-brown soil over bedrock.

PN 57A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 3/2		
2	2	20-39	10 YR 3/3		
2	3	39-56	10 YR 3/4		Floor
2	4	56-67	10 YR 3/3		
2	5	67-77	10 YR 3/4		

PN 57A-3

This 2x1 meter test pit was located two meters from the southwest corner of V-46 with an orientation of 320 degrees northwest. The first layer was humus. The second was dark brown earth with a few rocks. The third layer had lighter brown earth than the previous layer. The fourth layer was composed of a yellow-brown soil. The fifth lot had dark yellow-brown soil. The last stratum was similar but with darker soil, then bedrock.

PN 57A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-15	10 YR 3/2		
3	2	15-30	10 YR 3/3		
3	3	30-40	10 YR 4/3		
3	4	40-60	10 YR 5/4		
3	5	60-76	10 YR 4/6		
3	6	76-88	10 YR 4/4		

PN 57A-5

This 2x1 meter unit was placed one meter from the eastern corner of V-43 with an orientation of 25 degrees northeast. The first layer was humus, followed by a layer of hard, dark brown earth. The third layer was composed of dark gray-brown soil. The fourth layer was similar but of a harder consistency. The fifth lot was the same material. The sixth stratum was a dark gray soil matrix over bedrock.

PN 57A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-25	10 YR 2/1		

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	2	25-36	10 YR 2/2		
5	3	36-46	10 YR 3/2		
5	4	46-68	10 YR 4/2		
5	5	68-81	10 YR 3/2		
5	6	81-92	10 YR 3/1		

Summary

These five test pits demonstrated the relationship between high phosphate concentrations and high concentrations of cultural material. In each unit, a midden or an area with dense artifact counts was discovered. The material from these units will help place them in the chronological framework of the center.

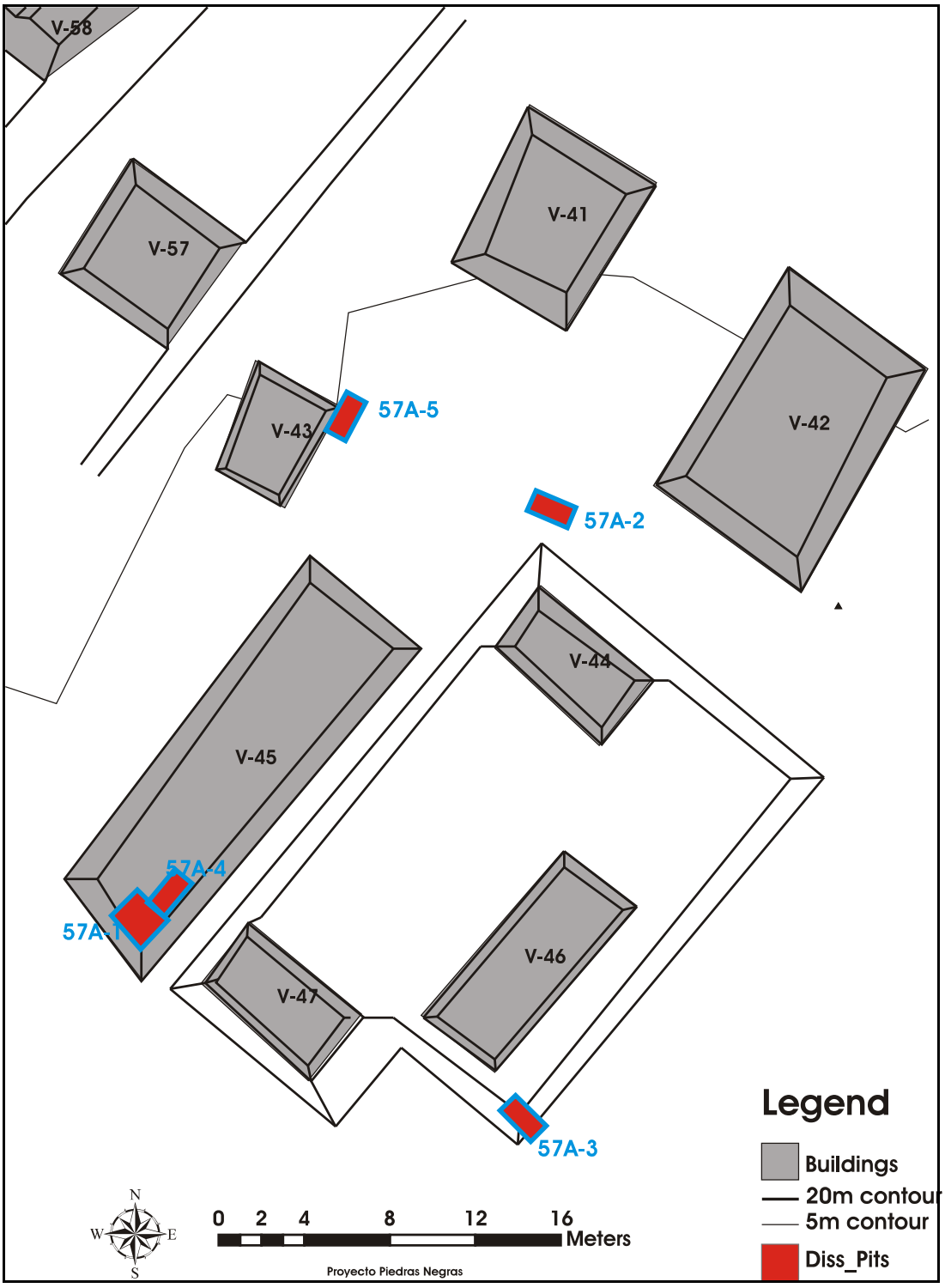


Figure F.65 Operation 57

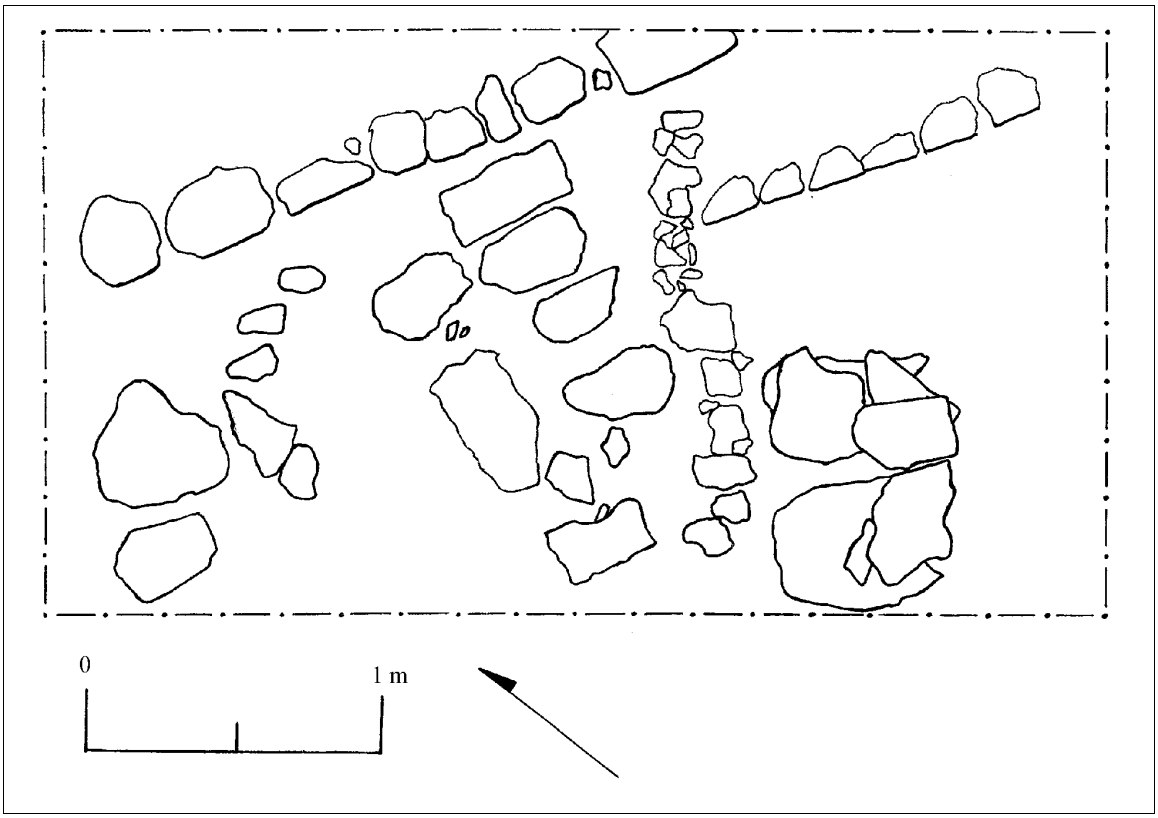


Figure F.66 PN 57A-1-4 Plan of Excavation (From Gillot 2001b:363)

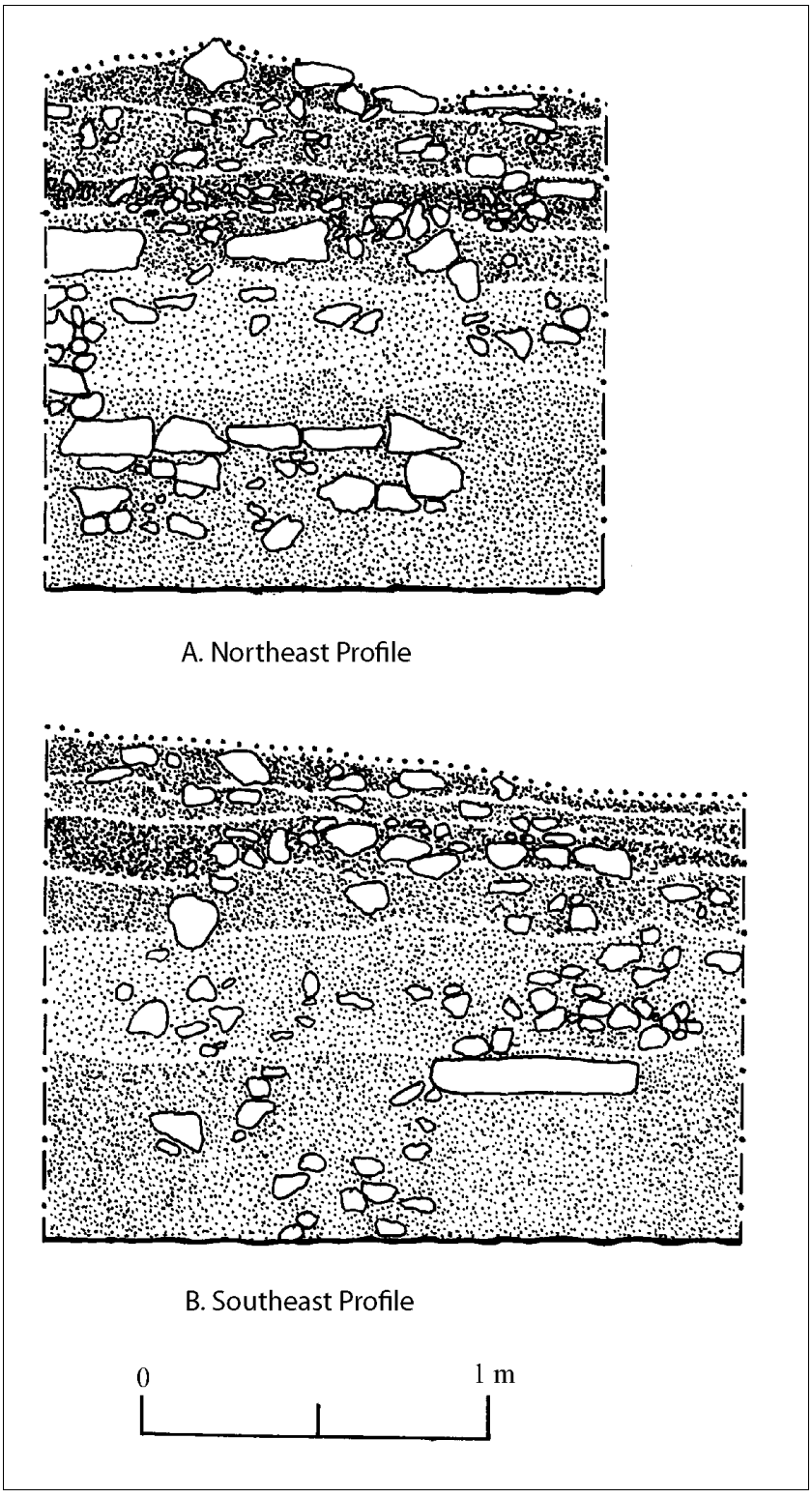


Figure F.67 PN 57A-4, Profiles (From Gillot 2001b:366)

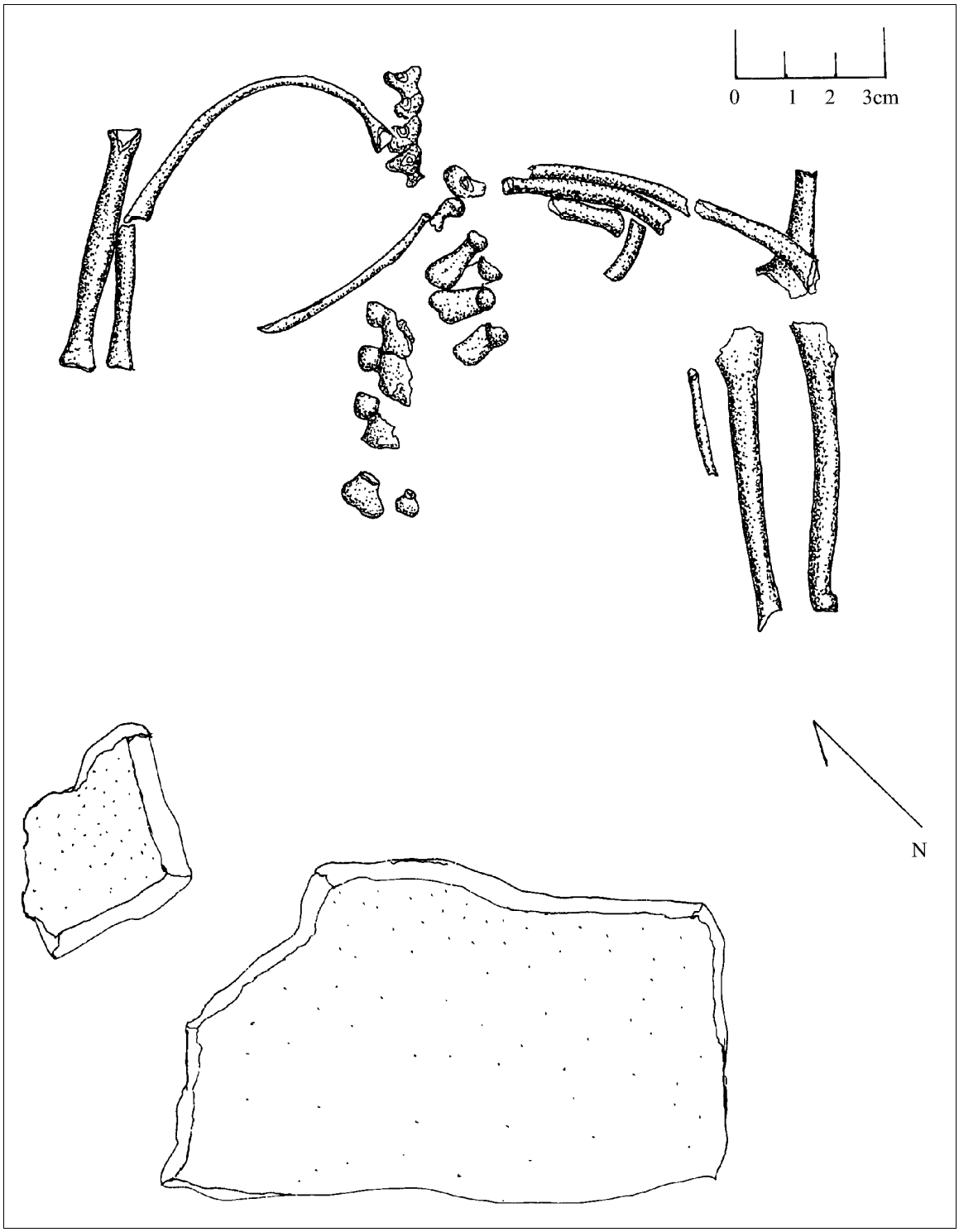


Figure F.68 Burial 86, Drawn by Z. Hruby (From Gillot 2001b:364)

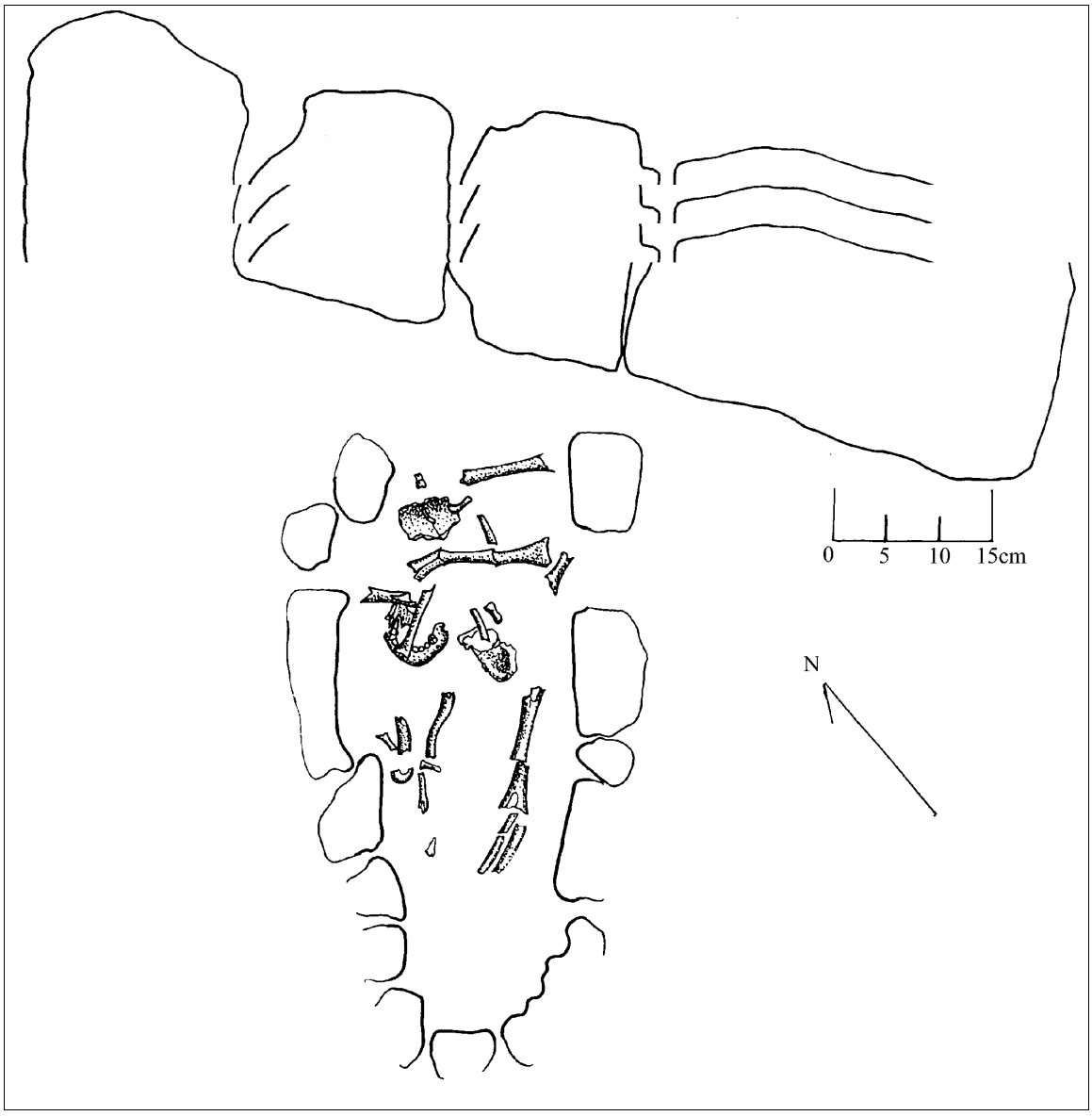


Figure F.69 Burial 89, Drawn by Z. Hruby (From Gillot 2001b:365)

OPERATION 62

This operation, like PN 57A, was devoted to better understanding the southern sector of the center via a series of test pits. This area had been recently mapped by Nelson (1999) and proved to have a high density of structures along the banks of a seasonally flooded arroyo. Alejandro Gillot Vassaux placed eleven units in this area during the 2000 field season, in conjunction with high chemical concentrations (Gillot 2000c, Figure F.70). The chemical concentration map was created by J. Jacob Parnell in the field.

PN62A-1, PN 62A-7, PN 62A-8

PN62A-1is a 2x1 meter test pit was placed over the platform H'-4 with an orientation of 50 degrees northeast (Figure A.70). The first layer was humus followed by a layer of dark gray-brown earth. The third layer consisted of dark gray soil with some rocks from the structure's fill. Burial 91 was found in this layer. Layer four was composed of dark earth and small limestone rocks. The fifth stratum had dark gray-brown earth and part of Burial 102 - which required an extension (PN 62A-7) to uncover completely.

PN 62A-7 was a 1.50 x 1.00 meter test pit placed in platform H'-4 as an extension to PN 62A-1 in its southeastern profile to uncover Burial 102 (Figure A.70). The first layer was humus with some rocks of uniform size, which pertained to the structure's fill. The next layer had the same size rocks with a brown-gray soil matrix. The third stratum continued with the rocks and a dark gray brown soil. The fourth layer had dark brown soil and the lajas of Burial 102. The fifth lot contained Burial 102 and a dark gray brown soil. Upon uncovering Burial 102, the remains of another individual were partially uncovered, Burial 99, which required another extension, PN 62A-8.

PN 62A-8 was a 1.50 x 1.00 meter extension to PN 62A-7 along its southeastern profile. Its purpose was to uncover the remains of Burial 99 which had been located in the course of the excavation. The first layer was humus, followed by a dark brown-gray soil layer with small rocks. The third layer was fill mixed with a dark gray-brown soil. The fourth layer was dark brown soil mixed with rocks of uniform size as part of the structure's fill and Burial 99.

Burial 91 (PN 62A-1-3) was a young child covered with a single laja over the body (Figure A.73). The bones were badly preserved, but the body was oriented east-west with the head towards the east. No offering were found with the burial, and no other burial facility was found, just the single laja.

Burial 99 (PN 62A-8-4) was found within the fill of H'-4, which contributed to the poor conservation of some of the bones. The cist was composed of a laja and metate covering the head with another metate fragment discovered over the chest and the right arm. The adult, female body was placed face-up in an east-west orientation with the head towards the east. The body was placed in an extended position. The burial offering consisted of a small fragmented jar and the metates.

Burial 102 (PN 62A-7-5) was an adult (female?) placed in a rock lined cist that measured 1.20 x 0.40 meters (Figure A.74). The body was orientated in an east-west direction in an extended position on its back with the head towards the east. The cist was covered with lajas and

a metate fragment and the walls were made of worked stone. Curiously, some of the leg bones were missing, although the toe bones were present. The only offering was the metate.

PN 62A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-15		Kumché	
1	2	15-29	10 YR 3/2	Kumché	
1	3	29-46	10 YR 4/2	Yaxché	Burial 91
1	4	46-61	10 YR 3/3	Kumché	
1	5	61-82	10 YR 4/2	Chacalhaaz	(Burial 102)

PN 62A-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-19		Chacalhaaz	
7	2	19-28	10 YR 3/2	Chacalhaaz	
7	3	28-43	10 YR 4/3	Balché	
7	4	43-67	10 YR 3/3		
7	5	67-72	10 YR 4/2		Burial 102

PN 62A-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-16		Chacalhaaz	
8	2	16-30	10 YR 3/2	Chacalhaaz	
8	3	30-47	10 YR 4/3	Yaxché	
8	4	47-62	10 YR 3/3	Yaxché	Burial 99

PN 62A-2

This 2x1 meter test pit was placed in the southern corner of H'-2, oriented 320 degrees northwest. This was one of the deepest test pit excavated at Piedras Negras with a depth of five meters, although the cultural material was found only within the first meter. The first layer was humus, followed by a layer of dark brown earth with small rocks. The third layer had a mixture of dark yellow-brown soil and small limestone rocks. Also a floor level was found in this stratum under a midden. The floor was composed of tiny crushed limestone rocks. The fourth layer was

composed of a dark brown soil. The last layer of this unit was sterile. Because part of the test pitting program was to excavate to bedrock, this excavation continued until safety reasons precluded deeper inquiry. It is very interesting that this excavation on the bank of the arroyo could proceed to a depth of five meters without finding bedrock while in most areas of the center bedrock was found within a meter of ground surface. The topography of this arroyo is more complex than previously thought. In the profile of this layer, one could see periods of inundation marked by a dark line of soil and small debris under the sandy material. These occurred about every meter. Mostly the profile just registered a yellowish sand component.

PN 62A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-14		Chacalhaaz	
2	2	14-35	10 YR 3/3	Yaxché	
2	3	35-42	10 YR 3/4		Floor
2	4	42-60	10 YR 4/3	Chacalhaaz	
2	5	60-500		Sterile	

PN 62A-3, PN 62A-5

PN 62A-3 is a 2x1 meter test pit was placed on the northern corner of G'-3, oriented to 50 degrees northwest. The first layer was humus, followed by a hard, dark gray-brown soil layer. The third stratum was similar. The fourth was dark brown earth with a large quantity of cultural materials. The fourth layer was also dark brown soil and some human bones, so an extension to the unit was excavated to uncover this burial (Burial 92, PN 62A-5). The fifth layer had hard gray soil. The sixth layer was light brownish yellow soil. The seventh stratum had more yellow soil as did the eighth and ninth layers.

PN 62A-5 was a 1.90 x 0.60 meter extension to PN 62A-3 along its northeast profile. The purpose of the extension was to uncover Burial 92. The first layer was humus which included some very large rocks along the southeast of the unit that pertained to the structure. The next layer was dark brown-gray soil mixed with rocks. The third layer was a dark gray-brown soil, as seen in PN 62A-3. Towards the northeast side of the unit was a laja (0.40 x 0.23 meters) which had been placed over the head of Burial 92. The fourth stratum had large amounts of cultural material in a dark soil matrix along with a layer of burned clay over which lay Burial 92. The fifth layer had dark gray earth, while the next layer's soil was a lighter brown-yellow color over bedrock.

Burial 92 (PN 62A-5-4) was placed on the northern fringe of structure G'-3, in an area with a high concentration of phosphates (due to the presence of a midden). The adult body had been oriented east-west with the head towards the east and the legs crossed (Figure A.72). Although the body was placed in an extended position on its back, no cist was found around it, just a single laja over the head. No burial offerings were found with the skeleton.

PN 62A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-22	10 YR 2/1	Chacalhaaz	
3	2	22-29	10 YR 3/2	Chacalhaaz	
3	3	29-48	10 YR 3/3	Chacalhaaz	
3	4	48-65	10 YR 3/2		Burial 92, Floor
3	5	65-93	10 YR 3/1	Yaxché	
3	6	93-122	10 YR 6/4	Yaxché	
3	7	122-180	10 YR 5/4	Balché	
3	8	180-210	10 YR 4/4		
3	9	210-250		Sterile	

PN 62A-4

This 2x1 meter unit was placed 1.50 meters to the northwest of PN 62A-1 with an orientation of 50 degrees, close to structure H'-4. Its purpose was to recover material outside of the structure, but still within the dense concentration of phosphates. The first layer was humus with some large rocks in the southwest corner of the unit which were fallen debris from H'-4. The second stratum was a dark brown soil with plentiful cultural material. The third layer was a thin yellowish soil with fewer artifacts. The fourth layer consisted of a brown soil mixed with small rocks. The fifth layer was sterile clay.

PN 62A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-19	10 YR 2/2		
4	2	19-36	10 YR 3/3		
4	3	36-45			Floor?
4	4	45-56	10 YR 4/3		
4	5	56-67		Sterile	

PN 62A-5

An extension of PN 62A-3.

PN 62A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-30	10 YR 2/2		
5	2	30-39			
5	3	39-50	10 YR 3/3		
5	4	50-72	10 YR 3/2	Yaxché	Burial 92
5	5	72-103	10 YR 3/1	Yaxché	
5	6	103-135	10 YR 6/4	Yaxché	

PN 62A-6

This 2x1 meter test pit was placed between structures G'-1 and G'-2 with an orientation of 5 degrees northeast (Figure A.71). Its placement was dictated by the chemical concentration map created by J. Jacob Parnell. The first layer was humus with large rocks mixed in. The second layer consisted of dark brown soil and more rocks. The third soil stratum was dark brown soil mixed with small limestone rocks. The next layer had a plaza floor consisting of small limestone rocks. The fifth layer caught the bottom edge of the floor and the soil changed to a yellowish color, but the quantity of cultural material remained high. The sixth stratum continued with the yellowish soil but the color was lighter. The seventh lot consisted of yellow-brown soil that was quite hard and compact. The eighth layer also had yellowish soil and so did the ninth lot, under which was bedrock.

PN 62A-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-18	10 YR 3/2	Chacalhaaz	
6	2	18-31	10 YR 3/3	Chacalhaaz	
6	3	31-46	10 YR 3/2	Chacalhaaz	
6	4	46-58	10 YR 4/3	Chacalhaaz	Floor
6	5	58-69	10 YR 4/4	Chacalhaaz	
6	6	69-85	10 YR 5/4	Chacalhaaz	
6	7	85-105	10 YR 5/6	Yaxché	
6	8	105-126	10 YR 6/6	Balché	
6	9	126-153	10 YR 5/6		

PN 62A-9, PN 62A-10, PN 62A-11

These three units began with PN 62A-9, but due to the presence of Burial 108, two more extensions became necessary. The original unit was a 2x1 meter test pit placed between structures G'-3 and G'-6, with an orientation 45 degrees northeast. The first layer was humus, followed by a layer of very dark gray-brown soil over a layer of small limestone rocks. The third layer had dark gray-brown soil. In this layer, the left arm of Burial 108 was uncovered, so an extension was made.

PN 62A-10 was a 1x1 meter extension in the northeast profile of the previous unit. It had basically the same stratigraphy as the preceding unit.

PN 62A-11 was a 1 x 0.5 meter extension of PN 62A-10 placed along the northeast profile. The stratigraphy was the same as the previous units.

Burial 108 (PN 62A-11-3) was an adult placed in an extended position with an east-west orientation. The head was towards the west (Figure A.75). The cist consisted of two lajas placed over the legs of the individual. To the side of the cranium was found a large animal bone, and some obsidian fragments were discovered around the pelvis region.

PN 62A-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-15		Yaxché	
9	2	15-25		Chacalhaaz	Floor
9	3	25-47		Yaxché	(Burial 108)

PN 62A-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-18		Chacalhaaz	
10	2	18-32		Yaxché	Floor
10	3	32-41		Yaxché	(Burial 108)

PN 62A-11

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	1	0-18		Chacalhaaz	
11	2	18-30		Chacalhaaz	Floor
11	3	30-51		Yaxché	Burial 108

Summary

These eleven test pits have revealed a wealth of information about the small mound groups to the south of the main center. These mound groups lie along a seasonally flooded arroyo, yet have a large occupation history. They were most likely residential, with several burials found placed inside of structures. The arroyo itself has a more complex topography than previously thought, extending deep into the ground where normal bedrock is usually quite close to the surface. This is an interesting zone of Piedras Negras.

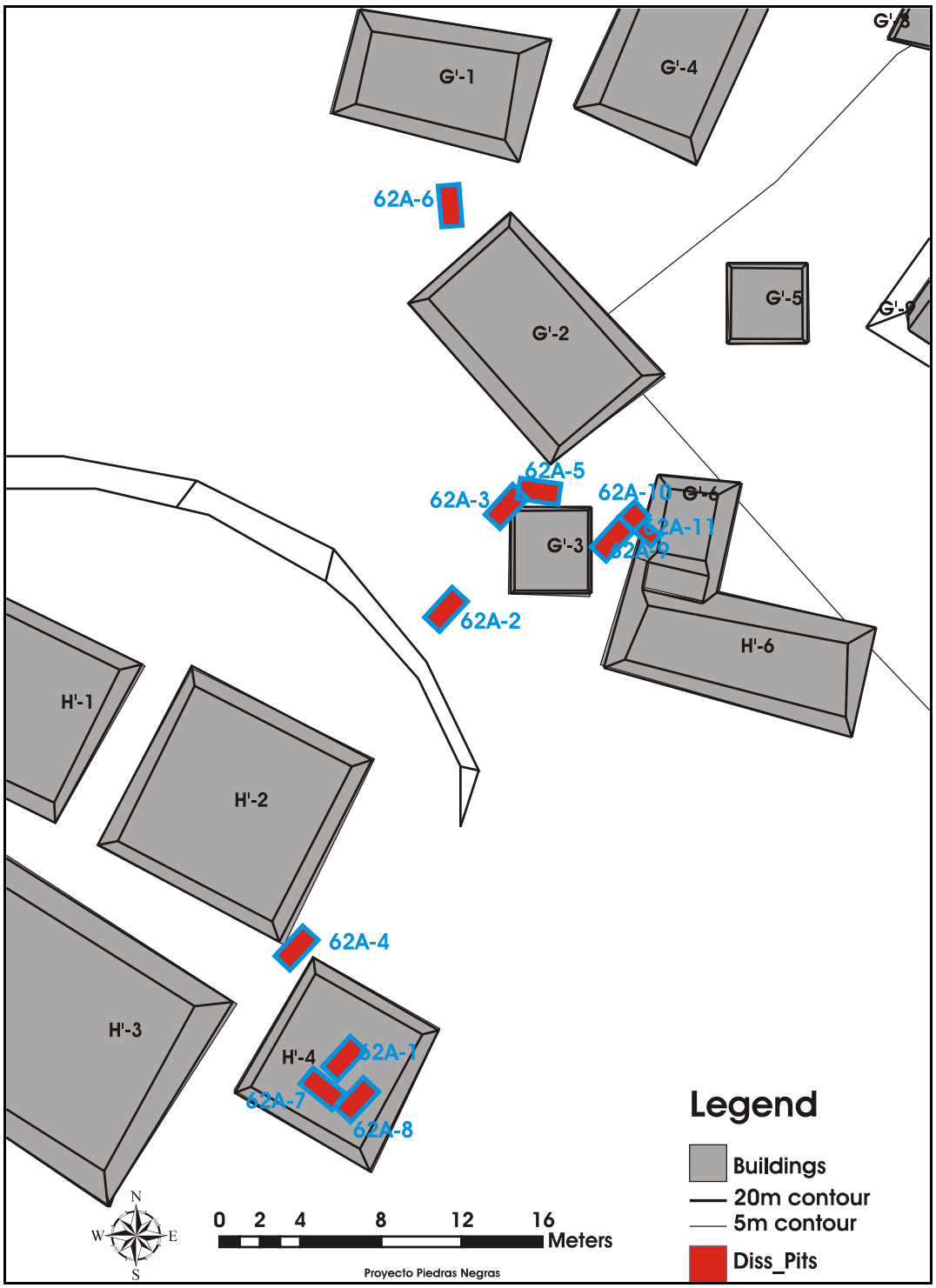


Figure F.70 Operation 62

Figure F.71 PN 62A-1-7, Southern Profile (From Gillot 2001c:441)

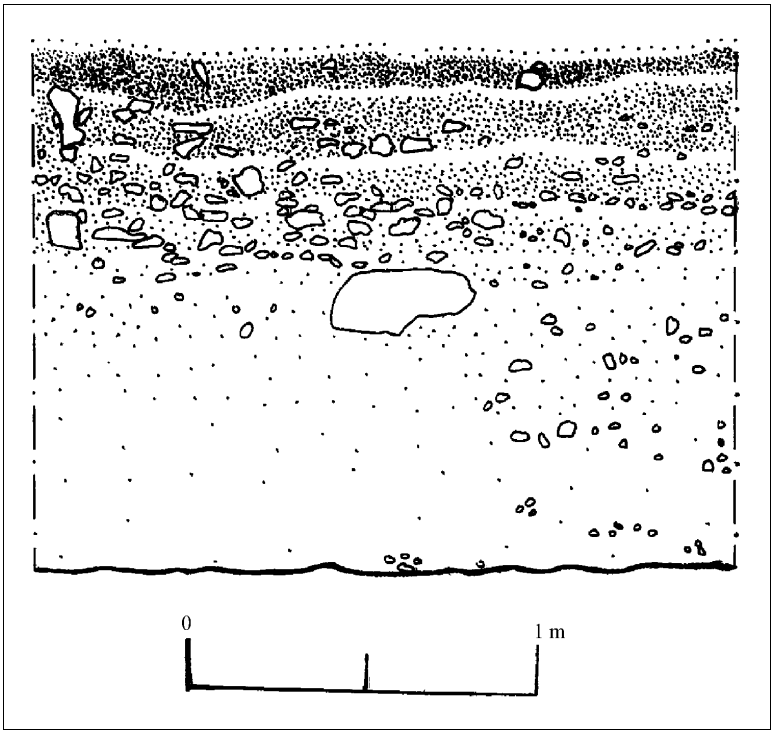


Figure F.72 PN 62A-6, Northwest Profile (From Gillot 2001c:444)

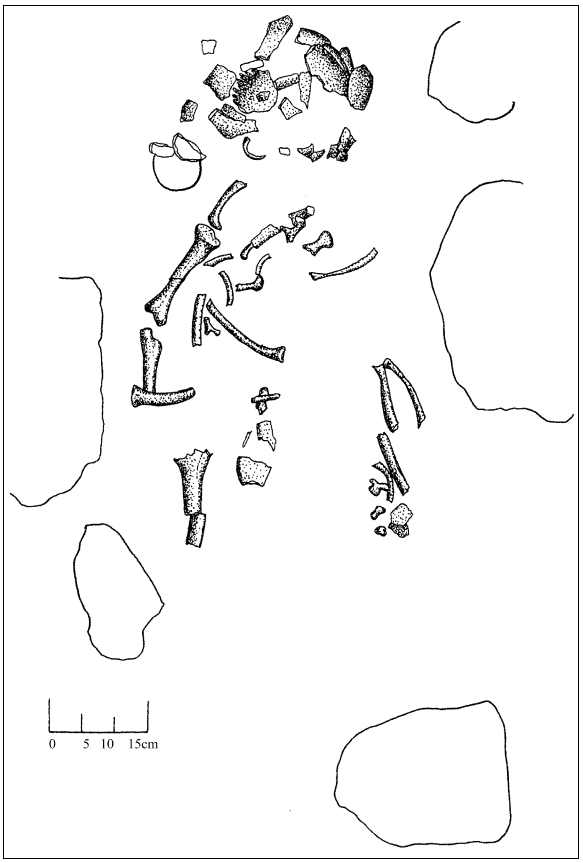


Figure F.74 Burial 91, Drawing by Z. Hruby (From Gillot 2001c:442)

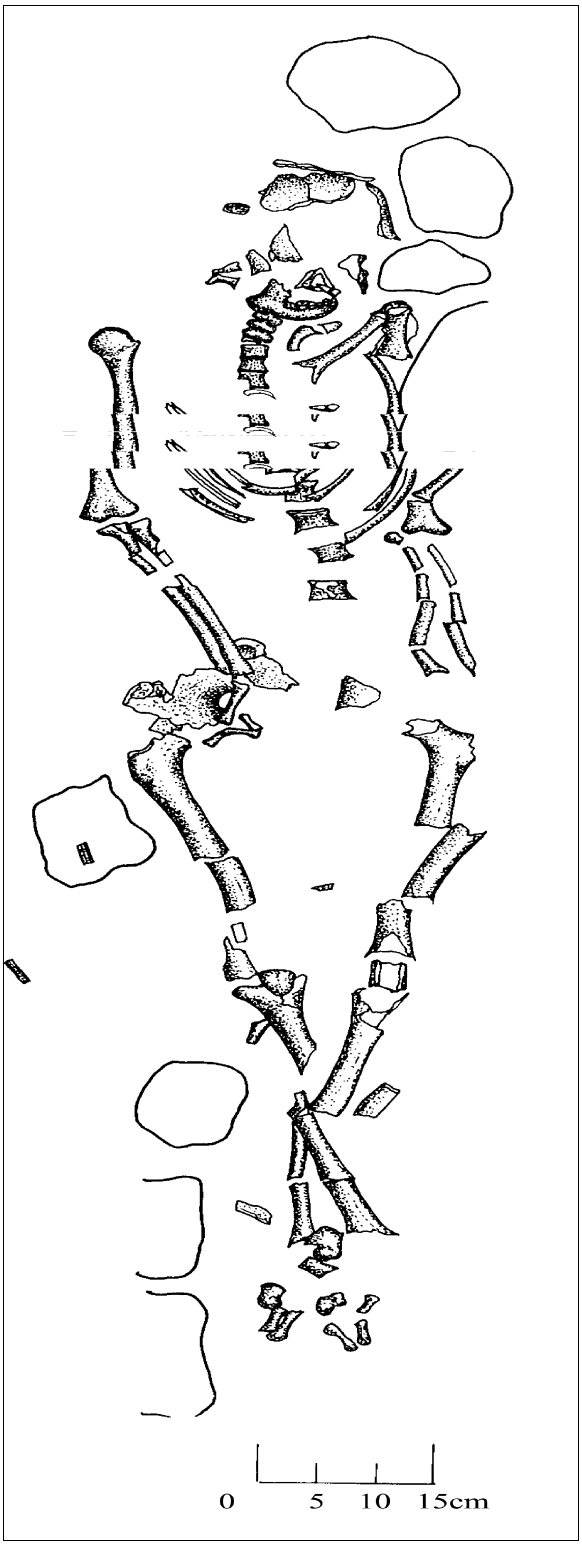


Figure F.73 Burial 92, Drawing by Z. Hruby (From Gillot 2001c:443)

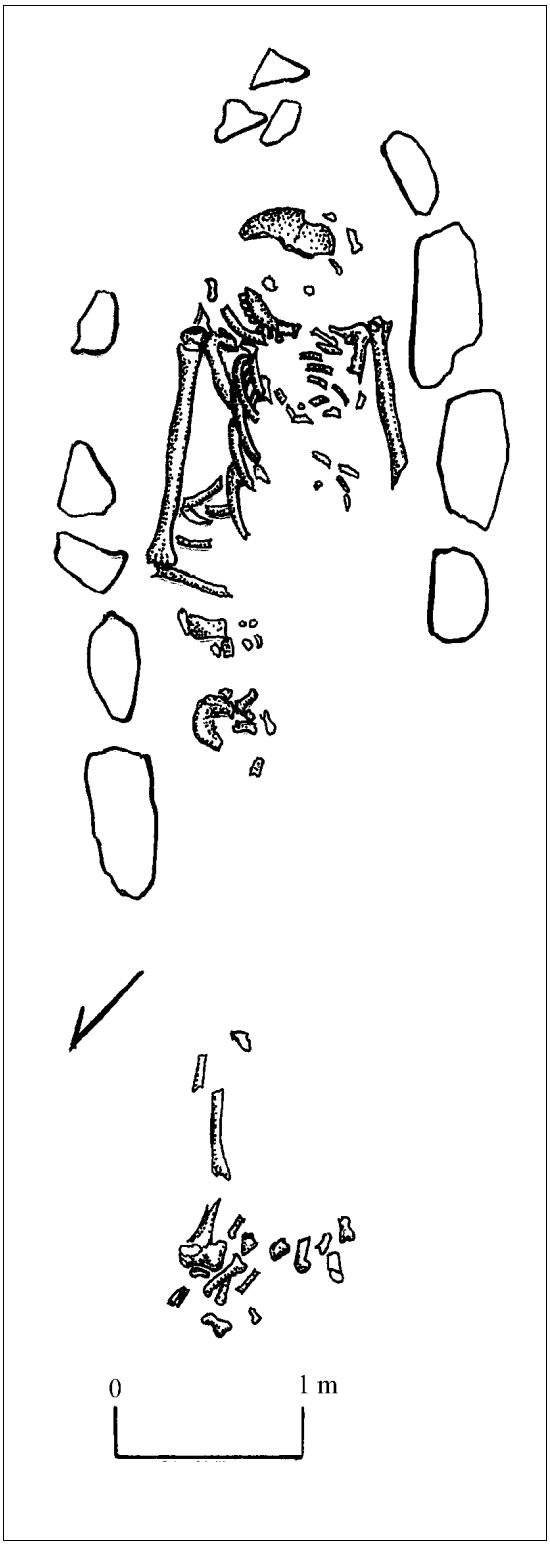


Figure F.75 Burial 102, Drawing by A. Gillot and Z. Hruby (From Gillot 2001c:445)

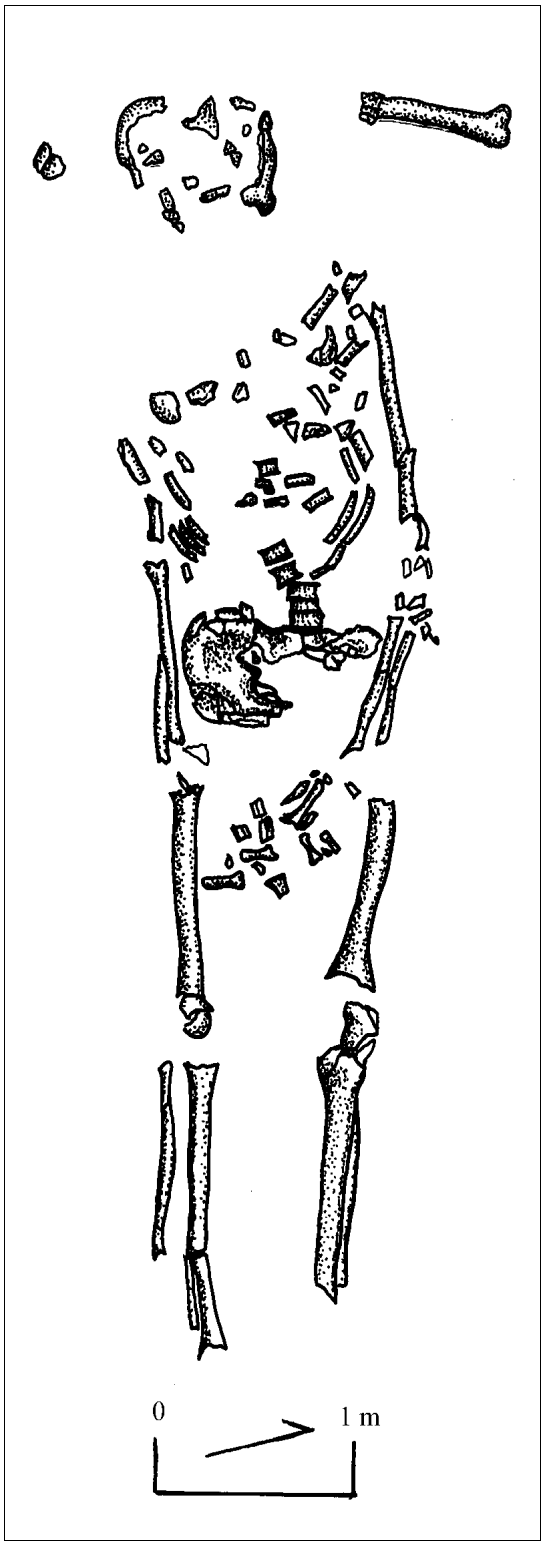


Figure F.76 Burial 108, Drawing by A. Gillot and Z. Hruby (From Gillot 2001c:446)

Appendix B

Large-Scale Excavations

LARGE-SCALE AND INTENSIVE EXCAVATIONS

Another facet of the Proyecto Piedras Negras was a better understanding of the various tiers of Maya social structure via excavations focused on different kinds of buildings. Work in the Acropolis of the site was balanced by work on non-royal elites (Jackson 2001) and work on non-elites (Nelson 2001). The excavations described in this chapter yielded information about elite and non-elite dwellings from different areas of the site, and two presumed non-domestic structures, to compare with the excavated patio groups. Each large-scale excavation is its own universe and its own unit, in the sense of a single realm of data collection, and a comparative entity. PN 23A-E, a possible domestic patio group. PN 26A (F-2) also might have had originally a domestic component merging into a more ritual use of architecture. The final excavations, PN 15 and PN 61 (S group), serve as a counterpoints to these excavations because their artifact assemblages and architecture suggest a non-domestic function.

