

**Ancient Maya Settlement and the Alacranes Bajo:  
Landscape and Communities in the Three Rivers Region.**

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**Thesis submitted for the degree of Doctor of Philosophy (PhD)**

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I, Gail A. Hammond, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

## **Abstract**

This thesis represents the archaeological investigation of a distinctive zone of the Three Rivers Region (TRR) of far northwestern Belize. The zone is dominated by the Alacranes Bajo, a seasonally inundated karstic depression bordered by the settlements of Nojol Nah and Tulix Mul. Understanding the relationship of the settlements to the bajo and to the wider political landscape of the TRR makes an important contribution to our knowledge of land use by the ancient Maya.

My research seeks to discover whether the settlements on the eastern edge of the Alacranes Bajo could be described as *bajo-centric*. That is, were they specifically located with the purpose of utilising the bajo's resources? Or, do the settlements fit a wider pattern characteristic of the TRR in areas without bajos? To address these questions, excavations were undertaken of households, monumental structures, and selected landscape features associated with Nojol Nah and Tulix Mul. The results of the excavations--chronology of settlement, status of occupants, nature of local and regional economy as well as analyses of burials and artefacts--are described and assessed within the local, regional and inter-regional context.

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## Introduction

### *The study area and research aims*

The Alacranes Bajo and the settlements with which it is associated are in the Three Rivers Region (TRR) of northern Belize (See Fig. 1). The TRR has been the setting of decades of research — primarily by the Maya Research Program (MRP), the Programme for Belize Archaeology Project (PfbAP), and the La Milpa Archaeological Project (LaMAP) — that focus on the archaeology of the Precolumbian Maya. Settlements near bajos have interested archaeologists for many years, partly because the bajos— a specific kind of wetland —are believed to have been exploited in some way, and perhaps in different ways over time. The main questions driving my research into the character of settlement associated with the Alacranes Bajo are:

- What is the nature of the settlement at the eastern edge of the Alacranes Bajo in the Three Rivers Region of Northern Belize?
- Is there evidence to support the idea that the settlements were situated primarily to take advantage of the bajo's resources?

To approach these questions I undertook archaeological fieldwork consisting of mapping, surface artefact collection, soil sampling, aerial reconnaissance with excavation of Tulix Mul, Nojol Nah and areas around the two sites and near the bajo.

In order to address the main research aims, it was important to articulate questions that would help to structure investigations of both the land and its settlement:

- Landscape-focused questions:
  - a. What natural resources and/or features are found in the study area?
  - b. Where are these features/resources located with respect to settlement?

- c. Is there evidence of land modification or exploitation of these resources or features, in particular, the bajo?
- Settlement-focused questions:
    - a. What evidence is there for settlement in the study area?
    - b. What is the chronology of settlement?
    - c. What pattern of settlement is indicated?
    - d. How does the pattern of settlement and its chronology fit with models already proposed for the Three Rivers Region?
    - e. What can the material culture (artefacts and architecture), as well as burial data, found associated with the settlements on the eastern edge of the Alacranes Bajo tell us about social organisation, daily life, labour specialisation, and local and regional interaction?

### ***The Maya Research Program***

My interest in the Three Rivers Region began when I first went to Belize in 2008 as a final year undergraduate to participate in the Maya Research Program's field school. I returned the following year as a staff member, and co-ran the lab for two years with Jacquie Martinez (then a graduate student at the University of York, UK). During the 2009 field season, when I was not working in the lab, I assisted the project's surveyor, Marc Wolf with mapping endeavours, including the relocation and mapping of the site of Grey Fox (see Chapter 4). In 2010 I was involved in assisting Marc with mapping in the Blue Creek area, when we started getting reports from the team working at the Nojol Nah site core that on the way to their site they saw vast swathes of land being bulldozed, burned, and chain-cleared by local farmers. Although the destruction of archaeological features is against the law in Belize, there is little infrastructure in place for enforcement. On the advice of the Maya Research Program project director, Dr Tom Guderjan, we went and carried out reconnaissance of the area, and it quickly became apparent that we had an extremely short window in which to record the archaeological features that had

been revealed by the land-clearance before they were completely destroyed or covered by crops. To this end, we re-focussed our 2010 efforts, and mapped the whole area (ca. 8-10 km sq.) on foot, noting that as well as large architecture and presumed house mounds there were a number of what appeared to be landscape modifications visible. Located directly to the south of the Nojol Nah site core, the cleared area was bounded by a small 500 m-wide *bajito* (small bajo) to the east, the Alacranes Bajo to the west, a modern fence line to the north and to the south a modern marl road that bisects the land following the natural topography. The most interesting thing about the land modifications and archaeological features was that they were located on the edge of the Alacranes Bajo, the largest land feature in the vicinity, a feature that had not been the subject of previous research. I subsequently became interested in determining the nature of the settlement around the eastern edge of the Alacranes Bajo, and investigating how this settlement fitted into what was known about the wider Three Rivers Region. The following three field seasons (2011-2013) were primarily devoted to the excavation of features uncovered during the 2010 field season. The results of the excavations and their implications for our understanding of the Alacranes Bajo and its settlements are reported in the following pages.

### ***Chapter outline***

Chapter 1 provides the broad regional context of the research in the TRR. Chapter 2 provides the theoretical framework of the Alacranes Bajo area study, drawn from landscape archaeology and approaches to community organisation. Chapter 3 presents the ecological and environmental context of the eastern Alacranes Bajo area, and Chapter 4 presents previous research in the Three Rivers Region, both archaeological and environmental.

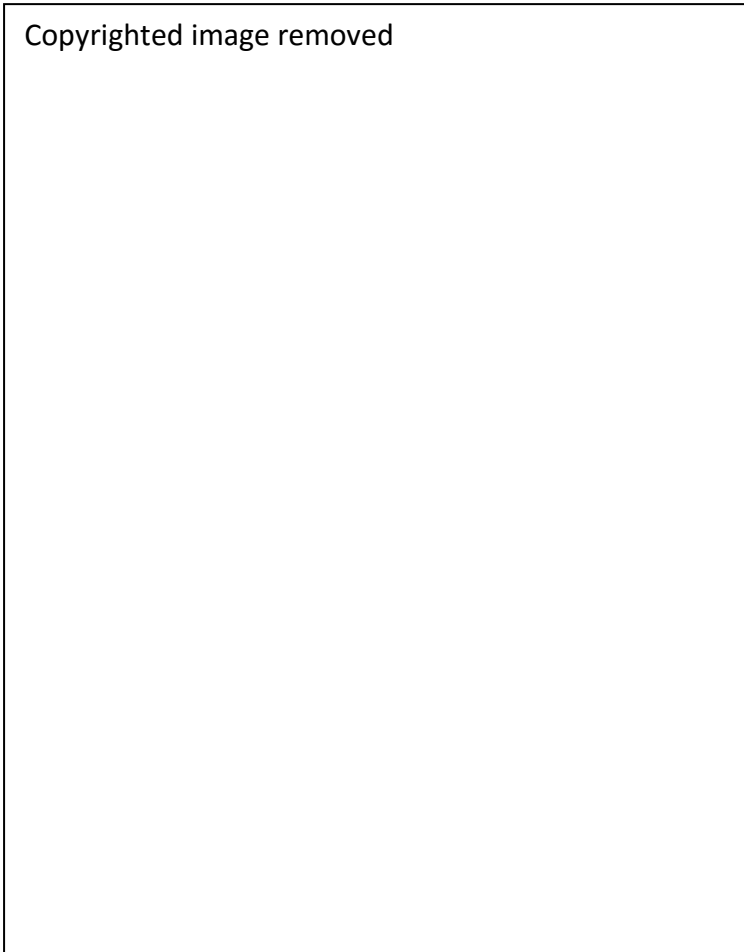
Chapter 5 outlines the methods used in the course of my field research and analyses. Chapters 6 through 9 present the data collected for this study, and at the end of each of these chapters I provide a summary and interpretation of the data. The data chapters are split as follows: Chapter 6 presents the 2010 mapping and surface collection; Chapter 7 deals with the 2011 test excavations across the Nojol

Nah Settlement zone; Chapter 8 describes the 2012 and 2013 excavations and landscape investigations at Tulix Mul; and Chapter 9 reports previously unpublished work relevant to the Alacranes Bajo zone carried out at the Nojol Nah site core by various members of Maya Research Program staff.

The final two chapters, Chapter 10 and Chapter 11, present the conclusions of the study by assessing how my data have addressed the main research questions. Chapter 10 focuses on data collected from the Eastern Alacranes Bajo sites, and Chapter 11 contextualises the Eastern Alacranes Bajo area within the wider Three Rivers region. Appendix A presents the raw soil data tables; Appendix B comprises scans of, and notes about, micromorphology slides; Appendix C contains detailed photographs of a painted wall from the site of Tulix Mul; Appendix D is a CD with high quality images of some of the maps and graphs that appear in this thesis, digital copies of the photographs that comprise Appendix C, and a report on the painted wall. Photographs and items that appear in the appendices are referenced in the body of this thesis as e.g. C1, C2, C3, D1, D2, D3. All photographs, where not otherwise noted, were taken by me during my time with the Maya Research Program. Images taken from MRP reports are included with the permission of Dr Guderjan.

## Chapter One: The Eastern Alacranes Bajo Area: Background to Research

### *The Maya Lowlands Context*



**Figure 1** Map of the Maya area indicating highlands, lowlands, and location of the TRR (annotated version of original by Beach et al. 2006, 167)

It was in the Maya lowlands (Fig. 1) that the largest and best-known cities of the Maya Classic period developed, including Tikal, Palenque, Yaxchilan and Calakmul. The written language of the lowlands, the single coherent prestige language Classic Ch'olti'an, was shared by elites, literati and priests, and was employed for the hieroglyphic texts and inscriptions (Houston et al. 2000, 123) that have been used by scholars to build up a picture of the Classic Period Maya civilisation (see Fig. 2 for ancient Maya chronology). The importance of a shared written language is discussed by Hammond (1991a, 254); he hypothesises that 'language in particular may have

## 1. The Eastern Alacranes Bajo Area: Background to Research

established the psychological frontier of a cognitive interaction sphere that marked the Maya from their Mesoamerica neighbours’.

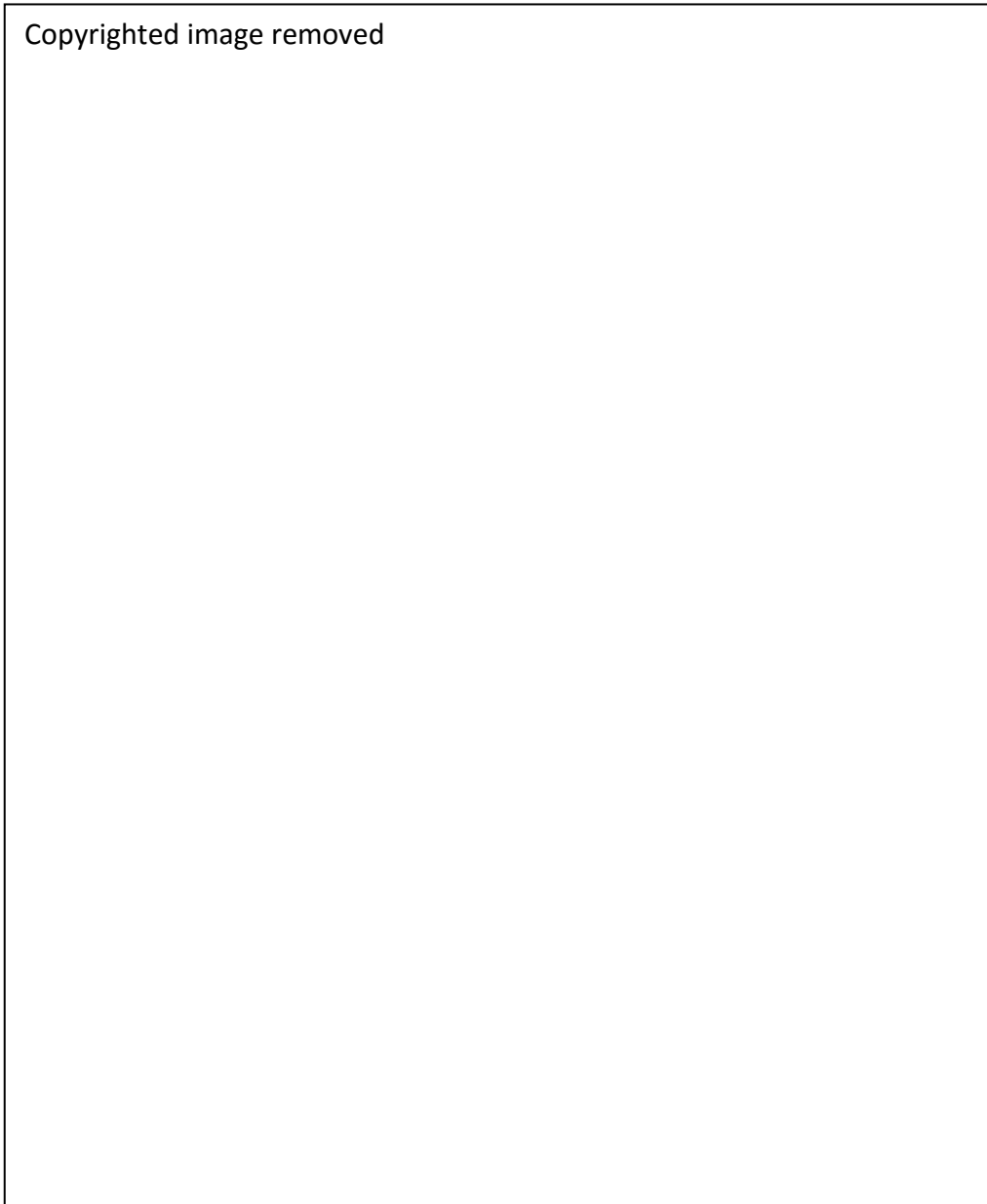
Period	Estimated Dates	Major Cultural Developments
Paleoindian or Lithic	12,000/20,000 – 8000 BC	Initial Settlement of the Americas
Archaic	8000 – 2000 BC	Settled communities and agriculture
Early Preclassic	2000 – 1000 BC	Initial Complex Societies
Middle Preclassic	1000 – 400 BC	Growth in socioeconomic development
Late Preclassic	400 BC – AD 100	Initial states
Terminal Preclassic	AD 100 - 250	Decline and transformation of states
Early Classic	AD 250 - 600	Expansion of lowland states
Late Classic	AD 600 - 800	Apogee of lowland states
Terminal Classic	AD 800 – 900/1100	Decline and transformation of states
Postclassic	AD 900/1100 - 1500	Reformulation and revival of states

Figure 2 Table of ancient Maya Chronology (after Sharer and Traxler 2006, 98)

As well as the Ch’olti’an written language used by the elites, there were other languages within the lowland region. Within the Three Rivers Region (TRR) there is a paucity of written language evidence, with carved stele at only a handful of TRR sites including La Milpa and Blue Creek. However, architectural styles, burial practices and artefact types indicate that the TRR was well integrated into wider Maya lowland

## 1. The Eastern Alacranes Bajo Area: Background to Research

culture. Although there is less Mayan language diversity in the lowlands as compared to the highlands (see Fig. 3), there was nonetheless considerable diversity in customs and practices (Sharer 2006, 93) as well as in environment, resources (Graham 1987), and soils (Fedick 1995).



**Figure 3 Map of distribution of Maya languages (Coe 2011, 27)**

Despite this diversity, archaeologists use the single word 'Maya' to refer to the cultures of both the highland and the lowland regions, mainly because the languages of this region are proposed to have descended from a single language sometime around 2,000 B.C. (Coe 2011, 26). The reification of 'Maya' into a homogeneous entity also

## 1. The Eastern Alacranes Bajo Area: Background to Research

reflects the aforementioned fact that all the lowland inscriptions were written in a language that at least could be read by all elites. The word 'Maya' as used to refer to the group, or groups, of people originated in the sixteenth century. According to Diego Lopez de Cogolludo, a Franciscan friar, the land that is now known as Yucatan was called 'Maya' by its occupants, but other evidence suggests that the land called 'Maya' was in fact in the area of present-day Honduras (Lopez de Cogolludo 1688 in Graham 2011, 61; Lothrop 1927, 350-55). Eventually, the term 'Maya' came to be used to describe a diverse range of people and has since become, in some instances, a uniform ethnic identity in today's contemporary world (Graham 2011a, 61; Restall 2004, 65-67; Hostettler 2004, 193). For example, a Pan-Maya movement has grown in recent years to campaign for equal rights for indigenous communities in Guatemala, but although this group purports to represent 'the Maya' there is no agreement amongst indigenous people as to what it means to be Maya. Indeed there are twenty different 'types' of Maya nationalities in Guatemala alone (Stavenhagen 2003, 40).

Although we as archaeologists, and increasingly the indigenous people of the area, now use 'Maya', the term was not used in the ancient past; instead, people self-identified according to the village or town or community of their birth, known as the *cah* (Restall 1997, 13). Therefore it is important to study specific areas on their own terms as well as part of a wider culture, and to be wary of imposing general labels on people of the past that assume a homogenous identity for them on their behalf. Owing to accepted conventions in this matter, however, and lacking records for the actual names of communities in the eastern area of the Alacranes Bajo, I use the term 'Maya' to refer to the inhabitants although I acknowledge that this is a simplistic term. I do consider, however, that the inhabitants would have self-identified as belonging to their community, even though the actual name or names of the communities are not known.

In terms of modern popular culture, the ancient Maya have been of interest since the 19<sup>th</sup> Century, although the concept in popular and scientific Western culture of a Maya civilisation is an abstract one, created by 150 years of study (Gunn et al. 2002, 80) by



## 1. The Eastern Alacranes Bajo Area: Background to Research

archaeologists, explorers, and antiquarians amongst others. The ruins of ancient Maya sites have captivated audiences in the Western world ever since gentlemen explorers of the Victorian era – in particular the Stephens and Catherwood expeditions of 1839 to 1842 - returned from Central America with tales, and exquisite drawings (Fig. 4), of lost cities lying ruined in dense jungles (Stephens 1841). Other explorers then followed in the footsteps of Stephens and Catherwood during the 1880s and 1890s including individuals such as Arthur Maudslay. From 1914 until World War 2, the Carnegie Institution entered the field, supporting the work of archaeologists such as Sylvanus Morley (Ashmore and Willey 1981).



**Figure 4 Catherwood's drawing of the Palace at Palenque (Stephens 1969 [1841], 308)**

Images of the ancient Maya in popular culture during the 20<sup>th</sup> and 21<sup>st</sup> centuries have often been biased towards romanticised notions of past peoples, concentrating on mystical and fantastical elements, which reached a crescendo in 2012, the supposed 'end of the world'. A cursory search of the internet using the term 'Maya' brings up a myriad of items from 'Maya Rainforest Therapies', to advertisements for tourism, which of course is a big business for the region. Ancient Maya material is often displayed in museums as 'high art', whereas contemporary Maya materials are displayed as 'folk art', or 'crafts', and this has the effect of patronising the past, and almost dismissing the present (Pyburn 1998, 111). Popular magazines such as National Geographic, while often providing vital funding to archaeological excavations,

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construct a depiction of the ancient Maya past for the consumption of non-Maya audiences. For many American consumers, National Geographic is their key source of knowledge about third world countries, and 'to a large extent reflects the world the way that middle class America wishes to see it' (Hervik 1999, 169). This also affects Western anthropologists and archaeologists who are generating the data from excavations, as they will be embedded in ontologies of Western culture, and so academic research into the ancient Maya may involve what Hervik (1999) calls a 'double hermeneutic process' in which the construction of an ancient Maya past is created for Western audiences, and this view is reflected back onto Maya scholars who then in turn project it back to these audiences (Hervik 1999, 170-171). This is not to say that all Mayanists are generating meaningless, ethnocentric discourse but rather that these are important issues to bear in mind when considering the current field of ancient Maya Studies.

The Maya as a recognisable (although not homogeneous) entity have inhabited the area since roughly 2000 BC to the present day (Fash 2002, 6). The Maya area was never politically unified and in the Southern Lowlands area alone, during the Classic Period, there were at least 45-50 separate kingdoms (Webster and Evans 2005, 623), although super-states, such as Tikal and Calakmul, seemed to be developing in certain areas (Martin and Grube 1995). The Three Rivers Region seems to have encompassed several kingdoms: royal palaces and tombs have been noted at La Milpa, Chan Chich and Blue Creek; although the status of settlements and centres shifted over time, and there are multiple centres across the TRR.

A notable facet of the Maya world was their writing, which is preserved only on stone monuments, mural paintings, tombs, stucco friezes and ceramics; of their numerous books only three and possibly four Precolumbian books have survived (Coe 2011; Sharer and Traxler 2006). Several books were written after the Spanish Conquest, however, such as the Books of *Chilam Balam* and the *Popol Vuh* (Edmonson 2010; Christenson 2007; Bricker 1989), and these serve as sources of information on cosmology and, to some extent, history.

## 1. The Eastern Alacranes Bajo Area: Background to Research

Much of what is known about ancient Maya beliefs and the Maya way of life has been gathered from the study of monumental centres. Multiple studies (eg. Freidel and Schele 1988; Sabloff 1997; Martin and Grube 2000; Harrison 1999; Webster 1999) focussing on these elite centres have shown that Maya society was hierarchical with the ruler at the top and priests and other elite officials at the next level with commoners making up the bulk of society. Although society was hierarchical, this is not to say that the lives and life styles of non-elites were dependent on the whim of elites. Although much previous research has focussed on elite expressions such as monumental architecture, royal tombs and notions of kingship and dynasty, a more balanced view of Maya society is beginning to emerge, with an increasing focus on commoners (see Lohse and Gonlin 2007), which could include members of society ranging from farmers to artisans.

Although the TRR includes architecture and grave assemblages that suggest the presence of ruling elites in the region (e.g. at La Milpa and Blue Creek), the eastern area of the Alacranes Bajo is enigmatic in terms of its status. The sites near the bajo show differentiation but monumental architecture is limited, and most of the structures are of modest size. Thus the bajo and the nearby mounds provided an excellent opportunity to expand investigations beyond a focus on ruling elites and monumental centres.

### ***The Eastern Alacranes Bajo Area***

The Alacranes Bajo (Fig. 5; D1) spans the northwestern corner of Belize and the southern part of the Mexican state of Campeche. It covers an area of ca. 500 sq. km (Guderjan 2013, 229).

## 1. The Eastern Alacranes Bajo Area: Background to Research

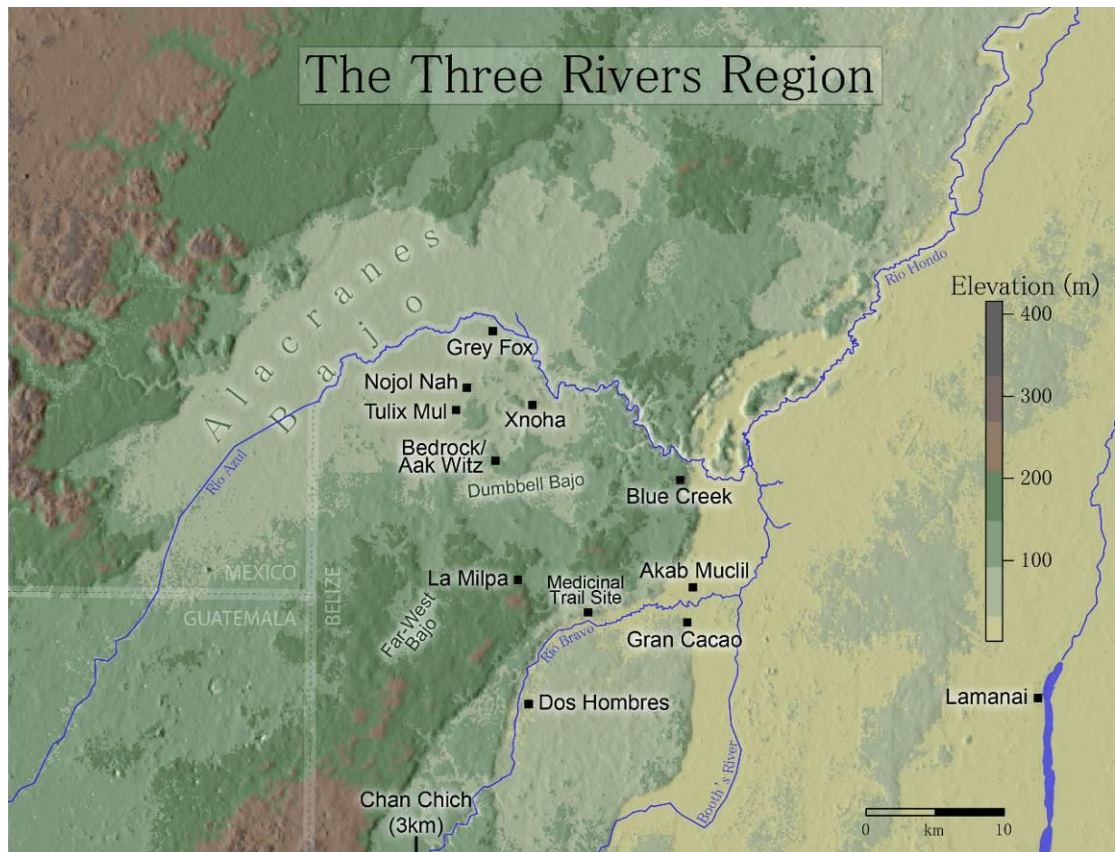


Figure 5 Map showing the location and extent of the Alacranes Bajo, and archaeological sites

## 1. The Eastern Alacranes Bajo Area: Background to Research

The eastern Alacranes Bajo area and the settlements with which it is associated are located in the Three Rivers Region (TRR). The name of the TRR derives from the fact that the area is characterised by three rivers: the Rio Azul, the Rio Bravo, and Booth's River (Fig. 6).

Copyrighted image removed

**Figure 6 Map of physiography of the Three Rivers Region (Houk 2003, 53)**

It is important to note however that the naming of the TRR as a discrete geographical region is not intended to imply that this was a specifically bounded cultural zone, or a political unit, but rather that this is a modern heuristic device which defines an area in which a series of research projects have taken place during the last twenty or so years. Having said that, however, Adams et al. (2004, 175) have suggested that the environmental context created by the confluence of these three rivers, taken together with the shared material culture of the area may point to the drainages having had a uniting effect on the ancient Maya that inhabited this area.

The three rivers (which will be described in full detail in Chapter 3) drain the study area with which I am concerned, and are the three principal tributaries of the Rio Hondo, a

## 1. The Eastern Alacranes Bajo Area: Background to Research

major north-south trending river in northern Belize that separates Belize from Mexico. The Rio Hondo empties into Corozal Bay, a southern extension of Chetumal Bay, an important access point to the Caribbean Sea, and ultimately to the northern Yucatan Peninsula (Guderjan 2007, 102). The presence of the Rio Hondo in the TRR meant that Maya populations living in the TRR would have had access to both riverine and coastal trading systems.

Bajos have been proposed as one of the most important resources for the ancient Maya (Dunning et al. 2002). The English translation of the Spanish word *bajo* literally means 'low'; however, when used to describe a feature of the ancient Maya landscape, the term bajo refers to a low-lying area within an upland context that can become inundated during the wet season that persists from about June through November over the region where the ancient Maya lived (Culbert et al. 1990, 117; and see Chapter 3 for a more detailed discussion). My research seeks to make an original contribution to the corpus of knowledge regarding settlement around bajos by investigating two settlements and their associated land modifications on the eastern edge of the Alacranes Bajo.

A study of the Maya settlements associated with the eastern side of the Alacranes Bajo also represents an effort to learn more about what distinguished settlements and communities within the greater Maya region, and is a response to previous studies that have focussed on large monumental centres. The eastern Alacranes Bajo landscape and its past peoples have not been studied prior to this research, although there have been numerous investigations within the TRR in recent years (e.g. Adams 1995; Adams et al. 2004; Barrett 2004; Barrett and Brown 2009; Barrett and Majewski 2010; Brown 2011; Dickson et al. 2011; Dunning et al. 2003; Gonzalez 2003; Guderjan 1991a, 2004, 2006, 2007, 2009; Guderjan et al. 2010; Hammond 1991b; Hammond and Bobo 1994; Hammond and Tourtellot 1993, 2004; Hammond et al. 1996; Scarborough et al. 2003).

## 1. The Eastern Alacranes Bajo Area: Background to Research

The eastern side of the Alacranes Bajo became my specific research focus for a number of reasons. First, the organisation that sponsors the research, the Maya Research Program (MRP), holds a research permit whose area lies solely in Belize where the eastern edge of the bajo is located. Other portions of the Alacranes Bajo lie in Mexico and Guatemala. Second, there are hundreds of mounds that are literally on the Alacranes bajo's edge. Their location raises questions about the structures and features represented by the mounds and provide an opportunity to investigate aspects of ancient Maya settlement that has not formed part of archaeologists' traditional focus on major architectural groups and city centres. Third, the area is being heavily impacted by modern farming practices. Cultivation and farming activities are rapidly destroying the archaeological record at the same time that clearing for agriculture is revealing settlement density. This makes the investigation of the nature of life around this bajo crucial while the archaeological remains of the people who once lived here are still available to study. The specific study area covers roughly 8 square kms on the eastern side of the Alacranes Bajo.

The locations of many ancient Maya sites are today covered in a heavily forested environment making the study of the spatial arrangement of Maya settlements difficult, if not impossible, to determine in many cases. Large-scale surveys and excavation in settlement zones are can be exceedingly complex and labour intensive. In 2010, due to farming activities by local Mennonite farmers, we found ourselves in the position of being able to map every single visible feature within the study area, which meant a rare opportunity to record the structures and land modifications within the eastern Alacranes Bajo area.

My research is concerned with determining the nature of the settlement that surface surveys in the area have suggested were associated with the eastern edge of the bajo (Hammond 2012, 41-53). The two settlements in question are Nojol Nah and Tulix Mul. Considering the lowlands more broadly, although many of the largest Maya settlements, such as Tikal and El Mirador, were located adjacent to wetland areas (Dunning et al. 2002), there is some contention amongst Mayanists as to the economic

## 1. The Eastern Alacranes Bajo Area: Background to Research

importance of bajos in the Maya Lowlands, and whether or not they represented an agricultural resource (Culbert et al. 1995, 1996; Turner and Harrison 1983; Fedick and Ford 1990; Pope and Dahlin 1989; Pope et al. 2000; Pohl and Bloom 1996). Additionally, a problem with previous studies of bajos has been a tendency to generalise findings from one bajo to the majority of bajos (Dunning et al. 2006, 81).

### ***Eastern Alacranes Bajo area settlements: Nojol Nah and Tulix Mul***

Nojol Nah (Fig. 5) was first identified in 2004, when activities surrounding the construction of a logging road uncovered a large amount of lithic tool debitage. The debitage was subsequently identified as representing the remains of workshops that dated from the Late Preclassic to the Late Classic periods (Barrett and Majewski 2010, 57). The fortuitous rediscovery of the lithic workshop led Dr. Jason Barrett to the site, Nojol Nah, with which it was associated. Nojol Nah is located on the eastern edge of the Alacranes Bajo, approximately 3.5 km south of the modern day Mexican border. The most concentrated cluster of large architecture at Nojol Nah covers an area of approximately 4 square kms (Dickson et al. 2011, 31). This main cluster of architecture, the presumed site core, has been the focus of excavations since 2008, primarily led by William T. Brown, who concluded investigations at Nojol Nah in 2013. This cluster of architecture is situated within a forested area, although the land around the forest has been cleared by modern farming practices. The Nojol Nah settlement zone, containing dispersed architectural groups occupying elevated points across the undulating land around the Alacranes Bajo, lies outside the forested area. The Nojol Nah settlement zone stretches across a greater area than the architectural groups inside the forest, and covers approximately 8 sq. kms. Modern farming activities have meant that much of the terminal phase architecture in the settlement zone has been severely impacted – in some cases destroyed. Indeed many of the terminal phase artefacts have been displaced from their original archaeological context (Dickson et al. 2011), and moved by bulldozer activities.



## 1. The Eastern Alacranes Bajo Area: Background to Research

Tulix Mul (Fig. 5), is located approximately 3km from the central cluster of architecture at Nojol Nah, and is differentiated from the Nojol Nah settlement zone by a ca. 1km absence of settlement and man-made landscape features. Although the ca. 1km space between Nojol Nah and Tulix Mul had been cleared of vegetation and burned like the rest of the mapped landscape, there was no evidence of bulldozed structures or other features, although it is not possible to say that this area did not ever contain ephemeral structures in the past. Therefore these two places which I have named as if they were separate may represent the remains of a single settlement. This is a point I will discuss further in Chapters 3 and 10.

The Tulix Mul courtyard group was selected to specifically excavate because it is the largest complex in the Tulix Mul area, and is adjacent to the Alacranes Bajo. The Tulix Mul Courtyard group is located 200m from the edge of the bajo on one of the last high points in the undulating karstic terrain before the land slopes down into the bajo. The courtyard group afforded far-reaching views across the bajo.

## Chapter Two: A Theoretical Framework for Investigating the Ancient Maya Settlements and Landscape on the Eastern Edge of the Alacranes Bajo

### *Introduction*

Chapter Two comprises three sections. In the first section I consider how a *site* is defined, before proceeding to examine how the concept of the site has been used within archaeological thought. I then consider *settlement patterns*, and discuss the limitations of the site and settlement pattern approaches.

The second section discusses *landscape archaeology*, a concept that drives my research. Within this section I discuss theoretical approaches particular to landscape archaeology: i) how vantage points, ease of access, or respite from heat or insects affect why people decided to live where they did; ii) how the land is marked by its inhabitants; iii) how landscape features or architecture and its placement can express cosmological or ideological concerns; and iv) how more practical aspects of the land affect decision-making, such as subsistence needs and resource location.

The final section considers social organisation. Understanding the social organisation of the people who lived on the eastern edge of the Alacranes Bajo will allow us to see how the settlements and the people within them fitted into the wider Three Rivers Region, and into the Maya lowlands in general. I also discuss a number of concepts such as rural and hinterland places, elites and commoners, and communities and households. Popular models of social organisation within ancient Maya communities, namely the House model and the Lineage model, are examined to assess whether or not Tulix Mul and Nojol Nah conform to these models.

Factors discussed in the three sections of this chapter form the foundation from which to consider the nature of settlement at the eastern edge of the Alacranes Bajo, and to examine whether there is any evidence to say that the settlements were *bajo-centric*, with the Alacranes Bajo as the focus of settlement.

### ***Sites and Settlement Patterns***

#### **The Sites of Nojol Nah and Tulix Mul**

The term *site* is a problematic one (Graham 2006, 60; Erickson 2003, 461). Sites are features on the land, and are created and lived in. However human activity does not take place solely in spatially bounded and discrete loci (Fedick 1996b, 336).

A site is not a standardised archaeological concept (Guderjan et al. 2003, 77). When defining a site, it is often arbitrary to say where one site ends or another begins – unless there is strong evidence such as clear territorial markers, or perhaps emblem glyphs. In the absence of such markers, however, we need to be able to draw sensible inferences on the matter. The notion of the *site* is largely one of nomenclature; it is part of a naming system that archaeologists have devised to frame the contents of the archaeological record. In reality, the concept of a *site* is a generic one, used to signify a place where things occurred. Those things can be anything from two or more artefacts to monumental architecture (Dunnell 1992, 22). It is an abstract concept, unless clearly defined by the archaeologist to explain the context in which they are using it. Even words such as town, village, city or hamlet lack precision and do not have standardised meanings (Roberts 1996, 15). As there are no territorial markers in the area, the reason I name Nojol Nah and Tulix Mul as two separate sites within the eastern Alacranes landscape was originally arbitrarily based on the break in architectural and landscape modifications that occurs in the space between the two places (as noted in Chapter ). However I concede that this is a small space (ca. 1km), and that any low density settlement in this space may not have survived in the archaeological record. My arbitrary decision should therefore be seen as a heuristic devise about which to frame my study, and I will briefly discuss in Chapter 10 the implications of this decision on the emerging interpretive scenario. Although as I am using a landscape-based approach I hope that the problems of arbitrary site delineation will be minimised, and this has been achieved by using the term ‘eastern Alacranes Bajo area’ than encompasses both Nojol Nah and Tulix Mul.

### **The Eastern Alacranes Bajo Settlement Zone**

The term *settlement pattern* is used to refer to the relationships and distributions of settlements on an area of land (David and Kramer 2001, 226). Therefore settlement pattern studies have an advantage over the study of a single site in terms of eliciting a wider picture of the past. The concept of *settlement patterns* encompasses the study of all buildings, landform modifications, and other archaeological data attributable to humans (Ashmore & Willey 1981, 4). The term settlement pattern has been applied in Mesoamerica since Willey's work in the Belize Valley in the early half of the 20<sup>th</sup> Century (Ashmore and Willey 1981; David and Kramer 2001, 226; Willey 1953, 1974; Willey et. al. 1965). Concentrating solely on "settlement patterns or site configurations" can therefore limit our understanding because the settlement (or a settlement system) is envisioned as a built unit or units separate from the environment – whether that environment is 'built' or natural. An effective solution to addressing this issue is to adopt a *landscape archaeology* approach.

### ***Landscape Archaeology***

A landscape archaeology approach allows settlement patterns to become part of something larger. In landscape archaeology, settlement, as represented by architecture, is only one element that is considered. Natural resources as well as anthropomorphic land modifications are also part of the landscape. Using a landscape approach allows us to consider settlement within a wider context. In my research this is relevant as I am trying to determine why people may have settled at the eastern edge of the Alacranes Bajo, and what the nature of this settlement was. Therefore it became important to learn more about the bajo, and what about it may have stimulated the pattern I observed. Landscape archaeology is not simply about noting where things are in relation to each other; it can provide a framework for drawing other types of inferences.

### The Alacranes Bajo as Part of an Ancient Landscape

‘A landscape is not merely a geographic space as it has contents, not merely a container as it shapes and is shaped by what it contains, and not merely a human-modified environment as it is a holistic system in which nature and culture co-evolve’ (Wu 2010, 1149).

The above statement describes the complexities of the term *landscape*. The term *landscape* has been adopted by archaeologists in order to form a theoretical and methodological way of approaching the study of past societies. It is not to be confused with, or considered simply as, *land*, or *nature*, or *space* (Ingold 1993, 153). The term *cultural landscape* has been used to describe the modification of the land by human activity, with geographer Carl Sauer stating that ‘the cultural landscape is fashioned from the natural landscape by a cultural group. Culture is the agent, the natural is the medium, the cultural landscape is the result [Sauer 1925]’ (Wu 2010, 1147). As a counter to this view, however, it has been argued that ‘landscape’ is itself a cultural term because it means a ‘view’ of the land through human eyes; its use *entails* culture, and one could say that the existence of a ‘natural’ landscape is a cultural claim (Graham 2011b, 230). Therefore the meaning of the word ‘landscape’ is not as straightforward as it may initially seem. I use the term landscape to refer to the features of the land that are present around the eastern edge of the Alacranes Bajo, which potentially were part of the surroundings of—and hence had meaning for—its past inhabitants.

### Landscape and Archaeology

*Landscape* was first used in an archaeological context in the mid-1970s by Aston and Rowley (1974). However it was not until the late 1980s that *landscape* became an object of investigation in its own right rather than simply a unit of analysis above and over the *site* (David and Thomas 2008, 27). Literally, the term *landscape* means *land-view*; however when used in an archaeological context, landscape refers to the totality

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of the remains of human behaviours across the area of space in question, and is concerned with everything that locates human existence (David and Thomas 2008, 27). Landscapes are complex, and can contain an infinite variety of shapes that are formed by individual elements or configurations of elements (Ode et al. 2010). While there have been many attempts to pin down an exact meaning of landscape in terms of archaeology, it is generally understood 'to refer, at varied scales, to space materializing cumulative interactions of people and their environs' (Ashmore 2009, 183). Landscape can be a backdrop to human activity at the same time that it is also a symbolic ordering of space, and is therefore a cognitive concept (Ingold 1993, 152). Landscape archaeology is less concerned with boundaries, definitions of which are entailed in a single-site approach. Broadly speaking, landscape archaeology is concerned with all things that situate human existence and/or experience - from human-environmental interactions to the more social aspects of interaction with the land. Cultural remains are encompassed, as are the availability of resources, the topographical and physical characteristics of the land, and more ephemeral aspects such as changing rainfall patterns or the position of the stars. Thinking about things such as rainfall and prevailing wind when considering the location of settlement may explain why buildings were oriented in a certain way.

A landscape-based approach to the archaeological record emphasises how people engaged with each other and the world around them, and additionally how people chose to manipulate their surroundings—hence just 'land' becomes 'landscape'. However the approach is equally concerned with how surroundings affected people's ways of doing things (David and Thomas 2008, 3). Localities in which individual sites are located will have shaped and influenced settlement structure, in both practical and ideological respects. A settlement of any size from a hamlet to a large monumental city does not simply exist within the bounds of its architecture. For example, even before excavation it was apparent that the settlements in the eastern Alacranes Bajo area encompassed modifications to the land outside the areas containing the presumed house mounds. Landscape archaeology is the archaeology of places (Bradley 2000), not just of architectural remains.

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As a landscape is fundamentally a cultural object created by the interaction between humans and the physical world, another way to consider the landscape is to think of it as *domestic*. A *domestic landscape* is the landscape of habitation and living, which reflects the cultural identity and actions of individual communities. A domestic landscape includes behaviours of daily living and subsistence, inclusive of cosmology and politics (Gonzalez 2003, Kealhofer 1999, Jackson 1984). A single domestic landscape therefore can include features such as similar dwelling styles, a shared pattern of landscape modification and artefact distribution, and represents the material remains of a community (Gonzalez 2013, 150). The idea of a domestic landscape led me to consider whether the eastern Alacranes Bajo area could be considered as such, and how factors such as artefact distribution might indicate (or not) that land might be shared. In addition I looked for evidence of similar or different dwelling styles in order to infer whether a community or more than one community was present.

Within the Maya area specifically, the earliest instances of what could be termed landscape studies took place in the 1960s by researchers such as Escoto (1964) and Tamayo and West (1964), who focused on physical geography and ecology, in relation to how these factors affected the ways in which humans organised themselves and their societies (Barrett 2004). Recent studies have addressed aspects such as: how the location of resources of the ancient Maya landscape represented a 'managed mosaic' (Fedick 1996a); how changes in the landscape and the environment were anthropomorphically driven as opposed to being driven by natural processes (e.g. Dunning et al. 1999; 2002); how ideology and cosmology interact to affect the landscape (e.g. Ashmore 1991; Houk 1996; Knapp and Ashmore 1999); and how a landscape changes in relation to urban developments (Isendahl 2012). Archaeological features – such as ball courts – are also studied at different sites to determine political boundaries and affiliation (Finstein et al. 1996).

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In summary, landscape archaeology is concerned not only with individual sites or settlements (somewhat arbitrarily defined) but also with the placement of sites or settlements on the land, and the relation of sites to natural resources and other topographical features. The land around the eastern edge of the Alacranes Bajo includes features such as mounds of various sizes, other topographic anomalies, cenotes, and the bajo itself. Adopting a landscape approach encourages me to ask questions about whether the variety of features associated with the Alacranes Bajo are natural or artificial. What was the attraction of the bajo itself, if any? Are there resources in the area and do these seem to affect settlement proximity? Do any of the features represent modifications to the land?

### **Why People Live Where They Do**

“A place owes its character to the experiences it affords to those who spend time there – to the sights, sounds and indeed smells that constitute its specific ambience. And these, in turn, depend on the kinds of activities in which its inhabitants engage” (Ingold 1993, 155).

Phenomenology (Merleau-Ponty 1962 [1945]; Heidegger 1962) focuses on how humans experience the world through the physical or bodily realm: it is about how people understand and interpret the world through the experience of *being-in-the-world* (Tilley 1994, 12). Being-in-the-world involves the use of the bodily senses, and despite the fact that we will never be able to experience life as ancient peoples did phenomenology can be a useful heuristic tool, particularly when considering material manifestations of spatial organisation. For example, Bradley (1998) experimented with different vantage points relating to the Avebury standing stones in Wiltshire to see how different points in the landscape would affect visual and experiential perceptions of stone circles, and found that depending on where one stood, one would have very different experiences – in some areas one would feel completely cut off from the world, and in other areas one would be acutely aware of the layout of the stones and their position in the landscape (Bradley 1998, 127).



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Basically, phenomenology can be described as a form of thinking *through* the body. Considering the sensory effects of one's surroundings in relation to the human body can be a useful way of creating experiential opportunities to try to access ways that people may have interacted and had dialectical relationships with the world around them. Thus drawing on phenomenology can complement rationalist approaches in which decision-making processes are seen to be based on factors such as adaptive strategies or access to exchange networks (Graham 2011b, 223). For example, the karst of the Alacranes Bajo area has created a topography that is mostly flat but with some rolling hills. Walking around allows us to consider which places were well placed to avoid rain, humidity and insects - things that might affect the location of structures or the type of structure at a location. We can also note the ease of access to structure or other features in relation to the topography which may help us understand how people moved from one place to the next or how they reacted to their surroundings on a quotidian basis. One way to evaluate location of architecture is to examine whether structures were built on natural high points on the land, and if so, what advantages this might have had.

### **Landscapes as Built or Marked Environments**

There are a number of examples in the archaeological literature in which landscapes are described as built or marked environments, for example the Nazca lines in Peru (Patterson 2008, 80) or rock art and its relationship to settlements in Spain and Scandinavia (Bradley 2000).

In the case of the Maya who lived around the eastern edge of the Alacranes Bajo, considering places and proximity to settlements is important in trying to understand the activities in which people engaged, including walking. For example, one can ask whether roads, access ways or quarries were present. Quarries are known to exist throughout the Maya world (e.g. Bullard 1960, 363; Shafer and Hester 1983, 531; Weiss-Krejci and Sabbas 2002, 344). In the eastern Alacranes Bajo area, there is a large limestone quarry close to the Nojol Nah settlement zone that is used by the local

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farmers. It is not known whether the ancient Maya also used this particular resource, but our investigations incorporated both a search for evidence of quarrying and of the material being quarried.

### **Landscapes Reflecting Cosmologies and World-Views**

One way of exploring cosmological views made manifest at the eastern Alacranes Bajo is through the study of *primary axes* of the mapped structures. The primary axis of a structure refers to a conceptual line through the centre of the structure from front to rear, in which caches or burials were often placed. The primary axis can be seen as anchoring the structure to the landscape, and burials and caches are commonly found along this axis. Pendergast (1979, 1982) suggests that the primary axis of a structure is of great ritual importance, and this is seen at Lamanai (Pendergast 1981), Altun Ha (Pendergast 1979), and Tikal (Coggins 1982) where the primary axis is considered the building's lifeline and is preserved even when the building is added to or built over. However, often axial caches did not coincide *precisely* with this line, indicating that these axes were perceived rather than precisely measured (Loten and Pendergast 1984, 3). Pendergast also notes that no two structures in the same plaza or patio complex will have the same primary axis (Loten and Pendergast 1984, 3). Therefore the primary axis can be seen as anchoring the structure to the landscape. Whether or not the primary axis was maintained over time in the complexes I examine in the eastern Alacranes Bajo area is one way to explore continuity or disruption in cosmology or world-view.

The study of site plans has been carried out in various loci in the Americas, including at Teotihuacán (Heyden 1981; Sprajc 2005), the Olmec area (Tate 2008), in the Aztec region (Van Zantwijk 1981), the Inca area (Hyslop 2014), and in the Maya area (Houk 1996; Aveni and Hartung 1986; and others). Ashmore (1989, 1991, 1992) has studied the site configurations of many lowland Maya sites and postulated an idealised site planning template: 1) emphasis on a north-south axis in the overall site organisation; 2) complementary dualism between the north and south, in form or function; 3)

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causeways to emphasize specific connections; and 4) ball courts marking the north-south transition (Dunning et al. 1998). Sites that have these characteristics are known as Type 1, or Peten-style sites. Type 2 sites, which include most northern Belize-style sites, have an open plaza to the south, and an enclosed acropolis to the north (Houk 2003, 55).

Brett Houk (1996) studied site plans in the TRR and showed that there is a split between Type 1 and Type 2 sites, with the former occurring in the west of the TRR, and the latter in the eastern portion of the TRR, thus showing a fundamental cultural divide, which may be linked to ideas of cosmology. The main impetus to study site plans is the understanding that 'symbolic manipulation of space is a common theme in architecture all over the world. Even the most mundane components of the built environment have often been shown to convey rich symbolic meaning' (Ashmore 1991, 199). In terms of the eastern Alacranes Bajo area, the existence and degree of site planning is important to determine whether the sites under study were part of a wider cultural tradition in the Three Rivers Region or whether multiple cultural traditions are present. That is to say whether cultural traits expressed through the built environment suggest homogeneity or diversity; this is important to determine to fully understand the socio-political make-up of the Three Rivers Region. My research will show that Ashmore's (1991) site planning template does not fit the evidence from the eastern Alacranes Bajo area and that the implication is that 'hinterland centres' such as those seen in the eastern Alacranes Bajo area stray away from the plan types evinced by larger centres such as Blue Creek and La Milpa, and thus it can be argued that they exemplify another distinct cultural tradition within the socio-political landscape of the Three Rivers Region (see Chapter 10).

### **Landscapes and Subsistence**

Subsistence and settlement in landscape archaeology take into account the wider *environmental* settings. The point is to focus on how human settlement and behaviour reflects proximity and/or access to subsistence needs and environmental resources. The location of natural resources is one of great importance when considering land

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management, resource base, and social organisation in relation to settlement. In my work, I considered what natural resources were available in the eastern Alacranes Bajo area and where they were located in relation to the settlement. We therefore surveyed the area in search of resources such as water, clay, chert, or limestone, and looked for evidence of exploitation. Land use for agriculture is more difficult to determine, but we approached the question at more than one level (see Methods chapter).

Landscape archaeology is a good fit for my research in terms of the approaches that can be used to provide insight into relationships between people and the land. I will now consider approaches to understanding the social organisation of the eastern Alacranes area in order to be able to discuss the nature of settlement in the area.

### ***Social Status and Community Organisation***

One of my aims is to enhance what we know about people in the Maya area who have been described as commoners (See Hyde 2011; Lohse and Gonlin 2007; Lohse 2007). There is some indication, based on the paucity of formal monumental architecture, ball-courts, and other conventional markers of elite status, that the majority of people who lived in the eastern Alacranes Bajo area were likely to have held commoner status. Therefore an important question to consider is how the eastern Alacranes Bajo settlements were organised and what this might mean in terms of the settlements' relation to the wider Three Rivers Region. This discussion will form the first part of the remainder of this chapter. Distinguishing social status is also critical in hypothesising about elite vs. commoner status, and the last section of this chapter will briefly describe how social status is identified in the archaeological record.

### **The Nature of Settlement in the Eastern Alacranes Bajo area**

One of the objectives of my work is to determine what kind of settlements are in the eastern Alacranes Bajo area. Even before excavation it was clear that the eastern

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Alacranes Bajo area was unlikely to be a city based on mound density. So the question of determining the nature of settlement arose. One of the motivations behind excavating the mound groups was to determine whether there was some sort of hierarchy present in the area, and whether some groups may have acted as centres for the surrounding populations. This led to three questions: 1) Was the eastern Alacranes Bajo area part of a hierarchy of settlement linked to a separate and larger core? 2) Was the eastern Alacranes Bajo area a hinterland that provided goods or services to a core? 3) Did the eastern Alacranes Bajo area operate independently, or was it part of larger urban and regional relationships?

The term rural is often defined by its relationship to 'urban'; therefore it is important to be clear about what we mean when we use the term 'urban'. Urbanism 'connote[s] a process of nucleation and its attendant social organizational changes' (Graham 1999, 186). Urbanism in the Maya Lowlands refers to structural components forming a complex mosaic whose parts are functionally related, and include monumental architecture, public spaces and discrete residential areas (Guderjan 2007, 67).

The ultimate zenith of a nucleated population is the formation of a city (Sharer and Traxler 2006). A city is the material expression of urbanism. The concept of a city is 'notoriously hard to define' (Childe 1950, 3). However in general terms, a city is a place defined by specific conditions of density of habitation and size, and must contain a diverse population in terms of occupational specialisation, a range of social statuses, and a range of ethnic affiliations, as well as containing a focal area of civic-ceremonial architecture (Evans 2004, 37; 235). A city is defined by Whitehouse and Wilkins (1986, 58) as a community of substantial population density and size, that serves as a political, administrative and economic centre, and supports a range of non-agricultural specialist activities. People in cities may have been concerned with producing food themselves up to a point, for example in kitchen gardens, or maintaining farm plots outside of the city. However, in general, agricultural hinterlands produced the majority of food that was consumed by a city; and inhabitants of cities specialised in other activities such as religion, trade or manufacturing (Sharer and Traxler 2006, 71;

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Whitehouse and Wilkins 1986, 58).

In the lowland Maya area, cities seem to have been more dispersed than in other parts of the world, that is Maya cities were ‘centers with numerous monumental stone temples surrounded by large homogeneous areas of sprawling low-density settlement, with considerable agricultural modification of the landscape’ (Isendahl and Smith 2013, 133). This pattern is due in part to the environmental constraints of the tropical lowland environment (Graham 1999; Sharer and Traxler 2006, 671), with parallels to patterns of low-density, dispersed cities seen in other tropical environments such as Cambodia (Isendahl 2012, 112). It has been argued that in some of the more dispersed Maya cities, areas were devoted to agriculture, and this has led to the term *agro-urban landscapes* (See Isendahl 2012). In the ancient Maya world specifically, there were other markers of cities such as the presence of a ball court (Webster and Evans 2005, 628). Most Maya cities, despite temporal and spatial differences spanning thousands of years, seem to share a basic settlement pattern – a central civic-ceremonial core surrounded by elite residential and administrative buildings, which in turn are surrounded by an urban sprawl clustered into neighbourhoods – and this indicates a common model of how to organise the landscape that was perpetuated over time and space (Isendahl 2012, 113). The main difference between a town and a city in the Maya area is that a town is a lower-order settlement within a larger system; it may in fact serve a city-like role in terms of administration and economy but is dependent on the primary settlement, the city (Whitehouse and Wilkins 1986, 58). In the archaeological landscape of the ancient Maya there are numerous settlements ranging in size and complexity from major ceremonial centres, to minor centres, to clusters of residential buildings with lineage shrines close to agricultural resources (Hammond 1991a, 280); there are therefore many other forms of settlement to consider besides cities or towns.

### **Rural Populations**

Rural populations are those that live outside of urban areas, and they may or may not have had direct dealings with urban centres. This is not to say that rural populations

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did not share characteristics of city dwellers – for example rural populations would have had access to craft and religious specialists, and there would have been social stratification and architectural elaboration, supporting arguments for the presence of rural elites (Adams and Smith 1981) – therefore rural populations are defined to some extent by *where* they lived, rather than *how* they lived.

Many rural populations would have lived in what are often called hinterland areas. The definition of a hinterland is similar to that of a periphery in that a hinterland is an area outside the urban core (Oxford English Dictionary). A hinterland however, although likely to have economic and cultural links with a core or urban area, unlike a periphery, does not only exist in relation to the core. To put it simply, most if not all peripheries are equated with hinterlands, but not all hinterland settlements are peripheries.

### **Hinterlands in an Archaeological Context**

In an archaeological context, hinterlands are considered to be rural areas that are located away from urban centres, but can contain their own central places (Hyde 2011, 2013). In agrarian societies such as that of the ancient Maya, hinterlands are defined as low density, rural settlements that can contain a broad spectrum of society from elites to commoners; additionally, in agrarian societies, the control of agricultural land—or at least the produce from the land (Graham 2011b, 29-46) and resources provided the means for acquiring wealth (Lucero 2001, 1). Hinterland areas are much less densely populated than urban ones; and it has been estimated that in the Late Classic there would have been 500-800 people per square km in urban areas, as opposed to around 150 people per square km in rural areas (Culbert and Rice 1990, 103-122). Theoretically, hinterlands could be self-sufficient, although it would be unlikely that a hinterland community would exist in isolation from the wider social, political and economic area in which it was located. Indeed one of the most interesting questions in relation to the ancient Maya is to what extent hinterlands interacted with urban centres— although of course it is likely that this varied from hinterland

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settlement to hinterland settlement. One of the key aims in my research is to evaluate the eastern Alacranes Bajo area. Is the area a centre or a hinterland? Or a hinterland centre (Hyde 2011; 2013)? Would settlement be defined as rural and if so, on what basis?

Kunen (2004) has studied three hinterland communities in the Three Rivers Region in the area close to La Milpa, and postulated that they were *resource-specialised communities*. A resource-specialised community refers, as the name suggests, to a community that invests and specialises in particular resource production strategies (Scarborough and Valdez 2003, 5). The communities can range in size from small villages to large settlements. Scarborough and Valdez (2003, 11-12) suggest that small resource-specialised communities, such as those proposed in the Three Rivers Region, could have been *bajo communities*, whose inhabitants exploited the bajo and its margins; *terrace communities*, which appear to be very small, isolated communities that controlled artificially created terraces; or *aguada communities*, which were, according to Scarborough and Valdez, communities that found scattered along the edges of water sources and presumably exploited these sources. The term 'resource specialised communities' refers specifically to the theorised resource-procurement focus. A resource-specialised community is, however, just one form that a hinterland settlement can take, but the theory is a good heuristic starting point for the investigation of hinterland settlements. If a settlement is engaged in procuring critical natural resources however, such as water, soil or stone (See G. Hammond 2009; Hammond 2016), it would have to be shown that the settlement was exploiting a surplus of these items for use or trade elsewhere, not simply for the subsistence needs of the community.

A large proportion of the ancient Maya would have lived in hinterland settlements (Lucero 2001, 1), so these settlements are crucial to study in order to gain insight into how the bulk of ancient Maya society would have lived and exploited the surrounding land. As Nojol Nah and Tulix Mul are both located close to a large bajo, one of the aims of my study is to determine whether or not they were resource specialised



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communities whose inhabitants focused on the resources of the Alacranes Bajo. If this was the case, I would expect to see evidence of practices that focussed primarily on exploiting the bajo's resources. These resources could include lithic or clay deposits, or land with good agricultural potential.

There are shared elements that occur in certain types of settlements, for example ball-courts and pyramids occur in most large urban settlements – however, some of these features can appear in non-urban centre settings too. In short, Maya settlements do not conform to a series of discrete site types; rather they are best viewed as occupying a continuum of variation (Ilanonne and Connell 2003, 3).

### **Communities and Households**

#### **Communities**

As with the definition of elite and commoner, the term *community* has also been problematic when used by archaeologists, and it has often been the case that a community is assumed to be a coherent entity and natural unit, with the words community and site often used interchangeably (Mac Sweeney 2011, 5). The academic study of the community can be traced back to the German theorist Ferdinand Tonnies who focussed his arguments on human geography and social organisation, comparing what he termed urban *societies* and rural *communities* to postulate that these two different forms of human spatial organisation resulted in fundamentally different forms of mentality and psychology (Mac Sweeney 2011, 10). Tonnies argued that communities were a form of rural social organisation that were naturally occurring, close-knit, and small scale; his ideas were followed by fellow theorists Durkheim and Simmel who used the term community to 'evoke an almost wistful nostalgia for a form of small-scale rural social grouping governed by intimate and familiar social relations' (Mac Sweeney 2011, 10): 'For thinkers in this period, the community simply *was* – traditional, rural, and most important, completely natural' (Mac Sweeney 2011, 11).

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In the mid-twentieth century, researchers from the Chicago school of social geography turned their attention to urban centres, arguing that communities did not just exist in rural settings, but also in urban ones. However, urban communities were thought to be more complex than rural ones, and there was an understanding that an individual could be part of several communities at one time. Like the nineteenth century researchers, there was an implicit understanding that a community just *was*, and the term was used to refer to people living in a particular locale, or taking part in a particular activity. During the 1960s, the term community fell from use and was heavily criticised (see Stacy 1969). As Tringham (1972) points out, equating a geographical unit with a social one is unsound theoretically. During the 1980s Anthony Cohen (1985) revived the term community, but with a radical rethink. He argued that 'a community was not a natural social unit arising from residential proximity and locality, but, rather a dynamic and socially constructed identity group' (Mac Sweeney 2011, 14). Thus there was a shift in the use of the term community from a geographically based entity, to one that focussed on identity, and therefore the difference between 'us and them'. Benedict Anderson (1983) took the idea of community a step further and suggested that since communities were abstract entities that existed only as mental constructs, a community's members need not ever interact, as long as a collective sense of community was adhered to by its members, and he termed this *the imagined community*.

Therefore with the work of Cohen and Anderson, the term community firmly shifted away from describing a group of people that inhabited the same physical locale to being about a form of social identity that was part of an imagined or mental construct in which members self-identified as being part of a community, and who felt a collective sense of *us* (Mac Sweeney 2011, 16). A community in this sense is a social structure through which individuals' social identities are constructed and maintained. A structuralist view of the creation of social identity theorises that unconscious structures reside deep in the mind, and that perceiving the world in binary oppositions, i.e. *us/them*, *self/other*, *black/white* etc. is the natural way of things. A post-structural, context-contingent approach, based on social rather than neural

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structures, considers how social identities are constructed and subsequently maintained. According to Bourdieu (1977) each person is shaped by his or her *Habitus*, which is the shared body of culture. The *habitus* is the embodiment of the everyday practice of actions; that is, each society is reproduced through habitual action, or practices, which are themselves structured by traditions. Giddens (1984), like Bourdieu, wrote about the interactions between humans and social systems. He too posits that social structures are formed and re-formed through action. The difference is that habitual action is something that we might expect to be manifested in the archaeological record, whereas details of interaction between humans and social structures are not observable archaeologically. In terms of the study area, habitual action may be seen in the persistence of cultural behaviours such as burial practices, as well as in material culture, for example continuity in pottery.

Canuto and Yaeger (2000) convincingly argue that the term community *is* a socially meaningful unit of analysis, as it belongs in scale between households and regions, and that correlating the geographical proximity of a group of people to the mental construct of community identity can be done by studying 'practices of affiliation'. Practices of affiliation are practices that can be seen in the archaeological record, such as shared material culture styles, whose use may have promoted and engendered a feeling of community identity. In this sense, 'community [is] a dynamic form of social identity, anchored to the idea of shared geographical space and common lived experience through the active use of shared social practices' (Mac Sweeney 2011, 28). The main characteristics of a community identity for Canuto and Yaeger are flexibility and instability, and the fact that identity is a fluid social construct that can change and shift over time, with dynamic tensions between individual and community identities. For Canuto and Yaeger, in the archaeological record, community can be thought of as a constructed social identity that has roots in shared experiences, and *shared geographical space* between its members. Critics argue, however, that identifying a community as a social group in the archaeological record is all but impossible (Mac Sweeney 2011, 29). I recognise the problems in defining 'community', as discussed above, but it is important for us to envision settlements as having people in them, and

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to hypothesise, on good basis, that communities will form. I use the term 'community' following Varien (1999), who states that a community consists of many households whose members 'live close to one another, have regular face-to-face interaction, and share the use of local social and natural resources' (Varien 1999, 19). In an archaeological sense, when I use the term 'community' I mean a group of people who shared material culture, domestic landscapes, geographical locales, and group labour for public architecture. All of these criteria – apart from proof of social identity - should theoretically be available to the archaeologist. Therefore one of the questions driving my research is: To what extent do Tulix Mul and Nojol Nah represent communities?

### **Social Organisation of Communities**

In terms of social organisation of communities, a number of theories have been put forward in relation to ancient Maya society. An urban community, for example, at the large urban centre of Palenque, would have been headed by an *ajaw* (king), who was at the head of a hierarchy of titled nobles and commoners. This type of social structure has been well documented, using both epigraphic, and archaeological data (e.g. Martin and Grube 2000; Friedel and Schele 1988), but in smaller communities it is rare to find textual evidence. Although I was not discounting finding texts, I envisaged my main sources of evidence for hierarchy as portable items, burial data, and architectural data.

### **Domestic Landscapes and Communities**

In terms of archaeological remains, a community's domestic landscape can be viewed in the four following ways: 1) general as well as specific similarities between households/dwellings, in terms of size, shape, and other architectural attributes; 2) in the arrangement of the dwellings in reference both to each other, and to natural features; 3) the specific arrangement of dwellings in relation to communal property, and subsistence infrastructure, such as land engineering projects; and 4) environmental modifications over time in terms of communal use of the available

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resources such as agricultural land (Gonzalez 2003). If there are similar patterns found within domestic landscapes over a wider area, then a cultural identity can be inferred, with careful consideration of all archaeological material culture. Relating this to the eastern Alacranes Bajo area, it is important to consider the area as a whole and whether there are attributes shared among the architectural groups, and to then consider to what extent my data correlate with previous research in the Three Rivers Region.

### **Households**

**What is a Household?** According to Bawden (1982), the household is a unit, or an organisational denominator that can serve as a starting point that allows us to frame social behaviour. Households are the smallest, but most abundant remains of ancient communities (Douglass 2002, 1). The main point about a household is that it is part of the larger corporate group (Hammel 1980). Levi Strauss (1979, 1983) describes the household as a corporate group that has communal ownership of specific resources; reproduces itself through the creation and subsequent perpetuation of shared social memory and identity; and importantly, may or may not refer to an actual piece of architecture.

**Why study households?** Households are at the centre of communities – a community is a collection of households – and the household is where individuals perform and learn their cultural identity (Gonzalez 2003; Hendon 2010, 96). The role of household archaeology within the wider remit of settlement pattern studies is to focus archaeologists' attention on the human behaviour that forms the settlement pattern (Robin 2003, 311).

**The material remains of households:** The material remains of households reflect where people lived. The domestic sphere encompasses the activities of everyday life (Hendon 2010, 94), including subsistence activities, as well as domestic rituals, and other esoteric behaviour that is not performed in the public sphere. For example a household may be expected to contain artefacts such as storage jars, manos and

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metates, stone tools, spindle whorls. Esoteric behaviour may be seen for example in non-utilitarian pottery such as figurines and wall decorations

**Households in the Eastern Alacranes Bajo area:** Household archaeology allows us to ask many diverse questions about the past, for example reconstructing resource distributions and restrictions of both exotic and local goods, ritual behaviour, social hierarchies, site planning considerations, and exploitation of natural resources from the surrounding landscape, to name but a few. The study of the individual household is imperative to form an understanding of the people who lived in, created and used the land in question. By studying the material remains of households in the eastern Alacranes Bajo area, I will be able to consider the *hidden transcripts* (Scott 1985; 1990; Robin 2003) of the people that inhabited this area as well as to contrast the households with public architecture and to consider the everyday activities of the people that resided in the eastern Alacranes Bajo area.

### **Social Status**

Ancient Maya society, like most complex societies, was based on a stratified hierarchical structure (Hammond 1991a, 261). In the early days of ancient Maya archaeology, researchers such as J. Eric Thompson (1931, 1942 [1927], 1966 [1954]) championed the idea that ancient Maya society consisted of two classes of people – priests, and peasants, terms which to some degree have been replaced by elites and commoners (A. Chase 1992, 31). Although there is no definitive agreement amongst archaeologists about what does or does not signify elite status in the archaeological record (Chase and Chase 1992a, xii), elites are often identified by difference between a minority and the majority, based on the evidence of recovered material culture. A definition of elite is ‘small group within the upper echelon of a society that exerts ideological, political, social, or economic power or any combination of these’ (Culbert 1991, xviii). Differences can be seen for example in the treatment of the dead; the presence of exotic, valuable and scarce goods; and in terms of architectural elaboration (Hendon 1991, 395). It is estimated that non-elites would have made up

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between 80 to 98% of ancient populations (Lohse 2007, 6; Hammond 1991a, 261); however most of the archaeological record uncovered in the Maya area has been at monumental centres, and at the dwellings of royals and other higher-status members of society.

### **Elites and Non-Elites/Commoners**

Within ancient Maya society there were many different forms that elite individual/group status could take. For example, a person that controlled agriculture or land, or religious rituals in a small community would have had a higher social status than other members of that community. At the heart of the elite vs. commoner debate is the idea that some members of society wished to distinguish themselves from the majority, and that they socially identified with others they considered similar to themselves. In Social Identity Theory, 'people classify themselves and others into various *social categories* that are defined by prototypical characteristics abstracted from the members' (Hyde 2013, 2). Archaeologically speaking this may be difficult to see, but may be discerned through the study of different artefacts found in specific settings or dwelling types - or differences in styles of architecture.

### **Elites/Commoners in the Eastern Alacranes Bajo Area**

Elites do not just reside in urban centres. Urban elites are often identified by public art, elaborate tombs, residences and/or religious structures, for example at large centres such as Tikal and Palenque. Hyde (2013) suggests that in areas outside of cities, the term *Hinterland Elite* is appropriate to use, and that these hinterland elites use 'the symbols and material culture of the Urban Elites on a smaller scale and of much more modest means [to] define themselves, relative to the rest of the rural inhabitants, through their architecture, treatment of the dead, access to exotic materials, dress, adornments, and physical modifications' (Hyde 2013, 7).

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One of the inherent problems with the term commoner is that it implies a dichotomy with its opposite, the elite (Fig. 7); but factors such as gender, age, kinship, and economics are also some of the other ways that a society is organized and divided into factions (Lohse and Gonlin 2007, xxi). In terms of the eastern Alacranes Bajo area, I use the terms elite/commoner as heuristic starting points without assuming that they are empirical realities.

<b><i>Characteristic</i></b>	<b><i>Commoner</i></b>	<b><i>Elite</i></b>
<b>Status</b>	Low	High
<b>Geographical locale</b>	Rural/periphery	Urban/centre
<b>Architecture</b>	Small Simple Low quality materials	Large Complex High quality materials
<b>Occupation</b>	Agrarian Craft production of utilitarian good	Administrative Craft production of non- utilitarian goods
<b>Burials</b>	Simple No or few grave goods Utilitarian	Elaborate Numerous grave goods
<b>Artefacts</b>	Utilitarian Local Few forms	Utilitarian and non-utilitarian Local and exotic Many forms
<b>Writing</b>	Illiterate	Literate
<b>Ritual</b>	Domestic Simplistic	Public Complex
<b>Ideology</b>	Acquiescent	Dominant
<b>Power</b>	None	All

Figure 7 'Two ends of the continuum: Common assumptions about ancient Mesoamerica commoners and elites' (Lohse and Gonlin 2007, xxv)



## Chapter Three: The Environmental setting of the Eastern Alacranes Bajo area

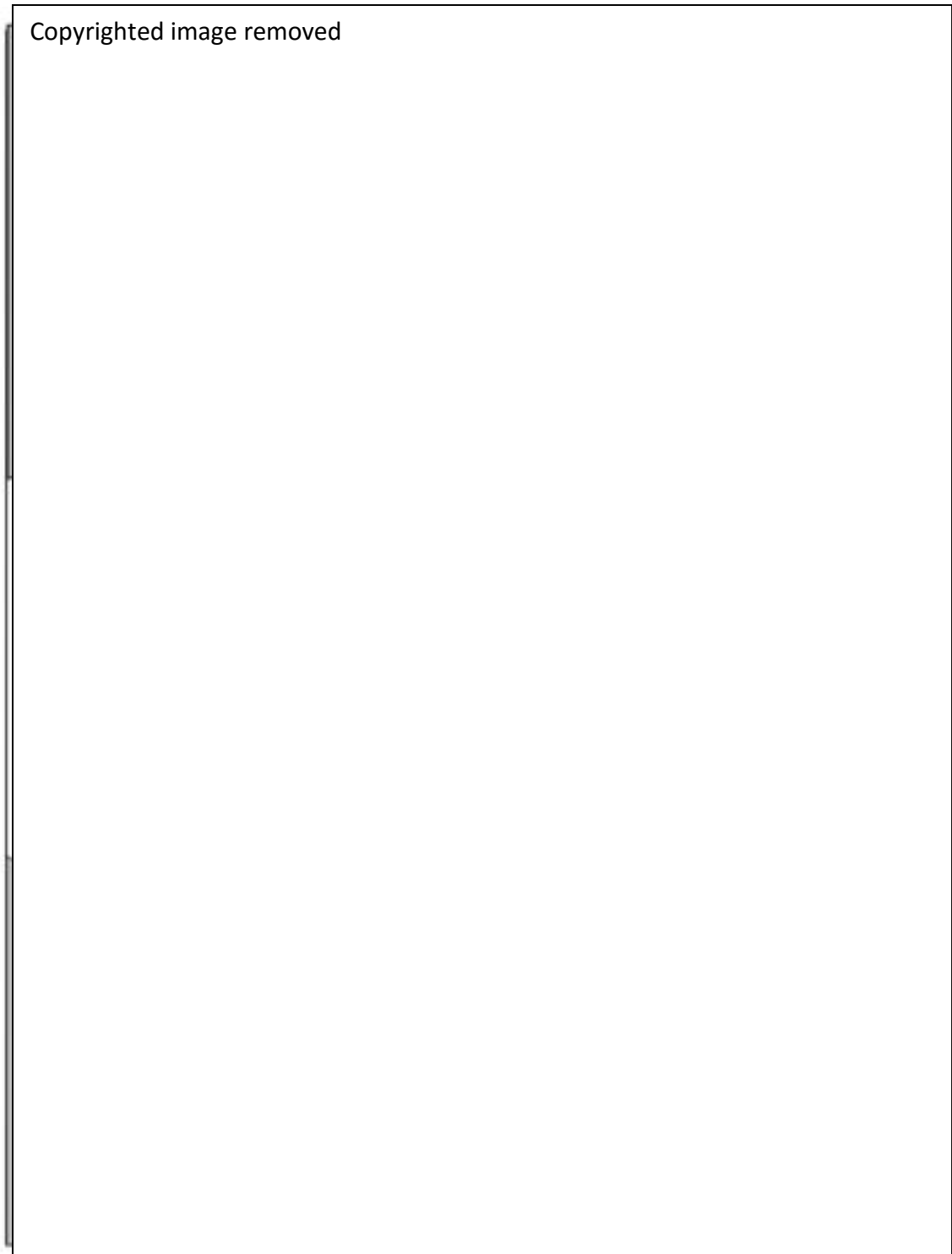
### *Physical Location*

The study area with which my research is concerned is located in modern-day, far northwestern Belize. Belize lies between 18.5 and 17.75 degrees north latitude on the east coast of Central America bordering the Caribbean Sea (Fig. 8). The country measures 109 km east-west, 280 km north-south, and covers an area of 14081 sq. km. The shallow coastal waters to the east overlie a coastal shelf, the eastern edge of which forms a barrier reef and is dotted with small islands or 'cays/cayes' (Wright et al. 1959, 13).

Belize is broadly part of the southern Maya lowlands. The term 'Maya lowlands' refers to both a physical and cultural area that covers 250,000 sq. km and consists of the Yucatan Peninsula and low-lying contiguous land (Fig. 8). In terms of modern political boundaries, the Lowlands encompass the modern countries of Belize, Guatemala, El Salvador, Honduras, and parts of Mexico. The term 'lowlands' reflects the relatively low relief of the peninsula in contrast to the volcanic highlands of Guatemala and Chiapas, which were (and still are) home to a high concentration of Maya groups. Although Belize is considered part of the lowlands, the Maya Mountains extend into Belize from Guatemala. The Maya Mountains are not volcanic but instead comprise a chain of metamorphic/granite mountains, less than 800 m above sea level, which have their own distinctive resources such as jade, clay minerals, plants and animals (Graham 1997; Wright et al. 1959)

The lowlands are delimited in a cultural sense by the elite-oriented traits of the Classic Maya period, which include hieroglyphic inscriptions, corbel-vaulted architecture, particular types of polychrome pottery and carved stone monuments; almost all of the known major sites that contain these features are located between 15° and 22° north latitude, and 87° and 93° west longitude (Hammond and Ashmore 1981, 20).

### 3. The Environmental Setting of the Eastern Alacranes Sites



**Figure 8** Map of the Maya area indicating highlands, lowlands, and location of the Belize (annotated version of original map by Beach et al. 2006, 167)

The Three Rivers Region (TRR) of which the Alacranes Bajo is a part is located in the central part of the Maya Lowlands, along the eastern edge of the Central Karst Plateau (Ferrand et al. 2012, 85), and forms a geographically defined area of study: Where the

### 3. The Environmental Setting of the Eastern Alacranes Sites

Rio Azul curves eastward and becomes the Rio Hondo forms the northern boundary of the TRR; the western boundary is marked by the Rio Azul; and the eastern edge is delimited by Booth's River, with its southernmost point at the site of Chan Chich (Houk 1996, 8-9). The Three Rivers Region lies in both modern-day Belize and Mexico.

The TRR lies in a fascinating part of the Maya world, at the edge of the Elevated Interior Region (EIR), where the better-studied monumental centres of power in Peten and southern Campeche are located and from which much of the information about the nature of ancient Maya civilisation has been gleaned. The term 'Elevated Interior Region' refers to an area of the Maya Lowlands that sits atop the carbonate Yucatan Platform where the land has been uplifted into a series of plateaus and basins (Dunning et al. 2012, 3653). Altitudes range from 40 to 300m in elevation (Dunning et al. 2012, 3652). The EIR was the focus of expression of monumental architecture and cultural development from the Late Preclassic to the Terminal Classic periods and is described as the heartland of Maya civilisation (Fig. 9). The TRR lies at the interface of multiple environments and contains a rich variety of resources (Dunning et al. 2012, 3647). Within the TRR, the portion that lies within northwestern Belize, is further delineated and referred to as the Bravo Hills (King et al. 1992), and within that delineation, the study area containing the eastern Alacranes Bajo sites has been described as the La Lucha Uplands (Scarborough and Valdez 2003, 3).

### 3. The Environmental Setting of the Eastern Alacranes Sites

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**Figure 9 Map of Location of Elevated Interior Region, indicating position of the TRR (Dunning et al. 2012, 3653)**

#### ***Climate***

As the Maya Lowlands lie within the tropics, this means that the whole of the Lowlands are subject to a tropical bi-seasonal pattern of wet and dry periods, with most of the yearly average rainfall falling between May and December - although in reality rainfall can be unpredictable, mainly because the inter-annual variation of the Azores-Bermuda high pressure system and Inter Tropical Convergence Zone (ITCZ) is subject to variations in both long and short term time scales (Ferrand et al. 2012, 85). The overall climate of Belize is sub-tropical (Wright et al. 1959, 15). The area has also historically been susceptible to severe droughts (Ford 1996, 298), and drought can be accompanied by other events such as plagues of locusts that decimate crops (Gunn 2002, 80). During the wet season the area is prone to tropical storms, hurricanes and torrential rains - a time when fields and *bajos* can become inundated, and erosion of hill slopes is greater. Occasionally a year will pass with no dry season--in other words, intermittent showers will occur during the usually dry months (Gunn et al. 2002, 80). In line with the rest of Belize, 90% of the annual 1500 – 2000 mm rainfall in the TRR occurs between May to December (Dunning et al. 2003, 15); however far northwestern Belize is the driest part of the country. The average temperature in the TRR is 26° from April to October, and 24° from November to March.

The prevailing winds in Belize are from the east, known as the South East trade winds; apart from tropical storms, the stronger winds come from the north or northeast (Wright et al. 1959, 19). Tropical storms develop in the Caribbean usually during May, June and July, and Belize usually experiences them when they are in their formative stages, so they are not too violent; the worst type of weather phenomenon to affect Belize are hurricanes, which originate in the Atlantic Ocean and can bring destructive winds of over 100 miles per hour – during such storms, the coast and cays of Belize can become inundated (Wright et al. 1959, 19).

The climate is an important consideration when building a view of the past, as climate and climatic changes affect the physical environment in many ways – for example the

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flora, fauna and soils in any region are affected by the climate, thus the environment, human culture and climate are intricately linked (Brenner et al. 2002, 141). Within the Maya Lowlands, there have been recent efforts to reconstruct the climatic record in order to understand how climatic factors have influenced or been influenced by humans. Lake sediment cores have been used to develop continuous climatic records, using techniques such as studying the stable isotopes of recovered aquatic marine shells, and pollen data have been used to provide data on flora and fauna over time. Both lake cores and pollen data suggest that the cool, dry conditions present during the late Pleistocene/early Holocene transitioned into warmer, moister conditions, which were followed by general drying over the next three millennia; Maya agriculture on the Yucatan Peninsula coincided with the late Holocene drying (Brenner et al. 2002, 148). Pollen records taken from the Lowland Maya area indicate that there was a loss of tropical forests beginning at around 3000 years BP. Forest loss coincides with the expansion of ancient Maya populations throughout the Yucatan Peninsula and is likely to reflect human-induced land clearance (Brenner et al. 2002, 151). However it is important to note that the late Pleistocene/early Holocene was also a time of climatic drying that may have also had an influence on forest reduction during this period.

Studies in Haiti have led to the postulation that long-term climate trends were caused by orbitally forced changes in solar insolation (Hodell et al. 1991; Hodell et al. 2000). The wet conditions of the early Holocene were caused by greater seasonality linked to the precessional cycle of the earth – 8000 years ago in the early Holocene, the earth passed closest to the sun during the northern hemisphere's summer perihelion, and the difference between the summer and winter insolation remained high into the mid Holocene, although it has been diminishing ever since, and this may account for the climatic drying trend that has been occurring over the past 3000 years (Brenner et al. 2002, 149).

The Maya Lowlands were subject to droughts, and ancient and historical records registered both droughts and excessively wet periods (Folan and Hyde 1985; Folan et al. 1983; Gunn et al. 2002, 80). Faris (1984) states that even during historic colonial

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times, droughts could be responsible for the deaths of 50% of the indigenous population. Droughts would be devastating in areas that have scarce water supplies, and when crops failed, famine would follow.

Today, there are different types of drought that have been defined by the UN: 1) meteorological – this refers to a diminishment in precipitation; 2) agricultural – a diminishment in soil moisture; 3) hydrological – stream and lake level diminishment; and 4) socioeconomic – this is the disruption of production of goods and services dependant on water. These drought types however do not exist in isolation. Meteorological drought can quickly become agricultural drought – because crops need rainfall – which in turn could translate into socioeconomic drought in which food production and trade of surpluses are interrupted (Dunning et al. 2012, 3653). Indeed a number of studies even suggest that a prolonged drought influenced, if not caused, the decline of ancient Maya civilization in the Terminal Classic period (Gunn et al. 2002, 790), although this is still a point of debate amongst Mayanists.

Hoddell et al. (2001) have correlated drought-confirming-data obtained from lake cores from the Yucatan Peninsula with periods of known increased solar activities to demonstrate that the 206-year cycle of increased solar activity corresponds with large-scale drought events in the Maya Lowlands, and that the regularity of the drought-inducing solar activity may have allowed the ancient Maya to predict this cyclicity (Gunn et al. 2002, 82). However, periods of droughts were not always the same, and did not always affect the entire lowlands at one time; indeed sometimes they struck one of the areas in the lowlands, but not others (Gunn et al. 2002, 80). It is crucial when considering how droughts may have affected an area to have drought-related data that is particular to a specific place, as localised variances occurred across time and space. That is not to say that there were not widespread drought events that occurred throughout the period of time occupied by the ancient Maya, but only that the droughts occurred at different scales during ancient times, the same as they do today.

## ***Physiography and Natural Resources of the Three Rivers Region***

### ***Geology***

The under-lying geology of an area affects aspects such as soil types, and susceptibility to natural disasters such as earthquakes and volcanic activity, which in turn affect the ways people interact with the land. Most of the Lowlands are made up of the Yucatan Platform, consisting of carbonate rock -- the majority of which is limestone (Dunning et al. 1998, 88) - - with outcrops of chert (Wright et al. 1959, 24). The Yucatan platform has its geologic origins in the Precambrian period, which is when the metamorphic and igneous substrate formed. A series of major changes occurred during the Mesozoic with deposition and erosion events, and during the early Cretaceous the sea began to cover the platform, and limestone and dolomite layers were deposited (Wilson 1980). The country of Belize has been described by Wright et al. (1959, 22) as 'a low-lying shelf occupying an embayed area on the eastern side of the Central American isthmus'. The southern half of this shelf was uplifted to form the Maya Mountains, which dominate the landscape of the southern half of the country. The Maya mountains are formed from very hard and ancient Palaeozoic rocks, and the main mass of the mountains is made from quartz-rich metamorphic rock, formed over 200 million years ago, that contains few minerals that are able to be transformed into plant foods (Wright et al. 1959, 23). Limestone also occurs in abundance in Belize, and the northern region, where my research is based, is underlain by limestone. These limestone deposits decrease in age from those formed in the Cretaceous, located immediately to the north of the Maya Mountains, to the Pleistocene-Holocene formations that make-up the northeast coast and the off-shore cays (Howie 2005, 132). The metamorphic rocks of Central America formed in the Palaeozoic era, over 200 million years ago, and Belize formed during the Eocene era as marine deposits formed the limestone beds that make up the Yucatan Peninsula (Turner and Harrison 1983, 13).



### 3. The Environmental Setting of the Eastern Alacranes Sites

The limestone of Belize is called Rio Dulce Limestone, and this thick white, hard limestone covers most of the Yucatan peninsula and nearby islands in the Caribbean (Morse 2009, 100-101). In Belize and other areas in the southern lowlands, crumbly calcareous deposits - called sascab - are found beneath the soil profile: sascab has a higher concentration of chlorite, dolomite and talc than the limestone bedrock, and these deposits can be several metres thick, with nodules of chert occurring in the sascab deposits during diagenesis (Villaseñor 2010, 25). Beach (1998, 786) suggests that sascab may have been used as a fertiliser, and so may have been an important component in agriculture. Sascab was also widely used for building purposes (Villaseñor 2010, 25), with floors sometime constructed of compacted sascab, as opposed to burnt lime (Villaseñor 2010, 140).

#### **The Geology of the Three Rivers Region**

It has been suggested that the Three Rivers Region is a microcosm of the southern Maya Lowlands (Scarborough et al. 2003, xvi), as the complex karst hydrology of the region has had the effect of creating a variety of ecological settings within this specific area (Dunning et al. 2003, 14). The presence of carbonate rock in the geology of the area means that karst landforms and processes follow, and the intensity of the karst processes influence the topography and create radically varying surface characteristics and drainages (Dunning et al. 1998, 89). For example typical karst topography is formed by the weathering of the limestone to form hills and caves, and when unconsolidated limestone is deposited as dirt or soil, it is known as sascab, and when it is deposited as clay, it is known as *marl* (Morse 2009, 101). However, marl can also be formed by degraded chert and quartzite, as is the case in northern Belize, where the limestone bedrock is overlain with veins of both chert and quartzite.

The TRR lies at the eastern edge of the large Peten karst plateau, and the bedrock here consists of Late Cretaceous to Early Tertiary marine carbonates, mostly limestone and marls (Dunning et al. 2003, 14). From north to south, the rocks of Lowlands range from Quaternary to Cretaceous ages. In Belize, there are no active volcanoes, and the

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earthquake risk is at 2 on a scale of 1-5 (5 being the highest risk), however no major earthquakes are known to have taken place in Belize (Hall et al. 2003, 25).

In terms of natural resources - due to the limestone substrate of the Yucatan Platform - as a whole the Three Rivers Region contains good supplies of water, agricultural soil, chert and chalcedony, and clay. However the distribution of knappable chert is extremely heterogeneous across the TRR with some areas having little to no high quality chert resources, with others having high quality chert in such abundance that it is used as building construction fill (Guderjan 2013, 231).

#### ***Soils and Climate***

The agricultural potential across the Lowlands is not uniform. For example, the Peten contains areas with deep and fertile soils, whereas Yucatan contains areas where the soils are the complete opposite: shallow and infertile (Coe, 2004, 5) In terms of soils, there are three major types in the TRR. Calcareous-based soils occur in the upland areas; there are thick wetland deposits of calcareous clay or loam found in the bajo areas; and a band of siliceous sandy soils is in the northeast part of this area (Guderjan 1991a, 3). The distribution of soils in the Maya lowlands can be explained by climatic patterns, drainage characteristics and parent materials (Dunning et al. 1998, 91). In reference to agriculture, soil knowledge is an important consideration, as for example, manioc and maize prefer the acidic upland soils, and it has been proposed that maize, beans and squash prefer the soils of the bajos, which tend to be more basic (that is high pH), and this may have spurred the exchange of crops between farmers in each soil zone (Dunning et al. 2003, 22).

Soil type is very significant when considering the resource base of a society, as for example soil types have an impact on food production capabilities, characteristics of standing water resources, as well as vegetation (Rice et al. 1985, 91). One of the most important factors that determined whether a population would thrive or fail in a given location in times of environmental or human-induced stress is the heterogeneity of landscape resources (Barrett 2004, 51), which are underpinned by soil type. The soil

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classification system used by archaeologists in Belize is based on surveys undertaken by the Land Resource Development Centre (Birchall and Jenkin 1979); The British Honduras Land Use Survey, under the auspices of the now defunct Colonial Office (Wright et al. 1959); and the Natural Resources Institute (King et al. 1992). Although these surveys were not undertaken in recent years, they provide excellent foundations for the study of ancient landscapes, as they are based on soil forming processes that have remained constant through time (Fedick 1995, 20). It is important to note when using these maps that the Land Resource Development Centre team used a 1:50,000 scale, therefore on-the-ground observations of localised variations must be carried out in conjunction with the maps.

There are several hundred different types of soil in Belize (Wright et al. 1959, 53). Most of the soils of Belize are directly or indirectly associated with, and derived from, the geology of the Maya Mountains, which contain few minerals necessary for plant growth, such as potash, lime, copper, zinc, manganese or sulphur (Wright et al. 1959, 23). Therefore soil parent materials formed from the Maya Mountains assemblage would be nutrient poor. However, the other main soil forming rock in Belize is limestone, and the soils derived from limestone parent material are considered the most fertile in the country. The northwestern region of Belize, where this research takes place, has parent materials formed of fragmented limestone and chalk dating to the Eocene, as well as areas of calcareous clay.

Sedimentological studies of Peten lake cores have been initiated to reveal the impact of deforestation on regional soils within the time frame in which the ancient Maya inhabited the region. It was reported that early Holocene deposits contained relatively high – 30 to 60% - concentrations of organic matter, but were overlain by 'Maya Clay'. 'Maya Clay' is a fine grained, inorganic deposit composed mostly of montmorillonite clays deposited around 3000 years BP, and believed to reflect severe erosion of the soil caused by widespread human-induced deforestation (Brenner et al. 2002, 146). This erosion may also have been, in addition to deforestation, a consequence of regional drying, but whatever the case, once the vegetation had disappeared from the

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hill slopes of the Peten region, the nutrient-rich surface soils became subject to downslope colluvial erosional processes (Brenner et al. 2002, 146), thereby affecting the quality of the soil available for cultivation. Much of the soil being washed downslope would then accumulate in natural depressions such as *bajos* or lakes, and long-term effects of this soil erosion may have had negative ramifications for ancient Maya populations by reducing agricultural yields. In addition, Maya clay also could have had the effect in some circumstances of forming a thick, hard impenetrable layer (Rice et al. 1985, 95) that, if deposited on to a wetland field, could have not only sealed the groundwater below it but also prevented the field from draining during the rainy season, therefore causing fields to be flooded and making the fertile agricultural soil inaccessible. As well as deforestation, soil erosion may also have been accelerated by the following: frequent and intensive convective storms during the wet season, high piping and runoff in expanding clay soils, and moderate slope lengths with steep sections (Beach et al. 2006, 169) - however deforestation has the effect of exacerbating these processes.

Ethnographic observations amongst modern day inhabitants of Belize, reported by Fedick (1995, 25) have revealed that those who use mechanical farming techniques have difficulties farming areas with exposed bedrock, such as those on the foot slopes on the edge of *bajos*, whereas farmers using traditional hand techniques prefer these well-drained slopes. Fedick also observed that mechanical farming was suited to poorly drained clayey areas, such as those in *bajos* themselves, and traditional techniques did not fare well in these circumstances. It is possible therefore to extrapolate from this study that the ancient Maya would have preferred to farm the soil on the edges of *bajos* as opposed to soils in the *bajos*.

#### **Soils in the Three Rivers Region**

Beach et al. (2006) state that the TRR has two types of buried soils across the upland and lowland depressions of the region. There is a lower paleosol – 95 to 180 cm below modern surface that dates to the Preclassic, and earlier; and an upper paleosol, 50-75

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cm below modern surface that dates to the Early Classic, and the early part of the Late Classic. The presence of these two paleosols shows that there were two episodes of erosion and sedimentation that occurred at different times, with the earlier episode (during the Preclassic) having the same depth of sediment accumulation as the later episode - even though there were fewer people in the Preclassic - therefore suggesting that there were similar quantities of soil erosion despite the lower populations during the earlier episode (Beach et al. 2006, 171). Pre-Maya paleosols are designated as *Eklum*, the Maya term for 'black earth', and *Eklum* are also noted throughout the wider lowland region (Beach et al. 2006, 167). *Eklum* is the equivalent of Rendoll in the USDA soil classification system (Tim Beach 2016 Pers. Comm.).

Using data obtained from a variety of studies of paleosols in the Maya lowlands, Beach et al. (2006) have identified five general soil formation episodes: '(1) early Holocene soil formation under tropical forest, (2) Preclassic and earlier erosion and sedimentation from pioneer farmers, (3) some cultural hiatus of stable soil formation at the end of the Preclassic to the Late Classic, (4) Late Classic soil erosion and sedimentation, intense at some sites [...] and less so in some places [...], and (5) finally stable soil formation and (5) recovery after the Maya collapses in the 10<sup>th</sup> and 16<sup>th</sup> centuries AD' (Beach et al. 2006, 173-173).

#### ***Topography***

The examination of an east-west transect of the Lowlands (Fig. 10) going from the Caribbean coast to the Mirador basin shows that the variations in elevation are significant across the lowlands, with the coastal areas 1-20m above sea level, and the interior regions elevated 120-300m above sea level (Dunning et al. 2002, 269). Topographical differences across the Lowlands mean that there are environmental variations and different types of habitat that occur across the region (Dunning et al. 1998, 87).

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**Figure 10 Elevational Transect from the Northern Caribbean Coast of Belize to the Mirador Basin Guatemala (Dunning et al. 2002, 269).**

### **Topography of the Three Rivers Region**

The country of Belize is made up of two techno-morphological regions: the northern region characterised by flat, low-lying relief; and the mountainous southern region, which contains the Maya Mountains (Howie 2005, 123). Generally speaking the north is a region of gently sloping limestone hills, coastal and inland swamps, sandy plains, and lagoon complexes (Howie 2005, 126). The La Lucha Uplands/Bravo Hills region of the TRR, which includes the Alacranes Bajo, is characterised by weathered zones of rugged karst hills within the limestone uplands; this has created a modern landscape of conical hills, ridges, and bajos (Dunning et al. 2003, 14). In the TRR, local relief between the valleys and uplands can exceed 100m (Dunning et al. 1998, 93).

### **Water Resources**

The geologic structure of the Maya lowlands is important in the determination of the availability of groundwater across the region – in the north, rivers flow beneath the limestone surface with water appearing above the surface in bedrock fractures; in parts of the Lowlands, due to the nature of the limestone karst make-up, the water quickly enters ground-water systems, lies far beneath the surface and is accessible in only a few places (Dunning et al. 2002, 269). A subsurface drainage system could be described as cave-like (Morse 2009, 129). Because of widespread shortages of water, seasonal waterholes known as *aguadas* and water-bearing sinkholes known as *cenotes* were vital features for the ancient Maya within their cultural landscape. Aguadas can be natural or man-made, and often served as reservoirs for the ancient Maya, and

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have been noted in some cases as being located in site centres, as is seen at the Belizean sites of El Posito and Cuello (Morse 2009, 132).

#### **Water Resources of the Three Rivers Region**

Unlike the rest of the Elevated Interior Region, the TRR had perennial water sources. Aside from the Three Rivers themselves, the TRR contains many *cenotes* as well as *aguadas*. Both *cenotes* and *aguadas* have been noted in the eastern Alacranes Bajo area of the TRR. Water is a vital resource, and some have proposed that whoever controls water would be in a good position of power (Scarborough 2003, 1). At large TRR centres such as Blue Creek, however, there is no evidence to date of any kind of water control. But this just may reflect that water was abundant and distributed broadly in this area, as water only becomes a controllable resource when it is scarce (Guderjan 2007, 100). Features that manipulate water such as dams, reservoirs and canals *are* indicative of centralised control (Scarborough 2003, 43) and these are all features that are present in the study area. Water availability and access played an important role in settlement location choice and also structured agriculture, domestic water needs, and ceremonial usage (Dunning et al. 1998, 90). When thinking about the role that water played in settlement location, it is important that we do not think solely in terms of agricultural needs.

As water was not uniformly available across the Maya lowlands, the people residing in each area needed to adjust to and manage their specific water resource availability. In areas with scarce water resources, permanent human settlement location was strongly tied to the necessity of being able to capture and store rain water (Dunning et al. 2012, 3652). However in the TRR, water seems to have been particularly abundant in comparison to some other lowland areas. The Maya lowlands contain few perennial rivers or lakes; however the western portion of the lowlands contains three major rivers – the Rio Hondo, the New River and the Belize River. The area which this study concerns, the TRR, contains the watersheds of the three principle tributaries of the Rio Hondo. These tributaries are: The Rio Bravo, The Rio Azul, and Booth's River. The

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topography of the TRR is dominated by three terraced uplands, which were formed by a series of fault lines, and rise in terms of elevation from east to west (Hyde 2003, 7) – these are the Booth’s River escarpment, the La Lucha escarpment, and the Rio Bravo escarpment.

The three rivers each have distinctly different characteristics. Booth’s River is located in a large depression, and its principle channel floods widely in response to the wet season’s rain, and gently flows through wide perennial wetlands during the dry season (Dunning et al. 2003, 14). The Rio Bravo flows erratically all year round – in the wet season it can be a raging torrent, but in the dry season it is a placidly flowing stream (Houk 2003, 53). In contrast to the two other rivers, the Rio Azul is not perennial – it sluggishly flows through a series of interconnected bajos and during the wet season spreads over a wide flood plain, and inundates the bajos (Houk 2003, 53). Figure 11 indicates the course of the three rivers for illustrative purposes, not taking into account their seasonal nature.

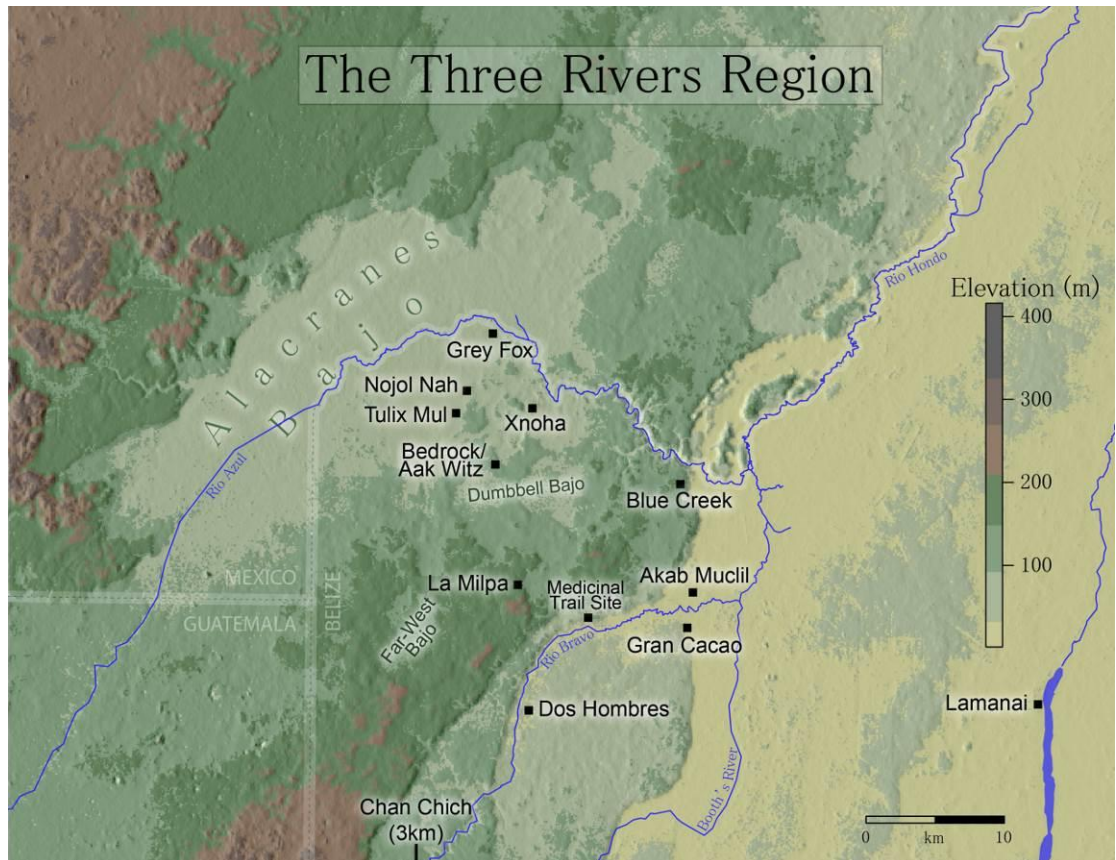


Figure 11 Map of the Northern TRR indicating position of rivers



#### ***Bajos***

Another notable feature of the Maya Lowlands are Bajos, and many ancient Maya cities were built on the margins of these landscape features (Dunning et al. 2002). In Maya lowlands In the EIR, large and small bajos make up 40% of the land surface (Dunning et al. 2012, 3654). As mentioned previously, the word *bajo* in the Spanish language literally means *low*. When used in terms of a feature on the landscape, the word bajo refers to a specific type of wetland.

Wetlands are scattered throughout the Maya Lowlands, and are generally defined as areas of land where the water table is at or close to the surface for a sustained period of time, effectively storing water (Siemens 1983, 167), thereby making the water, or hydrological benefits, available for human use. There are three significantly different types of wetland ecosystems in the Maya Lowlands (Kunen 2004, 3). These are i) riverine flood plains ii) permanent wetlands and iii) the seasonally inundated low areas -- the bajos (Kunen 2000, 16). Bajos occur in the upland interior areas of the Yucatan, and other types of wetlands, typically occur in the coastal plain areas (Beach et al. 2009, 1710). Brokaw and Mallory's (1993) vegetation survey of the TRR demonstrated that bajo vegetation characteristically is of the 'scrub swamp forest' type, and that the ancient Maya cleared much of this forest in antiquity.

The key characteristic of a bajo is that it is a feature of the upland topography that is subject to seasonal inundation (Culbert, Levi, and Cruz 1990, 117). Typically, bajos are floored with deep clays, and inundated each year for several months. In the dry season, bajos are edaphically dry, meaning that all of the remaining water in the bajo is held too tightly by the soil particles to be of any use to plants (Dunning et al. 2003, 16). The hydrology of bajos shows a wide inter-annual variability (Beach et al.. 2009, 1713). Bajo soils generally consist of dark, slowly draining clays that often contain sub-surface layers of chert (Kunen and Hughbanks 2003, 95). Soils within many bajos are vertisols, which have mineral deficiencies and are susceptible to shrinking and

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swelling, and these characteristics have led some scholars to question their suitability for cultivation (Kunen 2004, Pope and Dahlin 1989; 1993). It is important to note, however, that generalisations about the characteristics that allow a landscape feature to be identified as a bajo should not be allowed to mask the fact there is great variation and environmental heterogeneity within and between bajos, in terms of their soils, hydrologies and vegetation associations (Dunning et al. 2002, 269-271). The variability among bajos reflects different drainage hydrologies within these karstic depressions, as well as variations in human impacts on these features (Beach et al. 2006, 172). Bajos can have numerous complex micro niches within them that can be exploited using a wide range of techniques such as ditching, and modification of the gentle slopes around them (Guderjan 2013, 230).

Another landscape feature found throughout the Maya lowlands are small bajos, or *bajitos*. Bajitos are usually around 1-2 square kms, and often merge. Bajitos are typically ringed with karstic hills, and like bajos have deep soils, although they are not usually characterised by standing or running water (Guderjan 2013, 229-230).

#### **Bajos and the Ancient Maya**

Studies of the ancient use of bajos in the Maya lowlands began in the 1970s when Peter Harrison's aerial reconnaissance over the Bajo del Morocoy in Quintana Roo revealed extensive field systems (Harrison and Turner 1978). These field systems were later revealed during investigations on the ground to be associated with the site of Tzibanche (Kunen 2004, 4). At the Bajo el Labertino in southern Campeche, small raised rubble platforms thought to be planting platforms were excavated by William Folan and colleagues (Folan and Gallegos 1988); Patrick Culbert and his team investigated the Bajo Pedernal in the Peten, and discovered drainage ditches on the margins of this bajo; Patricia McAnany's work at the seasonally inundated edges of Pulltrouser Swamp reported wetland fields and canals associated with the site of K'axob (McAnany 1998, Kunen 2004, 4). It is estimated that bajos cover between 40% and 60% of the southern and central Maya lowlands; however it is important to note

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that some bajos had greater agricultural potential than others (Dunning et al. 2002 269 - 271).

Many of the earliest Maya centres were built on the margins of bajos, and a number of these early centres were abandoned between 100 BC and 250 AD in the Early Classic period. However some early centres built close to bajos did survive into the Classic period and the people in these sites constructed elaborate water storage systems (Dunning et al. 2002). Dunning et al. (2002) have investigated the reasons behind this, and using paleo-environmental data, found that when these early settlements were founded on the margins of bajos, the bajos were perennial wetlands, but that they were anthropogenically transformed between 400 BC and 250 AD. The fact that the bajos were perennial wetlands, some even having open water, suggests that the bajos would have been attractive features to locate settlements near.

#### **Bajos in the Three Rivers Region**

In the TRR itself are a number of bajos, notably the Alacranes Bajo; the Far West Bajo that has been studied extensively by Julie Kunen (2004); and the Dumbbell Bajo that has had massive agricultural productivity in both modern and ancient times (Guderjan et al. 2003, 77). The two bajos (the Far West and the Dumbbell within the TRR that have previously studied will be used as points of comparison for the data that I have collected around the eastern edge of the Alacranes Bajo. Within the northern TRR, prolonged weathering has produced large basins that have formed into bajos.

Debate about the importance of wetland agriculture has been spirited in recent years (Luzadder-Beach et al. 2012, 3646, Dunning et al. 2002, 270-271), with the role of bajos in particular being questioned. There are those scholars (e.g. Culbert et al. 1995, 1996; Turner and Harrison 1983) who believe that the modification of wetlands for intensive agriculture was a central component of ancient Maya subsistence, especially in the densely populated Classic period; on the other hand, the opposing side of the debate (e.g. Fedick and Ford 1990; Pope and Dahlin 1989; Pope et al. 2000; Pohl and

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Bloom 1996) contends that wetland agriculture was not as geographically or temporally spread as its proponents believe, and that any use of the wetlands was limited to drained field farming and confined to the Preclassic period before sea levels rose (Kunen 2004, 5). Debate into whether the exploitation of these wetlands was central to ancient Maya subsistence has been thoroughly addressed by recent work in the TRR and these studies strongly indicate that bajos and wetland agriculture were important components for the ancient Maya (e.g. Dunning et al. 2002; Beach et al. 2006; Beach et al. 2009; Guderjan and Krause 2011).

Additionally it is clear that many of the largest and best-known ancient Maya centres, including El Mirador, Nakbe, Tikal and Calakmul, were situated adjacent to these landscape features (Kunen 2004, 3), and modern-day farmers in the Peten region of Guatemala farm bajos extensively (Kunen and Hughbanks 2003, 95). My research seeks to contribute to the corpus of knowledge by examining whether settlements around the eastern edge of the Alacranes Bajo were purposefully located to take advantage of the bajo. If so, did these settlements persist and flourish over time, or were they confined to one temporal period?

Most recent investigations into the nature of the Maya use of bajos have focussed primarily on the environmental and climate records, and have demonstrated for example that prior to 250 AD some bajos were perennial wetlands – with some having pockets of open water (Dunning et al. 2002, 268-269). This may explain why areas around bajos were attractive settlement locations in the Early Classic period, with many centres, such as El Mirador, abandoned at the end of this time period (Luzadder-Beach et al. 2012). However some bajo-aggregated settlements, such as those at the eastern edge of the Alacranes Bajo, as well as Aak Witz near the Dumbbell Bajo, persisted into the Late and even Terminal Classic, so clearly further investigation into their exploitation is required. Dunning et al. (2002) also demonstrates that in some cases bajos were anthropogenically transformed, through environmental disturbance and deforestation, into seasonal swamps from perennial wetlands, another intriguing line of enquiry.

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Kunen (2004) has identified three related environments that seem to have been recognised as such by the ancient Maya who lived on the edge of the Far West Bajo: obtaining and extracting water from the bajo itself; settling and gardening the uplands; and terracing and intensively farming the low slopes that surrounded the bajo (Kunen 2004, 1).

The studies of settlements located close to bajos from across the Lowlands provide useful starting points for my study of the eastern Alacranes Bajo settlement area. Previous studies regarding bajos in the Maya Lowlands also furnish us with good proxy environmental data. In terms of bajos within the Maya Research Program's permit area within the Three Rivers Region, only the Dumbbell Bajo has been extensively studied to date, and these studies will be described in detail in Chapter 4. The Dumbbell Bajo is located 8 km from the Blue Creek Centre, covers an area of 40 sq. km and has been demonstrated to have been agriculturally productive (Morse 2009, 105-106). The settlements of Aak Witz and Bedrock are located directly adjacent to this bajo, and provide good comparative data for my study of the eastern Alacranes sites. Aak Witz and Bedrock are roughly 4.5 kms away from the eastern Alacranes area to the south, and Blue Creek is roughly 12 kms from the Alacranes Bajo area.

Indications are that the mounds near the Alacranes Bajo reflect aggregation stimulated by the bajo and its resources, and the pattern of the structural remains is something to be examined through survey and mapping. The Alacranes Bajo is by far the largest bajo in the area.

Previous research has shown direct evidence of that the use of bajos around the large monumental site of La Milpa (located in the southern half of the TRR, outside of MRP's research permit area) was for agricultural purposes, as seen in terracing across the channels on the low foot slopes leading to the Far West Bajo (Dunning et al. 2003, 19). The foot slopes around bajos may have been favourable for food production, as although clay sediments in the bajo were not suitable for agriculture - due to

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inundation in the wet season, and edaphically dry conditions in the wet season - the deposits that built up on the foot slopes may have provided a rich and fertile habitat (Dunning et al. 2003, 20).

#### ***Flora and Fauna***

The natural vegetation of the lowlands is influenced by drainage and soils, as well as rainfall patterns (Dunning et al. 1998, 91). The Lowlands also are noted for their broadleaf tropical forests. Forest cover increases in height as precipitation increases going south, with the southern EIR forests becoming tropical moist forest – and embedded in these forests are numerous types of wetlands, including bajos (Dunning et al. 2012, 3653). The forest was an important resource for the ancient Maya - 90% of Maya forest plants are useful to humans, and there are 509 different species of indigenous plants in the Maya area (Fedick 2012). Plants would not only have been used for food, but also for medicine and building materials. Trees such as the ceiba tree (*Ceiba pentrandia*) were important in spiritual terms, and tree species such as cedar (*Cedrela odorata*) and mahogany (*Swietenia Macrophylla*) would have provided useful building materials. The forest played an important role in the Maya world not just in terms of provision of subsistence resources but also in terms of cosmology. Forest art and symbolism often appear on monumental art and in other imagery throughout the ancient Maya Lowland region.

Although the entire Maya region has a subtropical climate, different altitudinal zones within the area mean that vegetation, and what is suitable to grow, varies within different parts of the region. For example, in modern times, tropical crops such as cacao, cotton and bananas are grown near sea level; temperate crops, such as potatoes, are grown in the cooler mountain areas; and sub-tropical crops such as coffee are grown in the intermontane valleys (Hall et al. 2003, 18). Within the Three Rivers Region there are five major vegetation types: 63% upland sub-tropical moist forest; 20% swamp forest; 8% palm forest; 7% marsh; and 2% savannah, with the swamp, marsh and savannah habitat occurring east of the Bravo and Booth escarpment systems (Guderjan 1991a, 3). Animals were also an important resource, on

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both a practical and spiritual level, and species indigenous to the Lowlands include deer, spider monkeys, jaguars, peccary and tapir (Coe 1999, 26), as well as many birds such as doves, woodpeckers, turkeys and parrots (Sharer and Traxler 2006, 42).

The extent of the forest cover across the Maya Lowlands has waxed and waned in conjunction with human population numbers – paleo-ecological data from throughout the lowlands show a strong correlation between human population rises and declining forests, due to the need for timber, and to clear forests to carry out agriculture (Dunning et al. 2012, 3653). The effects of forest clearance, however, were often negative on the regional environment. Examples of this are: i) declining forest cover likely translated into reduced transpiration and hence precipitation, which potentially would have exacerbated the severity and persistence of drought; ii) the removal of forests would have left sloping land vulnerable to erosion and therefore soil loss; iii) the reduction of tree canopy would affect the amount of airborne volcanic ash, soot and other airborne phosphorous that is captured, and this would affect the composition of the soil - of which these elements are principle inorganic components; and iv) the reduction of forest resources for construction and fuel for growing populations would have created greater risks for sustaining human needs associated with urbanism and population rises (Dunning et al. 2012, 3653-3653).

Forest clearance peaked during the Late Classic period, however. After the Maya collapse, significant re-growth began to occur at around A.D. 1250, and forests again dominated the Peten area between then and A.D 1600 (Dunning et al. 1998).

#### ***Lithic and Clay Resources***

Lithic resources are vital for basic subsistence needs, such as food processing, and may have provided surpluses for trade. However even within the TRR there are differences in types, quantities and qualities of resources available. The most common materials used to manufacture stone tools within the Maya world were chert and chalcedony, and these materials were good to work with because the fractural properties of these two minerals meant that they were consistent and predictable (Barrett 2004, 76).

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Outcrops of good quality chert and chalcedony are visible around the eastern Alacranes Bajo area. The presence of good quality chert is not the case throughout all of the TRR however; for example Barrett (2004, 272) has demonstrated that less than 20% of lithic tool artefacts recovered at the TRR site of Blue Creek were actually manufactured there, and the geology of the area immediately surrounding Blue Creek is characterised by poor quality lithic outcrops containing sedimentary quartzites, dolomites and coarse-grained cherts that were unsuitable for making durable stone tools. At the time of writing, further to Barrett's 2004 study, the Maya Research Program is engaged in mapping the lithic resources of the wider TRR (Tom Guderjan 2015, Pers. Comm.). Not all stone requirements could have been met from within the TRR – for example granite is not a naturally occurring stone in this area, with the nearest source hundreds of miles away in the Maya Mountains. Different types of granite can be found in different locations in the mountains, and these can be differentiated from one another by mineralogy and texture (Graham 1987, 756). Basaltic rock and obsidian do also not occur naturally in the TRR or indeed the in Lowlands, and would have had to have been sourced from the volcanic Maya Highlands.

The nature of the geology of the area, in particular the weathering processes that created the bajos, often exposed deposits of chert that are secondary inclusions within the limestone matrix (Dunning et al. 2003, 16), as was the case in the eastern Alacranes Bajo area.

Rich clay resources have also been observed at the eastern edge of the Alacranes Bajo (Hammond 2013). The soils at the edges of bajos are often rich in clay, with bajo soils acting as natural repositories of clay (Kunen 2004, 32).

#### ***Agriculture & Land Management***

It was once thought that the lowland Maya relied solely on swidden agriculture (also known as 'slash-and-burn'), which involved alternated cycles of cultivation and fallow. More critically, the tropical environment was characterised often as homogeneous or



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at least not differentiated enough to matter (Thompson 1970; Sanders and Price 1968). However, more recent work (e.g. Graham 1987; Fedick 1995) has shown things to be completely different, particularly disproving the notion that the vegetation, environment and resources of the lowlands were homogeneous, and has led the Maya Lowlands to be considered as in fact a 'managed mosaic', a turn of phrase popularised by Scott Fedick (1996b). The ancient lowland Maya were in fact able to adapt to their natural environment and also devise sophisticated ways of exploiting the land with a suite of agricultural techniques, as the environmentally heterogeneous nature of the Lowlands necessitated (Dunning et al. 1998, 87). At the peak of ancient Maya civilisation several million people were being fed (Gomez-Pompa 2003, 5), and had their needs for medicine, fibre, wood, fuels and resins met (Gomez-Pompa and Kaus 1992, 271). To illustrate the scale of this, it has been estimated that during the Late Classic Period, there were between 150 – 500 people per square km, contrasting with only 4.5 to 28.1 people per square km today (Gomez-Pompa and Kaus 1992, 271). For populations to reach such a density the land must have been capable of supporting such high numbers, and of course natural environmental conditions, although not entirely deterministic, certainly strongly influence population distributions and densities.

The rainforest nature of the Lowlands and the delicate soils meant that soil nutrients could be exhausted rapidly. But by mimicking the diversity and natural dispersion of individual species of plants over a wide area, the ancient Maya managed to maximise their environment's agricultural potential, and therefore support large populations (Demarest 2004, 127-129). As such, there was no one agricultural technique employed by the ancient Maya but rather a myriad of different strategies in a myriad of different settings. Horticulture was also likely to have been widely practiced. The difference between agriculture and horticulture is that agriculture refers to the large-scale cultivation of plants in specific prepared grounds, whereas horticulture refers to the cultivation of plants in gardens (Denham 2005, 291). In reality, these two terms are often used synonymously, and there is some overlap between the two in practice. Some of the diverse agri/horticultural strategies used by the ancient Maya are as

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follows: The afore-mentioned swidden agriculture; household gardens – small intensive garden plots located close to residential house lots; raised field agriculture – this took place in low-lying areas such as seasonally inundated bajos and swamps, where drainage channels were excavated with soil islands piled up between the channels to create productive fields; bajos – which were also exploited during the dry season for single dry-season suitable crops of cultigens such as tubers and maize; and *Rejolladas* – naturally occurring sinkholes within the limestone karst that held thick, nutrient-rich soils within them (Demarest 2004, 130-139), and functioned as sediment traps that retained moisture (Guderjan 2013, 230). *Rejolladas* provided some of the most useful farmland in the drier parts of the Yucatan Peninsula, and these may have been a contributing factor that served initially to attract settlers to the area in ancient times (Guderjan et al. 2003, 80).

