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Constructing the Past: Monumentality of the Bagaces and Sapoá Periods at the Site of El Rayo Granada, Nicaragua

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Constructing the Past: Monumentality of the Bagaces and Sapoá Periods at the Site of El Rayo Granada, Nicaragua

by

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Abstract

Monumentality in the Intermediate Area has been a poorly explored avenue of analysis in favour of the more structurally impressive, vertically standing examples from Mesoamerican and Andean societies. Though specific countries in the Intermediate Area, such as Costa Rica, have been discussed in terms of architectural achievement and present examples of monumentality, Nicaragua, and by extent the Greater Nicoyan subregion, has been overlooked. This thesis looks to the lake shore site of El Rayo, on Lake Nicaragua, to overview the architectural features represented at the site over the course of four field seasons during the PAGN project. Differentiation between monument, memorials, and monumental memorials are discussed, and the known built forms at El Rayo, including structures, shrines, cache boxes, and standing stones, are detailed and evaluated. In total, 13 architectural features are detailed, dating from the Bagaces (500-800 AD) period to the Sapoá (800-1300 AD) period. Included in this thesis is an architectural energetics assessment of the four structural remains excavated at El Rayo.

Keywords: Architecture, Architectural Energetics, Bagaces Period, Greater Nicoya, Intermediate Area, Monumentality, Nicaragua, Sapoá Period

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Chapter 1: Introduction

The long history of human ingenuity and societal efforts have left behind an enriched archaeological record of monumental feats of human endeavour. The global distribution of monumentality displays the significant innovation and achievement of past generations and societies. As conspicuous reminders of the past, monumentality has, for centuries, been the subject of archaeological study. It has been considered by many theoretical schools of thought over the past century, each developing theory as to why monuments are so widespread and trying to understand their origins. Culture historians, such as Childe (1950), have sought to interpret monumentality as diffusion from critical culture areas. However, there has been little evidence to support this theory, and diffusion does not answer the questions of why monumentality originates (Rosenswig and Burger 2012). Processual archaeologists such as Renfrew (1973) have considered monumentality as locally adapted, demonstrating socio-political organization, while post-processual archaeologists have described agency and the individual's experience of a monument as the most critical aspect of study. This reveals the prevalence of monumentality in the viewer's daily life as well as how a monument is experienced throughout the course of its life history (Rosenswig and Burger 2012).

The focus of this research stems from the architectural data excavated at El Rayo over the course of four field seasons. El Rayo, positioned on the southern portion of the Asese Peninsula, is located on Lake Nicaragua, the largest freshwater lake in Central America. The site was occupied from the late Bagaces period (500-800 CE) to the Sapoá period (800-1300 CE), as demonstrated by the radiocarbon dates, transitions in the ceramic seriation, and changes in the

mortuary practices within the cemetery sections of the site. El Rayo was first discussed by Salgado Gonzalez (1996a) in her archaeological regional survey of the department of Granada.

Architecture has been a minimally studied concept in Pacific Nicaragua and the Greater Nicoya region. Though there has been mention of mounded features at sites such as Ometepe Island and Zapatera Island from the early explorations of Squier (1853) and Bovallius (1886), and residential mounds in more recent settlement pattern studies such as those of Niemel (2003) and Román-Lacayo (2013), minimal discussions and details of these site features have been presented. Over the past three decades, the archaeological study of Pacific Nicaragua has dramatically increased, incorporating topics of ceramic economy (Dennett 2016), settlement patterns (Niemel 2003), mortuary practice (McCafferty et al 2011, McCafferty et al. 2019), and lithic studies (Debert 2005, Debert and Sherriff 2007). As a prominent feature within society which incorporates the concept of place, architecture and especially monumentality are valuable archaeological avenues of study. Monuments are places in which traditional knowledge and stories are passed down, occur, and where important materials are used and incorporated (Harmanşah 2014). These places require the investment of labour and materials to create and to maintain. By definition, a monument is any construction that demonstrates a greater scale of elaboration than strictly functional, or a construct which displays great skill and an excessive use of labour (Trigger 1990). It does not have to be a public monument, such as a plaza or elaborate hydraulic system (Paradise 2012), nor does it need to be private in nature, such as a palace or temple (Haas and Creamer 2012).

Nicaragua is located in Central America, between the countries of Honduras and Costa Rica, and has steadily gained archaeological interest in recent years. Known as part of the Intermediate Area, as will be later discussed in **Chapter Four**, this area pertains to the region of

[Figure 1.1: Map of Lower Central America and Nicaragua]

Central America between of the Mesoamerican and Andean societies' world systems (Drennan 1996, Lange 1992, Sheets 1992, Smith and Berdan 2003). This world systems approach refers to complex systems of various culture groups interacting within a given region. They are made up of periphery zones and core zones which describe the intensity of culture exchange within the region (Smith and Berdan 2003). The Intermediate Area has a significant history of being under-investigated archaeologically in contrast to its Mesoamerican and Andean neighbours with their much larger and more permanent architectural monuments (Frost and Quilter 2012). Though

they are not non-existent, sites demonstrating monumental features in the Intermediate Area are rarely recognized and reported as monumental sites, leaving the misunderstanding that there are no examples of monumentality in the region.

Another term for the Intermediate Area is Lower Central America[1]. Though many questions remain regarding the ethnicity of the culture groups residing within the Pacific Coastal region, recent studies (McCafferty and Dennett 2013) have significantly affected the field research conducted in the region. Beginning in the 1800s, archaeological inquiry has led to the understanding of the migratory patterns and cultural affiliations of the Nicaraguan peoples residing within the country prior to colonization. By studying monuments within the region, archaeologists are provided insight into aspects of a culture which reflect important parts of life, significant events, or relevant locales. Monuments may also reveal information regarding social memory and burial practice within the Greater Nicoyan region.

Nicaragua is divided into 15 political departments, and two autonomous regions. Despite being one of the smaller departments by area, Granada (in which this study is based) has seen a significant amount of prior archaeological inquiry (McCafferty 2020, Salgado Gonzalez 1996a). Studies within the department have dated as far back as the 1800s and include studies at such sites as Sonzapote (Bovallius 1886, McCafferty 2013), Ayala (Salgado Gonzalez 1996b, Dennett and Salgado Gonzalez 2019), Punta de las Figuras (Squier 1853), El Rayo (McCafferty 2019, McCafferty and Dennett 2013, Rice et al. 2017), and others.

[1] Lower Central America is a term which, recently, has been disputed as a degrading term to refer to the populations outside of the Mesoamerican system of influence, implying that the cultures represented within the region are of lesser significance (Sheets 1992). For the future use in this thesis, Central America or the Intermediate Area will be the term used to consider those cultures outside of Mesoamerica and the Andean systems of influence.

[Figure 1.2: Map of Nicaraguan Political Districts]

Research Question

Little attention has been paid towards the study of architectural features and built forms within Greater Nicoya, possibly due to the lack of standing structures within the region. The studies that do exist focus primarily on domestic mounds (such as Nejapa [Lechado 2017]) and settlement pattern surveys (Granada regional survey [Salgado Gonzalez 1996a]). This has

resulted in a lack of study on architecture, and hence monumentality and memorialization, leading to the assumption that this area lacked either. The problem is further aggravated by the application of inconsistent definitions applied to the study of monuments and memorials. But to what value is the consideration of monumentality in Greater Nicoya. Generally, it is assumed that the presence of monument suggests a greater than tribal level social organization. Due to the inconsistent definitions of monumentality definitions applied within the discipline, archaeologists may be overlooking monumentality in social groups or cultures with smaller scale architecture. In light of this problem, this thesis questions whether there is the presence of architectural monumentality within Greater Nicoya. If given a consistent definition of monumentality, how does El Rayo compare to other sites both in Nicaragua and known monumental sites within Costa Rica? If by using this set definition El Rayo's architectural features correlate with the known monumental sites in Costa Rica, then it can be considered that El Rayo demonstrates monumentality. Such methods as architectural energetics and a refined traits list will be applied to prove or disprove the potential of monumentality within Greater Nicoya.

Chapter Summaries

This thesis will examine architectural features and other aspects of the built environment at the site of El Rayo, and subsequently discuss the potential for monumental public architecture at the site of El Rayo. The theoretical approaches to this thesis are described in detail in **Chapter Two**. It focuses primarily on architectural and monumental theory. Monumentality has occurred amongst societies from egalitarian to state level over several millennia, typically acting as a conspicuous reminder of the past and resonating within the present. However, moving to a more

Nicaraguan oriented discussion, there have been few examples of monuments recognized. This chapter will outline the basic concepts of architecture and monumentality, focusing on architectural energetics (Abrams 1989) and thermodynamics (Trigger 1990).

The physical and climatic setting are described in **Chapter Three**. Nicaragua is a tropical country, and the largest on the Central American Isthmus. It is bordered by Honduras to the north and Costa Rica to the south. Divided into three microregional zones, Nicaragua's current population is concentrated within the large geological feature known as the Nicaraguan Depression, and archaeologically, has also demonstrated this pattern of settlement. El Rayo is located on the Asese Peninsula, a geological feature formed by the flank collapse of Mombacho Volcano some time before 140 – 350 AD (Stansell 2013).

The background information of Nicaragua's ethnohistory and archaeology are described in **Chapter Four** and **Chapter Five**. **Chapter Four** focuses on the ethnohistory of the Pacific Lowlands of Nicaragua, relating to the cultural setting. The Greater Nicoya region is defined, and the history of migration from central Mexico is outlined. Furthermore, the colonization and conquest of Nicaragua is discussed throughout the chapter. **Chapter Five** reviews the archaeological history of Nicaragua, especially pertaining to the Pacific Coast. The archaeological record in Nicaragua stretches back thousands of years, though the best explored phases included the Tempisque, Bagaces, and Sapoá periods. This section also looks to the more significant studies relevant to the El Rayo PAGN project, and includes the early history of archaeological exploration in the mid 1800s. Finally, the chapter introduces the archaeological sites which will later be used as comparisons to El Rayo discussing monumental architecture.

The methods used within this thesis both in the field and in the lab are recorded in **Chapter Six**. There were four field seasons at El Rayo: 2009, 2010, 2015, and 2016. These field

seasons are described in detail, discussing the methods and goals of the loci excavated. This chapter discusses the analytical methods used within the laboratory setting, including cleaning and cataloguing of artifacts, as well as scientific methods of dating the site and artifact assemblages. Dating of the site used relative and absolute dating methods.

Chapter Seven pertains to the data analysis of El Rayo, focusing on the architectural features spread throughout the site. Details, including structure size, numbers of units excavated, depths of units excavated, and the goal of opening each locus and operation are discussed. El Rayo is a unique archaeological site as it is a cemetery which spans two phases, with a large material culture base and various examples of burial practice, indicating a significant occupation.

In **Chapter Eight**, El Rayo is discussed in terms of its architecture. Theoretical perspectives are analysed in the context of El Rayo to best understand the meaning of its architecture and the site's function. Each individual architectural feature described in the previous chapter is discussed in detail, suggesting potential time periods of occupation. Included in this chapter is an architectural energetics assessment of various structures at El Rayo and other comparative sites. In **Chapter Nine**, the site is then compared to other monumental sites both within and externally to Pacific Nicaragua to analyse the degree of monumentality at El Rayo. In this chapter the memorials and monuments of El Rayo are further explored and compared to examples from other sites to highlight the architectural features. Finally, in **Chapter Ten**, this thesis is concluded to suggest that EL Rayo featured diverse architectural forms, including some with both monumental characteristics and others that served as memorials.

Chapter 2: Theoretical Approaches

To fully explore whether or not monumental architecture existed in Greater Nicoya, one must be familiar with discussions of monumentality and architectural theory. While there have been studies of Pacific Nicaraguan mortuary practice (Manion 2016, McCafferty et al. 2019, Wilke et al. 2011), settlement patterns (Niemel 2003, Roman-Lacayo 2013, Salgado Gonzalez 1996a), and ceramic economy (Dennett 2016, Steinbrenner 2010) in the last few decades, there have been minimal studies dealing with the structural features of the region. The most relevant work to the topic of monumental features has been the study of stone statuary by such researchers as Bruhns (1992) and Navarro (2007), and the excavations conducted at Aguas Buenas (Geurds and Terpstra 2012). Looking outside of the Greater Nicoya region, relatively recent work in Costa Rica has resulted in studies of monumental architecture (Frost and Quilter 2012, Fonseca Zamora 1980, Quilter 2004, Quilter and Vargas 1995), but no comparable studies have occurred in Nicaragua.

In this chapter, current debate of monumentality and the theoretical paradigms related to the topic are described to set the theoretical background of the thesis, in preparation for later discussion chapters. This argument will take a range of theoretical approaches to the study of monumentality, including such topics as architectural energetics and their taskscapes, thermodynamics, the changing relationship between the individual and the monument on display; and finally, domestic architecture versus non-domestic architecture will be discussed.

The Built Environment and Architecture

Architectural theory begins with the discussion of the built environment. This refers to how humans interact with and change the natural environment to create temporary or permanent

features. This abstract concept refers to the physical alteration of the environment including small features, such as hearths, and large features, like cities (Lawrence and Low 1990). The built environment involves all aspects of construction by humans which changes the natural environment for the purpose of creating place, a concept which will be discussed later in this chapter. These features, otherwise referred to as built forms, "are defined as building types […] created by humans to shelter, define, and protect activity. Built forms also include […] spaces that are defined and bounded, but not necessarily enclosed […]. Further, they may include landmarks or sites, such as shrines, which do not necessarily shelter or enclose activity." (Lawrence and Low 1990, 454).

Built forms are, in essence, the individual features on the landscape, or an amalgamation of those features, which create a locale. Where multiple built forms occur, reference can be made to the site plan of an area. These site plans can be complex, including multi-chambered structures on their own combined with exterior built forms (such as plazas or outdoor cooking spaces), or multiple structures clustered into a grouping with clearly defined areas and organization to the structures placement, or site plans can be simple, with no apparent organization to structure placement. The most important aspect of site plans is the combination of clustered built forms both enclosed and open in arrangement (Lawrence and Low 1990). Architecture can take on a range of form and function, permanence, and size. It is typically defined as built forms, sometimes monumental, which are designed or constructed by specialists (Lawrence and Low 1990). By this definition, not all construction can be considered architecture, but rather specific examples of structures which display specialized skill to create can be considered architecture. Throughout this thesis, the term architecture will be used to refer to the structures located in the

cemetery of El Rayo. Site planning will also be briefly considered as to the layout of the enclosed and open areas of the site.

Monumentality

Theoretical perspectives of monumental architecture in archaeology have a longstanding history of discussion and debate regarding aspects of origin, function, social structure, and other cultural matters. As one of the most prominent features of cultural remains, monumentality has captured the imaginations of millions of peoples across time, resulting in worldwide historical tourism as archaeological sites of significant cultural value are preserved by countries to better display their cultural history to the public. Globally, monumentality has many origins and stylistic properties, from plazas and statues to irrigation systems and structures. At one point, monumental architecture was considered to be the result of the diffusion of ideas (Rosenswig and Burger 2012), radiating outwards from prominent city-state centres such as those of the Mesoamerican world system to less prominent chiefdoms and egalitarian societies, such as the Nicarao of Nicaragua. Recent discussion (Rosenswig and Burger 2012), however, has looked at monumentality as the result of localized innovation within a social organization, resulting in the widespread variety of monumental features across culture groups, though with stylistic and form variation.

Often, when one views the subject of monumentality, examples of large scale monuments of ritual and mortuary significance, such as the pyramids of Egypt or the civic-ceremonial centers of the Mayan world are the most prominently discussed examples. These types of impressively scaled architectural feats are first to be recognized as monumental, while chiefdom and egalitarian level monuments are left as a footnote of history, if they are recognized at all.

The more elaborate and massive a monument is, the more it is featured in overall discussion. However, monumentality takes on a range of features in varying scales and differing materials. When examining New World monumentality, it can take on various meanings, changing traditional definitions as to what constitutes monumental features (Rosenswig and Burger 2012). These traditional concepts of monumentality need to be altered in the face of New World examples of monuments, a concept which has recently seen publication.

As conspicuous reminders of the past, taking a range of forms and functions, monumentality is still a relevant and current matter of archaeological inquiry. However, in Pacific Nicaragua, the study of monumentality has gone by the wayside. While this is not to indicate that the study of other areas of archaeological inquiry are of no value, it is perhaps accurate to argue that this gap in architectural study has been remiss of past studies. This lapse in reporting is in part due to the challenges of locating and identifying such features. Due to the modern terrain of Pacific Nicaragua, and indeed much of Central America, one of heavily covered areas with forest and fast growing underbrush, there has been a challenge to locate buried and mounded architectural features, as these mounds are often only built up to a meter off the ground. In conjunction with the nature of these features being primarily constructed out of perishable materials, resulting in relatively little in the way of vertically standing remains, there has been considerable challenge for archaeologists to locate structures. Often, archaeologists must rely on the local knowledge of the people currently residing within the area of study and their observations of the landscape to features. In the following sections, the theory behind monumental architecture and its construction will be considered.

Defining Monumentality and Memorialization

Defining monumentality can be challenging, as a range of objects or built forms can be considered monumental. In some arguments, monuments can be as grand as palaces and temples or as small as totems and idols (Osborne 2014). But the range in size does not make an object a monument, it is the ability of the monument to influence its audience through social memory and experience which makes the mundane monumental. Social memory is the collective memory of a group regarding a past event or the history of a collective (Van Dyke and Alcock 2003). When considering monuments and memorials, it is imperative to understand its connection to social memory. The collective memory is critical to group identity (Assmann 1995). Therefore, monuments and memorials are an expression of group identity through the built form.

Generally, a monument should be considered to be an object, or multiple objects, which possess widely understood sets of meanings to a given community or social grouping (Osborne 2014). They can act as physical manifestations of the socially contrived principles of the collective by their social meanings and the perception of the monument by the individual experiencing it (Knapp 2009). Monuments exert agency by "influencing our thoughts, beliefs, [and] even actions" (Osborne 2014:4). This agency, however, is difficult to understand archaeologically without a significant assemblage of material culture remaining to allude to the types of activities occurring around the monumental feature.

In consideration of the theoretical perspectives which will be discussed in this chapter, I propose a two part inclusive definition befitting monumentality and memorialization than one which only encompasses large buildings. This is based on the concept of memorialization, the idea that some built forms which are not structurally massive but have social value to a culture

group must be considered as significant. Monuments are typically considered to be large built forms displaying specialized skill in their creation.

The first aspect of the definition of monumentality is the most commonly understood definition, based on Trigger's (1990) definition of monumentality. The term monumental can be used to define any construction (be it structural or artistic in nature), which demonstrates a larger scale of construction, and a level of elaboration and use of space beyond the strictly functional. Furthermore, this definition includes any construction which displays a supreme demonstration of skill or an excessive cost of construction, referring to resource consumption and the number of individual labour days required. This definition does not distinguish between utilitarian versus non-utilitarian monuments, nor does it address the matter of small scale monumentality[2].

Secondly, monuments can be a commemorative reminder of the past or construct a social memory of the deceased. Social memory is the construction of a collective idea or notion, (Van Dyke and Alcock 2003) which is reflected in a culture through social practice, materiality, and/or the landscape. As the term monument derives from the Latin term *monēre* meaning 'to remind' via the French *monumentum* (Soanes et al. 2006), a monument can be inferred to be any built form on the landscape which has social meaning, linking to an event, an individual, religious belief system, or a social group. Examples of this could include a tombstone, or statue depicting religious imagery. In this definition, the social connotation of the monument is the important defining feature.

[2] The dichotomy between utilitarian and non-utilitarian monuments, as discussed in Trigger's thermodynamic discussion (1990), refers to construction projects which are open to the public's use or benefit, and private areas that are not open to the public. For instance, utilitarian projects that are considered functional for infrastructural related purposes (such as massive scale irrigation projects as discussed by Paradise [2012]) are public oriented acts of monumentality, while non-utilitarian buildings and features, such as the temples of the Maya and Inca societies, are often private spaces secluded from public use. However, there are issues with this dichotomy. As Benfer argues, the term utility is not a term with cross-cultural meaning, and as such is difficult to apply (2012).

With concern to memorialization, memorials can either be monumental or non-monumental. By definition, they are commemorative reminders of the past, and follow the same definition as the second criteria of monumentality. What distinguishes a monument from a memorial is the scale, both physically and socially. This meaning that the prevalence of the

Monument Traits	**Memorial Traits**
Large in scale	Small or grand scale
Elaborate in design	Elaborate or simplistic in design
Exceeds minimal space requirements	No size requirements
Displays exceptional skill	Can be skillfully made or not
Excessive labour cost	Any labour cost
Commemorative reminder of past	Commemorative reminder of the past
Has social meaning	Has social meaning
Represents an event, individual, belief system, or social group.	Represents an event, individual, belief system, or social group.

[Table 2.1: Traits list of Memorials and Monuments]

memorial in a large social group is on a large scale as opposed to small impact on a small social group. As not all memorials are monuments, smaller scale memorials, such as a personalized tombstone or a shrine, can be considered memorials without the scale of a monument. To make a memorial a monument, it must represent a group identity, shared history or belief system, and must be prevalent in the minds of many as opposed to the few. An example of a monumental

memorial would be *The Response*, the Canadian National War Memorial in Ottawa, Ontario. It can be classified as a memorial as it refers to the many wars that the nation has been apart of and allows for individuals to reflect of these conflicts and recall those individuals who died fighting in these conflicts. It is a monument as it is large in scale, was built by specialized labour, has social meaning, and links to multiple events. Other examples of memorials which are not considered monuments would be individual tombs of a family member. These are memorials as they are memorializing an individual but lack the scale of a monument.

Collective Agreement versus Political Control

Monumentality has often been considered evidence of power enacted over a group of people. But, as Rosenswig and Burger warn, "it is ill advised to equate the existence of a singular characteristic such as monumentality a priori with the presence of political power" (2012: 6). As Haas and Creamer (2012) would argue, all monumentality occurs because someone else is directing and ordering a subservient class of individuals to complete the project. While this might be the case in some instances, can it be said of all circumstances that monumentality is the result of political power? As Sassaman and Randal (2012) describe, the shell mounds of St. John's Basin were monuments which were constructed over time through repeated use in ceremonial context. These two arguments contrast in the causality of monument construction. Whether it is certain that all monumental construction occurs through the use of collective agreement or political power it is obviously neither a one nor the other decision. Most certainly, there is a combination of collective agreement and political control which dictates the construction of monuments globally.

Examples of this come from some papers (Sassaman and Randal 2012, Saunders 2012) describing monumental scale construction projects without the influence of socially organized positions of power. Haas and Creamer (2012) argue that the cause of monumental construction is the result of someone ordering others to build. Yet this takes away matters of individual agency and collaborative planning amongst groups of equals. Sassaman and Randall take a contrasting approach to monumentality, stating that its construction can be a representation of commemorative practice, using the mounds of Florida to support their claims (2012). They conclude that the slow construction of these mounds over time by frequent deposition of new layers of shells and faunal bones, follows an argument of historical practice. Therefore, the act of constructing social memory creates a course of action for the population in the creation of monuments (Sassaman and Randall 2012).

Monumentality is not a static representation of a culture group, but a dynamic representation of values and ideals amongst a group. As Brysbaert (2018) explains, monumental constructions do not physically remain the same over time, whether due to the types of materials used or whether the monument was made to be commemorative (refer here to the previously discussed shell middens), monuments are altered, reconstructed, and added to as they are interacted with by people. Structures with perishable materials might need to be repaired on a regular schedule, or material cultures may be interacted with and moved around at the monument's location. With this in mind, monumentality is an "ongoing, constantly renegotiated relationship between things and persons, between the monument and the person experiencing the monument" (Brysbaert 2018: 21). Meaning, over time, changes are made by the individuals who experience the monument, redefining the associated meaning on a continuing basis, thus reflecting the cultural values of a group of peoples.

For example, the Postclassic Mayan site of Chichén Itza was once an influential religious complex, which would have been a centre for spiritual practice and confirmation. The site would have been experienced by many people of various classes, incorporating ritual activity, and associated with a multitude of artifacts, which would have interacted with the monumental site. However, over time, this site fell out of use by the Mayans, and is currently a historical tourism site. Though Chichén Itza is no longer used as a centre for religious practice, it has been reinterpreted as a location of historic learning. Currently, Chichén Itza is a reminder of the past, and is used as a touristic destination, with a marketplace lining the causeways of the site. To local people, it is a location of business, and to visitors, it is a site of learning. As such, the site's life history is an ongoing discussion between the monuments and those who are experiencing them.

Returning to the argument of political control versus collective agreement, collective arrangements of monumental construction could be a better interpretation of some forms of monumentality, specifically if one considers monuments which arise from a sense of social memory. While the idea that monumentality is a causality of political control explains most large scale constructs (Trigger 1990), such as large scale temples, or monuments which naturalize the authority of a political entity (Van Dyke 2009) such as stone stelae depicting the ruling class, other, smaller scale monuments may have different origins. Monuments such as tombstones memorializing deceased affluent members of society or statuary commemorating a significant local event could be the actions of collaborative efforts, without the direct dictation of elite classes directing their production.

Thermodynamics and Monumentality

There have been many definitions of what constitutes a monument, each using a separate criterion and based on concepts of power relations, energy use, and social memory. Perhaps the best understanding of monumental architecture for state-level societies stems from Bruce Trigger (1990), who argues:

> "monumental architecture embraces large houses, public buildings, and special purpose structures. Its principle defining feature is that its scale and elaboration exceed the requirements of any practical functions that a building is intended to perform" (1990:119).

This would include buildings of a scale which do not serve a practical function beyond appearance and statement of power. Monumentality, in short, exceeds the practical and extends into the ornate and luxurious. This act of construction is argued to be the conspicuous consumption of resources, wherein this case, the primary currency of resource consumption is human labour. While Trigger's article provides a thorough explanation for what constitutes monumentality, it ignores examples of monumental structures which do not originate from early state-level complex societies as well as any relation to social memory, a problematic position when considering the architecture of El Rayo.

For example, Trigger describes temples and upper class tombs, particularly those of ancient Egypt, to describe conspicuous consumption, a Marxist term which describes the control of power through the uneven distribution of resources. Using the example of the Great Pyramids of Giza, there is no doubt that these are examples of monuments. They are large, exceeding the minimal need required to inter the deceased, they create a location of place on the landscape, and

they require a high degree of elaboration to be created. The pyramids exceed functionality in design and construction through size and decoration.

Trigger describes monumentality using a thermodynamic explanation. His argument looks at this phenomenon as breaking the principle of the least energy expended and instead looks towards conspicuous consumption to achieve a specific set of goals. It is by exceeding this minimal effort output in the activity of architectural construction which can define monumentality cross-culturally (Rosenswig and Burger 2012, Trigger 1990: 124). Typically, it is argued that human efforts in everyday life, including in construction, will look to the least amount of effort and materials required to achieve a set goal in an effort to conserve energy in production (Trigger 1990: 122-123). In contrast to this theory is the concept of conspicuous consumption, a vital aspect of monumentality and its construction process. Conspicuous consumption refers to the excessive use of materials to demonstrate power and social prestige (Trigger 1990).

As an example, if a given structure's purpose is to function as a dwelling, then any additional construction beyond the scope of functionality (to both incorporate the total number of individuals who will be residing within and their socially constructed requirements of space to perform daily activities), and therefore the cause of consuming excessive energy, can be considered monumental in scale. As argued by Trigger;

> "if economy of effort is the basic principle governing the production and distribution of those goods which are necessary to sustain human life, the ability to expend energy, especially in the form of other people's labour, in non-utilitarian ways is the most basic and universally understood symbol of power. Monumental architecture and personal luxury goods become symbols of power

> because they are seen as embodiments of large amounts of human energy and hence symbolize the ability to those whom they were made to control such energy to an unusual degree" (1990:125).

This argument claims that the presence of monumentality reflects on an individual's ability to organize and control the labour of a group.

In summary, some key issues are raised regarding what constitutes as monumental and its affect over the society which built the monumental feature. Trigger claims that monumentalism aides in forming the political and economic behaviours of individuals, both through the act of construction and the residual long term effects of monument visibility over time (Trigger 1990). One issue with this concept is that there needs to be some form of centralized power source to direct and control groups of individuals in order to achieve the construction of a monument, and that this power source uses monumentality to display their personal power over a social group. However, this might not always be the case. Instead monumental construction could be a community decision for such reasons as of social memory or ancestor worship. Another issue which arises through Trigger's (1990) article is that his definition of monumentality can only be applied to structures of a grand scale and ignores all possibility of smaller scale architectural features being considered as monumental. This is an issue which will be addressed in this chapter's sections on social memory and mortuary practice. Trigger's arguments play off of the idea of energy control, which leads into the work of Abrams (1989) and Abrams and Bolland (1999).

Architectural Energetics and Monumentality

Though not specifically relating to monumental architecture, Abrams' paper on energy expenditure in architectural construction helps to support Trigger's notions of energy and economy. This theoretical perspective is termed 'architectural energetics' and argues that the presence of architecture acts as an index of labour. This labour index can be considered a control mechanism for cultural development (Abrams 1989). Energetics is the study of energy through transformation, conversion, and movement by means of a system. It is the relationship between the physical, the cultural, and the symbolic, and it allows for a proper scientific inquiry and comparison between culture groups (Abrams 1989). By calculating energy outputs of architectural structures, researchers are able to cross culturally compare the amount of effort and energy required to construct monuments, as this looks at quantifiable traits rather than qualitative traits. This principle could then be applied to look at degrees of monumentality across time or ethnic boarders.

The overarching goals of applying energetics to architecture, and by extent monumentality, is to produce a relatable data set of culture change over time though construction techniques. Abrams explains energetics as a means of studying architecture, and it being a representation of energy expenditure which can reflect organizational behaviours for construction and act as a cultural index of complexity (Abrams 1989: 53). "Energy, as an attribute of architecture, is empirical, cross-culturally valid, and verifiable" (Abrams 1989:75). Abrams argues that this mode of study results in quantifiable data. Architectural energetics can be applied to accurately compare cultural innovation, perhaps providing a solution to Frost and Quilter's concerns of comparing qualitative traits of monumentality outside of their culture groups (Abrams 1989, Frost and Quilter 2012).

This discussion ties in with Abrams and Bolland's argument, discussing architectural energetics on monumental architecture. Again, energetics takes the built object, and translates the completed project into energy output costs to complete the construction tasks in a measurable context (1999). Costs, in this context, are the expenditure of human energy calculated as labour-time, measured in number of labour days per person. This energy expenditure provides the baseline to compare cases of architectural construction (Abrams and Bolland 1999, Rosenswig and Burger 2012, Rosenswig 2012). In such an equation, the only arguable consideration is the quantification of person hours (referring in general terms to a labourer regardless of gender) per day by activity. The researcher may suggest a set number of hours a person can work on a specific task, but this is only an approximate estimate of possible past construction methods. Without historical documents of the construction conditions and methods, it is impossible to be certain that the energetics model is correct in its assumption of volume of work per person each day. As Abrams explains, many of his estimates are based off of controlled replicative experiments (Abrams 1989) which are then expanded upon to create number of person hours. However, this fails to account for worker skill and experience levels at a given task. Comparisons must be made in relativistic terms as the calculation of the visible archaeological feature does not include the time in labour to related tasks such as quarrying stone, which is not always visible today (Rosenswig and Burger 2012).

An energetics survey of a structure begins with the description of the feature under evaluation, followed by each material element being isolated and converted into volumetric equivalents (Abrams and Bolland 1999). This is dependent on the known materials used in the construction process and the extent of archaeological excavation of the structural feature. A flowchart is then created, demonstrating procurement, transportation, and manufacturing tasks

related to each material type used (Abrams and Bolland 1999), referring to behavioural archaeological methods as used by Schiffer (1976). Person-day estimates are obtained through ethnohistoric and experimental archaeological techniques before a cost estimate by task is considered (Abrams and Bolland 1999). Energetics models of architectural construction are based on the concept of 'life-histories' or 'behavioural chains': a narrative in which an object's design is broken down into stages, including such stages as manufacture, production, and the use of the object (Skibo and Schiffer 2008). Similar in theory to the *chaîne opératoire* theory, which also looks at the steps by which an object is manufactured as being intrinsically linked to the social characteristics of a society (Delage 2017), the life-histories approach used by Abrams and Bolland (1999) is primarily concerned with the construction phases of an architectural feature, and less so on the use/reuse and maintenance cycle.

Abrams also argues that the act of constructing a monument may have been an important strategy employed in unifying and creating group cohesion in a society which has previously been suffering internal tensions (1989: 62). As Hildebrand (2013) summarizes, the act of constructing a monument and the monument itself can counteract social tendencies to become disjointed from a unified society, particularity in times of social turmoil. "The architecture itself and the process of its creation can counterbalance centrifugal tendencies as social differentiation intensifies" (Hildebrand 2013: 157). This is done by creating work for a large group incorporating different classes to work together to create a monument or architectural feature which can then be experienced by all classes of people, cementing various cultural beliefs through design and symbolism (Abrams 1989).

Another take on energetics is to consider the taskscapes of a project. Taskscapes are the totality of the steps it takes to construct a monument, from the labour and hours needed to

construct the monument itself, and the other required activities in order to complete the task (Ashmore 2014). This includes such tasks as the construction of roads to move materials, the gathering of materials, and in some cases growing of these materials, making the required tools to complete the monument, and the production of food sources to maintain the working labour force required to construct the project. It is taskscapes which are important in considering the monumental projects as it affects the landscape and surrounding area of the monumental site. With reference to energetics, it increases the numbers of labour hours and types of tasks which are required in the construction of a monument. One issue energetics does not address is the timeframe in which a monument is constructed. Some monuments are built over decades through constant alteration of the architectural feature, such as the Mississippian Shell mounds (Sassaman and Randall 2012) while others are built in one construction phase.

Intermediate Area and Monumentality

Intermediate Area studies of monumentality have been few in number (Frost and Quilter 2012, Fonseca Zamora 1980, Quilter 2004, Quilter and Vargas 1995). As Frost and Quilter state in their article on Intermediate Area monuments:

> "the degree to which Intermediate Area large-scale construction should be considered in the category of 'monumental' architecture is a potentially debatable issue. While ancient constructions of the Intermediate Area generally lack the vertical impressiveness of the stone-on-stone constructions of Maya or Inca temples, extensive modifications of the landscape that included expansive horizontal constructions of plazas and patios, fountains and pools, temples and tombs, and similar features attest to considerable sophistication in planning and

prodigious efforts in constructing works of great scale that are impressive achievements" (2012: 233).

Essentially, they argue that in spite of the region between Mesoamerica and Andean societies lacking tall structures made of stone and adobe brick, this does not mean monumentality is a non-existent feature to the landscape, but rather monumentality has been expressed on a horizontal plane, incorporating a range of features which demonstrate planning and spatial management. This alteration to the landscape on a large scale, including multiple individual features to create a whole must be noted as significant when dealing with Intermediate Area monumentality.

However, this argument is not accepted by all as a viable definition of monumentality in regions where large scale monuments, such as those megalithic Old World features, are not present to the same degree. Challenging this perspective, I argue that monumentality must be considered in the context of the society under study to determine what represents monumental scale by comparison to other known works within the region of study. Following this initial step of determining what constitutes monumentalism, these features can then be cross-referenced to other region's examples of monuments. However, Frost and Quilter warn to use caution when using comparisons, as this removes the monumental features from the context of their society, and as such, loses the full meaning (2012:233-234).

Place and Monumentality

Another important aspect of monumentality is understanding place and its relationship with monuments. Place is a significant aspect of culture, one which is often understood but rarely discussed. If asked, anyone could list off a large number of places, but what is the criteria which

makes a location a place and how does this help in the understanding of monumentality? Understanding place is important to monumentality as it defines the cultural significance of a locale, and in some cases can explain why an area was developed into a monument. Places are small, socially significant locations which exist on the landscape. These features can range in type, from the naturally occurring to the manually constructed. Some examples of places include naturally occurring water features, such as cenotes or oases on the landscape or physically created places, such as temples or cemetery complexes.

These meaningful locales are important to specific social or cultural groups within a society, in which meaningful everyday experiences occur (Harmanşah 2014). These meaningful occurrences can be ritual in nature, or ordinary in nature. “Meaningful places,” as stated by Ashmore, “are the products of enduring locations where people’s practices accumulate, along with stories and memories shared about individual and collective experiences there” (2014: 40). These places, therefore, are areas where animate and inanimate entities, material culture, traditional knowledge and cultural stories gather or are centred around these areas. Understanding what constitutes a place is important to understanding why monuments are created, as they are specialized places which hold significant cultural value within a society.

Domestic versus Non-Domestic Architecture

Throughout this thesis, the concept of non-domestic architecture arises, discussed in the context of the structural remains excavated at El Rayo. In order to best understand what non-domestic architecture means, household archaeology must be incorporated into the discussion, looking at what traits constitute a domestic dwelling. This must then be compared to the examples of structures at El Rayo to determine whether the structures were domestic in nature. A

household is made up of three aspects: the social (meaning the number of individuals present within a household and their relationships), the material (referring to the domicile, possessions, and activity areas), and finally the behavioural (being the activities performed within the household) (Wilk and Rathje 1982). While archaeologically only the material and behavioural can be excavated, it is up to interpretation of theses elements to understand the social aspect of household activity.

Though understanding households requires more than the study of just material remains and the structure itself (Allison 1999), for the purpose of this study only the basic household features will be considered, to distinguish between domestic and non-domestic features. For this section the material characteristics which would be excavated within a Nicaraguan domestic unit are listed. While non-domestic architecture may exhibit some of the following characteristics, it will not demonstrate all, nor will it possess a social element as domestic structures have. At Santa Isabel, key characteristics were acknowledged within the mounded architectural features which identified them as domestic. The most critical feature excavated was a hearth within the structure. A second feature was the organization of space through the use of storage areas, differentiated by type of material. Ceramic vessels which were sunk into the floor of structures were excavated, implying their function as storage, and a possible storage pit, filled with the remains of deer were found (McCafferty 2008).

Foodways were another distinguishing characteristic of domestic residences, with the presence of middens containing food remains, as well as toolkits required for the procurement of subsistence. In the case of Santa Isabel, fishing hooks and net sinkers were identified, along with the lithic tool type known as the raspadita which would have been used for grating of root vegetables, such as manioc (Debert 2005, Debert and Sherriff 2007). Another aspect of

foodways and of domestic structures is the presence of plainware and decorative ceramic vessels and sherds. Finally, specialized production can be observed in domestic contexts, such as textile production (McCafferty 2008) or lithic manufacture of tools used in daily activity.

Summary

As prominent reminders of the past, monumentality has held the interest of people for hundreds of years. Monumentality is expressed in a wide variety of forms and functions within a society. It can be utilitarian in nature, such as roadways and irrigation canals or it can be non-utilitarian, featuring temple complexes and large works of artistic endeavour such as stone statuary or stelae. Archaeologically, the study of monumentality can reveal information regarding the cultural significance of these features through the study of associated material cultures, without which understanding the function of monuments can be challenging.

The Intermediate Area is often misunderstood to display no monumentality, or a select few rare examples. Monumentality in the Intermediate Area is often overlooked as it lacks the vertical impressiveness of Mesoamerican and Andean examples. Instead, Intermediate Area examples display horizontal examples of impressive features, such as at the site of Rivas-Panteón de la Reina, where much of the monumental features are now reduced to outline foundations, causeways, irrigation, and other such features (Quilter 2004).

Here it was defined that monumentality can be any construction, be it structural or artistic, which demonstrates a large scale and level of elaboration beyond the functional need, displaying a supreme demonstration of skill and conspicuous consumption. This definition does not hinge on monumentality being a means of displaying power. Trigger's article refers to monumental construction as a consequence of a ruling class directing and ordering subservient

classes. This is a sentiment also agreed upon by Haas and Creamer, however, it fails to consider that monumentality has also been produced by egalitarian societies lacking centralized power organization.

In consideration of the relationship between monuments and demonstrations of power, Trigger states that the demonstration of an individual leader or group of leaders' abilities to control large quantities of materials and numbers of human labourers through the presentation of a monument shows the socio-political power of those in charge. This leads into the topic of energetics and the use of human labour hours demonstrated through the study of monumental architecture. This theory allows for researchers to quantifiably study the architecture of a site and be able to compare sites based not on the cultural meaning but the physical. Overall, monumental theory is important to understanding these features left behind by the architects of the past in order to understand aspects of cultural importance.

Chapter 3: Geographic and Climatic Setting

Nicaragua is a diverse tropical country and is the largest country on the Central American Isthmus. It is bordered by the countries of Honduras to the north and Costa Rica to the south, and the Caribbean Sea and Pacific Ocean to the east and west respectively. Nicaragua was once explored as a potential location for the Inter-Oceanic Canal which would have crossed through Lake Nicaragua but was later rejected as the canals local in favour of Panama. The western portion of Nicaragua is dominated by the Nicaraguan Depression, and features two large lakes, Lake Nicaragua and Lake Managua, as well as a portion of the Central American Volcanic Arc. Demographically, the population of Nicaragua exceeds 6 million. This population is most densely located within the fertile Nicaraguan Depression region, as appears to have been the case before conquest, though in lower concentrations. In the following chapter, the geographic and climatic features of Nicaragua are detailed, focusing on the Granada region and the site of El Rayo.

Geographic and Climatic Setting

Climate Zones

There are three microregional zones within Nicaragua: the Atlantic Watershed or the Miskito Coast, the Central Highlands, and the Pacific Lowlands, within which the Granada region is located. The country of Nicaragua covers 129,494km^2, making it the largest country in Central America, of which the Atlantic Watershed (or Miskito Coast) expands over nearly half the area (McSweeney et al. 2010). Given its proximity to the Caribbean coast and its associated

tropical storms, the Miskito Coast region has the highest annual rainfall of approximately 3,000-6,000 mm of precipitation, while the Pacific Lowlands annual rainfall ranges at approximately 780-1000 mm (Karlberg and Sjöstedt 2007).

The mountainous region of the Central Highlands is located as part of the northern section of the country and is the smallest of the three microregions in area. A continuation of the Honduran uplands, and a vastly folded and faulted mountainous area (Healy 1980), the Central Highlands are the source of many of the country's river headwaters, feeding much of the Atlantic Watershed's complex hydromorphology, as well as the Nicaraguan lake basin in the Pacific Lowlands (Healy 1980). Nicaragua's Pacific Lowlands, the most pertinent area to this study, is a fertile low-lying area due to the ash produced by volcanic activity along a branch of the Central American Volcanic Arc.

This branch runs parallel to the western coast of Lake Nicaragua. The Pacific Lowlands region is separated by the Diriamba Highlands from the Central Highlands (Healy 1980), and from the Atlantic Watershed by the Nicaraguan Depression. The Pacific Lowlands are an area which is a part of the Greater Nicoya Region (a culture area ascribed by archaeologists to refer to the area from the Greater Nicoyan peninsula in Costa Rica to just north of Lake Nicaragua [Norweb 1964]) and contains the Nicaraguan Depression within its borders. This feature is a large area of depressed land caused by plate tectonic movement which possesses fertile soils from local volcanic activity and a highly concentrated population.

Nicaragua is considered a tropical savanna climatic zone, distinguished by high annual temperatures, precipitation, and humidity. Temperatures in the costal and lowland areas have been recorded to range between 25-27ºC, with cooling trends blowing off the Pacific Ocean, Atlantic Ocean, and Lake Nicaragua (McSweeney et al 2010). In the Central Highlands,

temperatures tend to be cooler due to the altitudinal difference, ranging from 21-25ºC (McSweeney et al. 2010, Salgado Gonzalez 1996a). With high seasonal temperatures and high humidity, Nicaragua's climate is ideal for growing crops year round.

[Figure 3.1: Map of Nicaragua and its Microregional Zones]

The seasonality of rain in Central America, and by extension Nicaragua, is controlled by the Inter-Tropical Conversion Zone's (or ITCZ) position to the equator and, along the Pacific coast, the El Niño Southern Oscillation (or ENSO) (McSweeney et al 2010, Stansell et al 2013).

Although in recent times, general warming trends have altered the regularity and predictability of precipitation, Nicaragua still experiences a seasonal split between rainy and dry seasons (Gourdji et al 2015). The rainy season is marked from May to November, with microregional variation (McSweeney et al 2010). Around mid July to early August, there is a break in the rainfall, known as a 'veranillo' (Salgado Gonzalez 1996a). From December to April, the dry season prevails, with a national precipitation average of 100-200 mm per month, (McSweeney et al 2010).

Studies of past climatology from lake El Gancho, a small precipitation-fed lake on the northern section of the Asese Peninsula, suggests a variable rainfall pattern and changes in lake levels (Harvey et al. 2019). Based on lake core sediments spanning approximately 1400 years, evidence at El Gancho suggest that the Medieval Climate Anomaly (MCA), dating from approximately 950-1250CE with climatic changes as early as 600CE, presented wetter conditions and temperature rises. This was followed by a rapid change during a 150 year intermediate period to drier and cooler conditions, moving into the Little Ice Age (LIA) dating from 1400-1850CE, which has continued into modern times (Stansell et al. 2013). The changes in water levels are demonstrated within the site of El Rayo with the presence of lake shore side retaining walls.

Nicaraguan Depression

The Nicaraguan Depression can be defined as a low-lying area bound by a Tertiary volcanic highland region and a Pliocene formed coastal fold belt (Girard and van Wyk de Vries 2005). It is a large ranging area of low lying land surrounded on the west side by a volcanic chain. The depression expands across the Pacific coast of Nicaragua and along the Central American Volcanic Arc; a chain of volcanic activity affected by tectonic activity of the

subducting Cocos Plate beneath the Caribbean Plate (Funk et al. 2009). The late Quaternary depression extends in a broad arc from the Gulf of Fonseca to Caribbean Costa Rica, creating a fertile and highly populated valley crescent, with a high percentage of archaeological sites as well as modern populations (Healy 1980). The depression ranges from 40 to 70 km wide, and while it does stretch into Costa Rica and Honduras, it is most prominent in Nicaragua (Funk et al. 2009).

Mombacho Volcano

The Mombacho Volcano is a significant feature on the landscape, especially with regards to the site of El Rayo, as various pyroclastic events have led to the formation of the landmass which El Rayo is located upon. The geological construct of the region has been formed over time by pyroclastic activity from the volcanoes and plate tectonic activity within the region during the Quaternary period. Mombacho Volcano, named after the Nahuatl term 'Mopachotepetl,' meaning inclined mountain (Atwood 1984: 191), like many volcanoes in the Central American Volcanic Arc, is built up upon a basement of ignimbrite deposits, including the Las Sierras formation. Towering over the landscape at 1345 m, this stratocone volcano demonstrates compositional variation ranging from porphyric olivine basalts to hypersthene augite andesites (Shea et al. 2008). Volcanic activity has left the soils rich and fertile with volcanic ash deposits, and as such has been a heavily utilized area (Salgado Gonzalez 1996a).