These excavations are large-scale (i.e., they horizontally exposed most of a patio group or most of a structure including ambient space) and intensive in that excavations usually proceeded to bedrock, as time permitted. Bedrock was generally about one meter below ground surface, but the height of the mound or structure might be several meters higher. In some cases the unstable sediments and fill of the structure precluded deep excavations for safety reasons. Excavation units were usually 2x2 m and were rarely screened, as is all too common in Mesoamerican archaeology. Some soil samples were taken from interesting contexts, but most of these were never properly processed for microdebitage, so the majority of the artifacts recovered were identified by eye during the excavations.

The work presented here includes excavations under the direction of several different archaeologists, each with their own method of directing their investigation. All artifacts went through the same analytical procedures so any bias in the sample will relate to recovery methods and not to analytical methods. The excavation descriptions presented come from three main sources (where available): Reports submitted to the Instituto de Antropología e História, Guatemala (Escobedo and Houston 1997, 1998, 1999, and 2001); lot forms from each operation; and field notes of each excavation. In each operation description I cite the published report once, but I want to emphasize that I am synthesizing the excavator's work even without multiple (and constant) references for each operation.

Documentation for Proyecto Piedras Negras units focuses on a lot system. Lots are defined as a "feature" of interest, generally a soil layer with its associated cultural material. Units may encompass many different lots, with each lot being numbered from 1 to infinity, depending on the depth and complexity of the unit. Operations are geographic areas that encompass many different units. Operations are sub-divided by letter designators denoting excavations in different areas defined by the operation. For example, PN 2A-1-3 denotes that an excavation within the bounds of Piedras Negras (PN) in the geographic area defined by operation 2, there was a suboperation focused on a particular area (A) and this unit (1) was the first excavation in the area. The lot number "3" signifies that this particular layer or feature was the third to be defined.

Many of the test-pits were excavated in arbitrary 20 cm levels, so PN 2A-1-3 could indicate the cultural material derived from the soil stratum located 60-80 cm below ground surface or a datum. Building phases are identified by their coordinates (U-5) followed by "sub" if the phase involved a major remodeling, and then by phase (U-5-sub-4) from the most recently constructed (1) to oldest.

OPERATION 15
SOUTH GROUP, S-11 PLAZA GROUP

The S group had been investigated by Penn during their numerous excavations in Piedras Negras. Their excavations in this area included the structures S-2, 4, 5, and 19 from which they defined the area as an elite habitational group with a funerary pyramid, S-11 (Satterthwaite 1952 and 1954). Operation 15 excavations were initially under the direction of Héctor Escobedo (Escobedo 1997), then Mónica Urquizú (1998) placed additional units within S-8. Sarah Jackson and Zachary Hruby (2001) test pitted in the plaza area while Mónica Urquizú and Alfredo Román (1997) also had placed some units in the same general sector (PN 2). The landscape of the S group is that of a bajo area with an underlying clayish soil between two elevated areas of land, upon which sit some rectangular range structures. The main buildings in the area include Palace structures (S-17 and 18), Sweat baths (S-2, 4, and 19), and Pyramids (S-5, and 11)(Figure B.0).

Figure B.0 Operation 15

SUBOPERATIONS

PN 15A

This suboperation centered on S-11, with the goal of understanding better its formation, chronology and purpose within the sector (Figure B.1). This is the tallest building in the sector, and consists of a basal platform with two smaller structures that abut against it on the East (S-10) and West (S-12). Five units were initially placed in and through this structure.

PN 15A-1

PN 15A-1 is a 5x1 meter trench that extends from the base to the top of the structure along the northern face. Its objective was to investigate the presence of a staircase along this side. The first lot consisted in humus, lightly compacted and loose. The second lot contained debris from the eroding superstructure of the building, evidenced by rectangular and irregular building blocks mixed with loose soil. This lot revealed the basal platform with a height of 24 cm and a width of 82 cm. This platform was seated just above bedrock. The second step consisted of a line of three worked stones that were 44 cm tall. The back of the stair had been destroyed, so its depth could not be determined. The stairs continued upward and met with an existing part of the superstructure at the top. The northeast room of the building measured two meters from the stairs to the central wall of the structure.

PN 15A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-15	10 YR 2/2	Kumché	
1	2	15-81	10 YR 5/3		Stairs, Walls

PN 15A-2

PN 15A-2 is a 2x2 meter test pit placed in the northwest corner of the top of the building S-11. An objective of this unit was to determine if the buildings had a superstructure and what kind it had. This unit revealed that it had a vaulted superstructure which had collapsed. The first unit was dark organic material. Its removal unearthed the long lajas that formed part of the roof vault. The second lot consisted of debris and decomposed stucco from the superstructure mixed with brown earth. An important finding from this lot was the stucco floor and the base of the central wall of the superstructure.

PN 15A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-15	10 YR 2/2	Kumché	Roof collapse
2	2	15-95	10 YR 5/3	Kumché	Wall, Floor

PN 15A-3

PN 15A-3 is a 3x2 meter test pit placed on the top of structure S-11, but south of the east-west wall on its summit, and in the middle of that dimension (Figure B.2). Its objective was to excavate to ground level and find the earliest phases of the building. The first lot consisted of humus and revealed the fallen vault stones of the superstructure. The second lot was very similar to the previous unit's second lot, with a stucco floor and the base of the central wall being uncovered. The third lot consisted of the material below the stucco floor (Floor1) and its building fill. The plaster surface was badly preserved although it seemed to have measured 24 cm deep. The central wall was composed of irregular limestone blocks.

The fourth lot consisted of the material from Floor2 down to Floor3. This material corresponds to S-11-Sub-1 (Figure B.3). This floor was also stuccoed and was 12 cm deep. The fill of this building was formed by small limestone rocks mixed with lots of fine brown earth. S-11-Sub-1 was uncovered at 1.82 m below Floor1 directly below the building fill of S-11. A further architectural feature of S-11-Sub-1 was a bench running 23 degrees from azimuth located in the eastern side of the test pit. This feature was constructed out of three courses of stone.

The fifth lot was a 2x2 meter unit, to avoid destroying the remaining architecture of the previous building phase. The material from this lot corresponds to S-11-Sub-2 with its stucco floor, building fill, and finally bedrock. Floor3 was only 10 cm deep and appeared 2.79 m below Floor1. The building fill was similar to that of later building phases, loose limestone rocks and fine earth mixed together. S-11-Sub-2 appears to be a circular building, as indicated by worked stones which define the southern side. There was a definite change from this building style to the rectangular style in succeeding phases.

PN 15A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-15	10 YR 2/2	Kumché	
3	2	15-110	10 YR 5/3	Kumché	Floor, Wall
3	3	110-288	10 YR 6/2	Yaxché	Floor1, Fill
3	4	288-356	10 YR 5/3	Nabá	Floor2, S-11-Sub-1
3	5	356-415	7.4 YR 5/3	Nabá	Floor3, S-11-Sub-2

PN 15A-4

PN 15A-4 is a 2.2 x 0.60 meter test pit in the shape of an inverted L placed in the northeast corner on top of Structure S-11. Its purpose was to explore the central wall of the superstructure. The first lot consisted of a dark humus. The second lot was composed of material from the superstructure collapse, along with rectangular blocks from the wall itself. It was excavated to Floor1. This test pit showed that the central wall was 0.60 m thick and that there was doorways linking the two different sides, or rooms on the west and on the east sides of the building.

PN 15A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-12	10 YR 2/2	Chacalhaaz	
4	2	12-77	10 YR 5/3		Floor1

PN 15A-5

PN 15A-5 is a 5x1 meter trench that extends from the base to the top of S-11 along the south face of the building (Figure B.4). The purpose of this trench was to detect the presence of a south staircase toward the plaza group mentioned at the beginning of this operation. The first lot consisted of dark earth mixed with organic material (humus). The second lot began with the debris from the superstructure consisting of worked and irregular natural stones mixed with brown earth. Bedrock was reached at the base of the structure.

Architectural features from this test pit are quite important to our understanding of the structure. The expected staircase linking S-11 with the plaza group to its south did not exist. Instead two walls were found. Wall-1 belongs to S-11, and not to an earlier phase. The remaining part of the wall was 60 cm high, although the profile showed five courses of stone. This wall was probably over 1 meter in its original height, and the stones were worked rectangular blocks with a plaster binding agent. Wall-2 was discovered behind Wall-1 and was composed of irregular stones held together with a clay binding agent. This second wall probably provided support for Wall-1 and was preserved to a height of 1.30 m. A small limestone cylinder was uncovered near the base of Wall-1. This “Sculpture” probably served as a marker for the axis of the building, and had other, unknown significance.

PN 15A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-15	10 YR 2/2	Kumché/Chacalhaaz	
5	2	15-135	10 YR 5/3	Chacalhaaz	Wall-1, Wall-2

PN 15B

This suboperation involves those excavations undertaken in building S-12, which abuts against S-11 on the west side. A single 2x2 meter test pit (PN 15B-1) was placed at the intersection between S-12 and S-11 to understand how these buildings were connected (Figure B.5). The first lot was humus which did not reveal the floor of the terrace, only its construction fill. The next lot consisted of S-12's construction fill being a mixture of brown earth and large stones. The third lot was a different kind of fill with smaller rocks and a gray-brown soil matrix. The last lot was a black soil that is believed to have been the original humus layer before construction of S-12. Underneath this layer was bedrock.

S-12 appears to have been constructed after S-11-Sub-1 and 2 as its ceramic assemblage does not extend into the Nabá period. Unfortunately, it is difficult to evaluate the function of this building due to the paucity of artifactual and architectural remains.

PN 15B-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-15	10 YR 2/2	Chacalhaaz	
1	2	15-70	10 YR 4/3	Chacalhaaz	
1	3	70-100	10 YR 4/2	Yaxché	
1	4	100-115	10 YR 2/1		

PN 15C

This suboperation includes those excavations within S-10, which also abuts S-11, but on the east side. This low platform is quite similar to S-12 and the excavations realized here had the same objective of exploring how the buildings connected (Figure B.6). The first lot consisted of humus and construction fill without a floor. The second layer corresponded to the construction fill of the building being gray-brown earth mixed with small to medium sized rocks. The third stratum consisted of the floor and construction fill of S-10-Sub-1. This stucco floor was 22 cm thick. The fill had rocks of diverse sizes and brown earth located over bedrock.

This building has two different construction sequences but both of these appear to be later than S-12. It is possible that they correspond to remodeling performed during the same ceramic sequence and during the last phase of use of S-12. This building is slightly more complex than S-10, due to its multiple constructions, but they probably served the same unknown function.

PN 15C-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-15	10 YR 2/2	Chacalhaaz	
1	2	15-78	10 YR 3/2		
1	3	78-150	7.5 YR 5/3	Yaxché/Chacalhaaz	Floor, S-10-Sub-1

Summary

This series of test pits provide a general knowledge of the S group area. A more profound understanding of the area is provided by suboperations D-F under the large-scale excavation section.

Figure B.1 PN 15A-5, 3, 2, and 1, West Profile along the axis of Structure S-11 (From Escobedo 1997:127)

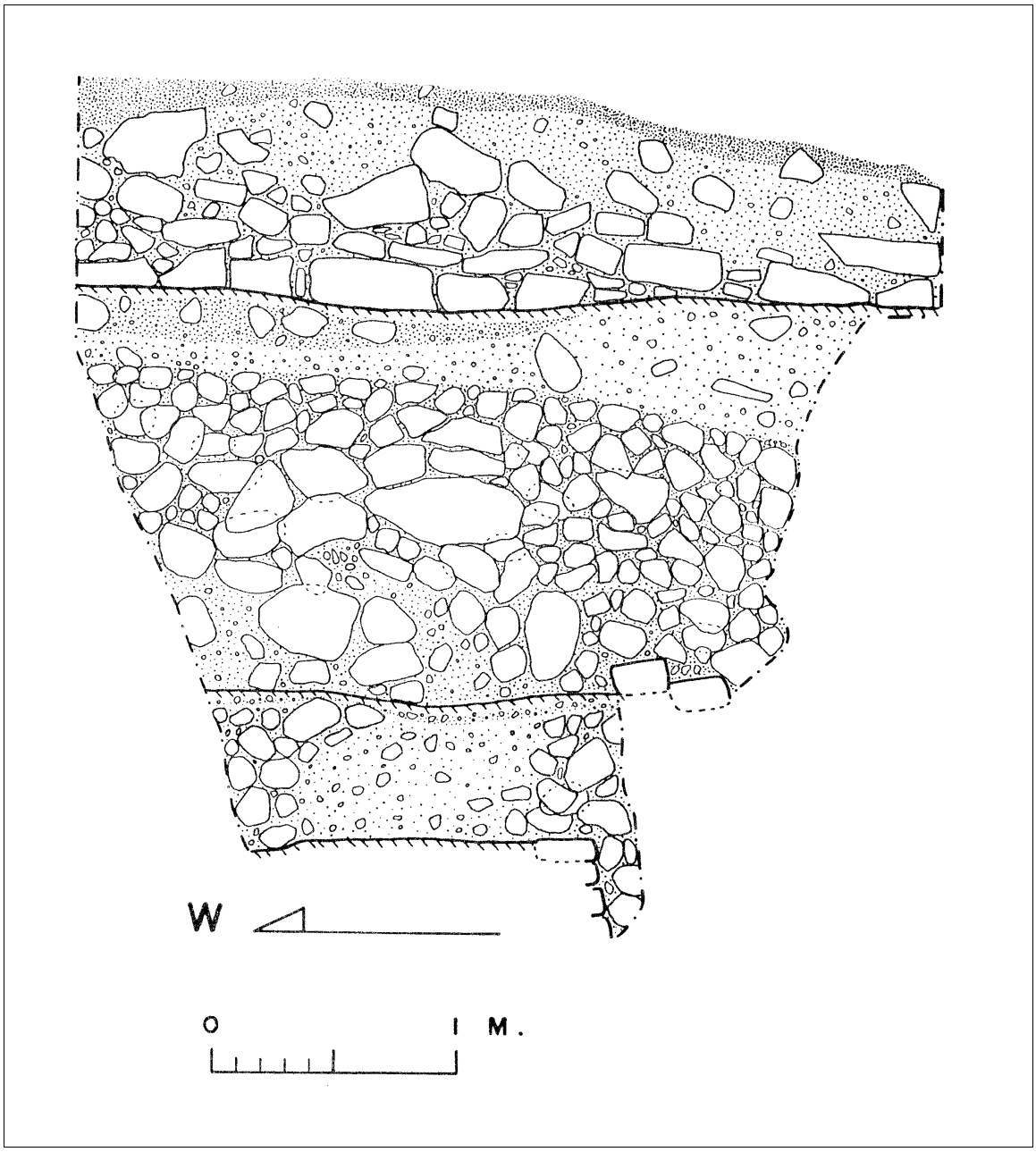


Figure B.2 PN 15A-3, North profile showing stucco floors (From Escobedo 1997:128)

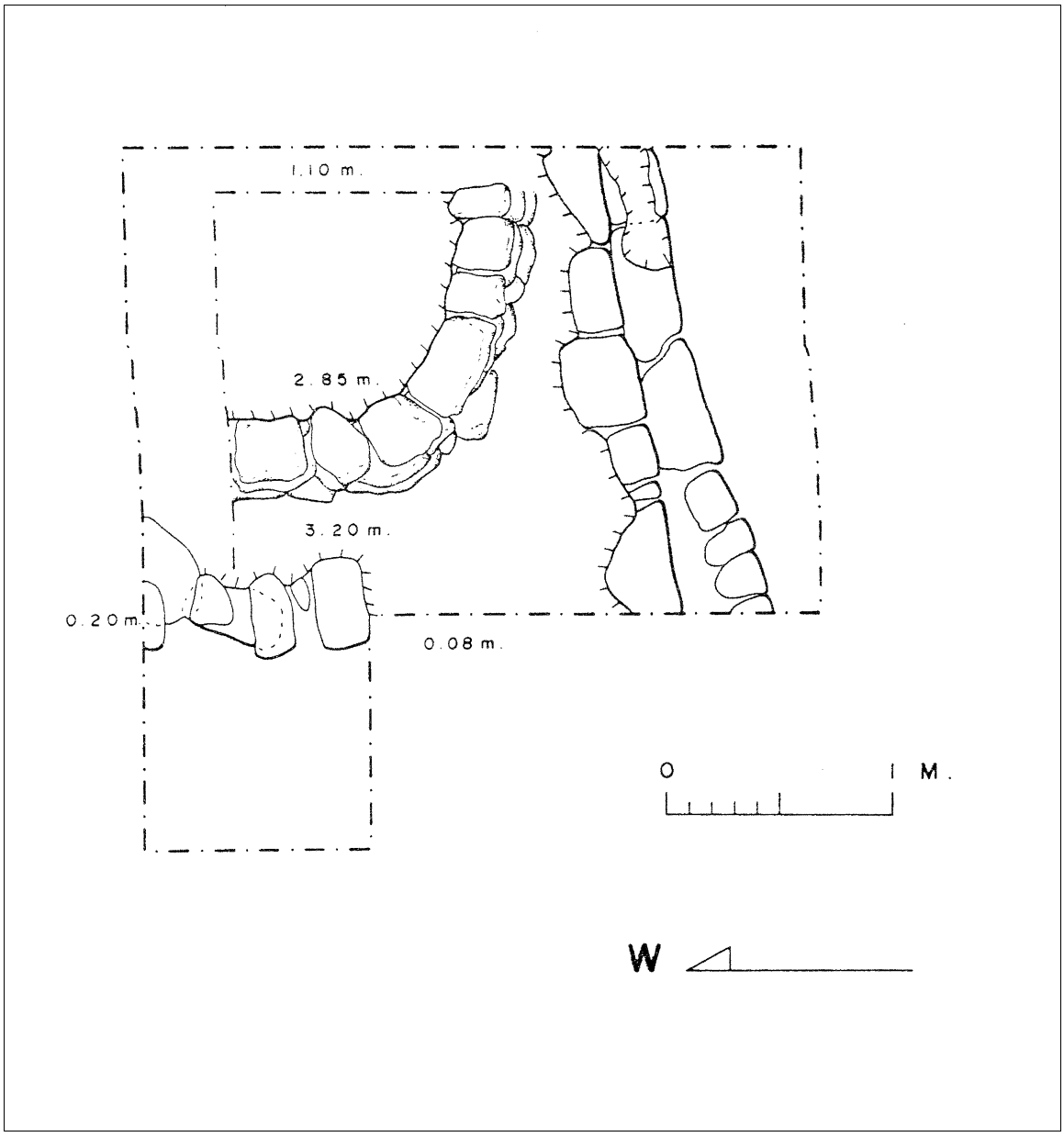


Figure B.3 PN 15A-3, Plan showing S-11-sub (at 1.10 m) and S-11-sub-2 (at 2.85 m) which was a round structure (From Escobedo 1997:129)

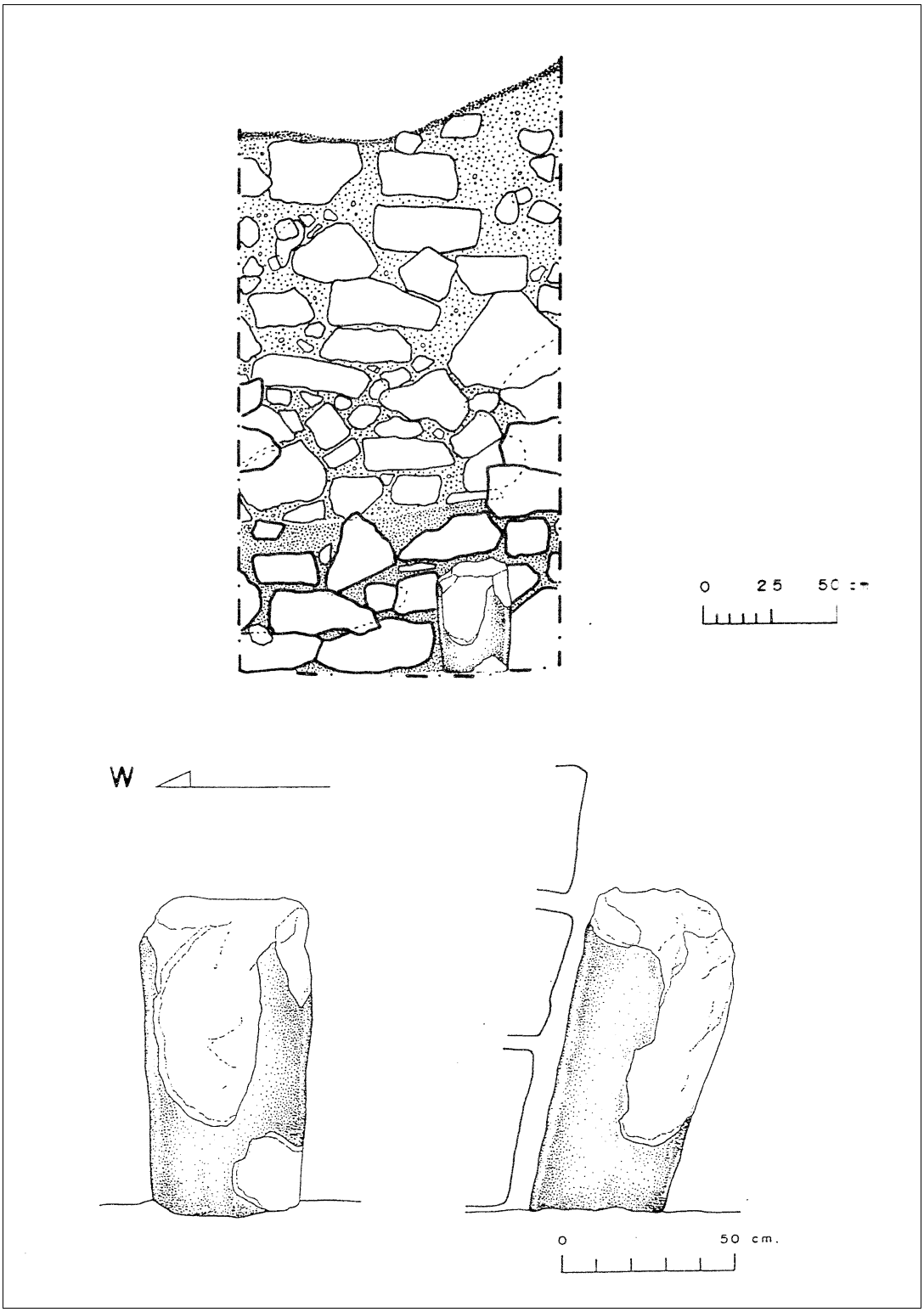


Figure B.4 PN 15A-5, North front view of basal wall and fill of Structure S-11, and a small sculpture found in situ (From Escobedo 1997:130)

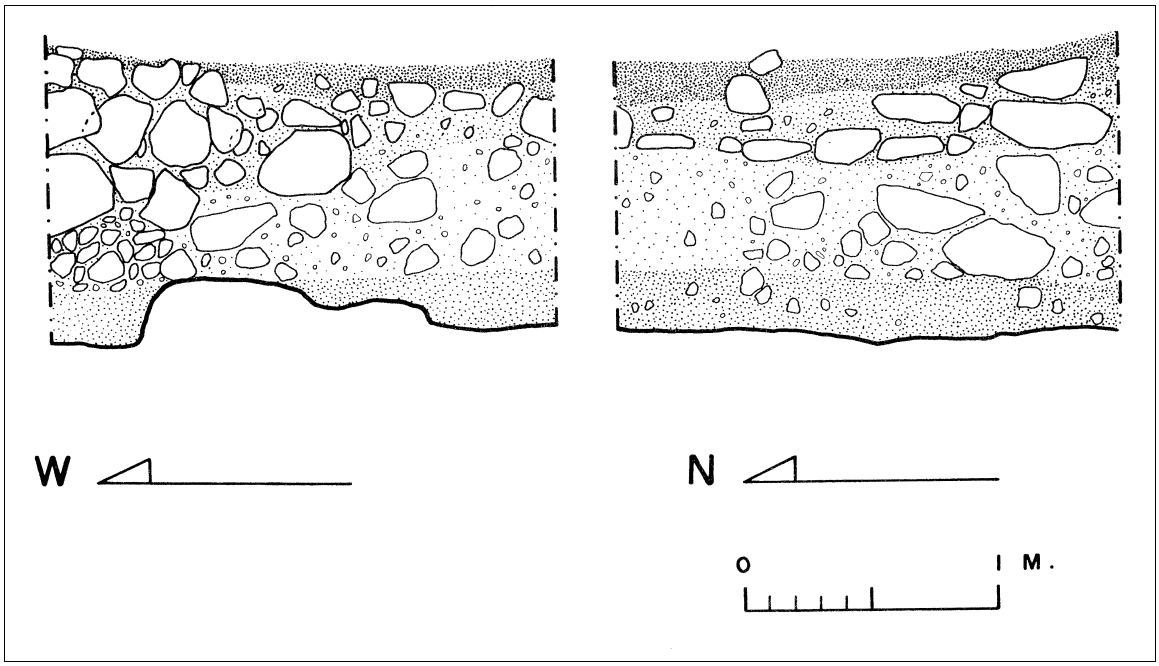


Figure B.5 PN 15B-1-4, Profiles North and East (From Escobedo 1997:131)

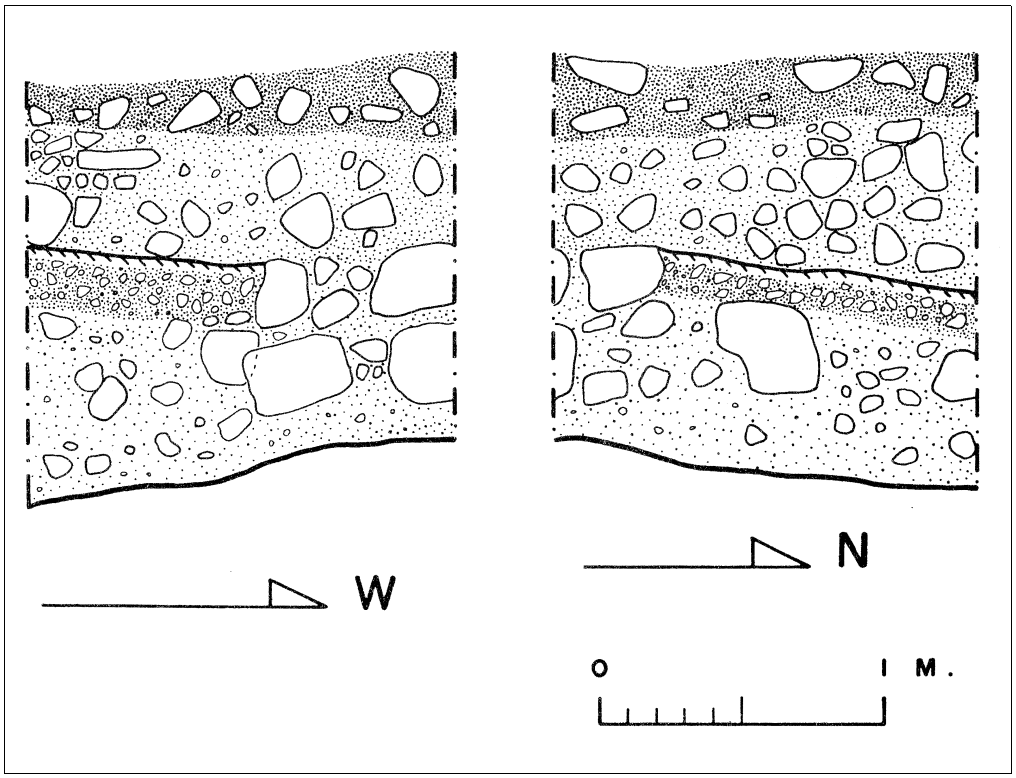


Figure B.6 PN 15C-1, Profiles South and West (From Escobedo 1997:132)

PN 15D and 15E

The purpose of these suboperations (15D and E) was to explore and understand better a particular building, S-8. Work in this structure was under the direction of Mónica Urquizú (1998) and she placed a series of test pits and trenches in and around the building to understand how its size and functions had changed over time (Figure B.0).

S-8 abuts three other structures in the S-11 group: To the north is S-10, to the west is S-9, and to the south is S-7. S-8 is a rectangular structure measuring roughly 25 m long by 7 m wide. Urquizú placed 17 units throughout the structures to determine its general characteristics and construction phases.

S-8-Sub-1[4]

The initial architecture appears to be a rectangular bench placed in the central part of a platform during the Yaxché ceramic phase. It is possible that the platform supported a perishable structure of bajareque, but no traces of such a structure were revealed within the small area exposed by the deeper units.

S-8-Sub-2

The second construction episode began with a new floor placed over the bench and platform, followed by a rectangular bench built along the southern side of the platform, perhaps in conjunction with the construction of a nearby building. The platform is also slightly extended with the construction of walls on the east and west side of the structure, elevating the southern side. This modification also occurred during the Yaxché ceramic phase.

S-8

The last construction episode began during the Chacalhaaz ceramic phase with the addition of low terraced steps along the east, permitting traffic to enter into the plaza via the building (a pattern also seen in the C group). Also, this period probably marks the general construction of the other buildings that abut against S-8 on its sides.

PN 15D-1

This 1x1.50 m unit was placed on the northwest corner of S-8. The first lot was sterile humus followed by a second lot of hard earth mixed with fallen structural material (Figures B.7, B.8 and B.15). An important feature of the unit was the discovery of the western wall of the structure. Bedrock was uncovered at 60 cm.

PN 15D-1

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[4]Urquizú numbered the sub-structures differently than is common practice in her notes and publications, reversing Sub-1 and Sub-2; however this numbering was retained here to avoid confusion between published sources.

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-15	10 YR 2/2	Sterile	
1	1	15-60	10 YR 5/3	Chacalhaaz	Wall

PN 15D-2

This 1x1 m unit was placed along the western face, at the intersection of structures S-8 and S-9 (Figure B.9). The purpose of the unit was to discover how the buildings were joined together. The stratigraphy consisted of three strata: Humus, a soft organic material, followed by a layer of hard earth mixed with rocks. In this layer was a bench attached to the north face of Structure S-9. The last stratum was another hard earthen layer. Another bench was found which runs under the previous one in a north-south direction, under the plaza floor.

PN 15D-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-25	10 YR 2/2	Chacalhaaz	
2	2	25-40	10 YR 5/3	Chacalhaaz	Bench
2	3	40-110	10 YR 5/3		Plaza floor

PN 15D-3

This trench was 50 cm by 4.30 m long and followed the western face of Structure S-9, immediately south of PN 15D-1 (Figure B.7). The stratigraphy consisted of two layers, the first was humus without any archaeological material. The second stratum consisted of a hard and compact layer of earth mixed with some limestone rocks. In this layer the base of the wall was unearthed. The wall was 40 cm high without any visible features such as stairs adjoining it.

PN 15D-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-20	10 YR 2/2	Sterile	
3	2	20-40	10 YR 5/3	Chacalhaaz	Wall base

PN 15D-4

This 1x1.50 m unit was placed along the eastern face of S-8 and to the west of PN 15D-7, in the northwest section of the platform. A single stratum of humus was uncovered along with a type of staircase that provided access to the platform. The run of the stair was between 90 and 55 cm while the rise of the stair was 10-12 cm.

PN 15D-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-20	10 YR 2/2	Sterile	Stair

PN 15D-5

This 1.50 x 2 m unit was placed in the southeast corner of S-8, to the west of PN 15D-9 (Figure B.10). The first stratum was humus, followed by a hard and compact brown earthen layer mixed with limestone rocks. A floor was discovered at 40 cm below ground surface, upon which sat a platform formed by a single course of stone running east-west. This platform would have abutted S-8 and probably sweat bath S-19. The third stratum was similar to the second and consisted of a midden sealed by the previous floor. The last layer was a clayish soil that descends into sterile layers beneath the buildings.

PN 15D-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-25	10 YR 2/2	Chacalhaaz	
5	2	25-40	10 YR 5/3	Chacalhaaz	Platform, Floor
5	3	40-60	10 YR 5/3	Chacalhaaz	Basurero
5	4	60-100	10 YR 4/2	Yaxché	

PN 15D-6

This 50cm by 6 m trench was located along the north face of structure S-8 in an attempt to understand the architecture of this side of the building. The first stratum was humus, followed by a layer of hard brown earth and rocks. The wall had been destroyed by roots so little information was recoverable.

PN 15D-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-30	10 YR 2/2	Chacalhaaz	
6	2	30-50	10 YR 5/3	Sterile	

PN 15D-7

This 50 cm by 4.80 m trench was placed along the eastern side of the structure, and to the south of PN 15D-4. A single stratum was detected consisting of humus and fallen structural material. There are two platform levels that lead up to the main structure, but both were heavily damaged.

PN 15D-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-30	10 YR 2/2	Chacalhaaz	“Stairs”

PN 15D-8

This 1x7.80 m trench was placed along the east-west axis of Structure S-8, covering the center of the structure (Figures B.11, B.12 and B.13). The first stratum was humus under which sat a staircase with 80-90 cm of run and 30-40 cm of rise to the stairs. The second layer was compact earth consisting of the fill of the structure and materials which helped even out the irregularities of the soil below (“relleno de nivelación”). The fill covered the first bench of the platform down to the base of the platform, but without finding a plaza floor. Because this trench mainly focused on the last stage of architecture of S-8, two more units were placed perpendicular to the trench at the summit of the structure, PN 15D-8a, and 8b.

PN 15D-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-15	10 YR 2/2	Chacalhaaz	Stairs
8	2	15-115	10 YR 5/3	Yaxché/Chacalhaaz	Structure Base

PN 15D-8a

This 2x2 m unit was placed over the summit of S-8 with the principal hope of discovering any substructures. In fact, S-8-Sub-1 was discovered, so this was a successful unit. There were three strata in this unit. The first was humus over the final construction phase of the building. The second layer consisted of a loose brown earth and rock mix that represented the fill of the last construction phase. At 90 cm below ground surface, a bench belonging to a prior construction phase (S-8-Sub-1) was found. The bench was two courses high with an east-west orientation of 300 degrees azimuth. The final lot was a clayish gray soil upon which the structure sat.

PN 15D-8a

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8a	1	0-30	10 YR 2/2		
8a	2	30-100	10 YR 5/3		S-8-Sub-1
8a	3	130-200	10 YR 4/2		

PN 15D-8b

This 2x3 m unit was placed along the southern side of PN 15D-8a over the summit of Structure S-8. A single stratum was excavated consisting of humus over a bench (S-8-Sub-2) that

sat on a hard compact floor made of light brown earth and small limestone rocks with a thickness of 10 cm. This floor covered the bench found in PN 15D-8a and represents a different construction phase.

PN 15D-8b

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8b	1	0-30	10 YR 2/2	Chacalhaaz	S-8-Sub-2, Floor

PN 15D-9

This 50cm by 4 m trench was placed between structures S-8 and S-19 (a sweat bath excavated by Mark Child). The purpose of the trench was to understand how these building connected and to find the edge of a platform detected in PN 15D-5. A single stratum was excavated consisting of humus. Architectural features discovered in this lot include a bench that extends from S-8 to S-19. It was discovered at 30 cm below ground level and rises 20 cm from its base. The width of the bench is 5.40 m, but the length is unknown. Also, no floor was detected between the two structures.

PN 15D-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-40	10 YR 2/2	Chacalhaaz	Bench

PN 15D-10

This 1x1.50 m unit was placed in the corridor between Structures S-8 and S-19, at a distance of 3 m to the east of PN 15D-8. The purpose of this unit was to find a floor between the two structures and understand more about the bench found in PN 5D-5, and 9. Three strata were recognized in the unit, the first was humus mixed with construction debris. The second stratum was a hard earthen soil mixed with rocks. Underneath this layer was a dense floor layer, 10 cm thick, which probably was the floor between the two buildings. The final level was composed of grayish clay and soil mixed which forms the natural soil of the area.

PN 15D-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-20	10 YR 2/2	Chacalhaaz	
10	2	20-80	10 YR 5/3	Chacalhaaz	Floor?
10	3	80-110	10 YR 4/2	Yaxché	

PN 15D-11

This 1x1 unit was expanded with an additional extension of 50 cm by 3.90 m to accommodate the segment of the building up to where the S-8's wall abuts with Structure S-9

(Figure B.14). There were three strata identified with this unit. The first was humus, whose removal showed that the wall rose 1 m high but without an expected stairway leading up the main structure. The second lot was a brown earthen soil mixed with small rocks. A floor was discovered 70 cm below ground surface that was 10 cm thick. The third stratum was a clayish soil that underlies all the buildings in this area, whereupon the excavation stopped.

PN 15D-11

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	1	0-30	10 YR 5/3	Chacalhaaz	Wall, Floor
11	2	30-80	10 YR 5/3	Chacalhaaz	Floor
11	3	80-150	10 YR 4/2	Yaxché	

PN 15D-12

This 1x8.60 m trench was placed over the south section of the platform in an east-west heading. The purpose of the trench was to clean off the last construction phase of the platform. A single humus layer was removed, which exposed the stairs of the platform. Additionally, a wall was exposed that belonged to S-8-Sub-2 which had been covered by the final construction.

PN 15D-12

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
12	1	0-30	10 YR 2/2	Chacalhaaz	Steps, Wall of S-8-Sub-2

PN 15D-12a

This 1 m x 50 cm unit was placed inside PN 15D-12 as an exploratory unit to uncover the height of a wall associated with S-8-Sub-2. The first stratum was humus devoid of cultural material. The second layer was the fill of the last construction episode: regular sized blocks of limestone with little soil mixed in, covering the earlier phase wall. The wall, lying on the western side of the building, was 1.30 m tall. The third stratum uncovered the floor upon which sits the wall.

PN 15D-12a

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
12a	1	0-30	10 YR 2/2	Sterile	
12a	2	30-130	10 YR 5/3	Yaxché	Wall of S-8-Sub-2
12a	3	130-150	10 YR 5/3	Yaxché	Floor of S-8-Sub-2

PN 15D-13

This 1x6.20 m trench was placed along the northern section of the platform, between PN 15D-7 and 3 (Figure B.16). The trench had a single stratum, a humus layer, and a section of stairs pertaining to the last construction sequence of S-8. The four stairs are very similar to those previously uncovered in PN 15D-7 and 8 with 80-90 cm of run and 30-40 cm of rise to the stairs.

PN 15D-13

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
13	1	0-20	10 YR 2/2	Chacalhaaz	Stairway

PN 15D-14

This 0.50 x 2 m test pit was placed on the northwest side of PN 15D-9, between structures S-8 and S-19. A single stratum was removed to better view the architecture between the buildings.

PN 15D-14

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
14	1	0-60	10 YR 2/2	Chacalhaaz	

PN 15E-1

This 50 cm x 2.90 m trench was placed along the northern side of Structure S-9, to the west of PN 15D-2 (Figure B.17). The first stratum was humus. The second layer was brown earth mixed with small limestone rocks covering the bench found in PN 15D-2. The bench has two courses off stone.

PN 15E-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-25	10 YR 2/2		
1	2	25-40	10 YR 5/3	Sterile	Bench

SUBOPERATION 15F

During the 2000 field season, Sarah Jackson placed seven test pits within the same plaza where Héctor Escobedo and Mónica Urquizú had been excavating with the objective of defining more of the chronology and function of the area (Jackson and Hruby 2001). Her method of excavation was to screen everything through a 1/4" screen and each test pit proceeded to bedrock. Zachary Hruby also excavated a unit in the area, due to the presence of a lithic deposit (PN 15F-7) which unit was screened with a 1/8" and 1/16" screen to recover all possible debris.

The test pits were placed in front of the buildings comprising the plaza (S-8, S-9, S-10, S-11, and S-13) aligned with the central axis of structure S-9. The main findings of this

suboperation was Burial 78, described below, and a hidden platform. The platform was probably associated with an earlier version of the plaza and its walls were found just in front of S-9 and S-13, which indicates that the plaza area was expanded during the occupation of the area.

PN 15F-1

This 2x2 test pit was placed in the plaza in front of S-9, along the central axis of the structure, facing S-11 (Figure B.19). The first lot was humus in the which a small wall was found in the center of the unit. The second lot comprises the material on the northwest side of the unit, towards S-11 and consisted of loose fill. The third stratum comprised the material closer to S-9 and consisted of fine brown soil. The fourth lot resides under the third one, and had the same fine soil. This lot exposed the base of the wall. The fifth lot comprises part of the material under the wall, in the center of the unit. In this lot Burial 78 first appeared, but as the unit was taken out, the burial was assigned to lot 9. The sixth lot was the wall, part of it was removed. The seventh stratum comprised the material under stratum 2 which continued as a fine soil. The eighth lot consisted of soil extending to bedrock. The ninth lot is the material immediately around Burial 78.

Burial 78 (PN 15F-1-9)

Burial 78 consists of a badly preserved skull that was found in the fill of S-9's platform. No other bones were associated with the burial and no formal funerary architecture was discovered.

PN 15F-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-13	10 YR 4/1		Wall
1	2	13-31	10 YR 5/2		
1	3	13-48	10 YR 5/2		
1	4	48-83	10 YR 5/2		Wall Base
1	5	83-122	10 YR 5/2		Burial 78
1	6	13-53			
1	7	31-61	10 YR 5/2		
1	8	83-129	10 YR 7/2		
1	9	120-122			Burial 78

PN 15F-2

This 1x1 m test pit was placed in the plaza in front of S-8, and between S-9 and S-10 along the central axis of the structure (Figure B.18 and B.20). The first lot was humus, followed by a layer of fill. In this second layer a noticeable quantity of chert flakes were found. The third

lot was also fill but with a large quantity of chert flakes - so Zachary Hruby opened up PN 15F-7 to better understand the chert deposit. They appear to be on a decomposed floor layer. The fourth stratum continued with fill but with more sand mixed in which was possibly another floor. The fifth stratum was a floor and the excavation stopped.

PN 15F-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-5	10 YR 5/2		
2	2	5-18	10 YR 5/2		Chert deposit
2	3	18-30	10 YR 5/2		Chert deposit over Floor
2	4	30-49	10 YR 7/2	Sterile	Floor
2	5	49-66	10 YR 5/2		Floor

PN 15F-3

This 2x2 m unit was placed in the plaza in front of S-11 and along the central axis of the building, but far enough out to avoid previous excavations in the area. The only stratum was a thin layer of humus mixed with rocks from S-11's staircase right over bedrock.

PN 15F-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-13	10 YR 5/2		

PN 15F-4

This 2x2 m test pit was placed along the front of S-13 and in line with its central axis. The wall of the building formed the side of the unit, and hopefully this test pit will help define the construction sequence of the building. The first stratum was humus. The second stratum was loose fill with a small wall, about 35 cm high, towards the plaza side of the square. The third stratum found the base of the wall, and the fourth excavated into bedrock a little ways.