The aforementioned is not an exhaustive list of the agricultural techniques employed by the ancient Maya; however, it serves to illustrate that the ancient Maya were highly adapted to their environments, and able to maximise their potential with knowledge that must have been built up over multiple generations. But at the same time, it is clear that a single adaptive model cannot be applied uniformly across the Maya Lowlands, as adaptations were made across time and space to changing environments, and of equal importance, changing cultural considerations (Dunning et al. 1998, 87). Indeed Dunning et al. (1998) have shown that there were 27 different adaptive regions across the Maya lowlands. Furthermore, it is not always possible to detect cultivation strategies in the archaeological record, for example wetland agriculture. Agriculture that takes place in moist, often seasonally inundated wetlands such as bajos, swamps and riverbanks is difficult (although not always impossible) to identify archaeologically, so we may not be able to build a complete picture of the extent of ancient Maya agriculture and resource management strategies in a given area.

Traditional Maya agriculture is highly adapted to seasonal patterns of precipitation (Dunning et al. 2012). Ethnographic work has shown how modern-day farmers divide the landscape into different use zones, and has been summarised in the ‘in-field out-

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field' model (Netting 1977). This strategy involved the combination of intensive cultivation of plots near residential areas, and extensive cultivation of hinterland fields. This meant that households involved in farming invested decreasing amounts of labour into cultivation as the distance from the residential area to the agricultural field increased; i.e. kitchen gardens and orchards near residences were carefully tended with a great deal of time invested in them, whereas more distant fields were used to plant staple crops that did not need constant tending, and these distant fields were even subject to long periods of fallow (Kunen 2004, 98). Dividing the landscape into different use zones may have been one of the ways in which the ancient Maya of the TRR tended and managed their landscape. There is archaeological evidence derived from spatial patterning and from the nature of spaces between residential units associated with prime agricultural land that confirms that the ancient Maya maintained home gardens within their settlements. As well as using various agricultural techniques, the ancient Maya also knew how to treat soils and conserve its moisture by inter-planting, mulching and sowing cover crops (Morse 2009, 151).

One of the most striking findings from archaeological and paleo-ecological work carried out in the Maya Lowlands is that agricultural intensification occurred from ca. 2000 BC to 1000 BC (Pohl and Bloom 1996, 358). The Three Rivers Region appears to have been settled a little later than this at ca. 900 BC (Padilla 2007). Much of the recent work in the Blue Creek area, which directly borders the Alacranes Bajo zone, has afforded us many insights into Maya agriculture, at least as it was practiced during the Classic Period. The Maya in the Blue Creek area, as in the rest of the Lowlands, employed a multiplicity of techniques for land management. One of the research aims of my study is to determine what land management techniques were used around the eastern Alacranes Bajo settlement areas.

Check dams are often used to control water flow into agricultural fields. These small dams were typically located on hillsides and terraced agricultural fields, the margins of reservoirs or on creeks or rivers (Morse 2009, 210). Within the archaeological record, the dams that are found are primarily made from earth, limestone or rubble, but may have included construction materials that do not survive in the archaeological record,

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such as wood. Terraces are used for a number of different reasons including controlling run-off and soil erosion, to help prevent the channelling of water down a hill slope by creating a means for more even water distributions, and for the maintaining of moisture levels during the dry season (Morse 2009, 150). Terracing throughout the Lowlands is seen from the Preclassic period; however terraces are mostly associated with later Classic periods when population growth necessitated more centralised food production. There were different types of terraces and construction techniques employed by the ancient Maya. In contrast to terraces, berms are less well studied and are subsequently more difficult to interpret – these features did not contain any walls, but their angle in relation to the hill-slope (many berms run roughly parallel to slope contour) as well as their position in relation to terraces and their rubble construction suggests that their primary purpose was water management. Other interpretations of these features include property walls, stockpiles of lithic resources or elevated walkways (Kunen 2004, 53). Perhaps it was the case that berms had different functions in different contexts.

#### ***Water Management***

As discussed earlier, the climate and geology of the Maya Lowlands meant that water was often not in abundant or reliable supply. Therefore, as in the instance of developing a myriad of agricultural techniques, the ancient Maya became adept at devising water management techniques. Agriculture is tightly linked with water management strategies, such as the use of terraces and check dams, as discussed above. In terms of shaping the land, water is the one agent, or resource, that plays the most fundamental role, and the Maya Lowlands is the principle region in the New World where complex water system management arose – as can be seen in the widespread use of well-designed dams and terrace systems (Scarborough 2003, 10 and 42).

Aside from its uses in agriculture, water is of course the most critical natural resource of them all, as without it all living organisms, including humans, would soon die. Scarborough (2003, 1) has estimated that, per day, a human needs 2 to 3 litres of water under normal settled living conditions. Therefore, the management of water

### 3. The Environmental Setting of the Eastern Alacranes Sites

must have been a prime concern for the ancient Maya, particularly when population reached a zenith in the Late Classic period (Fedick 1996a, 13). To cope with unreliable water supplies, the ancient Maya employed strategies such as the development of water storage features. There were four principal landscaping features that the ancient Maya devised for water storage: wells, reservoirs (also known as *aguadas*), dams, and canals. All of these features, aside from wells, would have involved large-scale earth moving activities, requiring major amounts of labour (Scarborough 2003, 43). Water storage features would have been utilised for different aspects of life and subsistence, for example dams and canals were likely to have been solely for agricultural intensification, whereas reservoirs and wells would have been for water storage and collection, and used for daily subsistence needs. Although these were the four main water storage features found associated with the ancient Maya landscape, other features were also present. A *chultun* for example, was a form of a man-made storage in which a bell-shaped chamber was excavated into the natural limestone bedrock (Fig. 12)

Copyrighted image removed

Figure 12 Diagram of a Chultun (Scarborough 2003, 52)

Chultuns were not exclusively used for water storage; they were also often used for food storage and in some cases human burials – particularly in the southern Lowlands. However there is good evidence that they were used as water storage in many cases (Harrison 1993, 82), especially when lined with stones and plastered walls, as is often seen in the northern Maya area (Puleston 1971; Sabloff and Tourtellot 1992). Another

### 3. The Environmental Setting of the Eastern Alacranes Sites

important source of water in the Maya Lowlands were *cenotes* – these are naturally occurring bodies of water that are accessible above ground, and are connected to subterranean bodies of water. *Cenotes* were not just used on a practical level by Maya communities, but they also had ritual significance. A study of cenotes in the El Eden Ecological Reserve in Quintana Roo, Mexico concluded that all of the settlements in this particular area were associated with a cenote, but not all cenotes were associated with settlement - and that larger cenotes were associated with larger monumental complexes, and non-elite sites were associated with small cenotes that had diameters of less than 4 metres (Fedick and Morrison 2004, 210).

In terms of water supplies in the TRR, aside from the three rivers themselves, the area contains many *cenotes* as well as *aguadas*. As already discussed, *aguadas* can be artificially created as well as natural (Morse 2009, 131). Both *cenotes* and *aguadas* have been noted in the eastern Alacranes Bajo area of the TRR. Water features on the landscape, such as rivers, springs and *cenotes*, may also have served in a social and political sense as boundary markers between territories (Iannone 2006, 209)

#### ***Concluding Remarks***

Although this chapter has been concerned with presenting the environment and ecology of the TRR within the lowland context, it is important to note that there are ideational aspects that are significant when thinking about the relationships that people have with the natural resources available to them, as their worldview will affect their interactions and usage of resources. Wells and Mihok (2010) discuss how ancient Maya belief systems and worldviews influenced how people interacted with the biophysical environment. For example, 'Soil was understood not as the product of biogeochemical processes involving erosion and weathering, but as a gift from the ancestors' (Wells and Mihok 2010, 311). By considering these kinds of ideational aspects of a society in conjunction with the actual physical nature of the environment, a more robust reading of past environmental interactions may be obtained.

## **Chapter Four: Previous Research in the Three Rivers Region**

### ***Introduction***

In this chapter, I describe previous work carried out in the TRR, which includes archaeological excavations, investigations into bajos, other land features, and environmental research. It is important in terms of my research questions to consider other places in the region in relation to Nojol Nah and Tulix Mul. In this way I can determine whether Nojol Nah and Tulix Mul display characteristics related specifically to their proximity to the Alacranes Bajo. Comparison also enables me to examine how Nojol Nah and Tulix Mul fit into the wider politics and economy of the region, and provides an example of the breadth and variety of sites in the Three Rivers Region. I do not attempt to portray all of the sites in the Three Rivers Region, but I describe a representative sample of major, medium, and minor sites, as well as some smaller settlements.

### ***Cultural History of the Three Rivers Region***

Evidence for permanent settlement in the Three Rivers Region dates to the Middle Preclassic era ca. 900-400 BC. We have no information on whether hunter-gatherer groups were in the TRR in the Archaic period, although it is not unlikely. There is evidence of Archaic presence in Belize at sites such as San Estevan (Rosenswig et al. 2014), Colha (Schafer and Hester 1991) and in southern Belize (MacNeish and Nelken-Terner 1983). Middle Preclassic ceramics deposits have been found at the locations of Blue Creek, Dos Hombres, and La Milpa, but there is no evidence of any structures dating to this period (Houk 1996, 112-113). Settlement during the Late Preclassic - ca.300 BC to 250 AD- centred around stable water sources, and structures were built using wattle and daub building techniques. Monumental architecture first occurs in the TRR during the Late Preclassic at Rio Azul (Adams 1999) and also domestic structures occur at Rio Azul, La Milpa, Dos Hombres and Blue Creek. Over the next 500 years, the population grew with monumental construction and landscape

#### 4. Previous Research in the Three Rivers Region

modifications appearing in the archaeological record. During this time there is evidence for craft specialisation (Houk 1996, 115).

The Early Classic Period in the TRR ca. 250 AD - 550 AD saw increased interaction with outside regions, with the rulers of Tikal conquering Rio Azul (Sullivan and Sagebiel 2003, 28). Populations in the TRR during the Early Classic were concentrated in large centres, with monumental construction seen at Rio Azul, Gran Cacao, Blue Creek, La Milpa and Chan Chich (Houk 1996). During the Early Classic, Blue Creek seems to have been an independent polity (Guderjan 2007); however by the end of this period, at around 550 AD, ritual deposits - including a large cache of jade – coupled with a cessation of public architectural endeavours signified the end of Blue Creek's ruling lineage and its time as an independent polity (Guderjan 2007), while other sites, such as La Milpa and Rio Azul remained independent. In 534 AD, a 120-year period known as the Hiatus occurred, in which there is little evidence of monumental construction and stela carving in the Three Rivers Region (Houk 1996, 118; Sullivan and Sagebiel 2003, 31). Adams (1995) suggests that during this period in the TRR, civil war occurred resulting in a dramatic drop in population, and subsequently sites in the TRR became detached from regional powers, and more localised control began. At the end of the Early Classic period, the rulers of Tikal appear to withdraw from the region, and there was a general decline in the TRR population (Houk 1996, 118), with presumably people moving elsewhere.

The Late Classic in the TRR ca. 600-800 AD saw an increase in rural settlement, with agricultural activities and landscape modifications intensifying in these areas, as well an escalation in monumental construction at sites such as La Milpa, Dos Hombres, Blue Creek, Kinal, and Ma'ax Na (Houk 1996). Populations underwent rapid growth, and rural populations were at their Precolumbian maximum, with widespread agricultural landscape modification occurring throughout the TRR. At Blue Creek, buildings that were originally public were turned into private residences (Guderjan 2007), and at La Milpa, large-scale construction of monumental buildings took place (Houk 1996). In the rural areas of the TRR, courtyard centres were surrounded by house mounds.



#### 4. Previous Research in the Three Rivers Region

The Terminal Classic ca. 840-900 A.D. saw widespread abandonment of settlements across the TRR, as well as across the Lowlands in general, although there are a number of exceptions in Belize, such as Lamanai (Graham 2004, 2011; Pendergast 1981, 1986) and Ka'Kabish (McLellan and Haines 2013). Analyses of ceramics from the trading site of Marco Gonzalez on Ambergris Caye show that not only was the caye thriving at this time, but the ceramics being traded during the Early Postclassic were from a number of manufacturing locales in northern Belize (Howie 2012; Ting 2013). Indications are, therefore, that some settlement in the TRR was likely even after the Maya collapse.

Where sites were abandoned, one hypothesis is that the abandonment followed a long climatic drying trend between 660 and 1000 AD that reduced agricultural yields, leading to death, famine, increased warfare and over all socio-political destabilisation throughout the Maya lowlands (Kennett et al. 2012).

Many TRR sites were never repopulated, but Rio Azul appears to have been briefly taken over by invaders from the north, with Puuc/Chichen style stelae being erected, followed by remnant populations living in the acropolis, scavenging stones from surrounding structures (Houk 1996, 119-125). The depopulation of the TRR in the Terminal Classic suggests a collapse of the systems that sustained the complex integration of communities in the region.

The Postclassic period ca. 900 AD to 1600 AD saw little occupation of the TRR, with the exception of the small site of Akub Muklil (Padilla 2007; Padilla et al. 2013). At La Milpa, Dos Hombres, and Chan Chich, Postclassic incensarios have been found, but again these do not appear to represent occupation, but rather pilgrimage events (Hammond and Bobo 1994). Therefore, with the exception of Akab Muclil, the TRR appears to have been largely abandoned by the Postclassic period (Padilla 2007; Padilla et al. 2013).

#### ***Archaeological Investigations in the Three Rivers Region***

#### 4. Previous Research in the Three Rivers Region

Much of the archaeological work in the Three Rivers Region in recent years has been carried out either by the Maya Research Program (MRP), the Programme for Belize Archaeology Project (PFBAP), or the La Milpa Archaeological Project (LaMAP). PFBAP sites are in the western portion of the TRR, and the MRP research permit covers the eastern portion. Recent work by the PFBAP has focussed on major centres such as Dos Hombres, Gran Cacao, and La Milpa, and also at over forty smaller settlements that were occupied from around 900 B.C. to AD 900 (Adams et al. 2004, 174), including smaller centres such as Chan Chich, and Medicinal Trail. The LaMAP project was initiated in 1992 by Norman Hammond and Gair Tourtellot to investigate the social structures, settlement history, and political organisation of La Milpa and its surrounding area. The Maya Research Program was initially set up to study the monumental site core of Blue Creek, and Blue Creek was explored from 1992 to 2000. In 2008 MRP began work outside of the Blue Creek area, and this expansion of the project included the eastern Alacranes Bajo sites of Nojol Nah and Tulix Mul that are the focus of my research. Also included were the medium-sized centre of Xnoha; the residential group of Aak Witz, located on the edge of the Dumbbell Bajo within the Bedrock site; the residential group Akab Muclil; and the monumental site Grey Fox. See Fig. 13 for locations of sites mentioned.

#### 4. Previous Research in the Three Rivers Region

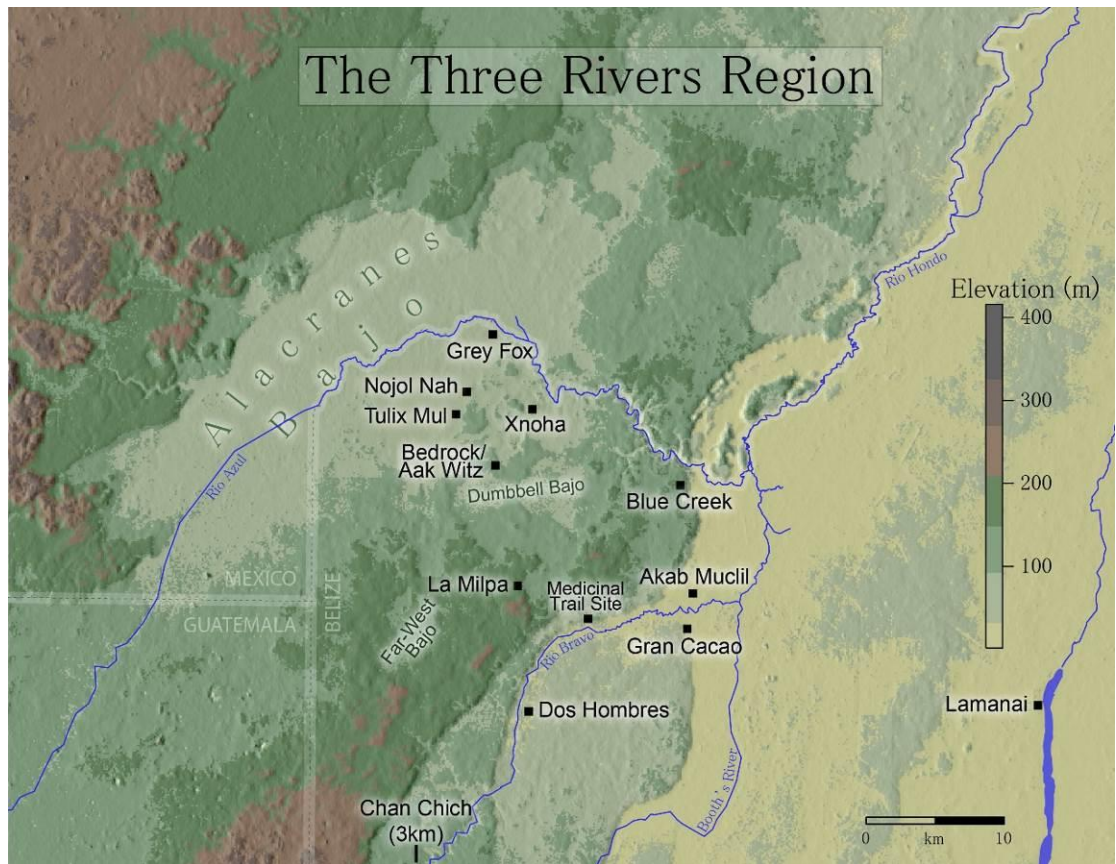


Figure 13 Map of sites mentioned in chapter

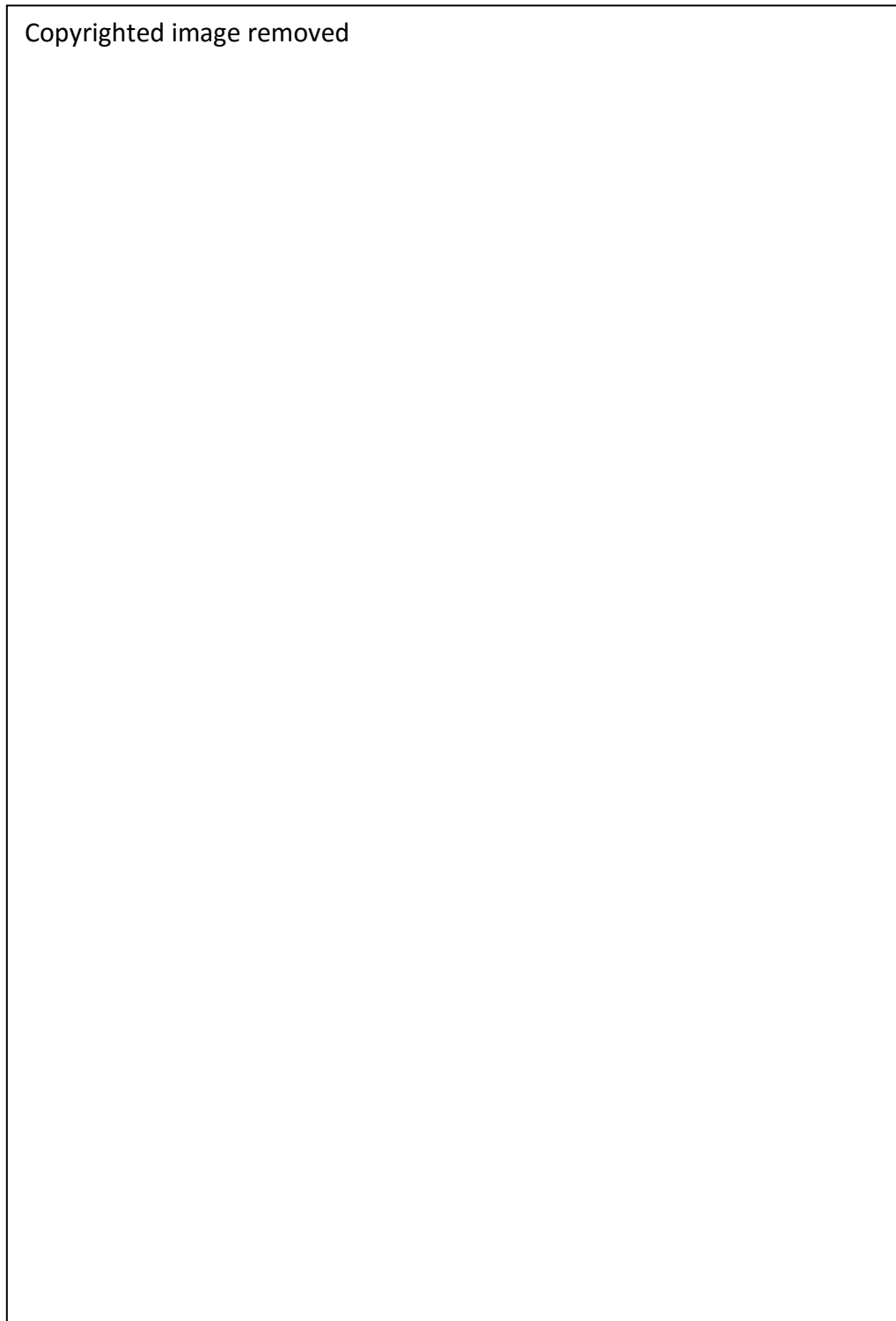
### La Milpa

La Milpa (Fig. 14) is the largest site in the Three Rivers Region. It is one of the most thoroughly investigated sites in the area (e.g. Grube 1994; Guderjan 1991b; Hammond 1991b; Hammond and Bobo 1994; Hammond and Tourtellot 1993; 2004; Hammond et al. 1996; 1998; Sagebiel 2005; Zaro and Houk 2012). La Milpa's site core is on top of a prominent limestone ridge 180m above sea-level. The site covers an area of 78 square kms, and is the third largest site in the whole of Belize. It is considered to be a major centre. The site core of La Milpa contains three plazas, five temple pyramids, nineteen stelae, and two ball courts, and follows the topography of the ridge upon which it is situated. There are smaller centres to the north, east, south, and west of the site core (Kunen 2004, 11), which according to Tourtellot et al. (2003) represent a cosmogram or quincunx. La Milpa had a complex system of water control (Scarborough and Dunning 1995 cited in Kunen 2004). La Milpa was occupied from the Late Preclassic to the Terminal Classic, with occupation at the site shifting between the site core, and the

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smaller centres. There was notable expansion and population growth in the Late Classic, and this led to landscape modifications, including the creation of gardens, agricultural fields, terraces, and earthworks, and these features indicate centralised control (Sagebiel 2005). The sustaining area for the populations at La Milpa was believed to have been the Far West Bajo, located 3km northwest of the site core (Hyde 2003, 50-51), and this bajo will be discussed further later in this chapter. La Milpa conforms to Type 1 in Ashmore's (1991) site planning template.

#### 4. Previous Research in the Three Rivers Region



**Figure 14** Map of La Milpa site core (Zaro and Houk 2012, 146)

Construction and population growth at La Milpa reached its apogee in the second half of the Late Classic period; however the site soon declined and much of it was abandoned, with lingering occupation of the smaller centres to the east and north of

#### 4. Previous Research in the Three Rivers Region

La Milpa, until they too were abandoned. The reason(s) for decline and abandonment remain a mystery, as abandonment appears to have occurred in the middle of a surge of public works, when elite residences, religious buildings, and the administrative infrastructure were all undergoing expansion (Hammond and Tourtellot 2004). After the site was abandoned, it was never re-occupied, but there is evidence of possible pilgrimages to the site during the Postclassic.

#### **Dos Hombres**

Dos Hombres is located 16km east of the modern Guatemalan border, 13 km southeast of La Milpa and is one of the largest sites in the TRR. The Dos Hombres site has three large north-south oriented plazas and smaller courtyard groups within its vicinity (Fig. 15). The three plazas were constructed atop limestone hills, surrounded by a bajo (Hyde 2003, 54). The first trace of human activity in the Dos Hombres area was in the Middle Preclassic, with construction of the site beginning in the Late Preclassic. The site was then occupied until the Late Classic, with some evidence of re-visitation, possibly pilgrimage events but not settlement, after abandonment. The re-visitation of Dos Hombres dates to the Late Classic. The site contains clear elements of Ashmore's (1991) site planning template (Type 1): monumental architecture laid out on a north-south axis, architectural and functional dualism between the northern and southern parts of the site (Houk 1996). These features and others seem to be common at monumental sites in the northeast Peten and northwest Belize.

#### 4. Previous Research in the Three Rivers Region

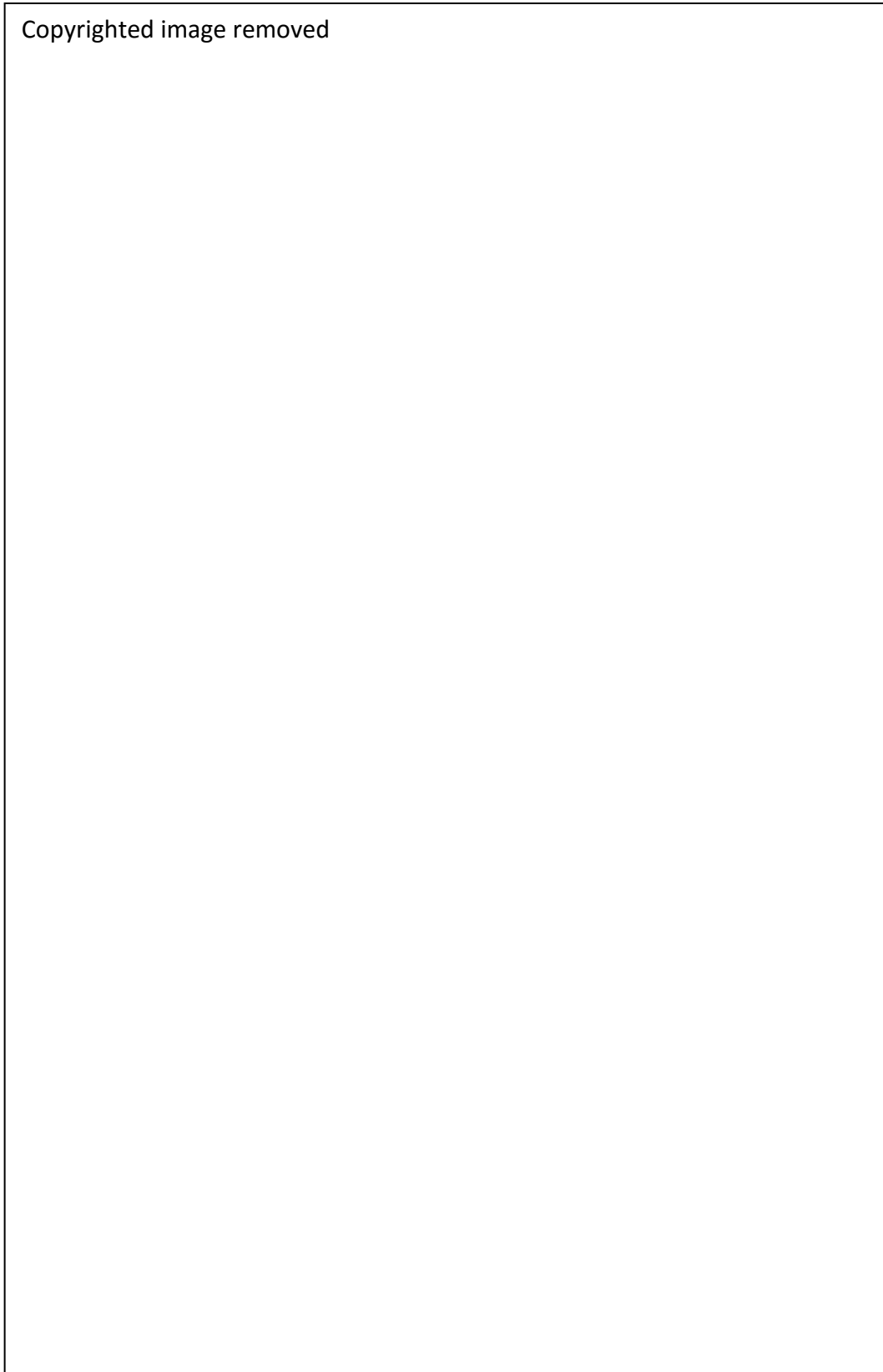


Figure 15 Map of Dos Hombres (Hyde 2003, 43)

### Blue Creek

Blue Creek is another site in the Three River's Region that has been intensely investigated over a number of years (Guderjan 2007). Within the TRR only Blue Creek has a ballcourt that was constructed during the Early Classic period. Ball courts at other sites, such as Dos Hombres, La Milpa, and Gran Cacao, were constructed in the Late Classic (Lohse et al. 2013). The site of Blue Creek consists of 2 large plazas which contain monumental architecture (Fig. 16), a ball court, and several hinterland communities. Blue Creek conforms to Type 2 in Ashmore's (1991) site planning template. According to Litchenstein (2000, 1) over 400 cultural features have been recorded at Blue Creek. Guderjan has argued convincingly that Blue Creek was an independent polity (N. Hammond 2009, 530), at least in the Early Classic, despite being near to La Milpa, one of the largest sites in the whole of Belize (N. Hammond 2009, 530). The presence of an Early Classic ball court is a major factor in this argument. Blue Creek was a wealthy centre, especially for its modest size, and this was likely to have been because of its rich agricultural land, and its control of the Rio Hondo headwaters (Guderjan 2007). Numerous jade caches have been found throughout the site, and in one tomb at Blue Creek (Tomb 5) over one hundred pieces of jade were found.

Blue Creek's site core is located atop the Rio Bravo escarpment, and overlooks the vast coastal plain 150m below. Blue Creek is located at an ecotone. An ecotone is a place where two ecological zones meet, in this case, the Peten physiographic district, and the Belize coastal plain (Guderjan 2007). Therefore the inhabitants of Blue Creek would have had a variety of different resources within reach. In addition to this, Blue Creek is located at the headwaters of the Rio Hondo, which in turn flows into the Rio Bravo, and the Rio Bravo goes all the way to the Caribbean Sea. Surrounding the public/administrative areas of the plaza were residential groups (Fig. 17), each with its own individual characteristics, which in turn were all surrounded by agricultural fields (Guderjan 2007, 9). However to date, the commodity circulation routes and processes amongst these settlement areas remain obscure (Clayton 2013, 172). To the west of



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the site core the land is made up of a mixture of bajos which contain deep fertile soils, and are interspersed with rolling limestone hills (Baker 1996).

Guderjan (2007, 92-99) has identified at least five different agricultural techniques utilised by the Maya of Blue Creek: Lowland ditched fields, upland dry farming, kitchen gardens and house-lots, terraces and check dams, and specialised niches such as *Rejolladas* (Guderjan 2007, 92-99). These represent a mixture of individual household farming techniques and techniques that would have required centralised control (G. Hammond 2009, 43). Guderjan has estimated that the Blue Creek Maya would have used at least 40 square kms for upland dry farming, and at least 5 square kms of lowland ditched fields. In terms of lithic resources, the chert outcrops around Blue Creek were poor in terms of providing raw material for stone tools (Barrett 2004, 112); therefore lithic resources were procured from further to the west, including from the Nojol Nah area, and the Dumbbell Bajo area.

The first sign of human occupation at Blue Creek was in the Middle Preclassic. Ceramics dating to this time have been found in Plaza A, in a midden underneath the ball-court, and these ceramics are likely to represent a nucleated community living atop the Rio Bravo escarpment (Guderjan 2007, 44). In the latter portion of the Late Preclassic, the first of Blue Creek's monumental architecture was built, with structures in both Plazas A and B being erected. At 100 A.D. the first royal leader was installed (Guderjan 2007, 45) and during this time, the population of the site expanded dramatically, with settlements established in all of the residential areas around the site core. During the latter part of the Late Preclassic, Blue Creek displayed signs of great wealth, with the aforementioned Tomb 5 dating to this time period. During the Early Classic, major construction projects, including the ball-court, continued, and Blue Creek continued to grow. Blue Creek's access to jade reached an all-time high in the Early Classic, with large quantities of jade found in caches, and in both elite and non-elite burials. During the Early Classic period, 'Blue Creek was thriving economically and politically, and was an integrated system of residential areas somehow tethered to the core' (Guderjan 2007, 46). In 500 A.D. however, the situation changed after a massive

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cache was interred at Str. 4, and according to Guderjan (2007), this caching event may represent a dedicatory event related to warfare, a lineage ending, or an attempt to rejuvenate leadership. Whatever the case, after this event, things at Blue Creek changed dramatically. Str. 1-iv was razed, and formerly sacred areas were turned into private residences. The Late Classic period saw continued maintenance and modification of structures within the site core, with the expansion of elite residences outside of the site core. Jade no longer appears in the archaeological record after the Late Classic at Blue Creek, and this may have to do with changing economic dynamics in the immediate and wider area. The abandonment of the site in the Terminal Classic is marked by large ceramic, and other artefact deposits against many of the structures, and by 900 A.D., the site was abandoned (Guderjan 2007, 46). Evidence for Postclassic activity is seen at the residential area of Chan Cahal, where an ephemeral Postclassic presence was detected (Guderjan 2007, 47).

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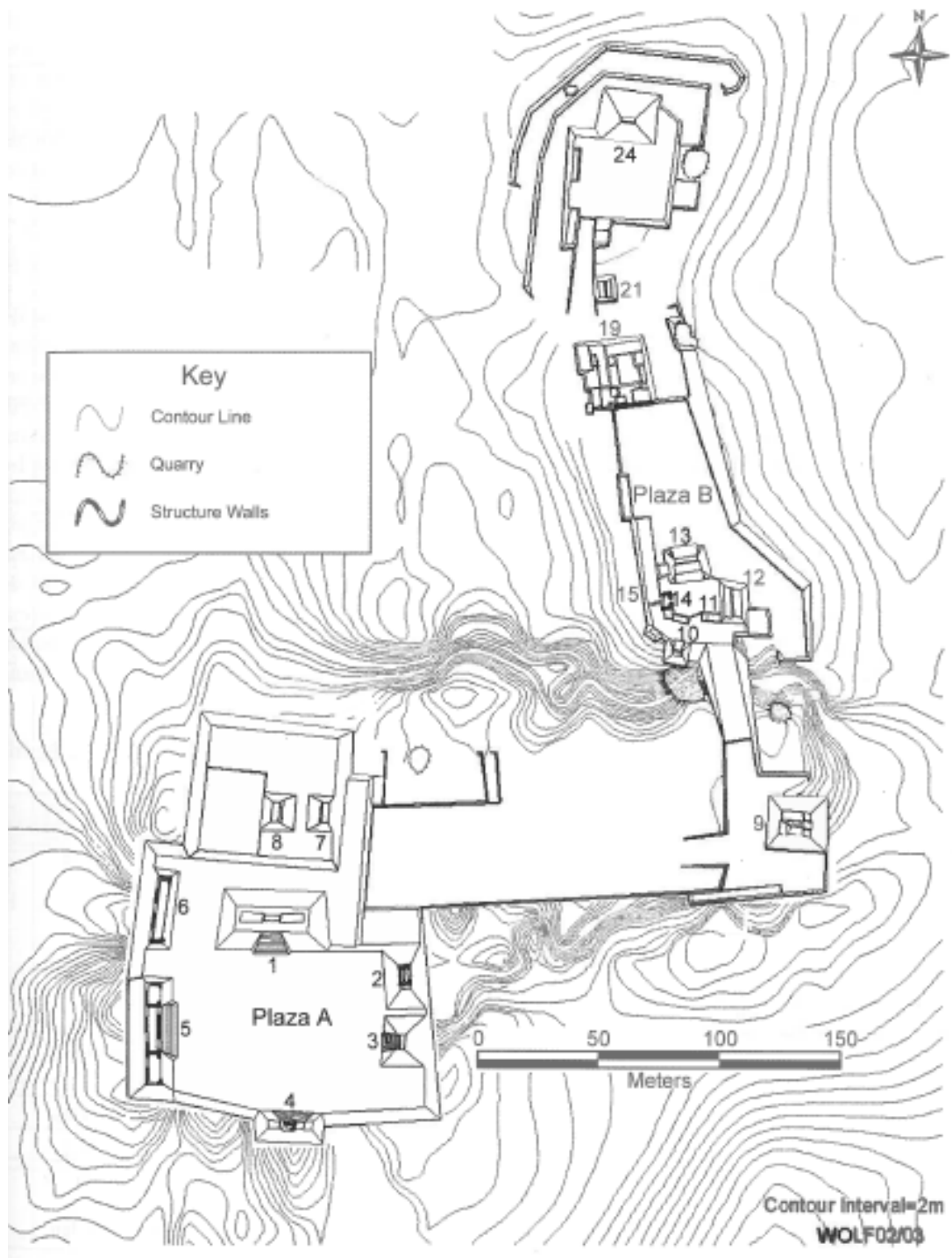


Figure 16 Map of the Blue Creek Site core map by Marc Wolf (courtesy of Tom Guderjan)

#### 4. Previous Research in the Three Rivers Region

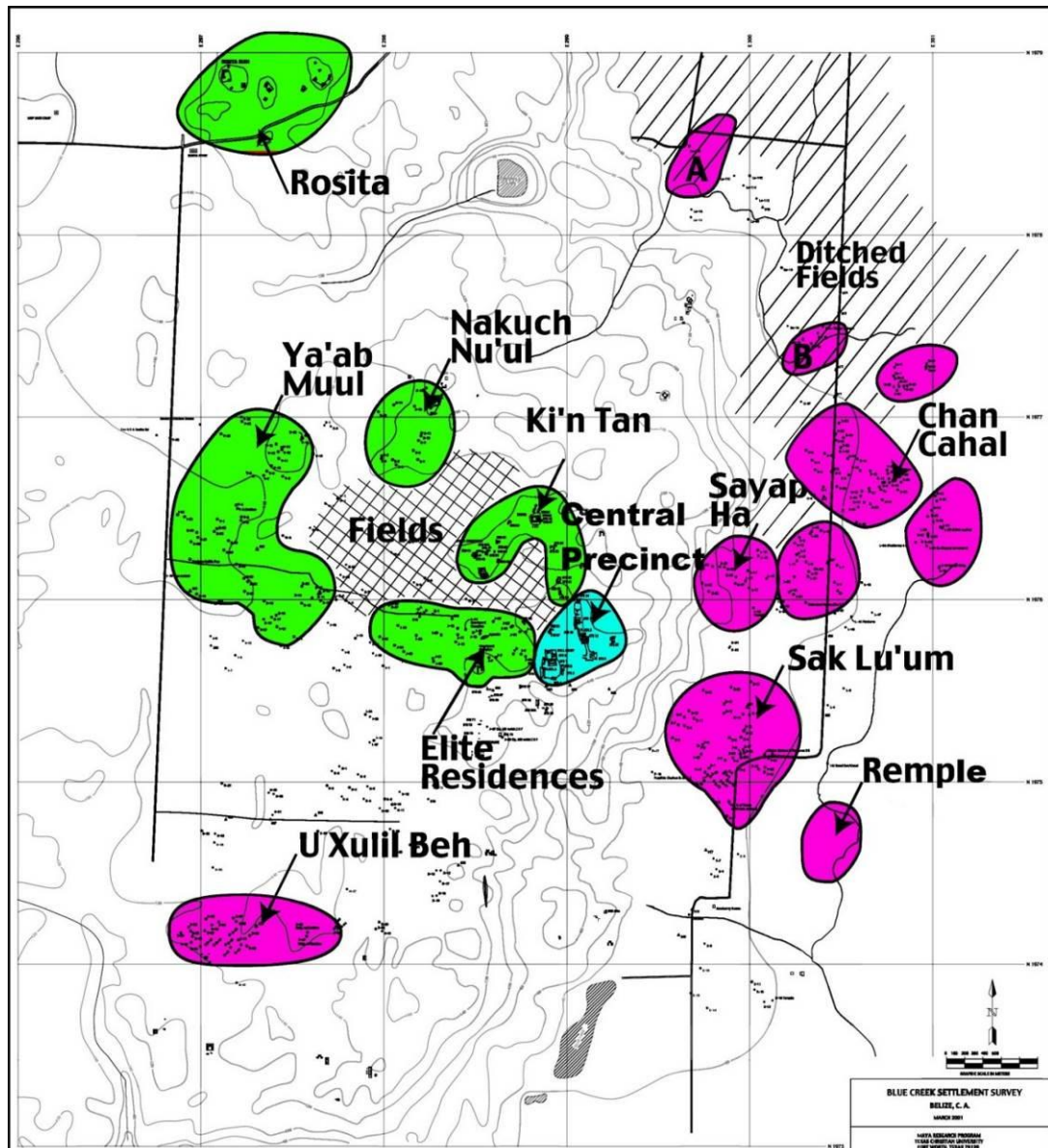


Figure 17 Map of the residential areas surrounding Blue Creek (courtesy of Tom Guderjan)

### Settlements Associated with Blue Creek

#### Rosita

Rosita (Fig. 17) is located approximately 3.5kms to the northwest of the Blue Creek site core, and is associated with a dock and dam feature indicating participation in riverine, and perhaps coastal trade routes (Guderjan and Barrett 2006; Van der Notelaer 2016a). Rosita consists of eight hill top groups, containing more than 20 structures (Fig. 17). The Rosita hills rise approximately 20-25m above an expansive bajito, with the bajito providing an important agricultural resource controlled by the Rosita residents

#### 4. Previous Research in the Three Rivers Region

(Guderjan 2007, 56). Str. RS-20 served as the community's axis mundi, and was located at the northern end of the settlement (Van der Notelaer 2016b, 48). Str. RS-21 was a circular platform likely to be a small shrine or platform (Preston 2008, 9). Material spanning the Late Preclassic through the Late Classic was recovered from Str. RS-20; however the majority of the material was from the Late Classic. Elsewhere at Rosita, for example at the RS-7 structure, construction continued into the Terminal Classic. Material recovered from the RS-9 patio group indicated ritual behaviours including a crypt containing four jade beads, and a zoomorphic jade object (Fig. 19). The zoomorphic object has been interpreted as a monkey head, and as Van der Notelaer (2015a, 50) points out, monkeys were symbols of scribes, therefore possibly indicating the presence of a scribe at Rosita. Since writing is associated with upper class members of society, the presence of a scribe at Rosita, writes Van der Notelaer (2015a) suggests that there was an elite presence at Rosita; however, this supposition of course is contingent on the veracity of the interpretation of the zoomorphic object. However, the presence of both elaborate and simple residences at Rosita indicates that there was a broad spectrum of social classes at this location.

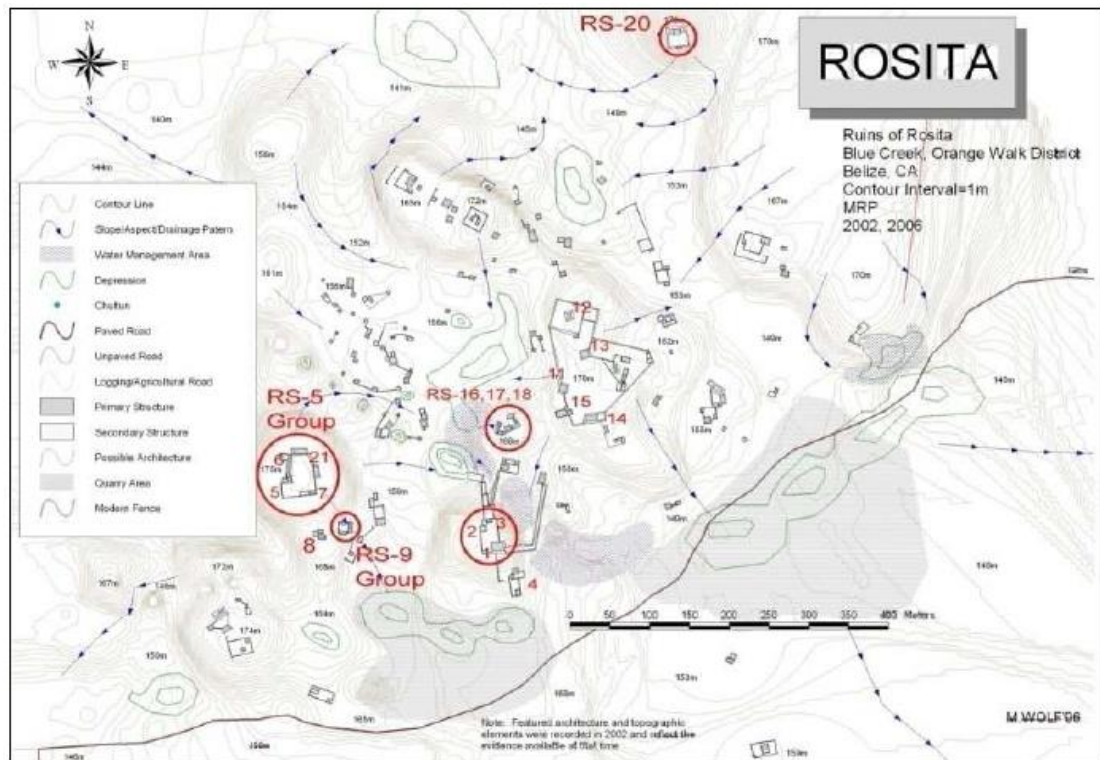


Figure 18 Map of Rosita (courtesy of Tom Guderjan)

#### 4. Previous Research in the Three Rivers Region



Figure 19 Zoomorphic jade object, roughly 2 cm wide (courtesy of Tom Guderjan)

#### U Xulil Beh

The U Xulil Beh settlement area is located roughly 2.5km southwest of the Blue Creek site core (Fig. 17). The U Xulil Beh area has not been fully documented, however in the area that has been studied, there are roughly 30 small residential structures surrounded by agricultural terraces to the west. The U Xulil Beh settlement is set on a flat area that is bounded by a steep ridge with agricultural terraces constructed on the western side of the ridge (Fig. 20).

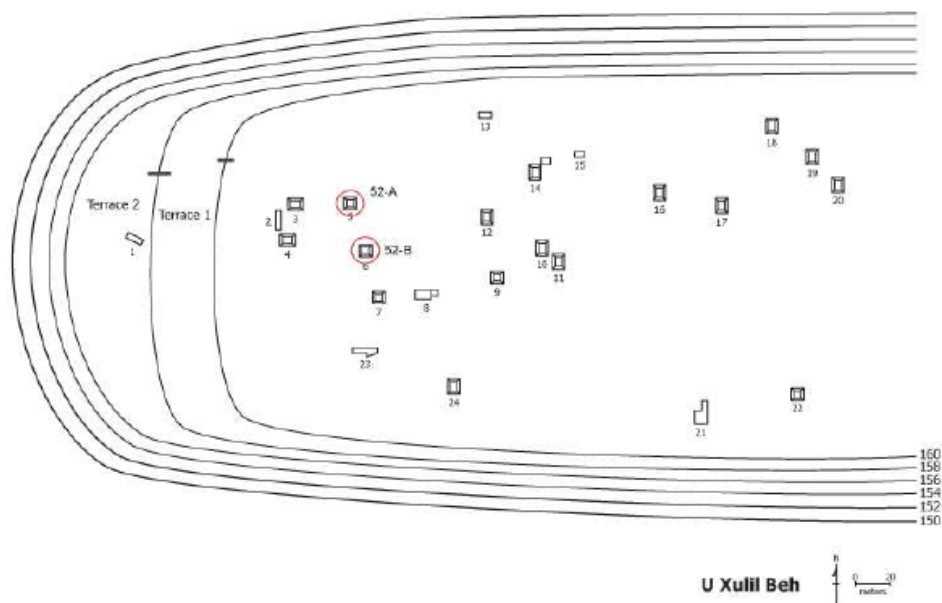


Figure 20 Map of U Xulil Beh (courtesy of Tom Guderjan)

#### 4. Previous Research in the Three Rivers Region

Biosilicate analysis on samples from the terraces suggests that the cultivation of palms and edible fruit was taking place on the U Xulil Beh terraces (Bozarth 2009; Van der Notelaer 2016a). There is some suggestion of stratification within the settlement portion that has been excavated, based on different architectural configurations; however no elite goods or burials have been recovered from U Xulil Beh to date. Ceramic material recovered from U Xulil Beh suggests that this area was settled in the Early Classic.

The Quincunx architectural complex is located just to the south of the U Xulil Beh settlement area. The Quincunx architectural group contains a central structure, surrounded by four low cobble platforms creating an asymmetrical layout. The construction of this complex dates to AD 650 – AD 750. These platforms lie to the northwest, northeast, southeast and southwest of the central structure. The group is surrounded by small-scale settlement for around 500m in all directions, and there are numerous agricultural features in the vicinity, including terraces, berms and water control features, but there are no large administrative structures associated with the settlement (Zaro 2003, 83) as is the case at U Xulil Beh.

#### **Chum-Balaam-Nal**

Chum-Balaam-Nal (CBN) is located approximately 1.5 kms south of the Blue Creek site core. Only the central courtyard of the settlement has been excavated to date, and it is currently unclear where the boundaries of CBN lie. Excavations suggest that the CBN courtyard was inhabited by elite members of society (Van der Notelaer 2016a, 46), and this interpretation is based on the architectural complexity of the group and excavated materials, including jade and obsidian. The earliest construction of the CBN courtyard dates to the Terminal Preclassic period and occupation continued until the Terminal Classic period. Ritual behaviour is noted at CBN with the presence of two Early Classic caches, one comprising a vessel containing ash, and the other comprising sherds, a bifacial tool, and three flat circular stones (Preston 2011; Van der Notelaer 2016a). The abandonment of CBN occurred in the Terminal Classic, soon after large concentration

#### 4. Previous Research in the Three Rivers Region

of artefacts was deposited; this deposit consisted of 4000 sherds and 19 lithic tool fragments that showed signs of burning (Van der Notelaer 2016a, 47).

#### Kin Tan

Kin Tan is located just to the west of Plaza B of Blue Creek's central precinct (Fig. 17). It is an area of elite residential architectural complexes set on hilltops comprising seven patio groups, three courtyards and one plazuela (Fig. 21), and each of the residential complexes had its own ritual central place (Guderjan 2007, 54). Additionally Kin Tan is nearly completely surrounded 'by uninhabited flatlands that are so fertile that it is unimaginable that they were not used for dry farming' (Guderjan 2007, 55). There is an absence of commoner households at Kin Tan, so presumably the inhabitants of Kin Tan were either doing their own farming, or importing daily labourers from elsewhere (Van der Notelaer 2016a, 39). Equally though, labourers may have lived in ephemeral structures that left no trace in the archaeological record.

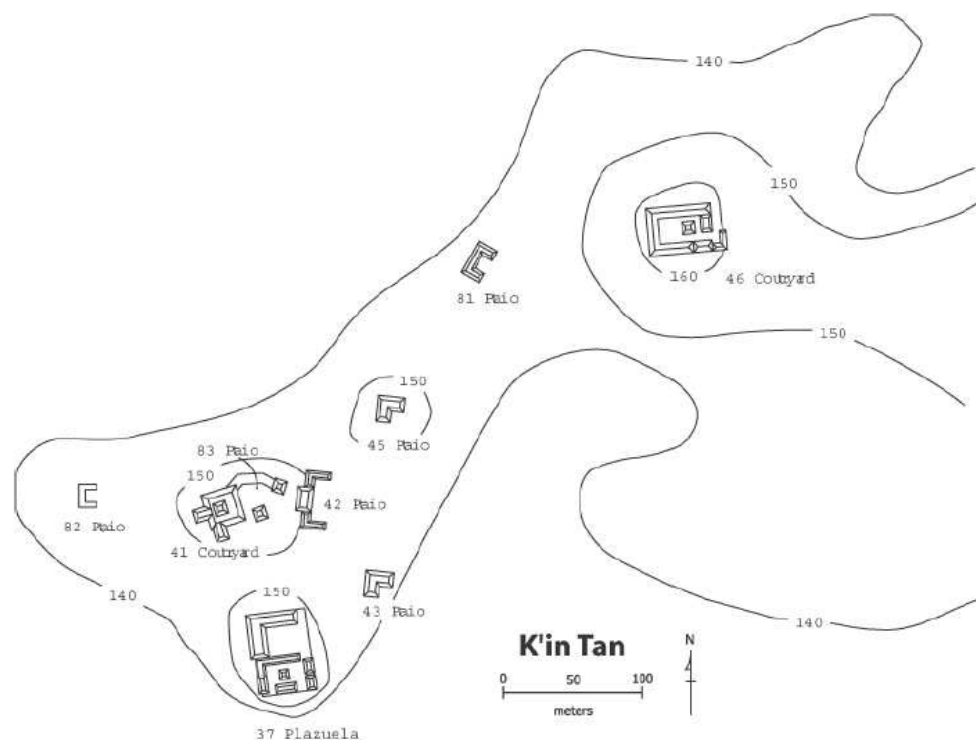


Figure 21 Map of Kin Tan (courtesy of Tom Guderjan)



#### 4. Previous Research in the Three Rivers Region

Kin Tan's earliest occupation dates to the Late Preclassic as evidenced by a midden. The earliest construction date at Kin Tan was very early in the Early Classic, and there was an abundance of construction in the Late Classic indicating the prosperity of the Kin Tan inhabitants during the Late Classic period. A total of four graves were found in Str. 37 (the largest and most elaborate structure) alone, and grave goods included carved high quality jade and marine resources (Van der Notelaer 2016, 39). Sub floor burials at Str. 37 followed by architectural expansion indicates ancestor veneration and the continuation of a powerful lineage over centuries (Van der Notelaer 2016a, 39). Construction appears to have ceased by the Terminal Classic and the abandonment of Str. 37 is linked to a termination deposit that included items such as obsidian blades, and ceramic figurines. A similar pattern is seen elsewhere in Kin Tan with Str. 46 (the next most prominent structure after Str. 37) also abandoned in the Terminal Classic period. The abandonment of Str. 46 was, like Str. 37, preceded by the deposition of a termination deposit that included chert biface fragments, obsidian blades, hammer stones, a mother-of-pearl bead, and 235kg of sherds (Van der Notelaer 2016a, 41).

#### **Chan Cahal**

Chan Cahal (Fig. 17), unlike Kin Tan, CBN, and Rosita is situated below the escarpment upon which the Blue Creek Site core sits. Guderjan (2007, 60) describes Chan Cahal (Fig. 22) as a non-elite residential farming community surrounded by extensive wetland agricultural fields. Chan Cahal appears to be the earliest inhabited settlement in the Blue Creek area with occupation beginning in the Middle Preclassic (Van der Notelaer 2016, 51). Due to the position of Chan Cahal at the bottom of the escarpment, it was at risk of seasonal flooding. To mitigate this risk, in the Late Classic period, the Chan Cahal residents built a series of ditched fields and canals to protect their crops, and these land modifications were in use until the Terminal Classic period (Luzadder-Beach et al. 2012). In addition to these large-scale land modifications, many of the Chan Cahal houses had kitchen gardens indicating a distinction between crops grown for economical purposes, and those for personal use (Van der Notelaer 2016a, 51). Chan Cahal consists of loosely arranged house mounds, with the exception of Str. U-5, a Late Classic two-roomed masonry building thought to be an elite residence with

#### 4. Previous Research in the Three Rivers Region

possible secondary public functions (Guderjan 2007, 60), that had a circular free-standing platform to its west. This circular platform appears to have fallen out of use after the early phase of the Late Classic (Van der Notelaer 2016b, 89).

In a number of the residential structures Yucatecan slate wares were recovered indicating trade with outside areas presumably linked to the agricultural surplus that the Chan Cahal residents were able to produce. Although Chan Cahal was inhabited by non-elite people, a remarkable number of jade artefacts have been recovered from this location, and Guderjan (2007, 61) suggests that ‘the presence of this jade is a reflection of the relationship between the wealthy royalty [of Blue Creek] and those whose work in the agricultural fields created wealth for the royalty’.

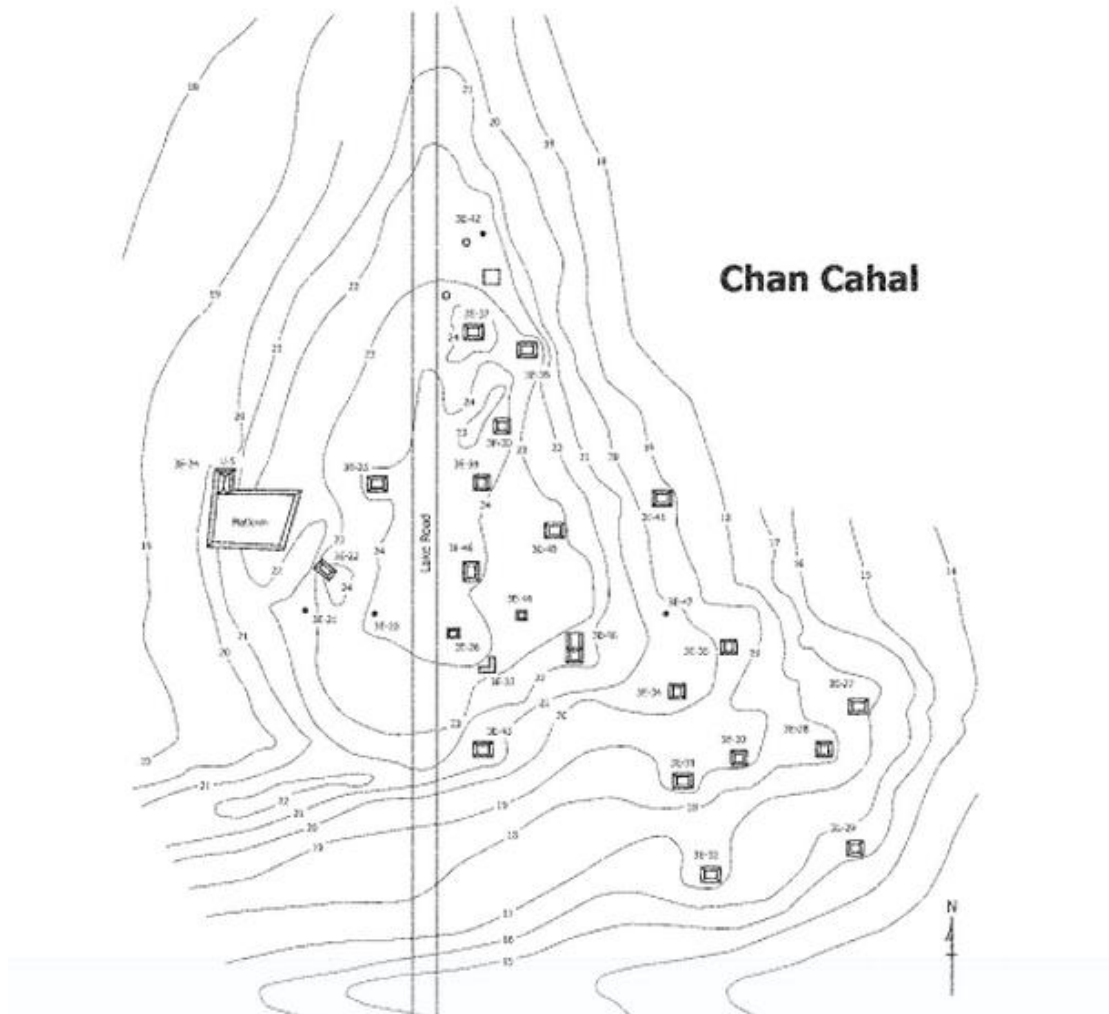


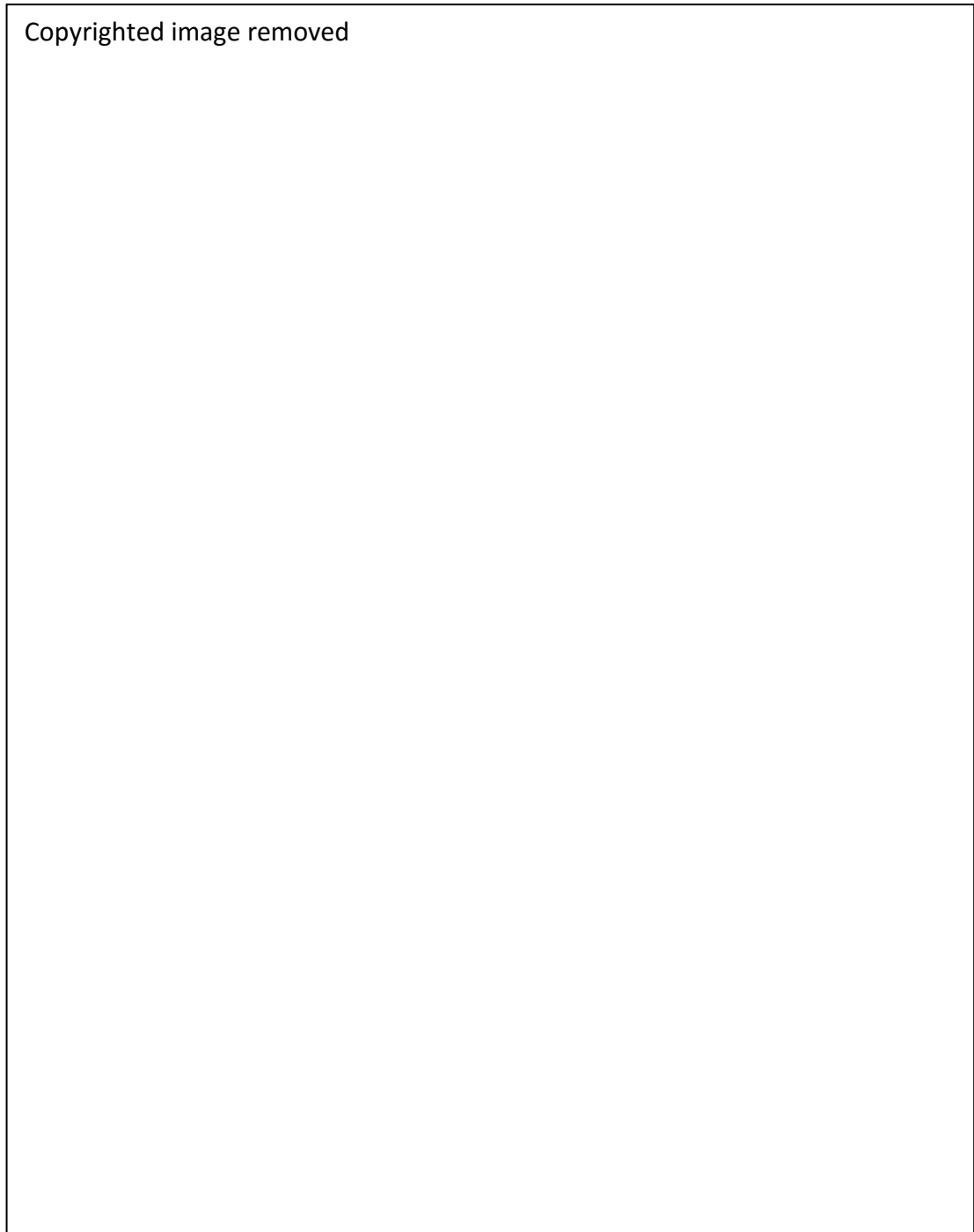
Figure 22 Map of Chan Cahal (courtesy of Tom Guderjan)

### **Gran Cacao**

Like Blue Creek, Gran Cacao (Fig. 23) is another medium-sized centre located in the TRR. Gran Cacao is located 8 kms south of Blue Creek's site core. The site is situated in upland terrain, with a nearby river flood plain, and seasonal wetlands to its north and east (Lohse 2005). The settlement pattern of Gran Cacao appears to be dictated by the natural topographic features of the area (Hyde 2003, 56). Like Dos Hombres, there is Middle Preclassic, and Postclassic material present, but actual construction and occupation at Gran Cacao runs from the Late Preclassic to the Terminal Classic.

Excavations at Gran Cacao have concentrated on the ball court, although test excavations have been carried out at one of the central plazas, and two residential groups (Padilla 2007, 107). The Late Preclassic is represented by a ritual act that involved the placement of jade beads on top of bedrock, and Late Preclassic material is found all around the ball court area. Ritual acts are also seen continuing in the Early Classic, with the construction of round platforms. An Early Classic midden contained ceramics, turtle bones, fish bones, and terrestrial animal bones (Lohse and Sagebiel 2006), thus indicating some of the subsistence base at the time. During the Late and Terminal Classic, public rituals continued, as seen from the massive ritual architecture constructed during this era, including a ball court that was constructed in a single event over existing architecture. Interestingly the people of Gran Cacao continued large architectural endeavours during the Late/Terminal Classic when the nearby similar-sized site of Blue Creek was abandoned (Padilla 2007, 105). However, the site was eventually abandoned before the beginning of the Postclassic period. This site conforms to Type 2 in Ashmore's (1991) site planning template.

#### 4. Previous Research in the Three Rivers Region



**Figure 23 Map of Gran Cacao (Hyde 2003, 56)**

#### **Chan Chich**

Another site in the PfbAP area that has been intensively investigated is the small centre of Chan Chich (Fig. 24). Chan Chich is located at southern boundary of the TRR. The southern boundary of the TRR was arbitrarily set by R.E.W Adams (Houk 1996, 8-9; Scarborough and Valdez 2003, 3) because there was no natural physiographic feature in the south to denote the edge of the region. This site conforms to Type 1 of

#### 4. Previous Research in the Three Rivers Region

Ashmore's (1991) site planning template theory. Chan Chich is located at a bend in the Chan Chich Creek, and contains two plazas on a hilltop, surrounded by smaller courtyard groups of various sizes, and vegetation surrounding this site consists of three types of forest (Hyde 2003, 59). Occupation at the site's location began in the Middle Preclassic, as evidenced by the presence of a midden dating to this time. The terminal phase of the main plaza was built in the Late Classic; however, it was built atop earlier Late Preclassic structures. The site and its populations underwent rapid expansion in the Late Classic. Chan Chich also contains a ball court, and a causeway going west towards a small bajo (Houk and Valdez 2000, 159). The ceramic sequence of Chan Chich shows that it was first settled around 900 B.C., and abandoned by 850 A.D. (Valdez and Houk 2000, 136), which ties in to the general abandonment of other TRR sites. Like La Milpa and Dos Hombres, there is evidence at Chan Chich of special offerings being deposited in the Postclassic; however there was no permanent re-occupation of the site once it had been abandoned (Valdez and Houk 2000, 138).

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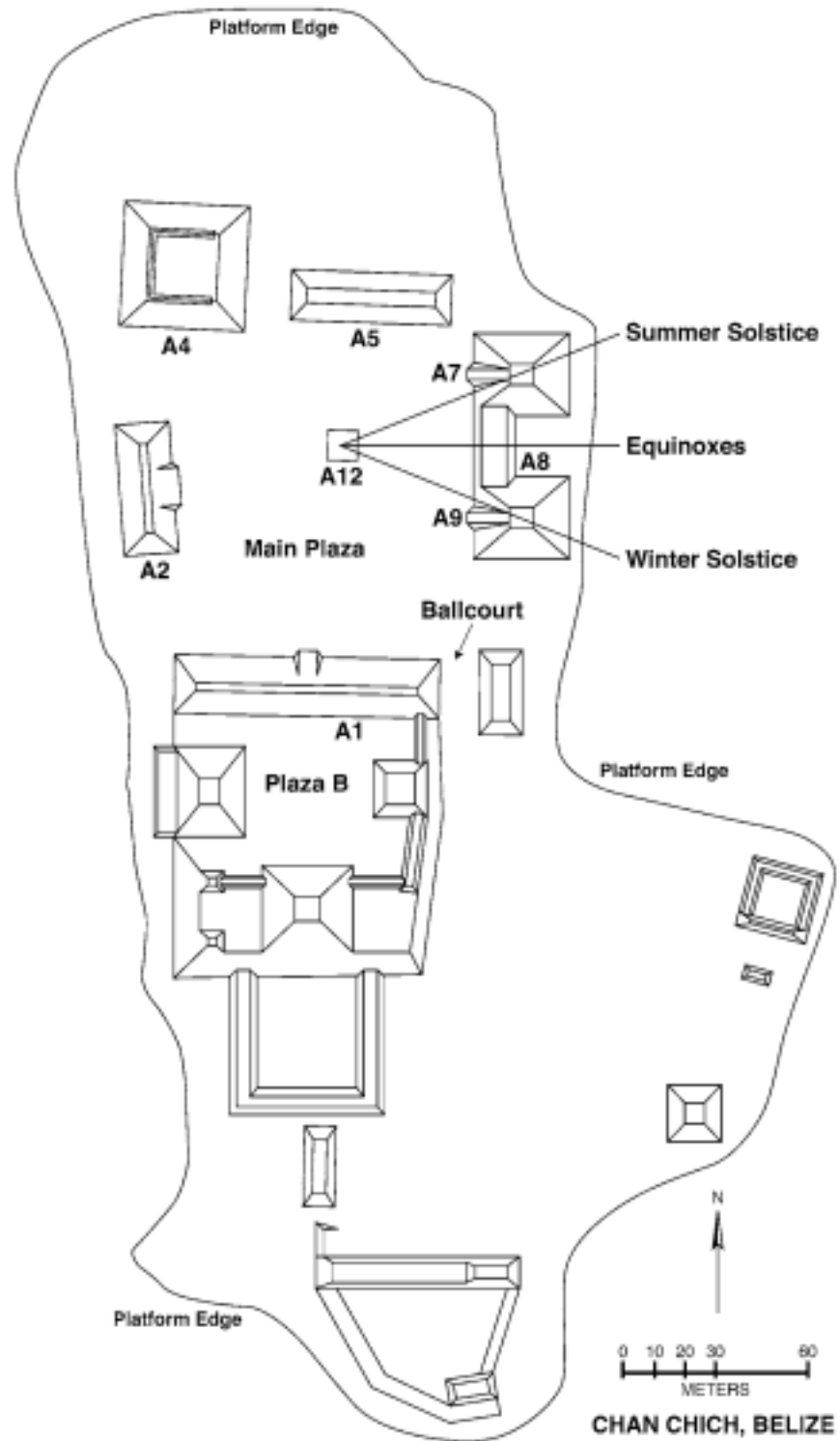
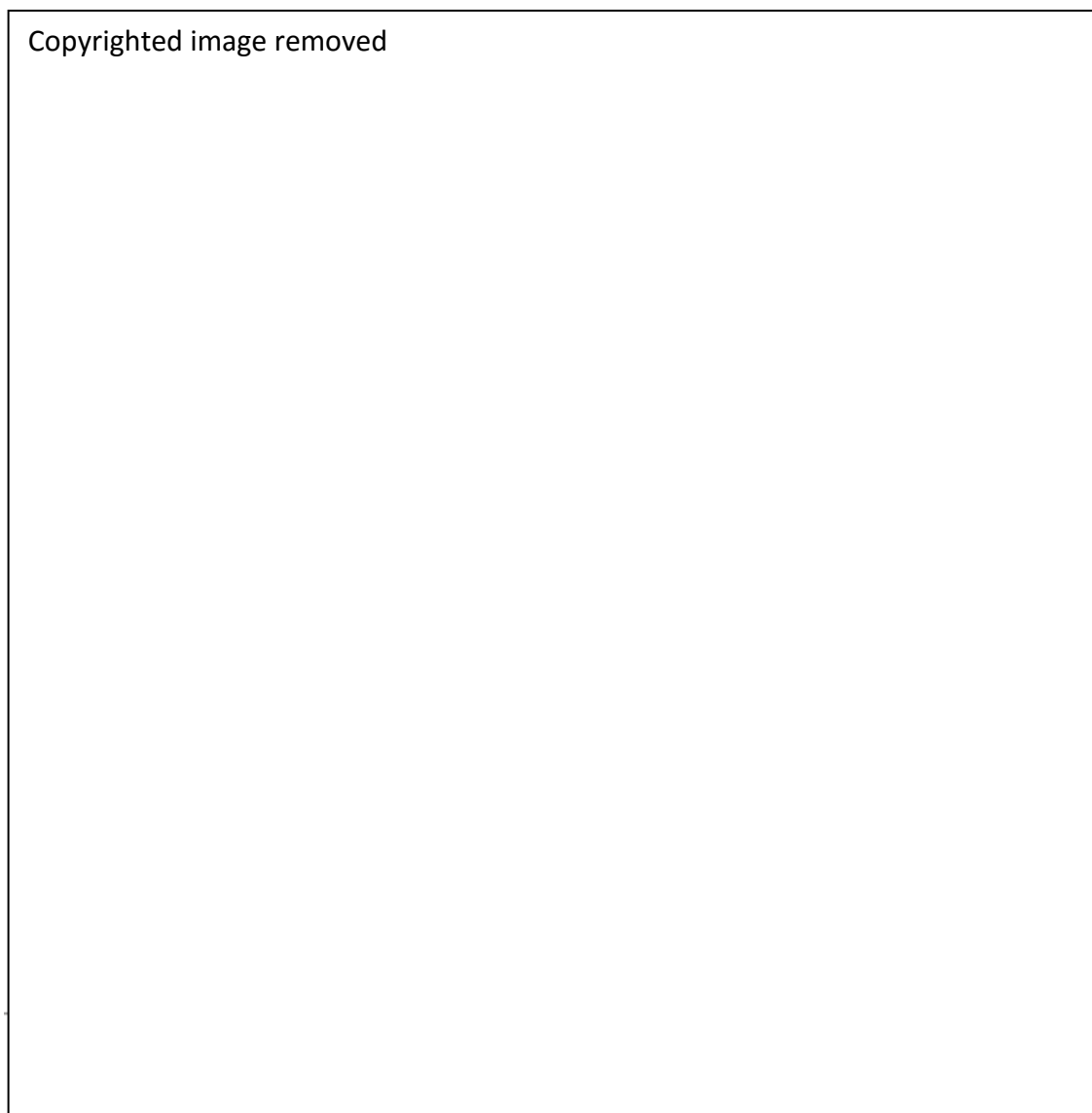


Figure 24 Map of the Chan Chich site core (courtesy of Tom Guderjan)

#### 4. Previous Research in the Three Rivers Region

##### **Medicinal Trail**

The Medicinal Trail site (Fig. 25) is a dispersed hinterland community consisting of three courtyard groups containing elite architecture, numerous informal clusters of mounds, and multiple landscape modifications such as depressions, terraces, and linear features (Hyde 2011, 174). In addition, a Preclassic round platform, and a number of burials have also been recorded at the site. Dental modifications were noted in some of the skeletal remains. Medicinal Trail is located on the eastern periphery of La Milpa, around 5km from the site core (Hyde 2013).



**Figure 25 Map of The Medicinal Trail site (Hyde 2011, 5)**

### **Akab Muclil**

Akab Muclil is a small nucleated residential cluster (Fig. 26) that is situated equidistant between Blue Creek and Gran Cacao. A site was first located in the vicinity by Guderjan in 1997, and named the Rempel group (Guderjan 2007, 14), after a local Mennonite farmer; however no excavation was undertaken at this time. This locale was not visited by archaeologists again until 2005, when the then MRP director John Lohse, and Antonio Padilla, a graduate student, named the site Akab Muclil, and began excavations. The site was newly named because Lohse and Padilla were unable to verify whether Akab Muclil was the same place as the Guderjan's Rempel Group (Padilla 2013). There were discrepancies between the original map and the located site, and there was some confusion as to why, if they were the same place, the site had been named after the Rempel family instead of the Reimer family, who owned that land (Padilla 2013). In 2011 Timothy Preston of MRP sought to verify Padilla's findings at Akab Muclil, and decided to revert back to using the name The Rempel Group -- although he spelled it Remple -- with the justification that this had been 'the original name' (Preston 2012, 20), although the name Akab Muclil had already been used in several publications (e.g. Padilla et. al. 2006; Padilla 2007; Sullivan et. al. 2007; Houk et. al. 2008; and subsequently Sagebiel et al. 2013). I will follow the majority and refer to this site by the name that the original excavators gave it, Akab Muclil.

Akab Muclil consists of two raised platforms that were constructed on a limestone outcrop surrounded by swampy bajo land. There are 13 prominent structures, and several other less visible ground level and buried features. At the centre of the site is a large pyramidal temple 4.5m high, which the excavator has described as 'squat' (Padilla 2013, 196). The site is just 500 ms from the Rio Bravo, and inhabitants of this site relied heavily on fresh water aquatic resources such as turtle, and jute. The excavator has described Akab Muclil as a *resource specialised community* focussing on riverine resources. The participation in long-distance trade at Akab Muclil is seen in the presence of materials such as green obsidian and granite (Padilla 2007, 119-120). Akab Muclil is situated in an environmentally diverse area (Padilla 2013, 196).



#### 4. Previous Research in the Three Rivers Region

The earliest occupation of the Akab Muclil area was in the Early Classic, and the population reached its peak in the Late/Terminal Classic. Postclassic ceramics formed 'a thin sheet midden [that] seemed to cover the entire site' and 'Early Postclassic construction occurred directly on top of the earlier buildings, most of which show some collapse between the Late or Terminal phases and the Postclassic ones' (Padilla 2007, 122). The Postclassic construction mainly consisted of low-lying house mounds. The Birds-of-Paradise agricultural ditched fields are located 2 kms from Akab Muclil. The Birds-of-Paradise fields were also used and maintained during the Postclassic period, and were likely to have been associated with Akab Muclil, as there were no other nearby sites in the area that were occupied during the Postclassic (Padilla 2007).

When Preston (2012) revisited Akab Muclil it was to test Padilla's data, and to try to determine whether the site was re-occupied in the Postclassic, or if there was continuous occupation. His excavation report states that the site was re-occupied 100-200 years after the initial abandonment, around the same time that the Bird-of-Paradise fields were used at 1100 AD (Preston 2012, 31). However, Padilla and colleagues (2013), while acknowledging that some of the structures show a break in occupation, demonstrated that stratigraphic layers, including mixed Terminal Classic and Early Postclassic materials from Str. 4 indicate 'permanent residence at this locale through the Late and Terminal Classic and into the Postclassic', and a piece of green obsidian from the Pachuca region of central Mexico found in an unmixed Postclassic context demonstrates that Akab Muclil was still involved in established economic networks outside of the Three Rivers Region during the Postclassic period (Padilla et al. 2013, 205 - 207). Whichever the case, Akab Muclil remains the only site in the TRR found to date that shows any significant occupation during the Postclassic, with Postclassic assemblages at other sites signifying visitation/pilgrimage events, rather than significant occupation.

#### 4. Previous Research in the Three Rivers Region

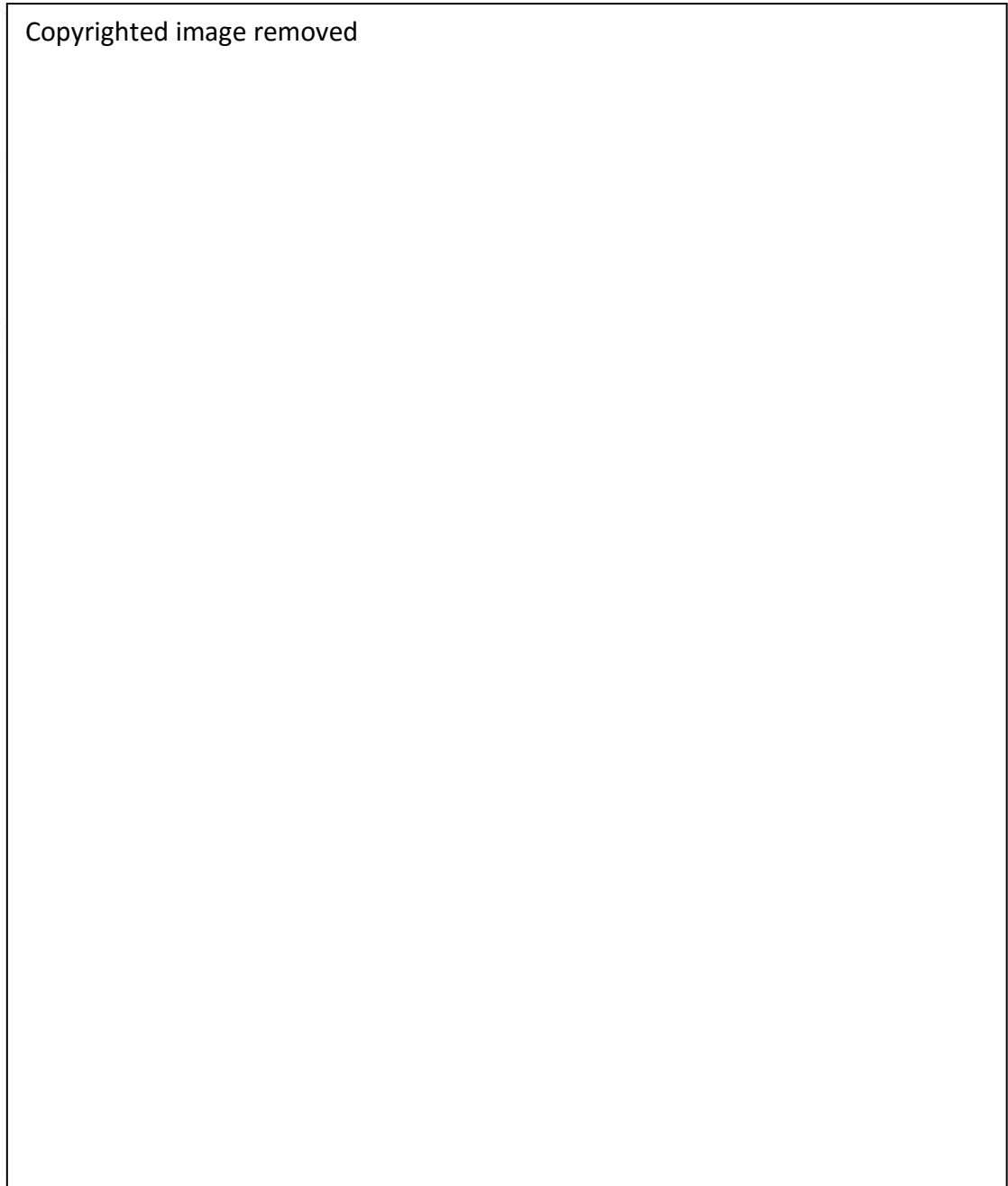


Figure 26 Map of Akab Muclil (Padilla et al. 2006, 13)

#### **Bedrock/Aak Witz**

The site of Bedrock and its associated elite courtyard group Aak Witz is the closest site to Blue Creek, although it is much smaller than Blue Creek. The majority of the site has been levelled by local Mennonite landowners, whose farming activities are systematically destroying much of northwestern Belize's archaeological heritage. The topography and soil is similar to that of Blue Creek, but with one major difference – the presence of a bajo (Barrett 2004, 81). Bedrock is located on the northern side of

#### 4. Previous Research in the Three Rivers Region

the Dumbbell Bajo, a bajo that covers around 42 square kms. The site of Bedrock (Fig. 27) contains 3 elite residential plazas (Mongelluzzo 2003, 71), that are surrounded by ten courtyards, but the site contained no ball court or stele, which are signs of political autonomy (Barrett 2004, 129). Therefore it is likely that Bedrock was economically and politically associated with a larger site (in this case probably La Milpa, which lay across the Dumbbell Bajo to the south) at least for most of its existence (Guderjan 2013, 234). Bedrock is also thought also to have significant economic ties with Blue Creek, and this is seen archaeologically by the large volume of lithic tools that originated from the Bedrock area that were found in multiple contexts at Blue Creek (Barrett 2004, 7). Test excavations in the main plaza undertaken by MRP in 2001 and 2002 suggest that construction of central Bedrock began in the Early Classic; however material recovered from an artificially excavated chultun date to the Late Preclassic (Mongelluzzo 2003, 77). There are a number of caves close to the Dumbbell Bajo on its north and east side and these were used by the ancient Maya, particularly in the Early Classic period (Guderjan 2013, 229).



Figure 27 Photograph of Bedrock from the air showing bulldozed mounds (Photo by Kim Cox)

One of the Bedrock courtyard groups, Aak Witz (Fig. 28), located 500m from the centre

#### 4. Previous Research in the Three Rivers Region

of Bedrock, may have served as a central place for the community that resided around it. Investigations by Pieta Greaves have uncovered ritual behaviour at the courtyard group in the form of an altar found inside a chultun (Fig. 29). Greaves contends that the chultun represents an artificial cave (Greaves et al. 2009, 52-53). Caves were important ritual spaces for the ancient Maya (Bassie-Sweet 1996; Brady and Ashmore 1999). Also found within the chultun/cave was an Early Classic midden. Initial analysis of the midden material revealed micro-faunal, faunal, and artefactual materials, which were extremely well preserved, and biosilicates included cultigens *Phaseolus* (bean), *Zea mays* (maize), and *Cucurbita* (squash) (Guderjan et al. 2010, 223).

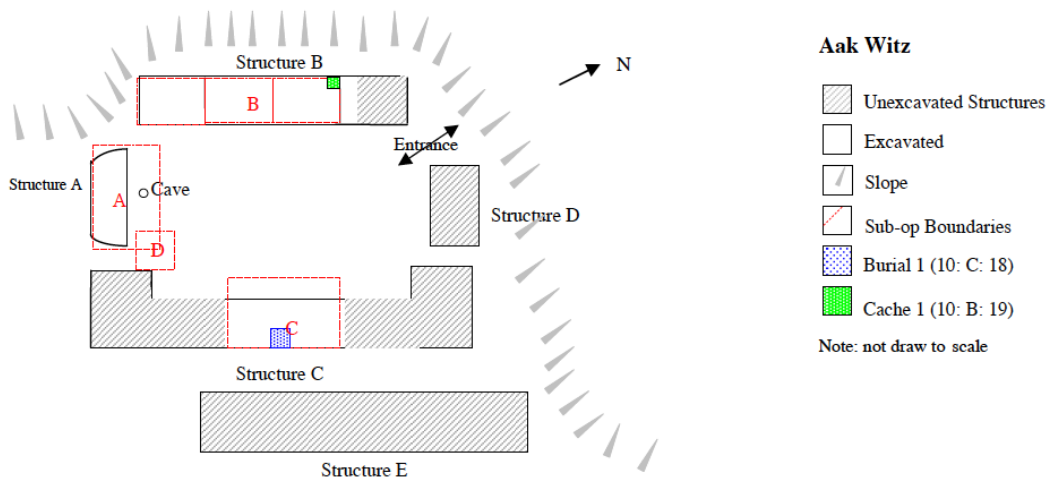


Figure 28 Map of Aak Witz (Greaves et al. 2009, 48)

#### 4. Previous Research in the Three Rivers Region



Figure 29 Photograph of altar within chultun at Aak Witz (courtesy of Tom Guderjan)

#### **Xnoha**

Xnoha (also previously spelled Ixnoha, Ixno'ha) was first located in 1990 by Tom Guderjan, and is situated approximately 14 kms northwest of the Blue Creek site core. It contains a large plaza with a range of residential architecture (Fig. 30) and a settlement zone of approximately 50 sq. kms.

#### 4. Previous Research in the Three Rivers Region

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**Figure 30 Map of the Xnoha site centre (Gonzalez 2005, 110)**

Xnoha is smaller than Blue Creek, but still of substantial size (Guderjan 2007, 16), and may have been an independent polity (Barrett 2004, 100). Xnoha contains two plazas, a single acropolis, and a stela. The stela is inferred to be the marker of an independent polity, the other being a ball court, as noted above. However, there is no ball court at

#### 4. Previous Research in the Three Rivers Region

Xnoha. As well as the monumental site core, there are smaller structures that make up the site, and Xnoha is surrounded by a series of small upland bajos and larger lowland bajos to the north, south, and west. Additionally, landscape modifications such as berms and terraces were located a km away from the site core, at the edge of its settlement zone (Kanipe and Gonzalez 2003, 45). The land directly around Xnoha is not especially fertile, and agricultural landscape modifications associated with Xnoha are located away from the site core area. The Mennonite farmers who work the land today use the land around Xnoha for ranching, rather than for agriculture. Guderjan (2013, 234) suggests that Xnoha was located at an inter-resource area where it may have exerted hierarchical control over communities located at the edge of the Dumbbell and Alacranes Bajo. However it is not clear whether or not this was the case, as large-scale excavations at Xnoha and its surrounding area are in their infancy at the time of writing.

Aside from the settlement survey information (Kanipe and Gonzalez 2003), most of the data published to date from Xnoha reflects the results of ceramic analysis (e.g. Gonzalez 2005), but lithic resources were abundant within proximity to the site, with high quality chert occurring naturally in the bajo. Recent work in 2012 and 2013 has focussed on a number of architectural groups in and around the Xnoha site core to reveal the broader construction history of the site (Parmington 2014, 101), and to create a comparative sample from the site to relate it to other similar-sized sites in the area (Plumer 2014, 83), particularly those in proximity to the Alacranes Bajo (McLellen 2014, 165). This is an ongoing project and is intended to be the primary focus of excavations undertaken by the Maya Research Program in the next few years (Guderjan 2013, Pers. Comm.).

#### **Grey Fox**

One of the more recently located sites in the Three Rivers Region is Grey Fox. Grey Fox is around 5 kms north of Nojol Nah, and also overlooks the Alacranes Bajo. The site is well placed to exploit the lithic resources of the area, as the site is bounded on its southern side by small ridges that seem to be the source of – or are at least capped by

#### 4. Previous Research in the Three Rivers Region

– thick dense chert cobbles. According to Cox and Ricklis (1999, 87-90), evidence seen at Grey Fox indicates that at least the initial stages of the reduction of tools was taking place where the raw materials were procured.

The central portion of Grey Fox contains interconnected two plazas, each measuring roughly 100 x 100m in size (McLerran 2011), with an 11.3m tall pyramid on the eastern side. There are also large elite residences, several range buildings, smaller house mounds, a ball court, as well as a third detached plaza, and a reservoir is located around 200m south of the site core (Fig. 31). While no excavation has been carried out at Grey Fox to date, this is an important site to consider in the social and cultural dynamics of the area. It is the second largest site in the MRP research area (after Blue Creek); it is the largest monumental centre on the eastern edge of the Alacranes Bajo; and it is located just 200m from the Rio Azul – indeed when we relocated the site in 2009, we accidentally crossed into Mexico, because at that time of year the river was dry. However during the rainy season, when the river flowed, canoe traffic would have been feasible and Grey Fox would have been linked to the Rio Hondo, and from there to a wider range of riverine networks, and ultimately to the Caribbean Sea (G. Hammond 2009, 48).



4. Previous Research in the Three Rivers Region

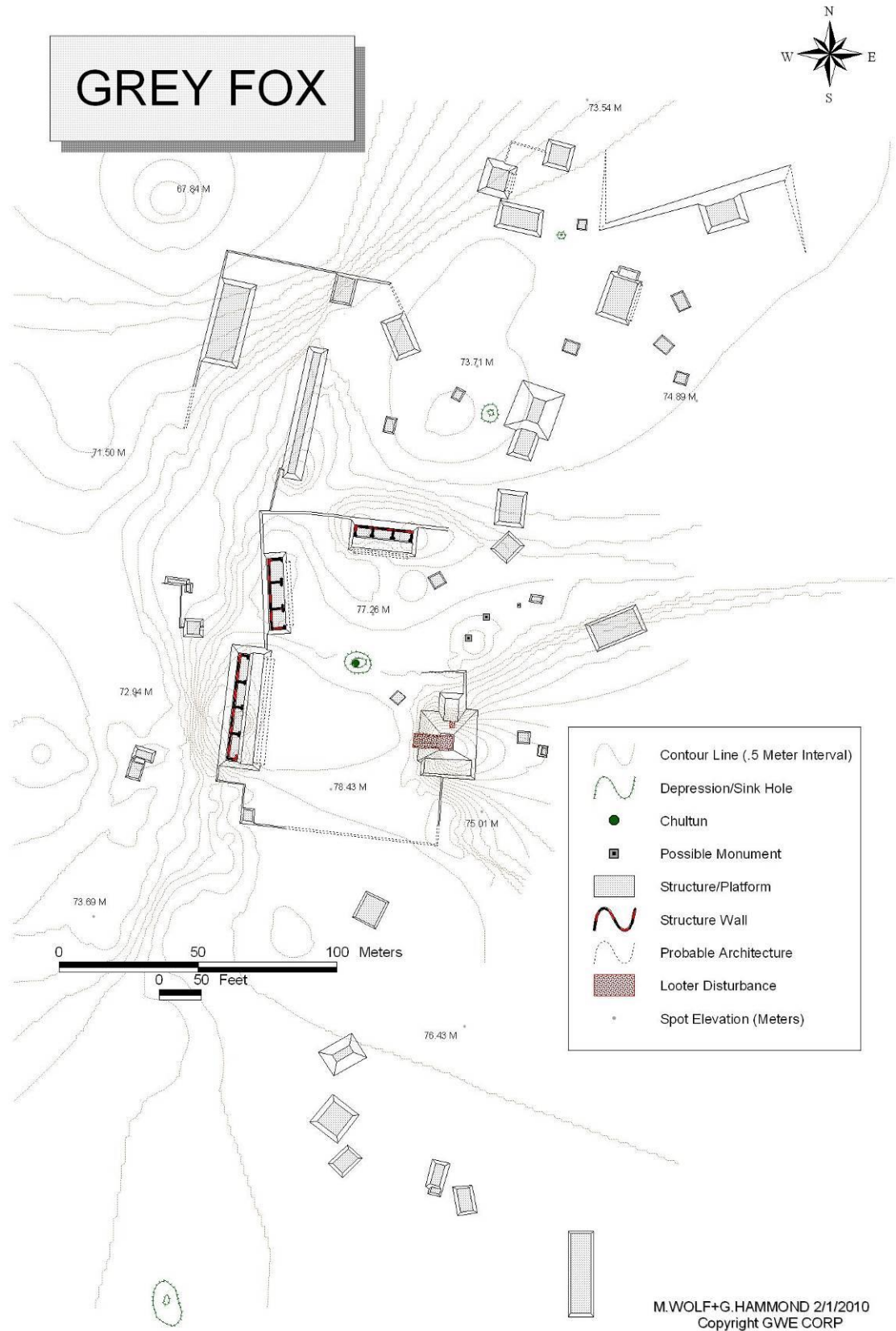


Figure 31 Map of Grey Fox (Marc Wolf and Gail Hammond)

### ***Studies of Bajos and Landscape Management in the Three Rivers Region***

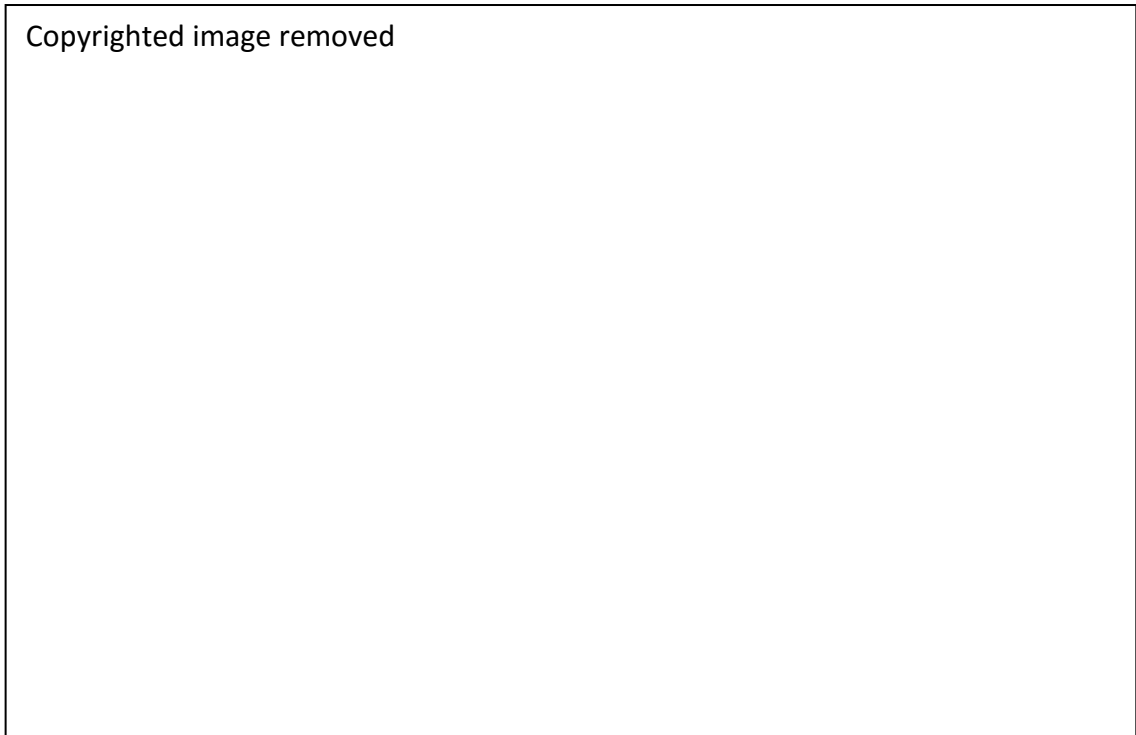
There have been a few detailed studies of bajos and associated settlements and landscape features over the past decade or so, including in the wider TRR, although not at the Alacranes Bajo. The most thorough and widely cited study was undertaken by Julie Kunen (2001) as part of her doctoral research, and focused on a bajo that was associated with the zone of La Milpa, known as the Far West Bajo. The heart of Kunen's study was the integration of three lines of evidence – settlement data, landscape modification data, and environmental data. I undertake a similar approach, and I consider Kunen's study an inspiration for my own work.

The Far West Bajo is on the outskirts of La Milpa, and Kunen examined three communities that were located nearby. The Bajo Hill site, consisting of 38 structures arranged in 17 groups; La Caldera, located on the northeastern edge of the bajo, which contained 75 structures arranged in 32 groups with some isolates; and Thompson's Group which contained 53 structures, arranged primarily in 24 groups and isolates. Rather than examining the entire landscape of the area, Kunen initiated a combination of survey transects and blocks (Fig. 32) 'which were subject to topographic mapping, pedestrian survey, and test excavation' (Kunen 2004, 19). She found that in the Far West Bajo, houses were clustered together and surrounded by agricultural zones rather than isolated houses. The house clusters were far enough apart to allow room for kitchen garden plots (Kunen 2004, 99). Kunen also reports that the land around the Far West Bajo was divided into house lots, agricultural areas, and extraction (of the bajo's resources) zones, and that this division was the core characteristic of a bajo community (Kunen 2004, 102).

In terms of how the bajo was used by these communities, Kunen found that there was little evidence for modifications of the bajo itself, but that there was ample evidence for land modifications, such as berms and terraces on the margins of the bajo. The ancient Maya farmers of the Far West Bajo 'exploited three related environments: settling and gardening the uplands, terracing and farming intensively the low slopes

#### 4. Previous Research in the Three Rivers Region

surrounding the bajo, and extracting raw materials and obtaining water from the bajo itself' (Kunen 2004, 1). Kunen's research led her to argue for the concept of *resource specialised communities* and convincingly demonstrated that the settlements under study at the Far West Bajo were located specifically to exploit that particular environmental zone, which includes not only the bajo itself, but the marginal areas that were located on the bajo's edge.



**Figure 32 Map of The Far West bajo, showing Kunen's survey blocks and transects (Kunen 2000, 74)**

The Dumbbell Bajo is another major landscape feature in the Three Rivers Region (Fig. 33). This bajo was named for its distinctive shape in the 1990s by Jet Propulsion laboratory staff that were conducting experiments in the area (Guderjan 2013, 228). The Dumbbell Bajo covers an area of approximately 42 sq. kms (Lohse 2005, 4), and is ringed by small courtyard groups and other settlements such as the Bedrock site. The Dumbbell Bajo yielded chert outcrops that contained high quality materials for stone tool production, including chalcedony and fine-grained chert (Barrett 2004, 113); this stands in contrast to the Far West Bajo, the chert outcrops of which were of poor quality, and unsuitable for stone tool raw material (Kunen 2004, 108). Barrett (2004, 101) describes a stone tool workshop found at the Bedrock site (Fig. 34), where large slabs of chalcedony were noted, with several loci around the Dumbbell Bajo showing

#### 4. Previous Research in the Three Rivers Region

evidence of stone tool manufacture. The Dumbbell Bajo has been subject to geomorphological studies, and radiocarbon dates show that the deepest soils of the bajo were formed during the Pleistocene around 12,470 years ago, when the ecosystem of this area was characterised by an arid environment dominated by grasses and scattered woody vegetation (Dunning et al. 2006, 86). Human populations colonised the Maya lowlands between 3,500 and 2,500 years ago, and 'paleoenvironmental data from the bajos of the southern lowlands suggests that a range of wetland environments faced the earliest Maya settlers' (Dunning et al. 2006, 87). During this period, widespread agriculture and sweeping forest clearance took place throughout the region, and the soil record shows the beginning of Maya Clay deposits forming (Dunning et al. 2006, 87). By the time of the middle of the Classic period, the Dumbbell Bajo and the Far West Bajo were seasonal wetlands with vertisols developing within the clayey sediments.

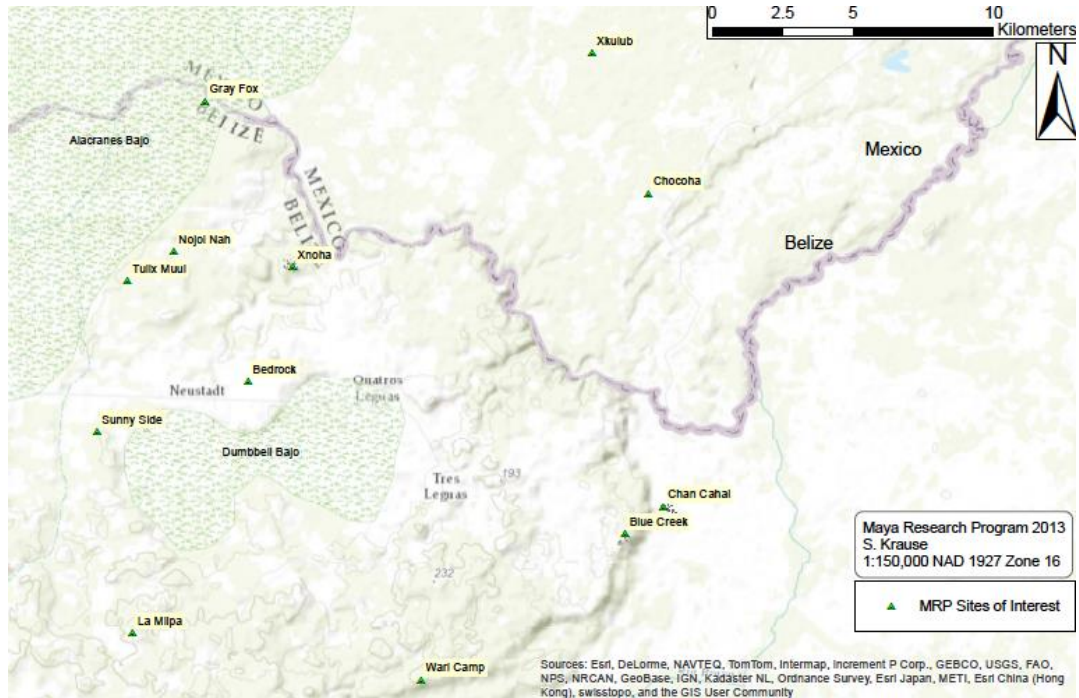


Figure 33 Map indicating position of Dumbbell Bajo (map by Samantha Krause, courtesy of Tom Guderjan)

#### 4. Previous Research in the Three Rivers Region

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**Figure 34 Map of location of Lithic workshop within the Dumbbell Bajo, map by Marc Wolf (Barrett 2004, 102)**

Elsewhere in the Maya lowlands, the study of the Preclassic centre of El Mirador has revealed that the site was situated in the middle of several large bajos. The inhabitants of the site built vast, water management systems on the edges of the bajos, and the investigators (Dahlin and Dahlin 1994) concluded that these bajos were not perennial water sources at the time of habitation. In contrast, the Far West Bajo of the Three Rivers Region has a pollen record that indicates that during the time of La Milpa's occupation, and dating to 1,950 BP, it was a perennial wetland containing aquatic grasses (Dunning et al. 2006, 89). This is an important point to note when discussing the role of bajos in Maya civilisation – that there is no such thing as a typical bajo from which extrapolations can be made and assigned to other examples of this type of landscape feature. Each bajo must be studied for its individual attributes, and the subsequent human interaction varied from place to place.

#### 4. Previous Research in the Three Rivers Region

Aside from the study of bajos in the Three Rivers Region, there have also been studies of other types of land management. One of the most intensively studied areas is that which encircles the site of Blue Creek. Although Blue Creek itself is not situated on the edge of a bajo, it was located adjacent to wetland areas that were manipulated and exploited by the ancient inhabitants. Blue Creek had a number of small discrete neighbourhoods/hinterland communities that appear to have been focussed on agriculture, and so make a good point of comparison to Tulix Mul and Nojol Nah. As mentioned in the section above, there were at least five different agricultural techniques that the Blue Creek Maya utilised (Guderjan 2007, 92-99), and these were carried out on both an individual household basis, and on a larger centralised basis, for example the extensive network of ditched fields.

#### ***Environmental Research in the Three Rivers Region***

Hydrology, soil chemistry, and soil formation in the TRR have been extensively investigated by Beach, Luzadder-Beach, and Dunning over a number of years (eg. Dunning et al. 1998; 1999; 2002; 2003; 2006; 2012; Beach et al. 2006; Luzadder-Beach et al. 2012). In doing so they have been able to create a model to explain and describe the changes in ground water levels over time – that affect the nature of landscape features such as bajos. They note that during the latter half of the Preclassic period, the water table began to rise and created wetland areas (Luzadder-Beach and Beach 2009). These wetland areas were subsequently filled with sediments, both natural and anthropogenic, and ceased to be perennially wet. This has been seen elsewhere in the Maya lowlands. In the Mirador basin, Hansen et al. (2002) have shown that due to human-induced sedimentation at the end of the Preclassic, many formerly permanent natural water holes became in-filled, and whole areas changed from marsh to forest (Morse 2009, 130). Anthropogenic processes that may have caused these changes to the environment include deforestation of upland areas, and natural contributing factors could have been large storms or hurricanes (Morse 2009, 131).

#### 4. Previous Research in the Three Rivers Region

To date a comprehensive soil map of the Three Rivers Region has not been created or published. This is an important gap in knowledge that must be filled in the future in order for us to gain a holistic view of past agricultural potential. Tim Beach and others are currently working towards this goal. The consequence for this doctoral research of the lack of a detailed soil map for the Three Rivers Region is that I am unable to state whether or not fertile soil appeared continuously in the Eastern Alacranes Bajo area, or if it was patchy and appeared in a mosaic fashion. The availability of fertile soil (if it was not continuous throughout the Eastern Alacranes Bajo area), and its subsequent value, could have implications relating to land use rights, territorial control and settlement configurations. These are topics that I hope to revisit in the future once the comprehensive soil data are available.

Pollen studies have also been carried out in the Three Rivers Region. McKenzie Morse of Texas A&M University implemented one of the most recent investigations for her doctoral research (Morse 2009). The pollen core that Morse used for her study was obtained from the small Laguna Verde Lake at the bottom of the escarpment on which Blue Creek was located. The goals of the Morse study were to elucidate information about agricultural practices and plant consumption (Morse 2009, 3), and to analyse palynological markers of human activities in the area (Morse 2009, 36). The earliest date from the Laguna Verde core was 4,500 BP, and a human presence was detected in the Blue Creek area from this point with cultivated maize in the core (Morse 2009, 346). The core indicated that the area might have been subjected to sedimentation during the Late Classic, when agricultural production was at its peak. The core is dominated by arboreal pollen (Morse 2009, 347), indicating that there was a heavy tree presence in the area. The main conclusion of Morse's study showed that 'different vegetation associations have fluctuated consistently in dominance throughout the most recent 4,500 years' (Morse 2009, iv).

#### **Summary**

This chapter has briefly and very generally outlined the currently known culture history of the Three Rivers Region, and described previous research in the area. One of the

#### 4. Previous Research in the Three Rivers Region

ways researchers have sought to understand the area is to apply models to the archaeological data in order to discern a pattern. For example in terms of Ashmore's site planning templates, in the TRR, Type 2 sites are located on the eastern side of the TRR in a north-south line, which follows the course of Booth's river, whereas the Type 1 sites are found to the west of this line, along the Rio Bravo (Houk 1998, 9). Ashmore's site planning template however, although it allows data from monumental urban centres to be drawn together, does not allow for analyses of the smaller, rural hinterland sites where the majority of the ancient Maya of the TRR would have lived their lives.

Through the archaeological record, it is clear that the political fabric of the Three Rivers Region shifted and changed through time with, for example, Blue Creek ceasing to be an independent polity after the Early Classic, and many ball courts (a sign of political independence) being built during the Late Classic. There was a definite rise in population and construction during the Late Classic, before all sites in the area went into decline, with some experiencing rapid depopulation. Revisitation/pilgrimage is seen at a number of sites during the Postclassic, with ephemeral traces of Postclassic visitations seen at Chan Chich, Dos Hombres, Chan Chich and La Milpa. The nature and length of these visits are unknown; however, there was no permanent settlement in the Three Rivers Region after the area was abandoned, aside from at the small site of Akab Muclil.

Looking at sites in terms of their location, it is clear that many TRR sites, for example La Milpa and Gran Cacao, were built following the natural topography. Intra- and inter-regional trade is seen with many instances of artefacts of jade, obsidian and marine shell, materials not naturally occurring in the TRR, found in various contexts. The presence of stone tools at Blue Creek that originated from Bedrock is an example of intra-regional trade. Ritual and esoteric behaviour is also noted in hinterland settlements, for instance the altar complex at Aak Witz, and the Quincunx architectural complex.



#### 4. Previous Research in the Three Rivers Region

Land management and modifications are seen across the TRR, at both urban and hinterland sites, and soil and hydrology studies have demonstrated both anthropogenic and natural changes in the landscape. The pollen and phytolith analyses of the Early Classic midden at Aak Witz indicates that cultigens were present, therefore giving an insight into the subsistence base of the period.

Over the past two decades, as noted, a number of different studies have been initiated and implemented within the Three Rivers Region, making it one of the most intensively studied areas in the entire Maya lowlands. Despite this, there is still much to be learned. The Alacranes Bajo, as pointed out by Dunning et al. (2006), needs to be studied in its own environmental and socio-cultural context. Also, the variety of configurations of non-urban centres means that there was no one way that rural populations chose to live, therefore making my study of the settlements on the eastern edge of the Alacranes Bajo an important contribution to the corpus of knowledge about this area.

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#### 4. Previous Research in the Three Rivers Region

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## Chapter Five: Methods

### *Introduction*

The goals of the archaeological research at Nojol Nah and Tulix Mul are: to gain an understanding of the people who lived on the eastern edge of the Alacranes Bajo; to learn about how people interacted with and managed the land and resources; to explore how the settlements and practices in this location fitted within the wider Three Rivers Region; and to determine whether there is evidence that these settlements were specifically *bajo-centric*. To work towards these goals a program of mapping, surface collection, and excavations was initiated and carried out during the summers of 2010 to 2013 (Hammond 2012; 2013; 2014).

Fieldwork consisted of mapping archaeological and topographical features in the study area, and subsequent excavation of selected features and structures. The fieldwork can be split into five main areas of interest relating to my research questions:

1) *The initial mapping and surface collection of the study area.*

The mapping was designed to address the following research questions: What natural resources and/or features are found in the area? Where are these features/resources located with respect to settlement? What evidence is there for settlement in the study area? What pattern of settlement is indicated? The surface collection was intended to provide a general idea of the chronology of settlement.

2) *Test excavations of topographical features in the Nojol Nah settlement zone.*

This phase of the work examined the nature of resource exploitation, and allowed me to address the questions: Is there evidence of land modification associated with agriculture? Is there evidence of exploitation of resources or features, in particular the Alacranes Bajo?

3) *Test excavations of small architectural mounds in the Nojol Nah settlement zone.*

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Work at the Nojol Nah Settlement Zone was designed to address the following research questions: What is the chronology of occupation? How does the Nojol Nah settlement and its chronology fit with models already proposed for the Three Rivers Region? What can the material culture (artefacts and architecture) and burial data tell us about social organisation, daily life, labour specialisation, and local and regional interaction? How do these data contribute to our understanding of the settlements on the eastern edge of the Alacranes Bajo?

### 4) *Larger-scale excavations in the Tulix Mul courtyard group.*

The characteristics of the Tulix Mul courtyard group are pertinent to address the following: What is the chronology of occupation? How does the Tulix Mul settlement and its chronology fit with models already proposed for the Three Rivers Region? What can the material culture (artefacts, architecture, ecofacts) and burial data tell us about social organisation, daily life, labour specialisation, and local and regional interaction? How do these data from Tulix Mul contribute to our understanding of the settlements on the eastern edge of the Alacranes Bajo?

### 5) *The collection of data from around the bajo's edge.*

Collecting bajo data involved both mapping and excavation to determine what natural resources were present at the eastern edge of the Alacranes Bajo. Bulk and monolith soil samples were also collected in the Tulix Mul area for soil chemistry analysis and for preliminary micromorphological analysis. This investigative focus was designed to answer the following research questions: What natural resources and/or features are found in or near the bajo? What is the relationship of these features/resources with respect to settlement?

In addition to the archaeological investigations, mapping and analysis, I integrate previously unpublished excavation data from some of the larger mounds at the Nojol Nah site core area which appear in field reports written by MRP staff members William T Brown, Dr Jason Barrett, Dr Bruce Dickson, and Virginia Das Neves from 2008 to 2013. These reports are duly acknowledged.

### ***Methods***

#### **Mapping Techniques**

The 2010 field season was entirely devoted to mapping the eastern Alacranes Bajo area, comprising the Nojol Nah settlement zone and the Tulix Mul area. The eastern Alacranes Bajo area was bulldozed and burnt by local Mennonite farmers. The methods used in the ground survey were partially influenced by the destruction of the area. The rapid clearance of the land meant that we had to survey in a less than ideal time frame, and as such we were unable to use a total station in our efforts. The size of the mounds on the landscape did not suggest an abundance of monumental architecture, therefore the ground survey methods were aimed towards the detection of lower level centres and any associated settlements, as well as landscape features of possible significance - for example agricultural features, prominent points in the landscapes, and potential resources areas.

Maps were created of all the features visible to the naked eye, using GPS technology (Garmin eTrex Vista HCx Handheld GPS) and the tape and compass method. As the entire area was surveyed on foot, it was possible to capture everything that was visible, from topographical and elevation information to mounds, natural resource locations, and other landscape features.

A 1:1000 scale was employed for the drawing of these maps, and a UTM co-ordinate and elevation reading was taken at each point: At irregular intervals, owing to the topography of the landscape, a point from which to map was chosen and given a unique identifying designation beginning with NOS (Nojol Nah Settlement) and then a sequential number, for example NOS 11. The points were partly determined by the scale of our field map - a 1:1000 scale on an A4 piece of paper meant that the landscape was surveyed in a series of rectangular portion. The placing of each of these points meant that the whole of the landscape could be mapped, with no gaps. All features were then mapped from each point using a compass, tape measure, and a measuring wheel (or an Electronic Distance Measurer where appropriate); surface

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artefacts were collected at each point. Areas with a paucity of mounds or visible land features were not surveyed as intensively as areas with multiple mounds and features, however equal time was spent at each point collecting surface artefacts. The artefacts from the surface were not from secure archaeological contexts. They were not only out of context but had also been subject to bulldozer displacement. They were collected with the idea that they could provide valuable information about general activities and chronology for the study area. The ideal way to map would have been using a total station; however, time and resources did not allow for this. Although the tape and compass method is rudimentary, I minimized errors by using the same equipment and people to map each day, took multiple GPS readings at each location, and the mapping team was thoroughly trained to collect surface artefacts in a consistent manner. The team was small enough that I could be involved in the creation of each map, therefore maintaining consistency in terms of quality and drawing conventions. As well as the cleared area, an area adjacent to the burnt fields to the southwest was also mapped, because large architectural groups were visible under the foliage, and these included the Tulix Mul Courtyard group. The maps created during the 2010 field season were then traced onto a topographical base map using the program ArcGIS.

### **Excavation methods**

The 2011, 2012, and 2013 field seasons were devoted to excavation at locations mapped during 2010. The primary purpose of the 2011 field season was to collect more detailed information about the Nojol Nah Settlement Zone that we had mapped during the previous year. The most important aspect of archaeology and the baseline that everything else relies on is chronology. So the main goal for 2011 was to establish chronology for the research area, and if possible gather information regarding the activities that had taken place. Small, controlled excavation units were undertaken at a number of different locations. Where appropriate or feasible, larger excavations were carried out (for example for ethical reasons to remove human remains that would be destroyed by modern farming).

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Decisions concerning the locations for the excavation units were based on a number of factors. Using the maps from 2010, locations were selected to give a representative sample in order to reflect the variety of different structures and landscape modification types that had been identified and mapped the previous year. Once identified, the mounds that were chosen for excavation were re-measured to verify the 2010 maps, and an excavation unit was usually situated in the centre of each structure along the presumed primary axis. Artefacts were collected for analysis. Where possible, excavations were taken down to the old land surface or to bedrock to establish the earliest surviving construction phase. During the 2011 field season, 28 test units were implemented; half of these were focused on architecture, and half on landscape modifications. The excavated mounds and landscape features were given individual identifiers based on the NOS position, and on the type of feature: M=mound, T=terrace, F=feature, P=platform and B=bajo. For example, the mound where Test Unit 1 was placed is designated NOS34-M1; the terrace where Test Unit 15 was placed is NOS1-T4 and so on.

The 2012 and 2013 field seasons focused intensively on Tulix Mul. The Tulix Mul courtyard group was selected because it is the largest complex adjacent to the Alacranes Bajo and, like Nojol Nah, is surrounded by dispersed settlement. Excavations at Tulix Mul were designed to tie Tulix Mul to data already collected at Nojol Nah, and eventually to compare data from both these sites with already known information about the wider Three Rivers Region. The main difference between the excavations in the Nojol Nah settlement zone and those undertaken at Tulix Mul is that the Tulix Mul excavations were larger-scale and involved entire structures. A new burial number sequence was started for the human remains recovered from Tulix Mul to differentiate them from the burial sequence at Nojol Nah.

