

POSTCLASSIC MAYA SETTLEMENT ON THE  
RURAL-URBAN FRINGE OF  
MAYAPÁN, YUCATÁN, MEXICO

by

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## **Chapter 7 - Revised Population Estimates, Settlement Chronology and Distribution**

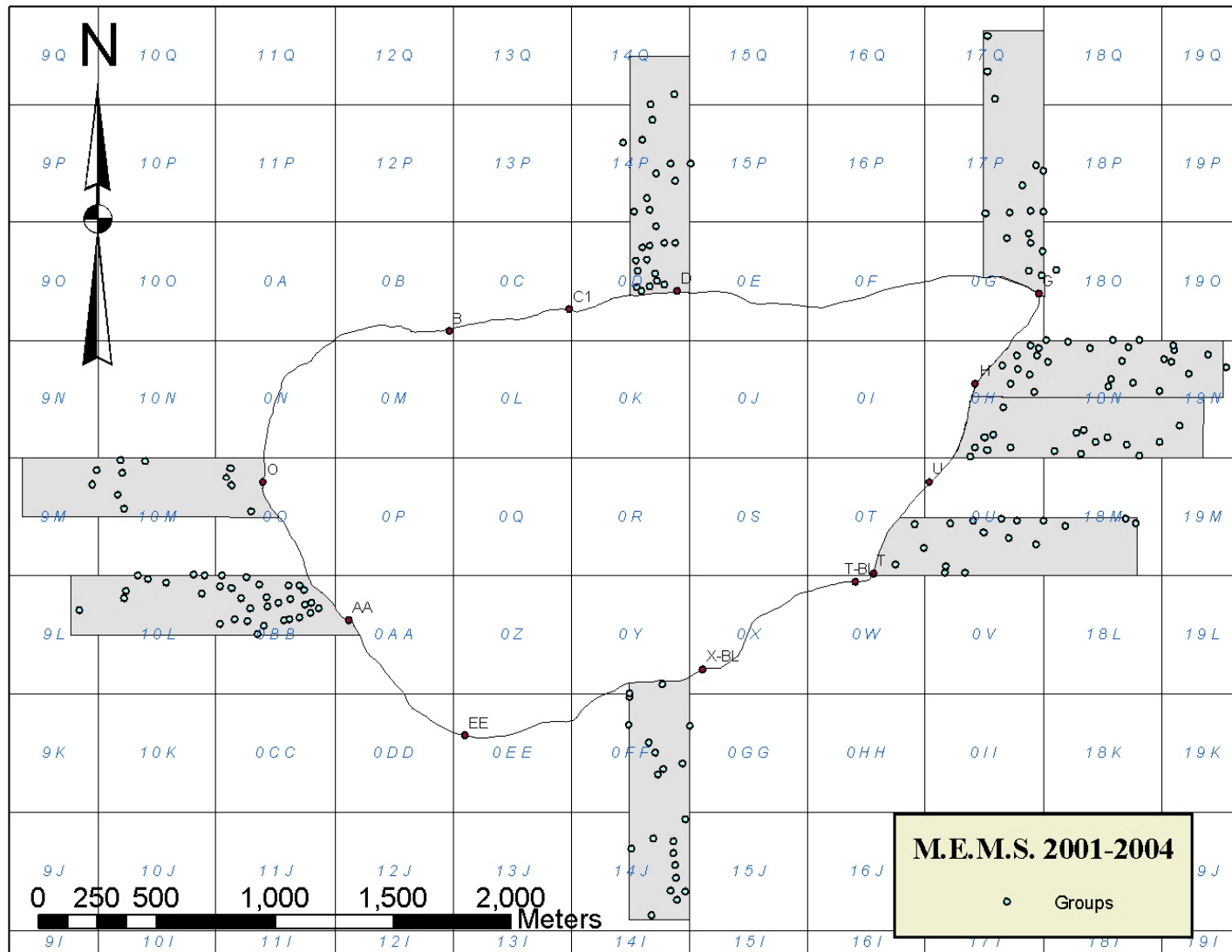
Among the stated goals of this study was the creation of a more detailed picture of the settlement history and distribution at the site of Mayapán. Specifying the changes in settlement distribution and density over time provides a window on the processes of urbanization that resulted in the final city form we find for the Postclassic settlement. A thorough understanding of the urban form of the site cannot overlook the rural-urban fringe which is, in this case, primarily composed of settlement areas located outside of the formal city wall. This chapter reviews what has been found regarding the settlement history and general form of the area, both within the city wall and the aforementioned settlement zones found outside of it. The focus of this chapter is the overall temporal and spatial variation reflected in the archaeological record of the site. Chapter 8 will address the functional variation reflected in architecture and settlement distribution in more detail.