There are multiple important facets of Mombacho to the archaeology of the region, including the vegetation, and the geomorphology of the volcano. The vegetation of the Mombacho region is separated into three altitudinal vegetative zones. As described by Atwood (1984), the deciduous seasonal forest, the lowest of the vegetative zones, is most affected in

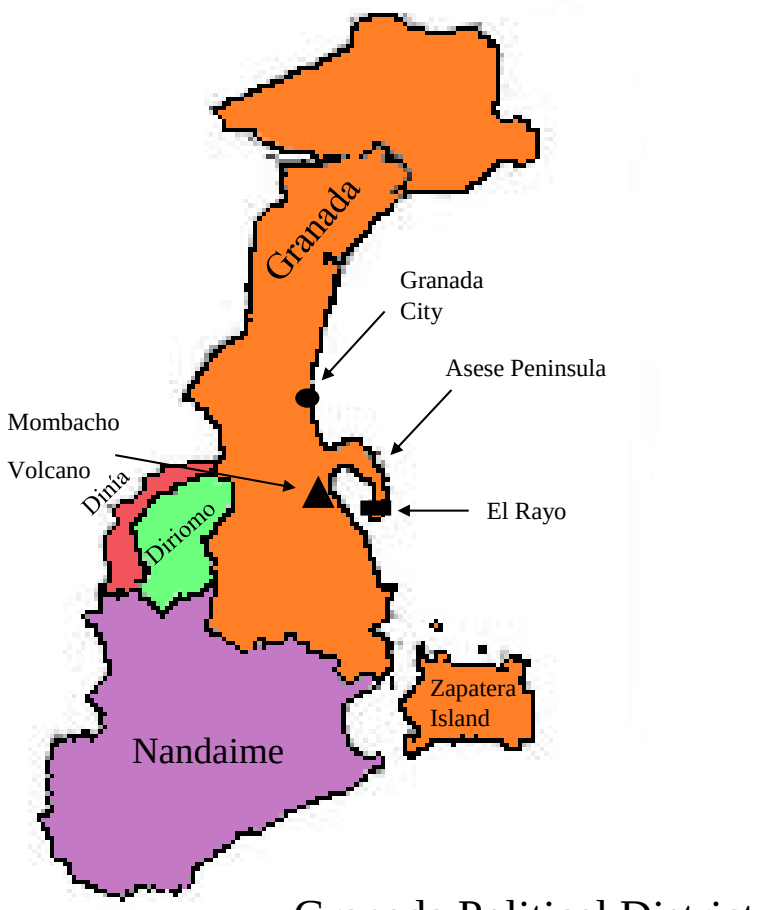
growth by the seasonal rainfall in the area, wherein following the rain season, the trees shed their leaves. This is the zone most commonly inhabited, with numerous settlements. The middle range zone, termed the cloud forest is an evergreen forest, named for its common location within a belt of clouds and hidden from view. This zone extends from 400 m in elevation to near the summit of the volcano. Trees decreases in height as the growth nears the summit of the volcano until it comes to the third and highest vegetative zone, the elfin forest, which has noticeably stunted tree growth of up to eight meters in height. This zone is the least affected by human interaction.

Regarding the geomorphology of the volcano, there are two clear debris avalanche scars on the northeastern and southern flanks of the volcano. The Asese Peninsula and Lake Nicaragua's island archipelago was formed in a collapsing event of Mombacho's northeastern flank, likely caused by Mombacho's weakened core and spreading basement floor (Stansell 2013). Based on basal radiocarbon dates, the northeast face of Mombacho collapsed before 140-345CE, suggesting a tremulous period of time for the inhabitants of the region. Similarly, the southern face of Mombacho collapsed before approximately 650CE, creating the large area known as El Crater (Stansell 2013, Dennett 2016). Until recent studies, these flank collapses were assumed to have been the evidence of volcanic eruption episodes. The two flank collapse events would have affected population settlements within the area, as demonstrated by El Rayo, which after the creation of the Asese peninsula, became a settled area in the Bagaces period.

El Rayo

El Rayo is located near the southernmost portion of the Asese Peninsula, a large volcanic feature with a highly stratified rock debris bed, accompanied by the large archipelago of over 300 islands, and sheltered by the Bay of Asese. The archipelago and peninsula are part of Lake

Nicaragua, the largest lake in Central America, and is the result of a collapsing event of the Mombacho volcano (Shea et al. 2008). Including Lake Managua (Lake Xolotlan) to the north, as well as Lake Nicaragua, the two lakes encompass over 9000 km^2. The lakes are two of the primary features of the Nicaraguan Depression, consuming a large portion of the country (Funk et al. 2009, Dennett 2016).



[Figure 3.2: Map of the Granada Political District]

The site of El Rayo (NI-GR-39) is located in the Granada region of Nicaragua. El Rayo was first identified by Silvia Salgado Gonzalez (1996a) as part of her field survey of the Granada region. The site was originally described as an area of approximately four hectares, with a rolling terrain and multiple knolls with the potential to contain architectural features. Since then, survey work conducted by Geoffrey McCafferty in 2009 and 2010 has increased this estimate to at least 10 hectares (Dennett 2016: 119) though estimates by McCafferty have moved this estimate to 20 ha (personal communications with Geoffrey McCafferty, 2019). The site's land is currently owned by multiple families; many of these properties are currently farmland. The area of El Rayo excavated in this study is owned by the Salablanca family, which is an active farmland for plantains, thus limiting the area in which excavations could occur.

Since its initial identification as an archaeological site, El Rayo has been excavated as part of the Proyecto Arqueológica Granada, Nicaragua, or PAGN, as directed by Geoffrey McCafferty of the University of Calgary over the course of four field seasons spread out from 2009-2016. These excavations have revealed a rich assemblage of ceramic artifacts, strong examples of mortuary practice through intact primary and secondary burials, and numerous examples of architectural features (McCafferty 2019, McCafferty and Dennett 2013, Rice et al. 2017). Through radiocarbon dates and diagnostic ceramics, El Rayo has been dated from the late Bagaces period (500-800 AD) through the Sapoá period (800-1300AD), spanning these two culture phases.

Excavations during the PAGN project included seven loci, three of which pertained to burials, and five of which contained architectural features. Of the seven loci, Locus 1 is least discussed as it pertains to burials and does not demonstrate examples of architecture. Locus 2 is the most excavated locus, as it demonstrates numerous examples of architectural features, both

Sapoá and Bagaces burials, as well as a transitionary line between the Bagaces and Sapoá. Locus 3 is another cemetery dating to the Sapoá period. It demonstrates a small architectural platform built contemporaneously with the cemetery. Locus 4 possesses the largest architectural feature at the site, a 24x12 m platform structure which will be argued to represent monumentality in the culture region. While Locus 5 does not exhibit much in the way of architectural context, Locus 6 features a small open aired structure and a standing stone with a cobble platform. Finally, Locus 7 contains a stone cache box related to the architectural structure at Locus 4, and a large retaining wall with a raised earthen terrace.

Summary

Nicaragua is the largest country in kilometers in Central America, with a population exceeding 6 million individuals. The department of Granada, where in the site of El Rayo is located, borders the northwestern portion of Lake Nicaragua, and was a significant location of Prehispanic history. Divided into three microregions, the Atlantic Watershed, the Central Highlands, and the Pacific Lowlands, the department of Granada resides within the Pacific Lowlands, which is the most densely populated region. The country experiences a dual seasonality revolving around the precipitation, a wet and dry season, of which the wet season is interrupted by a veranillo from mid July to mid August. The Pacific lowlands, annually, experience up to 1000 mm of rainfall.

The dominating features of the landscape include the Central American Volcanic Arc, of which Mombacho Volcano is apart, Lake Nicaragua and the Asese Peninsula, and the Nicaraguan Depression. El Rayo, located on the Asese Peninsula of Lake Nicaragua, was established during the late Bagaces period at approximately 500 CE, and continued use until the

end of the Sapoá period at approximately 1300 CE. In the following chapters, the history of the Granada region ethnographically and archaeologically will be explored, followed by an in depth study of the architectural features at the site of El Rayo.

Chapter 4: Cultural and Ethnographic Background

Writing a cultural setting in any region depends on the historic time period and the validity of the sources used to describe the region. As such, the accuracy of modern descriptions of Pacific Nicaragua relies on the precision of the previous research conducted within the region and the biases of the ethnohistoric and archaeological sources available. Biases can include the type of questions asked to receive information, the cultural worldview of the ethnographer or archaeologist, or the interpretations of the information received from a source. While today's ethnographers follow rigorous guidelines and principles to attempt to curtail personal biases (Hammersley and Atkinson 2007), historic ethnographers were not held to the same standards. Without these standards in place, there is no means by which to check one's own bias, to produce a better understanding of a given culture area. This chapter contains an overview of historical sources, which describe the cultural makeup of Pacific Nicaragua and the Greater Nicoya region, as relevant to this body of work, as well as the cultural setting of the research area. The cultural setting includes terms which will be used throughout this thesis as well as key cultural features which help to define the region under study.

Cultural Setting

Greater Nicoya

The Greater Nicoya area is an archaeologically ascribed subregion following west of the shores of lakes Nicaragua and Managua, and includes Costa Rica's Nicoya Peninsula to the south, and north of Lake Nicaragua (Norweb 1964). The majority of ethnographic and archaeological research in Greater Nicoya has been conducted in the Costa Rican Nicoya

peninsula and the Isthmus of Rivas (Debert and Sherriff 2007, Healy 1980, Hoopes 1980, Lange 1971, McCafferty 2008, McCafferty and Steinbrenner 2005, Sweeney 1975). As such, many of the examples provided over the next two chapters will revolve around the southern portion of Greater Nicoya. The Greater Nicoya region was defined through the similarities between the Nicaraguan Pacific Coastal region and the Nicoya Peninsula based on the ethnographic reports, and the ceramic and lithic stylistic similarities (Salgado Gonzalez 1996a).

Greater Nicoya was first considered by Lothrop (1926) as the 'Pacific Region'. It was later coined by Norweb (1964) as the Greater Nicoya region (Dennett 2016) which is the term we continue to use today. The 'Pacific Region' was an area of shared cultural attributes for approximately 2,000 years (Salgado Gonzales and Leiva 2006). This region was later amended by Lange to be separated into a northern and southern sector, separating the Costa Rican and Nicaraguan region into separate culture areas. This was based on differences in ceramic distribution and settlement patterns (Dennett 2016). The northern sector encompasses Pacific Nicaragua and the northern portion of Costa Rica, while the southern sector includes the Nicoya peninsula and the Guanacaste region of Costa Rica.

Norweb's definition was based on Mesoamerican influence in the region, suggesting that prior to 800AD (or the Sapoá period), there was limited contact with the overlying culture area of Mesoamerica. His definition instead implies that the region was more of a corridor of cultural interaction between the Mesoamerican world systems and the Andean world systems, wherein Greater Nicoya and Central America were seen as an area of culture exchange between these dominant groups, as opposed to a valid region of cultural growth and innovation unto itself.

[Figure 4.1: The Greater Nicoya Region in Nicaragua and Costa Rica]

In Dennett's dissertation (2016: 256), she proposes a new regional outline of Greater Nicoya, dividing the region into three sectors: from just to the north of Lake Xolotlan to the Granada/Rivas department border denoted as the northern sector, the central sector running from

this border to the Guanacaste region of Costa Rica, and the southern sector encompassing the Nicoya peninsula. This division of the Greater Nicoya region is based on her study of ceramic economy with each sector representing a constellation of practice[3] (Dennett 2016). Recent arguments have suggested that the concept of Greater Nicoya as an area of cultural unity is not strongly supported by archaeological data (Dennett 2016, McCafferty and Fernandez Léon 2016).

Migratory and Linguistic Evidence

Pacific Nicaragua, at the point of first contact with European explorers in 1522, was inhabited by three Mesoamerican culture groups: the Nicarao, the Chorotega, and the Maribios (Healy 1980). Additionally, Matagalpa was a term used to include the peoples residing to the northeast of the lake region and into southern Honduras (Niemel 2003). Evidence for each individual group's migration into the region is limited, and what little information on each group exists may have been confused by ethnohistorians, making the ethnohistoric and linguistic branches of research unreliable without the addition of an archeological context.

At contact, the Nicarao resided in the northwestern peninsula of Cosigüina, Chinandega, and the southern border and up the isthmus of Rivas (Fowler 1985, Healy 1980, Salgado Gonzalez 1996a). The Chorotega controlled the central portion of the Pacific Coastal Zone,

[3] In Dennett's definition of constellations of practice, multiple communities of practice can be interconnected in such a manner that members of various communities can discern a connection between participating groups, forming a constellation, or interconnected web of related communities. Communities of practice can at the same time be apart of multiple constellations of practice depending on their interrelationships of similar cultural material, geographic proximity, shared history, facing common challenges, or overlapping styles (Dennett 2016: 40-41).

[Figure 4.2: Map of Mesoamerican Linguistic Distribution]

bordered both to the north and the south by the Nicarao, and following the eastern border of the Nicaraguan Depression, as well as in southern Honduras and the Greater Nicoya region of Costa Rica (Healy 1980). Finally, the Maribios resided in the region of modern day Léon (Fowler 1985, Salgado Gonzalez 1996a). Of the three groups the Maribios migration from Mexico is the

least understood, though possibly it was the result of famine in central Mexico driving their ancestors away from the region (Niemel 2003).

Any events of migration can be traced back with linguistic evidence and ethnohistoric accounts from the Nicaraguan peoples. The most significant migratory event, the Pipil-Nicarao migration (Fowler 1985) from central and southern Mexico, marks one of the clearest cases of mass migration in Mesoamerican history. The Pipil-Nicarao group includes the Nahuat speaking groups of Pipil and Nicarao, as the name suggests. These groups migrated in multiple stages, possibly as a consequence of the collapse of Teotihuacan beginning during the 6th century AD (Beekman and Christensen 2003). However, there is some debate as to the reason for the migratory event outside of turmoil within Teotihuacan. As outlined by Dennett (2016), some sources (Steinbrenner 2010; Healy 1980) cite a multi-year drought as the cause of this migratory event, while ethnohistoric sources from Bobadilla (a priest of the conquest period) claim that the Nicarao ancestors in central Mexico were oppressed by hard working conditions by slave driving masters (Torquemada 1975-83). Regardless of the reasons for the migration, ethnohistoric accounts from colonial times indicate that the migration was a remembered event in Pacific Nicaraguan through oral histories.

This mass migration is estimated to have begun as early as 900 AD. The Nicarao are believed to have split off from the Pipil and migrated further south into Nicaragua by approximately 1200 AD based on glottochronological studies (Beekman and Christensen 2003, Fowler 1985, Healy 1980). However, evidence of Mesoamerican influence beyond artistic style (which suggests a transfer of religious ideas) has remained difficult to identify (McCafferty 2015, McCafferty and Dennett 2013, McCafferty and Steinbrenner 2005). Other groups of Nicaraguan heritage also claimed that their ancestors migrated from Mesoamerica, such as the

Chorotega. Though little is known of the Chorotega, an Oto-Manguean speaking peoples, Torquemada (1975-83) argued that their oral accounts claim that their ancestors arrived in Nicaragua through an earlier wave of migration than the Pipil-Nicarao (Dennett 2016: 52).

Ethnohistoric Sources

Ethnohistorical sources demonstrate the bias of the Spanish cultural worldview in comparison to the lifeways of the indigenous populations of Central America (Abel-Vidor 1980). This has left the utility of texts recorded by Spanish chroniclers limited in the information regarding indigenous populations' unique cultures. While the texts provide information regarding sociopolitical organization, population density, economy, and ethnicity (Salgado Gonzalez 1996), the texts do not use cultural group names with consistency, leaving the researcher the task of determining to whom the chronicles are referring. Primarily, these accounts refer to the Nicarao population over the other known inhabitants of the region.

Despite these limitations, the sources clearly indicate a Mesoamerican world system of influence on the culture groups settled along the Pacific Coast of Nicaragua (Salgado Gonzalez 1996a). Carmack and Salgado Gonzalez (2006) have argued that the peoples along the Pacific Coast of the Intermediate Area (particularly those of the Greater Nicoya region) constitute a frontier zone of the Mesoamerican sphere of influence, citing evidence of archaeological and ethnohistorical accounts, meaning that this region also diffused indigenous ideas from Greater Nicoya out towards other regions.

Regarding historical sources from indigenous groups, there have been mention of the Pipil-Nicarao ethnic groups recording on folding screen books (Abel-Vidor 1980, Fowler 1985). Accounts claim that the Nicarao were recording genealogy and mapping information on these

deerskin folding codices, potentially similar to codices of Mesoamerica (Fowler 1985). Mention of their texts by Spanish reporters are documented, though the information is lacking in specific detail. Instead, we are forced to rely on texts by European authors (primarily the Spanish), with dates spanning from conquest to the late 18th century. The primary sources for precontact evidence of cultural history are derived from linguistic studies and archaeological research, as will be discussed in this chapter.

Regional Chronology of Greater Nicoya

The most current chronological sequence of Nicaragua's prehistory includes five culture phases (the Orosí, Tempisque, Bagaces, Sapoá, and Ometepe) defined by changes in the most commonly found material remains: ceramic stylistic changes, settlement patterns, and examples of mortuary practice (McCafferty and Steinbrenner 2005). There has been limited evidence to describe the Orosí phase. As noted by Roman-Lacayo (2013), there are very few sites which

Cultural Sequence	**Time Period**
Orosí	2000-500 BC
Tempisque	500BC-300AD
Bagaces	300-800AD
Sapoá	800-1300AD
Ometepe	1300-1550AD (or conquest)

[Table 4.1: Regional Chronology of Greater Nicoya]

demonstrate Orosí occupation phases in the Masaya department. Some of the known sites around Greater Nicoya include Ayala, Ometepe Island, Tisma, Ticuantepe, and Villa Tiscapa (Roman-Lacayo 2013, Salgado Gonzalez 1996b). The Tempisque phase is better represented, with one of the more recent sites being excavated at Ticuantepe in 2016. This period demonstrates a combination of extended, flexed, and secondary burial techniques, as was demonstrated at the site of Ticuantepe.

During the Bagaces phase, an increased social and hierarchical complexity emerges, demonstrated by new forms of architecture (primarily mounded platforms) and a new ceramic sequence. In the late Bagaces, the site of El Rayo develops as a significant second tier hierarchical site (Salgado Gonzalez 1996a), with a cemetery complex. The Bagaces period demonstrates a change in secondary burial styles in comparison to the Tempisque phase. Both the Bagaces and the Sapoá phases are represented at the site of El Rayo, a rare find, as most sites were abandoned or significantly diminished in favour of new locations following the transition between the Bagaces to the Sapoá. The Sapoá phase introduces new polychrome ceramic variants and continues the trend of mounded architectural features. Both phases represent critical phases of the prehistory of Nicaragua and have been the most thoroughly investigated within the Pacific Coastal region. Finally, the Ometepe phase lacks a strong archaeological data set, at this time, as most known Sapoá sites were abandoned between 1200-1300 AD.

Ethnohistoric Background

Though known to the Spanish in 1519 (Abel-Vidor 1980), the first accounts from Nicaragua by Spanish Conquistadors date to 1522 from the accounts of Gil González Dávila, who led the first exploratory expeditions into Pacific Nicaragua, and Andres de Cereceda, the

treasurer of the same expedition (Fowler 1985). Following their journey from Spain to Panama, González Dávila set out with 100 soldiers traveling north, towards the Nicoya Peninsula of Costa Rica after a hostile meeting with the governor of Castilla del Oro in Panama, Pedrarias Dávila (Oviedo 1853). Entering Pacific Nicaragua from the southern boarder, González Dávila explored the modern day Rivas region, where he encountered the Nicarao people and Chief Nicaragua (for whom the country is named) near what is the modern town of San Jorge, Rivas. González Dávila and company were well received by the Nicarao, and following a dialogue, converted Chief Nicaragua and approximately 9,000 of the Nicarao under the chiefdom's control to Christianity (Fowler 1985 Oviedo 1853). This mass conversion did not include the other villages encountered along the way which were also converted to Christianity as reported by Cereceda. This initial exploration by these conquistadors took an unusually peaceful approach to their interactions with the native peoples of the Pacific Coastal region.

Chronicler	**Year**	**Occupation**	**Accomplishment**
Gil González Dávila	1522	Conquistador	Accounted numbers of Nicaraguans and village locations.
Andres De Cereceda	1522	Conquistador	Accounted people baptised, caciques, and gifts received.
Gonzalo Fernándes De Oviedo Y Valdés	1527	Chronicler	Documents religion and settlement patterns of caciques.
Francisco De Bobadilla	1528	Mercedarian Friar	Documents on socio-political organization and religion.

[Table 4.2: Key Chroniclers of Nicaragua and their Ethnohistory]

After the mass conversion, the conquistadors traveled further north to the Chorotega territory of Denocherrí, or the modern day Granada-Masaya region, where they traveled through multiple chiefdoms before their arrival at Diriangen, located near modern day Granada City (Dennett 2016). Despite the previous warm reception with the Nicarao, the Chorotega were not as open to the conquistadors' approach. Chief Diriangen rallied a force of 4,000 soldiers over the course of three days, after initially welcoming the conquistadors, to turn González Dávila's missionary attempts away. This successful demonstration of strength forced González Dávila to retreat back south towards the Nicarao, where they were this time greeted by Chief Nicaragua's own armed forces, ultimately driving González Dávila into an early return to Panama (Fowler 1985).

González Dávila wrote an account of the 1522-1523 journey which was sent to Spain with Cereceda, along with Cereceda's own reports of the expedition (Fowler 1985). Though González Dávila's report was lacking in detailed information, the recordings of Cereceda added to the ethnohistorical accounts of the region. His significant contribution to the history of Nicaragua included reports of the major population locations, noting that a 'Mayan' dialect was encountered in the lake's region. Unfortunately, he ignored the information regarding the caciques and the expedition's contact with these groups. The 'cacigazgo', as used by the Spanish, referred to a village or town which exhibited some form of localized chief figure head.

Cereceda wrote two important documents regarding the 1522 expedition and the native inhabitants encountered, including an itinerary listing the caciques which were contacted during the expedition. This listing included the quantity of gold each cacique gifted to the González Dávila expedition, the conversations held with the groups, the number of individuals baptized, and the distance between the caciques visited along the journey (Abel-Vidor 1980, 1981, Fowler

1985). After a period of two years, during which González Dávila used to resupply and request additional forces before his planned return to Nicaragua in 1524, his opportunity to return to the region was missed, as Francisco Hernández de Córdoba was then commissioned to claim the territory by the Spanish King.

Successfully obtaining ground in Pacific Nicaragua, Córdoba was hampered on both sides by several attempted coups by both González Dávila from the south, and the famed Hérnan Cortés from the north (Dennett 2016: 48). In order to cement his territory, Córdoba founded two imperial provinces and within each province a capital city (two of the earliest cities of Central America): Léon to the north in the indigenous province of Negrando, and Granada City (Abel-Vidor 1980) both of which still stand to this day. In 1526, Córdoba's confidence in this new territory grew, and his goals changed from simply maintaining the held territory. He plotted to remove the Panama governor's influence from Nicaragua in order to form a new governorship stationed in Nicaragua. However, this error in judgment resulted in the loss of Córdoba's life as his attempts were stopped by Pedrarias. Córdoba was soon after executed by Pedrarias for the attempt, ultimately resulting in Nicaragua being placed under the governorship of Guatemala.

Significant chroniclers of Pacific Nicaragua include, most importantly, Gonzalo Fernández de Oviedo y Valdés (Oviedo), who arrived in Nicaragua in 1527 where he remained until July of 1529 (Abel-Vidor 1981). His accounts were most significant as he was able to visit indigenous towns before they were taken over by the Spanish governance in the region (Oviedo 1853), especially those populations of the Chorotega and the Nicarao (Fowler 1985). Though Oviedo's work takes an 'anthropological' approach to documenting cultural aspects including religion and settlement patterns, regrettably, it is vague in referring to which ethnic groups a

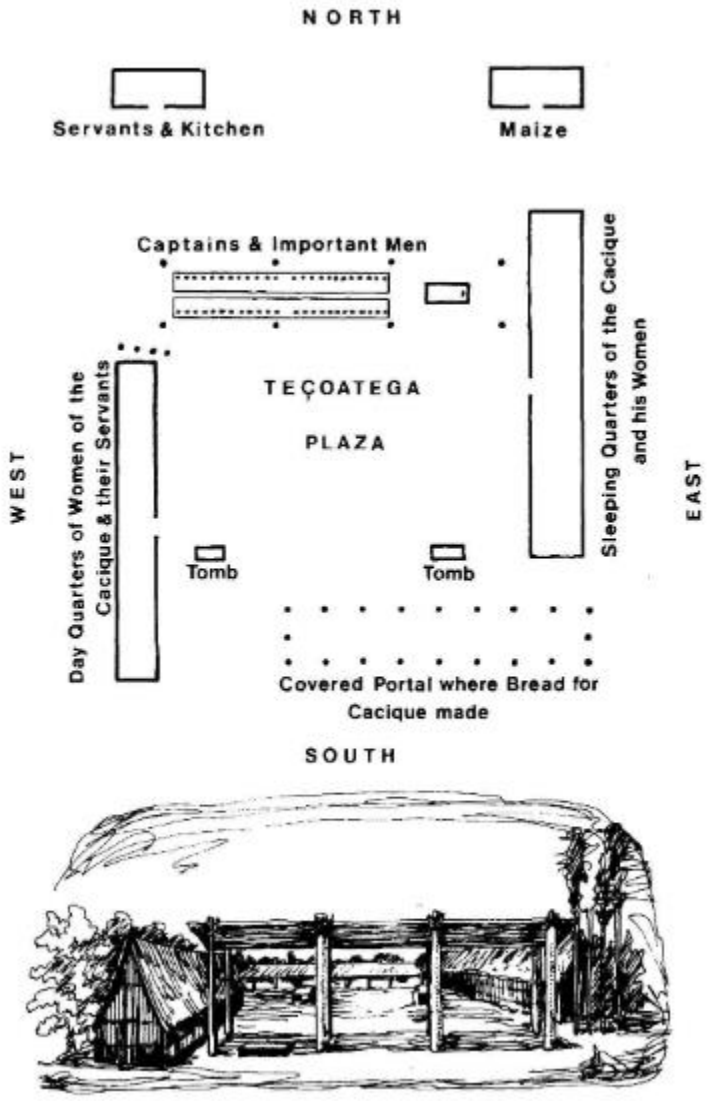
given set of cultural customs came from (Fowler 1985), an issue which may have led to subsequent errors in interpretation of these documents.

Oviedo also transcribed the work of Francisco de Bobadilla in 1528. Bobadilla collected some of the more significant information on the Nicarao religion, socio-political organization, and the Pipil-Nicarao migratory events by interviewing members of various caciques (Fowler 1985). A Mercedarian friar, Bobadilla was appointed by Pedrarias to investigate the natives of Nicaragua. Other chroniclers who wrote firsthand experiences in Nicaragua include Pascula de Andagoya, Girolamo Benzoni, Bartolomé de Las Casas, and Toribio de Benevente (or Motolinia) (Steinbrenner 2010). The accounts of the interviewers, hailing from various countries across Europe, were based on various lengths of time spent within Nicaragua, and were often a part of a Central American travelogue.

While there were some ethnohistoric accounts, the main goals of the colonial phase of history was to conquer new (by European perspectives) areas of land and claim them for European monarchies as resource reserves. What was not considered was the lasting effect of colonialism on the populations residing within these new territories. In many cases, colonialism resulted in mass genocide of populations, particularly in the New World, and the eventual forced conversion of religious practice and lifestyles to fit in with the European ideals of the time. Data collected was less for the purpose of study of foreign culture, but for the purpose of domination of ethnic groups considered to be ‘barbaric’ and of lesser status than Western Europeans. Despite these conditions, the accounts which have been collected over time have provided archaeologists valuable but limited insight into the past populations regarding their religion’s practice, land use, and population size distribution. This area of study has led into the modern archaeological inquiry of the regions.

Ethnohistorical Architecture

There is not a lot of historical information regarding the general buildings and the construction of those structures. Some of the best references to housing refers to the cacique's residential areas, from Oviedo and Martyr (Healy 1980). Mention of these residences described the cacique's house as being mounded on platforms half a person's stature and were



[Figure 4.3: Sketch from Healy (1980) from Oviedo]

approximately 100 by 15 paces in size. Houses are described as low in height and dark with one short door to keep it sturdy for earthquakes and hurricanes, and the door closed during the day to keep out mosquitoes (Healy 1980). These references date to the Ometepe period and may not be similar to the housing styles of the Bagaces and Sapoá periods. These structures recorded upon also refer directly to the cacique and his household and does not include special purpose buildings other than those which relate to the storage of food and cooking. As El Rayo presents a unique case of specialized buildings not related to residential activity, comparison to the architecture discussed by Oviedo and Martyr is difficult.

Further information regarding architectural features at the point of conquest also comes from Oviedo (1945) describing the construction material of houses built for prostitutes. These houses are described to be built over a set term, with all materials and labour provided by possible suitors for the woman for whom the house is intended. Oviedo writes in the first person to describe the social processes surrounding prostitution and marriage based on the construction of dwellings and the celebration of marriage.

> "Ya he dicho que en Nicaragua hay mugeres que públi- camente é por presçio de aquella moneda ó almendras que corren por monedas, ó por otra cosa que se les dé, conçeden sus personas á quien se lo paga. Tambien hay mançebias é lugares públicos para las tales, é tienen sus madres, ó mejor diçiendo madrastras, que son aquellas que en Flandes llaman la porra y en España madre del burdel ó de las putas, que como mesoera les alquila la botica é les da de comer por un tanto: é tienen sus rufianes, no para darles ellas nada, sino para que las acompañen é sirvan, y el salario no le pagan ellas á essos rufianes en pescado, sino en carne, é tan suçia

como ella es. Pues aquestas tales lupanarias moradas entre chripstianos se admiten, por excusar otros daños mayores, no me paresçe mal que las haya entre aquesta gente, pues que hay cuylones (que ciylon llaman al sodonmita). Pero nunca oy de otra cosa más donosa ó viçiosa é de bellaca generaçion que la questos indios haçen; y es que en çierta fiesta muy señalada é de mucha gente que á ella se junta, es costumbre que las mugeres tienen libertad, en tanto que tura la fiesta (ques de noche) de se juntar con quien se lo paga ó á ellas les plaçen por principales que sean ellas é sus maridos. É passada aquella noche, no hay de ahí adelante sospecha ni obra de tal cosa, ni se haçe más de una vez en el año, á lo menos con voluntad é liçençia de los maridos: ni se sigue castigo ni çelos ni otra pena por ello, como se siguió á las romanas de aquella su devoçión ó puteria bacanal, que castigó el Senado y el cónsul Posthumio, como más largamente Livio la escribe, en el qual diabólico ayuntamiento avia homeçidios, é adulterios é sodométicos, é tanto más que diçe el mesmo auctor aquestas palabras: "Nunca jamás ovo tan grand mal en la república, ni que á tantos hombres tocasse".

Ni entre indios yo no sé ni he oydo tan herética é suçia é diabólica, ni más cruda ni viçiosa maldad que aquesta que, como digo, ovo un tiempo en Roma. Pero porque la materia es mejor quanto menos della se usa ni se platica, diré solamente una forma de matrimonio que en aquellas partes se usó, é no se desusára tan presto entre los infieles. Acaeseia que un padre ó madre tenian una ó dos ó más hijas, é aquellas en tanto que no se casaban por voluntad de sus padres (ó de las mesmas), con quien les plaçia, por via de acuerdo é contractaçion, no dexan de usar de sus personas: é dánse á quien se les antoja por prescio ó sin él; é aquella ques más

deshonesta é impúdica é más gayones ó enamorados tiene, é mejor los sabe pelar, essa es la más hábil é más querida de sus padres. Y en aquel offiçio suçio gana el dote é con que se case, é aun sostiene la easa del padre: é para apartarse ya de aquel viçio ó tomar marido, pide un sitio al padre allí çerca de donde él vive, é se lo señala tan grande como le quiere. Estonçes ella ordena de haçer la casa á costa de majaderos, é diçe á sus rufianes ó enamorados, (estando todos juntos) que!la se quiere casar é tomar á uno dellos por marido, é que no tiene casa é quiere que se la hagan en aquel lugar señalado: é dá la traça de cómo ha de ser, é que si bien la quieren, para tal dia ha de estar hecha, ques de allí á treynta ó quarenta dias. É al uno dá cargo de traer la madera para la armar, é á otro que trayga las cañas para las paredes, é á otro el bexuco é parte de la varaçon, é á otro la paja para la cu- brir, é á otro que trayga pescado, é á otro çiervos é puercos é otras cosas, é á otro el mahiz para la comida en abundançia, segund el ser della é dellos. Y esto se pone luego por obra é se cumple, sin faltar una mínima cosa de todo ello: antes traen duplicado, porque los tales son ayudados de sus paientes é amigos, é tienen por mucha honra quedar con la muger avida desta manera, é quél sea escogido é los competidores desechados. É venido el dia de la boda ó sentençia libidinosa, más que no matrimonio, çenan juntos los gayones y ella é los padres é amigos de los unos é de los otros en aquella nueva casa, en quella y el uno de los enamorados han de quedar casados: é despnes que han çenado, ques á prima noche (porque la çena se comiença de dia) ella se levanta é diçe ques hora de yr á dormir con su marido, é dáles en pocas palabras las graçias de lo que en su serviçio aquellos sus servidores han trabaxado; é diçe quella se quisiera haçer tantas mugeres, que á cada uno dellos

pudiera dar la suya, é que en el tiempo passado ya avian visto su buena voluntad é obra con que los avia contentado, é que ya no avia de ser sino de un hombre, é quiero que sea aqueste: é diçiendo aquesto, tómale de la mano y éntrase con él donde han de dormir. Estonçes los que quedan por desechados, se van con sus compañias, é los parientes é amigos de los novios comiençan un areyto é á baylar ´é beber hasta caer de espaldas, é assi se acaba la fiesta" (Oviedo 1945, 184-186).

As translated by Sharisse McCafferty:

"I have already said that in Nicaragua there are women who, publicly, by the pressure of the coin, or cacao, or for something else that is given to them, grant their persons to whom it is paid. There are also brothels and public places for such, and they have their mothers, or rather saying stepmothers, who are those who in Flanders call the *porra* and in Spain the mother of the brothel or whores, who rents the apothecary and grants them to eat for a bit: they have their ruffians to accompany them and serve them. They are paid in meat not fish, as dirty as the women are. Among these there are sodomites (called the *cuylon*). Once a year for a certain fiesta the women are free to spend a night with whomever pays them as long as the principles and their spouses agree. It is voluntary and no punishment involved. If a girl marries that is fine but if a parent has several daughters and they don't wish to marry, then they use them for prostitution and the more money they make the better and more beloved by the parents they are.

And if she makes enough money for her dowry, she then asks for a house to be built near her father. Then she gets the ruffians or lovers and tells them she wishes to marry and to take one of them for a husband and she wishes to make a house. She

> gives them the plans and gives them 30-40 days to build it. The men are assigned to bring wood, vines, straw, *barazon,* and deer, fish, pigs, corn etc. for the feast, wood for the frame, canes for the walls, reeds, straw for covering, and *barazon* which is rows or lines. The lovers and bouncers all compete to bring the construction materials, the most and best so she will choose them as her husband. They all work hard along with their relatives so they will be honored by her. And on the day of the marriage, they all come to the new house to have a big meal but only one will stay the night and be considered married. She gets up and thanks everyone for what they have done and brought and says it is time for her to go to bed with her husband. And she wishes she could be many women for each one of them and they have seen in the past all of her good work and deeds. She then takes one by the hand and leads him away to the sleeping area. Then the friends and relatives of her husband dance and drink until they fall on their backs" (translation by Sharisse McCafferty personal communications 2019).

This text demonstrated a 30-40 day time frame for the construction of a dwelling for a nuclear family unit, build by the labour of multiple individuals (assumed male) as a means for a prostitute to select a husband. In this translation, the designs for the house are provided from the woman intending to marry, while the materials, and feasting foods are provided by the suitors. The description suggests a matrilocal organization of houses, where the females construct their homes near that of their parents. Though this description does not provide much in the way of architectural data, it does detail the materials which were required in the typical dwelling. Though in the description of materials for the feasting celebration following the completion of the house structure corn is mentioned,

there has been no archaeological evidence of corn found at the site of El Rayo or Pacific Nicaragua (Geoffrey McCafferty personal communications 2018).

Summary

The cultural history of any region is a complex narrative which extends beyond the realm of material culture and ethnohistoric accounts. For the Greater Nicoya region, there is no exception. For the amount of ethnohistoric research which has occurred in the region, little is known about Nicaragua's prehistory. Though archaeological studies (which shall be discussed in **Chapter Five**) have recovered information on sociopolitical economies and settlement patterns, many questions still remain regarding the past. At the time of first contact from González Dávila's party of Conquistadors to later travelogues from various individuals traveling through Central America, limited ethnographic studies were conducted with the native populations of Pacific Nicaragua's supposed 'barbarism' and non-Christian ideals. However, the limited accounts of settlement patterns, religious practice, sociopolitical organization, and migration have led to modern archaeological inquiry and interest within the region.

Chapter 5: Archaeological History of Greater Nicoya

The archaeological history of Nicaragua dates back to the mid 1800s, beginning with regional explorers who took an interest in the archaeological sites of the region, and collectors who were sent to Central America to acquire antiquities for museums. The chapter will overview significant individuals to Nicaraguan archaeology, spanning to the most current and scientific research in the area, with specific attention payed to sites exhibiting architectural features. This chapter's goal is to describe the archaeological history of the region concluding with a list of sites and their description which will later be compared to El Rayo by terms of potential monumentality.

Archaeological Research

Archaeological research in Greater Nicoya has greatly changed in methodological and procedural approach from its earliest origins. The history of Nicaraguan archaeology begins with regional exploration by various individuals, such as Squier (1853), Boyle (1868), Bransford (1881), and Bovallius (1886). Following this descriptive phase, archaeological goals changed to more scientific approaches with the work of Fredrick Lange (1971) and processual archaeology. The majority of archaeological research in Nicaragua has focused on the Pacific Lowland region rather than the Central Highlands and Atlantic Watershed. The following illustrates the individuals whose work in Pacific Nicaragua and Greater Nicoya has brought archaeology into the modern era, discussing the current research in the Greater Nicoya region with primary consideration to the discussion of architecture.

Archaeology of the 19th Century

The first serious archaeological consideration in Nicaragua comes from the works of Ephraim George Squier. Prior to his work in Pacific Nicaragua, the archaeology of the country was of little concern to the local populations (Squier 1852). Having already established himself in archaeology through his research in the United States with publications including *Ancient Monuments of the Mississippi Valley* (Squier and Davis 1998[1884]), Squier published two critical documents of his research in Nicaragua. The first was a two volume text titled *Nicaragua: Its People, Scenery, Monuments, and the Proposed Inter-Oceanic Canal* (Squier 1852, 1860) that argued the benefits of constructing the trans-isthmus canal (Healy 1980). His second book was *Observations on the Archaeology and Ethnography of Nicaragua* (Squier 1853, 1990).

During his time in Nicaragua, Squier produced the first archaeological overview of the Pacific region (1853), though it was primarily focused on his observations of the local peoples of Pacific Nicaragua and connecting their lineage to Central Mexico. However, in this volume, Squier's significant accomplishments include:

1) Writing the first accounts from Zapatera Island. This island located south of lake Cocibolca archipelago is a part of the Granada region. There, Squier illustrated the stone statuary of the island and described the site of Punta de las Figuras, excavating and describing sixteen statues (Salgado Gonzalez 1996) of humanoid figures with animal effigies hanging over their back with the animal's head on the head of the humanoid figure. Also included were mound features which may have contained evidence of architectural features, though these were not excavated during his work on the island.

2) Visiting Momotombito, a small island volcano in lake Xolotlan near Momotombo volcano, where he described more stone statuary that was badly eroded, though he did not ascribe these works with a culture group.

3) Traveling to Ometepe Island, the largest island in Lake Cocibolca formed by the two volcanoes Concepcíon and Madera, where he studied the petroglyphs of the island and illustrated his findings.

Following Squier's work in Pacific Nicaragua, several other researchers were sent to the region by various institutions in the United States and Europe to acquire antiquities for museums (Boyle 1868). From the Royal British Museum in 1866, Fredrick Boyle was the first individual to note differences in style in stone statuary and monoliths between Chontales, Niquiran, and others, such as the Nicarao (Boyle 1868). He was also responsible for illustrating and describing the stone statues of Mombacho and Chontales (Boyle 1868). Other researchers collecting for the Smithsonian museum included Carl Berendt 1868, John F. Bransford (1881), Earl Flint 1969 (Whisnant 1994), Charles Nutting 1885, and J. Crawford 1890. Though they were not all major names in Nicaragua's archaeological history, they all contributed to the field by their explorations of the region and chance findings of archeological features.

The next significant individual was John F. Bransford. He was the first individual to excavate on Ometepe island and within the Rivas region (Bransford 1881). On Ometepe, Bransford excavated urn burials and cemeteries, recording that many urn burials were capped by polychrome vessels (Bransford 1881). As a collector for the Smithsonian Institute (Bransford 1881), Bransford's excavation at Hacienda Palmar, found the ceramic class Bocana Incised (originally Palmar Ware), the earliest known ceramic type from the region (Niemel 2003:

Critical Archaeologist	Major Publications	Contribution to Archaeology
Ephraim G. Squier	- Nicaragua: Its People, Scenery, Monuments, and the Proposed Inter-Oceanic Canal (1852,1960). - Observations on the Archaeology and Ethnography of Nicaragua (1853).	- Excavated on Momitombito Island, Ometepe Island, and Zapatera Island. - The description and illustrations of stone statuary and petroglyphs.
Fredrick Boyle	- A Ride Across a Continent: A Personal Narrative of Wanderings through Nicaragua and Costa Rica (1868).	- Notes stylistic and ethnic differences in stone statuary in the Chorotega territory. - Excavated and described Luna ware pottery. - Excavated and described shoe pot urn burials.
John F. Bransford	- Archaeological Researches in Nicaragua (1881).	- Excavated at Hacienda Palmar and Ometepe Island. -Excavated cemeteries with urn burials, noting that they were capped with polychrome vessels. - Excavated and described Bocana ware pottery.
Earl Flint	- Human Footprints in Nicaragua (1884).	- Collected for the Smithsonian and Harvard Peabody museums. - Excavated and described Tola-Trichrome ware pottery. - Discovered the Acahualinea human footprints.
Carl Bovallius	- Nicaraguan Antiquities (1886).	- Collected for the Swedish Museum of Natural History. -Excavated on Ometepe Island and Zapatera Island. - Excavated the site of Los Angeles, Ometepe Island.

[Table 5.1: Key Archaeologists of the 19th Century in Nicaragua and Greater Nicoya]

40). His book *Archaeological Researches in Nicaragua* (Bransford 1881) was the first book since Squier's to focus only on archaeology of Nicaragua.

Earl Flint was another significant individual in the narrative of Nicaraguan archaeology. He was responsible for the most significant amount of collecting for museums. Flint was sponsored by the Smithsonian Museum and later the Harvard Peabody Museum (Whisnant 1994). He is today best known for the discovery of the Acahualinca human footprints in volcanic tuff in 1884 (Lockley et al. 2009). Amongst Nicaraguan archaeologists, Flint is better known for his identification of the Tola Trichrome ceramic type (Steinbrenner 2010). Despite these significant finds, Flint published minimally on his time in Nicaragua.

The final significant individual to be discussed regarding 19th century Nicaraguan archaeology is Carl Bovallius, who was sent to Nicaragua to collect antiquities for the Swedish Museum of Natural History, Stockholm (Bovallius 1886). Arriving in Central America in 1881, he returned to sites excavated by Squier and Bransford on Ometepe and Zapatera Islands, to find that looters had destroyed a great deal of the archaeological record (Bovallius 1886) and removed the stone statuary described and illustrated by Squier (Salgado Gonzalez 1996a). On Ometepe, Bovallius excavated ceramic vessels from outside of Los Angeles, and recorded their location on maps of the island, as well as noted the presence of two large stone sculptures at the entrance of a church at Los Angeles (Salgado Gonzalez 1996a).

On Zapatera, he excavated at three separate sites (Bovallius 1886). At Isla del Muerto, he recorded drawings of the numerous petroglyphs located at the site. At Punta de las Figuras, he excavated the large mounds previously recorded by Squier (Salgado Gonzalez 1996a, Steinbrenner 2002, 2010). Finally, Bovallius excavated at Punta del Zapote, which was by far the greater of the three sites, where there were six large mounds, with one of the mounds being up to

18 x 12 m in size (Bovallius 1886: 21). There were also stone statues placed along the periphery of the mound, which Bovallius hypothesised to be columns of the long since rotted roof structure (Bovallius 1886).

Archaeology of the 20th Century

The early 20th century experienced a great reduction of archaeological interest in Greater Nicoya, where very little was published pertaining to the region. Though there were not many researchers of Pacific Nicaraguan archaeology or prehistory prior to the 1950s, one scholar stands out amongst the rest; Samuel Lothrop. His greatest contribution to Nicaraguan archaeology was the publication of a two volume set. A revised edition of Lothrop's 1916 Harvard dissertation, *Pottery of Costa Rica and Nicaragua* (1979[1926]) was the first book to systematically study both region's ceramic artifacts (Healy 1980).

Yet Lothrop did more than just write what would become the primary ceramic study of Nicaraguan archaeology until the late 20th century. As an archaeologist from the United States, Lothrop worked in Nicaragua, writing on stone statuary across Pacific Nicaragua, which he determined to be of Chorotega origins (Lothrop 1921). Unfortunately, Lothrop's work in Nicaragua did not spark an immediate interest in Nicaraguan archaeology until later, where the increase of archaeological pursuit was targeted to understand cultural affiliation in Greater Nicoya.

With the emergence of radiocarbon dating, ceramic sequences were linked to C^{14} dates, better cementing chronologies in the region. The joint efforts of Michael Coe and Claude Baudez resulted in the first archaeological sequencing of Greater Nicoya using radiocarbon dating and ceramic seriation (Coe and Baudez 1961). While Baudez excavated in 1959-1960 working along

the Tempisque River, Coe was excavating in the costal region of Guanacaste. Their collaboration resulted in the sequencing of the Zoned Bichrome ceramics in Costa Rica (Coe and Baudez 1961). This study identified four periods of ceramic production with dates following along Maya chronologies.

Other researchers in Pacific Nicaragua during this time included Gordon Willey and his student Albert Norweb. From 1959-1961, they excavated at multiple sites in the departments of Granada, Managua, Masaya, and Rivas under the Harvard Peabody Museum of Archaeology Project (Healy 1980, Norweb 1964). From 1958-1963, Haberland and Schmidt conducted excavations on Ometepe Island (Haberland 1963, 1992, Schmidt 1963). In their study, they extended the ceramic assemblage to date well before Coe and Baudez's Zoned Bichrome phase classification. They uncovered ceramic evidence of what they called the Dinarte phase, which they dated as early as 2000 BC (Niemel 2003).