Excavation material was recorded using the Maya Research Program's 'Operation, Structure, Sub Operation, Lot' protocol (Guderjan et al. 1994). For example, in the MRP format, TM 12-01 refers to Operation 01 in 2012 at Tulix Mul; Str. TM-4 refers to a structure number at Tulix Mul; letters such as 'A' refer to sub-operations; and 'Lot 114' refers to a lot or level number. An operation is numbered sequentially by year and

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unique numbers are given to excavations. The sub operation can best be described as a specific intention within the operation goal; that is, the sub-operation is a way of differentiating significantly different areas within an excavation. For example, Sup-Operation A could be used for defining the exterior architecture of a structure and Sub-Operation B could then be used to represent the penetration of said architecture. The sub-operation system is a good way help to organise the recording and reporting processes. The most basic level of recording is the 'Lot', which has been described by Coe and Haviland (1982, 43) as the ' . . . most significant provenience according to the excavators' perceptions . . . ' An individual lot can represent a change in the soil matrix, a ceramic concentration within a level, or a floor assemblage. Detailed photographs, maps and drawings were produced as part of the recording procedure. Excavations were carried out using a range of different tools: Large picks, various types of shovels, 4-inch WHS trowels, hand picks, paint brushes, dental picks, brooms, and in the case of burials, wooden bamboo sticks.

For architectural terminology I follow Loten and Pendergast's (1984) 'A Lexicon for Maya Archaeology'. For example, courtyard is an exterior space that is either bounded by the wings of a single structure, or by contiguous parts of different yet conglomerated structures (Loten and Pendergast 1984, 7). A patio is similar in form to a courtyard; however the exterior space of a patio is generally larger than a room, but smaller than a courtyard (Loten and Pendergast 1984, 11). A plaza is defined as a relatively large exterior space delimited by large structures (Loten and Pendergast 1984, 11).

The excavations reported here—except where otherwise noted—were carried out under my direction with the guidance of the program director Dr. Thomas H. Guderjan. I was assisted by MRP staff members and interns, volunteers, university students, and 3 workers from the nearby village of San Felipe: Pete Magaña, Fidel Cruz and Simon Cante, who, between them, have had decades of archaeological experience at various sites in northwestern Belize. The 2010 mapping of the burnt fields was co-led by the program's surveyor, Marc Wolf, and me; we were assisted by MRP staff members



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Justin Telepak, Samantha Krause and Kim Cox, and volunteers Dr. Lars Kotthoff and Tara Majewski.

### **Artefact and Human Remains analysis**

Analysis of ceramics, human remains and other artefact classes were undertaken in the Maya Research Program's lab facility in Belize. Travis Hildenbrand (a student at Texas Christian University) carried out lithic analysis for the 2011 and 2012 field seasons. Ceramic identification and analysis at MRP are currently the responsibility of Colleen Hanratty (a graduate student at Southern Methodist University). William T. Brown, Hannah Plumer, and Shannon Vance (all graduate students specializing in osteology) carried out the Nojol Nah and Tulix Mul skeletal analyses.

In the Maya lowlands, the 'type:variety' classification system for ceramics has long been established (Smith 1955; Adams 1971; Gifford 1976), and has been used at numerous sites across the lowlands including Altar de Sacrificios, the Belize Valley, Cerros (Robertson-Friedel 1980), Coba (Robles 1980), Colha (Valdez 1987), Cuello (Kosakowsky 1987; Pring 1977), El Mirador (Forsyth 1989), K'axob (Lopez Varela 1996), Rio Azul (Adams and Jackson-Adams 2000), Santa Rita (Chase and Chase 1988), and many others (see Houk and Valdez 2000, 127). Although several archaeologists working in the region of northern Belize do not use type-variety methods (for example David Pendergast) or use it as one of several systems (Aimers and Graham 2013; Howie 2012; Graham 2004), it is accepted as a way of distinguishing ceramic styles and surface treatments, proposing 'types' assumed to represent cultural choices, and establishing broad chronologies within the Maya region (e.g. Smith et al. 1960). Type-variety is the method employed by the MRP and therefore all my references to ceramics reflect the 'type:variety' approach.

Anything recorded as 'lithics' refers to chipped stone tools made from chert. 'Ground stone' and 'obsidian' are recorded separately. Skeletal analysis involved a range of techniques. The ageing of the skeleton was based on six age categories which followed the parameters established by White and Folkens (2000): i) Infant – aged 0 to

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3 years old; ii) Child – 3 to 12 years old; iii) Adolescent – 12 to 20 years old; iv) Young Adult – 20 to 35; Middle Adult – 35 to 50 years old; and Old Adult – over 50 years old. The age assigned to an individual skeleton was based on factors such as tooth eruption and/or the level of the closing of the epiphyses, which occurs during childhood and adolescence; in older skeletons, age estimates reflect observations of the deterioration of bone that comes with age (See Brown and Plumer 2012 for further discussion). Estimating the stature of an individual was based on the measurements of long bones. The sex of the skeleton was determined by pubic bone measurements (where a pubic bone was present) or on the examination of cranial elements such as the nuchal crest, the mastoid process, and the projection of the mental eminence (Brown and Plumer 2012, 142).

The skeletons were also examined for pathologies such as arthritis, anaemia, dental problems, fluctuations in blood supply, inflammation of soft tissue, mechanical stress and so on (White and Folkens 2000, 382; Brown and Plumer 2012, 144), all of which can give valuable information about diet and health, occupations, illness and injury. The presence of porotic hyperostosis/cribra orbitalia, commonly seen as lesions on the cranium, can indicate an iron-deficient maize-based diet. Similarly, lesions or furrows in tooth enamel can be an indication of dietary deficiencies and/or childhood illnesses (Brown and Plumer 2014). Other forms of information collected during skeletal analysis included those based on cranial and dental modifications for example filed and/or inlaid teeth, and artificial cranial flattening.

Cranial modification is the most common form of artificial skeletal deformation (White and Folkens 2000, 388), and this type of modification is found in ancient populations throughout the world, not just in the Maya area. Cranial modification must take place in infancy, when the skull is still forming and is soft enough to manipulate. The fact that only certain individuals were subject to the treatment suggests that status or ethnic/cultural identities may be involved. However as individuals (both male and female) with cranial modification are found in a variety of contexts, from elaborate tombs, to simple sub-floor burials, it is not prudent to link this phenomenon with class

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or wealth status; rather there must have been other factors in play, such as cultural practices of only certain groups, that decided which infant would be subject to this treatment. Dental modification, in contrast to cranial modification, can only be performed when teeth have developed, and dental modification can take the form of filing, inlaying, chipping, engraving, ablation, or colouring (Brown and Plumer 2012, 161-162). Geller (2006) suggests that irreversible modifications to the teeth may have been carried out as a rite-of-passage, therefore signalling a shift in a person's identity. Dental modification must have been incredibly painful, and would have needed to be carried out by specialist practitioners. Romero (1970, 53) suggests that dental modifications may have been carried out by specialised jewellers who had acquired detailed knowledge of dental anatomy. Dental inlays found in the ancient Maya skeletal population varied both temporally and geographically and included turquoise, jadeite, obsidian, hematite and pyrite (Williams and White 2006, 139-141). In terms of filed teeth, Romero's (1970) typology is still in general use and was employed in the course of this research.

### **Soil Sampling**

Soil sampling was co-ordinated by Dr. Timothy Beach of the University of Texas, Austin, assisted by me, and a group of his undergraduate students. The soil samples were collected from three separate trenches in the Tulix Mul area that were excavated using a backhoe during the 2012 field season. Bulk samples were collected for soil chemistry analysis, and monolith samples for micromorphological analysis. The first of the backhoe trenches was a 15-m trench that was dug through what had been identified as a series of channels, possibly the remains of check dams that lay between the NOS 37 and the NOS 29 hills. The purpose of the monolith samples taken for micromorphological analysis was to determine whether these channels were natural or anthropomorphic. I undertook the analysis in November 2013, under the guidance of Richard MacPhail of UCL, and sponsored by Tim Beach. I was looking for signs of anthropomorphic activity throughout these channels. I looked for evidence of cultural material such as pottery sherds, or evidence of stone tool fragments – items that may have been utilised in the creation of these ditches if they were man-made. I also aimed

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to determine whether inclusions in the samples were the result of natural formations, or of anthropomorphic ones.

The second backhoe trench was situated to test a terrace feature on the NOS 29 hill. This excavation was designed to determine whether there was evidence for quarrying, or construction. Soil samples were collected from each of the soil horizons. A third trench was placed on the edge of the Alacranes Bajo, where the land slopes down into the edge of the bajo proper. Although water and soil are critical natural resources (G. Hammond 2009), clay for ceramics was another vital material that people would need. Soil samples were collected from each soil horizon for analysis.

Dr. Beach performed analysis of the soils samples, including LOI (loss on ignition) in which each sample is weighed, burnt, and then weighed again to measure the amount of organics (see Tite and Mullins 1971). He also determined the amounts of trace elements within the soil, and performed a Mehlich III test to extract nutrients. He then provided the raw data to me in table form, which I converted into charts and graphs using Excel. Visualising the data in this way allowed me to make comparisons between the trenches, and to compare the samples within the trenches to gain a general sense of the soil regime that was available to the inhabitants of the eastern Alacranes Bajo area. Dr. Beach will be publishing an in-depth analysis of the soils in due course.

## Chapter Six: Mapping and Surface Collection

### *Introduction*

In 2010 an area of roughly 8 square kms on the eastern edge of the Alacranes Bajo was cleared of its dense foliage by local Mennonite farmers, who had decided to use the land for cattle farming. The land was chain-cleared, and the vegetation burned (Fig. 35). The cleared land lay directly to the south of the site core of Nojol Nah. The clearance area was bounded by a small 500 m wide low-lying seasonally inundated area (a bajito) to the east, the Alacranes Bajo to the west, a fence line to the north (at the edge of the forested area that contains the site core of Nojol Nah), and to the south runs a modern marl road which bisects the land following the natural topography.



Figure 35 Photograph of land clearance in progress

Although the effects of the clearance was devastating to local eco-systems, and destroyed some of the archaeological record, the clearance had the effect of revealing

## 6. Mapping and Surface Collection

a landscape of settlement (Figs. 36 & 37). As well as revealing the extent of the settlement, small mounds that would otherwise not have been visible under forest cover were now revealed. As well as structures, land modifications such as tiny *chich mounds* (features thought to be related to ancient land management techniques or even to have served as boundary markers), and terraces became visible. The rich chert and thick soil resources of the Alacranes Bajo were also revealed where the bulldozer had removed the topsoil. The grass that the Mennonites plant for cattle is thick and fast-growing and it would soon obscure the features that clearance had unveiled. Therefore, it was imperative that the area was mapped before the grass was planted. This meant proceeding, in some cases, where the ground was still smouldering from the clearance fires.



Figure 36 Photograph indicating effect of modern land clearance: unexcavated mound



Figure 37 Aerial photograph of the burnt and cleared area (cropped and annotated from an original photo by Kim Cox)

### ***Mapping and Surface Collection Data***

Forty-seven individual maps of the newly cleared area were created; examples of two are given in Fig. 38. In total 320 individual mounds were mapped. In addition, numerous landscape features such as check dams, berms and ditches were recorded, as well as other land modifications, with UTM co-ordinates taken at each base point that we mapped from (Fig. 39). Each of the UTM co-ordinates was given a unique numerical designation, preceded by the letters NOS (standing for Nojol Nah Survey). For a more detailed discussion of the survey methods, see Chapter 6. The location of water sources, such as cenotes, and the river were noted. Surface collection ceramics were analysed by the Maya Research Program's lab team (Fig. 39). Although artefacts were displaced by bulldozing and chain-clearing, information gleaned from them provides valuable data on activities and chronology across the entire landscape. The sketch maps were combined into a single map using ArcGIS (Fig. 41; D3), and a further map was created using NASA elevation data to show the structures in relation to their elevations (Fig. 42; D2).

## 6. Mapping and Surface Collection

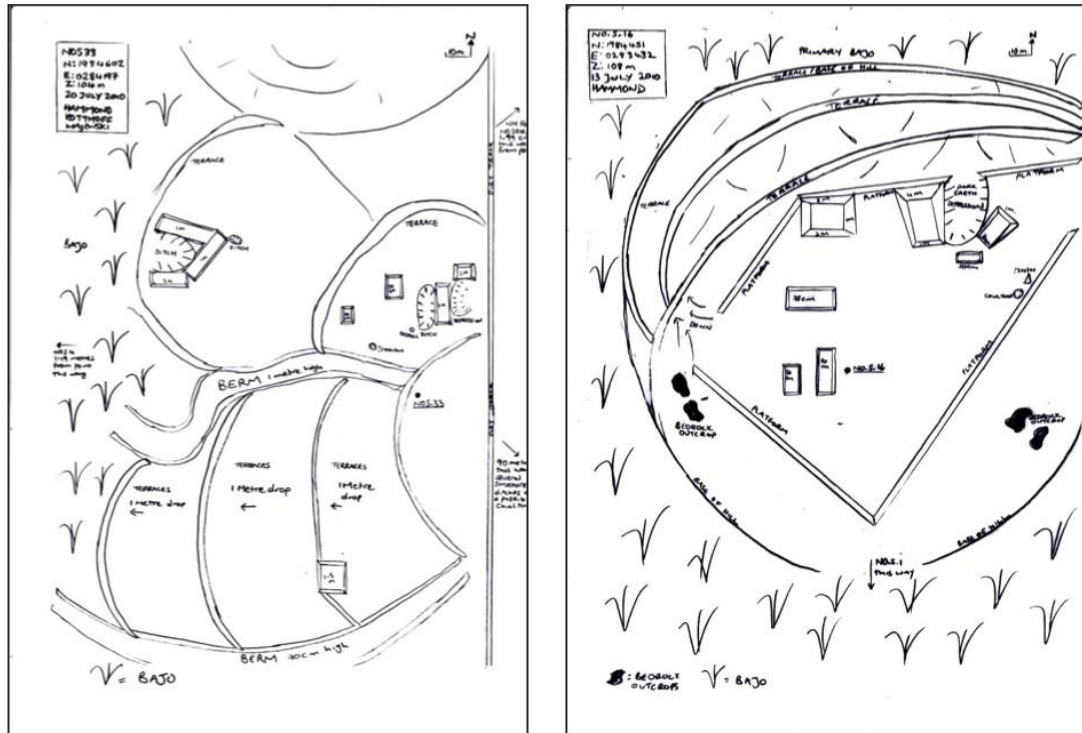


Figure 38 Maps: examples of sketch maps created in the field (original map size = A4)

NOS Point	Northing	Easting	Z (m)	Number of structures	Type of landscape feature
NO.S.1	1984123	283333	118	3 structures, 2 platforms	Terraces
NO.S.2	1984076	283189	112	8 small structures	Ditch
NO.S.3	1984175	283406	115	6 structures, 2 larger, 4 small	Terraces
NO.S.4	1984240	283065	117	8 structures, 1 platform	Terraces
NO.S.5	1984287	283108	116	4 structures	
NO.S.6	1984210	283236	111	8 structures, 1 platform	Large dark earth depression, 1 ditch
NO.S.7	1984354	283230	109	5 structures, 2 large, 3 small	1 possible terrace, large dark earth depression
NO.S.8	1984488	283138	107	2 structures	Terraces, depression
NO.S.9	1984698	283159	107	9 structures, 1 group of 5 around a small plaza area,	7 depressions, 2 large, 5 small
NO.S.10	1984749	283249	104	9 Structures, quite spread out	Terraces
NO.S.11	1984956	283088	99	12 Structures, 11 fairly large	Terraces, depressions
NO.S.12	1985077	283085	92	5 structures, 4 lithic scatters	Terraces, depressions
NO.S.13	1985309	283228	88	3 structures, 1 large, 2 small, 1 platform	Terraces, depressions
NO.S.14	1985379	283259	87	13 structures, 1 platform	Berm, depressions
NO.S.15	1984079	283531	109	10 structures, 22 chich mounds	Terraces, depression
NO.S.16	1984451	283432	108	7 structures, 1 platform, 1 stelae, 1 chultun	Terraces
NO.S.17	1984714	283341	98	10 structures, 2 chultuns	Ditch
NO.S.18	1984843	283345	92	3 structures in dark soil area	Berm, depression, swampy wet area
NO.S.19	1985109	283336	90	11 structures, 2 chultuns	? Check dams
NO.S.20	1984256	283635	100	2 long structures, 37 chich mounds	Depression
NO.S.21	1984401	283653	98	2 structures, 64 chich mounds	
NO.S.22	1984600	283360	92	0	Terraces, check dam
NO.S.23	1984613	283122	90	0	Check dams, cobble piles
NO.S.24	1984820	283106	97	2 structures, 1 platform	Terraces, berm, check dam
NO.S.25	1984697	282137	75	6 structures, 1 platform	Terraces, depressions
NO.S.26	1984644	282105	71	13 structures	Terraces, depression
NO.S.27	1984708	282229	75	4 structures, lithic scatters	
NO.S.28	1984713	282329	68	8 structures	Depression



## 6. Mapping and Surface Collection

NOS Point	Northing	Eastings	Z (m)	Number of structures	Type of landscape feature
NO.S.29	1984754	282595	83	10 structures, 1 chultun	Terraces, depressions
NO.S.30	1984722	282494	75	8 structures, 2 groups, both with ditches next to them	Depressions close to structures
NO.S.31	1985229	282624	60	12 structures in slightly raised area	Depressions close to structures
NO.S.32	1985137	281958	62	14 structures, possibly 2 platforms	Depressions close to structures
NO.S.33	1984602	284197	104	8 structures, 1 chultun	Terraces, berm, depressions
NO.S.34	1984443	284187	113	6 structures, 1 large chultun	Terraces, depression
NO.S.35	1984324	285208	113	9 structures	Terraces, berms, depressions
NO.S.36	1984296	284207	112	2 structures	Terraces, berms
NO.S.37	1984735	282775	84	9 structures, 1 chultun	Terraces, berm, check dam
NO.S.38	1986454	285257	101	14 Structures, 6 chultuns	Terraces, berms
NO.S.39	1986782	285353	95	2 structures	
NO.S.40	1986697	285271	89	11 Structures	
NO.S.41	1986412	285173	86	3 mounds	
NO.S.42	1986220	284328	84	7 structures	Terraces, berms
NO.S.43	1986355	284288	95	4 structures, 1 platform	
NO.S.44	1986249	283745	83		
NO.S.45	1986360	283718	71	6 structures, 1 lithic workshop area	Terraces
NO.S.46	1985993	283880	76	7 structures	Terraces, cenote
NO.S.47	1984285	283873	79		

Figure 39 Table showing NOS point data

NOS Point	Ceramic Analysis
NOS 1	Tepeu 2/3
NOS 2	Early Classic, Late Classic
NOS 3	Early Classic, Late Classic.
NOS 4	Early Classic, Late Classic
NOS 5	Early Classic, Late Classic
NOS 6	Early Classic
NOS 7	Early Classic
NOS 8	No diagnostics
NOS 9	Late Classic
NOS 10	Early Classic, Late Classic
NOS 11	Late Classic
NOS 12	Early Classic
NOS 13	Late Classic
NOS 14	Late Classic
NOS 15	No diagnostics
NOS 16	Late Preclassic, Early Classic
NOS 17	Early Classic, Late Classic
NOS 18	Early Classic
NOS 19	Late Classic
NOS 20	No diagnostics
NOS 21	Late Classic
NOS 22	No diagnostics
NOS 23	No diagnostics
NOS 24	No diagnostics
NOS 25	No diagnostics
NOS 26	Late Preclassic, Early Classic, Late Classic
NOS 27	No diagnostics
NOS 28	No diagnostics
NOS 29	Early Classic
NOS 30	Early Classic
NOS 31	No diagnostics
NOS 32	No diagnostics

## 6. Mapping and Surface Collection

NOS 33	Early Classic, Late Classic
NOS 34	Early Classic, Late Classic
NOS 35	Early Classic, Late Classic
NOS 36	No diagnostics
NOS 37	No diagnostics
NOS 38	No diagnostics
NOS 39	No diagnostics
NOS 40	No diagnostics
NOS 41	No diagnostics
NOS 42	No diagnostics
NOS 43	No diagnostics
NOS 44	Late Preclassic, Early Classic, Late Classic
NOS 45	Late Preclassic, Early Classic, Late Classic
NOS 46	Late Preclassic, Early Classic, Late Classic
NOS 47	Late Preclassic, Early Classic, Late Classic

**Figure 40 Table of surface collection ceramic analysis**

## 6. Mapping and Surface Collection

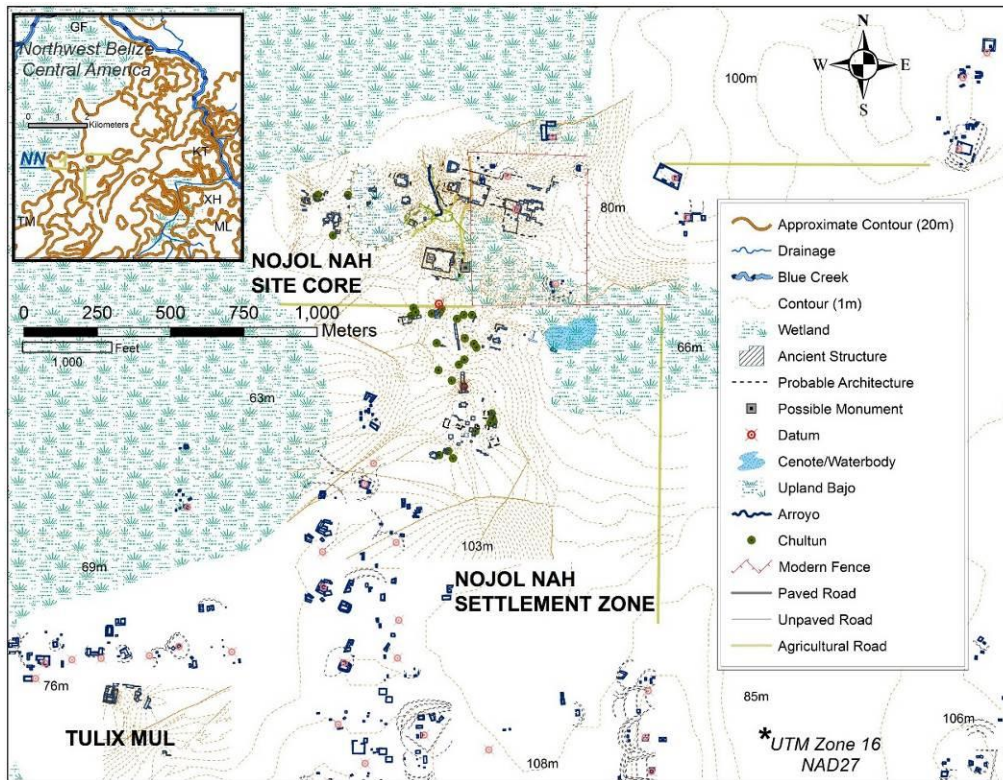


Figure 41 Map of the Nojol Nah Site Core, Settlement Zone, and Tulix Mul (Marc Wolf and Gail Hammond)

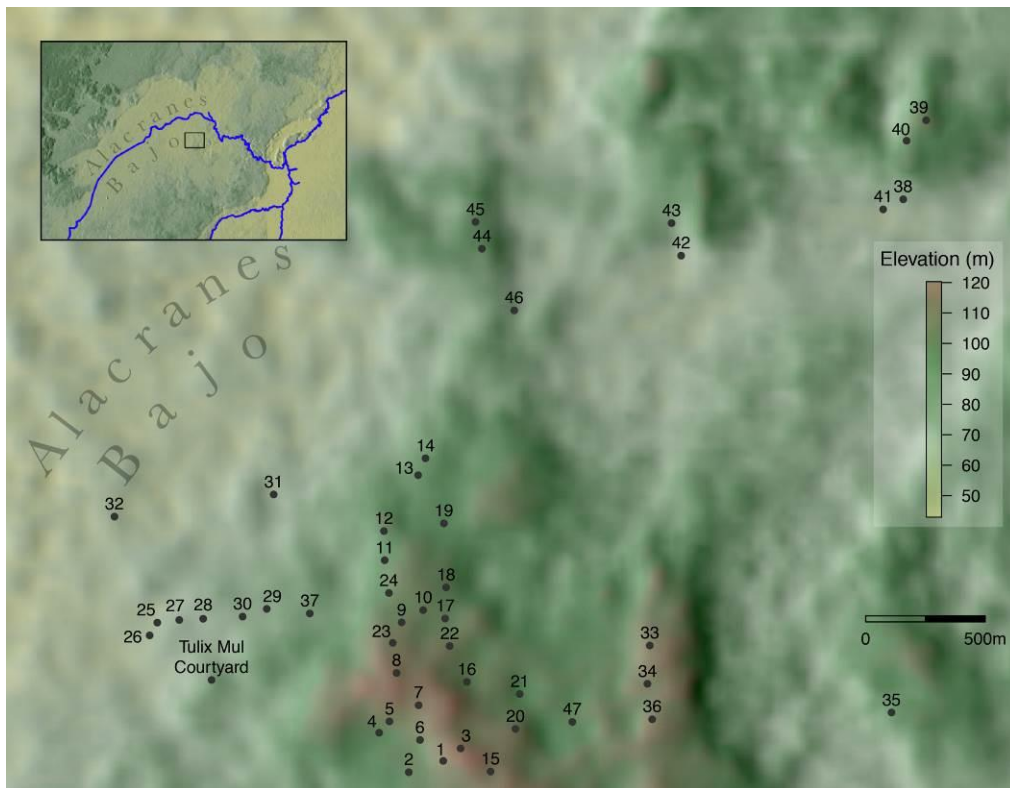


Figure 42 Map showing elevations across the landscape and NOS points

## 6. Mapping and Surface Collection

The majority of artefacts collected from the surface were ceramics and lithics; however there were other materials such as ground stone (mano and metate fragments), marine shell, stalactite fragments, and a greenstone celt (possibly jadeite) (Fig. 43).



Figure 43 Photographs of artefacts from the surface collection: granite, chert tools, obsidian, stalactite and greenstone/jade

### ***Summary and Interpretation of the Mapping and Surface Collection Data***

The ceramic analysis of the surface collections revealed that occupation dated from the Late Preclassic to the Late Classic period— however this could not tell us if the land was occupied throughout that whole period, or abandoned and re-occupied on one or more occasions. The final maps (Figs. 41 and 42) created using information from the sketch maps present a general holistic view of the landscape: man-made structures (represented by mounds), land modifications, and natural topography. These maps however do not tell us anything about how settlement had changed or remained static. Settlement configurations fluctuate over time, and it is not possible from mapping and survey alone to glean this information. Therefore the following three field seasons were devoted to excavation of the features recorded during the initial mapping.

## Chapter Seven: The Nojol Nah Settlement Zone

### *Introduction*

The main purpose of the 2010 field season was the mapping of the Nojol Nah settlement zone. In 2011, selected mounds and land modifications were excavated under my direction in order to gain an understanding of the chronology of occupation, and also, where possible, to determine functions of features. During the 2011 field season, 14 structures, and 14 landscape features were tested. The goal was to obtain a representative sample of the different structures and features present, which meant deliberately avoiding working only at the largest structures. Agricultural features are notoriously hard to date (Turner 1983); the archaeological convention is to date the features by nearby structures, with the assumption that the agricultural features were associated with their nearest structures (Kunen 2004, 48). Nevertheless my team and I carried out excavations on some of the agricultural features to see if we could gain direct chronological data, which we obtained on two occasions.

A pressing factor in deciding where to place the test excavation units was whether the features that we wanted to excavate were accessible a year after they had been mapped. For example, at NOS 11 a farming track had been built through a group of structures; at NOS 12 and NOS 13 mounds had been completely flattened; and at NOS 3, the land had been bulldozed flat and a work station for cattle ranchers had been built. As well as the destruction of many of the mounds, the landmarks changed owing to the type of grass that the Mennonite farmers planted for their cattle. Tall grass now covered the landscape, making the smaller mounds difficult to locate, despite having multiple UTM co-ordinates; and landscape features were almost impossible to discern. The chich mounds were now invisible. However the detailed maps created the previous year coupled with the GPS co-ordinates, and my memory, enabled us to locate and excavate a representative sample of mounds and features across the Nojol Nah settlement zone.

### ***The NOS 34-36 Ridge***

**Overview:**

The NOS 34 – NOS 36 UTM points marked a ridge that contained at least 20 structures as well as terraces and linear land modifications. The surface collections consisted of a rich concentration of artefacts, including a greenstone celt. The concentration of artefacts is not attributed solely to bulldozer push, as the bulldozer tracks did not go all the way to the top of the ridge. The structures along the ridge were situated near or adjacent to landscape modifications such as terraces and linear features, implying a relationship between the structures and the landscape modifications.

A total of five test units were implemented in this area: two test units at the NOS 34 area; one at NOS 35; and two at NOS 36

Test Unit 1 - NOS34-M1

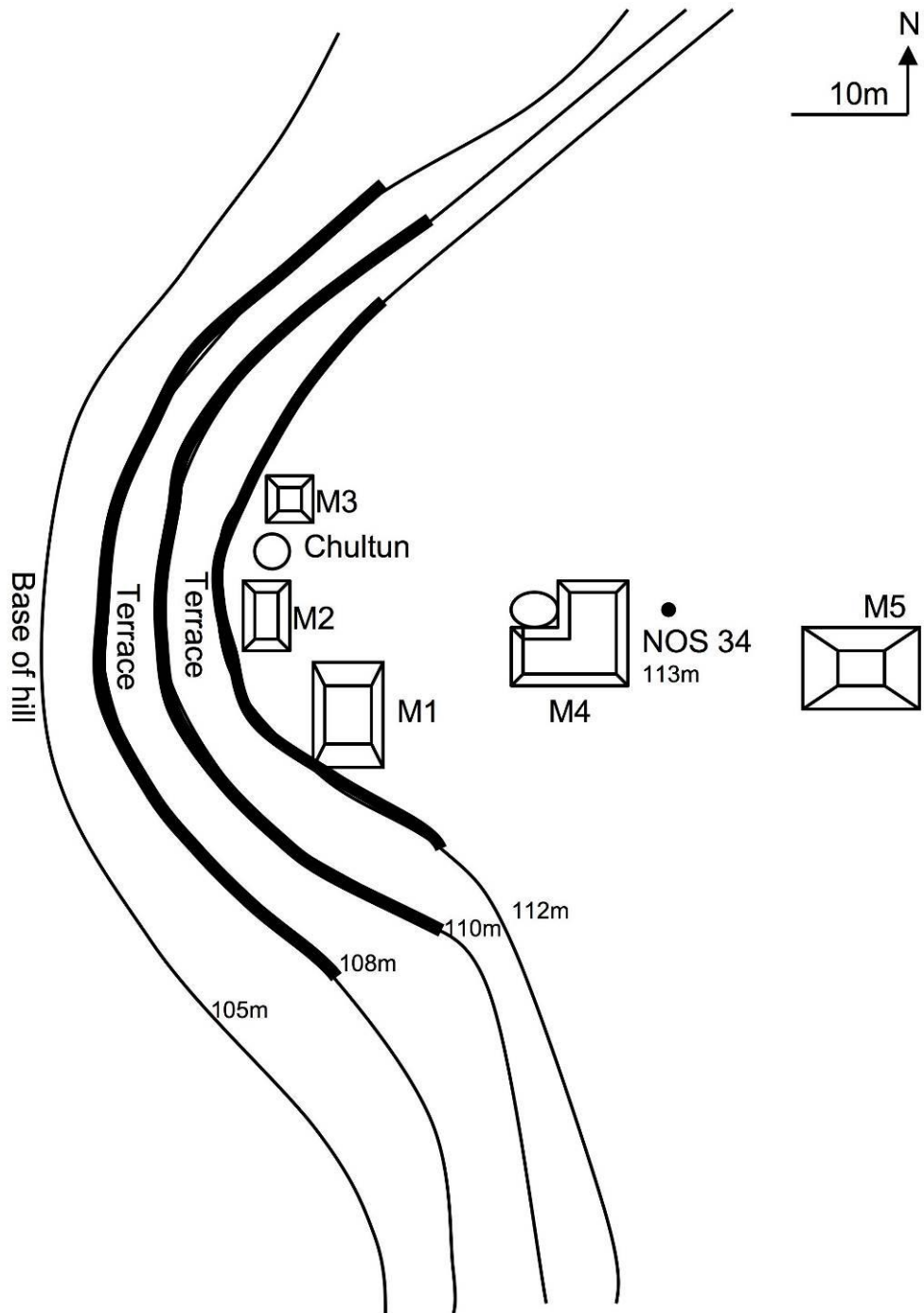


Figure 44 Map of the NOS 34 area

**Excavation:**

The NOS 34 area contained five mounds (M1-5) on top of a hill, with a terraced area, as well as a chultun, and a small ditch area located adjacent to Mound 4 (Fig. 44). Test Unit 1 measured 1x2m; it was oriented east-west on a small mound (NOS34-M1) on the edge of a terraced area (Fig. 45).



## 7. The Nojol Nah Settlement Zone

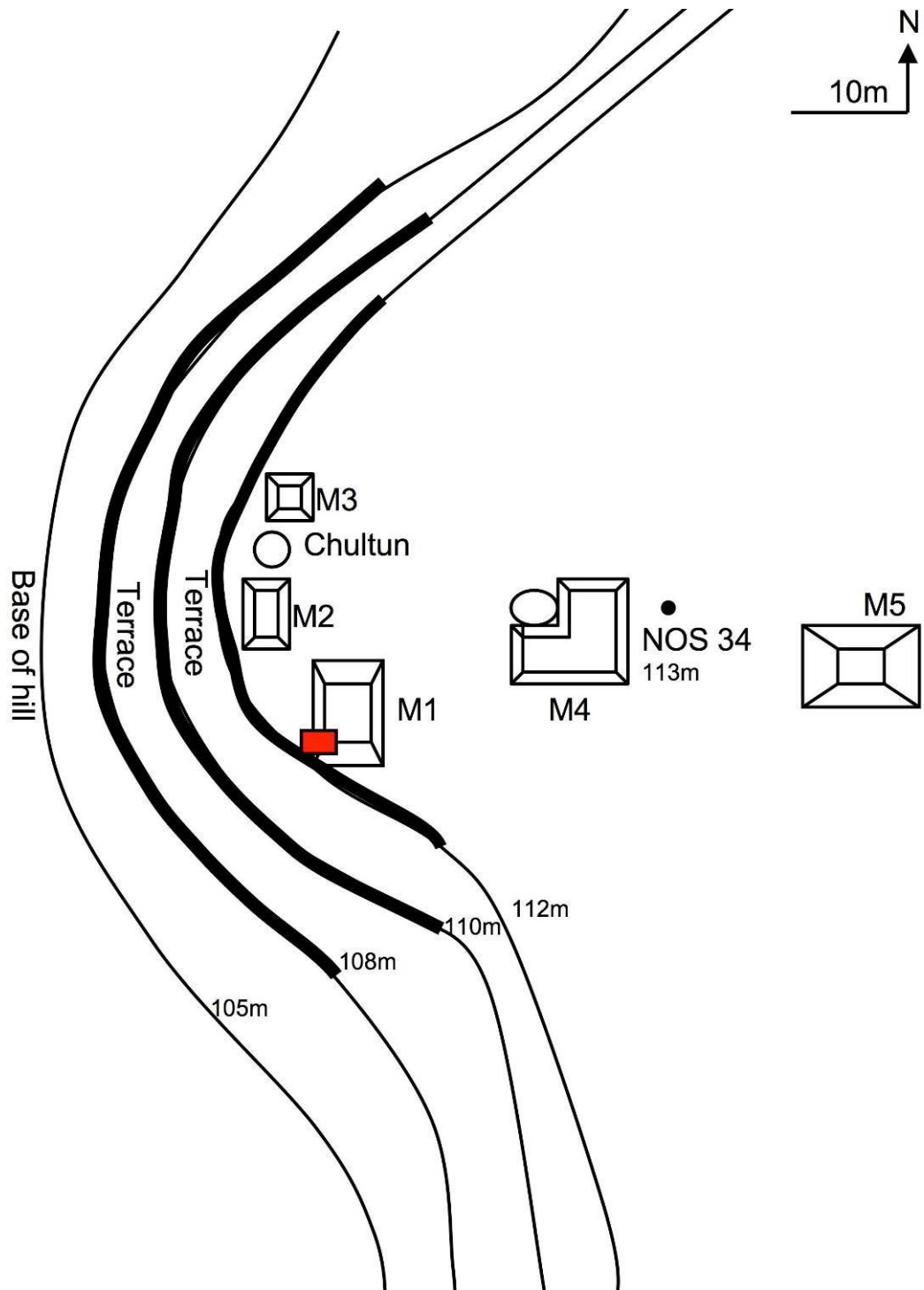


Figure 45 Map of the NOS 34 area with Test Unit 1 indicated in red

The mound appeared intact (the other mounds had undergone further bulldozer damage since they were mapped the previous year); therefore this unit was planned with the hope of recovering good structural evidence and datable artefacts. Surface collections from this location had been collected during the previous year before local farmers burned the area. The humic layer of Test Unit 1 ranged from 20 cm below the

## 7. The Nojol Nah Settlement Zone

surface (cmbs) to 60cmbs across the unit. Underneath the humic strata was an A horizon (the topsoil) that was still being bioturbated. Beneath the topsoil was a layer of limestone chunks (Lot 1) and bedrock was reached at 90cmbs (Fig. 46). Ceramics were derived from both the humus and the limestone layer.

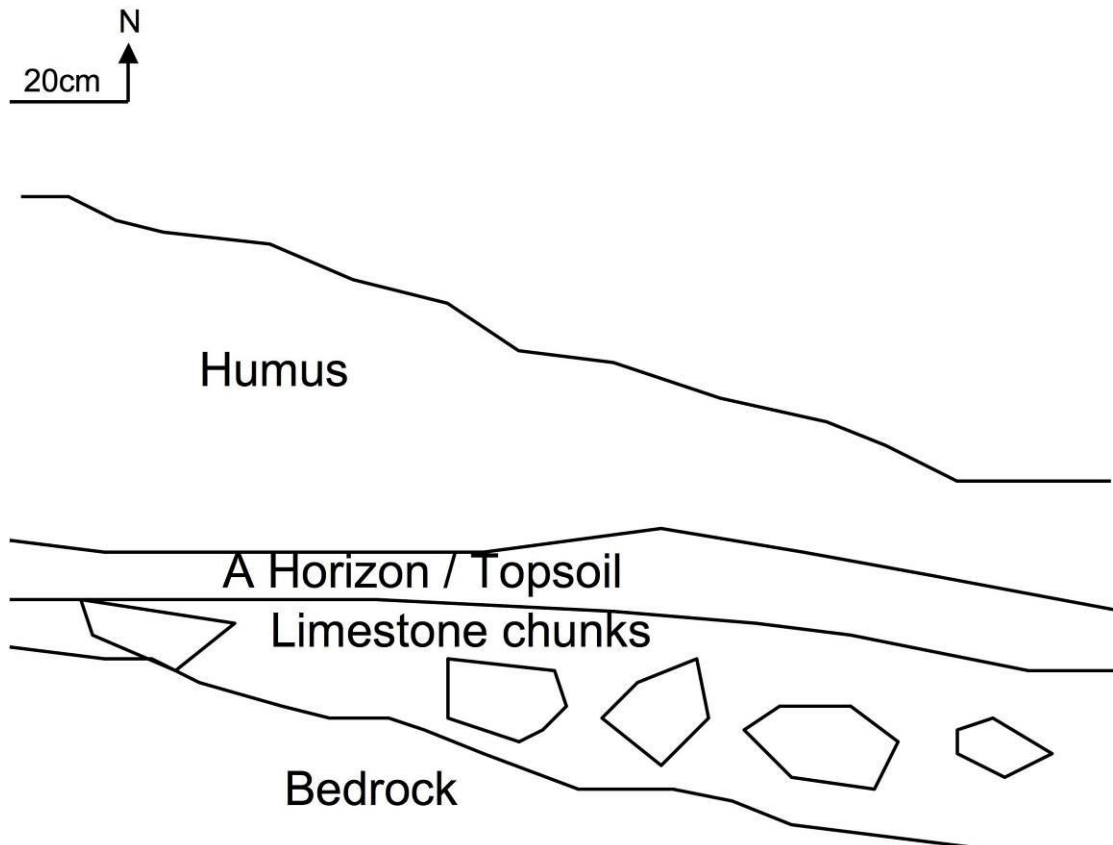


Figure 46 Section drawing of Test Unit 1, NOS-34-M1

### Artefacts:

#### *Ceramics:*

No diagnostic ceramics came from this unit; sherds were all heavily eroded and burnt. There were 82 sherds from this unit, weighing a total of 1433g. The surface collection in this area yielded both Early and Late Classic sherds.

*Ground stone:* A fragment of a granite metate was found just below the humic layer, reflecting bulldozer push.

## 7. The Nojol Nah Settlement Zone

*Lithics:* Six chert tool fragments were found in the limestone layer, including two bifacial blanks

### **Test Unit 1 Summary:**

The limestone chunks were determined to be structural collapse that had been eroded over time; therefore artefacts found in this layer are associated with the collapse. The humus was post-abandonment accumulation. We did not gain any artefacts in a primary archaeological context that allowed us to date the construction of NOS34-M1.

### **Test Unit 2 - NOS34-F1**

#### **Excavation:**

Test Unit 2 was a 1x1m unit placed in a 7m wide depression (NOS34-F1) which was located near the join of an 'L' shaped structure (Fig. 47). Similar features were noted beside many of the mounds in the Nojol Nah Settlement zone. This depression contained a darker more organic soil compared to the soil around it. There were three distinct layers in this unit: The humic layer, a layer of silty loam with fist-sized chert cobbles and limestone chunks (Lot 1), then a clay layer, before bedrock was reached at 94 cmbs (Fig. 48). A limited number of sherds and chert tool fragments were derived from all three layers.

7. The Nojol Nah Settlement Zone

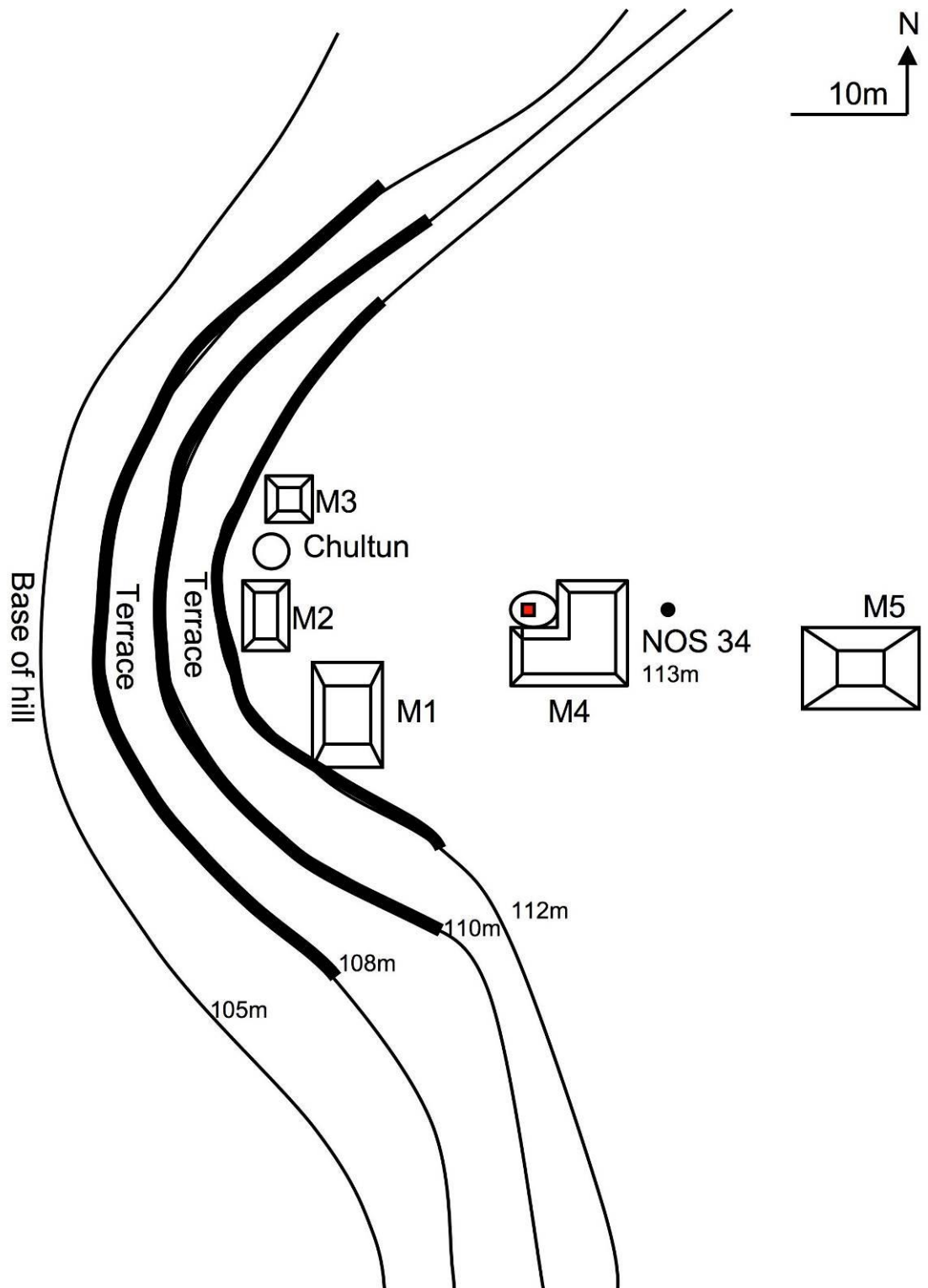


Figure 47 Map of the NOS 34 area with Test Unit 2 indicated in red

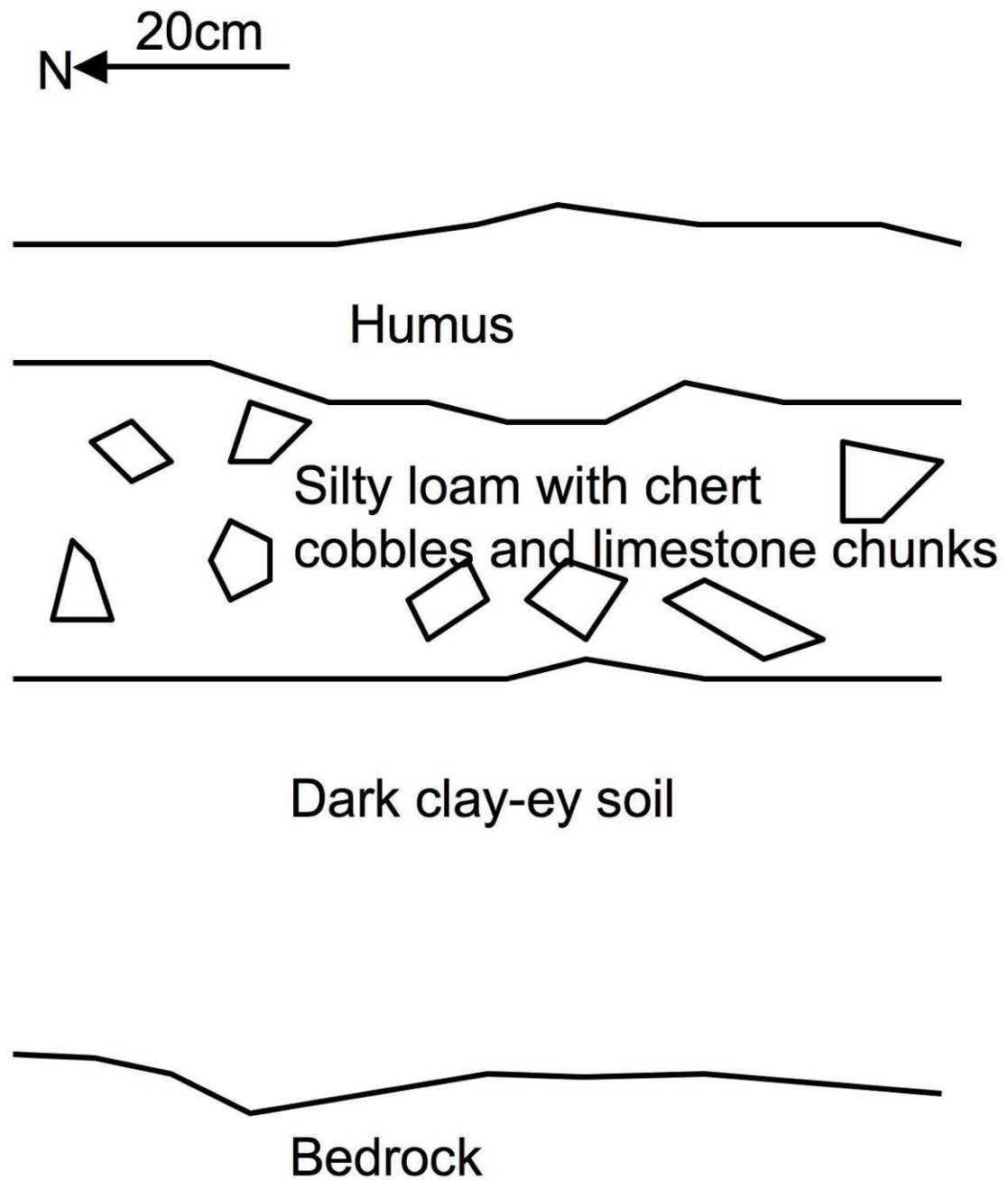


Figure 48 Section drawing of Test Unit 2, NOS-34-F1

**Artefacts:**

*Ceramics:* Ceramics recovered from this test unit were eroded and could not be dated. The 7 small fragments weighed a total of approximately 40g. Surface collection at this area yielded Early and Late Classic ceramics.

## 7. The Nojol Nah Settlement Zone

*Lithics:* A total of six fragments from chert flaked stone bifacial tools were found in Test Unit 2.

### **Test Unit 2 Summary:**

It is not clear what the purpose of the depression was, but due to its rich organic soil, and the relative paucity of artefacts, it may be the remains of a kitchen garden. Samples were taken for future macrobotanical and pollen analysis by MRP staff members. The clay appears to have been laid down to even the surface of the bedrock. The chert cobbles and limestone chunks then seem to have been deliberately laid down on top of the clay, perhaps to serve as core for a platform. The test area was too limited to be certain, but may represent an area of ancient cultivation.

### **Test Unit 3 - NOS 35-M1**

#### **Excavation:**

The NOS 35 area contained six mounds, flattened terrace areas, two linear earth features, and two ditches (Fig. 49). At the bottom of the NOS 35 hill was a bajito. Test Unit 3 measured 2x2m tested a mound, NOS35-M1, at the base of the hill that abutted the bajito (Fig. 50). The mound measured 5x5m and was approximately 0.5m tall, but was likely taller before the bulldozing of the land. The humic layer ranged from 2cm to 10cm in depth across the unit. Beneath the humic strata was a layer of sascab, followed by a matrix consisting of sandy soil, and fist- to pebble-sized chert cobbles (Lot 1). Around 25% of these cobbles appeared to have been raw cobbles that were tested to determine suitability for tool making, with flakes removed. Sherds were collected from Lot 1, but underneath the Lot 1 layer lay dark soil that was sterile of artefacts, judged to be the old land surface (Fig. 51). Therefore the unit was closed, even though bedrock had not been reached.

7. The Nojol Nah Settlement Zone

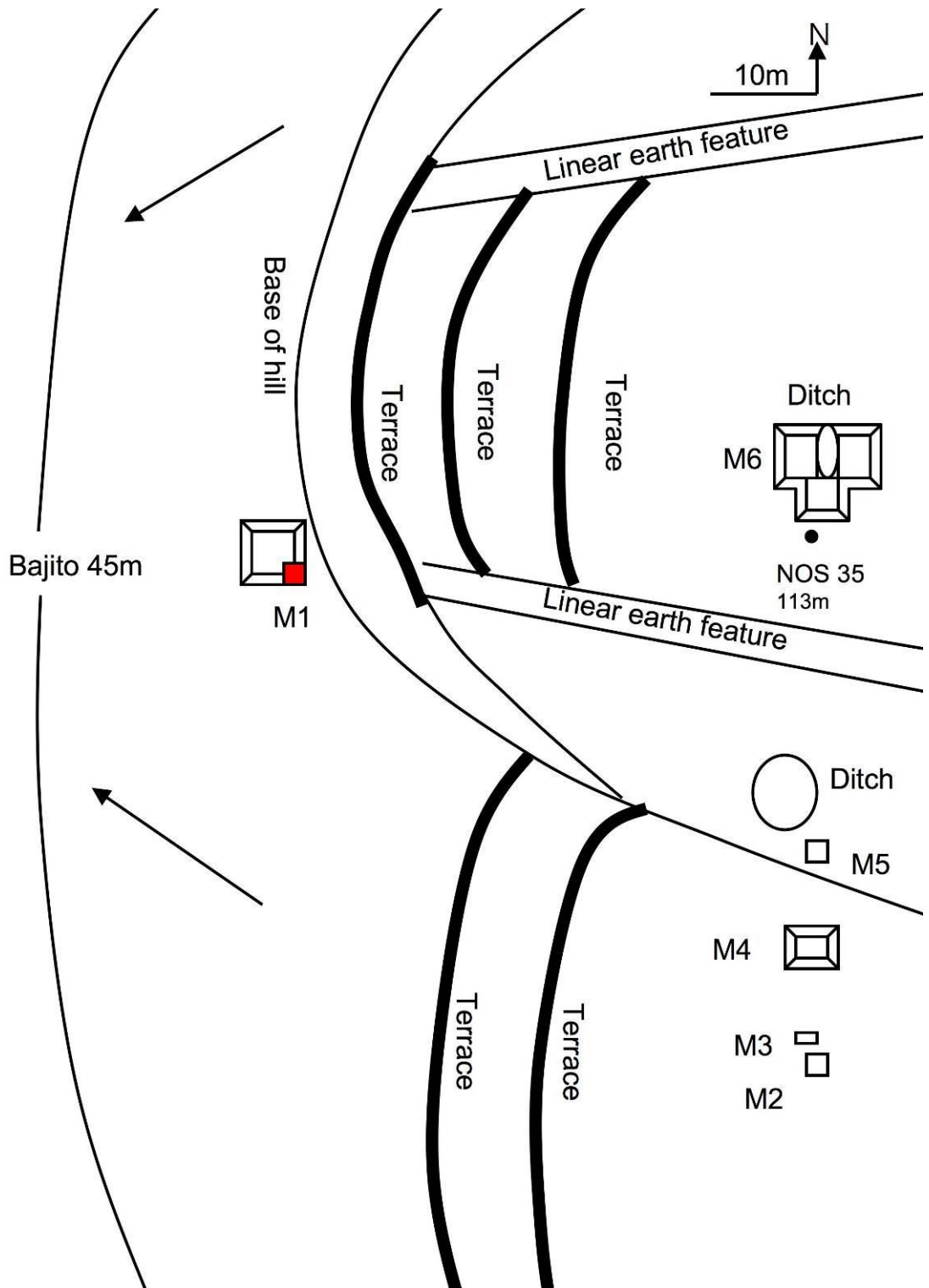


Figure 49 Map of the NOS 35 area

7. The Nojol Nah Settlement Zone

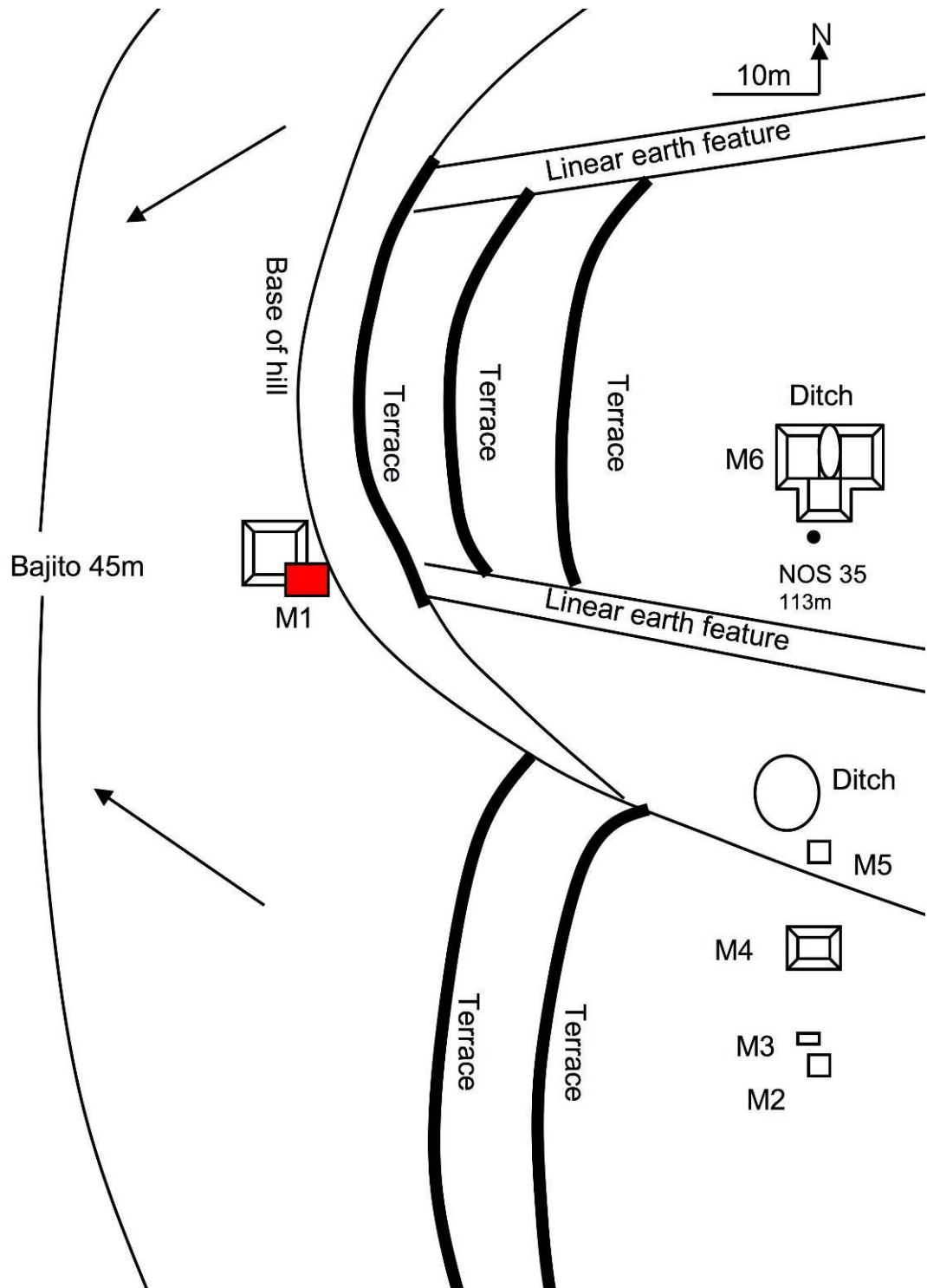


Figure 50 Map of the NOS 35 area. Test Unit 3 indicated in red.



## 7. The Nojol Nah Settlement Zone

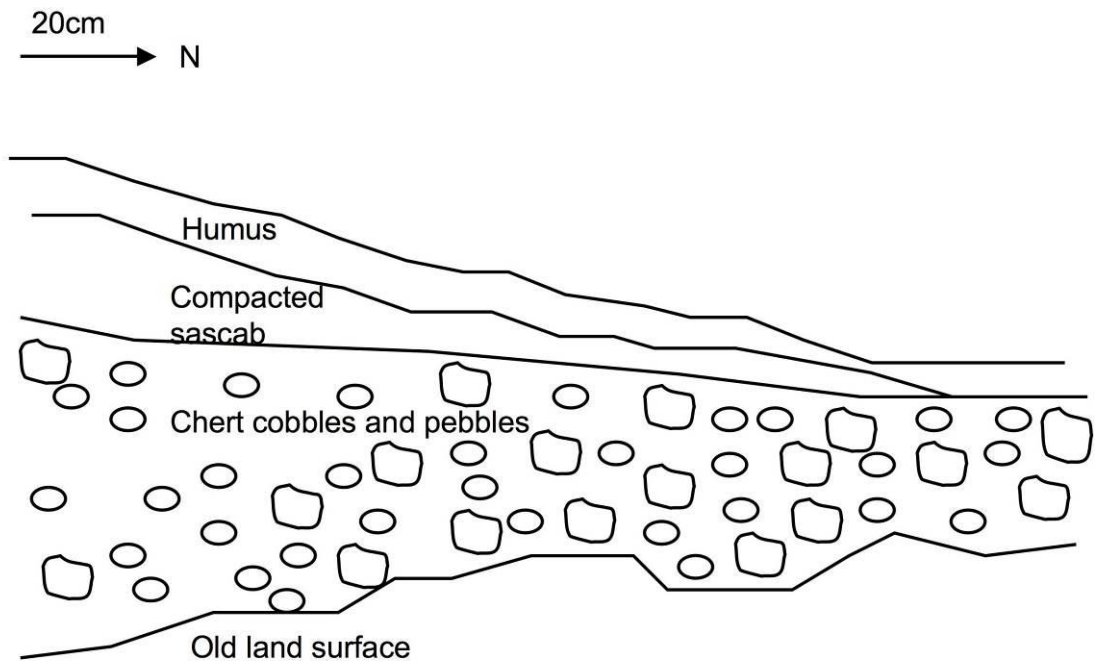


Figure 51 West section drawing of Test Unit 3, NOS 35-M1

### Artefacts:

*Ceramics:* Four small sherds weighing a total of 20g were recovered from the floor foundation layer, but the sherds were non-diagnostic.

*Lithics:* Five worked chert flakes were found in the floor foundation layer, including the proximal end of a general utility biface, and a whole general utility biface

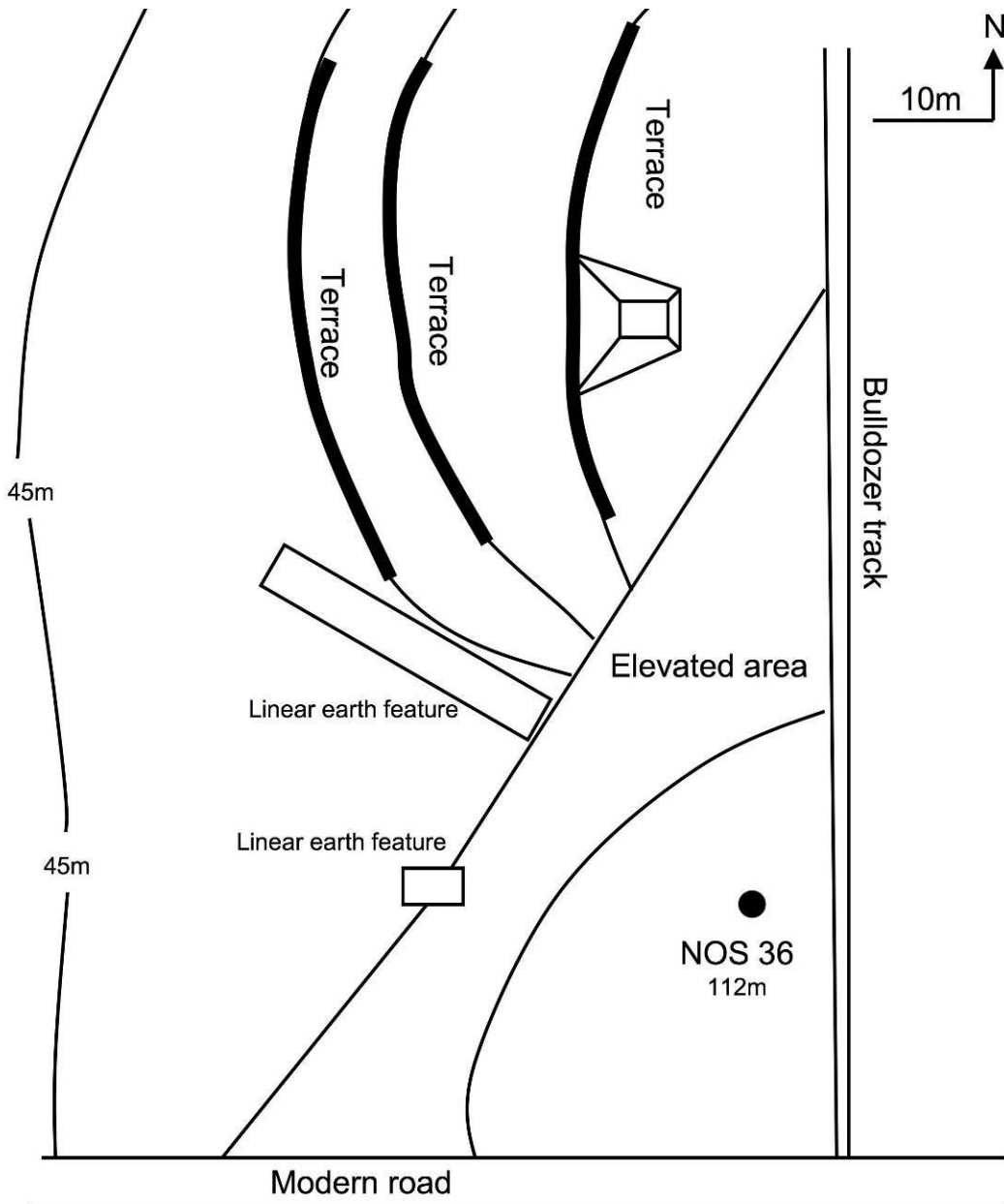
### Test Unit 3 Summary:

The height of NOS35-M1 (0.5m) may reflect bulldozer flattening; it is not possible, based on recovered evidence, to know for certain. The gradation in size of the chert – cobbles to pebbles – suggests that this deposit served as a foundation for a floor; however no in situ evidence of the floor remained. If the structure was a platform, any evidence of a floor has since eroded away over time, and this may explain the sascab deposit in the matrix beneath the humus directly above the foundation layer – as floors were sometimes constructed from compacted sascab (Villaseñor 2010, 140). We were unable to obtain any dateable material from this unit.

**Test units 4 and 5 - NOS36-F1**

**Overview:**

The NOS 36 area contained 1 mound, terraces, and two linear earth features (Fig.52).



**Figure 52 Map of the NOS 36 area**

Units 4 and 5 tested the largest linear feature, NOS36-F1. This feature was 36m long northwest to southeast, and 5m wide, and ran from a naturally elevated area down into the bajito. NOS36-F1 was unlikely to have been a natural formation, as it did not conform to the natural slope of the hill. My working hypothesis was that NOS36-F1

## 7. The Nojol Nah Settlement Zone

was a berm. Berms are features thought to have been used by the ancient Maya for slope management, and/or to mitigate soil loss. Berms can be made from vegetation, earth, or stone (Beach and Dunning 1994, 56). The specific goals of these two test units were to determine whether or not the NOS36-F1 was artificial, whether there was enough information to say it was a berm, and in any case to date the feature. As NOS36-F1 was such a large feature, two test units were implemented. One (Test Unit 4) was placed on the southwestern corner with the other (Test Unit 5) centred on the summit of the feature (Fig. 53).

## 7. The Nojol Nah Settlement Zone

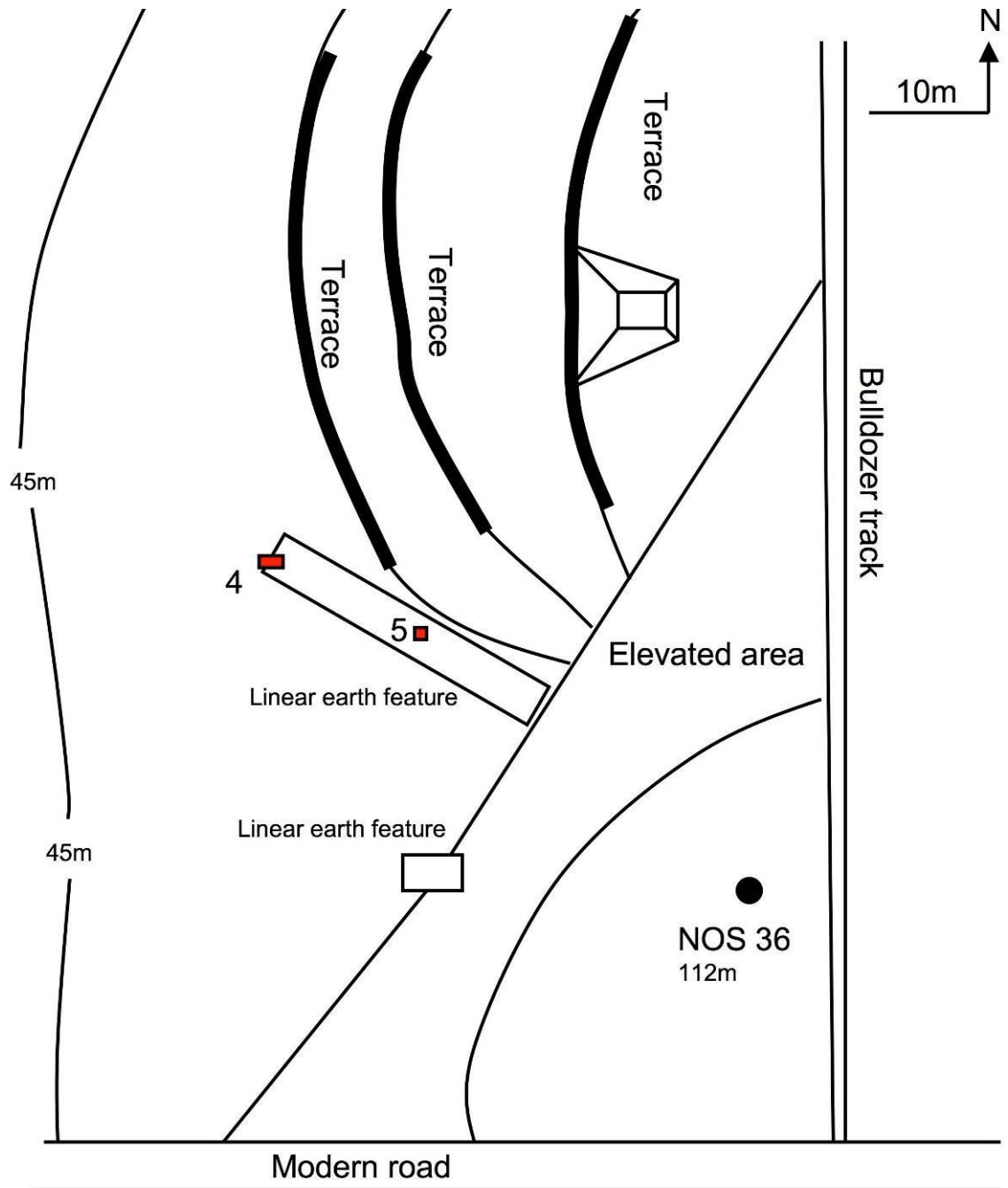


Figure 53 Map of the NOS 36 area with Test Units 4 and 5 indicated in red

### Excavation Test Unit 4

Test Unit 4 was a 1x2m unit designed to capture the linear feature's construction. Beneath the humic layer – which ranged from 10-40cm in depth - were two further layers (Lots 1 and 2). The first layer, 40 cm in depth, comprised a silty loam with chert

## 7. The Nojol Nah Settlement Zone

cobbles (approximately 40% of these cobbles had flakes removed), as well as some larger cut chert pieces and one limestone block that looked like collapse. Beneath Lot 1, the Lot 2 layer also consisted of a silty loam with chert cobbles and chert pieces, but also included approximately 60% degraded compacted sascab. Included in the Lot 2 layer was a piece of compacted sascab floor. The unit was taken down to 80cmbs where bedrock was encountered (Fig. 54). Ceramics were recovered from both Lots 1 and 2 but not from the humus.

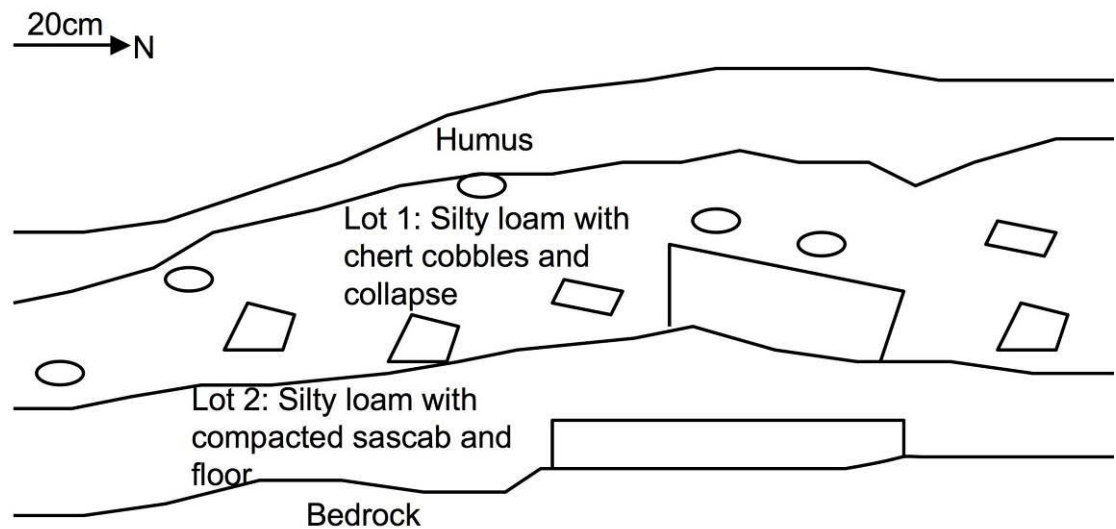


Figure 54 Section drawing of Test Unit 4, NOS36-F1

### Artefacts (Test Unit 4):

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	141	456g	Early Classic Tzakol 1-3 – including an Aguilla Orange bowl rim, and 7 Uaxactun unslipped jar rims
Lot 2	44	240g	Early Classic Tzakol 1-3

## 7. The Nojol Nah Settlement Zone

*Lithics:* Two chert flakes from stone tools were recovered from Lot 1 weighing a total of 38g, including the distal end of a general utility biface

### **Test Unit 4 Summary:**

The evidence recovered from Test Unit 4 does not point conclusively to the feature being a berm. However the evidence does indicate that this feature is an artificial construction, as does the pottery

The degraded compacted sascab was determined to be representative of the remains of a floor, possibly the surface of a platform. The chert cobbles with flakes removed and the cut larger pieces of chert may represent debris from a lithic workshop that was operating at this location, although one would expect to see more evidence of lithic tool debris if this was the case.

Therefore this location may have been used to test and then to procure raw chert material for lithic tools that were then created elsewhere. The chert may also have formed the core of the construction of NOS36-F1. However we cannot say based on present evidence whether NOS36-F1 was a berm or a platform with another function.

### **Excavation (Test Unit 5):**

Test Unit 5 was a 1x1m unit at the summit of NOS36-F1, ca 15m from the western end of the Str. and roughly at its midline. Two distinct layers were encountered during this excavation. The first layer, Lot 1, was 10-15cm deep and contained modern organic material, mostly burned tree roots. Lot 1 contained around 25% chert cobbles dispersed throughout, with compacted sascab pieces. This layer had been churned due to recent bulldozer activities. Lot 1 overlay Lot 2, a stratum that contained around 45% pebble- to cobble-sized chert pieces, with larger chunks of compacted sascab than Lot 1. Bedrock was reached 83-95cmbs (Fig. 55). Sherds were recovered from both lots.

## 7. The Nojol Nah Settlement Zone

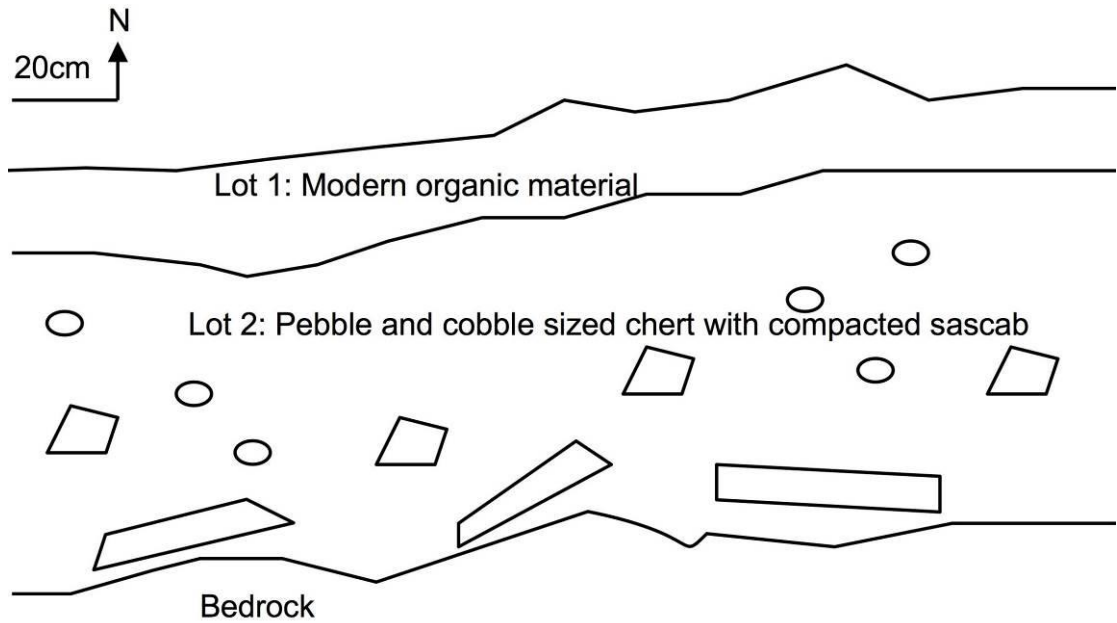


Figure 55 Section drawing Test Unit 5, NOS36-F1

### Artefacts (Test Unit 5):

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	73	826g	Terminal Late Preclassic (including a Sierra Red bowl rim) – Late Classic (one Monochrome Red bowl rim, two Achote Black bowl body sherds, and one Tinaja Red bowl rim fragment)
Lot 2	3	16g	Non-diagnostic

### Test Unit 5 Summary:

The location of Test Unit 5 – at the summit of NOS36-F1 – had been more impacted by bulldozer activities than the area of Test Unit 4. Thus the artefacts recovered, particularly from Lot 1, were not from a secure archaeological context. The compacted

## 7. The Nojol Nah Settlement Zone

sascab found in Lot 2 may be the remnants of the floor previously identified in Test Unit 4, and was found at roughly the same elevation in both units. Both test units on NOS36-F1 indicate that this was a man-made feature. The absence of mound groups in the immediate vicinity, and the proximity of the terraces, suggest that the berms was a form of land management rather than a residential structure. The chert that comprised much of this feature may have itself been instrumental in assisting with drainage.

### ***The NOS 15 area***

#### **Overview:**

Across the bajito from NOS36-F1 going 750m towards the west, the land rises in elevation. The lowest point of the bajito is 36m above sea level, as opposed to the 113m above sea level at the top of the ridge. NOS 15 marks a point in the west of the bajito, just before the land rises in elevation. Ten (10) mounds were mapped at this location in 2010 (M1-10), as well as chich mounds and terrace-like features (Fig. 56). The NOS 15 structures do not appear to have been arranged in formal patio or courtyard groupings. We hoped to recover chronological data and determine the function of these structures that were at the same elevation as the bajito, and located on its edge. Two tests, Unit 6 and Unit 7, were excavated.



## 7. The Nojol Nah Settlement Zone

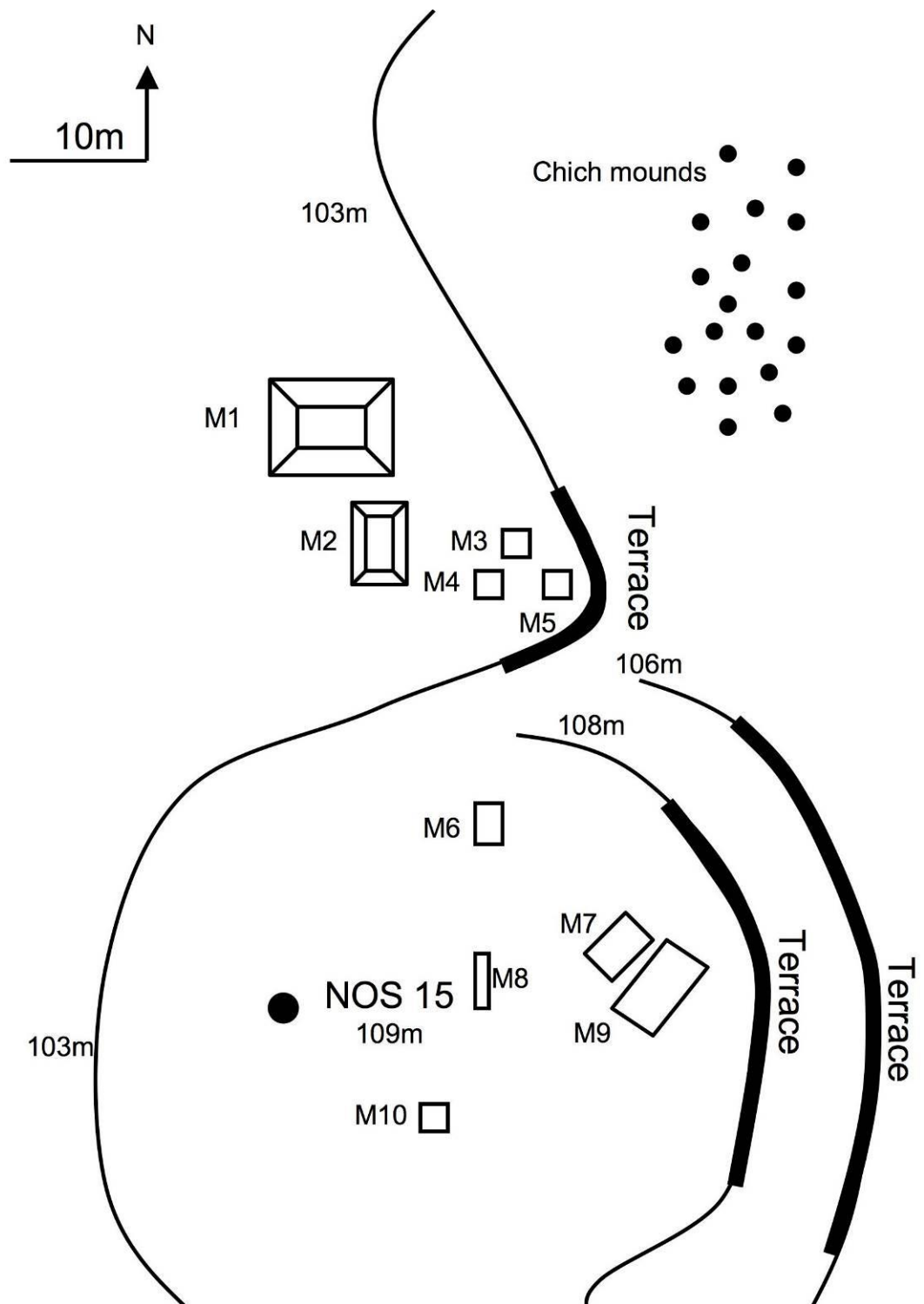


Figure 56 Map of the NOS 15 area

7. The Nojol Nah Settlement Zone

Test Unit 6 - NOS15-M1

Excavation:

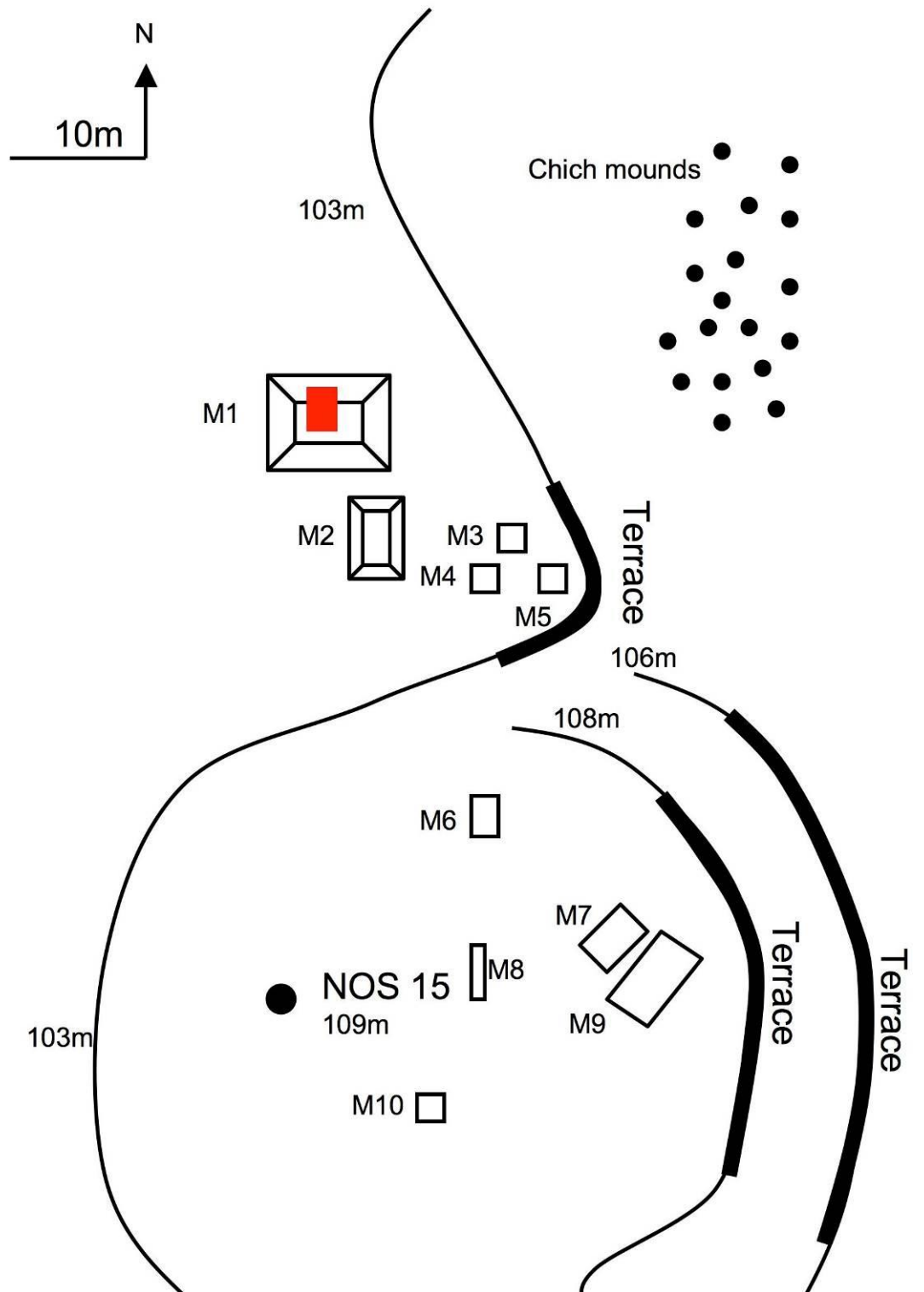


Figure 57 Map of the NOS 15 area, Test Unit 6 indicated in red

## 7. The Nojol Nah Settlement Zone

Unit 6 was a test trench located on a mound 106m north of the NOS 15 UTM point (Fig. 57). This mound (NOS15-M1) measured 9x6m, and had been heavily impacted by bulldozer activities. The excavation trench was placed on the mid-line of the structure and measured 4x2m. There was a 2m layer of bulldozer-churned material on the slope of the mound. Once this had been cleared, we reached a humic layer (the ground surface before the bulldozing took place) that was streaked with charcoal, and was between 10-30 cm in depth across the unit. Beneath Lot 1, which ranged from between 20–70cm in depth, which contained cut limestone blocks in a sandy matrix. Beneath Lot 1 was a plaster floor, and artefacts associated with the floor were designated as Lot 2. We uncovered part of the face of a wall. The surface of the floor, which was likely the surface of a building platform was ca. 10cm thick (Fig. 58). Artefacts recovered from the core of the wall were designated Lot 3. The unit was closed at the floor level, as it is hoped that complete excavation of this structure can be carried out in the future. Sherds were recovered from all three lots.

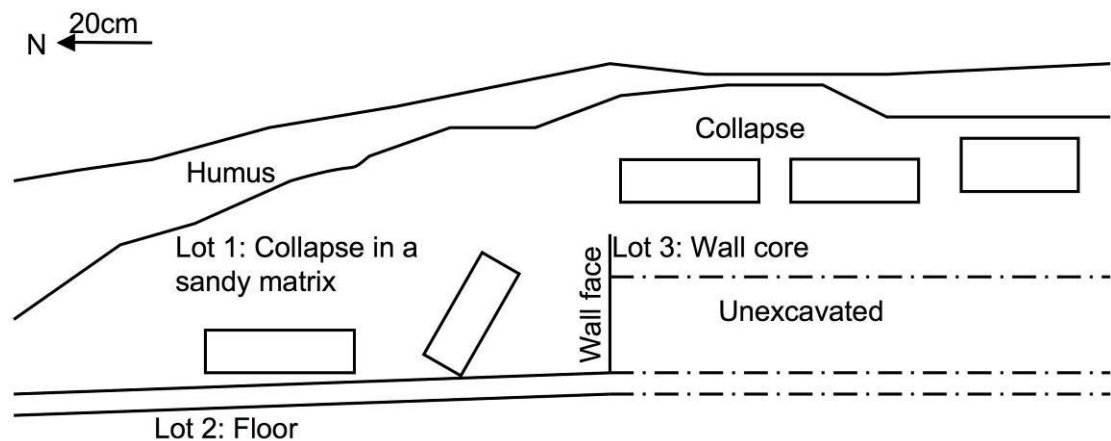


Figure 58 Section drawing Test Unit 6, NOS15-M1

## 7. The Nojol Nah Settlement Zone

### Artefacts:

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	11	178g	Non-diagnostic
Lot 2	5	58g	Early Classic Tzakol 1-3 (including 1 Aguilla Orange basal flange rim fragment)
Lot 3	21	380g	Non-diagnostic

#### *Lithics:*

LOT	COUNT	WEIGHT
Lot 1	3	106g
Lot 2	6	156g
Lot 3	12	396g

All of the tools were made from chert, and were mostly bifacial in nature. The nature of this lithic inventory is consonant with residential use.

#### *Other:*

A medial fragment of an obsidian prismatic blade, 0.8cm wide was recovered from Lot 3.

### **Test Unit 6 Summary:**

The only datable ceramics from this test unit were from the wall core (Lot 2), and these were dated to the Early Classic Tzakol 1-3 period. The sherds from Lot 2 indicate that the structure dated to the Early Classic Tzakol 3 or later. The limestone floor was still nicely preserved suggesting that it was originally well made. The sherds were from

## 7. The Nojol Nah Settlement Zone

items of a utilitarian nature – jars, plates and bowls - so this is likely to have been a residential structure. As the structure had a masonry wall rather than a wooden one, it is likely that this residence belonged to a person of reasonable means.

### Test Unit 7 - NOS15-T1

Excavation:

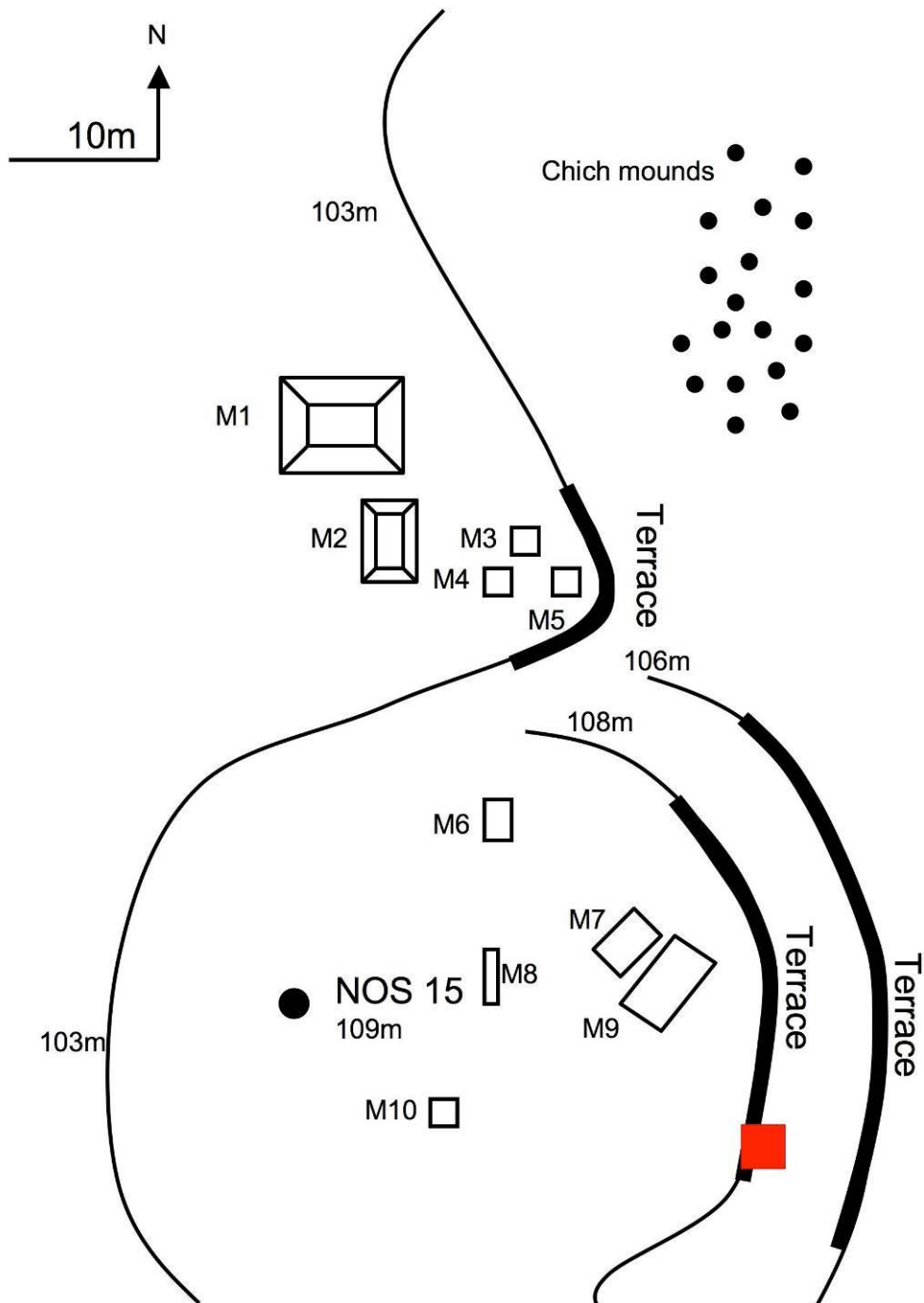


Figure 59 Map of the NOS 15 area, Test Unit 7 indicated in red

## 7. The Nojol Nah Settlement Zone

Unit 7 tested a terrace feature identified during the 2010 mapping exercise - NOS15-T1 (Fig. 59). The purpose of Test Unit 7 was to determine whether the 'terrace' was natural or artificial. The unit was 2x2m. Excavations uncovered a line of roughly cut and shaped limestone blocks (Figs. 60 and 61) surrounded by chert cobbles, beneath a thin humic layer. The soil matrix throughout the unit was dark and clayey, and was designated as Lot 1. The unit was closed after finding the line of cut limestone, as consecutive days of rain meant that the clay-ey soil was impossible to dig through efficiently, and we had gained the information that was desired from this unit.



Figure 60 Photograph of cut limestone forming terrace feature, Test Unit 7, NOS15-F1

7. The Nojol Nah Settlement Zone

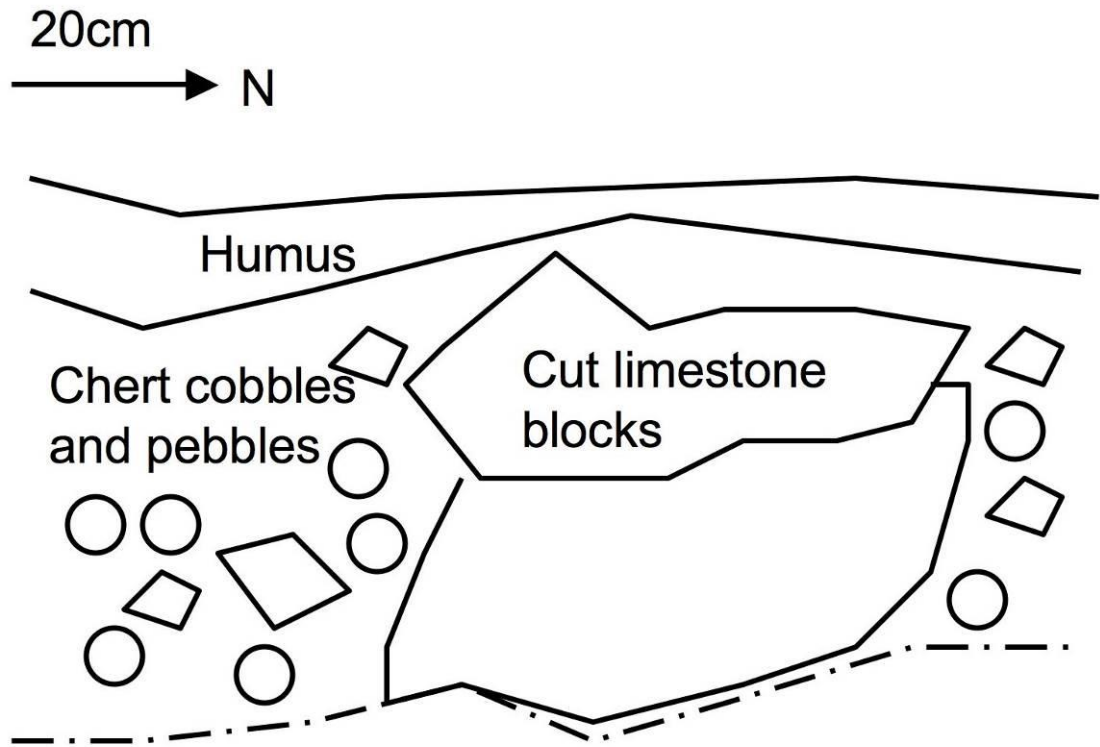


Figure 61 Section drawing Test Unit 7, NOS15-F1

**Artefacts:**

*Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	37	178g	Early Classic Tzakol 1-3 period (including a Uaxactun Unslipped 'nailhead' rim)

*Lithics:*

LOT	COUNT	WEIGHT
Lot 1	6	962g

These flaked chert tool fragments were bifacial in nature.

### **Test Unit 7 Summary:**

NOS15-T1 was clearly a man-made construction as evidenced from the line of cut limestone that seems to have formed a terrace face. Ceramics were recovered from this unit, and dated to the Early Classic Tzakol 1-3 period. This temporal designation matches that of the nearby NOS15-M1 test unit, suggesting that these were contemporary.

### ***The NOS 1 area***

#### **Overview:**

The NOS 1 mapped area (Fig. 62) was the highest point in the Nojol Nah settlement zone; from here there are far-reaching views to the north and west over the Alacranes Bajo (Fig. 63). There were three mounds at this location; two of them were situated on the upper platform (P1), and the other one (heavily bulldozed) was on the lower platform (P2). In addition there were flattened terrace area on the east and west sides of the hill. This location was the most intensely excavated area during the 2011 field season: I placed 3 test units on top of the hill, and a further 4 on the possible terrace features mapped in 2010 to verify the accuracy of the 2010 maps, and to gain chronological and functional data. The hill may have been an important strategic location as it commanded far-reaching views, both of other structures and the bajo. There were two mounds (NOS1-M1 & NOS-M2) atop a building platform on the apex of the NOS 1 hill, and one heavily bulldozed mound on a lower platform (NOS1-M3). Additionally there were three flattened possible terraced areas (NOS1-T1, NOS1-T2, and NOS1-T3).



## 7. The Nojol Nah Settlement Zone

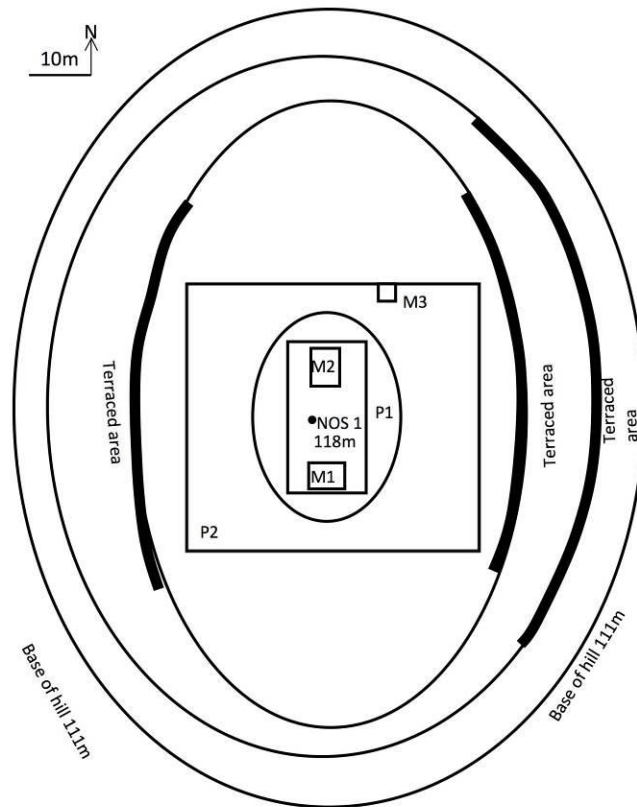


Figure 62 Map of the NOS 1 Area



Figure 63 Photograph of far-reaching views from the NOS 1 point (looking north)

## Test Unit 8 - NOS1-M1

### Excavation:

The southernmost mound on the NOS 1 hill (NOS1-M1) measured 10x7m north-south (Fig. 62). Initially a 2x1m trench was placed in the centre of the mound on its northern side. The unit was then expanded to follow a curved-stone face that formed the exterior of a probable platform, NOS1-M1 (Fig. 64). Two square features were located on the northwest of the structure (NOS1-M1-F1 and NOS1-M1-F2), which turned out to be rectangular walled enclosures with interior floors level with the bases of the walls (Fig. 65).

## 7. The Nojol Nah Settlement Zone



Figure 64 Photograph of Test Unit 8, NOS1-M1 curve of platform face

## 7. The Nojol Nah Settlement Zone

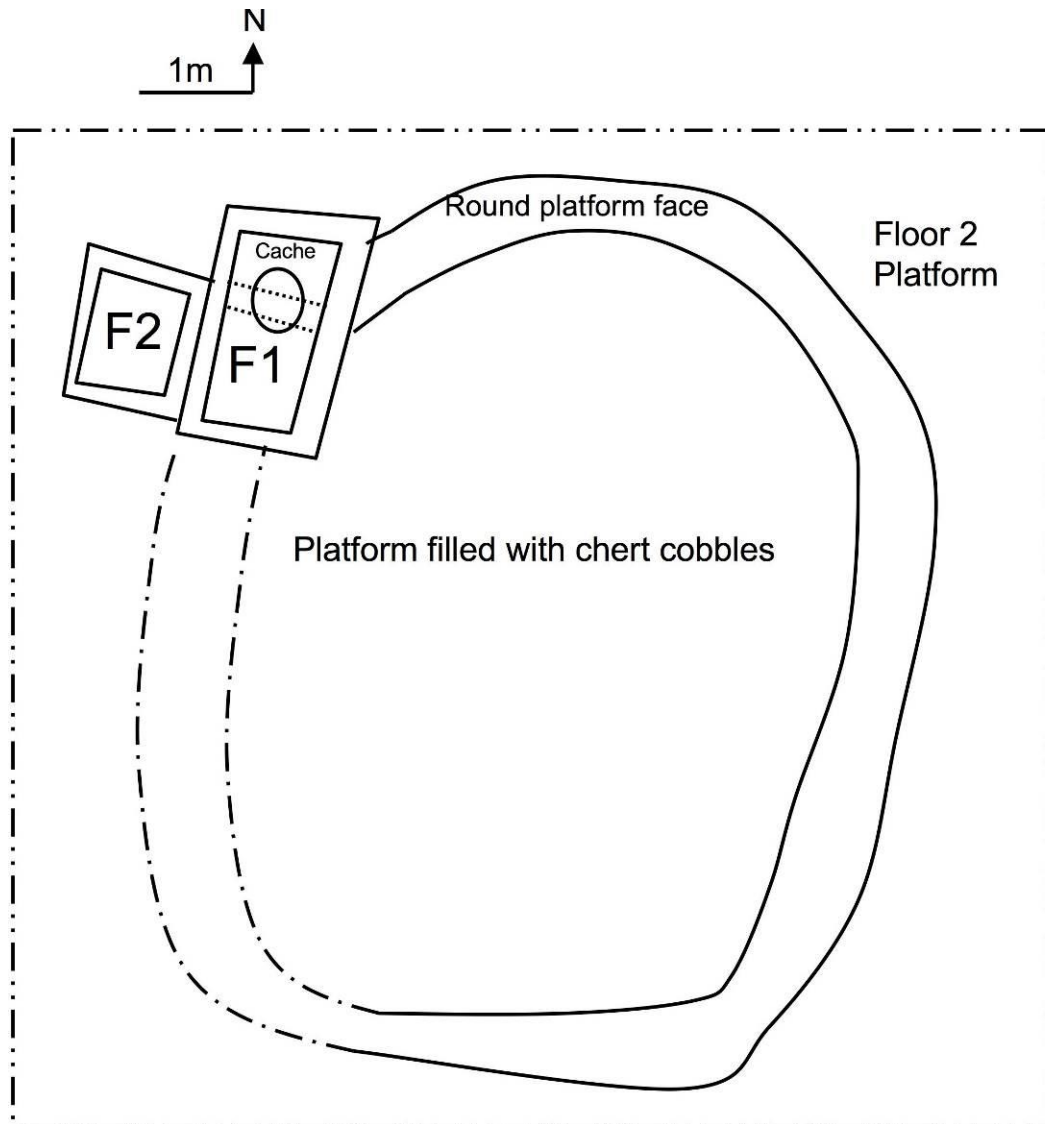


Figure 65 Plan map of Test Unit 8, NOS1-M1

NOS1-M1-F1 had in addition a low interior wall running east to west that rested on the interior floor, Floor F1-1. Underneath F1-1 was another floor, F1-2, and beneath F1-2 a lip-to-lip bowl cache was resting on top of bedrock. Inside the bowls was organic material, two bone beads, and a piece of shell (figs. 66 to 69).

## 7. The Nojol Nah Settlement Zone



Figure 66 Photograph of Test Unit 8 Cache in situ. Rebar with pink flagging tape shows position of removed interior wall



Figure 67 Photograph of Test Unit 8 Cache bowls

## 7. The Nojol Nah Settlement Zone



Figure 68 Photograph of beads and inlay from inside cache vessels



Figure 69 Photograph of obsidian associated with cache

Around three-quarters of the stone face of Str. NOS1-M1 was exposed. Roughly a quarter of the top of this mound was stripped to reveal chert cobbles that appeared to form the core of the platform. The platform rested on a plaster floor, Floor 1, which overlay a lower floor, Floor 2, presumed to be the surface of the basal platform. Floor 1 was found to underlie both the core and face of Str. NOS1-M1. NOS1-M1 was not entirely excavated due to time restraints, however excavations that were carried out

## 7. The Nojol Nah Settlement Zone

allowed us to determine the complete shape of the platform, and recover artefacts from the earliest construction level.

There were 14 separate lots within this excavation: Lot 1 was the designation given to the humic level from the initial 2x1m trench; Lot 2 was given to the upper level of the core on the north side; Lot 3 was the material from the 5 cm of humus that overlay the exterior floor of Str. NOS1-M1. Lot 4 was the material overlying the floor inside the Str.; Lot 5 was inside NOS1-M1-F1 from beneath the humic layer down to the 10cm above the floor; Lot 6 was the material overlying the interior floor of NOS1-M1-F1 and 10cm above it; Lot 7 represented artefacts recovered overlying the floor once the low interior wall of NOS1-M1-F1 was removed; Lot 8 refers to the material derived from the upper floor of NOS1-M1-F1 when it was removed, so was part of floor construction; Lot 9 was the material from the lower floor of NOS1-M1-F1; Lot 10 was the cache and associated artefacts; Lot 11 refers to material recovered from the upper floor, Floor 1, which underlay the core; Lot 12 refers to material recovered from the underlying floor, Floor 2 but exterior to Str. NOS1-M1; Lot 13 refers to artefacts from the same level of the cache, but not directly associated with it; and Lot 14 refers to material derived from beneath the humus, and down to the floor (Floor 1) in NOS1-M1-F2.

### Artefacts:

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	708	10794g	Terminal Late Preclassic – Early Classic Tzakol 1
Lot 2	157	2390g	Terminal Late Preclassic – Early Classic Tzakol 1
Lot 3	12	128g	Unknown Classic
Lot 4	3	32g	Unknown Classic

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Lot 5	12	144g	Unknown Classic
Lot 6	5	66g	Early Classic Tzakol 1
Lot 7	20	360g	Terminal Late Preclassic – Early Classic 1
Lot 8	8	66g	Unknown Classic
Lot 9	59	596g	Early Classic Tzakol 1
Lot 10	2	Two intact bowls	Terminal Late Preclassic (Sierra Red lip-to-lip bowls)
Lot 11	18	88g	Unknown Classic
Lot 12	1	1g	Unknown Classic
Lot 13	32	272g	Early Classic Tzakol 1-3
Lot 14	38	828g	Early Classic Tzakol 1-3

### *Lithics:*

LOT	COUNT	WEIGHT	NOTES
Lot 1	24	4848g	Including bifacial blanks, biface fragments, a scraper fragment, and a circular incising tool
Lot 2	27	1530g	Including biface fragments, and bifacial blanks
Lot 3	n/a	n/a	



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Lot 4	n/a	n/a	
Lot 5	6	1318g	Including bifacial blanks
Lot 6	n/a	n/a	
Lot 7	4	406g	Including a tapered proximal end of a biface
Lot 8	n/a	n/a	
Lot 9	2	22g	A bifacial blank, and a triangular chert blade
Lot 10	n/a	n/a	
Lot 11	7	422g	Including bifacial blanks
Lot 12	n/a	n/a	
Lot 13	1	2g	
Lot 14	n/a	n/a	

Lithics recovered during the excavations at NOS1-M1 were a mixture of flakes, cores, unifacial and bifacial tools – items associated with domestic activities. The number of bifacial blanks recovered suggests that tools were being made in situ

*Groundstone:* A fragment of a granite mano was found in Lot 1, and a fragment of a granite metate was recovered from Lot 7.

*Obsidian:* Near the Lot 10 cache, but not directly inside it, was a small piece of an obsidian blade weighing 1g.

*Bone and Shell:* Two small bone beads, and a shell fragment –which might have been some kind of inlay – were found inside the lower cache bowl.

### **Test Unit 8 Summary:**

The most striking thing about the NOS1-M1 excavations is that this was a round structure, not a rectangular structure as I had assumed it was during the 2010 mapping of the area. Dateable ceramics were recovered from the majority of lots, and the lip-to-lip cache resting on bedrock was identified as being from the Terminal Late Preclassic. This cache was likely to have been a dedicatory offering from the time of the building's construction, and NOS1-M1-F1 was built directly above the cache, most likely to mark its position. Str. NOS1-M1 appears to have been a platform of some kind. There was no evidence of a masonry superstructure built upon this platform. Round structures with caches are found throughout the Maya lowlands, and seem to be most prevalent during the Early Classic (Aimers et al. 2000). The presence of the cache and the round structure links the builders of NOS1-F1 to a style and presumably a behaviour that has been found across the Maya lowlands, therefore indicating that the people who built the platform were culturally part of a larger group. Dedicatory caches are thought to represent the fundamental components of the cosmos – the land, the sky and the sea (Bozarth and Guderjan 2004, 206). No artefacts were recovered that dated beyond the Early Classic, suggesting that this structure was abandoned at this time. Circular/oval structures appear across the Maya lowlands infrequently, and so a specialised function may be inferred (Hansen 1998, 85).

### Test Unit 9 - NOS1-P1

**Excavation:**

Unit 9 was placed in the centre of the western side of the upper platform on the summit of the NOS 1 hill. (Fig. 70).

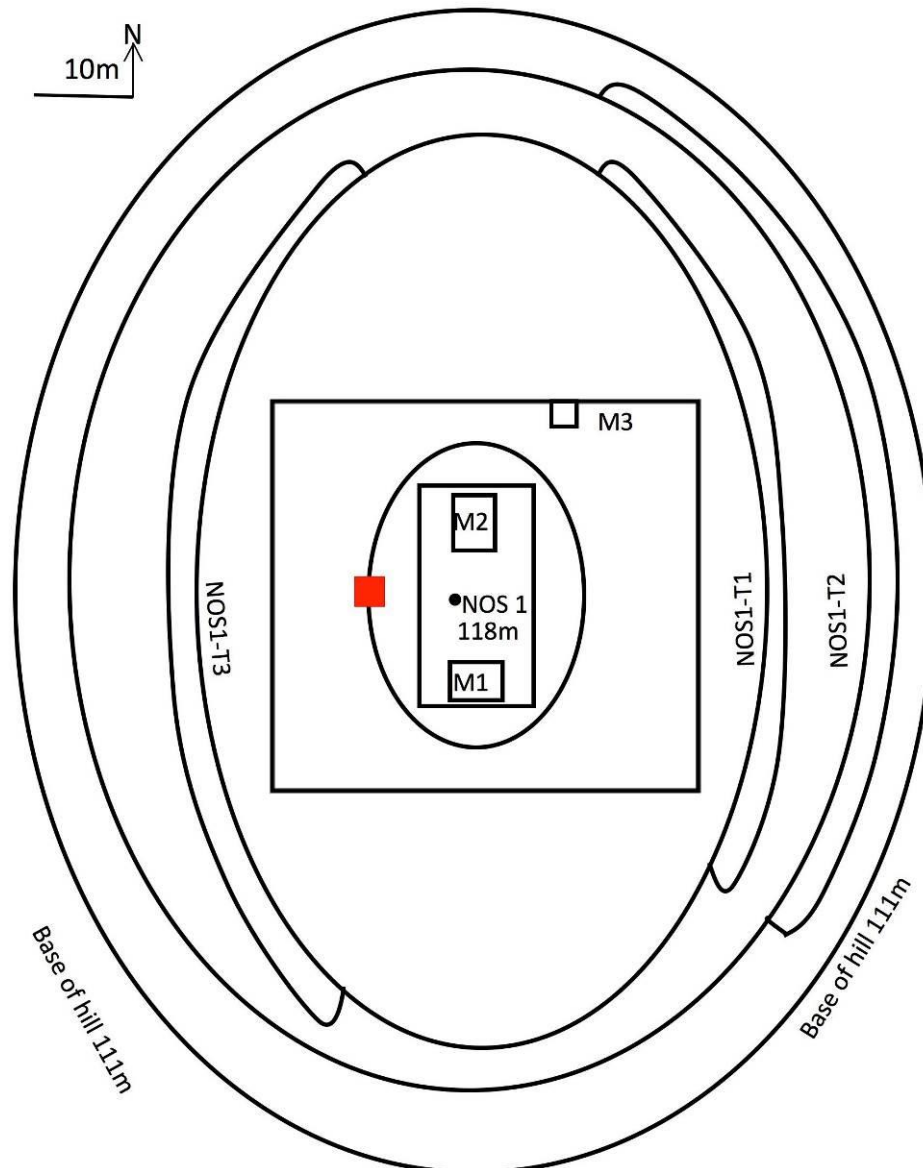


Figure 70 Map of NOS 1 area with Test Unit 9 shown in red

The excavation here was implemented in order to gain chronological data, and to determine whether there was any evidence of a plaster floor that covered the

## 7. The Nojol Nah Settlement Zone

platform. Unit 9 was a 2x2m excavation trench. There were four distinct layers beneath the humic layer, and these were designated Lots 1-4 (Fig. 71). Artefacts were recovered from Lots 1-3. Lot 1 was a rich dark brown soil containing small pieces of chert and limestone rubble, 20-30cm deep. Beneath was a layer that contained chert cobbles 15-20cm in diameter (Lot 2). The Lot 2 matrix had a higher percentage of chert than Lot 1. Lot 2 was 25-40cm deep. Beneath Lot 2, was Lot 3, and this consisted of a layer of stones – roughly cut limestone and chert cobbles – that were larger than those of Lot 2. Some of the Lot 3 stones appeared to be laid in a line. Beneath this line of stones was an earthy layer (Lot 4). As this unit was excavated specifically for investigating the upper platform, excavations were halted at this point.

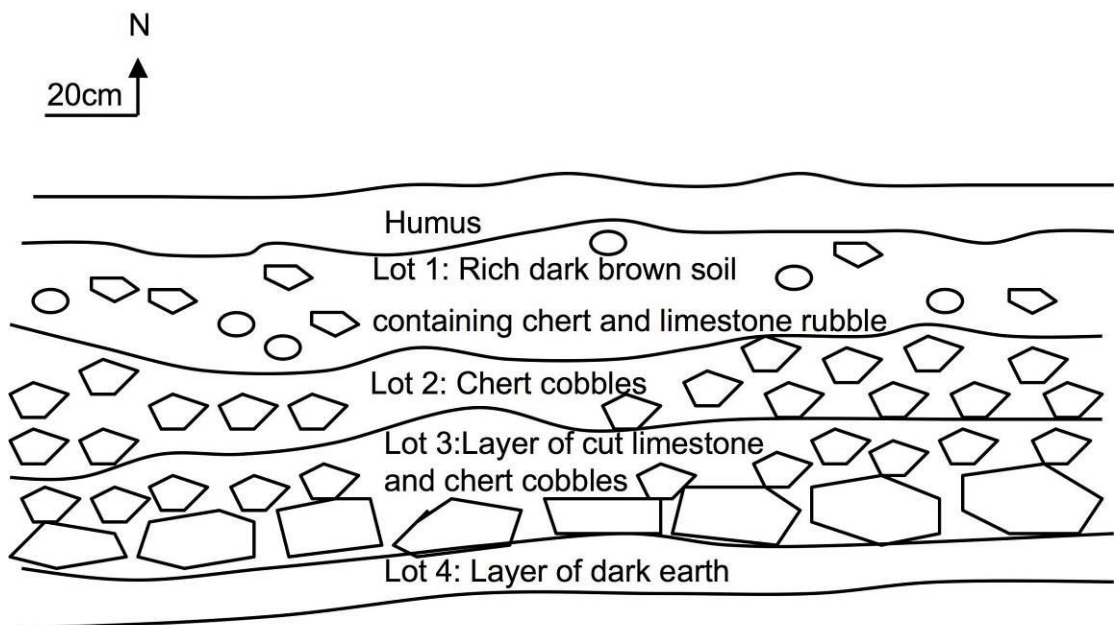


Figure 71 Section drawing of Test Unit 9, NOS1-P1

### Artefacts:

#### Ceramics:

LOT	COUNT	WEIGHT	DATE
Lot 1	166	3556g	Early Classic Tzakol 1 - 3
Lot 2	70	460g	Unknown Classic
Lot 3	52	464g	Unknown Classic

## 7. The Nojol Nah Settlement Zone

Lot 4	23	100g	Unknown Classic
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### *Lithics:*

LOT	COUNT	WEIGHT	NOTES
Lot 1	8	282g Including flakes, a core and a biface preform	Including a medial fragment of a large prismatic chert blade 5.9cm wide
Lot 2	4	284g	
Lot 3	n/a	n/a	
Lot 4	n/a	n/a	

### **Test Unit 9 Summary:**

Excavations on NOS1-P1 revealed the construction of the platform. Large cut stones were placed on top of flattened soil, with large chert cobbles on top of the cut stones, and then smaller limestone and chert pieces were placed on top of the chert cobbles. There was likely a plaster floor capping the platform, but there was no remaining evidence of the floor capping in situ. Datable ceramics were recovered from Lot 1 only, with the ceramics from Lots 2, 3, and 4 only able to be given the designation of 'unknown Classic'. As the Lot 1 ceramics were dated to the Early Classic Tzakol 1-3 period, it is likely that this was the latest date in the platform's construction.