### **Population Estimates for the Rural-Urban Fringe and Site-Wide Implications**

The inclusion of information about the rural-urban fringe of the site provides several new and important observations about the Postclassic center of Mayapán. One of the most important observations is a new estimate for the population of the site at its Postclassic height. The study area sample that was surveyed by our team is roughly half as large as the area contained within the city wall (4.2 sq km). In total, we documented 347 structures in 173 groups along 8 survey transects, each roughly  $\frac{1}{4}$  sq km. in size (Figures 7.1-7.12). A small number of those structures were included in the margins of the Carnegie map (Jones 1957) which stopped just beyond the wall. The vast majority of

structures are newly recorded. This count of 347 structures in approximately 2 sq km can be compared with the much greater density of structures within the wall. In the 4.2 sq km area contained within the wall there are approximately 4,000 structures (952 structures per km sq.). Of those 4,000 structures mapped by the team, 2,100 were identified as dwellings. Based on that data, the Carnegie project estimated a site population of roughly 12,000 inhabitants (Smith 1963:264-265).

The density outside of the wall, just 174 structures per sq km, is predictably lower than recorded within the walls. However, the total external area within 1 km of the city wall is several times larger than that contained within it. As a result, even at much lower density, the total number of structures located in the periphery of the site is still quite large. Projecting my sample out over the entire study area suggests that there may be roughly 1,700 structures located within the total study area. Further research will undoubtedly refine this estimate to some degree. Of the 347 structures mapped, 176 are Postclassic dwellings. Projected out over the entire study area, that represents some 880 new dwellings that can be considered part of the Postclassic settlement at Mayapán. The new estimate represents a 42 percent increase in the number recorded by the Carnegie project. In short, the results of the Mayapan Periphery Project survey push the newly estimated population to over 17,000 inhabitants at the site's height.