Frederick Lange's work in Greater Nicoya introduced innovative theoretical and methodological considerations to the discipline. His dissertation in 1971 was based on field work from 1969-1970 in the Sapoá Valley of Costa Rica (Steinbrenner 2010). In this study, Lange introduced processual archaeology to Greater Nicoya, revolutionizing the manner in which archaeological research was conducted in the study region. In his dissertation, Lange's goals were to survey and map pre-Columbian occupations in the region, collect the surface materials, as well as stratigraphically collect the materials from the test excavation units in numerous contexts to achieve a regional overview (1971). This project moved Costa Rican, and by extension Greater Nicoyan, archaeology towards a more scientific discipline, a goal that had been started by Coe and Baudez's (1961) research in Costa Rica. Another significant scholar to Nicaraguan archaeology was Paul F. Healy, whose 1974 dissertation was based on the research

of Willey and Norweb. The dissertation discussed the archaeological research in Pacific Nicaragua, as pertaining to the department of Rivas.

During the 1980s, on the east side of Lake Cocibolca, two French archaeologists, Franck Gorin and Dominique Rigat, developed a chronology for the region, working alongside archaeologists from Nicaragua's Cultural Patrimony office (Gorin and Rigat 1987). From 1984-1987, they documented 98 sites, surveying 71 of them, and excavating at four of these sites for a better understanding of the cultural materials (Gorin and Rigat 1987, 1988). Their research identified cultural materials similar to those of the Greater Nicoya region in Guanacaste, the Nicoya Peninsula, and the Isthmus of Rivas, serving as the first confirmed indicators that Greater Nicoya extended to the east of Lake Cocibolca (Gorin and Rigat 1987, Steinbrenner 2010).

Archaeology of the 1990s and 21st Century

Beginning in the 1990s, researchers focus shifted to understanding Nicaraguan prehistory. The departments of Granada, Masaya, and Rivas were most heavily investigated with important studies of emerging sociopolitical organization, settlement patterns, economic systems, and ceramic studies. Silvia Salgado Gonzalez's dissertation in 1996(a) discussed the first formal regional survey of the Granada area in 1992-1993, identifying sites (including El Rayo) over an area of 204 km^2. Salgado Gonzalez's (1996a) goals were to refine a chronology of the study area and to understand settlement hierarchy within the region. She did this by assigning hierarchical tiers to various sites within the region which described the level of sociopolitical complexity within the site, based on its estimated size. For example, El Rayo, a site initially estimated to be 60 ha in area (Salgado Gonzalez 1996a: 118), was designated to be a second tier hierarchical site. This survey was later aided with an intensive survey and excavations at the Ayala site (on the

northern face of Mombacho volcano), relating it to Tepetate (a site just outside of Granada city) (Salgado Gonzalez 1996a). Subsequent studies of the site focus on the ceramic economy (Dennett et al. 2019).

This regional study was followed closely by Karen Niemel's (2003) study of the Rivas region, focusing on social change and migration. Her dissertation discusses the emergence of social complexity within the area through site settlement patterns of over 40 sites, dating this emergence to between 300 AD and 800 AD (Niemel 2003). The largest site identified during this regional survey, Santa Isabel, had been investigated previously by Willey and Norweb (Healy 1980). Finally, a settlement pattern survey of the Masaya department was conducted by Roman-Lacayo (2013), covering an area of approximately 293 km^2. This dissertation was meant to study the factors which caused social change over time within the area of study.

Other work within the Greater Nicoya region in the last few decades include the works of Geoffrey McCafferty and his students from the University of Calgary in addition to the collaboration from Universidad Nacional Autónoma de Nicaragua (UNAN) (McCafferty 2008, McCafferty and Steinbrenner 2005, McCafferty et al. 2010, McCafferty et al. 2012, McCafferty and Zambrana 2017), Larry Steinbrenner (2002, 2010), Carrie Dennett (2016), Jessica Manion (2016), and other's contributions (Debert 2005, Wilke et al. 2011). McCafferty's research over the last two decades has focused on issues of ethnicity within Pacific Nicaragua, looking for evidence of the Mesoamerican migrations, through the material culture. Primarily, his research has considered the Bagaces and the Sapoá cultural periods (McCafferty and Dennett 2013). One of the key issues which has been discussed throughout the course of his research is the problem of finding evidence supporting the Central Mexican migration to Nicaragua (McCafferty 2015).

Critical evaluations of the Santa Isabel site come from the thesis and dissertation of Debert (2005) and Steinbrenner (2010), who investigated the material remains of the site by means of lithics and ceramics. Research for these projects occurred from field research in 2000-2005. In Debert's (2005) thesis, a lithic analysis of the materials from the Santa Isabel Project discusses the finding of a new lithic tool, called the raspadita. This tool is believed to have been part of a grater which could have been used to shred root vegetables, such as manioc. Other dissertations which have derived from this project include Steinbrenner's (2010) stylistic approach to identifying ceramic economy in Rivas between the Bagaces and Sapoá phases, and Dennett's (2016) petrographic and Neutron Activation Analysis of ceramic pastes to identify constellations of practice between the Granada and Rivas departments.

Finally, the study of mortuary practice in Pacific Nicaragua has been examined by Manion (2016), McCafferty et al. (2019), and Wilke et al. (2011) on the Island of Zapatera (Sonzapote site) and the El Rayo mortuary complex. Manion's (2016) research at these sites focused on the reconstruction of mortuary practices of the Chorotega and how this has created a social memory. Social memory, in this context, means the active practice of individuals reiterating their cultural memory by actions, such as interment of the dead and the gifting of burial offerings.

Comparative Archaeological Sites

In **Chapter Nine**, El Rayo will be compared to other archaeological sites within the Greater Nicoya region. Based on this brief history of archaeology in Greater Nicoya, I will now incorporate those sites from Nicaragua which contain elements of architecture or possible monumentality. Nevertheless, there has been relatively little in the way of information recorded

and published on architectural features from the Greater Nicoya region, leaving the list of comparable sites short. Here, the sites of Ayala, Aguas Buenas, Los Angeles, Nejapa, Santa Isabel, Sonzapote, Tepetate, and Tisma are introduced, highlighting their architectural features. The architecture from the sites listed below date to the Bagaces and Sapoá periods.

[Figure 5.1: Site Map of Nicaragua]

Ayala

Ayala is located 8 km to the south of Granada city near the slopes of Mombacho volcano. Originally excavated by Norweb, the site was originally listed as three separate sites: Castilla,

Ayala, and Gonzalez, but later survey by Salgado Gonzalez resulted in the amalgamation of all three sites into Ayala (Salgado Gonzalez 1996b). During its occupation, Ayala was the largest nucleated site in the region during the Bagaces period until 800 AD. Ayala was a major producer and distributor of ceramics, including the Papagayo Polychrome type in the Sapoá period (Dennett et al. 2019).

During the Bagaces phase, one domestic structure measured 4 x 4 m with aligned stone foundation, though the perimeter had been disturbed by recent plowing within the area. No post holes were found around the structure, likely due to the soft and darkly coloured soils at the site (Salgado Gonzalez 1996a). The floor was a 5 cm thick packed earth with a fine layer of sand strewn on top, and the walls may have been a form of wattle and daub, based on the associated bajareque around the structure. The bajareque was well preserved and possessed the imprints of *Gynerium sp.* cane indicating this as the wall building material (Salgado Gonzalez 1996).

Aguas Buenas

North of Juigalpa by 3 km, Aguas Buenas is a site known for the large number of mounded features (Geurds and Terpstra 2012) and 116 known petroglyph motifs (Vlaskamp 2012). Aguas Buenas was first visited by French archaeologists Rigat and Gorin in the 1980s, looking at surface collections of artifacts in the area (Geurds and Terpstra 2012). Recent studies at the site have revealed that it is the largest site in the region by size and number of mounded features (Vlaskamp et al. 2014). This site has been considered to possess monumental characteristics, particularly in its site planning and organization. Over 500 mounds, both earthen and stone, have been identified and mapped out, revealing a site plan of concentric semi-circles in parallel rows (Geurds and Terpstra 2012: 51). The mounds range between 6-18 m in diameter

on platforms up to a height of 5 m (Geurds and Terpstra 2012). In the centre of the concentric semi-circles, there were 25 mounds set in a rectangular alignment (Geurds and Terpstra 2012). Only five of these mounds have been excavated (Vlaskamp 2012).

Los Angeles

Los Angeles is located on Ometepe island, southwest of the Concepcíon volcano. This site was visited by Bransford in the late 1800s. The Los Angeles site demonstrates monumental characteristics in large mounded features with stone faced borders (Bransford 1881) and stone statuary. Bransford describes the primary mound excavated: "on a hill about a quarter of a mile southeastward of the village [of Los Angeles], and nearly half a mile from the lake, was a mound five feet high and thirty feet across the base. It was quite regular in form, with round base, sloping sides, and flat top. There were quite large trees growing on it; and in the centre of the top was a sink, which may have been due to the uprooting of a large tree or to excavation" (Bransford 1881:60). After trenching from the northern face into the centre of the mound, Bransford (1881: 61) records that there was a row of flat slabs of stone forming an enclosure around the mound. These stones were unworked and set in place without any form of grouting to hold them.

Nejapa

The Nejapa archaeological site, spanning approximately 15 ha, is a part of southwest Managua and is adjacent to the Nejapa Lagoon. It is a poorly preserved site, due to the recent residential construction and activity, however, in contains a significant number of mounded features. Initially, there were 18 mounds documented, though some of these have since been

disturbed by construction projects (Lechado 2017). Of the 18 mounds, Mound 1 and Mound 5 have been excavated in recent years. These mounds are circular structures with stone basalt slab perimeters, arranged vertically (Balladares and Lechado 2011, Lechado 2017, Lechado et al. 2013). Mound 5 had an internal diameter of 10.1 m, while Mound 1 had a diameter of 12.4 m (Balladares and Lechado 2011). These mounds were determined to be domestic in nature, with signs of hearths being located within the structures and strewn material culture on the floors (Balladares and Lechado 2011).

Santa Isabel

Santa Isabel was first excavated by Gordon Wiley and Albert Norweb in the 1950s (Healy 1980). Located in the Rivas department, it is a large site, spanning over 270 hectares. Architectural remains recently excavated by McCafferty, were evaluated along with the ceramic chronology (McCafferty 2008). The site displayed particularly good preservation of carbonized wood samples which resulted in 17 radiocarbon dates (McCafferty and Steinbrenner 2005). The mounded platform structures, of which there are 40, did not display stone architecture, but represented well preserved floors and large dimensions.

The house mounds were measured to be between 1-3 m in height and ranged in diameter (McCafferty 2008). Of these mounds, Mound 1 is the largest, and was excavated by Norweb (1964), Niemel (2003), and McCafferty (2008). The mound features a walking surface in association with a wall foundation (McCafferty 2008). In total, Mounds 1, 2, 5, 6, and 8 were excavated by McCafferty and team (2008). With regards to the floors, they were often packed earth, with grey inclusions of compacted sand. One floor contained embedded ceramic sherds in a pattern which looked to have been a paving attempt within the mounded structure (McCafferty

2008). As McCafferty states regarding the overall examples of mounded architecture at Santa Isabel, “the ubiquitous domestic debris indicates that these mounds were primarily residential in nature and probably not the result of large scale architectural investment” (2008: 69).

Sonzapote

Sonzapote is located on the northeastern shore of Zapatera island, in Lake Nicaragua. Sonzapote features numerous examples of architecture, petroglyphs, and stone statuary. It is also a mortuary site, with numerous human remains (Manion 2016, McCafferty et al. 2017). While much of the stone statuary today is displayed at the Ex-Convent San Francisco museum, fragments still remain at the site. Sonzapote possesses many similarly styled architectural examples to the Locus 4 structure at El Rayo, as well as large circular mounded features.

The site featured 17 mounded features, along with the stone statuary and petroglyphs spread throughout the site. Of these, 11 mounds were mapped by McCafferty and team (Manion 2016). Sonzapote’s architectural features can be tentatively considered monumental in nature, given their similarities in form and size to the monumental ER-S3 at El Rayo (which will be discussed in **Chapter Eight**). The largest mound (Mound 14) at Sonzapote measured 22 x 12 m (Manion 2016). Mound 8’s stone architectural feature was stacked vertically to create the mounded platforms foundation.

Tepetate

Tepetate is an estimated 244 ha extending north of modern day Granada City along the shore of Lake Nicaragua (Carmack and Salgado Gonzalez 2006), but due to severe looting many of the remaining architectural features have been destroyed (Salgado Gonzalez 1996a). In

Salgado Gonzalez's study (1996a) 10 domestic mounds were identified as surrounding a central plaza, demonstrating site planning and organization. Tepetate structures have been hypothesised to have been constructed with palisade walls, with rows of rocks outlining them (personal communications with Geoffrey McCafferty, 2019). Mound 1 was the largest feature at the site, on a 1.5 m platform with a diameter of 30 m (McCafferty 2009). Though badly disturbed by looting and modern activity, evidence of wall structures as well as a stone paved floor, known as a talpetate floor (conglomerate bed rock which hardens with exposure to air), was uncovered (McCafferty 2009).

Tisma

Tisma is a municipality with a rich archaeological history, and a part of the Masaya district of Nicaragua. This area has a range of small archaeological sites, with a history stretching back to the Orosí period. It is proposed to be either a buffer zone or a land bridge between culture groups (Roman-Lacayo 2013). The area has been heavily looted for ceramics, jade pieces, and gold (Roman-Lacayo 2013). Domestic mounds were generally 4-9 m in diameter during the Bagaces phase, though these structures decrease in size and were constructed closer together during the Sapoá period (Roman-Lacayo 2013). These mounds did not demonstrate evidence of stone architecture, not exhibiting signs of an elite ruling class, as the material culture was non-elaborate in nature (Roman-Lacayo 2013).

Summary

Beginning with humble origins of regional exploration, archaeology has progressed a significant distance from those 19th century expeditions. These early research projects focused on

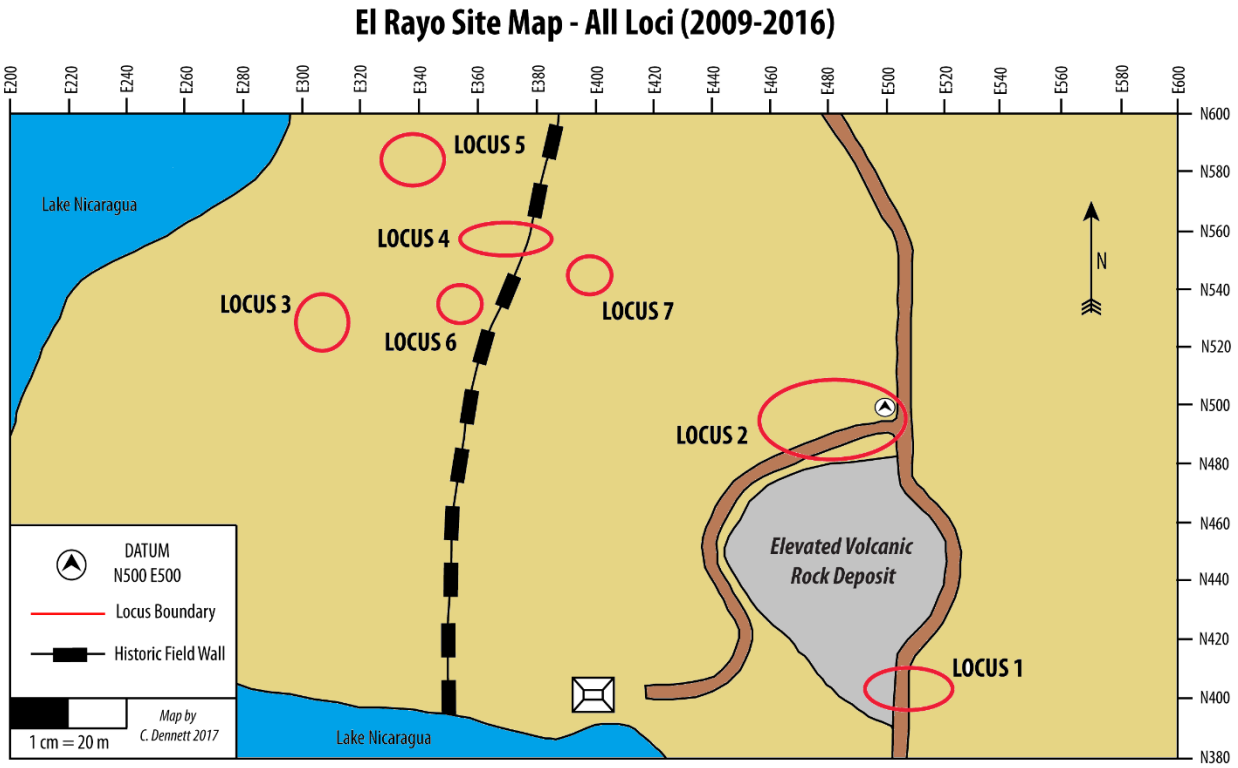
acquiring museum pieces and documenting the locations of sites, which led to mass looting of Nicaraguan archaeological sites for rumoured gold artifacts and salvageable urns. During the 20th century, research goals changed from the collection of materials to understanding the Mesoamerican influence (and to a lesser extent that of the Andean civilizations) upon the peoples of Nicaragua. After the 1950s, more scientific studies of Greater Nicoya emerged, to create ceramic chronologies and employing the use of radiocarbon dating.

It was not until the work of Lange that there was a shift in theoretical orientation (processual archaeology) and a change in ideas of Mesoamerican domination over the Greater Nicoya region. Research has since become oriented to Nicaraguan innovation, studying economy, mortuary practice, settlement patterns, and sociopolitical organization. These studies have taken archeology in Nicaragua into a new direction of research answering bigger questions of ethnic identity in the region. But where does this leave the study of monumentality in Pacific Nicaragua? Typically, there has been minimal studies of architecture within the region. By being able to determine the presence or absence of monuments within Nicaragua, future research will be able to evaluate the significance of monuments within the culture groups of the culture region, determining why they were constructed.

Chapter 6: Methodological Approaches

When analysing a given data set, the methodologies applied to the data's collection are an important point of consideration. Methods must be selected based on the research questions posed (Maschner 2005). The best methods are those with strong links between technique, method, and theory. They detail the steps a researcher has taken, both in the field and the laboratory to achieve viable results. As a part of the PAGN project, architectural features were excavated, photographed, mapped, and measured over the course of four field seasons. Artifacts excavated in the field were analysed in the laboratory, while carbon samples were taken for radiocarbon dating at Beta Analytics. As such, this chapter has been divided into two sections: Field Methods, subdivided by each field season, and Analytical Methods, including laboratory methods and chronology.

Over the course of the four field seasons excavated at El Rayo, 7 loci were excavated, of which loci 2, 3, 4, 6, and 7 demonstrated architectural features. Locus 1 was a dedicated cemetery area, with no architectural remains. Locus 2 was a mix of architectural features and burial elements, with retaining walls, structures, and a potential memorial feature present, as well as a ritual episodic feasting area dating to the Bagaces and Sapoá period. Locus 3 was primarily a dedicated cemetery, with a potential memorial related to ancestor veneration. Locus 4 was one of the larger loci, containing a large rectilinear structure and a surrounding area which had been raised and leveled out with earth and retaining walls. Locus 6 was a small area featuring a potential memorial and small open-aired structure. Finally, Locus 7 contained a cache box to the



[Figure 6.1: Site Map of El Rayo, Map by Carrie Dennett]

southeast of the Locus 4 structure. Overall, the goals of the PAGN project were to determine if there was evidence of the Mesoamerican migration into the region, through ceramic and mortuary evidence, as well as to understand the architectural features of the site.

Burial Elements of El Rayo

As El Rayo is a mortuary complex, an overview of the individuals excavated from the site will be introduced. Burial elements were recovered from 2009, 2010, and 2015. In total, an MNI of 27 was recovered, with ages ranging from fetal to adult (Manion 2016, McCafferty et al. 2019). 15 of the individuals were aged as adults. Burials at El Rayo occurred between the

Bagaces and Sapoá periods and demonstrated a transition in mortuary practice between these periods. Bagaces period burials were characterized by extended and flexed primary

[Figure 6.2a, 6.2b: Examples of Bagaces Period Primary Flexed Burials from Loci 1 and 2, Photography by Geoffrey McCafferty]

deposition interments, while the Sapoá burials are typically secondary in nature, with individuals being placed in or surrounding 'shoe-pot' urns (Manion 2016, McCafferty et al. 2019, Wilke 2012, Wilke et al 2011). These vessels are asymmetrical, elongated urns with the orifice located at one end, and resemble a shoe. Bagaces period primary burials were located at Loci 1 and 2, while Sapoá period secondary interments were found at Loci 1, 2, and 3. At Locus 2, only one Sapoá period burial urn was encountered, located at Operation 4.

Excavations were contained to a small area. The Locus 1 cemetery complex was a great deal broader, extending to the south and east of the naturally formed mound on which Locus 1 was located. In total, nine burials were recorded from the locus (Wilke 2012), including both Bagaces and Sapoá period burial elements. Urn burials were the most frequently encountered,

possibly indicating that the section excavated was more frequently used in the Sapoá. Vessels encountered (as grave offerings) included *ollas* and Sacasa Striated urns (Manion 2016, McCafferty et al 2019). The high frequency of Sacasa Striated urns is an important characteristic throughout the site, as high frequencies of these sherds were found, most notably at Locus 4.

Locus 2 contained the lowest frequency of burials. Multiple Bagaces burials were encountered, spread throughout the area. One burial was so deteriorated that it was not removed from context (personal communications with Geoffrey McCafferty, 2019). A Sacasa Striated

[Figure 6.3a, 6.3b: Examples of Sapoá Period Secondary Burials from Loci 1 and 3, Photography by Geoffrey McCafferty]

'shoe-pot' was also excavated, on the west side of a structural wall at Operation 4. However, this vessel did not have any human remains. Most notable at this locus was the excavation of a fetus from a midden context, demonstrating possible cut-marks on a diaphysis (McCafferty et al. 2019).

Locus 3 was another large cemetery area of Sapoá period urn burials. These were found, upon excavation, to be at a high density. Some burials were located beneath a stone platform (referred to as Architectural Feature 7 in **Chapter Seven**). The architectural feature was removed to access the burial elements. Most remarkably found at Locus 3 was a copper bell, similar in style to Costa Rican gold bells, and associated with burial 15 (Wilke 2012).

Field Methods

Standard field methods were used throughout the four field seasons. Excavation of the site used trowels, shovels, 5-gallon buckets, dustpans, an assortment of brushes, wooden and metal picks, tape measures, cord, line-levels, 5 x 5 mm wire mesh screens, plastic bags, and aluminium foil. All architectural features were measured and photographed. Measurements took the length, width, and height of rocks within feature walls and were used in scaled drawings of the features. All sediments were sieved using a 5 x 5 mm wire mesh screen to locate smaller artifacts in the initial excavation. Soils were back-filled into the excavation units at the end of each field season.

2009/2010 Field Seasons

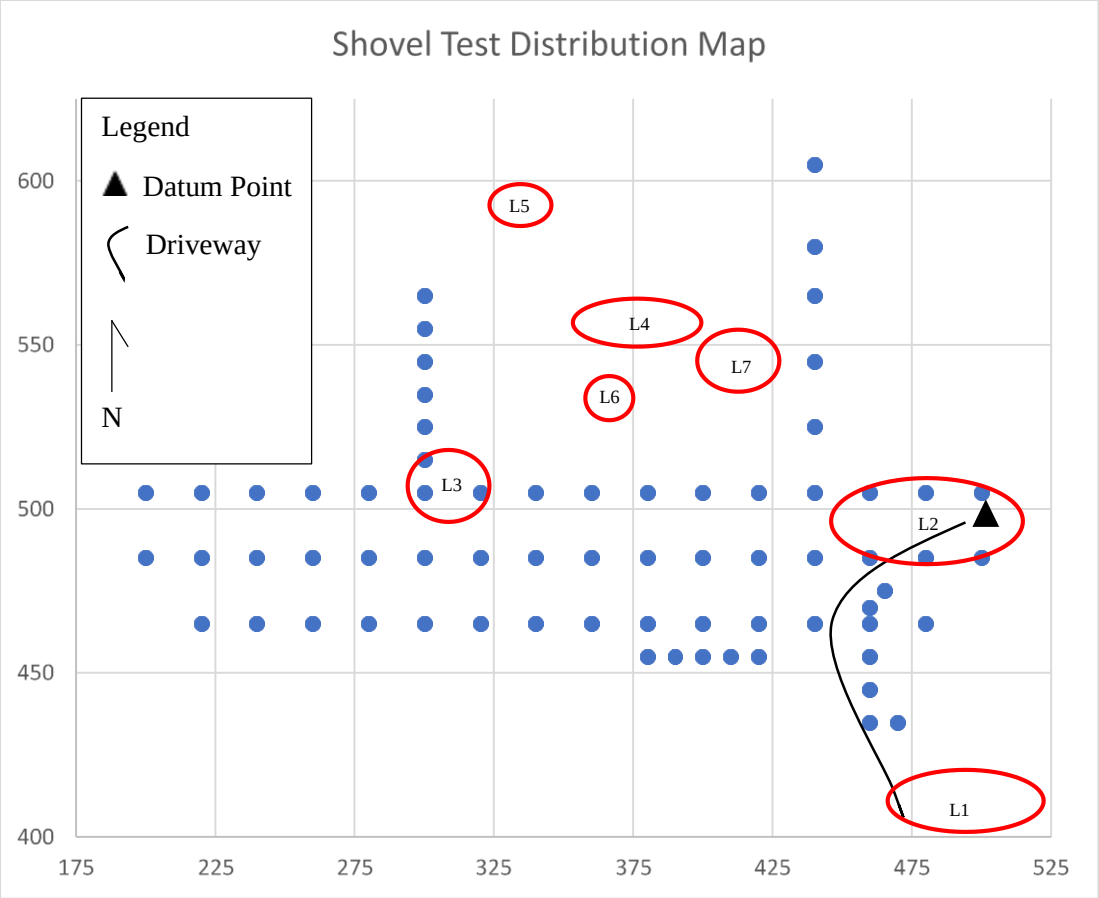
The PAGN 2009 and 2010 field seasons, were scheduled during the month of July and the beginning of August of both years. The project was funded by the Social Sciences and Humanities Research Council (or SSHRC) grant. Although I was not a part of the original team of archaeologists working during 2009 and 2010, the architectural features excavated from this period of time are included in the present data set. The primary objective of the 2009 field season was to explore the eroding archaeological deposits from a road-cut, identified by the team on a

trip to El Rayo in 2008. This road-cut revealed a portion of the burials at Locus 1. Over the two seasons, three loci were excavated at El Rayo. Locus 1 was located and identified along the aforementioned road-cut, while Loci 2 and 3 were identified through shovel testing, conducted in the 2009 season. Excavations of all three loci were conducted during both field seasons. For the site datum point, the edge of a large boulder was used, located at the entrance to the Salablanca's property designated as N500, E500 (within the boundaries of Locus 2). A datum triangle symbol was carved into the edge to maintain accuracy when laying out transect lines.

Shovel Testing Work

One of the primary objectives to the 2009 season was to shovel test the site of El Rayo. Locus 1 was the first to be identified, and excavations commenced while the rest of the site was shovel tested. Over the course of 2009, 68 test pits were dug, probing for artifacts and architecture. Test pits were approximately 50 cm in diameter and up to 1 m in depth. The shovel testing started in Locus 1, over the road-cut mound, and towards the lake shore at 10 m intervals. Nearly all of the Salablanca's property north of the family driveway was shovel tested. Survey work was rewarding, with the identification of multiple loci which were subsequently excavated. Further shovel testing was carried out during the 2010 field season.

A team of two individuals laid out transects from north to south over the Locus 1 area. Further transects were then laid out into the Locus 2 area. Locus 2 (located at coordinates N510/E460; N510/E500; N480/E460; N480/ E500) was identified along the driveway to both the north and the south by the high frequencies of ceramic, lithic, and faunal materials. Along these transects the team would excavate test pits every 10 m, screening the soil for artifacts. After



[Figure 6.4: Shovel Test Distribution Map at El Rayo, 2009]

bagging and tagging artifact assemblages collected from the screening process, soil was then returned to the excavated pit. From Locus 2, teams were then sent out on east to west transects towards the lakeshore, discovering Locus 3 (located N535/E295; N535/E315; N520/E295; N520/E315) by the presence of subsurface remains. In areas of concentrated artifacts, primarily at Locus 2 and its periphery, shovel tests were excavated at a higher frequency than 10 m intervals to pinpoint significant areas to focus excavation. In 2010, further test pits were dug along a north-south transect, and into the area which were subsequently identified as Loci 4 and

5. As Locus 1 did not demonstrate architectural features, only Locus 2 from the 2009/2010 field seasons will be described in this section, while the architectural data from Locus 3 will be discussed in the 2015/2016 section.

Locus 2

Four operations were excavated at Locus 2 in 2009, and four additional operations were excavated in 2010. All operations were superimposed onto a grid allowing each unit excavated to be given a north-easting location, which was then mapped onto an overall site map. Based on the high artifact frequencies from the materials excavated in the shovel testing and the subsequent excavation, Locus 2 was initially interpreted as a residential area, though later considerations have challenged this. Operations were excavated with 1 x 1 m units and dug in arbitrary 10 cm levels until sterile soil or architectural features were exposed. One architectural feature excavated at this locus was thought to be a retaining wall. This was primarily excavated in Operations 4 (2009) and B (2010), excavated extensively to determine the direction in which the rock retaining wall was aligned.

2015/2016 Field Seasons

The PAGN 2015 and 2016 field seasons occurred during the veranillo month (a short lapse of rainfall during the rainy season) of July, and into the first week of August. They were scheduled accordingly to the availability of archaeologists, students, and to avoid extreme rain conditions during the summer months. For these two seasons, work was sponsored by the Institute for Field Research, which involved a field school for international students to excavate at El Rayo. Work once again was divided into two parts: excavation and laboratory studies.

Mornings consisted of excavation followed by afternoons working in the lab at Mi Museo, a privately owned collection of Greater Nicoyan ceramics. The 2015 and 2016 field seasons included a large array of international researchers, as well as groups of students from various institutions. Archaeologists from Canada, the Netherlands, and Nicaragua helped to achieve the goals of each field season. During both seasons, members of the Salablanca family were employed as field workers.

The primary objectives for the 2015 season were to both uncover more of the burials at Locus 3, which had been excavated during the 2009 season, and to excavate more areas to further clarify site function. Locus 4 was a newly excavated part of the 2015 season. At first this looked to be a small mounded platform, but the abnormal size and form were unique to the site and in fact all of Nicaragua. Locus 5 was also excavated in the 2015 season. This was initially suspected to be a domestic mound, but it was exposed as a natural earthen hill, containing few cultural materials. The 2016 field season began with the objectives of locating a corner to the structure at Locus 4, as well as opening new loci on other potential structural features, including Loci 6 and 7. Locus 6, first assumed to be a burial area, revealed straight stone slabs arranged into what appeared to be the foundation of some form of structure. Locus 7 had two stone features: one disturbed by bioturbation but the other in relatively good condition. Excavators also returned to Locus 2, first excavated in 2009, to continue research on the possible domestic features at the site.

Locus 2

After being excavated in both the 2009 and 2010 field seasons, and previously being identified in 2009 by shovel testing, Locus 2 was re-opened during the 2016 field season.

Excavation here consisted of numerous individual 1 x 1 m unit operations to continue exploration for architectural features as well as artifact assemblages. Intact vessels were pedestalled in situ, and later removed carefully from the excavation pits. At this locus, multiple examples of architecture were uncovered, including a monumental feature, retaining walls, and structures. Primarily, this locus demonstrated evidence of episodic feasting during the Bagaces period, with associated middens of faunal remains, middens of ceramic sherds, and in situ decorative serving ware vessels.

Locus 3

Locus 3 was primarily a burial area, associated with a stone architectural feature. This area was mainly comprised of secondary urn burials. However, in one operation of Locus 3, there was a platform of flat stone slabs, which might have been a staging area for the burials (Manion 2016). This stone platform was disturbed by bioturbation, particularly from the roots of trees in the surrounding area. At the time of excavation, the purpose of excavations was to identify burial elements, resulting in the further disturbance of the stone platform as rocks were removed to excavate beneath for burials. Overall, there was not a lot of time spent examining the stone platform of Locus 3.

Locus 4

The identification of Locus 4 (N560/E350; N560/E390; N550/E350; N550/E390) was based on previous shovel testing in the area, surface indicators (typically ceramic artifacts), and consultation with the landowners. The excavations at Locus 4 during the 2015 field season were divided into two operations, (Op. 1 and Op. 2). All units excavated were on a north-easting grid

in alignment with the grid established in 2009. Operation 2 was located at N555, E370, and was a 1 x 1 m exploratory pit within the boundaries of the architectural feature's floor plan. The purpose of this unit was to recover cultural materials and to locate a walking surface within the structure. Three arbitrary levels of 10 cm were excavated in Op. B, with excavation ceasing after exposing a sterile soil surface.

Operation 1 was positioned along the northern facing wall of the mounded platform; this operation's goal was to uncover the stone remains of the platform wall. The 2015 field season used excavation units of 1 x 1 m, running east to west along the wall. Units uncovered a small array of cultural materials, including ceramic sherds, lithic flakes, and faunal remains. A double row of stone slabs was uncovered, which had been disturbed over time by agriculture and bioturbation. Multiple walking surfaces were uncovered. Initial estimates of the mound were of a small area, given the limited visibility of the raised stones through the underbrush, but with further excavation, the architectural feature soon appeared to be much greater than initially hypothesised. In total 27 units were excavated in Op. 1.

In 2016, excavators returned to Locus 4 with the intention of excavating the northeast corner of the architectural feature. Two operations were excavated, (Op. A and Op. B) continuing along the hypothesised line of the wall based on the 2015 excavations. The wall was nearly aligned perfectly in an east-west line (7º south of west, or 263º). Op. A managed to hit the corner as estimated based on the visible rocks on the surface, while Op. B overshot the structure's boundary too far to the east. An excavated trench perpendicular to the Locus 4 north wall indicated that the structure did not continue to the other side of the historic field wall.

Locus 5

Locus 5 (N590/E325; N590/E345; N580/E325; N580/E345) was identified by the landowners and through shovel testing in 2009. It was excavated in the last week of the 2015 season. Locus 5 was hypothesised to be a secondary mounded platform adjacent to Locus 4, but excavation at the site turned up no architectural features. This locus was trenched with five 1 x 1 m units, with one branching 1 x 1 m unit on the northern face of the trench. Units were aligned to the grid established in 2009. Artifacts uncovered from this area included lithic and ceramic elements. Of note, there were three large stones at the base of the mound which may have been a part of a continuing line of stones forming a retaining wall at the base of the mound, but no further excavations continued at this locus.

Locus 6

Locus 6 was excavated in the 2016 field season. It is situated east of the cemetery at Locus 3, and to the south of Locus 4. The site was originally identified by several large rectilinear rocks protruding from the ground surface, reminiscent of Sapoá period burial tombs. This was initially hypothesised to be a prestige grave. However, excavation quickly uncovered the foundation of an architectural feature. 18 units were opened at Locus 6, none revealing burial evidence. There were three operations established for the excavation. Op. A, focused on the primary cluster of rocks, and the interior of the structure. Op. B followed along the southeast alignment of stones to uncover a wall foundation. Op. C was located outside of the structure to determine its dimensions and possible activity patterns.

Locus 7

At Locus 7, on the opposite side of a historic rock wall from Locus 4, there were visible standing stones on the surface. In 2016, this area was designated as Locus 7 and excavations proceeded to expose two of the small architectural features. Locus 7 was an artificially modified hill with a retaining wall along the eastern edge to create a flattened ground surface. The hill was a part of the raised platform on which the Locus 4 structure is located. Two features were identified, consisting of stone alignments for small architectural units. Feature 1 was the best preserved, and most thoroughly investigated. It consisted of two rectangular chambers, each measuring about 1 x 0.5 m and delimited by upright stones. These chambers were capped with large flat stones. Removing the capstones revealed a dense layer of cobbles, and beneath them was a 1 m deep deposit of loose dirt. Whereas the initial interpretation was that these were burial crypts, no human remains were encountered.

Analytical Methods

Laboratory Methods

There were three main components to laboratory work: artifact cleaning and inventory, artifact cataloguing, and artifact analysis. For the last week of the field seasons, attention was entirely focused on lab work, with no excavations taking place. Following the in field laboratory work, C^{14} data was collected and further analysis of the collected artifact data was conducted. Below are the detailed descriptions of laboratory methods as pertaining to the loci described in this thesis.[4]

[4] For a detailed record of the osteological study of the burial remains at El Rayo, see Manion 2016.

Inventory and Artifact Cleaning

Artifacts were collected and bagged according to a sorting guide known by all field workers. Artifacts were sorted by class, and groupings of artifacts from the same level were bagged together. Each bag of artifacts contained labels specifying the year, date, excavators, locus, operation, unit number, and level excavated. These sorted artifact class bags were then put into a larger bag to keep track of all objects excavated from a specified level. When a level took multiple days to complete, the bag tags were marked with the number of artifact assemblage bags in total (e.g., 1 of 2, 2 of 2). Ceramic artifacts, lithics, and miscellaneous items were placed into plastic bags, while faunal remains, osteological remains, carbon samples, shells, and seeds were wrapped in an aluminium foil packet before being bagged in plastic. This specified bagging guide helped to consistently label artifact classes, protect them from damage, and keep record of the locations of these cultural materials.

After bringing artifacts into the lab, the artifacts were cleaned and inventoried. Different artifact classes were handled and cleaned using methods designed to maintain the material's integrity. As excavations took place during the wet season, artifacts were often coated in wet soil, and as such needed to be dried for proper cleaning. Most materials were dried for a day or more before cleaning, while others were able to be cleaned the same day they were taken out of the field. Osteological, faunal, seeds, shells, carbon samples, and lithics, were set out on drying racks to air dry, preventing mold growth and further disintegration of materials. While drying, these materials were kept with their identifying bag tags to keep track of the loose artifacts. Lithics were air dried before cleaning to make the brushing off of soils easier in the following days. All artifacts were counted by type before being labeled and recorded within the artifact inventory.

Ceramic materials were washed upon arrival in the lab, each sherd being carefully brushed clean of mud using fingertips on painted or slipped pot sherds, after being soaked in a bucket of clean water, so as not to remove any remaining painted detail which had been made fragile after years of submersion within soil. Toothbrushes and nail brushes were used carefully on plainware sherds, so as not to erode the sherds edges, or to striate the edges with bristle grooves. The potsherds were then counted by overall quantity and placed on drying racks to air dry over night, before being bagged in a clean plastic bag once again for future labeling.

Any whole ceramic vessels excavated in the field were taken to the lab with the dirt still remaining within the vessel to be sifted within the lab setting to retrieve any materials which might have been inside the vessels, with the exception of burial urns found at Locus 3. The sieve used was a fine plastic mesh. As stressed by Ellis,

> "if a whole vessel, or a significant part of the base of a pot, is excavated, one should seriously consider not emptying out the soil contents. Retaining the soil inside the pot can allow one to analyze the residues for information about the original contents of the vessel" (2014: 213-214).

Small excavation tools, including metal picks and brushes were used to remove the contents from the vessel carefully, and sifted, and in one instance, the contents were floated, to recover any materials. The dirt at the bottom portion of the vessels was left for future research and potential residue sampling.

Lithics were dried prior to cleaning. In the event of future residue sampling conducted on the lithic artifacts, all lithics were dry brushed using a toothbrush to remove the majority of the dirt clumped to the surface, though the remaining dirt was left as it could contain residues for analysis as suggested by Fullagar (2014). A soft toothbrush was used to prevent additional

striations which might be misinterpreted in any future microanalysis. Lithics were then tabulated by quantity, and inventoried, then resealed in a clean bag with a site tag. In 2015 and 2016 two separate lithic analyses were conducted by students, to determine material and flake size and type.

Osteological and faunal remains, after drying for 1-3 days (depending on the daily humidity), were cautiously cleaned of dirt using wooden picks, rather than washing with cool water, to prevent additional damage to remains. An inventory of presence or absence of human remains, and faunal bones was recorded, with a more detailed analysis being recorded later on. Carbon samples were resealed after drying and inventoried as present or absent in each level. Only charcoal samples large enough to undergo ^{14}C dating were collected. Seeds and shell materials were cleaned in a similar manner to the faunal and osteological artifacts, using wooden picks to scrape off dried soils, then inventoried as present or absent. No analysis of the seeds has yet been conducted.

Labelling and Cataloguing

Following the cleaning and drying stages of the lab work, the artifacts were labelled. For ceramic artifacts, labelling was conducted using liquid white out and a black permanent marker. Labels on ceramics were placed in inconspicuous locations, such as on the inside wall of ceramic sherds, or the underside of an applique. To prevent the erosion of the labels, researchers avoided placing them on the broken edge of sherds. Due to the size of faunal and lithic artifacts, labels were placed on a paper tag within a sealed bag to identify the grouping of artifacts with the site information. Following the labelling, the artifacts were catalogued. Carbon samples maintained their tags from the field.

Cataloguing artifacts is a multistage technique which is used to describe the artifacts found in such a manner that can later be interpreted. “The catalogue not only creates an inventory of the artifacts for management and curation purposes, but also serves the equally important goals of analysis and interpretation” (Lawrence 2014). Artifacts were catalogued by artifact class, quantity, and specific features of the piece being analysed. The artifacts of primary interest during the field seasons were the ceramic artifact class, osteological remains, faunal remains, and lithics.

Ceramics were divided into initial categories: complete or partially complete vessel, rim sherd, body sherd, base sherd, applique, figurine, ceramic objects, ceramic ball, spindle whorls, or ear spool. The rim sherds were then further separated into three main categories: polychrome, Castillo engraved, and plainware. Once separated, the utilitarian rim sherds were sorted into similar rim forms. Rim sherds were measured by orifice size, type of lip, and type of slip to look at vessel form frequencies at the site (Rice and McCafferty 2016). Decorated rim sherds were analysed with the painted body sherds, along with the decorated bases. Body sherds were separated into three categories, painted, slipped, and plainware. The painted category was further analysed by stylistic qualities. Applique and figurines were drawn and detailed within the catalogue.

Chronology

The site of El Rayo was dated using a combination of absolute dating and relative dating, including stratigraphic data. Ceramic evidence was compared to previously established ceramic sequences to aide in dating the site. The absolute dating method used, from the 2009 and 2010

Sample ID	14C Date (Before Present)	Σ-1 Range	Σ-2 Range
β-265450	1230±40	710-870$_{AD}$	680-890$_{AD}$
β-265451	1220±60	690-890$_{AD}$	660-970$_{AD}$
β-265453	1030±50	980-1030$_{AD}$	900-1140$_{AD}$
β-265454	1430±40	600-650$_{AD}$	560-660$_{AD}$
β-265459	960±40	1020-1150$_{AD}$	1020-1170$_{AD}$
β-265462	1360±40	650-670$_{AD}$	620-690$_{AD}$
β-265463	1220±40	720-880$_{AD}$	680-890$_{AD}$

[Table 6.1: AMS Radiocarbon dates from El Rayo 2009/2010 Field Seasons, Data for table compiled from McCafferty 2010]

field seasons was radiocarbon dating. The samples were sent to Beta Analytic where they performed the accelerator mass spectrometry (AMS) method of dating the carbon samples. Some of the benefits of AMS radiocarbon dating over radiometric dating include: the reduction of time taken to run each sample[5], smaller sample sizes required to produce accurate results, and a higher precision frequency of results with reduced background interference (Beta Analytic 2019, Taylor and Bar-Yosef 2014).

In total, seven viable samples were dated, indicating a range of dates spanning the late Bagaces to the Sapoá periods. These dates were used in association with the ceramic evidence to represent the transitional period between the Bagaces and Sapoá at approximately 800 AD. Three

[5] It takes only a few hours to run an AMS sample after the pre-treatments, whereas other radiometric methods take 24 hours or more time to run each sample, making the AMS a preferable, yet more expensive option.

of the carbon samples span across the transition phase, two mark the late Bagaces phase, and two mark the Sapoá phase. Overall, the dates span from 600-650 AD to 1020-1150 AD, making El Rayo significant for its demonstration of this transition period.

Architectural Energetics

In **Chapter Eight**, an architectural energetics project was conducted on the Locus 4 structure, as well as other comparative structures from El Rayo. In order to complete this task, the methodology from Abrams (1989) and Abrams and Bolland (1999) were used. In this multistep process, materials area calculated to complete a given structure in terms of labour-days per person. The first step was to deconstruct the structure into tasks and materials required to complete the structure (Abrams 1989). Next, a volumetrics assessment is completed, in which each materials volume is calculated. This is a difficult and often inaccurate task as most structures are incomplete or are misrepresented in the archaeological record. The calculation of materials was compiled into a table for easy comparison. The next step was to determine the behavioural tasks and life histories of the structure (Schiffer 1976) through the formation processes of the structure's construction.

After determining the steps and quantities of materials which would be required to complete the structure, a life history flow chart is then created to depict the manufacturing of materials, transportation of materials, and construction with the given materials (Abrams and Bolland 1999). Next, the taskscapes (Hildebrand 2013) are considered. Thesis include all tasks which are required to create the structure, including the tasks required to support the workers (such as food procurement), the roadways or transportation features which were required to move materials, and the activities surrounding the structures construction itself. Finally, the tasks

by quantity of materials, are converted into an estimated labour-days per person, based on the estimates of the amount of work an individual could do in a day.