PN 15F-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-21	10 YR 4/1		
4	2	21-65	10 YR 5/2		Wall
4	3	65-82	10 YR 8/2		
4	4	82-91	10 YR 8/2	Sterile	

PN 15F-5

This 2x2 m test pit is located next to PN 15F-5 on the inside towards the plaza. The purpose of the unit was to investigate a small wall found in the previous unit. The first stratum was humus, followed by a layer of fine fill. The third stratum was the main wall feature while the fourth and fifth stratum investigated its foundation.

PN 15F-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-14	10 YR 4/1		
5	2	14-53	10 YR 5/2		
5	3	14-49			Wall
5	4	49-58	10 YR 8/2		
5	5	58-76	10 YR 8/2	Sterile	

PN 15F-6

This 2x1 m test pit was placed along the southern side of PN 15F-4 to further investigate a small wall found. The first lot was humus followed by a layer of fine fill.

PN 15F-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-23	10 YR 4/1		
6	2	23-55	10 YR 5/2		

PN 15F-7

This 2x1 m unit was placed in the plaza in front of S-8, close to its axis. It is a continuation of PN 15F-2, to further investigate a large quantity of chert flakes uncovered in that unit. A fine mesh (1/8" and 1/16") was used to recover the chert flakes.

PN 15F-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-10	10 YR 5/2		
7	2	10-30	10 YR 5/2		Midden
7	3	30-50	10 YR 5/2		Midden

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	4	50-80	10 YR 5/2		Midden

Summary

These operations recovered a lot of cultural material associated with a probable elite residential group. The artifacts are interesting in that there are few metates or manos recovered in the excavation, which are always presumed indicators of residential life. Jackson sees the wall discovered in units 1 and 5 as part of a large platform that cut across S-9 in the past, with possibly S-9 being built later and bisecting an earlier plaza group. An important find was the chert deposit in units 2 and 7. Very few loci of production have been found within Piedras Negras, and the presence of one in this elite compound is very interesting. Doubtless, Hruby's dissertation (in progress) will define the production in great detail. The chert flakes are late-stage pressure flakes and, with around 2000 flakes recovered in this area, imply the creation of several bifaces. Another aspect of the deposit is that the chert was heat-treated and comes from several different sources, some likely to have been imported.

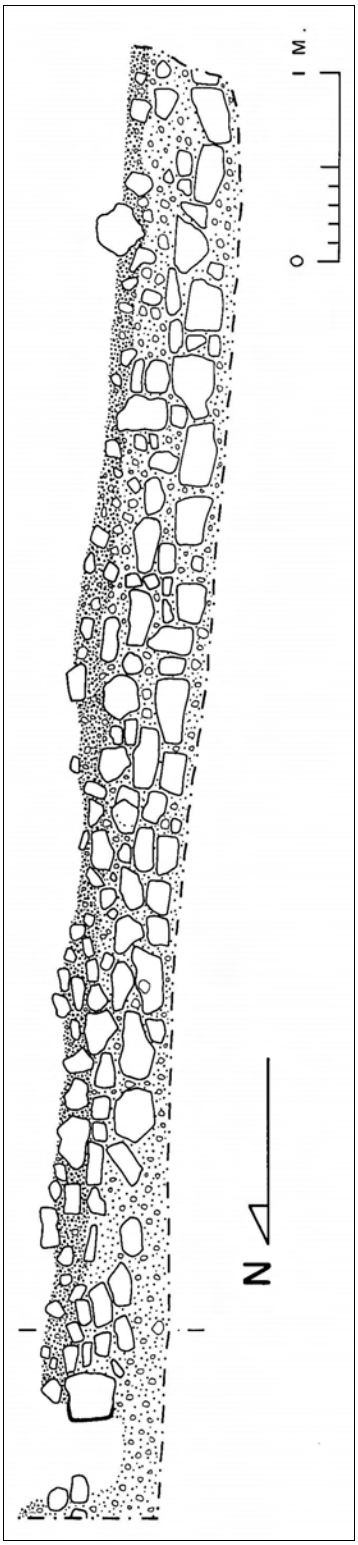

Figure B.7 PN 15D-1 and D-3, Profile East, West Wall, and Northwest Corner of Structure S-8 (From Urquizú 1998:91)

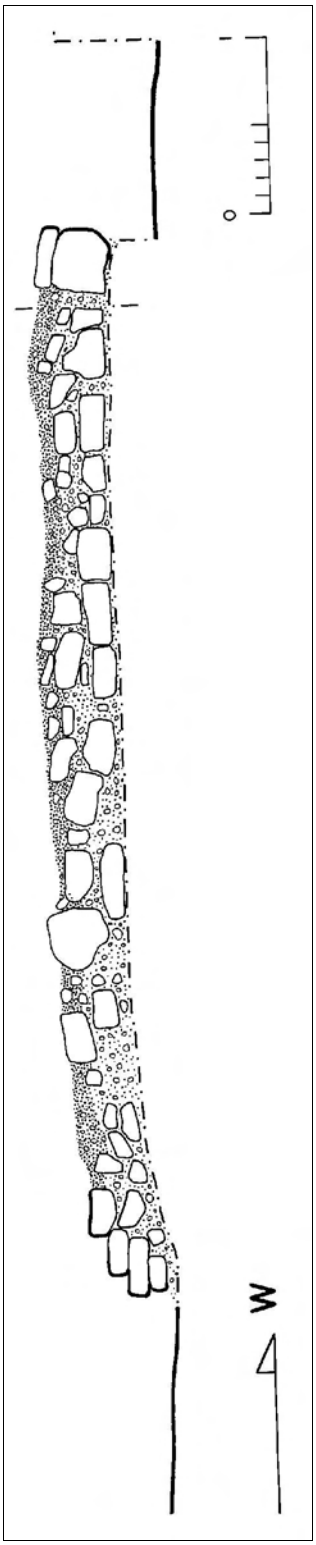

Figure B.8 PN 15D-1 and D-6, South Profile, East-West Wall of Structure S-8 (From Urquizú 1998:92)

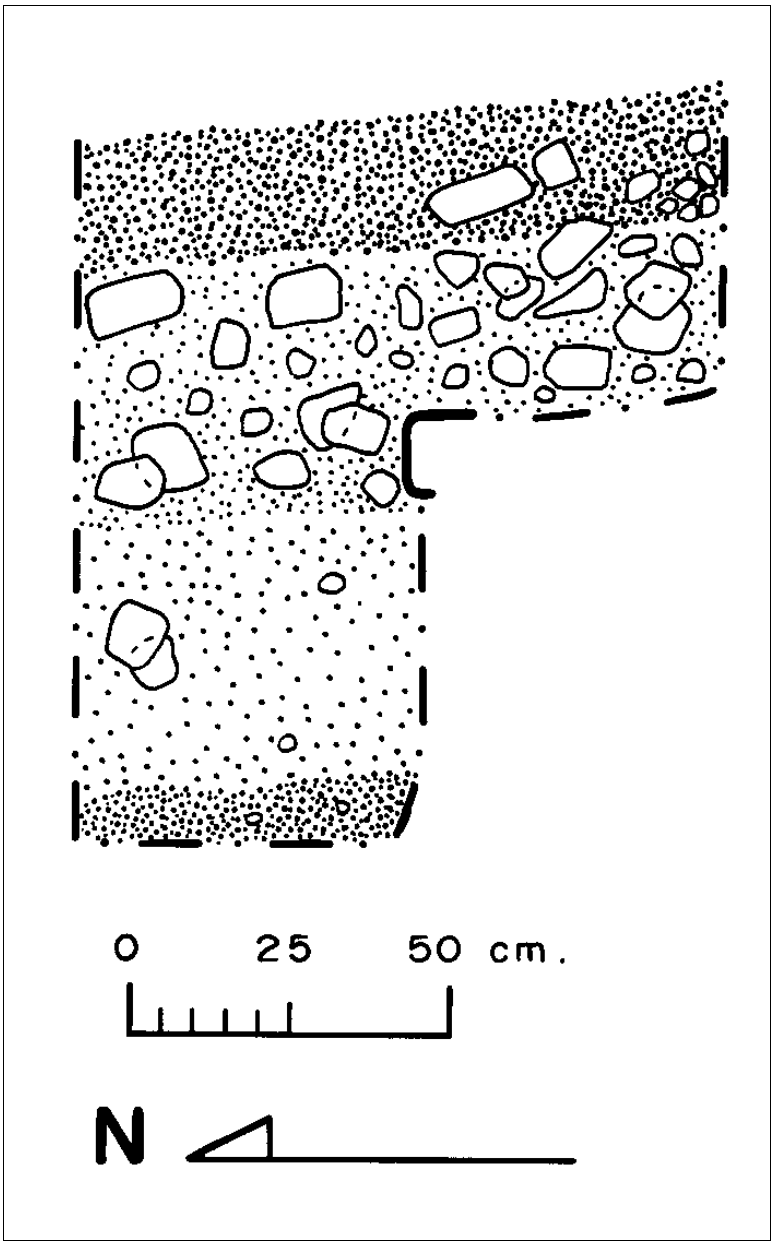

Figure B.9 PN 15D-2, East Profile, Bench of Structure S-9 which abuts Structure S-8 (From Urquizú 1998:93)

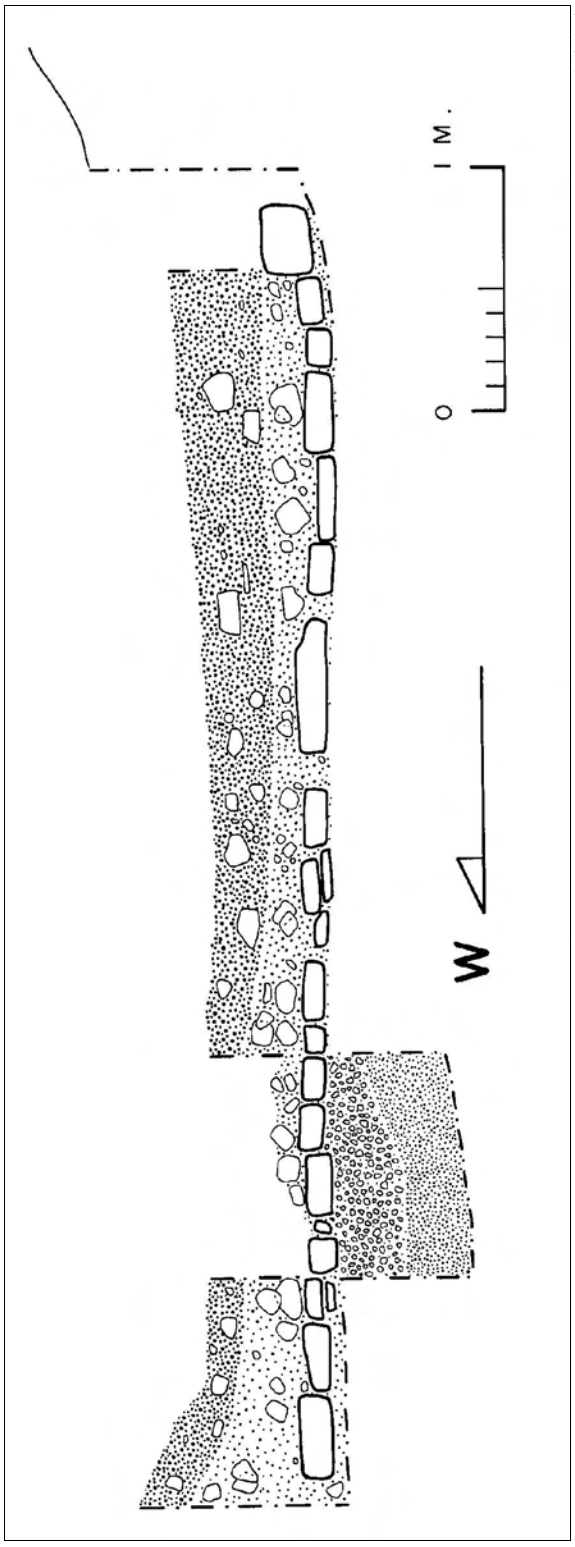

Figure B.10 PN 15D-5 and D-9, North Profile, Platform and Bench between Structures S-8 and S-9 (From Urquizú 1998:94)

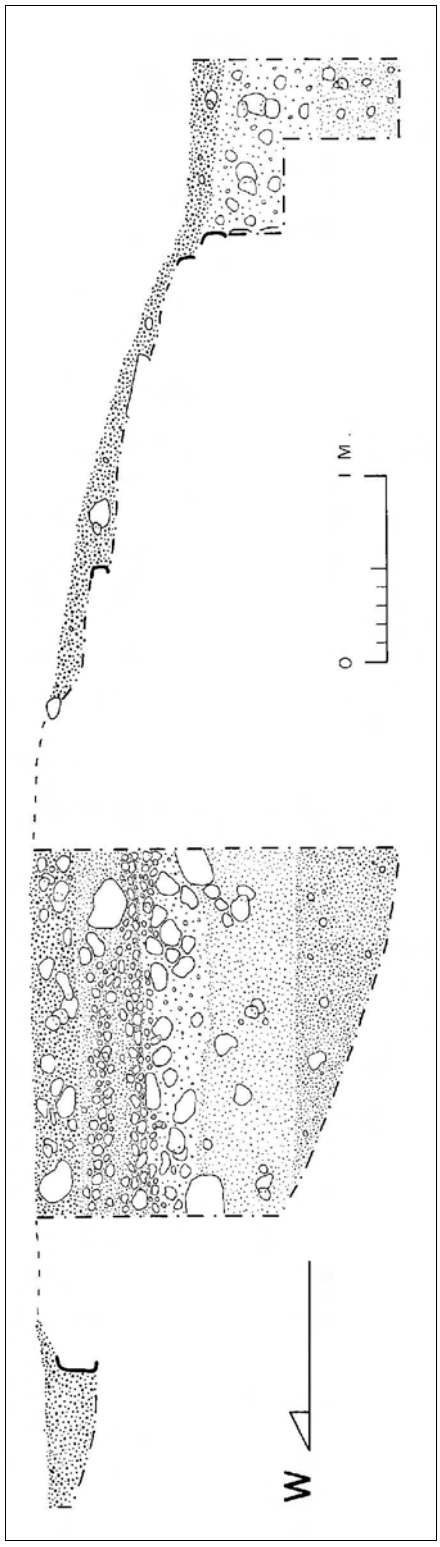

Figure B.11 PN 15D-8 and D-8a, North Profile, East-West Wall of Structure S-8 (From Urquizú 1998:95)

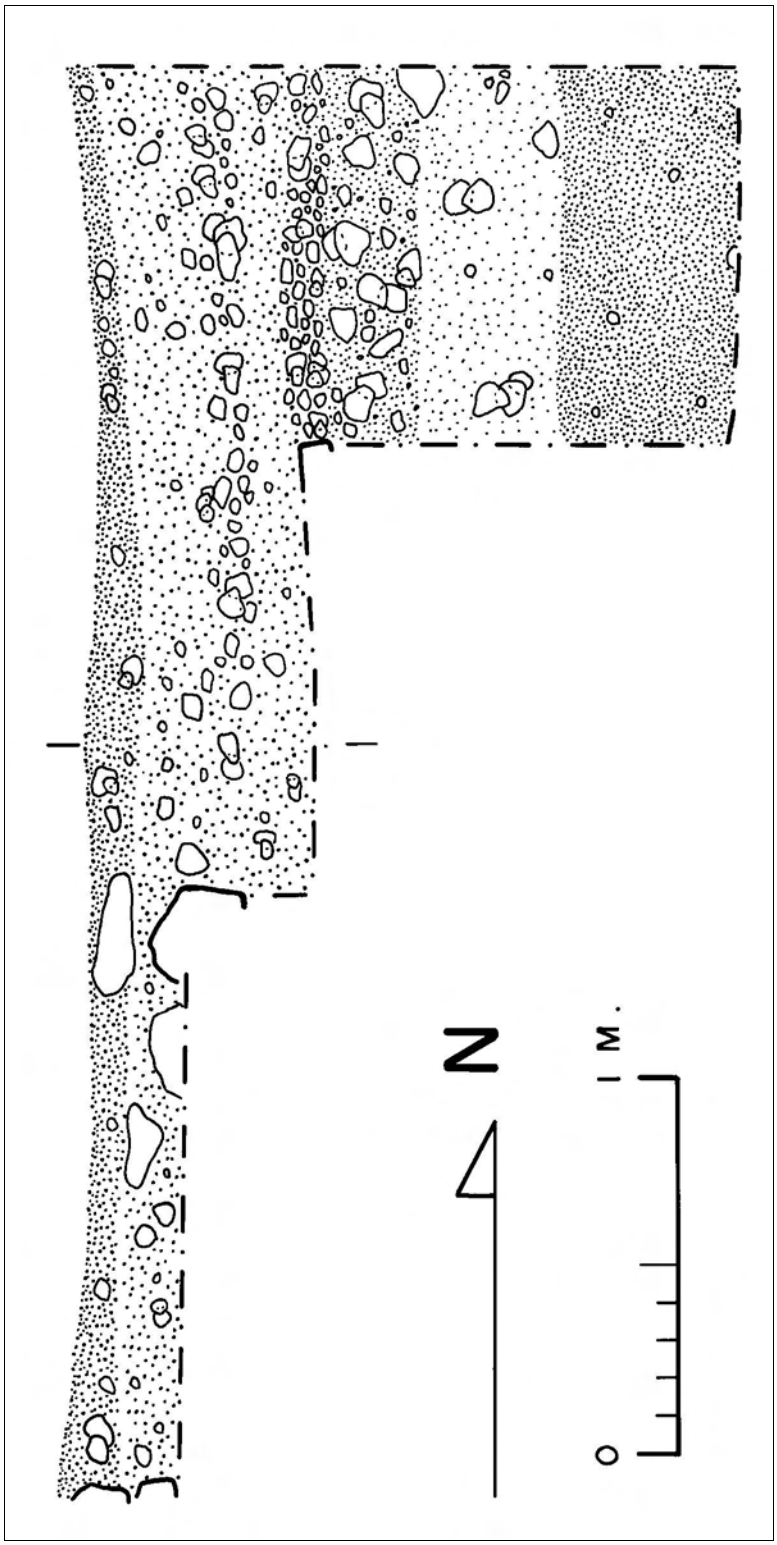

Figure B.12 PN 15D-8a and D-8b, West Profile, Structure S-8 (From Urquizú 1998:96)

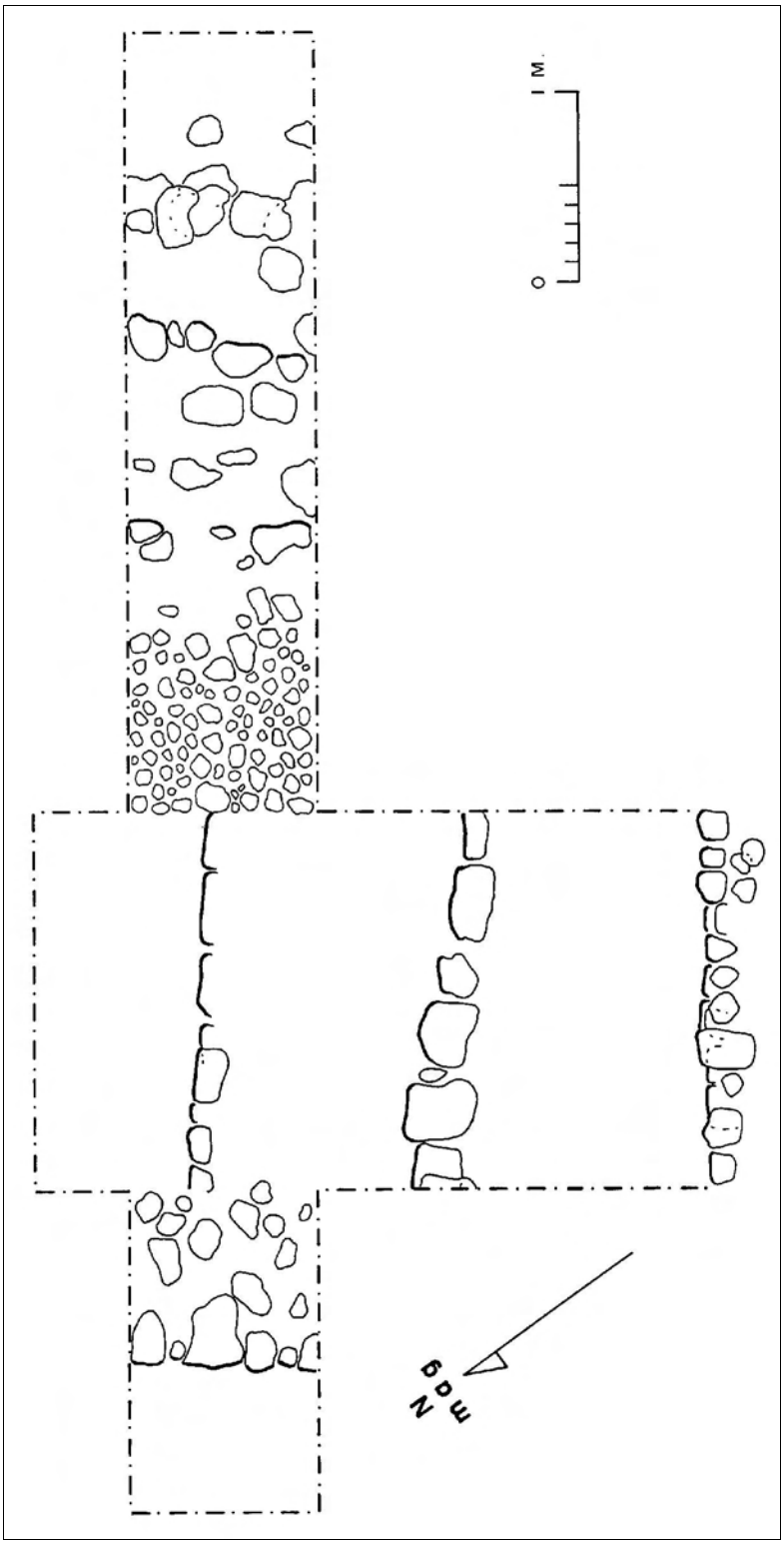

Figure B.13 PN 15D-8a and D-8b, Plan of Excavation, Structure S-8 (From Urquizú 1998:97)

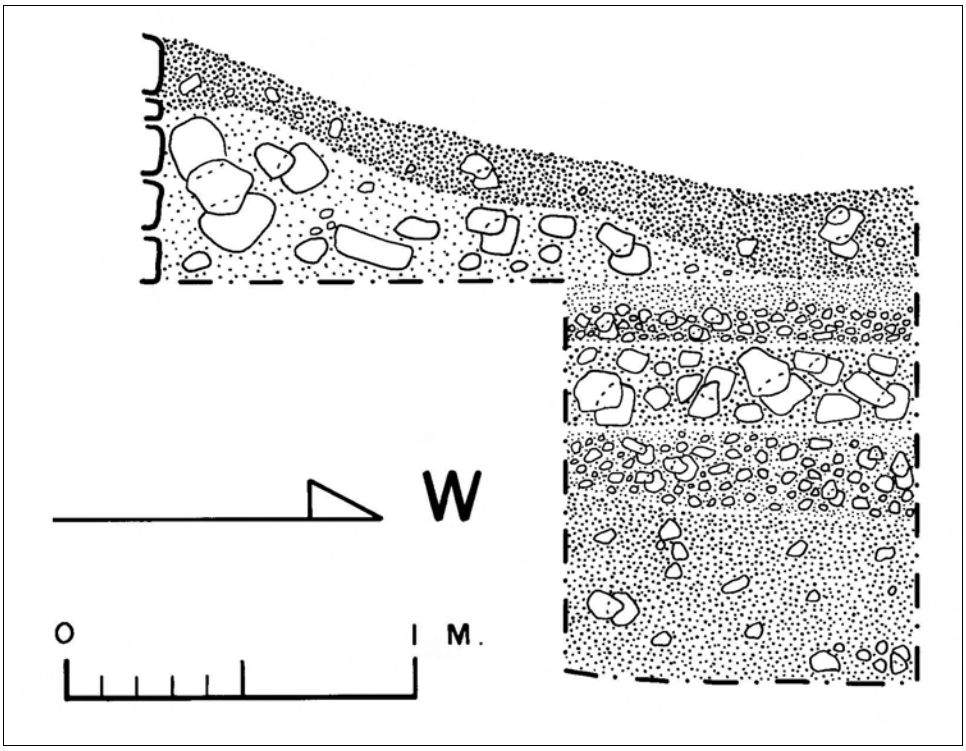

Figure B.14 PN 15D-11, South Profile showing Wall and Floor of the Southwest Plaza of Structure S-8 (From Urquizú 1998:98)

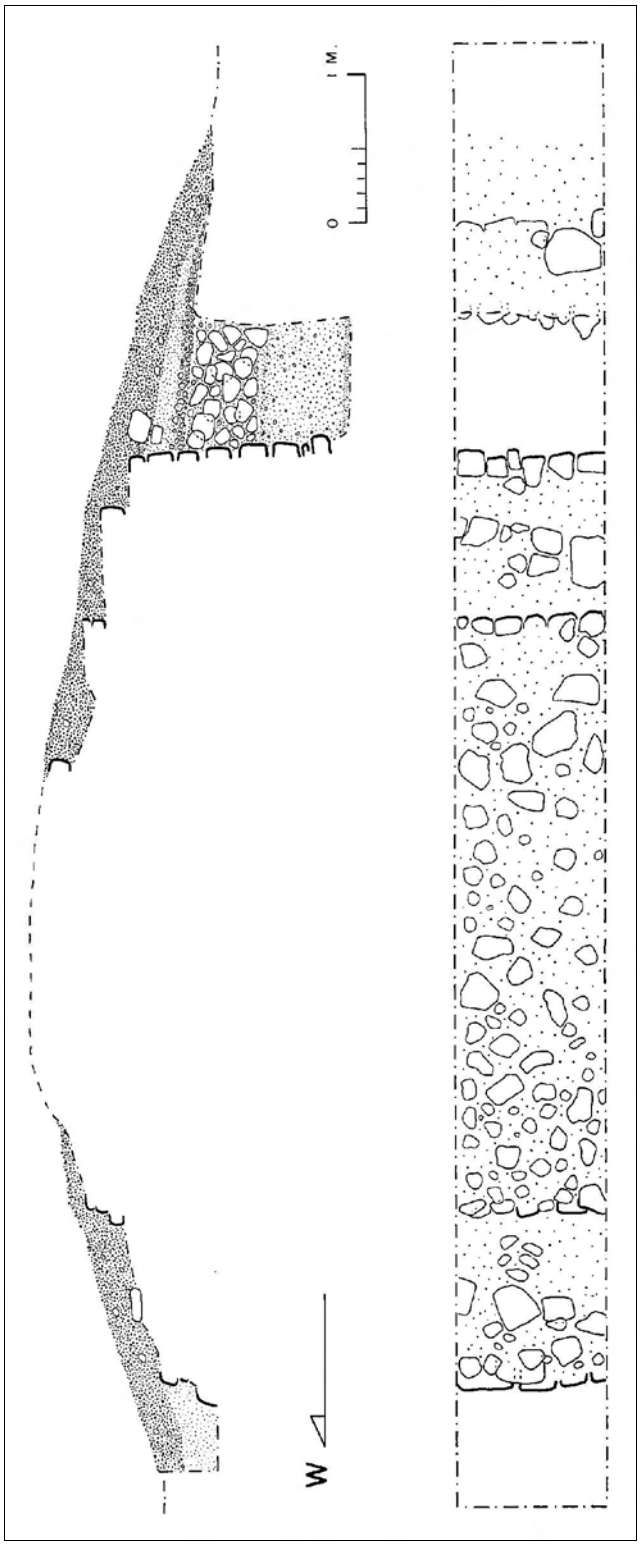

Figure B.15 PN 15D-1 and D-6, South Profile, East-West Wall of Structure S-8 (From Urquizú 1998:99)

Figure B.16 PN 15D-13, North Profile, East-West Wall of Structure S-8 (From Urquizú 1998:100)

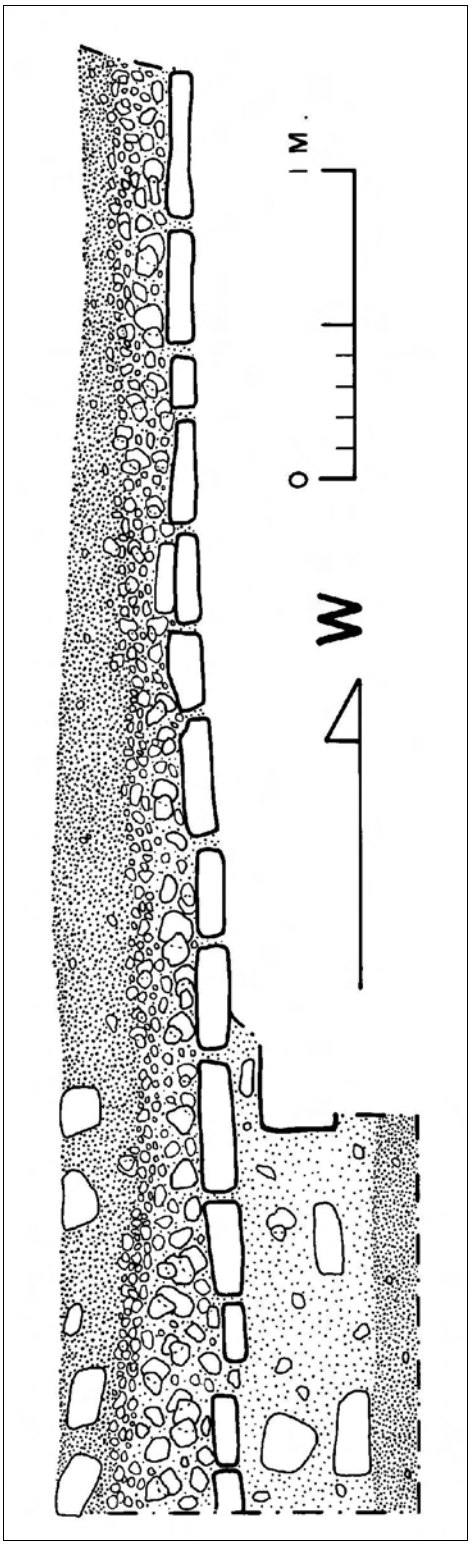

Figure B.17 PN 15E-1, South Profile, Bench of Structure S-9 (From Urquizú 1998:101)

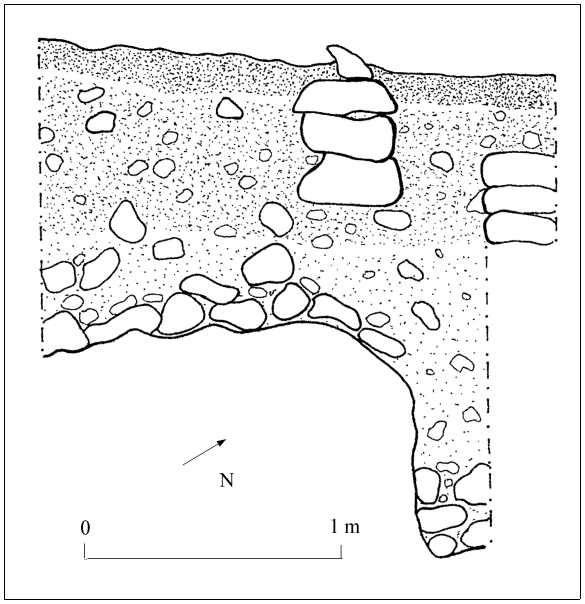

Figure B.18 PN 15F-2 North Profile (From Jackson and Hruby 2001:35)

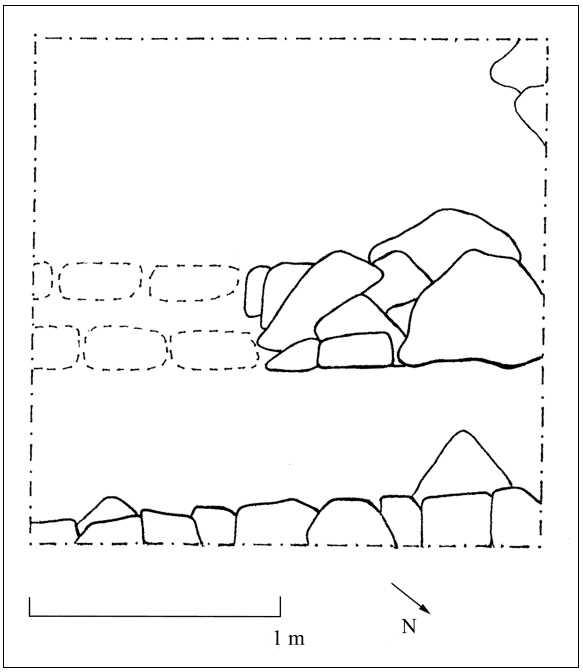

Figure B.19 Plan of Excavation (From Jackson and Hruby 2001:34)

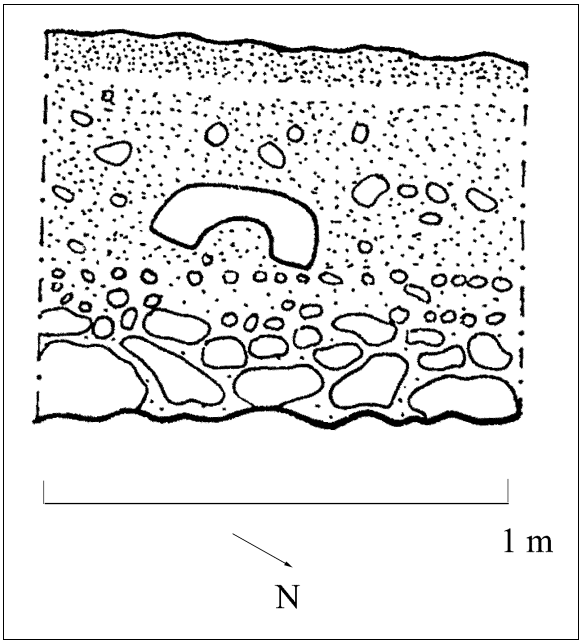

Figure B.20 PN 15F-2 West Profile (From Jackson and Hruby 2001:36)

OPERATION 23

SOUTH GROUP, R-SECTOR, R-20 & R-30

This operation centered on the R section of the Piedras Negras map, in particular on the plaza and buildings associated with R-18, R-19, R-20, R-30, R-31 and R-37 (Figure B.21). These buildings were investigated in 1998 by Nancy Monterroso and in 1999 by Luis Romero (under the direction of E. Christian Wells). The intent of the work here was to extensively open areas (to bedrock where possible) to better understand a small plaza group thoroughly. Excavations in 1998 concentrated on Suboperations 23A-D, while the 1999 excavations were suboperation 23E. A major component of this type of research is the focus on building change over time, and the large sample of burials obtained from presumably residential contexts in and around plazas.

SUBOPERATIONS

PN23A-D

This suboperation had 19 test pits placed in different areas of the plaza, most of which were excavated to bedrock. These excavations are included in this section because they help to integrate the large-scale excavations of Suboperation E into a wider picture of this geographic area and its evolution. Suboperation B were three units placed in the interior of R-20, only one of which went to bedrock and found an impressive burial. Suboperation C also had a small number of units and focused on R-37. Suboperation D consisted of a single test pit placed in the center of Structure 30.

BUILDING PHASES

In general, the buildings in this area look haphazardly placed. The building plan, if one ever existed, was lost somewhere during early Yaxché times, and never recovered. The remodeling phases of the structures tend to grow into other structures presenting a plan of unsupervised organic growth possibly as a consequence of lack of space in the area or just a desire to add (in good Maya fashion) to a building rather than create a new one, or even worse, no reconstruction at all.

R-19

R-19 had a small bench along the north side facing R-20 which dates to the Chacalhaaz period (Figure B.26).

R-20-4rth to R-20-1st

The evidence for R-20-4rth comes from floors found in PN 23A-2 and 19, on the south and west sides of the building. PN 23A-2 has a floor dating to the Abal ceramic phase (300 BC - 175 AD) which makes this one of the earliest floors at Piedras Negras. The floor found in PN 23A-19 is later, dating to the Nabá period (350-550 AD). There is no evidence for a structure, but a perishable building could have existed in the area from that time.

The evidence for R-20-3rd is a floor lying underneath the wall of R-20-2nd. This floor dates to the Yaxché phase and is visible in several different areas of the structure (PN 23A-2, 3, 10, B-3). Now, it is important to note where burials begin to figure in the construction sequence.

Burial 45 has Balché ceramics in the fill, and Chacalhaaz offerings. Most of the burials are believed to be intrusive by the excavator and may have been placed late in the construction sequence.

The evidence for R-20-2nd was discovered in PN 23B-3. The wall runs east-west across the structure with a well-faced southern side. It is unclear if the wall corresponds to a room or sub-structure, because it connects with the outside wall of the structure it is probably an earlier remodeling phase rather than a different construction. The wall dates to the Yaxché ceramic phase and is separated from the previously defined construction episode by a 30 cm layer of fill under its base. The building at this time probably measured 5.6 x 9.7 m.

R-20-1st is the last major construction episode of the building, and dates to the Chacalhaaz ceramic phase (750-825AD). A possible stairway was placed on the east side of the structure, as well as a stairway along the south and another access stair was placed on the north-east corner of the platform leading to R-32. A bench was built along the eastern side of the structure facing R-31 and R-37. At this time, burials 23, 29, 31, 32, and 33 were probably placed into the plaza through the plastered plaza floor (Figures B.22 and B.23, B.27).

R-30-3rd to R-30-1st

This 18x7.3 m range building appears to have had three main construction sequences. The earliest phase of the building (R-30-3rd) was a smaller version of the building constructed in the Pom/Nabá ceramic phase. R-30-2nd was wider than its predecessor, with a single room on its summit. R-30-1st is the latest construction episode, and it began sometime in the Chacalhaaz ceramic phase with its present width and a smoothed floor hiding the previous constructions. It probably had a perishable structure on top, that has long since vanished.

R-31

While not directly investigated in this suboperation (see 23E) there is evidence of a talud structure along the western side that had been buried by elevating the plaza. The talud seems to have been cut from the bedrock which lies unevenly in the area.

R-32

This Early Classic building had a round corner on the southwest side. The wall on this side was also uncovered, ranging in height from 30 to 130 cm. The wall was not well-constructed, and there is slight evidence of a previous construction episode of an interior wall. This would make sense in that the distance between R-32's and R-20's corner at the latest construction episodes was a scant 30 cm. Suggesting that each building gradually increased in size with little forethought.

R-37 (R-31a)

This small structure lies to the western side of R-31. Originally designated as R-31a by the investigator, it was renamed in this document to comply with the general Piedras Negras naming scheme. This platform originally may have had a perishable bajareque building on its top (R-37-2nd). Then a small stairway leading to the structure from the southwest side with stairs 30-40 cm deep and 10 cm high was constructed (R-37-1st). The stairway appears to be later than the placement of burials 23, 29, 31 and 33.

BURIALS

The burial pattern noticed in this group is that each burial (described below) is generally orientated north-south with the head towards the north. The actual deviation in degrees from magnetic north can range from 30-40 degrees, and probably is influenced by the orientation of the building near the burial. In general, the burial chamber is a simple cist made of irregular, unworked stones positioned around the body, with a covering of lajas, or thin slabs of limestone, on top. Burial 45 is an exception to this rule. Burial offerings are typically poor, consisting of a single pot or even flakes of chert with, again Burial 45 as the exception.

Burial 23 (PN 23A-1-5)

This burial of a small child was quite casual (Figure B.28). The burial was placed into the plaza and covered with the leveling layer of earth; there was no formal mortuary facility. The dental structure suggests a child of 7-9 years old who was placed in a north-south orientation with the head towards the north. The body was extended on its back and badly preserved. A broken Chacalhaaz pot was the only mortuary offering.

Burial 29 (PN 23A-6-3)

This burial of a child under the age of 7 years was unusual in that the cist did not have walls, just lajas covering the body. The child had been placed in an extended position on its side with a north-south orientation with the head towards the north. The general preservation is bad and the mortuary offering consists of a fragmented vase.

Burial 31 (PN 23A-6-5)

This burial was the smallest of the group (Figure B.28), and also was deposited very carefully with a fine layer of brown earth placed over the bones in addition to being covered with two lajas (reused metate fragments) in a deliberate act that the excavator believed was meant to mark a hierarchical difference in this burial between the other ones located nearby (i.e., 29 and 33). The burial cist measured 40 x 80 cm on the outside, and the burial was placed 65-70 cm below ground level. The burial is that of a small child placed in an extended position on its back, orientated north-south with the head towards the north. The general conservation of the bones was not good, with some bones missing and decomposed, but the burial was primary with the bones articulated. No offerings were associated with the burial.

Burial 32 (PN 23A-3-4)

This burial was placed in a cist covered by lajas with the wall made of irregular rocks (Figure B.30). The body had been orientated north-south, in an extended dorsal position with the head towards the north. There is some question about whether the head was facing up or to the east. The extreme north side of the burial was actually under the south wall of R-20. The cist area measured 30 cm by 1.70 m in length. The bones were fairly well preserved and some appeared disturbed. No offerings were associated with the individual.

Burial 33 (PN 23A-6-4)

This burial was that of a young child under the age of 7 years that had been placed in a cist whose walls had collapsed on the burial. The body was oriented north-south in an extended position face-up with the head towards the north. No offerings were associated with this burial.

Burial 35 (PN 23A-8-3)

This burial was placed in a cist composed of rocks on the western side and the R-31 talud on the east (Figure B.28). The burial is that of an young child, possibly under 7 years old, placed in an extended position on its back oriented north-south with the head towards the north. The bones were badly preserved. A tambor was placed as a mortuary offering to the east of the body near the chest cavity.

UNIT DESCRIPTIONS

PN 23A-1

This 1x2 m test pit was later amplified to 1x3 m to remove Burial 23 (Figure B.24). The unit was placed along the southeastern corner of R-20 with the hope of uncovering the chronological and architectural sequence of the structure. The first stratum was humus, followed by a layer of collapse from the structure. The third stratum was a leveling layer for the last occupation phase, a mix of earth and large rocks. The fourth layer was a floor that had been broken through to deposit Burial 23. The last stratum was burial 23.

PN 23A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20		Chacalhaaz	
1	2	0-10		Chacalhaaz	
1	3	20-70	10 YR 4/2	Chacalhaaz	
1	4	70-76			Floor
1	5	76-86	7.7 YR 4/2	Balché	Burial 23

PN 23A-2

This 1x1 m test pit was extended another 1x1 m to better understand the deposit. The placement is on the southwest corner of R-20 with the hope of finding the basal platform of the structure. The first layer was humus followed by a leveling fill stratum of brown earth. The western profile of this layer showed a north-south wall (120 degrees azimuth) which should be the southwest corner of the structure. Underneath this level was a badly preserved floor. Then another fill layer. Then another floor that comes under the structure. Then a leveling layer of earth mixed with medium sized rocks over bedrock.

PN 23A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-25		Chacalhaaz	
2	2	25-70	10 YR 4/2	Nabá	Wall
2	3	70-80	10 YR 4/5	Yaxché	Floor
2	4	80-120	10 YR 4/3	Abal	
2	5	120-130	10 YR 5/3	Sterile	Floor
2	6	130-160	10 YR 4/3		
2	7	160-200			Bedrock

PN 23A-3

This 3x1 m test pit was placed at the foot of the south wall of R-20. The purpose of this unit was to better understand the architecture of R-20, because even though the corners of the building had been uncovered, they had different orientations and the walls near the corners were crudely crafted. The natural stratum were humus, then a layer of fill (to raise the plaza during the last period of use). Also burial 32 was discovered.

PN 23A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-15		Chacalhaaz/Yaxché	
3	2	15-60	10 YR 4/2	Yaxché	
3	3	20-60		Yaxché	
3	4	70-95	10 YR 4/3	Balché	Burial 32

PN 23A-4

This 1x2 m unit was placed to the south of R-20, between PN 23A-2 and PN 23A-3. Three strata were identified in the unit, the first was humus, followed by a layer of soil and medium sized rocks. The third was similar material.

PN 23A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-10		Chacalhaaz	
4	2	10-55	10 YR 4/3	Yaxché	
4	3	55-95			

PN 23A-5

This 1x1 m test pit was placed in the plaza between R-20 and R-31, about 4 m to the southwest of PN 23C-2 and to the west of PN 23-7 (Figure B.25). Various strata were identified in the unit. The first was humus, followed by a leveling layer of fill comprised of brown earth and small rocks. The third layer was similar, with an increase in rocks. The fourth stratum had an admixture of bajareque, which indicates the presence of an earlier structure and a possible wall in the profile. The last stratum were sandy soil mixed with decomposed bedrock.

PN 23A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-10		Chacalhaaz	
5	2	10-30	10 YR 4/3	Yaxché	
5	3	30-70		Balché	
5	4	70-110	10 YR 4/4	Nabá	Early structure
5	5	110-130		Nabá	
5	6	130-150			Bedrock

PN 23A-6

This 1x2 m test pit was placed in the plaza to the east of PN 23A-1 as an extension of the unit to uncover more of burial 23. Another three burials (29, 31, and 33) were uncovered during the course of the excavation. The stratum consist of a layer of humus, followed by a layer of fill used to level the plaza. In this stratum were found three burials of children. The burials were intrusive into the plaza floor and probably come from the latest phase of occupation.

PN 23A-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-10		Chacalhaaz	
6	2	10-59		Balché/Yaxché	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	3	59-65			Burial 29
6	4	60-72		Balché	Burial 33
6	5	65-70	10 YR 4/3		Burial 31

PN 23A-7

This 1.50 x 0.50 m test pit was placed next to the southwest corner of PN 23A-5 to better understand the talud found in that unit (Figure B.25). Accordingly, it connects against R-31 and the talud area. The first lot was humus followed by a layer of fill. The last layer was also fill but with a high density of piedrin or small rocks.