**Figure 7.1 – Location of all clusters mapped.**

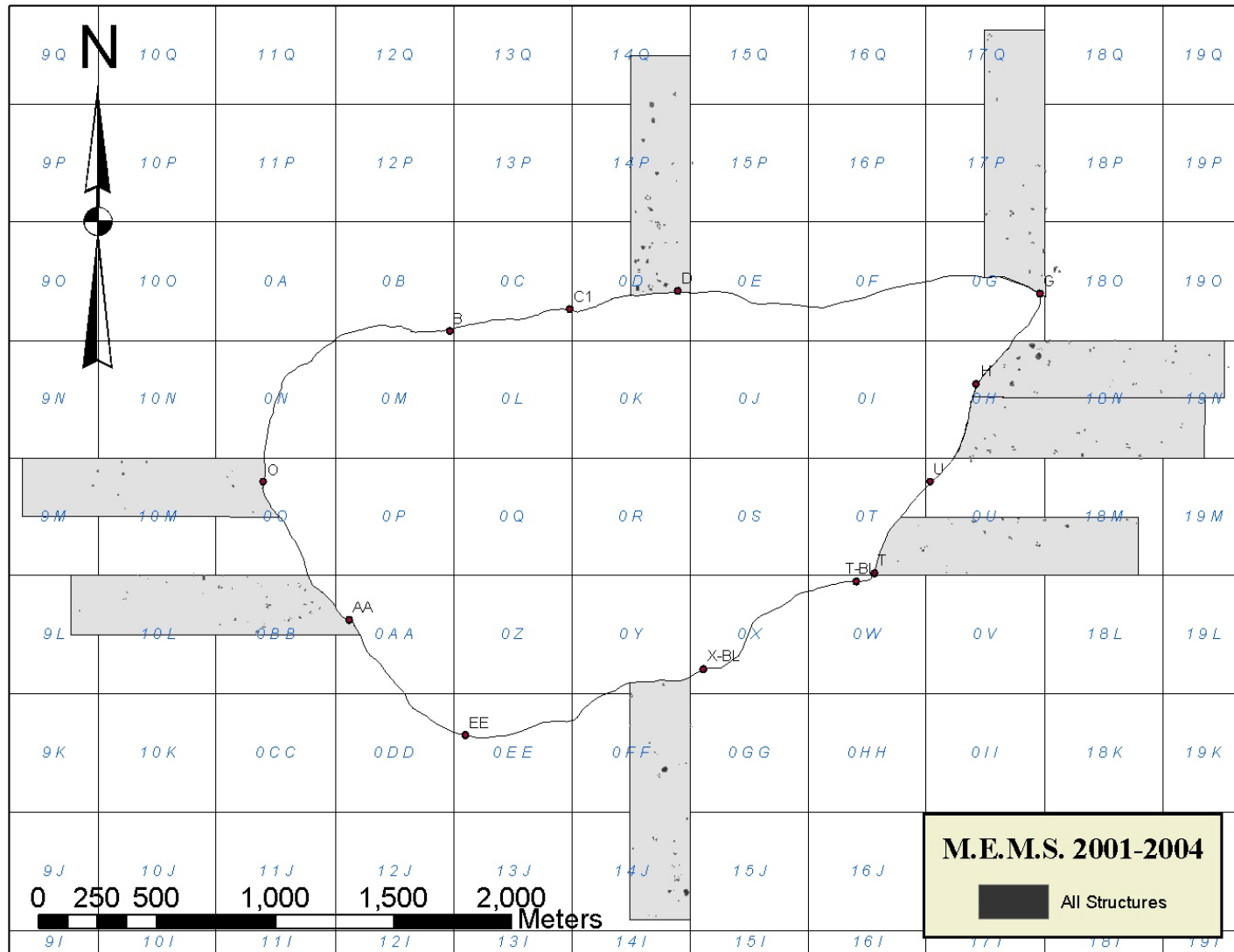


Figure 7.2 – Location of all structures mapped.