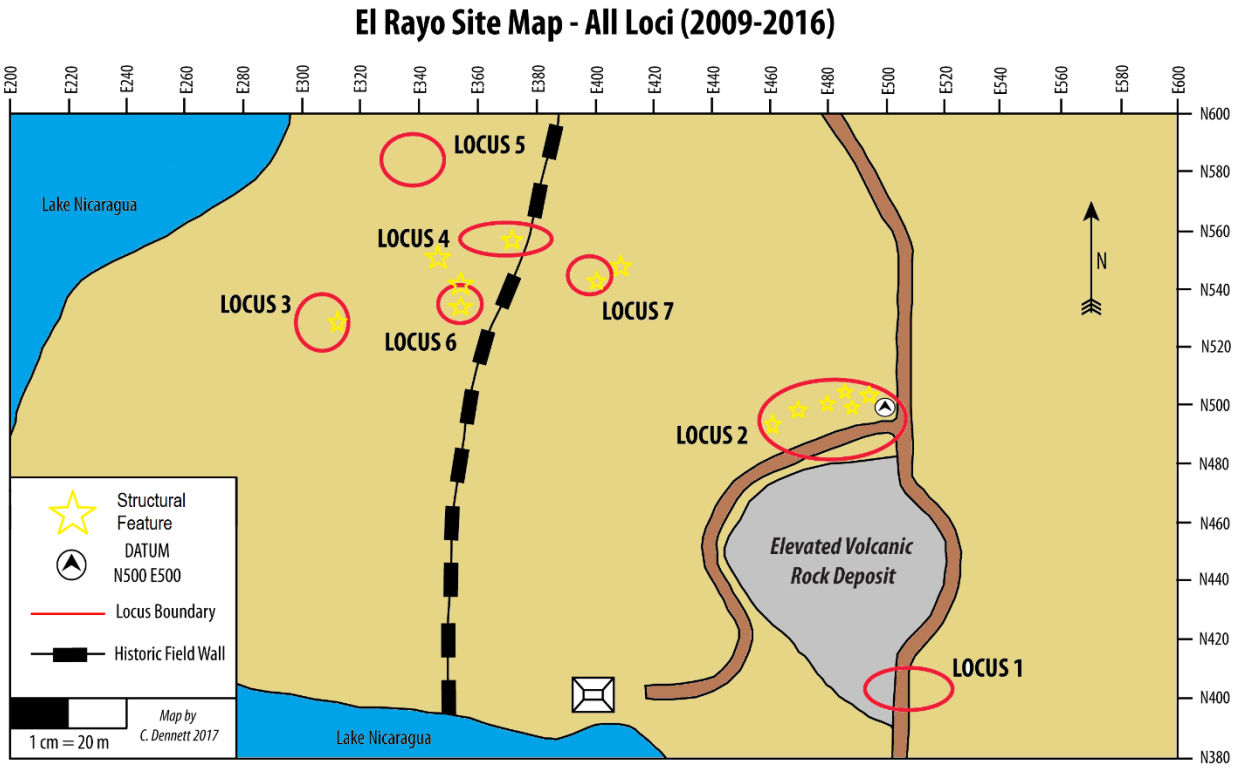
Summary

Over the course of four field seasons, El Rayo has been surveyed, excavated, mapped, photographed, and the material culture found have been catalogued for the most complete overview of the site. Of the seven loci excavated, six loci exhibited architectural features. Shovel testing was used as the primary discovery strategy, along with the suggestions of the landowners. These techniques located numerous loci which were subsequently excavated from 2009-2016. After the conclusion of the 2010 field season, numerous examples of charcoal were submitted to Beta Analytics to get radiocarbon dates of the site. These were used in conjunction with the excavated ceramic sequence to date the site of El Rayo to the Bagaces and Sapoá phases. In the following chapters, the results of the excavation along will be discussed in relation to monumentality, and later compared to sites throughout Greater Nicoya and Costa Rica to better describe the monumental features of El Rayo.

Chapter 7: Data Analysis

Monumentality has been minimally verified within the culture region of Greater Nicoya. Though some sites, such as Aguas Buenas, demonstrate indisputable monumentality in site planning and organization, other sites, such as Sonzapote, show monumentality through stone statuary, mounded architecture, and petroglyphs. At El Rayo, it will be argued that this site demonstrates monumentality through elaboration of structural design in a non-domestic circumstance. Further argument will be made of the presence of memorials spread throughout the cemetery site. Understanding how the local people of El Rayo would have perceived the cemetery is critical to understanding the importance which would have been placed on the architectural features, and therefore in understanding the monumentality of the site.

The data set collected from El Rayo was obtained over the four field seasons by different teams of archaeologists under the direction of Geoffrey McCafferty. The architecture at El Rayo is comprised of four structural feature types: platforms, structural stone wall foundations, retaining walls constructed of earth and rock, and standing stones. There is evidence that the structural walls related to the rock foundations would have supported wooden walls with a form of wattle and daub called bajareque. As these perishable wall and roof structures decayed or were burned down to combat insect infestations, the only remaining evidence of these structures come from excavated postholes, rock foundations, and the scattered and charred remains of bajareque. In this chapter, the architectural data shall be described, leading into the discussion chapter which shall discuss monumentality in the context of El Rayo.



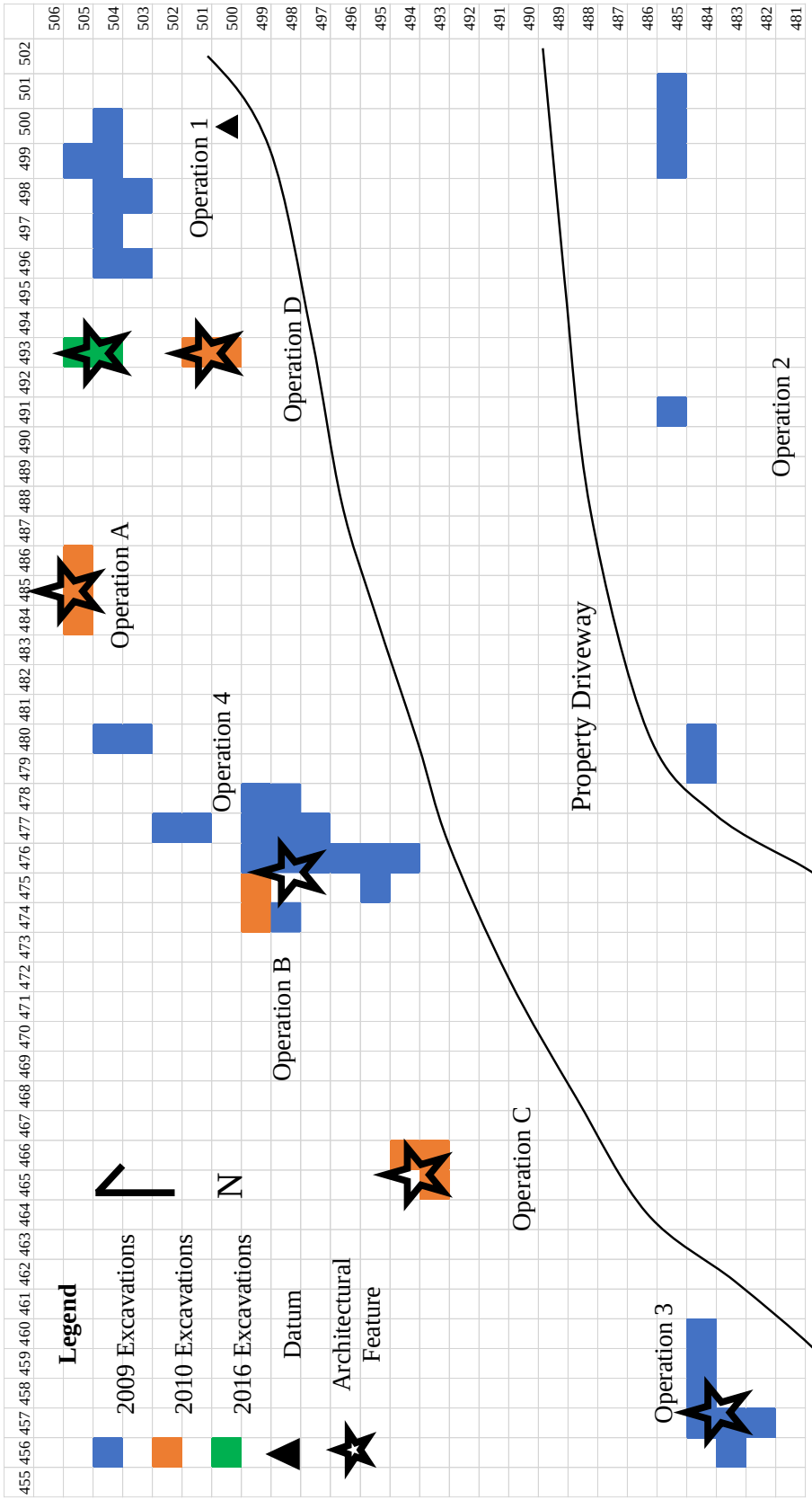
[Figure 7.1: Site Map Indicating the Location of Architectural Features by Locus, Map by Carrie Dennett]

Locus 2

Locus 2 was excavated during the 2009, 2010, and the 2016 field seasons. Within these three seasons evidence of mortuary practice, ceramic economy, diet, and memorialization were recovered, including the presence of structures and possible retaining walls. Following the shovel testing of the site, Locus 2 was identified for its impressive concentration of material culture including ceramic sherds, lithic flakes, and faunal remains. The excavation of the architectural features was unexpected as they were deeply stratified with no surface indicators present.

Feature Name	Locus	Description
Architectural Feature 1	Locus 2: Op. D, Op, G.	Late Bagaces period stone wall running on a north-south orientation.
Architectural Feature 2	Locus 2: Op. D.	Late Bagaces period Talpetate floor running beneath Architectural Feature 1.
Architectural Feature 3	Locus 2: Op. A.	Late Bagaces period stone wall running on an east-west orientation.
Architectural Feature 4	Locus 2: Op. 4, Op. B.	Late Bagaces period stone structure foundation running on a north-south orientation.
Architectural Feature 5	Locus 2: Op. C.	Sapoá period standing stone surrounded by rocks.
Architectural Feature 6	Locus 2: Op. 3.	Sapoá period stone structure foundation running on a north-south orientation.
Architectural Feature 7	Locus 3	A small stone platform in a mortuary context.
Architectural Feature 8	Locus 4	24 x 12 m Sapoá period structure on an east-west alignment with multiple flooring levels.
Architectural Feature 9	West of Locus 4	A Sapoá period retaining wall related to the construction and terracing of Architectural Feature 8.
Architectural Feature 10	Locus 6	Sapoá period standing stone structure with cobble stone platform.
Architectural Feature 11	Locus 6	2 x 2.5 m Sapoá period stone structure foundation
Architectural Feature 12	Locus 7: Op. B.	Dual chambered cache box associated with ritual practice at Architectural Feature 8.
Architectural Feature 13	Locus 7	Retaining wall of large boulders relating to the construction and terracing of Architectural Feature 8.

[Table 7.1: Summary of Architectural Features at El Rayo]



[Figure 7.2: Excavation Unit Map of Locus 2, 2009 and 2010 Season. From Carrie Dennett's Field Drawing Data]

Locus 2 is unique to El Rayo as it demonstrates high frequencies of artifacts and activity patterns separate from the interment of the dead. This locus presented evidence of episodic feasting, based on the high frequencies of faunal bones, including fish and reptile, and the presence of many large fragmented serving vessels. The locus was divided by the landowner's family driveway, limiting excavation between operations. 2009 was the most extensive excavation of the locus, with four operations and 38 units excavated. The following section is divided into the field seasons excavated with a focus on those operations which demonstrated architectural features.

Bagaces Period Architecture

Locus 2 featured the only examples of Bagaces period architecture excavated at El Rayo. Its key characteristic included stacked stone wall foundations and packed earthen or talpetate floors. Stone alignments were comprised of rubble and a mixed size of stones, from fist sized cobbles to larger boulders.

2009 Season, Operation 4

In 2009, a series of single 1 x 1 m units were excavated at Locus 2 following along a rock feature wall. Running on a north-south orientation, this feature spanned eight 1 x 1 m units and ran along the episodic feasting sector of Locus 2. The wall was a stacked stone foundation, comprised of large boulders with earth and fist sized cobbles packed into the gaps in the feature. On the east side of the structure, artifacts were dated to the Bagaces period, particularly through the excavation of a Bagaces urn vessel with a Potosí lid association, while on the west side of the

wall, Sapoá period artifacts were uncovered at a lower stratum. Excavations on the western side of the wall continued in 2010. This wall has since been designated Architectural Feature 4.

[Figure 7.3a, 7.3b: Rock Wall at Locus 2, Operation 4, Photography by Geoffrey McCafferty]

2010 Season, Operation A

In 2010, a surface alignment of stones was investigated at coordinates N506, E485, to determine if there was a structure located in the area. This was labeled as Feature 8, and a possible packed earthen floor paved with ceramic sherds to the north of this possible was reminiscent of that found in Santa Isabel, was uncovered. However, this wall did not display the same style of architecture as other known Bagaces structures at the site, and it is tentatively

considered to be a wall, though it could easily be a convenient alignment of rocks. This stone wall has been designated as Architectural Feature 3.

2010 Season, Operation D

Originally designated as Feature 6, Op. D, located at N501/E493, was a small structural wall with deeply stratified Bagaces materials. The wall consisted of large boulders with smaller fill added to the foundation wall. No post holes were recovered. This wall has since been relabelled as Architectural Feature 1. Originally called Feature 7 and associated with the rock wall and buried at 110 cm below ground level, was a stone flooring known as a talpetate floor. This floor appears to have been older than the structural wall, as the floor ran beneath the wall. The floor has been designated as Architectural Feature 2 for this body of work. At the end of 2016, this structure was returned to, and more of the wall was excavated to the north.

2016 Season, Operation G

In 2016, a series of single unit operations were excavated at Locus 2 near the end of the season. These unit operations were based to the west and north of Op. 1 from the 2009 season. Their purpose was to collect more evidence of cultural materials from the Bagaces to the Sapoá phases and to determine the extent to this area of high artifact concentration and trash middens. At Op. G, two 1 x 1 m units were excavated: N504/E494 and N505/E494. At a depth of approximately 30 cm, excavators came upon evidence of a rock wall running on a north-south orientation and continued excavation along the feature to determine the type of architecture. This wall was built of compacted soils with larger rounded rocks as a matrix. The unit revealed a number of ceramic objects, including decorated serving ware sherds, net sinkers, and worked

sherds. As typical of El Rayo, the most numerous artifact class was plainware ceramic sherds. This operation did not demonstrate any living floors or changes in soil. The wall was approximately 30 cm wide and 50 cm high. With more time, further excavation would have continued to the north and south of this retaining wall to further uncover its function. This wall has been determined to be a continuation of Architectural Feature 1.

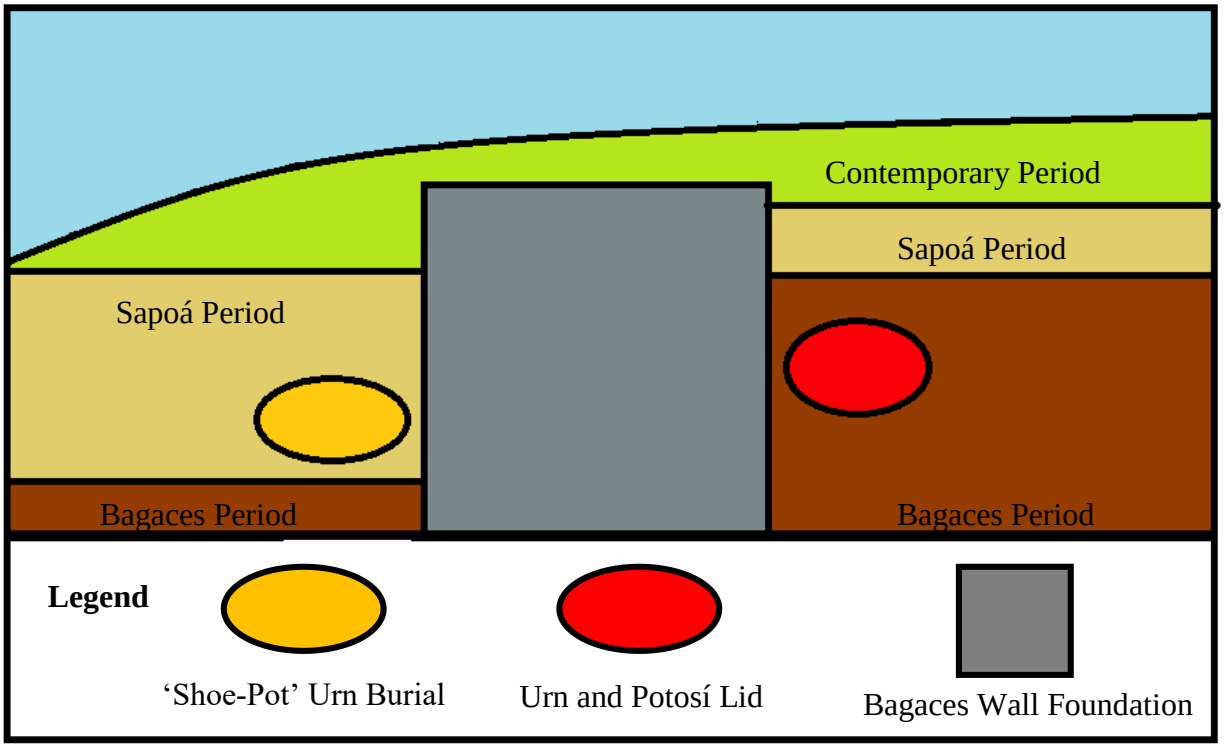
Sapoá Period Architecture

Sapoá architectural features are characterized with the placement of standing stone markers, possibly indicating the site as a cemetery complex. Walls in Locus 2 demonstrated similar foundations as those of the Bagaces period, but in other loci, flat lajas were used in the wall foundations, taking on an entirely new style of foundation. This new style included forming parallel rows of laja stones (described in the Locus 4 section) or perimeters of laja stones (described in Locus 6 section). Foundation walls in Locus 2 are narrower than their counterparts in the Bagaces period.

2010 Season, Operation B

This operation was the continuation of the wall excavated the 2009 year, west of the original stone alignment. A secondary wall was excavated which intersected with the Op. 4 wall at a right angle. Interpretation of these two operations was that they formed a structure. As previously mentioned, the eastern side of Op. 4's wall dated to the Bagaces period with a thin stratigraphic layer of Sapoá period artifacts, while to the west of this wall, and within the structure, the stratigraphy was almost exclusively Sapoá in origin. This assemblage included a 'shoe-pot' urn burial, with no human remains associated with the find. Ops. 4 and B seem to

mark a transitionary line running along E475, separating Bagaces from Sapoá period occupation, both in burials and in structures and activity patterns. The cause of this is as yet unknown.



[Figure 7.4: Stratigraphy at Operations 4 and B, Locus 2]

2010 Season, Operation C

Op. C, excavated in 2010, is a feature unique to the El Rayo cemetery region. Labeled originally as Feature 2, this was first interpreted as a posthole surrounded by rocks. However, a large elongated andesite stone was lying on its side nearby. This has since been reinterpreted as a standing stone which had fallen over. As this interpretation did not arise until after excavations in the area, the hypothesis has not been tested by attempting to raise the large stone into an upright

position, nor are their any images of this feature available. This has been given the label of Architectural Feature 5.

2009 Season, Operation 3

At Op. 3, seven units were excavated around Feature 11, which was as a small structure and walking surface, with a foundation wall running along the northern and western sides. This structure was exposed in two excavated units. The two units best exhibiting Feature 11 are N485/E457 and N485/E458. Though the proper dimensions of this feature were not found, it appears to have been a rectangularly shaped structure with a potential corner in N485/E457 as the northwestern corner. The stone foundation wall was made up of andesite rounded stones, unlike at Locus 4 which shall be discussed below. This stone wall feature had been disturbed and fallen, so the decision was made to remove the stones to look for a walking surface, which was found in level three. This has been designated as Architectural Feature 6.

The matrix of the wall was a soil with a high concentration of clay, while the walking surface was a compact sandy floor with gravel embedded throughout. The living floor surface was strewn with lithic debitage, faunal remains, and ceramic serving vessel sherds, making the activity pattern look to be related to food preparation, which would tie in with the episodic feasting at Locus 2. The living surface, based on the debitage excavated, is dated to the Sapoá phase. The Locus 2 structure was not fully uncovered, and revealed evidence of a single living surface, which included evidence of fishing activities (indicated by net sinkers), a bone needle which may have been associated with textiles or for sewing together nets and net sinkers, and feasting evidence including plain and decorative ceramic vessels.

[Figure 7.5: Stone Wall Structure at Locus 2, Operation 3, Photography by Geoffrey McCafferty]

Locus 3

Locus 3 was excavated during the 2009, 2010, and 2015 field seasons. The architectural feature, relevant to this body of work was first identified in 2009. This feature was a small stone foundation overlying an area within the cemetery, covering further urn burials. Feature 11, an urn burial containing long bone fragments, lithic flakes, and ceramic sherds was excavated from under the platform. Though small in nature, this platform may have been a memorial dedicated to ancestor worship, though little is known regarding the structure. It has been interpreted as a

shrine which may have been used to display urn burials, or an otherwise staging area related to mortuary practice (Manion 2016). This feature has been labeled as Architectural Feature 7.

[Figure 7.6: Stone Foundation (in Red Outline) Affected by Bioturbation, Locus 3, Photography by Geoffrey McCafferty]

Locus 4

Locus 4 was excavated during the 2015 and 2016 field seasons and is considered to be the main structure within the cemetery complex. This structure was constructed on a low mounded platform and had dimensions of 24 x 12 m. The goal of the 2015 season was to excavate along the northern facing wall and record the structure's dimensions. This task, due to the extreme size of the structure platform, took the entire month of July to excavate. The visible rocks embedded in the ground were mapped, giving the structure a northwest and southwest corner, but the eastern corners were not visible on the surface. The following 2016 season's goal

at Locus 4 was to locate the northeastern corner. The Locus 4 structure has been designated as Architectural Feature 8. It resides on top of a large mounded terrace, which tends beyond the limitations of Locus 4 and 7. This terrace is supported with two large retaining walls, Architectural Features 9 and 13, and will be discussed as a part of the taskscapes required to construct Architectural Feature 8 in **Chapter Eight**.

[Figure 7.7: Locus 4 Structure After Excavation, Photography by Geoffrey McCafferty]

2015 Season, Operation 1

Op. 1 was the most extensive excavation at Locus 4, encompassing a large portion of the north facing wall and its extremities. A sizable portion of the feature was cleared of underbrush

to determine Architectural Feature 8's dimensions. Clearing the area resulted in many stones being revealed, running roughly in an east-west orientation. These half-buried stones, or lajas, were used to orient the operation's excavation. These excavations began with units N560/E368.5, N558/E367.5, and N558/E366.5, to look for the limits of the wall foundation which ran on a near perfect east-west orientation (7º south of west), and to evaluate the extent of the structure. Another goal was to search for associated cultural materials to understand an activity pattern.

As excavations continued, estimates of the structure's size significantly increased. Excavations revealed two parallel rows of lajas with an approximate 30 cm gap between the rows. These stones had been badly disturbed and toppled over, but still indicated a discernable pattern. One large flat rock, which had been excavated lying overtop of the other smaller lajas, is believed to once have been standing upright along the foundation wall and was repositioned to act as a support column for the now destroyed roof structure. This may have been a part of the entrance way of the structure, as it is located at the midpoint of the long edge of the structure. At the end of the excavation, the lajas were repositioned to stand upright.

Three walking surfaces were excavated on the interior of the wall, associated with Papagayo Polychrome and Sacasa Striated ceramics, suggesting that the structure was used during the Sapoá period. Overall, Architectural Feature 8's remains measure 24 x 12m in total, indicating this as a special purpose structure, as the size seems to extend beyond domestic functionality. To the west of Locus 4, there was evidence of yet another retaining wall built into a rising hill, however, time constraints did not permit excavation to continue on this feature. The feature looked to be supporting the surrounding area of Locus 4 and 7. It is hypothesised that this

Operation	Unit Number	Max. Depth
Op. 1	N 561 E 668.5	130 cm
Op. 1	N 560 E 367.5	No Data
Op. 1	N 560 E 368.5	94 cm
Op. 1	N 560 E 371.5	72 cm
Op. 1	N 559 E 364.5	80 cm
Op. 1	N 559 E 367.5	79 cm
Op. 1	N 559 E 368.5	78 cm
Op. 1	N 559 E 369.5	55 cm
Op. 1	N 559 E 370.5	80 cm
Op. 1	N 559 E 371.5	52 cm
Op. 1	N 558 E 360.5	54 cm
Op. 1	N 558 E 361.5	52 cm
Op. 1	N 558 E 363.5	70 cm
Op. 1	N 558 E 364.5	70 cm
Op. 1	N 558 E 365.5	61 cm
Op. 1	N 558 E 366.5	60 cm
Op. 1	N 558 E 367.5	57 cm
Op. 1	N 558 E 368.5	54 cm
Op. 1	N 558 E 369.5	55cm
Op. 1	N 558 E 370.5	50 cm
Op. 1	N 558 E 371.5	46 cm
Op. 1	N 557 E 360.5	45 cm
Op. 1	N 557 E 361.5	56 cm
Op. 1	N 557 E 362.5	67 cm
Op. 1	N 557 E 364.5	97 cm
Op. 1	N 556 E 361.5	48 cm
Op. 1	N 556 E 364.5	53 cm
Op. 2	N 555 E 370	67 cm

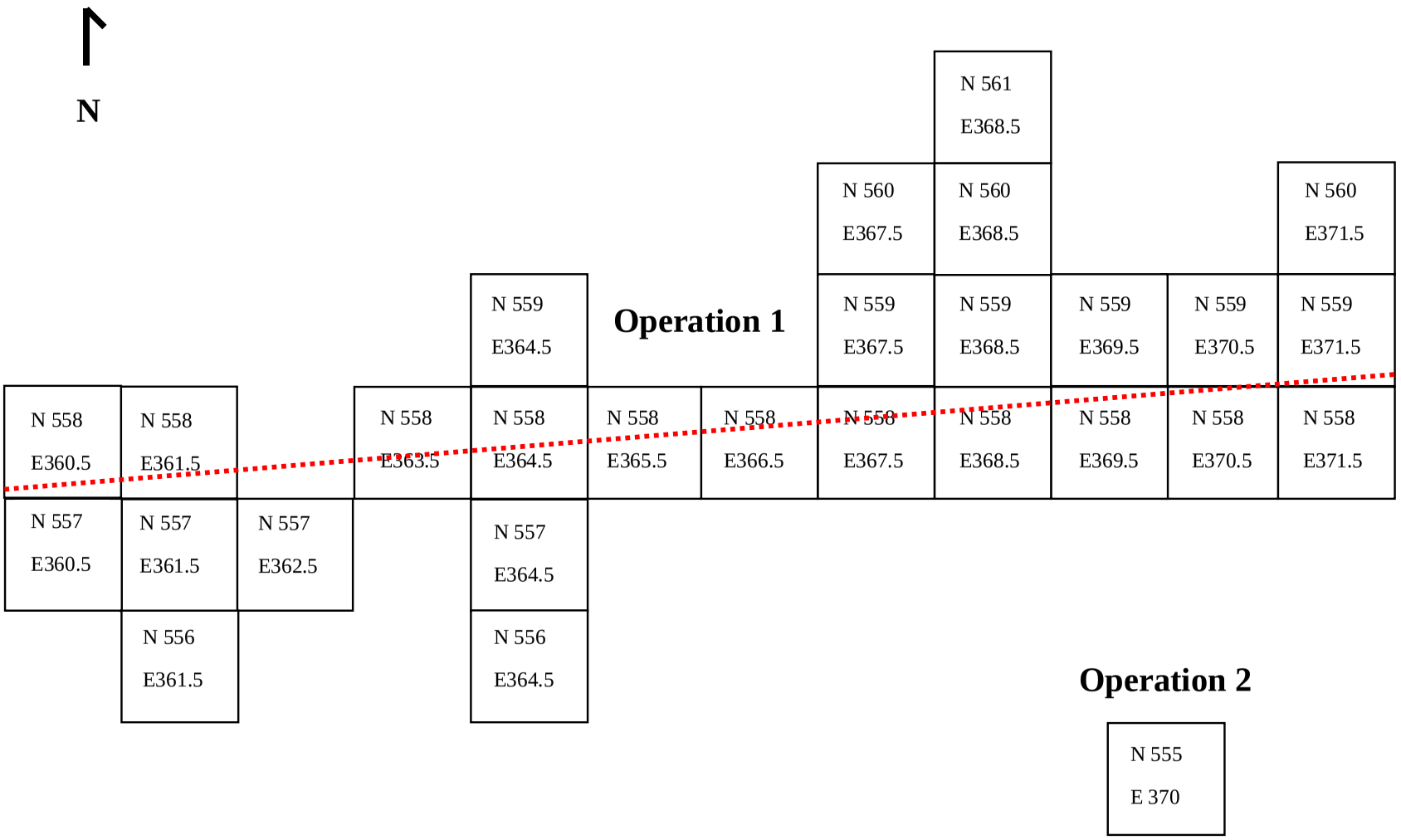
[Table 7.2: Units at Locus 4, 2015 by Operation, Unit Number, and Level Depth]

Architectural Feature 9 was a part of the terracing of the area which Architectural Feature 8 resided on.

2015 Season, Operation 2

Op. 2 was the first area to be excavated at Locus 4, not including the shovel testing carried out in previous field seasons. This operation was located within the mounded platform's interior. Its purpose was to determine whether there were any artifacts remaining within the structure at the point of abandonment in the late Sapoá phase. Only one unit, N555/E370, a 1 x 1 m pit was excavated. This unit was excavated down three arbitrary levels to a final depth of 67 cm below datum. There were several soil changes within this unit, indicating possible walking surfaces, with the bottom of level three being a packed earthen walking surface made up of fine silt soil with a matrix of small coarse gravel. The unit was excavated down to sterile soil, with no artifacts being collected on the walking surface. Overall, the artifact assemblage consisted of small ceramic plainware body sherds, a few ceramic spheres with a diameter of approximately 1-2 cm, small lithic flakes indicating tool retouch and sharpening, and some degraded faunal bones.

One feature within the interior of the structure was a large modified volcanic rock, too large and buried too deeply to be removed. This andesite boulder showed some areas which could have been used for grinding, though a full analysis did not take place during the field season. The andesite boulder was located in the western side of Architectural Feature 8 and encompassed a large portion of the excavation unit.



[Figure 7.8: 2015 Field Season Map of Locus 4, Red Line Indicating Orientation of the Wall]

2016 Season, Operation A

In 2016, we returned to Locus 4 to excavate the northeast corner of the structure to confirm the estimated dimensions. Both Ops. A and B were located along a hypothesised line of the structure's continuation, a line which followed along the 7º south of west orientation of Architectural Feature 8. This operation was comprised of eight units excavated two or three levels deep with a maximum depth of around 70-80 cm below datum. These units located the corner of the structure, confirming the structure size. The rocks followed the same pattern as Op. 1, with a row of parallel laja stones, but these led to a pattern of stacked stones arranged in such a way that a wooden post could have been positioned in the rock gap. This marked the extreme end of the structure, and the corner, which then had some rocks going on a north-south alignment. Material remains found at this locale included a higher frequency of faunal bones (primarily fish). Other materials included ceramic sherds and lithic flakes, as was typical for the Locus 4 artifact assemblage.

2016 Season, Operation B

Op. B was the first trench opened during the 2016 season at Locus 4. It was comprised of one unit, N 560/561/E 383. This unit was located on the east side of the historic rock wall, along the hypothesised line of structure continuation. The historic wall was dismantled in a section along the hypothesised line to make access for excavation possible. While the trenched unit, which was a 2 x 1 m trench, was in line with the northern wall of the structure, very little material culture was recovered, nor was any rock foundation located. This unit reached a maximum depth of 86 cm below datum by the end of the second level. A small assortment of artifacts was collected, including turtle shell, lithic flakes, and broken ceramic sherds.

Miscellaneous

To the west of the primary structure at El Rayo, between Locus 3 and 4, there was a stacked stone retaining wall, half buried by underbrush, separating two levels of walking surface. This Architectural Feature 9 was not excavated due to time constraints in 2015, but a visual analysis took place. This retaining wall was constructed of flat lajas stacked on top of one another to form a terraced effect between the two walking surfaces, with the higher ground to the east. Future excavations at this locale would be beneficial to understanding monumentality at the site. Architectural Feature 9 is associated with the construction of Architectural Feature 8 and will be discussed in the following chapter.

Locus 5

Locus 5 was excavated at the end of the 2015 field season. It was an earthen mound and considered to be a potential domestic structure. The locus had one operation, a trench cross-cutting the side of the hill, and consisted of six units, five units in a trench and one unit off to the side of the trench. These 1 x 1 m units did not recover architectural features, nor a high frequency of artifacts, leaving researchers to assume this was a natural hill and not a domestic residence. However, there were walking surfaces at the mound, suggesting that the mound was frequented. One of the materials found at the locus was burned bajareque, suggesting a proximity to a structural feature. Large stones stood along the eastern side of the mound, obviously placed there by human intervention. One hypothesis discussed has been a rock retaining wall, similar to those seen in other areas around El Rayo. This retaining wall might have been reducing the erosion of the mound onto the flatter area, but this is speculation.

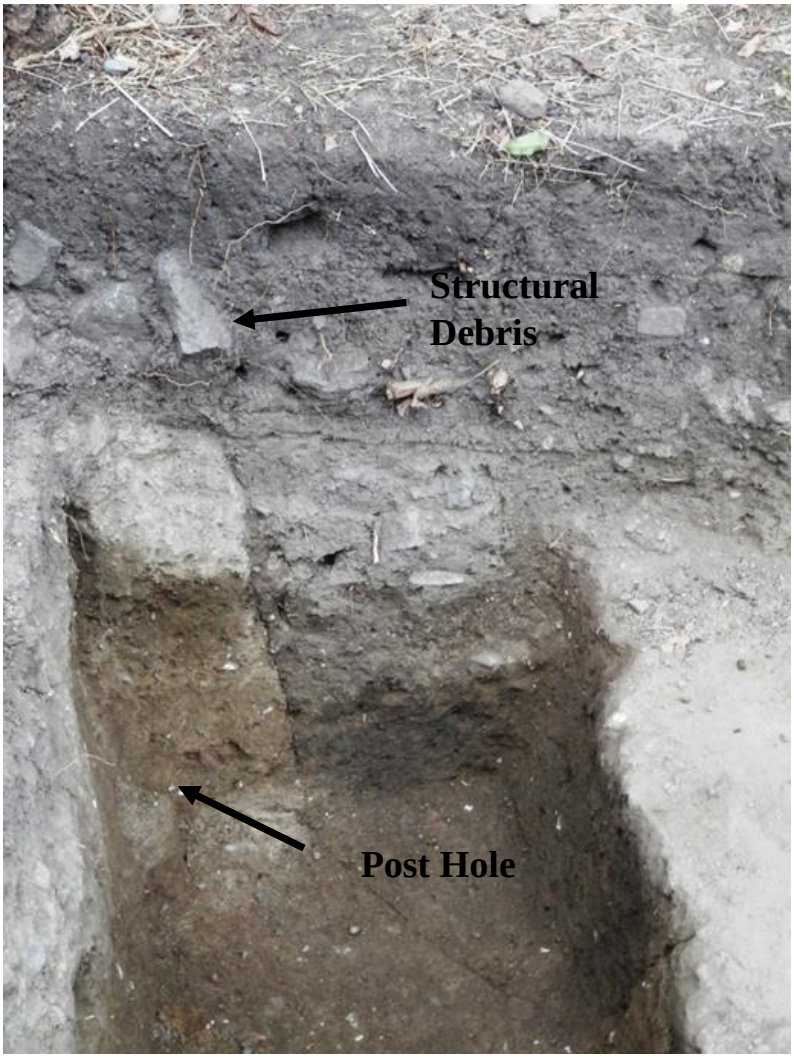
Locus 6

At the end of the 2015 field season, Locus 6 was identified by an alignment of vertical rectilinear lajas sticking out of the underbrush. Initially, this locus was thought to be an elite tomb similar to tombs in Costa Rica and Nicaragua (personal communication with Jorge Zambrana, 2016), as the stones sticking out of the ground demonstrated a sharp corner and a smaller area than the Locus 4 structure. Excavations began early in the 2016 field season at this locus, and quickly the locus was determined not to be a burial, but some form of architectural feature. It was determined that the rectilinear lajas were a part of the perimeter of a small structure. The structure was labeled as Architectural Feature 11.

[Figure 7.9: Locus 6 Structures After Excavation, Photography by Geoffrey McCafferty]

This locus, situated to the south of Locus 4, to the east of Locus 3 and the west of the historic rock wall, did not include a large artifact assemblage. There were few ceramic sherds

and few other artifacts found at the locus. This left identifying the structure's function as ambiguous. Architectural Feature 11 was small in size, approximately 2 x 2.5 m in dimension, with a raised walking platform within the structure. This surface was made up of packed earth. Outside of the structure there was a stone feature. This area was made up entirely of packed earth and small fist sized stones. In the centre of these fist sized cobbles, was a larger stone slab which



[Figure 7.10: Post Hole Feature at Locus 6, Photography by Geoffrey McCafferty]

had fallen onto its side. This was interpreted to be some form of standing stone, akin to the one located at Locus 2, and was called Architectural Feature 10.

Finally, to the east of the structure, at a depth of 50 cm, a post hole with two concentric soil stains was found. The exact depth of the post hole was not determined, due to time constraints, nor were others found within the area. However, given more time, there would likely have been more excavated. Overall, this structure may have been an open air structure meant to act as a shelter from the elements, as no evidence of bajareque was found in or around the locus. Its function remains unknown due to the lack of artifacts found at the site.

Locus 7

Locus 7 was identified on the east side of the historic rock wall as an area with many lajas protruding from the ground. Initial assumptions were that these lajas represented stone structure foundations, and so multiple operations were set up to further explore the area. Also of note was a large retaining wall on the east side of Locus 7 made up of earth and large boulders, leaving the western part of Locus 7, where the excavations took place, as a raised and flattened terrace. This is now referred to as Architectural Feature 13. While there were three operations excavated, only Op. B demonstrated an intact architectural feature. Ops. A and C, while containing lajas, were not in a discernible pattern and may have been disturbed by root action.

Op. B contained a dual chambered stone box made up of large rectilinear lajas, assigned as Architectural Feature 12. Once more, initial interpretations prior to excavations believed this to be some form of tomb structure, but this theory was disproven with the lack of human remains. The box was approximately 1 x 0.5 m in dimension and capped with a large flat stone to

[Figure 7.11: Dual Chambered Cache Box, Photography by Geoffrey McCafferty]

protect the contents from the elements. On removal of the capstone to continue excavations, a dense layer of small cobble stones was encountered in the first few centimeters of soil, obviously placed there, but for unknown reasons. The remaining meter of excavated depth consisted of loosely packed silt. Broken jewelry was encountered within the box, such as shark vertebra earspools, ceramic earspools, and a large mammalian tooth pendant. This container is hypothesised to have been a cache depository for ritual paraphernalia, such as costume, which upon abandonment of the site had been filled in, based on the broken and remaining artifacts from the boxes.

Artifact Assemblage

The artifact assemblages from Loci 4, 6, and 7 were limited in quantity. The following summary of the artifact assemblage is based on the excavations of 2015 and 2016. The classes of artifacts excavated included rim sherds, lithic tools, lithic debitage, decorated body sherds, ornamentation, ceramic handles, ceramic bases, ceramic supports, ceramic applique, ceramic colanders, ceramic net sinkers, worked sherds, ceramic balls, figurines, ceramic adornment, bajareque, faunal remains, and bone objects. Of these classes of artifacts, the rim sherds, lithic tools, and figurines are most significant in determining the potential function of the areas, however, the nondescript distribution of the artifacts left interpretation difficult.

The most frequent artifact class was lithic debitage, consisting primarily of tertiary flakes and retouch flakes. Locus 7 demonstrated the highest percentage of flakes by artifacts with 66.0% of the artifact assemblage being comprised of the lithic debitage. Locus 4 had the lowest density of debitage, at 48.5%. These flakes were mostly excavated from around the rock foundation of Architectural Feature 8. The second highest frequency of artifacts by class were the rim sherds. Locus 4, in this category, had the highest frequency of sherds by the total artifact assemblage, with 30.8% of the artifacts representing rim sherds. Loci 6 and 7 were similar in their percentages of rim sherds, at 24.6% and 25.8% respectively. Overall, the lithic debitage made up the highest artifact class with a total frequency of 51.1%.

Figurines made up a small portion of the artifact assemblage, ranging from 2.3% (at Locus 6) to 1.0% (at Locus 7). Locus 4 had a total of 1.5% of the artifact assemblage related to figurine fragments. Another low category of artifacts includes lithic tools. At Locus 4, the highest frequency of lithic tools was excavated, representing 1.1% of the artifact assemblage. Locus 7 only had 3 lithic tools, making up 0.2% of the artifact assemblage. Bajareque was only

excavated at Locus 4, with 34 pieces recovered, indicating that the structure at Locus 6 was an open aired structure, while the structure at Locus 4 was likely plastered with the bahareque. For a full description of the artifact assemblage, see **Appendix A** and **B**.

	Locus 4	**Locus 6**	**Locus 7**	**Totals**
Rim Sherds	662 / 30.8%	98 / 24.6%	484 / 25.8%	1244 / 28.1%
Decorated Body Sherds	38 / 1.8%	N/A	N/A	38 / 0.9%
Lithic Objects	24 / 1.1%	N/A	3 / 0.2%	27 / 0.6%
Lithic Debitage	1042 / 48.5%	254 / 63.8%	1239 / 66.0%	2259 / 51.1%
Ornamentation	5 / 0.2%	N/A	9 / 0.5%	14 / 0.3%
Ceramic Handles	4 / 0.2%	N/A	N/A	4 / 0.1%
Ceramic Bases	53 / 2.5%	5 / 1.3%	30 / 1.6%	88 / 2.0%
Ceramic Supports	70 / 3.3%	15 / 3.8%	31 / 1.6%	116 / 2.6%
Ceramic Applique	24 / 1.1%	N/A	7 / 0.4%	31 / 0.7%
Ceramic Colanders	6 / 0.3%	N/A	3 / 0.2%	9 / 0.2%
Ceramic Net Sinkers	27 / 1.3%	6 / 1.5%	26 / 1.4%	59 / 1.3%
Worked Sherds	19 / 0.9%	5 / 1.3%	12 / 0.6%	36 / 0.8%
Ceramic Balls	69 / 3.2%	14 / 3.5%	13 / 0.7%	96 / 2.2%
Figurines	33 / 1.5%	1 / 2.3%	18 / 1.0%	52 / 1.2%
Ceramic Adornment	3 / 0.1%	N/A	N/A	3 / 0.1%
Bajareque	34 / 1.6%	N/A	N/A	34 / 0.8%
Faunal Remains	7 / 0.3%	N/A	N/A	7 / 0.2%
Bone Objects	5 / 0.2%	N/A	2 / 0.1%	7 / 0.2%
Totals	2149 / 100%	398 / 100%	1877 / 100%	4424 / 100%

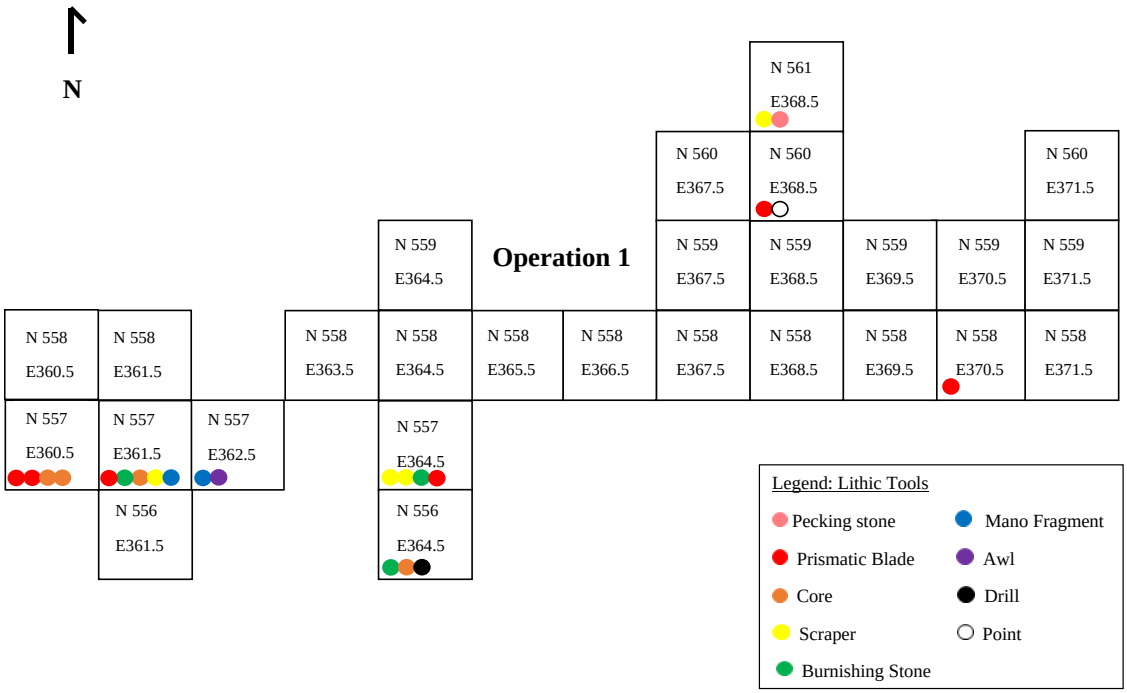
[Table 7.3: Artifact Assemblage of Loci 4, 6, and 7]

Activity Patterns at Locus 4

The activity patterns for Locus 4 encompasses the excavations of the Locus 4 structure and surrounding area. In order for the activity patterning to be successful, a structure or area must contain “parts of the original inventory” (Pfälzner, 2015, pp.30) of artifacts. In the case of the Locus 4 structure, a minimal collection of artifacts, mostly refuse makes revealing the

original activity patterns challenging. At Locus 4, the higher frequency of artifacts was found in and around the collapsed wall foundation. The interior of the structure was mostly clear of artifacts, indicating the area was swept clean of debris before final abandonment at the end of the Sapoá period. There were few complete artifacts found at this locale, indicating that the site was abandoned with all useful tools being removed from the structure and taken to the next locale. To the exterior of the structure, artifacts were few in number and fragmentary. In the following sections, the artifact assemblage will be considered, using Pfälzner's (2015) methodological considerations of activity patterns. The artifact classes have been divided into lithics, net sinkers, figurines, ceramic balls, and miscellaneous artifacts.