### **Test Unit 10 - NOS1-M2**

#### **Excavation:**

On the northern side of the NOS1 hill's summit, directly opposite NOS1-M1 lay NOS1-M2 (Fig. 62). The purpose of the excavation of this mound was to obtain chronological and functional data. I felt it was important to carry out excavations of Str. NOS1-M2

## 7. The Nojol Nah Settlement Zone

because Str. NOS1-M1 turned out to be a round platform, not the square structure that I had assumed it to be during the 2010 mapping. I wanted to determine whether this was the case or not with NOS1-M2.

Excavation began with a 2x2m unit on the northern side of the mound, and once a wall and a degraded floor were uncovered, the excavation expanded to follow the wall, and then investigate the interior of the building. The wall was straight, and was oriented 18 degrees off a north-south alignment. Lot 1 represents a layer of limestone collapse directly underneath the humus in the initial 2x2m unit. The collapse layer was 60cm deep. Beneath the degraded floor was a 20cm layer of small chert pieces, and this was designated Lot 3. Lot 2 was the designation given to material from the interior of the Str., beneath the humic layer. The matrix of the material of Lot 2 consisted of collapse mixed with a sandy loam that continued down to the interior floor for roughly 50cm. The floor (Floor 1) inside of the structure (Fig. 72) had a pinkish hue (Munsell 7.5YR 7/4), and this colour was likely to have been derived from hematite pigments (Tom Guderjan 2011, Pers. Comm.). Artefacts from the floor surface were designated Lot 4, and Lot 5 was a concentration of sherds in the northeast corner of the floor. Beneath the Floor 1 was a ca. 10-15cm layer of fist- to pebble- sized chert (Lot 6), probably the floor foundation, which lay directly atop another plastered surface (Floor 2), possibly the surface of a building platform. This lower plaster layer (Lot 7) lacked the pinkish hue and was ca. 5cm thick. Beneath it was a 25cm layer of small and medium sized (10-15cm across) chert cobbles. This layer of chert (Lot 8) was a bright orange colour in contrast to the grey chert from other layers (Fig. 73). In the southeastern corner of the room, beneath the orange cobbles was a 'horse-shoe' shaped piece of plaster (Lot 9) which lay on the north side of a flat limestone rock, oriented southwest–northeast, that lay flat and measured 68cm in length, 40cm in width, and 19cm in depth. Two limestone boulders lay beneath the flat rock. To the north of the flat rock was a burial crypt (Fig. 74), designated Lot 12, containing poorly preserved human remains (Burial 39 in the Nojol Nah burial sequence / Lot 13).

## 7. The Nojol Nah Settlement Zone



Figure 72 Photograph of Test Unit 10 - Well preserved pinkish floor.

7. The Nojol Nah Settlement Zone



Figure 73 Photograph of orange chert, Test Unit 10, NOS1-M2



## 7. The Nojol Nah Settlement Zone



**Figure 74** Photograph of stone lined box with plaster floor that originally was likely to have contained the Lot 12 human remains, Test Unit 10, NOS1-M2

Beneath the large stela-shaped rock was a 30cm deep sandy layer (Lot 10), which overlay a degraded limestone floor, possibly the surface of the basal platform, (Floor

## 7. The Nojol Nah Settlement Zone

3), which had a cut measuring roughly 90cm in diameter. The cut represented the top of a 50cm-deep shaft (Lot 11), angled to the west and filled with chert cobbles of different sizes, with around 60% of these cobbles having had flakes removed. At the bottom of the shaft we encountered organic matter, and a greyish powder (Lot 15), which may have been the remains of human bones, eaten by termites (Tom Guderjan 2011, Pers. Comm.). There were no artefacts associated with Lot 15, and beneath Lot 15 was a 50cm-deep layer of limestone boulders, and beneath this lay natural soil (Fig. 75).

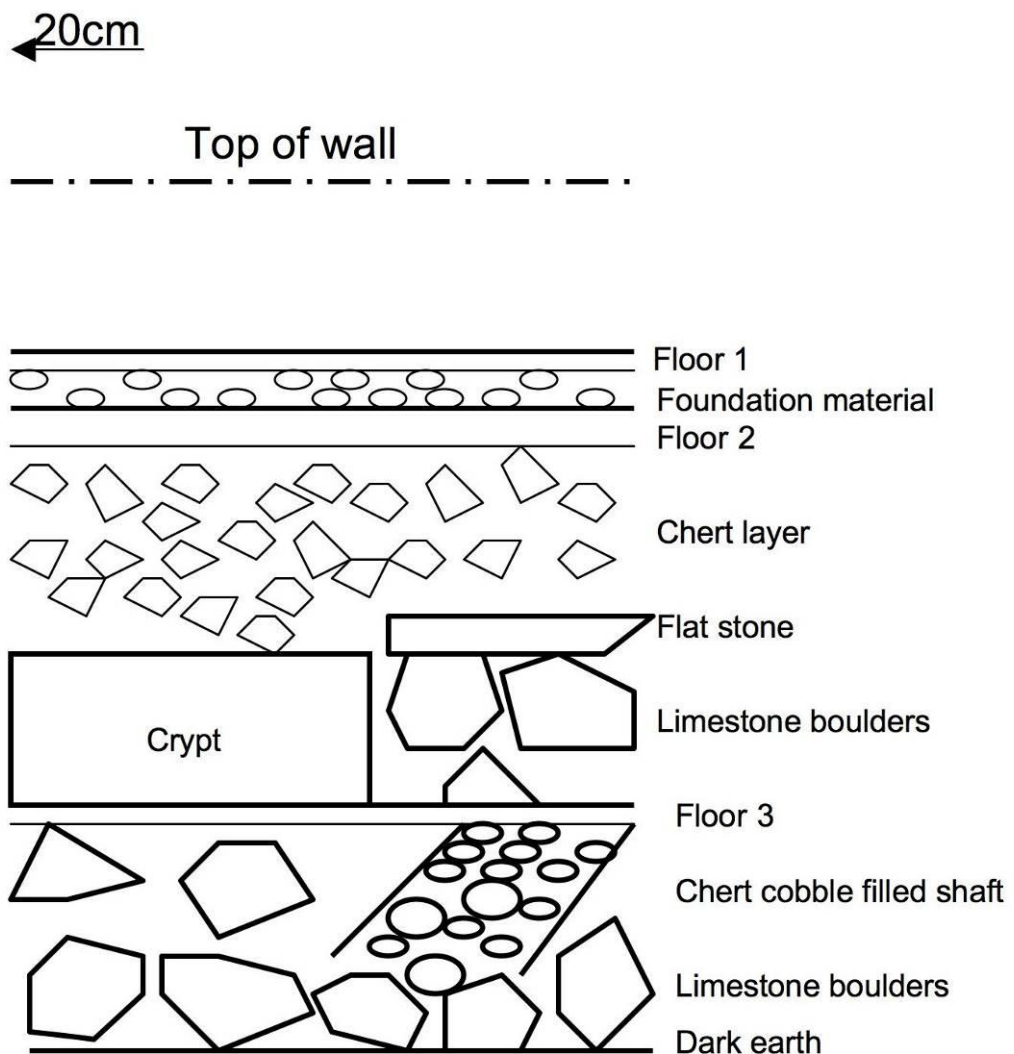


Figure 75 Section drawing of Test Unit 10, NOS1-M2

## 7. The Nojol Nah Settlement Zone

### Artefacts:

#### Ceramics:

LOT	COUNT	WEIGHT	DATE
Lot 1	6	3g	Late Classic Tepeu (including an Achote Black vessel foot)
Lot 2	221	2780g	Late Classic Tepeu 1-3 (including a ¼ complete Rubbercamp brown bowl rim, a Garbutt Creek red bowl rim fragment, and an Achote Black bowl rim fragment)
Lot 3	18	52g	Non-diagnostic
Lot 4	3	32g	Unknown Classic
Lot 5	44	1436g	Late Classic Tepeu 2-3 (including a ½ complete TuTu Camp jar rim and a 1/3 complete unslipped/eroded bowl rim)
Lot 6	20	118g	Non-diagnostic
Lot 7	26	344g	Non-diagnostic
Lot 8	12	392g	Non-diagnostic
Lot 9	2	10g	Non-diagnostic
Lot 10	13	334	Early Classic Tzakol 1-3 (including one Aguilla Orange)

7. The Nojol Nah Settlement Zone

			Plate Rim, one Dos Arroyos Poly Bowl Base and Rim, and one Aguilla Orange bowl base)
Lot 11	13	334g	Terminal Late Preclassic – Early Classic Tzakol 1-2 (including one Sierra Red Bowl Rim fragment, one Dos Arroyos Poly bowl rim fragment, and a 1/5 intact EC Redware bowl)
Lot 12	6	380g	Early Classic Tzakol 1-2 (including a fragment of a Dos Arroyos Poly bowl base, and one Aguilla Orange bowl rim fragment
Lot 13	n/a	n/a	n/a
Lot 14	4	48g	Non-diagnostic

*Lithics:*

LOT	COUNT	WEIGHT	NOTES
Lot 1	n/a	n/a	
Lot 2	15	424g	Including distal fragments of

## 7. The Nojol Nah Settlement Zone

			bifaces
Lot 3	n/a	n/a	
Lot 4	4	188g	Including tertiary flakes, and a possible adze
Lot 5	9	118g	Including a distal fragment of a biface, a retouched scraper
Lot 6	n/a	n/a	
Lot 7	9	334g	Including tertiary flakes with evidence of pressure flaking
Lot 8	25	3896g	Including bifacial blanks, 1 general utility biface, and secondary flakes with evidence of pressure flaking
Lot 9	1	94g	A whole general utility biface
Lot 10	2	10g	Tertiary flakes with evidence of pressure flaking
Lot 11	17	1410g	Including 1 large secondary flake with retouching of surfaces

## 7. The Nojol Nah Settlement Zone

Lot 12	1	120g	Bifacial blank core with cortex still intact
Lot 13	n/a	n/a	
Lot 14	6	74g	Including the proximal end of a biface

Lithics recovered during the excavations at NOS1-M2 were a mixture of flakes, cores, unifacial and bifacial tools.

*Obsidian:* Lot 1 contained a partial prismatic obsidian blade that weighed 2g. Another obsidian blade fragment (2g) was recovered from Lot 4.

### **Test Unit 10 Summary:**

Excavations at NOS1-M2 revealed that like the NOS1-M1 structure, this building was constructed in the Terminal Preclassic/Early Classic period, therefore suggesting that these structures were contemporaneous initially. However, judging from the ceramic dates from the upper levels of NOS1-M2, this structure was used during the Late Classic also, with another level of floor built on top of the initial Terminal Preclassic / Early Classic floor levels. It is not clear whether the Late Classic occupation represents a continuous occupation at this location, or whether the entire location was abandoned at the end of the Early Classic period, and re-occupied at a later date.

A large shaft was excavated into the core beneath the lowest floor, a possible burial was deposited, and the shaft was filled with chert cobbles. Once the refilling of the shaft was complete, it was sealed with a flat limestone rock that was fixed in place with plaster that formed a horse-shoe shape. The stela-shaped rock underneath the floor may have also served as a marker for the crypt burial located behind it. The crypt burial has been identified as an adult due to the complete epiphyseal union (Brown

## 7. The Nojol Nah Settlement Zone

and Plumer 2012, 167). The sex of this individual was indeterminate, and the preservation was poor so no further information could be gleaned about this individual. There were no grave goods

The inhabitants of NOS1-M2 would have had far-reaching views across the entire Nojol Nah settlement zone, across to the site core area, and then onto the Alacranes Bajo. However, it is not known whether this area would have been forested or cleared or a mixture of the two, but whatever the view-shed, the fact that this structure was on top of the highest point on the landscape meant that it was likely to have had a symbolic or strategic significance.

**Test Units 12, 13, 14, and 15 - NOS1-T1, NOS1-T2, and NOS1-T3**

**Excavation:**

These four test units were also on the NOS 1 hill, and were placed on areas that appeared to have been purposefully flattened curvilinear terraces, with the flattened areas measuring between 70 and 100 cm long. These units (Fig. 76) were designed to investigate any evidence of construction (as in the case of the NOS15-T1 terrace). We hoped to determine their use, and to obtain any cultural material present for dating. The ancient Maya across the Lowlands were documented to have modified natural bedrock, by digging out these outcrops, and building low rubble walls to trap the soil, to provide terraces that allowed natural formation processes to form soil accumulations rather than allowing the soil to be washed down the slope (Beach and Dunning 1994, 58). Each of these test units measured 1x2m and the humic layer was removed to look for signs of modification.



## 7. The Nojol Nah Settlement Zone

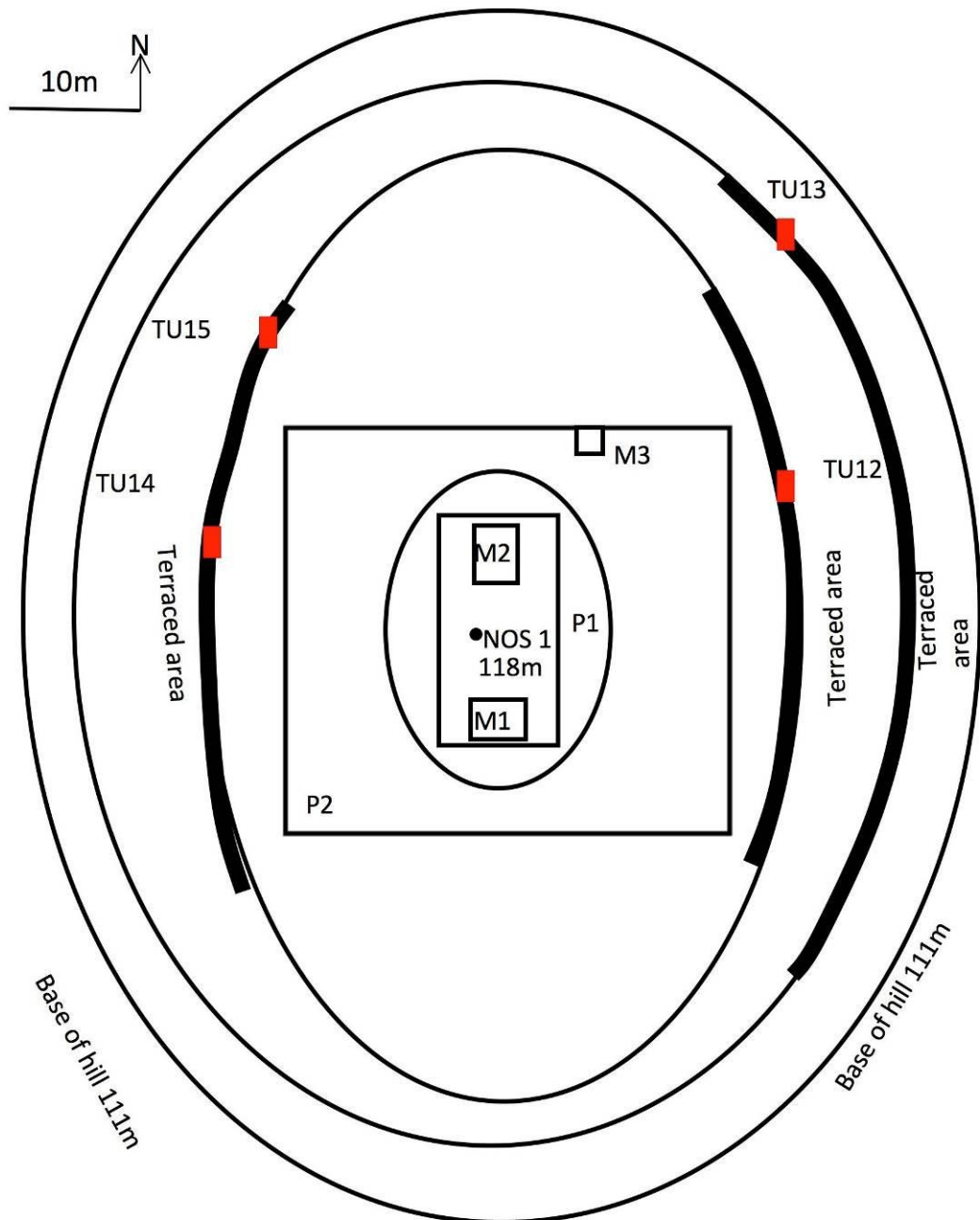


Figure 76 Map of NOS 1 area indicating position of Test Units 12, 13, 14, and 15

Test Unit 12 was placed on NOS1-T1, half-way down the hill, and was 50.88m at a 71 degree bearing from the NOS1 UTM point, with bedrock reached at 12 cmbs. Test Unit 13 was on the lowest proposed terrace area, NOS1-T2, was located 104.77m at a 47 degree bearing from the NOS 1 point with bedrock encountered at 15 cmbs. Test Unit 14 was on the western terrace, NOS1-T3, 321 degrees, and 47.88m from the NOS 1

## 7. The Nojol Nah Settlement Zone

point, with bedrock at 5 cmbs; and Test Unit 15 was also on NOS1-T3, on a bearing of 13 degrees, and 72.76m from the NOS 1 point with bedrock at 8 cmbs (Fig. 77).



Figure 77 Photograph of bedrock in (clock wise from top) Test Units 12, 13, 14, and 15, photos taken facing east

### Artefacts:

No artefacts were found during the excavations of Test Units 12, 13, 14, and 15.

### Test Units 12, 13, 14, and 15 Summary:

At all of these 4 test units, we found no evidence of bedrock modification, any kind of terrace face, or any cultural material. However, this is not to say that these features

## 7. The Nojol Nah Settlement Zone

were definitely not present in antiquity, but may not have survived in the archaeological record, especially as the hill had been subject to a thousand or so years of weathering and erosion since this location was occupied. Therefore the results of these four test units were inconclusive. They did, however, illustrate the abundance of bedrock outcrops close to the structures at NOS 1, therefore indicating the ready access the people of the area would have had to bedrock resources, such as limestone, sascab, chert and clay.

### ***The NOS 9 area***

#### **Overview:**

The NOS 9 area was located 572m to the northeast of NOS 1 at a bearing of 337 degrees. The terrain here was fairly flat in contrast to the NOS 1 hill, and was 11m lower than the top of the NOS 1 hill summit. We chose to investigate this area because the mounds had not been subject to further bulldozing since they were mapped in 2010. It was hoped that data could be gathered to add to the database of chronology across the Nojol Nah settlement zone landscape. The NOS 9 area contained 9 mounds (M1-9), with mounds 8 and 9 heavily bulldozed. The other seven mounds were fairly intact. There were also six ditched areas in this vicinity (Fig. 78).

## 7. The Nojol Nah Settlement Zone

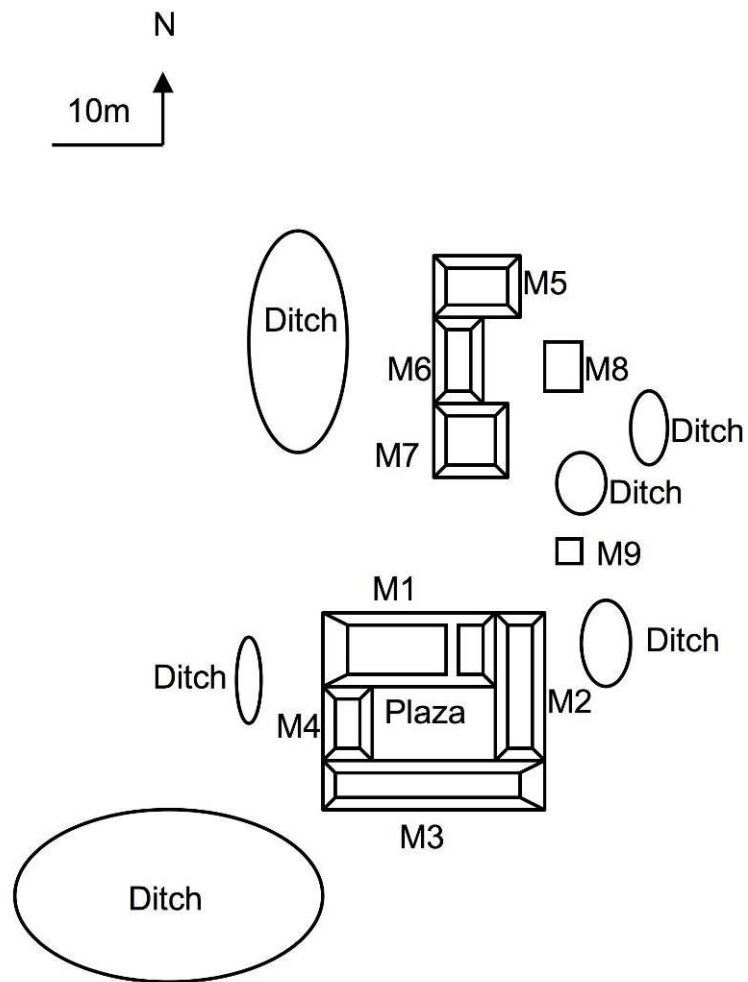


Figure 78 Map of the NOS 9 area

## **Test Unit 20 - NOS9-M1**

### **Excavation:**

The main purpose of Test Unit 20 was to gain chronological information and to gather any other information possible about the people who used these structures. The group that we tested was a Plazuela group (figure 79), and the test unit was a 2x2 m trench, that was designed to catch the corner of two buildings, and some of the plaza area in between structures.

## 7. The Nojol Nah Settlement Zone

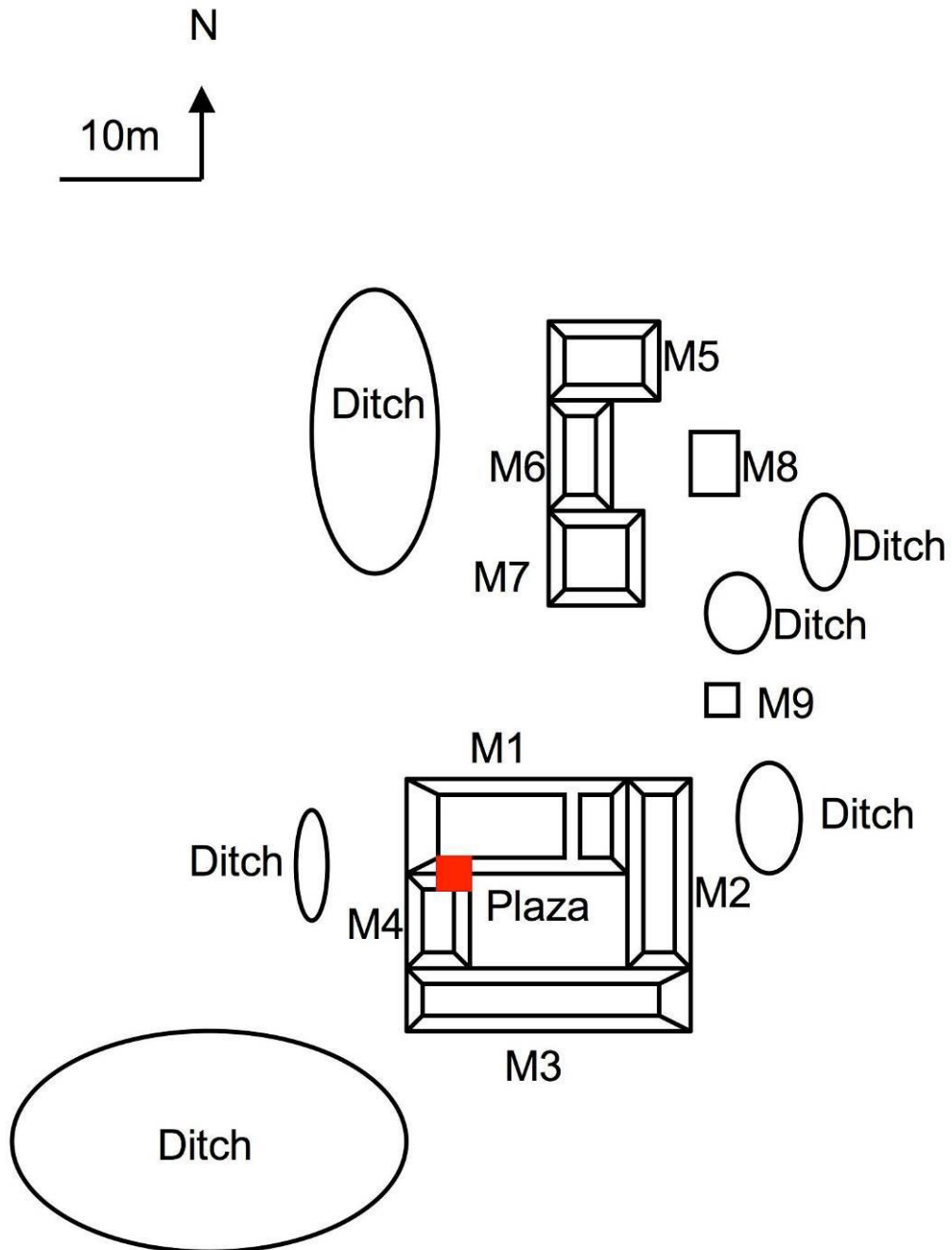


Figure 79 Map of the NOS 9 area, Test Unit 20 indicated in red

Once the bulldozer rubble had been cleared, the humic layer on this mound was found to be ca. 30cm thick. Within the humic layer, an almost intact granite metate and whole granite mano were recovered; however these were not from a secure archaeological context. Once the humus had been cleared, a layer of limestone collapse and loam was encountered, and this became Lot 1. This collapse layer went

## 7. The Nojol Nah Settlement Zone

on for around 90cm, and at the bottom of the collapse a floor and an intact wall corner were encountered (Fig. 80).

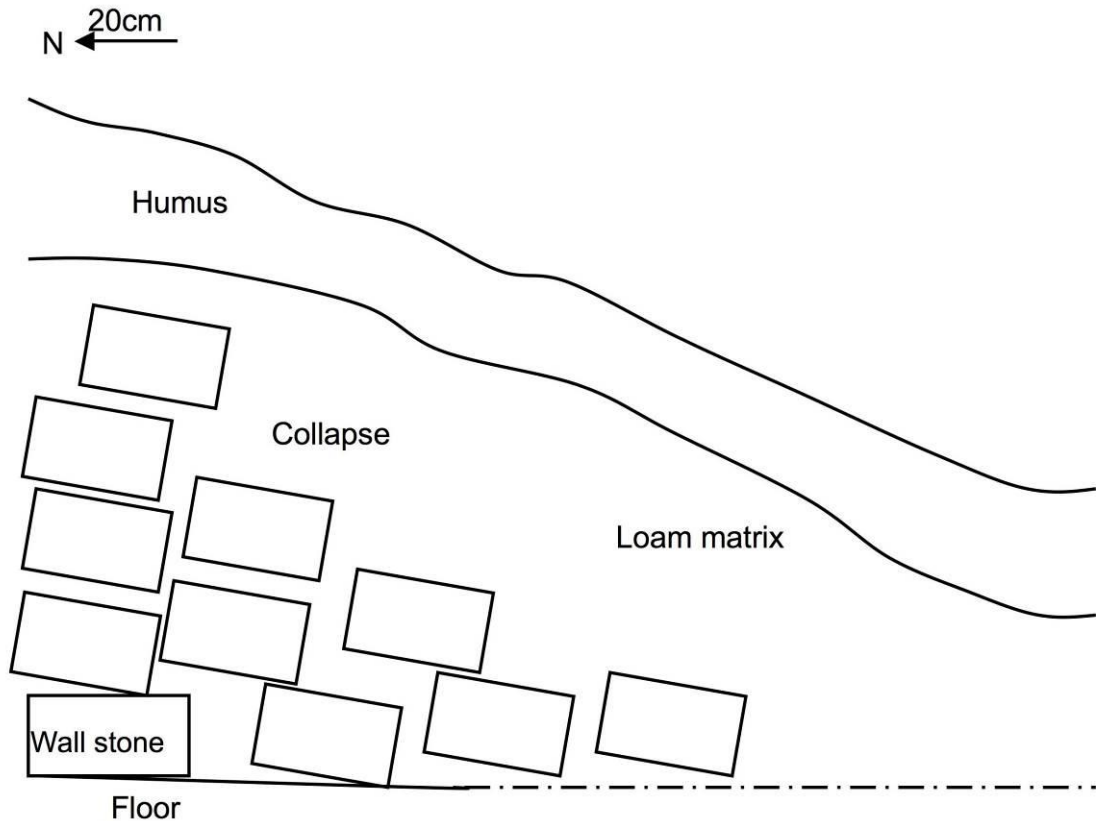


Figure 80 Section drawing of Test Unit 20, NOS9-M1

### Artefacts:

*Ceramics:* One sherd was recovered from Lot 1, however this was not a diagnostic piece.

*Groundstone:* An almost complete granite metate and a granite mano were recovered from the humic layer. However these were not from a secure archaeological context, and so it is not possible to say how they were associated with the plazuela group.

### Test Unit 20 Summary:

Having found the corner of a structure within the test unit's perimeters, due to time constraints we were unable to investigate this plazuela further during the 2011 field season. I planned to work more on this architectural group the following year;

## 7. The Nojol Nah Settlement Zone

however, upon returning to the area in 2012, it had since been bulldozed much further, and was now used actively for cattle grazing and pasture. So sadly any data from this plazuela group is now lost to time.

### ***The NOS 12 area***

#### **Overview:**

The NOS 12 point was located 119m north of the NOS 11 point. There were three mounds atop a flattened hill, and two terraced areas (Fig. 81). Similarly to the NOS 11 area, much damage had been done to the archaeological features in this area in the intervening year between mapping and excavations. The Alacranes Bajo is located directly at the bottom of the NOS 12 hill slope. The objective of two of the NOS 12 test units (Fig. 82) was to see if there was any indication of terrace construction. We also placed two units on the edge of bajo itself to see if there was any dateable cultural material from this context.



7. The Nojol Nah Settlement Zone

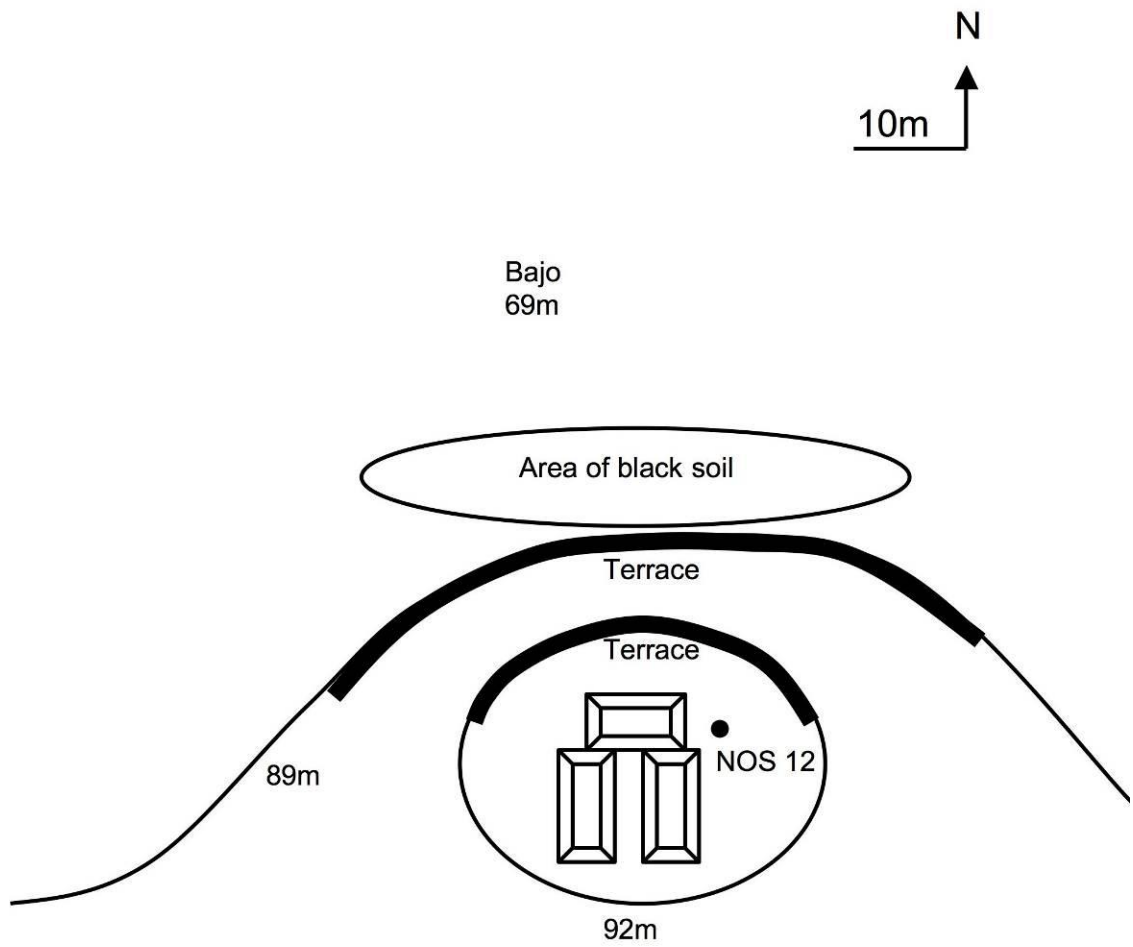


Figure 81 Map of the NOS 12 area

## 7. The Nojol Nah Settlement Zone

### Test Units 16, 17, 18, and 19 - NOS12-T1, NOS12-T2, NOS12-B1, NOS12-B2

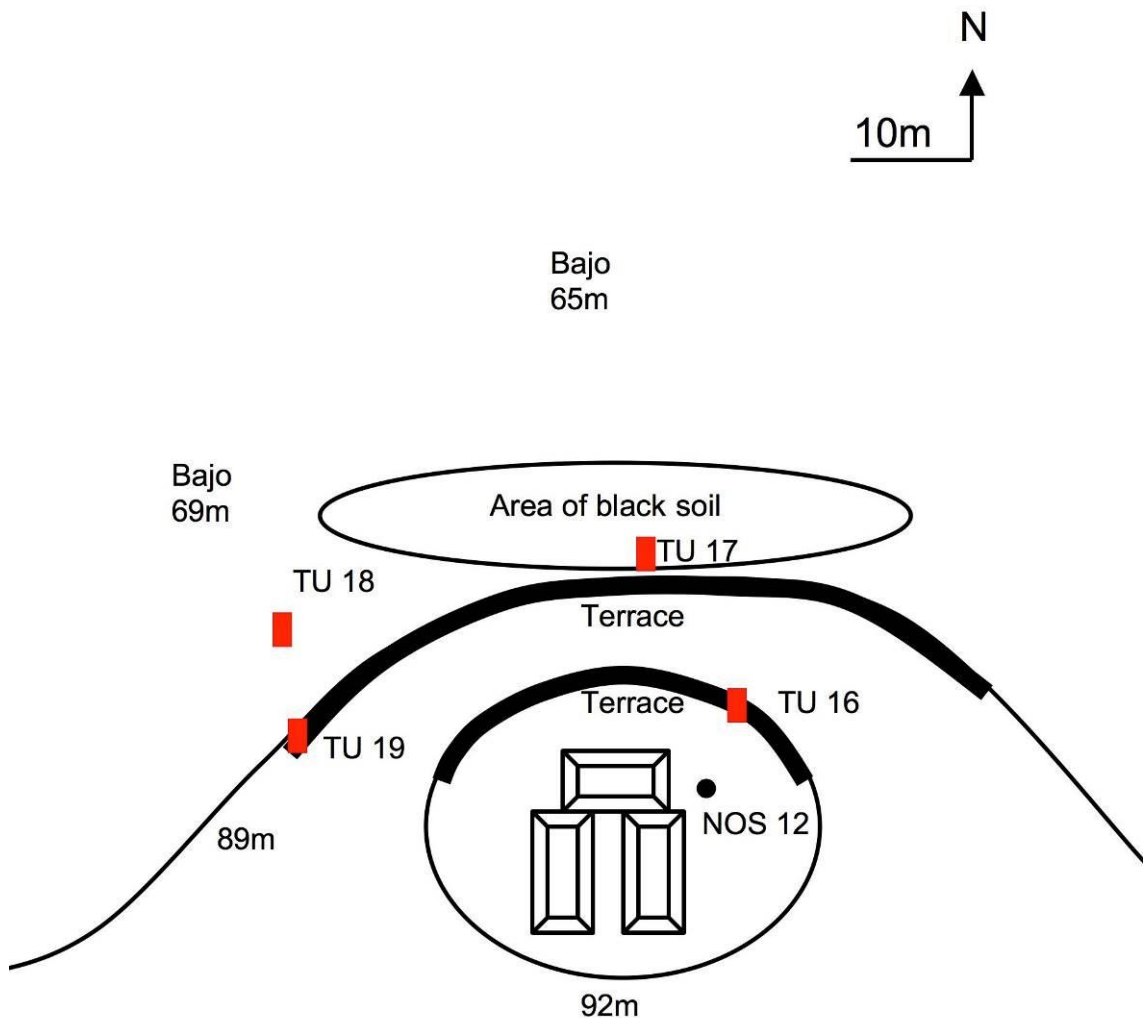


Figure 82 Map of the NOS 12 area. Test Units indicated in red

#### Excavation:

Test Unit 16 was located roughly halfway down the slope on a flattened area (NOS12-T1), and was a 1x1 m unit. Bedrock was 20cmbs, beneath a clayey soil, but there was no evidence of construction or modification. Test Unit 17 (NOS12-T2) was on another flattened area, this time near the bottom of this slope. This was also a 1x1 m unit, and here bedrock was reached 35cmbs, beneath a layer of clayey soil. There was no

## 7. The Nojol Nah Settlement Zone

evidence of construction or modification at the test unit either, and the only artefact recovered was a lithic flake. Test Unit 18 (NOS12-B1) was on the bajo at the bottom of the NOS12 hill in an area of dark organic earth, and was a 1x1 m unit. Bedrock was reached at 45 cm below surface beneath a dark crumbly clayey soil. The unit also contained around 20% of small plaster fragments. There were no artefacts or cultural material recovered from this unit. Test Unit 19 (NOS12-B2) was on the western edge of a flattened area that is on the edge of the bajo. Bedrock was reached in this unit 35 cm below surface beneath a sandy clay soil (Fig. 83).



Figure 83 Photograph of bedrock in (clock wise from top) Test Units 16, 17, 18 ,and 19

## 7. The Nojol Nah Settlement Zone

### **Artefacts:**

*Lithics:* One chert tool fragment was recovered from NOS12-T2.

### **Test Units 16, 17, 18, and 19 Summary:**

It is not clear from these test units what the flattened areas were used for - neither of the units uncovered any evidence of modification, although such evidence may not have survived in the archaeological record. The flattened areas may have been areas that had been prepared for planting. No cultural material was recovered from either of the test units on the edge of the bajo. The four units at the NOS12 area revealed the abundance of limestone bedrock close to the surface that would have been accessible to the inhabitants of the area. The NOS12-B1 unit contained small pieces of plaster, which may represent plaster from the NOS 12 structures that washed down the slope over time.

### ***The NOS 11 area***

#### **Overview:**

This NOS 11 area was located on the edge of the Alacranes Bajo, around 880m northwest of the NOS 1 point, and at an elevation that was 20m lower than the summit of the NOS 1 hill. The NOS 11 structures were built on a small ridge that slopes directly onto the bajo, and like the NOS 1 structure, there are far-reaching views from this location across the bajo and towards the Tulix Mul area (Fig. 84). There were a total of nine mounds (M1-9) in this area (Fig. 85).

## 7. The Nojol Nah Settlement Zone



**Figure 84** Photograph of view looking west across the Alacranes Bajo, and towards the Tulix Mul Courtyard (in clump of trees) from atop the NOS11-M2 Structure, NOS 11.

## 7. The Nojol Nah Settlement Zone

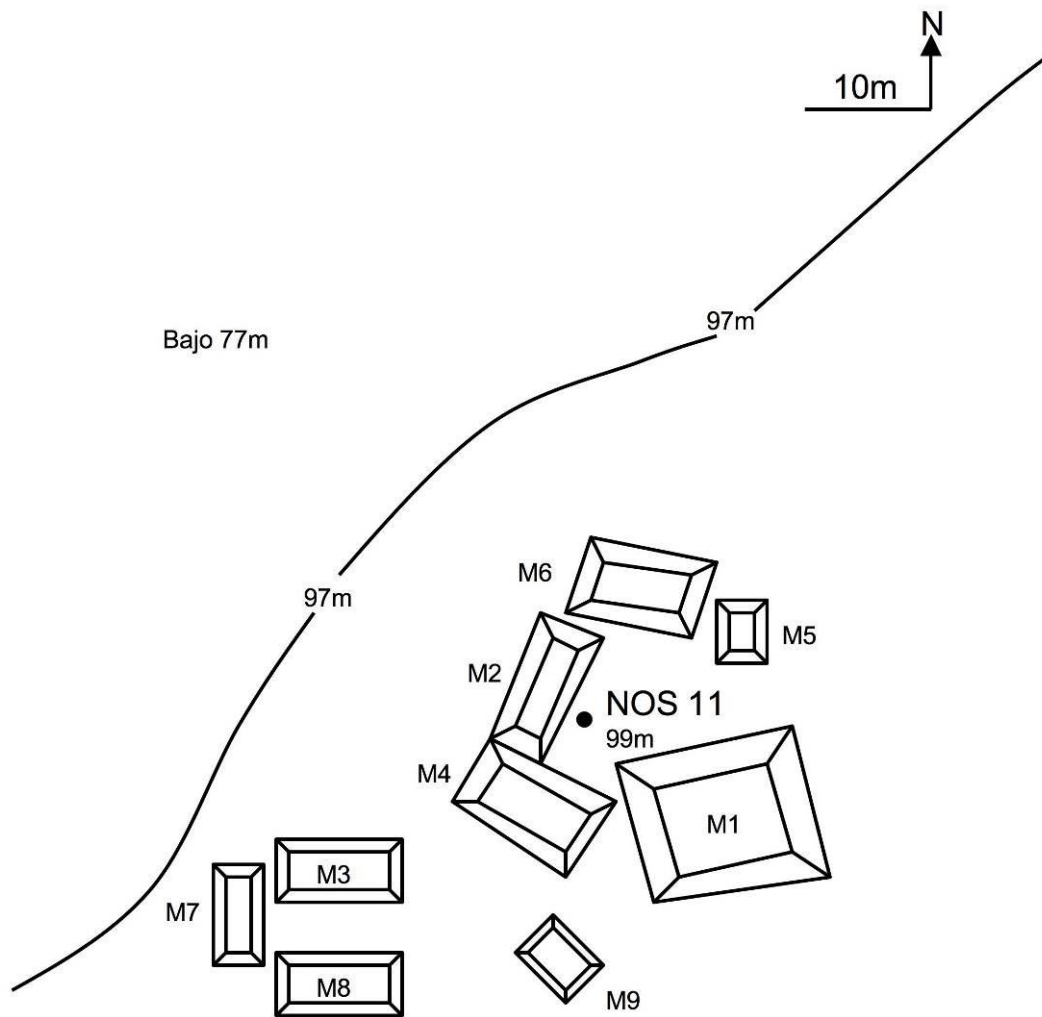


Figure 85 Map of the NOS 11 area

The NOS 11 mapped area had been compromised in the time between the 2010 mapping and the 2011 field season as a bulldozer had literally gone through a structure (M1) to make a farming vehicle track. This track exposed a cross-section of NOS11-M1 showing a collapsed vaulted roof, the various construction phases of the building – including multiple floors – as well as a burial (Figs. 86 to 87).

## 7. The Nojol Nah Settlement Zone



Figure 86 Photograph of collapsed vaulted roof, NOS11-M1



Figure 87 Photograph of profile of building and sub floor burial chamber, NOS11-M1

## 7. The Nojol Nah Settlement Zone

The objectives at this location were to recover the human remains from NOS11-M1 (mainly for ethical reasons), gain chronological information from this area that contained a dense concentration of architecture, and obtain insights into the people who built and inhabited these structures.

Three excavation units were located in the NOS 11 area:

### **Test Unit 11 - NOS11-M1**

#### **Excavation:**

The location of Test Unit 11 (Fig. 88) was determined by the bulldozer track that had run right through it. Str. NOS11-M1 was part of a patio group and would not have been chosen particularly as there were more intact structures. The bulldozer, however, had revealed the cross-section of the structure, saving us days of work (Fig. 89). The other reason to excavate was that the bulldozer had disturbed a burial, and human remains were exposed to the elements.



## 7. The Nojol Nah Settlement Zone

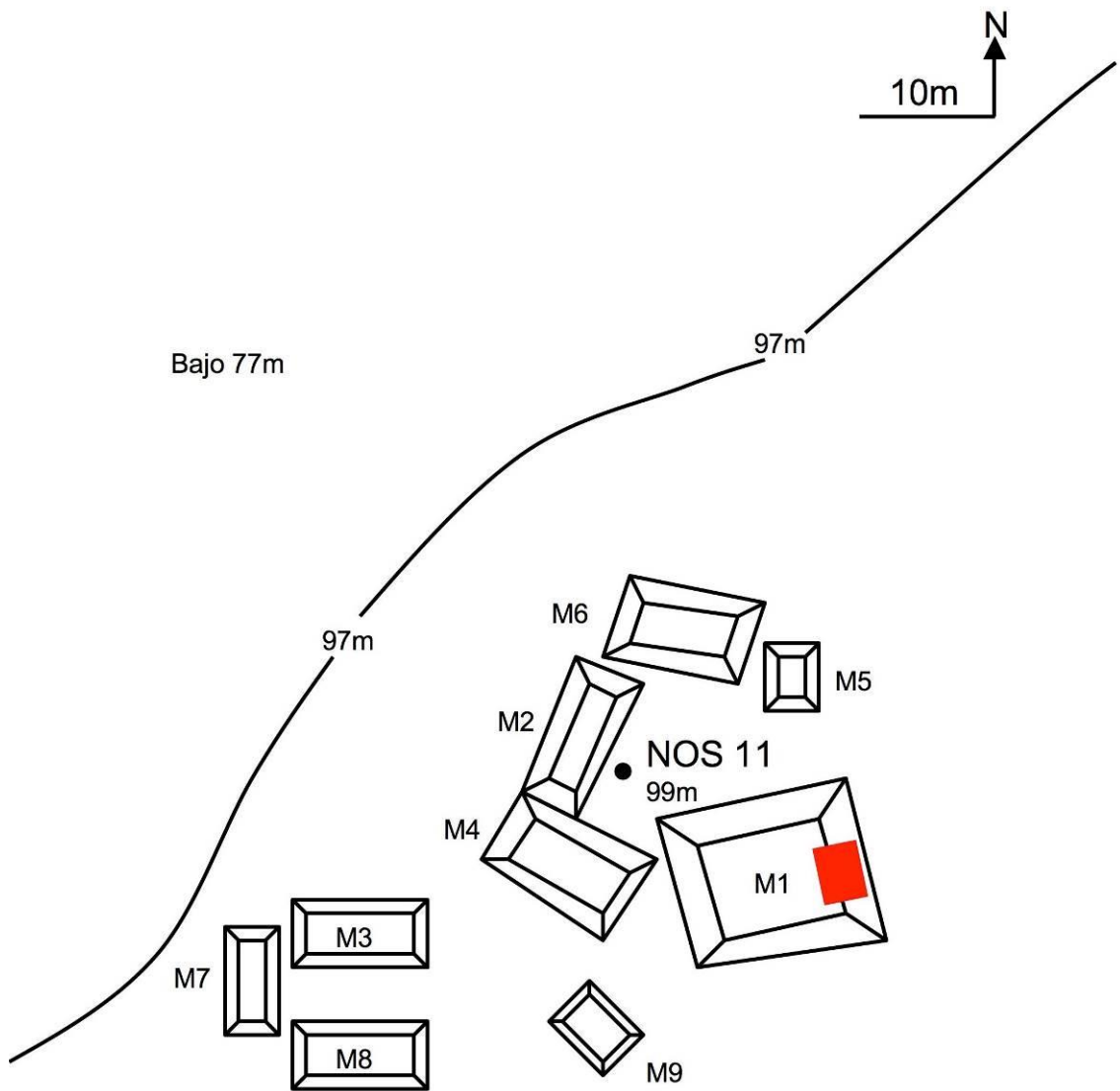


Figure 88 Map of the NOS 11 area, Test Unit 11 indicated in red, NOS11-M1

## 7. The Nojol Nah Settlement Zone



**Figure 89** Photograph of Str. NOS-M1 bisected by bulldozer

Excavations began by clearing off the exposed profile so a section drawing could be made, and any artefacts from a secure archaeological context could be collected. There were three successive floors, Floors 1, 2, and 3, of which the uppermost was burnt (Fig. 90).



**Figure 90** Photograph of Test Unit 11 floors, NOS11-M1

## 7. The Nojol Nah Settlement Zone

All three floors lay stratigraphically above the burial that had been exposed by the bulldozer. Lot 1, ca. 40cm in depth, was the designation applied to the deposit that lay beneath the 15cm-deep humic layer and above the burnt floor, Floor 1. This lot consisted of both lithics and ceramics in a matrix of collapsed wall stones and crumbled plaster. Lot 2 was the designation applied to the deposit from beneath Floor 3 to the top of the burial. Lot 2 consisted mainly of chert cobbles of varying sizes that formed the foundation for the Floor 3 and its successive re-plasterings. A limestone block sat atop the burial. Both ceramics and lithics were recovered from Lot 2. Lot 3 was the sub-floor burial (sealed by Floor 3) that had been exposed by the bulldozer. This burial was designated Burial 38 in the Nojol Nah burial sequence.

Associated with Burial 38 were two ceramic spindle whorls, one at the northern end of the burial, and one at the southern end (Fig. 91)



Figure 91 Photograph of spindle whorls associated with Burial 38, NOS11-M1

The human remains were in fair to good preservation (Fig. 92); 15 teeth were recovered from Burial 38, and of these nine were modified, with five filed and four inlaid (Fig. 93). The teeth were filed into T-shapes, and the inlays were of an unidentified gold-coloured substance, and hematite (Fig. 94). Beneath the northern end of the Burial 38 area was a large, cut limestone block, and beneath this were the remains of another individual, designated Burial 40 in the Nojol Nah sequence. Burial 40 and associated artefacts, which included a granite metate, were assigned as Lot 4. The excavation was closed after the Burial 40 remains had been excavated, as we had achieved our objectives at this structure (Fig. 95).

7. The Nojol Nah Settlement Zone



Figure 92 Photograph of the Burial 38 skeleton, NOS11-M1 (photo by William T. Brown)



Figure 93 Photograph of inlaid and modified teeth (photo by William T Brown)

7. The Nojol Nah Settlement Zone



Figure 94 Photographs of inlaid teeth including close up of hematite inlay (Photos by William T Brown)

## 7. The Nojol Nah Settlement Zone

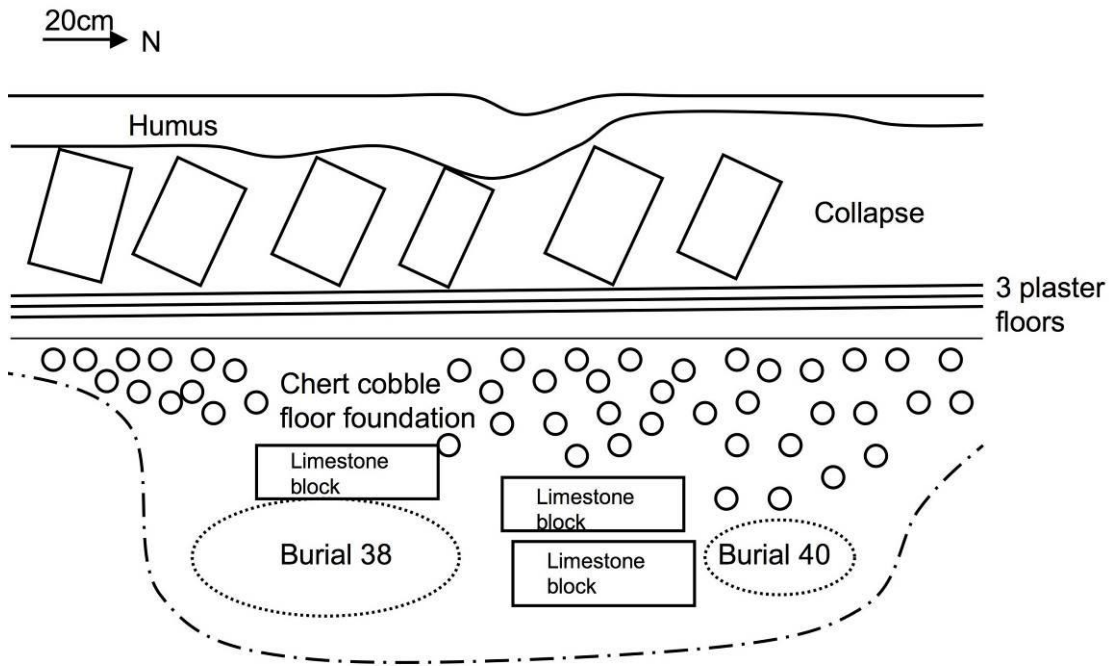


Figure 95 Section drawing of Test Unit 11, NOS11-M1

### Artefacts:

### Ceramics:

LOT	COUNT	WEIGHT	DATE
Lot 1	62	2794g	Late Classic Tepeu 2-3
Lot 2	1	1g	Non-diagnostic
Lot 3	118	1900g	Non-diagnostic (including 2 complete spindle whorls)
Lot 4	11	286g	Non-diagnostic

### Lithics:

LOT	COUNT	WEIGHT	NOTES
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## 7. The Nojol Nah Settlement Zone

Lot 1	9	1022g	Including two intact general utility bifaces, a distal fragment of a biface, and a bifacial blank
Lot 2	1	158g	
Lot 3	1	146g	Medial fragment of a general utility biface
Lot 4	1	248g	Distal end of a biface

*Groundstone:* A groundstone mano was found in Lot 4, and associated with Burial 40.

### **Test Unit 11 Summary:**

The presence of a collapsed vaulted roof and three consecutive floors at Str. NOS11-M1 shows that this was a structure whose construction would have required considerable time and effort.

Based on osteological criteria, both individuals recovered from NOS11-M1 were male adults. Of the teeth recovered from the burials at NOS11-M1, using the Romero classification system (Romero 1970), three upper central incisors were found with type G1 inlays. One incisor was inlayed with hematite, another with an unidentified gold-coloured crust, and one had the inlay missing. Two upper lateral incisors had G1 hematite inlays and there were two upper canines with type C2 notching and two lower incisors with type C3 notching. However, due to the disturbance of the two graves, some of the teeth thought to be associated with Burial 38 may have actually belonged to Burial 40, in particular two of the upper central incisors (Brown and Plumer 2012, 166).

## 7. The Nojol Nah Settlement Zone

Grave goods associated with Burial 40 consisted of Unknown Classic sherds, and a granite metate. These two male burials contained grave goods associated with domestic activities – spindle whorls and a metate. The only diagnostic ceramics from Test Unit 11 were from above the upper floor, Floor 1, and these dated to the Late Classic 2-3 period, showing that this Str. was inhabited during this period.

### **Test Unit 22 - NOS11-M2**

#### **Excavation:**

NOS11-M2, the location of Test Unit 22 (Fig. 96), was located in the same architectural complex as NOS11-M1. NOS11-M2 was one of the largest intact mounds in the NOS 11 area, so I chose to excavate here as excavations elsewhere in the Nojol Nah settlement zone had focussed on smaller mounds, and I wanted to obtain data from a representative set of structures.



## 7. The Nojol Nah Settlement Zone

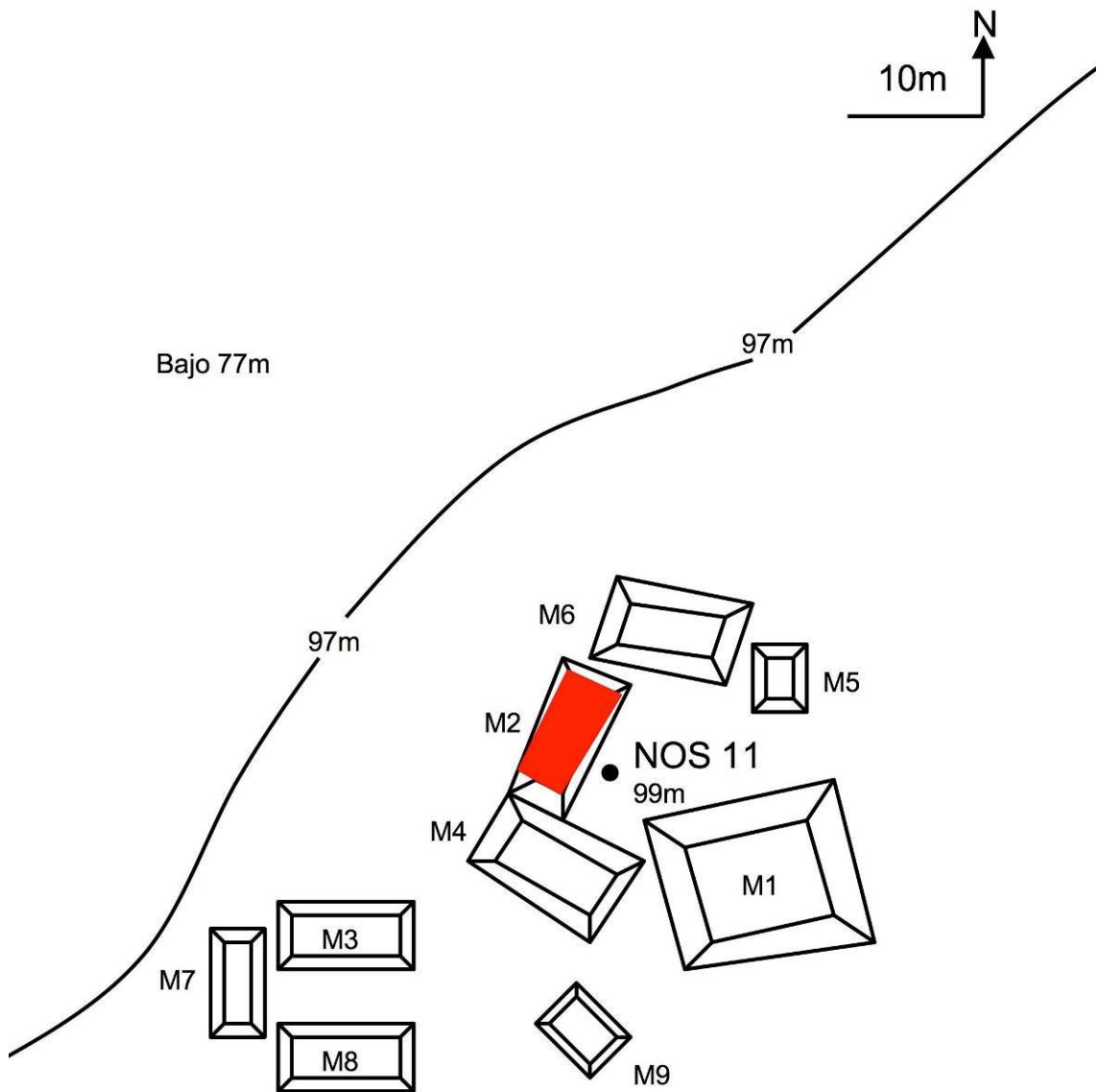


Figure 96 Map of the NOS 11 area, Test Unit 22 indicated in red

The excavation began as a 1x2m trench that was expanded to follow the architecture. The structure was 9m long, and contained three rooms:

*Room 1:* The northern room - NOS11-M2-R1 - was the first to be excavated. The humic layer was 30cm deep, and contained burnt organic matter from the recent burning of the area.

Beneath the humus was a layer of collapse, 60cm deep, overlying a standing wall. Lot 2 was applied to the stratum that extended from the level of the top of the wall down

## 7. The Nojol Nah Settlement Zone

to a floor, and Lot 3 represented the floor level. The floor, Floor 1, had been exposed to burning. This room contained a bench (NOS11-M2-R1-B1) on its eastern side (Fig. 97) which was associated with Floor 1: the plaster covering the bench was continuous with Floor 1. The top of the bench had also been exposed to burning, but a spot of red pigment remained on its surface (Fig. 98). The plaster of the interior wall of this room had also seen the effects of a burning event, and underneath it was an unburnt plaster layer.



Figure 97 Photograph of floor and bench, Room 1, NOS11-M2 (facing east)

## 7. The Nojol Nah Settlement Zone



Figure 98 Photograph of burnt bench and spot of red paint, Room 1, NOS11-M2

In the northwest corner of this room was a fragment of human bone (Burial 43 in the Nojol Nah burial sequence), and in the southeast corner of the room, on top of the bench, was an intact deer radius. Lot 4 was created to collect samples of the unburnt wall plaster, some of which displayed painted red lines. Lot 8 represented samples of the burnt wall and bench plaster. We removed the bench to investigate its relationship to room construction. Excavation revealed that the bench was underlain by a burnt floor, Floor 2, which underlay Floor 1 (Fig. 99).

## 7. The Nojol Nah Settlement Zone



Figure 99 Photograph of upper and lower burnt floors beneath bench, Room 1, NOS11-M2

The bench core comprised small chert pebbles, and this was designated Lot 9. Samples of the burnt plaster from Floor 2, from beneath the bench, were collected as Lot 10. Beneath Floor 2 were chert boulders (ca. 30 cm across), as well as smaller chert cobbles, designated Lot 12 and ending at 210cmbs. At this depth there was a large ceramic concentration (Lot 15) of 636 sherds weighing a total of 30817g. In the southeastern corner of the Lot 15 ceramic concentration there was a human phalanx, and some bird bone fragments. Beneath Lot 15 was natural soil.

After investigating the bench construction sequence of Room 1, excavations in the rest of the room continued. Once the upper floor had been removed, the lower floor showed evidence of cut in the centre of the room. There was evidence that the cut had been plastered over, and that the feature had been exposed to the burning that affected Floor 2. The lower floor of the room was removed to reveal chert cobbles and

## 7. The Nojol Nah Settlement Zone

pebbles, Lot 11. In the centre of the room, beneath the Lot 11 layer, was a burial (Fig. 100).

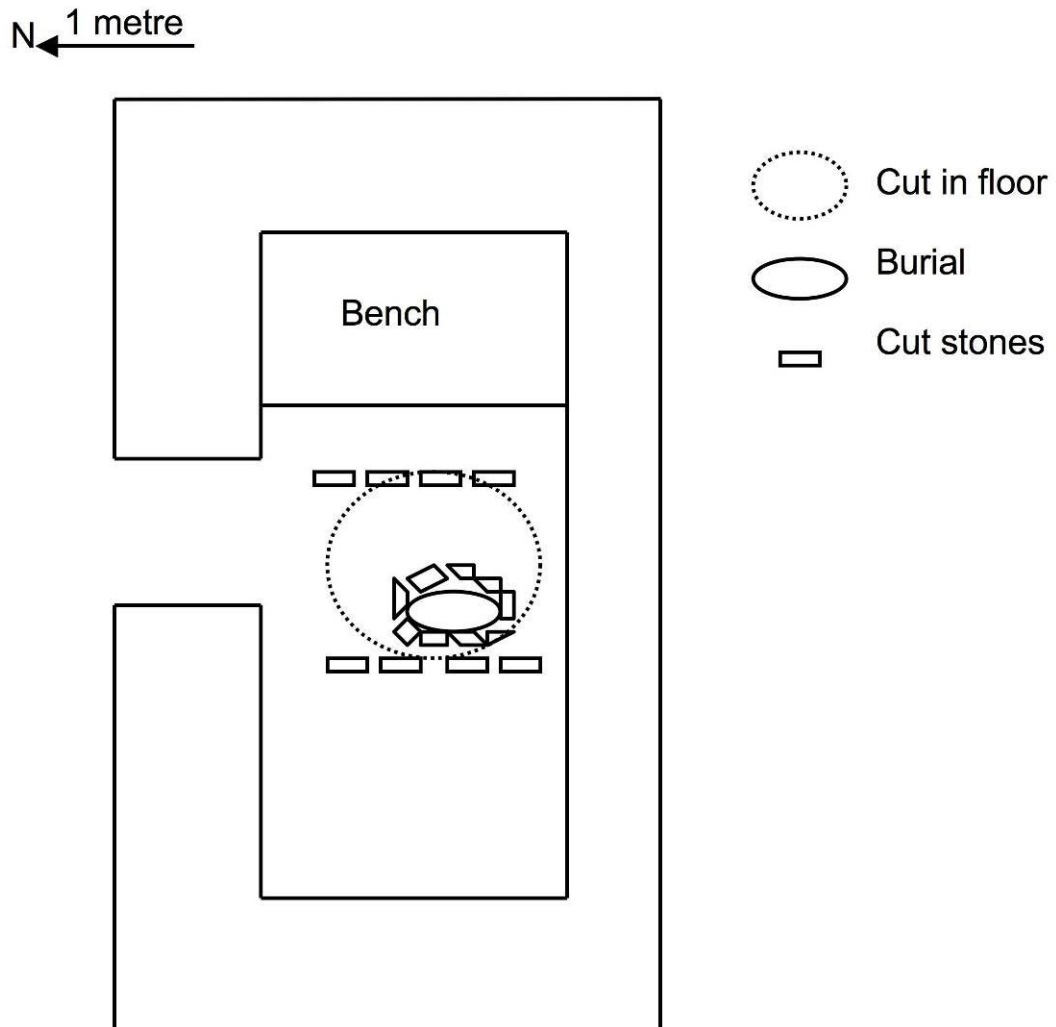


Figure 100 Plan drawing of Room 1, NO11-M2

The burial (Burial 41 in the Nojol Nah burial sequence) was a stone-lined crypt, and either side of the crypt was a line of cut limestone blocks (Fig. 101). Capping the crypt was a round chert stone (measuring 25cm across) that was burnt on its underside only. This stone had been placed directly above the location of the individual's face. The chert was a water-smoothed river cobble that must have been brought to the burial specifically. The individual was buried on his or her back with the head to the south, and feet pointing north.

## 7. The Nojol Nah Settlement Zone

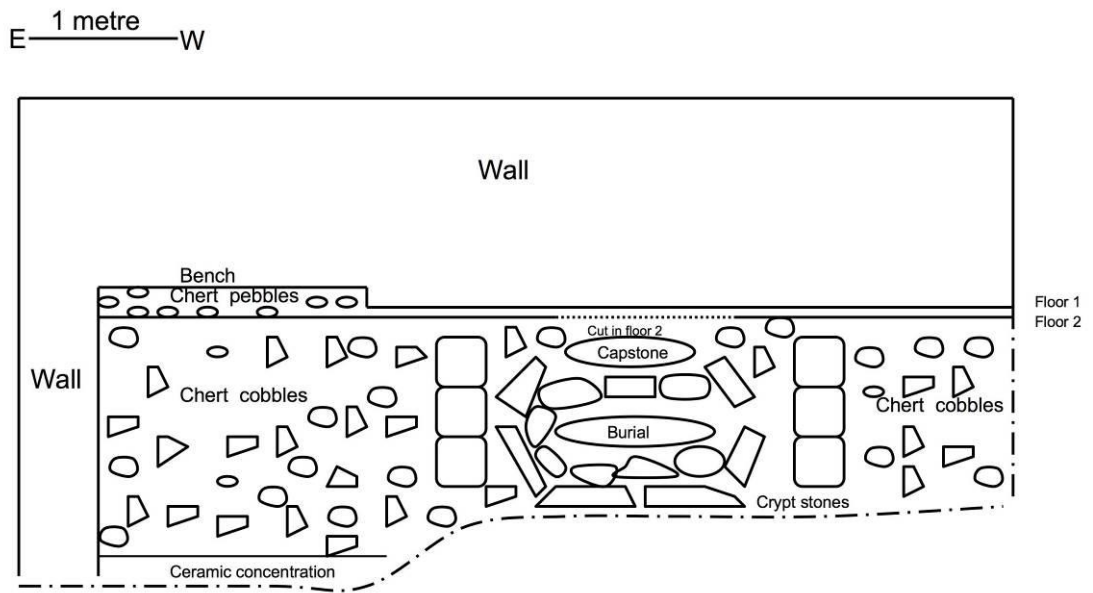


Figure 101 Section drawing south profile of Room 1, NO11-M2

*Room 2:* The excavation and clearing of Room 2 (NOS11-M2-R2), the middle room, was not as complete as in the case of Room 1. Lot 5 represented the material derived from beneath the humus, down to the floor of the room. Lot 6 represents artefacts found overlying the floor in this room. Room 2's walls were also plastered, but neither the floor nor the walls had evidence of burning. Due to time and resource constraints, the floor in this room was not penetrated.

*Room 3:* Room 3 (NOS11-M2-R3) was the southern-most room. We cleared the room out down to the floor level. The room was filled with collapse, with cut stones measuring up to 60cm across. As with Room 2, no further excavation was implemented beyond this point due to time and resource constraints. No artefacts were recovered from Room 3.

### Artefacts:

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	9	214g	Unknown Classic

## 7. The Nojol Nah Settlement Zone

Lot 2	7	74g	Unknown Classic
Lot 3	13	312g	Unknown Classic
Lot 4	n/a	n/a	n/a
Lot 5	40	540g	Unknown Classic
Lot 6	n/a	n/a	n/a
Lot 7	n/a	n/a	n/a
Lot 8	n/a	n/a	n/a
Lot 9	236	5232g	Late Classic Tepeu 2-3
Lot 10	n/a	n/a	n/a
Lot 11	28	686g	Late Classic Tepeu 2-3
Lot 12	26	112g	Unknown Classic
Lot 13	14	226g	Unknown Classic
Lot 14	n/a	n/a	n/a
Lot 15	636	30817g	Early to Late Classic (including some decorated polychrome pieces, a pseudo glyph sherd, and sherds from a variety of different forms such as bowls, plates and jars)

### *Lithics:*

LOT	COUNT	WEIGHT	NOTES
Lot 1	n/a	n/a	

## 7. The Nojol Nah Settlement Zone

Lot 2	n/a	n/a	
Lot 3	n/a	n/a	
Lot 4	1	100g	
Lot 5	n/a	n/a	
Lot 6	n/a	n/a	
Lot 7	n/a	n/a	
Lot 8	n/a	n/a	
Lot 9	4	124g	Including 1 distal fragment of a general utility biface
Lot 10	n/a	n/a	
Lot 11	2	112g	Including a distal end of a biface
Lot 12	n/a	n/a	
Lot 13	n/a	n/a	
Lot 14	n/a	n/a	
Lot 15	1	102g	A retouched biface showing signs of pressure flaking

*Plaster:* Plaster samples were collected from lots 4, 7 and 8.

*Groundstone:* A fragment of a granite metate fragment was recovered from Lot 5.

### **Test Unit 22 Summary:**

The most notable thing about the NOS11-M2 structure concerns the burning events associated with Room 1. These burning events must have been carefully controlled to have not even scorched the room next door. However, due to the elevated position of this structure, on the last ridge before the bajo, the fires would have been visible by surrounding structures, and even all the way from Tulix Mul. This may mean that the



## 7. The Nojol Nah Settlement Zone

fires had ceremonial significance for the surrounding community. Or they may have been associated with rites concerning the Burial 41 individual.

Osteological analysis revealed that Burial 41 tall adult male with a 'massive skull' (Brown and Plumer 2012, 170). The burial crypt was one of the most elaborate found in the entire Nojol Nah burial assemblage (William T. Brown 2013 Pers. Comm.). This man was interred on his back with his head to the south – pointing directly towards the Nojol Nah site core. Despite the elaborate crypt construction, there were no grave goods associated with this individual.

Due to the lack of artefacts on the floor of Room 1, it would appear that the room was cleared before it was abandoned. The only objects found on the floor of Room 1 were the human bone in the northwestern corner and the deer bone in the southeastern corner, and so these may have been purposefully placed in these locations at the time of abandonment in some sort of unknown ritual event. It is possible that perishable materials were burned in the room, explaining the burnt plaster walls and floor.

The 636 sherds of a wide variety of styles and forms recovered from Lot 15 weighed over 30kgs. The ceramics dated from the Early to Late Classic, and that they spanned these two time periods may mean that they represent significant pieces collected over time, perhaps belonging to ancestors that were then used to consecrate this structure. Or perhaps NOS11-M2 was built on top of a midden, or refuse pile.

### **Test Unit 21 - NOS11-M3**

#### **Excavation:**

NOS11-M3 was located in the NOS 11 area, close to the last ridge before the land sloped down to the Alacranes Bajo (Fig. 102). The excavation at this location was designed to obtain chronological and functional information so that the NOS 11 area structures were well sampled.

## 7. The Nojol Nah Settlement Zone

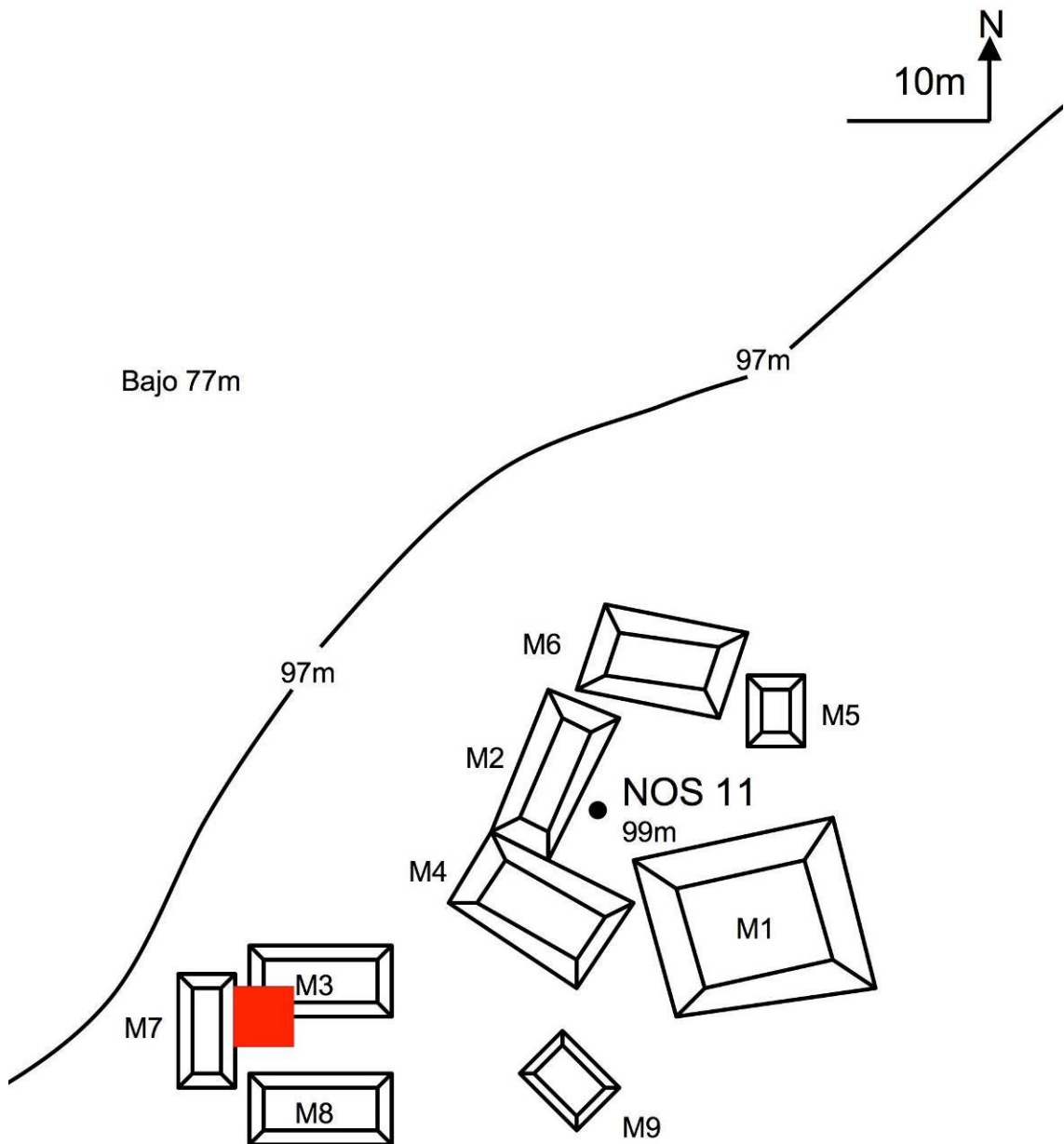


Figure 102 Map of the NOS 11 area, Test Unit 21 indicated in red

Test Unit 21 started as a 2x2m unit on the southwest corner of NOS11-M3, the largest structure in this architectural group. The unit ended up as a 4x4m unit. The humic layer ranged between 5 and 20cm in depth across the unit. Directly beneath the humic layer was a layer of sandy loam, with a high concentration of pottery sherds (Lot 1). Lot 1 was between 5 and 20cm in depth. The matrix beneath Lot 1 was different between the north and the south half of the unit. The southern half (Lot 2) was a dark soil that contained only one sherd. The northern half was characterised by collapsed limestone

## 7. The Nojol Nah Settlement Zone

blocks. This layer (Lot 3) was 60cm deep and contained pottery sherds. Beneath both lots 2 and 3 was a degraded floor. There was a ceramic concentration on the floor in the southwest corner of the unit, and this was designated Lot 4 (Fig. 103). Having reached the floor level, and obtained ceramics associated with the floor, I decided not to proceed any further with this unit, due to time and resource constraints.

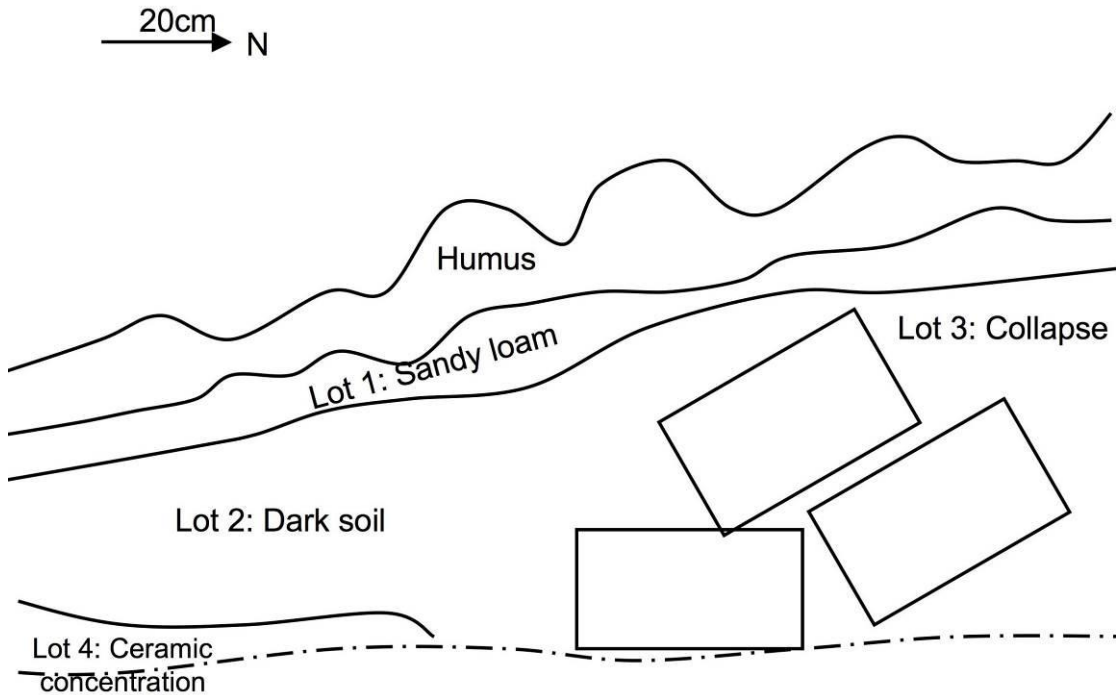


Figure 103 Section drawing of Test Unit 21, NO11-M3

### Artefacts:

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	109	2992g	Late Classic Tepeu 1-3
Lot 2	1	468g	Late Classic Tepeu 1-3 (a Cayo unslipped jar rim)
Lot 3	19	382g	Late Classic Tepeu 1-3
Lot 4	174	6268g	Late Classic Tepeu

## 7. The Nojol Nah Settlement Zone

			1-2 (including 6 Cayo jar rim pieces, an Achote Black bowl base, and a 1/4 complete TuTu Cap jar rim)
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*Lithics:* The proximal end of a very fine tapered biface (1.1cm x 2.6cm) was recovered from Lot 4

### **Test Unit 21 summary:**

Test Unit 21 revealed a layer of limestone blocks which were interpreted as collapse from a wall or a face. The ceramics were dated to the Late Classic Tepeu 1-3 period, which broadly matches the other structures excavated in the NOS 11 area. The sherds recovered were from items such as bowls and jars, which points to NOS11-M3 having been a domestic structure.

### ***The NOS 49 area***

#### **Overview:**

NOS 49 was the easternmost area mapped in the eastern Alacranes Bajo zone. NOS 49 was not part of the Nojol Nah settlement zone, which consisted primarily of domestic structures, and was located almost 2km to the west. The three NOS 49 mounds, sitting on top of a plaza (Fig. 104) were much larger than anything mapped during 2010. They were separated from the Nojol Nah settlement zone by a gap in architecture and land modifications; and a bajito. NOS 49 was mapped during the 2011 field season, with limited test excavation. It had not been subject to land clearance during 2010 when the Nojol Nah settlement zone and Tulix Mul were decimated. However in 2011, as we drove past each day to reach the Nojol Nah settlement zone, we could see the devastating effects of the Mennonite bulldozing and burning regime, which was now

## 7. The Nojol Nah Settlement Zone

heavily impacting this area, with the mounds becoming smaller and smaller each day (Fig. 105).

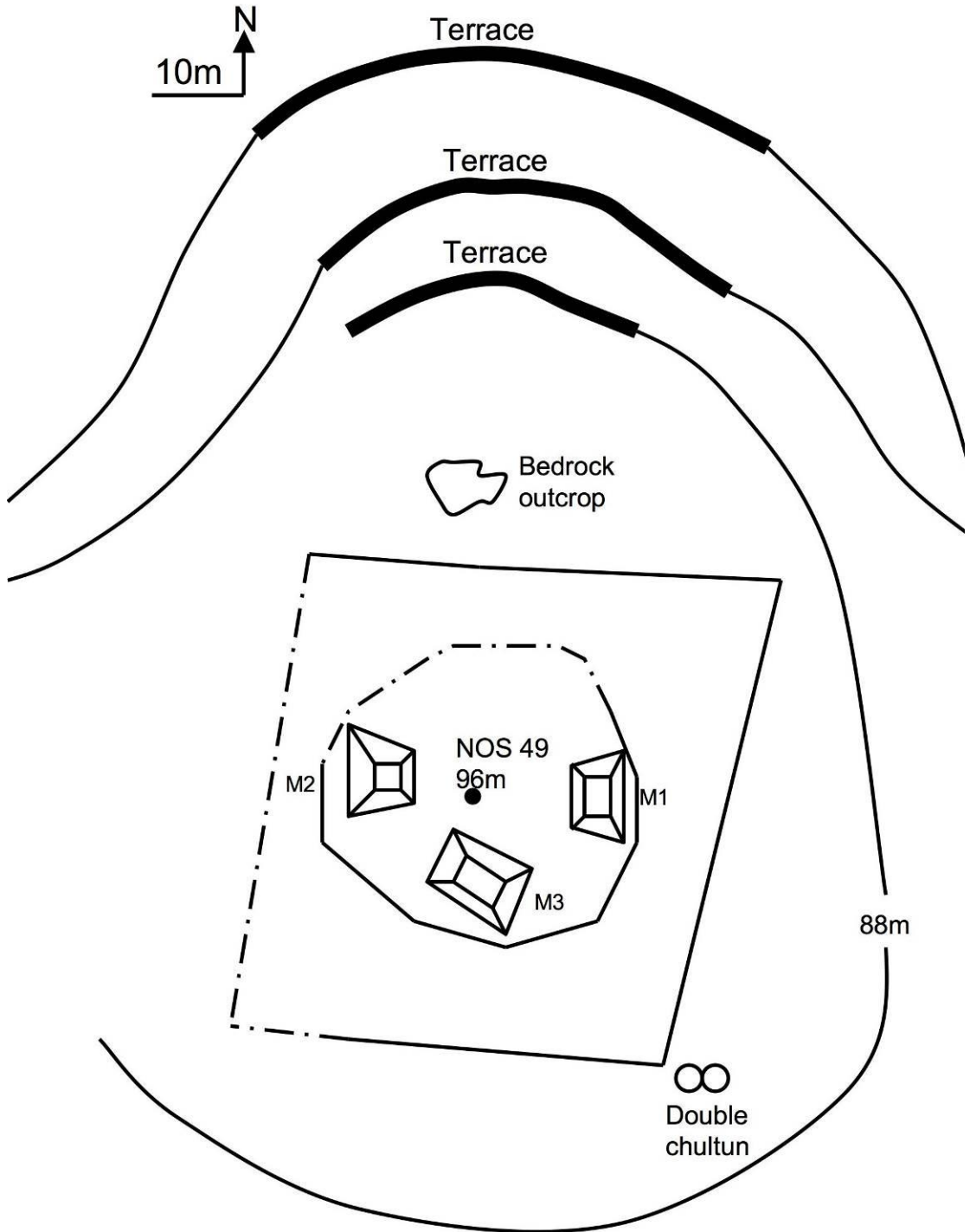


Figure 104 Map of the NOS 49 area

## 7. The Nojol Nah Settlement Zone



Figure 105 Photograph of heavily bulldozed mounds taken from the NOS 49 point facing north

I decided to place test units in the NOS 49 area to gain chronological data to be able to determine whether the structures or features represented by the large mounds were inhabited during the same time period at the rest of the eastern Alacranes Bajo area; I also wanted to salvage what data we could before the mounds were completely flattened by the Mennonite farmers (as they were by the following year). Three test units were placed on the architecture, and two in the terrace areas (Fig. 106).

7. The Nojol Nah Settlement Zone

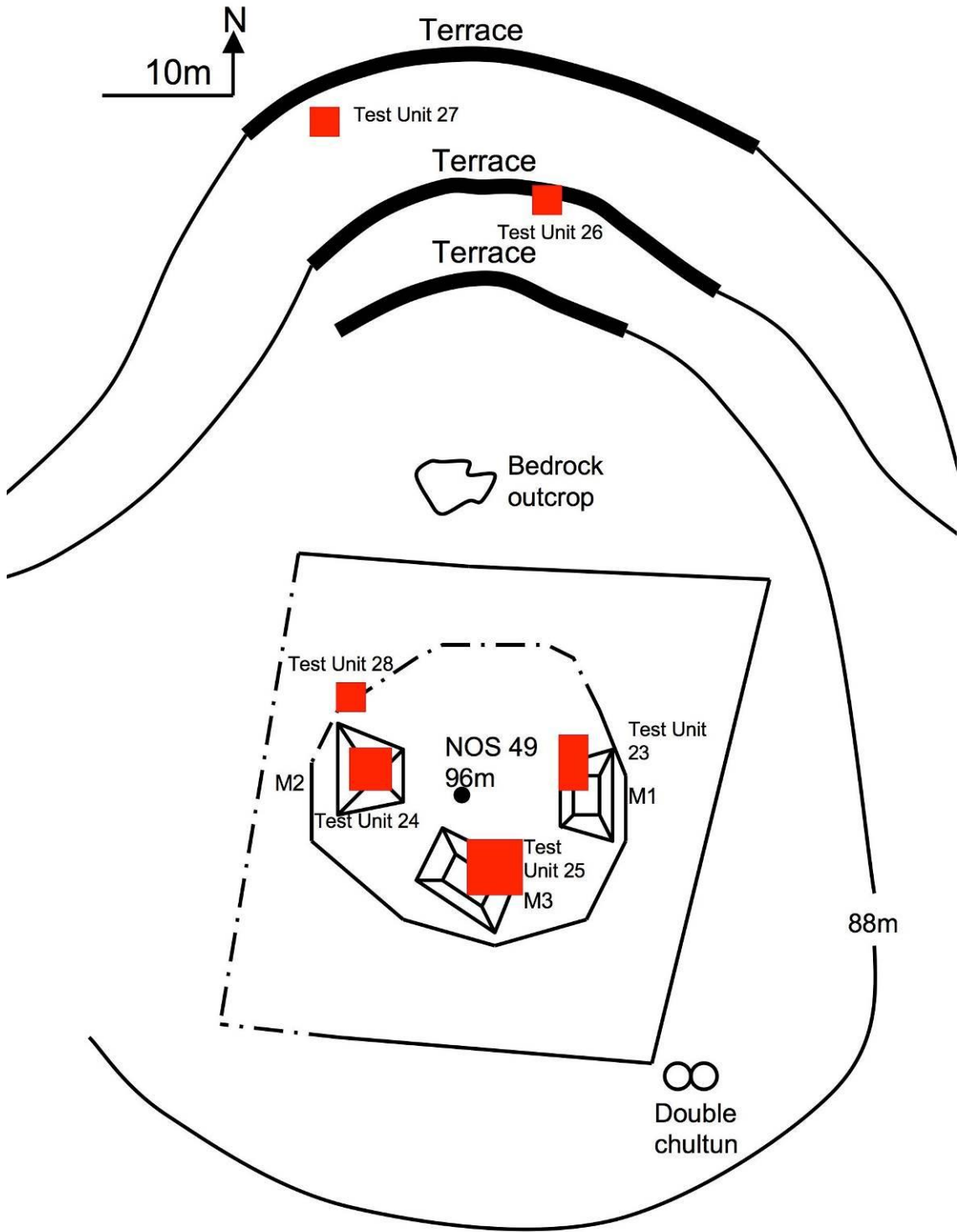


Figure 106 Map of the NOS 49 area with position of test units in red

**Test Unit 23 - NOS49-M1**

**Excavation:**

NOS49-M1 measured 8m north-south, and 5m east-west after heavy bulldozing, so the mound would have been much larger originally. Test Unit 23 was a 4x2m unit placed in the northwestern corner. After clearing the bulldozer debris (Lot 1) from the mound we reached a 1.75m deep layer of cobble and boulder-size chert (Lot 2), likely to have been core material of a platform. The unit was taken down to the level of the plaza, where this excavation was ended (Fig.107). We recovered ceramics from Lot 1, and Lithics from Lot 2.

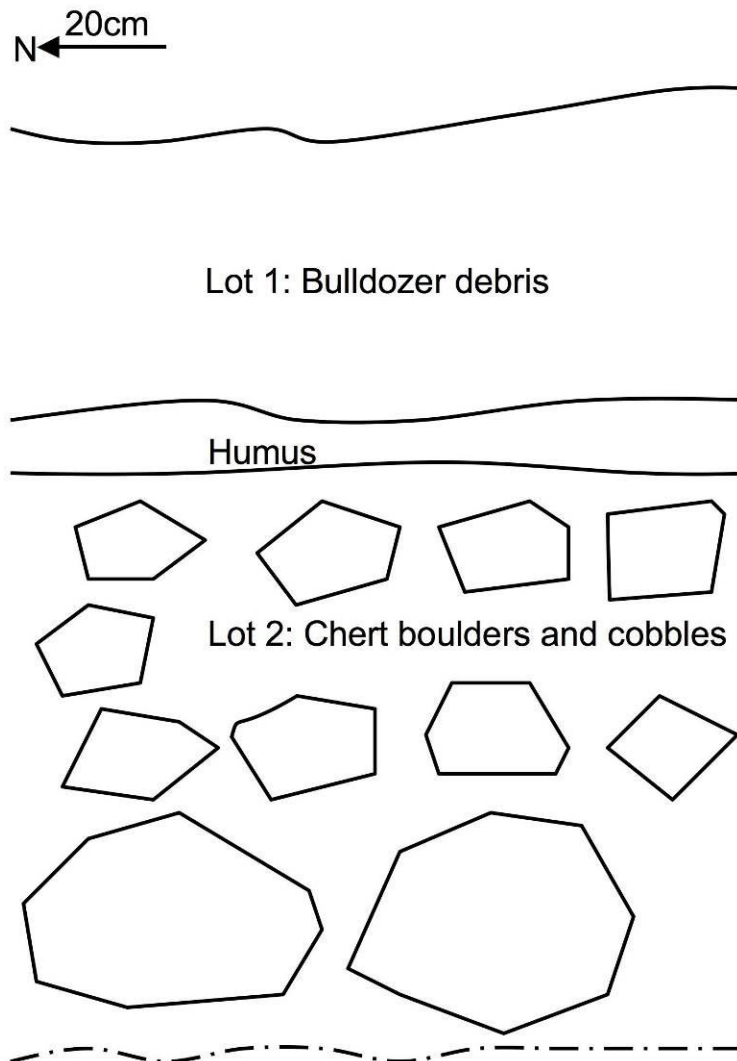


Figure 107 Section drawing of Test Unit 23, NOS49-M1



## 7. The Nojol Nah Settlement Zone

### Artefacts:

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	141	456g	Early Classic to Late Classic.
Lot 2	n/a	n/a	n/a

#### *Lithics:*

LOT	COUNT	WEIGHT
Lot 1	n/a	n/a
Lot 2	5	26g

### Test Unit 23 Summary:

NOS49-M1 was the most heavily bulldozed structure on the plaza. The 1.75m layer of chert cobbles and boulders was interpreted as construction core material, thus indicating that a platform, probably once supporting a building of some kind, had stood here. It would seem that the bulldozing activities had completely destroyed any superstructure prior to our excavation and mapping efforts, or perhaps the superstructure was made from wood and has not been preserved. The ceramic sherds recovered from Lot 1 were not from a secure archaeological context. We were unable to obtain any chronological information from this location.

### Test Unit 24 - NOS49-M2

#### Excavation:

NOS49-M2 was the westernmost of the mounds on the NOS 49 plaza. It was located at the edge of the plaza, and was 5x5m, and roughly 8m tall on its western side, and 2m tall on the eastern side that faced the plaza. Test Unit 24 was a 3x3m unit placed on the southeastern corner of the mound, as this side seemed to be the least impacted by the bulldozer (Fig. 108).

## 7. The Nojol Nah Settlement Zone



Figure 108 Photograph of NOS49-M2, taken facing south west

Beneath the bulldozer debris was a humic layer 10cm deep. Beneath this was a ca. 40cm layer of wall collapse and sandy soil (Lot 1), which rested on a plaster floor. Beneath the floor was a 10cm layer of cobble-sized chert pieces (Lot 2); directly beneath Lot 2 was a 10-15cm deep layer of pebble-sized chert (Lot 3); beneath Lot 3 was a ca. 40cm- deep layer of cut limestone blocks (Lot 4); and beneath Lot 4 was a layer of even larger cut limestone blocks, the largest of which measured ca 40x30cm (Lot 5). The Lot 5 blocks, that were likely the platform face, were sitting at the level of the plaza, and at this point the excavation was closed (Fig. 109). Sherds were recovered from all lots, and flaked chert tool fragments from lots 1, 3 and 4.

7. The Nojol Nah Settlement Zone

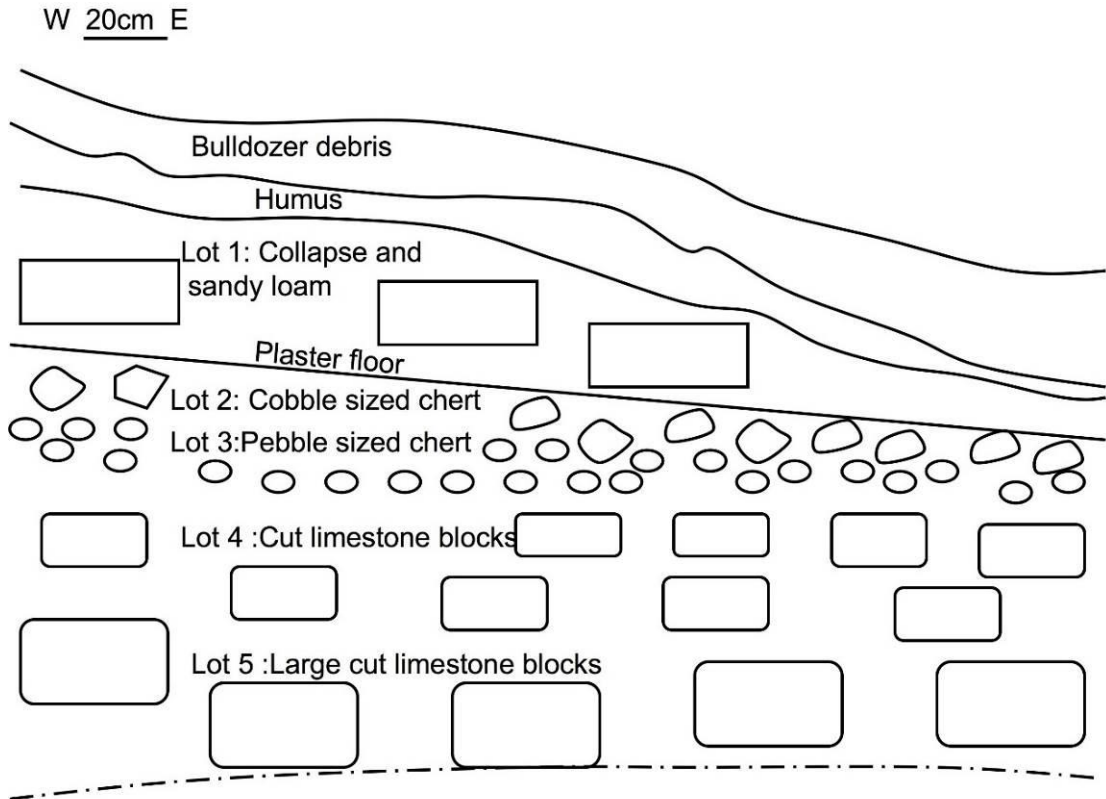


Figure 109 Section drawing of Test Unit 24, NOS49-M2

**Artefacts:**

*Ceramics:*

LOT	COUNT	WEIGHT	DATE
1	115	1598g	Early Classic Tzakol 1-3
2	14	150g	Unknown Classic
3	267	3608g	Early Classic Tzakol 1-3
4	124	1560g	Early Classic Tzakol 1-3
5	33	562g	Early Classic Tzakol 1-3

## 7. The Nojol Nah Settlement Zone

### *Lithics:*

LOT	COUNT	WEIGHT
1	4	106g
2	n/a	n/a
3	5	272g
4	7	252g
5	n/a	n/a

### **Test Unit 24 Summary:**

NOS49-M2 was more intact than NOS49-M1, and we were able to obtain datable sherds from archaeological contexts. The sherds from all dateable lots were from the Early Classic Tzakol 1-3 period, suggesting that this part of the structure was constructed and used during this time. We were able to see how this part of the structure was constructed – a layer of large cut limestone blocks, likely to be the platform face, was placed on the plaza level, with a smaller layer of limestone block above this, overlain with a layer of cobble and pebble sized chert, capped by a plaster floor. As we only excavated a tiny portion of this large structure however, I am not able to say whether the structure contained multiple rooms, or construction phases. Although judging by its size it is likely that this structure had a complex construction history.

### **Test Unit 25 - NOS49-M3**

#### **Excavation:**

NOS49-M3 was the southernmost mound on the NOS 49 plaza, located 20m to the southeast of NOS49-M2. NOS49-M23 was 7x5m, ca. 5m tall, and oriented northwest to southeast. Test Unit 25 was placed on the northeast corner of the mound, because here a floor could be seen where the bulldozer had clipped the building. The test unit was taken down to the plaza level. There were two lots beneath the ca. 10cm humic

## 7. The Nojol Nah Settlement Zone

layer. Lot 1 was from beneath the humus to the level of the floor, Floor 1, and was 70cm deep. Lot 1 consisted of limestone block collapse and sandy soil. Both ceramics and lithics were recovered from this lot. Lot 2 was the designation for material recovered from beneath Floor 1, and went down to the plaza level, and was 130cm deep. This layer consisted of chert cobbles, sherds, and a lithic tool. The unit was closed once the plaza level was reached (Fig. 110). The plaza had been so badly bulldozed that it was difficult to determine from the material that remained whether there was a masonry superstructure.

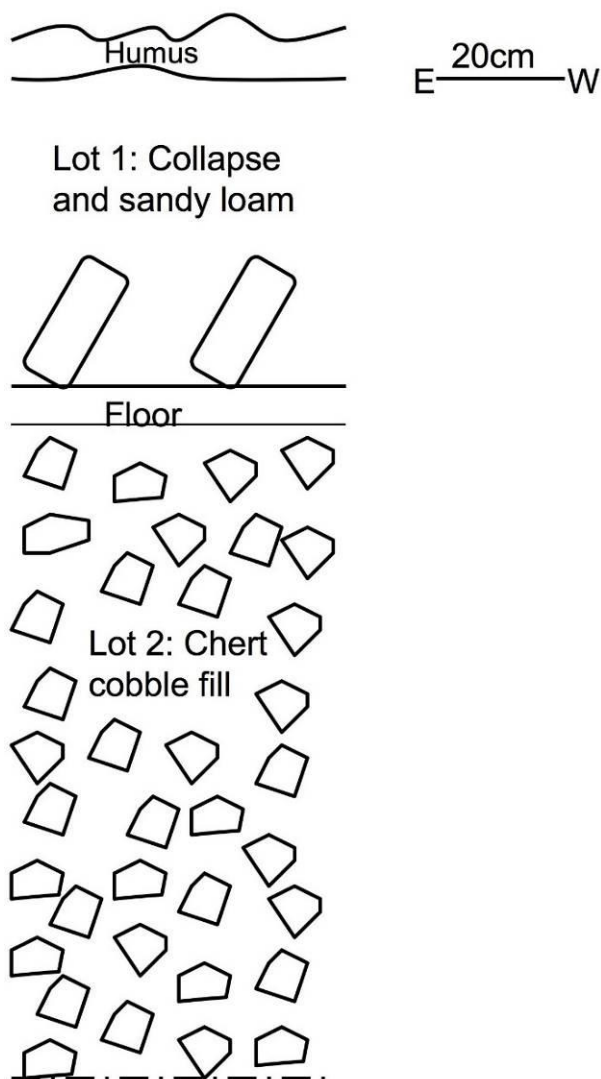


Figure 110 Section drawing of Test Unit 25, NOS49-M3

## 7. The Nojol Nah Settlement Zone

### Artefacts:

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
1	37	276g	Unknown Classic
2	10	210g	Unknown Classic

#### *Lithics:*

LOT	COUNT	WEIGHT
1	10	824g
2	1	16g

Lot 1 contained 10 chert tool fragments weighing 824g, and Lot 2 contained 1 chert tool fragment weighing 16g.

### **Test Unit 25 Summary**

The 130cm deep chert layer appears to have been a foundation material for a platform. No dateable ceramics were recovered from this structure.

### **Test Unit 28 - NOS49-P1**

#### **Excavation:**

Test Unit 28, a 2x2m unit, was placed on the western side of NOS49-P1, a few metres to the north of NOS49-M2. The objective of this unit was to see if there was any evidence of a plaza floor, and to gain chronological data for the plaza's construction.

## 7. The Nojol Nah Settlement Zone

There was a ca. 20cm humic layer, which contained organic material and small pieces of limestone. Directly beneath this was a plaster floor, Floor 1.

Floor 1 capped a 40cm-deep layer of cobble- and pebble-sized chert pieces, with some dark soil mixed in. This was likely the core of the plaza platform. Beneath the cobble layer the chert cobbles continued, but with large cut limestone blocks (Fig. 111) that represented the face of the platform wall. No artefacts were recovered from Test Unit 28.

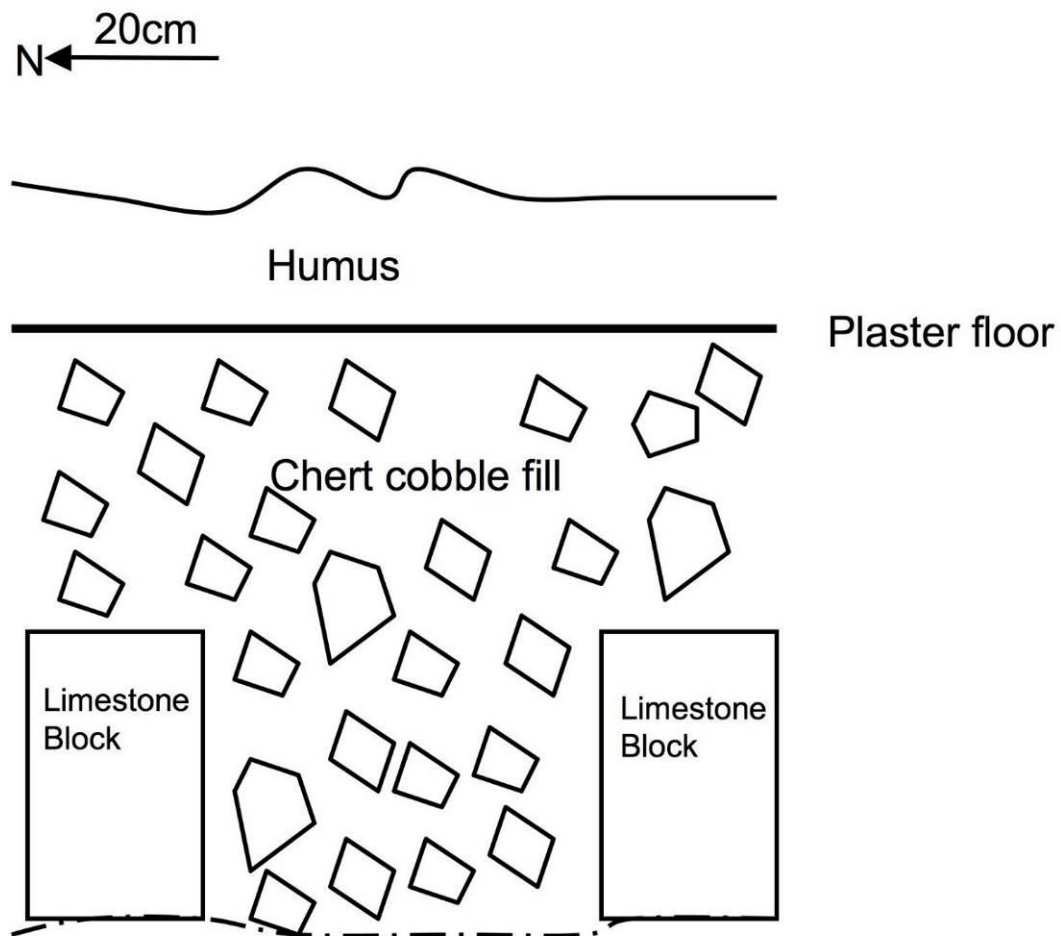


Figure 111 Section drawing of Test Unit 28, NOS49-P1

### Test Unit 28 Summary:

Although we were unable to gain any chronological data from NOS49-P1, Test Unit 28 did allow us to observe the nature of the plaza construction. Large crudely cut

## 7. The Nojol Nah Settlement Zone

limestone blocks were laid down beneath a chert layer, with the chert layer a foundation for a plaza floor. It would have been ideal to investigate beneath the limestone blocks to confirm that they were faces supporting core material beneath; however the salvage excavations at NOS 49 were carried out close to the end of the 2011 field season and there was no time to continue.

### **Test Unit 26 - NOS49-T1 and Test Unit 27 - NOS49-T2**

#### **Excavation:**

To the north of the NOS 49 plaza were two stepped areas that appeared to represent land modification. Test Unit 26 was placed on the upper flattened area 155m, at a bearing of 18 degrees, from the NOS 49 point. This was a 2x2m unit, and bedrock appeared 15cmbs directly beneath the humic layer. Test Unit 27 was also a 2x2m unit. Bedrock appeared 20cmbs, directly beneath the humic. No artefacts were recovered during this exercise.

#### **Test Units 26 and 27 Summary:**

No evidence of terrace construction was found in at NOS49-T1, or NOS49-T2. The inhabitants of this place may have levelled the flat areas by removing some of the limestone bedrock to use elsewhere, however future further excavation would be needed to confirm this.

### ***The Nojol Nah Settlement Zone (NOS) Excavations: Summary***

The test units implemented during the 2011 field season furnished us with valuable information about the Nojol Nah settlement zone. In particular they provided chronological information at many of the locations, verified or refuted the 2010 sketch maps, and showed evidence of landscape modification as seen at NOS15-T1 and NOS36-F1. In contrast to work carried out at the site core area of Nojol Nah - a concentrated area of large architecture thought to be inhabited by elite members of society (Hammond 2012; Hammond et al. 2012) -- the work at the Nojol Nah



## 7. The Nojol Nah Settlement Zone

settlement zone focussed primarily on features and modestly-sized structures spread across the landscape. The circular structure of NOS1-M1 and the multiple burnings of the contents of structure NOS11-M2-R1 are also indicative of ritual behaviour in the Nojol Nah settlement zone.

Controlled extensive burning events in particular locations are noted elsewhere in the Maya lowlands: Str. N10-77 in the Ottawa Complex at Lamanai displayed charring of its floors and walls on its final two building phases in a similar fashion to Room 1 at Str. NOS11-M2. As the burning was carried out at the termination of both the final and penultimate building phases and seemed to involve the ordered and careful burning of perishable materials – perhaps interior furnishings – it is unlikely that these events were due to hostile activities (Graham 2004, 236). Whatever the reason, fire was an important element in ancient Maya ritual, with fire and renewal ceremonies being linked to calendrical cycles, particularly the 52-year cycle that many ancient Mesoamerican cultures celebrated (Kirkhusmo Pharo 2010, 448).

The construction of non-domestic buildings in the sample of structures excavated across the Nojol Nah settlement zone - such as Str. NOS11-M1 and the NOS 49 structures - date to the Early Classic, while the construction of the NOS 11 domestic structures date to the Late Classic.

Evidence of sub floor burials were found in the Nojol Nah settlement zone, with the burial found beneath the floor in Str. NOS11-M2 having the most elaborate crypt construction seen in over 60 burials that have been recovered to date from Nojol Nah (W.T. Brown 2013 Pers. Comm.). All of the skeletons that could be sexed were male adults. None of the graves contained grave goods aside from the spindle whorls and metate seen at Str. NOS11-M1 – items usually associated with women’s domestic activities.

The presence of modified teeth in two of the burials gives pause for thought. Dental modification was practiced in the Americas for thousands of years, with two types of

## 7. The Nojol Nah Settlement Zone

modification – inlaying and filing (Hillson 1996, 251). Filing was the earlier of the two practices according to information available from the archaeological record, and first appeared in the Early Preclassic, with inlaying appearing slightly later in the Middle Preclassic; and by the time of the Late Classic, both forms were common (Williams and White 2006, 139). However it does not appear that dental modification was linked with wealth or elite status (Chase & Chase 1997, 24-26). That is not to say that dental modification was not linked to any kind of social status, it may well have been that only certain people, regardless of their wealth, had dental modification because of their role within a community. Equally though this may have not have been the case at all, but there is simply not enough evidence either way. Skilled practitioners must have carried out dental modification, and so thorough knowledge of dental anatomy is implied. The whole process of dental modification must have been quite painful for the individual, so it may have been a ritual practice that conferred a specific social identity on those who had undergone it. The filed teeth recovered from Burial 38 were all filed into T-shapes. Throughout Mesoamerica, the sun god is often depicted as having T-shaped teeth (Williams and White 2006, 139-141).

Because of the destructive effect the Mennonite bulldozing activities had on architecture in the Nojol Nah settlement zone, in some instances – such as at NOS49 – although we found clear evidence of platforms, it was not clear from the debris surrounding the mounds whether or not there had been masonry superstructures at these locations. Erosion and bioturbation on the surfaces of what plaster floors did remain meant that it was impossible to determine whether postholes, signifying wooden structures, would have been present. We also found evidence of landscape modification in some areas, but with inconclusive results in other areas, such as the NOS1 terrace feature test units. Having excavated at a sample of locations across the Nojol Nah settlement zone, our attention turned to the cluster of architecture and landscape features that sat on the edge of the bajo two kms away at Tulix Mul.

## Chapter Eight: Tulix Mul

### *Introduction*

The 2012 and 2013 field seasons focussed on the central architecture of the Tulix Mul area located roughly 3kms from the centre of Nojol Nah. Excavations were implemented at the largest architectural configuration: a courtyard group, with two large multi-roomed structures, five smaller structures, and two enclosed exterior spaces: Courtyards A and B (see Fig. 112). We also conducted landscape investigations at the edge of the Alacranes Bajo in the Tulix Mul area to determine clay, soil and lithic, and the first part of this chapter will describe the landscape investigations, with the bulk of this chapter presenting the excavation data. The final portion of this chapter provides a summary of the data collected at Tulix Mul beginning with construction history and occupation, followed by a synopsis of the landscape investigation data.

The Tulix Mul courtyard group was selected to excavate because it is the largest architectural complex adjacent to the Alacranes Bajo. It is located less than 200m from the edge of the bajo on the last high point in the undulating karst before the land slopes down into the bajo, and affords far-reaching views of the landscape (Fig. 113)

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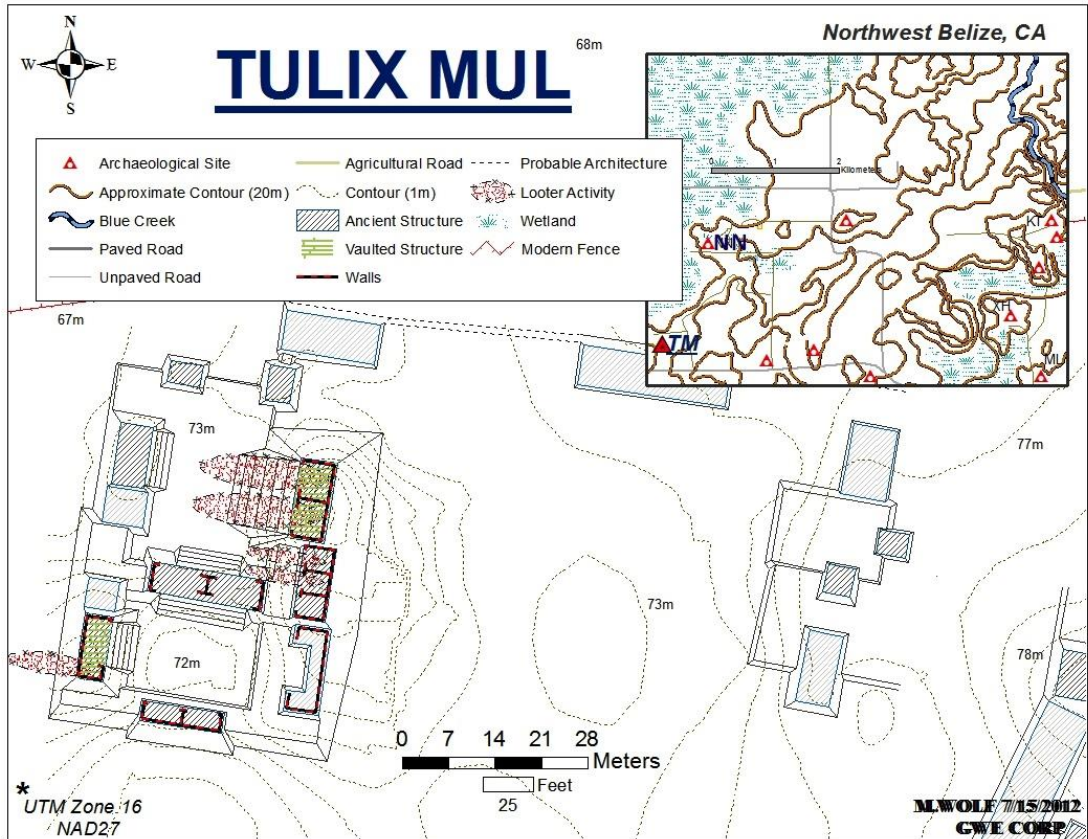


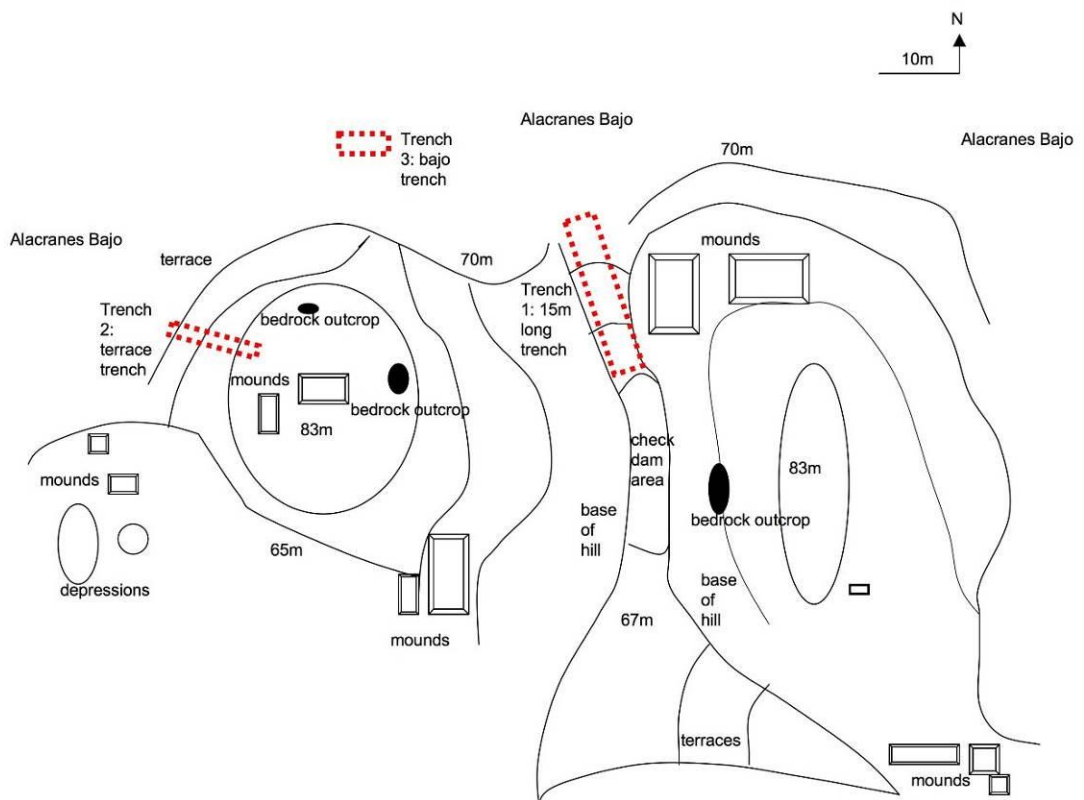
Figure 112 Map of the Tulix Mul Courtyard Group, pre-excitation – walls estimated by surveyor. Inset map shows location in relation to Nojol Nah (map by Marc Wolf)



Figure 113 Photograph of view towards the Alacranes Bajo from atop Str. TM-1 (looking north-west)

### ***Landscape Investigations in the Tulix Mul area***

A number of non-mound topological features in the Tulix Mul were mapped during the 2010 field season (see Chapter 6). During the 2012 and 2013 field season, further investigations of these features were implemented in order to determine if they were part of the ancient landscape. Using a backhoe, three trenches were excavated (Fig. 114), in the Tulix Mul area near what had been originally mapped as the NOS 29 and NOS 37 points (Fig. 115; D4).