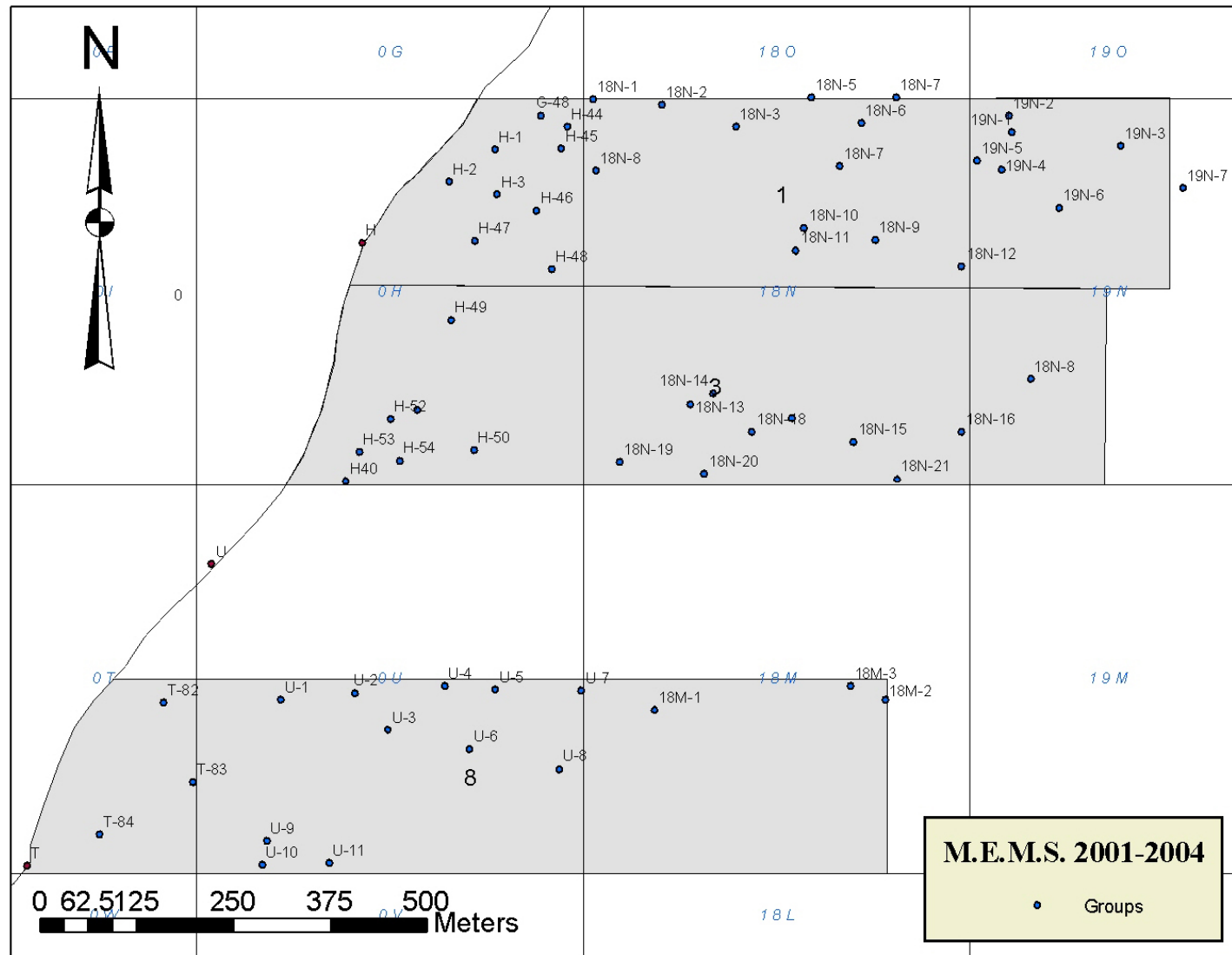


Figure 7.3 – Clusters mapped along transects 1, 3, and 8 (east).