PN 23A-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-20		Late Yaxché	
7	2	20-50	10 YR 5/3	Chacalhaaz	
7	3	50-120	10 YR 4/3	Sterile	

Figure 5

PN 23A-8

This 2x2 m test pit was placed to the north of PN 23A-7 as an extension and to the east of PN 23A-5 with the purpose of following the talud discovered in PN 23A-5. The principal finding was Burial 35. The first stratum was humus, followed by a layer of brown earth and rocks that covered the talud and Burial 35. The third lot was burial 35. The fourth lot was removal of platform collapse. The fifth lot was the material under the burial. The last stratum was over bedrock and consisted of burned earth and bajareque mixed with brown soil.

PN 23A-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-10		Yaxché	
8	2	10-90	10 YR 4/3	Yaxché	
8	3	90-100	10 YR 4/3	Yaxché	Burial 35
8	4			Yaxché	
8	5	100-110	10 YR 5/3	Yaxché	
8	6	110-200		Nabá/Balché	

PN 23A-9

This 0.50 x 2.50 m unit was placed in the plaza between R-20 and R-37 (R-31a) with an east-west orientation, to the east of PN 23A-6. The main finding is that the access to R-20, a possible stair, had a total dimension of 3 m from the side of the building. The first stratum was humus, followed by a layer of fill meant to level the plaza.

PN 23A-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-10		Chacalhaaz	
9	2		10 YR 4/3		Base R-20

PN 23A-10

This 1x2 m test pit was placed along the extreme southwest corner of R-20 and north of PN 23A-2 as an extension. The stratigraphy is very similar to that unit. The main information from this unit was a clearer view of the west wall of R-20 which wall is a later addition to the structure. The first floor was clearly broken through to place the plaza burials.

PN 23A-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-25		Chacalhaaz	
10	2	25-70	10 YR 4/2		
10	3	70-80		Yaxché	Floor
10	4	80-120			
10	5	120-130	10 YR 5/3		Floor
10	6	130-160			
10	7	160-200		Sterile	Bedrock

PN 23A-11

This 1 x 4.50 m trench was placed along the western wall of R-37 (R-31a). The first stratum was humus. The second layer was a possible midden with medium sized rocks, lying close to R-37.

PN 23A-11

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	1	0-28	10 YR 4/2	Chacalhaaz	
11	2	28-48	10 YR 4/3	Chacalhaaz	

PN 23A-12

This 2x2 m test pit was placed along the southwest side of R-20. A single humus layer was removed which exposed the remains of a 2x2 m bench which abutted against the western side of R-20, believed to have been constructed during the last phase of occupation of the structure.

PN 23A-12

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
12	1	0-20		Early Chacalhaaz	R-20 Bench

PN 23A-13

This 2.50 x 2 m test pit was placed in the plaza between R-20 and R-32, to the west of PN 23A-11 and north of PN 23A-12, at the foot of the eastern side of R-20. The first stratum was humus followed by a layer of dark brown soil with medium sized rocks. This unit reinforced the difference in architectural styles between R-20 and R-32.

PN 23A-13

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
13	1	0-10	10 YR 4/2		
13	2	10-40			

PN 23A-14

This 1.50 x 2.50 m test pit was placed in the plaza between R-19 and R-20, to the east of PN 23A-3 and south of PN 23A-1, and to the east of PN 23A-15. A stratum of humus was removed which left exposed a 2.50 m of an east-west running line of stones and its corner. Further excavation found its foundation on the plaza floor. This is believed to have been part of a bench abutting R-19. The form of the floor implies that the burials 23, 29, 31, and 33 are intrusive into the plaza floor.

PN 23A-14

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
14	1	0-10		Chacalhaaz	Bench

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
14	2	10-40	10 YR 4/3		Bench base

PN 23A-15

This 2x2.50 m test pit was placed to the west of the previous unit and to the east of PN 23A-16. The purpose of this unit was to continue to define the plaza area between R-20 and R-37. A single stratum of humus was removed which lead to the discovery of the remains of a small bench along the eastern side of the unit, associated with R-19.

PN 23A-15

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
15	1	0-40		Chacalhaaz	Bench

PN 23A-16

This 1.50 x 2 m unit was placed to the immediate west of R-37 (or R-31a) along its south side and to the east of PN 23A-15. A single stratum of humus was removed which revealed a small stairway leading up to R-37. The stairs were 30-40 cm deep and 10 cm high. The physical evidence suggest that the staircase was added to R-37 after the building was already constructed. The stairs were probably added after burials 23, 29, 31, and 33 were placed in the plaza due to how the plaza floor level had been changed across the width of the plaza.

PN 23A-16

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
16	1	0-10			R-37 stairs

PN 23A-17

This 1x2 m unit was placed between R-20 and R-32, to the west of PN 23A-18. Two strata were identified, humus and fill with rocks. R-32's southeastern wall was uncovered, ranging in height from 30-130cm. Also, R-20's northwestern corner was found, which was comprised of five stones that descended from south to north (following the bedrock) as a kind of stairway. Also, an east-west wall was located that could have been part of a remodeling phase over an eroded floor.

PN 23A-17

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
17	1	0-30			
17	2	30-130	10 YR 4/3		Wall, Stair, Floor

PN 23A-18

This 2.40 x 2.50 m test pit was placed between R-20 and R-32 to document how the two buildings joined, if they did. The excavation revealed that R-32 had a round corner, an architectural technique characteristic of the Early Classic at Piedras Negras, and that the wall was formed of limestone blocks that were not well-made. The corridor between the two buildings also reduces to a scant 30 cm at the narrowest point. R-20 may have had a small stairway in this area, and there is a little evidence of a previous construction layer for R-32. The first layer was humus, followed by a layer of earth mixed with large and medium sized rocks.

PN 23A-18

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
18	1	0-40			
18	2	40-125			Plaza floor R-32

PN 23A-19

This 2x3 unit was placed along the northwest side of R-20, a little to the north of PN 23A-2 and 10, and at the base of PN 23B-2. The object of this unit was to investigate features of the last construction phase of the building. The first layer was humus. Underneath the humus layer was a fill layer of brown earth and small rocks. This layer had a small altar associated with it, 30 cm high sitting on a floor composed of lajas that covered an area of 1.70 x 2.80 m. The unit was then subdivided into four quadrants to excavate in and around the altar.

The southwest quadrant (PN 23A-19-4) began by breaking through the lajas. This revealed a soil layer of brown earth in which was found an eccentric. Beneath this layer was a thin layer of grayish earth. The northeast quadrant (PN 23A-19-6) excavation revealed a midden layer followed by an earthen floor with small rocks. This floor is not associated with the interior of the structure. Because the previous stratum did not reveal the foundation of the altar, the eighth lot was placed under it which revealed medium sized rocks with little earth mixed in over bedrock.

PN 23A-19

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
19	1	0-10	10 YR 4/3		
19	2	10-90			Floor, Altar
19	3				
19	4		10 YR 4/3		
19	5	80-85	10 YR 5/2		
19	6	90-100	10 YR 5/2	Chacalhaaz	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
19	7	100-110		Nabá	Floor
19	8				

PN 23A-20

This 1x2 m test pit was placed in the plaza formed by R-30 and R-31 at 3.50 m from the western side of R-30. A single humus layer was removed before hitting bedrock at 35 cm below ground level. The great difference in the bedrock levels between this unit and others a few meters to the west (like PN 23A-8 and A-5) made the excavator wonder if the bedrock had been cut, perhaps forming the top of the talud structure, which was then covered by the low platform, R-31.

PN 23B-1

This was a 1x12 m trench placed along the north-south axis of R-20 to uncover the architectural features of the last construction episode of the building. A single stratum of humus was removed with a variable depth from 10 to 35 cm. An important discovery of this trench was three very destroyed steps along the southern edge of the building. Each one could have had a width of 75 cm and a height of 20 cm leading up to the summit of the structure, where a perishable building (or even an altar) could have been located.

PN 23B-2

This unit was a 1x6 m trench placed along the east-west axis of the building, with the intent to uncover the last construction episode of the building. A single stratum of humus (10 cm) was removed.

PN 23B-3

This 2x2 m test pit was later enlarged to 3.50 x 2.80 m. It was placed at the intersection of PN 23B-1 and 2 directly over the axis of R-20 with the hopes of finding substructures and a burial. In fact a major burial was found, Burial 45. The initial layer was humus (part of which was previously removed as part of the other units). The second stratum was fill with large rocks (30 cm) and little earth - a recipe for wall failure. A wall was discovered with an east-west orientation, the south side of the wall was worked while the other was still rough indicating a possible substructure with perhaps a filled-in room. The amplification of the unit revealed that the wall articulates with the outer wall of R-20 which would make this a remodeling episode (R-20-2nd) instead of an earlier construction episode (not R-20-Sub-1).

The third layer was fill under R-20-2nd consisting of brownish earth mixed with sand. The fourth lot had a disintegrated plaster floor with some grouting beneath it of small limestone rocks. Located 30 cm below the base of R-20-2nd, this floor was 8-15 cm thick. The fifth stratum was lighter soil found in the northern side of the unit. The sixth stratum was light brown earth mixed with fine limestone particles and small rocks. The removal of this layer exposed the lajas covering the crypt to view. The seventh stratum was that of Burial 45.

Burial 45 (PN 23B-3-7)

This elaborate crypt, composed of worked stone, was approximately 74 cm high and had a length of 2.26 m. It was covered by large lajas (Figure B.31). The crypt also had niches which held mortuary offerings. The individual was placed in a north-south position with the head towards the north, in an extended dorsal position. The bones were in an excellent state of preservation. The right incisor had a jade "flower" inserted. Offerings include 5 bowls with glyphs and pseudoglyphs forming the skyband, 6 clay beads, a jade bead, some chert flakes, and 2 jade plaques.

PN 23B-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-40		Yaxché	
3	2	40-150	2.5 Y 5/2	Yaxché	Wall of R-20-2nd
3	3		2.5 Y 5/2		
3	4			Yaxché	Floor
3	5				
3	6		10 YR 6/3	Balché	
3	7	-274		Balché	Burial 45

PN 23C-1

This 1x2 m test pit was placed in an elevated area (which was probably once R-37, or R-31a as Monterroso named it) in front of R-31. The first layer was humus. The second layer was loose earth mixed with medium sized rocks. The third layer was also fill mixed with large rocks. The lajas of Burial 28 were discovered, so the next unit was opened to uncover the burial completely.

PN 23C-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-10	10 YR 4/3		
1	2	10-30	10 YR 4/3		
1	3	30-50	10 YR 4/3		Burial 28

PN 23C-2

This 1x5.50 m trench was placed to the east of PN 23C-1 and extended from the base of R-32. The first stratum was humus, followed by a stratum of fill used to level the area. A second

layer of the same material was underneath. The fourth stratum was intrusive collapse from R-32's southern corner. The fifth stratum comprised Burial 28.

Burial 28 (PN 23C-2-5)

The burial chamber consists of a simple cist that measured 50 cm wide by 1.75 m long in which the body was placed covered by lajas (Figure B.29). There is a possibility that the cist had been reentered because there was some disturbance of the chest cavity bones, perhaps when still articulated. The individual had been placed in an extended position on its back, orientated north-south with the head towards the north. Mortuary offerings included two (broken) bowls placed on the lajas and west side of the cist, and a broken stingray spine found in the pubic area of the skeleton.

PN 23C-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-10	10 YR 4/3	Yaxché	
2	2	10-30	10 YR 4/3	Chacalhaaz	
2	3	30-50	10 YR 4/3	Yaxché	
2	4	10-50	10 YR 4/2	Chacalhaaz	
2	5			Yaxché	Burial 28

PN 23C-3

This 1x2 m test pit was placed one meter to the north of PN 23A-8 and followed the orientation of the talud building section found in that unit. There were three strata identified in the unit. The first was the humus layer, followed by a layer of brown earth mixed with large rocks. This fill covered the eastern wall of R-37 (called R-31a by Monterroso). The last layer was a mixture of brown earth and fine rocks that covered the foundation of the wall.

PN 23C-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-18			
3	2	18-42	10 YR 3/3		Wall of R-37
3	3	42-80			Base of R-37

PN 23D-1

This 2x2 m test pit was placed in the center of R-30 to understand its chronology. The first stratum was humus, followed by a layer of brown soil with medium rocks. Under this stratum was a floor. The fourth stratum was a fill layer overlying the fifth layer which contained

a wall oriented 30 degrees east-west. The last stratum also had a line of stones, only these ran north-south along the eastern edge of the unit.

PN 23D-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-10			
1	2	10-30	10 YR 4/3		
1	3	30-40	5 YR 5/2		Floor
1	4	40-50	10 YR 5/4	Nabá/Chacalhaaz	
1	5	50-90	10 YR 4/2	Nabá	Wall
1	6	90-110		Pom/Nabá	Wall

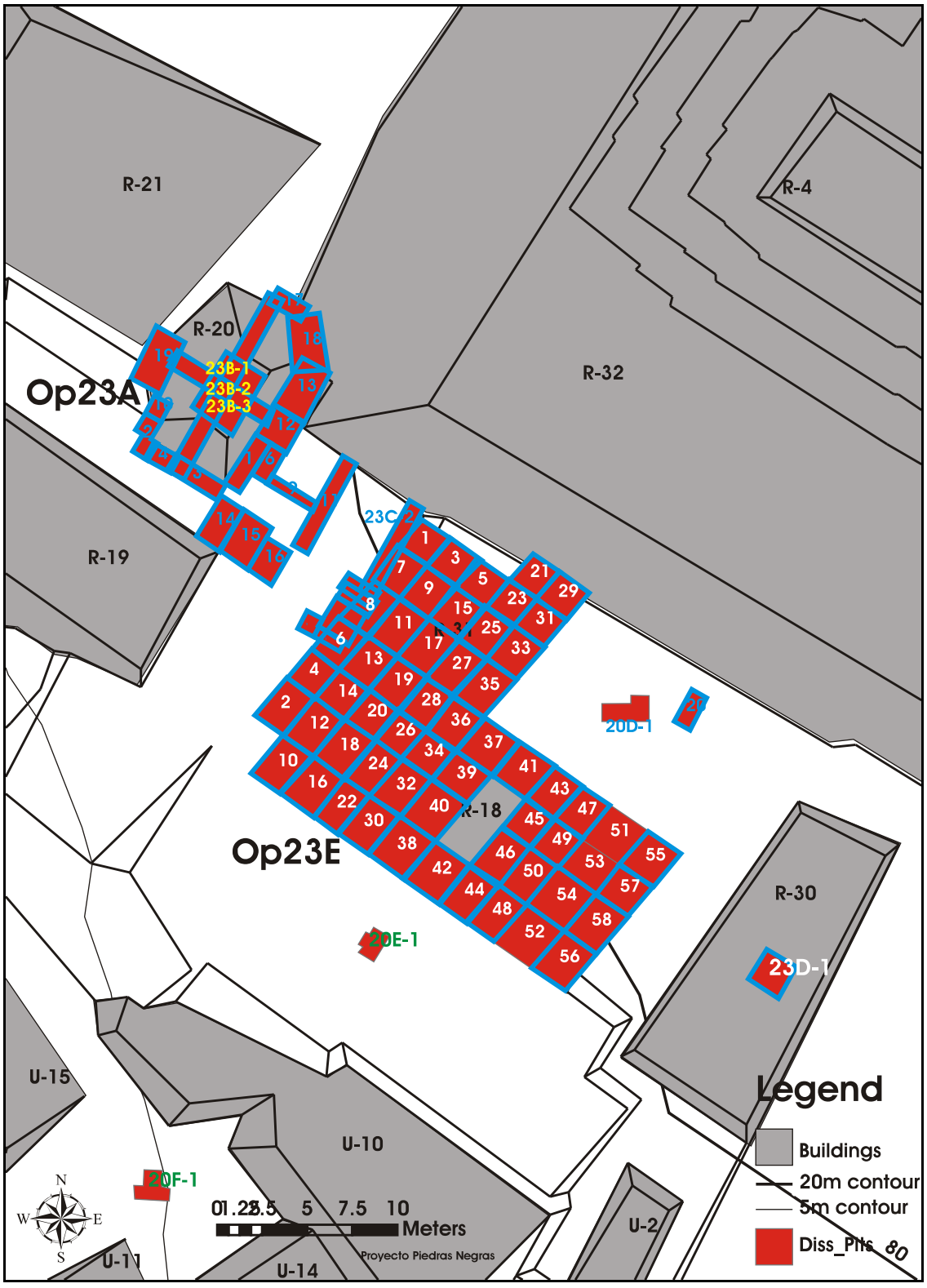

Figure B.21 Operation 23

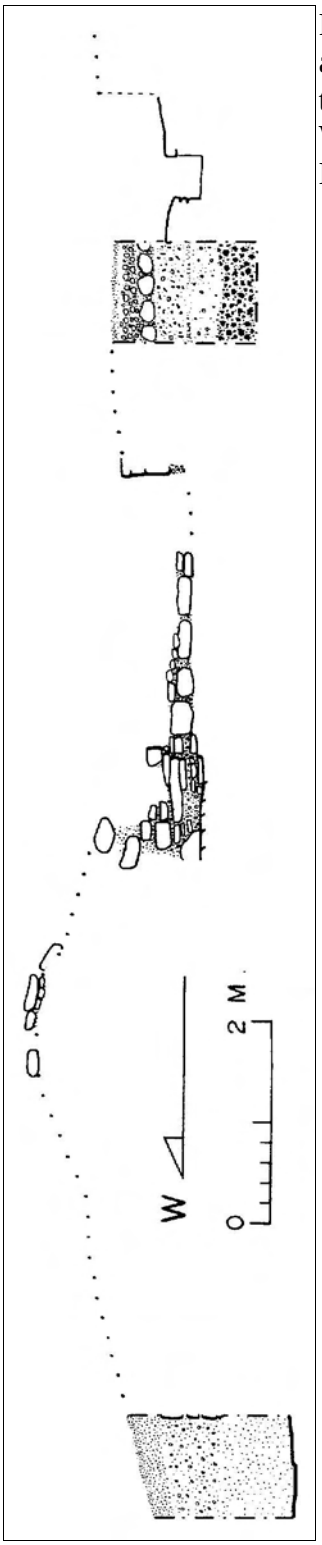

Figure B.22 PN 23A, B, and C, Structure R-20 to R-31 along East-West Profile (From Monterroso 1998:113)

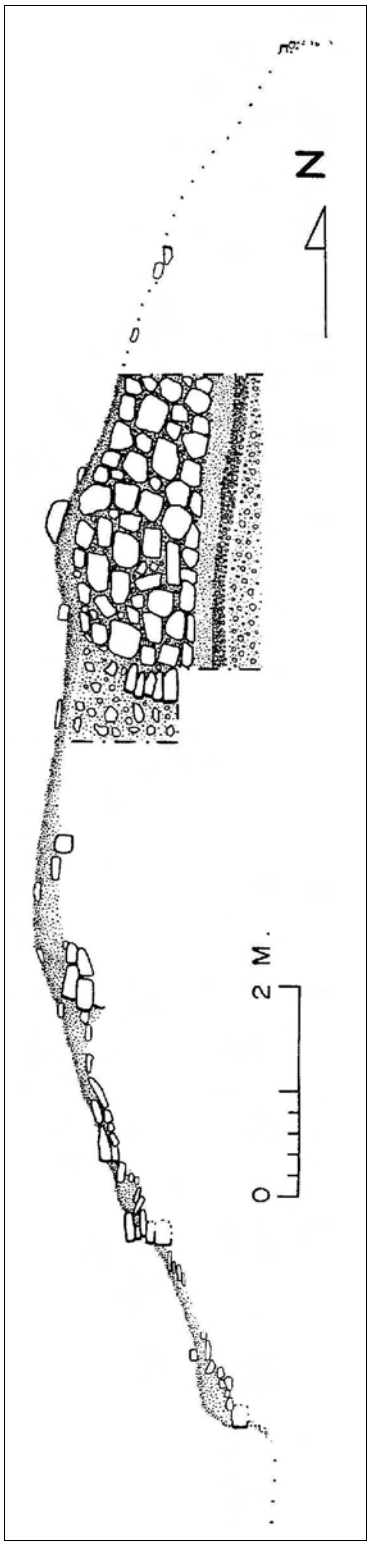

Figure B.23 PN 23B, Structure R-20 along the North-South Profile of the Trench (From Monterroso 1998:119)

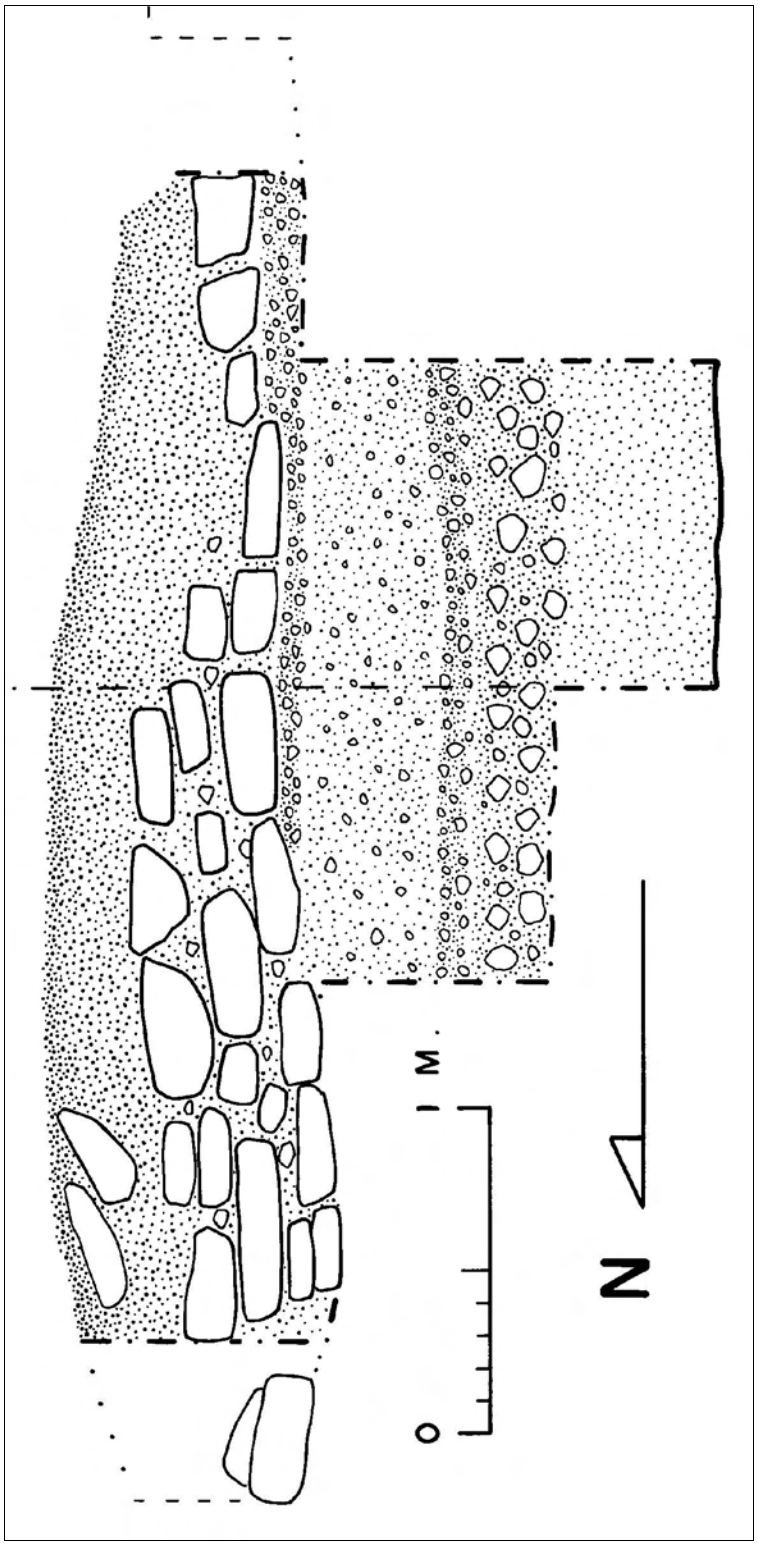

Figure B.24 PN 23A, Profile of the Excavations (From Monterroso 1998:115)

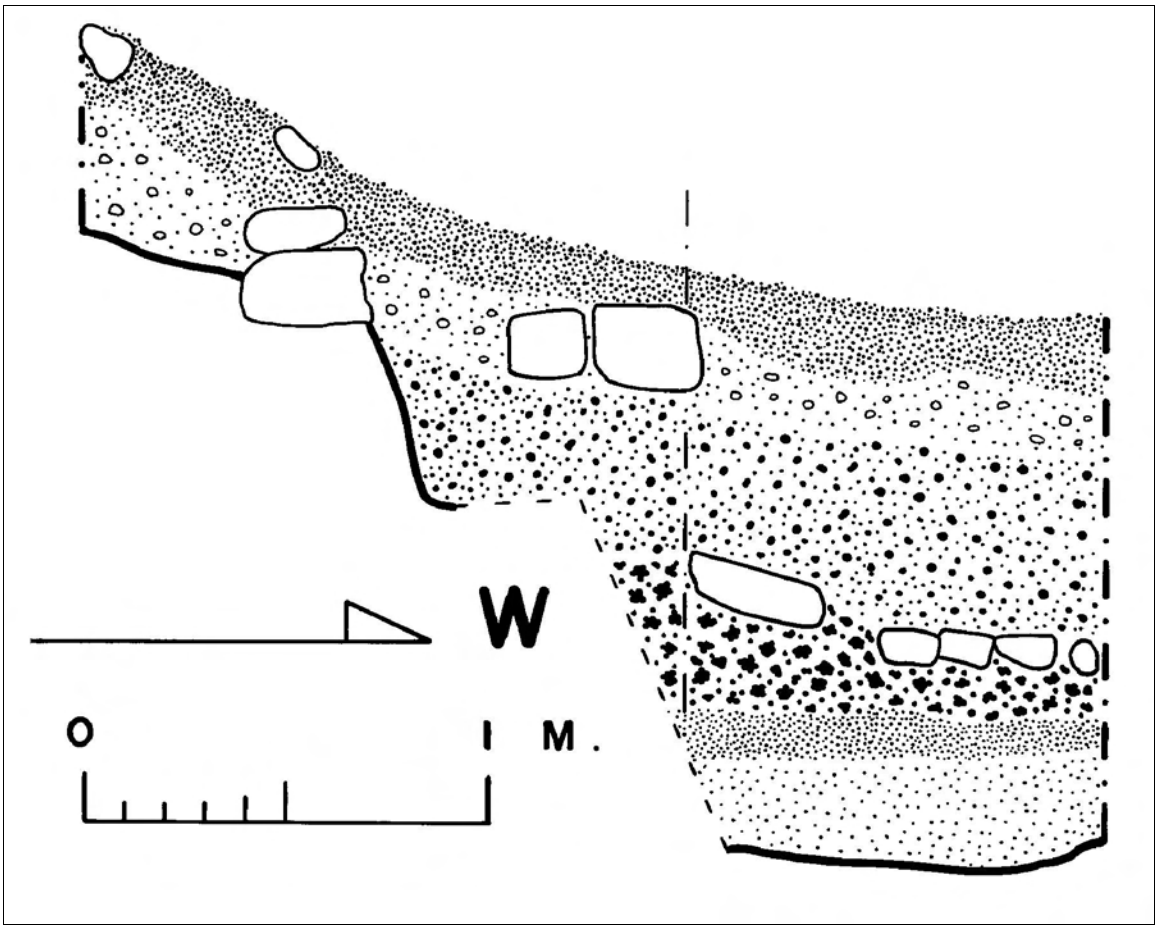

Figure B.25 PN 23A-5 and A-7, Profile (From Monterroso 1998:117)

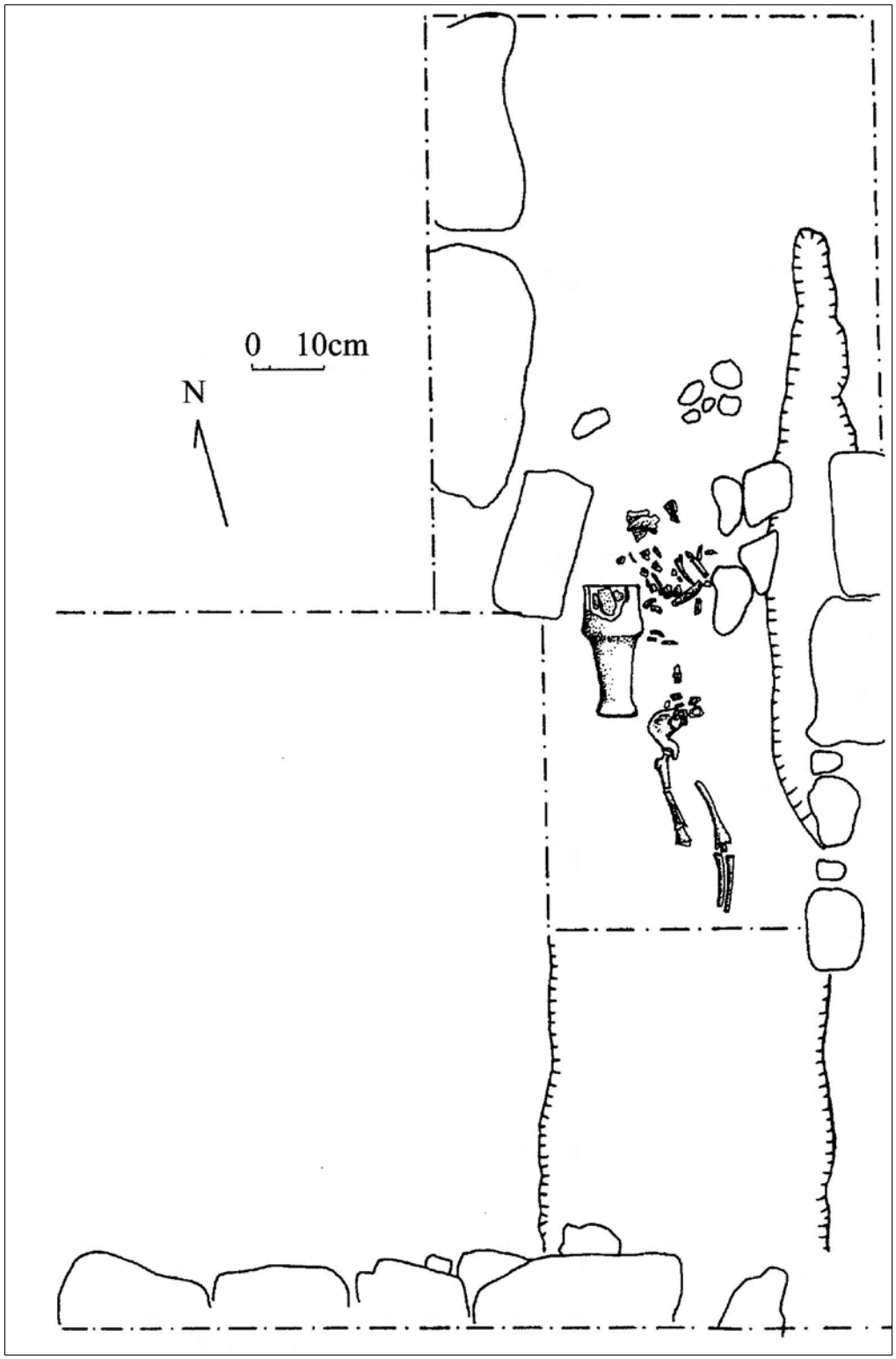

Figure B.26 Plan View of Structure R-19 (From Monterroso 1998:118)

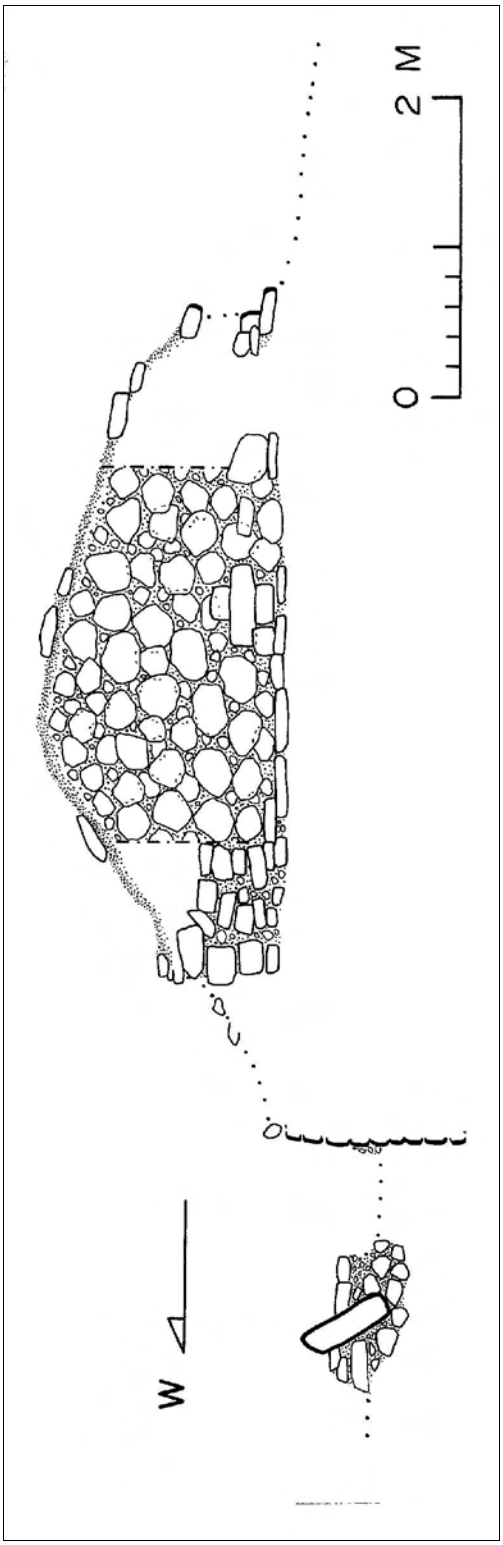

Figure B.27 PN 23A, B, and C, Structure R-20 with an East-West Profile along the Northern Face (From Monterroso 1998:122)

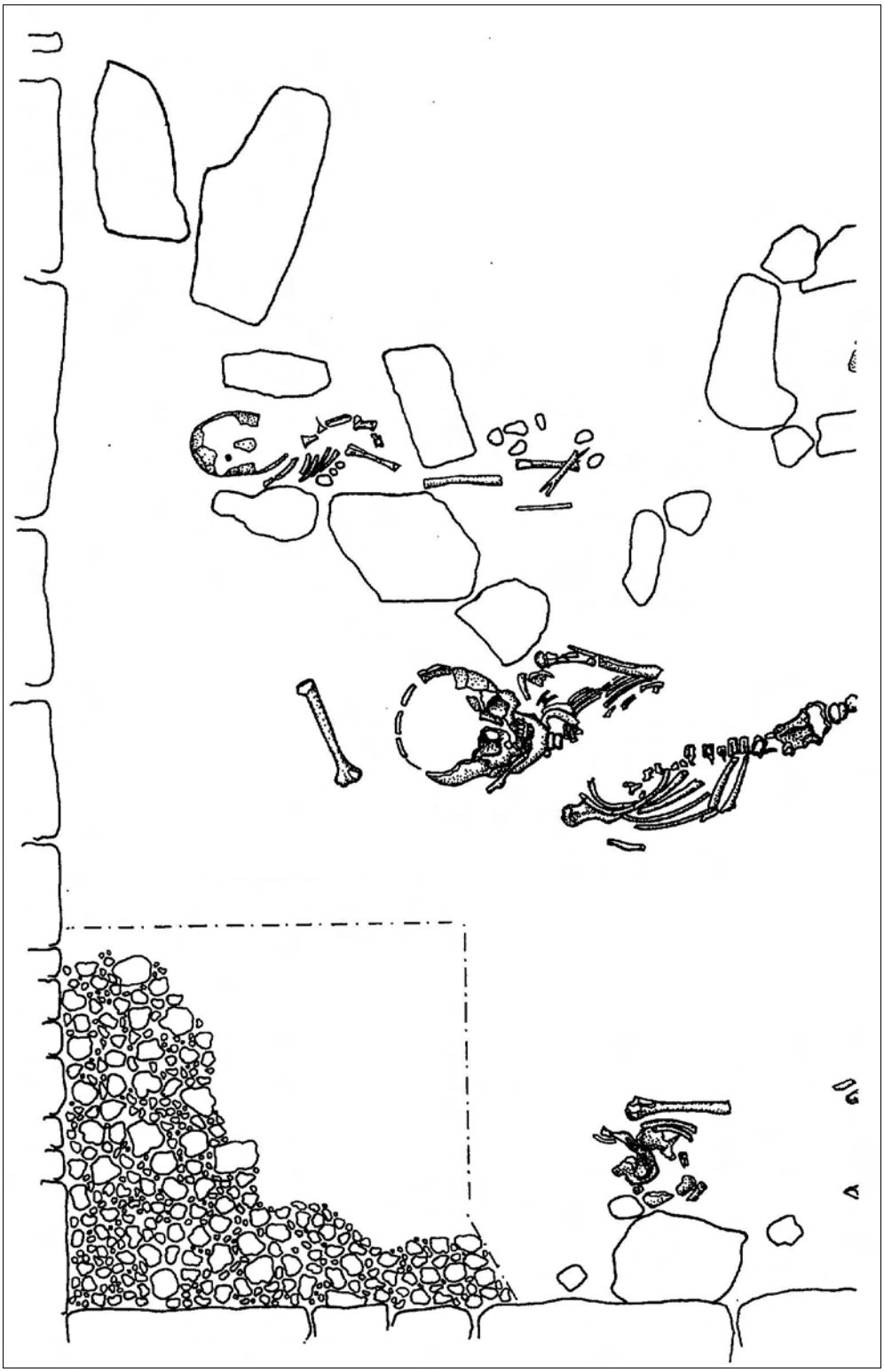

Figure B.28 PN 23, Plan view of Burials 23, 31, and 35 (From Monterroso 1998:114)

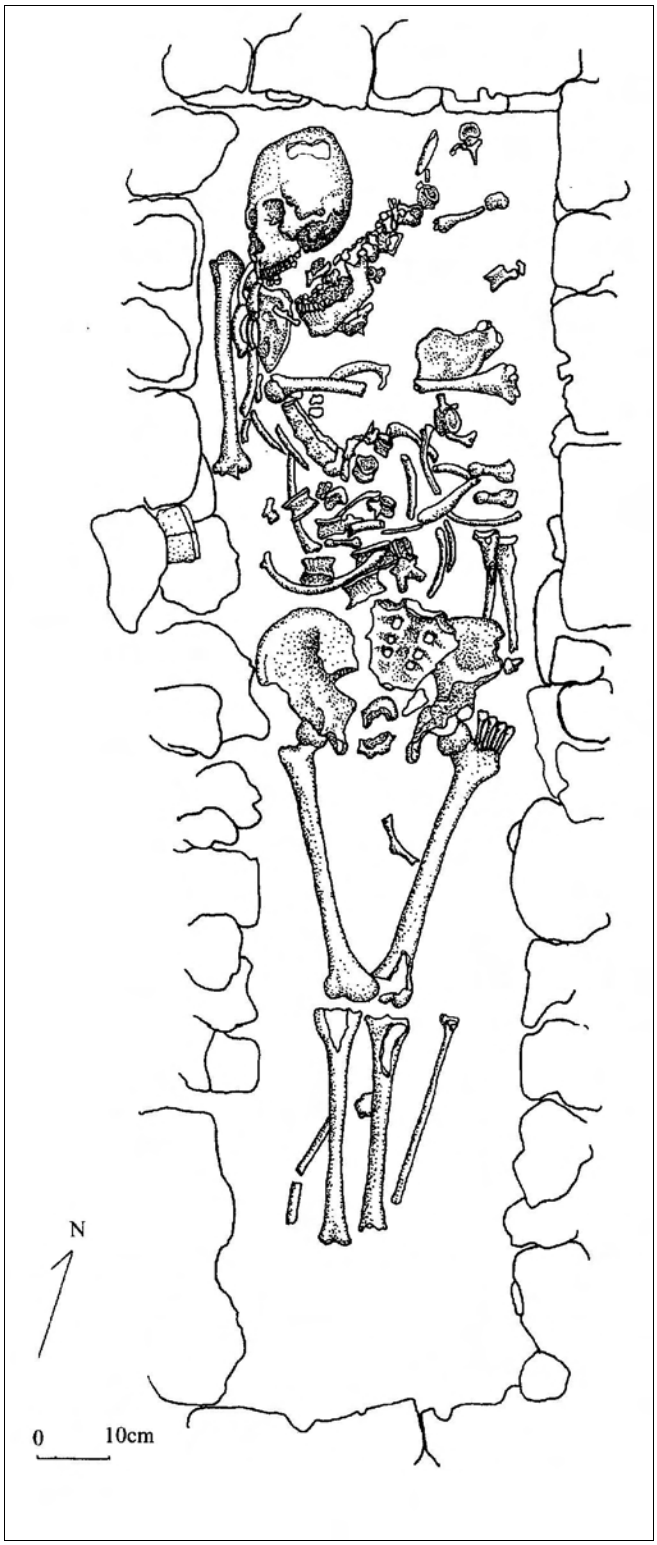

Figure B.29 Burial 28 (From Monterroso 1998:121)

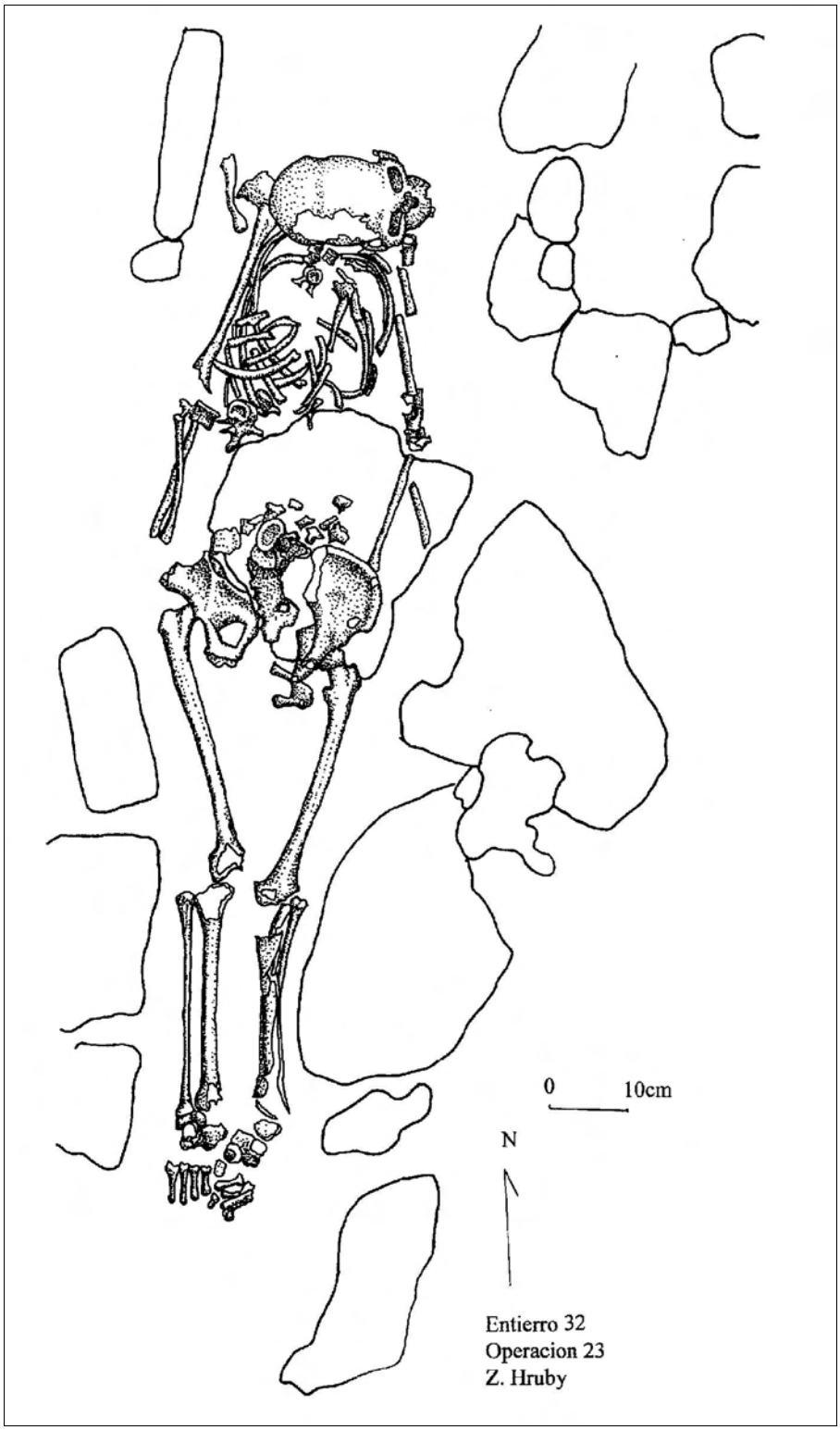

Figure B.30 Burial 32, Drawing by Z. Hruby (From Monterroso 1998:116)

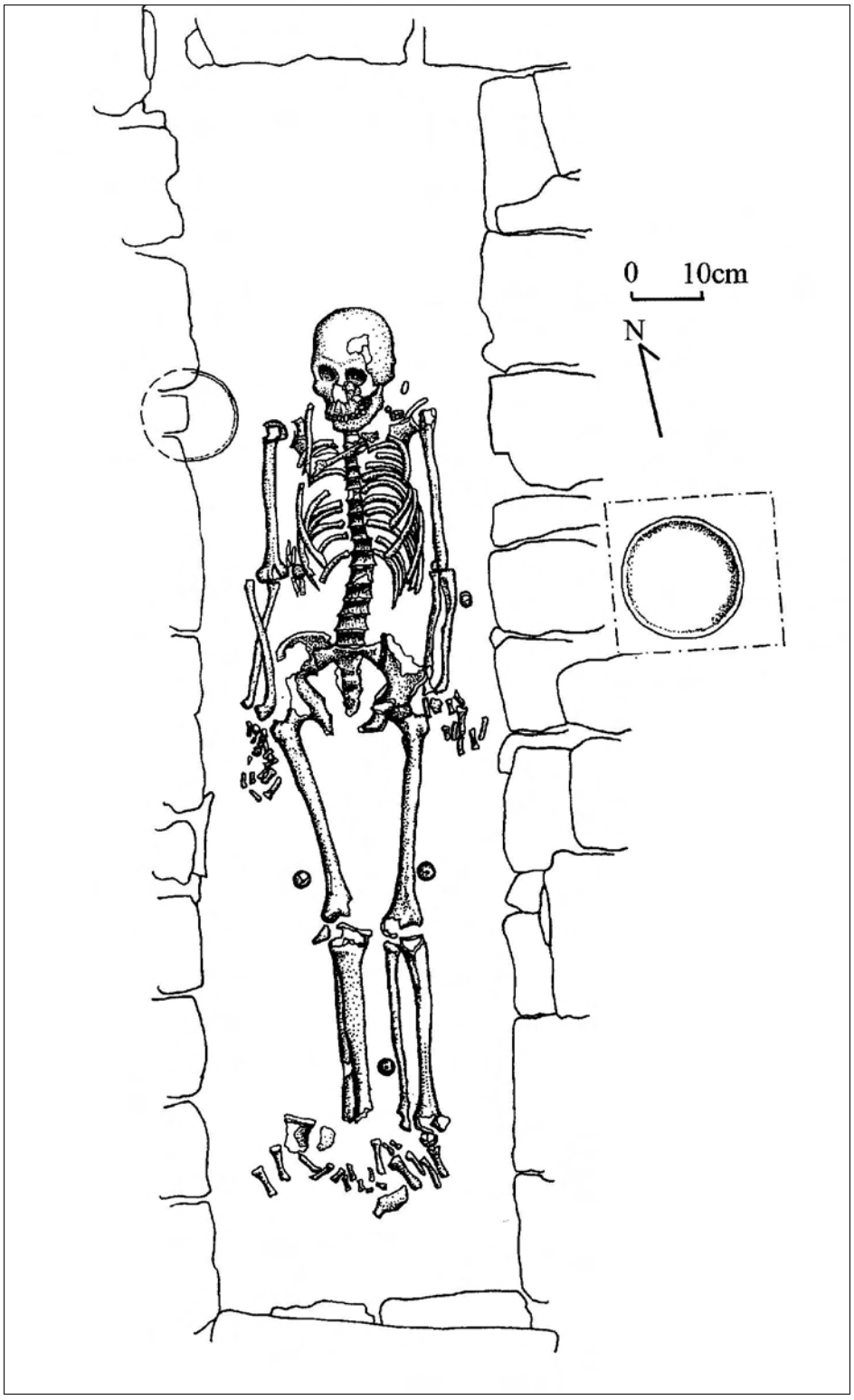

Figure B.31 Burial 45 (From Monterroso 1998:120)

SUBOPERATION 23E

This suboperation concentrated on two buildings in the R-sector: R-18 and R-31. These buildings are attached in an "L" shape to each other and were explored during the 1999 season under the direction of Luis Romero (1999). Unfortunately, his published informe chapter does not go into the detail that other authors chose to, and I do not have a copy of his field notes or lot forms, so this part of the general excavations will not have the fine detail that other excavation provided.