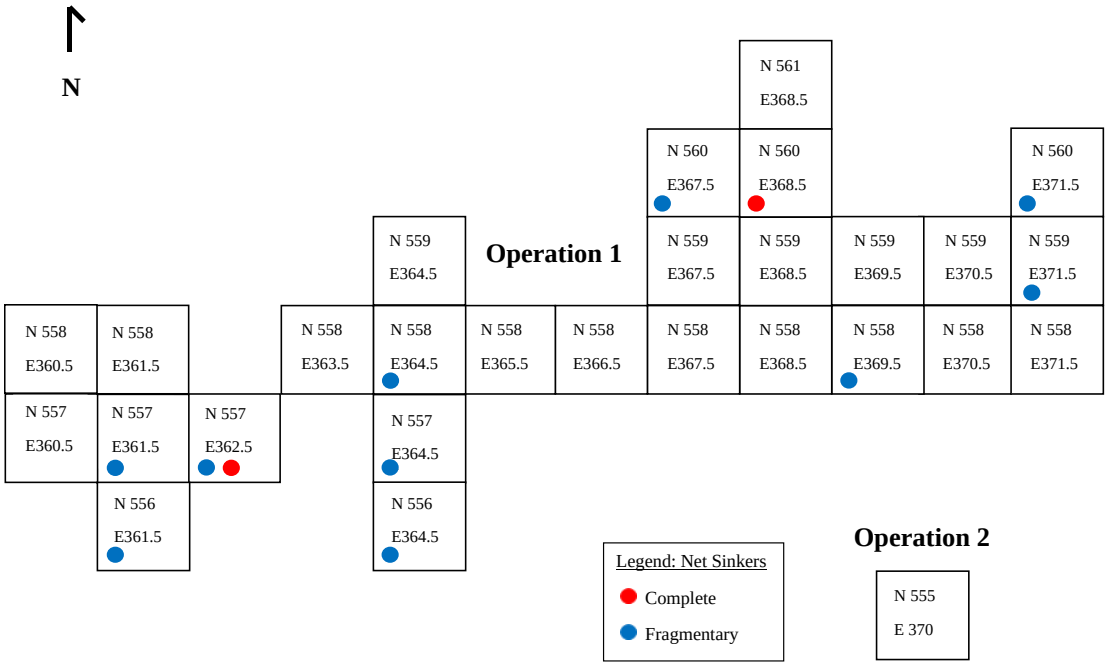
Step A) Recording Artifact Locations



[Figure 7.12: Organization of Lithic Tools at Locus 4]

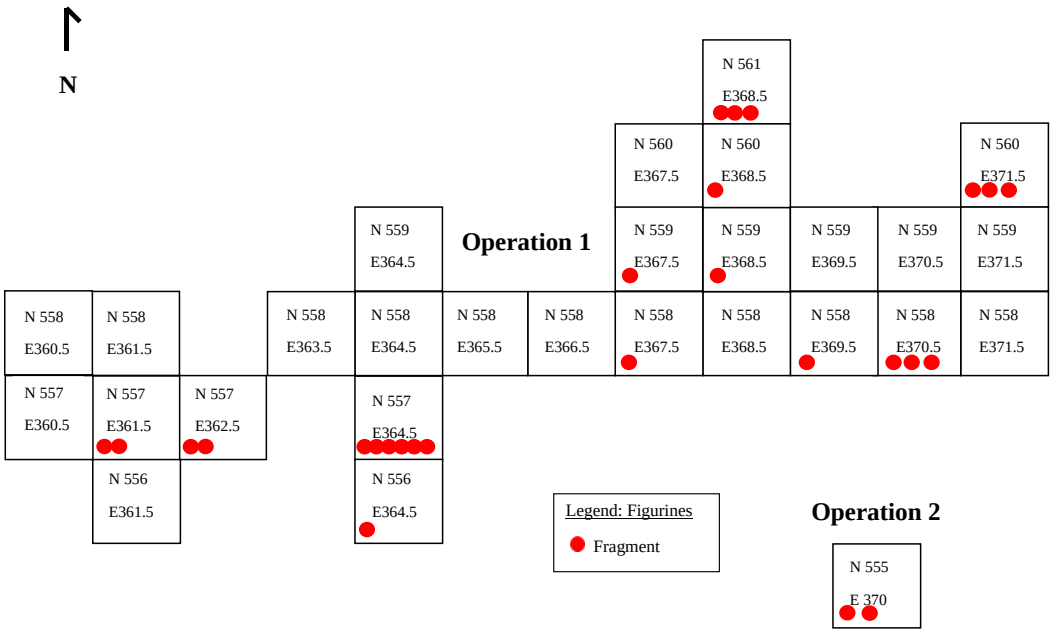
Lithics. The highest frequency of artifact was lithic debitage, made up of the tertiary and retouch flakes from the end of the manufacturing process. These were found in and around the wall structure. Lithic tools were also clustered around the wall, including five prismatic blades, three cores, three scrapers, two burnishing stones, two mano fragments, and an awl. Other lithic artifacts near the foundation include one burnishing stone, one core, one drill, one point, one prismatic blade, one scraper, and one pecking stone as represented in **Figure 7.12**.

Net Sinkers. This artifact class made up 1.3% of the Locus 4 artifact assemblage. Other than the two complete ceramic net sinkers, 25 of the net sinkers were broken in half. Net sinkers came in two varieties: broken body sherds which had been repurposed or broken rim sherds which had been repurposed. These artifacts were found primarily around the wall foundation, similar to the lithic artifacts. The locations of these artifacts can be seen in **Figure 7.13**.



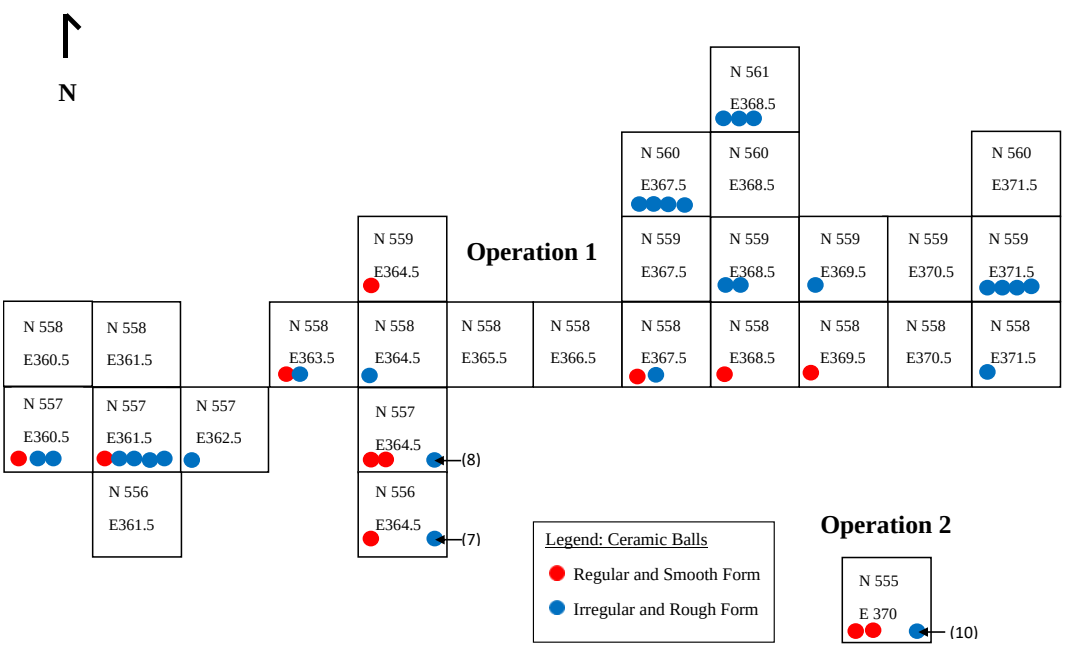
[Figure 7.13: Organization of Net Sinkers at Locus 4]

Figurines. Making up 1.5% of the artifact assemblage from Locus 4, these artifacts were in fragments scattered in most units, though a majority of the figurine fragments were clustered along the wall remains. Figurines were found up to 80 cm in depth, which was apart of the earthen platform of the structure, while most were located within the first 30 cm of substrata. (See **Figure 7.14**).



[Figure 7.14: Organization of Figurine Fragments at Locus 4]

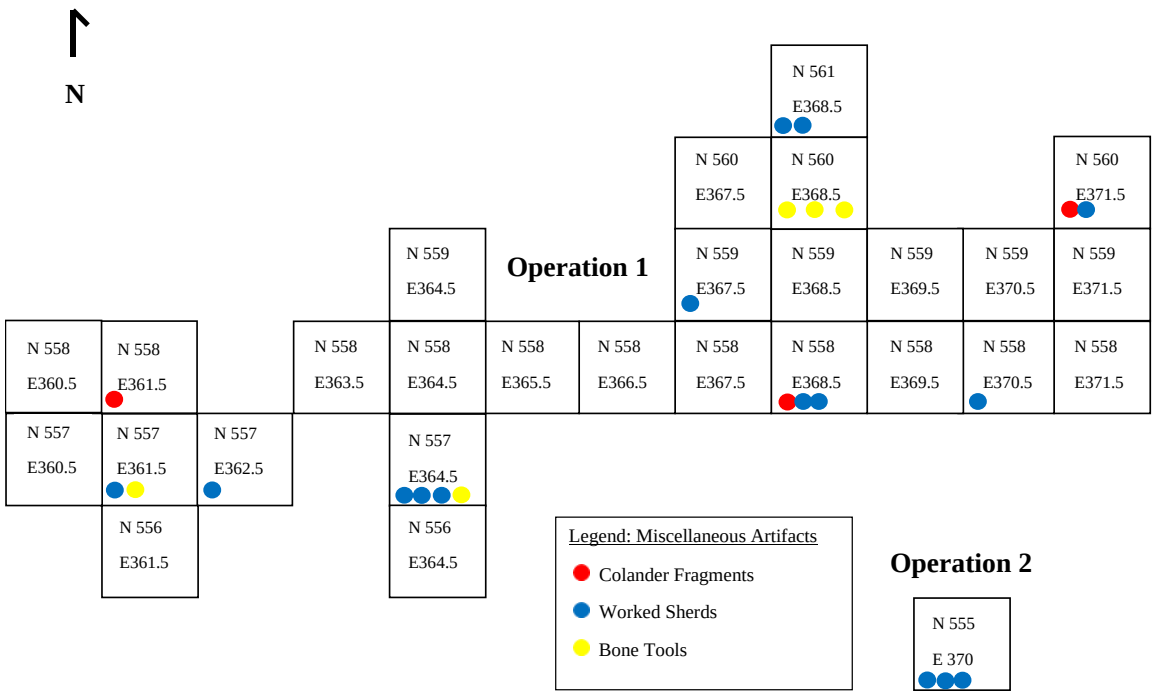
Ceramic Balls. This artifact class was divided into two categories: regular and smooth and rough and irregular in form. This distinction is based on assumed function of the artifacts. These were 3.2% of the artifacts at Locus 4.



[Figure 7.15: Organization of Ceramic Balls at Locus 4]

Plainware Ceramics. At Locus 4, 30.8% of the artifact class found was undecorated, plainware rim sherds. This percentage was noticeably higher than at other near by loci, indicating that plainwares were used in higher frequencies at Locus 4.

Miscellaneous. Three colander fragments were found at Locus 4, near the surface. They were located within the wall of the foundation. These fragments were all small pieces. Worked sherds were also found throughout the excavated area, though their function was undetermined. Finally, bone tools were excavated within the wall foundation, and included one needle, two awls, and two incised bones.



[Figure 7.16: Organization of Miscellaneous Artifacts at Locus 4]

Step B) Function of Objects

Awls. Pointed tools of either stone or bone possibly used in leather working at Locus 4. This is supported by the presence of burnishing stones and scrapers.

Burnishing Stones. Small rounded and smooth stones with exterior polish. As no pottery production is known from this site, it is possible they were used in leather production.

Ceramic Balls. Ranging in size from 13 mm to 25.5 mm, these balls fell into the two categories previously established. Regular and Smooth: these ceramic balls were likely once

pellets for a blowgun (personal communications with Geoffrey McCafferty 2019). Irregular and Rough: these pellets were likely the rattles form tripod supported vessels.

Colanders. These fragments were undetermined in their function through they were possibly used to sieve soils at the Locus 7 cache box, a feature which was filled with a fine silty matrix prior to abandonment, through another possible function is as a strainer for soaking maize, there has yet to be any evidence of maize being used (McCafferty 2008) even in areas where other seeds have been located.

Cores. The cores were small, depleted chert cores.

Drill. A perforating tool used to create a hole in a working material.

Figurines. Decorative and possible religious in nature, these fragments were unclear regarding their represented sex or gender.

Incised Bones. Possibly decorative features these bone fragments had incisions in linear patterns carved into their surface.

Mano Fragments. Broken ends of manos, a tool used for grinding various objects. A possible function is as a grinder for maize; however, no maize has been found in El Rayo. Another possible function may have been to grind pigments for body adornment, though there is no evidence to support either argument.

Needle. A bone tool possibly associated with leather production. Supported by evidence of scarpers, burnishing stones, and awls.

Net Sinkers. Used on nets to fish. El Rayo has been an assumed fishing village based on the presence of Gaspar (Gar) scales and bones, as found at Locus 2.

Pecking Stone. This tool may have been used as a hard hammer in lithic production. It was not hafted to a shaft, limiting the possible functions of this tool. Limited markings indicate this may have been a tool of convenience.

Point. A small broken tip of a lithic pointed tool, possible used for hunting.

Prismatic Blades. These small blades, less than 5 cm in length, would have been attached to a wooden handle along with other blades to create a cutting surface. These tools were made up of either chert or obsidian.

Scrapers. These were tools with a steep working edge, possible for scaping wood, bone, or leather, associated with awls, burnishing stones, and a needle indicate a leatherworking function.

Step C) Relationship Between Objects

Based on the patterning of the tools, and materials remains, it is apparent that the interior of the structure was swept clean of debris. Usable materials were likely collected and removed

prior to abandonment of the site. Though the floor was swept, there were some clustering of objects which implies activities. The awl, scrapers, and burnishing stones were clustered near the entrance in the wall of the structure. The category of artifacts remaining were likely defacto-refuse (Schiffer 1987), meaning artifacts which were no longer seen as usable by the people at the time and left behind as garbage where other reusable artifacts, were taken away at abandonment. It is possible that some sort of leather working was occurring within the structure, based on the artifact assemblage, though there was a limited number of artifacts remaining at the locus. High frequencies of lithic debitage indicate that tools were frequently used and retouched within the structure, though the tools which were used, and the types of activities they were used for, are unknown.

Step D) Activity Pattern

Based on the artifacts clustered in and around the wall feature of the structure at Locus 4, and the small numbers of remains found, determining the function of the Locus 4 structure remains unclear. With the high percent of rim sherds and the presence of colander fragments, it is tempting to suggest that food preparation was occurring at Locus 4. However, the sieved soils from the near-by Locus 7 cache box and the lack of evidence of a midden or food refuse near the structure suggest an alternative function than as a food preparation locale. One possible hypothesis includes the Locus 4 structure as a civic-ceremonial building related to the preparation of the deceased.

In the Sapoá period, urn burials in plainware shoe-pots were the most frequently used burial style, either by placing the defleshed body into an urn or a token part of the individual (Manion 2016, Wilke 2012). Often, these burial urns were topped with upside down polychrome

vessels, such as Luna Ware vessels, as recorded by many, including Bransford (1881). In some instances, in El Rayo, these shoe-pot burials, as noted by Sharisse McCafferty (personal communications 2019), had polychrome vessels placed within the urn, and in order to achieve this, the shoe-pot's rim needed to be broken off (see **Figure 6.3b**). In some instances, these broken rims were then placed back on the urn burial, but in others, they were absent. As explained in the artifact assemblage, there was a high frequency of rim sherds found at Locus 4, which could be connected to the preparation of these urn burials, through the ritual paraphernalia associated with the Locus 7 cache box, including incense burner fragments and decorative ornamentation (see **Figure 8.2a** and **8.2b**).

Summary

This dataset covers the variety of architectural features found at El Rayo. The overall site planning would have taken organization and coordinated labour. This site planning would have been required to construct this organized space, between retaining walls and large structures, and to organize the cemetery spaces. Though there are seven loci excavated at El Rayo, Loci 1 and 5 do not present architectural evidence. A combination of earthen mound platforms structures, retaining walls, and other small structures, are included amongst the architectural features at El Rayo.

Locus 2 the most thoroughly excavated locus, contained evidence of foodways, mortuary practice, and architecture. Architectural Feature 6 was excavated with many materials in situ on the floor, and Architectural Feature 1 was excavated in 2009 and 2016. Locus 4 contained the largest and most unique structure, with a 24 x 12 m area and parallel rows of lajas which would have supported wooden beams. Locus 6 featured a small structure, possibly an open air building.

Locus 7 had a large stone box, which contained the remnants of ritual paraphernalia, which could be associated with the activity at Locus 4. Between the numerous retaining walls, the division of activity patterns and the existence of Architectural Feature 8, El Rayo demonstrates critical features. Overall, the cemetery complex of El Rayo would have required attention to site planning. This site planning is demonstrated by the use of retaining walls and structures aligned to some measure which has yet to be determined. In the subsequent chapters, I will evaluate the degree of monumentality present at the site of El Rayo and compare this site to other similar Greater Nicoya sites, and monumental features in Costa Rica.

Chapter 8: Discussion

The word ‘monument’ is derived from the Latin term *monere* meaning ‘to remind’ (Soanes et al. 2006). An important consideration in the discussion of monumentality at El Rayo, is that it is a cemetery complex constructed in memorial of the deceased. Understanding the cultural significance of the potential monumentality at El Rayo may aid in our understanding of social memory and mortuary practice in Greater Nicoya. According to Knapp, “monumental buildings are culturally constructed places; enduring features of the landscape that actively express ideology, elicit memory, and help to constitute identity” (2008: 47). Or as Connerton (1989) has described, the concept of social memory is encoded within monumentality through inscribed memory.

Following the descriptions of the 13 Architectural Features excavated at El Rayo, this discussion chapter will analyse these Architectural Features to determine their degree of monumentality or memorialization. Primarily, it will be argued that the Architectural Features 8, 9, and 13 represent a monumental construct within the cemetery complex of El Rayo, and an architectural energetics model will be presented as an example of the labour required and the taskscapes used to construct El Rayo’s ER-S3 structure. The presence or absence of monumental features or memorials at El Rayo will be assessed based on the previous definitions detailed in **Chapter Two**.

Understanding Monumentality and Memorialization at El Rayo

Monuments can be defined in many ways. To date there has not been a great deal of agreement as to what constitutes a monument or monumental feature within a culture. In this

thesis, monumentality is defined in two parts, to encompass the structural features and other architectural features related to the cemetery complex of El Rayo. Firstly, monumentality can be used to define constructed elements (such as a palace or an irrigation system) which demonstrates a large scale of construction and level of elaboration than serving a functional purpose. This definition includes constructed elements which would have required an extraordinary example of skill or an excessive cost of construction. Secondly, using a definition based in social memory theory, a monument or a memorial can be a built form which serves to remind a collective group of an event, individual person, ideology, or social group, and in so doing, creating a place on the landscape.

These definitions allow both chiefdom level and state-level societies to be considered in a monumental context, as well as structures of grand proportions and smaller scale objects. Furthermore, a memorial can be considered as a means for social collectives to recall or interact with a set of beliefs, which is demonstrated by the architecture at El Rayo. This can be as simple as a tombstone marker or elaborate as a decorated building. Finally, a monument or a memorial must be of significance to the population experiencing the place or the object, for it to truly have meaning. Often, it can be challenging to determine what monuments meant to the population without a strong artifact assemblage to associate with daily practice. El Rayo presents a challenge in determining what the past functions of the Architectural Features were, due to the small artifact assemblages. As such, this chapter will focus more on the architectural importance, monumentally, than functionally.

Typically, monumental construction is considered from a top-down model of political control over a subservient class, referring to Haas and Creamer's (2012) notion that leadership and centralized power are critical to monumental construction. But as argued in **Chapter Two**,

collective agreement can also be the driving force behind monumentality. In Salgado Gonzales' (1996a) dissertation, she cited public architecture as being related to the emergence of centralized power within Nicaragua, and that this display of public architecture can be used to determine the degree of social complexity amongst ancient Nicaraguan societies. In the case of El Rayo, based on the scale of memorialization represented, I would argue that this was an act of collaborative cooperation. As the function of El Rayo was a cemetery, social memory was acted out via mortuary practice and memorial construction. The nature of the site implies a sense of community practice rather than elite dictation of construction.

In instances such as at El Rayo, it could be argued that the purpose of the structures there are not to highlight the chiefdom's power, but to preserve the memory of the deceased and develop a reverence for their ancestors, through the mortuary practices exhibited at El Rayo, including both primary and secondary mortuary practices, as described by Chesson (2001). Had there been elite residences within the cemetery, it may have been interpreted as the ruling class or chief connecting their power and authority through their ancestors, but no elite domestic mounds were found[6].

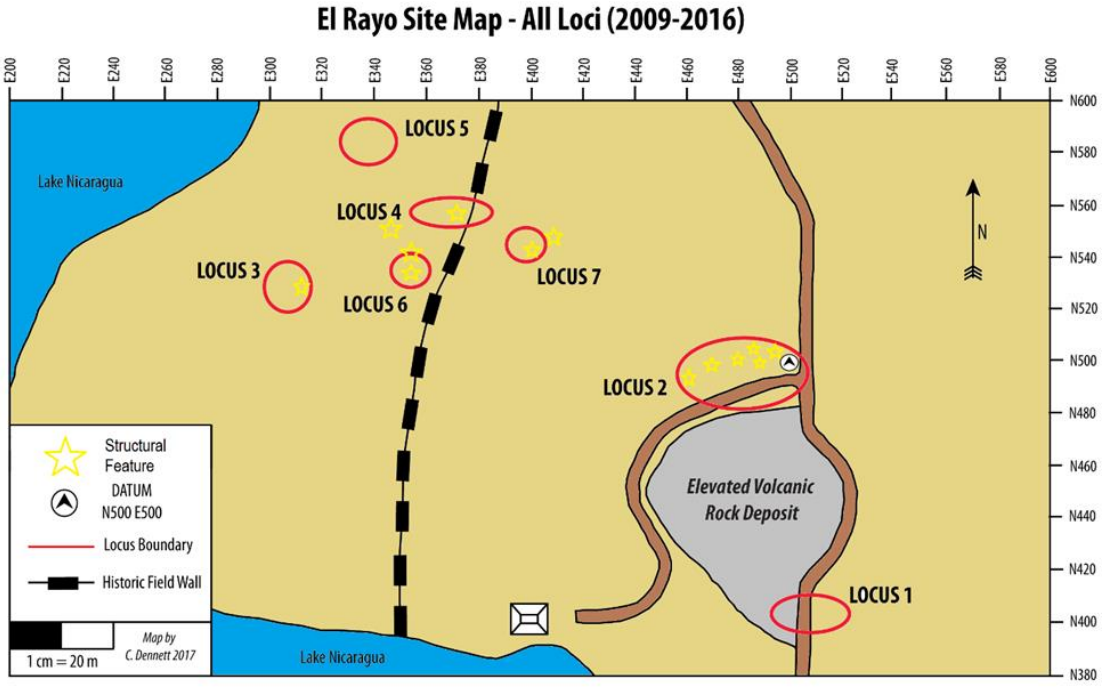
In certain models, monumentality is viewed as a means for an elite group to exert their influence and power over a collective (Trigger 1990), by building a permanent reminder of their ability to control labour and resources embedded on the landscape. Thermodynamic models would have monumentality be a means of social and political competition via conspicuous energy consumption (Thomas 2013) and be expressed on a vast scale and level of elaboration which goes beyond practicality. One aspect of this model is the architectural energetics equations

[6] Nor were any domestic mounds from any hierarchical tier found at El Rayo, but rather special purpose buildings which did not contain artifact assemblages related to domestic practice.

which calculate the levels of energy required to construct a monument (Abrams 1989, Abrams and Bolland 1999).

Architectural Features at El Rayo

In the previous chapter, I established that there were 13 Architectural Features at El Rayo, describing their characteristics and features. In this section, I will be discussing these features in terms of the monumentality or memorialization they possess. In order to do this, some clarification of how various Architectural Features relate to one another must be made, as this will be important in the discussion. I propose that there are four excavated structures at El Rayo, which will be discussed below. I associate Architectural Features 8, 9, and 13 as a part of a singular structure.



[Figure 8.1: Architectural Features Location by Loci; Map by Carrie Dennett]

Structure Name (El Rayo – Structure X)	Architectural Feature #	Time Period
ER-S1 (Locus 2, Op. 3)	6	Sapoá
ER-S2 (Locus 2 Op. 1)	4	Bagaces/Sapoá
ER-S3 (Locus 4)	8, 9, 13	Sapoá
ER-S4 (Locus 6)	11	Sapoá

[Table 8.1: Structure Names at El Rayo]

Architectural Feature 1 and 3

Architectural Feature 1 was excavated initially in 2010, and later continued in 2016. It was a minimum 6 m long late Bagaces period wall structure built overtop of an earlier flooring feature (Architectural Feature 2). Associated with a material context of Bagaces period ceramics, this feature was initially hypothesised to be a retaining wall. This was interpreted as being a part of a system of retaining walls constructed during the Bagaces phase as a way to increase the land area in the face of a higher water level of Lake Cocibolca. However, this theory was challenged in the face of new evidence supporting the water level of the lake was lower in the Bagaces phase and higher during the Sapoá phase of occupation (Harvey et al. 2019). This feature was found at a deeper stratigraphy than Architectural Feature 3, a secondary retaining wall at surface level. These two retaining walls were not considered monumental as they did not demonstrate intensive labour or use or materials to construct, nor were they memorials as they demonstrated no connection to socially significant individuals, events, or ideals.

Architectural Feature 2

Architectural Feature 2 was a talpetate floor positioned beneath Architectural Feature 1. This paved stone floor would have been a part of a structure which may have been exposed to the elements originally, as the rock flooring would have been convenient for walking on where a packed earthen floor would turn to mud in rain-storms. This flooring type, though uncommon, has also been exhibited at Tepetate, in an area dated to the Sapoá period (McCafferty 2009), indicating that this flooring style spanned the transitionary period between Bagaces and Sapoá periods. Due to the stratigraphy, it is likely that the floor was a part of an older structure during the late Bagaces, which was subsequently dismantled and the newer Bagaces period Architectural Feature 1 was positioned over top. I suggest that this floor was apart of a structure created in the early stages of El Rayo's inhabitation. Overall, Architectural Feature 2 does not display monumentality, as it represents a singular element of a larger structure, and though less common than a packed earthen floor, does not demonstrate an exemplary example of architectural accomplishment.

Architectural Feature 4

Architectural Feature 4, also referred to as structure ER-S2, had a minimum dimension of 5m x 2 m, though there were signs of ER-S2 continuing to the west beyond the unit N499/E474. Structure ER-S2 did not represent a monument, as the elaboration of construction was minimal. Though there was a stone foundation, it was simple, and appeared to have been made of materials from near by, not indicating much planning or intensive labour costs for procurement and transportation of materials. There was also no platforming of this structure. The most notable feature of this structure was its stratigraphy. Stratigraphically, there was a 'shoe-pot' urn in the

Sapoá period layer located to the west of the 5 m long wall. This may have been an example of sub-floor storage of a domestic structure; however, this is not supported with other indicators of domestic activity. Later in this chapter, ER-S2 will be compared to the other El Rayo structures to demonstrate any abnormalities in construction technique or labour time.

Architectural Features 5 and 10

These features were the standing stones located at Locus 2 (Architectural Feature 5) and Locus 6 (Architectural Feature 10). The stones were short in height, standing at knee level, but may have had a great symbolic meaning. The standing stones were both located near known burial areas. Architectural Feature 10 was positioned near the Locus 3 cemetery by 30 m, while Architectural Feature 5 was located near the cemetery area of Locus 1 (80 m away, though it is likely that the Locus 1 cemetery area extended further to the north on the volcanic outcropping). Though there were no markings visible on either stone, I hypothesise that they were meant as memorials referring to the cemetery centres spread through the site. Recent observations of EL Rayo may have indicated further examples of standing stones and structure foundations, though no excavation has occurred since 2016 (personal communications with Geoffrey McCafferty 2020).

As Osborne (2014) describes, based on the etymology of the term monumental, monuments are not solely inanimate objects, but are objects which have agency, or are objects that ‘do.’ They actively remind the experiencer of a specific event, individual, ideology, or social group. With this in consideration, the standing stones of El Rayo would have been memorials acting as reminders of the ancestors interred in the cemeteries. I argue this based on the theory behind collective memory; these stones would have represented the locations of burial grounds

and been socially recognized as such. Though they are not considered monuments, as they lack the scale and elaboration criteria, they are arguably memorials based on the rational of Osborne (2014).

Architectural Feature 6

Architectural Feature 6, or ER-S1 is a Sapoá period structure, based on the material assemblage located within the structure. ER-S1 has a minimum dimension of 4 x 3 m though excavation indicates a continuation of either side of the structure. The structure was determined to also be a non-monumental construction on the grounds that it displayed similar wall types to the Bagaces period structures and was not built on a platform. Nor were there any other indicators that this structure would have required an exemplary degree of labour costs. The scale also appears to have been on the smaller side. Architectural Feature 6 may have represented a domestic example in El Rayo, based on the activity patterns. Evidence of food preparation was found within the structure, including lithic debitage, faunal remains, and ceramic serving vessel sherds. However, this may have related to Sapoá period episodic feasting at El Rayo. No hearths were encountered in the investigation of ER-S1, but as the excavations concentrated on the walls, a hearth may have been located within the structure closer to the centre of the floor, and therefore overlooked.

Architectural Feature 7

Architectural Feature 7 was the stone platform, located above the Sapoá period urn burials at Locus 3. This feature has been interpreted to be a memorial related to the direct veneration of the ancestors. Manion (2016) describes this structure as a staging area, though does

not go into detail describing its purpose. I build on the argument that this was a staging area, by proposing that the Architectural Feature was a shrine, which would have acted as a location on which paraphernalia related to the veneration of the deceased would have been placed. This shrine was in direct association with the interred bodies below. For the same reasoning that a tomb stone can be considered a memorial, I conclude that Architectural Feature 7 was intended to remind individuals of the deceased.

Architectural Features 8, 9, and 13

Here, I will argue that ER-S3, encompassing Architectural Features 8, 9, and 13, was a non-domestic monumental memorial. This unusual construction was a Sapoá period structure (dated by the artifact assemblage) and consisted of a large earthen platform (supported to the east and the west with stone retaining walls) and a stone foundation of 24 x 12 m in dimension. The first unusual feature of this structure was its rectangular form. At most sites, architectural structures were round (such as at Aguas Buenas [Geurds and Terpstra 2012], Ayala [Salgado Gonzalez 1996b], Los Angeles [Bransford 1881], Nejapa [Lechado 2017], and other sites [McCafferty 2008, Niemel 2003, Roman-Lacayo 2013]). Similar in form to those structures at Sonzapote (McCafferty et al. 2017), ER-S3 was by far, one of the largest recorded examples of a rectangular building in Greater Nicoya. This size is considered unusual, as most mounded architecture averaged 4 - 9 m in diameter during the Bagaces period (Roman-Lacayo 2013), with evidence suggesting that during the Sapoá period, the sizes of newly constructed structures decreased (Salgado-Gonzalez 1996a).

The mounded platform area was approximately 1625 m^2, encompassing both Loci 4 and 7. As noted previously, two retaining walls were constructed to support the earthen platform, a

feature which would have been necessary to level out the surrounding area for the structure. Architectural Feature 9 was a retaining wall of stacked laja stones, while Architectural Feature 13 was a retaining wall made up of large boulders. There was no indication as to why these two styles were used to create the retaining walls, however, it is possible that they represent two phases of construction. The platform is unique, as it encompasses a greater area than a typical mounded platform in the region.

Another unique feature to ER-S3 was the parallel row of vertical lajas, providing a 30 cm gap between the rows. It is hypothesised that a wooden wall would have been bracketed by this row of lajas. There was also a concentration of bajareque found around the foundation, indicating that the walls were plastered in the wattle and daub style. One large stone which had fallen diagonally to the parallel row of lajas, and was erected by excavators, is assumed to be a part of the entranceway, a feature which was supported by the evidence of a post hole surrounded by a large ring of bajareque on the outside of the structure where a post supporting the roof structure may have been located. This indicates that the roof line could have extended beyond the walls of the structure to provide a shelter for the bajareque walls as well as added additional stability to the roof. The structure was occupied for a significant period of time, as there were three consecutive occupation surfaces excavated within the structure, one of which consisted of ‘talpuja’, a plaster like floor with a high ash concentration.

These occupation surfaces were composed of compact soils, with a clay matrix and little debris or rocky soil making up the floor. Plainware ceramic sherds were located outside the structure, and a significant number of lithic flakes (mostly tertiary and retouch flakes), were found within the rock foundation, indicating that the area was frequently swept clear of debitage. It also indicates that some degree of lithic modification occurred within the structure, though to

what purpose it is yet unclear. Within the structure, there were no domestic artifacts or any other artifact classes found, aside from the broken plainware ceramic sherds found above the last occupation phase surface. The argument for ER-S3 being a monumental memorial will be continued further in this chapter.

Architectural Feature 11

ER-S4 was a small structure from the Sapoá period with a small artifact assemblage. Measuring 2 x 2.5 m, there were no bajareque remains found at this locus, indicating that the structure may have been an open air structure, perhaps similar to the ones discussed by Oviedo (1851). However, the absence of evidence, in this case, may not be evidence of absence. Located within meters of Architectural Feature 10, the standing stone of Locus 6, ER-S4 was determined to be non-monumental, as its dimensions were extremely small. The lack of platforming, and low quantity of materials which would have been required to construct the open aired structure also point away from monumental architecture.

Whether it was connected to the standing stone is unclear. Though it is possible that this might have been a shrine related to the mortuary function of the site, the minimal archaeological evidence makes this assumption only hypothetical, with no data to back it up. ER-S4 was unique in that it demonstrated a different walking surface type than previously found at the site. While the other structures' walking surfaces were smooth soil floors with minimal rock inclusions, the walking surface of the Locus 6 structure was a raised platform of soil and large fist sized cobbles, packed into the earth to create an uneven walking surface. This surface was reminiscent of the Salablanca family's terraced patios surrounding their house. However, this feature may

have also have once been a pile of stone cobbles surrounding the standing stone to form a memorial.

Architectural Feature 12

Architectural Feature 12, a dual chambered cache box associated with the activity pattern at ER-S3, is interpreted here to be of a similar function to those offering boxes of the Maya Classic Period (Braswell 2017, Vadala 2016). The Locus 7 feature had been emptied of most materials at the time of site abandonment. The cache was filled with a layer of cobbles over top of a fine silty soil before the capstones were replaced. Amongst this fill, several broken and lost decorative pieces of jewelry and other artifacts were excavated. Amongst these artifacts were several worked and broken vertebral ear spools, small ceramic ear spools, a fragmented incense burner lid, and, most remarkable, a carved tooth pendant.

Similar cache boxes have been found in the Maya portion of Central America, such as the caches excavated by Braswell (2017) in Belize. He describes these caches as being filled with offerings, including animal and human remains, ceramics, beads, and greenstone (typically jade). In this Belize context, caches were located within a palace complex with multiple elite burials associated near the caches. Yet, typically, Maya caches associated with monumental architecture contain artifact assemblages that are symbolically charged (Vadala 2016). But significant to the understanding of caches is that "during caching events ritual practices and objects are combined to endow important places like shrines, dwellings or monuments with spiritual or religious energies (Vadala 2016:15). As ER-S3 has been determined to be a monumental structure, the association of the cache box to the civic-ceremonial structure, containing what has been interpreted to be ritual paraphernalia, may have had symbolically inscribed meaning.

[Figure 8.2a, 8.2b: Artifacts from the Locus 7 Cache; 8.2a: Broken Fragments of Incense Burner, 8.2b: Carved Tooth Pendant]

In this context, Architectural Feature 12 is not a monument, as it does not display an example of elaborative design or scale, nor does it directly relate to the memorialization of the dead with via association with human remains. However, it is associated with a monumental structure (ER-S3) and its activity patterns, as the cache would have contained the ritual paraphernalia related to the activities surrounding ER-S3. This cache box can be considered a feature associated with the function of ER-S3, possibly implying a ceremonial function of the structure, however, the small artifacts assemblage associated with both Loci 4 and 7 make confirming a functional use difficult.

Architectural Energetics Models

Architectural Energetics Model of ER-S3

ER-S3, incorporates Architectural Features 8, a structure foundation with packed earthen floors; Architectural Feature 9, a retaining wall made of stacked stone lajas; and Architectural Feature 13, a retaining wall made of large boulders. Both retaining walls are supporting the large earthen platform on which Architectural Feature 8 is positioned. The following energetics model is based on hypothetical projections of the monumental structure ER-S3, based on ethnohistoric illustrations (Oviedo 1851) of buildings types within the culture region. No experimental

Material	Quantity	Equation
Earth	$812.5m^3$	V=l*w*h 65m x 0.5m x 25m
Stone	$18.4m^3$	V=l*w*h 4(24m x 0.2m x 0.6m)+4(12m x 0.2m x 0.6m)+3(3m x 0.6m x 0.2m)
Wood	72m	M=(l*2)+(w*2) (24m x 2)+(12m x 2)
Cane	$291.8m^2$	A=l*w 2(24m x 6.08m)
Palm Fronds	$291.8m^2$	A=l*w 2(24m x 6.08m)
Bajareque	$144m^2$	A=l*w 2(12m x 2) + 2(24 x 2)

[Table 8.2: Quantity of ER-S3 by Material Type, Showing Calculations]

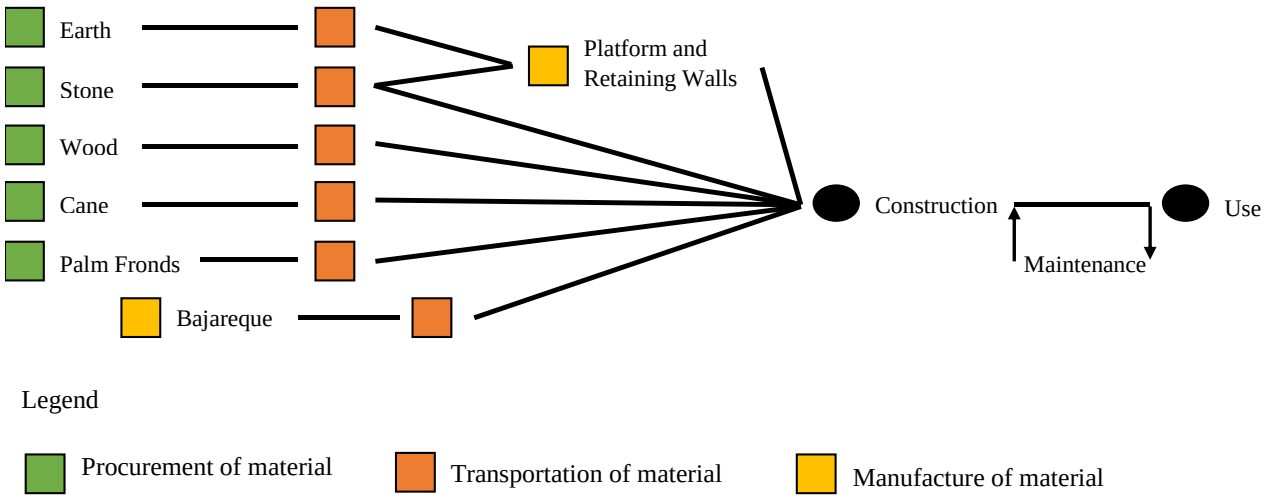
archaeological studies were carried out, thus all estimates of person-days by activity are based on speculation. Limitations to this model include: a small portion of the ER-S3 being excavated, limited remains of the structure, and minimal ethnohistoric accounts of architectural features. An architectural energetic assessment has been modeled on all the El Rayo structures to highlight the unusual features of ER-S3 and to determine a time ratio between construction processes of all the structures. If ER-S3 demonstrates a greater than average labour investment, then it must be considered monumental in the context of Greater Nicoya's architecture. if it is within the range of typical construction investments, then it must be considered non-monumental. As function is required to determine its statue as a memorial, the architectural energetics assessment excludes the possibility of memorialization.

Firstly, material types were converted into their estimated volumetric amount, based on the projections of field measurements and assumed form of the structure. As the exact measurements of the earthen platform, an estimated area of 65 x 25 m with a depth of 0.5 m was assumed. This is based on the distance between Architectural Features 9 and 13, as well as the extents of Loci 4 and 7. An excavated unit at Locus 4 determined that the depth of the added soil was approximately 0.5 m. Volumes of wood for the walls, palm fronds and cane for the roofing, and the bajareque plaster, are based on ethnohistoric illustrations of similarly styled structures in Oviedo (1851). Calculations were completed using formulas for rectangular prisms [volume (V) equals length (l) by width (w) by height (h)]. **Table 8.2** illustrates the volumes of materials which would have been required. Materials would likely have been sourced from nearby localities.

The taskscapes which would have occurred in the process of constructing ER-S3 would have been extensive. Six material classes would have been required for the construction of the

structure: earth, stone (lajas), wood, cane, palm fronds, and bajareque. Though other materials were likely used in the construction process, there was no evidence of these remaining at the site. The basic tasks which would have occurred in the construction process would have been the sourcing and procurement of the material, the transportation of the material to the structure site, manufacturing of materials and special features, and finally the construction of the structure.

Following a behavioural archaeological model, the life history of ER-S3 would have included maintenance and use over time (Schiffer 1976). This is demonstrated in the archaeological record by the presence of multiple floors, indicating that the structure's floor was regularly resurfaced. But, as mentioned in the theory chapter, taskscapes do not end with the activities directly linked with the construction of a structure. Taskscapes include the construction of transportation routes, tools required to complete a task, the required subsistence to maintain



[Figure 8.3: Flowchart of the Construction Process for ER-S3]

the workers, and any associated tasks which would be required for the completion of building ER-S3. Unfortunately, the complete taskscapes of ER-S3 were not identified at the site or surrounding area and cannot be fully commented upon in this discussion.

Finally, by dividing material volumes by output rates yielded a total number of person-days. This was calculated, based on estimated labour abilities of an individual. In this energetics model, person-days represent to amount of labour an individual can effectively work per day. In the following table, 16 basic tasks related to the construction of ER-S3 are considered, including area calculations for clearing the vegetation from the area of Loci 4 and 7, the procurement, transportation, and manufacture of materials, as well as the construction steps of Architectural Feature 8. As ethnohistoric examples were not available for estimates of volume or area of task by person-day, these estimates do not reflect on known data.

This energetics model has provided an example of the quantity of labour it would have taken to produce ER-S3, which when compared to the less elaborate structures elsewhere at the site highlights an importance of the Locus 4 civic-ceremonial building. The building project would have required approximately 490.2 – 243.8 person-days to complete, which is a significant investment of time, resources, and energy. This was modeled after a collective labour approach to construction. In the following sections, an architectural energetics model of the other structures of El Rayo will be evaluated in order to argue that ER-S3 was a monumental structure based on labour cost. Finally, a hypothetical 9 m in diameter circular structure will be evaluated to complete the range of typical domestic structures through architectural energetics models. These assessments will aide in describing the potential monumental status of ER-S3. If ER-S3, after comparison to these other models, is outside the typical range of domestic structures, then it can be considered to be monumental.

Task	Quantity by Task	Minimum Quantity of Task per Person-Day	Maximum Quantity of Task per Person-Day	Total Number of Person Days per Quantity
Clearing Land	1625m^2	200m^2	400m^2	8.1 - 4.1 d/m^2
Procurement of Earth	812.5m^3	10m^3	20m^3	81.3 - 40.1 d/m^3
Transportation of Earth	812.5m^3	5m^3	10m^3	162.5 - 81.1 d/m^3
Procurement of Stone	18.4m^3	5m^3	10m^3	3.7 - 1.8 d/m^3
Transporting Stone	18.4m^3	5m^3	10m^3	3.7 - 1.8 d/m^3
Procuring Wood	72m	1m	2m	72.0 – 36.0 d/m
Transporting Wood	72m	5m	10m	14.4 – 7.2 d/m
Procuring Cane	291.8m^2	15m^2	30m^2	19.5 – 9.7 d/m^2
Transporting Cane	291.8m^2	15m^2	15m^2	19.5 – 9.7 d/m^2
Procuring Palm Fronds	291.8m^2	10m^2	20m^2	29.2 - 14.6 d/m^2
Transporting Palm Fronds	291.8m^2	10m^2	20m^2	29.2 – 14.6 d/m^2
Setting Lajas	144m	50m	100m	2.9 - 1.4 d/m
Constructing Wooden Structure	72m	5m	10m	14.4 – 7.2 d/m
Constructing Roof (Cane and Palm)	583.6m^2	100m^2	200m^2	5.8 – 2.9 d/m^3
Manufacturing Bajareque	144m^2	12m^2	25m^2	12.0 – 5.8 d/m^2
Plastering Bajareque	144m^2	12m^2	25m^2	12.0 – 5.8 d/m^2
Total Person Days	N/A	N/A	N/A	490.2– 243.8 d/m

[Table 8.3: Taskscapes of ER-S3 Construction Including Material Procurement and Transportation]

Architectural Energetics Model of ER-S1

Architectural Feature 6, or ER-S1, is a small structure in Locus 2, operation 6. Following the same formula as the ER-S3 model, ER-S1 is compared in quantity of labour days required to construct in order to demonstrate the monumental status of ER-S3. As will be demonstrated, the construction of ER-S1 took fewer labour days and materials to construct, as well as used a

Material	Quantity	Equation
Stone	$0.63m^3$	V=l*w*h 2(3m x 0.3m x 0.15m) + 2(4m x 0.3m x 0.15m)
Wood	0.6m	M=w*4 0.15m x 4
Cane	$42.4m^2$	A=l*w 2(4m x 2m) + 2(3m x 2m) + 2(4m x 1.8m)
Palm Fronds	$14.4m^2$	A=l*w 2(4m x 1.8m)
Bajareque	$28m^2$	A=l*w 2(4m x 2m) + 2(3m x 2m)

[Table 8.4: Quantity of ER-S1 by Material Type, Showing Calculations]

different design for the structure's form. For the sake of brevity, the flowchart illustration will be skipped in this section as it matches the ER-S2 chart. (See **Figure 8.5** for the flowchart of ER-S1's construction process.) The following architectural energetics model is again based on the ethnohistoric illustrations from Oviedo (1851) and the quote from Oviedo (1945), as well as the projections of labour-day time requirements as estimated for ER-S3. Materials were estimated based on the descriptions of structure materials from Oviedo (1945), including the assumption of

Task	Quantity by Task	Minimum Quantity of Task per Person-Day	Maximum Quantity of Task per Person-Day	Total Number of Person-Days per Quantity
Clearing Land	$20m^2$	$200m^2$	$400m^2$	0.1 – 0.05 d/m^2
Procurement of Stone	$0.63m^3$	$5m^3$	$10m^3$	0.12 – 0.06 d/m^3
Transportation of Stone	$0.63m^3$	$5m^3$	$10m^3$	0.12 – 0.06 d/m^3
Procurement of Wood	0.6m	1m	2m	0.6 – 0.3 d/m
Transportation of Wood	0.6m	5m	10m	0.12 – 0.06 d/m
Procurement of Cane	$42.4m^2$	$15m^2$	$30m^2$	2.83 – 1.41 d/m^2
Transportation of Cane	$42.4m^2$	$15m^2$	$30m^2$	2.83 – 1.41 d/m^2
Procurement of Palm fronds	$14.4m^2$	$10m^2$	$20m^2$	1.44 – 0.07 d/m^2
Transportation of Palm Fronds	$14.4m^2$	$10m^2$	$20m^2$	1.44 – 0.07 d/m^2
Setting Stone	14m	50m	100m	0.28 – 0.14 d/m
Constructing Wooden Frame	0.6m	5m	10m	0.12 – 0.06 d/m
Constructing Walls and Roof	$56.8m^2$	$100m^2$	$200m^2$	0.57 – 0.28 d/m^2
Manufacturing Bajareque	$28m^2$	$12m^2$	$25m^2$	2.33 - 1.12 d/m^2
Plastering Bajareque	$28m^2$	$12m^2$	$25m^2$	2.33 - 1.12 d/m^2
Total Person Days	N/A	N/A	N/A	15.23 – 6.24 d/m

[Table 8.5: Taskscapes of ER-S1 Construction Including Material Procurement and Transportation]

wood being used for framing purposes only. Cane, in this structure, would have been used as the wall material as well as in the roof structure. The stone foundation was not made up of lajas, as demonstrated in **Figure 7.5**, but instead of conveniently sourced rock from the surrounding area. ER-S1 was a 3 x 4 m structure.

The taskscapes of this construction project would have been similar to the ER-S3 structure, without the platforming of the area with soil. The land would have been cleared prior to construction, of vegetation. Next, the materials would have been gathered, including the stone (not lajas), wooden beams, cane for walls and the roof structure, and the palm fronds. The materials would have been procured and then transported to the site of construction. the first steps of the construction would have been the construction of the stone foundation. As this foundation was made up of an amalgamation of stones of many sizes, it is likely that they were sourced from the surrounding area. The frame, then the walls and roof structure would them have been constructed before the manufacturing and plastering of the bajareque to the walls. There were not consecutive floors found, indicating that the structure was not used and reused frequently.