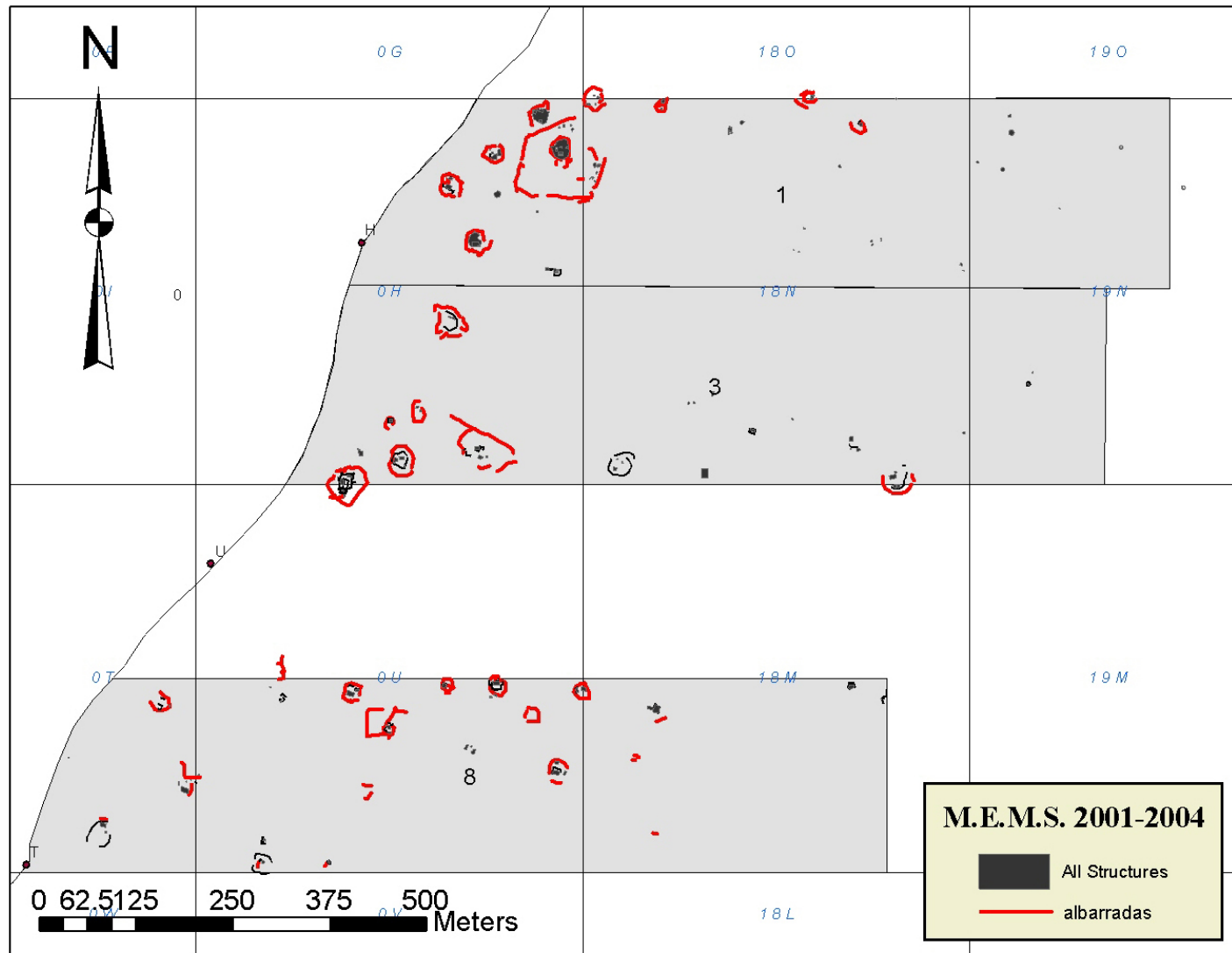


Figure 7.4 – Individual structures mapped along transects 1, 3, and 8 (east) with albarrada walls.