**Figure 114** Map of the NOS 29/NOS 37 area showing position of the three backhoe trenches

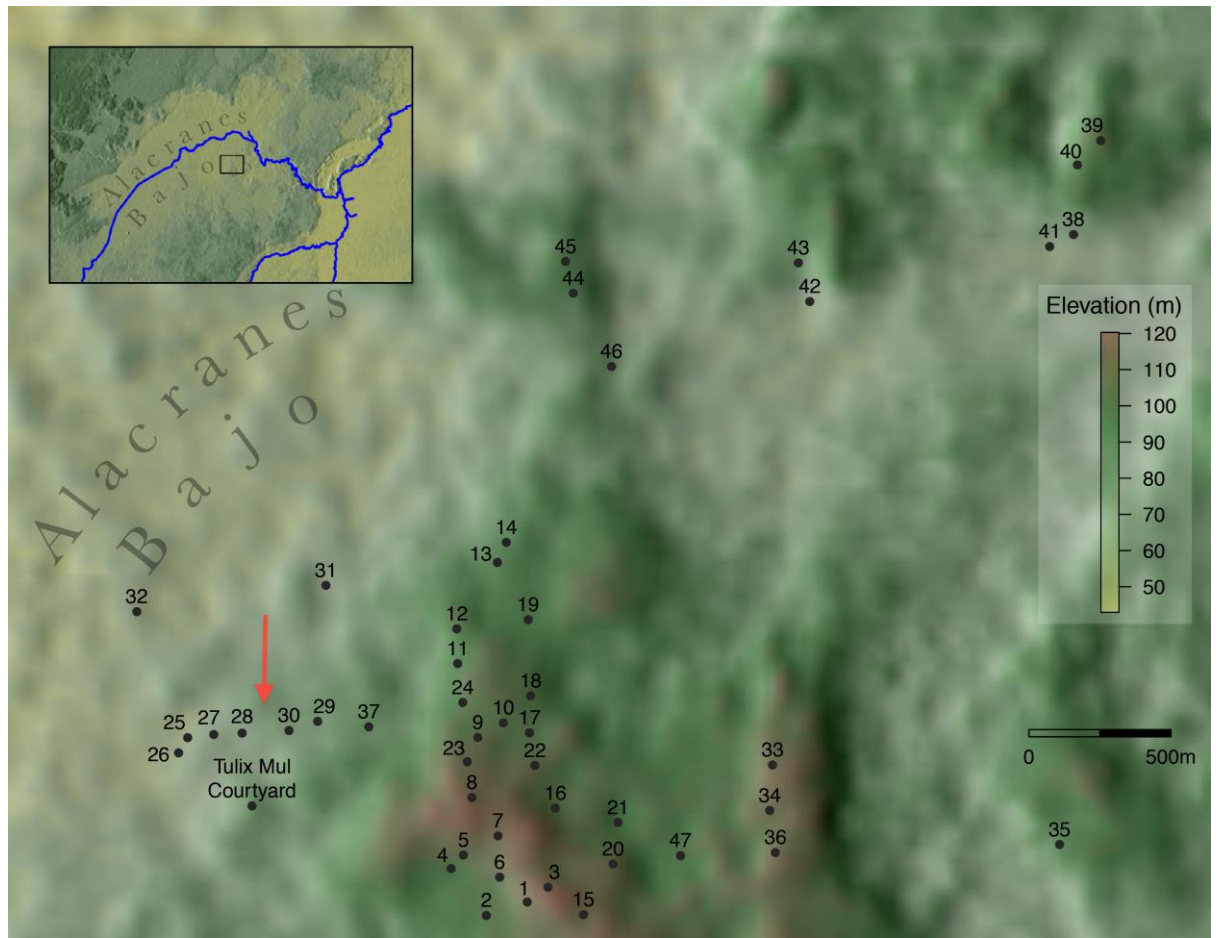


Figure 115 Map of the NOS points with red arrow indicating position of the backhoe trenches

The first (Trench 1) was a 15-metre trench that was dug through features that lay between the slopes of the NOS 37 and NOS 29 hills, which were hypothesised as a series of check dams. Trench 1 revealed a series of evenly spaced light and dark areas (Fig. 116; D6) along the entire length of the trench, forming a wavy pattern, which have been interpreted as man-made canals (Timothy Beach 2012, Pers. Comm.), with the dark areas representing the channels dug out of the natural limestone bedrock (the light areas). Trench 1 also revealed the abundant amount of naturally occurring chert. A chert environment leads to thicker soils that are well aerated, so the presence of chert could be a factor in the formation of the thick fertile soils that are found at the eastern edge of the Alacranes Bajo (Timothy Beach 2012, Pers. Comm.); the chert acts as a tempering material, increasing the fertility of the soil (Guderjan 2013, 227). Another explanation for these channels, however, could be that they reflect naturally occurring formations created by the shrinking and swelling of the vertisols during the

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wet and dry season (Nick Dunning 2013, Pers. Comm.). This effect has been seen in other parts of the world, such as Australia, where they are known as Mukkara or Gilgai (Rettalack 2008, 38-39). In order to determine whether or not these soils were vertisols, I undertook a micromorphological analysis from representative monolith samples taken from throughout the profile:



**Figure 116** Photograph of an example of the light and dark areas from 15 metre long trench (Photo courtesy of Timothy Beach)

My aim was to determine whether or not the channels were man-made, but also to determine what type of soil was present in order to confirm or refute the idea that the soils around the bajo edge were vertisols.

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In order to determine whether there were signs of anthropogenic activity, I looked for evidence of cultural material such as pottery sherds, or evidence of stone tool fragments – items that may have been utilised in the creation of these ditches if they were man-made. I also sought evidence of whether inclusions in the samples were the result of natural or anthropomorphic processes. Nine slides were made from samples from the channels, and a full description and images of these slides can be found in Appendices B and D. In brief, in terms of this study, examination of the slides revealed that although there was no evidence of ceramics or lithic tools, charcoal found throughout the samples is likely to indicate human-induced burning of the land. Amongst other strategies, the ancient Maya were known to have practiced slash-and-burn agriculture. In the lower levels of the channels, evidence of fine roots was present, indicative of humic soils, which were likely to have been displaced from the topsoil through manuring practices – another anthropogenic activity. The presence of slickensides (permanent cracks that develop with the shrinking and swelling of the clay) within the micromorphology slides revealed that these soils were vertisols, meaning that the soils around the edge of the bajo are rich clayey soils that shrink and stretch between the dry and wet seasons. The evidence of burning and indirect evidence of manuring within the vertisols suggests that the people inhabiting the area were using the nature of the vertisols to their advantage, with the channels observed highly likely to be man-made modifications of the naturally occurring vertisols. The even spacing of the channels also makes them highly likely to be man-made.

Another backhoe trench (Trench 2) was excavated to examine a terrace feature on the NOS 29 hill. Although we didn't find any evidence of construction, there were areas that looked like the limestone had been quarried, as there was no bedrock at the slope break, as one would expect to see if the slope was in its natural state. One possible explanation could be that the areas of bedrock were quarried, then filled, flattened, or evened out to perhaps be used for other purposes, such as aguadas or kitchen gardens. Quarrying of bedrock was seen at Nohmul (Heighway et al. 1985) and may have also been carried out by the people who lived in the Tulix Mul area.



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An important part of landscape archaeology is to determine what kind of natural resources are available. Water and soil resources are critical natural resources (Barrett 2004), but clay for ceramics was another vital material that people would need. For this reason, we excavated a backhoe trench (Trench 3) in the foot-slopes of the Alacranes Bajo. This trench revealed that there was a rich clay resource in this bajo zone that would have been available to the ancient Maya (Fig. 117). There has of course been sediment build-up since the ancient Maya occupied the area, but we found a pottery sherd within the clay at 136cm below the surface, deep into the clay.



**Figure 117** Photograph of the deep, rich clay resources

Another interesting phenomenon that Trench 3 revealed was that, during the wet season at least, the water table is very high, and rainwater is very slow draining. The bajo trench remained flooded for at least a fortnight after it was filled with heavy rain (Fig. 118).

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**Figure 118** Photograph of the flooded bajo trench

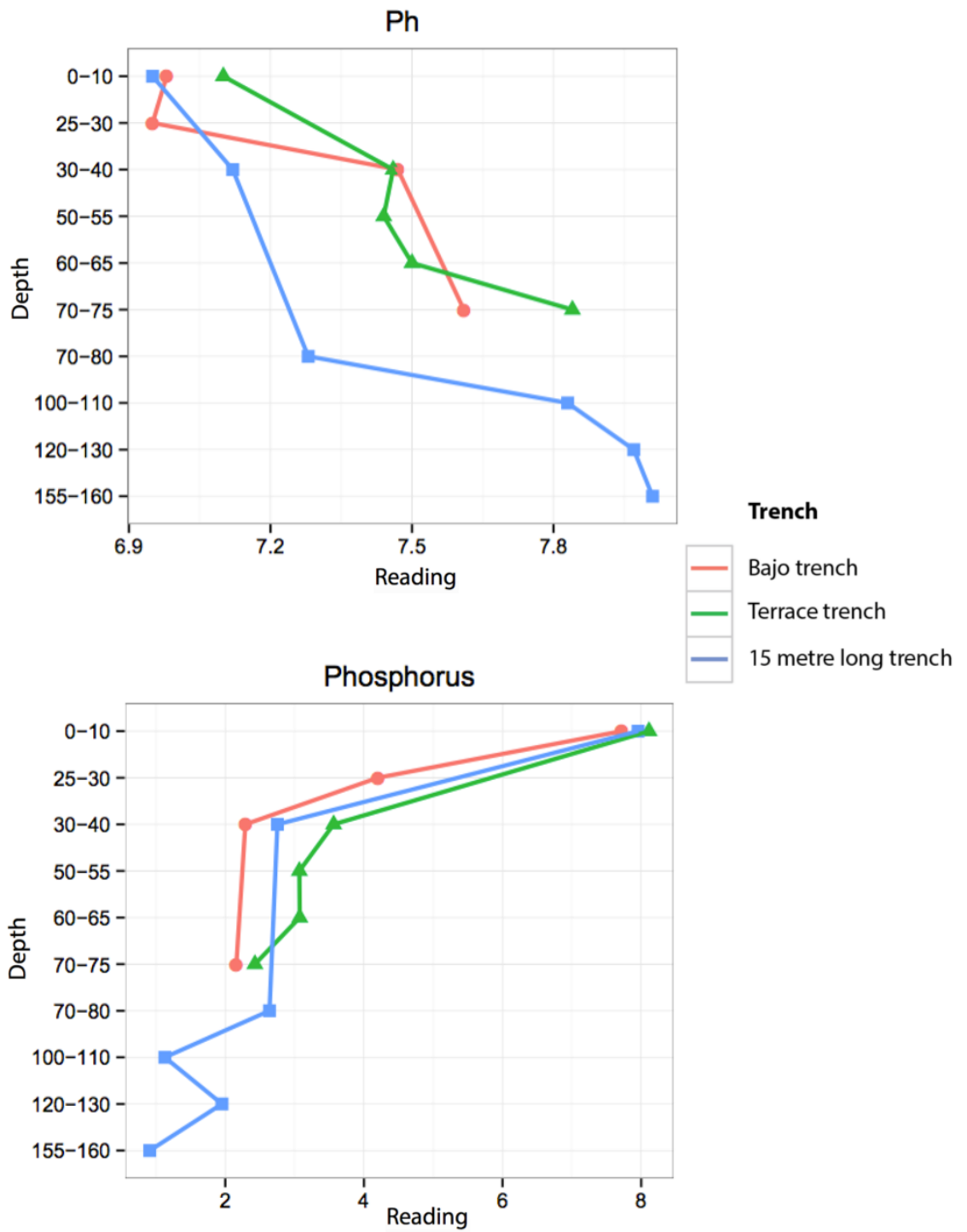


Figure 119 Graphs of pH and Phosphorous with each trench represented by a separate colour (see also Appendix D)

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We collected bulk soil samples at various depths from each of the trenches, and Timothy Beach carried out chemical analyses which he then sent to me in the form of an excel table (see Appendix A). I had graphs created from the data to facilitate preliminary comparison (Fig. D7).

The graph data showed that there was no significant difference among the trenches in terms of pH and phosphorus (Fig. 119); therefore all areas would have had similar agriculture potential in relation to these two factors. Trench 1 samples were collected from between 0-160cmbs, and pH readings ranged from 6.9 to 7.9; Trench 2 samples were collected from between 0-75cmbs and pH readings ranged from 7.1 to 7.8; and Trench 3 samples were collected from between 0-75cmbs and pH readings ranged from 6.9 to 7.6. All three trench's pH readings fall in the neutral to slightly alkaline range, and the similarities in the phosphorous readings between all three trenches mean that each of the areas would have had similar levels of this important nutrient. Further more detailed analysis of the soil chemistry is beyond the current remit of my research but is avenue for future research that I hope to pursue.

Differences in what may have been grown in these locations may have been determined by moisture retention rather than soil chemistry (M. Arroyo-Kalin 2014, Pers. Comm.). For example, the bajo was much more likely to have been flooded and water-logged during the wet season than the terrace slopes, thereby affecting the agricultural potential, and length of the growing season. Pollen and phytolith analysis of the soil samples to determine what may have been grown in the flooded is another potential direction of future research.

Another avenue we investigated was using aerial reconnaissance to look for ditched fields in the Eastern Alacranes Bajo area. Guderjan and Krause (2011) conducted a series of flights along the Rio Hondo in 2010, and were able to photograph and identify ditched field systems (Fig. 120) in the Rio Hondo area. Additionally, ditched fields have been identified at Blue Creek (Fig. 121). In 2011, Samantha Krause and I undertook a flight around the Eastern Alacranes Bajo area to see if we could identify ditched fields

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in the Nojol Nah and Tulix Mul vicinity. While we were able to take some clear pictures of the area (for example Fig. 122), we were unable to locate any ditched fields, and so we are unable to say whether or not this type of agricultural strategy was being used by the Eastern Alacranes Bajo area Maya. An area for future research would be to conduct further aerial surveys in the wider Alacranes Bajo area to discover whether ditched fields (or any other visible agricultural strategy) were being used by any of the sites over the other side of the bajo.



Figure 120 Photograph of ditched fields adjacent to the Rio Hondo (Courtesy of Tom Guderjan)

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Figure 121 Photograph of ditched fields close to Blue Creek (Courtesy of Tom Guderjan)



Figure 122 Aerial photograph of area south of the Nojol Nah site core / Nojol Nah Settlement Zone

### ***Excavations at Tulix Mul***

In order to gain maximum information from the Tulix Mul courtyard group, excavations at six of the structures were implemented: Structures TM-2, TM-3, TM-4, TM-5, TM-6, and TM-8 (Fig. 123). Two looter's trenches located on Str. TM-1 were also investigated. A datum was established from which to measure elevations, and the UTM coordinates of the datum are in the NAD 27 projection, grid co-ordinate 16Q: Easting = 0282350 Northing = 1984573 Elevation = 74 metres above sea level.

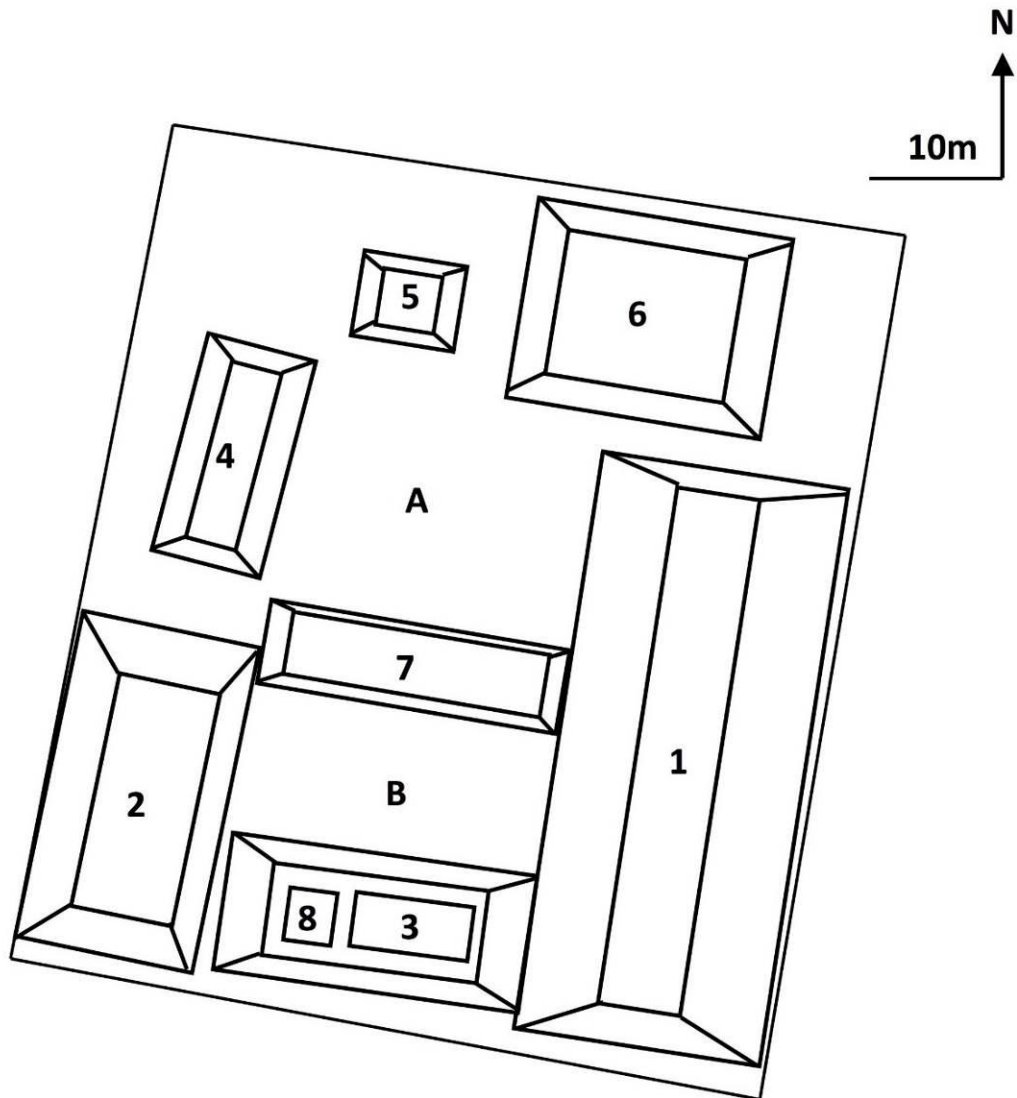


Figure 123 Plan of the Tulix Mul Courtyard with structures and courtyards marked



## ***Excavations at Structure TM-4***

### **Overview:**

Structure TM-4 was located in the northern half of the courtyard group, and was one of the structures that bordered Courtyard A.

### **Excavation:**

Excavation began by placing a 2x2 unit in the centre of the eastern side of the mound, half way up its slope. This unit was then expanded to follow the architecture until the front and top of the structure were exposed.

Lot 1 represented the initial 2x2m unit, and consisted of fine crumbly silt, and around 20% cobble-sized limestone pieces. This stratum was 65cm deep in the northern side of the unit, and 10cm in the southern side, and represents post-abandonment accumulation. Lot 1 ended when a degraded floor, Floor 1, was struck. Floor 1 represented the surface inside the Str. TM-4 room but continued beneath the walls to the exterior of the structure. The floor and the matrix just above Floor 1 were designated Lot 2. In the north eastern corner of the unit was a concentration of sherds, as well as the skeleton of a small bird or mammal, which were deposited post-abandonment.

Beneath Floor 1 was a 43cm-deep layer of chert pebble and cobble-sized core, representing foundation material (Lot 7), which overlay another floor, Floor 2. A ceramic concentration within Lot 7 was designated as Lot 8, and consisted of 31 sherds. Beneath Floor 2 were chert cobbles mixed with a medium, light-grey silt (Lot 9), and this layer was around 15cm deep, and sat on top of bedrock. Floor 2 was interpreted to represent the surface of the building platform upon which the superstructure of Str. TM-4 was constructed.

Once the exterior wall of the superstructure had been defined, we cleared out the inside of the room. We discovered that the building consisted of a single room

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measuring 9m N-S, and 2.5m E-W, with two benches (Fig. 124) – a Southern Bench (TM4-B1), and a Northern Bench (TM4-B2). There were four sealed doorways/openings in each of the cardinal directions. The room contained post-abandonment limestone collapse mixed with crumbly dark greyish-brown silt, therefore indicating that there were no further construction phases. The post-abandonment accumulation was designated Lot 4, and was roughly 1m deep, and ended when the top of the Southern Bench was reached. Lot 5 represented the matrix from the top of the Southern Bench down to the floor of the room. Lot 5 was made up of fine to very fine crumbly silt with around 20% limestone collapse, and was 80cm deep.



Figure 124 Photograph of Southern Bench (top of picture) and Northern Bench of Str. TM-4 4 (photo taken facing south)

Directly on the floor of the room were a number of items (Lot 6): snake bones in the northwest corner of the room, two human tibia on either side of the northern filled-in doorway, an obsidian blade, as well as ceramics and lithics. The floor had a burnt area in front of the sealed eastern doorway, and on top of the burnt area of the floor was a ceramic concentration comprising 29 sherds, and this was designated Lot 10. These

ceramics were embedded in the burnt floor, but were unburnt, so appear to have been deliberately placed over the burnt patch of Floor 1.

What we had initially interpreted as the southern wall of the structure turned out actually to be collapse over the Southern Bench. Lots 11 and 12 represent artefacts recovered during the clearing of collapse back to the actual south wall. The southern interior wall face was completely exposed, and the wall was found to sit on top of Floor 2. From the top of the southern wall down to the exterior floor was 99cm, and this was designated Lot 13. There was a paucity of artefacts from Lot 13.

In order to reach the earliest surviving construction phase at this location, and to establish whether there was a dedicatory cache on the structure's primary axis, we penetrated the floor of the eastern doorway, and excavated down to bedrock. Lot 84 represented material from beneath the floor of the room down to bedrock, a layer of chert cobbles measuring roughly 70cm in depth. Lying on the bedrock were large chert and limestone blocks that appear to have been laid to even out the undulating bedrock in order to give stability to the foundation material placed above the bedrock that supported the building platform. On top of the chert blocks was a peccary tooth, some sherds and a lithic tool (Lot 86). Lying to the south of the layer of limestone and chert blocks was a sherd concentration, including part of a painted ceramic vessel (Figs. 125 and 126) that depicts what looks like a pair of human legs (Lot 90). Close to the sherd concentration, but not definitely associated with it, was a human tooth, which was given the designation Lot 96.

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Figure 125 Photograph of Lot 90 ceramics in situ, Str. TM-4



Figure 126 Photograph of Lot 90 reconstructed ceramic vessel with painted figure, Str. TM-4

### The Southern Bench (TM4-B1)

In the southwest corner on the surface of the southern bench lay sherds, a chert tool flake, and human long bone fragments. This assemblage was designated Lot 14. There was a large cut in the plaster on top of the southern bench (Fig. 127), and it appears that the cut was made in antiquity, as the collapse on top of the bench did not seem large enough to be the cause of this feature. Inside the cut was a thin layer of medium to fine sand, and this was designated Lot 42. Beneath Lot 42, the matrix of the core of the bench comprised a 49cm deep layer of medium-sized chert cobbles and crumbled limestone plaster that contained a large amount of ceramics – 737 sherds – and this stratum was assigned Lot 44. Beneath Lot 44 was a poorly preserved burial (Burial 1 in the Tulix Mul burial sequence). This burial was likely to have been a secondary burial, based on the high degree of fragmentation of the bones, the lack of teeth, and paucity of hand/foot phalanges (Brown 2013, 421), and was an adult of indeterminable sex. There were no grave goods found in association with Burial 1.



Figure 127 Photograph of cut through top of the Southern Bench, Str. TM-4

We removed the remaining plaster from the top of the bench and discovered that there was a small stone-lined enclosed space within the bench, as well as two crypts, one atop the other, with a floor (Floor 2) in between that had been marked with a cut in the plaster.

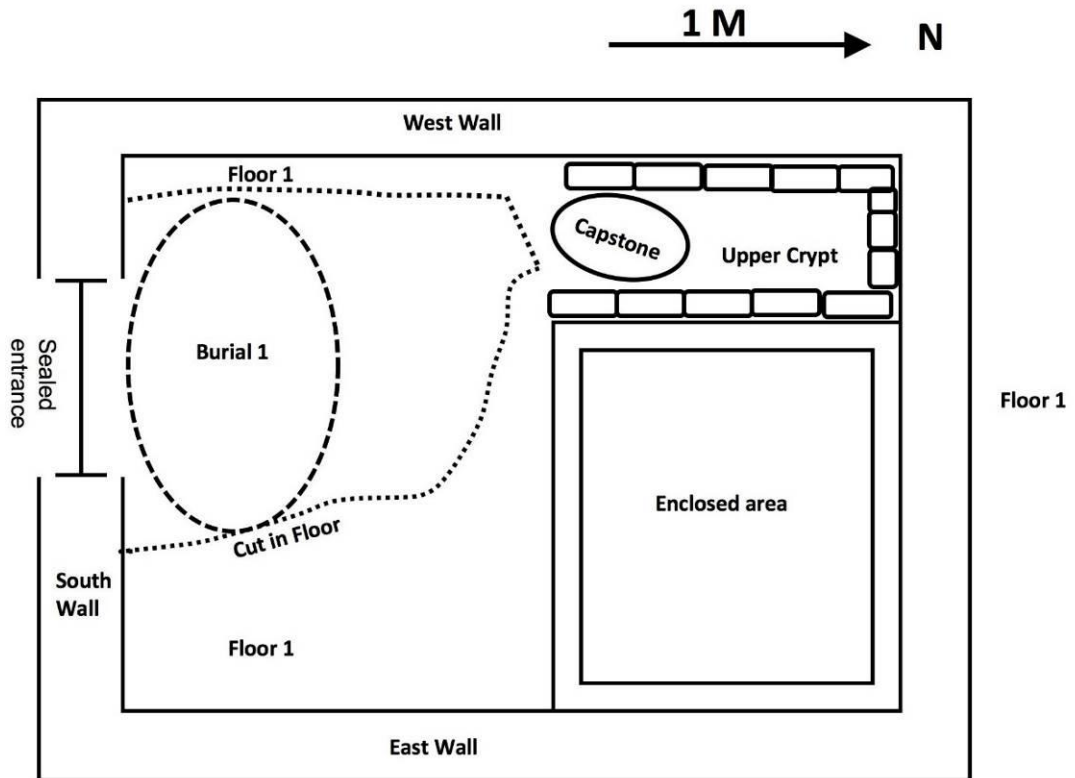


Figure 128 Schematic plan of inside Southern Bench, Str. TM-4



**Figure 129** Photograph of small chambered area beneath surface of the Southern Bench, Str. TM-4 (Burial 1 area under plastic sheet)

The enclosed space within the bench (Figs. 128 and 129) was 114cm north-south, and 85cm east-west, and 15cm deep. This small area was filled with a matrix of coarse- to medium-grain crumbled sascab-like material, and artefacts recovered from this layer were assigned Lot 59. The floor in this area had burnt patches, and contained just one object: a quartzite pecking stone (Fig. 130) with deep use-wear grooves (Lot 61). Beneath the floor (Floor 1) was roughly 50cm of chert cobbles which overlay bedrock and represented the core of the platform supporting the structure.

To the west of the chambered area beneath the surface of the southern bench was a capstone (Capstone 1) covered crypt (Crypt 1) that contained a human vertebra and some unidentified bone fragments (Burial 3). The crypt measured 76cm north-south, 22cm east-west and 46cm deep. Within the crypt were a few sherds which were given the designation of Lot 60, but were probably intrusive rather than directly associated with the crypt. The floor of Crypt 1 (Floor 1) contained a cut in which lay a 10cm- deep layer of cobble fill (Lot 66) overlying another capstone (Capstone 2). Capstone 2 (Fig.



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131) was part of a second stone-lined crypt (Crypt 2), measuring 35.5cm east-west, and 83.5 m north-south which contained Burial 4. Also within the crypt, at its western edge, was a cut rectangular limestone block that displayed scorch marks (Fig. 132). Burial 4 was an adult burial of indeterminate sex. The bones were not articulated, and were in a state of poor preservation. A small (roughly 1x1cm) piece of organic material that had the feel of animal hide was found within the matrix around the burial, as well as sherds, lithic tool flakes and a small piece of obsidian (Lot 71). At the time of writing the organic material had not been identified. Crypt 2 was constructed on top of bedrock with a plaster surface overlying chert cobbles that formed a foundation for the crypt. Crypt 2 is associated with the earliest construction phase of Str. TM-4.



Figure 130 Photograph of quartzite pecking stone from the Southern Bench of Str. TM-4



Figure 131 Photograph of capstone underneath cut, below Crypt 1, Str. TM-4



Figure 132 Photograph of burnt limestone block at western end of Crypt 2, Str. TM-4

### The Northern Bench (TM4-B2)

The Northern Bench showed two distinct construction phases. The first was the initial construction of the bench, then a second phase which involved the raising of the bench by 33cm, which also covered a cord holder that was composed of a ceramic rim and a deer bone in the wall (Lot 85) (Figs. 133 & 134). Cord holders consist of rectangular or square recesses sometimes framed by a circular ceramic inset containing a vertical peg of stone or bone; they are usually found in walls adjacent to doorways (Loten and Pendergast 1984, 6).

The Northern Bench contained 100cm of chert cobble fill (Lot 45) that overlay the floor of the room (Floor 1). Lot 45 artefacts included sherds, lithic tools, and rounded ground stones. Beneath Floor 1 was a 25cm deep layer of chert cobbles, which served as core material to support the building platform, and the cobble stratum overlay a burial, Burial 2 (Lot 65) (Fig. 135). This burial actually contained 2 individuals as evidenced by redundant hand-bones. The skeletons were in a state of fairly good preservation, and there were notched upper central incisors (Romero Type B4). However there were many elements missing from both skeletons, so these were likely

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to have been secondary burials. There were grave goods associated with Burial 4 – fifteen mother-of-pearl shell ornaments, a micro flake, and two carved turtle bones (Fig. 136). Artefacts in the matrix surrounding Burial 4, but not directly associated with it, were designated as Lot 77. Beneath the Burial 4 matrix, which comprised small chert pebbles, lay bedrock. Like Burial 1, Burial 4 is associated with the earliest construction phase of Str. TM-4.



**Figure 133** Photograph of close-up of pot rim in wall with deer bone (cord holder), interior western wall, Str. TM-4

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Figure 134 Photograph of cord holder in context; Alacranes Bajo in background.

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Figure 135 Photograph of Burial 2 in situ, Str. TM-4



Figure 136 Photograph of grave goods from Burial 2, Str. TM-4: mother-of-pearl-shells, carved bone, and microflake

**Artefacts:***Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 1	430	7349g	Unknown Classic
Lot 2	137	2216g	Unknown Classic
Lot 3	19	576g	Unknown Classic
Lot 4	98	1438g	Unknown Classic
Lot 5	159	2058g	Unknown Classic
Lot 6	216	5392g	Early Classic Tzakol 1-3
Lot 7	31	488g	Unknown Classic
Lot 8	54	1273g	Unknown Classic
Lot 9	17	282g	Early Classic Tzakol
Lot 10	29	1000g	Early Classic Tzakol 2/3
Lot 11	33	766g	Unknown Classic
Lot 12	35	746g	Unknown Classic
Lot 13	6	66g	Unknown Classic
Lot 14	2	10g	Unknown Classic
Lot 42	8	106g	Unknown Classic
Lot 44	737	6829g	Early Classic Tzakol 1-2
Lot 45	59	808g	Early Classic Tzakol 1-3
Lot 46	541	5868g	Early Classic Tzakol 1-2
Lot 48	n/a	n/a	n/a
Lot 49	n/a	n/a	n/a
Lot 50	n/a	n/a	n/a
Lot 52	23	352g	Unknown Classic
Lot 53	22	1884g	Unknown Classic
Lot 57	n/a	n/a	n/a
Lot 59	300	4250g	Unknown Classic
Lot 61	23	404g	Unknown Classic
Lot 62	88	1318g	Early Classic Tzakol 2/3
Lot 65	54	665g	Early Classic Tzakol 1-3
Lot 66	n/a	n/a	n/a
Lot 67	n/a	n/a	n/a
Lot 68	n/a	n/a	n/a
Lot 69	4	66g	Early Classic Tzakol 2/3
Lot 70	n/a	n/a	n/a

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Lot 71	7	40g	Unknown Classic
Lot 77	191	1322g	Unknown Classic
Lot 79	n/a	n/a	n/a
Lot 82	n/a	n/a	n/a
Lot 84	10	232g	Unknown Classic
Lot 85	1	202g	Late Classic Tepeu
Lot 86	n/a	n/a	n/a
Lot 89	150	2556g	Early Classic Tzakol 2
Lot 90	114	2195g	Early Classic Tzakol 2
Lot 96	n/a	n/a	n/a

*Lithics:*

LOT	COUNT	WEIGHT	NOTES
Lot 1	34	564g	Including retouched flakes, and a possible incising tool
Lot 2	31	862g	Including an adze showing use wear patterns, cores, and flakes
Lot 3	n/a	n/a	
Lot 4	22	418g	Including a distal end of a uniface tool
Lot 5	16	218g	Including flakes from the same core
Lot 6	6	361g	Including a shoulder hafted biface
Lot 7	1	12g	
Lot 8	n/a	n/a	
Lot 9	n/a	n/a	
Lot 10	n/a	n/a	
Lot 11	n/a	n/a	
Lot 12	35	746g	Including multiple flakes from the same core
Lot 13	8	150g	
Lot 14	1	102g	
Lot 42	n/a	n/a	
Lot 44	21	494g	



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Lot 45	1	94g	Including the medial end of a tapered biface
Lot 46	21	338g	Including a knife shaped secondary flake
Lot 48	n/a	n/a	
Lot 49	n/a	n/a	
Lot 50	n/a	n/a	
Lot 52	23	352g	
Lot 53	2	466g	
Lot 57	n/a	n/a	
Lot 59	25	890g	Including an intact general utility biface, an unfinished biface blank, and flakes from the same core
Lot 61	8	190g	
Lot 62	7	180g	Including a unfinished biface blank
Lot 65	4	140g	Including an unfinished macro blade blank
Lot 66	n/a	n/a	
Lot 67	n/a	n/a	
Lot 68	n/a	n/a	
Lot 69	5	210g	
Lot 70	n/a	n/a	
Lot 71	1	50g	
Lot 77	28	460g	Including flakes from the same core
Lot 79	n/a	n/a	
Lot 82	n/a	n/a	
Lot 84	n/a	n/a	
Lot 85	n/a	n/a	
Lot 86	1	16g	Distal end of a tapered biface
Lot 89	n/a	n/a	
Lot 90	n/a	n/a	
Lot 96	n/a	n/a	

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### *Other:*

Lot 3: Faunal remains - a small bird or mammal

Lot 10: Obsidian blade; 2 human tibia; faunal remains – snake bones

Lot 11: Faunal remains – rodent

Lot 12: Faunal remains – unidentified small mammal

Lot 42: Faunal - unidentified small mammal

Lot 44: Human remains – bone fragments

Lot 45: Round groundstone objects

Lot 46: Human remains – Burial 1

Lot 53: Human bone fragments

Lot 61: Quartzite pecking stone

Lot 65: Human bone fragment

Lot 67: Human bone fragment

Lot 68: Human remains – Burial 2; 15 shell ornaments; 2 carved bone/tortoise shell pieces

Lot 69: Human remains – Burial 3

Lot 71: Human remains – Burial 4

Lot 84: Human bone fragments

Lot 85: Cord holder pot rim and deer bone; plaster samples

Lot 86: Peccary tusk

Lot 96: Human tooth

### Str. TM-4 Summary

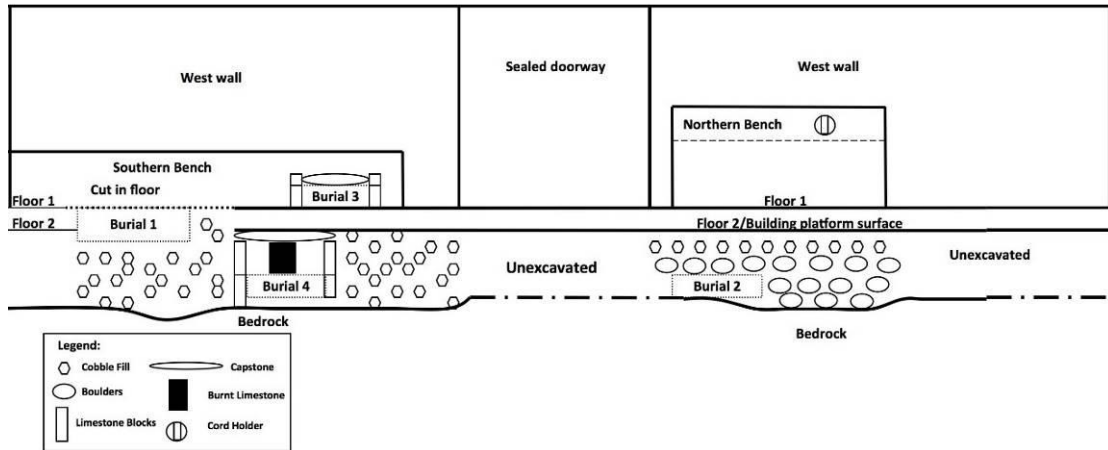


Figure 137 West elevation drawing of Str. TM-4.

Structure TM-4 (Fig. 137) consisted of a platform supporting a single room the internal dimensions of which were 9m N-S, and 2.5m E-W. The room contained two benches, the Southern Bench (TM4-B1) and the Northern Bench (TM4-B2). The Southern Bench spanned the width of the room (east-west) and was 3m long, and 49cm high. Excavation of the Southern Bench revealed a small chambered area, as well as two crypts – one lying stratigraphically above the other. The Northern Bench abutted the western wall and was 2m long (north-south), 96cm wide (east-west), and 100cm high. The top 33cm of the northern bench comprised an addition to the original height of the bench, and covered a cord-holder that was embedded in the interior wall of Str. TM-4. To the south of the Northern Bench was a filled in doorway, with which the cord holder was likely to have been associated. There were a total of four doorways/openings at Str. TM-4: one on the eastern side, one on the western side, one on the southern side, and one on the northern side. These features had been sealed prior to the abandonment of the building, suggesting planned further construction. However this further construction did not take place as evidenced by the room being filled with post-abandonment accumulation rather than building materials, such as chert fill. A total of four burials were recovered from Str. TM- 4.

Structure TM-4 showed three construction phases. The first phase (Str. TM-4-1<sup>st</sup>) was the initial construction of the building platform, which dated to the Early Classic 1-2 period that was capped by Floor 1; the next phase (Str. TM-4-2<sup>nd</sup>) was the addition of the walls of the super-structure, and the two benches. The final phase (Str. TM-4-3<sup>rd</sup>) was the heightening of the northern bench. Sherds recovered from the core of the Northern Bench date to the Early Classic Tzakol 1-3 period. The heightening of the Northern Bench likely coincided with the filling of the doorway, as the fact that the cord holder was covered suggests it was no longer needed for use alongside the doorway. The ceramic rim of the cord holder was a Late Classic form. The eastern and western doorways were also sealed at an undetermined point during the structure's history. In fact all of the entrances had been sealed, therefore indicating that this structure had been purposefully taken out of usage. It may have been that a new building was planned, but for some reason this did not happen. Items embedded in the floor of this room date to the Early Classic Tzakol 2/3 period suggesting that the room was abandoned at this time, however the Late Classic ceramic rim cord holder represents a chronological anomaly. The floor assemblage consisting of human and faunal bones, obsidian and pottery may be the material remains of a ritual carried out when the structure was abandoned. The human tooth, peccary tusk, and ceramic concentration found close to the bedrock beneath the structure are likely to represent a primary axis cache; and the Early Classic Tzakol 2 period sherds found in this context dates the initial construction of Str. TM-4 to Tzakol 2 or after this time. An inexplicable occurrence uncovered at Str. TM-4 concerns the small enclosure beneath the Southern Bench, with the single quartzite pecking stone placed in the corner. Unfinished chert tools and instances of flakes from the same core suggest that tool-making occurred in situ. The abundant chert cobbles used for core material also show direct evidence of nearby bajo resources being exploited.

The pot-rim-in-the-wall cord holder style was seen at Structures TM-2, TM-3 and TM-6 also. These other examples were placed lower in the walls, and were not covered by a heightened bench, and comprised only the pot rim, without the deer bone. The Late

## 8. Tulix Mul

Classic form of the pot makes more sense in Str. TM-3, as there were Late Classic materials recovered from throughout that structure. This may point to the deer bone cord-holder at Str. TM-4 as having some kind of ritual significance, as there was no further evidence of Late Classic material found at Str. TM-4.

The burials beneath the Southern Bench appear to have been interred in Early Classic Tzakol 2, with Crypt 2 lying directly on the bedrock that underlay Str. TM-4. The burnt limestone block in Crypt 2 was purposefully placed in an upright position and so appears to be representative of a burial rite of some kind. Burial 2 beneath the Northern Bench was the only one of the four burials from Str. TM-4 that had any associated grave goods. The marine shells found with Burial 2 were made from non-local material, therefore indicating an involvement with a long-distance trade network. One of the two individuals from Burial 2 had modified upper central incisors. None of the other individuals recovered from Str. TM-4 displayed any dental modification, suggesting that the individual from Burial 2 was different in some way.

### ***Excavations at Structure TM-5***

#### **Overview:**

A small mound was located just to the west of Structure TM-6. This was designated as Structure TM-5, and was the smallest mound within the Tulix Mul Courtyard group. The strategy behind the excavation was to investigate the chronology and function of the construction represented by the mound, and to this end a vertical 2x2m unit was implemented and excavated to bedrock.

#### **Excavation:**

Once the ca. 5cm humic layer was cleared, along with a further 50cm of post-abandonment accumulation consisting of around 20% chert cobbles in a sediment matrix, it became apparent that the eastern edge of the excavation unit corresponded to a wall face, which was judged to be the interior face of the eastern wall of a superstructure (Str. TM-5-2<sup>nd</sup>). Artefacts recovered from beneath the humus to the

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top of the wall were designated as Lot 26, and included a granite metate fragment, 2 chert handaxes, 2 chert unifaces, a chert biface, sherds, as well as faunal remains. Beneath the Lot 26 layer the soil matrix changed to include a high proportion of crumbly limestone and chert cobbles (designated as Lot 27), likely to have been degraded wall or floor material for a later building, TM-5-1<sup>st</sup>. Lot 27 was 77cm deep and contained the distal end of an obsidian projectile point (Fig. 138) and ended when a degraded floor (Floor TM-5-2<sup>nd</sup>-F1) was revealed. Floor 1 and the 10cm above it were designated Lot 28. Artefacts recovered from Lot 28 included a piece of a ceramic whistle; sherds and chert tool fragments, as well as faunal remains. Floor 1, determined to be the interior floor of Str. TM-5-2<sup>nd</sup>, overlay another floor surface (TM-5-2<sup>nd</sup>-F2) that served as the surface of the basal platform and underlay Str. TM-5-2<sup>nd</sup>. Artefacts from beneath Floor 2, and down to bedrock were designated Lot 29. Lot 29 was ca. 40cm deep. This lot comprised chert cobbles increasing in size closer to bedrock. Lying on top of the bedrock was an intact granite mortar and pestle (Fig. 139) that may have represented a cache. Bedrock was 162cmbs (Fig. 140).



Figure 138 Photograph of distal end of a projectile point, Str. TM-5



Figure 139 Photograph of granite mortar and pestle recovered from Str. TM-5

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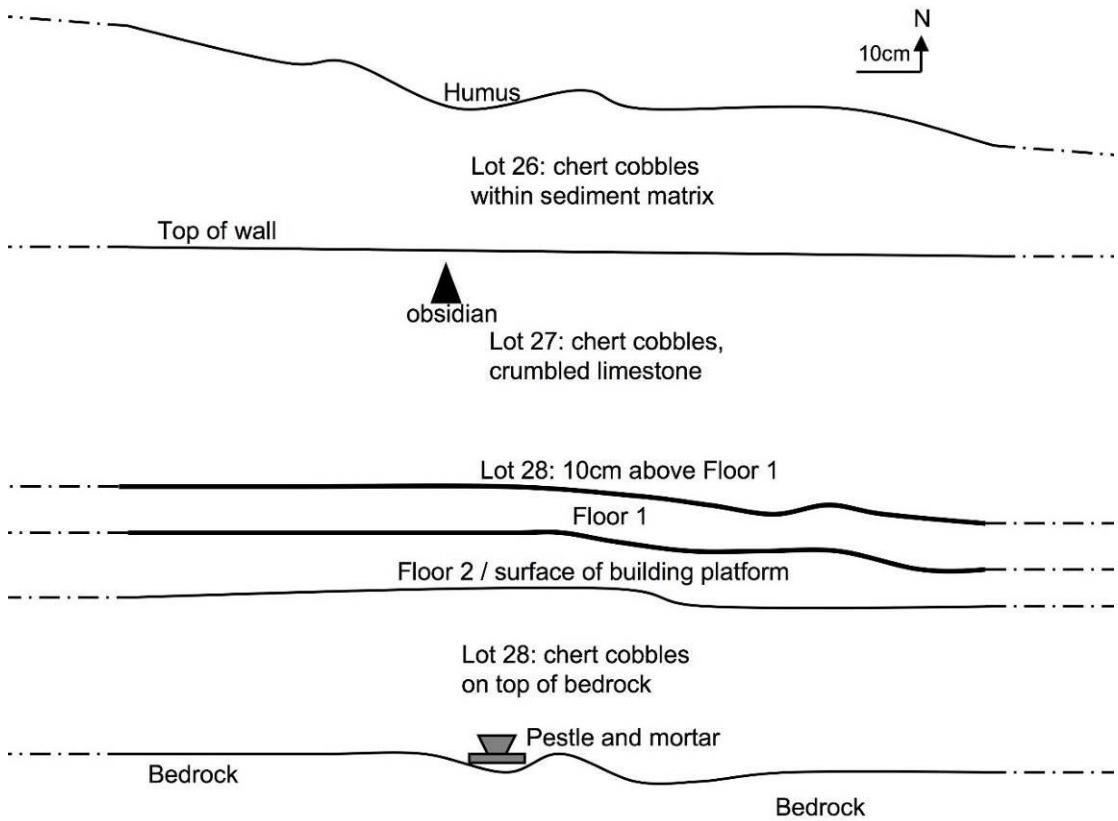


Figure 140 Section drawing of north profile of Structure TM-5 excavation

**Artefacts:**

*Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 26	316	3492g	Unknown Classic
Lot 27	24	1133g	Unknown Classic
Lot 28	391	4596g	Early Classic Tzakol, including a ceramic whistle fragment
Lot 29	684	6304g	Early Classic Tzakol 2/3



*Lithics*

LOT	COUNT	WEIGHT	Notes
Lot 26	34	2130g	Including 2 handaxes, 2 unifaces, and a biface
Lot 27	1	28g	Chert tool fragment
Lot 28	28	1328g	Including a biface fragment, and a rejuvenated tool
Lot 29	21	728g	Chert tool fragments

*Other:*

Lot 26: Two quarter-gallon bags of faunal remains mostly small mammals; granite metate fragment

Lot 27: Distal end of an obsidian projectile point; Two quarter-gallon bags of faunal remains mostly small mammals

Lot 29: 1 small piece of red painted plaster; granite ground stone mortar and pestle

**Str. TM-5 Summary**

As the excavation at Structure TM-5 was not a complete excavation, it is not possible to comment on the architectural form of the structure. However judging by the amount of faunal remains, utilitarian sherds, chert tools, and groundstone implements Str. TM-5-1<sup>st</sup> may have been a kitchen/food preparation area, or a workshop, built atop a low platform. The presence of chert cobbles and degraded limestone in Lot 27 indicates that there was another construction phase that did not survive in the archaeological record. Therefore there were two clear phases noted during the 2012 excavations at Str. TM-5: The deposition of the mortar and pestle in the core of Str. TM-5-2<sup>nd</sup> and the construction of the platform that supported TM-5-2<sup>nd</sup>; followed by another construction phase TM-5-1<sup>st</sup>.

Half of an obsidian projectile point recovered from Lot 26 was not of the usual El Chayal obsidian type that is often found in northern Belize; it was a much darker obsidian type which may have originated in Mexico (Tom Guderjan 2012, Pers.

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Comm.). This was the only example of this type of obsidian found in the entire excavations at both Tulix Mul and Nojol Nah.

Sherds recovered from the earliest construction level of the building platform (not pictured) have been dated to the Early Classic Tzakol 2/3 period, therefore making the platform contemporaneous with Str. TM-4.

### *Excavations at Structure TM-6*

Overview:

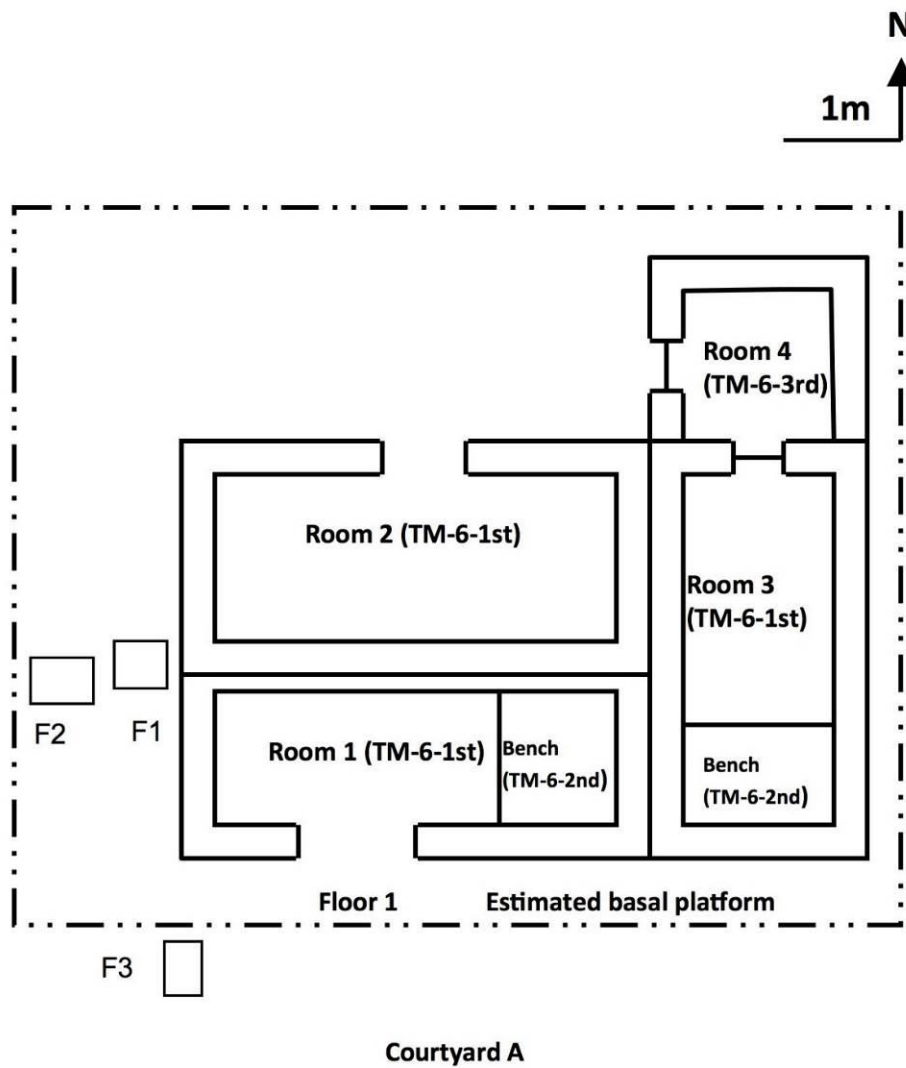


Figure 141 Plan of the standing architecture of Structure TM-6

Structure TM-6 was located in the north east of the Tulix Mul courtyard group, with the foot-slopes leading to the Alacranes Bajo beginning directly to the north.

### **Excavation:**

The standing architecture of Str. TM-6 consisted of a four-roomed building sitting atop a basal platform (Fig. 141). This represented three phases Str. TM-6-1<sup>st</sup>, Str. TM-6-2<sup>nd</sup> and Str. TM-6-3<sup>rd</sup>. Surrounding the Str. TM-6 mound were large pieces of limestone collapse that may have been from a later superstructure that did not survive in the archaeological record. However as Str. TM-6 was so close to Str. TM-1, it was not possible to say which structure the collapse had come from. One of the looter's trenches on Str. TM-1 had clearly been excavated with a machine, and this act of destruction had heavily impacted the area around Str. TM-6.

### **The Southern Room (TM6-R1)**

Excavations at Str. TM-6-1st began in what would be designated the Southern Room (TM6-1<sup>st</sup>-R1).

A 2x2m unit was placed on the southern side of the structure, and once a floor was found (Floor 1), the unit was expanded to follow the floor. Floor 1 was the surface of the basal platform (Platform 1), and Lot 15 represents artefacts recovered from the platform's surface and 10cm above it. Lot 16 represents artefacts collected to the north of Lot 15, while defining the edge of the floor of Room 1 (Floor 2) that overlay Floor 1. Lot 106 represents artefacts recovered when extending the excavation to the south to reveal a plaster surface beneath Platform 1 that was part of the floor of the courtyard/plaza area. The floor of the courtyard/plaza was degraded, and we did not find evidence of the plaza floor beneath Platform 1 once sub-floor excavations began in TM-6-R1; therefore it seems that the plaza floor was constructed after Platform 1.



**Figure 142** Photograph of limestone block fill in Room 1 Str. TM-6, looking east

Artefacts from Floor 2 up to a line of limestone blocks which rested on the floor were designated as Lot 17 (Fig. 142). The limestone blocks, presumed to be vault stones, may have been purposefully placed in the room in order to prepare for a later construction phase, however the tip angle suggests that they might have been collapse, although it later transpired that there were not any of these large blocks in any of the other rooms, as one would expect to see if they did represent collapse. The blocks covered over half of the surface of Room 1; the other half of the room was filled with a sandy loam interspersed with chert cobbles. The chert cobbles may represent core for a later building phase that did not survive. Artefacts lying against the line of stones were designated as Lot 18, and as well as sherds and lithics included one granite mano fragment, three whole granite metates, and a granite metate fragment. These implements appear to have been deposited after the room was filled with the limestone blocks, as they were lying against the line of stones, not underneath. We removed the limestone blocks, and uncovered the rest of Floor 2, which revealed the presence of a bench (TM6-R1-B1) that covered the eastern portion of Room 1 (Fig.

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143). Artefacts recovered during the clearing of the room were designated as Lot 21 (items directly beneath the blocks), Lot 22 (items behind the blocks), and Lot 23 (items sitting atop Floor 2). Floor 2 was heavily burnt in places, and there were ceramics embedded in the floor that were designated as Lot 95 to separate them from Lot 23. There was no turn-up from Floor 2 to the bench; therefore the bench appeared to be secondary to the floor. The addition of the bench represents a construction phase Str. TM-6-2<sup>nd</sup>.



**Figure 143 Photograph of bench in Room 1 (TM6-R1-B1) facing east**

Lot 47 represented artefacts from the surface of the bench. The surface of the bench was covered in a plaster layer that was 12cm thick. We removed the bench to investigate its relationship to the room's construction. The bench was filled with core material comprising chert cobbles and pebbles, and sherds and lithics recovered from

this matrix were designated Lot 113. The bench was 53cm high, and once it was removed we found that it sat atop Floor 2, confirming that the bench was secondary to the floor. Artefacts from Floor 2 beneath the bench, and 10cm above, were designated Lot 115. Floor 2 beneath the bench displayed a cut in the surface. Excavations beneath the bench were taken down to bedrock, which was at roughly 1.5m below the surface of Floor 2. No artefacts were recovered from beneath Floor 2, and it is not clear what the cut in Floor 2 represented, unless it signifies that something was removed from this location prior to the building of the bench. The core material beneath Floor 2 comprised chert cobbles, with larger chert pieces towards the bottom of the core layer sitting on top of bedrock, providing the foundation for the platform.

To the west of TM6-R1-1st were two square bench-like features, built of limestone blocks and ca. 1m x 1m x 30 cm. Feature 1 directly abutted the exterior west wall face of Room 1, and Feature 2 was slightly off set from Feature 1, 50cm to the west and was free-standing. Both of these features sat atop the platform surface exterior to Str. TM-6. Against both of these features was a large ceramic concentration, containing 613 separate sherds (Lot 24 and Lot 25). There was also an intact deer tibia against Feature 1, and the deer bone had half a metate leaning against it that may have been purposefully placed (Fig. 144). Feature 3, another square limestone feature similar in shape and size to Features 1 and 2, on the floor of the courtyard below the level of the Str. TM-6-1<sup>st</sup> platform. It was not clear which of the construction phases at Str. TM-6 that Features 1-3 were associated with, or what the purpose of the features was.



Figure 144 Photograph of metate fragment and deer tibia against F1, Str. TM-6. Photo taken facing north

### The Northern Room (TM6-R2)

After excavating the southern room, it was clear that the building contained further rooms. The Northern Room, TM6-R2-1st, shared a wall with TM6-R1-1st, and was cleared to reveal a very well preserved floor, and a doorway facing north (Fig. 145). Unlike TM-6-1<sup>st</sup>-R1, TM-6-1<sup>st</sup>-R2 was not filled with blocks. Beneath the humic layer (Lot 58), ca. 10cm thick, was a layer of medium to fine-grained greyish brown sandy soil (Lot 76) which continued down to the floor of the room, and represented post-abandonment accumulation. This stratum also contained sherds, lithics, seven obsidian blade fragments, and a round ceramic object 2cm wide. Artefacts recovered from the floor of Room 2 and 10cm above it were designated as Lot 81

There were burnt patches on the floor and walls of TM-6-1<sup>st</sup>-R2, and the walls had been plastered over on at least one occasion (Fig. 146). On the floor were two ceramic

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concentrations, one in the southwest corner of the room (Lot 83), and the other in the doorway (Lot 87), both of which had been subjected to burning (Figs. 147 and 148).

Against the exterior northern wall of TM-6-1<sup>st</sup>-R2 was another ceramic concentration, including one very thick piece (Fig. 149) and this was designated Lot 25.



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Figure 145 Photograph of the Northern Room, Str. TM-6-1st-R2

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Figure 146 Photograph of burned and re-plastered interior eastern wall, Str. TM-6-1st-R2



Figure 147 Photograph of Lot 83 ceramic concentration, TM-6-1st-R2

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Figure 148 Photograph of Lot 87 ceramic concentration, TM-6-1st-R2



Figure 149 Photograph of thick Terminal Classic ceramic piece from behind northern wall, TM-6-1st-R2

### The Eastern Room (TM6-1<sup>st</sup>-R3)

The eastern room, TM6-1<sup>st</sup>-R3 (Fig. 141), spanned the widths of Rooms 1 and 2, and shared a wall with them. I believe that this room was part of the Phase 1 construction. Its long axis ran perpendicular to the long axes of Rooms 1 and 2. A bench, associated with the Phase 2 construction (TM6-R3-2<sup>nd</sup>-B1) extended across the southern portion, and there was a sealed doorway in this northern wall. There was ca. 10cm of humus on top of a 46cm-deep layer of medium-grained sandy soil with some fine roots (Lot 55), and within this was a patch of oxidized soil that was designated Lot 54. Below Lot 55 was an 88cm-deep layer of finer grained sandy soil with no organic material that lay directly atop the floor of Room 3 (TM6-1<sup>st</sup>-R3-F1). Lots 54 and 55 represent post-abandonment accumulation.

A concentration of rim sherds was resting in the sandy matrix just above the floor in the northwestern corner of TM6-1<sup>st</sup>-R3, and these were designated Lot 64. The Lot 64 ceramics were from jars with fairly large rim diameters and likely served as storage jars (Fig. 150). Directly on the floor beneath the Lot 64 rim pieces was another ceramic concentration (Lot 74). A further ceramic concentration was found on the floor directly in front of the Room 3 bench, and this was assigned Lot 92. The Lot 74 and 92 ceramic concentrations may represent debris left behind when the structure was abandoned.



Figure 150 Photograph of Lot 64 Ceramic concentration, TM6-1st -R3

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The interior of the eastern wall face of TM6-1<sup>st</sup> -R3 had a cord holder embedded in it, with half of a pot rim still in situ (Fig. 151). This was not very deeply embedded in comparison to the one found in Structure TM-4, and was situated ca. 30cm from the floor like the one in Str. TM-3 not high in the wall as was the case in Str. TM- 4. However, it was from the same type of vessel, a Late Classic Yaxha Creamware jar and was designated Lot 99.



**Figure 151** Photograph of cord holder in Eastern Room, TM6-1<sup>st</sup> -R3

Artefacts from the southern end of TM6-1<sup>st</sup> -R3 (the floor and 10cm above) were designated Lot 102. Lot 105 represented the floor and 10cm above the northern half of the eastern room, and this lot consisted of ceramics, lithics, a piece of un-worked mother-of-pearl shell, and a piece of painted plaster. The Lot 105 items likely represent debris left when the room was abandoned rather than a deliberately placed floor assemblage, as they were found across the floor and not in a formal arrangement. On the floor against the filled-in doorway in the northern wall lay a broken vessel, designated Lot 109.

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The bench TM-6-2<sup>nd</sup>-B1 was removed to investigate its relationship to the construction of the room. The bench was 70cm high. The plaster layer on the upper surface of the bench was ca. 7cm thick. Beneath the plaster on top of the bench was a layer of compacted sascab which lay atop an intact 50cm-high olla (Fig. 152). The olla was located beneath the eastern end of the bench, resting on top of some stones that in turn lay on a layer of plaster (Fig. 153). The layer of plaster upon which the olla rested overlay the main floor of the room, Floor 1. The matrix surrounding the olla consisted of sandy soil with a scant amount of pebble-sized pieces of chert; artefacts recovered from this context – a ceramic whistle fragment, and an obsidian blade – were designated Lot 114.



Figure 152 Photograph of Olla under the surface of the bench in the Eastern Room, TM-6-2nd-R3-B1.

Lot 116 represented material from inside the olla. The olla was mostly filled with sandy soil and fist-sized chunks of limestone. These chunks of limestone must have been deliberately placed inside the olla, as the orifice was too small for them to have fallen inside without smashing it.

## 8. Tulix Mul

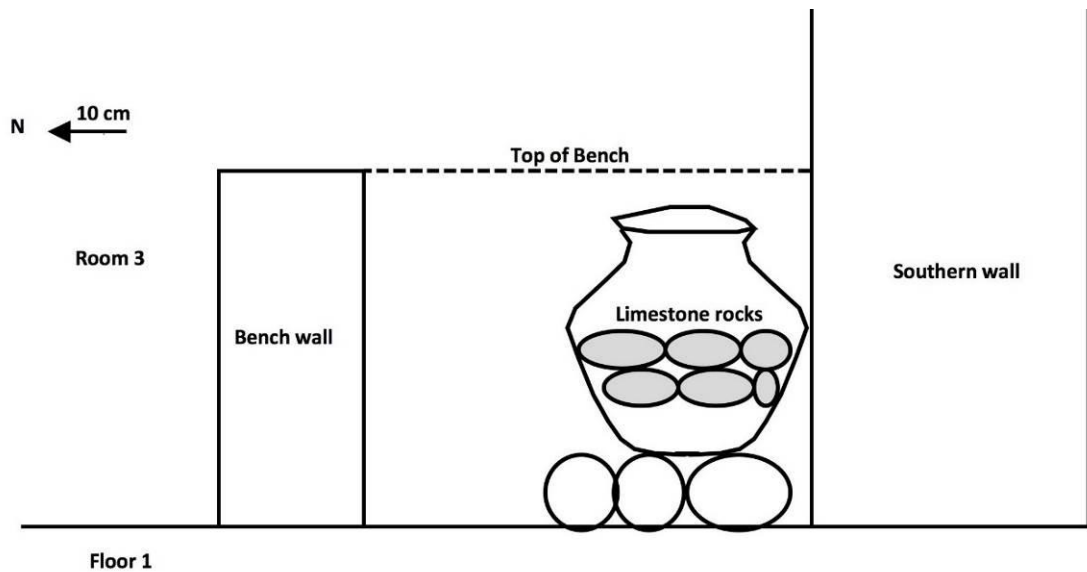


Figure 153 Schematic section drawing showing layer of limestone pieces within olla, and its position within TM6-2nd -R3-B

A small lithic, possibly an incising tool, was recovered from Lot 116. Beneath the limestone chunks within the olla was the top of a ceramic whistle. There were pieces of another small vessel at the bottom of the olla, reed-incised with blue paint (Lot 118). Identified as a Remate Red/Pantano impressed type of pottery, the most common form of this pottery type are tiny bowls used for burning incense (Sabloff 1975, 168). The presence of a bowl that may have been used for incense and the whistle could point to a ritual involving sound and scent at the time that the olla was deposited with the bench then built around it.

Directly beneath the plaster layer upon which the olla rested was the floor of the room/surface of the building platform (TM6-1<sup>st</sup>-R3-F1), and we excavated beneath this floor with the intention to gain information about the construction and chronology of Room 3. Lot 119 represents artefacts recovered from beneath the floor that included a polychrome sherd, and some pieces of quartzite. Thirty three (33) cm beneath TM-6-1<sup>st</sup>-R3-F1, corresponding to where the northern end of the bench had ended, was the cranium of a buried individual, designated Burial 5. Burial 5 extended beneath the floor to the north, and was surrounded by a matrix of small chert pebbles (Lot 124), which were part of the core material supporting the building platform associated with Str. TM-6-1<sup>st</sup>. The cobble matrix behind the cranium contained 52 shell ornaments carved



## 8. Tulix Mul

in individual shapes, as well as a rounded ceramic disc. The position of the ornaments behind the cranium suggests that they may represent a head-dress. The ornaments were found scattered both vertically and horizontally throughout the cobble fill (Fig. 154), all the way down to bedrock, so it is impossible to reconstruct their original configuration, however we can say that Burial 5 appears to be associated with the platform that supported Str. TM-6-1<sup>st</sup>.



**Figure 154** Photograph of some of the ornaments in the fill behind Burial 5, Str. TM-6-1<sup>st</sup>

Most of the ornaments (Fig. 155) were made from conch shell; however five were mother-of-pearl and one was cowrie, as well as the ceramic disc (Hammond 2013; Hammond and Guderjan 2013; Hammond et al 2014).



Figure 155 Photograph of shell ornaments, and ceramic disc from Burial 5, TM-6-1st

Burial 5 was a primary burial, as evidenced by the complete articulation of the skeleton, including the presence of smaller bones such as the feet and hands (Fig. 156). This was a middle-aged adult female who was buried in a flexed position with her feet and head facing north (Fig. 157).

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Figure 156 Photograph of articulated foot, Burial 5, Str. TM-6-1st



Figure 157 Photograph of Burial 5, face to the north, Str. TM-6-1st

The burial was in fairly poor condition; however, the cranium showed signs of fronto-occipital flattening and the individual, a female, had notched upper central incisors. Apart from the shell objects, the only other grave good recovered from Burial 5 was an obsidian blade that had been placed at her feet.

Directly beneath Burial 5's feet, and abutting the interior of the western wall, was a stone lined crypt (Fig. 158) which contained Burial 6 (Lot 128). Burial 6 comprised the very well preserved remains of an elderly adult female, as seen by the advanced tooth-wear (Fig. 159), and evidence of osteoarthritis (Brown 2014, 19). The burial was a primary one, as it was fully articulated. Her face was oriented at 60 degrees, and her cranium had signs of modification – flattening (Fig. 160). There were no grave goods associated with this woman; however the crypt obviously took planning and effort to construct, so it can be assumed that this person for some reason warranted special treatment - a crypt burial instead of a sub-floor burial. In the process of excavating Burial 6, we could see that there was another burial to the north, however we were unable to continue excavations due to time restraints, so excavations at Str. TM-6-1<sup>st</sup>-R3 ended with the recovery and recording of Burial 6.

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Figure 158 Photograph of Burial 6 crypt, Str. TM-6-1st



Figure 159 Photograph of Burial 6's advanced tooth wear (Photo by William T Brown)



Figure 160 Photograph of Burial 6 flattened cranium (Photo by William T Brown)

### **The Northeastern Room (TM-6-3<sup>rd</sup>-R4)**

The final room to be cleared at Structure 6 during the 2012 field season was Room 4. This room was uncovered during the excavation of TM6-1<sup>st</sup>-R3. The northeastern room (TM-6-3<sup>rd</sup>-R4) appears to be the latest addition to Str. TM6-1<sup>st</sup> because it abuts the walls of both Room TM-6-R2 and TM-6-R-3 (see Fig. 131). Construction quality of the walls was also different – much thinner than those of Str. TM-6-1<sup>st</sup>. This room was associated with the 3<sup>rd</sup> construction phase at Str. TM-6. Lot 110, post-abandonment accumulation, extended from below the humus down to 10cm above the floor. The soil matrix was homogenous, medium to fine greyish brown with small piece of crumbled limestone, and was 124cm deep.

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Ten (10) cm above the floor (TM6-3<sup>rd</sup>-R4-F1) level, the lot designation was changed from Lot 124 to Lot 111. Artefacts represented by Lot 111 were ceramics and lithics. There were a number of items embedded in the floor and these were assigned Lot 112. On the floor against the interior side of the eastern wall was a round rock made of quartzite, weighing 6.5kg, which was sitting on top of flat pieces of burnt chert. There was also a metate fragment, and some ceramics and lithics, including a whole biface on the floor (Figs. 161 and 162). I would suggest that Lot 112 was a deliberately placed floor assemblage based on the careful balancing of the quartzite rock that had been placed on top of the burnt chert pieces, and the varied nature of the artefacts. Additionally there were burnt areas on the floor, and a cut in the floor in the north-east corner, which we hope to investigate in the future. Between TM-6-1<sup>st</sup>-R3 and TM-6-3<sup>rd</sup>-R4 was a doorway that had been sealed. There was a further sealed doorway in the western wall of TM-6-3<sup>rd</sup>-R4.



Figure 161 Photograph of TM-6-3<sup>rd</sup>-R4 floor assemblage from l-r round quartzite rock, ceramics, metate

## 8. Tulix Mul

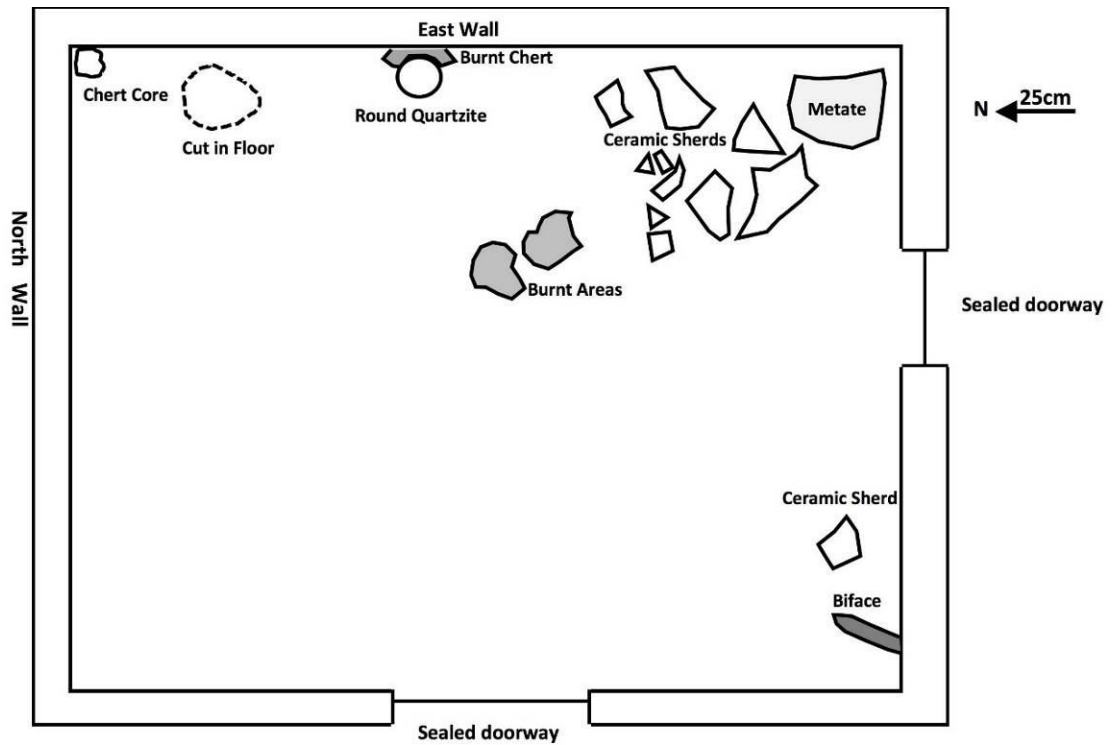


Figure 162 Schematic plan representation of TM-6-3rd-R4's floor assemblage

### Artefacts:

#### *Ceramics:*

LOT	COUNT	WEIGHT	DATE
Lot 15	223	3048g	Unknown Classic
Lot 16	276	1756g	Unknown Classic
Lot 17	17	482g	Unknown Classic
Lot 18:	426	12400g	Unknown Classic
Lot 19:	45	1309g	Late Classic Tepeu 2/3
Lot 20	58	1202g	Unknown Classic
Lot 21	74	1205g	Unknown Classic
Lot 22	29	468g	Unknown Classic
Lot 23	105	4834g	Late Classic Tepeu 2-3
Lot 24	598	2097g	Late Classic Tepeu 2
Lot 25	9	908g	Late Classic Tepeu 3 to Terminal Classic
Lot 47	11	126g	Unknown Classic
Lot 54			
Lot 55	43	1310g	Unknown Classic



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Lot 58			
Lot 64	34	3800g	Late Classic Tepeu 1-3
Lot 74	11	950g	Late Classic Tepeu 2/3
Lot 76	84	1518g	
Lot 81	96	2983g	Unknown Classic
Lot 83	134	2850g	Late Classic Tepeu 3
Lot 87	33	244g	Unknown Classic
Lot 88	n/a	n/a	n/a
Lot 91	101	978g	Unknown Classic
Lot 92	101	2750g	Late Classic Tepeu 1-3
Lot 94	30	926g	Late Classic Tepeu to Terminal Classic
Lot 95	158	4708g	Late Classic Tepeu 1-2
Lot 99	1	300g	Late Classic Tepeu 1-3 (Yaxha Cream ware rim)
Lot 102	51	670g	Unknown Classic
Lot 105	200	2700g	Unknown Classic
Lot 106	18	368g	Unknown Classic
Lot 109	26	748g	Late to Terminal Classic
Lot 110	n/a	n/a	n/a
Lot 111	31	1400g	Terminal Classic
Lot 112	42	3450g	Late Classic Tepeu 2
Lot 113	28	438g	Early Classic Tzakol 1-2
Lot 114	148	2134g	Late Classic Tepeu 2/3 (including a whole olla)
Lot 115	141	1900g	Early Classic 1-3
Lot 116	n/a	n/a	n/a
Lot 118	8	650g	Late Classic Tepeu 2/3 (including pieces with blue paint)
Lot 119	92	1546g	Early Classic Tzakol
Lot 121	20	250g	Early Classic Tzakol 1-3
Lot 122	8	100g	Unknown Classic
Lot 123	n/a	n/a	n/a
Lot 124	13	1202g	Unknown Classic

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Lot 128	13	80g	
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*Lithics:*

LOT	COUNT	WEIGHT	NOTES
Lot 15	27	421g	Including an intact general utility biface, a small intact bifacial point
Lot 16	12	212g	Including a tertiary flake with pressure flaking on 3 edges
Lot 17	1	90	
Lot 18:	6	254g	Including the distal end of a general utility biface
Lot 19:	n/a	n/a	
Lot 20	n/a	n/a	
Lot 21	2	162g	
Lot 22	1	4g	
Lot 23	1	420g	An intact general utility biface
Lot 24	4	174g	
Lot 25	1	1467g	Medial end of a general utility biface
Lot 47	n/a	n/a	
Lot 54	n/a	n/a	
Lot 55	3	1550g	
Lot 58	n/a	n/a	
Lot 64	2	18g	Including a secondary flake with pressure flaking
Lot 74	n/a	n/a	
Lot 76	7	114g	
Lot 81	n/a	n/a	
Lot 83	n/a	n/a	
Lot 87	n/a	n/a	
Lot 88	n/a	n/a	
Lot 91	n/a	n/a	
Lot 92	n/a	n/a	

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Lot 94	11	378g	
Lot 95	2	469g	Distal fragment of a general utility biface
Lot 99			
Lot 102	11	2514g	Including a prismatic chert blade
Lot 105	n/a	n/a	
Lot 106	n/a	n/a	
Lot 109	n/a	n/a	
Lot 110	n/a	n/a	
Lot 111	3	43g	
Lot 112	3	950g	3 intact general utility bifaces
Lot 113	n/a	n/a	
Lot 114	19	802g	
Lot 115	39	878g	
Lot 116	5	8g	
Lot 118			
Lot 119	30	2410g	Including a bifacial blank
Lot 121	n/a	n/a	
Lot 122	1	12g	
Lot 123	n/a	n/a	
Lot 124	15	957g	
Lot 128	2	60g	

*Other:*

Lot 15: Proximal fragment of an obsidian prismatic blade

Lot 24: Proximal fragment of an obsidian prismatic blade

Lot 76: Medial fragment of an obsidian prismatic blade

Lot 94: Proximal fragment of an obsidian prismatic blade

Lot 105: Small piece of un-worked mother-of-pearl shell, piece of red painted plaster

Lot 106: Granite mano fragment

Lot 112: One whole granite metate, groundstone quartzite sphere weighing 6.5kg

Lot 114: distal fragment of an obsidian pointed blade

Lot 119: One groundstone disc

Lot 123: 52 shell ornaments, one ceramic disc

**Str. TM-6 Summary**

Excavations at Str. TM-6 ended after clearing the floor of Room 4 due to time constraints at the end of the 2012 field season, with the MRP laboratory supervisor, Colleen Hanratty, calling a moratorium on all excavation activities due to an artefact processing backlog.

Str. TM6-3<sup>rd</sup> represented the latest standing architecture at this location. It comprised a masonry building about 7m x 5m on a basal platform, single terraced, that stood at least 20cm above the level of the courtyard and was approximately 9m by 7m. Preliminary analysis of the building suggests that it was constructed in at least three phases. Phase 1 was the construction of the basal platform, which was built to support a masonry superstructure, Str. TM6-1<sup>st</sup>, consisting of Rooms 1, 2 and 3. Phase 2 (Str. TM-2<sup>nd</sup>) was the addition of the benches to Rooms 1 and 3. Phase 3 saw the addition of Room 4 (TM-6-3<sup>rd</sup>-R4). The sealing of the doorway between rooms 3 and 4, and the sealed doorway in the western wall of Room 4 suggest that further construction was planned. However there was no evidence of this in the archaeological record. The

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doorway of Room 2 had not been sealed, so Room 2 does not appear to have been included in any further construction events.

Early Classic sherds were recovered from the core of the basal platform, and many remnants of storage vessels from in and around the standing architecture of Str. TM6 dated to the Late Classic, with sherds from the Terminal Classic recovered also, so it appears that the occupation of Str. TM-6 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> occurred during the Late and Terminal Classic. The Early Classic ceramics in the core of the basal platform may have been from an earlier building at this location that was razed to make way for TM-6-1<sup>st</sup>, therefore there may have been Early Classic occupation at this location.

The ceramics on the floor of Room 1 dated to the Late Classic Tepeu 1-2 period, suggesting that this was when the room was abandoned. The bench (TM6-R1-B1) in the Room 1 was built during the Early Classic Tzakol 1-2 period, which was early on in the Early Classic, and so contemporaneous with the construction of the earliest phase of Str. TM-4. Sherds recovered from within the core material of the Str. TM-6 basal platform date to the Early Classic. The limestone features to the west of Room 1 (F1 and F2) were surrounded by a sherd concentration, the latest date of which was the Terminal Classic. These sherds may have been the remnants of a termination ritual, with the deer leg covered up by the metate as some form of offering. The Terminal Classic date of the F1 and F2 sherd concentrations shows that the courtyard area had human activity even after the structures themselves were abandoned.

The Northern Room (TM-6-1<sup>st</sup>-R2) was notable for its well-preserved floor, and visible episodes of re-plastering. The floor of Room 2 had been extensively burnt, although only in patches, which suggests carefully controlled burning events. There were two main sherd concentrations present on Room 2's floor, dating to the Late Classic Tepeu 3 period. These two floor concentrations are later than those in Room 1. Unlike Room 1, Room 2 was not filled with large blocks. The comparison of ceramic dates from Room 1 and Room 2 suggests that Room 1 was taken out of use, but Room 2's use continued. Against the exterior northern wall of Room 2, sherds dating to the Terminal Classic were recovered similar to those found against Features 1 and 2

outside Room 1 – reiterating that the courtyard saw human activity during the Terminal Classic period. The North-Eastern room (Room 4) appears to have been a later addition onto the structure with a single wall course remaining in situ. This room was the smallest of the four rooms and both its entry points had been sealed. The floor assemblage was of a varied nature, and ceramically dated to the Late Classic Tepeu 2 period, although sherds stratigraphically directly above the floor dated to the Terminal Classic. The cord holder embedded in the wall in Room 3 was from a Yaxha cream-ware jar from the Late to Terminal Classic, and a broken vessel leaning against the sealed northern doorway dated to the same time period. This suggests that Room 3 was in use during the Late to Terminal Classic, and these were the latest dated sherds found at Str. TM-6

The core material from the basal platform beneath the floor of Room 3, including the material around Burials 5 and 6 contained sherds dating to the Early Classic Tzakol period. However the material recovered from beneath the surface of the bench (TM6-R3-B1) dated to the Late Classic Tepeu period, indicating that the bench was a later addition. Furthermore, the small vessel recovered from inside the olla was dated to the Late Classic Tepeu 2/3 period, therefore further refining the dating of the bench.

The basal platform beneath TM-6-1<sup>st</sup>-R3 contained the most notable finds from Str. 6: 52 individually carved shell ornaments (Fig. 155); two well preserved burials; and a large intact olla (storage vessel). Of the 52 shell ornaments, 5 were made from mother-of-pearl; 1 from cowrie; and the rest were conch. All of the conch ornaments had a single hole in the centre, presumably for attachment. A total of 14 of the conch ornaments were circular shapes of varying sizes with no other carvings; 4 were circular with carvings such as dots; 15 were star or flower shaped; 8 were of geometric shape with no further carving; 1 looked like the representation of a slice of a gourd; 2 may be anthropomorphic representations; 1 was a cross shape; 1 may represent a turtle. The single cowrie shell found as part of this assemblage was whole with a single hole drilled through it. The mother-of-pearl shells comprise 4 circular ornaments, and 1

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broken square. The ceramic disc had a hole through its centre with 2 further holes on 2 of the edges (Hammond and Guderjan 2013, 32). We did not find any evidence of shell working at Tulix Mul.

Shells are both practically and symbolically associated with water and the sea (Trubitt 2003, 244). Tulix Mul is located roughly 6 kilometres south of the Rio Hondo. The Rio Hondo was an important access point to the Caribbean Sea (Guderjan 2007, 102), where the raw material for the shell ornaments was likely to have originated. The number of the shells may also be significant as 52 was an important calendrical number for the ancient Maya people (Hammond and Guderjan 2013, 32). The glyphic representation of the work *itz* – meaning the substance of life (Dunning et al. 2006, 95) – was a flower and this symbol was often associated with shamans (Dunning et al. 2006, 96). The flower-shaped shells therefore may signify that the individual buried with the shell ornaments may have been a shaman.

Burials 5 and 6 were both female adults, and primary burials. Burial 5 was a middle-aged woman who showed both cranial and dental modification, and was buried with the shell-decorated head-dress, and an obsidian blade. Burial 6 was a remarkably well-preserved skeleton of an elderly female who had been buried within a crypt. The Burial 6 individual was buried without any grave goods, but her skull showed signs of cranial modification.

Excavations at Str. TM-6 were halted with the recovery of Burial 6 due to time and resource constraints. However we were able to excavate down to bedrock beneath the basal platform beneath Str. TM-6-R1 and Str. TM-6-R3 therefore uncovering the construction history of the standing architecture.

### ***Excavations at Structures TM-3 and TM-8***

#### **Overview**

At the southern end of the Tulix Mul courtyard group was a 20.5m long mound that abutted Structure TM-2 at its western end and Structure TM-1 at its eastern end (Fig. 112). This mound was initially mapped as one structure; however, upon excavation it was discovered that there were in fact two-buildings which shared a platform and were separated by roughly made, single-course steps consisting of compacted sascab. Work at Structures TM-3 and TM-8 began in 2012, with floor penetrations carried out the following year.



1 M

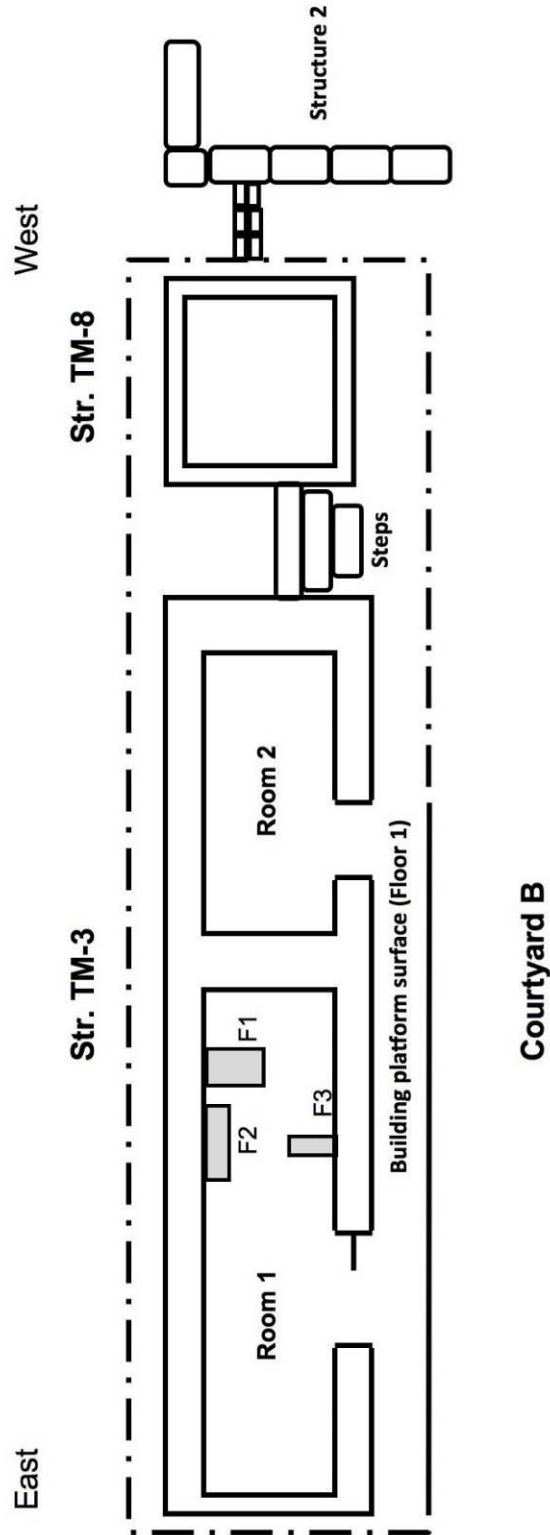


Figure 163 Plan map of Str. TM-3 and Str. TM-8

### ***Structure TM-3 Excavation***

Str. TM-3 excavations began as a 2x2m unit centred on the mound surface. There was a thin layer of humus over a 40cm-deep layer of silty loam (Lot 39) which represented post-abandonment accumulation, therefore suggesting that there was no further construction at this location beyond the standing architecture. Lot 39 ended when a degraded floor surface (Floor 1) was struck. The floor and 10cm above it were designated Lot 40, which contained sherds, lithics, an obsidian blade and a ground stone sphere. Within Lot 40 there was a concentration of animal teeth and a piece of an obsidian blade and these were designated Lot 41. We followed Floor 1 until we reached a wall face. Floor 1 did not turn up to the wall and instead continued beneath it. The excavation was expanded to follow the architecture with the aim of exposing the north side of the building. Upon doing so we found that Structure TM-3 had two rooms: an Eastern Room (Room 1) and a Western Room (Room 2) aligned along the building's transverse axis. Both rooms had doorways that faced northwards into Courtyard B (Fig. 163). Lot 78 represented the expansion of the unit to the east, and Lot 101 represented the expansion of the unit to the west. The matrices in these two lots were similar to that of Lot 39, a mixture of silty loam and humus.

#### **Str. TM-3-R1 - The Eastern Room**

Lot 125 designates artefacts collected during the clearing of the Eastern Room (Str. TM-3-R1); the context comprised a silty loam with 15% crumbled limestone representing post-abandonment accumulation. Artefacts recovered from Lot 125 included groundstone spheres (Fig. 164), a groundstone disc (Fig. 165), as well as sherds and lithic tool fragments. Lot 125 was 36cm deep and was terminated 10cm above a floor (Floor 2). The Eastern Room was cleared and measured 7.22m east-west, and 1.58m north-south.

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Figure 164 Photograph of Lot 125 groundstone, Str. TM-3



Figure 165 Photograph of Lot 125 groundstone, Str. TM-3

Lot 129 was beneath Lot 125, and represents the floor and 10cm above in the western half of Room 1. The floor in the western half of the room had been heavily burnt, although artefacts recovered from the 10cm above the floor were not burnt. Lot 129 included two reconstructable bowls, probably censers (Figs. 166 & 167).



Figure 166 Photograph of Lot 129 Terminal Classic Miseria Applique unslipped; possibly a censer, Str. TM-3



Figure 167 Photograph of Lot 129 Terminal Classic ceramic heavily burnt on inside, Str. TM-3

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The floor surface of Room 1 contained three raised features (F1, F2 and F3) as well as a deer tibia and sherds that were designated as Lot 132. It looked like a bench may have been removed after the burning event, as there was a bench-shaped area that was unburnt. This may indicate that there had been an intention to carry out further construction, however judging from the nature of the post-abandonment accumulation this does not appear to have taken place. Features 1, 2 and 3 appear to be made from compacted sascab. Feature 1 was located 43cm east of the western wall and was 48cm (east to west) by 68cm (north to south) and 11cm high. Feature 2 was located 127cm from the western wall and measured 52cm (east to west) by 96cm (north to south) and 7cm high. Feature 3 was located 119cm east of the western wall, along the south wall, and was 136cm (east to west) by 55cm (north to south) and 18cm high (see Fig. 168).



**Figure 168** Photograph of unburnt area where bench appears to have been removed, and Features 1, 2 and 3. Deer long bone just east of unburnt area. Str. TM-3

The doorway of the eastern room was cleared, and it became apparent that vertically set stones abutting the original jamb had, at some point, served to restrict the size of

## 8. Tulix Mul

the entrance (see Fig. 169). At the base of the vertically set stones, at the junction with the original door jamb, were 3 whole bifaces, and a ceramic disc surrounded by 4 pieces of charcoal (Fig. 170), with a shell, and these were designated Lot 130.



Figure 169 Photograph of Lot 130 assemblage adjacent to original door jamb, Str. TM-3



Figure 170 Photograph of Lot 130, Str. TM-3

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The eastern half of the floor of the eastern room was unburnt and ceramics recovered from this portion of the floor were designated as Lot 131. A cord holder was located in the lower interior wall face on the eastern side of the doorway (Fig. 171).



**Figure 171** Photograph of unburnt half of eastern room, also showing doorway and pot-rim-in-wall cord-holder, Str. TM-3

The 2013 excavations began in the eastern room, Room 1, with the penetration of Floor 2, and this necessitated the removal of Features 1, 2 and 3. Lot 2013b-1 represents artefacts recovered when removing Floor 2 to uncover Floor 1. Floor 2 was 15cm thick. Feature 2 proved to be entirely constructed of burnt compacted sascab, with sherd inclusions that were designated Lot 2013b-2. Lot 2013b-3 was assigned to artefacts recovered during the removal of Feature 3. Features 2 and 3 were made of compacted sascab, but unlike Feature 1 were not burnt. It is not clear what these features were.

In between Floors 1 and 2, within the Lot 2013b-1 layer, roughly corresponding to the centre of the room was a burial, Burial 23, which was assigned Lot 2013b-5. This burial

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was in a fairly poor condition and appears to have been a flexed burial facing north. The dimensions of Burial 23 were 30cm east-west, and 22.5cm north-south.

Beneath Floor 1 the matrix comprised a light grey sandy loam with 80% chert cobble fill that provided the foundation for the building platform. This layer was designated Lot 2013b-4, and included a granite groundstone fragment, a modified sherd, and a piece of an obsidian blade. At a depth of ca. 10cm beneath Floor 1, we encountered another burial - Burial 22 - assigned Lot 2013b-6. Burial 22 was in a fair condition. The individual was buried facing east, with the top of the cranium facing south (Fig. 172). The dimensions of the burial were 60cm east-west and 50cm north-south. There were no grave goods associated with Burial 22.



Figure 172 Photograph of Burial 22 cranium in situ Str. TM-3

Beneath Burial 22 layer was a degraded floor (Floor 3) which overlay chert and limestone cobble foundation material, which was assigned Lot 2013b-7. Within the



chert and limestone cobble matrix beneath Floor 3 was a burial, Burial 24 (Lot 2013b-8). The matrix around Burial 24 comprised pale yellow sand with ca. 20% pebble-sized limestone pieces and a weak red coarse sand with ca. 15% pebble sized limestone pieces. Burial 24 was partly located beneath the southern wall of Structure 3. Several foot bones were found first, followed by all six of the long bones. Continuing to the follow the remains beneath the wall, we found that the cranium was located beneath the base of the southern wall. Burial 24 was in fair condition with the top of the skull towards the west and the face pointing north. Metacarpals and phalanges lay beneath the skull, and the front of the cranium was resting against the left knee, indicating that this individual was interred on its side in a flexed position. The upper central incisors were filed into T-shapes, and the cranium showed evidence of fronto-occipital flattening. There were no grave goods associated with Burial 24.

Beneath Lots 2013b-7 and 2013b-8 the matrix comprised a thin layer of light grey silty sand with ca. 40% limestone and chert inclusions that were pebble sized. Beneath this was a layer of chert cobbles that were part of the foundation material (ballast) beneath Floor 3, and artefacts from this layer were designated as Lot 2013b-10. Lot 2013b-10 overlay a degraded plaster layer (Floor 4), likely to have been the surface of the platform upon which the earliest phases of the building were constructed. Beneath Floor 4 was a dark clayey soil, identified as the old land surface (Fig. 173), and we recovered several sherds, and a single shell bead (Fig. 174) from this context (Lot 2013b-11). The old land surface overlay bedrock (Fig. 175).

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Figure 173 Photograph of bedrock at bottom of Room 1 excavation, Str. TM-3-R1



Figure 174 Photograph of Lot 11 shell bead in situ, Str. TM-3

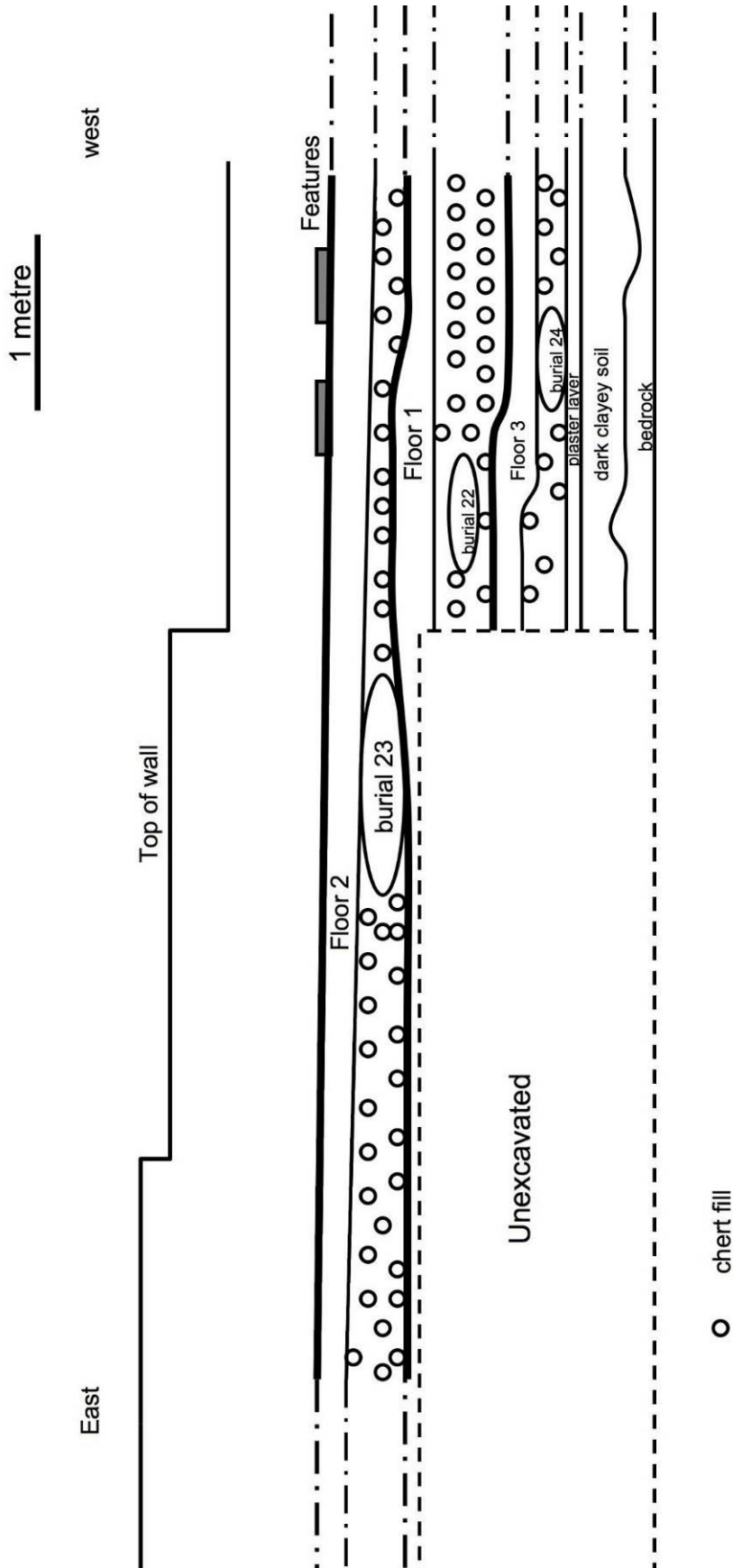


Figure 175 Section drawing of Room 1, Structure 3

### **Str. TM3-R2 - The Western Room**

Like Room 1, the fill cleared from Room 2 comprised a silty loam with around 15% crumbled limestone representing post abandonment accumulation. Floor 2 continued into Room 2 from Room 1, with the dividing wall sitting on top of Floor 2, therefore indicating that Str. TM-3 originally consisted of one room that was divided into two rooms. Floor 2 appears to have been the surface of a platform that supported the final form of the building. The floor in Room 2 contained a ceramic concentration that was designated as Lot 51.

The 2013 excavations in Room 2 began by clearing the final pieces of wall collapse from the southern side of the room, so floor penetration could begin. There were 3 sherds on the floor next to the southern wall, and these were designated Lot 2013a-1. The floor in the room (Floor 2) was removed to reveal ca. 20cm (depth) of small chert cobbles and pebbles which were the foundation materials of Floor 2. Beneath the chert cobble/pebble ballast lay the surface of another building platform (Floor 1). The Floor 1 building platform supported an earlier phase of construction. There were a few artefacts collected from in between the floors, namely 16 sherds, a chert biface fragment, and a piece of red plaster, and these were Lot 2013a-2. Beneath the surface of the platform Floor 1 were a few large limestone blocks, with chert pieces that were up to 20cm wide, mixed with coarse sand, providing a foundation for the surface above. Artefacts from this context were Lot 2013a-3, and comprised mostly sherds. Beneath the Lot 2013a-3 layer the matrix changed to a higher proportion of limestone (Lot 2013a-4), part of the core material for the platform. Lot 2013a-4 contained a sherd concentration, as well as a human phalange (Burial 7), some unidentified faunal remains, and a piece of an obsidian blade (Fig. 176).



Figure 176 Photograph of obsidian blade from Lot 2013a-4, Str. TM-3

Lot 2013a-5 represents the base of the limestone layer of Lot 2013a-4 that rested upon a degraded floor surface, Floor 3. Lot 2013a-5 was 10cm above the surface and contained a granite metate fragment and sherds. Lot 2013a-6 represents artefacts recovered from Floor 3. Floor 3 likely represents the floor of an earlier building platform (Phase 1), with the earlier building that was supported by the Floor 3 platform taken out of use by the subsequent construction of Phase 2.

Artefacts recovered from beneath Floor 3 were designated as Lot 2013a-7, and included sherds and lithic tool fragments. The Lot 2013a-7 matrix consisted of 70% mixed chert and limestone core material, with 30% light brownish grey coarse sand. Within the Lot 2013a-7 layer, in the centre-line of the room was Burial 20 (Lot 2013a-8). Burial 20 was in very poor condition, with the bones crumbling on touch. We were able to determine that the burial was an adult of indeterminate sex oriented north-south, with the head facing west. There were no grave goods associated with this person. The burial was located partly beneath the wall that separated Rooms 1 and 2 (Fig. 177), so was interred before the wall was built. There was no cut in the floor above Burial 20, so the burial was interred during the construction of the platform as

opposed to being intrusive. This suggests that Rooms 1 and 2 were a single room in Phase 1 of the construction.

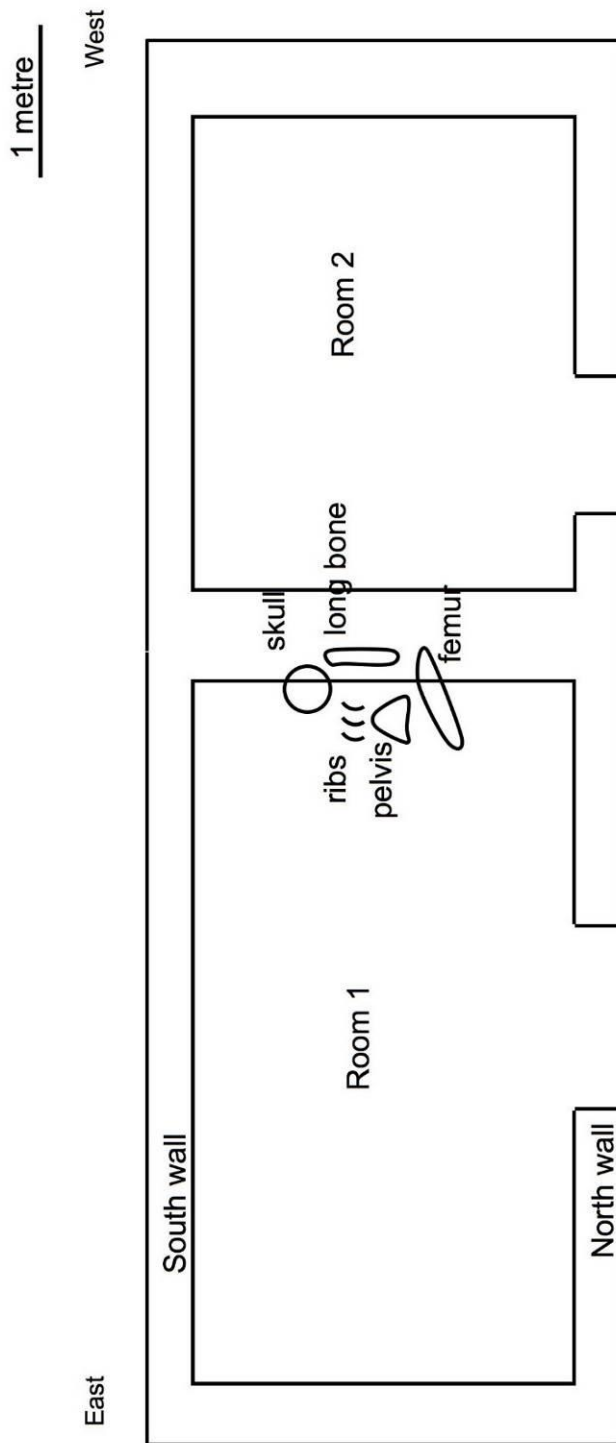


Figure 177 Schematic plan representation of Burial 20, Str. TM-3 to show its relationship with the dividing wall between Rooms 1 and 2

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The Lot 2013a-7 matrix ended at a plaster layer – the building platform surface for the earliest construction at this location. The plaster overlay a dark clayey soil (Fig. 178), deemed to be the old ground surface that in turn was on top of the natural bedrock (Fig. 179). Within this dark soil layer was a ceramic concentration totalling 621 sherds, and these were designated at Lot 2013a-9. This concentration may represent a midden used to create a surface upon which the earliest building platform was constructed (Tom Guderjan 2013, Pers. Comm.). A few sherds and a piece of obsidian were recovered from the bedrock layer, and these were designated as Lot 2013a-10.



Figure 178 Photograph of bedrock beneath Room 2, TM-3

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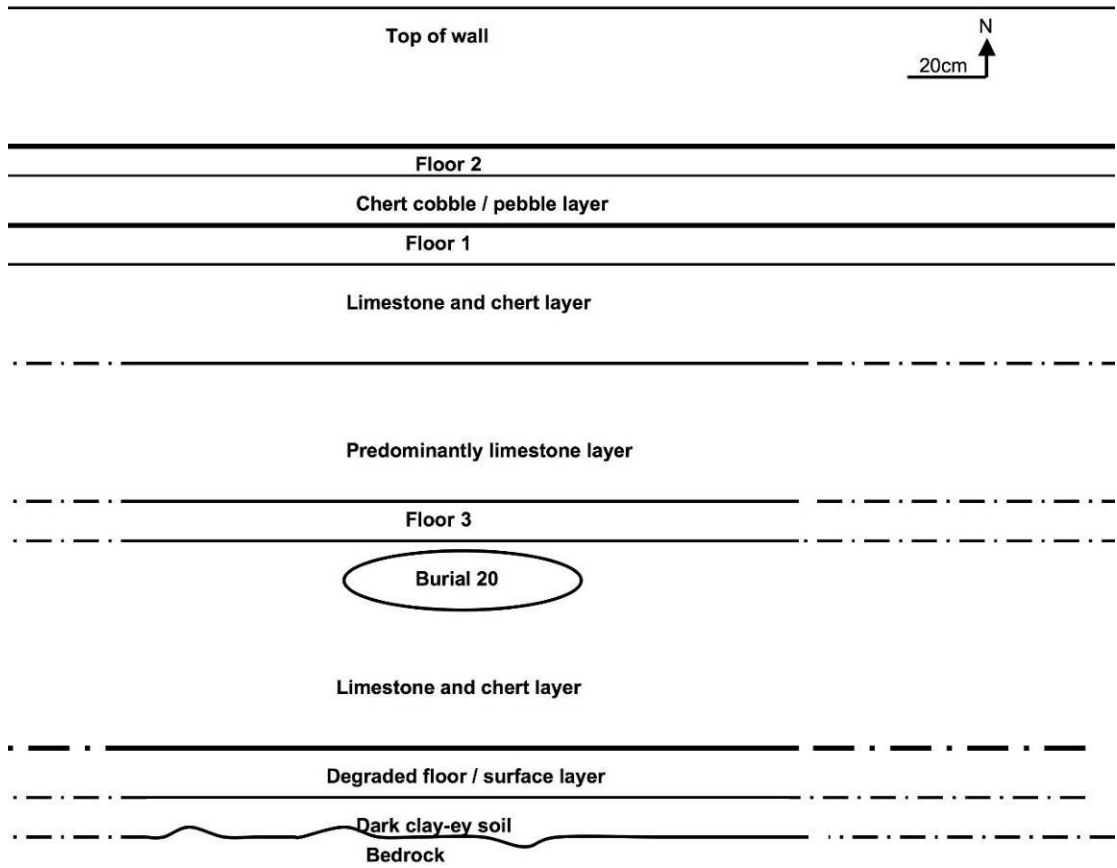


Figure 179 Section drawing of Room 2, Str. TM-3

**Artefacts:**

*Ceramics:*

Lot	Count	Weight	Date
39	50	1442g	Unknown Classic
40	136	3724g	Unknown Classic
41	33	590g	Unknown Classic
51	188	6045g	Late Classic Tepeu 2/3
72	940	22515g	Late Classic Tepeu
78	238	4002g	Late Classic Tepeu 2/3 to Terminal Classic
101	17	270g	Unknown Classic
104	77	306g	Unknown Classic
125	163	5788g	Late Classic Tepeu 1/2 and Late Classic Tepeu 2/3
126	1	244g	Late Classic Tepeu
129	206	9800g	Terminal Classic,



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			including Terminal Classic Miseria Applique censer rim
130	1	5g	Ceramic disc - Unknown Classic
131	85	2800g	Late Classic Tepeu 2/3
132	173	4045g	Late Classic Tepeu 2/3
2013a-1	3	216g	Unknown Classic
2013a-2	16	138g	Unknown Classic
2013a-3	37	354g	Early Classic Tzakol 2/3
2013a-4	31	500g	Early Classic Tzakol 2/3 and Late Classic Tepeu 1
2013a-5	92	2038g	Early Classic Tzakol 2/3 and Late Classic Tepeu 1
2013a-6	24	458g	Early Classic Tzakol 2/3
2013a-7	147	3515g	Early Classic Tzakol 2/3 and Late Classic Tepeu 1
2013a-8	23	596g	Unknown Classic
2013a-9	571	11976g	Early Classic Tzakol 2/3
2013a-10	111	950g	Unknown Classic
2013b-1	211	4140g	Early Classic 3 and Late Classic 1
2013b-2	49	900g	Unknown Classic
2013b-3	31	860g	Unknown Classic
2013b-4	238	5925g	Unknown Classic
2013b-5	2	52g	Unknown Classic
2013b-6	1	10g	Unknown Classic
2013b-7	80	1662g	Unknown Classic
2013b-8	4	92g	Unknown Classic
2013b-9	39	1500g	Unknown Classic
2013b-11	215	3855g	Unknown Classic

*Lithics:*

Lot	Count	Weight	Notes
39	2	44g	
40	6	78g	
41	n/a	n/a	
51	n/a	n/a	

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72	11	898g	
78	65	1175g	
101	2	44g	
104	n/a	n/a	
125	150	6433g	
126	n/a	n/a	
129	n/a	n/a	
130	3	666g	Whole bifaces
131	n/a	n/a	
132	n/a	n/a	
2013a-1	n/a	n/a	
2013a-2	1	320g	Broken biface
2013a-3	n/a	n/a	
2013a-4	n/a	n/a	
2013a-5	n/a	n/a	
2013a-6	n/a	n/a	
2013a-7	2	32g	
2013a-8	n/a	n/a	
2013a-9	n/a	n/a	
2013a-10	n/a	n/a	
2013b-1	4	22g	
2013b-2	n/a	n/a	
2013b-3	n/a	n/a	
2013b-4	1	150g	biface
2013b-5	n/a	n/a	
2013b-6	n/a	n/a	
2013b-7	n/a	n/a	
2013b-8	n/a	n/a	
2013b-9	n/a	n/a	
2013b-11	1	310g	Uniface tool

### *Other:*

Lot 40: Obsidian blade fragment; faunal remains; groundstone sphere

Lot 41: Faunal remains

Lot 125: Groundstone spheres x 2

Lot 132: Deer tibia

Lot 2013a-4: Obsidian blade fragment

Lot 2013a-10: Almost complete obsidian blade

Lot 2013b-4: Human remains; groundstone (metate fragments); obsidian flake

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Lot 2013b-5: Human remains

Lot 2013b-6: Human remains

Lot 2013b-7: Human remains

Lot 2013b-8: Human remains including modified teeth

Lot 2013b-11: Shell bead

### **Str. TM-3 Summary**

Excavations at Structure TM-3 revealed three distinct construction events. Phase 1 was the initial laying down of a plaster layer on top of the old land surface (and possible midden), and the construction of a chert-cored building platform, capped by Floor 3. Within the building platform, Burials 20 and 24 were interred. The building associated with this platform was razed to make way for Phase 2, as there was no sign of it in the archaeology. Phase 2 was the construction of another building platform beneath which Burial 22 was placed. The building associated with this platform must have also been razed, it is not possible to say whether the razed building was masonry or wood, although we did not find any post-holes. It is not clear whether the buildings of Phases 1 and 2 were single roomed or contained dividing walls. Phase 3 represents the final building platform (capped by Floor 2). The building atop the Phase 3 building platform consisted of two rooms, divided by a wall that sat atop Floor 2. In Room 1, Burial 23 was interred within the core material of the Floor 2 platform.

Sherds recovered from Phase 1, likely to be the old land surface, dated to the Early Classic Tzakol 2/3 period thus showing contemporaneity with the earliest levels of Structures TM-4 and TM-5. Phase 2 dated to the Late Classic Tepeu 1 period, with no datable sherds from Phase 3. However sherds recovered from the floor presumably corresponding to the time of abandonment were dated to the Late Classic Tepeu 2/3 period. Sherds recovered from the post abandonment accumulation on top of the terminal floor of Structure 3, included two partial vessels that were initially dated to the Postclassic period by the MRP ceramicist (Figs. 166 & 167) and reported on as such (Hammond 2014); however upon examining the photographs of the partial vessels, Dr

Jim Aimers of SUNY identified them as Terminal Classic censors (J. Aimers 2015, Pers. Comm.).

The earliest of the burials interred at Str. TM-3 were Burials 20 and 24. Burial 20 yielded the least information of the four skeletons recovered from Str. TM-3. Burial 20 was very poorly preserved with the bone crumbling on touch. It was clear from the size of the skeleton that Burial 20 was an adult and had been buried in a flexed position oriented north-south with no grave goods, and no burial crypt.

Burial 24 was an adult female buried in a flexed position oriented north-south, with cranial flattening and modified teeth: the upper central incisors were filed into T-shapes. The presence of linear enamel hypoplasia on the incisors and canines of Burial 24 points to an episode of ill health, or prolonged malnutrition during infancy or childhood; and her long bones showed signs of porotic hyperostosis which is indicative of iron deficiency anaemia (Hammond et al 2014, 466). There were no grave goods associated with Burial 24.

Burial 22 was associated with construction Phase 2 of Str. TM-3. Burial 22 was an adult of indeterminate sex interred in a semi-flexed position oriented north-south, facing east. There were no grave goods associated with this person.

Burial 23 was the latest burial within Str. TM-3. The remains were in fairly poor condition, but we were able to discern that this was a child of roughly 1-2 years in age. Like Burial 24, the child's skeleton showed signs of porotic hyperostosis, and the presence of periostitis on the long bones indicated long-term inflammation showing that the child had some sort of systemic disease/illness (Hammond et al 2014, 466). These two conditions together could mean that the child's infection/disease affected the absorption of iron therefore contributing to the child's anaemic condition, or perhaps the anaemia weakened the immune system meaning that the child was unable to fight the illness. There were no grave goods associated with this child.

Artefacts of note from Str. TM-3 included: a deer long bone embedded on the floor of Room 1 adjacent to where a bench once stood, but had been removed; the Postclassic vessels; obsidian blade fragments, which may represent blades that were broken during ritual use; three whole bifaces that had been placed in the corner of the doorway; and ground stone spheres that may have been used as slingshots. A single shell ornament was recovered from the lowest level of Str. TM-3, and was reminiscent of those found in Burial 5 over at Str. TM-6.

### ***Structure TM-8 Excavations***

Having defined its exterior during the 2012 field season, in 2013 excavations at Structure TM-8 began with clearing out the interior of the building. The room did not appear to have been purposefully filled. Beneath ca. 5cm of humus lay 22cm of post-abandonment accumulation comprising a fine to very fine silty loam with 15% crumbled limestone (Lot 117). Once Lot 117 was cleared, it became apparent that this was a single room. Lot 117 ended 10cm above the floor of the room. Lot 120 represents artefacts found on the floor and 10cm above it. Artefacts from Lot 120 included sherds, a chert biface, and some pieces of groundstone (granite) that may have been metate fragments.