Both buildings were completely cleaned of small vegetation, leaving the large trees in place as was common in our excavations. Then, the humus soil layer was removed from the buildings. A couple of trenches were placed in the southwest corner of R-18 with the intent of understanding better the earlier construction episodes of the structure. Various burials were found in these structures as well as a wealth of artifacts. Excavation units were 2x2 m squares placed over the buildings. A total of 58 units were excavated to variable depth in this suboperation (Figures B.32).

BUILDING PHASES

R-18 is a 20 m long (east-west) by 8 m wide building which abuts R-31. R-31 runs 16 m north-south and is 6 m wide. Together, these buildings lie just south of R-32, a large basal platform, which forms the north side of the interior plaza.

R-18 and R-31

This structure was functioning during the Nabá ceramic phase. The initial length of it remains uncertain, but due to the presence of a rounded corner on the building towards the east associated with Yaxché ceramics it probably began as a range structure (Figures B.33 and B.34). It has three terraces along its sides, rising like stairs to a height of one meter. Along its top are five rooms that probably were created during the Chacalhaaz ceramic phase. The foundations are over bedrock, which is higher to the east than to the west.

During the Late Classic (Chacalhaaz) the building was remodeled and R-31 was added. It is unclear whether the excavator thought that R-31 ever functioned as a separate building, or was placed as an additional platform/habitational space of R-18. The walls of the structure were not well made, so the quality of work was lower. The fill of this remodeling event may have been scooped up from other places - this would explain the random human bones found during the excavation in secondary contexts. The Late Classic phase of the structure clearly points to one solo building in use, rather than two buildings.

BURIALS

Burial 49 (PN 23E-4-3)

This secondary burial was recovered from the fill of R-18. There was no mortuary structure or offerings, and only pieces of the skull and mandible were recovered.

Burial 51 (PN 23E-4-2)

This secondary burial of a child was unexpectedly uncovered within a retaining wall for the soil and rock substructure of R-18. No offerings were included with the burial, and the bones were badly fragmented and not in their normal anatomical arrangement.

Burial 65 (PN 23E-20-3)

This burial was discovered 15 cm under the floor of R-18. The body had been placed in a rock lined cist which was covered with lajas (Figure B.38). The mortuary space was 1.80 m long by 40 cm wide. The individual was found in an extended dorsal position with the hands over the pelvis, oriented east-west with the head towards the east and looking north. A small jade bead was the only burial offering.

Burial 66 (PN 23E-13-3)

This primary burial was discovered directly in the earth, inside of the fill of R-18 (Figure B.39). The body had been placed in an extended dorsal position, oriented north-south, with the head towards the south and the face looking east. One hand was on top of the pelvis while the other was underneath it. Burial offerings include marine shell fragments, one worked into a cross form; bone needles; a spine of a manta ray; three Pachuca obsidian fragments; some decomposed bone fragments; and a small vase placed near the head of the individual.

Close to the right arm of the individual (at 10 cm) were located human foot bones and a jaguar bone, perhaps placed as another offering. Also, the cist of another burial was found nearby but was not excavated. Other artifacts found in association with Burial 66, but not directly with the burial, include fragments of another small vase with incised glyphs on it, and a jaguar face incised on a small fragment of shell.

Burial 68 (PN 23E-20-3)

Near Burial 65 were other lajas that covered this burial of an infant, approximately 2 years old. The body was placed in an extended dorsal position with the head towards the east, oriented east-west.

Burial 74 (PN 23E-18-3)

This burial was found while cleaning burial 65 and 68. This badly preserved skeleton was placed in a stone lined cist, oriented north-south with the head towards the north and looking sky-ward. The body was placed in an extended position (Figure B.40).

Burial 75 (PN 23E-18-3)

This secondary burial was found to the west of Burial 74 (Figure B.40). The bones were not in their anatomical position, but had been placed in a stone lined cist. Mixed in with the bones were that of a unborn child and some bird bones. The body had been orientated north-south with the head towards the north looking west.

UNIT DESCRIPTIONS

PN 23E-1, 2, 4, 6, 7 and 8

These units were placed on the western side of the structures to define the wall, and also to uncover the limits of Nancy Monterroso's 1998 excavation to tie together the previous work and this one. The wall of R-18 was much better preserved than that of R-31, which had only a single course of stone marking its place. The ceramics from these excavations date to the Chacalhaaz ceramic phase for the surface layer, and to Yaxché and Nabá ceramic phases for the deeper strata.

PN 23E-4

This unit was part of the trenching system of the building (Figure B.35 and B.37). Located along the southwest side of R-18, three lots were defined based on natural stratigraphy. The first was humus, followed by a layer of fill pertaining to the last construction episode. Then the third lot was a layer associated with early platforms and burial 49.

PN 23E-3, 9, 10, 11, 12, 13 and 14.

These excavations were aimed at discovering the main western wall of the structures. The fill was composed of small rocks and light brown soil. The ceramics from these excavations date to the Chacalhaaz ceramic phase for the surface layer, and to Nabá ceramics phase for the deeper strata.

PN 23E-10, 12, 13 and 14

These units had a three step stairway leading into R-18 from the lower platform. This might have provided access from R-20. The ceramics from these excavations date to the Chacalhaaz ceramic phase for the surface layer, and to Nabá ceramics phase for the deeper strata.

PN 23E-14

This unit continued the trenching begun with PN 23E-4 and appears to have reached an early period of construction (Figure B.36). At 1.05 m below ground surface the head of burial 66 was found and excavation stopped in this unit and began in PN 23E-13 to accommodate the recovery of the skeleton.

PN 23E-5, 15 to 20

These units delimited the upper area of both structures. Only the humus layer was removed. Some bajareque was recovered in this area. The ceramics from these excavations date from Yaxché to the Chacalhaaz ceramic phase.

PN 23E-16

This unit was along the southern side of R-18. The height of the building was 2 meters over bedrock. Apparently the building was composed of three platforms, with another two lower terraces.

PN 23E-21 to 28

This part of the excavations mainly concentrated on R-31. Unit 21 uncovered the north wall of R-31. Meanwhile 23, 25 and 27 were placed in a looter's pit which Romero cleaned up. Units 26 and 28 showed the limit of a room on the summit. The ceramics from these excavations date to the Chacalhaaz ceramic phase.

PN 23E-29-36

These units focused on the east wall of R-31, which was well-preserved. The southern wall of R-31 was not found; it may be that R-31 is just an extension to R-18. The north wall of R-18 was found in unit 36. Around here was found a small access with four steps (peldaños). Various small rooms on the summit were uncovered. The ceramics from these excavations date to the Chacalhaaz ceramic phase.

PN 23E-37-40

These units also revealed more of the platforms. Unit 37 was excavated down to a meter, uncovering another small access to the building, 2.50 m wide. The other units were merely cleaned of the humus layer. The ceramics from these excavations date to the Chacalhaaz ceramic phase.

PN 23E-41 and 42

These two units were placed on either side of R-18 along the walls. Unit 41 had three platform levels. The area between the units was not touched due to the presence of a large tree. The ceramics from these excavations date to the Chacalhaaz ceramic phase.

PN 23E-43 to 46

This row of test pits was not excavated too deeply, just the humus layer. The ceramics from these excavations date to the Chacalhaaz ceramic phase.

PN 23E-47 to 50

This row of test pits was not excavated too deeply, just the humus layer. The ceramics from these excavations date to the Chacalhaaz ceramic phase.

PN 23E-51 to 54

The eastern wall of the structure was discovered to be round. Further rooms were cleaned. The ceramics from these excavations date to the Chacalhaaz ceramic phase.

PN 23E-55 to 58

These units defined the eastern edge of R-18, which definitely had a round corner. Another access was found leading to R-30, possibly including that structure into the plaza area of R-18 and R-31. The ceramics from these excavations date from Late Yaxché to Late Chacalhaaz

SUMMARY

This suboperation uncovered the remains of an Early Classic structure that survived well into the Late Classic. The materials recovered from the excavation are numerous: 31,357 pieces

of ceramics (many fine-wares); 355 obsidian prismatic blade fragments (including 5 Pachuca pieces); 237 chert flakes and objects; 178 figurine fragments; 321 animal bone; 6 clay beads; and 78 pieces of shell. Taken together, this suggests that the area was probably elite. The burials discovered in the structures are probably members of the same lineage, some buried together - possibly as a family. The lack of grinding stones is interesting, and suggests that there is more to learn about this group.

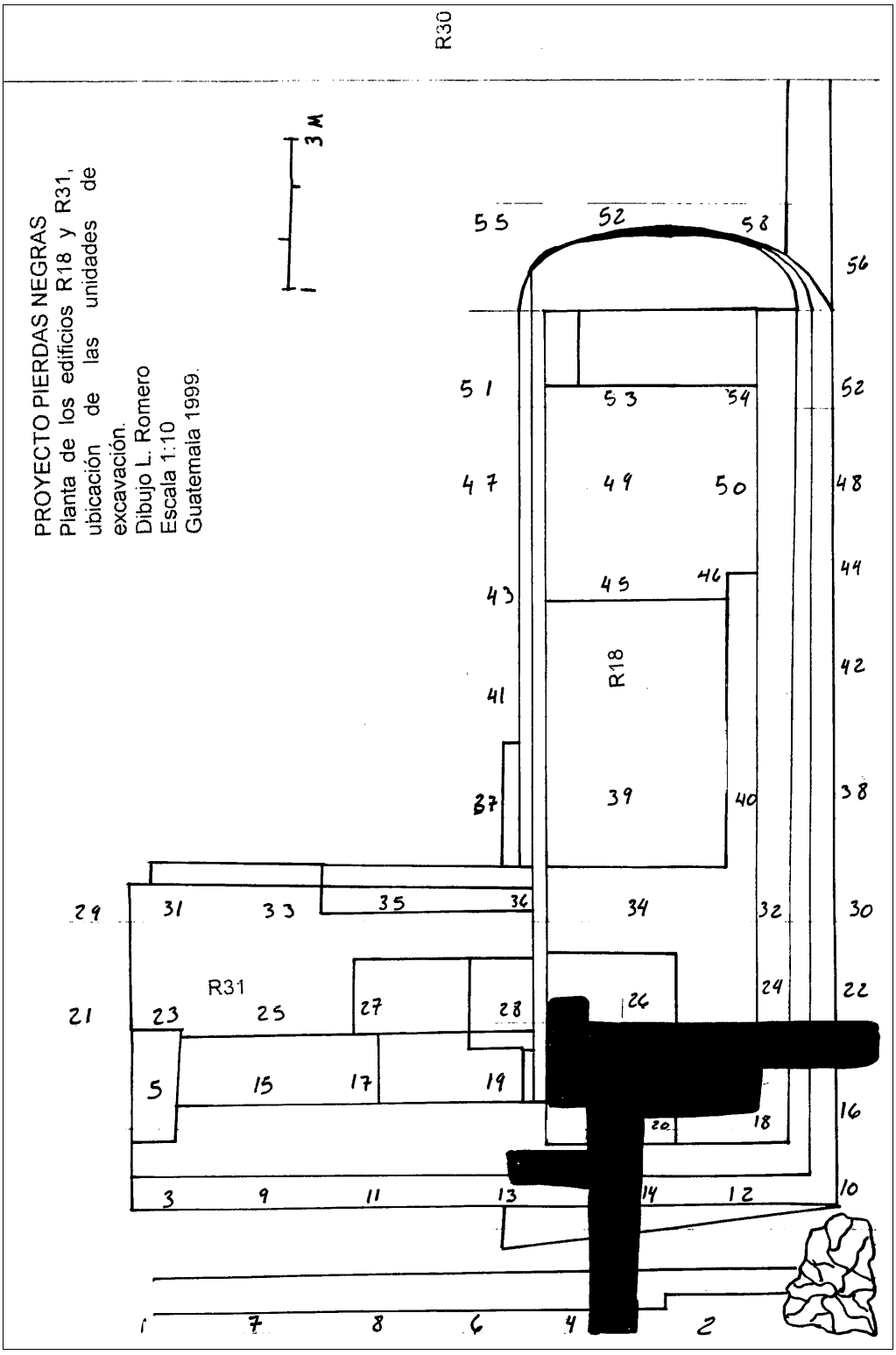

Figure B.32 Excavation Grid of PN 23E (From Romero 1999:45)

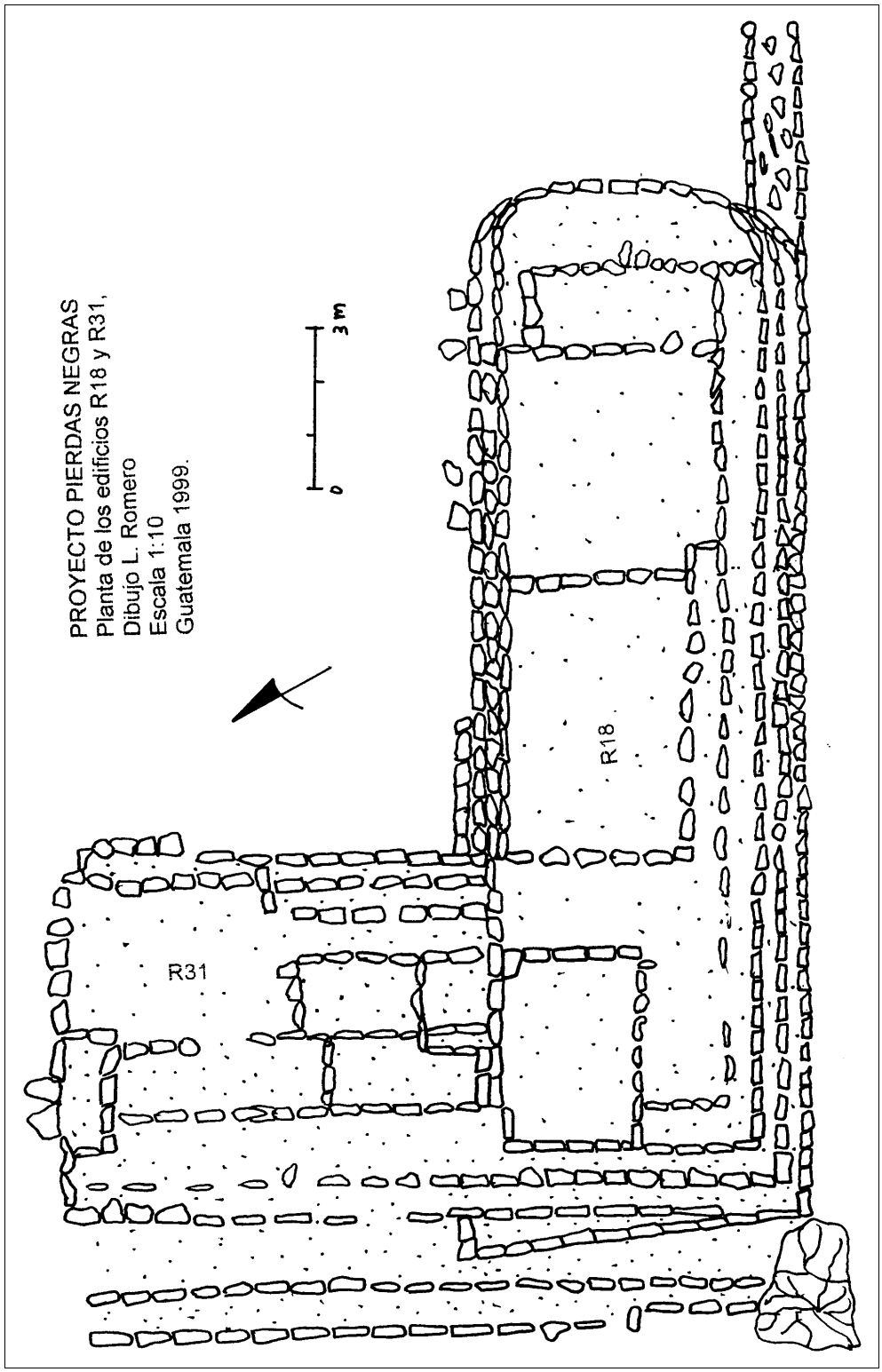

Figure B.33 Plan of Structures R-18 and R-31 (From Romero 1999:52)

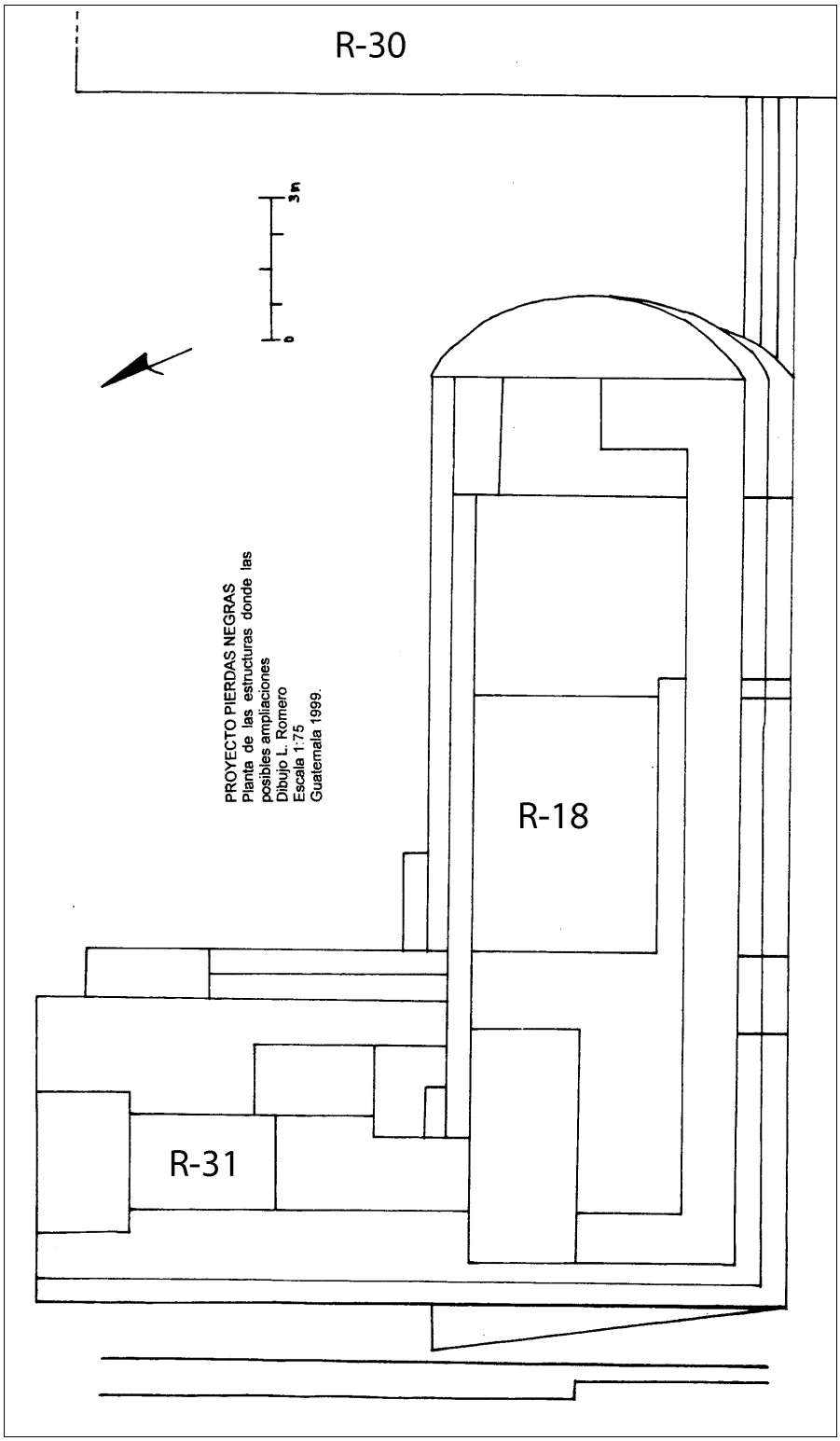

Figure B.34 Schematic Plan of R-18 and R-31 (From Romero 1999:51)

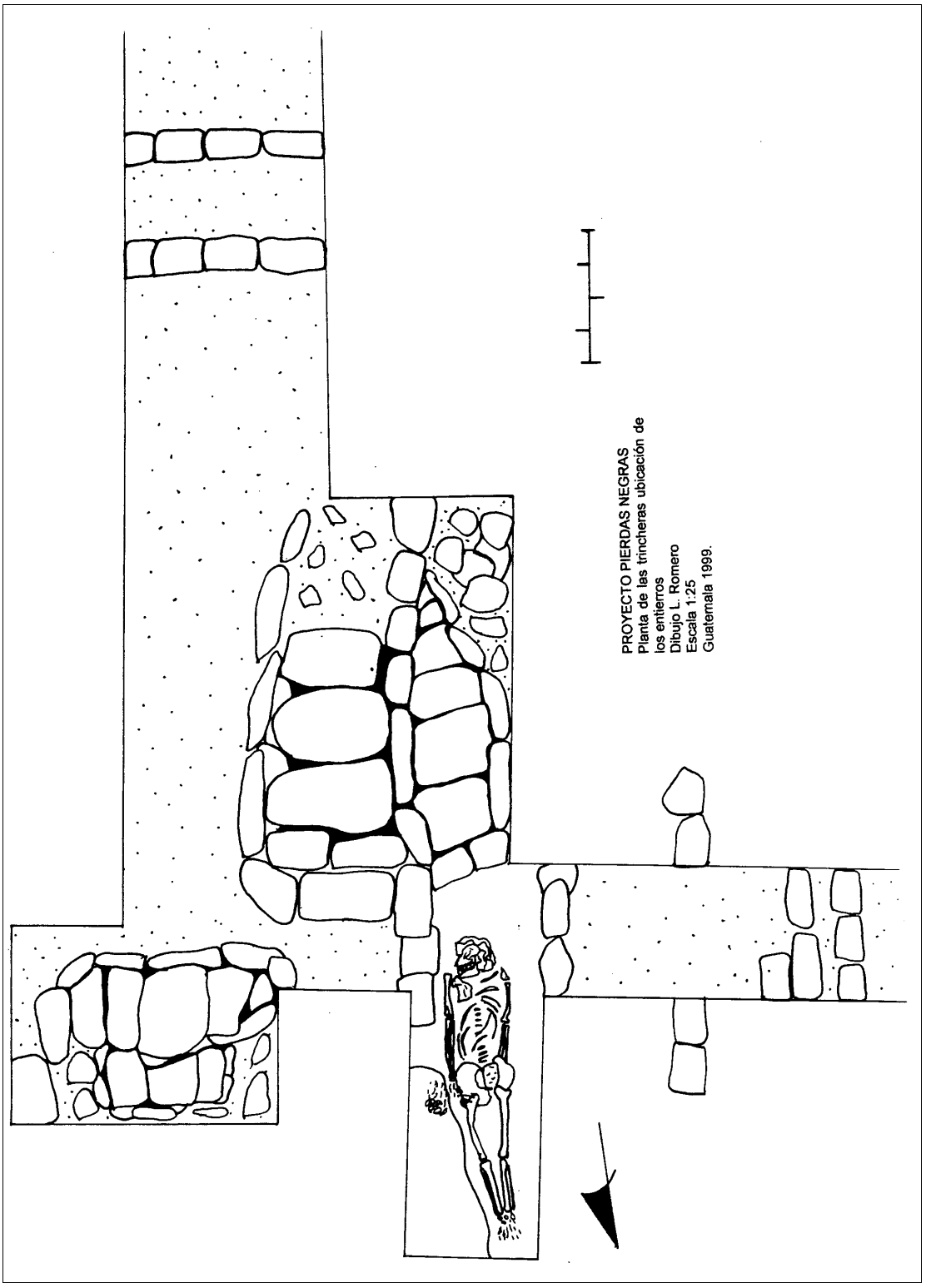

Figure B.35 Plan of Trenches within R-18 (From Romero 1999:44)

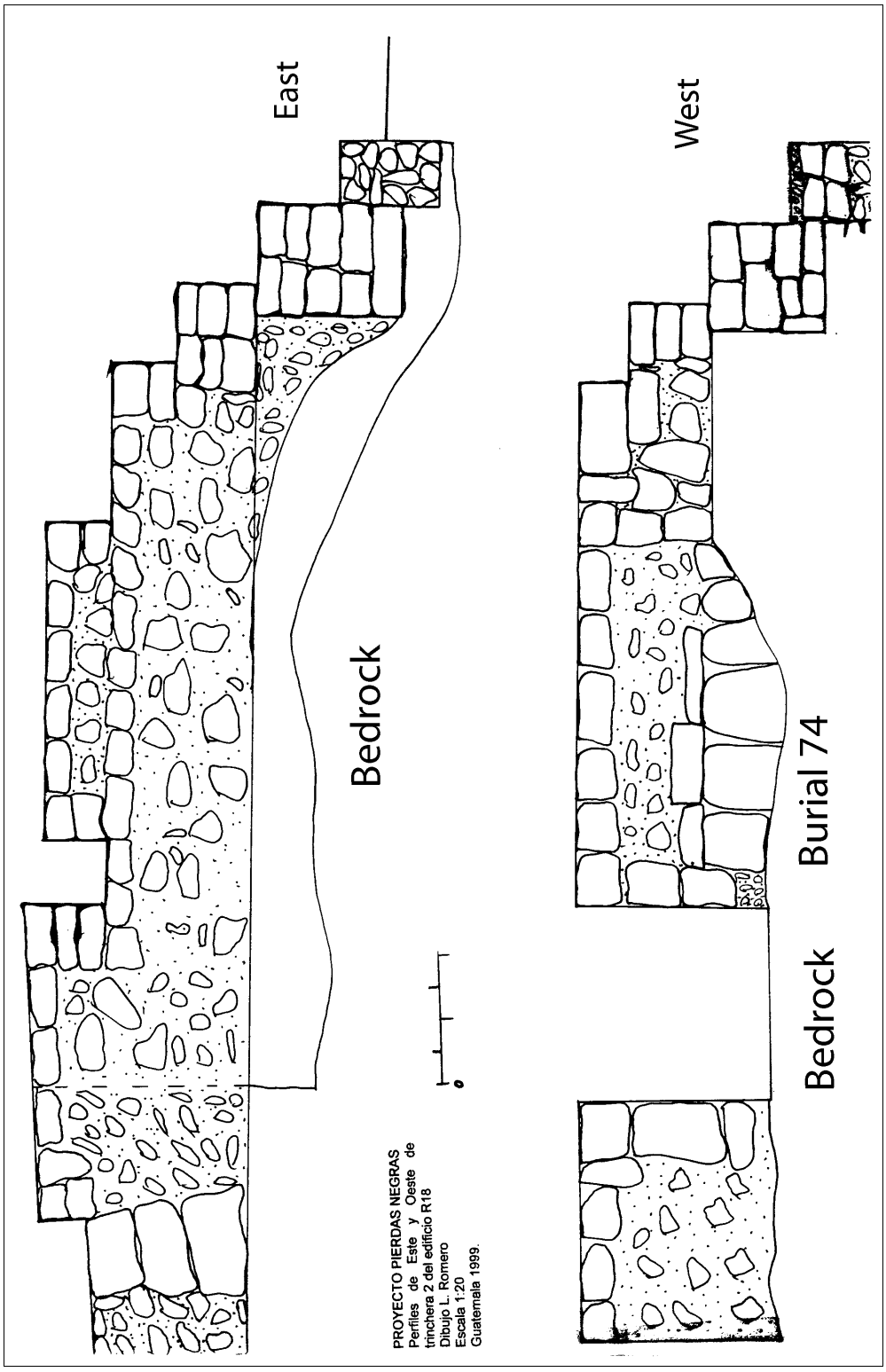

Figure B.36 Profiles of Trench 2 (From Romero 1999:50)

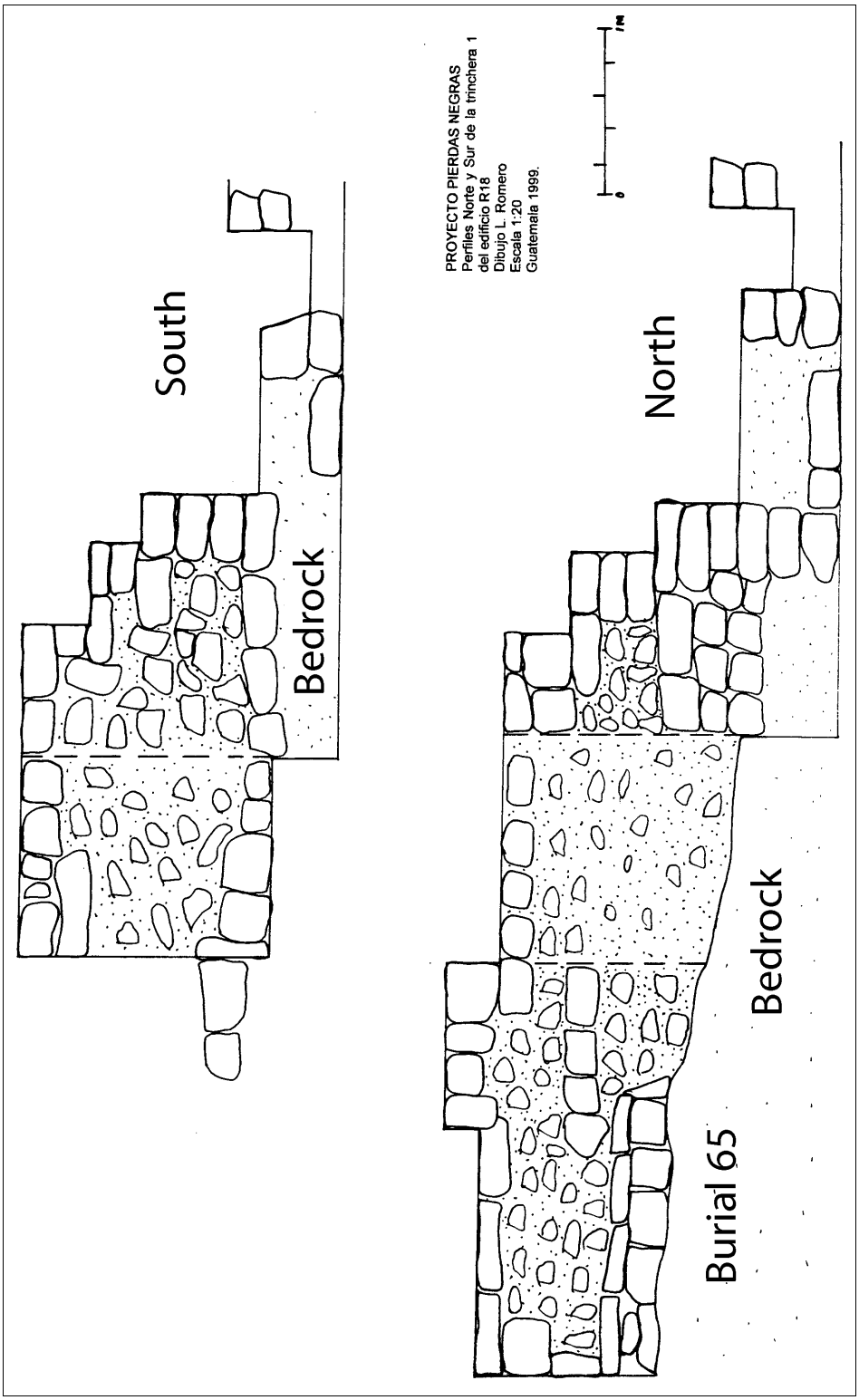

Figure B.37 Profiles of Trench 1 (From Romero 1999:53)

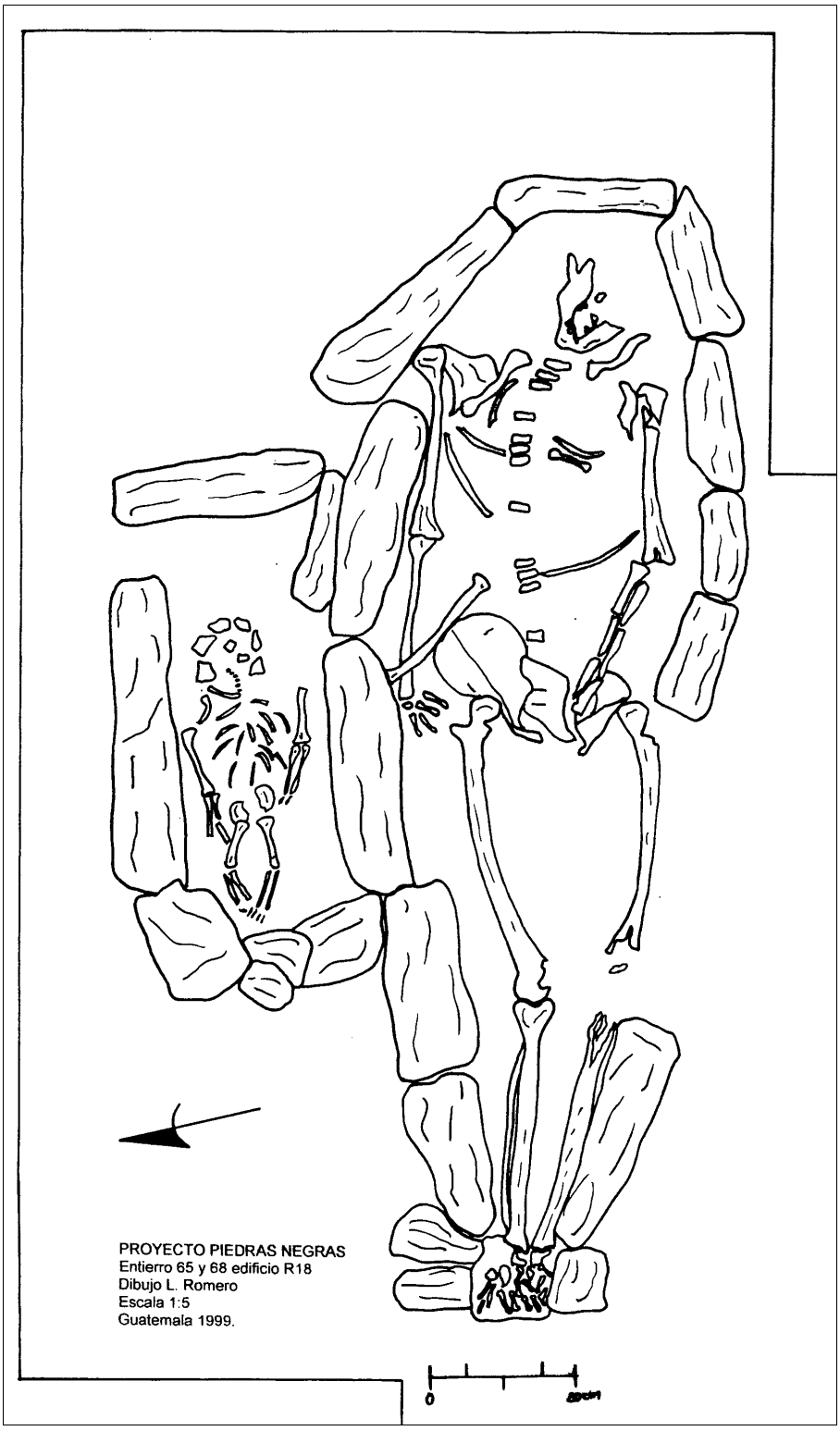

Figure B.38 Burial 65 (Adult) and Burial 68 (Infant) (From Romero 1999:48)

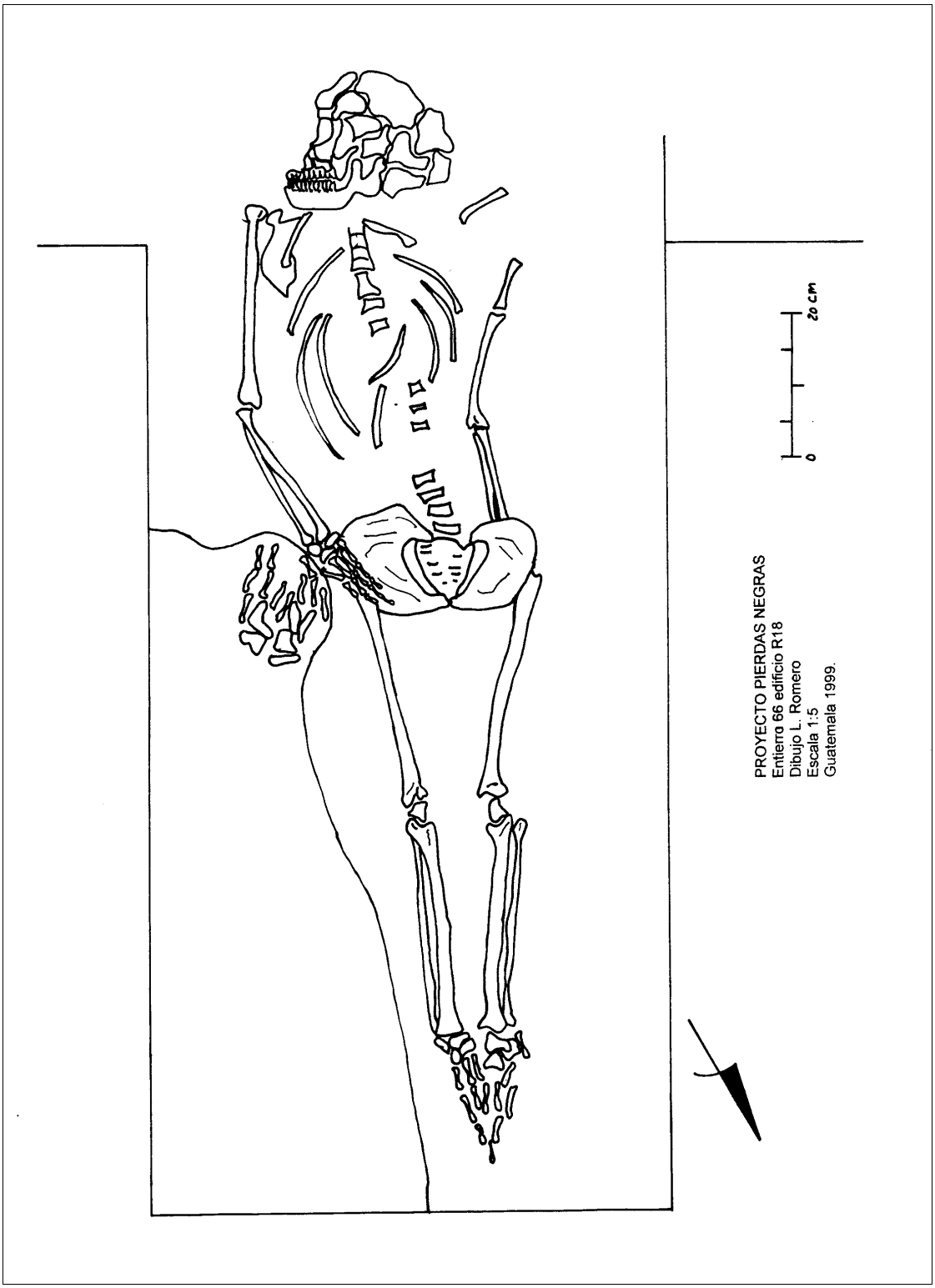

Figure B.39 Burial 66 (From Romero 1999:46)

Figure B.40 Burial 74 (Right) and Burial 75 (Left) (From Romero 1999:49)

OPERATION 26A

NORTHWEST GROUP, STRUCTURE F-2:

Located across a bajo area to the northwest of the Acropolis, Structure F-2 was excavated by E. Christian Wells in 1998 (see Wells 1998a). His work in this area complemented the test pits placed by Mónica Urquizú in 1997 (PN 14, Urquizú 1997c) through the bajo area to the south of F-2, as well as excavations by Linton Satterthwaite (1944, 1954) in nearby structures. The main objective was to discover if the building had a post-classic or terminal classic component as suggested by Holley (1983) in his ceramic analysis of Piedras Negras.

Structure F-2, in its pre-excavation form, is a 10 m in diameter mound situated on a 10x20 m platform oriented 101 degrees azimuth. The height of the mound was almost 5 m. Wells placed 11 units including a trench up the center of F-2 which uncovered the front of the platform, steps leading up to the mound, and the architecture of the building 41). He recovered a wide variety of artifacts and documented the construction sequence of the building (given below). Bedrock was not reached in any of the units.

F-2-sub

The early form of F-2 is an Early Classic (Balché ceramic phase) building with rounded corners (Figures B.42 and B.45). The plaza floor of this structure was uniformly 80 cm below current ground surface. The building is oriented 101 degrees azimuth, which orientation did not change in later phases. The walls (or possible platform) of the early stage were one meter high. The termination ritual of this building included burning the perishable structure on it, and, perhaps in an associated activity, breaking metates on its platform while depositing other materials nearby.

F-2-1st

The latest form (Chacalhaaz ceramic phase) of the building was constructed on top of F-2-sub, as is common in Mesoamerica. F-2-1st is approximately 10 m wide and 5 m tall. It rests on a 2.5 m high terraced platform (10x20 m) with two formal terraces. F-2 may have had a perishable structure on top, or served as an ancestor temple. A possible remodification occurred after the construction by elevating parts of the platform or remodeling the fachada.

PN26A-1

This 1x2 m unit was placed along the southern side of the basal platform of F-2 (Figure B.43). A Late Classic plaza floor was uncovered 60 cm below ground surface and an Early Classic plaza floor was found 20 cm deeper.

PN 26A-1

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	1	0-20	10 YR 5/2	Chacalhaaz	
1	2	20-40	10 YR 6/2	Yaxché	

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
1	3	40-60	10 YR 6/2	Yaxché	LC Plaza floor
1	4	60-80	10 YR 3/3		EC Plaza floor
1	5	80-100	10 YR 3/3		
1	6	100-120	10 YR 3/3	Balché	

PN 26A-2

This 1x2 m unit was placed along the southern side of the basal platform of F-2 (Figure B.43). A Late Classic floor was discovered 60 cm below actual ground surface where upon excavation ceased.