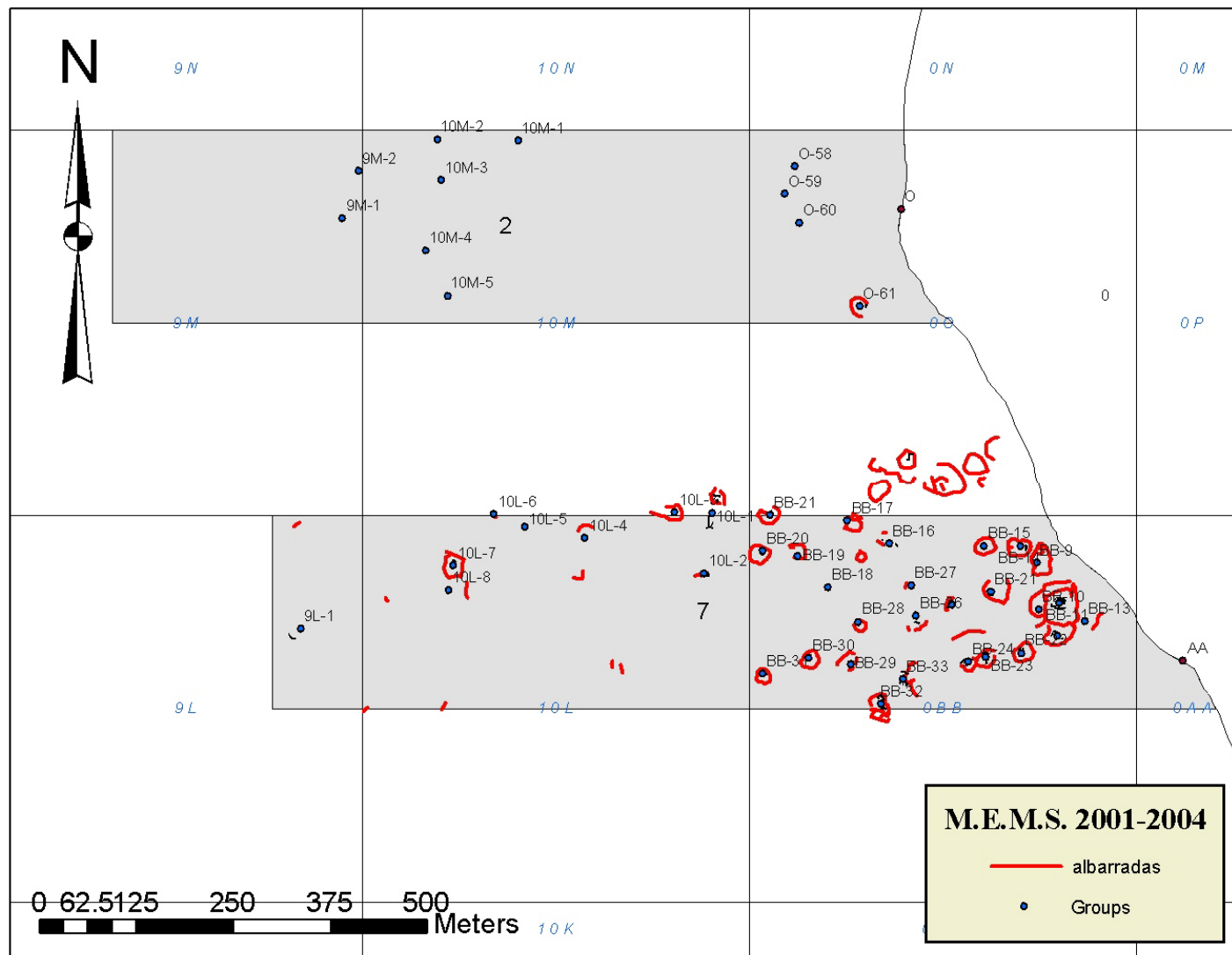
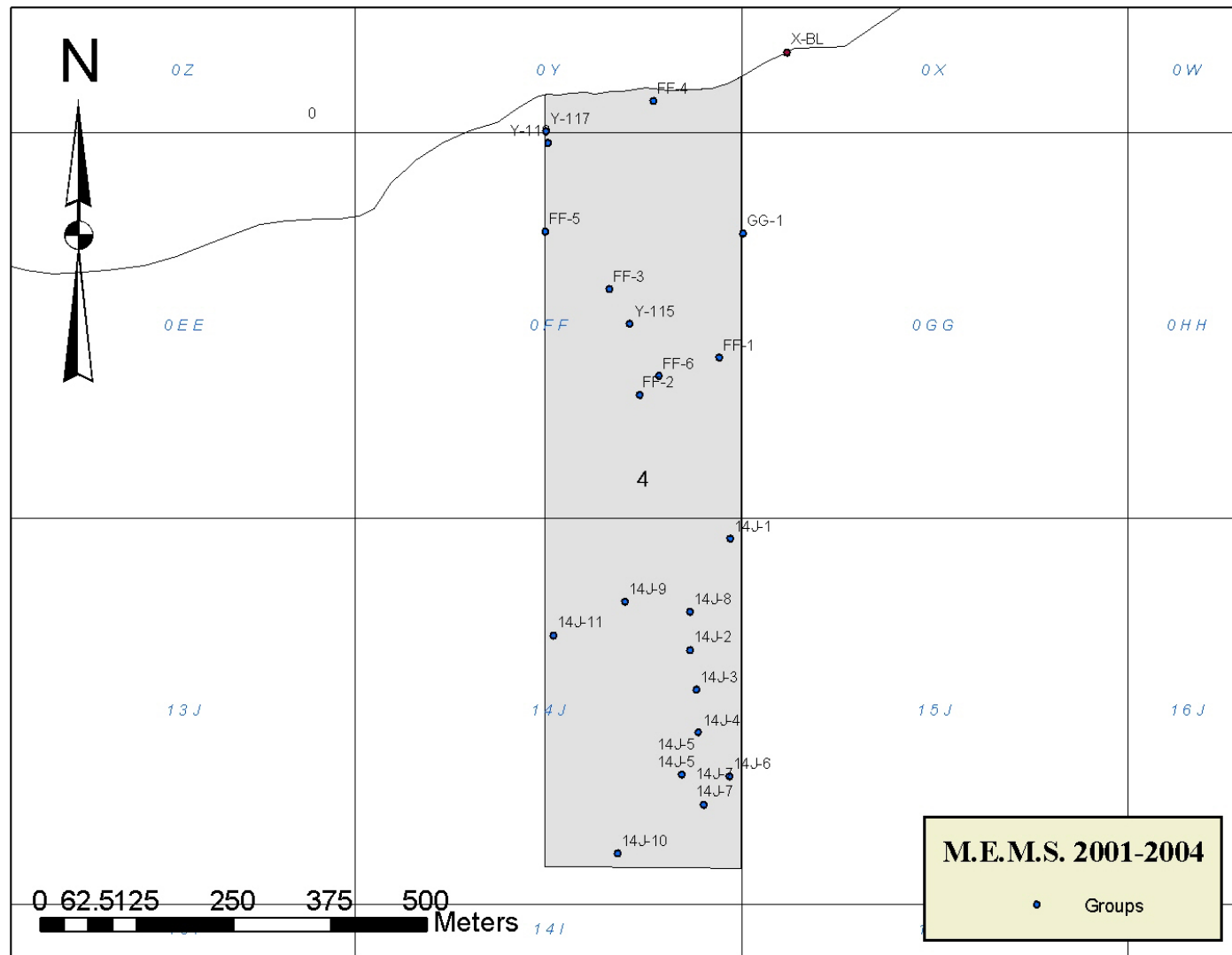


Figure 7.6 – Individual structures mapped along transects 2 and 7 (west) with albarrada and platform walls.