The material rates were then divided by the previously estimated output rates as shown in **Table 8.3**. One major difference in the construction style between these two structures was the lack of intentional platforming for ER-S1. Calculations of minimum and maximum output rates were added together to create a range of 15.25 – 6.24 d/m of material constructed. Assuming that most structures (based off of Roman-Lacayo's [2013] household size projections) average at approximately 4-9 m in diameter, ER-S1 would fit under the category of average structure size and would require less than a month's labour to complete. This differs greatly from the massive size of ER-S3, which had a range of 490.2 – 243.8 d/m of material constructed. Though it is not

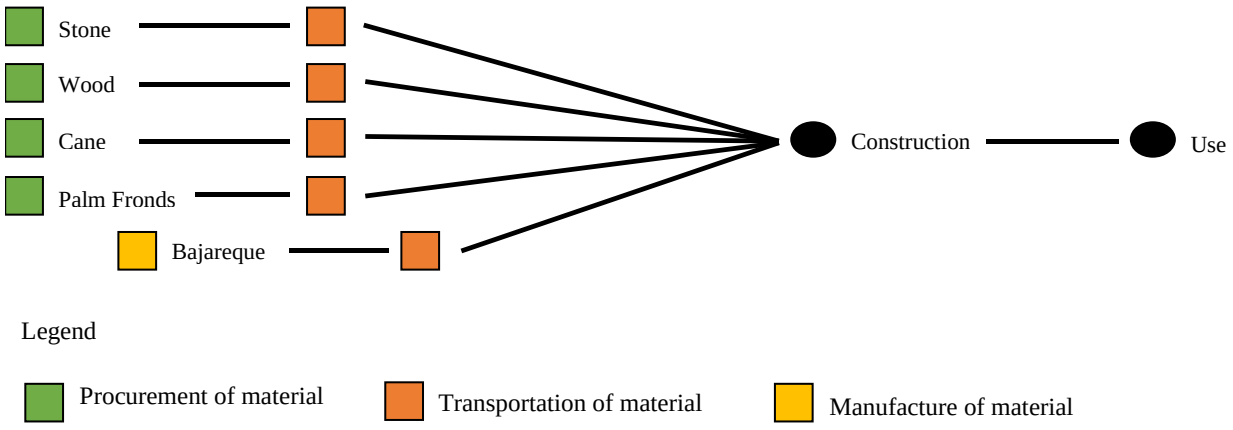
determined what the function of ER-S1 was, a household purpose cannot be crossed off the list. However, a lack of artifactual remains makes determining an activity pattern difficult.

Architectural Energetics Model of ER-S2

To strengthen the argument that ER-S3 represents a monumental structure in the El Rayo necropolis, further architectural energetics comparisons have been made to structures ER-S2 and ER-S4. Following the same design style of ER-S1, ER-S2's materials were calculated following the same formulas. Given the similar dimensions as ER-S1, the material quantities and time requirements are very close to one another. As should be mentioned, the structure ER-S2 may have been larger than then excavated 5 x 2m area suggested, as the full extent of the building was not uncovered. ER-S2, or Architectural Feature 4, is located in Locus 2, Operation 1.

Material	Quantity	Equation
Stone	$0.63m^3$	V=l*w*h 2(5m x 0.3m x 0.15m) + 2(2m x 0.3m x 0.15m)
Wood	0.6m	M=w*4 0.15m x 4
Cane	$42.1m^2$	A=l*w 2(5m x 2m) + 2(2m x 2m) + 2(5m x 1.41m)
Palm Fronds	$14.1m^2$	A=l*w 2(5m x 1.41m)
Bajareque	$28m^2$	A=l*w 2(5m x 2m) + 2(2m x 2m)

[Table 8.6: Quantity of ER-S2 by Material Type, Showing Calculations]



[Figure 8.4: Flowchart of the Construction Process for ER-S1 and ER-S2]

The taskscapes would have followed suit to ER-S1. Once again, an earthen platform was absent from the structure's design, which would have shortened the construction process and labour time required. This building also demonstrated a lack of consecutive floors, indicating the building was not used and reused over a long period of time. Another difference between the ER-S3 monument and ER-S1 and ER-S2 was the lack of wooden walls between parallel rows of stone lajas. Instead, the more typical cane walls were likely incorporated with ER-S1 and ER-S2, a feature described in Oviedo (1945). Once more, the sourcing techniques and transportation methods of the material used in these structures is undetermined, as studies of ancient pathways have not been conducted in the area**.**

Again, using the same estimates of labour outputs per day, a range of 16.19 – 6.19 d/m of material constructed was determined for ER-S1 and ER-S2. The most labour intensive tasks would have been the procurement and transportation of cane reeds, and the manufacturing and

plastering of bajareque. Following Roma-Lacayo's (2013) estimates of mounds, with a range of 4-9 m diameters, the area would range from 12.57 – 63.62 m^2. ER-S1 and ER-S2, at 12 m^2 and

Task	Quantity by Task	Minimum Quantity of Task per Person-Day	Maximum Quantity of Task per Person-Day	Total Number of Person-Days per Quantity
Clearing Land	18m^2	200m^2	400m^2	0.09 – 0.05 d/m^2
Procurement of Stone	0.63m^3	5m^3	10m^3	0.12 – 0.06 d/m^3
Transportation of Stone	0.63m^3	5m^3	10m^3	0.12 – 0.06 d/m^3
Procurement of Wood	0.6m	1m	2m	0.6 – 0.3 d/m
Transportation of Wood	0.6m	5m	10m	0.12 – 0.06 d/m
Procurement of Cane	42.1m^2	15m^2	30m^2	2.81 – 1.40 d/m^2
Transportation of Cane	42.1m^2	15m^2	30m^2	2.81 – 1.40 d/m^2
Procurement of Palm fronds	14.1m^2	10m^2	20m^2	1.41 – 0.07 d/m^2
Transportation of Palm Fronds	14.1m^2	10m^2	20m^2	1.41 – 0.07 d/m^2
Setting Stone	14m	50m	100m	0.28 – 0.14 d/m
Constructing Wooden Frame	0.6m	5m	10m	0.12 – 0.06 d/m
Constructing Walls and Roof	56.2m^2	100m^2	200m^2	0.56 – 0.28 d/m^2
Manufacturing Bajareque	28m^2	12m^2	25m^2	2.33 - 1.12 d/m^2
Plastering Bajareque	28m^2	12m^2	25m^2	2.33 - 1.12 d/m^2
Total Person Days	N/A	N/A	N/A	16.19 – 6.19 d/m

[Table 8.7: Taskscapes of ER-S2 Construction Including Material Procurement and Transportation]

10 m ^{2} respectively, fall at the end of the spectrum, while ER-S3, with an area of 288 m^2 is an outlier and likely not a household structure, based on the typical sizes of house mounds.

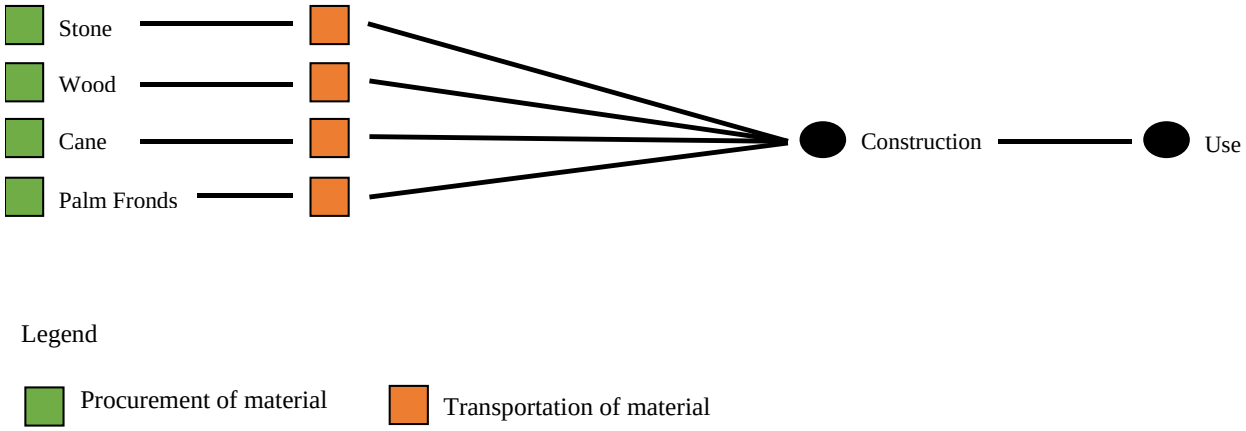
Architectural Energetics Model of ER-S4

The final structure at El Rayo excavated during the PAGN project was ER-S4. This was the smallest structure of the four buildings. Located at Locus 6, Architectural Feature 11, or ER-

Material	Quantity	Equation
Stone	1.08m^3	V=l*w*h 2(2.5m x 0.2m x0.6m) + 2(2m x 0.2m x 0.6m)
Wood	0.6m	M=w*4 0.15m x 4
Cane	7.05m^2	A=l*w 2(2.5m x 1.41m)
Palm Fronds	7.05m^2	A=l*w 2(2.5m x 1.41m)

[Table 8.8: Quantity of ER-S4 by Material Type, Showing Calculations]

S4, to date has been the smallest structure excavated at this site, measuring 2.5 x 2 m in size, and lacked bajareque plaster. This indicates that the built form was an open aired structure. Stone, wood, cane reeds, and palm fronds were used in the construction process, and calculated by linear meters, area, and volume of the material required.



[Figure 8.5: Flowchart of the Construction Process for ER-S4]

The taskscapes of the ER-S4 building would have been similar to the other structures. Yet, as demonstrated in **Figure 8.5**, there was not a manufacturing process of material, nor was there a use-reuse cycle, as suggested by the lack of consecutive floors. This structure was different in design from ER-S3, as it incorporated only a singular row of laja stones for the foundation as seen in **Figure 7.9**, implying that there was not wooden post walls, and there was no cane reed walls with bajareque plastered to them as would have been present in ER-S1 and ER-S2.

Based off of **Table 8.9**, ER-S4 would have taken approximately 4.01 – 2.01 d/m of material to construct, making it the fastest structure to build. No one task would have taken more than a day to complete, unlike the other buildings' tasks. This would have been an insignificant investment of labour, time, and materials to create the open aired structure.

Task	**Quantity by Task**	**Minimum Quantity of Task per Person-Day**	**Maximum Quantity of Task per Person-Day**	**Total Number of Person-Days per Quantity**
Clearing Land	10.5m^2	200m^2	400m^2	0.05 – 0.03 d/m^2
Procurement of Stone	1.08m^3	5m^3	10m^3	0.22 – 0.11 d/m^3
Transportation of Stone	1.08m^3	5m^3	10m^3	0.22 – 0.11 d/m^3
Procurement of Wood	0.6m	1m	2m	0.6 – 0.3 d/m
Transportation of Wood	0.6m	5m	10m	0.12 – 0.06 d/m
Procurement of Cane	7.05m^2	15m^2	30m^2	0.47 – 0.24 d/m^2
Transportation of Cane	7.05m^2	15m^2	30m^2	0.47 – 0.24 d/m^2
Procurement of Palm fronds	7.05m^2	10m^2	20m^2	0.71 – 0.35 d/m^2
Transportation of Palm Fronds	7.05m^2	10m^2	20m^2	0.71 – 0.35 d/m^2
Setting Stone	9m	50m	100m	0.18 – 0.09 d/m
Constructing Wooden Frame	0.6m	5m	10m	0.12 – 0.06 d/m
Constructing Roof	14.1m^2	100m^2	200m^2	0.14 – 0.07 d/m^2
Total Person Days	N/A	N/A	N/A	4.01– 2.01 d/m

[Table 8.9: Taskscapes of ER-S4 Construction Including Material Procurement and Transportation]

Extrapolating Architectural Energetics Models to Proposed Circular Structure

As discussed in Roman-Lacayo (2013), the largest documented household structures were recorded to be 9 m in diameter. In consideration of the Oviedo (1945) quote of the building time of houses from **Chapter Four**, an architectural energetics model has been assembled based

on the 9 m structure. The quote claimed that a female ex-prostitute seeking marriage would allot 30 – 40 days for the construction of her new house as built to her specifications by her chosen suitors (Oviedo 1945). In keeping with these time requirements, a large circular house is being considered through architectural energetics to not only prove whether the estimates of work per day by activity used throughout these models are close to probably working conditions, but whether it was possible to construct a house on the larger side of the household range within the allotted time frame. If the estimates are correct, then the taskscapes chart should be close to the 30 – 40 day range.

Material	Quantity	Equation
Stone	$1.27m^3$	$V=C*w*h$, $C=\pi d$ 28.27m x 0.3m x 0.15m
Wood	4.20m	$M=w*28$ 0.15m x 28
Cane	$121.72m^2$	$L=\pi rs$, $L=2\pi rh$ $(\pi$ x 4.5m x 4.61) + 2(π x 4.5m x 2m)
Palm Fronds	$65.17m^2$	$L=\pi rs$ π x 4.5m x 4.61m
Bajareque	$56.55m^2$	$L=2\pi rh$ 2(π x 4.5m x 2m)

[Table 8.10: Quantity of Circular Structure by Material Type, Showing Calculations]

This modeled structure would have a conical roof of cane reeds and palm fronds, cane reed walls overlapping a wooden post frame, bajareque plastering to the walls, and a stone foundation similar in style to ER-S1. In order to calculate the material quantities, the lateral

surface area of a cone ($L=\pi rs$), and circular prism ($L=2\pi rh$) were calculated. These material correlates were then calculated against the minimum and maximum quantity of tasks by person day to create a range of time in which the structure may be built.

Task	Quantity by Task	Minimum Quantity of Task per Person-Day	Maximum Quantity of Task per Person-Day	Total Number of Person Days per Quantity
Clearing Land	31.42m	$200m^2$	$400m^2$	0.31 – 0.16 m
Procurement of Stone	$1.27m^3$	$5m^3$	$10m^3$	0.25 – 0.13 d/m^3
Transporting Stone	$1.27m^3$	$5m^3$	$10m^3$	0.25 – 0.13 d/m^3
Procuring Wood	4.2m	1m	2m	4.20 – 2.10 d/m
Transporting Wood	4.2m	5m	10m	0.84 – 0.42 d/m
Procuring Cane	$121.72m^2$	$15m^2$	$30m^2$	8.11 – 4.06 d/m^2
Transporting Cane	$121.72m^2$	$15m^2$	$15m^2$	8.11 – 4.06 d/m^2
Procuring Palm Fronds	$65.17m^2$	$10m^2$	$20m^2$	6.52 – 3.26 d/m^2
Transporting Palm Fronds	$65.17m^2$	$10m^2$	$20m^2$	6.52 – 3.26 d/m^2
Setting Stone	28.27m	50m	100m	0.57 – 0.28 d/m
Constructing Wooden Structure	4.2m	5m	10m	0.84 – 0.42 d/m
Constructing Roof (Cane and Palm)	$186.89m^2$	$100m^2$	$200m^2$	1.87 – 0.93 d/m^3
Manufacturing Bajareque	$56.55m^2$	$12m^2$	$25m^2$	4.71 – 2.26 d/m^2
Plastering Bajareque	$56.55m^2$	$12m^2$	$25m^2$	4.71 – 2.26 d/m^2
Total Person Days	N/A	N/A	N/A	47.81 – 23.73 d/m

[Table 8.11: Taskscapes of Circular Structure Including Material Procurement and Transportation]

The table shows that the construction of a 9 m in diameter structure would take a range from 47.81 – 23.73 d/m of material to construct. While not exactly within the 30 – 40 day range, the structure was at the higher end of the household structure range. But this model is based on the labour of one individual, as opposed to a group of individuals, which would change the number of days it would take to construct a building. I would therefore conclude that the time estimates of construction are likely close to realistic occurrences, thus validating the architectural energetics models of ER-S1, ER-S2, ER-S3, and ER-S4.

Comparing ER-S3 to ER-S1, ER-S2, and ER-S4

Returning to the criteria in **Chapter Two**, a monument can be considered monumental if it demonstrates a scale larger than minimal space requirements, has taken specialized skill to construct, and is elaborative in design. Furthermore, a monument demonstrates excessive labour cost to construct. A monument may also be a memorial if it is a commemorative reminder of the

Monument	Presence	Memorial	Presence
Large in Scale	✓	Commemorative Reminder of the Past	?
Elaborate in Design	✓	Has Social Meaning	✓
Exceeds Minimal Space Requirements	✓	Represents an Event, Individual, Belief System, or Social Group	✓
Displays Skilled Construction Methods	✓		
Excessive Labour Costs	✓		

[Table 8.12: Monumental versus Memorial Status of ER-S3 from Architectural Energetics Model]

past, has social value, and represents an event, individual, belief system, or social group (or a combination thereof). Using the architectural energetics models to detail the labour commitments required in the construction of ER-S3 in comparison to the other El Rayo structures, reveals the monumental status of ER-S3.

Based on scale, ER-S3 outstrips the size of the other El Rayo buildings. The structure size alone is 24 x 12m, but with the platform and the retaining walls added to the calculation of size, the built form is 65 x 25m, with an area of 1625m^2. Even the largest household mounds of Tisma, as described by Roman-Lacayo (2013), were calculated to be 9m in diameter, with an area of 63.62m^2. The average area of ER-S1, ER-S2, and ER-S4 was 9m^2, ranging from 5m^2 (ER-S4) – 12m^2 (ER-S1), bringing them well below the size of ER-S3's area by 1616m^2 (equaling 0.55% of ER-S3).

In comparison of design, the elaboration of construction technique of ER-S3 when compared to the simplistic style of ER-S4 is astounding. The wall and foundation style of ER-S3 alone could qualify the structure as monumental in form, but with the addition of the earthen platform and retaining walls, the elaboration of design when compared to the other buildings of El Rayo becomes apparent. This leads into the next criterion, excessive space. The ER-S3 built form combines internal and external space to create one activity area, incorporating multiple architectural design elements, including the Locus 7 cache box. If this were a house, then the structure would by far surpass the minimal requirements of space, (being 12.57m^2 – 63.62m^2 as suggested From Roman-Lacayo [2013]). However, it is unclear what the function of ER-S3 was. Based on the cache boxes contents, it has been hypothesised as a ritual performance area, but to what extent is uncertain.

Task	ER-S1 d/m	ER-S2 d/m	ER-S3 d/m	ER-S4 d/m
Clearing Land	0.1 – 0.05 d/m^2	0.09 – 0.05 d/m^2	8.1 -4.1 d/m^2	0.05 – 0.03 d/m^2
Procurement of Earth	N/A	N/A	81.3 – 40.1 d/m^3	N/A
Transportation of Earth	N/A	N/A	162.5 – 81.1 d/m^3	N/A
Procurement of Stone	0.12 – 0.06 d/m^3	0.12 – 0.06 d/m^3	3.7 – 1.8 d/m^3	0.22 – 0.11 d/m^3
Transportation of Stone	0.12 – 0.06 d/m^3	0.12 – 0.06 d/m^3	3.7 – 1.8 d/m^3	0.22 – 0.11 d/m^3
Procurement of Wood	0.6 – 0.3 d/m	0.6 – 0.3 d/m	72.0 – 36.0 d/m	0.6 – 0.3 d/m
Transportation of Wood	0.12 – 0.06 d/m	0.12 – 0.06 d/m	14.4 – 7.2 d/m	0.12 – 0.06 d/m
Procurement of Cane	2.83 – 1.41 d/m^2	2.81 – 1.40 d/m^2	19.5 – 9.7 d/m^2	0.47 – 0.24 d/m^2
Transportation of Cane	2.83 – 1.41 d/m^2	2.81 – 1.40 d/m^2	19.5 – 9.7 d/m^2	0.47 – 0.24 d/m^2
Procurement of Palm Fronds	1.44 – 0.07 d/m^2	1.41 – 0.07 d/m^2	29.2 – 14.6 d/m^2	0.71 – 0.35 d/m^2
Transportation of Palm Fronds	1.44 – 0.07 d/m^2	1.41 – 0.07 d/m^2	29.2 – 14.6 d/m^2	0.71 – 0.35 d/m^2
Setting Stone/Lajas	0.28 – 0.14 d/m	0.28 – 0.14 d/m	2.9 -1.4 d/m	0.18 – 0.09 d/m
Constructing Wood Elements	0.12 – 0.06 d/m	0.12 – 0.06 d/m	14.4 – 2.9 d/m	0.12 – 0.06 d/m
Constructing Cane/Palm Frond Elements	0.57 – 0.28 d/m^2	0.56 – 0.28 d/m^2	5.8 – 2.9 d/m^3	0.14 – 0.07 d/m^2
Manufacturing Bajareque	2.33 – 1.12 d/m^2	2.33 – 1.12 d/m^2	12.0 – 5.8 d/m^2	N/A
Plastering Bajareque	2.33 – 1.12 d/m^2	2.33 – 1.12 d/m^2	12.0 – 5.8 d/m^2	N/A
Total d/m	15.23 – 6.24 d/m	16.19 – 6.19 d/m	490.2 – 243.8 d/m	4.01 – 2.01 d/m

[Table 8.13: Summary of Person-Days per Activity and the Total Construction Time for Structures ER-S1, ER-S2, ER-S3, and ER-S4]

The construction methods of ER-S3 would have taken a skilled and experienced worker/team of labourers to build, however, the other structures would also have required specialized knowledge to create. As to the labour costs, the previous four architectural energetics models has clearly demonstrated a significantly higher time, labour, and material commitment for ER-S3 when compared to the other structures (see **Table 8.11**). But how can ER-S3 be considered a memorial as well as a monument? It comes down to the presence of the cache box on the external platform, and its connection to the structure's function. If the prior hypothesis that the ER-S3 structure was connected to ritual performance is true, then it can be associated to a belief system and would therefore have social meaning. In summary, there was monumentality present within El Rayo, as well as memorialization as demonstrated by ER-S3, and the other Architectural Features of the El Rayo necropolis.

Summary

In discussing the monumentality of El Rayo, one must consider the context in which the site is located as well as the culture area associated with this monumental site. El Rayo is a site with a featured cemetery complex, where many human burials spanning the Bagaces and Sapoá periods were interred, and as such, any monuments or memorials within the site may be assumed to be associated with the interment of the deceased and with ancestor worship. It is important to understand the function of a site, in the context of its use and the means by which the site is experienced by the population, though it must also be understood by its construction cost and the specialized skill required to construct it. Although the presence of public architecture, such as that seen at El Rayo, may indicate an increased centralization of hierarchy and more complex

Feature Name	Monument	Memorial	Feature	Reason for Status
Architectural Feature 1	No	No	Bagaces retaining wall	N/A
Architectural Feature 2	No	No	Bagaces talpetate floor	N/A
Architectural Feature 3	No	No	Bagaces retaining wall	N/A
Architectural Feature 4/ER-S2	No	No	Bagaces structure	N/A
Architectural Feature 5	No	Yes	Standing stone	Commemorative Reminder of the Past
Architectural Feature 6/ER-S1	No	No	Sapoá structure	N/A
Architectural Feature 7	No	Yes	Stone platform	Represents Belief System
Architectural Feature 8/ER-S3	Yes	Yes	Sapoá structure	Scale is Monumental, Has Social Meaning
Architectural Feature 9/ER-S3	Yes	Yes	Sapoá retaining wall	Scale is Monumental, Has Social Meaning
Architectural Feature 10	No	Yes	Standing stone	Commemorative Reminder of the Past
Architectural Feature 11/ER-S4	No	No	Sapoá structure	N/A
Architectural Feature 12	No	No	Sapoá cache box	N/A
Architectural Feature 13/ER-S3	Yes	Yes	Sapoá retaining wall	Scale is Monumental, Has Social Meaning

[Table 8.14: Summary of Monumental and Memorial Architectural Features at El Rayo]

society, allowance must be made for other models of monumental construction, such as those examples provided by Sassaman and Randall (2012).

This chapter has looked at the organization of labour to construct a monumental site, considering the concept of temporarily organized collective groups of authoritative figures to direct a construction project which is then disbanded post-completion of the monument. This thesis has discussed the monumental characteristics of El Rayo in great detail. It has outlined the key features of monumentality, demonstrating site organization, structure size, and structure elaboration, and provided an energetics model of the monumental structure ER-S3. Architectural energetics models were then applied to the three remaining structures at El Rayo in order to contrast the structures to highlight ER-S3's monumental status. This discussion chapter has set up the following chapter, analysing other examples of monumentality within the Greater Nicoya region and the outer area of Costa Rica. El Rayo shall be compared to other monumental sites to demonstrate the degree of monumentality at the site.

Chapter 9: Comparative Sites

This thesis began by questioning whether there was a monument presence within Greater Nicoya and furthermore, asking how, if analysed using a consistent definition, El Rayo compared to other sites both in Greater Nicoya and Costa Rica. As the previous chapter concluded, there was a presence of memorials and a monument at El Rayo. As the purpose of this thesis is to best understand the monumentality and memorials of El Rayo, I shall draw comparisons between other sites both within and external to the Greater Nicoyan region. Throughout this thesis, it has been argued that El Rayo represents a site with monumentality on the grounds that it demonstrates significant site planning, architectural features which remind viewers of a social group, and a monumental memorial exhibiting large-scale construction with an assumedly non-domestic context. El Rayo also demonstrates potential ritual performance activity indicated by the presence of the Architectural Feature 12 cache box and its contents, which contained costume decor and ceramic vessel fragments. In comparing other sites of monumental and memorial features to El Rayo, I will highlight the elements of El Rayo which constitute monumentality, keeping in mind the relative cultural context.

Comparative Sites in Nicaragua

In order to consider El Rayo's monumentality, it is necessary to look at non-monumental sites to provide a frame of reference. In Salgado Gonzalez's dissertation, she indicates that El Rayo was a nucleated village during the Sapoá period, of approximately 60 hectares with a second tier level of hierarchy (1996a: 118). This suggests that the sociopolitical complexity of a site can be determined by the degree of hierarchical tiers present within a site. However, this

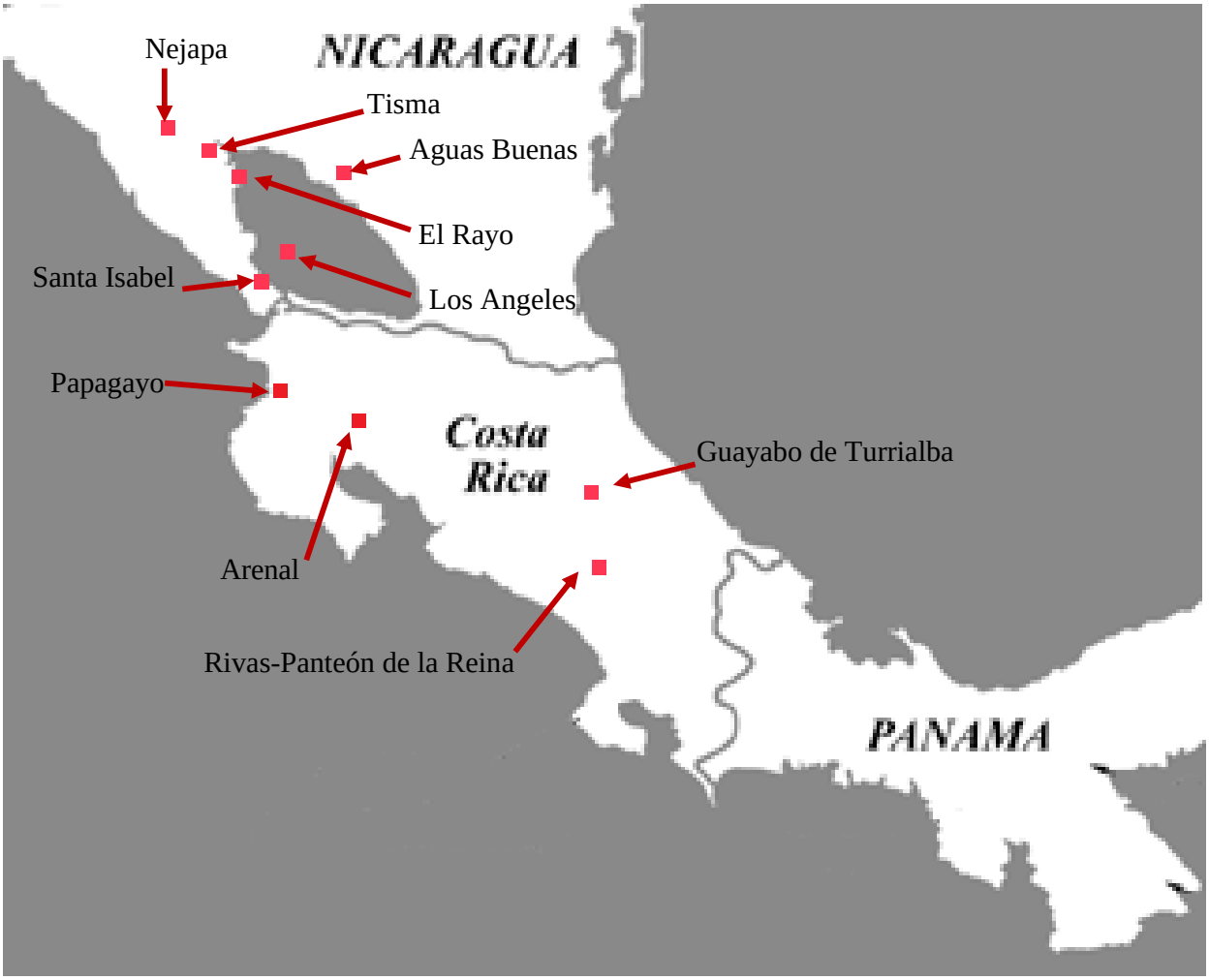
initial estimate of size has since been recalculated to be only 20 hectares in area, perhaps implying that the site of El Rayo was a special function site. In this section, various sites with domestic features shall be discussed in comparison to El Rayo in order to highlight those features which make El Rayo a site containing monumentality. As stated in the previous chapter, El Rayo did not display much evidence to support that any of the structures excavated were of a domestic function.

Ayala, Tisma, and Santa Isabel

Located 8 km south of modern day Granada City, Ayala was the largest nucleated site in the Granada department until 800 AD (Dennett et al. 2019, Salgado Gonzalez 1996b). Following the decline in population, Ayala continued as an influential site, by being a major producer and distributor of Papagayo polychrome ceramics during the Sapoá (Dennett et al. 2019). At the site of Ayala, during the Bagaces phase, domestic structures averaged approximately 4 x 4 m with alignments of stones encircling the structure's limits, and domestic activities occurred in a 16 m area surrounding the domestic mound (Salgado Gonzalez 1996a). Bajareque and imprints of cane reeds indicate the construction of the structures were similar to ER-S3 at El Rayo. The flooring at Ayala was also similar to the packed earthen floors demonstrated at El Rayo, specifically structures ER-S1, and ER-S2, though it did not specify a talpuja floor such as that found at ER-S3.

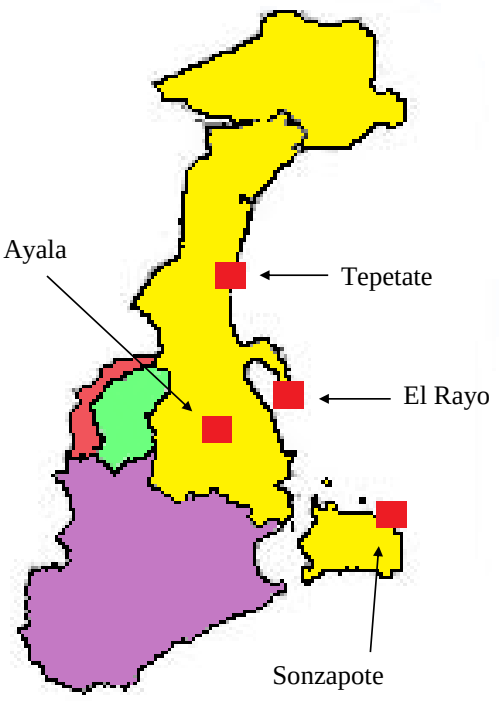
Yet there are other examples where El Rayo can be compared to domestic sites, again emphasising the monumentality of El Rayo's cemetery complex. As Roman-Lacayo (2013) states, mounded platform structures often indicate elite residences or ceremonial architecture, but the site of Tisma, Masaya goes against this generalization, given the low artifact assemblages.

Bagaces period domestic mounds at Tisma measured 4 – 9 m in diameter on raised platforms. The largest mound, measuring 8.4 m in diameter, sat on a raised platform of 1.3 m. During the Sapoá period there is a dramatic increase in population within the site, and a decrease in structure diameters to about 4 m in diameter, but still with a 1 m platform base. Mounds are also constructed closer together (Roman-Lacayo 2013).



[Figure 9.1: Map of Archaeological Sites in Nicaragua and Costa Rica]

Another non-monumental site which can be compared to El Rayo is Santa Isabel, a site located in the Rivas department. The architectural remains of the site were on mounded platforms ranging from 1 – 3 m above ground level with packed earthen floors (McCafferty 2008). One floor had broken ceramic sherds embedded into the surface, perhaps to form a paved surface (McCafferty 2008). An obvious difference between the structures at Santa Isabel and those at El Rayo were the rock outlines missing from the residential structures of Santa Isabel (McCafferty 2008), a feature which was abundantly visible at El Rayo. Finally, a significant feature, which was found at Santa Isabel, in which was remarkably missing from El Rayo, was hearths. This absence, again, suggests that the function of ER-S3 in particular, was not domestic in nature.



[Figure 9.2: Map of Archaeological Sites in Granada, Nicaragua]

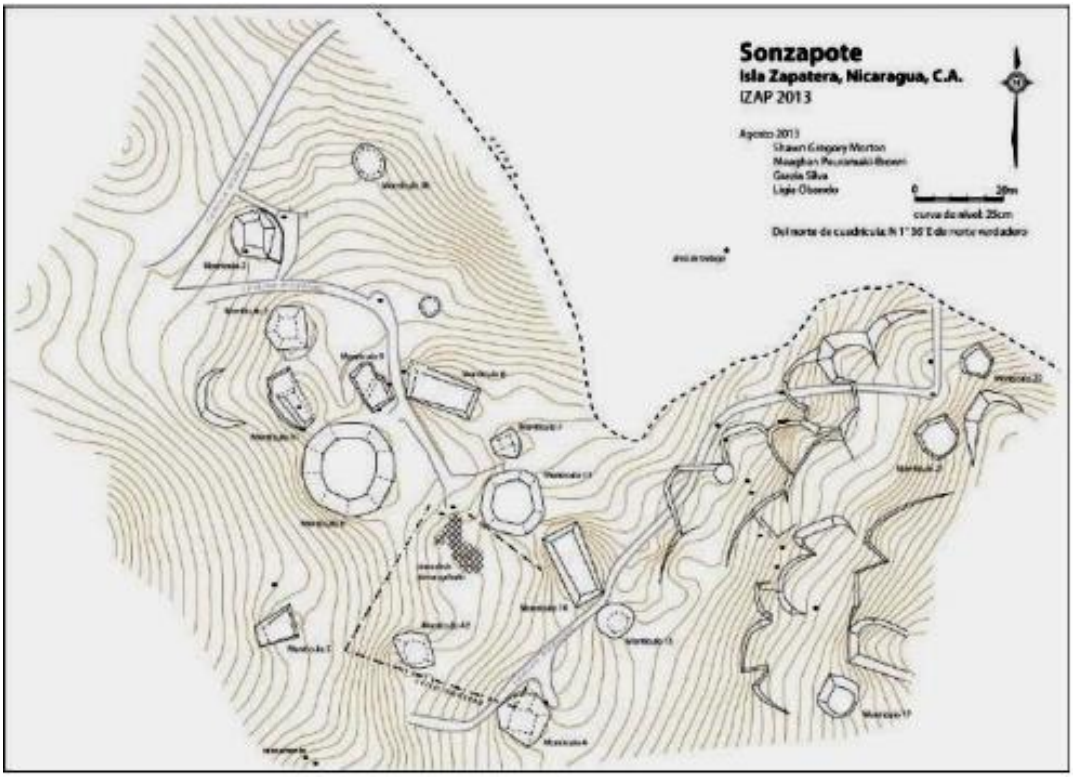
While there were differences between the three domestic sites investigated in Pacific Nicaragua, they possessed more similarities with one another than with the architecture of El Rayo. The most significant feature being the smaller size of the domestic mounds than ER-S3 at El Rayo. For another, there was evidence of domestic activity at the sites of Ayala and Santa Isabel, unlike at El Rayo, which had an absence of evidence of most activity patterns. Tisma was also a domestic site, without any monumental architectural features present. In summary, these three sites were non-monumental, possessed primarily domestic features, and were significantly sized sites.

Sonzapote, Zapatera Island

Sonzapote, located on Zapatera Island, in Lake Nicaragua, is a site possessing architectural features, stone statuary, and petroglyphs. Best known for its stone statuary, it is a mortuary site featuring examples of architecture (McCafferty et al. 2017) similar in form to ER-S3 of El Rayo. Sonzapote features numerous burials and impressive examples of stone statuary measuring up to 2 m in height. Though today much of the stone statuary is displayed in the Ex-Convent San Francisco museum, of Granada, fragments of statuary, petroglyphs, and 17 mounded platform structural remains are still present at the site.

Overall, the combination of stone features which would have required intensive labour and resources to construct represent Sonzapote as a monumental site. The Isla Zapatera Archaeological Project (IZAP) of the 2013 field season resulted in the mapping of the site, including 11 of the 17 mounds (McCafferty et al. 2017). Sonzapote possesses similarly styled architectural features, in foundation, shape, and size of the structures to those at El Rayo. Sonzapote included multiple examples of circular and rectangular architecture, with the larger

rectangular structure measuring 22 x 12 m, just shy of El Rayo's Architectural Feature 8's size. However, this structure lacked the retaining walls and packed earthen platform of ER-S3. Sonzapote also demonstrates a high degree of site planning, especially impressive as the site dates back to the Tempisque phase. However, the rectangular structures mapped at Sonzapote were not on an east-west orientation as the structural features at El Rayo were.



[Figure 9.3: Topographic Site Map of Sonzapote, from Manion (2016)]

The rock architecture of the mounds at Sonzapote differed greatly from the architecture at El Rayo. As seen in **Figure 9.4** of Mound 8, rocks were stacked vertically to create a raised platform, and base for the structure. This is unlike El Rayo, where at ER-S3 and ER-S4, the lajas

were set in the ground half buried, and not stacked upon one another, to form an area where wood might have been set as the walls. Nor was it like the Bagaces styled foundations of ER-S2 and Architectural Features 1 and 3. Given the slope of the area at Sonzapote, leveling the ground through the use of retaining walls and moving dirt would have been costly in energy output. Though not the same style or design of ER-S3, the large structures of Sonzapote may be considered monumental.

[Figure 9.4: Example of Architecture at Sonzapote, Mound 8, Photography by Geoffrey McCafferty]

Another feature of Sonzapote was the arrangement of petroglyphs of anthropomorphic characters and abstract alignments of dots on stone outcroppings and in some instances within the structures (Manion 2016, McCafferty et al 2017). Stone statue fragments were also located around the site. However, many of the complete or nearly complete statues have been removed from the site prior to the 2013 investigations. El Rayo, reportedly, possessed a stone statue but

this statue had been removed from the site. It was removed prior to excavations in 2009 and was thus not able to be analyzed within this thesis. However, if rumor of this statue is valid, it could have been interpreted as either a monument or memorial, dependant on its location and association with other archaeological features at the site.

Sonzapote can be considered a significant monumental site, including the statues, petroglyphs, and large scale structures with stacked stone bases. Though there was not a significant amount of site planning with regard to the orientation of the structures, the amount of labour invested in the construction of some of these buildings may have resulted in them having a monumental status. El Rayo demonstrates similar features to the monumentality of Sonzapote, such as in structure size and shape. However, El Rayo lacks the circular structural features which are present at Sonzapote. In comparison, El Rayo and Sonzapote are very similar, and perhaps with further exploration at El Rayo, more structural features and a domestic element will be located further to the north of the site as estimated by Salgado Gonzalez (1996a).

Tepetate, Granada City

Tepetate is located just to the north of modern day Granada city and demonstrates monumental features in its architecture. In Salgado Gonzalez's site evaluation (1996a), 10 stone-faced mounds on platforms ranging 1 – 2 m in height were located, surrounding a central plaza, indicating complex site organization and planning (Carmack and Salgado Gonzalez 2006). Though only one field season occurred at the site, valuable information regarding the construction of structures was revealed to the excavators in the project conducted at the site, lead by Geoffrey McCafferty in 2014. Unfortunately, the site was badly disturbed from modern construction and activity, and research concluded that year in favour of other sites.

[Figure 9.5: Example of Architecture at Tepetate, Locus 2, Photography by Geoffrey McCafferty]

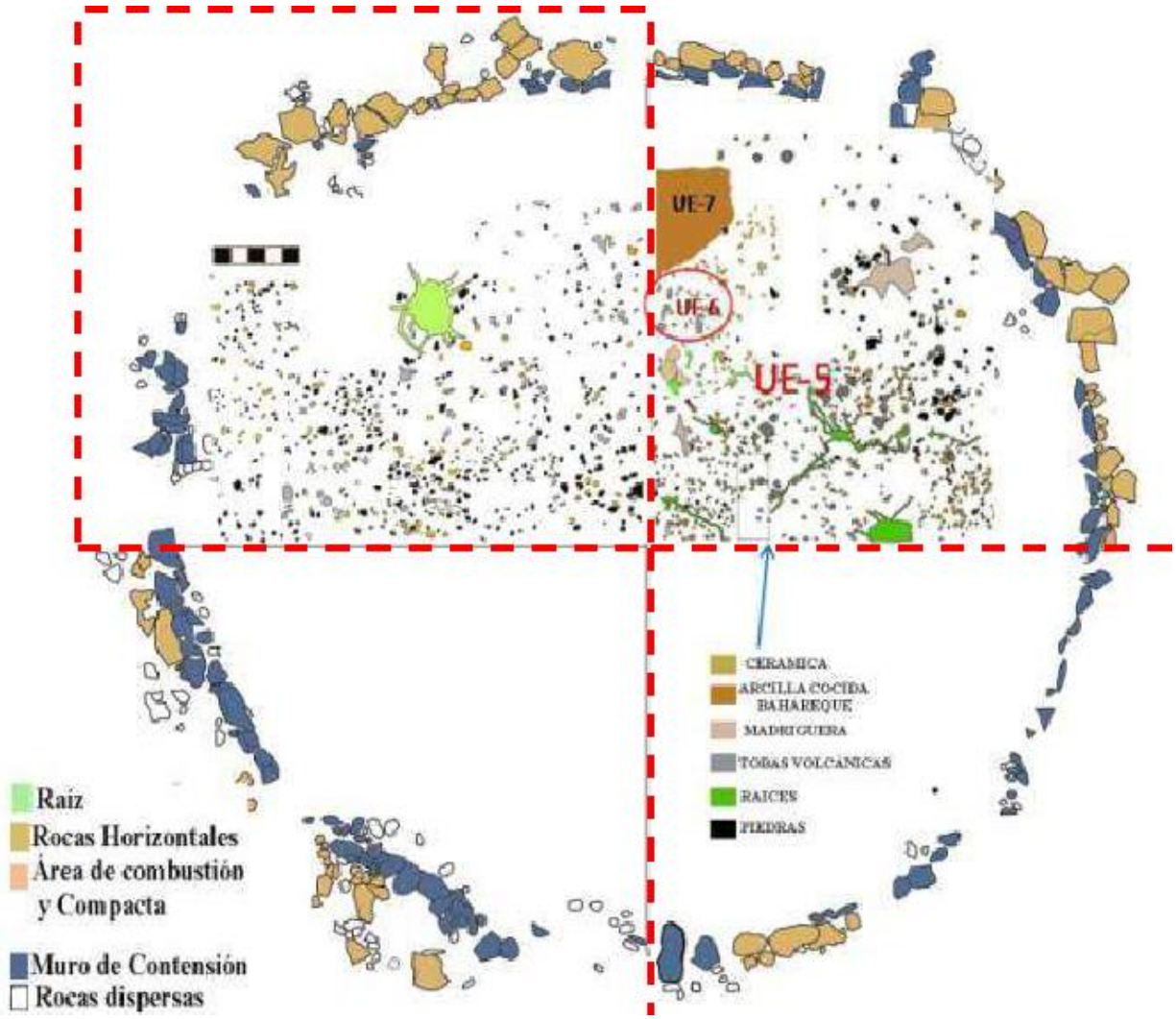
The foundations of Mound 1 were comprised of stacked stone to form wide walls. As seen in **Figure 9.5**, the Locus 2 foundation was of a similar style of construction to the late Bagaces stone foundations of ER-S2 at El Rayo. Unlike the monumental structure ER-S3, flat laja stones were not used in the construction of foundation walls at Tepetate. Instead, the stone was irregularly sized, rounded stone. The structures of Tepetate were constructed on small earthen platforms. The presence of bajareque in the soil indicates that the walls were plastered over with the wattle and daub like material, similar to the findings at ER-S3. Straight rows of rock outlines indicate rectangular structures at the site, which also follow a similar pattern to the ER-S1 and ER-S2 structures. No circular architecture was excavated at this time, though there may have been circular mounds amongst the now destroyed house mounds as described in

Salgado Gonzalez' research (1996a). There was no significant evidence that the structures excavated were monumental in status.

[Figure 9.6: Locus 2 Foundation at Tepetate, Photography by Geoffrey McCafferty]

Nejapa, Managua

Located to the southwest of Managua, on the shores of the Nejapa Lagoon, lies the Nejapa archaeological site. Estimated to span approximately 15 hectares, Nejapa represents a unique archaeological site with stone architecture. Originally, 18 mounds were documented as



[Figure 9.7: Mound 5 at Nejapa, from Lechado et al. (2013)]

being in the main centre of the Nejapa site, however, modern construction and residential buildings have disturbed much of this site and these mounds. As a consequence, these mounds have been poorly preserved (Lechado 2017). In recent years, two of these mounds have been excavated archaeologically (Mound 1 and Mound 5), with Mound 5 having the best published results (Lechado 2017, Lechado et al. 2013). The two mounds were circular, with a diameter of 14 m, encircled with upright stones as a border (Lechado 2017). These stone foundations were

grouted with a clay substance (Lechado 2017), a feature which was not seen in ER-S3 at El Rayo. Though the stones were not in a parallel row at Nejapa, they were flat lajas which were vertically standing in a similar form to the El Rayo ER-S4 structure. Mounds 1 and 5 were likely large households, and not monumental.