PN 26A-2

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
2	1	0-20	10 YR 5/2	Chacalhaaz	
2	2	20-60	10 YR 6/2		LC plaza floor

PN 26A-3

This 2x2 m unit was placed along the southern side of the basal platform of F-2, and includes a staircase leading up to structure F-2. Each step rises about 60 cm and runs 140 cm, which makes this a monumental staircase to the structure. There only appears to be two steps, so the overall effect is that of a low platform extending up from the surrounding bajo area to the building.

PN 26A-3

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
3	1	0-25	10 YR 5/2		Steps
3	2	25-40	10 YR 6/2	Chacalhaaz	Steps

PN 26A-4

This 1x1 m unit was placed on the base of the basal platform of F-2, along its southern side (Figure B.43). The unit was excavated in arbitrary 20 cm units to understand the stratigraphy of the area. A Late Classic plaza floor was discovered at 60 cm below ground surface, and a possible Early Classic plaza floor at 80 cm below ground surface.

PN 26A-4

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
4	1	0-20	10 YR 5/2	Chacalhaaz	
4	2	20-40	10 YR 6/2	Chacalhaaz	
4	3	40-60	10 YR 6/2	Yaxché	Plaza floor
4	4	60-80	10 YR 3/3	Balché/Yaxché	EC floor?
4	5	80-100	10 YR 3/3		
4	6	100-120	10 YR 3/3	Abal	

PN 26A-5

This 2x2 m unit was placed in F-2's platform, along the southern side. A Late Classic platform was discovered 50 cm below actual ground surface.

PN 26A-5

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
5	1	0-50	10 YR 3/1	Chacalhaaz	LC platform

PN 26A-6

This 2x2 m unit was placed in the middle of F-2's platform, along the southern side. A Late Classic platform was discovered 50 cm below actual ground surface, and a line of lajas visible in the profile is evidence that the platform had been covered anciently and had been much higher.

PN 26A-6

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
6	1	0-50	10 YR 3/1	Chacalhaaz	LC platform

PN 26A-7

This 2x2 m unit was placed over the basal platform, south of the base of structure F-2. A Late Classic platform was discovered 0.50 m below actual ground surface, while an Early Classic platform was discovered 30 cm deeper. The Early Classic platform had 3 (purposely?) broken metates on its surface along with Early Classic ceramic sherds, and an incised bone.

PN 26A-7

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
7	1	0-50	10 YR 3/1	Chacalhaaz	LC platform
7	2	50-70	10 YR 6/2	Chacalhaaz	
7	3	70-130	10 YR 6/2	Yaxché	EC platform
7	4	130-155	10 YR 6/2	Balché/Yaxché	

PN 26A-8

This 2x2 m unit was placed over the platform at the base of the mound along the southern side of the structure (Figure B.44). A Late Classic platform was found 0.50 m below actual ground surface, while an Early Classic Platform was discovered at 0.8 m below actual ground surface. A deposit of burned material (including bajareque) was found associated with the Early Classic Platform. The fachada or face of the building was uncovered which is 1.50 m high and made of worked stones. Also, an Early Classic wall was discovered in the western profile of the unit (1.00 m tall and 1.70 m wide) made from similar construction techniques as structure F-2.

PN 26A-8

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
8	1	0-50	10 YR 3/1	Chacalhaaz	LC Platform floor
8	2	50-70	10 YR 6/2	Chacalhaaz	
8	3	50-125	10 YR 6/2	Balché/Yaxché	EC Platform floor
8	4	70-110	10 YR 6/2	Balché/Yaxché	
8	5	110-150	10 YR 5/1	Balché	Burned layer
8	6	150-200	10 YR 6/2	Balché	Burned bajareque
8	7	200-320	10 YR 6/2	Balché	

PN 26A-9

This 2x2 m unit was placed on top of the basal terrace of F-2 along its southern wall. The main features from this unit are two “muros de contención” or retaining walls built of several courses of stone piled on top of each other with little grout whose purpose is to hold back the loose rubble that comprises the interior of the building. Each wall forms a box within which lies the loose construction rubble. Each box is 1.00 m tall, 1.00 m wide and probably extends the length of the building. Often the retaining wall is hidden behind a much finer wall created with well-fitting blocks. In this case, the fine wall was not present.

PN 26A-9

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
9	1	0-30	10 YR 3/1	Chacalhaaz	
9	2	30-50	10 YR 6/2	Chacalhaaz	fill / retention wall
9	3	30-50	10 YR 6/2	Yaxché	fill / retention wall

PN 26A-10

This 2x2 m unit was placed over the central axis of the building. The structural fill of F-2 consisted of mainly unworked limestone rocks extending for 5 meters. Underneath the rocks were several clay layers and the foundation of an Early Classic building made of worked stones. The uncovered segment measures 0.75 m high by 0.30 wide.

PN 26A-10

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
10	1	0-100	10 YR 6/2	Yaxché	
10	2	100-300	Rocks	Yaxché	
10	3	300-500	Rocks	Chacalhaaz	
10	4	500-600	10 YR 3/3	Balché/Chacalhaaz	Floors?
10	5	600-700	10 YR 6/6	Balché/Yaxché	EC Floor?

PN 26A-11

This 0.75 x 2.00 m unit was placed on the platform along the south side of the structure. The eastern side of the building foundation was discovered which rose 0.50 m above the surface of the Early Classic platform (Figure B.45). The building was faced with good quality worked stone.

PN 26A-11

Unit	*Lot*	*Depth (cm)*	*Munsell*	*Ceramic Phase*	*Features*
11	1	0-60	10 YR 3/1	Chacalhaaz	Round building corner

Summary

This operation extended the chronology of the Northwest Group by undertaking excavations in a significant structure of the area. Also, comparison of the material excavated

here with the previous excavations by Satterthwaite will permit a better fit between the Penn excavation notes and the Proyecto Piedras Negras work. Excavations revealed an Early Classic component to the building, with a hint of domestic activity in the abundant fill of the structure. The Late Classic phase structure is more monumental in its interior fill, being created from rubble to augment its size. Yet the orientation of the later building maintains the buildings original orientation, suggesting a continuity in building function or design from its inception to its demise.

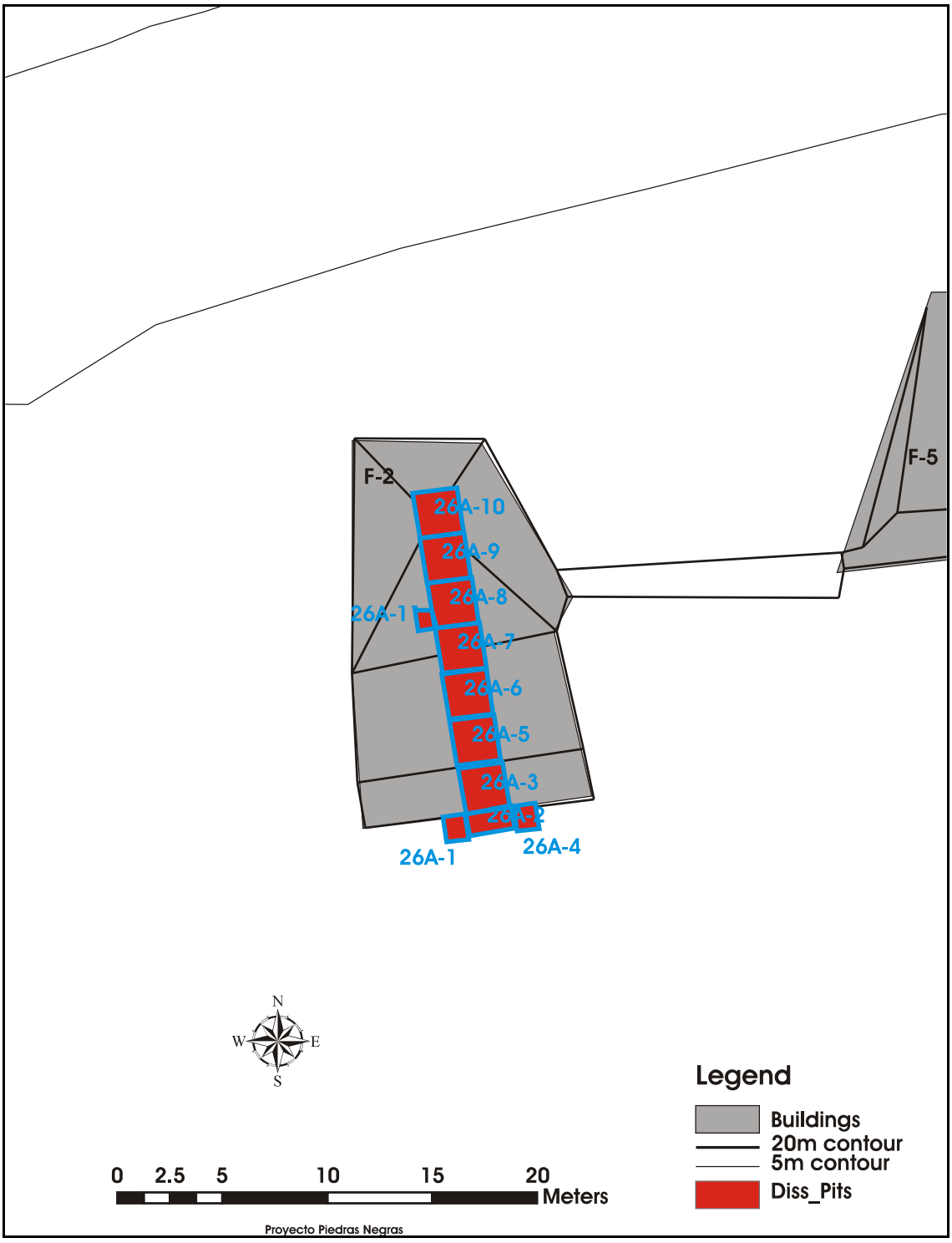

Figure B.41 Operation 26A

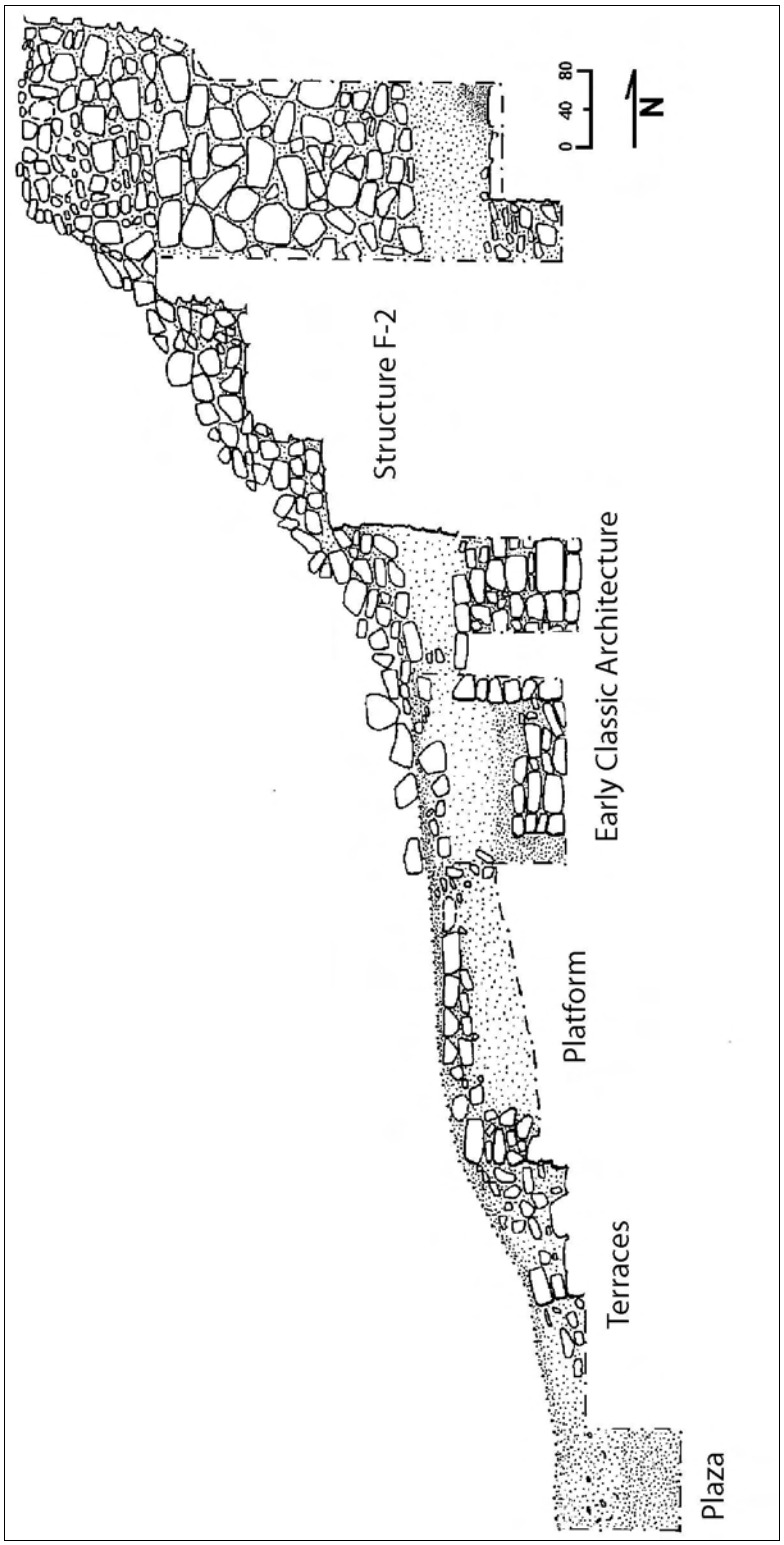

Figure B.42 PN 26A, Profile of F-2 from Excavations
(From Wells 1998a:150)

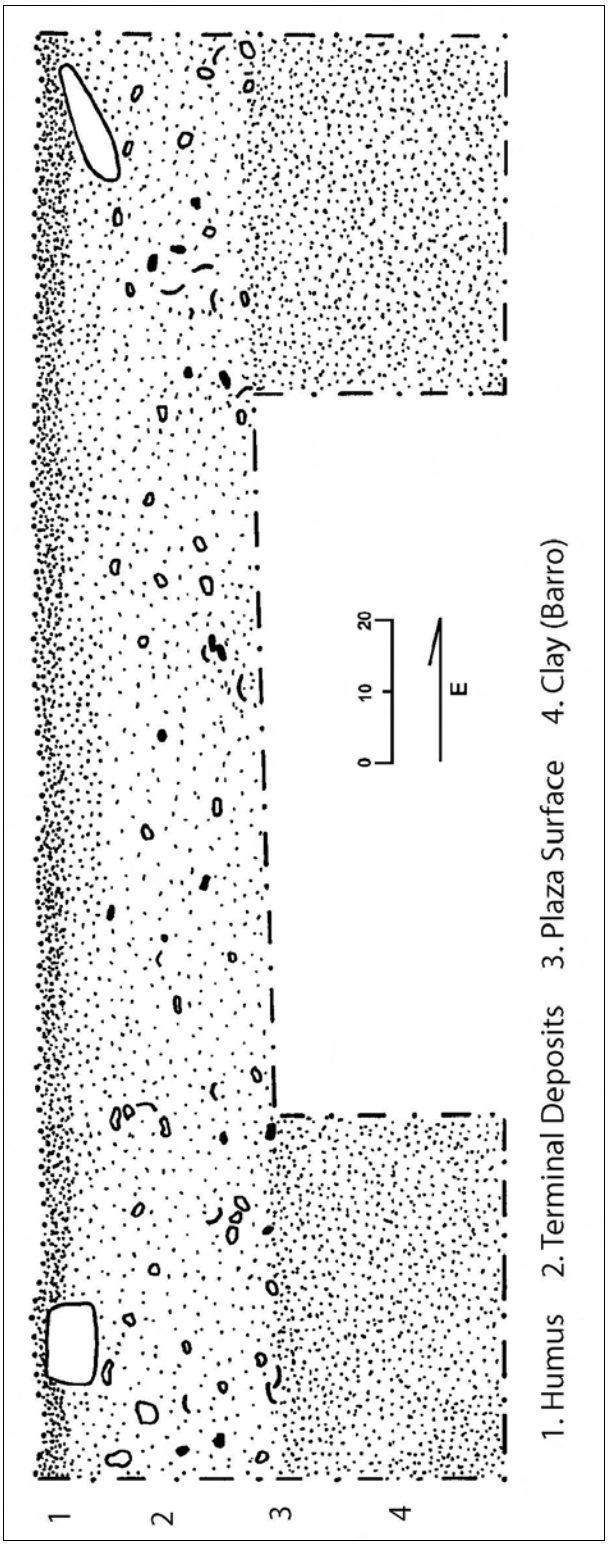

Figure B.43 PN 26A-1, 2, and 4, Profile of the Plaza Excavations in front of Structure F-2 (From Wells 1998a:151)

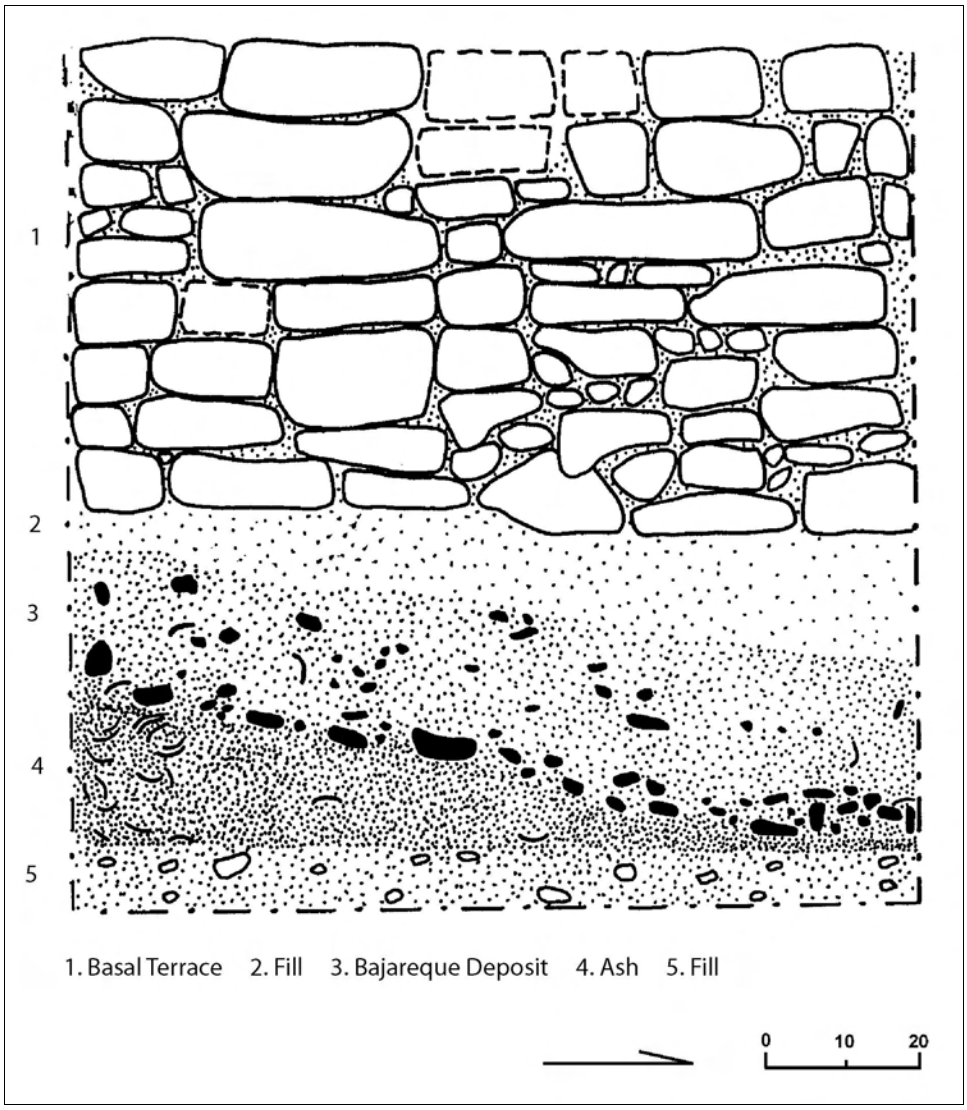

Figure B.44 PN 26A-8, Profile (From Wells 1998a:153)

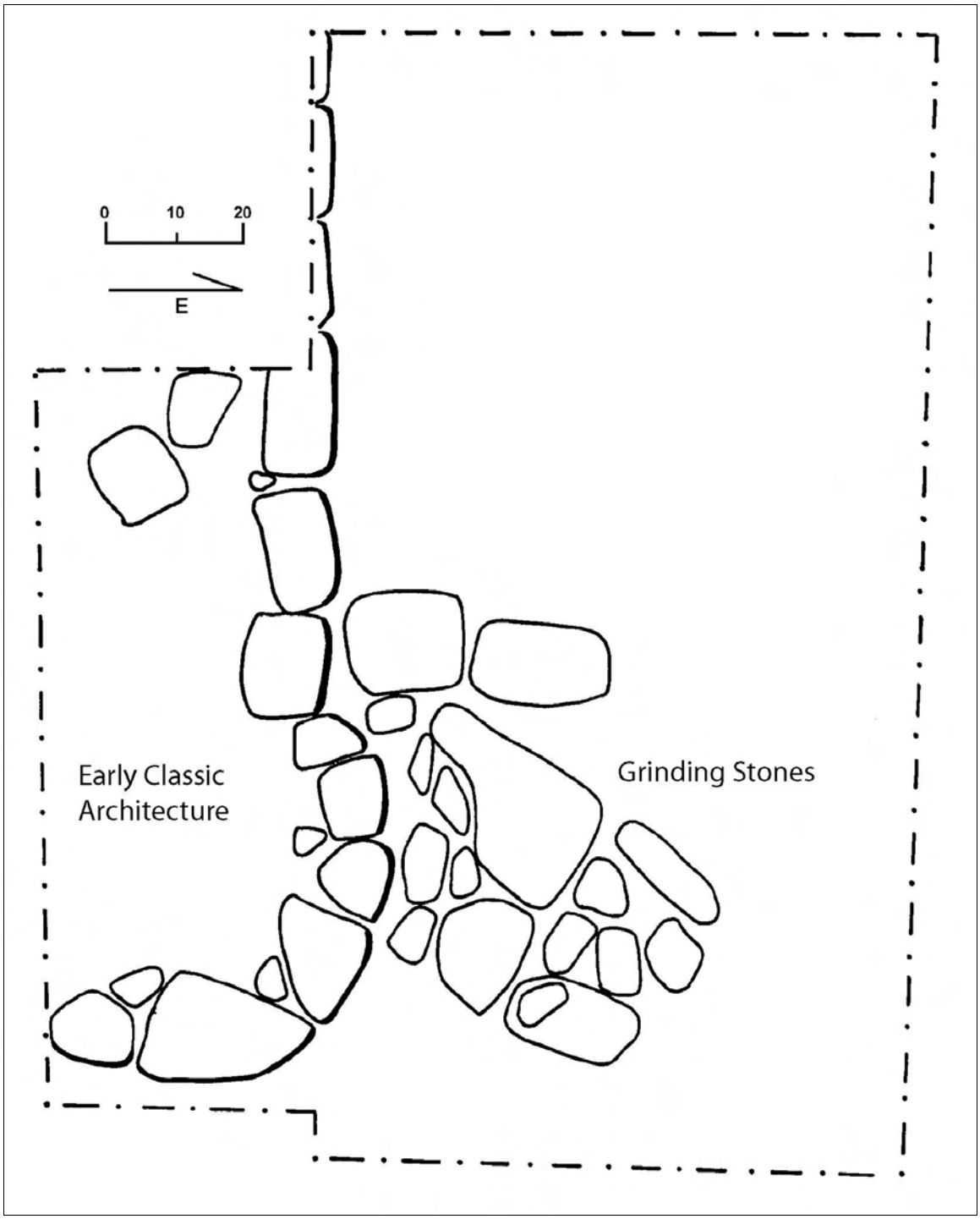

Figure B.45 PN 26A-11, Plan View of Early Classic Architecture (From Wells 1998a:156)

OPERATION 61
SOUTH GROUP: S-5 AND S-7

Lilian Garrido excavated two structures during the 2000 field season, S-5 and S-7, that are included in this dissertation (Figure B.46). These structures are located in an Early Classic part of the center and were originally excavated to provide a better understanding of this period of Piedras Negras's history. Her excavation strategy was to clear half of each building to understand its latest occupation with deeper units as time permitted. Both structures had not been previously excavated by the Proyecto Piedras Negras, but a test pit had been placed in the plaza between them during the 1997 field season (Urquizú 1997, PN 2G-5) and a Penn trench was discovered in the south side of S-5. Units were 2x2 m with those placed in and over S-5 designated under suboperation 61A and S-7's test pits as 61B.

Suboperation PN 61A

This suboperation focused on structure S-5 (Figure B.47). A trench along the south side placed by the University of Pennsylvania showed the southeast and southwest corners of the building. S-5 is a rectangular structure, 19 m long and 9 m wide. Garrido placed 34 units on the southern side of the building, including over the staircase and a single unit behind the building. Due to time constraints, most of the units had only one lot excavated - the humus layer, although a couple of units were excavated to bedrock.

S-5 consists of a large platform upon which sits another smaller platform (Figure B.48 and B.50). There is a staircase along the eastern side of the building with five steps leading to the top of the bottom platform, and another five steps leading to the second platform. The basal platform has a talud, with walls 0.90 to 1 m high, the crest of the talud has an apron-molded cornice which extends to the height of the building, or approximately 2 m. The building faces east with the stairs centered along the front of it. The base of the staircase, which was anciently destroyed, measures 10 m long and 3 m wide. The stairs themselves are 70 cm deep and rise, on average, 25 cm each. Overall, the building was well constructed with originally Early Classic architecture that had been remodeled on different occasions. The upper platform, in particular, appears to be a later construction.

The structure sits on a floor made of yellowish clay mixed with small limestone rocks (discovered in PN 61A-1-2) roughly 20 cm under the actual surface of the plaza. This floor also supports the stairs, showing it to be a later construction.

PN 61A-19 was a unit placed on top of the structure and excavated nearly to bedrock. The fill of the structure was not solid enough to facilitate deep excavations, nevertheless, important architectural features were discovered in this unit. A floor appeared under the collapse at roughly 0.30 m below the surface. Underneath this layer was large rocks comprising the fill. Then, 1.30 m below mound surface, another light brown floor layer was uncovered with large limestone blocks under it. The fill continued until 2.8 m when it abruptly changed into a yellowish clay (similar to the patio floor). At 3 m below mound surface, an interior wall was uncovered in the unit, running north-south. The wall was made of well-cut rocks and covered with the yellowish clay. Another wall was discovered 20 cm below the top of the first, in the eastern profile of the unit, which paralleled the first wall. Both had evidence of stucco covering them. These walls were built as taluds, which eventually ran together farther under the building

than was safe to follow them. The excavation was abandoned at 4.8 m below mound surface, which corresponds to approximately one meter above bedrock.

The second unit of deep importance, PN 61A-34, was placed along the back of the structure and excavated to bedrock. A possible patio surface was discovered at 0.30 m below the surface comprised of small limestone rocks in a dark clay matrix. Thereafter, more fill dominated the excavation. In the fourth lot, 0.93-1.60 m, a deposit of chert blades and waste was encountered along with an Early Classic midden. The unit ended with bedrock, discovered at 2.60 m below ground surface.

Summary

This suboperation exposed half of the surface of S-5 through a series of test pits. Unfortunately, time did not permit a deep excavation of the structure so most of the units simply consist of terminal debris. The building was a well-constructed Early Classic structure with talud walls and aproned cornices. The few deep test pits showed that the area has been artificially built up, which is not a surprise, but that also S-5 is one of the oldest buildings in the center. The few surviving Early Classic locales provide evidence for how the center looked at that point in its history. The two interior walls of the structure suggest S-5 may have once been two small buildings at its initial construction, and has since been converted into a large platform with stairs and then a two-tier structure with two sets of stairs. This building has had a long history of use.

Suboperation PN 61B

This suboperation focused on structure S-7, which is a two-tiered rectangular building whose outside dimensions measure 13 x 6.50 m (Figures B.48, B.49 and B.50). Lilian Garrido, during the 2000 field season, placed 13 units along the southern half of the building to better understand its construction sequence and functions. Like PN 61A, most of the units were not excavated very deeply due to time constraints, so our knowledge of this building is more extensive than profound.

Structure S-7 is composed of two platforms and a staircase. The lower platform measures 13 m north-south x 6.50 m by about 70 cm tall. The upper platform centered on the lower one, and measures 9 x 4.50 m and 30 cm tall. The staircase lies on the east side of the building, and measures 10.5 m long. It has two steps leading from the plaza up to the lower platform, and another two steps from the lower platform to the upper. The plaza had two previous surfaces, one found at 22 cm below modern ground level, and the other at 76 cm. The building itself does not have any distinguishing architectural features, it is just a crudely constructed building with Late Classic characteristics.

Summary

Operation 61 consisted of extensive excavations over two buildings, S-5 and S-7. S-5 is an Early Classic construction with talud and apron cornices while S-7 is a Late Classic double-tiered platform. They are orientated away from each other, suggesting that they had little in common, functionally, when they were in use.

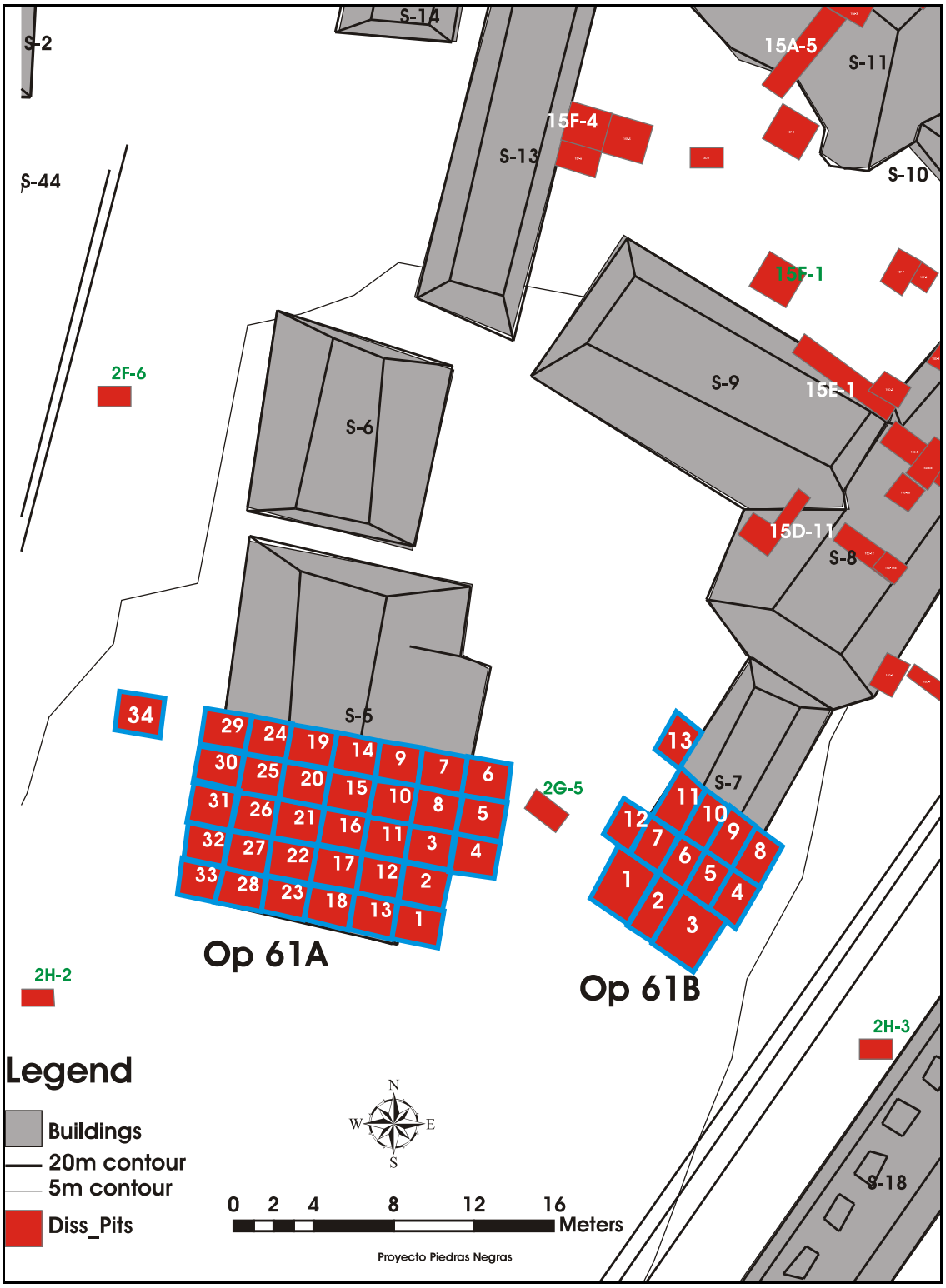

Figure B.46 Operation 61

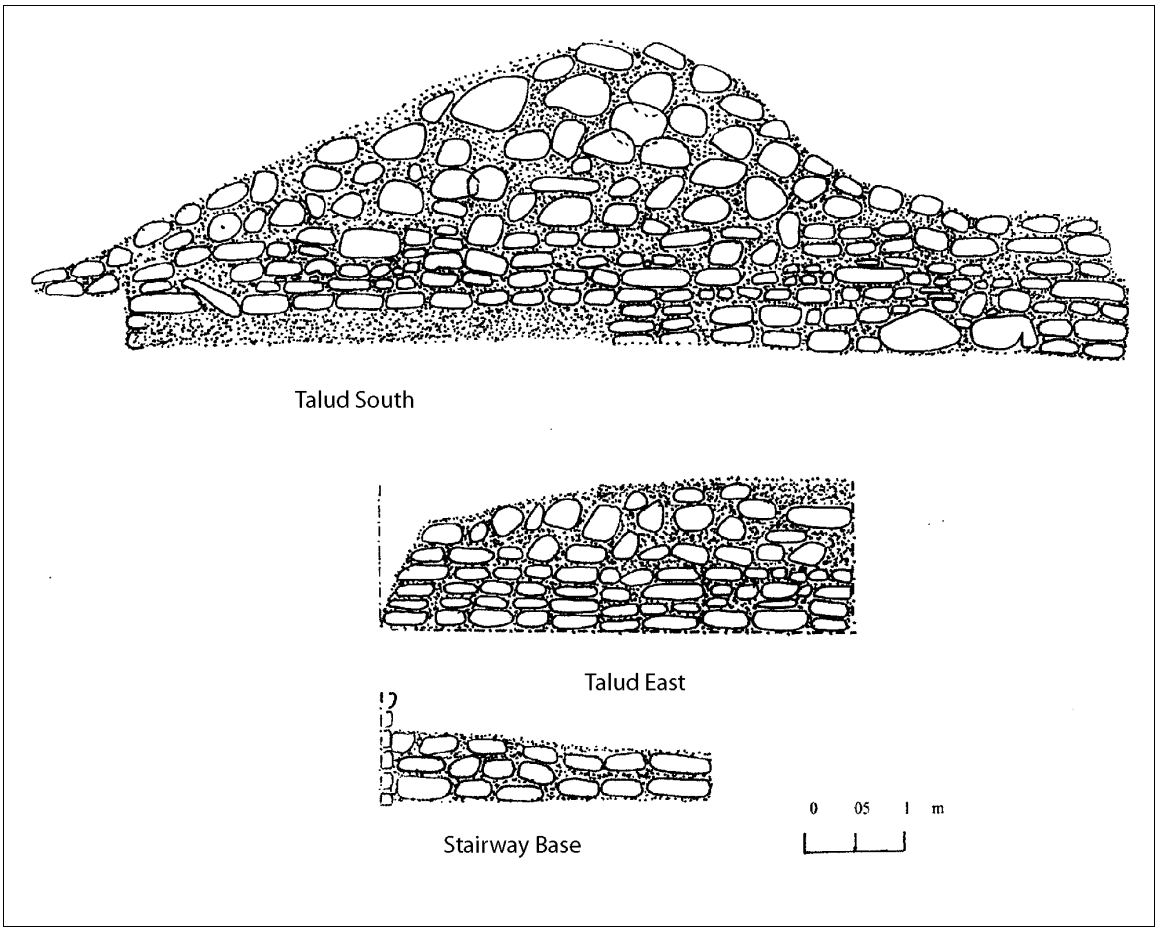

Figure B.47 Profiles of S-5, Walls and Stairway Base (From Garrido 2001:425)

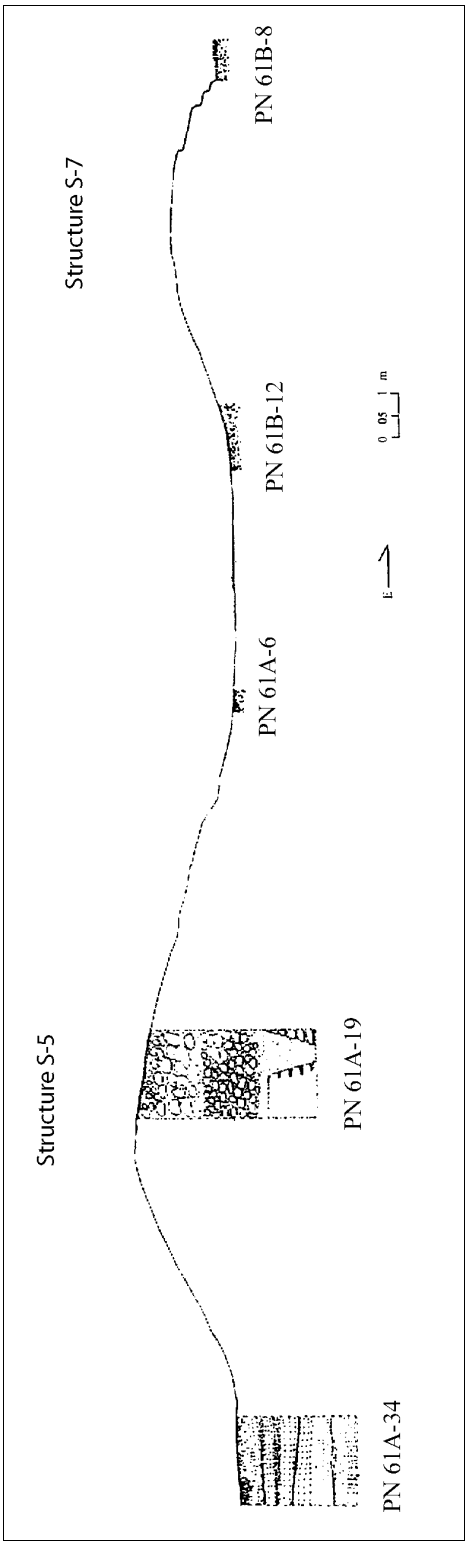

Figure B.48 Profile across S-5 and S-7 (From Garrido 2001:426)

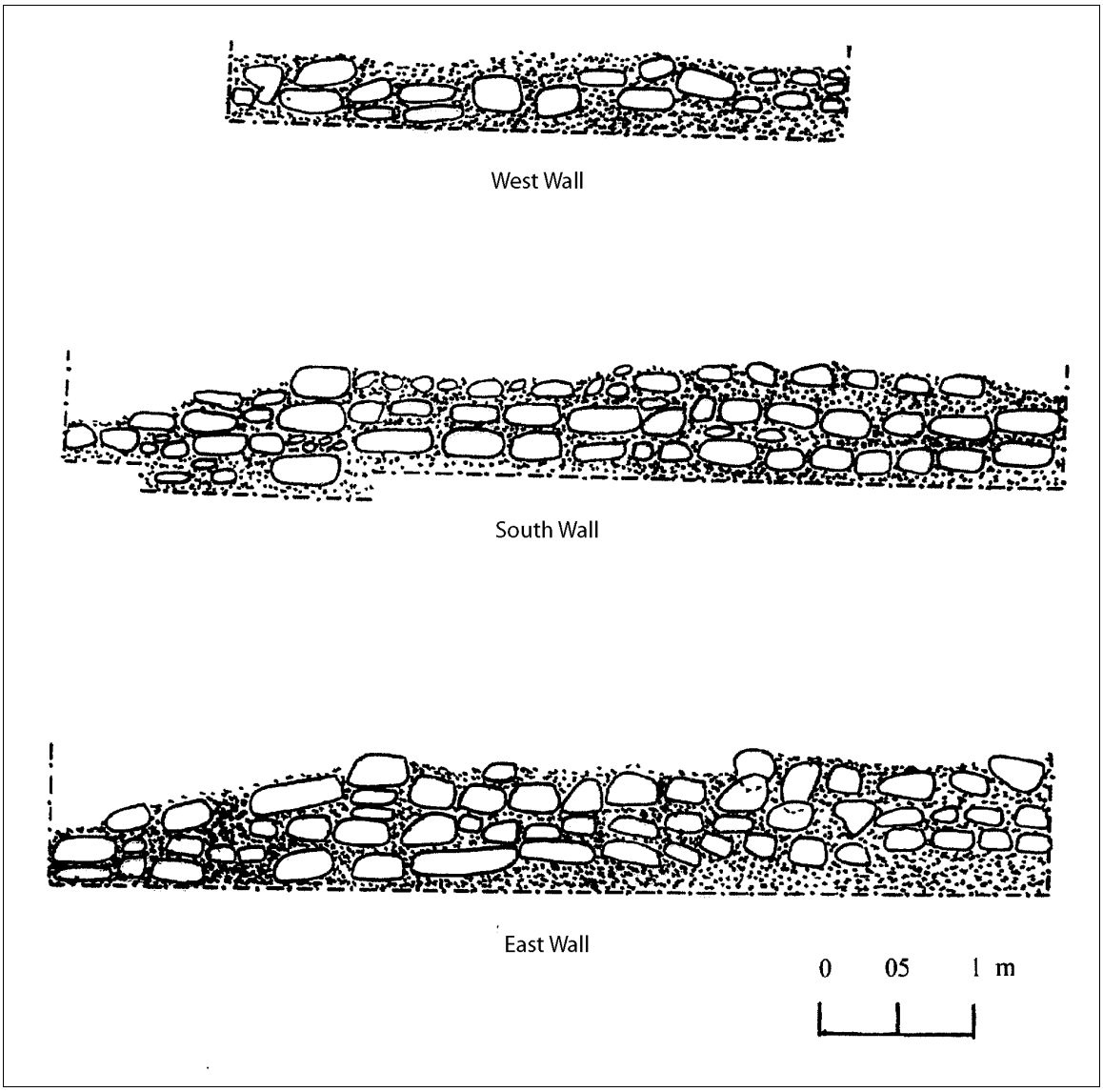

Figure B.49 Structure S-7 Wall Profiles (From Garrido 2001:427)

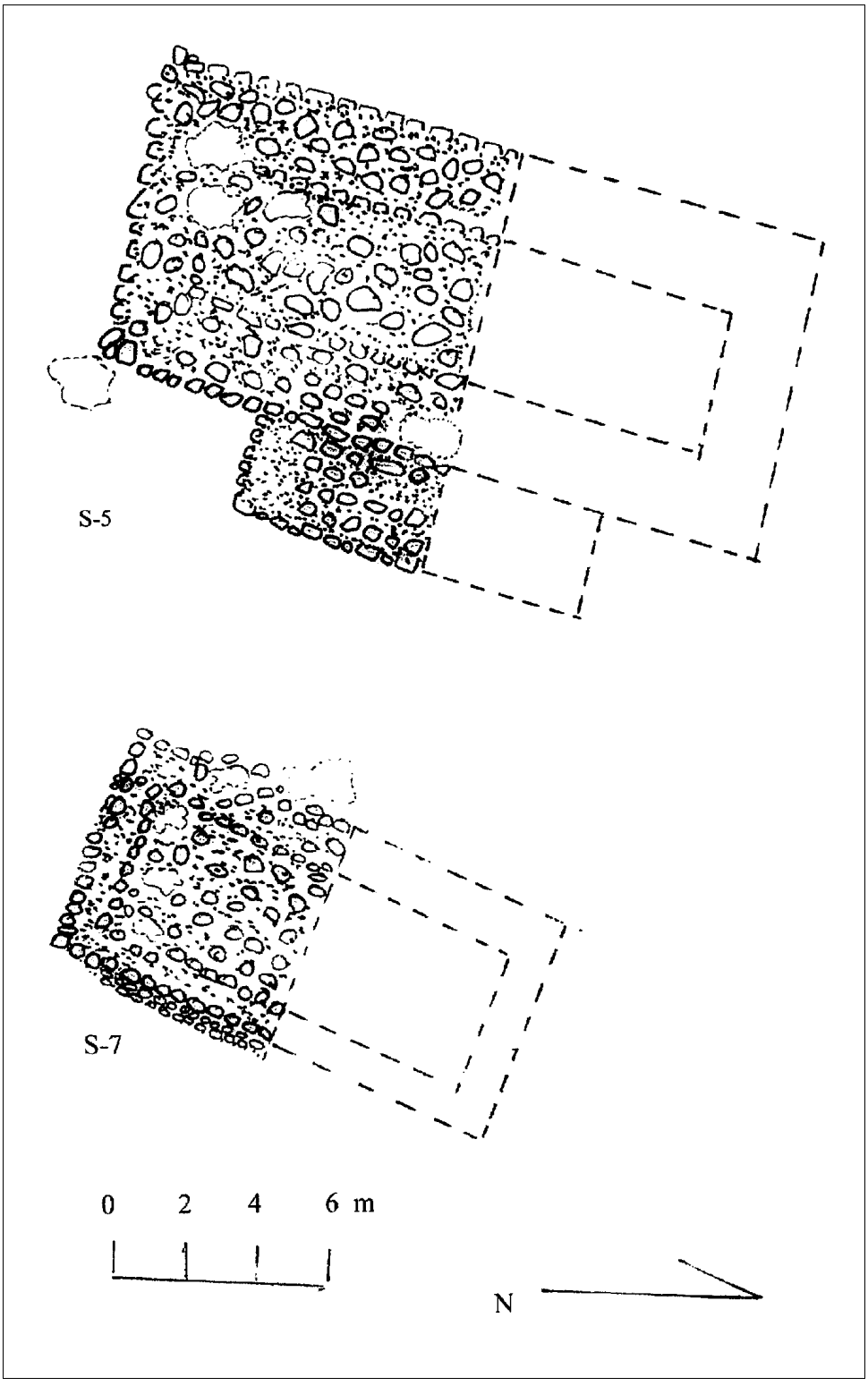

Figure B.50 Plan of excavations on Structures S-5 and S-7 (Drawing by L. Garrido)

Appendix C

TEMPORAL MARKERS OF CERAMIC PHASES

Chronology is key to understanding how cultures changed over time, and a good chronology is cross-checked against other data sources to ensure that archaeological units can be adequately dated. Due to the paucity of preservation of perishable artifacts, and the general difficulty and cost of dating bone, most chronologies in Mesoamerica are based upon changes in the frequency of ceramic vessel types, and then calibrated with reference to other ceramic chronologies in the region, and against other dating sources, such as radiocarbon dates. The first ceramic sequence for Piedras Negras was worked out by Mary Butler (1935), then modified by Frank Cresson (1937). Robert Rands (1973) derived a chronological sequence for Piedras Negras which was subsequently modified by George Holley (1983). Later, this major work was slightly revised by Bruce Bachand (1997). Further refining is under the direction of Arturo Rene Muñoz of the University of Arizona (Muñoz 1999, 2000, 2001; Muñoz and Fitzsimmons 1998), with help from Mary Jane Acuña and Griselda Perez (Muñoz, Acuña, Pérez 2002; Pérez, Acuña, and Muñoz 2003) both of the Universidad de San Carlos, Guatemala City, Guatemala.