The 2013 excavations at Str. TM-8 began with the penetration of the interior floor (Floor 1) of the room. Lot 2013-1 represented artefacts found within the floor matrix, and included small sherds. Floor 1 was well preserved and was 28cm thick. Lot 2013-2 represents chert cobble and limestone-chunk floor foundation fill supporting Floor 1, and ended when a degraded 5cm thick floor surface (Floor 2) was struck which likely represents the building platform surface. Beneath Floor 2 was chert cobble and limestone-chunk foundation material (Lot 2013-3) and within this matrix was a burial, Burial 21 (Fig. 180). Burial 21 had an almost intact ceramic vessel placed above the sacrum and there was a chert tool placed directly behind the cranium, as well as a round groundstone (limestone) disc and a piece of polychrome (Figs. 181 to 185). Burial 21 was a flexed burial oriented east-west, with the face to the west. There was

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at least one notched tooth. Burial 21 was a primary burial as evidenced by all parts, such as the vertebrae, articulated (Fig. 186) and small bones such as fingers were present and in anatomical position.

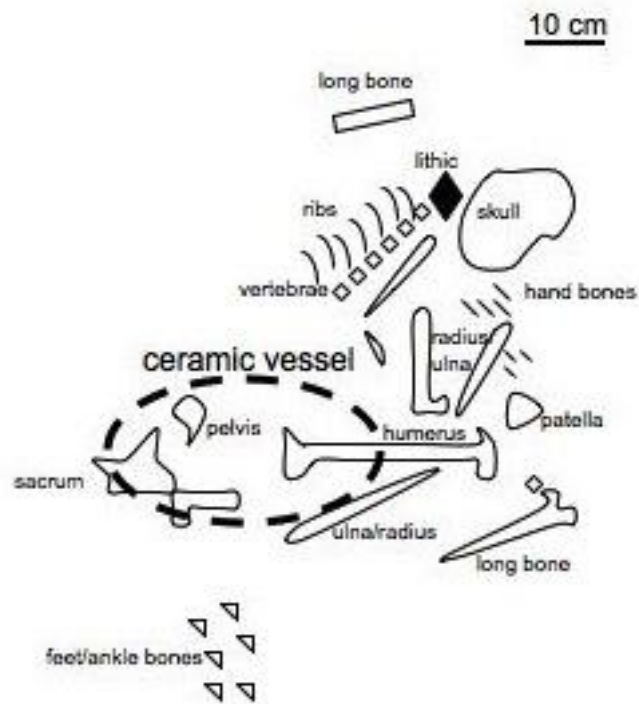


Figure 180 Plan map of Burial 21, Str. TM-8

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Figure 181 Photograph of Burial 21 ceramic vessel on top of Burial 21, Str. TM-8



Figure 182 Photograph of Burial 21 illustrating position of vessel and sacrum, Str. TM-8

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Figure 183 Photograph of vessel on top of Burial 21



Figure 184 Photograph of Burial 21, Str. TM-8



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**Figure 185** Photograph of lithic tool behind cranium of Burial 21, Str. TM-8



**Figure 186** Photograph of Burial 21 articulated vertebrae, Str. TM-8

The sub-floor fill continued beneath Burial 21 for another 25cm, and this was designated as Lot 2013-4. Lot 2013-4 ended when a degraded plaster floor (Floor 3) was encountered (Fig. 187). Floor 3 was 7cm thick, and artefacts recovered from close to its surface were designated as Lot 2013-5. Floor 3 was the lowest floor encountered

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during Str. TM-8 excavations, and represents the lower building platform and is the earliest phase of construction.



**Figure 187** Photograph of Lot 5 ceramics on top of degraded floor

Beneath Floor 3 was a ca. 60cm deep mixture of limestone and chert cobble-sized ballast that comprised the foundation material for Floor 3, and this layer was designated as Lot 2013-6. Underneath the Lot 2013-6 foundation material was a 12-20cm thick dark soil (Lot 2013-7), judged to be the old land surface, which in turn overlay bedrock (Fig. 188).

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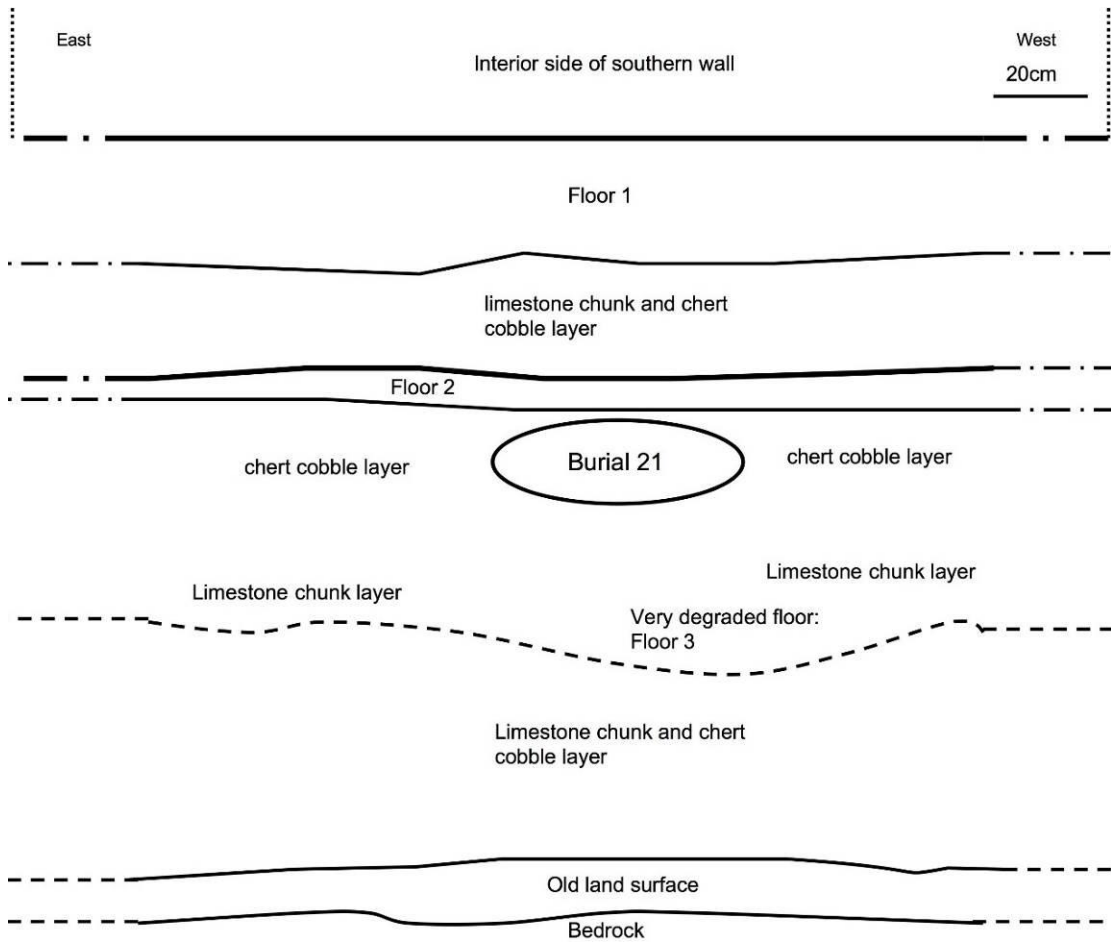


Figure 188 Section drawing of south profile of Str. TM-8

**Artefacts:**

*Ceramics:*

Lot	Count	Weight	Date
117	344	1746g	Late Classic Tepeu 2/3 and Terminal Classic
120	47	457g	Unknown Classic
2013-1	114	1270g	Early Classic Tzakol 2/3
2013-2	71	2540g	Unknown Classic
2013-3	21	250g	Early Classic Tzakol 1-3 including whole pot from burial 21

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2013-4	86	1090g	Terminal Late Preclassic to Early Classic 3
2013-5	88	1882	Early Classic Tzakol 2/3
2013-6	178	2200	Early Classic Tzakol 1-3
2013-7	72	650g	Unknown Classic

*Lithics:*

Lot	Count	Weight	Notes
117	19	1576g	
120	1	250g	Whole biface
2013-1	1	24g	Chert tool fragment
2013-2	1	4g	Chert tool fragment
2013-3	4	120g	Lot includes chert tool from behind cranium of Burial 21
2013-4	3	252g	
2013-5	n/a	n/a	
2013-6	3	34g	
2013-7	n/a	n/a	

*Other:*

Lot 117: Granite metate fragments

Lot 120: Granite metate fragments

Lot 2013-2: Obsidian blade tip

Lot 2013-3: Granite mano fragment from Burial 21; Burial 21 human remains

Lot 2013-4: Modified ceramic disc with perforation

### **Str. TM-8 Summary**

Excavations at Str. TM- 8 revealed that its final form was a single-room building measuring 3.5m east-west, and 2.5m north-south. There was no discernible doorway or entrance. There were three construction phases associated with this building that correlate to the same construction phases as Str. TM-3 therefore indicating that the two structures shared building platforms throughout their history. The earliest, Phase 1, was a layer of cobble- to boulder-sized chert and limestone on top of the old land surface that formed the foundation core material for the platform capped by Floor 3. There was no remaining evidence of the building associated with this platform, indicating that it must have been razed to make way for the next phase. Phase 2 was the construction of a layer above Floor 3 comprising chert and limestone, cobble- to boulder-sized, providing a foundation for a platform capped by Floor 2. Within the Phase 2 platform, Burial 21 was interred. Phase 3 was the final floor layer (Floor 1) that capped a platform that overlay core foundation fill comprising chert and limestone.

Sherds recovered from the terminal floor's surface dated to the Late Classic Tepeu 2/3 period suggesting that this room was abandoned then. Phase 2 sherds date to the Early Classic Tzakol 3 period, and Phase 1 sherds date to the Early Classic Tzakol period generally. As Phase 2 was dated to the Early Classic Tzakol 3 period, Phase 1 would not be earlier than that.

Burial 21 was a primary burial of an adult female, oriented east-west, with her face to the west. She was buried with an intact Balanza Black (Early Classic) vessel placed above her sacral area, and an upright chert tool directly behind her cranium.

It is not clear what the purpose of Str.TM-8 was. Judging by its size, and some of the artefacts found on its floor (metate fragments and lithic tools), it may have been a storage area.

## Excavations at Structure TM-2

### Overview:

Structure TM-2 was the second largest structure in the Tulix Mul courtyard group. It is located on the west side of Courtyard B. Our initial interest in this structure was simply to establish its chronology. To this end during the 2012 field season a test excavation unit was placed in the centre of this structure. Due to the types of artefacts present during the test excavations, a larger-scale excavation was implemented in 2013 to investigate the construction history and function of this building. There were five distinct sub-operations carried out in 2013, Sub-Operations A-E (Fig. 189)

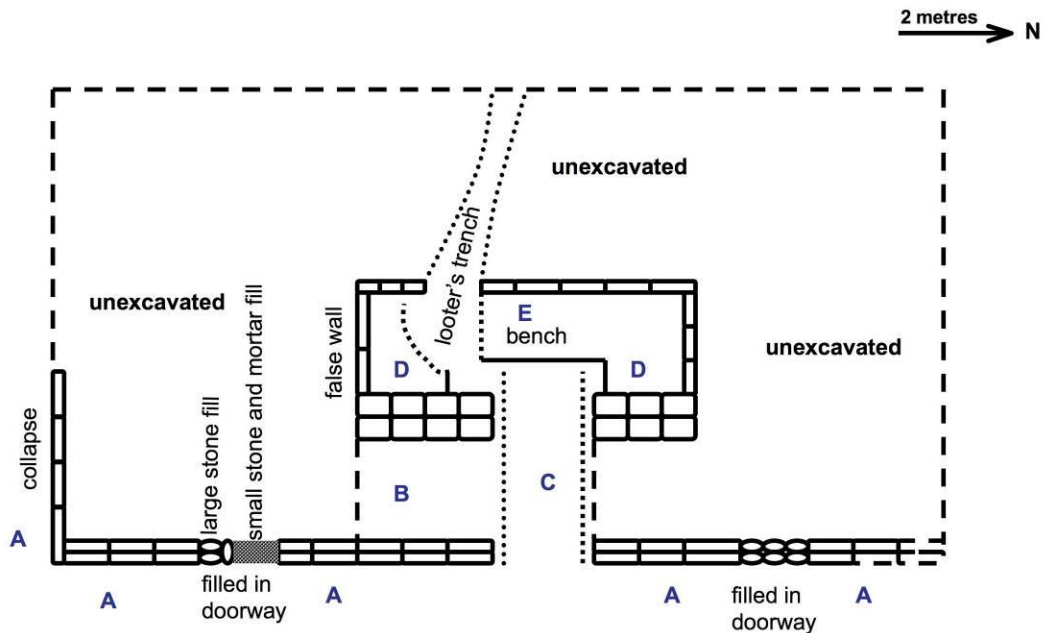


Figure 189 Schematic plan map of Str. TM-2 with locations of Sub-Operations A-E noted in blue letters

### Sub Operation A Excavations & 2012 Test Unit

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A 2x2m excavation unit was placed on the transverse axis of the mound at its base. Lot 36 represents artefacts collected from beneath the ca. 5cm humus to the beginning of a collapse layer. The collapse was ca. 1m deep and artefacts recovered from this context were designated as Lot 2012-37. The collapse layer overlay a well-preserved floor (Floor 1), and items recovered from the surface of Floor 1, including an obsidian blade, were recorded as Lot 2012-75. The unit was expanded to the north and south until we reached two stone faces on either side that constituted the entrance into the structure (Fig. 190). Artefacts recovered from the collapse layer during the expansion of the unit were Lot 2012-73, and included another obsidian piece. We then expanded the excavation to the west, following Floor 1 into the interior of the structure. There were pieces of red-painted plaster lying close to the floor (Fig. 191), and these were collected under the designation Lot 2012-97. Other artefacts recovered during the western expansion of the excavation were designated as Lot 2012-100. The painted plaster pieces were dark red (Munsell 5R 3/6), and had micaceous inclusions. There were also orange-hued pieces (Munsell 2.5YR 4/8). As we followed the floor further to the west, we were able to observe that there were two floor layers, the already revealed Floor 1, and a second floor, Floor 2 that overlay Floor 1. Floor 2 was of a red hue (Fig. 192), and artefacts recovered from on top of Floor 2 became Lot 2012-103. There was only a small section of Floor 2 remaining.

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Figure 190 Photograph of Str. TM-2 Collapse in doorway



Figure 191 Photograph of Str. TM-2, Painted plaster, Room 1





Figure 192 Photograph of Red floor (Floor 2), Str. TM-2

The painted plaster pieces hinted that the interior walls of the structure were repainted; therefore excavations were put on hold until the following field season (2013) when more time and resources could be committed to investigate Str. TM-2. The main purpose of the 2013 Sub Operation A excavation was to determine the dimensions of the Str. TM-2 building/superstructure.

Lot 1 represented artefacts recovered when cleaning up Floor 1 of debris that had fallen during the preceding year, including more pieces of the red- and orange-painted plaster. We then moved to the exterior of the structure to work towards defining the eastern exterior wall.

To the north of the entrance, the humic layer, 10cm in depth, was very fine, very dark greyish brown (2.5y 3/2) with 60% crumbled pieces of limestone. Lot 2, 9cm in depth, lay directly beneath the humus, south of the entrance. It consisted of 30% medium to

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very coarse sediment, and 70% crumbled limestone, and represented post-abandonment accumulation and erosion.

Directly beneath Lot 2 the matrix changed to 100% limestone – large pieces of plaster and soft, very fine, reddish-grey (2.5yr 7/1) sandy silt--designated Lot 5. Lot 5 was 40cm deep, and overlay a layer of 95% limestone chunks interspersed with eroded limestone plaster (Lot 8). Directly beneath Lot 8 was a floor (Floor 2). Artefacts from Floor 2 and 20cm above it were designated Lot 9.

The humus to the south of the doorway consisted of very fine to fine sediment which was dark reddish grey (5yr 4/2) with 20% inclusions of small roots and fragments of limestone. Beneath the humus was a 50cm layer of 70% eroded limestone (Lot 3), likely to have come from building material, with 30% very fine to very coarse dusky red (2.5yr 4/3) silt. Beneath the Lot 3 layer, was an 18cm-deep matrix comprising 90% limestone sand, representing eroded building material (Lot 4); a piece of a granite metate (Fig. 193) was recovered from this context.

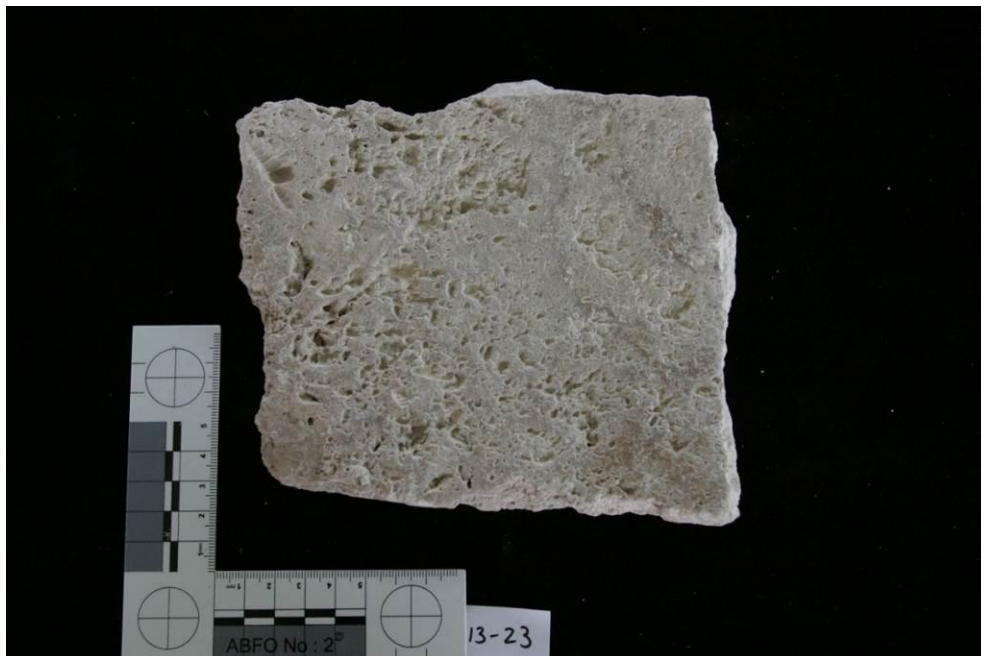


Figure 193 Photograph of metate fragment from Lot 4, Str. TM-2

Directly beneath Lot 4 was a layer of collapse comprising large blocks which likely represented roof stones (Fig. 194); the collapse and artefacts recovered from the

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collapse were designated Lot 7. Within Lot 7 were 2 mano fragments: 1 quartz crystalline and 1 granite, along with a grinding stone (Fig. 195).



Figure 194 Photograph of Str. TM-2, Lot 7 collapse, east side of superstructure



Figure 195 Photograph of groundstone from Lot 7, Str. TM-2

Directly beneath the collapse layer, we uncovered a floor (Floor 3). Floor 3 represented the surface of the basal platform underlying Str. TM-2; Lot 9 represented artefacts recovered during the clearing of the floor to the south of the entrance; Lot 10 represented artefacts (including two obsidian blades) recovered during the floor clearance to the north of the entrance way; and Lot 12 represented the expansion of the excavation opposite the entrance way to give us more room to work (Fig. 196).



Figure 196 Photograph of floor outside Str. TM-2 showing the position of Lots 9, 10 and 12 facing south

At the southern end of Str. TM-2 we encountered a wall connecting Str. TM-2 to Str. TM-8 (west of Str. TM-2). At the northern end, on the same side, we encountered the face of a platform (Str. TM-7) running perpendicular to Str. TM-2 (Fig. 197). The face of

the platform on its south side was in good shape, but it had collapsed on the north so we could not determine its dimensions. This platform was a later construction than Str. TM- 2, as the exterior eastern wall of Structure 2 continued beyond the abutting wall. We cleared the top of the wall in order to see how thick it was, and Lot 14 and Lot 15 represent artefacts recovered during this exercise. We did not excavate this platform, but it is an area for potential future research. We cleared the face of the platform down to the level of Floor 3, and artefacts recovered from this endeavour were designated Lot 18, with the exception of a broken granite mano and metate found against the abutting wall on Floor 3 (Lot 17) (Fig. 198).

The eastern exterior wall of Str. TM-2 contained three doorways. The middle entrance was 2m wide. There were two sealed doorways to the north and south of the middle entrance. The northern doorway was filled with uniform pieces of cut limestone, and the southern doorway was half filled with uniform pieces of cut limestone, and half filled with smaller limestone pieces and mortar. It is unclear why these doorways were filled in different manners, or whether the two sealing events were contemporaneous. The sealing of the doorway does seem to suggest a later construction phase - however there is no surviving evidence of any further construction at the Str. TM-2 location.



Figure 197 Photograph of the face of the platform perpendicular to, and abutting, the north end of Str. TM-2 with Lot 17 mano and metate in situ

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Figure 198 Photograph of Lot 17 mano and metate, Str. TM-2

We then turned to establishing the limits of the southern wall of the Str. TM-2 by following the eastern wall to its end point, and we were able to find the southern wall. Lot 34 represents the clearing of the humus and surface soil to reveal the top of the southern wall. A whole chert biface was recovered from this context (Fig. 199).



Figure 199 Photograph of Lot 34 whole chert biface, Str. TM-2

Having delineated the exterior dimensions of Str. TM- 2, our next goal was to investigate the interior of the building. To complete Sub Operation A we cleared the

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floor (Floor 1) around the entrance. In the process we discovered a circular lump/feature in the floor that had been plastered (Fig. 200). The plaster was removed and the feature was found to be made of compacted sascab, with sherd inclusions (Lot 13). It is not clear what this feature represented; it may be a haphazard floor repair, or a filled in post-hole from a later phase. The clearance of Room 1 ended with the discovery of a second room (Room 2) that was spanned by a bench with a burnt square patch on its vertical face (see Sub Operation D).



Figure 200 Photograph of limestone feature on Floor 1, Str. TM-2

### Sub Operation A Artefacts:

Lot	Count	Weight	Date
2012-36	32	522g	Unknown Classic
2012-37	181	2162g	Unknown Classic
2012-38	1	10g	Unknown Classic
2012-73	22	246g	Unknown Classic
2012-75	79	1568g	Early Classic Tzakol 1-3
2012-97	3	569g	Unknown Classic
2012-100	14	76g	Unknown Classic
2012-103	n/a	n/a	n/a
1	n/a	n/a	n/a
2	3	62g	Unknown Classic



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3	6	544g	Unknown Classic
4	3	33g	Unknown Classic
5	4	26g	Unknown Classic
6	n/a	n/a	n/a
7	79	400g	Late Classic Tepeu 1-3
8	61	300g	Unknown Classic
9	49	300g	Unknown Classic
10	185	350g	Early Classic Tzakol 1-3
11	13	350g	Unknown Classic
12	3	24	Unknown Classic
13	n/a	n/a	n/a
14	11	216g	Unknown Classic
15	5	138g	Unknown Classic
16	21	300g	Early Classic Tzakol 1-3
17	n/a	n/a	n/a
18	13	180g	Unknown Classic
19	7	236g	Unknown Classic
34	49	2062g	Late Classic Tepeu 2/3
47	7	62g	Unknown Classic
49	23	450g	Early Classic Tzakol 2/3

Lithics:

Lot	Count	Weight	Notes
2012-36	4	56g	
2012-37	2	6g	
2012-38	1	1g	
2012-73	1	14g	
2012-75	2	204g	
2012-97	n/a	n/a	
2012-100	n/a	n/a	
2012-103	n/a	n/a	
6	n/a	n/a	
7	4	144g	
8	4	94g	
9	1	24g	
10	27	302g	
11	n/a	n/a	
12	n/a	n/a	
13	n/a	n/a	
14	2	42g	

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15	1	14g	
16	n/a	n/a	
17	n/a	n/a	
18	n/a	n/a	
19	n/a	n/a	
34	1	240g	Whole biface
47	7	62g	Unknown Classic
49			

Other:

Lot 1: painted plaster sample

Lot 4: limestone metate fragment

Lot 5: granite metate fragment

Lot 7: Grinding stone fragment; mano fragment (granite); mano fragment (quartz crystalline)

Lot 8: Faunal remains (10g)

Lot 10: 2 obsidian blade fragments; 1 quartz/citrine chert sphere

Lot 16: Distal end of an obsidian blade

Lot 17: Granite metate fragment, with limestone mano fragment

Lot 34: Faunal remains (12g)

Lot 47: Faunal remains (44g)

### **Sub Operation A and 2012 Excavation Summary**

The micaceous plaster recovered during the 2012 test excavations provided the impetus for more extensive investigation of Str. TM-2, and so the primary goal of 2013 Sub Operation A was to delineate the exterior of Str. TM-2. Having done so, the dimensions of the structure were found to be 22m N-S, and 12m E-W, with three entrances, two of them sealed, presumably in preparation for an overlying construction – which did not survive in the archaeological record.

Ceramics embedded in Floor 1 in the interior of the structure were dated to the Early Classic Tzakol 1-3 period. The collapse exterior to the structure contained sherds with

the latest date of Late Classic Tepeu 2/3, as well as granite mano and metate pieces, quartz mano fragments, as well as a grinding stone and a whole biface – all items associated with domestic activities. The presence of the Late Classic Tepeu 2/3 ceramics mixed with the domestic-type artefacts suggests that Str. TM-2 was still inhabited during this period despite the Early Classic floor assemblages. There was likely a later building phase at Str. TM-2 judging from the sealed doorways (which would have likely been preparation for another building phase) however there was no remaining evidence of such left in the archaeological record.

### **Sub Operation B Excavations**

Having delineated the exterior of Str. TM-2 during the Sub Operation A excavation, our attention turned to the interior of the building. Directly through the middle (non-sealed) entrance lay a room (Str. TM-2-R1) to the south. Sub Operation B was directly implemented to clear Room 1 and to see if there was an intact painted wall, as pieces of the painted plaster recovered during the 2012 field season were associated with the location of Room 1, and to also try to determine when the room was used.

The excavation strategy for clearing Str. TM-2-R1 was to excavate horizontally in arbitrary 50cm lots, unless the archaeology necessitated specific lot changes.

Lot 20 represented the humic layer over Str. TM-2-R1. The excavation here started out as a 1x1m unit, and was expanded to follow the shape of the room. The humus was a dark reddish grey (5yr 4/2) silty clay, with 30% fine- to medium-sized roots; it ranged from 4cm to 70cm in depth. Lot 23 designated the level directly beneath the humic layer, and was made up of grey (5yr 6/1) very fine to very coarse silty sand, with 40% softball-sized lumps of plaster and limestone. Lot 23 ended when we encountered a layer composed of mostly large limestone blocks. Lot 24 was the first lot of the 50cm arbitrary lots. Lot 25 was the next 50cm down, and contained 79 sherds, including some rims. Lot 26 was the next arbitrary layer, directly underneath Lot 25, and comprised limestone blocks, and light grey (5yr 7/1) very fine to very coarse silty sand.

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Lot 27 represents a small plaster surface within Lot 26. On this plaster layer were some deer bones, including teeth, a mandible, a long bone and some vertebrae. There were limestone blocks balanced around the deer remains in what was a crude crypt-like shape (Fig. 201). This appears to have been done on purpose, as the deer bones only appeared within this context.



Figure 201 Photograph of 'crypt' containing deer bones Str. TM-2, Room 1

Lot 28, beneath Lot 27, was a distinct 10-15cm deep layer of chert ballast pieces that measured 5-20cm in diameter with white (10yr 8/1) very fine to very coarse silty sand. Lot 29, beneath Lot 28, was the continuation of the large limestone blocks – 70% limestone blocks – 40% of these were large roof stones. These large roof stones did not appear to be collapse as they were placed quite evenly, therefore suggesting the room was purposefully filled. The rest of the Lot 29 matrix was made up of very fine to very coarse white (7.5r 8/1) silty sand. Having cleared this layer, we uncovered another pot-rim-in-the-wall cord holder (Fig. 202), similar to those found at Structures 3, 4 and 6. In addition, the lot (Lot 29) contained a sherd with a painted glyph (Fig. 203). Within Lot 28 was a ceramic concentration, and this was designated as Lot 33.

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Figure 202 Photograph of cord holder, Str. TM- 2, Room 1



Figure 203 Photograph of sherd with glyph band from Lot 29, Str. TM-2

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Beneath Lots 28 and 29, the floor of Str. TM-2-R1 was cleared. Artefacts from the floor within the room and 20cm above it were designated as Lot 30, and a ceramic concentration within this context was designated as Lot 33. The floor inside Room 1 had red patches (Fig. 204), and it is likely that the entire floor was originally red. There were two limestone blocks sitting on the floor of Str. TM-2-R1 (Fig. 205), their purpose unknown. Additionally on the floor were pieces of painted plaster (Lot 31) (Fig. 206) which may have come from the inner west wall, which also had a few painted spots left on it. The plaster was red and orange. The floor displayed areas that had been burnt (Fig. 207); however the whole floor wasn't charred, so these burnt areas represent discrete events.



Figure 204 Photograph of Room 1 floor, showing red areas, Str. TM-2

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Figure 205 Photograph of Lot 30 limestone blocks, Str. TM-2



Figure 206 Photograph of wall plaster fragments from Room 1, Str. TM-2



Figure 207 Photograph of example of burning on floor along wall of Room 1, Str. TM-2

We excavated around half of the length of Str. TM-2-R1. I decided not to go any further because the main reason for excavating Str. TM-2-R1 was to establish when it had been filled, and whether a painted wall was present. The room appeared to continue along the length of the southern wall.

**Sub Operation B Artefacts:**

Lot	Count	Weight	Date
20	n/a	n/a	n/a
23	n/a	n/a	n/a
24	n/a	n/a	n/a
25	79	1500g	Late Classic Tepeu 1-3
26	167	2902g	Late Classic Tepeu 1-3
27	102	950g	Early Classic Tzakol 1-3
28	21	288g	Unknown Classic



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29	3	62g	Including Late Classic Tepeu 1 sherd with pseudo-glyph
30	98	1300g	Unknown Classic
31	n/a	n/a	n/a
32	13	170g	Unknown Classic
33	65	2100g	Late Classic Tepeu 1-3

### Lithics:

Lot	Count	Weight	Notes
20	n/a	n/a	
23	1	30g	Biface fragment
24	n/a	n/a	
25	n/a	n/a	
26	n/a	n/a	
27	n/a	n/a	
28	n/a	n/a	
29	n/a	n/a	
30	n/a	n/a	
31	n/a	n/a	
32	n/a	n/a	
33	n/a	n/a	

### Other:

Lot 29: Painted plaster sample

Lot 31: Painted plaster sample

## Sub Operation B Summary

Str. TM-2-R1 appears to have been purposefully filled rather than having been subject to post-abandonment accumulation. The nature of the room fill – large limestone blocks, then a clear layer of smaller chert ballast, then more large limestone blocks – does not conform to a typical pattern of collapse. Secondly, the odd placement of deer bones on a layer of plaster surrounded by limestone blocks is not something that could occur naturally during the post abandonment accumulation of collapsed material.

Artefacts recovered from throughout the fill of the room date to the Late Classic Tepeu period generally; therefore the room could have been filled at any point during the Late Classic. The purpose of the placement of the deer burial within the fill remains a mystery, but may represent some kind of ritual activity, especially because sherds found associated with the bones date to the Early Classic Tzakol 1-3 period, rather than the Late Classic Tepeu period as seen throughout the rest of the room fill. The painted plaster found near the floor level is likely to have fallen off or have been removed from the wall of Room 1 before it was filled.

A photograph of the sherd with the glyph band (Fig. 203) was examined by Dr. Christophe Helmke of the University of Copenhagen who wrote the following to me: '[it] clearly represents a pseudoglyphic segment. Here this sequence is meant to give the impression of a viable PSS. The main sign of the glyph in question blends two different signs together. One is the logogram for 'stone' **TUN**, here represented by the diagnostic elements of the so-called grapes in the central and upper portion of the glyph. The remainder of the glyph, both in terms of form, outline and the dotted scrolls on either side, derive from the main sign of the logogram **NAB** or **NABAL**, which is most often used to record the name of a particular place involving an aguada or reservoir. However, the segment *nahb(al)* also occurs as part of somewhat rare title that is tied to the Tikal dynasty. So this may give some clues as to the original source of inspiration that was used to create this pseudoglyph.' (Christophe Helmke 2015, Pers. Comm.).

### **Sub Operation C Excavations**

The goal of Sub Operation C was to determine whether there was a cache along the primary axis of Str. TM-2, and to gain chronological information on the earliest construction levels. To this end, a centre-line trench was laid out with the aim to excavate the building down to bedrock. The excavation was begun at the main entrance/doorway, before expanding into the interior of Str. TM-2.

Sub Operation C began with a 1x1m unit in the doorway. Directly beneath Floor 1 was a layer of chert pebble- to cobble-sized floor ballast, and artefacts collected from this context were designated Lot 36. The ballast was ca. 10cm thick, and overlay another floor, Floor 3 - the surface of the building platform (Platform 1). The 1x1m unit was expanded to expose more of Floor 3, and artefacts collected from on top of Floor 3 were designated as Lot 37. We penetrated Floor 3, and just beneath the floor were the fragments of two plates and a bowl, along with a whole obsidian blade (Figs. 208 & 209). These items were designated Lot 38, and were interpreted as representing a cache.

Beneath the cache was a ca. 10cm layer of chert ballast that overlay a burial, Burial 19 (Lot 39). Burial 19 was nestled among the chert cobbles that formed the core of the building platform. The burial's dimensions were 100cm north-south, and 60cm east-west. The interred individual appeared to be facing west in a semi-flexed position, and judging by the skeletal elements present was likely a primary burial. Sherds were recovered from the area around the burial; however there were no specific grave goods associated with Burial 19. Beneath Burial 19, the chert core material continued for another 10cm, and ended at a degraded floor surface (Floor 4), interpreted as the surface of a lower building platform (Platform 2). Beneath Floor 4 was the core of the supporting platform, a 60cm-deep layer of chert cobbles (Lot 35) which overlay a large piece of cut chert that in turn rested on bedrock. A few sherds were recovered from the bedrock level, including a piece of what may have been a figurine (Fig. 210), and these were designated as Lot 53.

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Figure 208 Photograph of cache ceramics and obsidian in situ, Str. TM-2



Figure 209 Photograph of Cache bowl & plate fragments, and obsidian blade from Str. TM-2



Figure 210 Photograph of Ceramic object from lot 53, Str. TM-2 (photo by William T Brown)

Once the doorway excavations had reached bedrock, the centre-line trench was expanded to capture the construction through the centre of Str. TM- 2 up to the bench in Room 2.

We removed Floors 1 (5cm thick) and 2 (10cm thick) to reveal the building platform surface, Floor 3 (8cm thick) and found that Floor 3 was well preserved on the east and west, but highly degraded in the middle section of the passage. The extreme west section of Floor 3 was coloured red, and displayed a linear cut mark (Fig. 211).

Directly beneath the western end of Floor 3, we uncovered an earlier phase of Str. TM-2 (Fig. 212). This was a small building platform (Platform 3) with what appeared to be a step in front of it. Both platform and step rested on a surface (Floor 4) that we interpreted as being the basal platform for this early phase. Items recovered during the removal of Floor 3 were designated as Lot 43, and included two obsidian blade fragments (Fig. 213).

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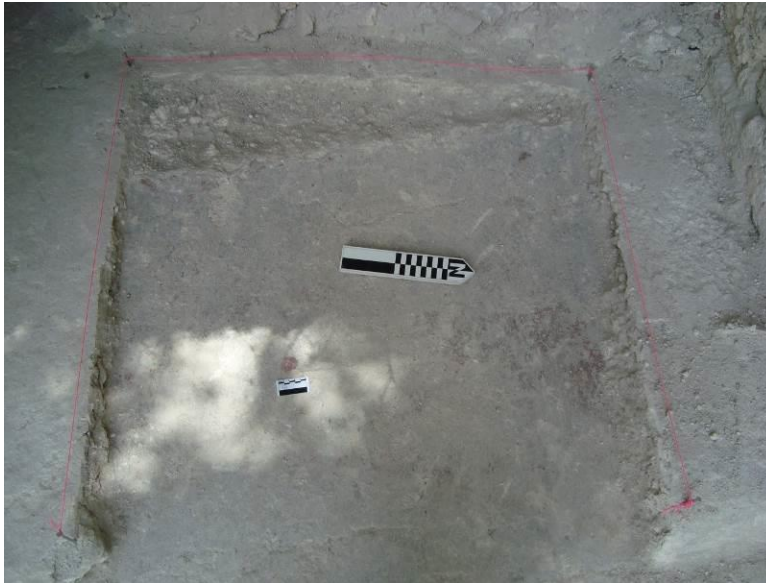


Figure 211 Photograph of Floor 3 with red paint, and linear cut in floor, Str. TM-2



Figure 212 Photograph of earlier phase beneath Floor 3 (Platform 3), Str. TM-2

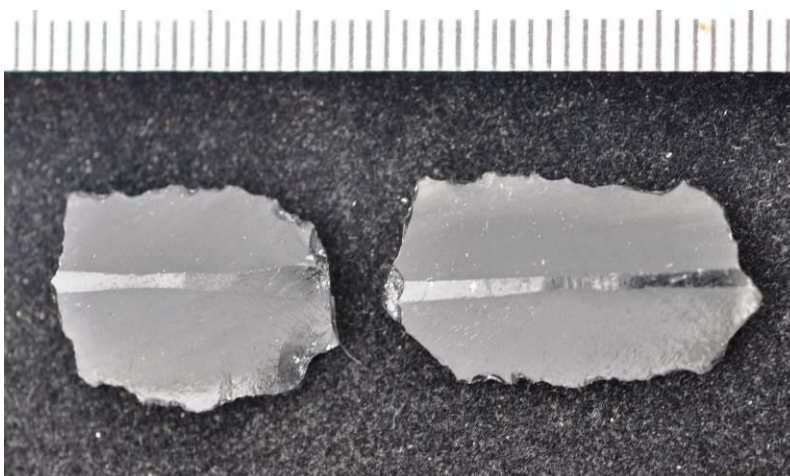


Figure 213 Photograph of Lot 43 obsidian.

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Artefacts from directly on top of Platform 3 were designated Lot 45. Platform 3 was oriented directly north, in contrast to the outer walls of Structure 2 (Sub Operation B) that were oriented at 20 degrees. Lot 46 represents a carbon sample from the stepped area in front of Platform 3. We then removed Platform 3 within the centre-line trench to expose Floor 4. Platform 3 was filled with small chert cobbles, with some large limestone blocks that rested on Floor 4, and artefacts collected from this context were designated Lot 51.

Floor 4 overlay a densely packed soil matrix with a concentrated artefact deposit (Figs. 214 & 215). The soil matrix was a very fine to very coarse grey (2.5y 6/1) clayey sand with burnt limestone. Artefacts from this context were designated as Lot 52. There were 2,809 sherds, including polychromes, and 20 lithic tool flakes. Also in Lot 52 was a bone bead, some bone fragments, obsidian, a mother of pearl shell with two holes drilled in it, groundstone objects, worked ceramic, and a biface (Figs. 216 to 232). Lot 52 was 120cm deep and ended at bedrock. Within Lot 52 was a concentration of large sherds that were designated Lot 55 (Figs. 233 & 234). The Lot 52/55 layer may have been a midden judging from the type and concentration of artefacts. There was a single course of cut limestone on both the east and west sides of the potential midden and these courses appear to have been put in place to stabilise the midden so it could become part of a solid foundation for the western portion of Floor 4.



Figure 214 Photograph of Lot 52 matrix, Str. TM-2



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Figure 215 Photograph of Lot 52, Str. TM-2



Figure 216 Photograph of Lot 52 polychrome in situ, Str. TM-2

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Figure 217 Photograph of Lot 52 polychrome, Str. TM-2

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Figure 218 Photograph of Lot 52 ceramics, Str. TM-2



Figure 219 Photograph of Lot 52 polychrome sherds, Str. TM-2

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Figure 220 Photograph of Lot 52 biface in situ, Str. TM-2



Figure 221 Photograph of Lot 52 bone bead, Str. TM-2



Figure 222 Photograph of Lot 52 polychrome sherds, Str. TM-2



Figure 223 Photographs of shell object from Lot 52, Str. TM-2



Figure 224 Photograph of ceramic object from Lot 52, Str. TM-2

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Figure 225 Photograph of worked bone from Lot 52, Str. TM-2



Figure 226 Photograph of bone bead from Lot 52, Str. TM-2



Figure 227 Photograph of worked sherds from Lot 52, Str. TM-2 (photo by William T Brown)

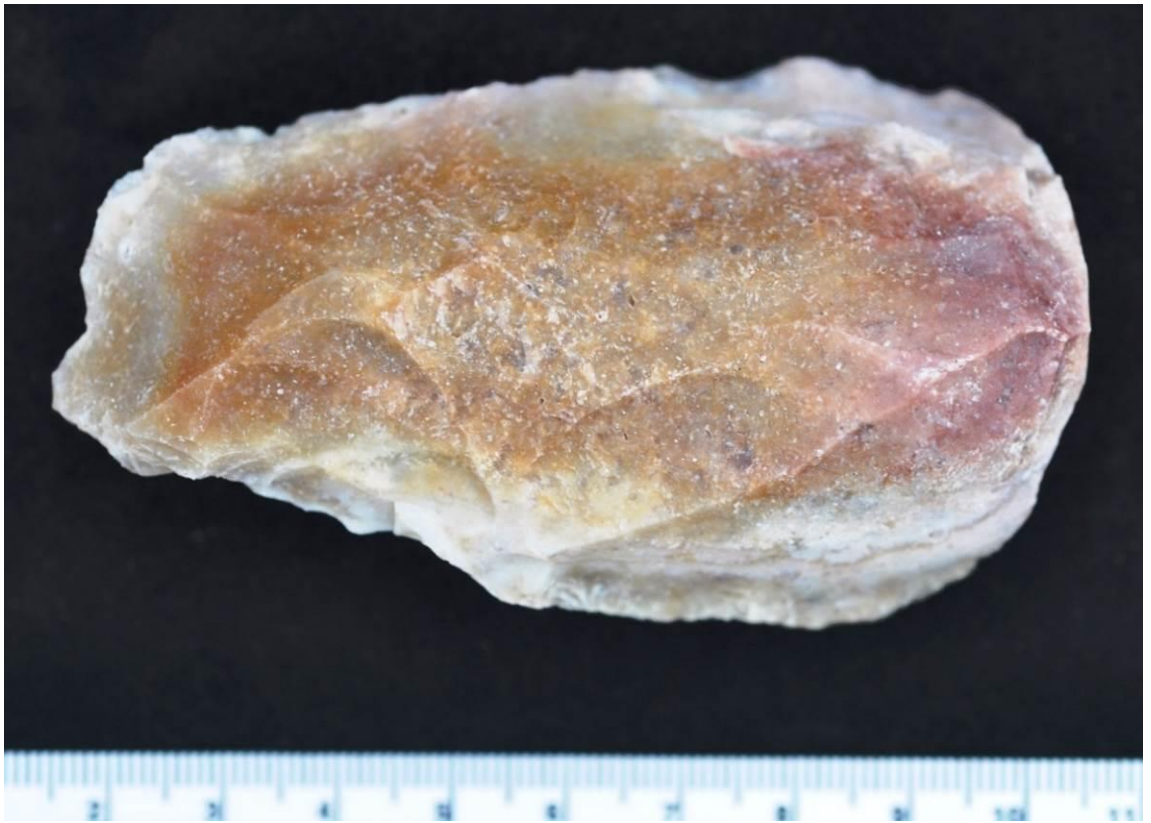


Figure 228 Photograph of chert biface from Lot 52, Str. TM-2





Figure 229 Photograph of groundstone from Lot 52, Str. TM-2

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Figure 230 Photograph of chert biface from Lot 52, Str. TM-2 (photo by William T Brown)



Figure 231 Photograph of chert biface from Lot 52, Str. TM-2 (Photo by William T Brown)



Figure 232 Photograph of obsidian blade from Lot 52, Str. TM-2 (Photo by William T Brown)



Figure 233 Photograph of Lot 55 ceramics in situ, Str. TM-2

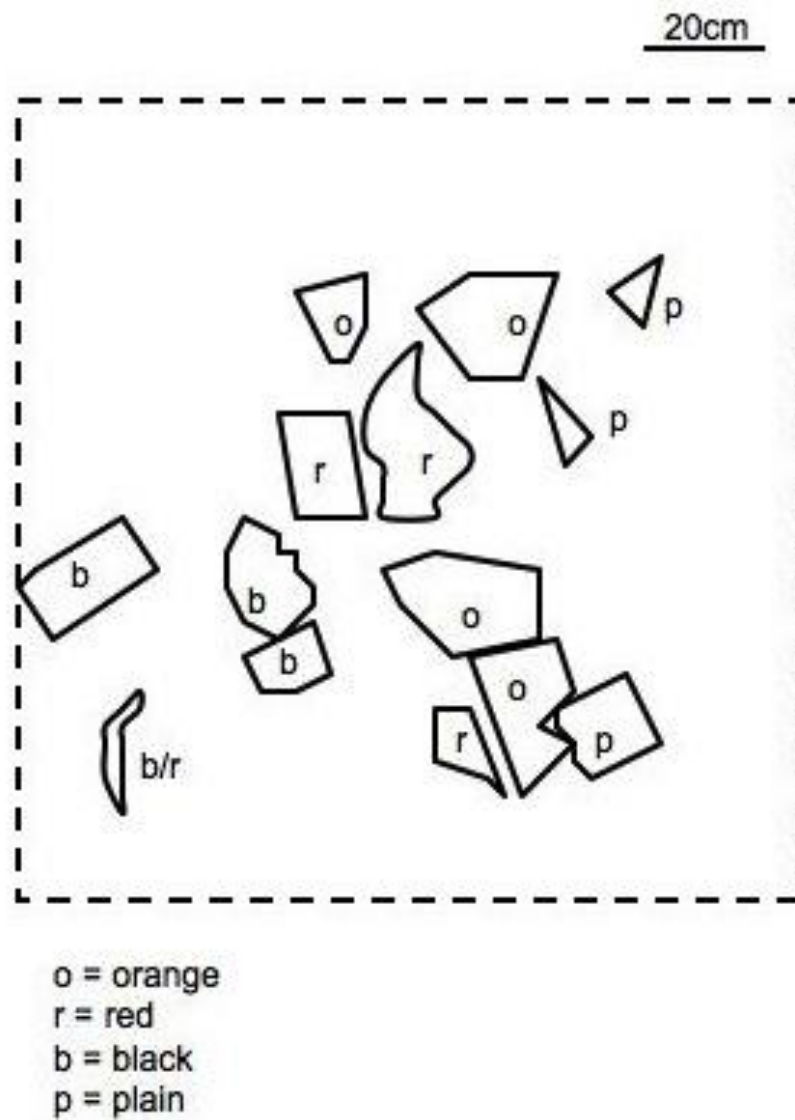


Figure 234 Plan map of upper layer of Lot 55 ceramic concentration

There was a layer of the dark clayey soil without any artefacts just above bedrock, which was reached at 245cm below ground surface (Fig. 235).

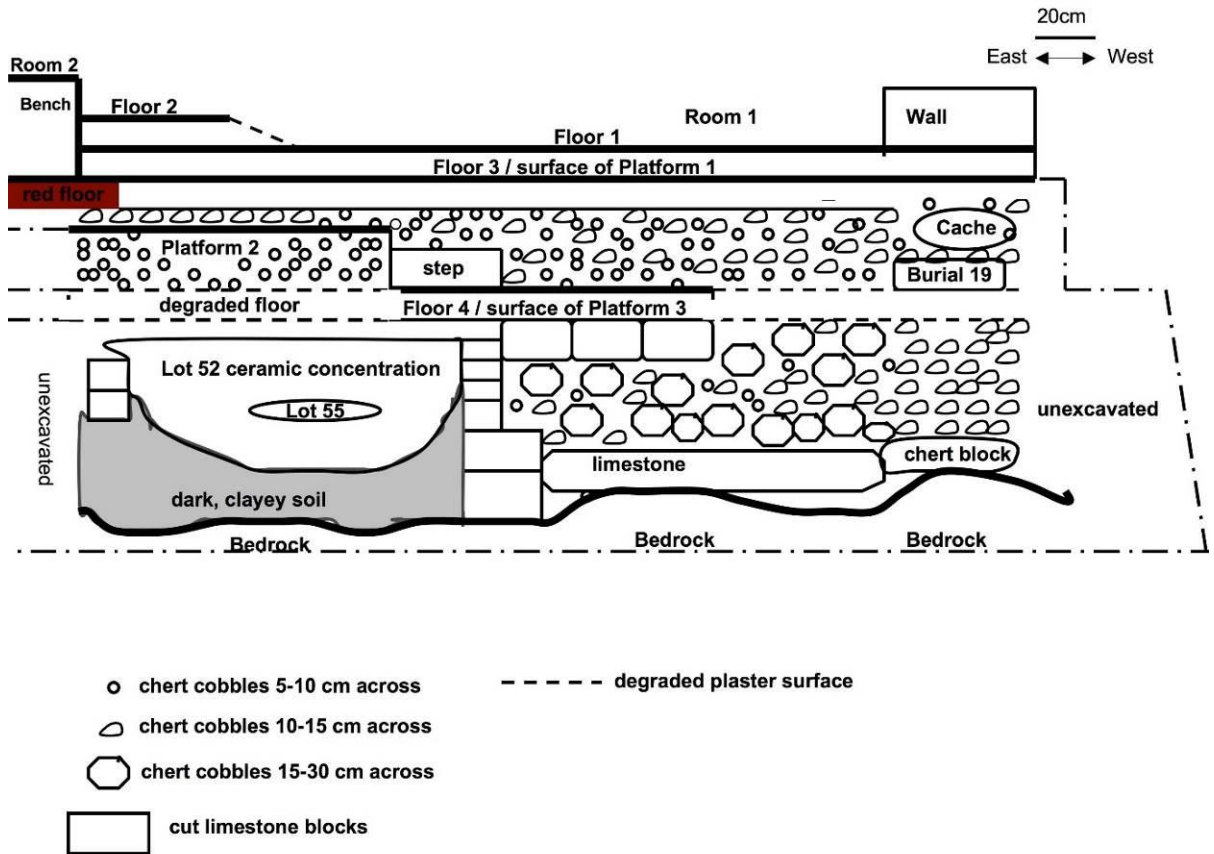


Figure 235 Section drawing of the centreline trench, Str. TM-2

**Sub Operation C Artefacts:**

*Ceramics:*

Lot	Count	Weight	Date
36	8	46g	Unknown Classic
37	3	16g	Unknown Classic
38	150	750g	Broken vessels from cache – 2 plates, 1 bowl. Early Classic Tzakol 3
39	17	280g	Early Classic Tzakol 1-3
43	29	232g	Early Classic Tzakol 3 to Late Classic Tepeu 1
44	7	64g	Unknown Classic
45	4	352g	Unknown Classic
46	2	56g	Unknown Classic
51	54	914g	Unknown Classic
52	2795	32296g	Early Classic Tzakol 2/3. Including

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			polychrome sherds, 1 set with figure in head-dress holding dagger
53	17	33g	Including ceramic object likely to be part of a figurine. Unknown Classic
54	14	350g	Unknown Classic
55	117	2050g	Early Classic Tzakol 1-3

*Lithics:*

Lot	Count	Weight	Notes
21	n/a	n/a	
22	n/a	n/a	
36	1	82g	Primary flake with cortex
37	n/a	n/a	
38	n/a	n/a	
39	2	72g	
43	n/a	n/a	
44	n/a	n/a	
45	n/a	n/a	
46	n/a	n/a	
51	n/a	n/a	
52	59	1408g	Including 2 complete bifaces, 1 broken biface
53	n/a	n/a	
54	n/a	n/a	
55	n/a	n/a	

*Other:*

Lot 36: Obsidian blade fragment

Lot 38: Whole obsidian blade from cache

Lot 39: Human remains – Burial 19

Lot 52: bone bead; worked piece of bone; 1 whole obsidian blade; 5 obsidian blade fragments; 1 worked shell (mother-of-pearl) with perforations; groundstone sphere

### **Sub Operation C Summary**

The Sub Operation C excavations (Fig. 235) furnished us with three main areas of information:

First, we found evidence of a cache, and a burial along the primary axis of the Str. TM-2. The cache comprised two plates and a bowl that have been dated to the Early Classic Tzakol 3 period, as well as a whole obsidian blade. Directly beneath the cache was Burial 19, also dating to the Early Classic period. Unfortunately due to the preservation of the skeleton, and the lack of grave goods, we were unable to ascertain much about this individual, aside from the fact that that it was an adult.

Second, we were able to determine the construction sequence. The first phase of construction, Str. TM-2-1<sup>st</sup>, appears to have been the placement of cut blocks of limestone on either side of a midden to stabilise it and allow it to become part of the foundation/core for a basal platform (Platform 3). The midden was beneath the western portion of the platform, and the eastern core comprised chert cobbles and cut limestone blocks. Phase 2 – Str. TM-2-2<sup>nd</sup> saw the construction of a smaller platform (Platform 2), probably a building platform on top of Platform 3 that had a small step in front of it. Any superstructure that Platform 2 was associated with must have been razed to make way for Phase 3. Phase 3, Str. TM-2-3<sup>rd</sup> involved covering Platform 2 and the surface of the basal platform, Platform 3, with chert core to form Platform 1. Burial 19 and a cache were placed in the core of Platform 1 as part of its construction. The new platform, Platform 1, was capped by Floor 3. The western portion of the surface of Platform 1 was painted red. A two-chambered building was constructed on Platform 1. Phase 4 saw a reflooring, Floor 2, of the original Floor 1.

Third, we uncovered datable sherds from the excavations that revealed that Phase 1 dated to the Early Classic Tzakol 2/3 period; Phase 2 dated to the Early Classic Tzakol 3 period; and Phase 3 dated to the Early Classic Tzakol 3/Late Classic Tepeu 1 period:

Therefore construction events spanned the middle of the Early Classic period to at least the end of the Early Classic Tzakol period into the beginning of the Late Classic Tepeu 1 period.

### **Sub Operation D Excavations**

On the back (west) side of the Str. TM-2 mound, there was a looter's trench (Fig. 236). The looter's trench went deep into the structure, and during the 2012 field season we were able to crawl down and see an intact vaulted room (Str. TM-2-R2). A profile drawing (Fig. 237) was made of this looter's trench to record information about the final construction phase associated with Str. TM-2. From the investigations at the looter's trench we could see that there had been a vaulted roof, and construction techniques involved the use of pebbles and mortar. We were unable to obtain any datable material from the upper super structure.

By the end of Sub Operation C we had revealed the front of the bench in Str. TM-2-R2. The room was filled with collapsed roof stones, with the southern part of the room disturbed by the looters. Sub Operation D involved investigating Str. TM-2-R2.





Figure 236 Photograph of looter's trench on the back side of Str. TM-2

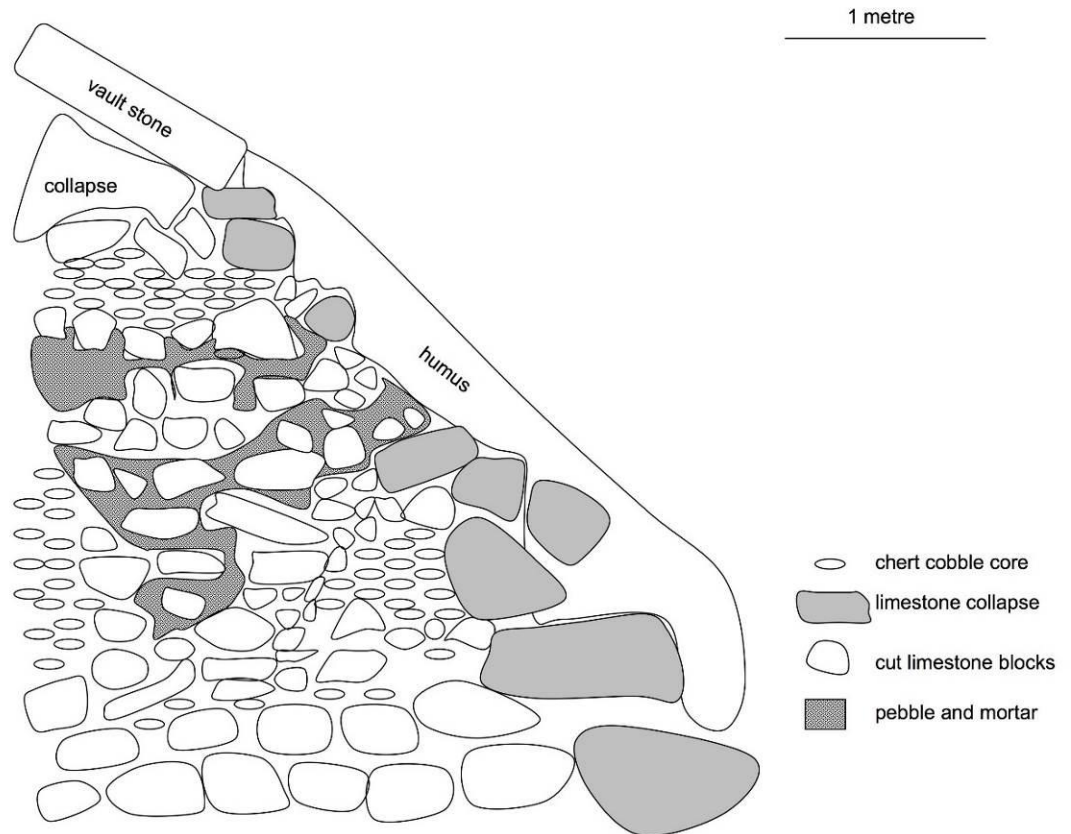


Figure 237 Profile drawing of Str. TM-2 looter's trench

The 2013 excavation began by clearing out the opening into Str. TM-2-R2 that was located to the west of Room 1. There were large pieces of limestone collapse – vaulted roof stones – sitting on top of the bench, and the collapse was mixed with crumbled plaster and loose sand. Artefacts from this context, including multiple pieces of red painted plaster (Fig. 238), were designated as Lot 35. Once we had cleared the collapse from the top of the bench, we could assess the bench, and it was noted that the bench had a rectangle-shaped burnt patch on its vertical face (Fig. 239). We could also see that there was burning on the interior of the western wall of Str. TM-2-R2.



Figure 238 Photograph of pieces of painted plaster from Lot 35

We then followed the bench surface and discovered that the bench was a U-shape and spanned the width of Str. TM-2-R2 (Fig. 240), and was covered with fallen vault stones. The surface of the bench had patches of burning and patches of red and black paint on its upper surface (Fig. 241) The interior of the western wall was plastered and painted in places.



Figure 239 Photograph of burnt area on front of bench, and burning on wall , Str. TM-2

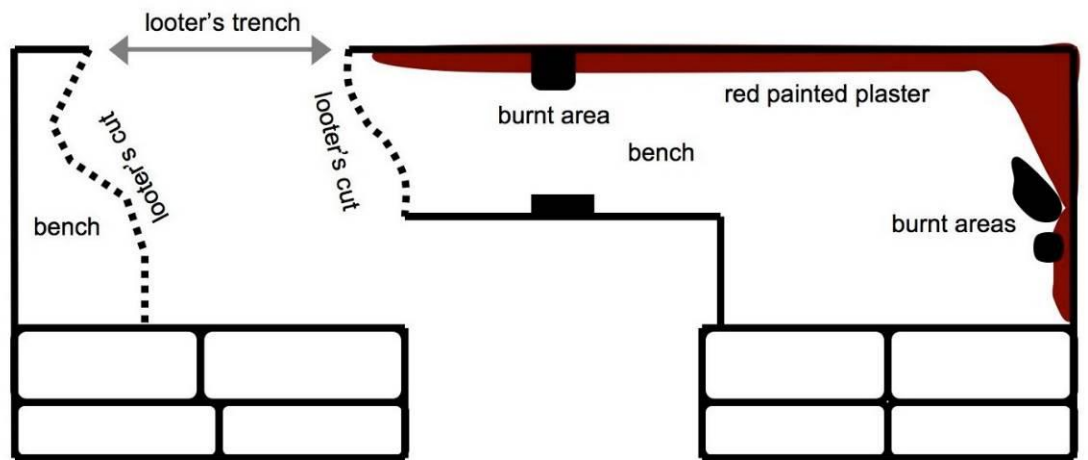


Figure 240 Plan map of Str. TM-2-R2



Figure 241 Photograph of red paint and burning on top of bench, Str. TM-2-R2

The southern portion of Str. TM-2-R2 had been heavily impacted by the looter's trench. This portion of the room was one-third full of sandy sediment likely to have

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been deposited after the looters left. There were also a few large roof stones that we removed (Fig. 242). Artefacts from the southern portion of the room were designated Lot 40. Once the room had been cleared out, we could see that the looters had broken through the top of the bench on its south side. We could also ascertain that there was an intact vault in the southern portion of Str. TM-2-R2 (Fig. 243 & 244), and there was a thin partition wall in the south of the room that still had plaster on it in places.



Figure 242 Photograph of Lot 40 fill beneath vaulted roof, Str. TM-2-R2



**Figure 243** Photograph of Intact vaulted roof, plastered wall, and looter-damaged portion of bench, Str. TM-2-R2 (photo taken facing south)

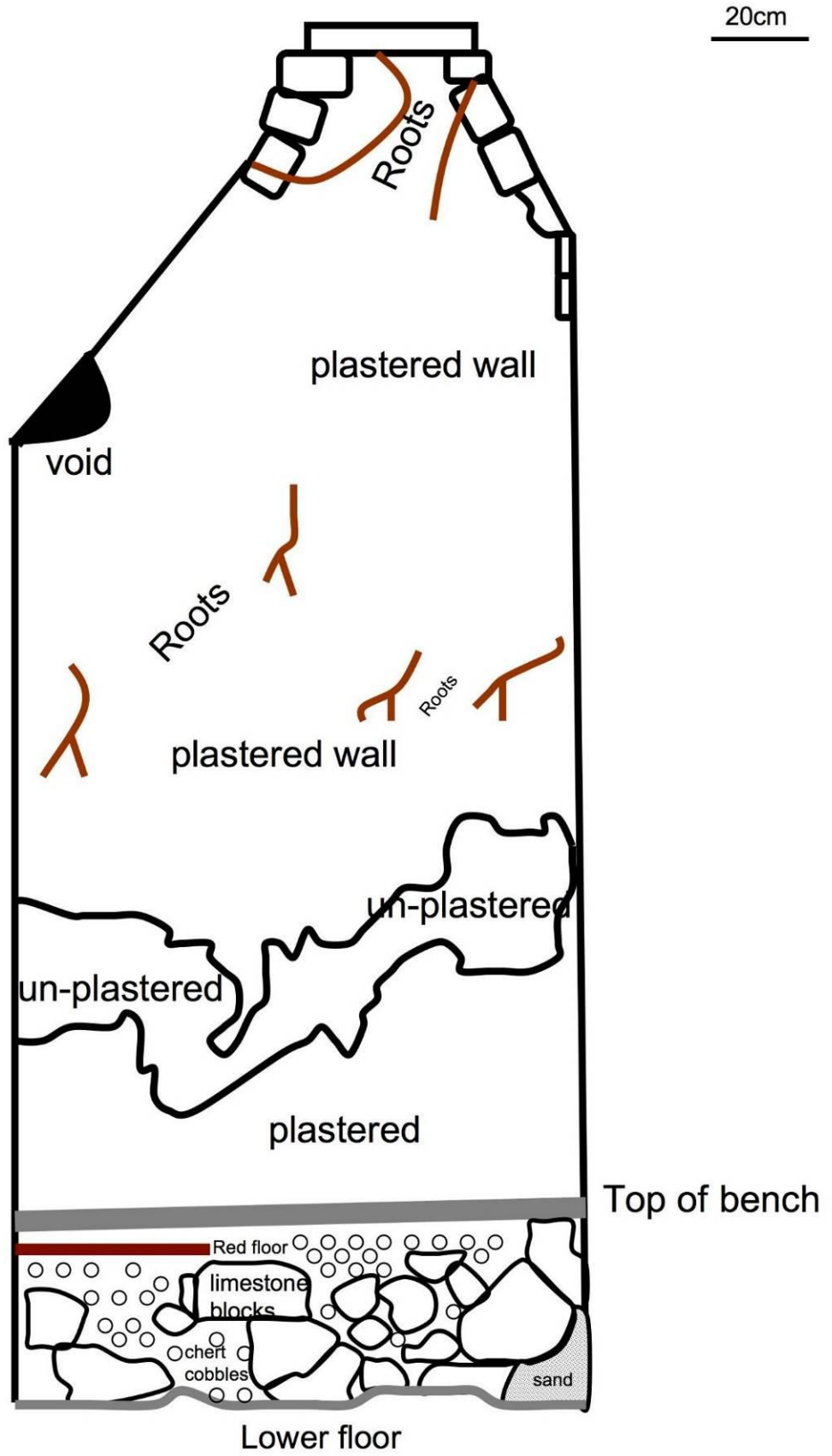


Figure 244 Elevation drawing of vaulted room, south wall, including bench penetrated by looters Str. TM-2-R2

Wall plaster was sampled, and this was designated Lot 41. The looted portion of the bench showed that there was a plain plaster surface overlying a red plaster surface (Fig. 245), and the core of the bench comprised a mixture of chert and limestone cobbles, and small limestone blocks. The bench rested on the floor of Str. TM-2-R2, so was secondary to its construction, and this floor matched the elevation of Platform 1/Floor 3 in the eastern portion of Str. TM-2. As was the case in the section of Str. TM-2-R1 just outside of Str. TM-2-R2, Floor 3 inside Str. TM-2-R2 was also painted red.



Figure 245 Photograph of red painted lower surface of bench, Str. TM-2-R2

Artefacts collected from Floor 3, and 20cm above it in the southern half of Str. TM-2-R2 were designated Lot 42, and included a piece of shaped plaster that might have been part of a mask or sculpture. We then cleared out the looted area of the bench core that comprised cut limestone pieces and chert cobbles. Artefacts collected from the core of the bench were designated Lot 48 and included an exhausted obsidian core (Fig. 246), a sherd with a glyph design (Fig. 247), a piece of shaped plaster (Fig. 248) and some dog and deer bones.





Figure 246 Photograph of obsidian core from Lot 48, Str. TM-2



Figure 247 Photograph of glyph sherd from lot 48, Str. TM-2



Figure 248 Photograph of shaped plaster from lot 42, Str. TM-2-R2

After clearing out the looted area of Str. TM-2-R2, we turned our attention to cleaning and recording the painted areas on the interior western wall. The painted areas were in the central part of the wall over an area of 6m x 2m, corresponding to the centre portion of the bench. When we were clearing out the fallen vault stones (Fig. 249) from on top of the bench it was noted that some of the stones had fallen directly onto some of the painted/plastered areas and obliterated the material on the wall. The fallen plaster pieces collected from within the fallen vault stone matrix on top of the bench were carefully examined for painted pieces; however the only plaster pieces recovered were fragments of the plain plaster from the vault stones. There were nine areas where coloured paint was still visible (see Appendices C1-9 and D8), and it was clear that there were multiple plastering/painting events (Figs. 250 to 252). Professor Robert Warden and his team from Texan A&M University scanned the mural, and produced a high resolution gigapan image which can be viewed using the following URL: <http://www.gigapan.com/gigapans/56f94e6165f87d63b24e3098518e7c4c>



Figure 249 Photograph of collapsed roof stones against painted wall, Str. TM-2-R2

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Figure 250 Photograph of overview of painted wall, Str. TM-2-R2

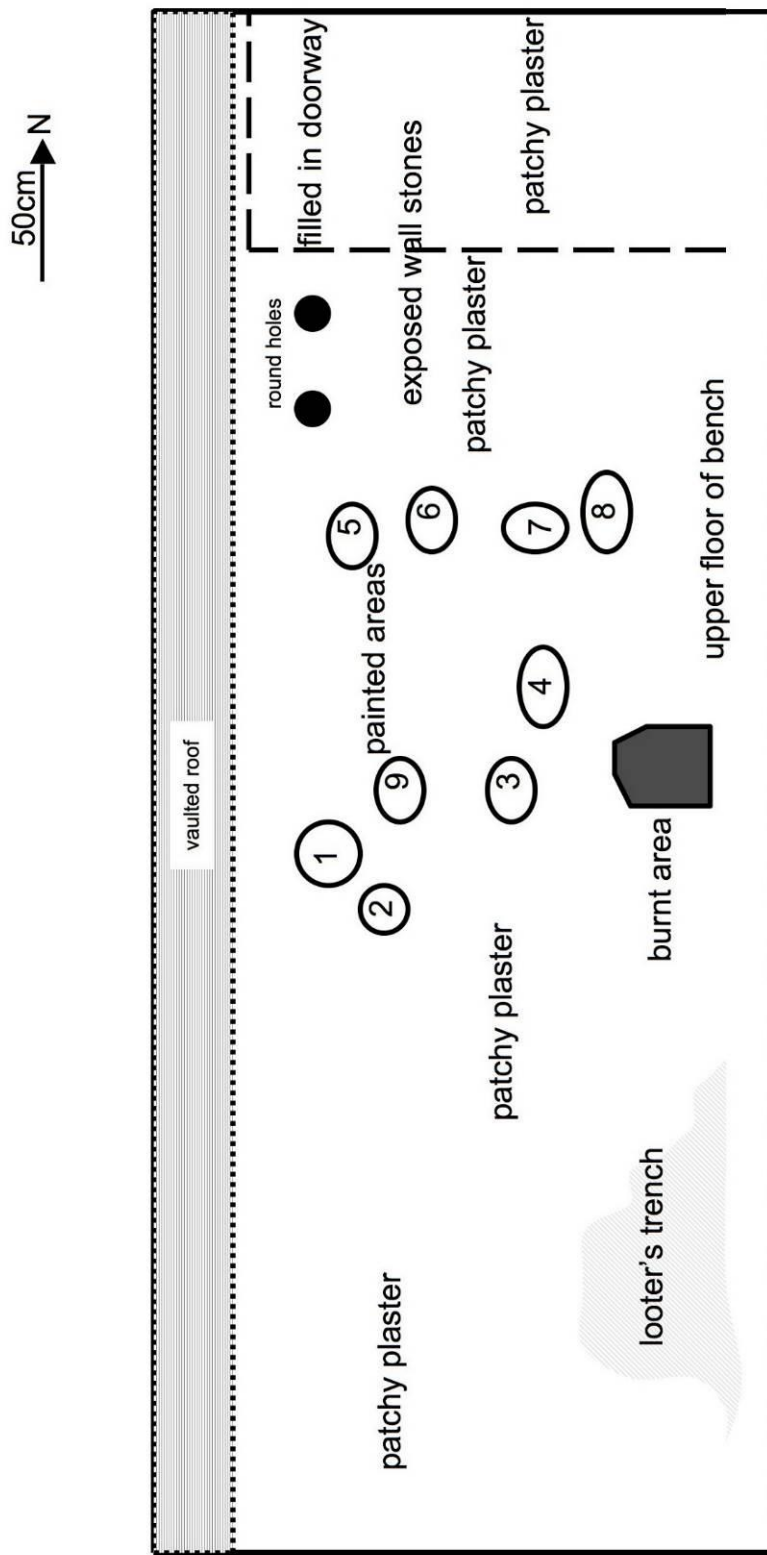


Figure 251 Elevation of west wall of vaulted room, Str. TM-2 numbers refer to painted areas, photos of which can be found in Appendices C and D



Figure 252 Photograph of multiple painting/plastering events, West Wall, Str. TM-2-R2

Sub Operation D ended once the features on the wall had been recorded. We then built a protective roof and wall to surround the painted wall, until conservator Pieta Greaves could assess the wall the following year.

### **2014 Investigations**

In the 2014 field season, conservator Pieta Greaves travelled to Belize to assess the wall painting. She reported that the plaster once covered the entire wall of the room, with at least two layers of visible plaster decorated with red and orange pigments, assumed to be naturally occurring ochre (Greaves 2015). The painted areas were concentrated in the central portion of the wall, but the original designs could not be made out with the portions that remained.

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The most striking thing that Greaves discovered during her assessment of the wall was that there were multiple instances of scratched graffiti. The graffiti was found on both the upper and lower plaster layers, thus demonstrating that the wall painting/plaster was already in a poor state when the graffiti was etched onto the wall (Greaves 2015 – see D10). Greaves also noted that there were burnt patches from the same burning event that had affected both layers of plaster, again demonstrating that the wall was in a state of decay, and the top layer suffered from losses, when the burning took place (Greaves 2015). There were eleven areas of graffiti (Fig. C10; D10) which Greaves describes as ‘crude’, and likely to have been etched into the wall with a lithic tool.

### Sub Operation D Artefacts:

Lot	Count	Weight	Date
35	13	374g	Late Classic Tepeu 1-3
40	28	448g	Unknown Classic
41	2	18g	Unknown Classic
42	n/a	n/a	n/a
48	17	250	Unknown Classic, including a polychrome pseudo glyph sherd

### Lithics:

Lot	Count	Weight	Notes
35	n/a	n/a	n/a
40	n/a	n/a	n/a
41	n/a	n/a	n/a
42	n/a	n/a	n/a
48	1	1g	Chert flake

### Other:

Lot 35: painted plaster sample

Lot 40: Faunal remains (74g); piece of unidentified mineralised bone

Lot 48: Obsidian core, curved plaster, faunal remains

### **Sub Operation D and 2014 excavation Summary**

The painted wall would have been visible from the entrance way to Str. TM-2 and so may have served as an important focal point for the community. Evidence of revisitation long after abandonment shown by the graffiti and burning at a time when the painting and plaster were already in a state of decay may suggest that the location remained an important symbolic location long after abandonment. The top of the bench was also coloured red, and this would have been an arresting sight. The use of colour in Maya architecture was symbolic, and red has been associated with ceremonial and political centres (Boone 1981, 173).

The Str. TM-2-R2 section of the building appears to have been constructed before the Str. TM-2-R1 area, and this is seen by the fact that the western wall of Str. TM-2-R2 was at a deeper level than the wall of Str. TM-2-R1; and the exterior eastern wall of the structure sat on top of Floor 1, whereas the walls of Str. TM-2-R2 continued below the level of Floors 1 and 2.

We were unable to recover datable material from a secure archaeological context from Sub Operation D, largely due to the activities of the looters. One significant find was the obsidian core that suggests that obsidian items such as blades were being created from raw materials at Tulix Mul, rather than imported as a finished product. The presence of the obsidian core hints at the involvement of the Tulix Mul community with long distance trading networks. A photograph of the glyph sherd (Fig. 247) found within Sub Op D was examined by Dr. Christophe Helmke of the University of Copenhagen, who noted that the sherd 'represents a wonderful iconographic scene and represents part of a personified mountain sign. There are several almost identical examples of the same type of personified mountain sign on a series of different Codex Style vessels from in and around Calakmul. Here though the ceramic type differs and appears to be Zacatel of one kind or another, but I suspect that the iconography and



the type of mythic narrative that this vase once recorded would duplicate those seen on Codex Style vessels.’ (Christophe Helmke 2015, Pers. Comm.)

### **Sub Operation E Excavations**

The purpose of Sub Operation E was to penetrate the central portion of Room 2’s bench to obtain dateable material from the bench. The central portion of the bench was intact, and had not been touched by the looters (Fig. 253). An area of 1m in width was excavated in the centre so as not to destroy the entire bench, and to minimise destabilising of the painting/plastering on the wall behind.



**Figure 253** Photograph of bench facing north taken from looted portion of bench, Room 2, Str TM-2

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Excavations of the bench began with the removal of the plaster surface. The plaster was 5cm thick. Directly beneath the surface was a 9cm-deep layer of chert, presumably part of the bench core; artefacts recovered from this context were designated Lot 56. Within the chert core was a curved piece of red plaster that had been made with a micaceous red material (Munsell 7.5r 3/8 dark red) colour. The red plaster looked like it may have been part of a mask or sculpture, and placed purposefully within the core of the bench (Fig. 254). There was also a granite metate fragment within Lot 56.



Figure 254 Photograph of curved red plaster piece from Lot 56

Beneath the chert layer of Lot 56, another plaster surface was encountered revealing that the bench had been altered, and heightened by 14cm. Beneath the lower plaster surface was chert core material (Lot 57), and directly beneath where the curved red

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plaster of Lot 56 was, within Lot 57 there was another curved red plaster piece (Fig. 255).



Figure 255 Photograph of curved red plaster within Lot 57

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The Lot 57 layer ended at Floor 3, and it was noted that both Floors 1 and 2 lipped up to the bench, therefore showing that the bench was already there when Floors 1 and 2 were laid. There was a large cut mark in Floor 3 beneath the bench, and a limestone block had been placed in the cut, presumably to fill in a hole so the bench could be built with a firm foundation. Beneath the limestone block was a layer of chert cobbles with ca. 40% chert lithic debitage (Lot 58) (Fig. 256). All of the flakes are secondary or tertiary flakes apart from ca. 3% that are bifacial thinning flakes. The flakes range from 1cm to 5cm, and represent tool-making debris.



Figure 256 Photograph of lithic debitage in the Lot 58 matrix

The Lot 58 layer was ca. 5cm deep, and overlay a line of cut limestone blocks that in turn overlay another piece of red curved plaster and a rounded limestone capstone (Fig. 257 & 258). The capstone measured 32cm x 25cm x 7cm.



Figure 257 Photograph of cut limestone blocks, Room 2, Str. TM-2



Figure 258 Photograph of capstone and red plaster at the bottom of Lot 58, Room 2, Str. TM-2

Beneath the capstone was a large void. However due to time constraints (this was the last excavation of the 2013 field season), the void was not investigated further in 2013. A section drawing was made of the 2013 Sub-Op E excavations (Fig. 259)

50cm → N

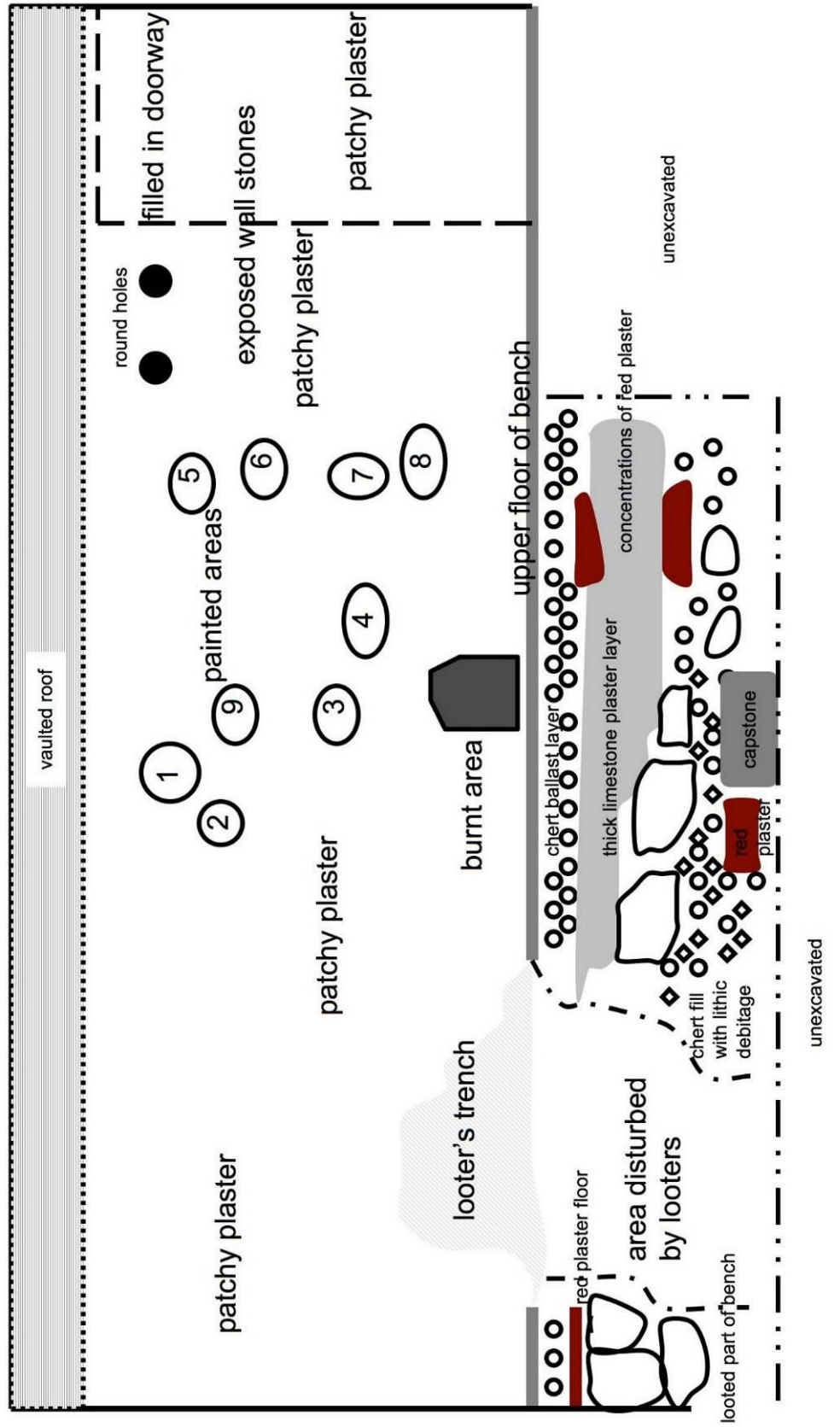


Figure 259 Elevation of west wall of vaulted room, including 2013 bench excavations

### 2014 Excavations

In June – July 2014, Pieta Greaves led a small-scale excavation designed to conclude the 2013 Sub Operation E investigations beneath the bench of Str. TM-2-R2 (Greaves and Guderjan 2015). She notes that the capstone was in fact constructed from a piece of Floor 3 that had been removed for this purpose, and that lithic debitage was even more pronounced beneath the capstone, with 1,224 pieces collected in 2014, and many more left in situ. The lithic debitage beneath the capstone had been mixed with plaster. The presence of plaster would normally indicate that it was laid on top of something to provide a foundation for the plaster; however there was no remaining material beneath the plaster, leading to the conclusion that the support for the plaster layer must have come from a decayed organic source (Greaves and Guderjan 2015). This conclusion was further reinforced when Greaves and her team removed the plaster in blocks and were able to distinguish impressions from wood supports. Additionally, the examination of the plaster showed distinct textile impressions of a warp and weft style (Greaves and Guderjan 2015) (Figs. 260 & 261).



Figure 260 Photograph of textile impressions (photo by Pieta Greaves, courtesy of Tom Guderjan)

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Figure 261 Photograph of wood and stick impressions (photo by Pieta Greaves, courtesy of Tom Guderjan)

The 2014 excavations suggest that the void beneath the capstone had originally been filled with organic material in the form of textiles, long since decayed.

**Sub Operation E Artefacts:**

Lot	Count	Weight	Date
56	60	1350g	Unknown Classic
57	66	850g	Early Classic Tzakol 1-3
58	4	100g	Unknown Classic

**Lithics:**

Lot	Count	Weight	Notes
56	n/a	n/a	
57			
58			Uncollected lithic flakes used as fill

**Other:**

Lot 56: red plaster; metate fragment

Lot 57: red plaster

Lot 58: red plaster



### **Sub Operation E and 2014 excavation Summary**

Excavations of Room 1 revealed that it was constructed earlier than Room 2 and the central passageway. This was evidenced by the fact that Floors 1 and 2 lipped up to the bench in Room 2, and also the walls of Room 2 were at a lower level than those of Room 1. Ceramic evidence from within the bench of Room 2 suggests that the bench was constructed in the Early Classic Tzakol period.

The red curved plaster, possibly stucco, that appears to have been purposefully placed in the fill/core of the bench may have been from a mask or sculpture, which suggests a symbolic reason for including the red plaster fragment into the construction material for the bench.

The organic deposit uncovered by Greaves and her team was located along the primary axis of Str. TM-2 beneath Str. TM-2-R2 and so may have been a component of a dedicatory cache. Due to the paucity of comparable deposits in the literature, knowledge of the nature of this organic deposit is limited (Greaves and Guderjan 2015). The fact that there are two potential caches along the primary axis (main entrance way to Str. TM-2, and in the entrance way to Str. TM-2-R2) suggests that this structure was an important location for the community. There was no evidence of human remains found in the textile deposit, so the organic deposit was unlikely to have related to ancestor veneration. The decayed organic material was wrapped in a textile cloth with a distinctive design. Future analysis of the impressed plaster and the style of textile pattern may reveal more about the nature and purpose of the organic deposit.

The large amount of chert debitage found beneath the bench suggests that tool making was occurring in the immediate vicinity with the debris then used for bench core material, and is direct evidence of the chert resources of the bajo being exploited for tool making (see landscape investigations section above).

## Structure 2 Summary

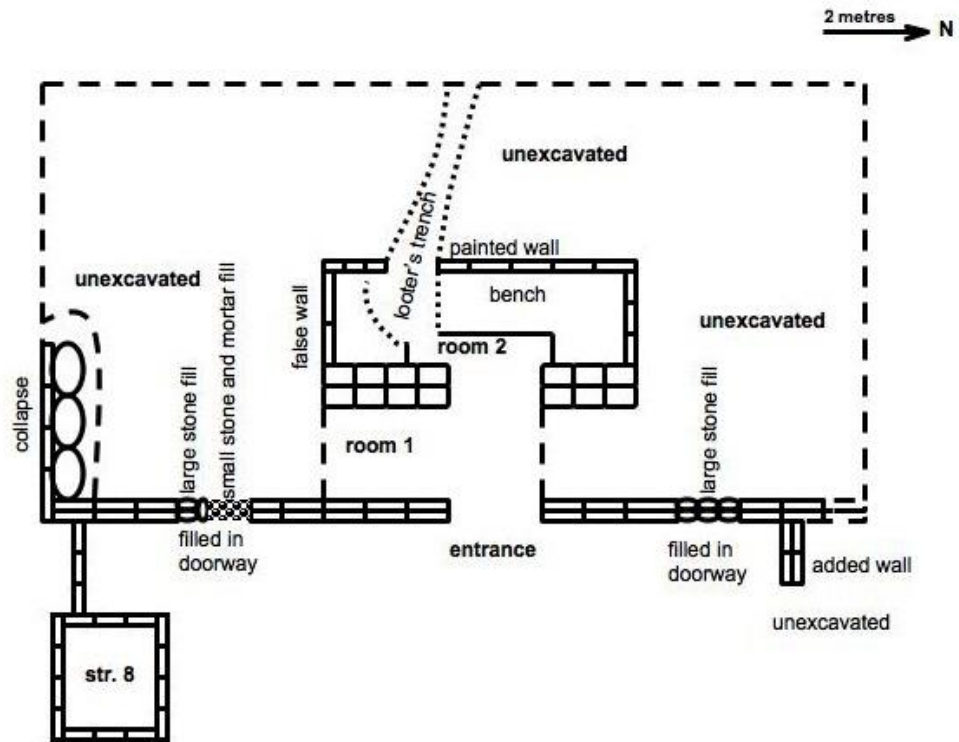


Figure 262 Plan of structure 2 showing extent of 2013 excavations at Str. TM-2

The purpose of the excavations at Str. TM-2-R2 (Fig. 262) was to gain information about the structure's function and construction history. Our investigations revealed multiple construction phases, each corresponding to one of the three platforms encountered.

Phase 1 (Fig. 263) was the construction of Platform 3 overlying the midden represented by Lot 52.

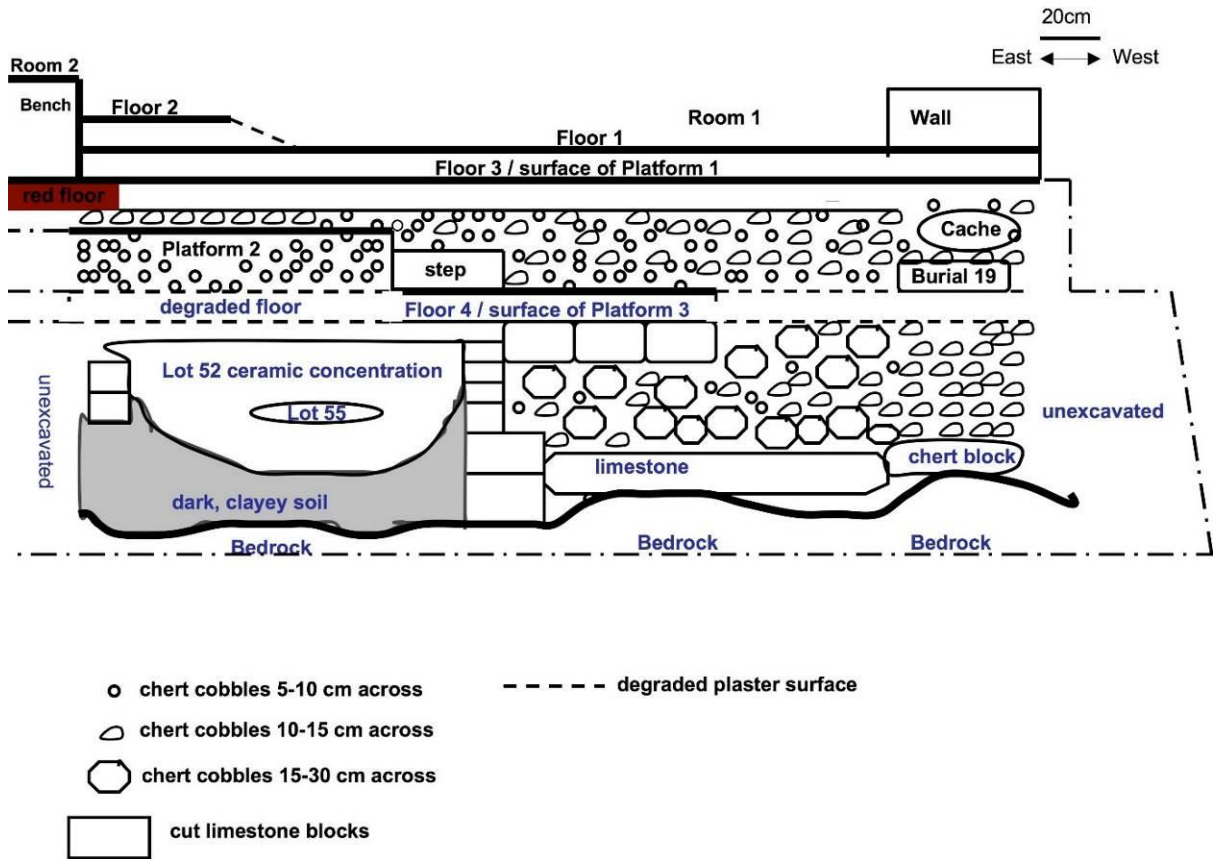


Figure 263 Section drawing with Phase 1 in purple, Str. TM-2

In Phase 2, Platform 2 was built, with a small outset step on the eastern side (Fig. 264). The size of Platform 2 suggests that the earlier phase of Str. TM-2 was much smaller than its final form. The walls of Str. TM-2-R2 were on top of Platform 2, showing that Platform 2 was built to support Str. TM-2-R2, and presumably the organic/textile cache was deposited during this time also.

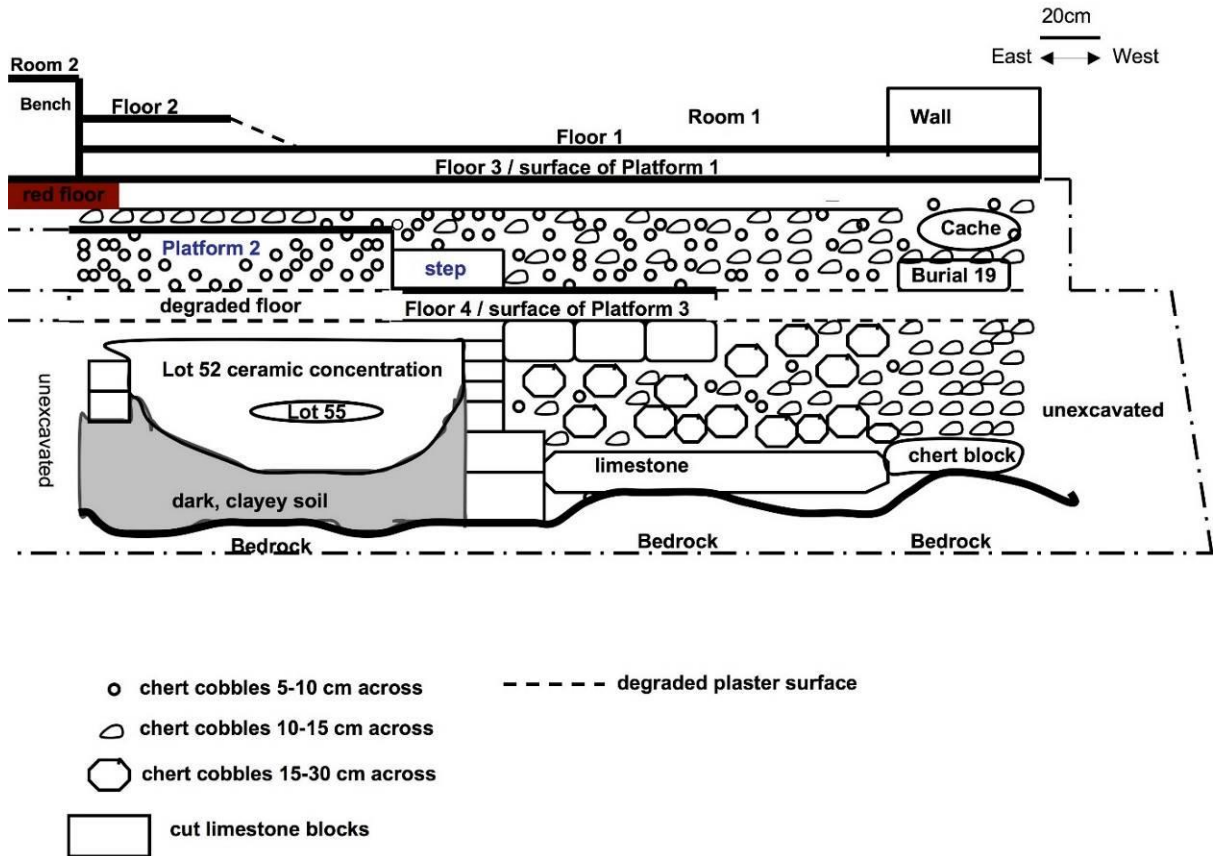


Figure 264 Section drawing with Phase 2 in purple, Str. TM-2

Phase 3 saw the construction of Platform 1, with another cache, and a burial interred beneath the cache within the platform (Fig. 265).

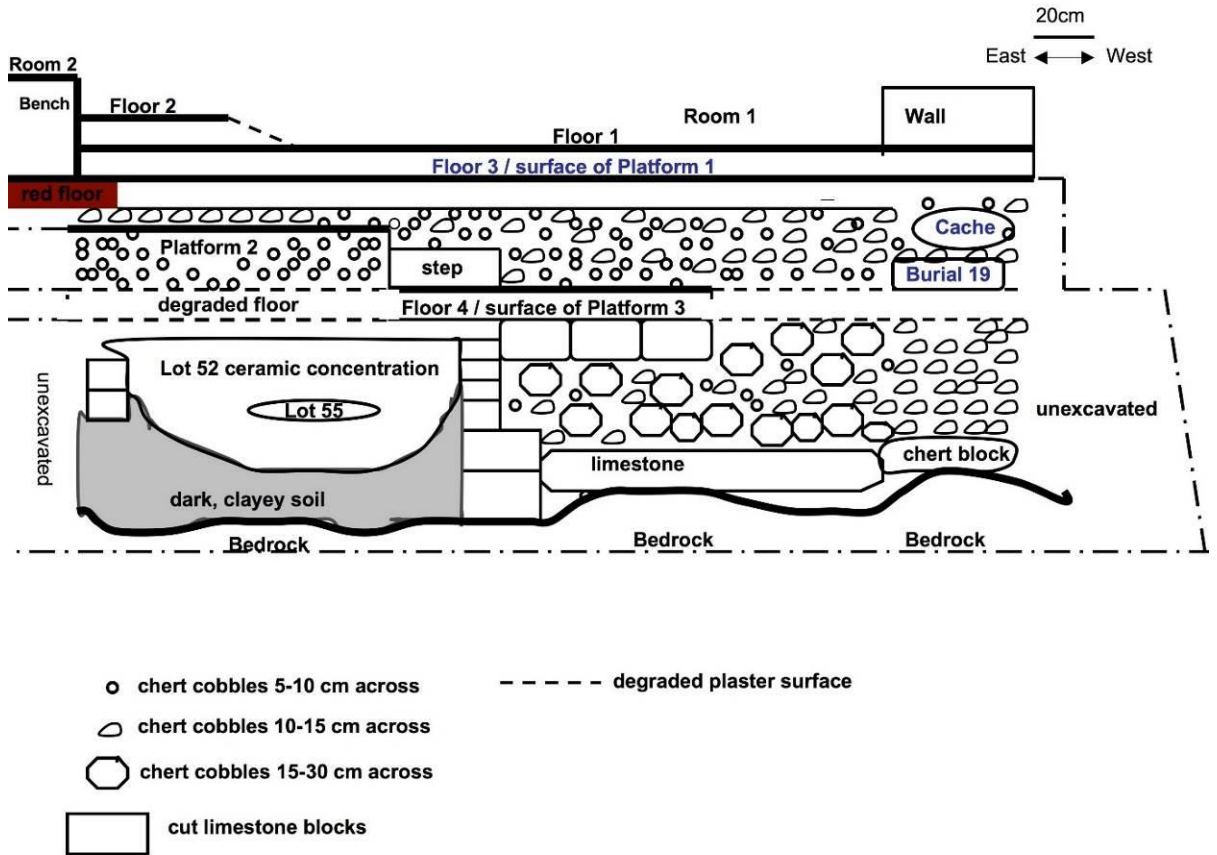


Figure 265 Section drawing with Phase 3 in purple, Str. TM-2

Both caches found at Str. TM-2 were located along the primary axis of the respective building phases. Phase 4 saw the addition of Floor 1 and of Str. TM-2-R1 as well as the construction of the terminal exterior wall of Str. TM-2 (Fig. 266).

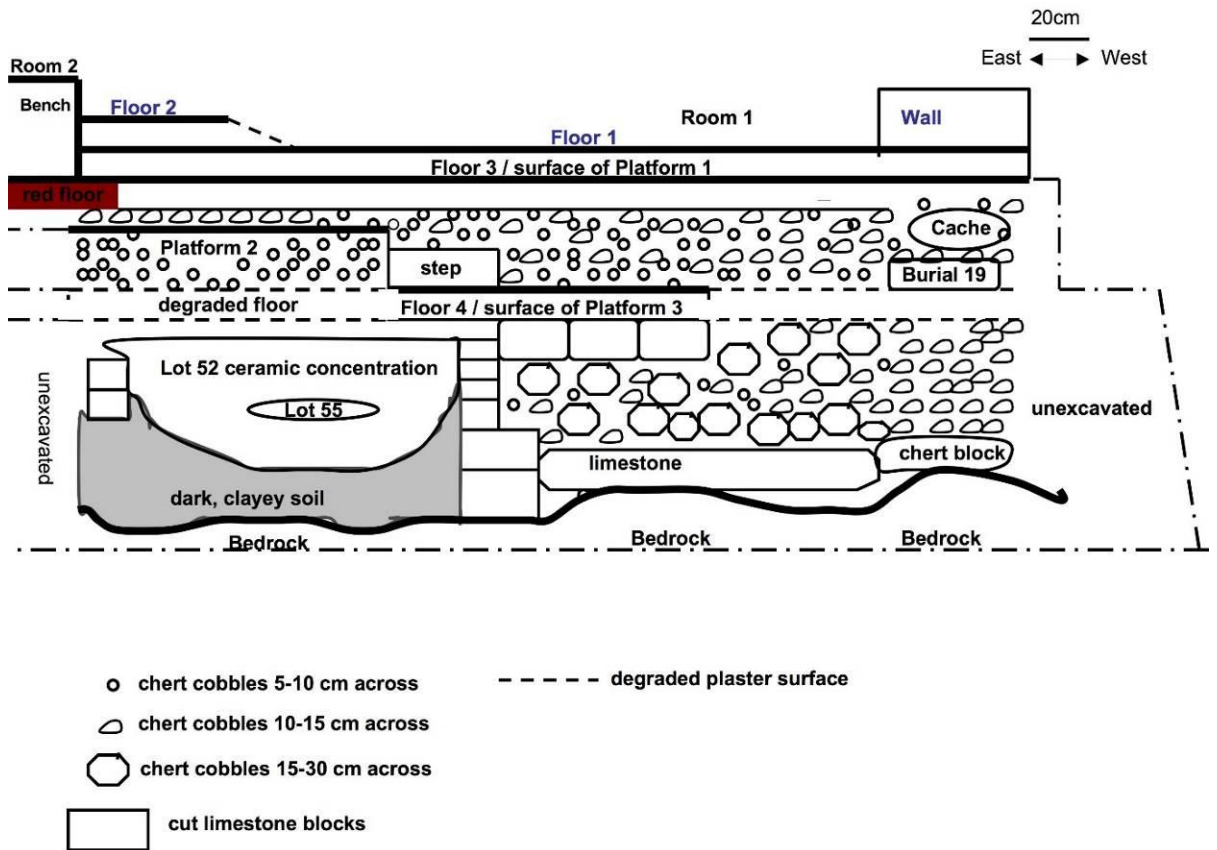


Figure 266 Section drawing with Phase 4 in purple, Str. TM-2

At some point in Str. TM-2's life cycle, a mural was painted on the back wall of Str. TM-2-R2, with subsequent painting and plastering events. Str. TM-2-R1 appears to have been purposefully filled and taken out of use, in contrast with Str. TM-2-R2 that was filled with post-abandonment accumulation. The structure was revisited at some point after it had been abandoned for some time, as seen by the graffiti and burning that bisects different plaster layers that had had time to undergo erosion. There were originally three doorways/entrances in the eastern exterior wall of the structure; however two had been sealed, therefore showing that the usage of the building changed over time.

Artefacts found on the floor of the main doorway into Str. TM-2 dated generally to the Early Classic Tzakol 1-3 period, suggesting that Str. TM-2 was abandoned during Tzakol 3. However Str. TM-2-R1 was not filled in until the Late Classic Tepeu Period. It is not

## 8. Tulix Mul

clear why Str. TM-2-R1 was purposefully filled. Obsidian blade fragments were found throughout the structure, suggesting that obsidian was a common material. Granite objects were also found during the excavations.

The fact that there were two caches on the primary axis of Str. TM-2, relating to two of the building phases, links the inhabitants of Tulix Mul to practices seen across the ancient Maya lowlands.

The Early Classic 2/3 initial construction at Str. TM-2 corresponds to the earliest levels of Structure TM-3, TM-4 and TM-5, showing their contemporaneity. There was a similar midden deposit beneath Str. TM-3, with both middens dating to the Early Classic 2/3 period, indicating that this was likely to be when the location of what became Tulix Mul courtyard group was first inhabited.

### ***Structure TM-1***

Structure TM-1 was the largest structure in the Tulix Mul Courtyard group. The structure stands at around 8 m tall, and is 20 m long. There are two looter's trenches in this structure and the trenches were photographed and elevation drawings were created (Figs. 267 to 270). The examination of the looter's trenches has unveiled the presence of at least 3 to 4 construction phases. The final phases of the northern section of the uppermost superstructure at Structure TM-1 had rounded corners (Fig. 271), which may represent Yucatecan influence (Tom Guderjan 2013, Pers. Comm.).

Profiling the looter's trenches on Str. TM-1 allowed us to note some of the construction phases without having to initiate large scale excavation. Large-scale excavations at Str. TM-1 would be an avenue for future investigation.



**Figure 267** Photograph of southern looter's trench, Structure TM-1



## 8. Tulix Mul

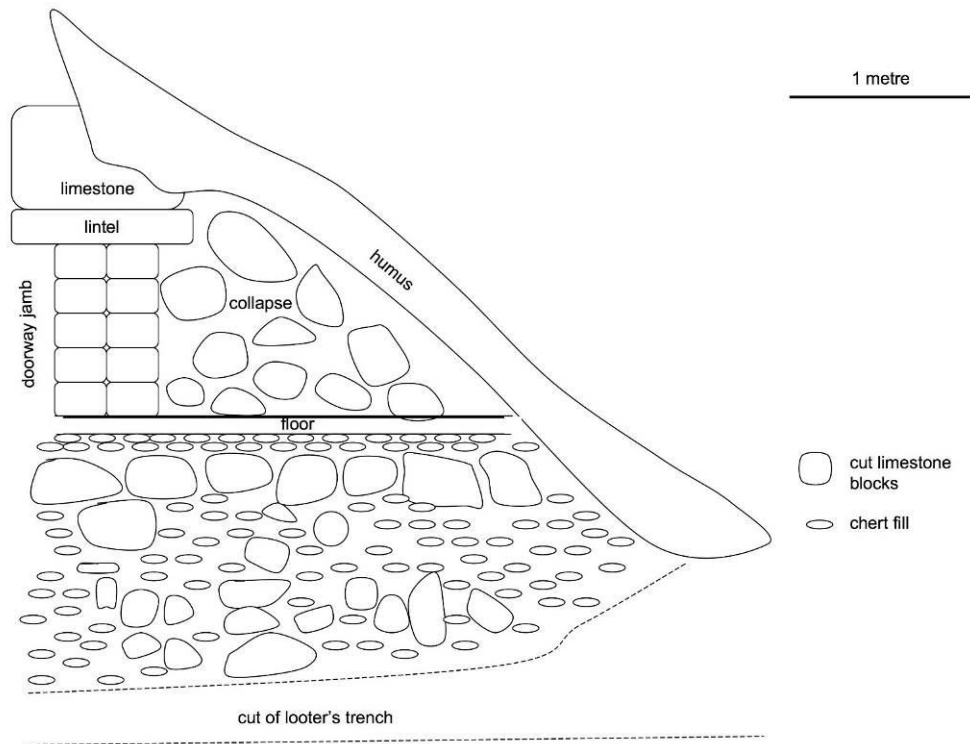


Figure 268 Elevation drawing of Southern looters trench, facing south, Str. TM-1



Figure 269 Photograph of northern looters trench, Str. TM-1

8. Tulix Mul

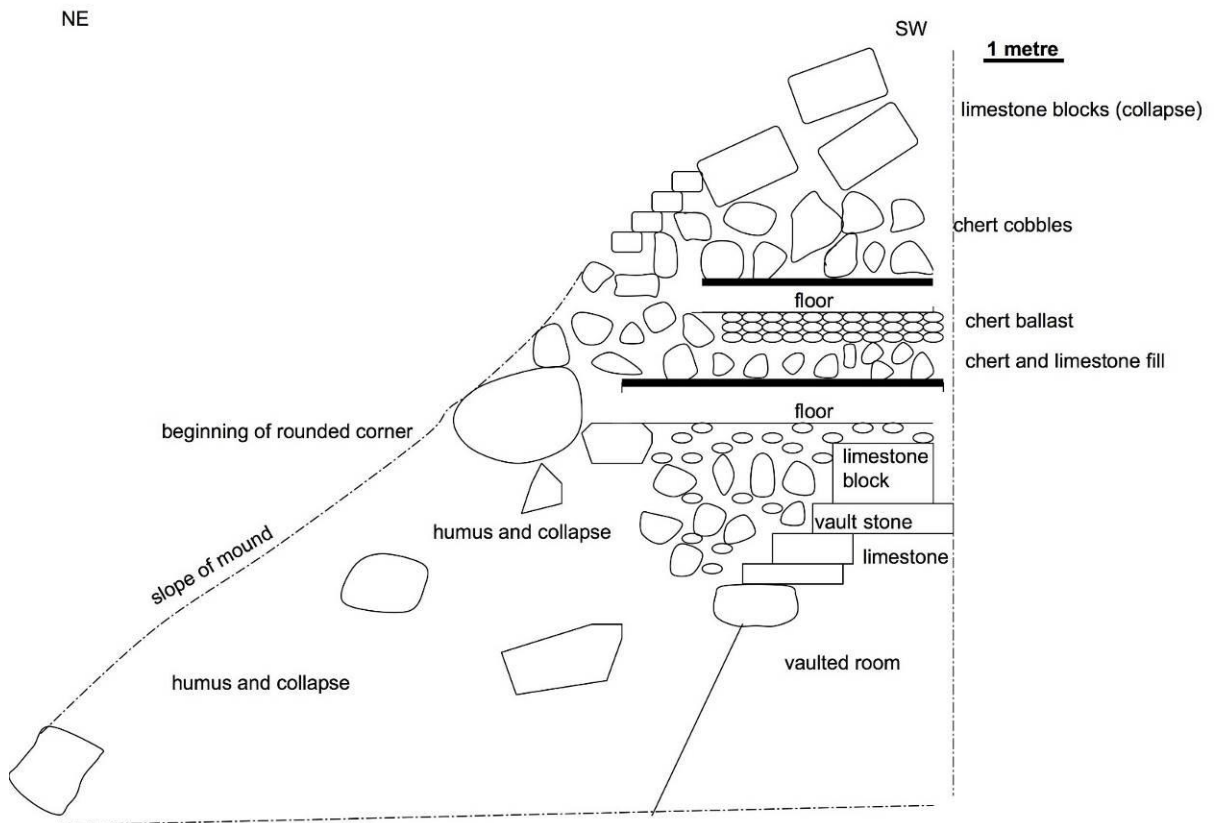


Figure 270 Elevation drawing of Northern looters trench, Structure TM-1



Figure 271 Photograph of rounded corner on superstructure of Str. TM-1 photo taken facing east

## ***Tulix Mul Courtyard Group Summary***

### **Construction history and occupation**

Investigations at the Tulix Mul Courtyard group and its surrounding area provided a rich data set. To date, twelve formal human burials have been recovered from this location, as well as instances of human bone being used in unusual contexts, such as that embedded in the floor by the northern doorway in Str. TM-4. All human remains were given a burial number hence the sequence goes up to 24. As well as human bone being found in unusual contexts, deer bones were also found throughout the site, purposefully placed in various locations, such as the deer bone embedded in the wall in TM-4, and the deer bones placed in the fill of Str. TM-2-R1. For lack of a better understanding, these deposits are termed 'ritual'.

Human burials recovered have yielded valuable information about the mortuary practices carried out at Tulix Mul, and have shown that a wide range of people were chosen to be interred beneath the floors of each of the structures excavated. These people ranged from the very young (Burial 23), to the very old (Burial 6). Child and young adolescent burials found interred beneath floors, unlike the adult burials, are not likely to represent ancestors. The majority of the burials lacked grave goods, the most notable exceptions being Burial 5, with the 52 unique ornaments, and Burial 2, with the shell discs. At least two of the skeletons showed signs of anaemia, and at least 4 of the adult individuals showed evidence of cranial and dental modification.

The presence of non-local materials in various deposits associated with the courtyard group such as marine shell, granite and obsidian suggest a number of things. The marine shells found in Burials 2, 4 and 5 as well as in the midden over bedrock that formed part of the core of the platform of Structure TM-2 indicate interaction with coastal areas, probably via the Rio Hondo and either by direct exploitation or through down-the-line trade. In either case, the inhabitants of Tulix Mul were clearly part of some kind of trade network. The obsidian core recovered from Str. TM-2 suggests that

## 8. Tulix Mul

at least in some instances, raw materials were being procured, with local skilled craftspeople working the material, rather than finished products being imported whole. The fact that non-local goods were taken out of circulation and buried with specific individuals means that the act of using them as grave goods either outweighed their value in keeping in them in circulation, or that these goods may represent inalienable possessions (see Weiner 1992). The abundant presence of granite and obsidian in multiple contexts shows that these materials were relatively easy to procure, which in turn suggests active trade networks. Many of the utilitarian domestic objects were made from granite, another non-local material.

Typologically dated ceramics have allowed us to examine the construction history of the Tulix Mul Courtyard. The initial construction of all of the structures excavated appears to have taken place during the Early Classic. Structures TM-2 and TM-3 both appear to have been constructed on top of middens containing dense ceramic deposits, indicating earlier occupation of the location. Floor assemblages and subsequent ceramics found in the fill of rooms in Structures TM-2 and TM-4 indicate that the standing architecture of the buildings was last used during the Early Classic period, but purposefully filled in the Late Classic, presumably for further construction that either was not completed, or did not survive in the archaeological record. Ceramic censers (incomplete) found in the collapse layers above the floors of Structure TM-3 date to the Terminal Classic, as post-abandonment accumulation had begun. Thus there was human activity at Str. TM-3 up until the Terminal Classic. Terminal Classic sherds were also found at Str. TM-6, at the opposite end of the architectural group, and this suggests that there was activity across the whole of the courtyard during the Terminal Classic. Additional data gleaned from two Late Classic sherds with glyph/pseudo-glyph markings from Str. TM-2 suggests cultural influences from Tikal and Calakmul may have been present at Tulix Mul, at least during the Late Classic period.

The Tulix Mul Courtyard group had a long occupation dating from early in the Early Classic, all the way through to the Terminal Classic. The presence of a now-degraded

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mural on the wall of Str.TM-2-R2, and the fact that there were multiple painting and plastering events at this location, indicates that the Tulix Mul Courtyard was an important location for the community that resided in this area.

### **Landscape and resource use**

Landscape investigations around the Tulix Mul area have revealed that there were rich clay, chert, and limestone resources within the immediate vicinity, and that the clayey nature of the Alacranes Bajo soils meant that water could be trapped for weeks. Although water trapped in clay would not be a supply suitable for drinking water, it could be used for other purposes. The major water source nearby is the Rio Hondo, 4 kilometres to the north. In terms of land management, numerous terrace features and possible check dams were recorded as being located within the Tulix Mul settlement area, and investigations into one of the proposed check dam areas has revealed that it was likely that the ancient Maya of Tulix Mul took advantage of the natural stretching and shrinking of the local vertisols by widening the channels formed by the shrinking and swelling of the soils, presumably for agricultural purposes. Future further analysis of the vertisols samples may allow us to determine exactly what kind of agricultural strategies were taking place.

There was evidence of quarrying of the limestone bedrock at the terrace feature. The quarrying may well have been related to chert acquisition, or limestone, sascab or clay. Guderjan (2013) has noted that there are large chert deposits in the Tulix Mul area, and that chert was a significant component of construction fill at Tulix Mul. Such chert sources may well have been unevenly distributed, however, because chert was only a minor component of material used at Nojol Nah (Guderjan 2013, 231). This uneven distribution of chert could imply that chert resources were controlled by the inhabitants of Tulix Mul.

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It is not known how (de)forested the landscape around Tulix Mul and the Alacranes Bajo was in the Early and Late Classic, but this topic may form the basis of future investigation, although the natural vegetation of vertisols is grassland, and savannah. The position of the Tulix Mul Group on the last natural high point before the start of the Alacranes Bajo meant that it occupied a strategic location in terms of overseeing the bajo, and the surrounding landscape. Although we were unable to date any of the land modifications around the Tulix Mul Courtyard Group, the fact that the architecture at this location was occupied from at least the Early Classic to the Terminal Classic indicates that the eastern edge of the Alacranes Bajo was a productive and viable environment for human occupation for hundreds of years.

## Chapter Nine: The Nojol Nah Site Centre

### *Introduction*

The area of Nojol Nah that was still under forest cover (as opposed to the cleared burnt fields of the settlement zone) contained several large architectural groups, including a pyramidal structure (Str. NN-3F1), and just outside the forested area was a heavily bulldozed acropolis area (Fig. 272). The site was first identified in 2004 after activities related to a new logging road uncovered a significant amount of lithic debris thought to be the remains of a workshop (Barrett and Majewski 2010, 57). From 2008 to 2013, teams led primarily by William T. Brown and Dr. Jason Barrett have excavated various architectural groups, and these excavations will be summarised below. In addition, MRP staff member Virginia Das Neves has carried out isotopic studies on human remains, and Steven Bozarth of the University of Kansas has implemented botanical analysis on organic material.

Although reports on the excavations and analyses concerning the Nojol Nah site centre have been submitted to the Institute of Archaeology, Belmopan, Belize, and have been made fully available by Dr. Tom Guderjan to any interested party, Nojol Nah has not been published at the time of writing. Therefore I am including (with the permission of Dr. Tom Guderjan) a synopsis of the Nojol Nah site centre data that is relevant to my research, fully acknowledging the efforts of William T. Brown and Dr. Jason Barrett and their respective teams. The information contained in this chapter comes exclusively from the site reports written by the excavators (Barrett and Brown 2008; Barrett and Brown 2009; Barrett and Majewski 2010; Brown and Barrett 2009; Brown 2010a; Brown 2010b; Brown 2011a; Brown 2011b; Brown 2009; Brown and Plumer 2012; Brown and Plumer 2014; Brown, Plumer and Vance 2013; Das Neves 2012; Dickson 2009; Dickson, Barrett and Brown 2011). Images are included courtesy of Tom Guderjan. When discussing the structures and groups in this chapter I have added the appellation 'NN' to clearly demarcate them from the TM (Tulix Mul) and NOS (Nojol

## 9. The Nojol Nah Site Centre

Nah settlement) excavations, although on Brown and Barrett's maps the NN prefix does not appear.

It is possible, argue Barrett and Majewski (2010), that the architecture of the site core may have been designed around a cruciform architectural plan, although this configuration may simply reflect the nature of the topography upon which the site core was built (Dickson et al. 2011, 29). The site was map was divided into grid squares (Fig. 272) and individual structures and architectural groups took their names from these grid squares.