Los Angeles, Ometepe Island

On Ometepe island, there are numerous archaeological sites with monumental properties. One of the sites, Los Angeles (Bransford 1881), featured numerous stone mounds. In his discussion of the mounds, Bransford describes them to be approximately 1.5 m in height, and 9 m in diameter, with the north side of the mound faced with flat rocks, which are naturally formed, and appear to have been part of the structure's wall foundation (Bransford 1881). This description is the closest to the architecture of El Rayo, by the materials used to construct the form. However, the platform was higher than that at El Rayo, and the structure was circular. The diameter of the circular structure falls within the range of the large Tisma structures as recorded by Roman-Lacayo (2013) and as such would not fall under the category of monumental. These structures were, however, located near a dedicated cemetery, which had been excavated by Bransford (1881). Numerous urn burials were recorded from the cemetery, where none were recorded from the structures. A different burial strategy was used at Santa Isabel, with burials being excavated from near the mounds (McCafferty 2008).

Aguas Buenas, Chontales

Located 3 km north of Juigalpa, Aguas Buenas is a site known for its mounded architectural features (Geurds and Terpstra 2012) and petroglyph motif panels (Vlaskamp 2012).

This site is the largest in the region, due to its overall size and mound frequency (Vlaskamp et al 2014). Over 500 mounds have been identified at the site through LiDAR exploration over the course of several field seasons. In general, mounds are "positioned to form several parallel concentric semi-circles" (Geurds and Terpstra 2012: 51) demonstrating complex site planning and through this monumentality, along with the presence of numerous petroglyphs ranging in complexity in design.

The mounds range in size from 6 – 8 m in diameter and up to a height of 5 m (Geurds and Terpstra 2012). Five mounds have been excavated at this point at Aguas Buenas (Vlaskamp et al. 2014). The construction indicates that the mounds were built with a ring of rocks filled with earth and this layer later covered by a coating of a material known as tufa (Vlaskamp et al. 2014). Though the style was considerably different from the style demonstrated at El Rayo, this site has been referred to as possessing "a certain level of monumental expression" (Geurds and Terpstra 2012: 56). This is certainly due to the examples of considerable site planning, as noted above, as well as an example of a rectangular plaza outlined by 25 mounds (Geurds and Terpstra 2012). This may have been a significant population centre in Juigalpa at the time of occupation, with significant residences organized surrounding the rectangular open plaza at the centre of the concentric rings of house mounds.

Summary of Nicaraguan Sites

Of the nine Nicaraguan sites discussed in this thesis, only three demonstrated monumentality: El Rayo, Sonzapote, and Aguas Buenas. The other sites were primarily residential dating from the Late Bagaces to the Sapoá periods. The only site with a dedicated cemetery was El Rayo; the other sites having burials present, but not in a cemetery area. In the

Site	Location	Site/Monument Description	Monumental Features	Residential Area
Aguas Buenas	Chontales	500+ circular mounds 6 m – 8 m in diameter with a ring of rocks and earth as a boarder to the mound.	Yes	Yes
Ayala	Granada	4 x 4 m mounds with stone foundation and a packed earthen floor.	No	Yes
El Rayo	Granada	24 x 12 m structure with parallel rows of lajas and a large standing stone forming the entrance, on a 65 x 25 m earthen platform with retaining walls.	Yes	Unknown
Los Angeles	Ometepe Island	9 m diameter mound faced with flat lajas on the northern face located near a cemetery complex.	No	Yes
Nejapa	Managua	14 m diameter mounds with upright stone boarder and plastered foundations.	No	Yes
Santa Isabel	Rivas	Platform mounds 1 – 3 m in height with no stone architecture and packed earthen floors.	No	Yes
Sonzapote	Zapatera Island	Circular and rectangular mounds with rocks stacked vertically to form mound bases.	Yes	Yes
Tepetate	Granada City	10 stone faced mounds surrounding a plaza.	No	Yes
Tisma	Managua	4 – 9 m circular mounds on raised platforms 1 – 3 m in height.	No	Yes

[Table 9.1: Summary of Nicaraguan Sites by Structures.]

following section, Costa Rican sites with monumental and memorial properties will be considered in comparison to El Rayo.

Comparative Sites in Costa Rica

In this section, multiple cemetery cites from around Costa Rica are evaluated for their monuments, structural features, and memorials, in order to make a comparison to El Rayo. These sites vary in degrees of monumentality, from the non-monumental site of Papagayo, to the nationally recognized monumental site of Guayabo de Turrialba. The common feature the next sites display are cemeteries located near or within a residential area, unlike many of the Nicaraguan sites which did not contain cemetery sectors like El Rayo, but burials beneath and near house mounds. Below, the sites of Arenal, Guayabo de Turrialba, Papagayo, and Rivas-Panteón de la Reina are described. Though not all the sites were monumental, they all displayed some form of monumentality or memorialization as determined by this thesis' working definition.

Arenal Area, Costa Rica

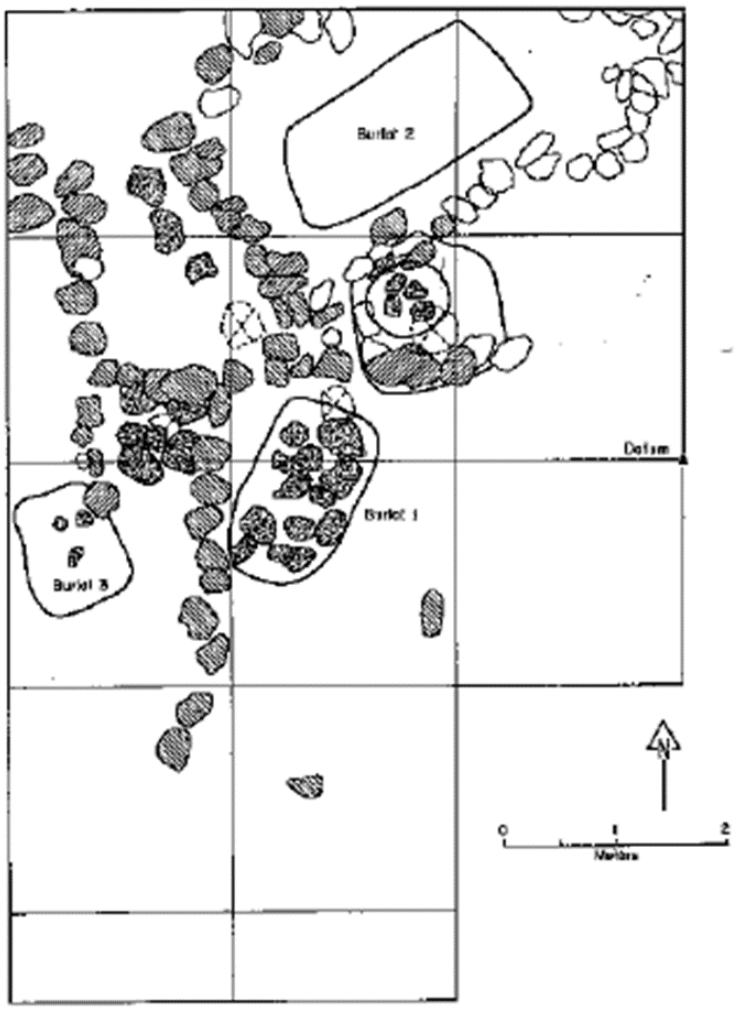
The Arenal area is located near the Arenal Volcano and demonstrates a long history of occupation and mortuary practices. Its exploration has been apart to the Proyecto Prehistórico Arenal (PPA) of north western Costa Rica. While the primary focus of this project has been on the prehistoric responses to volcanic eruptions in the area, data regarding pathways, burials, and settlement patterns has been considered. This section overview will focus of the residential area of Sitio Bolívar and the tombs from a number of cemeteries demonstrating a transition in mortuary practice from the Arenal Phase (300 – 500 AD) to the Early Silencio Phase (500 – 800

AD). Osteological preservation was poor at the Arenal cemeteries, containing a highly acidic soil, and resulting in few human remains being recovered from the earlier cemeteries (Butler 2005). The majority of the excavations have been on the pathways and the cemeteries of the sites spread through the Arenal Area.

Cemeteries of the Arenal Area

Multiple cemeteries were excavated in the PPA. The first cemetery being reviewed, Sitio Bolívar, is a residential and cemetery site. The cemetery rests 100 m away from the known structures of the residential area, atop a ridge (Butler 2005). The cemetery was located amongst a grouping of lake cobbles, piled into a mound and delineating the extent of the cemetery. The mound was not mapped, and as such does not have a specified shape. Important to note were the tombs, each being delineated by a stacked ring of these lake cobbles and enclosing the burials (Butler 2005). This form of tomb marking can be interpreted as a form of memorialization of the deceased, each tomb acting as a marker for a specific individual and as such being dedicated to that individual. These memorials would represent the social groups belief system.

At the Sitio Poma, a low stone wall marked the extremity of the 25 x 27 m cemetery area. The small area was used over 4 – 5 generations and resulted int the chaotic overlapping of tombs, with the stone cobbles being commandeered from older tombs and reused in the more recent burials. In some areas of the cemetery, the tomb outlines were unintelligible. Ceramic chronology of the burial offerings dated the cemetery to the Arenal Phase (300 – 500 AD) (Butler 2005). The stone tombs which were intact possessed completely lined walls with the lake cobbles.



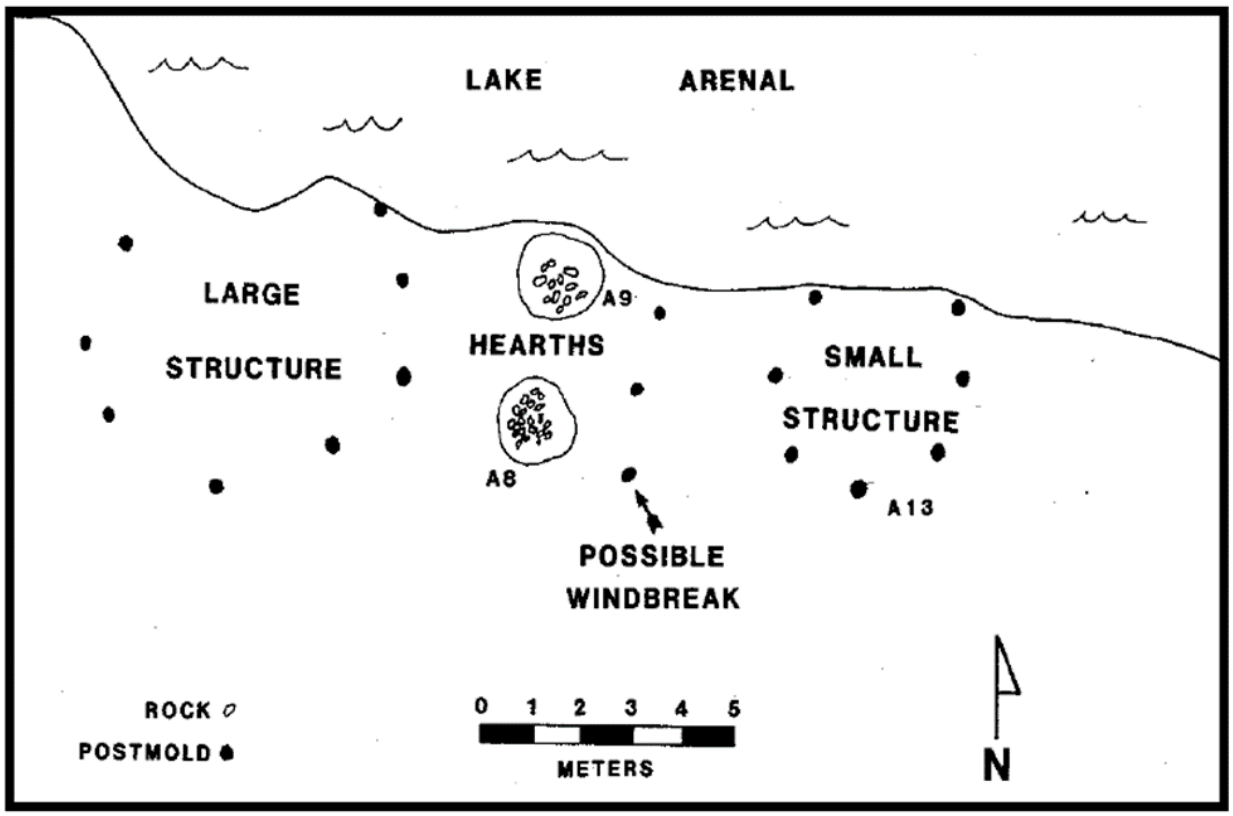
[Figure 9.8: Tomb Outlines from the Sitio Bolívar Cemetery, from Butler (2005)]

At the Sitio Castrillo cemetery, tombs were delineated with a combination of lake stone and lajas (Butler 2005). This site example was one of the primary reasons El Rayo's Locus 7 cache box was excavated, as it was hoped to be a tomb of a similar style to the Silencio Phase (500 – 1250 AD). The Castrillo site represents a transitional phase in mortuary practice between the Arenal Phase (300 – 500 AD) and the Silencio Phase (500 – 1250 AD) (Butler 2005). The Sitio Silencio cemetery demonstrated the final stage of the transitionary phase. These tombs were

completely lined (including the base of the tomb and capstone[s]) with lajas, with the occasional decorative metate, in place of the lake cobbles (Butler 2005). While there was no monumental architecture associated with the previous cemeteries, the presence of tomb markers indicates a use of memorials at the sites. Though not akin to the memorials of El Rayo, their function in a mortuary complex remains similar.

Sitio Bolívar Structures

The residential area of the Bolívar village area is currently under water due to the construction of the Sangregado Dam, which increased Lake Arenal's area to 80 km^2 (Sheets



[Figure 9.9: Sitio Bolívar Structures, from Butler (2005)]

1994). Of the remaining site, which has been badly eroded, two small circular structures and two hearths have been recovered. The smaller of the two structures was located by the presence of six post holes. The structure has a diameter of 3 m across and lacks an internal living floor, with the exception of a small raised packed earthen area to the west (Butler 2005). The second structure has a diameter of 5.5 m, and again, no living floor was recovered, due to the erosion. In this structure, eight postholes were recovered. (Butler 2005). Between the two structures were the two hearths, and towards the smaller structure, there was a line of three postholes, possibly delineating a windbreak. Neither of these structures can be considered monumental. According to Hoopes and Chenault (1994), the larger of the two buildings was suggested to be a household, while the smaller would have been a specialty structure, such as a sweat house or storage facility.

Guayabo de Turrialba, Costa Rica

Guayabo de Turrialba (hereafter referred to as Guayabo) is a large monumental site with a mortuary context on the slope of Turrialba Volcano located northeast of the modern day township of Turrialba. The site has been known to archaeologists since the late 19th century and has in recent decades been the victim of significant looting and destruction (Fonseca Zamora 1980). Though the full site has not been excavated, and it is suspected to continue, it is thought that the main features of the site have been excavated. Its context as a monumental mortuary complex and population centre is the reason for its comparison to El Rayo.

Based on ceramic evidence, the stone architecture of Guayabo dates back from 500 BC to the last 500 – 600 years prior to Spanish conquest. Its long history and established ranked society permitted this site to grow a monumental centre by around 1000 AD.

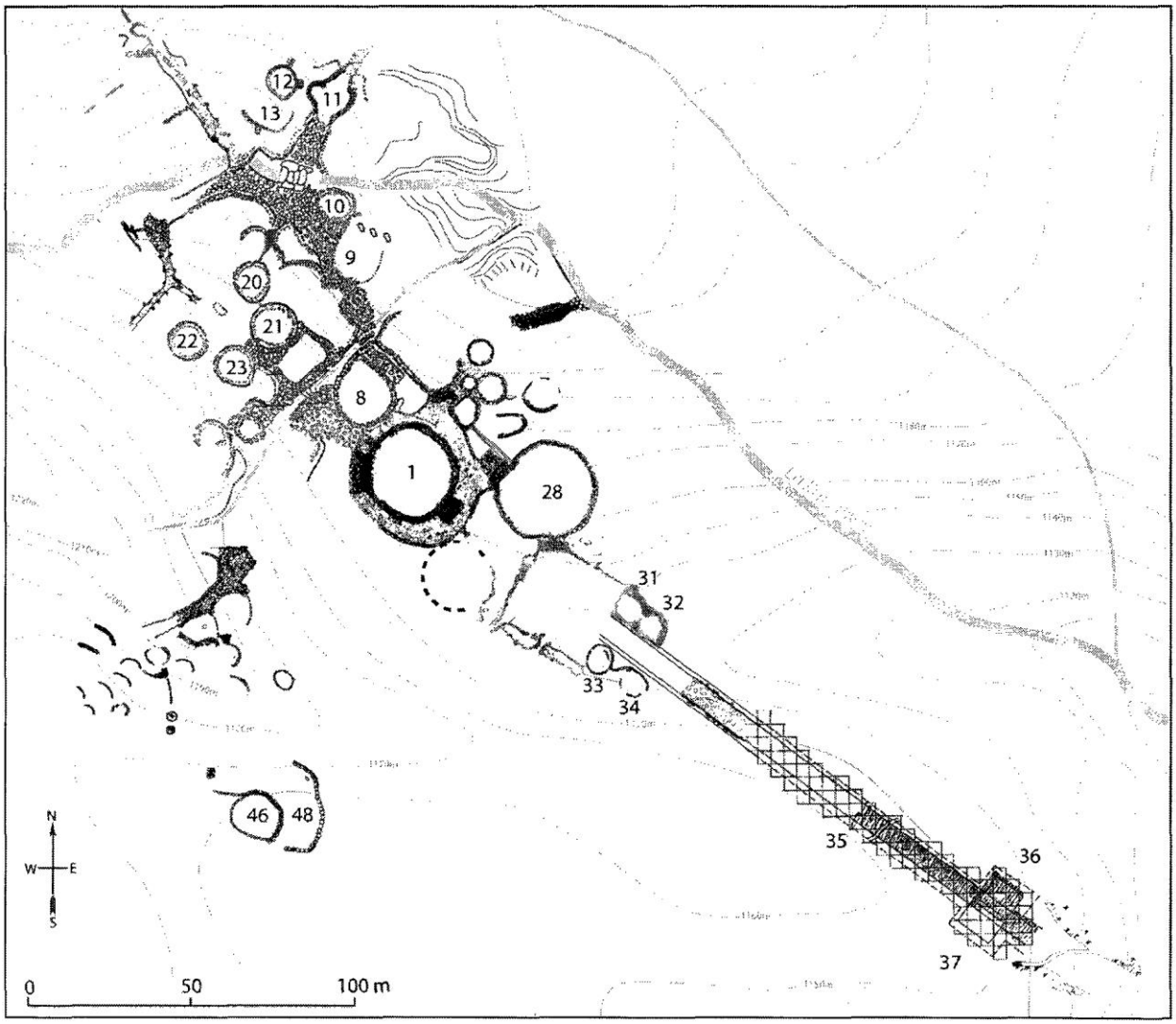
> "By AD 1000 a series of larger sites emerge […] in the Atlantic drainage of Costa Rica. [Sheets characterizes] them as ranked societies or chiefdoms, with their central places distinguished by large, bilaterally symmetrical architecture that exhibits monumentality. The sites often have long roadways paved with cobbles called *calzadas* that lead into formal plazas ringed with barrier structures, large mounds, and occasionally aqueducts, pools, and bridges" (Sheets 2009:171).

Two of the sites referred to by this quote include Guayabo de Turrialba and Rivas-Panteón de la Reina.

Structural Overview

The architectural features of the site are varied, but the accumulation of the whole complex's architecture makes the site a significant one. There are more than 50 architectural features exposed at Guayabo, including mounds, plazas, house foundations, a causeway, and other features (Frost and Quilter 2012). The mounds range in form from circular to rectangular (though the circular form is by far the most common) with the circular house mounds ranging from 10 – 30 m in diameter on stone and earthen mounds up to 3 m in height (Frost and Quilter 2012). These mounds are grouped in clusters and are ringed with large boulder-like rocks, creating stone patios on the outside of the structure.

Guayabo features a complicated system of drainage networks and structures oriented along a central causeway aligned on a northwest-southeast axis (Fonseca Zamora 1980). One of the theories behind the circular structures, particularly Mound 1, the largest feature of the site, is that the structure would have possessed a conical roof (Frost and Quilter 2012) and no walls, similar to the proposed form of the Rivas-Panteón de la Reina Structure 1, Operation A (Quilter



[Figure 9.10: Guayabo Site Map, from Frost (2009)]

2004) (this theory will be discussed in the following section). One of the features of Guayabo is that the organization and density of the structures indicates it was a population centre, as the surrounding area possessed what is assumed to be residential mounds which get smaller the further away from the centre they are. Guayabo is hypothesised to be the seat of a ruling figure who would have controlled Guayabo and the surrounding areas (Frost 2009).

Other theories revolving around this site as a seat of power for a ruling figure was their desire to relate their power with their ancestry through claims of spiritual access and power, a reason for why there were burials within the domestic site (Frost and Quilter 2012). Guayabo was a central location between other sites, with a central causeway and other paths leading towards other population centres. These road systems were a part of a complex socio-economic system which would have extended throughout the Atlantic watershed region of Costa Rica.

The Causeway

The most obvious monumental feature of Guayabo is the central causeway, or cobble calzada; a 175 m long 8 m wide pathway to the two main mound of the chiefdom centre, Mounds 1 and 28 (see below). The formal entrance of the causeway begins at the two patios, features 36 and 37 (see **Figure 9.10**) which narrows the calzada to 1 m in width and would have forced a single file entry to the site (Frost 2009). At the end of the path were the 'guard houses' features 31, 32, 33, and 34 (see **Figure 9.10**), though as Sheets (2009) notes, there were no defensive barriers which would have restricted entry to the central plaza from other directions. The pathway to the causeway stretched back on a north-northeast angle over 4 km and links the centre to other sites along the walking path (Sheets 2009). The guard houses also contained laja lined burials, similar in style to those tombs found at the Sitio Silencio cemetery, Arenal area. The causeway remains one of the more important monuments of the sites, as it connects to a broader network of pathways.

Mounds 1 and 28

Off of the central plaza (measuring 30 x 50 m) were the two largest structures of the site. Mound 1, interpreted to be the chief's residence, is measured to be on a 3 m high stone ring foundation, with a 28 m diameter and two stone stairways acting as the entry points to the structure. The stairways are trapezoidal (Frost 2009) and are similar to the proposed entryway at Structure 1, Operation A of Rivas-Panteón de la Reina (Quilter 2004). Directly to the northern corner of the central plaza is Mound 28, with a diameter of 30 m and a height of 3 m, Mound 28 is connected to the plaza by its southern facing stone stairway (Frost 2009). This site provides an example of a monumental site, based on the complex's sophistication and overall size. El Rayo in direct comparison cannot be considered a monumental site as it possesses only one monument: ER-S3.

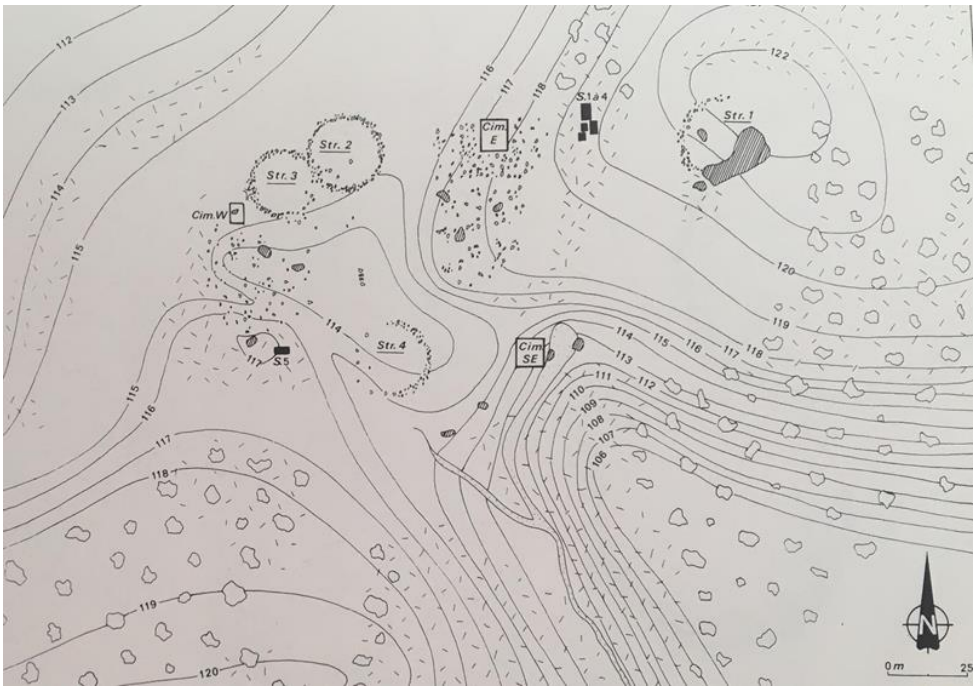
Papagayo, Costa Rica

North of the Bay of Culebra, Costa Rica, lies the site of Papagayo, a site which was first inhabited in the 700's AD. Papagayo is a cemetery with a residential sector located amongst the burials, and would have contained numerous examples of stone anthropomorphic statuary. Based on the burial types, the site is likely contemporaneous with the Bagaces period. Papagayo contained four examples of architecture, all of which were circular structures. Structures 1 and 4 were partially disturbed or destroyed at the stone perimeter. Structure 1 was, allegedly, disturbed by previous excavations in the area (Baudez et al. 1992). Structures 2 and 3 were the better preserved forms and will be discussed below with reference to the architectural styles of El Rayo. The three cemeteries excavated were surrounding Structures 2 and 3 in a semi circle, with positions to the east, south east, and west. Structures 2 and 3 are located side by side with south

facing thresholds. Structure 3 is positioned less than a meter from Structure 2, and slightly to the south west.

Structure 2

The stone perimeter of Structure 2 was formed of boulders in a regular circular formation. The diameter of which was 21 m (with an area of 346.36 m^2), and the width of the stone perimeter ranged from 50 – 200 cm (Baudez et al. 1992). The walls would have been plastered with bajareque. An argument made regarding the rock exterior was in reference to the floor being at a level depth below the stone perimeter. Baudez et al. (1992:21) hypothesised that the stone ring was not in fact a foundation (as was the case with the Bagaces rectangular structures at El Rayo), given that the last occupied floor was 30 cm below the protruding rock



[Figure 9.11: Site Map of Papagayo, Costa Rica, from Baudez (1992)]

wall, but instead was a wall constructed in line with the exterior of the roof line, in order to keep water from pooling along the bajareque walls.

There was no break in the stone wall which could have indicated the entryway, but it was assumed that the door would have been south facing, such as with Structure 3 (Baudez et al. 1992). The interior of the structure revealed foodways, a kitchen area, and multiple statue fragments of anthropomorphic and zoomorphic figures. Though the artifact assemblage did not reveal much in the way of activity patterns, a pit oven was found at the centre of the structure (Baudez et al; 1992:23). Overall, the structure was dissimilar to the El Rayo Bagaces structures ER-S1 and ER-S2.

Structure 3

This structure's rock outline was smaller than Structure 2 at 17.5 m in diameter, with a less than regular circular form (Baudez 1992: 26). While Structure 2's perimeter was comprised mainly of basalt stones, Structure 3's perimeter was primarily sandstone blocks, with only 6% basalt present in the stone ring. At the threshold, there were multiple stone statue fragments of anthropomorphic and zoomorphic figures. The interior of Structure 3 was similar to its neighbour, with the exception of the pit oven in the center of the room being replaced with a storage pit which had been converted into a hearth.

Mortuary Features

Of the three cemeteries, the western cemetery, just to the west-south-west of Structure 3, was a stone tomb, labelled as Burial 3. The tomb contained an extended burial with grave offerings (Baudez 1992), but the significance to this discussion is the stone built form. The tomb

was lined with long, rectilinear stone lajas, and capped with larger flat stones (see **Figure 9.12**). Though no detail is described regarding the stone tombs, from observations of Baudez' (1992) work, this would have been a prestigious burial. The tomb may have been considered a memorial dedicated to the individual buried within.

[Figure 9.12: Papagayo Burial 3, West Cemetery, Costa Rica, from Baudez (1992)]

Rivas-Panteón de la Reina, Costa Rica

Rivas-Panteón de la Reina is a ceremonial-mortuary complex which influenced the region greatly (Quilter 2004). Divided into two sections, Panteón de la Reina to the west which was a large cemetery complex and the Rivas ceremonial complex to the east, Rivas-Panteón de la Reina is a large monumental area demonstrating house mounds both circular and rectangular in form, as well as a variety of architectural features. Located in the northeast area of the Central Valley, the site was first identified in the late 1800s by local looters. It gained the reputation of one of the richer areas containing gold artifacts (Frost and Quilter 2012). Quilter and Vargas define monumental architecture as:

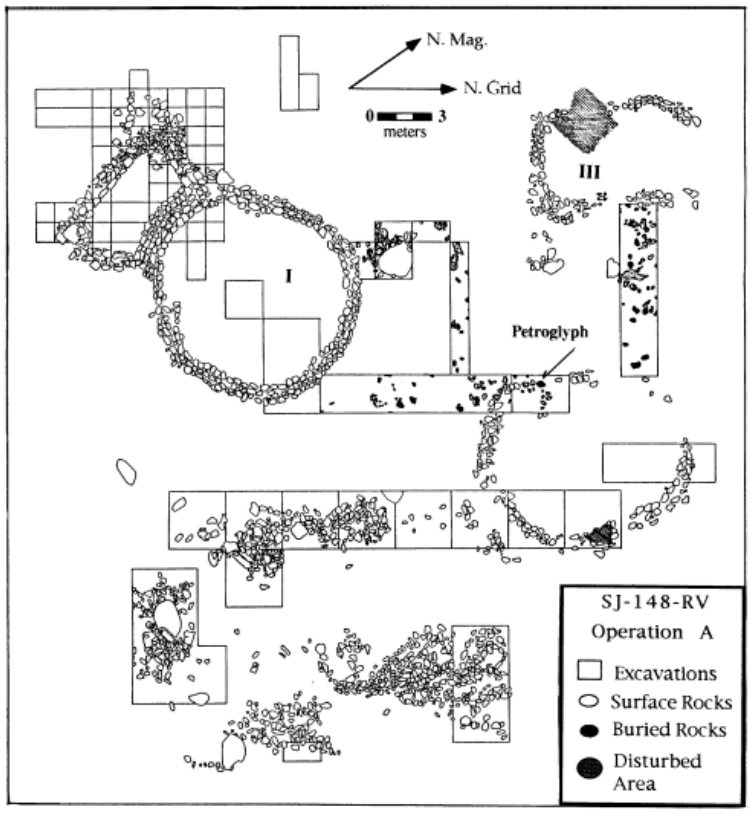
> "the labors of more than the minimal social unit to build, takes up significantly more space than other constructions, and commonly is elaborated by features, such as decorations, that distinguish it from non- monumental works" (1995:204).

This definition is more than fitting for the site of Rivas-Panteón de la Reina, as it is a large site with decorative features in petroglyphs.

The architecture is similar to that at Guayabo, with large andesite boulders making up a majority of the architectural house-ring foundations (Frost and Quilter 2012, Quilter 2004). Similar to Guayabo, the architecture was often linked together, sharing a wall with a neighbouring structure or other architectural features such as drains or steps (Frost and Quilter 2012). This site was likely part of an elite complex. The site is made up of causeways, plazas, patios, and structures spread out across a wide area of land. One of the theories suggest that this area was related the mortuary function of the La Reina, a large cemetery complex, connected to the Rivas site to the east.

Structure 1, Operation A

Structure 1 measured about 10 m in diameter. This structure was an irregularly formed circular structure with a south western addition of stone forming a quadrangular outline. These protruding stones forming the quadrangular outline were set at a deeper stratigraphy and assumed to have been a part of an attached patio. The stone used in the perimeter foundations were of smooth cobble, not stone lajas. Similar to Structure 2 at Papagayo, there was no break in the stone ring which could have suggested a threshold. Excavations of the stone patio indicated a refuse midden was located there and around the south west of the structure, with few artifacts



[Figure 9.13: Rivas-Panteón de la Reina Operation A Excavations, from Quilter and Vargas (1995)]

contained within (Quilter 2004). No evidence of living floors was found within the structures at Operation A, but the dense materials to the exterior of the stone ring suggests that daily activity occurred outside of the structure, and frequent cleaning of the structure was also common (Quilter 20014:28).

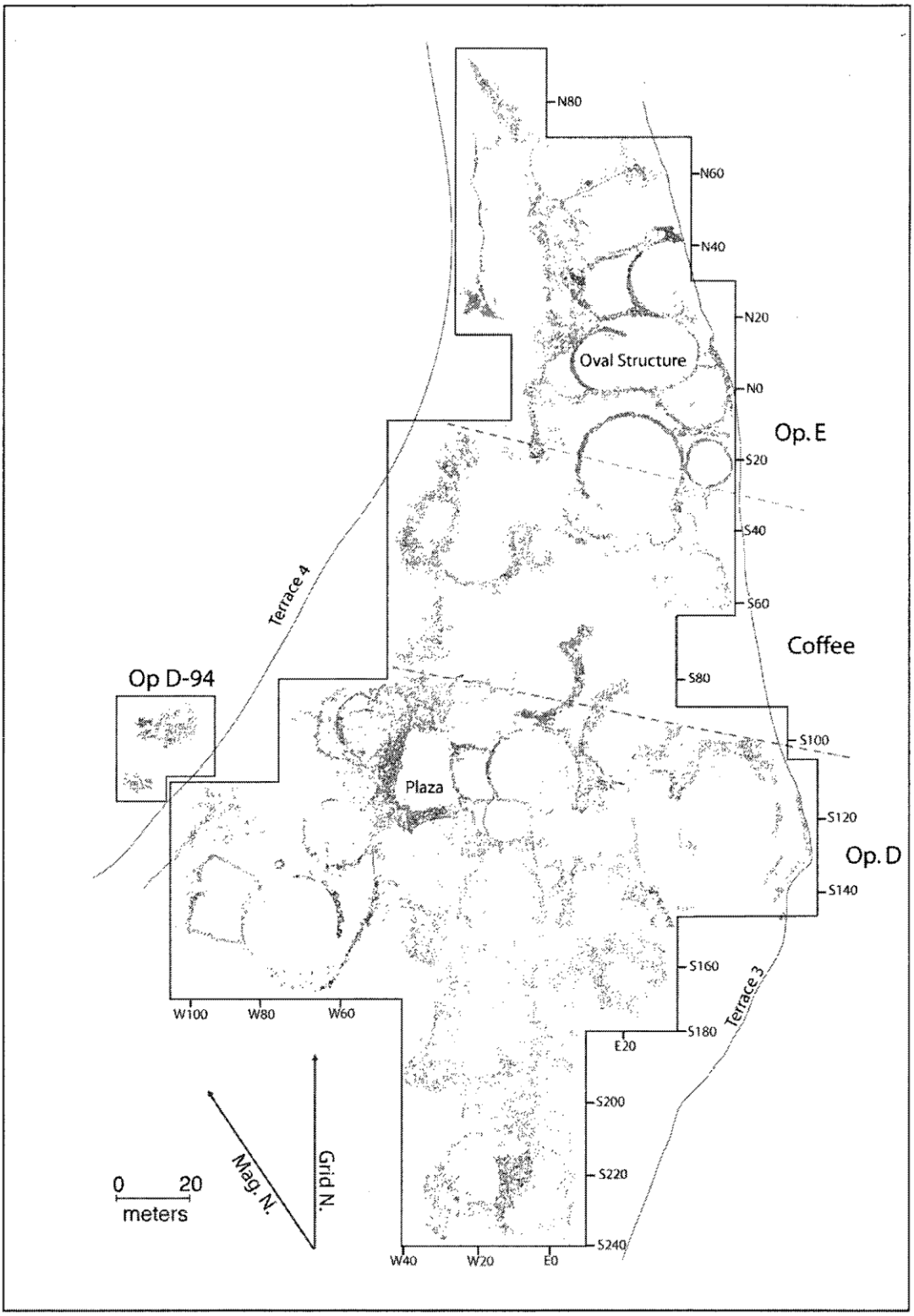
A lack of postholes and very little bajareque was found between Operations A through D. As a consequence, Quilter (2004) suggests a different form of architecture to one with vertical walls and a conical roof line.

> "The roofs may have been completely conical, like tipis, with the butts of sloped posts supported at the inner edge of the ring of stones or even placed within or on it for support. A photograph […] of the 'last cacique' (chief) of the Talamancas, taken around the turn of the nineteenth century, shown Antonio Saldaña and his family in front of just such a structure. The butts of the posts even appear to be resting on cobbles to the right of the figure at the extreme right. In addition, the roof over the entry way is quadrangular in shape, similar in form to the cobble patio in front of Structure 1 at Rivas" (Quilter 2004:30).

While the structures at Rivas-Panteón de la Reina may have been conical in form, this model would not fit the rectangular rock rings of ER-S1 and ER-S2 at El Rayo.

Operations D and E

The summarization of these two operations could span the pages of a book, but for the purpose of this study, a brief outline of the types of structures has been noted here, referencing the monumentality of the site. In total, the two operations discussed make up the site's monumental status, and most structures follow the same form as Structure 1, Operation A, but on



[Figure 9.14: Operations D and E at Rivas-Panteón de la Reina, from Frost (2009)]

a larger scale. The stone structures of Operations D and E were different form the stone cobbles of Operation A, Structure 1, in that the stones were not the typical 30 – 50 cm but boulders ranging from 50 – 100 cm (Quilter 2004: 49).

In total, Operations D and E measure 30 ha of large architectural features, and date to two different phases of construction (Frost 2009: 135). The structures were mostly circular in form with attached trapezoidal patios such as at Structure 1, Operation A. Interestingly, these patios were all facing west, towards the cemetery area of the site, following the same pattern as Structure 1, Operation A (Quilter 2004). Of note was the oval structure, unique to the site, at Operation E. It measured 20 x 30 m in size and was liked with 4 concentric rings of stone. The oval was interpreted to be a roofless performance area, based on the prepared floor of the structure, with orange soil, and the presence of unique ceramic vessels depicting mythological creatures and figures (Frost 2009). This area was monumental based on the overall site planning (with regards to the orientation towards Panteón de la Reina) and the size of the site's architecture and individual architectural features.

Comparing El Rayo and Rivas-Panteón de la Reina

Perhaps, El Rayo and Rivas-Panteón de la Reina share a similar function in their association with mortuary practice. Both demonstrate monumental structures, related to the mortuary function of each site, and were part of a larger complex. In both cases, it is hypothesised that the unexcavated areas are residential in nature. These sites both have stone foundations in common, as well as wattle and daub walls, and a variety of structure forms and sizes. Though other sites do not demonstrate the same elaboration of retaining walls spread throughout the site such as at El Rayo, they do possess more permanent structures and features,

such as drainage channels and stone patios, such as at Guayabo de Turrialba and Rivas-Panteón de la Reina.

Summary of Costa Rican Sites

Of the four sites explored in this comparison chapter, two possessed monumental features and could be considered monumental sites, while the other two contained memorials in the form of tomb markings. All four sites were occupied during the same timeframe as El Rayo, though not all sites had all their monuments present during El Rayo's occupation. Burial treatments also differed from those found in the Nicaraguan sector of Greater Nicoya, with stone linings being popular in Costa Rica but absent in the burial practices of the Bagaces and Sapoá periods as represented in El Rayo.

	El Rayo	**Arenal Area**	**Guayabo de Turrialba**	**Papagayo**	**Rivas-Panteón de la Reina**
Location	Nicaragua	Costa Rica	Costa Rica	Costa Rica	Costa Rica
Site Description	A site containing examples of monumentality, memorialization, and multiple cemetery locales	A multi-faceted region with burial grounds and villages spanning multiple time periods	A large monumental site, exhibiting a causeway, and city centre	A small site containing house structures and burials, displaying memorials	A large monumental site, exhibiting a city centre and cemetery grounds
Cemetery	✓	✓	✓	✓	✓
Monuments	✓	x	✓	✓	✓
Memorials	✓	✓	✓	✓	
Residential	?	✓	✓	✓	✓

[Table 9.2: Summary of Costa Rican Sites and El Rayo by Features]

Summary

In this chapter, multiple sites from Nicaragua and Costa Rica have been compared to El Rayo in terms of monumentality and construction methods. El Rayo has demonstrated examples of monumentality through the scale of its special purpose building (ER-S3), and the overall site planning through the north-south and east-west alignments of the structures spread throughout the site over the course of the Bagaces and Sapoá periods. As a part of a cemetery complex, El Rayo also contains multiple human burials in cemeteries across the site, dating between the two time periods. Arguments made regarding monumentality throughout this thesis are based on the style and technique of architectural features displayed within the site. In consideration to the Nicaraguan sites, there were not many that could be compared to El Rayo's monumentality, and none which have published data regarding memorials within these sites.

Architectural construction techniques are discussed at each of the comparative sites within this chapter, looking at the construction details and understanding what elements of these sites made them monumental, and to compare these elements to El Rayo in order to understand its monumentality further. The structures of Guayabo de Turrialba and Rivas-Panteón de la Reina in Costa Rica were selected as comparisons as they were close to the region of Greater Nicoya and were iconic monumental sites with a similar context within or close to cemeteries. Papagayo, Costa Rica, was another Greater Nicoyan site and was selected to further explore the differences in architectural styles between the Nicaraguan and Costa Rican sectors of this Archaeological region. Finally, the Arenal area was selected as a site of comparison because of its description of cemetery memorials, a feature which was not explicitly seen in every Costa Rican site.

Referring to the scale of the monumentality present, not all sites can be considered equal. Looking inside of Greater Nicoya, the two sites which displayed monumentality were El Rayo and Sonzapote. However, only Sonzapote can be considered to be a monumental site as it features more monuments overall, while El Rayo can be considered a site with monuments, but overall, there is not enough monumental feature present to consider it a monumental site. Looking outside of Greater Nicoya, the two Costa Rican sites which can be considered monumental sites were Guayabo de Turrialba and Rivas-Panteón de la Reina, where as the Arenal area and Papagayo had memorials, but no monumental features. Finally, Aguas Buenas is a monumental site based on its overall size and site planning.

Site	Location	Cemetery	Residential	Monumental Site	Reasoning
Aguas Buenas	Nicaragua	x	x	✓	Site planning
El Rayo	Greater Nicoya, Nicaragua	✓	?	x	Only one monument
Guayabo de Turrialba	Costa Rica	✓	✓	✓	Large, elaborate, site planning
Rivas-Panteón de la Reina	Costa Rica	✓	✓	✓	Large, elaborate
Sonzapote	Greater Nicoya, Nicaragua	✓	✓	✓	Large structures and statuary

[Table 9.3: Summary of Monumental Sites]

After applying this thesis' definitions of a monument and memorial to sites spread throughout Greater Nicoya and Costa Rica, it can be concluded that El Rayo displayed an example of monumentality. But what does this mean for future research. For one, Greater Nicoya

must be considered as being capable of monumentality, particularly during the Sapoá period. This leads to the further issue of why we, as archaeologists, have missed monumental architecture in Nicaragua previously, and how this will change our perception of the past. The main implication of this study is that either our assumption of tribal level organization is misguided in terms of monumentality, or the people of Greater Nicoya were not organized at a tribal level. While this debate is outside of the scope of this thesis, one possible conclusion is that further research into the socio-political organization of Greater Nicoya is called for.

Chapter 10: Conclusions

The built environment has been a critical aspect of human endeavour, altering the natural environment and leaving behind an enriched archaeological record. From the smallest built forms, such as a hearth, to the complex, such as a multi-chambered structure, these marks on the land scape create a sense of place, and locations where human activity occurs. El Rayo demonstrates a range of built forms spread throughout the cemetery complex, from standing stones as cemetery markers, to a large civic-ceremonial structure. This thesis has focused on the built forms of El Rayo, discussing their origins, construction methods, and significance to the population of the area.

El Rayo, excavated during the PAGN project, has been a significant area of study, archaeologically. With an area estimate of up to 20 ha, the area of El Rayo excavated has been minimal, restricted to the property of one landowner. Located on the Asese Peninsula, El Rayo has revealed exciting information regarding social memory (Manion 2016), mortuary practice (Wilke, McCafferty, and Watson 2011), and ceramic economy (Dennett 2016). The site was occupied from the late Bagaces Period (500-800 AD) to the Sapoá Period (800-1300 AD) as demonstrated by the ceramic chronology, architectural chronology, mortuary practices, and radiocarbon chronology. The carbon samples were dated, spanning from 600-650 AD to 1020-1150 AD, making the site of El Rayo significant as it demonstrates the transitionary period between these two eras. This thesis has expanded upon the literature by documenting and discussing the architectural features of El Rayo.

The primary focus of the thesis has been to discuss the presence of absence of Greater Nicoyan monumentality and memorialization through the data set from El Rayo. By far, since

the beginnings of archaeological research in Greater Nicoya and Nicaragua, the main aspect of study has been ceramic artifacts. While this is an important area of research, it has left gaps in the literature regarding other areas of human activities and lifeways, such as architectural forms and monumentality. As for more recent monument studies in Nicaragua, the stone statuary best analysed by Bruhns (1992) and Navarro (2007), and the monumental site planning of Aguas Buenas (Geurds and Terpstra 2012) have been the only published examples of monumentality. Though as **Chapter Nine** has demonstrated, these are not the only examples of monuments outside of El Rayo.

Sonzapote was discussed in terms of the potentially monumental structures, some of which were approximately the same size as the ER-S3 structure (not including the earthen platform and retaining walls to the east and west), and could be argued to be monumental in form, particularly with the association of the stone statuary fragments from the site. El Rayo, reportedly, also had a stone anthropomorphic figure, but it had been removed from the site prior to the PAGN project. These structures were either circular or rectangular in form, though only three of the structure mounds were of a size comparable to ER-S3.

Though it is a common misconception that there are no examples of monumentality in the Intermediate Area, as Frost and Quilter explain, "while ancient constructions of the Intermediate Area generally lack […] vertical impressiveness […], extensive modifications of the landscape that include expansive horizontal constructions […] attest to the considerable sophistication in planning and prodigious efforts in constructing works of great scale that are impressive achievements (2012: 33). This thesis has proposed that not only was monumentality a present feature at the site of El Rayo, but memorials were present within the cemetery complex, related to the veneration of the ancestors. Through detailed descriptions of the 13 Architectural Features

of El Rayo, architectural energetics assessment of the four structures at the site, and the use of detailed definitions of both monument and memorial, I have argued and provided evidence of the presence of both monuments and memorials within the El Rayo necropolis.

The main argument of this thesis has revolved around ER-S3 being classified as a monumental memorial at the site. This was, by far, the most thoroughly excavated structure during the PAGN project. Measuring 12 x 24m, with a platform of 65 x 25m, this built form was of a massive scale compared to other features in Pacific Nicaragua. The other aspect of the arguments made regarded the presence of memorials within the cemetery complex. It was argued that the two standing stones of Loci 2 and 6, and the stone platform of Locus 3 were intended as memorials in relation to the deceased.

These arguments were based on the definition of a monument and a memorial. A monument, by the first definition, can be determined, as Trigger (1990) suggests, if it is a built form demonstrating a vast scale (within the cultural context) and elaborative design, implying that skilled labour was required in the construction process. A monument represents an excessive cost of construction, represented through labour hours and material resources used. Finally, a monument uses more space than the minimally required amount for the activities conducted at the monument.