Muñoz's dissertation will focus on the ceramics of the center, so I will not delve into the more mundane details of the ceramics here. An important point to remember with ceramic chronologies is that rarely a single diagnostic exists per period. Often, the ceramist looks at a suite of characteristics and weighs the preponderance of traits to assign a particular lot to its ceramic period. Ceramic traits (paste, vessel form, and decoration) can change at different frequencies within a ceramic period, and the discerning eye of the ceramicist is necessary to understand in which period the whole lot tends to settle.

The nature of ceramic studies is description. Detailed descriptions of the changes in the frequencies of traits, and especially the exact nature of the traits in question are very important to adequately represent to another person the intricacies of detail that, in reality, only come from hands-on experience and hundreds of hours of training. For more information on the ceramics of Piedras Negras, please refer to the works of the above mentioned ceramicists.

Appendix D Historical Events from the Usumacinta Zone

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
8.14.02.17.06	02 Aug 320	Yaxchilán	Accession of Yoat-Balam		Yax. L. 11	Anaya 2001
8.16.10.00.00	12 Dec 366	Yaxchilán	Itzam-Balam I (Diety Jaguar) is ruling Yaxchilán and receives Royal visit		Yax. L. 11	Anaya 2001
8.17.01.17.16	06 Oct 378	Yaxchilán	Accession of Yaxun Balam I			Anaya 2001
8.17.02.11.05	29 May 379	Yaxchilán	Yaxun-Balam I is ruling Yaxchilán and receives Royal visit		Yax. L. 11	Anaya 2001
8.17.13.03.08	20 Oct 389	Yaxchilán	Yax-Deer Antler-Chami is ruling over Yaxchilán and receives Royal visit	Diving-Bird Site	Yax. L. 11	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
8.18.06.05.13	27 Sep 402	Yaxchilán	Ruler 5 is ruling over Yaxchilán and receives Royal visitor		Yax. L. 49	Anaya 2001
8.19.00.00.00	24 Mar 416	Yaxchilán	K'inich-Tab Chami I (Mahk'ina Skull I) is ruling over Yaxchilán	Bonampak	Yax. L. 49	Anaya 2001
8.19.07.11.08?	02 Oct 423	Yaxchilán	Moon-Chami is ruling over Yaxchilán	Piedras Negras	Yax. L. 49	Anaya 2001
9.01.00.00.00	27 Aug 455	Yaxchilán	Yaxun-Balam II is ruling over Yaxchilán	Piedras Negras	Yax. L. 37	Anaya 2001
9.03.00.00.00	29 Jan 495	Bonampak	Period ending celebration performed by Kan-Batz and Yak'ak, Bonampak King		Houston Panel	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.03.00.14.13	18 Nov 495	Bonampak	Flint deposit ritual performed by Yak'ak and/or Kan-Batz at Bonampak		Houston Panel	Anaya 2001
9.03.03.16.04	03 Dec 498	Bonampak	House dedication of Kan-Batz anabil of Yak'ak Bonampak king		Houston Panel	Anaya 2001
9.03.10.00.00	07 Dec 504	Yaxchilán	Tab-Balam I is ruling Yaxchilán and receives Royal visitors	Bonampak	Yax. L. 37	Anaya 2001
9.03.13.12.19	07 Aug 508	Yaxchilán	Tab-Balam I is ruling Yaxchilán and receives Royal visitors	Tikal	Yax. L. 37	Anaya 2001
9.03.19.12.12	30 Jun 514	Piedras Negras	Tab-Balam of Yaxchilán appears as subservient to the PN ruler	Yaxchilán	PN L. 12	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.03.19.12.12	02 Jul 514	Piedras Negras	Ruler C accession		Lntl 12, A1-B5	Teufel 2004
9.04.08.14.09	20 Jun 523	Bonampak	House dedication Waybil (house of dreams) of K'an Batz yanabil Yak'ak of Bonampak		Poh Panel	Anaya 2001
9.04.11.08.16	11 Feb 526	Yaxchilán	K'inich-Tab Chami II receives royal visit by Ak-Kuchah ?? Balam	Diving-Bird Site	Yax. L. 35	Anaya 2001
9.04.11.08.16	11 Feb 526	Yaxchilán	K'inich-Tab Chami II receives royal visit from Bonampak	Bonampak	Yax. L. 35	Anaya 2001
9.04.11.08.16	11 Feb 526	Yaxchilán	K'inich-Tab Chami II receives royal visit by 9 Ok'a	Lakamtun	Yax. L. 35	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.04.11.08.16	11 Feb 526	Yaxchilán	Accession of K'inich Tab Chami II		Yax. L. 35, L. 48, and L. 38	Anaya 2001
9.05.02.10.06	14 Jan 537	Yaxchilán	K'inich-Chami II of Yaxchilán receives a royal visit	Calakmul	Yax. L. 35	Anaya 2001
9.06.10.13.17	04 Jan 565	Sak Tz'i' (?)	House dedication event with the possible intervention of U-K'ab Sak Tsi Ajaw		New York Panel	Anaya 2001
9.06.10.14.15	17 Nov 565	Yaxchilán	Tab-Balam II captures Tok-Xun (Flint Bat) of Lacanha	Lacanha	Yax. HS. 3-I	Anaya 2001
9.08.00.00.00	22 Aug 593	Lacanha	Period ending celebration performed by local ruler		Lac. St. 1	Anaya 2001
9.08.05.13.08	21 Apr 599	Palenque	Calakmul wages war in Palenque	Calakmul	Pal. HS	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.08.06.13.17	24 Apr 600	Bonampak	Accession of Chan Muwan I	Yaxchilán Lacanha	Bon. S.S. 4	Anaya 2001
9.08.09.15.11	13 May 603	Bonampak	War waged against Palenque, the tok' pakal was thrown down	Palenque	Bon. L. 4	Anaya 2001
9.08.10.06.16	14 Nov 603	Piedras Negras	Accession of Ruler 1		PN St. 25	Anaya 2001
9.08.12.02.09	08 Aug 605	Bonampak	Seating even of unclear nature	Lacanha	Bon. S.S. 4	Anaya 2001
9.08.17.15.00	21 Mar 611	Bonampak	Capture of a Lacanha person by Chan Muwan I of Bonampak	Lacanha	Bon. S.S. 4	Anaya 2001
9.08.17.15.14	04 Apr 611	Palenque	Ch'akah (war event) against Palenque's capital (Lakamha) by Une-Kan Calakmul king	Pomona	Pal. Temple of the Inscriptions	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.09.00.00.00	09 May 613	Yaxchilán	The 14th Ruler of Yaxchilán appears performing an unknown event		Yax. St. 2	Anaya 2001
9.09.01.07.01	22 Sep 614	Bonampak	Death of Lacanha Ruler	Lacanha	Bon. S.S. 4	Anaya 2001
9.09.11.12.03	11 Nov 624	Piedras Negras	Ruler 1 takes as captives K'ab' Chan Te', Sak Tz'i' ajaw and Ch'ok Balam, a Yakun of the Ch'ul ajaw of Palenque	Sak Tz'i' Palenque	PN St. 26	Anaya 2001
9.09.13.04.01	25 May 626	Piedras Negras	Ruler 2 born		Lntl 15, A1-B9	Teufel 2004
9.09.16.10.13	15 Sep 629	Yaxchilán	Accession of Yaxun-Balam III		Yax. St. 6	Anaya 2001
9.10.06.02.01	03 Feb 639	Piedras Negras	Death of Ruler 1		PN L. 1	Anaya 2001
9.10.06.05.09	12 Apr 639	Piedras Negras	Accession of Ruler 2			Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.10.08.03.05	16 Feb 641	Sak Tz'i' (?)	K'ab Chan-Te', Sak Tz'i' ajaw did something (U-kabhi) to Ruler 1 of PN (war event?)	Piedras Negras	Denver Panel	Anaya 2001
9.10.08.06.02	14 Apr 641	Sak Tz'i' (?)	Nik-Mo' of the Rabbit-Stone place, sets fire to the "seat" of K'ab' Chan Te at Sak Tz'i'	La Mar	Denver Panel	Anaya 2001
9.10.08.06.02	14 Apr 641	Sak Tz'i' (?)	Nik-Mo' of the Rabbit-Stone place, sets fire to the "seat" of K'ab' Chan Te at Sak Tz'i'	Piedras Negras La Mar	Denver Panel	Anaya 2001
9.10.08.06.03	15 Apr 641	Sak Tz'i' (?)	K'ab Chan-Te' "axes" something or someone at the Rabbit Stone place of Nik-Mo'	La Mar	Denver/Brussels Panel	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.10.08.06.05	17 Apr 641	Sak Tz'i' (?)	K'ab Chan-Te' captures Ek Mo' Bonampak ajaw	Bonampak	Brussels Panel	Anaya 2001
9.10.14.13.00	30 Jul 647	Yaxchilán	Yaxun-Balam III captures Xupib (?) of Hix Witz	Hix Witz	Yax. HS. 3	Anaya 2001
9.10.15.07.06	04 Apr 648	Piedras Negras	War?		Lntl15, C11-D11	Teufel 2004
9.11.06.02.01	21 Oct 658	Piedras Negras	Royal visit of Yaxchilán young ajaws to Ruler 2 of PN	Yaxchilán Lacanha Bonampak	PN L. 2	Anaya 2001
9.11.06.16.11	07 Aug 659	Palenque	Palenque captures Pomona Lord	Pomona	Pal. HS	Anaya 2001
9.11.06.16.11	07 Aug 659	Tikal	Capture of the war palanquin of Itzam Balam III by Nu Bak Chak of Tikal	Yaxchilán Lacanha	Pal. House C	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.11.06.16.17	14 Jul 659	Palenque	Nu-Bak-Chak ch'ul Ajaw of Tikal arrives in the company of Hanab Pakal to Palenque	Tikal	Pal. House C	Anaya 2001
9.11.09.08.06	10 Feb 662	Piedras Negras	Calakmul visit for fire ritual?		St. 35, A1-A8	Teufel 2004
9.11.09.08.11	15 Feb 662	Piedras Negras	War?		St. 35, A10b-B10	Teufel 2004
9.11.09.08.12	16 Feb 662	Piedras Negras	War?		St. 35, A11-B11	Teufel 2004
9.11.09.15.19	10 Jul 662	Dos Pilas	Balah Kan K'awil, Dos Pilas King and kalaw balam ajaw wage war, and the battle takes place at the Tied-Hair place	Knot-Site	DP HS 2	Anaya 2001
9.11.10.16.17	13 Jul 663	Palenque	Death of Pomona Lord at Palenque	Pomona	Pal. HS	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.11.16.11.06	03 Feb 669	Piedras Negras	War against El Cayo ?, Och-Nal K'utim, Yax-Nil	El Cayo	PN St. 37	Anaya 2001
9.12.05.07.00	20 Oct 677	Yaxchilán	Capture done by Itzam-Balam III		Yax. L. 44	Anaya 2001
9.12.08.14.01	22 Feb 681	Yaxchilán	Capture done by Itzam-Balam III of Ah-Nik	Man	Yax. HS 3-III; L. 45; St. 18	Anaya 2001
9.12.09.08.01	20 Oct 681	Yaxchilán	Accession of Itzam Balam III		Yax. HS 3-III; L. 25	Anaya 2001
9.12.11.05.18	28 Aug 683	Palenque	Hanab-Pakal dies		Pal. Sarcophagus	Anaya 2001
9.12.11.06.09	08 Sep 683	Bonampak	Accession of Ah-Na-Chuy to Bonampak ajawship		Bon. S.S. 1	Anaya 2001
9.12.11.12.10	07 Jan 684	Palenque	Kan-Balam of Palenque accedes		Pal. Palace Tablet	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.12.13.04.03	13 Jul 685	Piedras Negras	Kohal headdress event for PN Ruler 2 U-kabhi a Calakmul subordinate	Calakmul	Hellmuth Panel	Anaya 2001
9.12.14.10.14	16 Nov 686	Piedras Negras	Death of Ruler 2		PN St. 8	Anaya 2001
9.12.14.10.15	20 Nov 686	Piedras Negras	Marriage of Ruler 3		St. 3, I3	Teufel 2004
9.12.14.11.01	26 Nov 686	Piedras Negras	Burial Ruler 3?		St. 8, H1-G2	Teufel 2004
9.12.14.13.01	02 Jan 687	Piedras Negras	Accession of Ruler 3		PN St. 3, St. 8	Anaya 2001
9.13.00.00.00	18 Mar 692	El Chorro	Mention of Lady from Knot-Site	Knot-Site	EC Altar 6	Anaya 2001
9.13.05.12.13	28 Oct 697	Yaxchilán	Unknown event between Itzam Balam II and one of his wives Lady Ik Kimi	Calakmul	Yax. L. 53	Anaya 2001
9.13.06.05.11	03 Jun 698	Yaxchilán	Itzam-Balam III takes a captive		Yax. HS 3-VI	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.13.09.14.14	17 Nov 701	Yaxchilán	Capture done by Itzam-Balam III of Tun Wob Ah K'in Ush		Yax. St. 20	Anaya 2001
9.13.10.01.05	16 Feb 702	Palenque	Kan Balam dies			Anaya 2001
9.13.10.06.08	30 May 702	Palenque	K'an-Hok-Chitan accedes to the Palenque kingship		Pal. Palace Tablet	Anaya 2001
9.13.17.15.16	28 Oct 709	Yaxchilán	Blood letting ritual performed by Lady Xoc		Yax. L. 24	Anaya 2001
9.13.18.08.00	20 May 710	Yaxchilán	Itzam-Balam II takes a captive		Yax. HS 3-VI	Anaya 2001
9.13.19.13.03	26 Aug 711	Tonina	K'an-Hok-Chitan of Palenque appears as captive at Tonina	Palenque	Ton. Mon. 122	Anaya 2001
9.14.01.17.14	14 Nov 713	Yaxchilán	Itzam-Balam II takes a captive of Ah K'an U-Sih Baktun ajaw	Buk-Tun	Yax. L. 46	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.14.03.08.04	28 Apr 715	Bonampak	Etz'nab Ch'oy of Bonampak declares himself yajaw of Bak Nal Chak (Ruler 3) of Tonina	Tonina	St. Louis Hieroglyphic Column	Anaya 2001
9.14.10.04.02	30 Dec 721	Palenque	Accession of Akul Anab		Pal. Tablet of the Slaves	Anaya 2001
9.14.10.05.00	17 Jan 722	Nuevo Jalisco (?)	Accession of Tab Balam at Lacanha U-kabhi K'ab-Chan Te' Sak tz'i' ajaw	Sak Tz'i' Bonampak Lacanha	NJ Panel 1,2	Anaya 2001
9.14.11.04.14	07 Jan 723	Dos Pilas	Itzam Kawil (Ruler 2) captures an ajaw from Yaxchilán	Yaxchilán	DP HS 1-III	Anaya 2001
9.14.12.07.02	18 Feb 724	Piedras Negras	Ruler 3 has 3 k'atun birthday		PN St. 8	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.14.13.10.08	19 Apr 725	Site R	Itzam Balam III is attired for war and performing pre-war rituals in the company of his sajals	Yaxchilán	Yax. L. 1, L. 2	Anaya 2001
9.14.13.10.08	19 Apr 725	Yaxchilán	Itzam Balam III is attired for war by Lady Xoc		Yax. L. 26	Anaya 2001
9.14.15.00.00	16 Sep 726	Lacanha	Period ending celebration connected to earlier date involving yajawte K'inich Chak-Chih, Lacanha ajaw, yajaw of K'ab' Chan Te' Sak Tz'i' and Bonampak Holy Lord	Bonampak Sak Tz'i'	Zurich	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.14.15.00.00	16 Sep 726	Sak Tz'i' (?)	House dedication event performed by K'ab-Chante Ch'ul Ajaw of Bonampak and Sak Tz'i'	Bonampak	New York Panel	Anaya 2001
9.14.17.14.17	30 Jun 729	Piedras Negras	Second wife Ruler 3		MP. 5, K2	Teufel 2004
9.14.17.15.11	10 Jul 729	Yaxchilán	Capture done by Itzam-Balam III of Pol-Chay Ah Pay Mo' (Chuwen)	Lacanha	Yax. HS 3-I	Anaya 2001
9.14.18.03.13	09 Nov 729	Piedras Negras	Accession of Ruler 4		PN Alt. 2	Anaya 2001
9.14.18.14.13	17 Jun 730	Tonina	Tomb dedication of K'inich Baknal-Chak (Ruler 3)		Tonina Disk	Anaya 2001
9.14.19.14.18	17 Jun 731	Yaxchilán	An ajaw from Hix Witz performs a conjuring rite	Hix Witz	Yax. HS 3	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.15.00.12.00	14 Apr 732	Yaxchilán	Capture done by Itzam-Balam III of Nak-Chiu, a Hix Witz ajaw	Hix Witz	Yax. HS 3-V	Anaya 2001
9.15.09.03.14	13 Sep 740	Bonampak	Capture of Cha vassal of the Bonampak/Lacanha lord Tab Balam (he who is from the knot place), U-kabhi Ah Sak-T'el-Huh of Lacanha/Bonampak?	Lacanha Knot-Site	Bon. L. 3	Anaya 2001
9.15.10.00.00	26 Jun 741	Copán	Somewhere around this date, Smoke Shell of Copán established a marriage alliance with Palenque	Palenque	Cop. St. 8	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.15.10.00.01	27 Jun 741	Yaxchilán	Vision Serpent ritual by Yaxun Balam IV, Lady Ik-Kimi, Lady Chak-Chami, and Lord Chak-Chami, Ub-kahiy Yukom of Calakmul	Calakmul	Yax. L. 39, L. 35, L. 14	Anaya 2001
9.15.10.17.14	15 Jun 742	Yaxchilán	Death of Itzam Balam III		Yax. St. 12, Alt. 1	Anaya 2001
9.15.11.17.03	?	Lacanha	Seating in sahalship of Ah-Sac-Tel-Huh	Bonampak Knot-Site	Lac. L.1	Anaya 2001
9.15.13.06.09	17 Oct 744	Yaxchilán	Yaxun Balam IV played a ball game and sacrificed Ek'-Chih, a Lakamtun ajaw	Lakamtun	Yax. HS 2	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.15.15.00.00	31 May 746	Lacanha	Sak-Tel-Huh celebrates his first Period Ending as sajal of Lacanha recognizing Tab Balam of Bonampak and Lacanha as his overlord	Bonampak Knot-Site	Lac. L.1	Anaya 2001
9.15.15.00.00	31 May 746	Yaxchilán	Yaxun Balam IV performs blood letting and celebrates Period ending at Yaxchilán		Yax. St. 11	Anaya 2001
9.15.15.00.00	31 May 746	Piedras Negras	Ruler 4 of PN celebrates Period Ending in company of his subordinate from Rabbit Stone place	La Mar	PN St. 40	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.15.15.16.16	27 May 747	Bonampak	Xuklan ajaw accedes U-kabhi Yaxun Balam IV	Yaxchilán	Bon. S.S. 5	Anaya 2001
9.15.16.06.09	?	Dos Pilas	K'awil Chan-Kinich (Ruler 4) of Dos Pilas, captures Chak-Chan-ha-Xoc Yaxchilán Ajaw	Yaxchilán	DP HS 3-II	Anaya 2001
9.15.18.03.13	27 Jul 749	Piedras Negras	Celebration of 1st Katun of Ruler 4 of PN attended by Sak-Hukub Baam of Yaxchilán (Ruler ?)	Yaxchilán	PN L. 3	Anaya 2001
9.15.18.03.15	29 Jul 749	Piedras Negras	Ruler 4 of PN dances and drinks fermented cacao in the presence of his Yaxchilán guests	Yaxchilán	PN L. 3	Anaya 2001
9.15.18.16.07	11 Apr 750	Piedras Negras	(Ruler 7 born)		Throne 1, O-P	Teufel 2004

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.15.19.01.01	31 May 750	Yaxchilán	Yaxun Balam IV displays his K'awil scepter in front of 3 captives		Yax. St. 11	Anaya 2001
9.15.19.02.02	21 Jun 750	Site R	Ah Ka-Mo' does a xikbalel (war preparation rite) in front of his lord Yaxun Balam IV of Yaxchilán	Yaxchilán	Site R L. 3	Anaya 2001
9.16.00.00.00	05 May 751	Yaxchilán	Period ending celebration by Yaxun Balam IV of Yaxchilán		Yax. Alt. 9, HS 4-III	Anaya 2001
9.16.00.00.00	05 May 751	Pomona	Period ending celebration by K'inix Ho-Ix king of Pomona in the company of a yitah of K'inich Kan-Balam Palenque Ch'ul ajaw	Palenque	Pom. "New Stela"	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.16.00.13.17	06 Feb 752	Yaxchilán	Capture of Kib-Tok ("Inverted pot"), sahal of Wak'ab	Wak'ab	Yax. L. 16	Anaya 2001
9.16.00.14.05	14 Feb 752	Yaxchilán	Itzam Balam IV is born, Yaxun Balam IV and his wife Lady Balam Mut perform blood letting	Hix Witz	Yax. L. 13, L. 17	Anaya 2001
9.16.01.00.00	29 Apr 752	Yaxchilán	Yaxun Balam IV officially accedes to power to Yaxchilán		Yax. St. 11, 12; L. 1, 30; Alt. 4; HS 4-III	Anaya 2001
9.16.01.02.00	08 Jun 752	Yaxchilán	Yaxun Balam IV danced the xukpi with wife Lady Wak Halam-Chan ajaw of Motul de San Jose	Motul de San Jose	Yax. L. 5, L. 42	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.16.01.08.06	12 Oct 752	Yaxchilán	Yaxun Balam IV danced the chak k'at with K'an Tok, and wife Lady Mutul Balam from Hix-Witz	Hix Witz	Yax. L. 6, L. 43	Anaya 2001
9.16.01.08.08	14 Oct 752	Yaxchilán	Yaxun Balam IV danced with wife Lady Chak Kimi		Yax. L. 7	Anaya 2001
9.16.01.13.17	03 Jan 753	Site R	Dance performed by the local sahal who recognizes subordination to Yaxun Balam IV of Yaxchilán	Yaxchilán	Looted lintel	Anaya 2001
9.16.03.16.19	24 Mar 755	Yaxchilán	Yaxun Balam IV's wife, Lady Wak-Halam-Chan ajaw of Motul de San Jose conjures vision serpent	Motul de San Jose	Yax. L. 15	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.16.04.01.01	05 May 755	Yaxchilán	Yaxun Balam IV captures Jeweled Skull in the company of K'an-Tok who captured Kot-ajaw		Yax. L. 8, L. 41	Anaya 2001
9.16.04.06.17	29 Aug 755	Yaxchilán	Dedication of the tomb of Lady K'abal-Xoc		Yax. L. 28	Anaya 2001
9.16.05.00.00	08 Apr 756	Yaxchilán	Yaxun Balam IV danced with his subordinate K'in-Mo ajaw 3 K'atun		Yax. L. 3, L. 54, L. 58	Anaya 2001
9.16.06.10.19	21 Oct 757	Piedras Negras	Yaxun Balam IV of Yaxchilán did some action (U-kabhi) at PN, he meets with Ruler 3 of PN	Yaxchilán	PN L. 3	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.16.06.11.00	09 Nov 757	Yaxchilán	Yaxun Balam IV is presented with 4 captives by a subordinate lord		Yax. L. 12	Anaya 2001
9.16.06.11.17	26 Nov 757	Piedras Negras	Ruler 4 of PN dies		Yax. L. 3	Anaya 2001
9.16.06.12.02	01 Dec 757	Piedras Negras	PN records this date as the accession of Yaxun Balam IV	Yaxchilán	Yax. L. 3	Anaya 2001
9.16.06.17.01	10 Mar 758	Piedras Negras	Ruler 5 acceded		PN St. 14	Anaya 2001
9.16.07.00.00	29 Mar 758	Yaxchilán	Yaxun Balam IV's wife, Lady Mutul-Balam of Hix Witz conjures the K'awil	Hix Witz	Yax. L. 40	Anaya 2001
9.16.08.03.18	10 Jun 759	La Pasadita	Yaxun Balam IV captures Bal-?ku and displays him in front of his sahal Tilom	Yaxchilán	LP L. 2	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.16.12.02.06	18 Apr 763	El Cayo	Sak Tz'i' lord and PN ruler 5 are named	Sak Tz'i' Piedras Negras	EC Panel 1	Anaya 2001
9.16.12.04.10	01 Jun 763	El Cayo	Ah Chak-zotz K'utim came out in sahalship U-kabhi Ah Sak-Max (Zotz') Sak Tz'I Ajaw	Sak Tz'i' Piedras Negras	EC Panel 1	Anaya 2001
9.16.12.05.14	25 Jun 763	Yaxchilán	Yaxun Balam IV's wife, Lady Wak-Tun of Motul de San Jose conjures K'awil	Motul de San Jose	Yax. L. 38	Anaya 2001
9.16.12.10.08	27 Sep 763	Piedras Negras	A subordinated lord from the Rabbit Stone place accedes into ajawship	La Mar	PN St. 16	Anaya 2001
9.16.13.00.07	04 Mar 764	Palenque	K'uk Balam was seated in ajawship		Pal. Tablet of the 96 Glyphs	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.16.15.00.00	15 Feb 766	Yaxchilán	Yaxun Balam IV and his son Chel-te K'inich (Itzam Balam IV) danced to commemorate the Period Ending		Yax. L. 52	Anaya 2001
9.16.15.00.00	15 Feb 766	La Pasadita	Yaxun Balam IV scattered in the presence of Tilom Sahal of La Pasadita	Yaxchilán	LP L. 1	Anaya 2001
9.16.16.00.04	18 Feb 767	Piedras Negras	Ha' K'in Xook Accedes ("Ruler 6"-ish)		St. 23, C16-D16	Teufel 2004
9.16.16.00.09	23 Feb 767	Yaxchilán	Yaxun Balam IV adorns a captive named "Star-Sky"		Netherlands Lintel	Anaya 2001
9.16.16.12.02	10 Oct 767	Site R	Yaxun Balam IV danced in the presence of Ah Ka-Mo'	Yaxchilán Laxtunich	Site R L. 4	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.16.17.06.12	16 Jun 768	Yaxchilán	Yaxun Balam IV danced with Lord Chak Chami the hasaw-chan dance		Yax. L. 9	Anaya 2001
9.16.18.00.19	18 Feb 769	Laxtunich	Fire was drilled U-kabhi Chel-te-Chan-K'inich in the company of the captor of Ba-Way	Yaxchilán	Lax. L. 4	Anaya 2001
9.17.00.00.00	20 Jan 771	Yaxchilán	Scattering ceremony celebrating a P. E. in which chel-te (Itzam Balam IV) is involved		Yax. St. 7	Anaya 2001
9.17.00.00.00	20 Jan 771	El Chorro	The Captor of ? ch'ah		EC Altar 4	Anaya 2001
9.17.00.16.01	07 Dec 771	La Pasadita	Tilom danced with a paper decorated spear		LP L. 4	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.17.01.02.12	07 Mar 772	El Cayo	Mention of PN k'in ajaw	Piedras Negras	EC Panel 1	Anaya 2001
9.17.01.05.09	05 May 772	El Cayo	Chan-Panak Wayib Ah Ek' Zotz' K'utim Ah Yax-nil came out in sahalship U-kabhi Ah Sax-Max Sak Tzi ajaw	Sak Tz'i' Piedras Negras	EC Panel 1	Anaya 2001
9.17.02.03.07	17 Mar 773	Laxtunich	Chel-Te Chan-K'inich (Itzam Balam IV) is presented a headdress in the company of Ka-Mo'	Yaxchilán	Lax. L. 4	Anaya 2001
9.17.05.08.09	11 Jun 776	Bonampak	Can-Muwan II came out into ajawship at Bonampak		Bon. St. 2	Anaya 2001
9.17.09.05.11	28 Mar 780	Piedras Negras	Ha' K'in Xook Dies ("Ruler 6"-ish)		Throne 1, U?-Y?	Teufel 2004
9.17.10.09.04	31 May 781	Piedras Negras	Ruler 7 acceded		PN Thr. 1	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.17.12.04.09	15 Feb 783	La Mar	The Sak Hunal was displayed for Mo' in his accession rites		LM St. 1	Anaya 2001
9.17.12.13.14	19 Aug 783	Laxtunich	Ba-Waybi was captured U-kabhi Ah-Chak-Ma-Chami sajal		Fort Worth Lintel	Anaya 2001
9.17.14.03.08	14 Jan 785	Bonampak	Chan Muwan captured a prisoner		Bon. St. 3	Anaya 2001
9.17.16.03.08	04 Jan 787	Bonampak	Xu???ak a yajaw of the Sak Tz'i' (?) ajaw was captured by Chel-te Chan captor of Tah Mo' Holy Yaxchilán Ajaw (Itzam Balam IV)	Sak Tz'i' Yaxchilán	Bon. L. 2	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.17.16.03.12	08 Jan 787	Bonampak	Ah-Ho-Bak, the yajawte of Yet K'inich Sak Tz'i' ajaw is captured U-kabhi Chan Muwan II	Sak Tz'i'	Bon. L. 1	Anaya 2001
9.17.16.14.19	23 Aug 787	Piedras Negras	Anabil Ah ?K'in K'ul Tok' was captured	Wa-Bird	PN St. 12	Anaya 2001
9.17.18.15.18	31 Aug 798	Bonampak	Blood letting ritual performed by Chan Muwan's II Mother Lady Akul-Patah, Lady sahal Yaxun, and Chan Muwan's wife Lady Yax Rabbit Ch'ul Yaxchilán Ajaw	Yaxchilán Lacanha	Bon. St. 2	Anaya 2001
9.18.00.00.00	07 Oct 790	Tonina	Captive from Sak Tz'i' is displayed	Sak Tz'i'	Ton. Mon. 83 and looted fragment	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.18.00.03.04	10 Dec 790	Bonampak	Chan Muwan designates his son as his heir, event takes place "in the presence of" Chel-Te-Chan-K'inich, Ch'ul ajaw of Yaxchilán	Yaxchilán	Bon. Str. 1 Room 1	Anaya 2001
9.18.01.08.18	28 Mar 792	La Mar	War related event (Ch'ak) was done against Pomona	Pomona	LM St. 3	Anaya 2001
9.18.01.09.02	01 Apr 792	Piedras Negras	War (star) event against Pakab (Pomona), which resulted in a series of captives	Pomona	PN St. 12	Anaya 2001
9.18.01.15.05	02 Aug 792	Bonampak	Battle conducted by Chan Muwan		Bon. Str. 1 Room 2	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.18.03.05.19	18 Jan 794	La Mar	Sak-Sotz' Chakte Chak sahal of Kuch-Balam of Pomona was captured, Ah-K'ech also captured	Pomona Piedras Negras	LM St. 3	Anaya 2001
9.18.03.05.19	18 Jan 794	Piedras Negras	War event on Pomona, Sak Sotz' and Ah K'ech are recorded as captives	La Mar	PN St. 12	Anaya 2001
9.18.04.07.10	13 Feb 795	El Cayo	Lady Hob placed a cache U-kabhi Ah-Yax-Tuxum (?) sahal K'utim		Cleveland Panel	Anaya 2001
9.18.06.04.19	13 Dec 796	Yaxchilán	Ah Naman underwent some ritual after his capture by Chel-te Chan K'inich		Yax. HS 5	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
9.18.09.04.04	13 Nov 799	Palenque	Accession of Chan-Ch'ok Tzuk, Bolon Ek'-Kab Wak Kimi Hanab Pakal		Pal. Initial Series Pot	Anaya 2001
9.18.15.00.00	20 Jul 805	La Mar	Mo' the ruler of La Mar celebrates the tun ending with 2 or 3 of his subordinates		LM St. 2	Anaya 2001
9.18.17.12.06	12 Mar 808	Yaxchilán	Tab-chami IV threw an unidentified object, star-shell event at K'utel Yaxha, an action was done with the flint shield of Itzam Balam IV		Yax. L. 10	Anaya 2001
10.01.14.00.14	28 Aug 863	Sak Tz'i' (?)	Balam-Chilkay the sahal of K'ab-chan-Te of Sak Tz'i' died		Randall Stela	Anaya 2001

Long Count	Julian Date	Site	Event	Other Sites	Monument	Source
10.01.14.09.17	29 Mar 864	Sak Tz'i' (?)	Smoke entered in the carved stone of Balam Chilkay, sahal (the tomb)		Randall Stela	Anaya 2001

Bibliography

Adams, Richard E. W.

1971 *The Ceramics of Altar de Sacrificios.* Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University. 63(1). Cambridge, MA.

Aliphat, Mario M.

1994 *Classic Maya Landscape in the Upper Usumacinta River Valley,* Unpublished Ph.D. dissertation, University of Calgary.

Allchin, F. Raymond and George Erdosy (Editors)

1995 *The Archaeology of Early Historic South Asia: The Emergence of Cities and States*. Cambridge: Cambridge University Press.

Anaya Hernández, Armando

2001 *Site Interaction and Political Geography in the Upper Usumacinta Region During the Late Classic: A GIS Approach*. Oxford: J. and E. Hedges: Archaeopress, BAR International Series 994.

Anaya Hernández, Armando, Stanley Guenter, and Peter Mathews

2001 "An Inscribed Wooden Box from Tabasco, Mexico" http://www.mesoweb.com/reports/box/index.html

Andrews, E. Wyllys, IV

1942 The Inscription on Stela 38, Piedras Negras, El Petén, Guatemala. *American Antiquity* 7(4): 364-368.

Anonymous

1932 Unusual Find at Piedras Negras. *Palacio* XXXII: 264-265.

1933 The Expedition to Piedras Negras. *University of Pennsylvania, University Museum Bulletin* 4: 78-79.

1934 The Third Expedition of the University Museum, Philadelphia, to the "Old Empire" Maya site of Piedras Negras. *Museum News* XI(13): 3.

1935 The Expedition to Piedras Negras, Guatemala. *University of Pennsylvania, University Museum Bulletin* 5: 74-75.

Arredondo Leiva, Ernesto

1998a PN 26B-1: Excavación de Sondeo en la Estructura E-2. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998,* edited by Héctor Escobedo and Stephen Houston; pp. 157-158. Report submitted to the Instituto de Antropología e História, Guatemala.

1998b PN 25, 29, 30 y 31: Excavaciones de Sondeo al Oeste y Norte de la Estructura K-5. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda*

Temporada 1998, edited by Héctor Escobedo and Stephen Houston; pp. 159-174. Report submitted to the Instituto de Antropología e História, Guatemala.

Arredondo Leiva, Ernesto and Alejandro Gillot Vassaux
1999 PN 42: Excavaciones en la Plaza Norte del Grupo C. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999*, edited by Héctor Escobedo and Stephen Houston; pp. 171-174. Report submitted to the Instituto de Antropología e História, Guatemala.

Ashmore, Wendy
1981 Pre-Columbian Occupation at Quirigua, Guatemala: Settlement Patterns in a Classic Maya Center. Unpublished Ph.D. dissertation, University of Pennsylvania, Philadelphia.
1988 Household and Community at Classic Quirigua. In *Household and Community in the Mesoamerican Past*, edited by Richard R. Wilk and Wendy Ashmore, pp. 153-171. Albuquerque: University of New Mexico Press.

Barnhart, Edwin L.
2001 The Palenque Mapping Project: Settlement and Urbanism at an Ancient Maya City. Unpublished Ph.D. dissertation, University of Texas, Austin.

Barrientos Q, Tomás, Héctor Escobedo, and Stephen Houston
1997 PN 1: Excavaciones en la Estructura O-13. In *Proyecto Arqueológico Piedras Negras, Informe Preliminar No. 1, Primera Temporada, 1997.* Edited by Héctor Escobedo, and Stephen Houston, pp. 1-20. Report presented to the Instituto de Antropología e História de Guatemala.

Bashand, Bruce
1997 Examination of a Ceramic Collection from Piedras Negras, Guatemala. Unpublished Master's Thesis. Brigham Young University, Provo, Utah.

Bawden, Garth
1982 Community Organization Reflected by the Household: A Study of Pre-Columbian Social Dynamics. *Journal of Field Archaeology* 9(2): 165-181.

Becker, Laurence C.
2000 Garden Money Buys Grain: Food Procurement Patterns in a Malian Village. *Human Ecology* 28(2): 219-250.

Becker, Marshall J.
1971 The Identification of a Second Plaza Plan at Tikal, Guatemala, and Its Implications for Ancient Maya Social Complexity. Unpublished Ph.D. dissertation, University of Pennsylvania, Philadelphia.

Berry, J. K.
1995 *Spatial Reasoning for Effective GIS*. GIS World Books, Fort Collins, Colorado.

Beyer, Hermann
1937 Lunar Glyphs of the Supplementary Series at Piedras Negras. *El México Antiguo* 4: 75-82.
1939a Elucidation of a Secondary Series on Lintel 2 of Piedras Negras. *El México Antiguo* 4: 289-292.
1939b Remarks on some Maya Hieroglyphs from Piedras Negras. *Ethnos* 4: 105-111.
1940 Rectification of a Date on Stela 12 of Piedras Negras. *El México Antiguo* 5: 7-8.

Blanton, Richard
1981 The Rise of Cities. In *Handbook of Mesoamerican Indians, Supplement 1*, edited by Jeremy Sabloff, pp. 392-400. University of Texas Press, Austin.

Braswell, Geoffrey E. (Editor)
2003 *The Maya and Teotihuacán: Reinterpreting Early Classic Interaction*. University of Texas Press, Austin.

Butler, Mary
1935 Piedras Negras Pottery. *Piedras Negras Preliminary Papers*, No. 4. University Museum, University of Pennsylvania, Philadelphia.

Cameron, Catherine M., and Steve A. Tomka (Editors)
1993 *Abandonment of Settlements and Regions: Ethnoarchaeological and Archaeological Approaches.* Cambridge University Press, Cambridge.

Carr, David L.
2004 Ladino and Q'eqchí Maya Land Use and Land Clearing in the Sierra de Lacandón National Park, Petén, Guatemala. *Agriculture and Human Values* 21: 171-179.

Casselberry, Samuel E.
1974 Further Refinement of Formulae for Determining Population from Floor Area. *World Archaeology* 6(1): 117-122.

Chambon, Ludovic
1994 [1892] *Un Gascón en México*. Mirada Viajera, México, D.F.

Chase, Arlen F.
1990 Maya Archaeology and Population Estimates in the Tayasal-Paxcaman Zone, Petén, Guatemala. In *Pre-Columbian Population History in the Maya Lowlands*, edited by T. Patrick Culbert and Don S. Rice, pp. 149-166. University of New Mexico Press, Albuquerque.

Chase, Arlen F., Diane Z. Chase and Christine D. White
2001 El paisaje urbano Maya: La integracíon de los espacios construidos y la estructura social en Caracol, Belice. In *Reconstruyendo la cuidada Maya: El urbanismo en las sociedades antiguas*, edited by Andrés Cuidad Ruiz, Maria Josefa Iglesias Ponce de León, and Maria del Carmen Martínez Martínez, pp. 95-122. Sociedad Española de Estudios Mayas, Madrid.

Chase, Diane Z.
1990 The Invisible Maya: Population History and Archaeology at Santa Rita Corozal. In *Pre-Columbian Population History in the Maya Lowlands*, edited by T. Patrick Culbert and Don S. Rice, pp. 199-214. University of New Mexico Press, Albuquerque.

Chase, Diane Z., and Arlen F. Chase
1992 Mesoamerican Elites: An Archaeological Assessment. University of Oklahoma Press, Norman. (Editors)
1996 Maya Multiples: Individuals, Entries, and Tombs in Structure A34 of Caracol, Belize. *Latin American Antiquity* 7(1): 61-79.

Chase, Diane, Arlen Chase, and William Haviland
1990 "The Classic Maya City: Reconsidering "The Mesoamerican Urban Tradition", *American Anthropologist* 92:499-506.

Chisholm, Michael
1967 *Rural Settlement and Land Use: An Essay in Location*. Wiley Science Edition, New York.

Clark, John E., and Stephen D. Houston
1998 Craft Specialization, Gender, and Personhood among the Postconquest Maya of Yucatan, Mexico. In *Craft and Social Identity*, pp. 31– 46. Archeological Papers of the American Anthropological Association No. 8. American Anthropological Association, Washington, D.C.

Clarke, S. K.
1971 A Method for the Determination of Pre-Hispanic Puebloan Population Estimates. Center for Man and the Environment, Prescott College. (Quoted in Casselberry 1974)

Coe, Michael, and Justin Kerr
1997 *The Art of the Maya Scribe*. Abrams, New York.

Coe, William R.
1959 *Piedras Negras Archaeology: Artifacts, Caches, and Burials*. Museum Monograph 18. Philadelphia: University Museum, University of Pennsylvania.

1965 A Model of Ancient Maya Community Structure in the Maya Lowlands. *Southwestern Journal of Anthropology* 21: 97-114.

Coomes, Oliver T., and Graeme J. Burt
2001 Peasant Charcoal Production in the Peruvian Amazon: Rainforest Use and Economic Reliance. *Forest Ecology and Management* 140: 39-50.

Cortés, Hernán
1986 Letters From Mexico. Anthony Pagden editor and translator. Yale University Press, New Haven.

Cowgill, George L.
1974 Quantitative Studies of Urbanization at Teotihuacán. In *Mesoamerican Archaeology: New Approaches*, edited by Norman Hammond, pp. 363-396. London: Duckworth.
1979 Teotihuacán, Internal Militaristic Competition, and the Fall of the Classic Maya. In *Maya Archaeology and Ethnohistory*, ed. Norman Hammond, and Gordon R. Willey, pp. 51-62. Austin: University of Texas Press.
1997 State and Society at Teotihuacán, Mexico. *Annual Review of Anthropology* 26: 129-161.
2004 Origins and Development of Urbanism: Archaeological Perspectives. *Annual Review of Anthropology* 33: 525-549.

Cowgill, Ursula
1962 An Agricultural Study of the Southern Maya Lowlands. *American Anthropologist* 64: 273-286.

Creed, Gerald W.
2000 "Family Values" and Domestic Economies. *Annual Review of Anthropology* 29: 329-355.

Cresson, Frank
1937 Foot Forms of Pottery Vessels at Piedras Negras. *Twenty-fifth Anniversary Studies: Philadelphia Anthropological Society*, edited by D. S. Davidson, pp. 37-46. Philadelphia.

Cuidad Ruiz, Andrés, Maria Josefa Iglesias Ponce de León, and Maria del Carmen Martínez Martínez (Editors)
2001 *Reconstruyendo la cuidada Maya: El urbanismo en las sociedades antiguas*. Sociedad Española de Estudios Mayas, Madrid.

Culbert, T. Patrick, Laura J. Kosakowsky, Robert E. Fry, and William A. Haviland
1990 The Population of Tikal, Guatemala. In *Pre-Columbian Population History in the Maya Lowlands*, edited by T. Patrick Culbert and Don S. Rice, pp. 103-122. University of New Mexico Press, Albuquerque.

De Roche, C. D.
1983 Population Estimates from Settlement Area and Number of Residences. *Journal of Field Archaeology* 10(2): 187-192.

Emery, Kitty F.
1998 Análisis Preliminar de Restos Oseos de Fauna del Area de Piedras Negras, Guatemala. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Héctor Escobedo and Stephen Houston; pp. 399-410. Report submitted to the Instituto de Antropología e História, Guatemala.
1999 Informe Zooarqueológico: Temporada de 1999. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999*, edited by Héctor Escobedo and Stephen Houston; pp. 401-404. Report submitted to the Instituto de Antropología e História, Guatemala.
2001 Informe Zooarqueológico 2000: Utilizacíon de Animales por la Élite de Piedras Negras. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Hector Escobedo and Stephen Houston; pp. 559-567. Report submitted to the Instituto de Antropología e História, Guatemala.