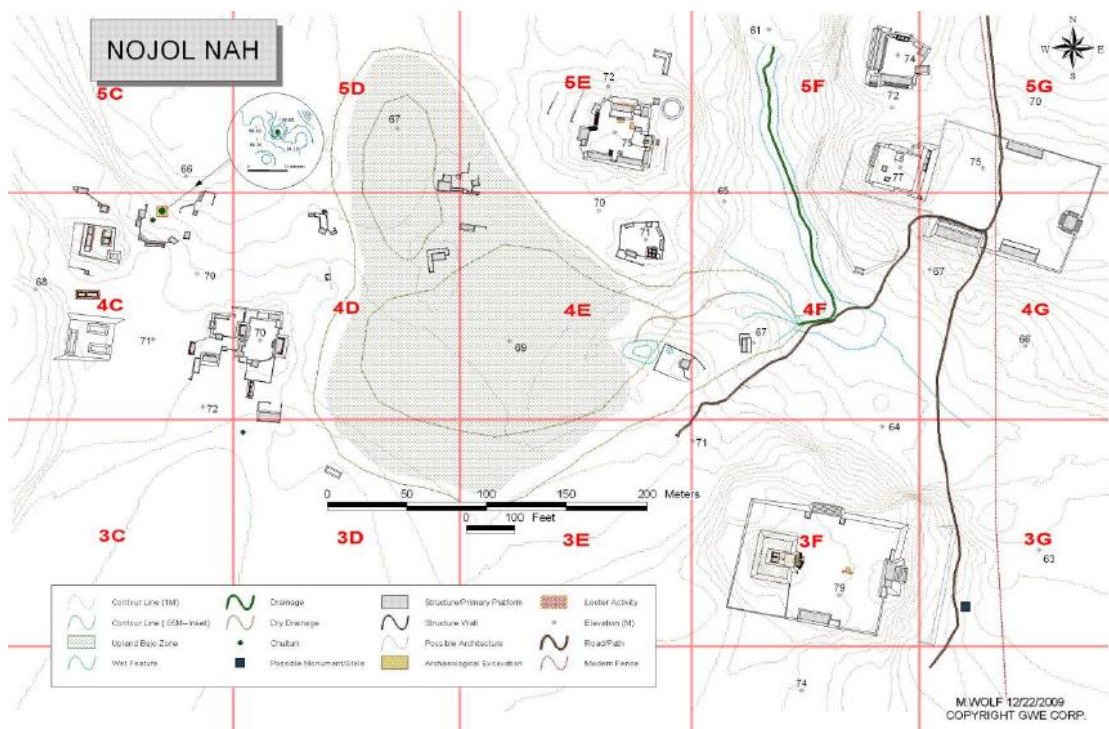


Figure 272 Map of The Nojol Nah site centre (Marc Wolf) with grid squares (Barrett and Majewski 2010, 60)



**Str. NN-3F1**

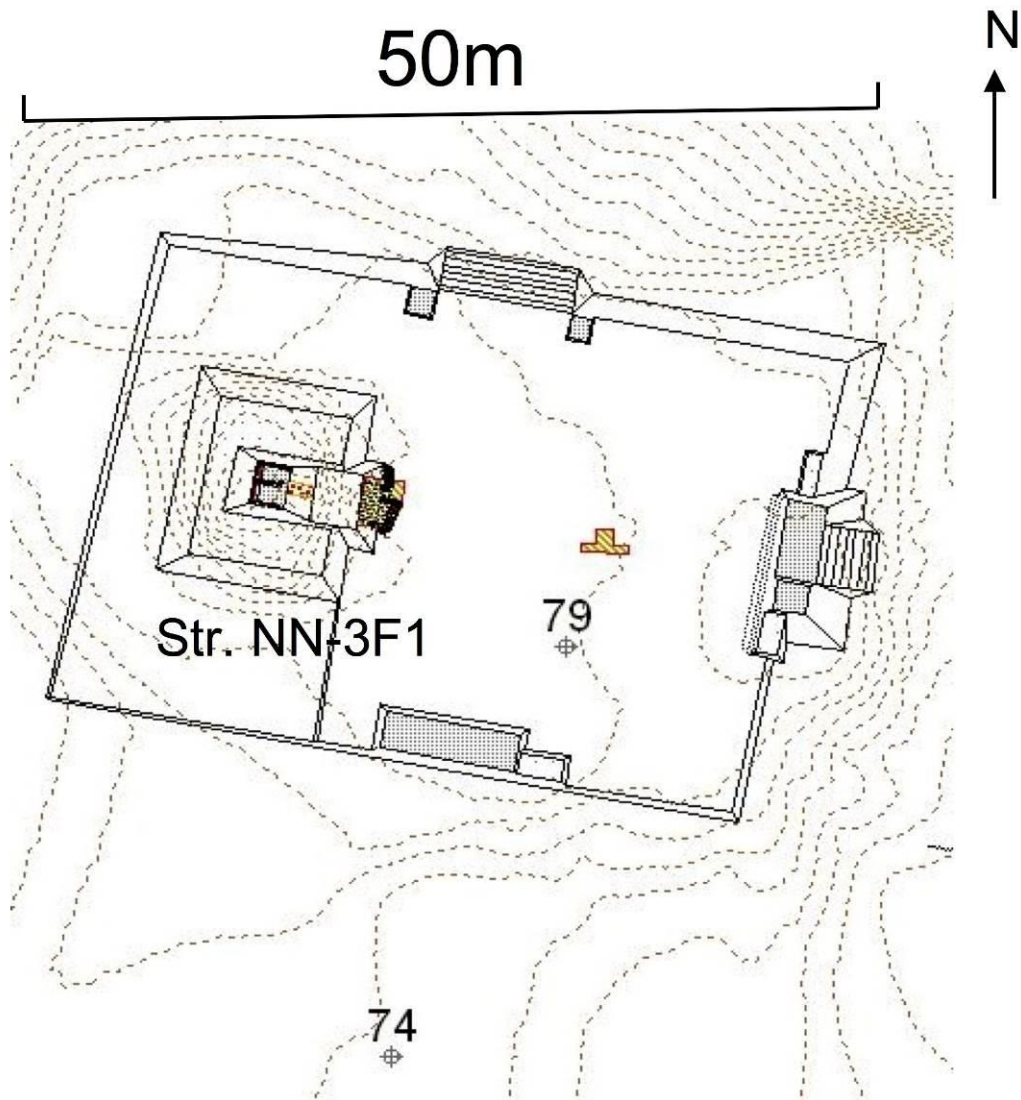


Figure 273 Map of the NN-3F1 platform (cropped and annotated version of an original map by Marc Wolf)

Str. NN-3F1 bordered a plaza containing three other structures (Fig. 273), located on top of a modified natural hill (Dickson 2009, 99). Operations at Str. NN-3F1 were designed to strip the humic layer off the mound to expose the architecture, and to see if any dates for abandonment could be obtained. The structure measured approximately 5m in height, and excavators estimate that the structure would have

## 9. The Nojol Nah Site Centre

been 4x6m (Dickson et al. 2011). On top of Str. NN-3F1 was a vaulted tomb that had been subject to looting (Fig. 274). The exterior of the structure was stripped between 2008 and 2010 (Fig. 275); however no excavation inside of the building has been undertaken to date. Based on architectural style, Guderjan (2009, 12) suggests that much of Str. NN-3F1 was built during the Early Classic. A Postclassic censer (Fig. 276) was found on top of the Str. NN-3F1 mound, suggesting that there was some sort of revisitation during the Postclassic perhaps by people on a form of pilgrimage.



Figure 274 Photograph of looted tomb atop of Str.NN-3F1. Direction of photograph unknown (Sam McLellan)

## 9. The Nojol Nah Site Centre



Figure 275 Photograph of Str. NN-3F1 excavations in progress, taken facing west (Sam McLellan)



Figure 276 Photograph of part of the Postclassic censer found at the top of Str. NN-3F1 (Sam McLellan)

### The NN-4C1 Group

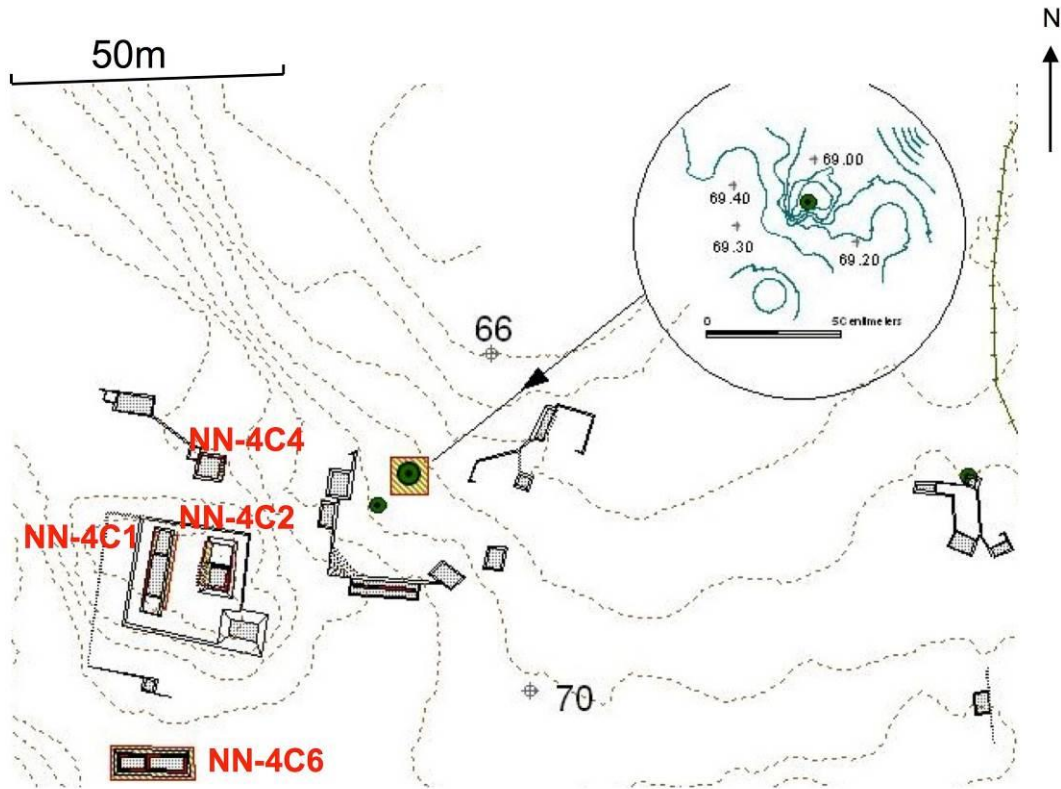


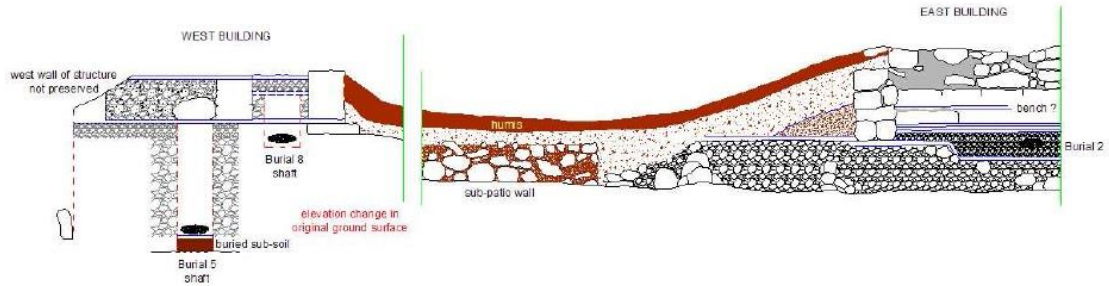
Figure 277 Map of the NN-4C1 group platform with Str.s indicated (cropped and annotated version of an original map by Marc Wolf)

**Overview:** Excavations were initially implemented in the NN-4C1 grid square area (Fig. 277) in 2008 with the purpose of establishing whether there was a ball court in this location. Excavations continued at the NN-4C1 group in subsequent years, with a total of 7 structures partially excavated.

#### Excavations at Structures NN-4C1 and NN-4C2

In 2008, Dr Jason Barrett undertook excavations to determine whether a small hinterland ball court was present in the NN-4C area of the site core, between Structures NN-4C1 and NN-4C2. The proposed ball court playing surface lay between two structures that appeared to have sloping sides, but excavation revealed that the slope was due to post-abandonment depositional processes (Fig. 278).

## 9. The Nojol Nah Site Centre



**Figure 278** Cross section of the 2008 excavations of a proposed ball court (Barrett 2009, 65)

Str. NN-4C1 and Str. NN-4C2 each consisted of a platform that supported a masonry building. Excavations into the platforms revealed that there were six burials (Burial numbers 1, 2, 5, 6, 8 and 11) all found in sub-floor contexts, with two covered additionally by benches (Barrett and Brown 2009, 66). Burial 1 was a 12-14 year old child with evidence of spina bifida and irregular jaw Str., and was a primary, flexed interment. Burial 2 comprised the well preserved remains of a young child; however the legs and lower body were missing. Burial 5 consisted of the poorly preserved remains of an adult with many missing elements, suggesting that there may have been post interment removal; Burial 6 was also in poor condition, crushed by the rubble matrix surrounding it, but a small jade fragment and an obsidian blade thought to be associated with this burial were recovered – missing skeletal elements indicated that this may have been a secondary interment. Burial 8 represents a young child between the ages of 3 and 6. This burial, although in fair to good condition, had elements missing and therefore may have been a secondary burial, and a piece of an obsidian blade was recovered from the matrix around the burial; however it is not clear if the obsidian was directly associated with Burial 8 or was a happenstance inclusion in the ballast around the burial. Burial 11 comprised the poorly preserved remains of an adolescent, who showed pathological signs of anaemia; this burial had two matching conch carved pieces (Fig. 279) associated with it (Brown and Barrett 2009, 110-135; Barrett and Brown 2009, 67-70).

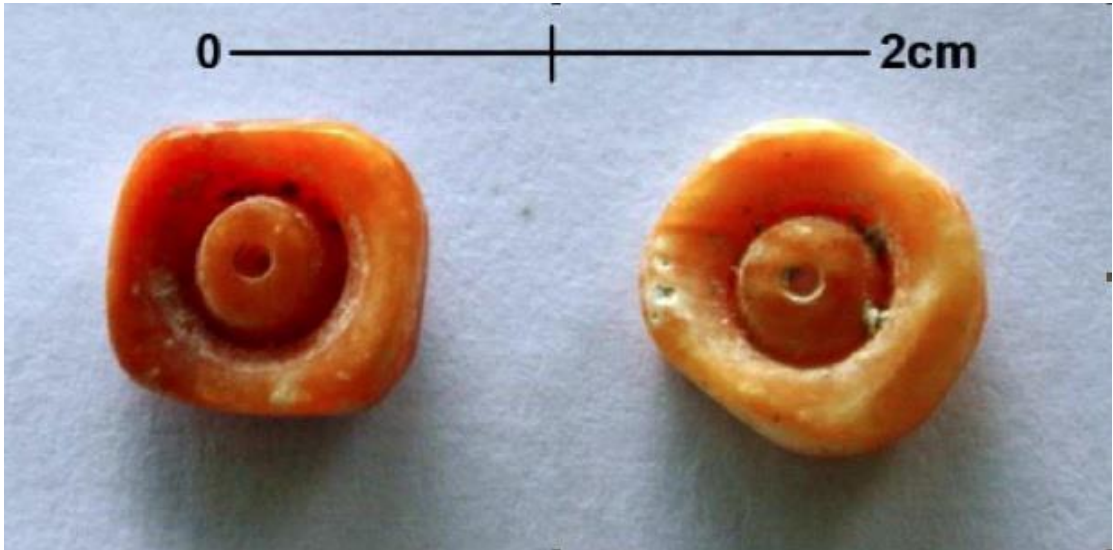


Figure 279 Photograph of conch shell ornaments associated with Burial 11 (Barrett and Brown 2009, 70)

### Excavations at Str. NN-4C4

The north (Str. NN-4C4) and south (Str. NN-4C6) structures of the NN-4C plaza were also subject to excavations during the 2008 field season. Str. NN-4C4 (Fig. 277) was hypothesised to have a ritual significance by the excavator. Although the answer to this question was inconclusive, a cache containing a large amount of ceramics and lithics was discovered along the southern side of the structure (Barrett and Brown 2009, 85). There was one burial found within the platform supporting the Str. NN-4C4 building – Burial 9. Burial 9 was a fairly well preserved skeleton of an adult male roughly 45 years old, with a carved shell - shaped like a 6 pointed star (Fig. 280) - associated with the grave (Barrett and Brown 2009, 86).



Figure 280 Photograph of shell ornament from Burial 9, Str. NN-4C4 (Barrett and Brown 2009, 86)

### Excavations at Str. NN-4C6

Str. NN-4C6 (Fig. 277) was built on a ridge. Two major strata were identified during the excavation of Str. NN-4C6 – a humic layer and a collapse layer. Str. NN-4C6 was oriented along an east-west axis, and it measured approximately 15.5m east-west, and at least 5.5m north-south (Brown 2011b, 77). A total of five rooms (Rooms 1-5) were excavated, and the supporting platform was excavated down to bedrock. Excavations of Str. NN-4C6 were instigated to determine its relationship to the other buildings in the architectural group, and to determine if possible the structure's function. No

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overall map of this structure has been produced to date. Excavations began in 2008 with the work of Barbara Hughes (unpublished) who uncovered two of the five rooms (Rooms 1 and 2), and excavated four sub floor burials in Room 1 (Str. NN-4C6-R1) – Burials 3,4,7, and 10 (Fig. 281). Both rooms contained benches.

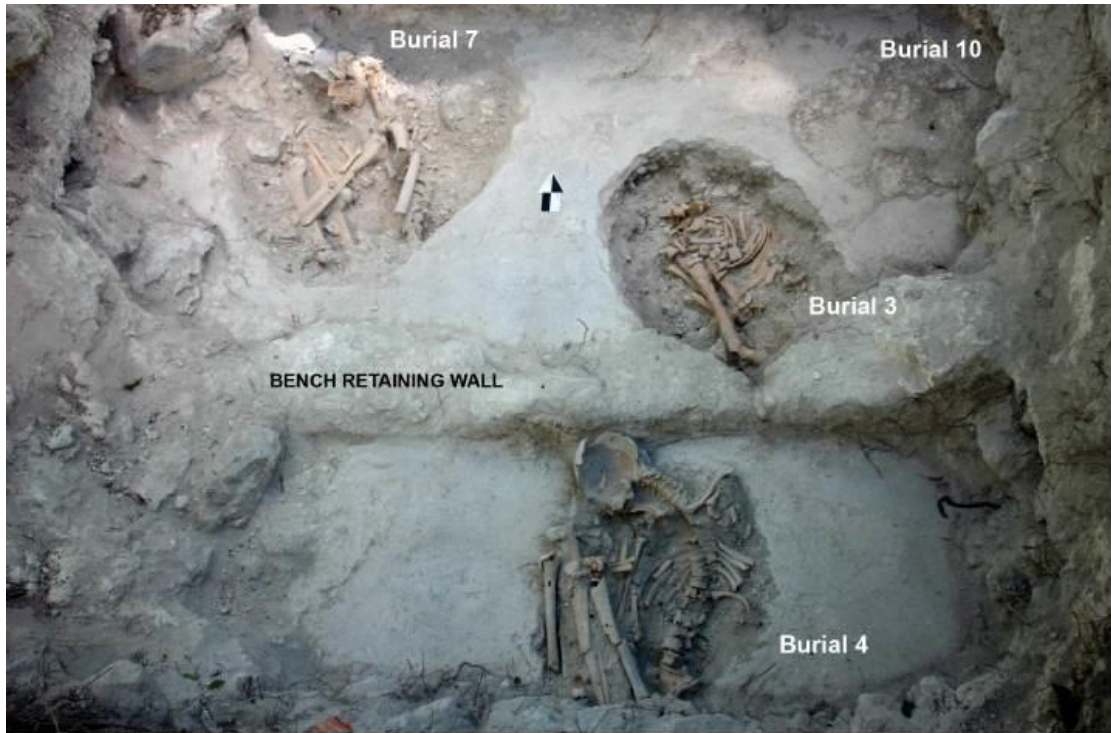


Figure 281 Photograph of Burials uncovered in Str. NN-4C6-R1 during the 2008 field season. Photograph taken facing north (Barrett and Brown 2009, 90)

Burial 3 was located within the fill of the bench of Str. NN-4C6-R1. This burial contained the remains of 3 individuals – a probable male sub-adult (aged between 12 and 15), a young child, and an older adult of indeterminate sex. The Burial 3 bones were in fair condition, but with many elements missing. It is likely that the sub-adult was a primary burial that intruded into the earlier graves of the adult and young child (Brown and Barrett 2009, 115). Burial 4 was underneath the bench of the Room 1, where the floor beneath the bench had been cut into and the Burial 4 individual interred. The Burial 4 individual was an adult female of advanced age who was interred in a tightly flexed position, lying on her right side. The woman had undergone cranial modification as a child, and her occipital bone was abnormally flat. In addition she had advanced osteoarthritis in her spinal column (Brown and Barrett 2009, 117-120). Burial 7 was found under the floor to the north of the bench of the south building, and



## 9. The Nojol Nah Site Centre

contained one individual – a robust adult male, aged around 40. The burial was in very good condition and, like Burial 4, the individual was interred in a tightly flexed position, lying on the right side. This individual was relatively healthy at the time of death, with only minor arthritis present on his spinal column (Brown and Barrett 2009, 124-127). Burial 10, like Burial 3, was inside the bench inside the southern Str., and contained the remains of two individuals. The two skeletons were in poor condition with many elements missing; therefore, not much can be said about either individual (Brown and Barrett 2009, 133).

Excavations in Str. NN-4C6-R1 continued the following year (2009) and the excavator reports that the upper floor of Str. NN-4C6-R1 yielded an assemblage consisting of a single shell bead, a metate fragment and 22 ceramic sherds with some diagnostic Late Classic sherds. A lower floor was uncovered, and beneath the lower floor was a chamber (the west chamber) which contained the remains of two individuals that were assigned the burial numbers 12a and 12b (Fig. 282).



**Figure 282 Photograph of Burial 12 in situ, Str. NN-4C6 (Brown 2010b, 81)**

Burial 12a was the best preserved skeleton found to date at Nojol Nah (Fig. 283), and was the largest individual recovered at Str. 4C6, with an estimated stature of 1.68 -

## 9. The Nojol Nah Site Centre

1.77m (5.54 to 5.81 feet) (Brown 2010a, 130). This adult male was buried in a flexed position on his right side, with the head to the north, facing west. Burial 12b was an adolescent, between 12-16 years old of indeterminate sex. The burial position of this individual was not possible to discern as the remains were scattered throughout the chamber that they shared with Burial 12a. The chamber contained grave goods of two round pendants, a dog tooth pendant, a worked sherd and an obsidian blade (Fig. 284).



Figure 283 Photograph of the Burial 12a skeleton, Str. NN-4C6 (Brown 2010a, 128)



Figure 284 Photograph of grave goods found associated with Burials 12a and 12b, Str. NN-4C6 (Brown 2010a, 131)

**Str. NN-4C6 Room 2:** Room 2 (Str. NN-4C6-R2) was to the east of Str. NN-4C6-R1, and measured 5.8m east-west, and 1.6m north-south, and contained a large bench that measured 2.3m east-west by 1.2m north-south located in the centre of the room.

## 9. The Nojol Nah Site Centre

Directly east of the main bench was a raised floor area, Floor 1 (Brown 2010b, 88). Upon removal of the bench, a large ceramic vessel's base was found resting against the north wall of the structure. Underneath the foundation ballast of the upper floor (Floor 1) was a lower floor (Floor 2). Excavated in Floor 2, and sealed by Floor 1 were four burials, Burials 14, 15a, 15b, and 16. Burial 14 was in very poor condition when excavated as the bones were badly damaged by water and by the sharp cobbles of the construction core (Brown 2010a, 135). Burials 15a, and 15b (Fig. 285) were partially dug into Floor 2, but some elements were in fact above the lower floor's surface (Brown 2010b, 91). Burial 16 was also dug into Floor 2 (Fig. 285), but at a deeper level than Burials 15a and 15b.



Figure 285 Photograph of Burials 15a & 15b (left) and Burial 16 (right) in and above the Floor 2, Room 2, Str. NN-4C6 (Brown 2010b, 92)

Burial 15a and 15b were commingled. Burial 15a comprised the remains of a small child, aged between 2-4 years old. This child's skeleton was in a state of excellent preservation, with only parts of the cranium missing, and the bones were strewn 'haphazardly' amongst those of Burial 15b, who was a young female, aged between adolescent and young adult, and was between 1.57 - 1.56m (5.16 to 5.43) feet tall (Brown 2010a, 138-140). Individual 15b was buried flexed on her left side, with her head to the south facing north towards the Burial 16 individual, who was an older

## 9. The Nojol Nah Site Centre

adult female. Burial 15b showed some evidence of dental modification on her upper central incisors and canines, and also cranial flattening of the frontal bone. Burial 16 was an adult female who was buried on her right side with the head facing the young female of Burial 15b. Burial 16 had dental modification of her upper central incisors (Fig. 286).



Figure 286 Photograph of modified teeth of Burial 16, Str. NN-4C6 (Brown 2010b, 142)

**Str. NN-4C6 Room 3:** Room 3 (Str. NN-4C6-R3) was the westernmost room of Str. NN-4C6, and yielded the most artefacts of all the rooms. Str. NN-4C6-R3 was built abutting Str. NN-4C6-R1 and slightly offset, with a ‘wall’ of only one course, and no discernible floor. Brown (2010b) contends that Str. NN-4C6-R3 was a palapa-style structure with a thatched roof. That is, the single course of stone would have supported wood poles and the thatched roof.

## 9. The Nojol Nah Site Centre

Str. NN-4C6-R3 was filled with what was either a midden or a termination deposit (Figs. 287-288), consisting of '6,889 pot sherds, 84 flakes, 24 bifaces, 15 fragments of obsidian, eight fragments of groundstone, six specimens of worked bone (including a bone earring and flute fragment), a worked conch shell, a spindle whorl, two fragments of a clay anthropomorphic whistle, a ceramic bird head effigy and four C14 samples' (Brown 2010b, 94). The deposit had two distinct layers and overlay bedrock (Fig. 289). Brown believes that the most parsimonious explanation for the deposit was likely that it had been a midden - rather than a termination offering - that was dumped into a room that had fallen into disuse at some time before the structure was abandoned. This interpretation is based upon the fact that all artefact types were represented, including food refuse, and that none of the artefacts within the deposit was intact (Brown 2010b, 95), although the excavator does not note whether or not the deposit was dumped all at once or accumulated over time.



Figure 287 Photograph of top layer of the Room 3 deposit in situ, Str. NN-4C6-R3 (Brown 2010b, 95)

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Figure 288 Photograph of layer 2 of the Room 3 deposit in situ, Str. NN-4C6-R3 (Brown 2010b 96)



Figure 289 Photograph of bedrock directly under the Room 2 deposit, Str. NN-4C6-R3 (Brown 2010b, 96)

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**Str. NN-4C6 Room 4:** Room 4 (Str. NN-4C6-R4) adjoined Str. NN-4C6-R2, and was connected to Str. NN-4C6-R2 by a doorway. Str. NN-4C6-R4 measured 4m east-west by 2.3m north-south. The exterior wall was heavily impacted by large tree roots; therefore the original height was impossible to estimate. Excavations of the floor revealed two burials – Burials 17 & 18 – in shallow oval pits. These two individuals were interred facing each other, but with a thin upright slab, wedged tightly between the floor foundation ballast, between the bodies (Brown 2010b, 97), which was almost certainly a grave marker (Brown 2010a, 145). Like Burials 15 and 16, Burials 17 and 18 were dug into the floor, (Fig. 290) but some elements of the burials were higher than the floor surface, suggesting that the floor predates the burials.



Figure 290 Photograph of Burials 17 and 18, with stone slab between them (Brown 2010b, 99)

Burial 17 was an adult to old adult male, and the skeleton was poorly preserved and in fragmentary condition. The individual was interred in a flexed position, on his left side with the face looking towards Burial 18. There were no grave goods associated with Burial 17. Burial 18 was also an adult to old adult male, with the skeleton in good condition, who was buried in a flexed position on his right side, with his face to the north, looking towards Burial 17. Burial 18 displayed cranial modification in the form of

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occipital and frontal flattening (Brown 2010a, 146). No grave goods were found in association with Burial 18. The similarity among Burials 15a, 15b & 16 and 17 & 18 is interesting because the floors beneath which they were sealed - although in separate rooms - were at the exact same elevation, which suggests that the individuals may have been interred during the same occupation phase. The fact that the four adults of these five burials were separated by gender is also likely to be significant.

**Str. NN-4C6 Room 5:** The final portion of NN-4C6 that was excavated was designated Room 5 – although it is not entirely clear if this is a room at all. ‘Room 5’ is represented by a floor that turned up to the south wall of Room 1. This floor was very well preserved, and excavator Brown suggests that this might have been a paved walkway leading from Str. 4C6 to another building 10-15m away (Brown 2010b, 100).

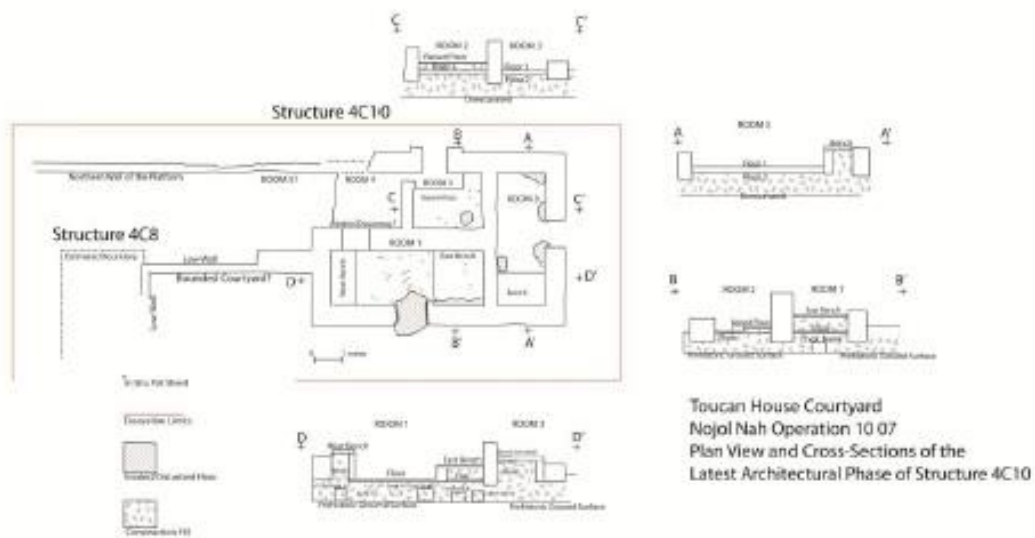
### **Str. NN-4C6 Summary:**

Str. NN-4C6 is likely to have been an elite residence that may have served other functions as well – such as a mortuary building. Evidence that this was an elite structure is based on two observations (Brown 2010b): First, the size of the structure and its multiple construction phases suggests that a large force would have been needed to build NN-4C6; however access to the building was clearly restricted by architectural elements meaning that it is likely that only a few selected individuals could gain access (this point was not expanded on by the excavator). Second, although Str. NN-4C6 did contain 12 individuals, potentially there was enough space for many more burials, so it is likely that the 12 individuals who were interred within Str. NN-4C6 were carefully selected. Although it could be argued that the paucity of grave goods denies the elite status of these individuals, parallels can be drawn between the Great Houses of Chaco Canyon in North America, where just being buried in a sacred building denotes importance within a community (Brown 2010b, 101), or following McAnany (1998) the individuals buried might invoke ancestral claims on the land.



**Str. NN-4C10**

**Overview:** Str. NN-4C10 (Fig. 291) was located in a courtyard group that also contained Structures NN-4C8 and NN-4C9 (no map of this area was available at the time of writing). The courtyard had a construction date in the Early Classic (AD 250-600) based on the recovery of Tzakol 1-3 ceramics found in the construction core of Str. NN-4C10. The group was abandoned in the Late to Terminal Classic, based on ceramics recovered from floor assemblages that dated to AD 850-900. The majority of the work at this courtyard focussed on Str. NN-4C10 as this was the best preserved building in this complex, and so would yield the most in situ data. The group was nicknamed the Toucan House Courtyard by the excavator (Brown 2011a, 67).



**Figure 291 Plan view and cross-section of Str. NN-4C10 (Brown 2011a, 65)**

Excavations at Str. NN-4C10 ‘yielded 14,400 pot sherds, three whole ceramic vessels (two Early Classic shallow bowls and a Chilar fluted cylinder jar), 334 flaked lithics, 59 biface fragments, 23 obsidian blades, seven fragments of groundstone, two ceramic figurines, two coral jade beads, two jade ornaments (possible earrings or pendant), one jade bead, one jade celt, a fragment of worked jade, a possible jade tooth inlay, one spiral-cut *Oliva* sp. shell bead, mother-of-pearl fragments, and nine human interments under the floors of various rooms in Str. NN-4C10. One of the most

## 9. The Nojol Nah Site Centre

significant finds of the season was four stone crypts under the floor of Room 1 [NN-4C10-R1]' (Brown 2011a, 64).

Str. NN-4C10 contained the most complex architecture within this courtyard group. The mound measured 6.5m north-south, by 10.5m east-west, and stood 1.4m above the modern ground level. The latest platform supported a building of four rooms, and possibly a fifth, but the northwest corner of the structure had been destroyed over time, either by looting or a tree fall.

**Str. NN-4C10 Room 1** The largest room (NN-4C10-R1) was in the southwestern portion of the structure, and measured 2.10m north-south, and 5.65m east-west. NN-4C10-R1 was contiguous with Rooms NN-4C10-R2 and NN-4C10-R4 to the north, with NN-4C10-R3 to its east, and contained 2 benches, designated the East and West benches. From NN-4C10-R1, Brown and his team recovered 1,621 ceramic sherds, 40 lithic flakes, nine bifaces, seven human burials, two obsidian flakes, and one cache consisting of a jade celt, a fragment of worked jade, and two Early Classic shallow bowls (Brown 2011a, 76). Burials 35 and 36 were interred in crypts in the east bench of NN-4C10-R1, and Burials 30 and 32 were interred in the west bench. There were three further burials located within the construction material beneath the platform floor beneath NN-4C10-R1, and the three burials were set into the old ground surface: Burials 33, 34, and 37 (Fig. 292).

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**Figure 292** Photograph of Burial crypts lying atop the old ground surface beneath Str. 4C-10 in the area of Room 1 (Brown 2011a, 86)

Burial 35 was an older female adult who was interred in a crypt capped by the east bench in NN-4C10-R1 (the crypt measured 65cm north-south, 53cm east-west and stood roughly 24 cm tall). The lack of small skeletal elements such as teeth in this burial coupled with the otherwise good preservation of the recovered remains suggested that this was a secondary burial (Brown 2011b, 145). Grave goods found with this woman included two jade ornaments (Fig. 293), one worked sherd of pottery, some painted plaster and 19 ceramic sherds.



Figure 293 Photograph of one of the jade ornaments from Burial 35 (Brown 2011a)

Also capped by the east bench was the crypt burial of another older woman, which was designated as Burial 36. This crypt lay to the west of Burial 35, and measured 5cm north-south, 40cm east-west, and 41cm high. The grave goods found in possible association with Burial 36 were a fragment of a mano, and 17 sherds. Like Burial 35, due to the missing elements of the skeleton and its otherwise good preservation, Brown (2011b) contends that Burial 36 was also a secondary burial.

Beneath the floor (Floor 1) of the west bench, almost directly above of the Burial 32 crypt was Burial 30 (Fig. 294). Burial 30 was a primary interment of an older adult male. There were no grave goods associated with Burial 30. The male individual was buried in a flexed position with his head to the south.



Figure 294 Photograph of Burial 30 above Burial 32, Str. NN-4C10 (Brown 2011a, 86)

The Burial 32 individual was a young adult of indeterminate sex. The interment was secondary, and the remains were un-articulated, and poorly preserved. There were no grave goods associated with the burial; the crypt was the westernmost of those found in a line underneath the floor of NN-4C10-R1.

Burials 33, 34, and 37 were underneath the Floor 1 of NN-4C10-R1. Burial 33 lay in the core associated with the construction of Floor 1. The individual was an adult of indeterminate sex, in poor condition. A mostly complete Chilar fluted cylinder jar, dating to the Late Classic, was found in the construction core above the skeleton. Burial 34 was an older adult female, the body was interred in a tightly flexed position with the head to the south, and there were no grave goods present. Burial 37 was an adult male 'situated between crypt Burial 36 to the east and non-crypt Burial 34 to the west' (Brown 2011b, 147). The crypt for Burial 37 measured 73cm north-south, 52 cm east-west, and was 44cm in height, and was the largest of the crypts found beneath the floor of NN-4C10-R1. The Burial 37 skeleton was poorly preserved, and judging from the lack of smaller elements, it is likely that this was a secondary interment,

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although eleven of his teeth were present. There were no grave goods associated with this individual.

**Str. NN- 4C10 Room 2:** Room 2 (NN-4C10-R2) was north of NN-4C10-R1 and measured 2.07m north-south by 2.60m east-west. There was a low bench in NN-4C10-R2 (Fig. 295) and doorway leading to NN-4C10-R4. Brown (2011a, 87) reports recovery of 1,960 sherds, 61 flaked lithics, and 2 obsidian blades and adds that the artefact density and dark colour of the deposit suggested that it represented material discarded in the room (perhaps a midden or dump) prior to the abandonment of the building.



Figure 295 Photograph of Room 2, Str. NN-4C10 (Brown 2011a, 85)

**Str. NN-4C10 Room 3:** Room 3 (NN-4C10-R3) was the eastern-most room of Str. 4C-10. It measured 4.9m north-south, and 1.8m east-west, and contained a 65cm tall bench in the southern third of the room (Fig. 296). There were two burials in this room, Burial 29, and Burial 31. Burial 29 was in the construction core of NN-4C10-R3's bench, and contained an older male who was interred in a tightly flexed position with the head to the south. This was in all likelihood a primary burial; many of the smaller fragile bones are present. The individual had lost most of his teeth whilst still alive – most of the tooth sockets on the right side of the mandible had closed (Brown 2011a, 88). Grave

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goods associated with Burial 29 were a fragment of jade – possibly a dental inlay, a spiral-cut *Oliva* sp. shell bead, and fragments of mother-of-pearl.



Figure 296 Photograph of Room 3, Str. NN-4C10, photo taken facing west (Brown 2011a, 89)

Burial 31 lay underneath the upper floor of NN-4C10-R3, in the northern corner of the room, and had been cut through the floor and sealed. This burial was the best preserved burial in the entire Nojol Nah burial assemblage of 2010 (Fig. 297). This was a primary interment of a young woman who ‘was transitioning from late adolescence to young adulthood’ (Brown 2011b, 139). There were three upright stone slabs surrounding this individual, likely to be the remnants of a stone crypt, similar to those seen NN-4C10-R1.



Figure 297 Photograph of Burial 31: well preserved skeleton from Str. NN-4C10

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There were no grave goods found in association with Burial 31; however the individual had dental modifications of her upper central incisors and upper canines (Fig. 298), and there are indications that her occipital bone was flattened.



Figure 298 Photograph of dental modification of the Burial 31 individual (Brown 2011b, 140)

**Str. NN-4C10 Room 4:** The final room cleared during the 2010 was Room 4 (NN-4C10-R4) (Fig. 299), which was adjacent to NN-4C10-R2, and measured 2.07m north-south and 1.6m east-west. Due to time and manpower constraints the floor of NN-4C10-R4 was not penetrated, therefore it is not known whether there were any sub-floor burials.



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Figure 299 Photograph of Room 4, NN-4C10. Photo taken facing east, with room 2 in the background (Brown 2011a, 92)

**Excavations at Structures NN-4D2, NN-4C11, NN-4C12**

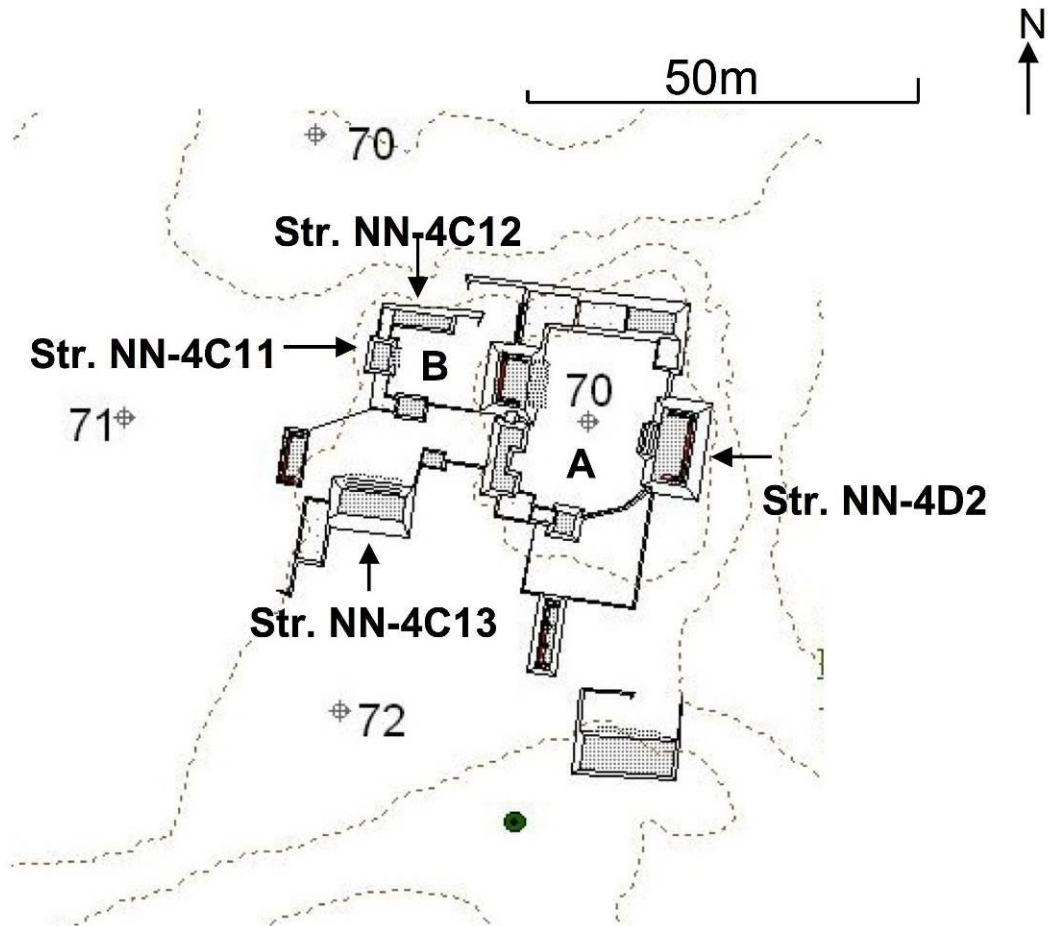


Figure 300 Map of the 2013 excavation group platform with structures indicated (cropped and annotated version of an original map by Marc Wolf)

**Overview:** The group consisted of two courtyards, designated Courtyards A and B (Fig. 300). A is the larger of the two courtyards, and lies to the east, and uphill from Courtyard B. Both of the courtyards shared a basal platform, and preliminary analysis suggests that the site was occupied on multiple occasions, although not necessarily continuously (Brown 2013, 34). Notable finds during the 2012 field season included 19 human burials, and a large cache that may have represented what the excavator terms a termination ritual (Brown 2013, 38), and in 2013 a large chultun beneath Str. NN-

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4C11 was excavated. Work at this architectural complex focused on Structures NN-4C11, NN-4C12, and NN-4D2; however, only Str. NN-4C12 (Fig. 301) was completely excavated, whereas the other two were only tested.

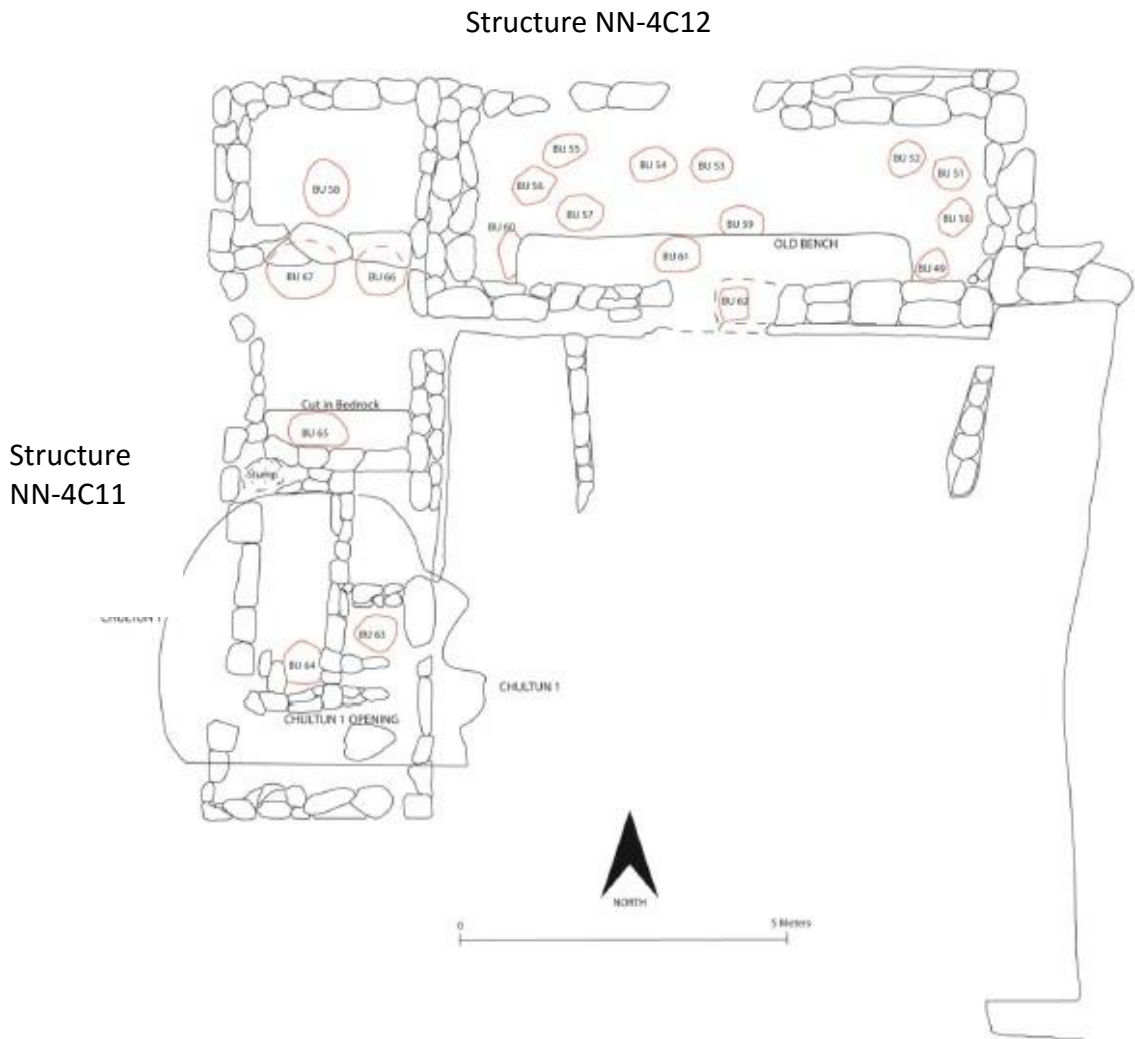


Figure 301 Plan map of Courtyard B, indicating position of burials and the chultun (Brown 2014, 18)

### Str. NN-4D-2

Str. NN-4D2 (Fig. 300) was roughly 16m long, 10m wide, and the height of the standing walls were 3.5m tall. Around 15% of the structure has been excavated to date, and so far three possible construction phases have been identified (Brown 2013, 39). Five postholes were discovered (Fig. 302) suggesting that the structure had a

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wooden component to its superstructure. These were filled with post abandonment degraded plaster (Brown 2013, 44)



Figure 302 Photograph of post holes; photograph taken facing north, Str NN-4D2 (Brown 2013, 45)

Much of the last phase of Str. NN-4D2 had collapsed, and so its final dimensions were indeterminate. In the construction fill to the south of the south wall were five human burials – Burials 44 to 48), with at least two of the burials interred in stone crypts (Fig. 303), similar to those found beneath Str. NN-4C10. The crypts appear to have been capped by a floor of a later phase, which has since eroded, which reflects renovation/modification of the building over time. The recovery of Daylight Orange, Dark Night variety ceramics (Fig. 304) suggest that the burials were interred during the Late to Terminal Classic period.

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Figure 303 Photograph of stone crypt found beneath the construction core at Str. NN-4D2 (Brown 2013, 49)



Figure 304 Photograph of Late to Terminal Classic Daylight Orange, Dark Night variety ceramic sherd, Str. NN-4D2 (Brown 2013, 54)

Burial 44 was a young adult found in a limestone crypt in the construction fill of the last surviving architectural phase of Str. NN-4D2. This individual was likely to have

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been a secondary burial due to missing elements, and the bones were disarticulated. The individual had a notched central incisor (Fig. 305).



Figure 305 Photograph of notched central incisor from Burial 44, Str. NN-4D2 (Brown et al. 2013, 240)

Burial 45 was a middle-aged adult male also interred in the construction core underneath the latest stage of Str. NN-4D2. There was no crypt associated with Burial 45, and the skeleton was in fair condition. The burial was likely to have been a

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secondary burial due to missing skeletal elements; however a jade ornament, likely to have been an ear spool or pendant (Fig. 306), was recovered within the Burial 45 context.



Figure 306 Photograph of jade ornament from Burial 45, Str. NN-4D2 (Brown 2013, 53)

Approximately a meter south of and half a meter east of Burial 45, was Burial 46, interred in the construction core of the latest surviving architectural phase of Str. NN-4D2 (Brown et al. 2013, 246). This individual was an old adult male in a crypt, with the head to the south, facing east. There were no grave goods recovered from this burial.

Burial 47 was a young adult female, and like Burial 45 and was a burial with no formal crypt, located in the construction core of the final surviving building phase of Str. NN-

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4D2. Burial 47 was a very poorly preserved secondary burial, with many elements missing.

Burial 48 was another disarticulated, probable secondary pit burial, again within the terminal construction fill of Str. NN-4D2. This individual was a middle-aged female adult, with no grave goods.

The burials (44-48) within the terminal construction fill of Str. NN-4D2 all appear to be secondary interments, and this suggests that the individual's bones were purposefully curated before being specifically placed in the construction fill. Therefore suggesting that the burials may have had some significant dedicatory purpose

### **Str. NN-4C12**

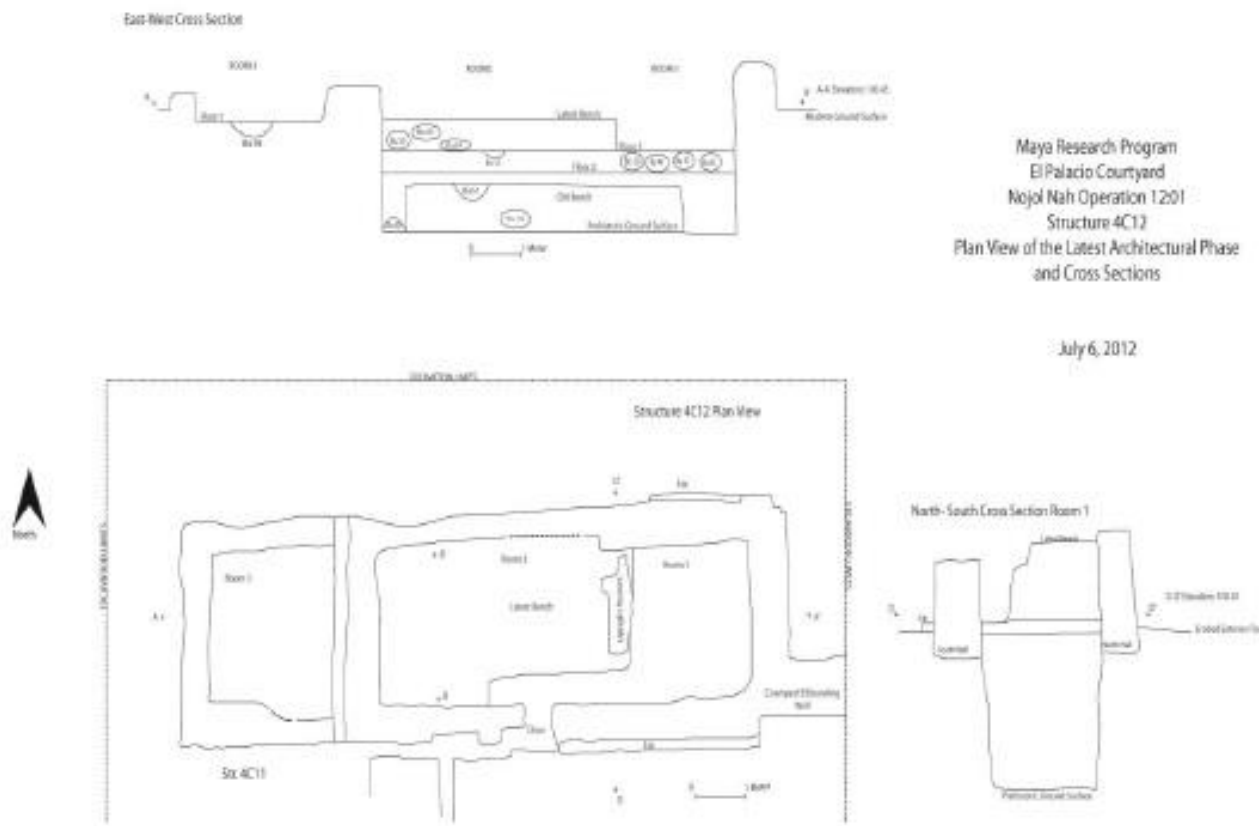
*Overview:* The standing architecture of Str. NN-4C12 (Fig. 307) measured 12.3m east-west, and 3.6m north-south, and consisted of three rooms (Fig. 308). This building comprised a platform supporting a masonry building and had at least two major architectural phases, which are evidenced by an earlier bench that runs underneath Rooms in Str. NN-4C12-R1 and Str. NN-4C12R-2, as well as the presence of multiple floors. Within the construction core of the various architectural phases were fourteen human burials: three middle-aged females, two young adult females, a middle aged male, a young adult male, two older adults (sex indeterminate), a middle aged adult (of indeterminate sex), two young adults (of indeterminate sex), an adolescent, and a young person who was at the boundary between being a child and an adolescent. These burials were designated as Burials 49-62. (Brown 2013, 56).



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Figure 307 Photograph of Str. NN-4C12 showing the latest architectural phase, photo taken facing east (Brown 2013, 57)



Maya Research Program  
 El Palacio Courtyard  
 Nojol Nah Operation 1201  
 Structure 4C12  
 Plan View of the Latest Architectural Phase  
 and Cross Sections

July 6, 2012

Figure 308 Plan and cross-section of Str. NN-4C12 (Brown 2013, 61)

## 9. The Nojol Nah Site Centre

**Str. NN-4C12 Room 1:** Room 1 (NN-4C12-R1) was the eastern-most room of Str. 4C12, and measured 2.5m by 2.3m. It had no exterior door, and access was through NN-4C12-R2. There were at least two floors (Floors 1 and 2), and in the construction core between these two floors, were four human burials (Burials 49-53) that were sealed beneath Floor 1, that appear to have all been interred at the same time. Burial 49 was a middle aged female adult who was lying directly on the lower floor surrounded by construction fill, in a flexed position with the head to the south. This individual had notched central and lateral incisors (Fig. 309), and cranial modification, namely fronto-occipital flattening (Brown et al. 2013, 265). As well as having modified teeth, this woman had extreme dental problems – five massive cavities, and the mandible showed signs of advanced periodontal disease (Fig. 310).



Figure 309 Photographs of notched teeth from Burial 49, Str. NN-4C12 (Brown et al. 2013, 266)



Figure 310 Photograph of mandible of Burial 49 showing extreme dental problems, Str. NN-4C12 (Brown et al. 2013, 261)

Burial 50 was a young adult of indeterminate sex who, like Burial 49, was interred in the construction core beneath the Floor 1 and above Floor 2 of Str. NN-4C12. This person had many cavities, modified teeth (notched central incisors), and a healed fractured arm. The burial position was tightly flexed, with the head between the knees.

Burial 51 was also one of the cluster of burials in the construction core between the Floors 1 and 2 of Str. NN-4C12, associated with Floor 1. This person was a young adult at the time of death and was buried flexed with the head to the south. Burial 52 was a young female adult who was interred as part of the collection of burials between the two floors (Fig. 311). This young woman also had dental problems, particularly cavities on the upper and lower molars, and there was cranial modification in the form of frontal flattening; she was found in association with a biface.

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Figure 311 Photograph of Burial 52 with biface, Str. NN-4C12 (Brown 2013, 91)

All of the burials sealed by Floor 1 of NN-4C12-R1 (Fig. 312) were flexed burials with no grave goods. Interestingly 3 of the 4 individuals buried in this context had severe, and what must have been painful, dental problems, and 3 of the 4 had cranial and/or dental modifications.



Figure 312 Photograph of Burials 49, 50, 51 and 52 beneath Floor 1 of Str. NN-4C12 (Brown 2013, 90)

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**Str. NN-4C12 Room 2:** Room 2 (NN-4C12-R2) was the largest, and central room of Str. NN-4C12, and was dominated by a large bench that separated it from NN-4C12-R1, and measured 4.8m east-west by 2.6m north-south. There were multiple floor layers, and an older buried bench (Fig. 313). The older buried bench spanned NN-4C12-R1 and NN-4C12-R2 showing that at an earlier stage there was one large room in place of the two later ones. Early Classic ceramics were recovered from the lower construction levels of this structure, and Late to Terminal Classic ceramics from the later phases, 'suggesting occupation of the building during these times, although it is not clear if it was continually occupied or just during these two phases' (Brown 2013, 86) with a gap in occupation.



**Figure 313** Photograph of the earlier, buried bench that ran between Rooms 1 and 2, Str. NN-4C12 (Brown 2013, 87)

Many of the lower floor layers of NN-4C12-R2 showed signs of burning corresponding to where human burials were interred. Nine burials in total were recovered from various depths within NN-4C12-R2 – Burial 62 was a in a crypt beneath the southern doorway in the oldest architectural phase, and included a jade ornament; Burials 54,

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55 and 56 were in the construction fill of the latest bench; Burial 53 was in a grave pit dug into the floor beneath the latest bench; Burial 57 was lying on floor 2; and Burials 59, 60, and 61 were found under floor 2 in association with earlier architectural phase beneath the earlier bench.

Burial 53 was located beneath the floor of the latest bench; this individual was a middle-aged adult male. The burial was in good condition; however there were many skeletal elements missing, so this was likely to have been a secondary burial. There were no grave goods with this man.

Burial 54 was a young adult female, with excellent preservation (Fig. 314), although some elements are missing, so again this is likely to have been a secondary burial. The cranium however was intact, and frontal flattening was in evidence, and one of the upper incisors was notched. This young woman was buried in a flexed position with the head to the north, facing south, within the construction fill of the latest bench. Burial 55 and Burial 56 were also found within the same bench context. Burial 55 was a child or adolescent of indeterminate sex, this burial appears to have been scattered throughout the construction fill/core of the bench (Brown et al. 2013, 287). Burial 56, like Burial 55, was also found scattered through the construction fill/core of the bench. This individual was a middle-aged adult male, and the skeleton had many elements missing, and was in poor condition – likely to have been a secondary burial.



Figure 314 Photograph of the Burial 54 cranium with frontal flattening, Str. NN-4C12 (Brown et al. 2013, 280)

Burial 57 was found lying on the lower floor of Room 2. This burial was in fact two commingled individuals, with at least one of them a young adult male. Beneath the lower floor were 3 more burials. Burial 59 was found in the construction ballast of the lower floor. This burial turned out to be two commingled individuals, both adolescents. They were buried in a pit-type grave and the preservation of these skeletons was poor to fair, and likely to have been secondary. Burial 60 was found to the west of the lower bench beneath room 2, lying on top of the old land surface. This was an old adult of indeterminate sex, and the skeleton was poorly preserved and highly fragmented. Burial 61 was interred intrusively in the lower bench. This was a middle-aged adult female, who was buried in a flexed position with her head to the southeast, facing northwest. Both of her top central incisors had been modified. No grave goods were recovered from Burial 61.

Burial 62 was the final burial recovered from Room 2. This burial is the only burial that can be definitely associated with the earliest construction phase of the building (Brown et al. 2013, 301). This individual was an old adult of indeterminate sex found buried in a stone crypt (Fig. 315) beneath the doorway of NN-4C12-R2. Burial 62, like the others

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of NN-4C12-R2, appears to be secondary. There was a jade ornament found in association with this individual (Fig. 316).



Figure 315 Photograph of stone crypt of Burial 62, Str. NN-4C12 (Brown 2013, 104)



Figure 316 Photograph of jade ornament from Burial 61, Str. NN-4C12 (Brown 2013, 106)



**Str. NN-4C12 Room 3:** Room 3 (NN-4C12-R3) was the westernmost Room of Str. NN-4C12, and is contiguous with the northernmost part of Str. NN-4C11. Very little of the exterior walls or internal floors of NN-4C12-R3 were preserved, and this may reflect the fact that the room did not have a masonry roof, and was thus unprotected from the elements after abandonment after the collapse of the thatched roof (Brown 2013, 85). This room measured 2.55m by 2.3m. One floor was found, and beneath this was Burial 58 – a middle-aged female who was buried in a crypt.

### **Str. NN-4C11**

**Excavation of Str. NN-4C11:** Alongside Str. NN-4C12, Str. NN-4C11 formed the southern boundary of the Courtyard B group (Fig. 300) The interior measurement of the largest room (Str. NN-4C11-R1) of Str. NN-4C11 was 11.2m by 3.8m. Only one floor was found during the excavation of Str. NN-4C11-R1, although there was some architectural renovation evidenced by remodelling of a bench (Brown 2014, 223). There was a bench spanning the southern portion of the room. Bedrock was located 91cm beneath the floor. Within the sub floor fill were Burials 65, 66 and 67. At the time of writing, the burials from Str. NN-4C11 had not been analysed. Str. NN-4C11-R2 was south of Str. NN-4C11-R1. Its interior measurements were 1.7m by 1.11m. There was a single floor in Str. NN-4C11-R2, and bedrock was 70cm below the floor. Str. NN-4C11-R3 was south of Str. NN-4C11-R2, and measured 72cm by 80cm. Bedrock was reached 70cm below the surface, and deep in the sub floor construction fill was Burial 63 (Brown 2014, 252). Str. NN-4C11-R4 was a 'small room' (Brown 2014, 235). No measurements were reported from Str. NN-4C11-R4. Bedrock was located 65-70cm below the floor, and Burial 64, identified in the field as an old adult woman was sealed by the floor, against the southern wall (Fig. 317).



**Figure 317** Photograph of Str. NN-4C11-R4, with Burial 64 in background. Photograph taken facing north, Str. NN-4C11 (Brown 2013, 236)

Prior to excavation of Str. NN-4C11 in the external southeastern corner of the structure, Brown and his team discovered evidence of a ritual event that happened just prior to the site being abandoned (Figs. 318 & 319). This ritual event is represented by different types of artefacts, and deer bones. Some of the deer bone was still articulated, suggesting that there was still tissue on it when it was deposited, and Brown remarks that ‘the presence of the articulated limb [...] strongly suggests that the site was abandoned after the arm was deposited, because the smell of rotting flesh would have been unpleasant to say the least. It is highly probable that some sort

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of ceremony, most likely involving feasting, took place immediately before the courtyard was abandoned' (Brown 2013, 102).

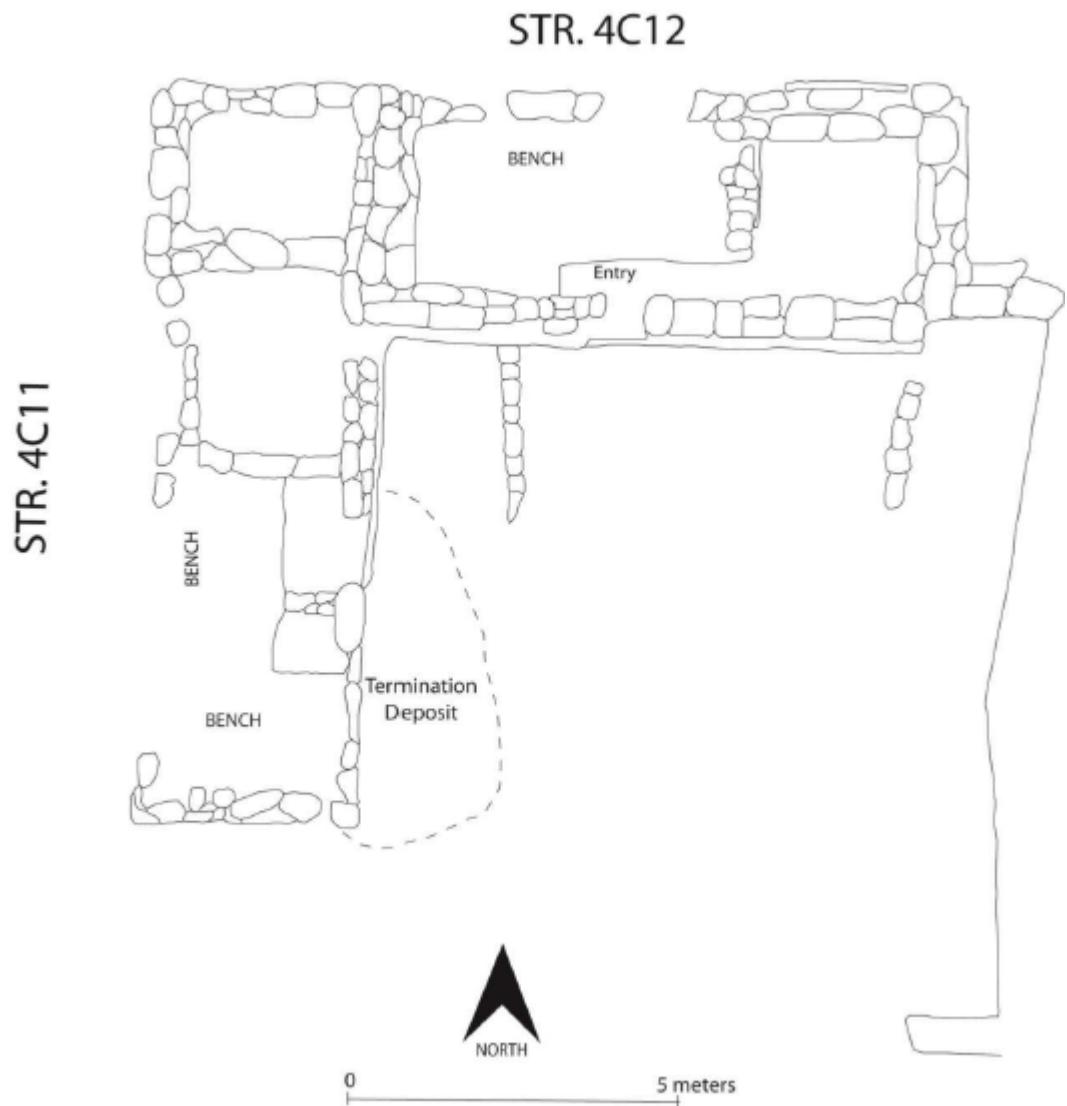


Figure 318 Map of Str. NN-4C11 indicating position of the ritual event, marked on here as 'Termination deposit' (Brown 2014, 210)



Figure 319 Photograph of remnants of feasting event in situ, Str. NN-4C11 (Brown 2013, 103)

Artefacts (Figs. 320 to 323) found in the ritual deposit included obsidian and chert blades, bifaces, ceramic spindle whorl, deer antler awl tip, ceramic anthropomorphic figurines, including a bird head figure, a jaguar tooth pendant, shell ornaments, and thousands of ceramic sherds (Brown 2013, 103-146). The ceramic sherds have been dated to the Tepeu 1 Late Classic period (Brown 2014, 23).

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Figure 320 Photograph of ceramic spindle whorl, Str. NN-4C11 (Brown 2013, 116)



Figure 321 Photograph of ceramic bird head, Str. NN-4C11 (Brown 2013, 124)



Figure 322 Photograph of jaguar tooth pendant, Str. NN-4C11 (Brown 2013, 125)



Figure 323 Photograph of shell ornament, Str. NN-4C11 (Brown 2013, 127)

All of these artefacts represent a multitude of activities that took place at this structure. For example, obsidian blades were often used in ritual blood-letting contexts, utilitarian pottery would have been used for storing food and water, stone tools would have been used for a variety of purposes, including building, food preparation and hunting, spindle whorls for textile and clothing production, ceramic figurines for ritual or decorative purposes, and jaguar teeth and shell for ornamental purposes. The presence of all of these material types indicates that the inhabitants of

## 9. The Nojol Nah Site Centre

this area of the Nojol Nah elite residence area used materials close by – such as lithic and clay resources, as well as having access to more exotic materials from further afield such as shell and obsidian.

### The Chultun

The 2013 field season saw the discovery of a chultun 1m below the construction core of the platform in the southeast corner of Str. NN-4C11, directly below the position of the ritual event uncovered in 2012 (Fig. 324). The chultun's opening was 62cm NE-SW and 57cm roughly E-W (Brown 2014, 252).

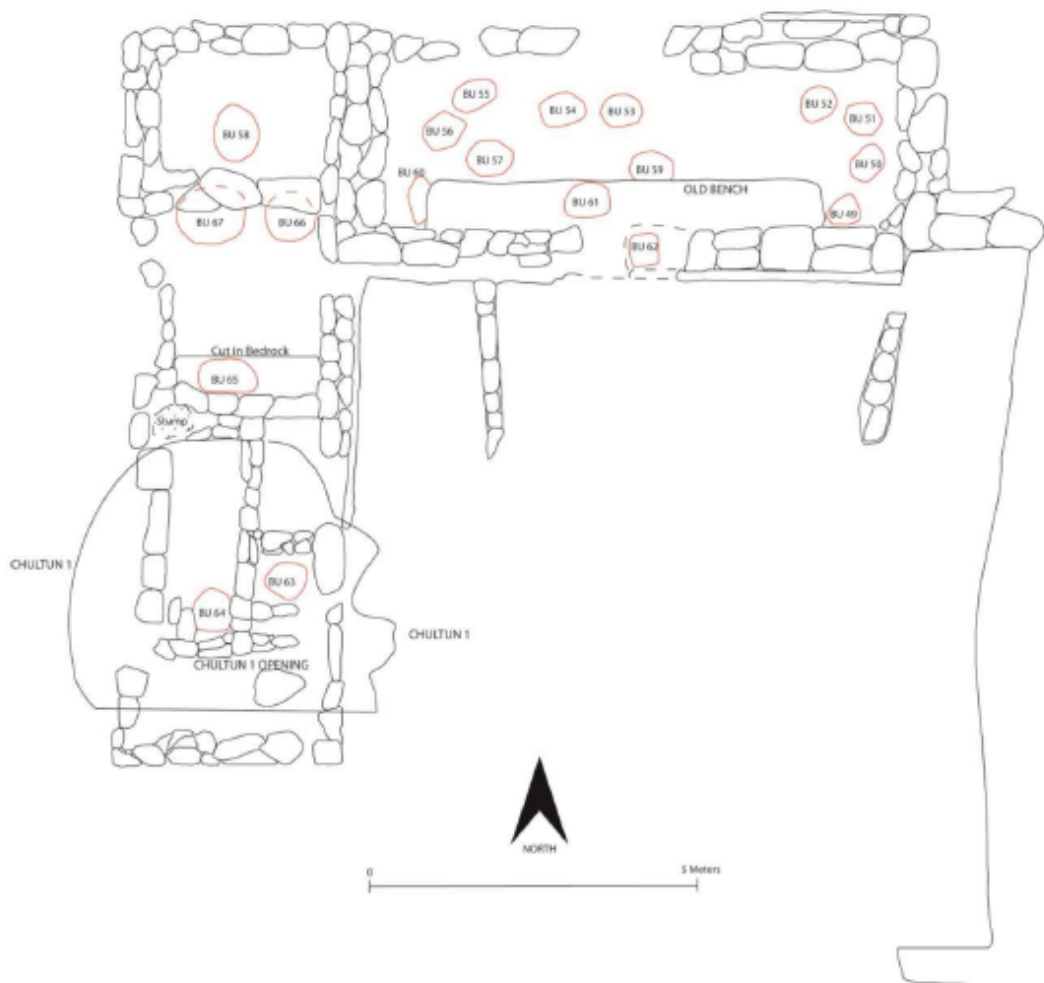
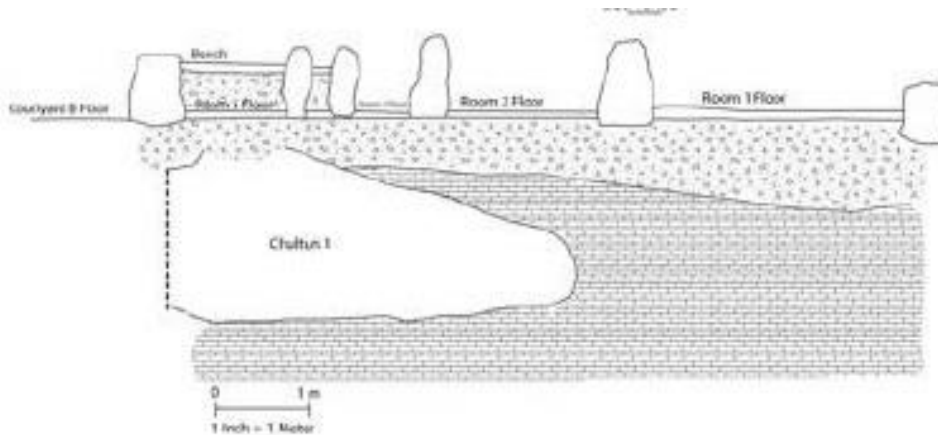


Figure 324 Map of Str. NN-4C11 indicating position of the chultun (Brown 2014, 212)

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A chultun can be generally described as a hole cut into the bedrock close to a site of habitation (Dahlin and Litzinger 1986, 722). Sediment analysis carried out by Steve Bozarth (University of Kansas) on organic materials recovered from the Str. NN-4C11 chultun showed the presence of maize, but no other cultigens (W.T. Brown 2014 Pers. Comm; Bozarth 2014). The chultun yielded 29,051 artefacts including pottery sherds, lithics, and 200 special finds. The chultun (Fig. 325) has been dated ceramically to AD 500 – 600, therefore dating the construction of Str. NN-4C11 to sometime after this period.



**Figure 325** Cross section of chultun (Brown 2014, 28)

Special finds found from the chultun included several bone needles, a mace or sceptre, a pottery stamp, shell objects, polished bone artefacts including a needle, turtle shell, deer bone, two complete bowls, and a profusion of other items (Brown 2014, 53), as well as multiple examples of polychrome pottery including some with glyphs on (Figs. 326 to 333). The items found in the chultun, like the ritual deposit described previously, point to some of the activities taking place at this location, although the items from the chultun contained objects of a more exquisite and varied nature that were purposefully taken out of circulation when placed into the chultun before it was sealed. The chultun deposit has been interpreted by the excavator as representing a midden, which was formed after the chultun's original function had come to an end (Brown 2014).



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The original function of the chultun is unclear – it may have been used for storage of food or other materials, or it may have been used for a ritual or ceremonial purpose; the only purpose that can be ruled out is water storage due to the porous nature of the bedrock from which its walls were made (Brown 2014, 73). The assessment of the contents as a midden is based on the following four points: 1. The volume and concentration of refuse; 2. The wide variety of materials found within the deposit which represent a spectrum of activities; 3. The abundant organic and food residue; and 4. The scarcity of whole, unbroken or still functional items - with the exception of a small percentage of the artefacts recovered such as the bone needle, and the pottery seal. It appears, from the quantity of the sediment that had built up that the chultun was left open for a long period, whilst the sediment accumulated, before finally being sealed and Str. NN-4C11 being constructed on top of it (Brown 2014, 73).

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Figure 326 Photograph of selected polychrome sherds from chultun, Str. NN-4C11 (Brown 2014, 76)



Figure 327 Photograph of polychrome ceramic from chultun, Str. NN-4C11 (Brown 2014, 77)

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Figure 328 Photograph of pottery seal, Str. NN-4C11 (Brown 2014, 82)



Figure 329 Photograph of ceramic figurine from chultun (Brown 2014, 90)

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Figure 330 Photograph of mace sceptre from chultun, Str. NN-4C11 (Brown 2014, 91)



Figure 331 Photograph of bone needle from Chultun, Str. NN-4C11 (Brown 2014, 91)



Figure 332 Photograph of shell objects from chultun, Str. NN-4C11 (Brown 2014, 93)



Figure 333 Photograph of carved shells from chultun, Str. NN-4C11 (Brown 2014, 100)

Brown (2014, 251) contends that Str. NN-4C11 was an elite residence that, based on ceramic evidence, was occupied for a relatively short period from the Early Classic Tzakol phase to the Late Classic Tepeu 1 phase.

### ***The NN-5E Architectural Complex***

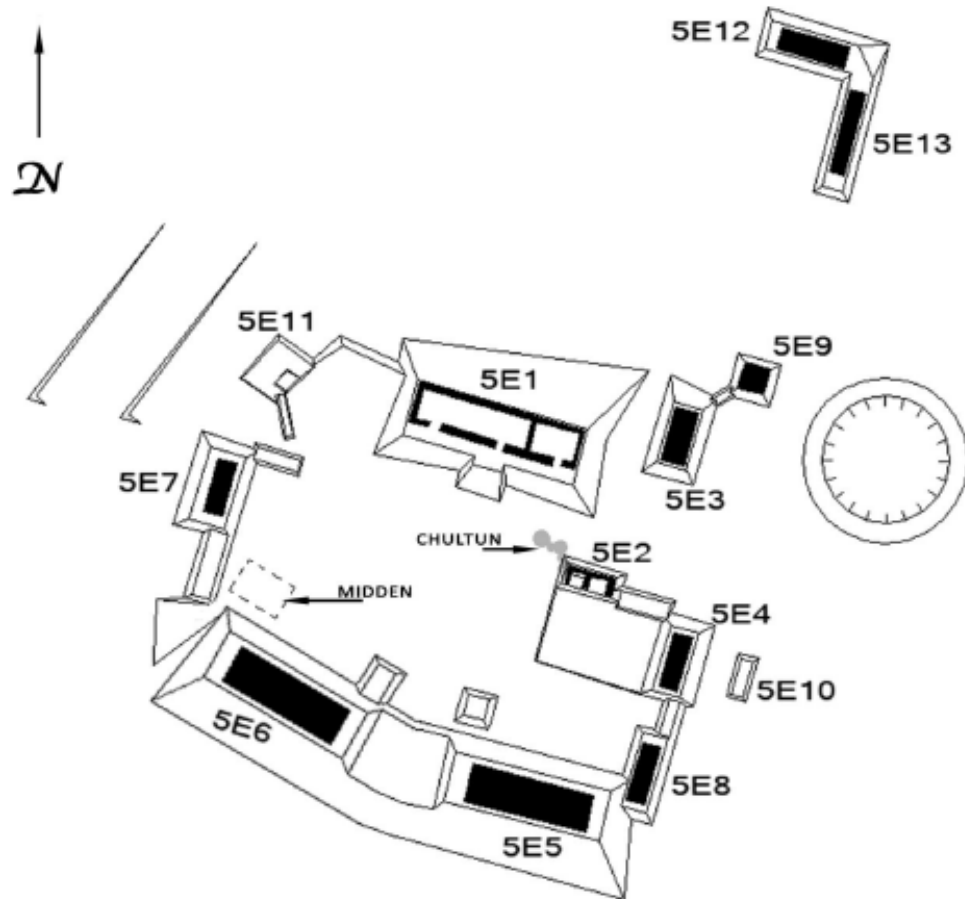


Figure 334 Map of the NN-5E Plazuela Group (Barrett 2011, 39)

**Overview:** The NN-5E architectural complex was composed of a plaza area surrounded by a number of structures (Fig. 334). Str. NN-5E1 was a pyramidal structure on the

## 9. The Nojol Nah Site Centre

north side of the plaza; Structures NN-5E5 and NN-5E6 were two buildings that together formed the southern boundary of the group; Structures NN-5E4, NN-5E8 and NN-5E2 formed a distinct patio area on the eastern side of the NN-5E plaza; Str. NN-5E9 is on the western edge of a possible artificial reservoir (Dickson et al. 2011)

### Str. NN-5E1

Excavations at Str. NN-5E1 were designed to define the architectural features, identify the terminal plaza surface, as well as attempt to identify any activity areas associated with said space (Barrett and Majewski 2010, 62). Excavation units were placed either side of the centreline staircase, at the articulation between the plaza and the base of Str. NN-5E1, and inside the central doorway of the structure. A Postclassic deposit containing a cache of bifacial stones tools, several large ceramic vessels, lithic debris and faunal bone was uncovered 20cm below the modern ground surface, lying on top of roof collapse; the deposit may be associated with the ceramic bird head whistle (Fig. 335) that was found lying on the ground surface 3m away (Barrett and Majewski 2010, 66).



Figure 335 Photograph of Postclassic ceramic bird head whistle recovered near Str. NN-5E1 (Barrett and Majewski 2010, 67)

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A total of 6 burials were recovered from Str. NN-5E1 during the 2009 field season. Burials 20, 21a and 21b were all sealed beneath the surface of the terminal floor at a depth of approximately 30-63cm below the surface of the floor; only Burial 21b had associated grave goods – an obsidian blade. Each of these 3 burials were interred in a sub-floor cist within a matrix of construction ballast (Dickson et al. 2011, 31). Burial 20 was an adult female, buried in a flexed position with her head to the north, facing south, and her skeleton was poorly to fairly well preserved. She suffered from dental issues, and had 9 cavities and a lost right 3<sup>rd</sup> molar (Brown 2010a, 150). Burial 21a was an excellently preserved skeleton, but of indeterminate sex. This individual was also buried in a flexed position with the head to the north, facing south. The Burial 21a skeleton showed evidence of cranial frontal and occipital flattening, as well as dental modifications on the upper canines, and the upper central and lateral incisors (Fig. 336).



Figure 336 Photograph of dental modifications from Burial 21A, Str. NN-5E1 (Brown 2010a, 153)

Burial 21b was likely an elderly female with one modified tooth (the upper central incisor). The burial, unlike Burials 20 and 21a, was interred in a flexed position with the head to the south, facing north. Burial 21b was in a fairly good condition in general, but there were many elements missing, and the cranium was in poor shape.



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Burials 22, 23 and 24 were also recovered from Str. NN-5E1. These 3 burials were sealed below a buried plaster surface that may represent an earlier floor, bench or altar (Barrett and Majewski 2009, 67). Burial 22 was an adult female, aged between 30 and 40 years old. She was buried flexed, on her right side with her head to the north and facing south. Long bone measurements revealed that her height was about 1.61m (5.3 feet) tall, and this woman had had a broken arm, which was well healed before she died (Brown 2010a, 160). There were no grave goods associated with Burial 22. Burial 23 was a poorly preserved adult skeleton with many missing elements. The skeleton was buried in a flexed position; however due to the poor preservation it was not possible to determine the burial position, or any other useful data. Burial 24 was an adult male, with the skeleton in poor to fair condition. This individual was buried in a flexed position with the head to the southwest, facing northeast, and a tip of a bone needle (Fig. 337) was associated with this burial (Brown 2010a, 163).



**Figure 337** Photograph of the tip of a bone needle associated with Burial 24, Str NN-5E1 (Brown 2010a, 163)

Str. NN-5E1 yielded a number of floor assemblages in their primary context, including several complete manos and metates, a groundstone paint pot, obsidian blades, whole pots (smashed when the roof collapsed), as well as numerous bifacial tools – suggesting that the structure may have been hastily abandoned (Barrett and Majewski 2010, 69).

### **Str. NN-5E2**

Str. NN-5E2, located 7m southeast of Str. NN-5E1, was part of a small patio group at the southeastern corner of the plaza. Excavators hypothesised that this small patio group represented the domestic space of separate family groups within the lineage of those occupying the 'palace cluster' (Barrett and Majewski 2010, 70). Excavations revealed floor deposits containing whole (but smashed) pots, bifaces, faunal bones, and a large metate sitting on three triangularly arranged stones. This example of a metate resting on the three stones is believed by the excavators to represent an element of the Maya creation myth (Barrett and Majewski 2010, 70), however this arrangement equally may have been simply a practical one. The presence of burnt walls, and lots of fire-cracked rock in one area of Str. NN-5E2 indicate that a hearth was located there. Judging from the artefacts found in this structure it is likely that Str. NN-5E2 was a food preparation area.

The chultun located close to Str. NN-5E2 contained five distinct chambers, and did not yield a high volume of artefacts.

### **Str. NN-5E4**

Excavations at Str. NN-5E4 were initiated to determine whether primary floor deposits observed in other structures in the Str. NN-5E group occurred here, as well as to determine the function of Str. NN-5E4 – given its proximity to Str. NN-5E2 which had been identified as a food production area (Dickson et al. 2011, 33). Investigations at Str. NN-5E4 revealed the remains of several ceramic storage vessels, as well as manos and metates, leading the excavators to assume that this structure was residential (Barrett 2011, 40).

### **Str. NN-5E5**

A side-notched arrow point was found on the ground surface near Str. NN-5E5, but not associated with the occupation of the structure, indicating that human activities were taking place at Nojol Nah after the site was abandoned. Floor assemblages found inside Str. NN-5E5 have been dated to the Late Classic. Burial 27 in the Nojol Nah

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burial sequence was sealed beneath a degraded plaster floor, and consisted of poorly preserved bone fragments, with their age, sex and the orientation of the burial impossible to determine.

### **Str. NN-5E6**

Excavations at Str. NN-5E6 were limited by the presence of several large trees, whose roots penetrated the structure. So excavations here were not as extensive as the excavator would have desired. A floor deposit consisting of whole vessels, as well as stone tools suggested a terminal room deposit that was purposefully smashed in situ, and portions of the smashed vessels were found over collapsed architectural stones, suggesting that the smashing of the vessels and the collapse of the wall happened as part of the same event (Barrett 2011). Beneath the terminal floor surface was Burial 25. Burial 25 was an adult female that was buried in a flexed position. This burial may have been associated with some cave stones, and a piece of polychrome, however this is not certain, as the burial was not inside a delineated crypt, so any artefacts found close by may have been intrusive. A degraded L-shaped bench feature was identified in the eastern portion of the room, and beneath the floor of the original portion of the bench (before the addition to form the 'L' shape) was another burial – Burial 26. This burial was located underneath loosely aggregated cobble fill, 60 cm below the floor. Barrett (2011, 50) reported that Burial 26 was in 'horrible' condition, with most elements in fragments, or degraded beyond recognition. There were some identifiable vertebrae; however these were not in the correct anatomical position. Some of the cranial fragments appeared to be coated in cinnabar – therefore showing that the skeleton was treated after the soft tissue had decayed, indicating that this likely was a secondary burial.

Within the fill of the addition to the bench that formed the 'L' shape of the bench was a large mano, a metate fragment, and a worked shell fragment. Underneath the floor in this area, was a burial cist that contained Burial 28. Burial 28 was highly fragmented – however some complete articulated elements such as feet bones, ribs, and vertebrae suggest that Burial 28 was a primary burial. The burial was in a flexed position with

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the cranium to the east, and the feet to the west. An intact Balanza Black basally impressed bowl, dating to the Early Classic was found at the head of Burial 7 (Fig. 338).

In the northwestern corner of Str. NN-5E6, a small ancillary structure was found, which was identified as a platform. The clearing of sediment atop this platform revealed the presence of a large volume of diverse objects – including ceramic figurine fragments, a stone spindle whorl, obsidian blade fragments, ceramic sherds, lithic tools, as well as six shell mother-of-pearl rings ranging between 1.25 and 2.5 cm in diameter (Fig. 339). This artefact concentration, tentatively identified as Terminal Classic but potentially Postclassic, may have been a termination offering/deposit, but more likely - due to the presence of faunal bones - a domestic midden (Barrett 2011, 53).

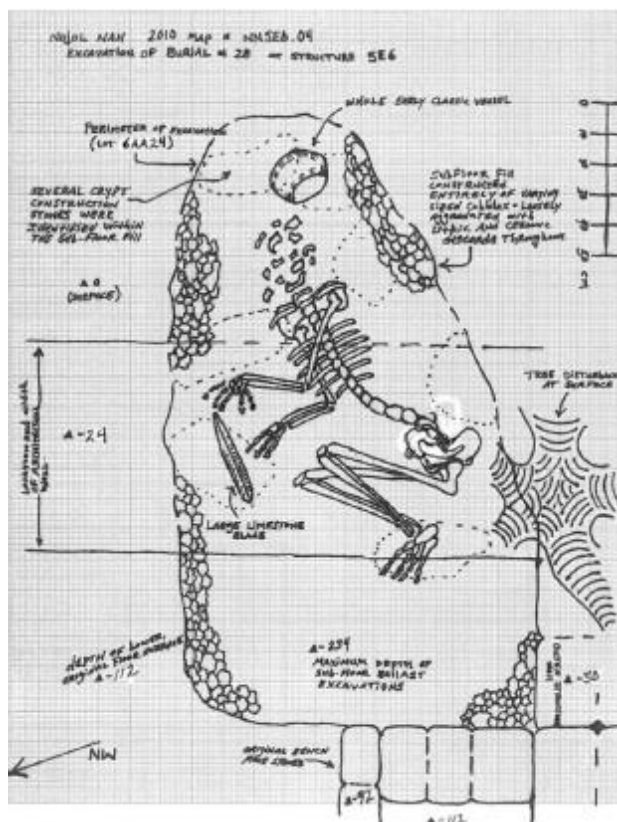


Figure 338 Field map of Burial 28 with position of Early Classic Balanza Black Bowl, Str. NN-5E6 (Barrett 2011, 54)

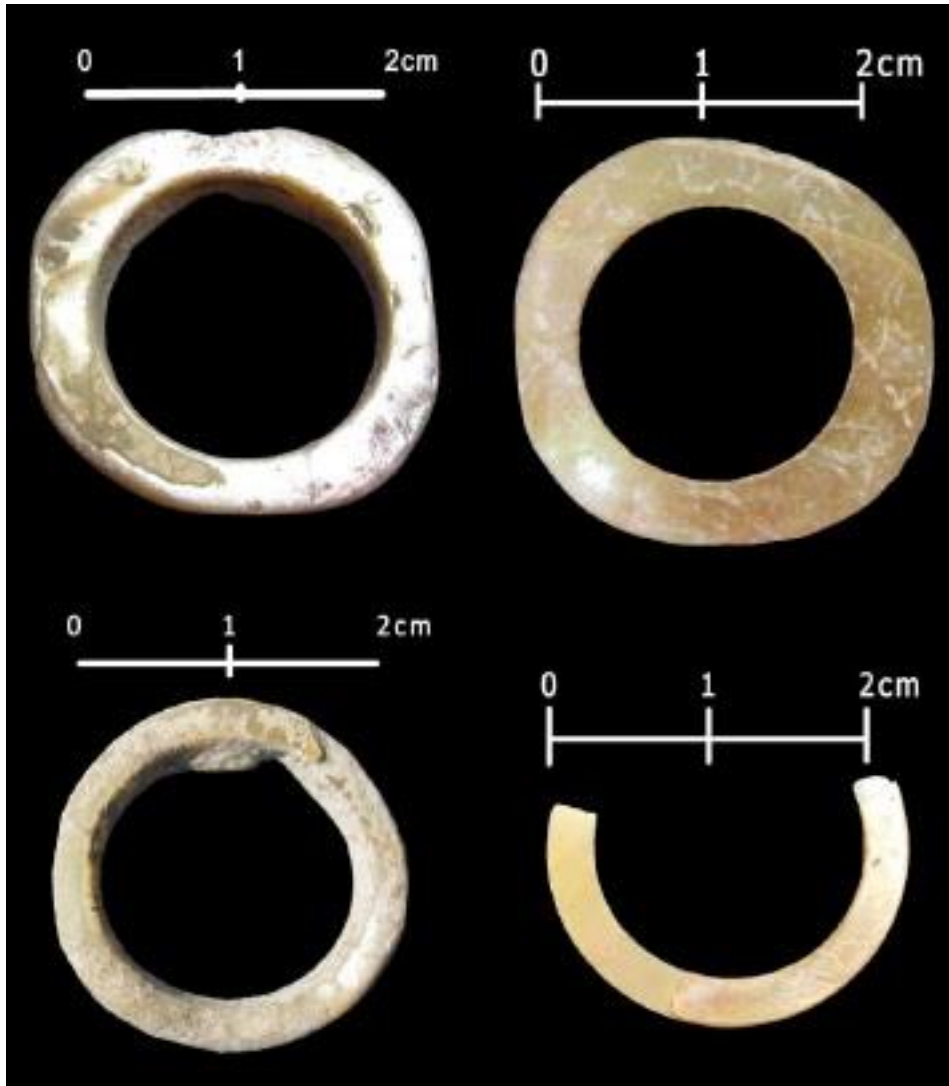


Figure 339 Photograph of sample of the mother-of-pearl shell rings, Str. NN-5E6 (Barrett 2011, 55)

### The NN-5E Architectural Group Summary

The excavators believed that the NN-5E Plazuela group represented the residence of Nojol Nah's most influential lineage, and was the primary residential palace complex at Nojol Nah (Dickson 2011, 30). The reasoning behind this is as follows: The Plazuela group is located on a rise in the topography, with sharply descending terrain to the north and east. It is at the same elevation as a large administrative complex that is 500 ms to the east of the NN-5E Plazuela; in addition the NN-5E Plazuela is the largest and most centrally located example of residential architecture anywhere in the site (Dickson et al. 2011, 30). In summary, excavations relating to the NN-5E Plazuela

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revealed a number of interesting findings. The structures are not in direct alignment with each other, suggesting that they were not designed as a single articulated architectural feature. The presence of clusters of artefacts throughout the courtyard that, although they have attributes in common with special termination deposits, are most probably in fact abandonment assemblages. This conclusion was reached by the principle excavator, because many of the artefact assemblages were mixed with fill sediments and large and small cobbles, therefore suggesting that they accumulated through time, rather than were placed there in a single event (Barrett 2011, 57). A total of eight mother-of-pearl shell rings were located within the context of the NN-5E Plazuela excavations, however no evidence of shell working activities were identified. The architecture of the courtyard contained structures with both high and low masonry walls, and the structures were built in multiple phases, beginning in the Early Classic, and continuing into the Late Classic.

### ***Isotope analysis on the Nojol Nah Skeletal Population***

In 2011 Virginia Das Neves of the Australian National University carried out stable strontium, oxygen and carbon isotope analysis on human tooth enamel, from 14 individuals from the NN-4C and the NN-5E architectural complexes at Nojol Nah. Isotopic analysis was introduced to the study of human populations by Jonathan Ericson, who realised that isotope ratios in human skeletons could be linked to dietary input. This meant that the analysis of isotope in human and animal populations could provide more nuanced explanations about things like migration, marital residence, and dietary difference than was available before (Ericson 1985, 50).

The two architectural groups from which Das Neves obtained here samples are 300m walking distance from one another. The goals of her study were threefold: 1. To establish an initial data set of strontium oxygen and carbon isotope values in an area when this kind of work had not been carried out before; 2. To test whether it was possible to determine whether the Nojol Nah populations were a cohesive group with local origins; and 3. To test whether there were differences between the male and

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female individuals studied (Das Neves 2012, 200). These kinds of techniques use data gained from the landscape to provide further analysis on human remains – in this case human teeth – which can tie these individual into a wider geographical context. In her report Das Neves provides a thorough overview of the background and methodologies used in stable strontium, oxygen and carbon isotope analysis, including the processes used to determine local signatures and baselines for the elements in question (Das Neves 2012).

Individuals selected for Das Neves' study included teeth samples from 5 definite male skeletons, 2 probable male skeletons, 5 definite female skeletons, and 2 probable female skeletons. The study showed that there was no significant difference in diet between the males and females of the sample population; both males and females appear to have been from a local place of origin; and the childhood diet of the individuals sampled comprised of at least half maize (Das Neves 2012, 224-233).

### ***Nojol Nah Site Centre Summary***

To date, work at the Nojol Nah site core area has seen 'the excavation of sixteen residential structures, a civic temple, four chultuns, three termination deposits, and 67 human burials (Brown 2014, 4). The residences in the site core, due to their size, and their proximity to the (now bulldozed) acropolis, suggests that these residences were the domain of the elite members of the Nojol Nah community. The configuration of Nojol Nah does not fit into Ashmore's (1991) site planning templates. As stated in Chapter 2, the implications of Nojol Nah not conforming to Ashmore's (1991) site planning template are that a distinct form of cultural tradition reflected in the built environment, separate from larger places such as Blue Creek and La Milpa, is present in the eastern Alacranes Bajo area.

At the time of writing, the excavators of the proposed ball court area had not provided an analysis of ceramics recovered during their excavations, so the buildings can only be temporally designated as 'unknown Classic'. In the proposed ballcourt area, apart

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from Burials 6, 9, and 11 there were no grave goods associated with the burials. The act of interring individuals under the floors of structures may have been an attempt to legitimise claims of the land and its resources publicly by the inhabitants of Nojol Nah (Brown 2010), especially if land was controlled and passed down through kin, or lineage group structures.

The local origin of the selected buried individuals (which were all sub floor), which were analysed by Das Neves (2012), supports the theory (McAnany et al. 1999) that burying people under the floors of structures was a way for the living relatives to re-enforce land ownership and kinship ties with their ancestral lines. Patricia McAnany et al. (1999) have written about how burials within residential structures actively constructed kinship links between the living and the dead, and therefore minimised competition over power and land rights; and that practices of residential burials evoke ancestral connections and centre on notions of inalienable possessions and land claims (McAnany 2010, 140). The sub-floor burials at Nojol Nah are likely to be example of this process, thus showing that the people of Nojol Nah were likely to have strong links to the land that they inhabited. The crypt burials underneath Str. NN-4C10-R1, may also represent human remains used as dedicatory caches that were built prior to the construction of Str. NN-4C10-R1. As these all seem to be secondary burials, indicating that the bones were curated and reburied and that this must have been a customary practice. The burials underneath Str. NN-4C10-R1 were not intrusive, and so were interred at the time that the room was constructed.

The excavations at the Nojol Nah elite residence area reveal interesting data about the processes of abandonment in this area; for example, floor assemblages in the NN-5E complex suggest that that abandonment there was hasty. On the other hand, the paucity of artefacts left behind on floor in Str. NN-4C6, coupled with the midden, suggest that this area's abandonment 'was likely a slow protracted process rather than one performed with haste or urgency' (Guderjan 2010, 12). The area containing Str. NN-4C11 was inhabited or at least used from the Early Classic Tzakol 1 period as evidenced from the dating of materials from the chultun, and then abandoned in the



## 9. The Nojol Nah Site Centre

Late Classic as seen from the Tepeu 1 ceramics found in the ritual deposit. The largest public building found within the Nojol Nah elite residential area, Str. NN-3F1, was constructed in the Late Preclassic and Early Classic periods, and abandoned by the end of the Early Classic period. This may indicate that 'Nojol Nah may have been a short-lived independent kingdom which was then incorporated into a larger polity' (Brown et al. 2013, 298). Postclassic items were recovered from the NN-5E group, and from atop Str. NN-3F1, indicating that there was an episode, or episodes of re-visitation after the site was abandoned.

The size of the structures in the Nojol Nah site core area are modest in comparison to the size of structures at the nearby sites of Blue Creek, Grey Fox and La Milpa, and unlike these larger sites did not contain a ball court. The presence of a ball court is often an indication that a site was politically autonomous (Guderjan 2007, 21). Barrett (2011) states that data gleaned from excavations at the elite residences of Nojol Nah give little indication 'about the structure and capacity of governorship, including the nature of the site's independence or subservience to its larger neighbours. [However] the site offers an ideal setting for exploring little-known aspects of rural Maya life in a setting absent [of] large contrasts in political and economic stratification' (Barrett 2011, 59). It is however not prudent to assume that social stratification was not present at Nojol Nah, based on evidence gathered at the site core area. For example, Brown's (2011; 2012) work at the NN-4C architectural complex clearly shows that there were differential treatments of the dead, and suggests that the term 'rural elite' may be prudent. – The residences of the non-elite or less wealthy people may have been ephemeral, and therefore undetectable in the archaeological record. The elusiveness of 'commoner' data was one of the reasons that the investigation of the wider Nojol Nah settlement zone was undertaken during the 2010, 2011, 2012, and 2013 field seasons, including the excavations at Tulix Mul. Investigation of the landscape around Nojol Nah and Tulix Mul was also concerned with elucidating the relationship between these two settlements and the Alacranes Bajo, the prominent landscape feature in the area. Although the excavations at the Nojol Nah elite residences area have furnished us with valuable information about the people who

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lived and used these Structures these excavations needed to be contextualised within the Eastern Alacranes bajo area and related to places outside of this specific elite architectural zone.

## Chapter Ten. The Eastern Alacranes Bajo Area: Landscape and Archaeology

### *Introduction*

The preceding four chapters describe the data derived through fieldwork as well as the results of preliminary analyses: e.g. stratigraphic sequences, chronology from ceramics, skeletal health, burial data, and soil chemistry. This chapter assesses the implications of these data to begin to answer questions concerning the ancient landscape and settlement. There are two sections in this chapter: I first synthesise the evidence from four field seasons devoted to this research, and the following section discusses the implication of the data. I also briefly discuss where relevant what the implications of my interpretation would be if Nojol Nah and Tulix Mul represent a single settlement rather than two separate ones. In the next chapter, I compare the data collected at Tulix Mul and Nojol Nah to other sites in the TRR to contextualise the eastern Alacranes Bajo area.

### *The Evidence from Survey, Mapping and Excavation*

#### **Chronology**

<b>Period</b>	<b>Estimated Dates</b>	<b>Major Cultural Developments in the TRR</b>	<b>Eastern Alacranes Bajo area structures</b>
Late Preclassic	400 BC – AD 250	Monumental architecture was first constructed at Rio Azul, La Milpa, Dos Hombres and Blue Creek	NOS1-M1, NOS1-M2, NOS36-F1, TM-8
Early Classic	AD 250 - 600	Population nucleation around large centres.	NOS36-F1, NOS15-M2, NOS15-T1, NOS1-M2, NOS1-M2, NOS1-P1, NOS49-M2, NN-4C10, NN-4C2, NN-4C11, NN-

## 10. The Eastern Alacranes Bajo Area: Landscape and Archaeology

			5E6, TM-2, TM-3, TM-4, TM-6
Late Classic	AD 600 - 800	Increased agricultural activity and land modification throughout the TRR, with rural populations at their maximum.	NOS1-M1, NOS1-M2, NOS11-M1, NOS11-M3, NN-4C6, NN-4C10, NN-4C11, NN-4D2, NN-4C2, NN-5E5, NN5E6, TM-2, TM-3, TM-6, TM-8
Terminal Classic	AD 800 – 900/1100	Widespread abandonment and rapid depopulation of many TRR settlements.	NOS1-M2, NN-4C10, NN-4D2, NN-4C2, NN-5E6, TM-3, TM-6, TM-8
Postclassic	AD 900/1100 - 1500	Akab Muclil only TRR site still occupied. Re-visitation episodes to some centres eg. Chan Chich, La Milpa, Dos Hombres an Blue Creek.	NN-3F1 (surface find), NN5-E1 (surface find)

**Figure 340 Table of ancient Maya Chronology in the TRR**

Chronology is based on stratigraphy and the recovery of dateable ceramics. A great range of time periods are represented: the Preclassic, Early Classic, Late Classic, Terminal Classic, and Postclassic periods (Fig. 340). Settlement at Nojol Nah and Tulix Mul began in the Terminal Preclassic to Early Classic period. During this time, non-domestic/ritual architecture (such as the round structure/platform at NOS 1), as well as household architecture was erected in both places. Occupation continued into the Late Classic at both sites, but some structures appear to have been abandoned prior to the Late Classic (Fig. 341).

Although construction appears to end at Str.TM-4 and Str.TM-5 at the end of the Late Classic, construction continued into the Late Classic at Tulix Mul as seen in the addition of Room 4 to Str. TM-6. Floor assemblages from Str. TM- 3 and TM-6 have been dated

## 10. The Eastern Alacranes Bajo Area: Landscape and Archaeology

to the Late Classic Tepeu 3 period, and there were some Terminal Classic sherds recovered from the collapse layers of Str. TM-3.77

Structure / Feature	Chronology from Excavation
TM-1	n/a
TM-2	Early Classic Tzakol 1 to Late Classic Tepeu 3
TM-3	Early Classic Tzakol 2/3 to Terminal Classic
TM-4	Early Classic Tzakol 1 to Early Classic Tzakol 2/3
TM-5	Early Classic Tzakol 2/3
TM-6	Early Classic Tzakol 1/2 to Terminal Classic
TM-8	Terminal Late Preclassic to Terminal Classic
NOS 34-M1	Non diagnostic sherds
NOS 34-F1	Non diagnostic sherds
NOS 35-M1	Non diagnostic sherds
NOS 36-F1	Terminal Late Preclassic to Early Classic Tzakol 1-3
NOS 15-M1	Early Classic Tzakol 1-3
NOS 15-T1	Early Classic Tzakol 1-3
NOS 1-M1	Terminal Late Preclassic to Early Classic Tzakol 1
NOS 1-M2	Terminal Late Preclassic to Late Classic Tepeu 2/3
NOS 1-P1	Early Classic Tzakol 1-3
NOS 1-T1	n/a
NOS 1-T2	n/a
NOS 1-T3	n/a
NOS 9-M1	Non diagnostic sherds
NOS 11-M1	Late Classic Tepeu 2-3
NOS 11-M2	Early Classic Tzakol 1 to Late Classic Tepeu 2/3
NOS 11-M3	Late Classic Tepeu 1-3
NOS 12-T1	n/a
NOS 12-T2	n/a
NOS 12-B1	n/a
NOS 12-B2	n/a
NOS 49-M1	Non diagnostic sherds
NOS 49-M2	Early Classic Tzakol 1-3
NOS 49-M3	Non diagnostic sherds
NOS 49-P1	n/a

## 10. The Eastern Alacranes Bajo Area: Landscape and Archaeology

NOS 49-T1	n/a
NOS 49-T2	n/a

Figure 341 Table of dates obtained from ceramic typologies from the Nojol Nah Settlement zone and Tulix Mul (n/a denotes locations where no sherds were recovered)

The NOS excavations revealed a range of dates of occupation in the Nojol Nah settlement zone. Construction of architecture with a ritual function, as seen at NOS 1, and NOS 49, dates to the Early Classic, as does construction of terraces and a berm. However the residential architecture of NOS 11 was constructed and inhabited in the Late Classic.

At the Nojol Nah site core, Brown and Barrett's excavations revealed that construction of many of the structures dated to the Early Classic: for example, the NN-4C courtyard, and Str. NN-3F1. Construction of Structure NN-3F1 appears to have been confined to the Early Classic, with no Late Classic evidence recovered from this location, although there was a Postclassic incensario recovered from post abandonment accumulation. In contrast, Str. NN-4C12 showed construction from the Early Classic through the Terminal Classic. Postclassic revisitation events were seen in the site core of Nojol Nah, in terms both ritual (the censer atop Str. NN3F1), and the practical (the arrow point from Str. NN-5E5). Taken as a whole, the chronological data from NN and TM is broadly similar, the only exception is the Postclassic revisitation of the NN site core. In terms of chronology therefore, considering NN and TM as separate places does not affect the interpretation of the chronology of settlement.

### Architectural Groups

Architectural groups consist of multiple structures and therefore would have housed more than just a nuclear family. Groups likely housed multiple-generations of an extended family, or members of a single lineage or corporate group – as well as possibly servants and other retainers. Individual household configurations and membership varied overtime as a household went through developmental cycles (Goody 1958; Fortes 1962; Tourtellot 1988b). Although there are some examples of freestanding structures in the Nojol Nah settlement zone, the majority of the buildings in the eastern Alacranes Bajo area occurred in more formal architectural groupings.

## Monumental Architecture

Historically within the field of ancient Maya studies there has been a focus on monumental architecture (e.g. Aimers and Rice 2006; Pendergast 2003; Braswell 2003; Gann 1925; Chase and Chase 1987 etc.). The term monumental architecture is used to refer to large structures, normally masonry, that are typically for public consumption, and by their very nature would have needed an organised work force to build and maintain. The interpretation of monumental architecture has been approached from a number of different theoretical stances within the history of archaeological thought. Examples include: Trigger's (1990) view of monumental architecture as the physical manifestation of harnessing human energy; Graves and Ladefoged's (1995) work that sees monumental architecture as an evolutionary adaptation that is a way of diverting excess energy that may otherwise be spent reproducing and populating a region to its carrying capacity; and Neo-Marxist approaches consider monumental architecture as a tool used to normalise unequal power relationships within a society through the use of ideology (e.g. Freidel and Schele 1988). Other recent approaches to monumental architecture have revolved around phenomenology and the human experience of place (e.g. Bradley 1993, Bender et al. 2007), as well as approaches that favour an archaeoastronomical slant (e.g. Aveni 2003). In terms of the eastern Alacranes Bajo area settlements, although there is no architecture large enough to rival the monumental structures of sites such as La Milpa, Tikal, or Palenque, there are structures that are monumental (for example the ca. 5m tall Str. NN 3F1, and the 8m tall Str. TM-1) in relation to the other structures found in the area. The monumental structures at Tulix Mul and Nojol Nah are likely to have served the same ritual and/or administrative and/or ideological purposes as monumental architecture at large sites -- but on a smaller scale to a smaller population.

## Non-monumental Architecture

Excavations revealed that the eastern Alacranes Bajo landscape was made up of domestic, monumental and ritual structures. Small, non-ritual buildings have been described as *vernacular architecture* (Webster 1998, 31), and these include the

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residential structures of most of the members of a community. Larger and more durably built structures may belong to those in a community with higher social status. Residences can range from palace-type structures in urban centres to more modest houses in a hinterland setting – such as those seen at Nojol Nah and Tulix Mul. Residential structures tend to be rectangular, allowing for rooms to be added and removed easily, depending on changing residential strategies (Doyle 2012, 357).

Within residential compounds, there were often separate kitchen areas, and the platforms upon which structures were built were often larger than the footprint of the building itself, which meant that there were outdoor areas where people could carry out activities (Hendon 2010, 96). Str. TM-5 was likely to have been a food processing area as evidenced by the mano and metate fragments, as well as the pestle and mortar, and the abundance of small bird and mammal bones. Manos and metates were found at residential structures through the Nojol Nah site core and settlement area, suggesting that people processed food within their homes.

Benches—platforms within building interiors—could have been used for sleeping, sitting, reclining or storage; therefore benches can be associated with residential structures but also with structures that had an administrative function. Iconographic representations on pottery, stone sculpture, and clay figurines have depicted a variety of different types of beings – from deities to supernatural creatures, to ordinary people – lying or reclining on benches (Hendon 2010, 97). Benches occur in the majority of excavated structures at Nojol Nah and Tulix Mul, in both monumental and domestic architecture. Notable exceptions include Str. TM-6-R2, and Str. TM-2-R1. The benches excavated in the eastern Alacranes Bajo area were not homogenous however, and all were of different heights, proportions, and construction techniques. For example the northern bench in Str. TM-4 was constructed in two phases, the later phase heightening the bench and covering a cord holder that had been embedded in the wall. In contrast the southern bench in Str. TM-4 appears to have been built in one phase and covered a chambered area and two crypts. The southern bench of Str. TM-4 was a low bench (49cm high) in comparison to the northern bench (100cm high). This



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highlights that two benches even in the same room were not homogenous and thus were likely to have served different functions. Other noteworthy benches included the bench in Str. TM-6-R3 that contained a whole olla; the bench in Str. TM-2 that was constructed atop of a cut in the floor where a cache was deposited; and the bench in Room 1 of NN-4C6 that contained NN-Burial 3 within its fill.

It is important to note that, within a residential compound, and given the evidence from the excavations of NN and TM, it is unlikely that a building was used for the same single purpose over time. Indeed ethnographic studies have shown that modern Maya houses serve multiple functions simultaneously; for example maize and other food stuffs are stored in the rafters above sleeping areas (Wauchope 1938). Identifying a residential structure is often based on finding domestic artefacts, such as manos, metates, or spindle whorls within them (Haviland 1985, Willey et al. 1965), a path that I have followed in the course of this research. Structures in the eastern Alacranes Bajo area that contained items such as manos, metates, a pestle and mortar, and storage jars, for example Str. TM 5, and Str. TM-6, I have considered households, whereas other structures, for example NOS 1-M1 in the Nojol Nah settlement zone were devoid of any household utilitarian items, so were likely to have been used for non-domestic activities perhaps relating to ritual. As I have considered the architecture across the whole of the eastern Alacranes Bajo area on a landscape wide scale, rather than primarily on an individual site basis, my decision to separate Nojol Nah and Tulix Mul into two separate places can be seen as the heuristic device that I intended this delineation to be.

### **Human Remains: Cranial and Dental Modification**

The study of skeletal remains found from across the eastern Alacranes Bajo area have shown that dental and cranial modification were practiced on both male and females, however only on certain individuals. As cranial modifications would have needed to have begun in childhood when the skull was still malleable, this indicates that some of the individuals from the eastern Alacranes Bajo area were chosen to have this done to them soon after birth, therefore implying differences in social status or cultural practices among this specific population.

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In terms of the dental filing and inlays, again only some of the skeletal population in this area had these modifications, therefore again suggesting some kind of difference in status or cultural affiliation. Dental and cranial modification was found in individuals from the across the whole of the eastern Alacranes Bajo area.

### **Human Remains: Diet and Health**

The chemical analysis of skeletal remains has furnished us with information about the origin and subsequent diets of a sample of people from Nojol Nah, with Das Neves' (2012) study indicating that the sample population were all locally born. Analysis of the skeletal population of the eastern Alacranes Bajo area has given us information about health, and shown that certain diseases were present, for example, a child with spina bifida (Nojol Nah Burial 1) and an adolescent with anaemia (Nojol Nah Burial 11). Burials 23 and 24 at Tulix Mul also showed signs of anaemia, and Burial 24 additionally displayed signs of a prolonged period of malnutrition during childhood. Burials 4 and 7 at Nojol Nah suffered from osteoarthritis. At Str. NN-4C12, three of the burials showed extreme dental problems, with these individuals suffering from massive cavities, and in one case, advanced periodontal disease. Of 89 observed pathologies in the Nojol Nah skeletal populations, 64 of them (72%) were dental-related. These dental problems included advanced tooth decay, caries, and tooth loss. It appears that oral health problems were one of the most prevalent afflictions affecting the people of Nojol Nah (Brown 2014, 328). Both tooth decay and anaemia are associated with a diet with a high reliance on maize as 'not only does maize erode tooth enamel, it is high in phytates that inhibit iron absorption and are low in amino acids, which, combined with a low protein diet, promote the development of iron-deficient anemia' (Brown 2014, 328).

At Tulix Mul, there was a high instance of dental caries in the individuals recovered from burials. Porotic hyperostosis, also observed in the population at Tulix Mul, can also be attributed to an iron-deficient high maize diet (Brown 2014, 328; Wright and Chew 1998, 925). The health problems suffered by the individuals studied indicate

that the daily diet of the eastern Alacranes Bajo population may have had a detrimental effect on the health of some of the people. Strontium isotope analysis also confirmed the high maize content of the Nojol Nah site core population's diet, and indicates that maize formed at least half of the childhood diet of the individuals studied, and this was true for both males and females (Das Neves 2012). In addition analysis of sediments from the large chultun beneath Str. NN-4C11 showed the presence of maize, but no other cultigens.

### **Burials and Social Status**

Inferences regarding social status at Nojol Nah and Tulix Mul could be gleaned from burial practices. At Str. NN-4C6 for instance, a select group of 12 people were buried at this large structure, despite there being room for many more, thus implying difference in social status or cultural practices. At Tulix Mul, Burial 6 was interred with a shell bead headdress/necklace of 52 beads, something not seen in other burials at the sites, again implying differential treatment of individuals. Burials recovered from throughout the eastern Alacranes Bajo settlements were infants, children, adolescents and adults (both male and female), showing that it wasn't just the elders of the community that were accorded preferential burial treatment. Burial goods, such as the spindle whorls found in Burial 38 at NOS 11 may indicate an individual's occupation in life, although the Burial 38 individual was male, and spindle whorls tend to be associated with female roles – perhaps indicating greater fluidity in household tasks that is normally assumed. The elaborate headdress of Burial 5 from Tulix Mul, and the flower shaped ornaments on it may point to that individual having a shamanistic role if the flower-shapes represent the *itz* glyph (as discussed in the Str. TM-6 summary, Chapter 8). Jade was recovered from only 9.6% of the burials at Nojol Nah, and there was no jade at all in the Tulix Mul burials, suggesting that the individuals that were buried with jade were afforded a different social status than those that were not. Differences in treatment of the dead also suggests that there were a range of social statuses present at Nojol Nah and Tulix Mul, with some individuals buried within

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construction fill beneath floors, and others in more formal crypts. In terms of the implications of considering Nojol Nah and Tulix Mul as separate places, burial and skeletal analysis from the Eastern Alacranes Bajo area has been considered both as a whole data set, and at an individual proposed site level. The main differences within the burial data from Nojol Nah and Tulix Mul is that there was no jade present at all at TM. However jade was only present at 9.6% of the NN burials, so this could not be used to support the argument that there were significant differences between Nojol Nah and Tulix Mul. Therefore we can say that burial practices across the eastern Alacranes Bajo area were similar enough for the possibility that Nojol Nah and Tulix Mul were a single place to be considered.

### **Domestic Ritual**

At both Nojol Nah and Tulix Mul the presence of caches in the primary axis of some structures, for example at Structures TM-2 and TM-4, does show that there were some ritual elements in the construction phases of structures.

At Tulix Mul, it appears that both human and faunal bones were an important part of ritual paraphernalia, as there were seven instances in four of the structures of bones that seemed to have been purposefully placed: The cord-holder at Str. TM-4 contained a deer bone; in the northwestern floor of Str. TM-4 were snake bones (not articulated); there were two human tibia on either side of the filled-in northern doorway of Str. TM-4; beneath the eastern doorway of Str. TM-4 were a peccary and human tooth; against an outer wall of Str. TM-6 was a deer bone covered by a granite metate; in the fill of Room 1 of Str. TM-2 was a cache of deer bones in a make-shift 'crypt'; and at Str. TM-3 a deer tibia was embedded in the floor. While it is not known what these instances of bone mean, it is apparent that the placement of bones had some kind of significance for the inhabitants of Tulix Mul. This appears to continue over time; for example, Str. TM-4 was abandoned in the Early Classic, with Str. TM-3 abandoned late in the Late Classic. Other occurrences of behaviours that may be termed ritual at Tulix Mul are seen at Str. TM-6, with the burial of an olla containing a small blue bowl and fragments of a whistle; and the floor assemblages including human and faunal bones, chert tools, sherds and charcoal found in Str. TM-3, TM-4, and TM-6.