By the second definition, a monument can be a commemorative reminder of the past, possessing socially contrived meaning, and links to a past event, an individual, a religious belief system, or a social group. Memorials, on the other hand do not require the scale requirements that a monument may possess, but it does need to have the commemorative quality, social meaning, and link to a past event, individual, belief system, or social group. It was further

explained that a monument can simultaneously be a memorial, while not all memorials can be considered monuments (for the full argument, refer to **Chapter Two**).

Monument Traits	Memorial Traits
Large in scale	Commemorative reminder of the past
Elaborate in design	Has social meaning
Exceeds minimal space requirements	Represents an event, individual, belief system, or social group
Displays exceptional skill	
Excessive labour cost	
Commemorative reminder of past	
Has social meaning	
Represents an event, individual, belief system, or social group	

[Table 10.1: Summary of Monument Traits Versus Memorial Traits]

The methods used to argue the presence of monuments and memorials at El Rayo were primarily based in excavation methods, field methods, the employment of architectural energetics, and an activity analysis of Locus 4. The most important field and excavation methods used were the shovel testing conducted in 2009/2010, and the use of 1 x 1m excavation units to explore the various archaeological features of the site, ranging from burials to middens to structures. Seven loci were excavated throughout the project, of which six contained architectural features. Laboratory analysis of the artifacts were conducted, and the 2015 and 2016 artifacts from Loci 4, 6, and 7 have been compiled into tables in **Appendices A** and **B**. An artifact assemblage summary was included in **Chapter Seven**, as well as an activity pattern assessment of Locus 4, following Pfälzner's (2015) methodology.

[Figure 10.1: East Facing View of ER-S3's Northern Wall]

The activity assessment, due to the nature of the site's abandonment, was inconclusive as to the types of activities occurring at Locus 4. Through it was clear that lithic tools were being used, along with a high frequency of plainware ceramics compared to polychromes, there were no middens or faunal remains present to indicate consumption activities. The presence of colander fragments at both Locus 4 and 7 suggest that a sieving activity was occurring, and with the fine silty matrix of the abandoned cache box of Locus 7, a plausible conclusion could be made that the colanders were being used to sieve the rocky debris out of the closed cache box

	Most Frequent Artifact	Least Frequent Artifact	Percentage of Rim Sherds	Total Number of Artifacts
Locus 4	Lithic Debitage	Ceramic Adornment	30.8%	2149
Locus 6	Lithic Debitage	Figurines	24.6%	398
Locus 7	Lithic Debitage	Ceramic Colanders	25.98%	1877

[Table 10.2: Summary of Artifact Analysis]

prior to final interment. Given the presence of the cache box, one plausible hypothesis was that ER-S3 was a civic-ceremonial structure, related to the ritual paraphernalia excavated from within the emptied cache box. Though the structure may also have served as a form of mortuary preparation area, the evidence was not strong enough to conclusively assign this function to the structure.

The architectural energetics models of ER-S1, ER-S2, ER-S3, and ER-S4 were built off of the known materials used in each structure and estimation of time allotments of each task. Architectural features can act as an index of labour, according to Abrams (1989), as a record of construction labour expended on a given task, which is then measurable by archaeologists. Energetics assessments calculate given energy (measured in labour) outputs of a structure to understand what sort of an investment of resources and time was put into construction. These models can then be put forth to cross-culturally evaluate architectural achievement (Abrams 1989: 75). As applied by this thesis, the architectural energetics models of ER-S1, ER-S2, ER-S3, and ER-S4 were used to highlight the intensive labour and material investment expended on ER-S3, in order to argue the structure was monumental by Nicaraguan standards at this time

Task	ER-S1 d/m	ER-S2 d/m	ER-S3 d/m	ER-S4 d/m	Circular Structure d/m
Clearing Land	0.1 – 0.05 d/m^2	0.09 – 0.05 d/m^2	8.1 -4.1 d/m^2	0.05 – 0.03 d/m^2	0.31 – 0.16 d/m^2
Procurement of Earth	N/A	N/A	81.3 – 40.1 d/m^3	N/A	N/A
Transportation of Earth	N/A	N/A	162.5 – 81.1 d/m^3	N/A	N/A
Procurement of Stone	0.12 – 0.06 d/m^3	0.12 – 0.06 d/m^3	3.7 – 1.8 d/m^3	0.22 – 0.11 d/m^3	0.25 – 0.13 d/m^3
Transportation of Stone	0.12 – 0.06 d/m^3	0.12 – 0.06 d/m^3	3.7 – 1.8 d/m^3	0.22 – 0.11 d/m^3	0.25 – 0.13 d/m^3
Procurement of Wood	0.6 – 0.3 d/m	0.6 – 0.3 d/m	72.0 – 36.0 d/m	0.6 – 0.3 d/m	4.20 -2.10 d/m
Transportation of Wood	0.12 – 0.06 d/m	0.12 – 0.06 d/m	14.4 – 7.2 d/m	0.12 – 0.06 d/m	0.84 – 0.42 d/m
Procurement of Cane	2.83 – 1.41 d/m^2	2.81 – 1.40 d/m^2	19.5 – 9.7 d/m^2	0.47 – 0.24 d/m^2	8.11 – 4.06 m^2
Transportation of Cane	2.83 – 1.41 d/m^2	2.81 – 1.40 d/m^2	19.5 – 9.7 d/m^2	0.47 – 0.24 d/m^2	8.11 – 4.06 m^2
Procurement of Palm Fronds	1.44 – 0.07 d/m^2	1.41 – 0.07 d/m^2	29.2 – 14.6 d/m^2	0.71 – 0.35 d/m^2	6.52 – 3.26 m^2
Transportation of Palm Fronds	1.44 – 0.07 d/m^2	1.41 – 0.07 d/m^2	29.2 – 14.6 d/m^2	0.71 – 0.35 d/m^2	6.52 – 3.26 m^2
Setting Stone/Lajas	0.28 – 0.14 d/m	0.28 – 0.14 d/m	2.9 -1.4 d/m	0.18 – 0.09 d/m	0.57 – 0.28 d/m
Constructing Wood Elements	0.12 – 0.06 d/m	0.12 – 0.06 d/m	14.4 – 2.9 d/m	0.12 – 0.06 d/m	0.84 – 0.42 d/m
Constructing Cane/Palm Frond Elements	0.57 – 0.28 d/m^2	0.56 – 0.28 d/m^2	5.8 – 2.9 d/m^3	0.14 – 0.07 d/m^2	1.87 – 0.93 d/m^2
Manufacturing Bajareque	2.33 – 1.12 d/m^2	2.33 – 1.12 d/m^2	12.0 – 5.8 d/m^2	N/A	4.71 – 2.26 d/m^2
Plastering Bajareque	2.33 – 1.12 d/m^2	2.33 – 1.12 d/m^2	12.0 – 5.8 d/m^2	N/A	4.71 – 2.26 d/m^2
Total d/m	15.23 – 6.24 d/m	16.19 – 6.19 d/m	490.2 – 243.8 d/m	4.01 – 2.01 d/m	47.81 – 23.73 d/m

[Table 10.3: Summary of Person-Days per Activity and the Total Construction Time for Structures ER-S1, ER-S2, ER-S3, ER-S4 and the 9 m Circular Structure]

period. Here, it is important to note that what qualifies as a monument in Nicaragua in the Sapoá period would not qualify as monumental in contemporaneous Mesoamerica.

To summarize the results of the architectural energetics models, ER-S3 would have taken between 490.2 – 243.8 d/m to construct while the smallest structure, ER-S4 would have taken 4.01-2.01 d/m. ER-S2, which was on the low end of Roman-Lacayo's (2013) range of structure sizes (as calculated by area) would have taken 16.19 – 6.19 d/m, while the proposed 9 m in diameter structure would have taken 47.81 – 23.73 d/m to build, falling into the 30 – 40 day range as cited by Oviedo (1945). The discrepancy between the extrapolated circular structure and the monumental ER-S3 is significant, with a 442.39 – 220.07 d/m difference. This highlighted the monumentality of ER-S3 through labour and level of elaboration in design.

Of the 13 Architectural Features, at El Rayo, six were determined to be either a memorial or a part of the monumental ER-S3 structure. Architectural Feature 5, located at Locus 2, Operation C, was described as an andesite elongated stone which had fallen over. It was surrounded by cobble stones and would have once been standing vertically. Located near the Locus 1 burial area, I have hypothesised that this stone may have been a memorial dedicated to the ancestors and indicated that the cemetery was located nearby. These stones would have been socially recognized, reminding the viewer of an ideological belief system with regard to the deceased and of their own social group.

The same argument was made of Architectural Feature 10, the Locus 6 standing stone. This stone was described to have fallen over from its original vertical position, and surrounded by a pile of fit sized cobbles, which would have emphasized the standing stone as well as bolstered it. The third memorial of El Rayo recognized in this thesis was Architectural Feature 7, the stone platform of Locus 3. The badly disturbed platform was further dismantled during

excavations of the Sapoá urn burials directly beneath the built form. As Manion (2016) described the platform, it may have been a shrine or staging area for the display of urn burials prior to interment and has been determined to be a memorial based on its relation to mortuary practice, ideological connotations, and contrived social meaning.

[Figure 10.2: Stone Shrine and Sapoá Cemetery at Locus 3, Photography by Geoffrey McCafferty]

Finally, Architectural Features 8, 9, and 13 were all associated with the ER-S3 structure. Architectural Feature 8 was the structures portion of ER-S3 (which encompasses the retaining walls, structure, and earthen platform). The stone lajas of the structure's foundation were visible from the surface prior to excavation and appeared to form two parallel rows with a 30 cm gap between them. The structure size was approximately 24 x 12m, and had a large upright stone positioned along the northern wall at what appears to have been entrance to the structure.

Architectural Feature 9 was a retaining wall to the west of Architectural Feature 8, comprised of stacked lajas, forming a tiered level to the east. Excavation was not conducted on this feature. Architectural Feature 13 was a differently styled retaining wall to the east of Architectural Feature 8, containing large boulders half buried in the 65 x 25m earthen platform of ER-S3. Again, this feature was not excavated. The ER-S3 structure was determined to be a monumental memorial.

Architectural Feature	Monument	Memorial	Feature Description	Reason for Monument/Memorial Status
Architectural Feature 5	x	✓	Standing Stone	Commemorative Reminder of the Past
Architectural Feature 7	x	✓	Stone Shrine	Represents a Belief System
Architectural Feature 8, Er-S3	✓	✓	Sapoá Structure	Scale is Monumental, Has Social Meaning
Architectural Feature 9, ER-S3	✓	✓	Sapoá Retaining Wall	Scale is Monumental, Has Social Meaning
Architectural Feature 10	x	✓	Standing Stone	Commemorative Reminder of the Past
Architectural Feature 13, ER-S3	✓	✓	Sapoá Retaining Wall	Scale is Monumental, Has Social Meaning

[Table 10.4: Summary of Monumental and Memorial Architectural Features at El Rayo]

The main limitation to this research was time. There was not enough time to further explore the site, as is the issue in most archaeological projects, nor was there the time or budget to attempt an experimental archaeological construction of ER-S3. Another limitation to the examination of the structures of El Rayo was their perishable materials being long since deteriorated and destroyed, leaving researchers to hypothesise the original form of the buildings.

Coupled with the lacking ethnohistorical data on construction methods and techniques recreating the El Rayo structures was a challenge to accurately portray. Finally, the limitation which affected the PAGN project was the restriction of excavations to one property, which coincided with the cemetery sector of El Rayo, and meant that any house mounds apart of the nucleated village described by Salgado Gonzalez (1996a) were not examined.

This research has contributed to the literature and archaeology in Pacific Nicaragua by discussing the monument and memorials incorporated in a cemetery during the Sapoá period at El Rayo. This thesis also records changes in construction styles from the Bagaces period to the Sapoá period. Finally, this research acts as a starting point from which further research can be conducted on public architecture in Pacific Nicaragua. The architectural features of El Rayo have proved to be revealing regarding the cemetery functions of the site, and the significance of the ancestor during the Sapoá period. This thesis has served as an introductory exploration of the architectural constructs in Pacific Nicaragua.

Future Research

This research has been an initial study of monumentality and memorialization within a cemetery context in the Greater Nicoya region. It is a topic which, archaeologically, has been under evaluated. Though there has been some agreement amongst Nicaraguan archaeologists that the stone statuary of Pacific Nicaragua represented monumental examples (Bruhns 1992, Navarro 2007), other architectural features had not been discussed in the same light. This study has evaluated monumentality and memorialization in the form of public architecture and stone features within the cemetery of El Rayo. One interesting feature to note in the comparative research within the Intermediate Area research was the tendency for monuments to be associated with burial elements, such as at Sonzapote and Rivas-Panteón de la Reina. Yet this research has

led to further lines of inquiry which could not be answered by the El Rayo data set alone. Here, I shall propose some questions which I have considered but not been able to answer through the research process.

1. Local report from the Asese peninsula indicate there may have been domestic house mounds further to the north of the El Rayo necropolis after modern construction in the area revealed many ceramic vessels and possible earthen mounds (personal communications with Geoffrey McCafferty 2018). Was this area a residential sector of El Rayo? If so, how does the mortuary complex of El Rayo relate to the presumed residential sector of the site?
2. There seems to be a dichotomy of structure forms in the late Bagaces and Sapoá, between circular mounds and rectangular mounds. The excavated structures in Nejapa were circular domestic architectural features, while other sited, such as Sonzapote, demonstrated a combination of circular and rectangular architectural features. To further confuse matters, Oviedo (Healy 1980) reports that the specialty structures of the Teçoatega plaza were all rectangular in the Ometepe period. Was there a functional reasoning for the form of a structure, and was it possible that this distinguished special purpose buildings from domestic buildings? Or, was there a shift in structure form over time?
3. Oviedo (1945) describes the presence of earthen mounds for ritual sacrifice in front of temples during the Ometepe period. To date, archeologically, there have been not examples of these architectural features, from any of the time periods. To what degree were these structures present in Pre-Hispanic Nicaragua, and what would the activity patterns look like within these locations?

4. As described by Haas and Creamer (2012), all monuments are constructed due to the influence of an elite ruling class or individual. However, examples form Sassaman and Randal (2012) suggest that there are other modes of monument construction than via dictation. What was the organizational force behind monument construction in Greater Nicoya? Was there an elite dictation of monument construction at El Rayo, or w more egalitarian mode of temporarily organized labour? How can we as archaeologists distinguish between these two modes of organized labour?
5. Due to the lack of research on the topic in Greater Nicoya, monumental public architecture appears to be a development of the Sapoá period, yet there has been no indication for the reason of this sudden emergence. What underlying factors of the emergence of monumental architecture were at play in Greater Nicoya, and were there examples of architectural monumentality prior to the Sapoá period?

Appendix A: Artifact Assemblages El Rayo 2015

[Table 1: 2015 Lithic Tools]

Locus	N/E	Level	Bag #	Material	Description
4	567/364.5	5	706	Chert	Scraper
4	567/364.5	5	706	Chert	Bladelet
4	557/360.5	2	722	Chert	Bladelet
4	557/360.5	2	722	Chert	Core
4	557/360.5	2	722	Chert	Core
4	557/360.5	1	721	Obsidian	Bladelet
4	557/361.5	3	743	Unknown	Scraper
4	557/361.5	3	743	Chert	Core
4	557/361.5	3	743	Obsidian	Bladelet
4	556/364.5	3	713	Unknown	Burnishing Stone
4	556/364.5	3	713	Chert	Bladelet
4	556/364.5	3	713	Chert	Core
4	557/362.5	2	752	Unknown	Possible Awl
4	556/364.5	3	713	Chert	Drill
4	560/368.5	1	611	Obsidian	Bladelet
4	560/368.5	3	613	Unknown	Point
4	557/361.5	2	742	Unknown	Burnishing Stone
4	557/364.5	3	703	Chert	Scraper
4	558/370.5	1	531	Obsidian	Bladelet
4	557/364.5	1-3	704	Unknown	Burnishing Stone
4	561/368.5	4	774	Chert	Scraper
4	561/368.5	5	775	Andesite	Pecking Stone
4	557/362.5	4	754	Basalt	Mano
4	557/361.5	3	743	Basalt	Mano

[Table 2: 2015 Lithic Debitage and Tools by Material Type]

	Chert	Obsidian	Basalt	Andesite	Limestone	Unknown	Totals
Locus 4	849	4	2	1	0	8	864

[Table 3: 2015 Decorated Ceramic Body Sherds]

Locus	N/E	Level	Bag #	Object #	Description
4	558/370.5	1	531	12	Polychrome
4	557/362.5	3	753	16	Polychrome/ Brushstroke
4	557/361.5	1	741	18	Incised
4	559/369.5	2	562	20	Incised
4	556/364.5	1	711	21	Incised
4	558/371.5	3	523	22	Polychrome
4	557/364.5	1	701	23	Polychrome
4	557/362.5	3	753	24	Polychrome
4	560/371.5	2	522	30	Brushstroke
4	560/371.5	2	522	33	Polychrome/Bichrome
4	557/364.5	2	702	41	Polychrome
4	557/362.5	3	753	43	Bichrome/Brushstroke
4	559/368.5	2	572	44	Incised
4	555/370	2	602	49	Incised
4	558/368.5	1	591	51	Polychrome
4	559/367.5	2	582	53	Incised/Brushstroke
4	559/368.5	2	572	55	Brushstroke
4	556/364.5	1	711	58	Polychrome
4	558/361.5	1	681	60	Excised
4	559/367.5	1	581	61	White Glaze
4	555/370	2	602	65	Incised
4	560/371.5	3	523	72	Polychrome
4	556/364.5	1	711	74	Incised
4	558/364.5	1	661	78	Polychrome
4	557/361.5	2	742	83	Incised
4	567/364.5	5	706	90	Polychrome
4	559/370.5	5	545	92	Polychrome
4	556/364.5	3	713	94	White Slip and Fine Incising
4	561/368.5	3	773	95	While Slip and Fine Incising
4	559/368.5	2	572	98	White Slip and Fine Incising
4	561/368.5	3	773	103	Unknown
4	556/364.5	3	713	105	Unknown
4	556/364.5	3	713	108	Unknown
4	557/361.5	3	743	109	Unknown
4	N/A	N/A	718	113	Polychrome
4	561/368.5	4	774	115	White Slip and Burnt
4	561/368.5	7	777	120	Polychrome
4	N/A	N/A	718	121	Red Slip

[Table 4: 2015 Ceramic Rim Sherd Count by Decorative Features]

	Monochrome	Red Ware	Polychrome Unidentified	Too Small	Polychrome	Castillo	Totals
Locus 4	257	0	36	163	30	6	492

[Table 5: 2015 Applique Ceramic Fragments]

Locus	N/E	Level	Bag #	Object #
4	559/364.5	2	692	352
4	559/367.5	1	581	355
4	558/367.5	1	631	356
4	559/364.5	1	691	358
4	559/368.5	1	571	360
4	560/367.5	1	621	367
4	559/367.5	1	581	368
4	559/367.5	1	581	369
4	558/363.5	1	671	375
4	559/368.5	1	571	375
4	558/367.5	1	631	379
4	557/364.5	1-3	704	382
4	561/368.5	4	774	388
4	561/368.5	3	773	389
4	555/370	2	602	391
4	559/370.5	4	544	398
4	559/368.5	2	572	1307
4	557/364.5	4	705	1311

[Table 6: 2015 Ceramic Colander Fragments]

Locus	N/E	Level	Bag #	Object #
4	558/361.5	1	681	2
4	558/368.5	1	591	3
4	N/A	3	52i3	4

[Table 7: 2015 Ceramic Base Fragments]

Locus	N/E	Level	Bag #	Object #
4	558/369.5	N/A	555	261
4	560/368.5	3	613	262
4	559/367.5	2	582	263
4	557/361.5	2	742	264
4	559/368.5	2	572	266
4	557/364.5	1-3	704	268
4	557/362.5	3	753	270
4	559/367.5	2	582	271
4	558/363.5	2	672	272
4	558/367.5	1	631	273
4	559/364.5	2	692	274
4	557/362.5	2	752	275
4	558/366.5	1	641	277
4	557/364.5	2	702	278
4	558/367.5	1	631	279
4	559/364.5	2	692	280
4	557/362.5	3	753	282
4	555/370	2	602	283
4	557/362.5	3	753	284
4	559/364.5	2	692	285
4	557/361.5	3	743	286
4	557/364.5	1-3	704	287
4	556/364.5	2	712	288
4	559/368.5	1	572	289
4	555/370	2	602	290
4	559/368.5	2	572	1101
4	557/364.5	4	705	1102
4	559/368.5	2	572	1103
4	556/364.5	2	712	1104
4	556/364.5	3	713	1105
4	557/361.5	2	743	1106
4	556/364.5	3	713	1110
4	561/368.5	4	774	1111
4	557/364.5	N/A	706	1114
4	661/368.5	3	773	1115
4	561/368.5	7	777	1129
4	561/368.5	6	776	1132
4	561/368.5	6	776	1135

[Table 8: 2015 Ceramic Net Sinkers]

Locus	N/E	Level	Bag #	Object #	Complete	Description
4	560/368.5	1	611	241	Complete	Body
4	558/364.5	2	662	242	Broken	Body
4	559/371.5	2	513	243	Broken	Body
4	560/367.5	1	621	245	Broken	Body
4	555/370	2	602	246	Broken	Body
4	555/370	2	602	247	Broken	Body
4	557/362.5	3	753	248	Complete	Rim
4	560/371.5	3	523	249	Broken	Body
4	557/362.5	3	753	251	Broken	Polychrome Body
4	558/369.5	1	551	245	Broken	Body
4	556/364.5	3	713	255	Broken	Body
4	557/364.5	1-3	704	258	Broken	Body
4	556/361.5	2	762	259	Broken	Body
4	557/361.5	2	743	260	Broken	Body

[Table 9: 2015 Worked Ceramic Sherds]

Locus	N/E	Level	Bag #	Object #
4	559/364.5	2	692	291
4	559/364.9	2	692	292
4	557/362.5	3	753	293
4	558/370.5	1	531	294
4	555/370	3	603	295
4	557/361.5	2	742	297
4	555/370	2	602	298
4	559/367.5	2	582	299
4	555/370	2	602	301
4	560/371.5	3	523	304
4	557/364.5	4	705	305
4	557/364.5	5	706	306
4	561/368.5	3	773	308
4	561/368.5	3	773	309
4	557/364.5	4	705	310

[Table 10: 2015 Ceramic Supports]

Locus	N/E	Level	Bag #	Object #	Description
4	557/364.5	2	702	721	N/A
4	559/364.5	2	692	722	N/A
4	557/364.5	1-3	704	724	Jaguar Support
4	337/364.5	1-3	704	725	Jaguar Support
4	558/369.5	2	551	727	N/A
4	556/364.5	1	711	728	Base Attached
4	557/360.5	1	731	729	Round Support
4	556/364.5	1	711	730	N/A
4	558/367.5	1	631	761	N/A
4	558/369.5	1	551	733	Fragment
4	558/369.5	2	552	734	Fragment
4	559/369.5	1	531	736	Fragment
4	557/362.5	2	752	738	Round Support
4	557/364.5	2	702	740	N/A
4	556/364.5	1	711	742	N/A
4	558/367.5	1	631	743	Button Support
4	557/364.5	1-3	704	744	Jaguar Support
4	559/367.5	1	581	745	N/A
4	559/371.5	2	513	747	Fragment
4	557/362.5	3	753	748	N/A
4	555/370	2	602	749	N/A
4	559/367.5	2	581	750	Fragment
4	557/362.5	3	753	751	Fragment
4	559/367.5	2	582	752	Button Support
4	560/367.5	1	621	753	N/A
4	555/370	1	601	754	Fragment
4	558/363.5	1	671	757	Fragment
4	559/367.5	2	582	758	Fragment
4	559/371.5	1	511	759	N/A
4	555/370	2	602	760	Button Support
4	559/367.5	1	581	761	Fragment
4	555/370	2	602	762	Fragment
4	557/364.5	2	702	763	N/A
4	555/370	2	602	765	Fragment
4	555/370	2	602	766	Fragment
4	559/368.5	1	571	768	N/A
4	560/371.5	3	523	769	Turtle Beak
4	556/364.5	3	713	771	Mamo Form
4	557/362.5	3	753	772	Polychrome Round
4	556/364.5	3	713	773	Polychrome Tapered

4	557/361.5	3	743	774	Polychrome
4	557/364.5	4	705	775	Polychrome
4	557/364.5	1-3	704	776	Base Attached
4	557/360.5	2	722	779	Base Attached
4	556/361.5	2	762	780	N/A
4	557/364.5	5	706	782	Fragment
4	561/368.5	4	774	783	Fragment
4	557/360.5	2	722	784	Fragment
4	557/361.5	3	743	785	Fragment
4	557/360.5	2	722	786	Fragment
4	557/364.5	4	705	787	Fragment
4	556/364.5	3	713	788	Fragment
4	557/360.5	2	722	789	Fragment
4	556/364.5	2	712	780	Fragment
4	557/361.5	3	743	791	Fragment
4	556/361.5	1	761	793	Fragment
4	556/364.5	3	713	794	Fragment
4	561/368.5	6	776	798	Fragment
4	561/368.5	7	777	1341	Fragment
4	561/368.5	6	776	1344	Fragment
4	556/364.5	4	714	1345	Fragment
4	561/368.5	6	776	1348	Fragment
4	561/368.5	6	776	1350	Pointed Base

[Table 11: 2015 Ceramic Handle Fragments]

Locus	N/E	Level	Bag #	Object #	Description
4	560/368.5	4	613	221	Broken
4	559/369.5	2	562	224	Broken
4	556/364.5	3	713	225	Broken
4	556/364.5	3	713	226	Broken

[Table 12: 2015 Ornamentation]

Locus	N/E	Level	Bag #	Object #	Material	Description
4	557/364.5	5	706	1201	Clay	Ear Spool

[Table 13: 2015 Ceramic Balls]

Locus	N/E	Level	Bag #	Object #	Diameter (mm)	Weight (g)	Description
4	559/364.5	2	562	401	9.5	5	Irregular
4	559/368.5	2	672	402	15.5	2	Irregular
4	560/367.5	2	621	403	16	3	Irregular
4	558/368.5	1	591	404	16.8	4	Regular
4	557/364.5	1-3	704	406	16.8	3	Irregular
4	558/367.5	1	631	407	22.1	9	Regular
4	559/364.5	2	692	409	15.2	2	Regular
4	558/369.5	1	551	411	12.6	2	Regular
4	557/361.5	1	741	412	15.1	2	Regular
4	557/361.5	1	741	413	17.1	3	Irregular
4	558/367.5	1	631	414	25.5	7	Irregular
4	557/361.5	2	742	415	17.1	2	Irregular
4	557/362.5	2	752	416	20.1	6	Irregular
4	560/367.5	1	621	418	15.4	2	Irregular
4	558/363.5	1	671	419	15.2	2	Regular
4	559/368.5	1	571	420	15.7	2	Irregular
4	559/370.5	1	741	422	21	6	Irregular
4	560/367.5	1	621	423	18.5	4	Irregular
4	559/371.5	2	513	424	10.8	<1	Irregular
4	557/364.5	3	703	428	15.4	4	Regular
4	555/370	2	602	429	14.2	2	Irregular
4	555/370	3	603	430	17.3	4	Irregular
4	557/364.5	4	705	431	19.2	4	Irregular
4	555/370	2	602	432	18	3	Regular
4	559/371.5	2	513	433	232	6	Irregular
4	555/370	3	603	434	15.6	2	Irregular
4	555/370	2	602	435	18.3	4	Irregular
4	555/370	2	602	439	15	2	Irregular
4	557/364.5	1	701	440	15.5	2	Irregular
4	555/370	3	603	442	14.8	2	Irregular
4	557/364.5	1	701	443	16.6	2	Irregular
4	558/364.5	3	663	446	13.9	2	Irregular
4	555/370	2	602	448	17.5	4	Irregular
4	555/370	2	602	449	16	3	Irregular
4	555/370	2	602	451	11.8	<1	Irregular
4	557/361.5	1	741	453	17.7	2	Irregular
4	559/371.5	2	513	454	16.5	2	Irregular
4	556/364.5	1	711	455	20.7	4	Irregular
4	556/364.5	1	711	456	17.8	2	Irregular

4	556/364.5	1	711	457	16.4	2	Irregular
4	556/364.5	1	711	458	14.4	2	Irregular
4	560/367.5	1	621	459	17.4	2	Irregular
4	559/371.5	2	513	464	10	<1	Irregular
4	557/364.5	2	702	465	19.2	4	Irregular
4	557/364.5	2	702	466	17.5	4	Irregular
4	557/364.5	2	702	467	15.2	3	Regular
4	557/364.5	2	702	468	13.9	<1	Irregular
4	555/370	2	702	469	13.2	<1	Irregular
4	555/370	3	603	470	13	2	Regular
4	558/371.5	2	602	472	16.7	2	Irregular
4	556/364.5	3	503	473	15	2	Irregular
4	561/368.5	3	713	477	20.5	9	Regular
4	561/368.5	3	773	479	17.5	4	Irregular
4	561/368.5	3	773	482	14.2	2	Irregular
4	556/364.5	4	714	487	14.8	2	Irregular
4	557/360.5	1	721	490	22.6	7	Regular
4	557/360.5	1	721	491	18	4	Irregular
4	557/360.5	1	721	492	9.3	<1	Irregular
4	556/364.5	3	713	497	13	2	Irregular
4	559/368.5	2	572	502	11.8	<1	Irregular
4	561/368.5	4	774	505	15.4	3	Irregular
4	N/A	N/A	718	510	1807	4	Irregular

[Table 14: 2015 Faunal Remains]

Locus	**N/E**	**Level**	**Bag #**	**Description**
4	561/368.5	1	771	Gaspar Scale
4	560/368.5	3	613	Gaspar Scale
4	557/364.5	3	703	Gaspar Scale
4	561/368.5	2	772	Gaspar Scale
4	557/362.5	1	751	Gaspar Scale
4	556/364.5	2	712	Gaspar Scale
4	560/368.5	1	611	Gaspar Scale

[Table 15: 2015 Worked Bone]

Locus	N/E	Level	Bag #	Object #	Material	Description
4	557/364.5	4	705	712	Bone	Needle
4	560/368.5	3	613	714	Bone	Incised
4	560/368.5	3	613	715	Bone	Incised
4	557/361.5	4	744	716	Turtle	Awl
4	560/368.5	1	611	718	Bone	Awl

[Table 16: 2015 Figurine Fragments]

Locus	N/E	Level	Bag #	Object #	Description
4	577/361.5	2	742	602	Arm
4	560/371.5	2	522	603	Arm and Leg
4	558/369.5	1	551	605	Head
4	558/369.5	N/A	555	607	Head
4	558/369.5	1	551	608	N/A
4	558/365.5	1	651	609	N/A
4	560/368.5	3	613	610	Eye
4	559/367.5	1	581	611	Head
4	557/362.5	1	751	612	Arm
4	557/361.5	2	742	613	N/A
4	560/371.5	3	523	614	Foot
4	560/371.5	2	522	616	N/A
4	555/370	2	602	617	N/A
4	555/370	2	602	618	N/A
4	559/368.5	1	571	620	Foot
4	558/367.5	1	631	622	Torso
4	557/364.5	2	702	623	Arm
4	557/364.5	2	702	724	Elbow
4	561/368.5	2	772	627	Face
4	557/364.5	4	705	628	Fragment
4	556/364.5	3	713	629	Shoulder
4	N/A	N/A	758	630	Arm
4	557/364.5	5	706	631	Foot
4	557/364.5	5	706	632	Foot
4	557/364.5	1-3	704	633	N/A
4	557/362.5	5	775	638	Torso
4	557/362.5	5	775	642	Arm

[Table 17: 2015 Adorno Fragments]

Locus	N/E	Level	Bag #	Object #
4	555/370	2	602	312
4	556/364.5	1	711	314
4	560/368.5	1	611	319

Appendix B: Artifact Assemblages El Rayo 2016

[Table 1: 2016 Lithic Tools]

Locus #	N/E	Level	Bag #	Material	Description
7	544/392	1	571	Chert	Core
7	N/A	N/A	770	Chert	Biface Point
7	N/A	N/A	770	Chert	Biface Point

[Table 2: 2016 Lithic Debitage and Tools by Material Type]

	Chert	Obsidian	Basalt	Andesite	Limestone	Unknown	Totals
Locus 4	200	0	2	0	0	0	202
Locus 6	253	0	0	0	1	0	254
Locus 7	1223	6	5	2	0	3	1239
Totals	1676	6	7	2	1	3	1695

[Table 3: 2016 Ceramic Rim Sherd Count by Decorative Features]

	Monochrome	Red Ware	Polychrome Unknown	Polychrome	Too Small	Castillo	Totals
Locus 4	98	0	23	0	49	2	170
Locus 6	51	0	6	2	37	2	98
Locus 7	295	5	81	29	53	21	484
Totals	444	5	90	31	139	25	734

[Table 4: 2016 Applique Ceramic Fragments]

Locus	N/E	Level	Bag #	Object #	Description
4	560/379	3	453	394	Spinel Applique
4	560/383	N/A	414	379	Turtle Head Polychrome
4	560-561/383	1	411	249	Snout
4	560/379	3	453	375	Turtle Head Polychrome
4	560/379	2	452	588	Bird Head
4	560-561/378.5	2	422	52	Animal Head Fragment
7	556/387	N/A	720	347	Turtle Head Polychrome
7	N/A	N/A	507	76	Body Sherd with Cacao Bean
7	556/393	N/A	500	623	Primate Arm, Torso, Head
7	544/393	1	561	579	Arm of Vessel
7	N/A	N/A	771	264	Owl Face, Molded
7	544/393	8	569	625	Bat Head
7	N/A	N/A	755	641	Unknown Fragment

[Table 5: 2016 Ceramic Colander Fragments]

Locus	N/E	Level	Bag #	Object #	Description
4	560/383	2	412	17	Body Sherd
4	560/379	3	453	35	Body Sherd
4	560/379	3	453	391	Body Sherd
7	N/A	N/A	580	342	Body Sherd
7	N/A	N/A	753	312	Body Sherd
7	556/393	1	701	80	Body Sherd

[Table 6: 2016 Ceramic Base Fragments]

Locus	N/E	Level	Bag #	Object #
4	562/378	3	483	166
4	560-561/383	1	411	197
4	560-561/378.5	2	422	198
4	560-561/378	2	402	200
4	560-561/383	1	411	218
4	560/379	3	453	220

4	560/379	2	452	222
4	560-561/383	1	411	228
4	560/377	2	432	229
4	560-561/383	1	411	232
4	560-561/383	1	411	241
4	560-561/378.5	1	421	246
4	560-561/383	2	412	247
4	560/377	2	432	251
4	560-561/378	3	403	260
6	506/368	4	363	162
6	507/369	2	671	177
6	508/367	3	332	182
6	506/369	5	625	219
6	506/319	4	624	242
7	544/393	2-3	563	159
7	543/393	1	511	176
7	544/393	1	561	178
7	544/392	1	571	180
7	544/392	1	571	184
7	555/393-394	2	582	186
7	544/392	1	571	190
7	544/393	10	731	193
7	544/392	1-3	574	196
7	N/A	N/A	651	199
7	544/393	5	566	201
7	544/393	10	731	210
7	544/392	1-3	573	213
7	544/392	1	571	223
7	544/392	4	575	224
7	544/393	4	736	230
7	544/393	4	565	235
7	556/387	3	722	239
7	544/393	6	567	240
7	544/392	4	575	243
7	544/393	6	567	245
7	544/392	4	575	248
7	544/393	2-3	564	250
7	556-557/393	3	503	253
7	542/392	1	541	256
7	544/393	4	565	258
7	556/393.5	2	702	259
7	544/393	10	731	261
7	555/393-394	2	582	262
7	544/392	4	575	265

[Table 7: 2016 Ceramic Net Sinkers]

Locus	N/E	Level	Bag #	Object #	Description	Complete
4	560/379	2	452	336	Body Sherd	Broken
4	560/379	2	452	382	Body Sherd	Broken
4	560/377	2	432	414	Rim Sherd	Complete
4	560/378.5	2	422	381	Body Sherd	Broken
4	560/378	2	402	337	Rim Sherd	Broken
4	560/379	2	452	41	Body Sherd	Broken
4	556/393	3	403	22	Body Sherd	Complete
4	559/393	3	403	28	Body Sherd	Broken
4	560/377	2	432	383	Body Sherd	Complete
4	560/377	2	432	330	Rim Sherd	Broken
4	560-561/383	2	412	325	Rim Sherd	Broken
4	556/393	3	403	33	Body Sherd	Broken
4	560/380	2	472	329	Rim Sherd	Broken
6	56-557/393	3	503	328	Rim Sherd	Broken
6	505/389	2	631	326	Rim Sherd	Broken
6	505/368	4	373	35	Body Sherd	Complete
6	N/A	N/A	624	281	Body Sherd	Broken
6	502/369.5	2	341	38	Rim Sherd	Broken
6	505/368	4	373	24	Rim Sherd	Broken
7	556/387	3	722	384	Body Sherd	Complete
7	544/393	3	735	331	Body Sherd	Broken
7	555/392-393	3	583	31	Body Sherd	Complete
7	555/393-394	2	582	32	Rim Sherd	Complete
7	N/A	1	750	277	Body Sherd	Broken
7	556/387	3	722	333	Body Sherd	Broken
7	556/387	3	722	327	Body Sherd	Complete
7	544/393	3	568	416	Body Sherd	Broken
7	544/392	1	571	29	Rim Sherd	Broken
7	556/393	2	701	335	Rim Sherd	Broken
7	556-557/393	1	502	27	Body Sherd	Complete
7	N/A	5	770	279	Rim Sherd	Complete
7	N/A	5	770	282	Rim Sherd	Complete
7	544/392	1	571	37	Rim Sherd	Complete
7	566/393	2	502	26	Rim Sherd	Complete
7	N/A	1	750	280	Rim Sherd	Broken
7	N/A	N/A	500	75	Rim Sherd	Broken
7	N/A	6	771	323	Rim Sherd	Broken
7	556/394.5	1	591	30	Rim Sherd	Broken
7	555/393-394	2	582	40	Body Sherd	Broken
7	544/393	1	561	420	Rim Sherd	Broken

7	542/392	2	522	39	Body Sherd	Broken
7	543/392	1	531	35	Body Sherd	Broken
7	N/A	N/A	759	380	Body Sherd	Complete
7	N/A	5	770	278	Body Sherd	Broken
7	556/393.5	2	702	42	Rim Sherd	Broken

[Table 8: 2016 Worked Ceramic Sherds]

Locus	**N/E**	**Level**	**Bag #**	**Object #**	**Length (cm)**	**Height (cm)**	**Description**
4	560/379	1	452	390	2.27	0.49	N/A
4	562/378-379	2	482	388	5.25	0.82	Circular Sherd
4	560-561/378	3	403	46	N/A	0.76	Possible Net Sinker
4	560/379	1	452	389	N/A	0.67	Possible Net Sinker
6	N/A	N/A	675	50	4.55	0.9	Drilled Hole
6	506/368	4	363	56	3.78	0.53	Possible Net Sinker
6	506/368	3	362	52	N/A	1.01	Ground Edges
6	506/372	2	681	57	3.57	0.95	Handle Fragment
6	506/369	3	623	45	N/A	0.97	Ground Edges
7	556-557/393	3	503	529	3.6	1.69	Support
7	N/A	N/A	776	275	4.78	1.65	Drilled Hole
7	542/392	1	541	321	5.54	1.28	Ground Edges
7	N/A	6	755	385	4.62	1.06	Ground Edges
7	542/392	1	541	322	N/A	0.62	Possible Net Sinker
7	542/393	2	522	47	5.85	0.68	Ground Edges
7	542/393	2	522	55	3.9	0.69	Ground Edges
7	544/392	2	572	319	N/A	0.69	Ground Edges
7	N/A	5	770	586	5.24	0.73	Ground Edges
7	N/A	4	562	408	N/A	0.79	Circular Sherd
7	N/A	6	571	51	N/A	0.48	Circular Sherd
7	556/394.5	1	591	58	N/A	0.58	Ground Edges

[Table 9: 2016 Ceramic Supports]

Locus	N/E	Level	Bag #	Description
4	560/380	2	472	Pointed Support
4	560/383	2	411	Wide Support
4	560-561/378.5	2	422	N/A
4	560/379	3	453	N/A
4	560/379	3	453	N/A
4	561/379	2	442	Button Support
4	560-561/378.5	1	421	N/A
6	506/368	2	361	Leon Punctate
6	N/A	N/A	303	Madera Polychrome
6	508/367	2	631	Pointed Support Fragment
6	506/369	5	624	Papagayo
6	505/369	2	631	N/A
6	507/369	1	670	Papagayo
6	N/A	N/A	655	Tola Trichrome
6	506/368	2	361	N/A
6	N/A	N/A	322	N/A
6	506	369	624	N/A
6	508/367	3	332	Wide Support
6	502/369.5	2	341	N/A
6	505/367	2	381	N/A
6	505/368	2	371	Polychrome
6	N/A	N/A	321	Pointed Support Fragment
7	544/393	1	561	Lago Modeled
7	544/393	10	731	Madera Polychrome
7	543/392	1	531	Madera Polychrome
7	N/A	N/A	580	Madera Polychrome
7	544/393	6	567	Rattles, Pointed Support
7	544/393	5	566	Papagayo
7	544/393	1	733	Pointed Support Fragment
7	543/392	1	533	Papagayo
7	N/A	4	763	Pointed Support
7	N/A	6	771	Support Base
7	555/392-393	3	583	N/A
7	560-561/383	2	411	Papagayo
7	544/392	2	572	N/A
7	556/387	3	722	N/A
7	556-557/393	3	503	Papagayo
7	542/393	2	522	N/A
7	555/393	4	711	N/A
7	556/387	3	722	N/A

7	542/393	1	522	Wide Support
7	544/393	1	733	Wide Support
7	N/A	5	770	N/A
7	543/392	1	531	N/A
7	556-557/393	3	503	N/A
7	556/387	3	722	N/A
7	N/A	8	757	N/A
7	543/393	1	511	N/A
7	544/393	6	567	N/A
7	544/393	4	565	Polychrome
7	N/A	N/A	576	Polychrome
7	N/A	5	770	Papagayo
7	503/496	2	781	Leg with Foot

[Table 10: 2016 Ornamentation]

Locus	N/E	Level	Bag #	Object #	Material	Description
4	560/379	3	453	11	Ceramic	Broken Labret
4	560/379	3	453	4	Ceramic	Earspool Fragment
4	561/379	2	462	10	Ceramic	Earspool Fragment
4	560-561/378.5	2	422	8	Ceramic	Earspool Fragment
7	N/A	4	753	12	Tooth	Carved Pendant
7	N/A	2	761	143	Fish Vertebra	Whole Earspool
7	N/A	7	757	1	Ceramic	Earspool Fragment
7	556-557/393	3	503	5	Ceramic	Earspool Fragment
7	544/392	1	571	7	Ceramic	Earspool Fragment
7	542/393	2	522	6	Ceramic	Earspool Fragment
7	544/393	1	733	2	Ceramic	Earspool Fragment
7	544/392	1	571	601	Turtle Bone	Perforated Shell
7	544/393	6	738	602	Turtle Bone	Perforated Shell

[Table 11: 2016 Ceramic Balls]

Locus	N/E	Level	Bag #	Object #	Diameter (cm)	Weight (g)	Description
4	560-561/378	3	403	88	2.68	13	rough and irregular
4	560-561/378.5	2	422	595	2.21	4	rough and irregular

4	560/380	2	472	98	1.68	3	smooth and irregular
4	542/393	1	521	100	2.15	3	smooth and regular
4	545/392	1	432	92	1.85	4	rough and irregular
4	560-561/378	2	402	142	1.56	2	rough and irregular
4	560/379	2	452	144	1.58	3	rough and irregular
6	505/367	2	381	87	2.04	4	rough and irregular
6	506/393	4	624	89	2.25	6	rough and irregular
6	N/A	N/A	301	91	1.75	3	rough and irregular
6	N/A	N/A	301	91	1.48	2	rough and irregular
6	N/A	N/A	321	N/A	1.45	1	rough and irregular
6	N/A	N/A	321	N/A	1.8	2	smooth and irregular
6	N/A	N/A	321	N/A	1.66	2	rough and irregular
6	N/A	N/A	321	N/A	1.87	4	rough and irregular
6	N/A	N/A	311	110	2	4	rough and irregular
6	N/A	N/A	311	111	1.77	2	rough and irregular
6	506-367	3	392	112	1.59	2	rough and irregular
6	507/366	1	660	N/A	1.44	1	rough and irregular
6	506/369	1	620	129	1.94	3	rough and irregular
6	506/369	1-2	622	666	1.76	2	rough and irregular
7	556-557/393	3	503	97	2.21	8	rough and irregular
7	N/A	N/A	756	285	2.1	6	smooth and regular
7	N/A	5	754	584	1.73	2	smooth and irregular
7	N/A	5	754	283	2.41	11	rough and irregular
7	542/393	2	531	99	2.41	9	rough and irregular
7	N/A	4	763	286	1.87	3	rough and irregular
7	556/393.5	2	702	96	1.33	<1	rough and irregular
7	N/A	3	752	95	1.86	4	smooth and irregular
7	N/A	N/A	756	287	1.59	3	smooth and irregular
7	N/A	5	770	288	1.61	1	smooth and irregular
7	544/393	2-3	564	102	2.27	7	rough and irregular
7	555/393-394	3	583	101	2.06	4	smooth and irregular
7	555/393-394	2	582	109	1.3	1	rough and irregular

[Table 12: 2016 Worked Bone]

Locus	N/E	Level	Bag #	Object #	Length (cm)	Diameter (cm)	Description
7	N/A	N/A	575	144	5.37	0.58	Burned Needle Straightener
7	556/387	3	723	616	5.58	0.57	Incised Sawfish Rostra

[Table 13: 2016 Figurine Fragments]

Locus	N/E	Level	Bag #	Object #	Description
4	560/3790	3	453	583	Arm
4	560-561/378	3	403	83	Fragment
4	560-561/378	3	403	78	Fragment
4	560-561/378.5	2	421	64	Body
4	562/378	3	483	82	Face Fragment
4	N/A	N/A	477	74	Face Fragment
6	N/A	N/A	322	6274	Fragment
7	544/393	7	568	69	Face Fragment
7	555/392-393	3	583	303	Body
7	544/393	1	733	574	Face Fragment
7	544/393	8	569	81	Face Fragment
7	544/393	4	565	373	Face Fragment
7	556/393.5	1	701	73	Body Fragment
7	544/393	7	568	580	Body Fragment
7	545/392	1	531	60	Fragment
7	555/392-393	2	582	75	Face Fragment
7	544392	1-3	574	80	Fragment
7	N/A	3	752	290	Arm
7	N/A	3	762	291	Fragment
7	N/A	N/A	593	633	Fragment
7	N/A	N/A	720	578	Fragment
7	544/393	1	561	77	Arm
7	544/393	6	567	63	Fragment
7	566/393	2	502	146	Arm and Body
7	N/A	N/A	529	548	Body

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