Escobedo, Héctor L.
1997 PN 15: Excavaciones en las Estructuras S-11, S-12, y S-10. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 121-132. Report submitted to the Instituto de Antropología e História, Guatemala.

Escobedo, Héctor L., and Stephen D. Houston (Editors)
1997 *Proyecto Arqueológico Piedras Negras, Informe Preliminar No. 1, Primera Temporada, 1997.* Report presented to the Instituto de Antropología e História de Guatemala.
1998 *Proyecto Arqueológico Piedras Negras, Informe Preliminar No. 2, Segunda Temporada, 1998.* Report presented to the Instituto de Antropología e História de Guatemala.
1999 *Proyecto Arqueológico Piedras Negras, Informe Preliminar No. 3, Tercera Temporada, 1999.* Report presented to the Instituto de Antropología e História de Guatemala.
2001 *Proyecto Arqueológico Piedras Negras, Informe Preliminar No. 4, Cuarta Temporada, 2000.* Report presented to the Instituto de Antropología e História de Guatemala.

Fernández, Fabián G., Richard E. Terry, Sheldon Nelson, and David Webster
nd Human Induced Changes in the Rural Soils Surrounding the Ancient Maya City of Piedras Negras, Guatemala.

Fleming, David
1998 The Space of Argumentation: Urban Design, Civic Discourse, and the Dream of the Good City. *Argumentation* 12: 147-166.

Folan, William J., Betty Faust, Wolfgang Lutz, and Joel D. Gunn
2000 Social and Environmental Factors in the Classic Maya Collapse. In *Population, Development and Environment on the Yucatán Peninsula: From Ancient Maya to 2030*, edited by Wolfgang Lutz, Leonel Prieto, and Warren Sanderson, pp. 2-32. RR-00-14. International Institute for Applied Systems Analysis, Laxenburg, Austria.

Forsyth, Donald and Zachary X. Hruby
1997 Análisis de la Cerámica Arqueológica de Piedras Negras: Temporada de 1997. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No.1, Primera Temporada 1997*, Edited by Hector .L. Escobedo and Stephen D. Houston, pp. 207-212. Report submitted to the Instituto de Antropología e História, Guatemala.

Fox, Richard
1977 *Urban Anthropology: Cities in Their Cultural Settings*. Prentice Hall, Englewood Cliffs, New Jersey.

Garrido, Lilian
2001 PN 61: Excavaciones en las Estructuras S-5 y S-7. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Héctor Escobedo and Stephen Houston; pp. 409-428. Report submitted to the Instituto de Antropología e História, Guatemala.

Gates, Charles
2003 *Ancient Cities: The Archaeology of Urban Life in the Ancient Near East and Egypt, Greece, and Rome*. Routledge, New York.

Gillot Vassaux, Alejandro
2001a PN 53: Excavaciones en el Cuadrante Z. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Héctor Escobedo and Stephen Houston; pp. 285-308. Report submitted to the Instituto de Antropología e História, Guatemala.
2001b PN 57: Excavaciones en el Cuadrante V. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Héctor Escobedo and Stephen Houston; pp. 355-366. Report submitted to the Instituto de Antropología e História, Guatemala.

2001c PN 62: Excavaciones de Sondeo en los Grupos G' y H'. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Héctor Escobedo and Stephen Houston; pp. 429-448. Report submitted to the Instituto de Antropología e História, Guatemala.

Golden, Charles

1997a PN 8: Exploraciones en el Petroglifo de la Tortuga. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 71-74. Report submitted to the Instituto de Antropología e História, Guatemala.

1997b PN 17: Excavaciones de Sondeo en el Cuadrante "C". In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 137-140. Report submitted to the Instituto de Antropología e História, Guatemala.

1997c PN 19: Excavaciones de Sondeo en el Cuadrante "K". In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 153-159. Report submitted to the Instituto de Antropología e História, Guatemala.

2002 Bridging the Gap Between Archaeological and Indigenous Chronologies: An Investigation of the Early Classic / Late Classic Divide at Piedras Negras, Guatemala. Unpublished Ph.D. dissertation, University of Pennsylvania, Philadelphia.

Gonlin, Nancy

1993 Rural Household Archaeology at Copán, Honduras. Unpublished Ph.D. dissertation, Pennsylvania State University.

1994 Rural Household Diversity in Late Classic Copán, Honduras. In *Archaeological Views from the Countryside*, edited by Glenn Schwartz and Steven Falconer, pp. 177-197. Smithsonian Institution Press, Washington D.C.

Goody, Jack

1977 The Evolution of the Family. In *Household and Family in Past Time*, edited by Peter Laslett, pp. 103-124. Cambridge University Press, Cambridge.

Hajnal, John

1982 Two Kinds of Preindustrial Household Formation Systems. *Population and Development Review* 8: 449-494.

Haviland, William A.

1972 Family Size, Prehistoric Population Estimates, and the Ancient Maya. *American Antiquity* 37: 135-139.

1981 Dower Houses and Minor Centers at Tikal, Guatemala: An Investigation into the Identification of Valid Units in Settlement Hierarchies. In *Lowland Maya*

Settlement Patterns, edited by Wendy Ashmore, pp. 89-117. University of New Mexico Press, Albuquerque.

Hayden, Brian, and Aubrey Cannon
1983 Where the Garbage Goes: Refuse Disposal in the Maya Highlands. *Journal of Anthropological Archaeology* 2: 117-163.

Hendon, Julia A.
1996 Archaeological Approaches to the Organization of Domestic Labor: Household Practice and Domestic Relations. *Annual Review of Anthropology* 25: 45-61.

Hirth, Kenneth G.
2003 The Altepetl and Urban Structure in Prehispanic Mesoamerica. In *El urbanismo en Mesoamérica/Urbanism in Mesoamerica*, edited by William T. Sanders, Alba Guadalupe Mastache, and Robert H. Cobean, pp. 57-85. Mexico City/University Park: Instituto Nacional de Antropología e História/Pennsylvania State University.

Holley, George
1983 Ceramic Change at Piedras Negras, Guatemala. Unpublished Ph.D. dissertation, Southern Illinois University, Carbondale.

Houston, Stephen D.
1983 On Ruler 6 at Piedras Negras. *Mexicon* V(5): 84-86.
1991 Appendix: Caracol Altar 21. In *Sixth Palenque Round Table, 1986*, edited by M. G. Robertson, pp. 38-42. University of Oklahoma Press, Norman.
2000 Into the Minds of the Ancients: Advances in Maya Glyph Studies. *Journal of World Prehistory* 14(2): 121-201.
2004 The Acropolis of Piedras Negras: Portraits of a Court System. In *Courtly Art of the Ancient Maya*. Edited by Mary Miller and Simon Martin, pp. 271-276. Thames and Hudson Ltd, London.

Houston, Stephen D., and Héctor Escobedo
1998 50 años más tarde: Nuevas investigaciones arqueológicas en Piedras Negras. In *XI Simposio de Investigaciones Arqueológicas en Guatemala*, edited by J. P. Laporte, and H. Escobedo, pp. 281-295. Guatemala: Ministerio de Cultura y Deportes.

Houston, Stephen, Héctor Escobedo, Mark Child, Charles Golden, and René Muñoz
2003 The Moral Community: Maya Settlement Transformation at Piedras Negras, Guatemala. In *The Social Construction of Ancient Cities*, edited by Monica L. Smith, pp. 212-253. Smithsonian Institution Press, Washington D. C.

Houston, Stephen, Héctor Escobedo, Donald Forsyth, Perry Hardin, David Webster, and Lori Wright

1998 On the River of Ruins: Explorations at Piedras Negras, Guatemala, 1997. *Mexicon* XX: 16-22.

Houston, Stephen, Héctor Escobedo, Mark Child, Charles Golden, René Muñoz, and Mónica Urquizú

1998 Monumental Architecture at Piedras Negras, Guatemala: Time, History, and Meaning. *Mayab* 11: 30-56.

Houston, Stephen, Héctor Escobedo, Mark Child, Charles Golden, Richard Terry, and David Webster

2001 In the Land of the Turtle Lords: Archaeological Investigations at Piedras Negras, Guatemala, 2000. *Mexicon* XXII(5): 97-110.

Houston, Stephen, Héctor Escobedo, Perry Hardin, Richard Terry, David Webster, Mark Child, Charles Golden, Kitty Emery, and David Stuart

1999 Between Mountains and Sea: Investigations at Piedras Negras, Guatemala, 1998. *Mexicon* XXI: 10-17.

Houston, Stephen and David Stuart

1996 Of Gods, Glyphs, and Kings: Divinity and Rulership among the Classic Maya. *Antiquity* 70: 289–312.

2001 Peopling the Classic Maya Court. In *Royal Courts of the Ancient Maya*, Vol 1. Edited by Takeshi Inomata and Stephen Houston, pp. 54-83. Westview Press, Boulder, Colorado.

Houston, Stephen, Héctor Escobedo, Richard Terry, David Webster, George Veni, and Kitty Emery

2000 Among the River Kings: Archaeological Research at Piedras Negras, Guatemala, 1999. *Mexicon* XXII: 8-17.

Inomata, Takeshi and Stephen Houston (Editors)

2001a *Royal Courts of the Ancient Maya: Vol. 1, Theory, Comparison and Synthesis*. Westview Press, Boulder, Colorado.

2001b *Royal Courts of the Ancient Maya: Vol. 2, Data and Case Studies*. Westview Press, Boulder, Colorado.

Inomata, Takeshi, and Laura R. Stiver

1998 Floor Assemblages from Burned Structures at Aguateca, Guatemala: A Study of Classic Maya Households. *Journal of Field Archaeology* 25(4): 431-452.

Jackson, Sarah and David Stuart
2001 The *Aj K'uhun* Title: Deciphering a Classic Maya Term of Rank. *Ancient Mesoamerica* 12: 217-228.

Jackson, Sarah E. and Zachary X. Hruby
2001 PN 15: Excavaciones en la Estructura S-11 y Plaza Asociada. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Héctor Escobedo and Stephen Houston; pp. 27-36. Report submitted to the Instituto de Antropología e História, Guatemala.

Jacobs, Jane M.
1961 *The Death and Life of Great American Cities*. New York: Random House.
1993 The City Unbound: Qualitative Approaches to the City. *Urban Studies* 30: 827-848.

Johnston, Kevin
2002 Protrusion, Bioturbation, and Settlement Detection During Surface Survey: The Lowland Maya Case. *Journal of Archaeological Method and Theory* 19(1): 1-67.

Kapp, Capt. K. S.
1974 *Central America: Early Maps up to 1860*. K. S. Kapp Publications, North Bend, Ohio. Facsimile edition published by the Museo Popol Vuh de la Universidad Francisco Marroquin [1993].

Kasarda John D., and Edward M. Crenshaw
1991 Third World Urbanization: Dimensions, Theories, and Determinants. *Annual Review of Sociology* 17: 467-501.

Kass, D. C. L., and E. Somarriba
1999 Traditional Fallows in Latin America. *Agroforestry Systems* 47: 13-36.

Keith, Kathryn E.
1999 Cities, Neighborhoods, and Houses: Urban Spatial Organization in Old Babylonian Mesopotamia. Unpublished PhD. Dissertation, University of Michigan.

Kemper, Robert V.
1991 Trends in Urban Anthropological Research: An Analysis of the Journal Urban Anthropology. *Urban Anthropology* 10: 373-503.
1993 Urban Anthropology: An Analysis of Trends in US and Canadian Dissertations. *Urban Anthropology* 22: 1-215.

Killion, Thomas W. (Editor)
1992 *Gardens of Prehistory: The Archaeology of Settlement Agriculture in Greater Mesoamerica*. Tuscaloosa: University of Alabama Press.

Klapisch, Christiane
1977 Household and Family in Tuscany in 1427. In *Household and Family in Past Time*, edited by Peter Laslett, pp. 267-282. Cambridge University Press, Cambridge.

Lange, Frederick W., and Charles R. Rydberg
1972 Abandonment and Post-Abandonment Behavior at a Rural Central American House-Site. *American Antiquity* 37(3): 419-439.

LaMotta, Vincent M., and Michael B. Schiffer
1999 Formation Processes of House Floor Assemblages. In *The Archaeology of Household Activities*, edited by Penelope M. Allison, pp. 19-29. Routledge, London.

Laslett, Peter
1977a Introduction: The History of the Family. In *Household and Family in Past Time*, edited by Peter Laslett, pp. 1-90. Cambridge University Press, Cambridge.
1977b Mean Household size in England Since the Sixteenth Century. In *Household and Family in Past Time*, edited by Peter Laslett, pp. 125-158. Cambridge University Press, Cambridge.

Low, Setha M.
1996 The Anthropology of Cities: Imagining and Theorizing the City. *Annual Review of Anthropology* 25: 383-409.

Lucero, Lisa
1999 Classic Lowland Maya Political Organization: A Review. *Journal of World Prehistory* 13(2): 211-263.

Ludendorff, Hans
1940 *Astronomische Inschriften in Piedras Negras und Naranjo.* No. 13. Akademie der Wissenschaften in Kommission bei W. de Gruyter, Berlin.

Maler, Teobert
1901 *Researches in the Central Portion of the Usumacintla Valley.* Memoirs of the Peabody Museum, Harvard University, Vol. 2, No. 1. Cambridge.

Mannion, Antoinette M.
2002 *Urban Form and Urban Land Use: Some Contrasting Case Studies*. University of Reading, England: Geographical Paper No. 164.

Marcus, Joyce
1983 On the Nature of the Mesoamerican City. In *Prehispanic Settlement Patterns: Essays in Honor of Gordon R. Willey,* edited by Evon Vogt and Richard Leventhal, pp. 195-242. Albuquerque: University of New Mexico Press.

Marcus Joyce, and Kent V. Flannery
1996 *Zapotec Civilization: How Urban Society Evolved in Mexico's Oaxaca Valley*. New York: Thames & Hudson.

Martin, Simon and Nikolai Grube
2000 *Chronicle of the Maya Kings and Queens: Deciphering the Dynasties of the Ancient Maya*. Thames and Hudson Ltd, London.

Mason, John Alden
1932a Excavations at Piedras Negras. *University of Pennsylvania, University Museum Bulletin* 3: 178-179.
1932b Superb Maya carving from Piedras Negras. *Palacio* XXXII: 127-128.
1933a Jade ornaments from Piedras Negras. *University of Pennsylvania, University Museum Bulletin* 4: 51, 53, 55-56 incl. pl. XI.
1933b Stela 12 from Piedras Negras. *University of Pennsylvania, University Museum Bulletin* 4: 89-90, pl. I.
1934a A Stela from Piedras Negras. *University Museum Bulletin* 5(2): 53-57.
1934b Descripción de un mágnífico dintel maya esculpido en piedra, procedente del sitio arqueológico de Piedras Negras, Guatemala. *Anales de la Sociedad de Geografía e História de Guatemala* 10(4): 413-417.
1938 Resultado cientifico de las excavaciones arqueológicas en la zona de Piedras Negras, Petén. *Sociedad de Geografía e História de Guatemala. Anales*: 202-216.

Mason, John Alden and C. J. Antonio Villacorta
1934 Descripción de un magnífico dintel maya exculpido en piedra, procedente del sitio arqueológico de Piedras Negras, Guatemala. *Sociedad de Geografía e História de Guatemala. Anales*: 413-417.

Mason, John Alden, Linton Satterthwaite, Jr. and Mary Butler
1934 The Work of the Eldridge R. Johnson Middle American Expeditions of the University Museum, Philadelphia, at Piedras Negras, Petén, Guatemala. *Maya Research* I: 30-36.

Mathews, Peter L.
1991 Classic Maya Emblem Glyphs. In *Classic Maya Political History: Hieroglyphic and Archaeological Evidence,* edited by T. Patrick Culbert, pp. 19–29. Cambridge University Press, Cambridge.

McAnany, Patricia A., and Sandra L. López Varela
1999 Re-creating the Formative Maya village of K'axob: Chronology, Ceramic Complexes, and Ancestors in Architectural Context. *Ancient Mesoamerica* 10(1): 147-168.

McKee, Brian R.
1999 Household Archaeology and Cultural Formation Processes: Examples from the Cerén Site, El Salvador. In *The Archaeology of Household Activities,* edited by Penelope M. Allison, pp. 30-42. Routledge, London.

Millon, Rene
1973 *Urbanization at Teotihuacán, Mexico, Vol. 1, The Teotihuacán Map. Part 1: Text.* University of Texas Press, Austin.
1992 Teotihuacán Studies: From 1950 to 1990 and Beyond. In *Art, Ideology, and the City of Teotihuacán,* edited by J. C. Berlo, pp. 339-429. Washington, D.C.: Dumbarton Oaks.

Moholy-Nag, Hattula
2003 The Hiatus at Tikal, Guatemala. *Ancient Mesoamerica* 14: 77-83.

Monterroso, Nancy
1997a PN 3: Excavaciones en la Plaza del Grupo Sur. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997,* edited by Héctor Escobedo and Stephen Houston; pp. 31-38. Report submitted to the Instituto de Antropología e História, Guatemala.
1997b PN 14: Excavaciones en la Plaza del Grupo Noroeste. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997,* edited by Héctor Escobedo and Stephen Houston; pp. 117-120. Report submitted to the Instituto de Antropología e História, Guatemala.
1998 PN 23: Excavaciones en la Plaza de R-20. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Héctor Escobedo and Stephen Houston; pp. 103-122. Report submitted to the Instituto de Antropología e História, Guatemala.

Montgomery, John
1994 Piedras Negras Drawings. Austin, Texas: Workshop Foundation.

Morley, Sylvanus G.
1937-1938 *The Inscriptions of the Petén*. Publication No. 437, Carnegie Institution of Washington, Washington, D.C.

Muñoz, Arturo René
1998 PN 35: Excavaciones de Sondeo en una Plataforma Nueve en el Cuadrante "U". In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda*

Temporada 1998, edited by Héctor Escobedo and Stephen Houston; pp. 257-258. Report submitted to the Instituto de Antropología e História, Guatemala.

1999 PN 35B: Excavaciones en la Plaza del Grupo Sur. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999*, edited by Héctor Escobedo and Stephen Houston; pp. 119-122. Report submitted to the Instituto de Antropología e História, Guatemala.

1999a La Cerámica de Piedras Negras: Temporada de 1999. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999*, edited by Hector Escobedo and Stephen Houston; pp. 347-358. Report submitted to the Instituto de Antropología e História, Guatemala.

2000 La cerámica de Piedras Negras: Cronología y Tecnología. In *XIII Simposio de Investigaciones Arqueológicas en Guatemala, 1999*. Edited by Juan Pedro Laporte, Héctor Escobedo, Ana Claudia de Suasnavar, and Barbara Arroyo, pp. 263-276 (vol. 1). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e História, Asociación Tikal.

2001 La cerámica de Piedras Negras: Análisis 1997-2000. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Hector Escobedo and Stephen Houston; pp. 527-542. Report submitted to the Instituto de Antropología e História, Guatemala.

Muñoz, Arturo René, Mary Jane Acuña, and Griselda Pérez Robles

2002 Del Preclásico al Clásico Temprano: La Cerámica de Piedras Negras. XVI Simposio de Investigaciones Arqueológicas en Guatemala, July 2002.

Muñoz, Arturo René and James Fitzsimmons

1998 Análisis de la Cerámica de Piedras Negras: Temporada de 1998. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Hector Escobedo and Stephen Houston; pp. 353-372. Report submitted to the Instituto de Antropología e História, Guatemala.

Murtha, Timothy

2002 Land and Labor: Classic Maya Terraced Agriculture at Caracol, Belize. Unpublished Ph.D. dissertation, Pennsylvania State University.

Naroll, Raoul

1962 Floor Area and Settlement Population. *American Antiquity* 27(4): 587-589.

Nelson, Zachary

1999 El mapa preliminar de Piedras Negras: Temporada de 1999. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999*, edited by Héctor Escobedo and Stephen Houston; pp. 415-426. Report submitted to the Instituto de Antropología e História, Guatemala.

2000 Analysis of an Obsidian Workshop at Hacienda Metepec, Teotihuacán, Mexico, AD 700-800. Unpublished Master's Thesis, Brigham Young University.

2001 PN 33: Excavaciones en el Grupo U, Sobre el Valle. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 4, Cuarta Temporada 2000*, edited by Hector Escobedo and Stephen Houston; pp. 63-104. Report submitted to the Instituto de Antropología e História, Guatemala.

2003 El Papel de los Machacadores en la Economía Doméstica Maya. In *XVI Simposio de Investigaciones Arqueológicas en Guatemala, 2002*. Edited by Juan Pedro Laporte, Héctor Escobedo and Barbara Arroyo, pp. 509-512 (vol. 2). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e História, Asociación Tikal.

Olson, Jan Marie

2001 Unequal Consumption: A Study of Domestic Wealth Differentials in Three Late Postclassic Mexican Communities. Unpublished Ph.D. dissertation, University of Albany, State University of New York.

Parnell, John Jacob, Richard Terry, and Zachary Nelson

2002 Soil Chemical Analysis Applied as an Interpretive Tool for Ancient Human Activities in Piedras Negras, Guatemala. *Journal of Archaeological Science* 29: 379-404.

Pérez Robles, Griselda, Mary Jane Acuña, and Arturo René Muñoz

2003 El Preclásico Terminal en Piedras Negras: La Cerámica de la Fase Pom. XVII Simposio de Investigaciones Arqueológicas en Guatemala, July 2003.

Possehl, Gregory L.

1990 Revolution in the Urban Revolution: The Emergence of Indus Urbanization. *Annual Review of Anthropology* 19: 261-282.

Pratchett, Terry

1989 *Pyramids*. Corgi Books, London.

Proskouriakoff, Tatiana

1950 *A Study of Classic Maya Sculpture*. Publication 593. Washington, D.C.: Carnegie Institution of Washington.

1960 Historical Implications of a Pattern of Dates at Piedras Negras, Guatemala. *American Antiquity* 25: 454-475.

Puleston, Dennis

1973 Ancient Maya Settlement Patterns and Environment at Tikal, Guatemala: Implications for Subsistence Models. Unpublished Ph.D. dissertation, University of Pennsylvania, Philadelphia. (Quoted in Rice and Culbert 1990)

Rands, Robert L.
1973 "The Classic Maya Collapse: Usumacinta Zone and Northwestern Periphery" in The Classic Maya Collapse, edited by T. Patrick Culbert, pp. 165-205. School of American Research, University of New Mexico Press, Albuquerque.

Redfield, Robert and Alfonso Villa Rojas
1934 *Chan Kom: A Maya Village*. Carnegie Institution of Washington, Publication 448. Washington D. C.

Reents-Budet, Dorie
1994 *Painting the Maya Universe: Royal Ceramics of the Classic Period*. Duke University Press, Durham, NC.

Reina, Ruben
1967 Milpas and Milperos: Implications for Prehistoric Times. *American Anthropologist* 69(1): 1-20.

Reina, Ruben, C. F. Ward III, and R. M. Maxwell
1984 Molab in 1727 Chinautla, Guatemala: A Case Study in Cultural Continuity. Paper presented at the Annual Meeting of the American Society for Ethnohistory, New Orleans. (Quoted in Ringle and Andrews 1990)

Restall, Matthew
1997 *The Maya World: Yucatec Culture and Society, 1550-1850*. Palo Alto, CA: Stanford University Press.
2001 The People of the Patio: Ethnohistorical Evidence of Yucatec Maya Royal Courts. In *Royal Courts of the Ancient Maya, Vol 2, Data and Case Studies*, edited by Takeshi Inomata and Stephen Houston, pp. 335-390. Boulder, Colorado: Westview Press.

Rice, Don S. and T. Patrick Culbert
1990 Historical Contexts for Population Reconstruction in the Maya Lowlands. In *Pre-Columbian Population History in the Maya Lowlands*, edited by T. Patrick Culbert and Don S. Rice, pp. 1-36. University of New Mexico Press, Albuquerque.

Ricketson, Oliver and Edith B. Ricketson
1937 *Uaxactun, Guatemala, Group E 1926-1931*. Carnegie Institution of Washington, Washington D.C.

Ringle, William M. and E. Wyllys Andrews V
1990 The Demography of Komchen, an Early Maya Town in Northern Yucatan. In *Pre-Columbian Population History in the Maya Lowlands*, edited by T. Patrick

Culbert and Don S. Rice, pp. 215-244. University of New Mexico Press, Albuquerque.

Robichaux, David
2001 Use of the Method of the Reconstitution of Families in the Indigenous Populations. CIEAP/UAEM *Papeles de Población* 28: 99-129

Romero, Luis A.
1999 PN 23E: Excavaciones en la Estructuras R-18 y R-31. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999,* edited by Héctor Escobedo and Stephen Houston; pp. 37-54. Report submitted to the Instituto de Antropología e História, Guatemala.

Roys, Ralph, F. V. Scholes, and E. B. Adams
1940 *Report and Census of the Indians of Cozumel, 1570*. Contributions to American Anthropology and History, no. 30, Carnegie Institution of Washington, Publication 523, Washington D.C. (Quoted in Ringle and Andrews 1990)

Sanders, William T.
1962-63 Cultural Ecology of the Maya Lowlands. *Estudios de Cultura Maya* 2: 79-121, 3: 203-241. (Quoted in Rice and Culbert 1990)

Sanders, William T., Susan Toby Evans, and Thomas Charlton
2001 The Colonial Period Cultural Geography of the Teotihuacán Valley and the Temascalapa Region. In *The Teotihuacán Valley Project Final Report, Volume 5, The Aztec Period Occupation of the Valley, Part 3,* edited by William T. Sanders and Susan Toby Evans, pp. 891-930. Department of Anthropology, Pennsylvania State University, University Park: Occasional Papers in Anthropology No. 25.

Sanders, William and Robert Santley
1983 A Tale of Three Cities: Energetics and Urbanization in Pre-Hispanic Central Mexico. In *Prehistoric Settlement Patterns: Essays in Honor of Gordon R. Willey*. Edited by Evon Z. Vogt and Richard M. Leventhal, pp. 243-291. University of New Mexico Press and Peabody Museum, Cambridge, MA.

Sanders, William and David Webster
1988 The Mesoamerican Urban Tradition. *American Anthropologist* 90(3): 521-546.

Sanjek, Roger
1990 Urban Anthropology in the 1980's: A World View. *Annual Review of Anthropology* 19: 151-186.

Satterthwaite, Linton, Jr

1933 The Piedras Negras Expedition. *University of Pennsylvania, University Museum Bulletin* 4: 120-126.

1935 The Black Rocks. *University Museum Bulletin* 8(1): 7-15.

1936a Notes on the Work of the Fourth and Fifth University Museum Expeditions to Piedras Negras, Guatemala. *Maya Research* 3(1): 74-93.

1936b A Pyramid without Temple Ruins (Structure J-3). Piedras Negras Preliminary Papers, No. 5. University Museum, University of Pennsylvania, Philadelphia.

1936c The Sixth Piedras Negras Expedition. *University of Pennsylvania, University Museum Bulletin* 6: 14-19.

1937a Identification of Maya Temple Buildings at Piedras Negras. In *Publication of the Philadelphia Anthropological Society, Vol. 1: 25th Anniversary Studies,* edited by D. S. Davidson, pp. 161-177. University of Pennsylvania Press, Philadelphia.

1937b [Types of buildings and ceramics at Piedras Negras.]. *Boletín bibliografico de antropología americana* I: 100.

1938 Evidence for a logical sequence of roof types on Maya buildings at Piedras Negras. *Science* n.s., vol. 88: 504.

1940 Another Piedras Negras Stela. *University Museum Bulletin* 8(2,3): 24-27.

1941 Some central Petén Maya architectural traits at Piedras Negras. *Mayas antiguos* 181-208.

1943a Introduction. *Piedras Negras Architecture, Pt. I, No. 1,* University Museum, Philadelphia.

1943b *New Photographs and the Date of Stela 14, Piedras Negras*. Notes on Middle American Archaeology and Ethnology 28. Carnegie Institution of Washington, Washington, D.C.

1944 *Piedras Negras Archaeology: Architecture, Part VI: Unclassified Buildings and Substructures. No. 1: Structure F-3; No. 2: Structure F-4*. The University Museum, University of Pennsylvania, Philadelphia.

1946 Incense burning at Piedras Negras. *University of Pennsylvania, University Museum, Philadelphia*.

1952 *Piedras Negras Archaeology: Architecture, Part V: Sweat houses*. No. 3: Six Partially Excavated Sweat houses (Structures S-19, J-17, O-4, S-2 and R-13). The University Museum, University of Pennsylvania, Philadelphia.

1954 *Piedras Negras Archaeology: Architecture, Part VI, Unclassified Buildings and Substructures, No. 4: Structure O-7*, University Museum, Philadelphia.

1965 Maya Practice Stone-Carving at Piedras Negras. *Expedition* 7(2): 9-18.

Schele, Linda
1991 An Epigraphic History of the Western Maya Region. In *Classic Maya Political History: Hieroglyphic and Archaeological Evidence*, edited by Patrick Culbert, pp. 72-101. Cambridge University Press, Cambridge.

Schellhas, Paul
1934 Die Stele nr. 12 von Piedras Negras. *Zeitschrift für Ethnologie* 66: 416-422.

Schlosser, Ann L.
1978 Classic Maya Lowland Figurine Development with Special Reference to Piedras Negras, Guatemala. Unpublished Ph.D. dissertation, Southern Illinois University.

Sharer, Robert
1994 *The Ancient Maya,* fifth edition. Stanford University Press, Stanford, CA.

Sheets, Payson D.
1992 *The Cerén Site: A Prehistoric Village Buried by Volcanic Ash in Central America*. Harcourt Brace and Company, Orlando Florida.
2000 Provisioning the Cerén Household: The Vertical Economy, Village Economy, and Household Economy in the Southeastern Maya Periphery. *Ancient Mesoamerica* 11: 217-230.

Schiffer, Michael B.
1987 *Formation Processes of the Archaeological Record*. University of New Mexico Press, Albuquerque.

Smith, Michael E.
1989 Cities, Towns, and Urbanism: Comment on Sanders and Webster. *American Anthropologist*, New Series 91(2): 454-460.

Smith, Michael E., Cynthia Heath-Smith, and Lisa Montiel
1999 Excavations of Aztec Urban Houses at Yautepec, Mexico. *Latin American Antiquity* 10(2): 133-150.

Smith, Michael E., and Kenneth G. Hirth
1988 The Development of Prehispanic Cotton-Spinning Technology in Western Morelos, Mexico. *Journal of Field Archaeology* 15(3): 349-358.

Stark, Barbara L.
2003 Cerro de las Mesas: Social and Economic Perspectives on a Gulf Center. In *El urbanismo en Mesoamérica/Urbanism in Mesoamerica*, edited by William T. Sanders, Alba Guadalupe Mastache, and Robert H. Cobean, pp. 391-427. Mexico City/University Park: Instituto Nacional de Antropología e História/Pennsylvania State University.

Steggarda, M.
1941 *Maya Indians of Yucatan*. Carnegie Institution of Washington, Publication 531. Washington D. C. (Quoted in Rice and Culbert 1990)

Stenholm, Nancy A.
1979 Identification of House Structures in Mayan Archaeology: A Case Study at Kaminaljuyú. In *Settlement Pattern Excavations at Kaminaljuyú, Guatemala*, edited by Joseph Michels, pp. 31-182. Pennsylvania State University Monograph Series, State College.

Staski, Edward and Livingston D. Sutro (Editors)
1991 *The Ethnoarchaeology of Refuse Disposal*. Anthropological Research Papers No. 42, Arizona State University.

Stone, Andrea
1989 Disconnection, Foreign Insignia, and Political Expansion: Teotihuacán and Warrior Stelae of Piedras Negras. In *Mesoamerica after the Decline of Teotihuacán - A.D. 700-900*, edited by Richard Diehl, and J. C. Berlo, pp. 153–172. Dumbarton Oaks, Washington, D.C.

Stuart, David
1998 ¿Una guerra entre Yaxchilán y Piedras Negras? In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Héctor Escobedo and Stephen Houston; pp. 389-392. Report submitted to the Instituto de Antropología e História, Guatemala.
2000 The ‘‘Arrival of Strangers’’: Teotihuacán and Tollan in Classic Maya History. In *Mesoamerica’s Classic Heritage: From Teotihuacán to the Great Aztec Temple*, edited by D. Carrasco, L. Jones, and S. Sessions, pp. 465–513. University of Colorado Press, Niwot.

Teufel, Stefanie
2004 Die Monumentalskulpturen von Piedras Negras, Petén, Guatemala: Eine Hieroglyphische und Iknongraphisch-ikonologische Analyse. Unpublished Ph.D. dissertation, Rheinishcen Friedrich-Wilhelms-Universität, Bonn, Germany.

Thompson, John Eric, Sir
1943 *The Initial Series of Stela 14, Piedras Negras, Guatemala, and a Date on Stela 19, Naranjo, Guatemala*. Notes on Middle American Archaeology and Ethnology, no. 18. Carnegie Institution of Washington, Cambridge, Mass.
1944 The Dating of Seven Monuments at Piedras Negras. *Notes on Middle American Archaeology and Ethnology* 2(39): 65-82. Carnegie Institution of Washington, Cambridge, Mass.

Tourtellot, Gair, Jeremy A. Sabloff, and Michael P. Smyth
1990 Room Counts and Population Estimation for Terminal Classic Sayil in the Puuc Region, Yucatan, Mexico. In *Pre-Columbian Population History in the Maya Lowlands*, edited by T. Patrick Culbert and Don S. Rice, pp. 245-262. University of New Mexico Press, Albuquerque.

Townsend, Nicholle, and J. Jacob Parnell
1998 PN 38: Excavación de un Grupo de Casas Rurales. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Héctor Escobedo and Stephen Houston; pp. 275-280. Report submitted to the Instituto de Antropología e História, Guatemala.

Urquizú, Mónica
1997a PN 6: Investigaciones en el Area Habitacional al Este de la Plaza del Grupo Sur. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 59-66. Report submitted to the Instituto de Antropología e História, Guatemala.
1997b PN 10: Investigaciones en el Area Habitacional al Sureste de la Plaza del Grupo Oeste. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 79-90. Report submitted to the Instituto de Antropología e História, Guatemala.
1997c PN 14: Excavaciones en la Plaza del Grupo Noroeste. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 117-120. Report submitted to the Instituto de Antropología e História, Guatemala.
1997d PN 20: Investigaciones en el Area Habitacional al Oeste de la Plaza del Grupo Sur. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 159-170. Report submitted to the Instituto de Antropología e História, Guatemala.
1998 PN 15: Excavaciones en la Estructura S-8, del Grupo S-11. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Héctor Escobedo and Stephen Houston; pp. 83-103. Report submitted to the Instituto de Antropología e História, Guatemala.

Urquizú, Mónica and Alfredo Román M.
1997 PN 2: Investigaciones en el Area Habitacional al Este del Patio del Grupo Sur. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 21-30. Report submitted to the Instituto de Antropología e História, Guatemala.

Urquizú, Mónica, E. Christian Wells, Isabel Aguirre, Nancy Monterroso, Ernesto Arredondo, and Alfredo Román
1998 Unidades Residenciales en Piedras Negras: Resultados de las Investigaciones Realizadas en las Temporadas de Campo de 1997 y 1998. Paper presented in the session, "Arqueología de las Tierras Bajas: Unidades Domésticas," at the *XII Simposio de Investigaciones Arqueológicas en Guatemala*, Museo Nacional de Arqueología y Etnología, Guatemala City, Guatemala.

Villa Rojas, Alfonso
1945 *The Maya of East Central Quintana Roo*. Carnegie Institution of Washington, Publication 559. Washington D. C. (Quoted in Ringle and Andrews 1990)

Villacorta Calderon, José Antonio
1933a Estelas de Piedras Negras. *The Sociedad de Geografía e História de Guatemala. Anales*: 3-20.
1933b Estelas de Piedras Negras. *Revista del Museo Nacional* 4: 65-84.

Villanueva, Margaret A.
1985 From Calpixqui to Corregidor: Appropriation of Women's Cotton Textile Production in Early Colonial Mexico. *Latin American Perspectives* 12(1): 17-40.

Wagner, Elisabeth
2003 The Female Title Prefix. Wayeb Notes 5.

Webster, David
1989 *The House of the Bacabs*. Dumbarton Oaks, Washington D.C.: Studies in Precolumbian Art and Archaeology 92. (Editor)
1999 The Archaeology of Copán, Honduras. *Journal of Archaeological Research* 7(1): 1-53.
2001 Spatial Dimensions of Maya Courtly Life: Problems and Issues. In *Royal Courts of the Ancient Maya, Vol 1, Theory, Comparison, and Synthesis*, edited by Takeshi Inomata and Stephen Houston, pp. 130-167. Boulder, Colorado: Westview Press.
2002 *Fall of the Ancient Maya*. Thames and Hudson, London.

Webster, David and AnnCorrine Freter
1990 The Demography of Late Classic Copán. In *Pre-Columbian Population History in the Maya Lowlands*, edited by T. Patrick Culbert and Don S. Rice, pp. 37-62. University of New Mexico Press, Albuquerque.

Webster, David, AnnCorrine Freter and Nancy Gonlin
2000 *Copán: The Rise and Fall of an Ancient Maya Kingdom*. Wadsworth, Belmont California.

Webster, David, and Nancy Gonlin
1988 Household Remains of the Humblest Maya. *Journal of Field Archaeology* 15: 169-190.

Webster, David, Nancy Gonlin, and Payson Sheets
1997 Copán and Cerén: Two Perspectives on Ancient Mesoamerican Households. *Ancient Mesoamerica* 8: 43-61.

Webster, David and Stephen Houston
2003 Piedras Negras: The Growth and Decline of a Classic Maya Court Center. In *El urbanismo en Mesoamérica/Urbanism in Mesoamerica*, edited by William T. Sanders, Alba Guadalupe Mastache, and Robert H. Cobean, pp. 427-450. Mexico City/University Park: Instituto Nacional de Antropología e História/Pennsylvania State University.

Webster, David, Jay Silverstein, Timothy Murtha, and Horacio Martinez
2003 Annual Report to the National Science Foundation: Re-evaluation of the Earthworks at Tikal, Guatemala. Submitted to the NSF August 2003.

Webster, David, and Jennifer Kirker
1997 PN 22: Sondeos en la Periferia sur de Piedras Negras. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 1, Primera Temporada 1997*, edited by Héctor Escobedo and Stephen Houston; pp. 175-184. Report submitted to the Instituto de Antropología e História, Guatemala.

Webster, David, and Amy Kovak
1999 RS 27: Excavaciones en la Periferia de Piedras Negras. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999*, edited by Héctor Escobedo and Stephen Houston; pp. 319-334. Report submitted to the Instituto de Antropología e História, Guatemala.

Webster, David, and William T. Sanders
1989 "The Mesoamerican Urban Tradition": Reply to Smith. *American Anthropologist*, New Series 91(2): 460-461.

2001 La antigua ciudad mesoamericana: Teoría y concepto. In *Reconstruyendo la cuidada Maya: El urbanismo en las sociedades antiguas*, edited by Andrés Cuidad Ruiz, Maria Josefa Iglesias Ponce de León, and Maria del Carmen Martínez Martínez, pp. 43-64. Madrid: Sociedad Española de Estudios Mayas.

Weeks, John M.

1988 Residential and Local Group Organization in the Lowlands of Southwestern Campeche, Mexico: Evidence from the Mission Census of 1615. In *House and Household in the Mesoamerican Past*, edited by Richard R. Wilk and Wendy Ashmore, pp. 73-96. University of New Mexico, Albuquerque. (Quoted in Ringle and Andrews 1990)

Weeks, John, Jane A. Hill, and Charles W. Golden

2004 *Piedras Negras Archaeology, 1931-1939*. University of Pennsylvania Press, Philadelphia.

Wells, E. Christian

1998a PN 26: Excavaciones en el Area Habitacional en la Plaza del Grupo Noroeste, Estructura F-2. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Héctor Escobedo and Stephen Houston; pp. 143-156. Report submitted to the Instituto de Antropología e História, Guatemala.

1998b PN 33: Excavaciones en el Area habitacional del Cuadrante U. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 2, Segunda Temporada 1998*, edited by Héctor Escobedo and Stephen Houston; pp. 197-242. Report submitted to the Instituto de Antropología e História, Guatemala.

1998c The Maintenance of History in Urban Domestic Architecture at Piedras Negras, Guatemala. Paper presented at the Symposium on Complex Societies, University Museum, University of Pennsylvania, October 24-25, 1998, Philadelphia, PA.

1999 PN 33: Investigaciones en un Conjunto Residencial del Cuadrante U. In *Proyecto Arqueológico Piedras Negras: Informe Preliminar No. 3, Tercera Temporada 1999*, edited by Héctor Escobedo and Stephen Houston; pp. 65-104. Report submitted to the Instituto de Antropología e História, Guatemala.

Wells, E. Christian, Richard E. Terry, J. Jacob Parnell, Perry J. Hardin, Mark W. Jackson and Stephen D. Houston

2000 Chemical Analyses of Ancient Anthrosols in Residential Areas at Piedras Negras, Guatemala. *Journal of Archaeological Science* 27: 449-462.

Willey, Gordon R.

1974 The Classic Maya Hiatus: A ‘Rehearsal' for the Collapse? In *Mesoamerican Archaeology; New Approaches*, edited by Norman Hammond, pp. 417-430. University of Texas Press, Austin.

Wingard, John D.
1992 The Role of Soils in the Development and Collapse of Classic Maya Civilization at Copán, Honduras. Unpublished Ph.D. dissertation, Pennsylvania State University.

Wirth, Louis
1938 Urbanism as a Way of Life. *American Journal of Sociology* 44: 3-24.

Wood, James W., George R. Milner, Henry C. Harpending, and Kenneth M. Weiss
1992 The Osteological Paradox: Problems of Inferring Prehistoric Health from Skeletal Samples. *Current Anthropology* 33(4): 343-370.

Wrobel, Gabriel D., Marie E. Danforth, and Carl Armstrong
2002 Estimating Sex of Maya Skeletons by Discriminant Function Analysis of Long-Bone Measurements From the Protohistoric Maya Site of Tibu, Belize. *Ancient Mesoamerica* 13: 255-263.

Zender, Marc and Stanley Guenter
2002 "New Piece of Pre-Columbian Wooden Box" http://www.mesoweb.com/reports/box/piece.html

Zier, Christian J.
1983 Cerén Site: A Classic Period Maya Residence and Agricultural Field in the Zapotitlan Valley. In *Archaeology and Volcanism in Central America*, edited by Payson Sheets, pp. 119-143. University of Texas Press, Austin.

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Education

Ph. D., Anthropology, 2005	Pennsylvania State University, University Park, PA
M. A., Anthropology, 2000	Brigham Young University, Provo, UT
B. A., with Honors, Anthropology, 1998	Brigham Young University, Provo, UT

Research Interests

Ancient Maya Writing, Precolumbian Art, GIS in Archaeology, Household Archaeology, Settlement Pattern Archaeology, Mesoamerican Cultural History, Urbanism, Lithic Analysis

Field Experience

2003	Survey and Excavation, Kaminaljuyú, Guatemala
1999 - 2004	Survey, Excavation, and Lab analysis, Piedras Negras, Guatemala
1999	Lab analysis, Lithics, Chiapas, Mexico
1997 - 1998	Survey and Excavation, Capitol Reef National Park, Utah

Publications

2004 De la Cartografía al Cálculo de Población de Piedras Negras, Guatemala. In *XVII Simposio de Investigaciones Arqueológicas en Guatemala, 2003*. Edited by Juan Pedro Laporte, Bárbara Arroyo, Héctor Escobedo and Héctor Mejía, pp. 7-15 (vol. 1). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, Asociación Tikal.

2003a The Acrópolis of Kaminaluyu, Guatemala: Recovering A Lost Excavation. (Stephen Houston, Zachary Nelson, Carlos Chiriboga and Ellen Spensley.) *Mayab* 16: 49-64.

2003b El Papel de los Machacadores en la Economía Doméstica Maya. In *XVI Simposio de Investigaciones Arqueológicas en Guatemala, 2002*. Edited by Juan Pedro Laporte, Héctor Escobedo and Barbara Arroyo, pp. 509-512 (vol. 2). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, Asociación Tikal.

2002a Soil Chemical Analysis Applied as an Interpretive Tool for Ancient Human Activities in Piedras Negras, Guatemala. (J. Jacob Parnell, Richard Terry, and Zachary Nelson). *Journal of Archaeological Science* 29: 379-404.

2002b La función y distribución de artefactos liticos en una residencia de Piedras Negras, Guatemala (with Zachary Hruby), In *XV Simposio de Investigaciones Arqueológicas en Guatemala, 2001*. Edited by Juan Pedro Laporte, Héctor Escobedo and Barbara Arroyo, pp. 987-996 (vol. 2). Guatemala: Ministerio de Cultura y Deportes, Instituto de Antropología e Historia, Asociación Tikal.

2001 *A Thematic Bibliography of Ancient Maya Writing*. (Stephen Houston and Zachary Nelson) Provo: Research Press, Brigham Young University.

2000 *Analysis of an Obsidian Workshop at Hacienda Metepec, Teotihuacan, Mexico, AD 700-800*. Unpublished Master's Thesis, Brigham Young University.

1998 *Altar de Sacrificios Revisited: A Modern Translation of Ancient Writings*. Honors Undergraduate Thesis, Brigham Young University.