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Other events that are of a ritual or unknown basis were seen in other places in the eastern Alacranes Bajo area. For example in the Nojol Nah settlement zone, the multiple burning and re-plastering of the NOS 11-M2 structure; caches found at NOS 1-M1, and in the Nojol Nah site core; and the feasting event of Courtyard B at the NN-4C courtyard in the Nojol Nah site core.

Burials and caches also provided chronological information, with caches from the Nojol Nah site core dating to the Late Preclassic and from Tulix Mul dating to the Early Classic. The presence of caches placed along the primary axis of different building phases of Str. TM-2, indicates a continuity of ideological beliefs persisting through time at the same location. There were no obvious architectural expressions of ideology such as E-groups in the eastern Alacranes Bajo area.

### **Land Modification**

The construction of both a terrace and berm in the NOS area date to the Early Classic period. Initial mapping of the area after it was freshly cleared of vegetation by local farmers allowed us to record various topographic anomalies that excavation revealed to be anthropogenic modifications, such as terraced areas on natural hill-slopes, berms, and chich mounds. Excavations at various loci at the edge of the Alacranes Bajo such as at the terrace area at NOS 6, and the backhoe trench between the NOS 29 and NOS 37 hills allowed us to gain direct evidence of land modification, and verify some of the information that was mapped, as did the examination of soil samples using micromorphological techniques.

In terms of agricultural resources, we have no evidence of large-scale agricultural techniques in the eastern Alacranes Bajo area, such as ditched fields. However, our excavations recovered evidence of terracing, berms and other man-made land modifications, which together point to an agro-urban landscape.

### **Resources: Soil, Chert, Clay and Water**

The work carried out in the eastern Alacranes Bajo area provides strong evidence Nojol Nah and Tulix Mul and their settlements were deliberately situated near the bajo in order to have access to the natural clay and chert resources of the bajo's edge. Mapping the Eastern Alacranes Bajo area revealed abundant clay and chert resources in the bajo, and the fact that residences and other kinds of structures were clearly situated in the proximity of the bajo. The 30m backhoe trench on the slopes of the Alacranes Bajo at Tulix Mul revealed abundant chert cobbles and boulders embedded in the clay sub soil (see Chapter 8). Not only was the chert useful for stone tools and construction material, but it may have served as 'tempering' materials to ameliorate the soil for agricultural purposes (Tim Beach 2012 Pers. Comm.; Guderjan 2013, 231). Rich deep clay resources were uncovered in another backhoe trench close to Tulix Mul within the Alacranes Bajo (see Chapter 8). The clay and chert resources of the bajo were within easy access of Tulix Mul, and some of the architectural groups in the Nojol Nah settlement zone were located literally on the edge of the bajo.

Abundant lithic debitage in buried deposits such as at NOS 1-M2, beneath the bench in Room 2 of Str. TM-2, and the small lithics workshop near the site core of Nojol Nah are evidence that the lithic resources of the bajo were also being exploited. Additionally chert was used at Tulix Mul as a major component in construction core, indicating direct exploitation of the natural resources available on the bajo's edge

Aside from the data gathered during the mapping phase of the research project, soil samples were taken from three different locations in the Tulix Mul area, namely a hill terrace area, the Alacranes Bajo's foot slopes, and an area between two hills that contained a series of check dams. Initial analysis of the soils from the three locations indicates that there was no significant difference in terms of agricultural potential between each location. The soils all had a reading just above and below pH7 meaning that they were largely neutral soils with nutrients readily available, suitable for a variety of plants. Dunning et al (2003, 22) suggests that plants such as maize, beans, and squash prefer the soils of bajos. Further analysis of these soils using micromorphology confirmed that the soils were vertisols, and that there was evidence

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of anthropogenic activity in the lower levels of the soil. Although we were unable to obtain dates for the activity, the presence of a ceramic sherd in the lower levels of the bajo trench implies early activity.

In terms of water resources, the Rio Azul, at 2km from the Nojol Nah site core, was clearly a feature considered in the location of the centre, as was the cenote 2kms to Nojol Nah's southeast. The Tulix Mul area however, did not contain any cenotes, and was ca. 4km from the river. However the bajo itself remained waterlogged during the wet season, so had the potential to provide non-potable water that could have been used for household gardens and farming. Thus, unless there was access to subsurface water, we cannot at this stage propose reasons for Tulix Mul's location based on proximity to natural water resources, at least. However if Nojol Nah and Tulix Mul represent the remain of a single site, then Tulix Mul can be considered a neighbourhood on the edge of a settlement that contained a cenote, and was close to the river.

### ***Implications***

#### **Settlement Distribution**

The site core of Nojol Nah is associated with an extensive settlement zone; thus settlement comprises both formal courtyard groups, and more dispersed architectural groups. Settlement arcs around the edge of the bajo, with land modifications just metres away from the architecture. Structures on the Nojol Nah settlement landscape are often located on high points on the terrain, but this is not always the case, as seen for example at NOS 15. The mapping and survey also revealed the small centre of Tulix Mul and its surrounding associated residential groups. The Tulix Mul area is separate from the Nojol Nah settlement zone, with a roughly 1km break in architecture and land modifications (Fig. 342). Although as discussed in Chapters 2 and 3 the 1km between Nojol Nah and Tulix Mul may once have contained continuous low density settlement that did not survive in the archaeological record.

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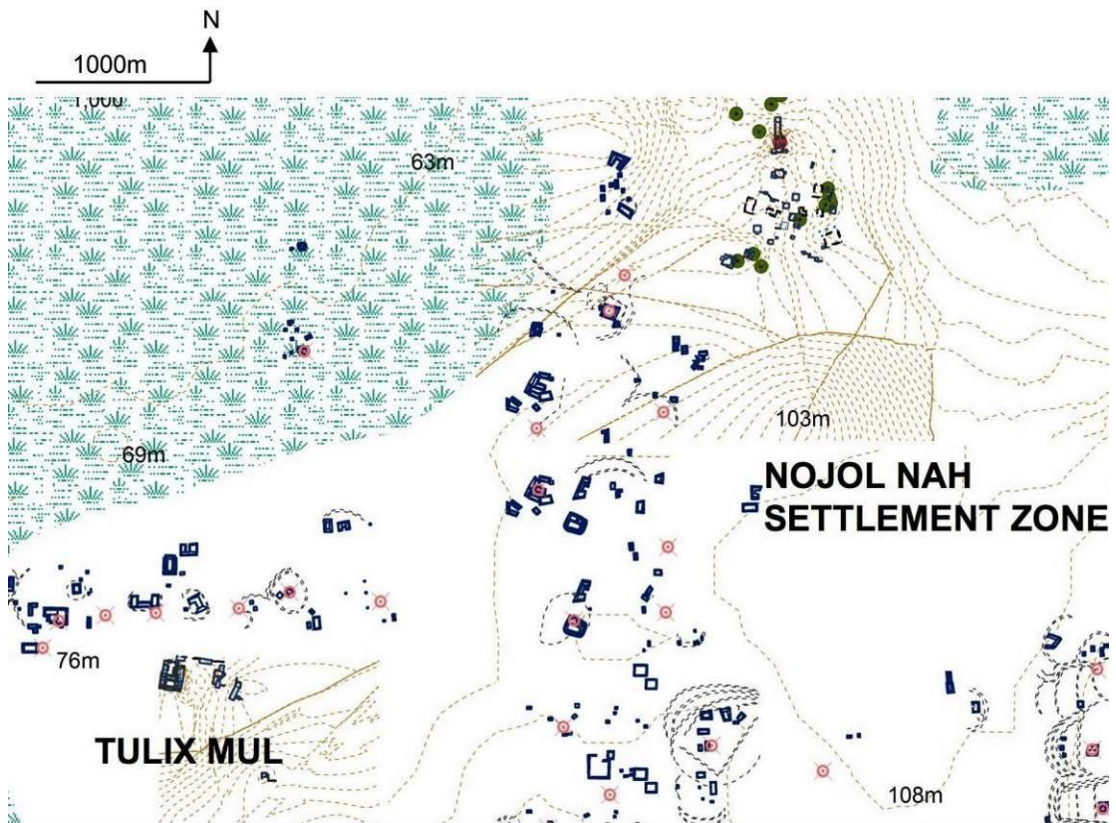


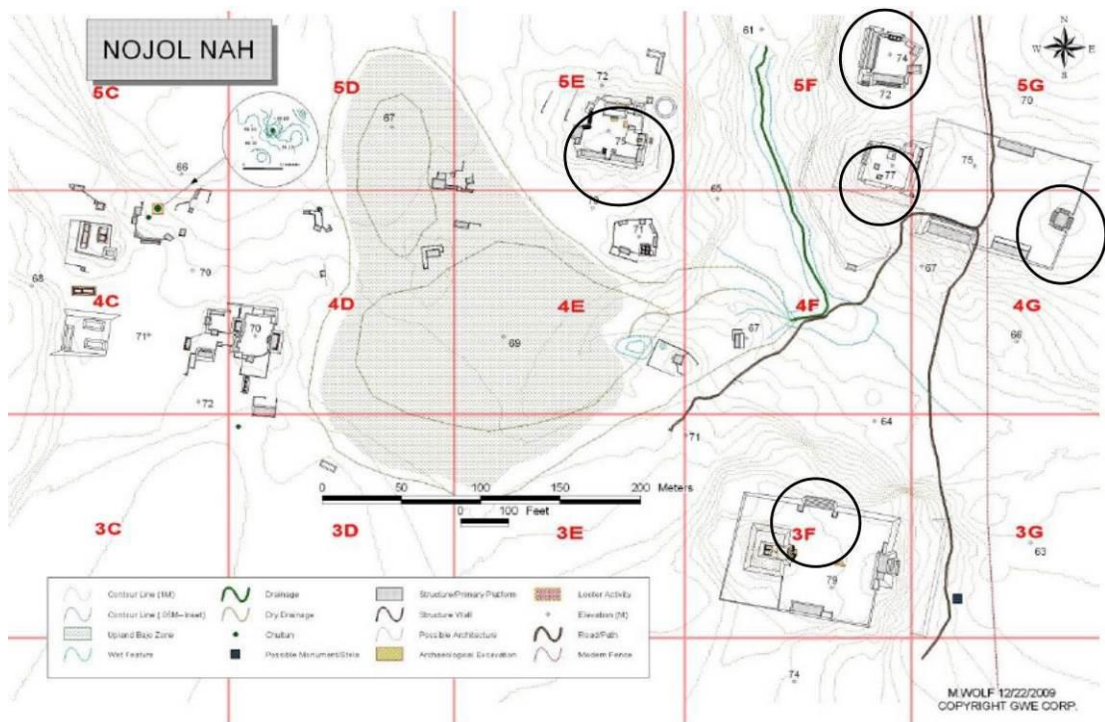
Figure 342 Map of Tulix Mul and the Nojol Nah Settlement Zone (cropped from original map by M. Wolf and G. Hammond)

### Site Planning

There was no obvious evidence of Ashmore's (1981) site planning template at Tulix Mul and the Nojol Nah settlement zone, which means that the locations of structures were more likely to have been determined by more prosaic means, such as the topography and the distance from natural resources. However it is possible that the site centre of Nojol Nah was based on a cruciform architectural (Fig. 343; D9) plan with group NN-5FB at the north, platform NN-4G at the east, platform 3F at the south, platform NN-5E in the west, with group NN-5FA at the centre (Barrett and Majewski 2010, 60).



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**Figure 343** Map of the Nojol Nah site core indicating Barrett and Majewski's proposed cruciform pattern (annotated version of an original map by Marc Wolf)

Thus it is not possible to say that the sites conformed to Ashmore's (1981) site planning templates as seen at other TRR sites (Houk 1996). Although there are no ball courts or stelae at Nojol Nah, usually markers of political autonomy, there is large public architecture, and a possible public plaza. Guderjan (2013) suggests the terms *ku'i'k* for a central place 'with at least one public plaza, [and] large temple-pyramids' (Guderjan 2013, 231). Thus Nojol Nah could qualify as a *ku'i'k* site. The Tulix Mul courtyard group may have served as a central place for the inhabitants of the many residential structures that surround it, however it does not fit into Guderjan's *ku'i'k* definition. If however Nojol Nah and Tulix Mul represent the remains of a single settlement, then Tulix Mul may be seen as a place within Nojol Nah that had its own function within the whole site – perhaps as an elite residential area or a place for ritual. Nonetheless even if the eastern Alacranes Bajo area was a single site, it still would not conform to Ashmore's (1991) site planning template. As mentioned in Chapter 2, non-conformity to Ashmore's (1991) site planning template indicates that a distinctly different form of site planning was in use in the eastern Alacranes Bajo area.

Defining this different type of site plan would be a fruitful area for future research.

### **Nojol Nah and Tulix Mul as Centres**

There are numerous centres in the TRR of varying sizes and population densities. These centres range from the large monumental sites of Rio Azul and La Milpa, to medium-sized centres such as Dos Hombres and Blue Creek, to small centres comprising 'elite structures' surrounded by residences (Hyde 2012, 60). Both Nojol Nah and Tulix Mul could be described as small centres; however there are significant differences between Nojol Nah and Tulix Mul in terms of size and architectural elaboration.

Compared in size and architectural complexity to the nearby sites of Blue Creek and La Milpa, Nojol Nah cannot be considered a major urban centre. However the Nojol Nah site core contains some characteristics of an urban space: The basic urban settlement pattern of a central civic-ceremonial plaza surrounded by elite residential and administrative buildings. Nojol Nah may therefore be considered a small urban centre. However Nojol Nah lacked accepted attributes to be considered a city such as a ballcourt (see Webster and Evans 2005, 268), and was not associated with an urban sprawl clustered into neighbourhoods (see Isendahl 2012, 213).

At Tulix Mul, the large courtyard group is surrounded by large multi-roomed (presumably elite) structures, but there is no central plaza with surrounding administrative buildings. However both the Nojol Nah site core, and the Tulix Mul Courtyard contained monumental architecture likely for public consumption. In this respect they may both be considered ritual or administrative centres in terms of a focal point for the community (see Guderjan 2007,54), and community activities. The term hinterland centre (See Hyde 2011; 2013) may be appropriate to use in relation to the Tulix Mul Courtyard.

The settlements within the eastern Alacranes Bajo area were also located to take advantage of the topography of the area to reinforce their role as central places. At

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Tulix Mul for example, the group containing monumental architecture was located on the last natural high point before the bajo – which would have given the users of these structures a strategic vantage point, sweeping views, exposure to cooling breezes, and easy access to the bajo, and reinforced the public function of the large structures, overlooking, and visible from, the surrounding domestic/vernacular structures. In the Nojol Nah settlement zone, NOS1 M-1, which evidence suggests had a ritual function, was also located on a high point with sweeping views; and others, such as the NOS 15, and NOS 11 residential structures, were situated in positions to allow easy access to the Alacranes Bajo. If however Nojol Nah and Tulix Mul represent a single site, then the Nojol Nah site core and Tulix Mul may be seen as two central focal points within the same place, perhaps performing different functions for specific groups of people within the site. As the chronological evidence shows that Nojol Nah and Tulix Mul had contemporaneous construction, occupation and abandonment it is sensible to surmise that if the two places were indeed part of the same site then they were likely used in conjunction with one another.

### **Community Cohesion, Organisation, Layout and Focus**

General community cohesion in the eastern Alacranes Bajo area can be inferred from aspects of the *domestic landscape* at both Tulix Mul and Nojol Nah. There are similarities between the two sites in land modification, with terraced areas close to structures, coupled with similar types of artefacts -- such as ceramic types (polychromes and utilitarian wares), domestic implements such as granite manos and metates. Sub floor burials, the majority of which have a paucity of grave goods, are found in structures throughout both Nojol Nah and Tulix Mul. At both sites there are cist and crypt burials, and male, female, young and old individuals are represented in the skeletal population at Nojol Nah and Tulix Mul, and the majority of burials were primary interments in flexed positions. This evidence suggests that the two sites shared certain cultural features. However there were some distinctions in the layout of the two places for example, at Nojol Nah, the settlement radiating from the site core is dispersed, whereas at Tulix Mul, settlement is not dispersed but located in the proximity of the central courtyard group. This may be indicative of different

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community specialisation or function, with the smaller community of Tulix Mul perhaps focused more intensively on exploiting the chert resources of the Alacranes Bajo as evidenced by the large amount of lithic debitage found at Str. TM-2. Whereas Nojol Nah, due to its size and larger population, may have been focused on a wider range of activities. Greater interaction with the chert resources by the residents of Tulix Mul is also evidenced by the fact that chert was a major component in construction core material at Tulix Mul, with the construction core material at Nojol Nah in contrast comprising both chert and limestone.

Taking the Nojol Nah site core along with the Nojol Nah settlement zone, the Nojol Nah area could be considered an *agro-urban landscape* with agricultural features and urban features sharing the same space (see Isendahl 2012). Even though agricultural land modifications at Tulix Mul were interspersed with settlement, Tulix Mul however cannot be considered urban in the same way that Nojol Nah can, therefore *agro-urban* is not appropriate to use in relation to Tulix Mul.

The presence of ritual/non-domestic architecture across the eastern Alacranes landscape gives us valuable information about community organisation, in that these non-domestic structures, such as the round platform of NOS 1-M1, may have provided a central focal point for community cohesion. Round structures are usually found in the Pre-Classic period, and typically appear to have served smaller audiences than the ball courts (Aimers et al 2000). This type of structure is believed to have been instrumental in the formation of group identities by providing locations for ritual on a household and public scale (Padilla 2007; Lohse and Sagebiel 2006). The nature of these rituals is unclear, but may have involved the use of the buildings as sweat-baths, astronomical observatories, or performance spaces for music and/or dance (Aimers et al 2000).

Considering the option that Nojol Nah and Tulix Mul represent the remains of a single settlement, my interpretation above still largely stands. The main difference would be that Tulix Mul could be seen as a neighbourhood on the edge of the Nojol Nah *agro-urban landscape*. Regarding the differences between Nojol Nah and Tulix Mul noted

above it could be argued that these differences represent diverse kinship groups occupying the same space, or could be based on social statuses.

### **Resource Specialisation**

Resource specialised communities as postulated by Scarborough and Valdez (2003) refer to communities that invested and focussed on one or two resource production strategies (see Chapter 4), presumably to trade with, or to support the wider area. In the eastern Alacranes Bajo area, although there is evidence to suggest that the people there were exploiting the bajo's resources, there is no evidence for large-scale agricultural systems, clay quarries or large-scale lithic workshops. However there was clearly wealth in the eastern Alacranes Bajo area as evidenced by the excavated material culture, so the wealth most likely was based on the exploitation of one or more of the resources controlled by the inhabitants of the area.

### **Abandonment and the Archaeological Record**

At Tulix Mul the dating of material from floor assemblages of Str. TM-2 and Str. TM-4 is restricted to the Early Classic period, suggesting that these structures fell into disuse at this time. Alternatively further construction at these locations may not have survived in the archaeological record. This may have been the case at Str. TM-2, where doorways were sealed, and Room 1 was deliberately filled presumably for a further construction phase. However it is equally possible that after the rooms were filled and the doorways sealed the planned construction did not occur for reasons we cannot know based on present evidence. To further explore if there were late construction features present at Tulix Mul, a program of extensive surface excavations could be employed that may detect evidence of perishable superstructures. If evidence for late construction is not forthcoming, future research should focus on recovering evidence for why the abandonment took place.

Floor assemblages recovered from different construction phases at Tulix Mul appear to contain purposefully placed objects, so it would seem that abandonment of each phase was deliberate and purposeful, with an element of possible ritual activity – for

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example the cache of 3 whole bifaces, and a ceramic disc surrounded by 4 pieces of charcoal on the floor of the Eastern Room of Str. TM-3.

As was the case at Tulix Mul, the Nojol Nah site core structures seem to have been abandoned at different times and in a manner of different ways – for example unlike Structure NN-4C12, Structure NN-5E1 was hastily abandoned (Barrett and Majewski 2010, 69) as evidenced by the primary floor deposits that included complete manos and metates, a pestle, a groundstone paint pot, obsidian blades, bifacial tools, and complete ceramic vessels that had been broken by subsequent roof collapse (Barrett and Majewski 2010, 69). As the items found on the floor were portable items that could have been reused, it would seem that they were left behind in a hurry.

Chronologically, both Tulix Mul and Nojol Nah show similar abandonment dates, with Terminal Classic sherds found at both places. Therefore the interpretation of abandonment does not add any further data to the question of whether the eastern Alacranes Bajo area comprised two sites or one.

### **Architecture and Social Status**

By studying architecture – form, function, and construction – a number of things can be inferred about the community as a whole: The variety of architecture and architectural groupings across the eastern Alacranes Bajo in terms of size, durability, and configuration suggests differences in social status of the inhabitants, with some structures much larger and more solidly built than others. For example in contrast to some of the single-room structures in the Nojol Nah settlement zone, Str. NN-4C12 in the Nojol Nah site core displayed complex multi-roomed architecture, with multiple individuals buried beneath its floors. Another example would be the elaborate NN-5E complex compared with the small mounds in the NOS-34 area. Differences in architecture points to an elite class of people who had access to larger, more elaborate structures than individuals who lived in the more modest habitations further away from the monumental architecture of both the Nojol Nah site core and the Tulix Mul courtyard. Hyde (2011) suggests the term hinterland elites, and I consider that this is

an appropriate term to use in relation to the eastern Alacranes Bajo area settlements. I believe this statement holds regardless of whether Nojol Nah and Tulix Mul were two different places, or represent the remains of a single site.

### **Burials, Ancestors and Lineages**

The act of interring people beneath floors of structures certainly seems to point to lineage or corporate household groups laying claim to the land, by physically tying themselves to a place via their dead ancestors/relatives (McAnany 1995). Sanders (1989) suggests that all of Maya society was based on lineages – with the smallest lineage consisting of individual households, which in turned formed part of larger lineages, with the highest lineage consisting of the royal lineage. The lineage concept has at its core inequality, as successful lineages control land and resources at the expense of others. A lineage is a unilateral descent group, based on common descent from a known ancestor (Barfield 1997). An alternative framework for explaining ancient Maya social organisation is the House Model that has, alongside the Lineage Model, become a dominant framework for exploring ancient Maya social organisation. The House Model sought to deflect the importance of descent ‘as a defining characteristic of Maya plaza groups and conceive of them instead as a “corporate body” holding an estate made up of both material and immaterial wealth, which perpetuates itself through the transmission of its name, its goods, and its titles down a real or imaginary line’ (Wanatabe 2004, 160). In the House Model then, the perpetuation of the corporate group is more important than unilateral descent and notions of kinship. Archaeologically it is difficult to fully validate either the Lineage or House models, and in reality, some ancient Maya communities may have been based on one model, some on the other, and there may have been shifts over time between them within the same community; and this may have been the case in the eastern Alacranes Bajo area. Further scientific analysis of the bones may help to answer this question, particularly if it was possible to extract DNA from the Eastern Alacranes Bajo populations.

## 10. The Eastern Alacranes Bajo Area: Landscape and Archaeology

The location of a burial can tell us about the continuing role that the deceased played in daily life in terms of ancestor veneration and/or the legitimisation of power and land ownership (McAnany 1998). Buried individuals are often found beneath the floors of residential structures, and some buildings have multiple individuals, interred at different points in time, in a single grave. The interring of an individual within a structure often coincided with rejuvenation or rebuilding efforts, and this is seen at both Tulix Mul and Nojol Nah where individuals were interred in the construction fill of successive floors.

Classic Maya architecture has been described as accretional, agglutinative, and organic suggesting repetitive cycles of building activity, and ritual performance (McAnany 1998, 271). McAnany suggests that this architectonic style results in part from efforts to incorporate ancestors into the Classic Maya built environment (McAnany 1998, 271). The practice of interring individuals within a structure, particularly in remodelling and foundational contexts, has been proposed by McAnany to reflect ancestor veneration, although this does not fully explain the presence of infant and child burials within structures. Ancestor veneration was common throughout Mesoamerica, with the first archaeologically noted occurrence taking place between 1150 B.C. amongst the Zapotec at San Jose Mogote, who fashioned figurines to represent venerated dead (Marcus and Flannery 1994). Among contemporary Maya, ancestral presence matters greatly, both within the home, and in terms of inheritance, and for the ancient Maya 'ancestors were those who validated political power, status and access to resources; moreover as facilitators of power transfers between the generations, ancestors played a particularly critical role in times of social transformation' (McAnany 1998, 272). Thus the interment of the dead beneath the floor of a residence that continued to be used by the living may have been a way of the living laying irrefutable claim to the land through physical proximity to the remains of their ancestors or fellow members of a lineage or corporate group. This concept probably became increasingly important as time went on. By the Late Classic period, ancient Maya population densities had reached their peak, and land resources became a valuable commodity (Hyde 2011, 153). Therefore those lineages or corporate groups



that had a claim on the land, and could demonstrate it by the physical presence of their venerated dead, would be in a stronger position to legitimise their claim and control of the land, presuming that other interested parties took this claim at face value. Death did and does not necessarily end an individual's participation in life; instead it initiates a different form or mode of participation (Hageman 2004, 64).

McAnany (1998, 272) points out, 'Becker (1992, 189-193) has commented...on the strong parallels between burials and caches. Certainly both involve ritual performance keyed to a transformation or enhancement of the built environment. Because burials are sometimes followed by structure renovation, such graves may have been viewed as indices of rebirth and the sustained prosperity of a family line through inheritance'. McAnany then goes on to observe that 'Parallelism in these two types of deposits is echoed in hieroglyphic texts, where [descriptions of] sealing or closing (*u-mak-wa*) and to opening (*pas-ah*) refer interchangeably to tombs and caches' (McAnany 1998, 272). If individuals buried within a building are ancestors of those living in the building, a possible explanation of child burials within structures is that the child's skeleton represents a cached offering in a dedicatory ceremony; or the child's burial within the house or structure may be tied into notions of the soul, 'and the belief regarding the *arrival, receipt or development* of a soul within a human infant' (Becker 1993, 62). Whatever the case, it is clear that only certain individuals, whether they were child or adult, were selected to be interred within a structure, thereby showing the importance of that individual (or what that individual represented) in maintaining the status quo to which the burial practice related. In terms of social organisation in the eastern Alacranes Bajo area I would suggest that burials in the larger structures denote members of higher status lineages than those in smaller structures.

### **Access to Resources**

The study of artefacts recovered from various locations point to the range of activities. Multiple instances of manos and metates in a number of structures suggested that these locations were domestic habitations, and the presence of lithic debris in these domestic habitations meant that people were making lithic tools within their residences during their daily lives. The abundance of clay, and lithic tools found

## 10. The Eastern Alacranes Bajo Area: Landscape and Archaeology

suggest that people had ready access to these materials on a day-to-day basis. Hence it is not possible to say that elites controlled basic resources since these resources were widely distributed.

Material culture also indicates differences in access to goods, with polychrome sherds and marine shell objects found at the Tulix Mul courtyard, in the Nojol Nah site centre, and in the larger structures in the Nojol Nah settlement zone, but not in the smaller structures in the NOS area. However even some of the smaller mounds contained examples of granite manos and metates, therefore indicating that access to items made from the non-local material granite was available across the eastern Alacranes Bajo area – regardless of whether or not Nojol Nah and Tulix Mul represent one site or two.

### **Food Production**

Skeletal evidence, as well as sediment analysis from Nojol Nah and Tulix Mul point to maize being a staple of the daily diet therefore suggesting that the land around the centres could have supported maize cultivation, and that members of both communities had access to agricultural land and its products. Das Neves' (2012) study concluded that 50% of diet was composed of maize. However 50% of the diet came from other sources so although maize was indicated in Das Neves' study, other food sources were of equal importance, and determining other aspects of diet and food production is an avenue for future research.

### **Labour Specialisation**

Excavation and mapping at the eastern Alacranes Bajo area has revealed signs of labour specialisation, or at least access to labour specialists amongst the people who lived there. For example the prevalence of dental modification suggests that there were specialists who lived in, or visited the area, who had extensive knowledge of dental anatomy, and were skilled in delicate work. Although it is impossible to say at

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this stage whether or not the skilled occupations were full-time or part-time. The remnants of the mural at Str. TM-2 suggest that there were skilled artists, as do the decorated polychrome ceramics found there; although the polychrome ceramics may have been imported. There is also evidence of tool making – there is a small lithic workshop close to the Nojol Nah site core, and there is lithic debris found in locations throughout the area, for example beneath the bench in Room 2 of Str. TM-2. The burial shaft at NOS 1-M2 was filled with chipped and tested chert cores. These examples show that there was lithic tool production close to where the raw materials would have been procured, i.e. from the Alacranes Bajo and surrounds. An obsidian core coupled with the abundant amount of obsidian tool fragments suggests that there was skill in working non-local material.

Complex architecture, such as that found at the Nojol Nah site core and at Tulix Mul shows labour specialisation – both of the designers of the buildings, and the work force who were skilled enough to build structures such as the multi-terraced structures at Nojol Nah and Tulix Mul; as well there being people who were able to design and build landscape modifications such as terraces and berms as seen throughout the eastern Alacranes Bajo landscape. Wittfogel (1957) argued that land modifications such as irrigation systems and terraces necessitated centralised control of labour and resources, however subsequent investigations (e.g. Acabado 2010; Lansing 1991; Leach 1961; Rodriguez 2006) have demonstrated that in some instances land modification is organised at a community level outside of a centralised polity (Acabado 2014, 32). Netting's (1993) agrarian small-holder model posits that a household, although organised within a wider community or socio-political unit, was responsible for intensive agricultural activities that directly benefited that household as each household had tenure rights over its homes and lands. As the household/small-holder was working its own land a body of intimate knowledge and experience of the land would be passed down through subsequent generations (Rodriguez 2006, 4). In the eastern Alacranes Bajo area, land modifications were close to associated house-mounds and therefore individual households may have directly managed these land modifications as per Netting's (1993) small-holder model without any form of

centralised control. Excavated structures associated with terraces (e.g. NOS15-M1, NOS34-F1) dated to the Early Classic, whereas those that were not associated with terraces (e.g. NOS11-M1, NOS11-M2) dated to the Late Classic, and points to changing social organization over time.

### **Local, Regional and Interregional interaction**

Trade is a two-way exchange, and can take one of two forms: 1) an exchange involving some form of money and 2) an exchange comprising barter where goods or services are exchanged directly for each other with money playing no part in the exchange (Barfield 1997, 468-469). Commodities have value in both exchange and use contexts (Gregory 1995, 912), and are usually alienable items - in contrast to inalienable items such as those used in votive caches.

Within the archaeological record, it is difficult to trace which form of trade took place, and may cause misleading patterns, as services do not always leave material traces. Aside from services replacing objects as a traded commodity, people can also become commodities. An example would be when individuals are stripped of their social identities by a third party and traded as slaves (Kopytoff 1996, 65), although there is no evidence of this among the ancient Maya. Another non-material form of exchange is the exchange of ideas, and this may be seen for example through the spread of a religion from region to region.

Local and regional interaction in the eastern Alacranes Bajo area is seen through the artifacts recovered during excavations at Tulix Mul, and Nojol Nah's settlement zone, and site core. A number of interesting things stand out. There were instances of granite mano and metates throughout the eastern Alacranes area. As the closest granite source is the Maya Mountains, hundreds of miles to the south, it is clear that regional trade mechanisms were in place. The fact that the granite procured from the Maya Mountains was used for domestic everyday equipment, as opposed to being used for ritual objects, shows that the granite was in abundant supply. The granite

## 10. The Eastern Alacranes Bajo Area: Landscape and Archaeology

trade could have been direct or down-the-line (Renfrew 1977). Another non-local artifact type found across the eastern Alacranes Bajo area is obsidian. The closest obsidian source to the eastern Alacranes area is in Guatemala, and the most common type of obsidian found in the Three Rivers Region comes from the El Chayal source (Guderjan 2007, 29). This obsidian source is hundreds of miles away, and like the granite example, this shows participation in regional trade networks. Also like granite, obsidian is found throughout the area, in different contexts (e.g. domestic settings, caches, burials) and so does not seem to be a rare material in the eastern Alacranes Bajo area.

Another material class that signifies the eastern Alacranes Bajo sites' participation in regional trade is jadeite. Unlike granite or obsidian, jadeite is a rare material class found at the eastern Alacranes Bajo area sites, with none found at Tulix Mul, one possible instance (a greenstone celt) found in the Nojol Nah settlement zone, and at the Nojol Nah site core it is only found as a grave good – but only in 6 out of the 62 burials (9.6%). Therefore it appears that jadeite was a rare, and non-utilitarian material to the eastern Alacranes folk. The only known natural deposits of jadeite in the entire Maya area are in the Motagua Valley of Guatemala, again showing the eastern Alacranes Bajo area people's participation in regional trade networks. As jadeite was found in six of the graves in the Nojol Nah site core, this is an example of how a non-local material was incorporated into a minority of local mortuary practices.

Chert tools from the Nojol Nah area have been found as far away as Blue Creek (ca. 20 kms), therefore indicating that stone tools from Nojol Nah found their way into the regional market (Barrett and Brown 2008, 61). However, the presence of one lithic workshop in a 10km radius does not indicate that lithic tool making was the specialisation of the economy at Nojol Nah. No lithic workshop has been found in the Tulix Mul area, although the presence of a lithic debitage deposit containing over 1000 pieces of chert beneath the bench in Room 2 of Str. TM-2 indicates that there was some on-site lithic production. But again, as is the case with Nojol Nah, this is not enough evidence to be able to say that Tulix Mul was a resource-specialised

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community that focussed on chert tool production. However if Nojol Nah and Tulix Mul represent the remains of a single site, then we may postulate that Tulix Mul represents one of multiple resource specialized areas within the single site.

Marine shells have been found in numerous contexts in the eastern Alacranes Bajo area -- most notably the marine shell grave goods of Burial 5 at Str. TM-6 -- and show that there was access to this type of non-local material. Direct access to the coast via the Rio Hondo during the wet season may have meant that marine shells were procured directly from their source by the inhabitants of the eastern Alacranes Bajo area; however it is just as likely that the marine resource were brought into the area by merchants and traders. No evidence of shell processing has been found in the area to date.

The fact that there were non-local goods throughout the eastern Alacranes Bajo area suggests that the residents of the area were able to produce enough surplus – perhaps of agricultural goods, lithic tools, or clay – to be able to participate in the regional trade networks. The glyph sherds found at Str. TM-2 indicate that there was also cultural interaction on a regional scale with influences from Tikal and Calakmul finding their way to the eastern Alacranes Bajo area.

## **Chapter Eleven: The Eastern Alacranes Bajo Area within the Three Rivers Region**

### ***Introduction***

This chapter discusses how the eastern Alacranes Bajo area sites compare to other places in the TRR. This will enable me to determine the nature of settlement in my study area, and whether Nojol Nah and Tulix Mul can be considered to be bajo-centric, or part of a wider pattern of settlement within the TRR.

### ***Natural Resources in the Three Rivers Region***

The TRR is filled with an abundance of natural resources; however the resources are not evenly spread throughout the area. The natural resources that concern my study are water, soil, and stone. The most obvious water sources in the area are the rivers. Settlements close to the rivers in the TRR are: Blue Creek, close to the headwaters of the Rio Hondo; Gran Cacao close to Booth's River; Grey Fox close to the Rio Hondo; Dos Hombres, close to the Rio Bravo; Akab Muclil close to the Rio Azul; and Chan Chich close to the Rio Bravo (Fig. 344). However, La Milpa, one of the largest sites in the TRR is not located close to any water source, with the Rio Bravo 9km to the southeast, and the only known spring/well located 4km away (Scarborough et al. 1995, 101). Nojol Nah is 2kms from the Rio Hondo, with Tulix Mul further away at 4kms from the river. However, the rivers in the TRR are not all perennial. Dos Hombres inhabitants mostly relied on stored rainwater, as the small springs and lakes accessible from the settlement were only recharged annually when the Rio Bravo floodplain was inundated (Hageman and Lohse 2003, 111). Therefore proximity to a river did not necessarily mean a plentiful water supply, although that is not to say that distance from a river meant a lack of access to water. In some places there was an abundance of water. For example the inhabitants of Chan Cahal built canals and ditched fields in order to protect their crops from flooding.

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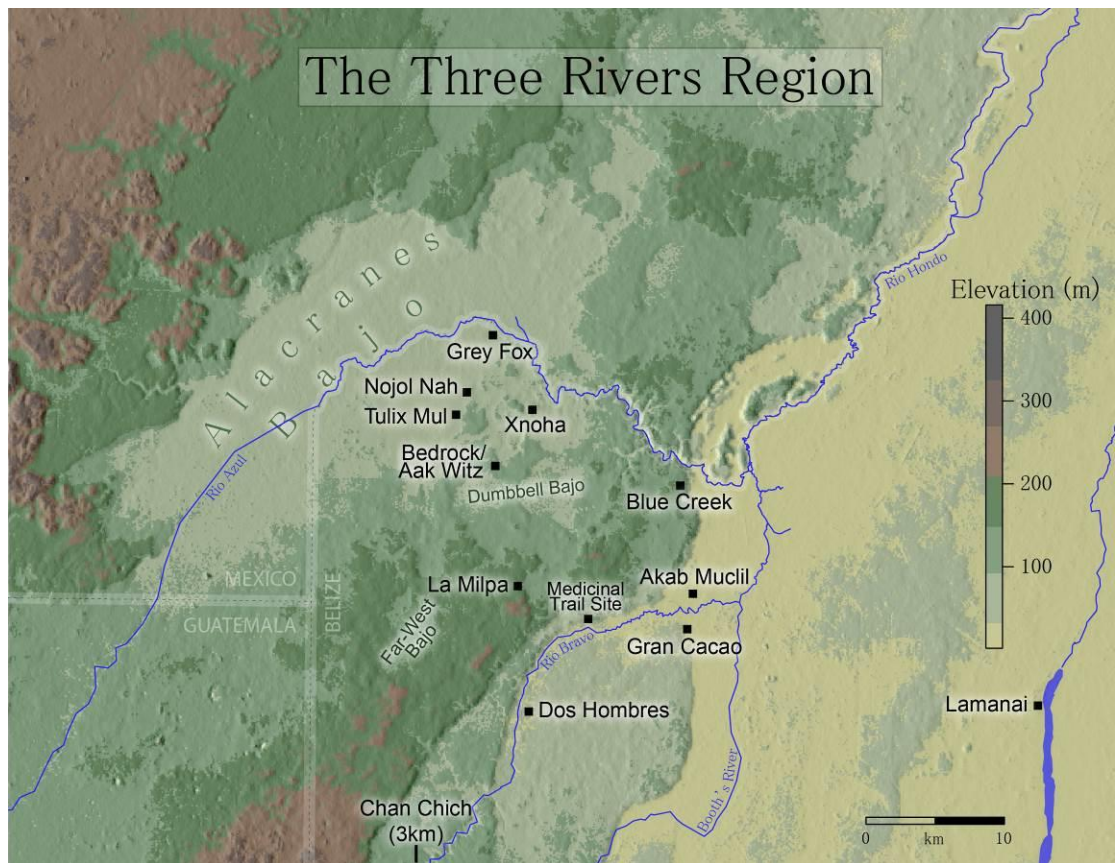


Figure 344 Map of the TRR sites mentioned in this study

Wetlands and bajos are found throughout the TRR (see chapter 3 for definitions), and many of the settlements were located close to wetlands (see settlement pattern section below).

Tests of the soil in the eastern Alacranes Bajo area (Chapter 8) demonstrate that the basic soil pH found in this area would be suitable for growing plants such as maize, beans and squash -- however further analysis would be beneficial to confirm the exact potential of the soil in terms of individual plant species, and this is an avenue for future research. Additionally maize cultigens were recovered from organic samples taken from the NN-4C11 chultun at Nojol Nah, and Das Neves' (2012) study demonstrated that the individuals from Nojol Nah in her sample had diets that were high in maize.

In the wider TRR, Blue Creek is situated within excellent soil resources, and the inhabitants of Blue Creek took full advantage of them - employing no less than five different agricultural techniques (Guderjan 2007, 92-99); the Blue Creek Maya were in



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the position of being able to produce a surplus. Biosilicate analysis at U Xulil Beh indicates that palm and edible fruit were being cultivated. The topography and soil around Bedrock and Aak Witz were similar to those of Blue Creek (Barrett 2004, 81), and beans, maize and squash cultigens have been recovered from a midden inside a chultun at Aak Witz (Guderjan et al. 2010, 223). La Milpa controlled an area that included the fertile resources of the Far West Bajo. In contrast the agricultural land around Xnoha is very poor, so presumably the inhabitants of Xnoha were supplied by other places, perhaps Nojol Nah and/or Tulix Mul. Most of the ecozones around Dos Hombres were unsuitable for agriculture without intensive labour investment (Hageman and Lohse 2003, 111).

Lithic resources are distributed unevenly throughout the TRR, with most of the local chert of inferior quality (Hyde 2003, 68). At Nojol Nah and Tulix Mul however there are excellent chert resources and limestone outcrops that were readily available to the inhabitants, and a lithic workshop has been identified at Nojol Nah. A lithic workshop and high quality lithic resources including fine-grained chert and chalcedony occur at Bedrock. At Grey Fox there is evidence of stone-tool making, and Xnoha has excellent chert resources. In contrast, the quality of the chert around Blue Creek is poor, and none of the chert that Kunen (2004, 108) found in the Far West Bajo could be called high quality. This demonstrates that the chert resources in the northwest of the TRR are of higher quality than in the rest of the TRR.

### ***Land Modification in the Three Rivers Region***

Land modifications such as terraces, berms, and depressions were noted throughout the eastern Alacranes Bajo area, and my research has shown that land modification is associated with both Nojol Nah and Tulix Mul. The presence of these modifications close to settlement indicates that the inhabitants of the eastern Alacranes Bajo area were directly exploiting the land in which they lived. Land modifications are also seen close to settlements throughout the TRR, thus linking Tulix Mul and Nojol Nah to wider regional practices. The most common types of terrace found in the TRR are dry slope contouring, or semi-contouring terraces and most frequently comprised amorphous rubble as opposed to well-laid stone terrace faces (Dunning and Beach 2004). The

## 11. The Eastern Alacranes Bajo Area within the Three Rivers Region

terraces found in the eastern Alacranes Bajo area conform to the non-formal construction style noted by Beach and Dunning (2004).

At La Milpa there were large-scale water management systems in place with a sophisticated complex of drains demonstrating a close relationship between water and land management (Scarborough et. al. 1995, 100). At Blue Creek, extensive lowland ditched fields were in place, with terraces, check dams and drainage modifications noted in the settlement zone of Blue Creek (Guderjan 2007, 97), particularly at Chan Cahal. The Birds-of-Paradise fields associated with Akab Muclil were heavily modified for agriculture. Terraces and berms are also seen for example at Medicinal Trail; Dos Hombres; Xnoha; the Far West Bajo sites, U Xulil Beh and Quincunx. Within the central area of Grey Fox, a man-made reservoir was noted.

Terraces and other land modifications are linked to investments in the social aspects of a landscape, particularly in terms of land, ancestral and hereditary rights (McAnany 1995). Terraces found close to residential complexes in the TRR have been associated with corporate groups, and/or proprietary farmsteads (Beach and Dunning 2004), and so we may assume that the terraces in the eastern Alacranes Bajo area located close to residences indicate the same type of social organization of the land.

### ***Settlement in the Three Rivers Region***

A variety of settlement types have been found within the TRR and one of my research aims was to situate the eastern Alacranes Bajo sites within the wider TRR in order to evaluate if proximity to the Alacranes Bajo had any bearing on the form and function of Nojol Nah and Tulix Mul.

The largest settlements in the area are Rio Azul and La Milpa followed by Gran Cacao, Chan Chich, Dos Hombres, Blue Creek and Grey Fox (Fig. 347). Each of these large settlements contained plazas associated with monumental architecture, at least one ball court, and stelae. Each could be considered a city in terms of size and population density and because they seem to have served as administrative and economic

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centres. Nojol Nah and Tulix Mul are not comparable in size to such large-scale centres. There is, however, monumental and ritual architecture at both Nojol Nah and Tulix Mul. Settlement surrounding the largest architectural groups at Nojol Nah and Tulix Mul suggests that they served as centres to lower density populations than those seen at the TRR's larger sites.

Aside from the large monumental centres, the TRR contained a range of smaller settlements of various sizes. One of the smallest settlements is that of the Quincunx agricultural settlement (Zaro 2003), part of the wider Blue Creek area. Quincunx is much smaller than either Tulix Mul or Nojol Nah, and unlike the eastern Alacranes Bajo area settlements does not contain monumental architecture. Therefore Quincunx cannot be thought of as a settlement type similar to Nojol Nah or Tulix Mul. Other Blue Creek settlement areas such as Chan Cahal and Kin Tan are similar in size to Tulix Mul. Parallels can be found between Nojol Nah and Bedrock in terms of size, architectural elaboration, and location on the edge of a bajo. The Medicinal Trail site - consisting of a dispersed community of at least three closely related courtyard groups and associated mounds and landscape modifications (Hyde 2011, 174) - could also be compared to Nojol Nah and its settlement zone, although Medicinal Trail did not contain architecture on the scale of the NN-3F1 structure. Other places similar in size to Nojol Nah are Xnoha, and the Far West Bajo settlements of La Caldera, and The Bajo Hill site. Tulix Mul can be compared in size and architectural density to the Aak Witz courtyard group, and to Thompson's group in the Far West Bajo.

Medicinal Trail, Bedrock, and the Far West Bajo sites have been economically, and therefore perhaps politically linked with the far larger site of La Milpa; and Chan Cahal, Kin Tan, CBN and U Xulil Beh have been linked to Blue Creek (Kunen 2001; Guderjan 2007). Following this pattern therefore it seems likely that Nojol Nah and Tulix Mul would have been linked to a larger site. Perhaps this larger site would have been Xnoha, but equally it may have been Grey Fox. It is likely that Grey Fox was the dominant site in the eastern Alacranes Bajo area due to its size, architectural elaboration and ball court. No excavation has been carried out at Grey Fox to date however, so its role in the eastern Alacranes Bajo area remains unknown.

***Site Planning and Settlement Patterns in the Three Rivers Region***

Previous site planning studies in the Three Rivers Region (e.g. Houk 1996) have focused on the largest settlements and applied a template to these sites from which the results have been used to detect a settlement pattern. Houk's (1996) study used Ashmore's (1991) site planning template to categorise large TRR places into either Type 1 or Type 2 sites. Type 1 sites were found in the west of the region, and Type 2 in the East of the region, as it is surmised by Houk that Type 1 sites were culturally more affiliated with other Type 1 sites, and Type 2 sites with other Type 2 sites (see more detailed discussion in Chapters 2 and 4). The eastern Alacranes Bajo area falls in the west of the TRR; however, based on their size and layout, Nojol Nah and Tulix Mul do not conform to either of these templates. Therefore Ashmore's (1991) site planning theory cannot be used to propose cultural ties within the TRR. The eastern Alacranes Bajo area was clearly tied to the rest of the TRR as seen by trade, similarity of artefacts, burial practices, and architectural styles. The non-conformity to Ashmore's (1991) site planning template in contemporaneous sites therefore is likely to be linked to functional aspects in that the Ashmore Type 1 and Type 2 sites were monumental centres that serviced large populations including high elites, whereas smaller hinterland centres such as those in the eastern Alacranes Bajo area were used by smaller populations whose elites did not have the same power and wealth as those in the monumental centres.

There are many settlements within the TRR that do not fit the Ashmore (1991) site-type theory, therefore comparison of their settlement pattern and layout with Nojol Nah and Tulix Mul is a useful exercise. Additionally it is useful to consider features (not contingent on the Ashmore categorisation) of the Type 1 and 2 sites that are similar to those found in the eastern Alacranes Bajo area to determine whether or not Nojol Nah and Tulix Mul fit into a wider settlement pattern applicable to the TRR. For example many of the TRR settlements are located close to bajos or other types of wetlands: La Milpa and the associated settlements of La Caldera, Thompson's group, and the Bajo Hill site are located near the Far West Bajo; Blue Creek and its associated settlements are located close to a series of wetlands; Gran Cacao has seasonal wetlands to its

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north and south; Xnoha is surrounded by a series of small upland bajos, with larger bajos to the north, south, and west; The three plazas of Dos Hombres are surrounded by a bajo; Grey Fox is close to the Alacranes Bajo; and Aak Witz and Bedrock are situated on the northern edge of the Dumbbell Bajo. Therefore it is possible to say that a common pattern in the TRR was for settlements to be located close to wetland areas, and Nojol Nah and Tulix Mul conform to this pattern.

Another settlement pattern in the Three Rivers Region is the practice of situating land modifications near settlements. This is seen at Nojol Nah and Tulix Mul, Medicinal Trail, Chan Cahal, U Xulil Beh, Xnoha, Quincunx, and also at the Far West Bajo settlements of La Caldera, The Bajo Hill site and Thompson's Group. These sites share with Nojol Nah and Tulix Mul the presence of both vernacular and monumental architecture within the same living space. La Caldera and Thompson's Group also have in common with Nojol Noh a settlement pattern consisting of a series of architectural groups, including complex residential structure with a composite group that is larger than any others seen in the settlement, as well as land modifications interspersed with the architecture (Figs. 345 and 346).

## 11. The Eastern Alacranes Bajo Area within the Three Rivers Region



**Figure 345** Map of La Caldera (Kunen 2001, 125)

## 11. The Eastern Alacranes Bajo Area within the Three Rivers Region

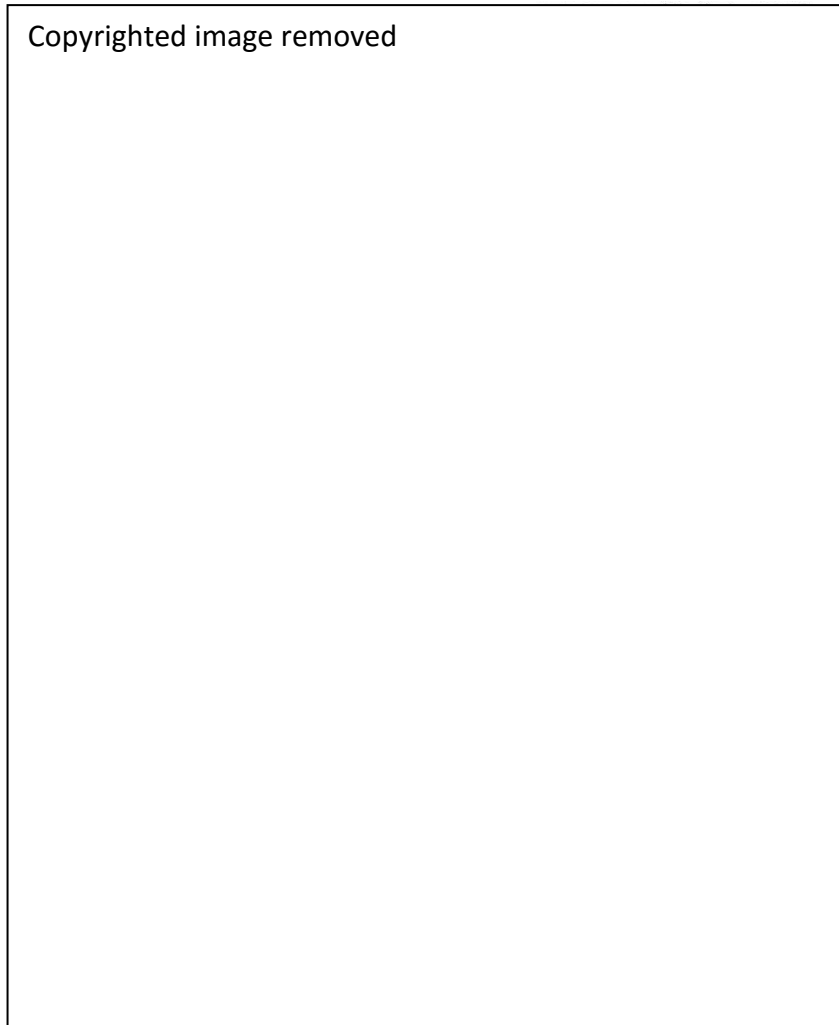


Figure 346 Map of Thompson's Group (Kunen 2001, 103)

### ***Chronology of Settlement in the Three Rivers Region***

#### **The Preclassic**

Excavated sherds from Nojol Nah and Tulix Mul allow us to examine how the sites fit the chronology of the wider TRR. Permanent settlement started in the TRR in the Middle Preclassic at La Milpa, Chan Chich, Blue Creek and Dos Hombres. There is no evidence in the excavated archaeological record from the eastern Alacranes Bajo area to show occupation dating to this time. So it would seem that the Eastern Alacranes Bajo area was settled after other places in the TRR.

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The earliest ceramic dates in the eastern Alacranes Bajo area are Late Preclassic; the Late Preclassic pottery examples come from a round Structure (in the form of lip-to-lip cache bowls), a terrace (sherds associated with construction), a residential Structure in the Nojol Nah Settlement Zone (sherds associated with the earliest construction phase), and also a presumed residential Structure (Str. TM-8) from Tulix Mul (sherds from sub floor core material).

Elsewhere in the TRR during the Late Preclassic, monumental architecture was first constructed at Rio Azul, La Milpa, Dos Hombres and Blue Creek, and Late Preclassic sherds were recovered from a midden within a chultun at Aak Witz.

### **The Early Classic**

Early Classic sherds were found in excavations across the eastern Alacranes Bajo area associated with residential, ritual and monumental structures. In the wider TRR in the Early Classic, excavation results indicate increased interaction with places outside the TRR, (Sullivan and Sagebiel 2003, 28). Monumental architecture continued to be built across the TRR during the Early Classic, with population nucleation contributing to the formation of large centres. There is evidence that the Tulix Mul Courtyard group's construction began in the Early Classic; additionally the terrace feature at NOS-15 dates to the Early Classic. In the Nojol Nah site core, the largest structure Str. NN-3F1 was built during the Early Classic.

Blue Creek was proposed to have been an independent polity during the Early Classic (Guderjan 2007), and Akab Muclil was first settled. Adams (1995 cited by Houk 1996, 116) states that later on in the Early Classic, for a 120-year period starting around 534 A.D., there was a drop in population across the TRR, perhaps due to a civil war, and at the end of the 120-year period the TRR seems to detach from regional powers. In the eastern Alacranes Bajo area, as there were no stelae, or other written records, on the balance of available evidence, it is not possible to say how Nojol Nah and Tulix Mul were affected in terms of population levels during this 120 year period.



### **The Late Classic**

The Late Classic saw increased agricultural activity and land modification throughout the TRR, with rural populations at their maximum. At both Tulix Mul and Nojol Nah construction continued into the Late Classic, and ceramic evidence dating to this period has been recovered from residential structures from a variety of different contexts (see Chapters 7, 8 and 9). At Blue Creek at this time, formerly public buildings were turned into residential ones (Guderjan 2007). In the latter part of the Late Classic and into the Terminal Classic, there was widespread abandonment and rapid depopulation of many TRR settlements. Dos Hombres was one of the first to be abandoned and this occurred in the Late Classic, but there appears to be revisitation later on in the Late Classic (Houk et al. 2008, 97). La Milpa was abandoned seemingly in the midst of a surge in public works (Hammond and Tourtellot 2004). At Nojol Nah construction continues into the Later Classic, and different parts of Nojol Nah appear to have been abandoned at different times from the Early Classic (Str. NN-3F1) to the Late Classic (e.g. the NN-5E complex).

### **The Terminal Classic and Postclassic**

There is some ceramic evidence from Tulix Mul that suggests that at least part of the courtyard group was still occupied in the Terminal Classic period, however the courtyard was abandoned completely by the end of the Terminal Classic. Terminal Classic construction continued at Gran Cacao, and there is some Postclassic material present there, but the site was abandoned soon afterward, and there was no further construction in the Postclassic. At Blue Creek there were a number of ritual events in the Terminal Classic after which the site was abandoned (Guderjan 2007), and this is also seen nearby at Kin Tan and CBN. The only place in the TRR that has any evidence of Postclassic occupation is Akab Muclil. However, Nojol Nah, La Milpa, Chan Chich, and Dos Hombres all had episodes of revisitation evidenced by ritual objects dating to the Postclassic period.

### ***The Built Environment in the Three Rivers Region***

Structures in the Maya area and indeed in Mesoamerica generally are rarely found in isolation and are usually part of an architectural group (Kirchoff 1943; Flannery 1972; Rice 1988) around an open space. The space around which the structures are grouped can be a plaza, patio or courtyard.

In the TRR we find a variety of different structures and architectural configurations, from the monumental structures of La Milpa, to the small house mounds at U Xulil Beh. Even within sites there was a vast discrepancy between the smallest and the largest residential architecture, for example at Blue Creek between what Guderjan terms 'the royal residences' (Guderjan 2007, 66) in the site core and the modest residential structures in the Chan Cahal and U Xulil Beh areas. However the largest structures in Blue Creek are dwarfed by those at La Milpa, but similar in size to structures found at Gran Cacao and Chan Chich. A complex social hierarchy on both an inter- and intra- site level is present within the TRR, but there are also indications of a heterarchy. Social organisation studied through the lens of architecture within the TRR is revealed to be composed of both hierarchy and heterarchy; that is sites did not just exist within a hierarchical structure, but possessed the potential to be ranked in a number of different ways (see Crumley 1995). The eastern Alacranes Bajo area sites existed within the heterarchical TRR cultural landscape.

### ***Cosmology and Cultural Practices Reflected in the Architecture of Three Rivers Region***

Cosmology reflected in architectural practice may be seen at La Milpa representing a vast physical cosmogram (Tourtellot et. al. 2003, 48). If Majewski and Barrett's (2010, 60) interpretation of the cruciform nature of Nojol Nah site core plan is correct this would in part link Nojol Nah with architectural practices in the wider TRR.

## 11. The Eastern Alacranes Bajo Area within the Three Rivers Region

Another way that the eastern Alacranes Bajo area demonstrates conceptual links with the wider TRR is through the practice of depositing caches along the axis of a structure. Primary axis caches in the TRR are found for example at Str. 22 at La Milpa (Houk and Zaro 2011, 189); Str. 4 at Blue Creek (Guderjan 2004, 240); Str. A-4 at Medicinal Trail (Hyde 2011, 265); and La Caldera in the Far West Bajo (Kunen 2004, 100).

Round structures, such the one seen in the Nojol Nah settlement zone, were common in the Maya Lowlands, particularly in the Preclassic period (Fig. 347)

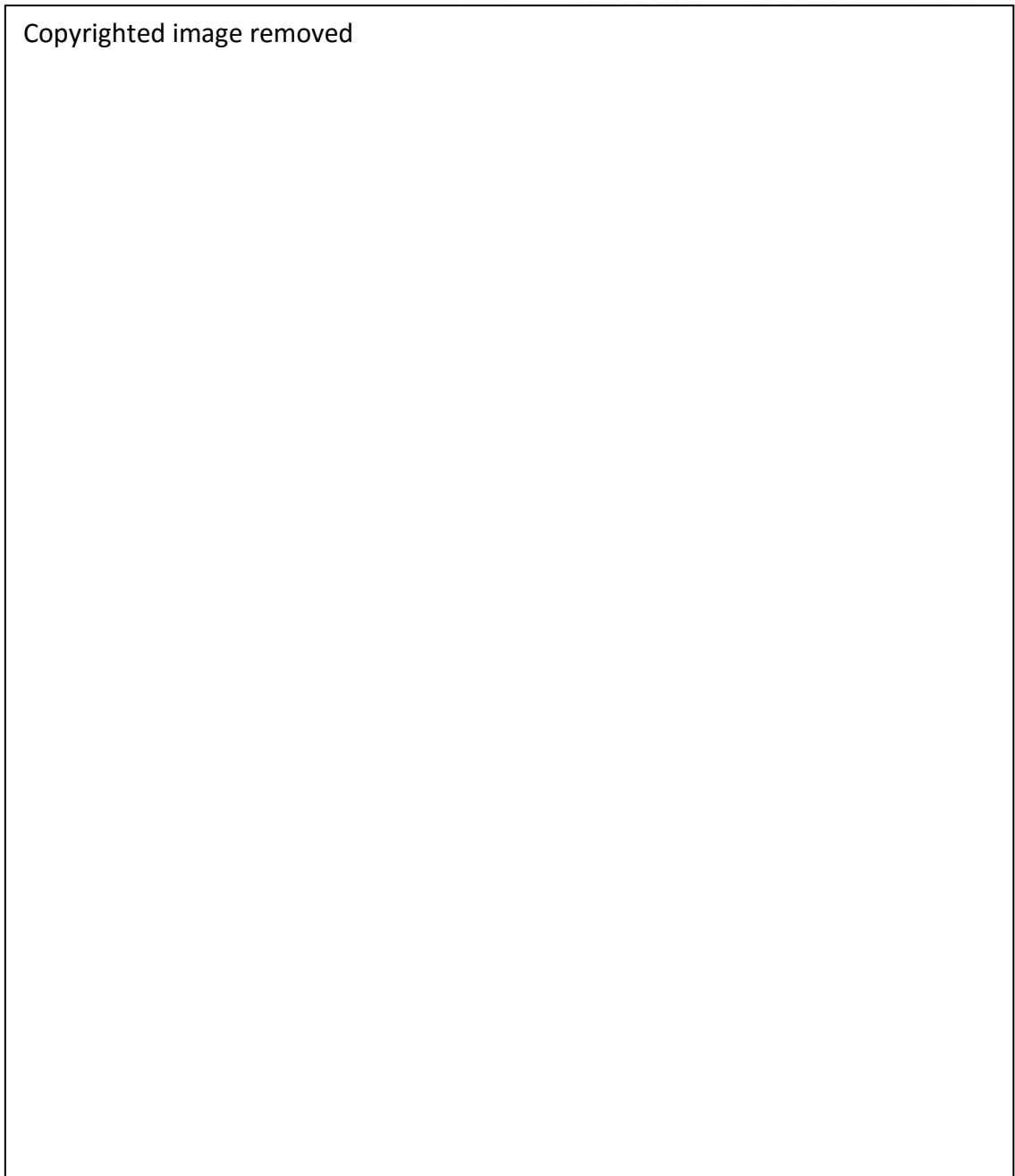


Figure 347 Middle and Late Preclassic round structures in the Maya Lowlands (Aimers et al. 2000, 72)

## 11. The Eastern Alacranes Bajo Area within the Three Rivers Region

Examples of round structures in the TRR include Dos Hombres (Brown 1995, 39-40 cited in Aimers et al. 2000), Str. A-sub-1, Medicinal Trail (Hyde 2011, 322), Str. RS-21 at Rosita, and the free standing circular platform at Chan Cahal. As round structures are thought to have specific ritual functions, perhaps pertaining to astronomical observatories, or performance spaces for music and/or dance (Aimers et al. 2000), the round structure at the Nojol Nah settlement zone again links the inhabitants of the eastern Alacranes Bajo area to cultural practices occurring in the wider TRR, and the Maya lowlands more generally.

### ***Social Status in the Three Rivers Region***

One of the most accessible ways to consider differences in social status on an inter- and intra-site basis is to consider differences in architectural size and elaboration. Nojol Nah and Tulix Mul contain architecture in the small to medium range compared to other sites in the TRR such as La Milpa, Blue Creek, Gran Cacao and Dos Hombres. Therefore it is unlikely that either of the eastern Alacranes Bajo area sites housed the type of people who had high social status and political power on a regional scale, an interpretation that could only be made by comparing Nojol Nah and Tulix Mul to other places in the wider TRR.

Elaborate tombs in terms of size and grave goods are found throughout the TRR, for example Tomb 2 at Chan Chich (Houk et al. 2010); Blue Creek Burial 5 (Kosakowsky and Lohse 2003); Dos Hombres Str. B16 Tomb (Durst 1998); and La Milpa Burial B11.67 (Hammond et al. 1996). Elaborate tombs provided an effective way of displaying status and power (Houk and Valdez 2011, 156). There were no such tombs uncovered in the eastern Alacranes Bajo area; indeed all of the burials at Nojol Nah and Tulix Mul, were sub-floor burials with few or no grave goods, with only burials at Str. TM-4 and Str. TM-6 comprising formal crypts. The lack of a single tomb in the eastern Alacranes Bajo area suggests that there were no individuals who held the status and power to warrant such treatment upon death. Simpler forms of burial are also found throughout the TRR, and parallels with Nojol Nah and Tulix Mul can be drawn from these, in particular

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from similar-sized places such as the Far West Bajo sites, Medicinal Trail and Bedrock/Aak Witz.

The Far West Bajo sites, like Nojol Nah and Tulix Mul, had sub-floor burials associated with construction events: a cut was made in the floor, the individual was interred, and the burial was sealed beneath the floor. Of nine excavated burials in the Far West Bajo sites, only three were placed in specially prepared grave crypts. The rest were all interments beneath floors and within construction fill (Kunen 2004, 115). The individual from Burial 4 at La Caldera--like those in Burial TM-6, Burial TM-3, and Burial NN-39--was interred in a crypt with no grave goods, prompting Kunen (2004, 115) to note 'no grave goods accompanied this individual, which seems unusual considering the maturity of the man and that his presumably high status warranted burial in a special chamber'. Subsequent work in the eastern Alacranes Bajo area demonstrates that not having grave goods in a crypt burial is perhaps not as unusual as Kunen thought.

Aak Witz, like the eastern Alacranes Bajo sites, also had sub floor burials within construction core (Greaves et al. 2009), and most of these did not have grave goods (Greaves and Guderjan 2012). One exception was Aak Witz Burial 10, which contained a pink coral bead [possibly a conch pearl], a shell bead, and a biface (Greaves and Guderjan 2012, 38). At Tulix Mul 22 of the 24 burials did not have grave goods, but the two that did had shell objects. Medicinal Trail also contained sub floor burials, and Burial 2 contained shell grave goods, including thin shell discs such as those seen from Tulix Mul Burial 2, and Nojol Nah Burial 28. At the site of Xnoha, roughly 5kms west of Tulix Mul, a carved marine shell bead was also found that was similar in style to the ones from Burial 5 at Tulix Mul. Perhaps shells in certain burials at Aak Witz, Medicinal Trail, Xnoha, Nojol Nah and Tulix Mul may indicate a specific ideological link between the places, and may suggest a similar social status between the individual's burial with the shell objects, as well as hinting at a shared regional culture.

Other possible indicators of social status found within the mortuary record are dental modifications, and individuals with modified teeth have been found at Medicinal Trail

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(Hyde 2011, 244), La Caldera (Kunen 2004, 115), as well as at Tulix Mul and Nojol Nah. Geller (2006, 287) suggests that people with dental modifications were probably 'distinct and perhaps central figures within the communities'. If this is the case, then dental modification in the TRR may be a sign of a type of social status common in different parts of the TRR.

Types of artefacts found in different settings can also demonstrate social status. For example access to exotic goods that are not uniformly distributed in a community or among communities can suggest that some people had access to certain goods and others did not. For example the people in the Blue Creek site core during the Early Classic had ready access to jade, whereas jade is not found in the majority of the settlements outside of the site core, for example U Xulil Beh - although at Chan Cahal there was an unusual amount of jade (Guderjan 2007). This type of pattern with unequal access to goods is seen also at Nojol Nah where small house mounds in the Nojol Nah settlement zone do not contain items such as polychrome ceramics and obsidian that are found in the larger house mounds of the Nojol Nah site core, therefore demonstrating that there were differences in status within Nojol Nah.

At similar-sized sites to Nojol Nah and Tulix Mul, such as the, Medicinal Trail, Bedrock/Aak Witz, and the Far West Bajo sites, evidence of groups of people who had access to larger architecture, and higher quality material culture than other people within the respective settlement is noted. This is something that is also seen at Nojol Nah and Tulix Mul. People with greater access to resources can be termed 'elite' in relation to others that did not have such access. Although the elites found in the similar-sized sites cannot be considered 'elite' in comparison to the higher echelons of society at monumental centres such as La Milpa, Chan Chich and Blue Creek, they appear to have been the elite within their settlements, and can therefore be termed rural/hinterland elite. The presence of rural/hinterland elite in the eastern Alacranes Bajo area settlements demonstrates that both Nojol Nah and Tulix Mul conform to a pattern of social organisation seen in other areas of the TRR.

### ***Daily Life in the Three Rivers Region***

Aspects of daily life that are visible in the archaeological record include subsistence and ritual. Instances of ritual were seen throughout the eastern Alacranes Bajo area in the form of architecture (the NOS round Str.); the placement of deer bones (at Str. NOS11-M1, Str. TM-2, Str. TM-8 and Str. TM-8); multiple burning and re-plastering inside rooms (at Str. NOS11-M1, Str. TM-2 and Str. TM-6); and a revisitation episode (evidenced by the Postclassic incensario placed atop Str. NN-3F1 at Nojol Nah).

As discussed above, the round structure in the Nojol Nah settlement zone conforms to an architectural tradition seen in other areas of the TRR. An instance of deer bone found in a ritual context in the wider TRR is the inclusion of a highly polished deer rib in Burial 4 at Medicinal Trail (Hyde 2011, 244). I was unable to find an example of burning and re-plastering within the TRR, but this behaviour was recorded for structures in Plaza N10 [3] at Lamanai (Graham 2004, 236), a site located on the Belize coastal plain to the east of the TRR.

The Postclassic revisitation of Nojol Nah conforms to a pattern seen across the Three Rivers Region, and indeed more widely in the Maya lowlands (Thompson 1970, 76; Morley 1946, 380-1, M.K. Brown 2011, 126). At La Milpa, Hammond and Bobo (1994, 26) documented several instances of Postclassic revisitation, including incensario fragments associated with Stela 7 dating to the Late Postclassic that may represent the remnants of a ritual focused on monument veneration (Houk et al. 2008, 97), as well as monument resetting (Hammond and Bobo 1994, 25). Houk (1996) notes that monument veneration appears to have also taken place at Dos Hombres, and refers to the individuals who took part in this ritual as 'pilgrims' (Houk et al. 2008, 97), a term also used by Hammond and Bobo (1994). A Lancandon-style censer (Thompson 1970) was recovered from the top of one of the buildings in the main plaza of Chan Chich (Guderjan 1991b), which suggests a presence in the 16<sup>th</sup> C or later. At Medicinal Trail three Postclassic censer fragments were found in front of Str. B1 (Houk et al. 2008, 97).

In terms of subsistence, work carried out in the eastern Alacranes Bajo area revealed that people ate a diet based largely on maize, with faunal remains suggesting that deer

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and small mammals and birds were also a staple dietary component. Maize cultigens from the chultun at Aak Witz, and Morse's (2009) pollen core at Laguna Verde, Blue Creek, indicate that the people there also relied on maize. Metates, used as food grinding implements are found in sites across the TRR. Maize was the staple crop of the ancient Maya not just in the TRR, but across the Maya Lowlands (Coe 1999). At Gran Cacao and Akab Muclil there is evidence of aquatic resources as part of the diet (Powis et al. 2002). Spouted pots -- used for cacao preparation and consumption -- have been found at Blue Creek and Chan Chich (Powis et al. 2002, 90).

### ***Labour Specialisation in the Three Rivers Region***

The wide variety of settlement types across the TRR suggests that some settlements may have had particular functions. Resource- specialised communities are settlements that 'developed near concentrations or "patches" of critical resources [and] may have become specialised producers by exploiting these resources' (Kunen 2004, 7). Examples of resource-specialised communities in the TRR include the Far West Bajo sites (Kunen 2004); Akab Muclil focused on riverine resources (Padilla 2013); La Milpa initially focused on aguada resources (Scarborough and Valdez 2003); and the residential areas of Blue Creek, each focused on specific environmental adaptations (Guderjan 2003). The abundance of resource specialised communities in the TRR has led scholars to the agreement that the political economy of the region was not based solely on a hierarchical structure, but rather an interdependent heterarchy (Scarborough et al. 2003). The concept of resource specialised communities can also be applied to Tulix Mul and Nojol Nah, as these two settlements developed in response to the resources of the Alacranes Bajo. However like the other sites within the heterarchy of the TRR, the resource specialised component of Nojol Nah and Tulix Mul is only an element of their nature, and only one way of categorising them.

Evidence of specialised skills can be found throughout the TRR. The lithic workshop at Bedrock indicates stone tool manufacture. Although no evidence of kilns or other pottery manufacturing debris has been found, the abundance of pottery found in all TRR settlements suggests that each site was manufacturing its own pottery. Cranial and dental modification, for example at La Caldera, suggests that there were



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practitioners skilled in these bodily modifications if not living in each settlement where these practices were seen, then at least visiting on a regular basis. Complex architecture is seen across the TRR, with the monumental architecture found at Chan Chich, Dos Hombres, Grey Fox, Xnoha, La Milpa, and Blue Creek, indicating specialisation in engineering, architectural design and implementation.

Land modification -- for example the complex water engineering at La Milpa, the terraces and berms at Medicinal Trail, and the raised and ditched fields situated in the Blue Creek at Chan Cahal area -- suggests that members of the communities had access to specialist and/or inherited knowledge regarding how to manage the land resources in the TRR. All of these types of skills were seen to some degree in the archaeological record of the eastern Alacranes Bajo area, therefore demonstrating that the inhabitants of Tulix Mul and Nojol Nah had access to the same generational knowledge and expertise as did the inhabitants of other settlements in the wider TRR, indicating that Nojol Nah and Tulix Mul were fully culturally integrated into the wider TRR.

### ***Local, Regional and Interregional Interaction on the Three Rivers Region***

Evidence of participation in local and region trade networks at Nojol Nah and Tulix Mul is evidenced by the presence of non-local goods (such as jade, granite, and obsidian) in the archaeological record, with lithic tools originating from Nojol Nah found at Blue Creek, and two glyph sherds suggesting links to Calakmul and Tikal. Lithic tools from a workshop at Bedrock were also found at Blue Creek, suggesting that there was a lithic tool trade network involving at least three settlements in the TRR. However it is not clear what goods and/or services that Nojol Nah and Bedrock received in return from Blue Creek, or even whether the lithic tool supply might have involved Bedrock and Nojol Nah paying tribute to the much larger Blue Creek. Similar-sized settlements to Nojol Nah and Tulix Mul -- such as Bedrock, Medicinal Trail, the Far West Bajo sites -- have been linked to La Milpa; however the place of Nojol Nah, Tulix Mul, within the regional interaction sphere has not yet been determined, although they were likely

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linked with Xnoha and/or Grey Fox, as mentioned above. Affiliations may have changed over time also, for example Bedrock is equidistant between Blue Creek and La Milpa so could have been affiliated to either, or both, or neither at different times throughout the site's history. Similarly Akab Muclil is equidistant between Blue Creek and Gran Cacao, and it is not clear to which, if either, of these larger sites it had ties. So Nojol Nah and Tulix Mul are two of a number of smaller sites of which the full range of affiliations within the TRR are currently unknown.

Evidence of interregional trade is noted at all settlements in the TRR, from the jade cache at the large settlement of Blue Creek (Guderjan 2007) to the smaller settlements, such as Akab Muclil's green obsidian and granite (Padilla 2013), and Quincunx's marine shell and jade artefacts (Zaro 2003). This illustrates that the eastern Alacranes Bajo area sites were part of a trade network that spanned the TRR and beyond.

### ***Concluding Remarks***

The main purpose of this study was to elucidate the nature of settlement of the eastern edge of the Alacranes Bajo, and to determine whether or not settlements at this location could be termed bajo-centric. As the eastern Alacranes Bajo area had never been investigated before, my work makes an original contribution to the corpus of knowledge being accumulated about the ancient Maya in the Three Rivers Region, and adds to our understanding of the nature of settlement at non-monumental centres. By adopting a landscape archaeology approach I was able to determine what natural resources were available at the eastern edge of the Alacranes Bajo, how the land was being modified to exploit the resources, and where settlements were located in relation to them.

By situating Nojol Nah and Tulix Mul within the wider TRR, it is possible to draw a number of conclusions. First, although Nojol Nah and Tulix Mul could be considered resource specialised communities, they cannot be considered simply bajo-centric. Their sole purpose was not to extract resources from the bajo. This is evidenced from their participation in the social, cultural and subsistence practices seen throughout the

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wider TRR. Second, we can note that there were different social classes or statuses present within the eastern Alacranes Bajo area, as there were in all other sites in the TRR. However the people at Nojol Nah and Tulix Mul that we may categorise as rural/hinterland elite did not have the same access to material wealth, and presumably to the same power, as the elites in the larger monumental centres. Third, we can say that the eastern Alacranes Bajo area settlements did not operate independently, but were part of wider regional heterarchy. Finally by comparing the resources of the eastern Alacranes Bajo to other bajos within the TRR, we can state that there is no typical homogeneous settlement that is found close to bajos, as the resources available vary from bajo to bajo even in a relatively small area.

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## Appendix

## Appendix A: Soil Sample Tables (raw data)

Terrace Trench		Soil Chemistry					
Sample ID	Moisture	pH	LOI	Organic matter	Aluminum	Arsenic	Boron
	%		%	%	mg/Kg	mg/Kg	mg/Kg
24	8.943089431	6.98	17.44505	11.98154	67.73527	0.876378	1.57037462
25	4.275286757	6.95	5.446623	3.582636	406.0567	0.8161	1.65003128
26	4.293714997	7.47	3.576073	2.273251	7.450569	0.547742	1.67933885
27	8.039906103	7.61	6.06254	4.013778	18.87076	0.65237	1.54101444
Sample ID	Barium	Calcium	Cadmium	Cobalt	Chromium	Copper	Iron
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
24	74.63720708	9332.084	0.376458	0.479923	0.057491	2.57334	33.5301897
25	95.84953076	4890.106	0.092158	0.168738	0.074046	0.888363	23.830292
26	26.52836782	6810.195	0.052332	0.167085	0.084486	1.958537	21.1509004
27	34.96887277	8927.313	0.037695	0.102522	0.102249	0.707729	25.3032296
Sample ID	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Nickel	Phosphorus
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
24	6643.467559	575.277	31.49953	0.081862	259.2096	1.301846	7.71751953
25	5621.583942	289.3242	5.28879	0.097883	238.2307	0.784004	4.2005318
26	2828.116007	226.0601	10.05642	0.072322	228.64	0.308052	2.2892189
27	6008.098923	224.7532	2.728574	0.081945	420.702	0.194209	2.15905912
Sample ID	Lead	Sulfur	Selenium	Silicon	Strontium	Titan	Vanadium
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
24	2.414347202	14.6224	0.057223	6.00922	0.281652	0.40931	0.60722461
25	0.707987487	5.000396	0.084932	4.444724	2.56927	0.32171	0.37492179
26	1.092748903	3.691528	0.078828	3.769602	2.255462	0.34822	0.47513692
27	0.812526612	4.03204	0.058636	3.644533	2.284252	0.317945	0.58308163
Sample ID	Zink	Chloride					

## Appendix

	mg/Kg	mg/Kg
24	0.898428184	7437.278
25	0.395755996	5809.974
26	0.922363428	3013.418
27	0.315122658	6426.463

### Terrace Trench Mehlich III ICP

Sample ID	Cm Depth	Horizon	pH	LOI %	OM %	Fe mg kg-1	Ca mg kg-1
24	0-10	Ap	6.98	17.44505	11.98154	33.53019	9332.08353
25	25-30	A2	6.95	5.446623	3.582636	23.83029	4890.10636
26	30-40	AC	7.47	3.576073	2.273251	21.1509	6810.19522
27	70-75	C	7.61	6.06254	4.013778	25.30323	8927.31292
Sample ID	Cm Depth	Horizon	K mg kg-1	Mg mg kg-1	Mn mg kg-1	P mg kg-1	S mg kg-1
24	0-10	Ap	6643.468	575.277	31.49953	7.71752	14.6224008
25	25-30	A2	5621.584	289.3242	5.28879	4.200532	5.00039625
26	30-40	AC	2828.116	226.0601	10.05642	2.289219	3.69152814
27	70-75	C	6008.099	224.7532	2.728574	2.159059	4.03204039
Sample ID	Cm Depth	Horizon	Al mg kg-1	Si mg kg-1	Cl- mg kg-1	Zn mg kg-1	
24	0-10	Ap	67.73527	6.00922	7437.278	0.898428	
25	25-30	A2	406.0567	4.444724	5809.974	0.395756	
26	30-40	AC	7.450569	3.769602	3013.418	0.922363	
27	70-75	C	18.87076	3.644533	6426.463	0.315123	

Appendix

**15m Long Trench Soil Chemistry**

Sample ID	Moisture	pH	LOI	Organic matter	Aluminum	Arsenic	Boron
	%		%	%	mg/Kg	mg/Kg	mg/Kg
28	8.685015291	7.1	14.73543	10.0848	52.35293	0.754144	1.64276112
29	6.685552408	7.46	6.982392	4.657675	37.98036	1.277994	1.47400053
30	7.907221929	7.44	9.215799	6.221059	310.8822	1.364631	1.49604718
31	9.017663465	7.5	7.084469	4.729128	1000.442	1.184457	1.51527753
32	6.621621622	7.84	5.93343	3.923401	152.8498	1.036454	1.5604769
Sample ID	Barium	Calcium	Cadmium	Cobalt	Chromium	Copper	Iron
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
28	40.78345283	9451.692	0.645656	0.611856	0.061694	1.980854	20.4278435
29	108.1022593	15212.28	0.231401	0.521733	0.090189	1.453407	17.7216547
30	199.1331349	14052.16	0.17424	0.776803	0.094579	1.667616	29.7891588
31	103.2636205	11508.24	0.096841	1.016694	0.077135	1.159958	31.0543574
32	169.8649301	10839.62	0.144621	0.785942	0.090986	0.994319	28.4273223
Sample ID	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Nickel	Phosphorus
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
28	5889.280436	445.2073	46.07881	0.082047	212.3505	1.906257	8.11313195
29	3674.75972	413.2589	33.03819	0.104714	264.9487	1.379583	3.56314093
30	4948.016036	450.8043	46.20037	0.129482	390.8648	1.501204	3.06797881
31	101.0072586	357.2268	47.48532	0.125866	311.654	0.958466	3.073694
32	74.4380233	377.9432	47.9147	0.103038	364.9494	1.284114	2.42627386
Sample ID	Lead	Sulfur	Selenium	Silicon	Strontium	Titan	Vanadium
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
28	2.928076316	10.85249	0.083774	6.242492	0.670915	0.471203	0.72506824
29	2.861122092	6.262824	0.063527	6.019655	3.203673	0.409113	0.62359793
30	2.563402478	4.777037	0.063636	7.028429	3.603406	0.45061	0.77219794
31	2.348675731	3.367412	0.092403	7.981503	2.900961	0.360734	0.93432202
32	2.409438157	4.204603	0.077371	6.420752	3.053795	0.404517	0.7312033
Sample ID	Zink	Chloride					
	mg/Kg	mg/Kg					
28	0.353993214	6190.347					
29	0.694296264	3739.234					
30	0.434677912	5071.927					
31	0.35940242	19.02445					

## Appendix

32	0.268819332	11.26125
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### 15m Long Trench Mehlich III ICP

Sample ID	Depth (cm)	Horizon	pH	LOI %	OM %	Fe mg kg-1	Ca mg kg-1
28	0-10	Ap	7.1	14.73543	10.0848	20.42784	9451.69151
29	30-40	A2	7.46	6.982392	4.657675	17.72165	15212.2775
30	50-55	A3	7.44	9.215799	6.221059	29.78916	14052.1607
31	60-65	A3	7.5	7.084469	4.729128	31.05436	11508.2448
32	70-75	AC	7.84	5.93343	3.923401	28.42732	10839.6198
Sample ID	Depth (cm)	Horizon	K mg kg-1	Mg mg kg-1	Mn mg kg-1	P mg kg-1	S mg kg-1
28	0-10	Ap	5889.28	445.2073	46.07881	8.113132	10.8524906
29	30-40	A2	3674.76	413.2589	33.03819	3.563141	6.26282443
30	50-55	A3	4948.016	450.8043	46.20037	3.067979	4.77703658
31	60-65	A3	101.0073	357.2268	47.48532	3.073694	3.36741161
32	70-75	AC	74.43802	377.9432	47.9147	2.426274	4.20460298
Sample ID	Depth (cm)	Horizon	Al mg kg-1	Si mg kg-1	Cl- mg kg-1	Zn mg kg-1	
28	0-10	Ap	52.35293	6.242492	6190.347	0.353993	
29	30-40	A2	37.98036	6.019655	3739.234	0.694296	
30	50-55	A3	310.8822	7.028429	5071.927	0.434678	
31	60-65	A3	1000.442	7.981503	19.02445	0.359402	
32	70-75	AC	152.8498	6.420752	11.26125	0.268819	

Appendices

**Bajo Trench Soil Chemistry**

Sample ID	Moisture	pH	LOI	Organic matter	Aluminum	Arsenic	Boron
	%		%	%	mg/Kg	mg/Kg	mg/Kg
33	8.104575163	6.95	14.367	9.826899	154.0555	1.085447	1.55870857
34	8.738548273	7.12	9.96139	6.742973	824.5904	1.295735	1.52224101
35	8.826945412	7.28	8.343949	5.610764	760.2461	1.651586	1.5363111
36	6.385616863	7.83	5.033113	3.293179	0	0.430348	1.65020839
37	2.59295499	7.97	2.360623	1.422436	0	0.783211	1.43863454
38	1.067839196	8.01	1.968254	1.147778	0	0.404435	1.79017745
Sample ID	Barium	Calcium	Cadmium	Cobalt	Chromium	Copper	Iron
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
33	114.2944842	12657.51	0.435783	0.50056	0.073877	1.785925	29.479782
34	161.1739562	10561.67	0.117438	1.282735	0.102747	1.028539	26.8365651
35	149.1004416	11231.44	0.103179	0.854499	0.087923	0.719726	23.9581123
36	19.66152302	8213.402	0.074521	0.687556	0.08036	0.607937	5.92968333
37	39.15319573	62549.31	0.197129	0.102615	0.314789	0.658896	4.88134671
38	14.97714196	6944.395	0.167492	0.98764	0.149981	0.863579	7.29466394
Sample ID	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Nickel	Phosphorus
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
33	444.6098859	602.6772	44.77704	0.107121	282.6109	1.903226	7.95607164
34	158.1111329	604.7322	57.35439	0.134355	298.7953	1.627837	2.75146599
35	181.9407953	474.433	57.01304	0.131434	292.5599	1.718296	2.63724831
36	72.56301093	248.511	29.88143	0.055334	230.9319	0.614704	1.12680204
37	81.80272573	304.4337	4.225633	0.087859	253.9353	0.498898	1.95055197
38	30.3412076	290.63	75.41045	0.057677	209.1436	4.153766	0.90928549
Sample ID	Lead	Sulfur	Selenium	Silicon	Strontium	Titan	Vanadium
	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
33	2.469194028	15.25833	0.084237	6.534576	3.712395	0.372897	0.60047354
34	4.955096169	5.148303	0.084673	5.946329	3.702722	0.352403	0.87976039
35	1.924112533	3.610724	0.09677	6.614199	3.418267	0.389246	0.77370718
36	2.697113797	6.052216	0.087126	4.382358	1.959043	0.304478	0.69172687
37	1.419442464	19.27136	0.082266	3.220605	2.927805	0.478838	0.34815785
38	0.816487123	4.761011	0.125842	3.169094	1.407904	0.145331	0.50089353
Sample ID	Zink	Chloride					
	mg/Kg	mg/Kg					
33	0.471729847	25.51089					
34	0.300049846	7.560811					
35	0.189748278	10.78144					
36	0.212717831	13.06875					

## Appendices

37	0.183530304	28.4959
38	0.216859296	12.60129

### Bajo Trench Mehlich III ICP

Sample ID	Depth (cm)	Horizon	pH	LOI %	OM %	Fe mg kg-1	Ca mg kg-1
33	0-10	Ap	6.95	14.367	9.826899	29.47978	12657.5136
34	30-40	A2	7.12	9.96139	6.742973	26.83657	10561.6655
35	70-80	B or Cg	7.28	8.343949	5.610764	23.95811	11231.4371
36	100-110	C1	7.83	5.033113	3.293179	5.929683	8213.40157
37	120-130	C2 mix C1 C3	7.97	2.360623	1.422436	4.881347	62549.3071
38	155-160	C3 SiS	8.01	1.968254	1.147778	7.294664	6944.39463
Sample ID	Depth (cm)	Horizon	K mg kg-1	Mg mg kg-1	Mn mg kg-1	P mg kg-1	S mg kg-1
33	0-10	Ap	444.6099	602.6772	44.77704	7.956072	15.2583344
34	30-40	A2	158.1111	604.7322	57.35439	2.751466	5.14830334
35	70-80	B or Cg	181.9408	474.433	57.01304	2.637248	3.61072377
36	100-110	C1	72.56301	248.511	29.88143	1.126802	6.05221621
37	120-130	C2 mix C1 C3	81.80273	304.4337	4.225633	1.950552	19.271357
38	155-160	C3 SiS	30.34121	290.63	75.41045	0.909285	4.76101131
Sample ID	Depth (cm)	Horizon	Al mg kg-1	Si mg kg-1	Cl- mg kg-1	Zn mg kg-1	
33	0-10	Ap	154.0555	6.534576	25.51089	0.47173	
34	30-40	A2	824.5904	5.946329	7.560811	0.30005	
35	70-80	B or Cg	760.2461	6.614199	10.78144	0.189748	
36	100-110	C1	0	4.382358	13.06875	0.212718	
37	120-130	C2 mix C1 C3	0	3.220605	28.4959	0.18353	
38	155-160	C3 SiS	0	3.169094	12.60129	0.216859	

### Appendix B: Micromorphology slides and descriptions

Micromorphology slides were taken from the 15m long trench. Figs. ?&? indicate where the samples were taken by Prof. Tim Beach. The samples sequence starts at 5, and there are nine slides in total. Scans of the slides and the descriptions follow. The descriptions follow the standard format as taught by Richard MacPhail of UCL. An avenue for future work would be a more detailed analysis of the slides, however this was beyond the remit of the PhD research.

Appendices

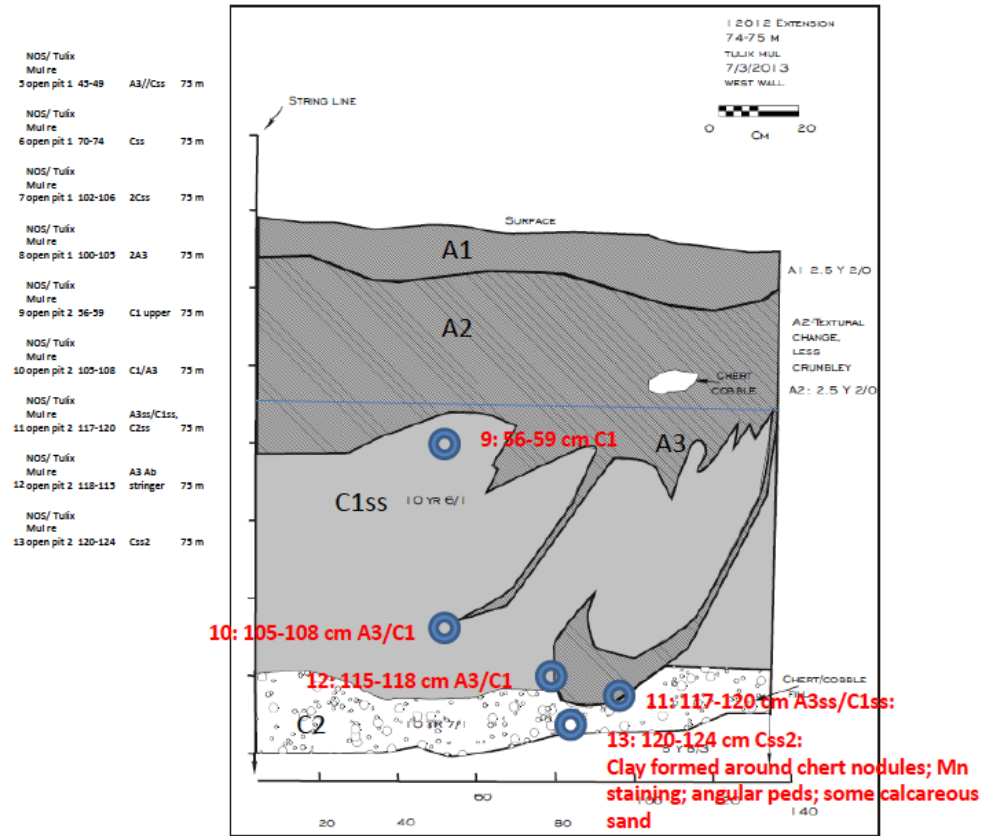


Fig. A1: Diagram indicating where samples 9-13 were taken (courtesy of Prof. Tim Beach)

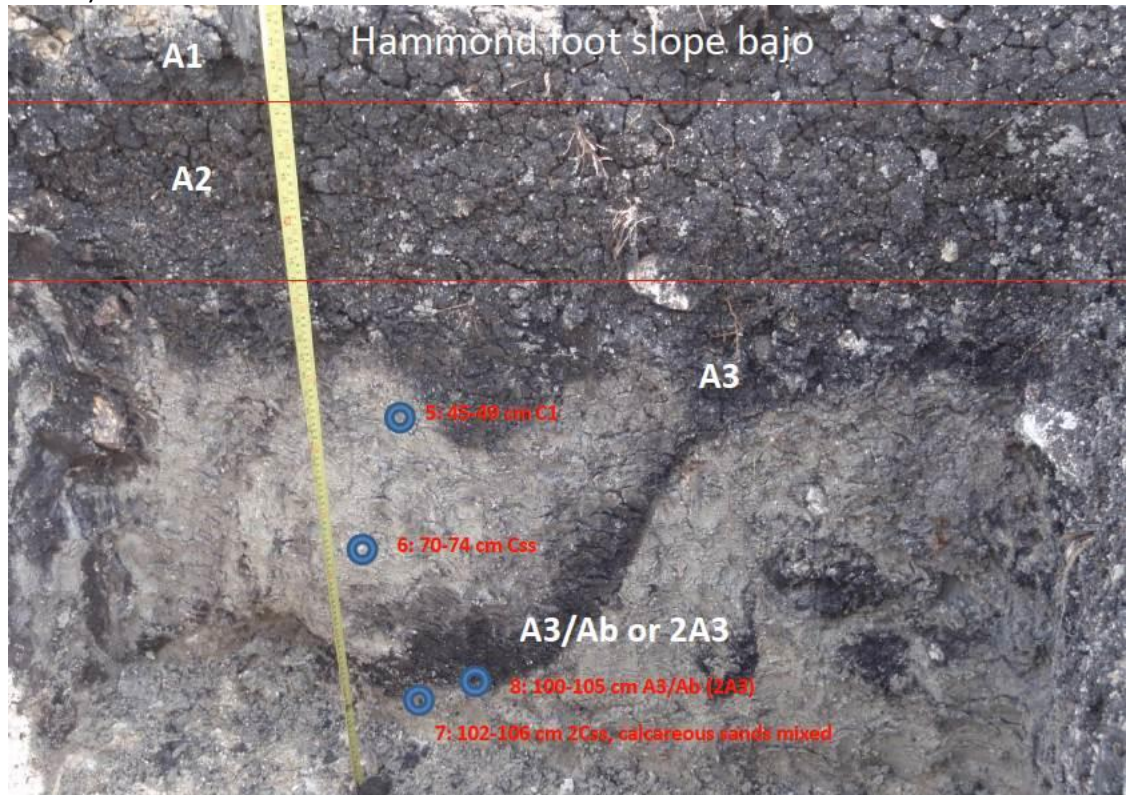


Fig. A2: Photograph indicating where samples 5-8 were taken (courtesy of Prof. Tim Beach)

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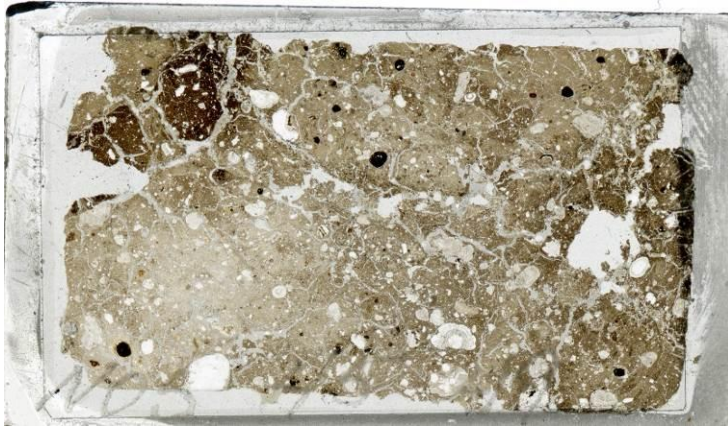


Fig. A3: Sample 5 (4x actual size)



Fig. A4: Sample 6 (4x actual size)

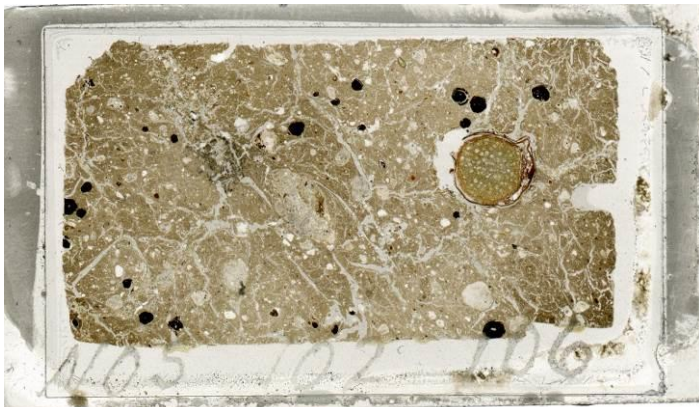
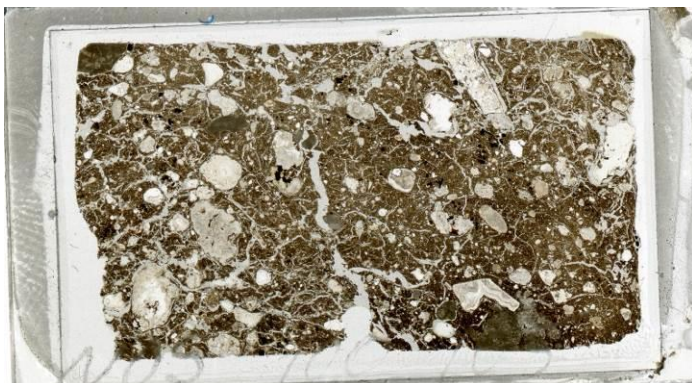


Fig. A5: Sample 7 (4x actual size)





**Appendices**

Fig. A6: Sample 8 (4x actual size)



Fig. A7: Sample 9 (4x actual size)

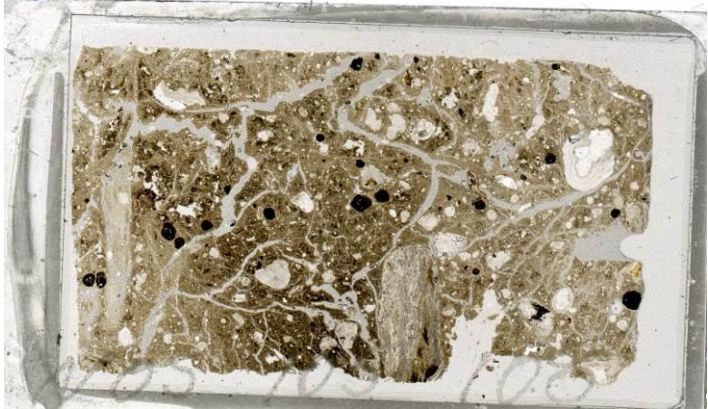


Fig. A8: Sample 10 (4x actual size)

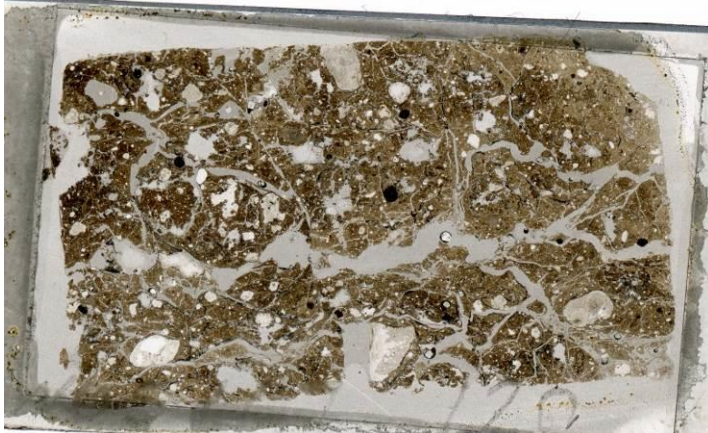
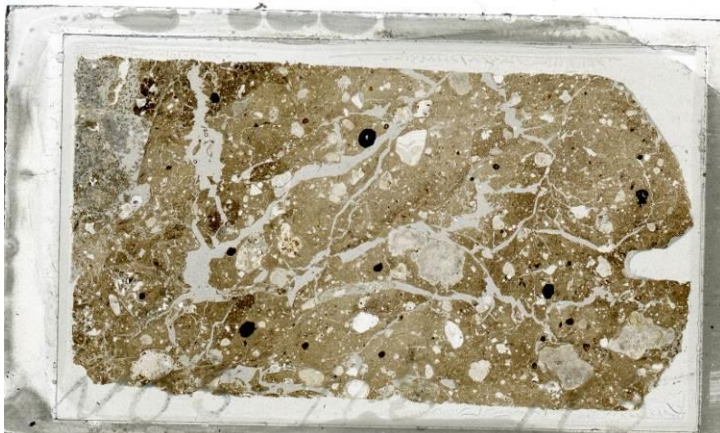


Fig. A9: Sample 11 (4x actual size)



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Fig. A10: Sample 12 (4x actual size)

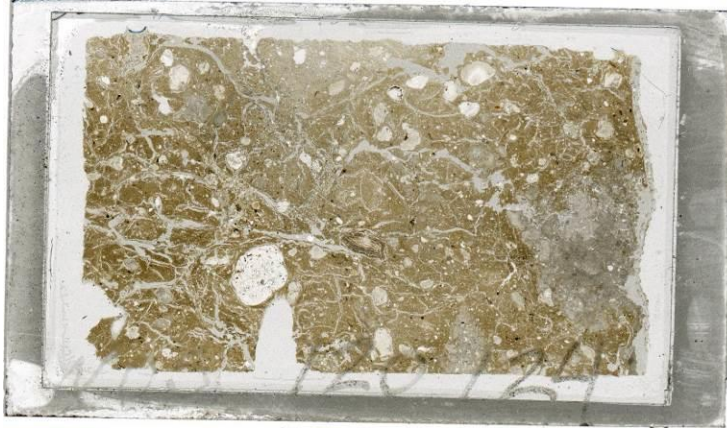


Fig. A11: Sample 13 (4x actual size)

### Slide Descriptions:

#### Sample 5:

**Heterogeneity:**

heterogeneous based on localised presence of different fabrics: 1a – the slide is predominantly a grey material

1b – at the right top corner of the slide is an area of dark brown soil.

**Str. and voids:** un-accommodated to partially accommodated voids, planar voids - 40%. Massive angular blocky peds

**Coarse Mineral:** moderately sorted Rounded gypsum crystals – around 30% across the slide. Silt sized tiny smooth subangular quartz crystals – 15%

**Coarse Organic:** Blackened roots and detrital organic matter.

**Coarse Anthropogenic:** few pieces of charcoal

**Fine Fabric:** Clays with humic material 1a – pale grey Under ppl, medium to high grade yellow interference under XPL. Light grey under OIL. 1b – medium brown PPL, not as birefringent as 1a, not isotropic – lower grade brown interference. Dark brown under OIL

## Appendices

<p><b>Pedofeatures.</b>  <b>Textural:</b> abundant dusty clay crust coating around the gypsum crystal and on the edges of voids  <b>Depletion:</b> none  <b>Crystalline</b>  <b>Amorphous or cryptocrystalline:</b> n/a  <b>Fabric:</b> bio-turbation from soil fauna  <b>Excrement:</b> None</p>
<p><b>In-situ Data:</b> sample taken from 45-49cmbs</p>

### Sample 6:

<p><b>Heterogeneity:</b> Homogenous across slide</p>
<p><b>Str. and voids:</b> Partially accommodated and accommodated Planar Voids, crack Str.</p>
<p><b>Coarse Mineral:</b> abundant gypsum (with iron staining not happened in situ), limestone fragments, iron nodules (part of the wetting/drying gleying conditions)</p>
<p><b>Coarse Organic:</b> root pseudomorphs</p>
<p><b>Coarse Anthropogenic:</b> none present</p>
<p><b>Fine Fabric:</b> PPL – light brown, XPL – light grey with yellow interference, OIL – dark grey</p>
<p><b>Pedofeatures</b>  <b>Textural:</b> abundant dusty clay coating around gypsum  <b>Depletion:</b> none  <b>Crystalline</b>  <b>Amorphous or cryptocrystalline:</b> Crystalline gypsum, quartz  <b>Fabric:</b> Slickenside features – evidence of wetting and drying. Biological fabric – burrows.  <b>Excrement:</b> None</p>
<p><b>In-situ Data:</b> Previously formed gypsum beds – klast in clay deposits. Sample taken from 70-74cmbs</p>

### Sample 7:

<p><b>Heterogeneity:</b> homogeneous to heterogeneous – there are quartz crystals but not throughout the</p>
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## Appendices

slide, mainly in the middle section of the slide
<b>Str. and voids:</b> sub-angular blocky Str.. Cracked. Accomodated and partially accommodated planar voids and channels.
<b>Coarse Mineral:</b> gypsum throughout. Sand embedded within the roots. Granostriate b-fabric around nodules
<b>Coarse Organic:</b> ironised roots – 26 of them. 1 piece of woody root 5mm across with lignified (bark) on it. Root channels
<b>Coarse Anthropogenic:</b> micro charcoal
<b>Fine Fabric:</b> PPL:Light brown XPL:grey with yellow interferences OIL:Dark grey
<b>Pedofeatures</b> <b>Textural:</b> some clay dusting around minerals <b>Depletion:</b> iron depleted <b>Crystalline</b> <b>Amorphous or cryptocrystalline:</b> Crystalline quartz and gypsum. Amorphous iron around nodules <b>Fabric:</b> slickenside features on larger channels <b>Excrement:</b> none
<b>In-situ Data:</b> Sample taken from 102 – 106 cmbs

### Sample 8:

<b>Heterogeneity:</b> homogeneous heterogeneity
<b>Str. and voids:</b>
<b>Coarse Mineral:</b> flint/chert, gypsum, quartz, iron nodules. Some iron staining on the gypsum
<b>Coarse Organic:</b> Roots, fine organic matter throughout. Lots of humic going through, perhaps through manuring, which may mean that the soil <i>was</i> put there deliberately
<b>Coarse Anthropogenic:</b> Charcoal throughout sample
<b>Fine Fabric:</b> PPL: Medium brown XPL:yellowish brown OIL: Dark grey
<b>Pedofeatures</b> <b>Textural:</b> Some clay dusting around minerals <b>Depletion:</b> <b>Crystalline</b>

## Appendices

<p><b>Amorphous or cryptocrystalline:</b> crystalline gypsum</p> <p><b>Fabric:</b> bioturbation from soil fauna</p> <p><b>Excrement:</b> none</p>
<p><b>In-situ Data:</b> Sample taken from 100-105 cmbs</p>

### Sample 9:

<p><b>Heterogeneity:</b> Homogenous across slide</p>
<p><b>Str. and voids:</b> accommodated, partially accommodated and unaccommodated planar voids are all present. Sub angular blocky peds. Cracked micro-Str. throughout slide</p>
<p><b>Coarse Mineral:</b> poorly sorted: 1 chert fragment. Silt sized quartz crystals. 1 piece of red mineral – possibly iron stone, abundant gypsum</p>
<p><b>Coarse Organic:</b> Roots throughout slide.</p>
<p><b>Coarse Anthropogenic:</b> None present</p>
<p><b>Fine Fabric:</b> Dark grey to light brown under PPL, medium yellow under XPL, medium brown under OIL</p>
<p><b>Pedofeatures</b></p> <p><b>Textural:</b> abundant dusty clay coating around gypsum.</p> <p><b>Depletion:</b> possible iron depletion</p> <p><b>Crystalline</b></p> <p><b>Amorphous or cryptocrystalline:</b> crystalline gypsum</p> <p><b>Fabric:</b></p> <p><b>Excrement:</b> None</p>
<p><b>In-situ Data:</b> Sample taken from 56-59 cmbs</p>

### Sample 10:

<p><b>Heterogeneity:</b> homogeneous heterogeneity</p>
<p><b>Str. and voids:</b> sub-angular blocky Str.. Cracked. Accommodated and partially accommodated planar voids and channels.</p>
<p><b>Coarse Mineral:</b> chert, limestone, gypsum, quartz crystals</p>
<p><b>Coarse Organic:</b> root channels and organic materials throughout, 23 ironised root channels containing organic materials – iron is depleted from the soil and it has gone to the</p>

## Appendices

nodules. Root with mite excrement
<b>Coarse Anthropogenic:</b> micro charcoal throughout
<b>Fine Fabric:</b> PPL: Medium Brown XPL: Medium brown with yellow interference OIL: Dark Grey. Unistrial b-fabric, granostrated around grain
<b>Pedofeatures</b> <b>Textural:</b> Moderate clay crusting around the iron nodules. Clay orientes around iron nodules <b>Depletion:</b> Iron depleted <b>Crystalline</b> <b>Amorphous or cryptocrystalline:</b> crystalline quartz and gypsum <b>Fabric:</b> Bioturbation from soil fauna <b>Excrement:</b>
<b>In-situ Data:</b> Sample taken from 105-108 cmbs

### Sample 11:

<b>Heterogeneity:</b> homogenous heterogeneity
<b>Str. and voids:</b>
<b>Coarse Mineral:</b> Silt sized quartz crystals, gypsum, chert fragments (unworked)
<b>Coarse Organic:</b> Ironised root channels. Humic remains – old roots, may be present through manuring.
<b>Coarse Anthropogenic:</b> Fine chacoal
<b>Fine Fabric:</b>
<b>Pedofeatures</b> <b>Textural:</b> Moderate clay crusting around the iron nodules. Clay orientes around iron nodules, weakly stained areas <b>Depletion:</b> Iron depleted <b>Crystalline</b> <b>Amorphous or cryptocrystalline:</b> crystalline quartz and gypsum <b>Fabric:</b> Bioturbation from soil fauna <b>In-situ Data:</b> Sample taken from 117-120 cmbs

### Sample 12:

<b>Heterogeneity:</b> homogenous heterogeneity
<b>Str. and voids:</b> sub-angular blocky Str.. Cracked. Accommodated and partially accommodated planar

## Appendices

voids and channels. Regular vughs
<b>Coarse Mineral:</b> Gypsum, quartz, micritic calcite
<b>Coarse Organic:</b> root channels
<b>Coarse Anthropogenic:</b> charcoal
<b>Fine Fabric:</b> PPL:Light to medium brown XPL: grayish brown with yello interference OIL:dark grey
<b>Pedofeatures</b> <b>Textural:</b> .clay crusting around nodules <b>Depletion:</b> Iron depletion <b>Crystalline</b> <b>Amorphous or cryptocrystalline:</b> amorphous iron around 22 old roots <b>Fabric:</b> Fine humic with charcoal, burrow fill, slickenside, burrow fill, grano-striated b-fabric <b>Excrement:</b>
<b>In-situ Data:</b> Sample taken from 115-118 cmbs

### Sample 13:

<b>Heterogeneity:</b> 2 fabrics – 1a (clay) (white) is the other 20%
<b>Str. and voids:</b>
<b>Coarse Mineral:</b> 1a:unworked chert; gypsum inclusions; slightly organic clay 1b: calcareous – calcium carbonate
<b>Coarse Organic:</b>
<b>Coarse Anthropogenic:</b>
<b>Fine Fabric:</b> 1b: burrowed, could be weathered upper part of sedimentary rock. Patch decalcification – thinning and void spaces
<b>Pedofeatures</b> <b>Textural:</b> <b>Depletion:</b> 1a: iron depleted <b>Crystalline</b> <b>Amorphous or cryptocrystalline:</b> <b>Fabric:</b> 1a: slickensides <b>Excrement:</b>
<b>In-situ Data:</b> Sample taken from 120-124 cmbs

Appendices

**Appendix C: Photographs from Str. TM-2**



Figure C1: Photograph of painted area 1, West Wall, Str. TM-2



Figure C2: Photograph of painted area 2, West Wall, Str. TM-2



Figure C3: Photograph of painted area 3 West Wall, Str. TM-2



## Appendices

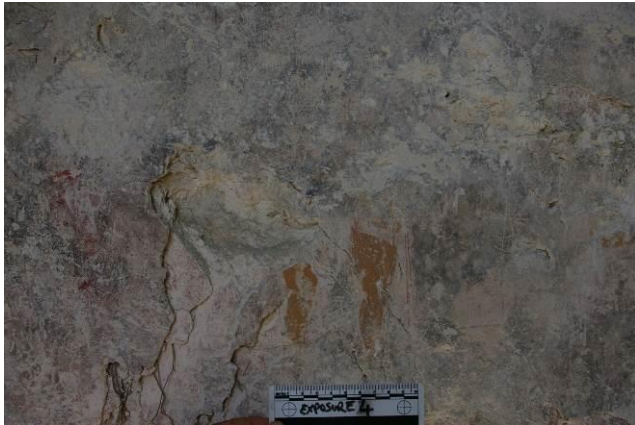


Figure C4: Photograph of painted area 4 West Wall, Str. TM-2



Figure C5: Photograph of painted area 5 West Wall, Str. TM-2



Figure C6: Photograph of painted area 6 West Wall, Str. TM-2

## Appendices



Figure C7: Photograph of painted area 7 West Wall, Str. TM-2



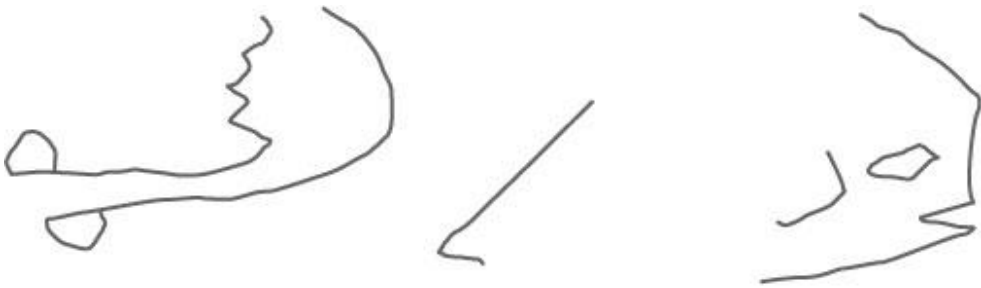
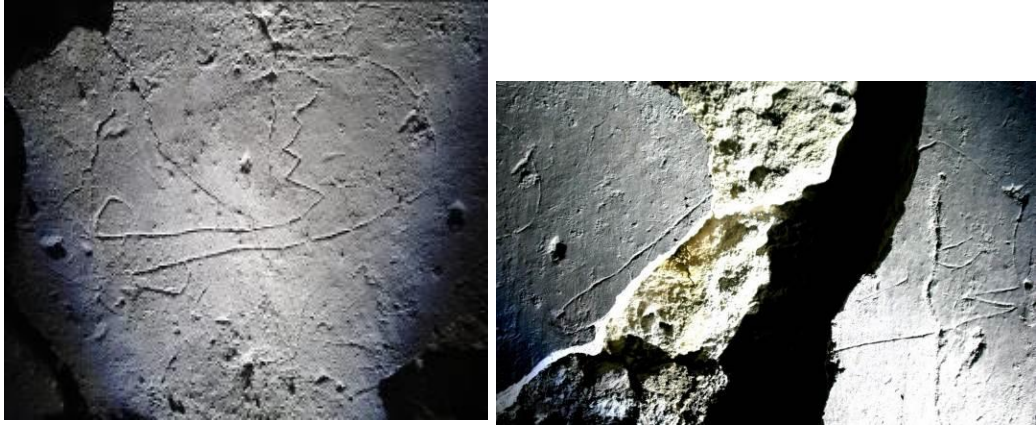
Figure C8: Photograph of painted area 8 West Wall, Str. TM-2



Figure C9: Photograph of painted area 9 West Wall, Str. TM-2

## Appendices

Graffiti 1 and 2: unknown animal and fish:



Graffiti 3 and Graffiti 4:



Appendices



3 & 4

Graffiti 5:



5



Appendices

Graffiti 6 and Graffiti 7:



6 & 7  
Graffiti 8:



8



Graffiti 9: An unknown amount of the Graffiti is missing due to plaster loss.

Appendices

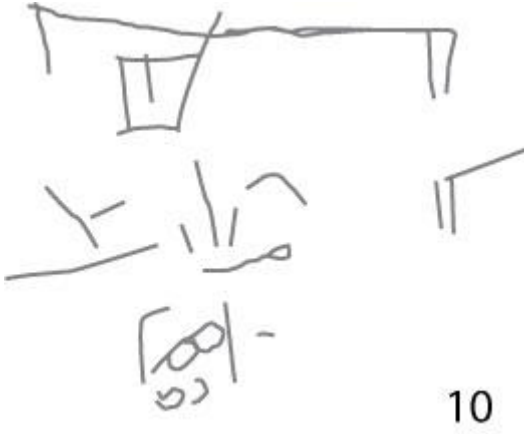


9

Graffiti 10:



Appendices



Graffiti 11:

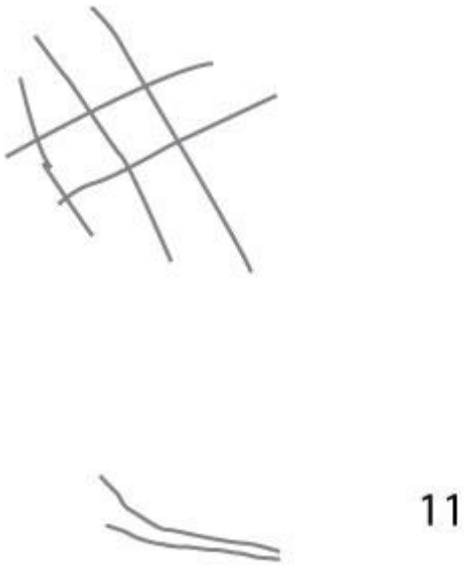


Figure C10: Photographs of graffiti and drawings by Pieta Greaves (Courtesy of Dr. Tom Guderjan)