**Figure 7.7 – Clusters mapped along transect 4 (south).**

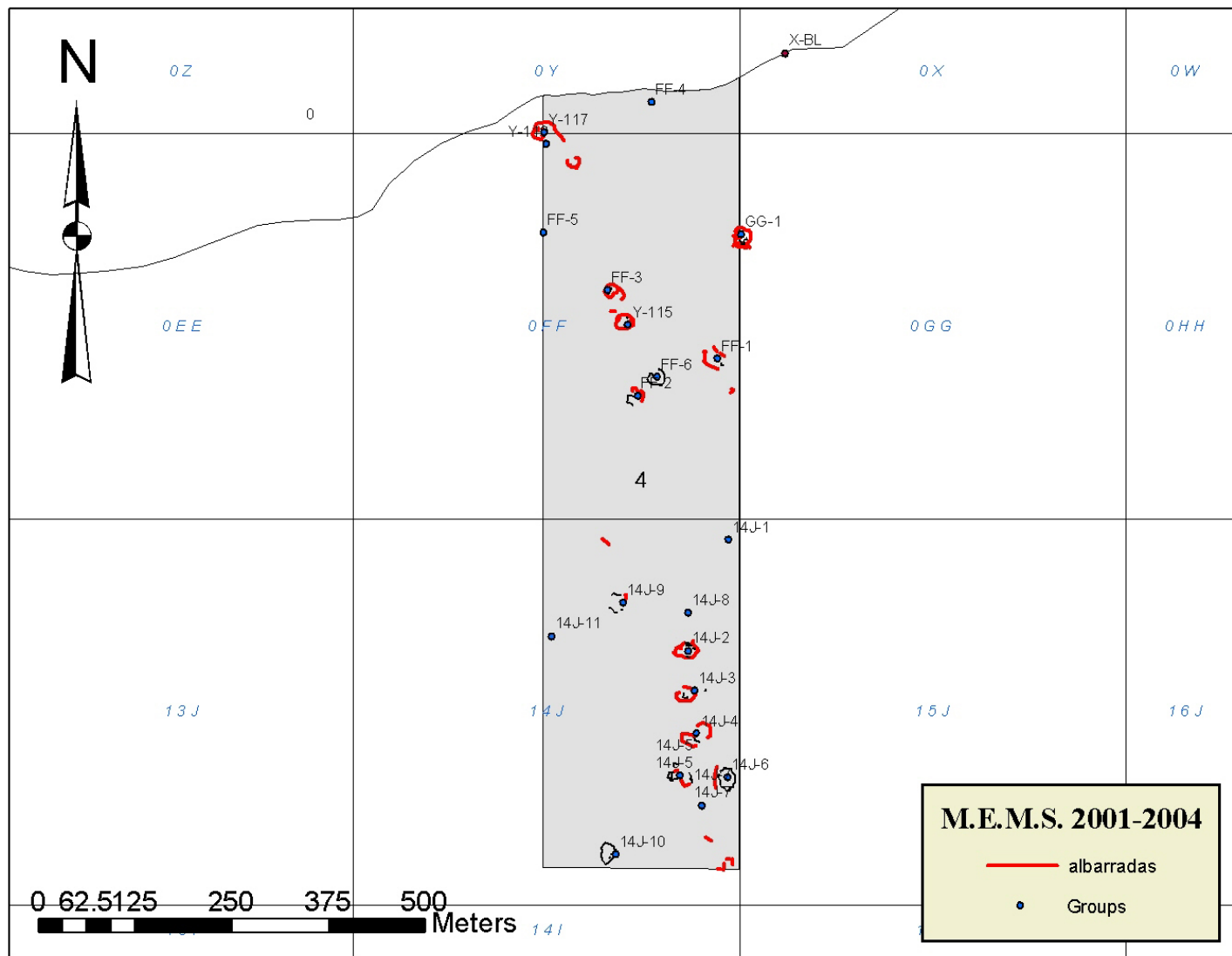
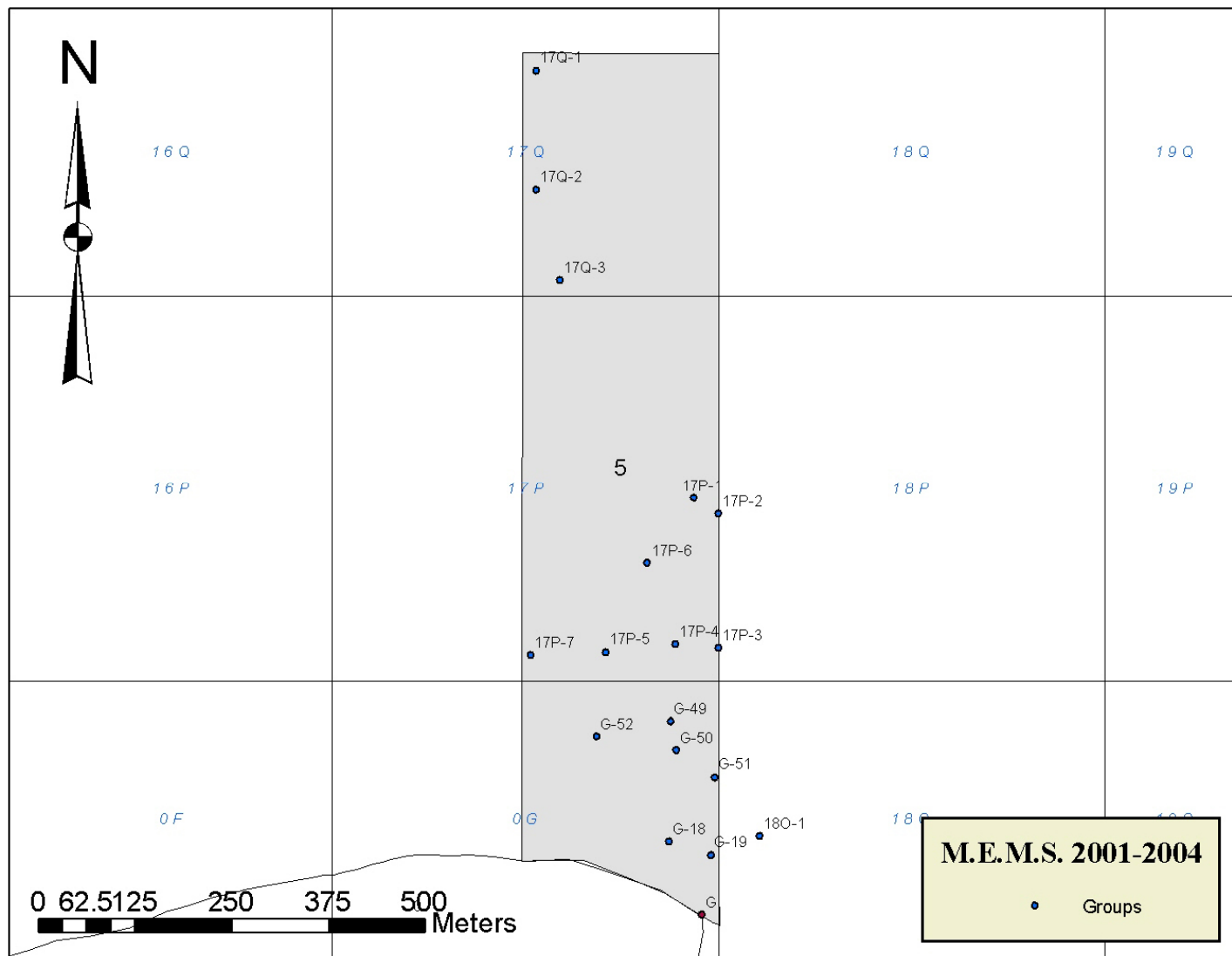


Figure 7.8 – Individual structures mapped along transect 4 (south) with albarrada and platform walls.



**Figure 7.9 – Clusters mapped along transect 5 (north).**

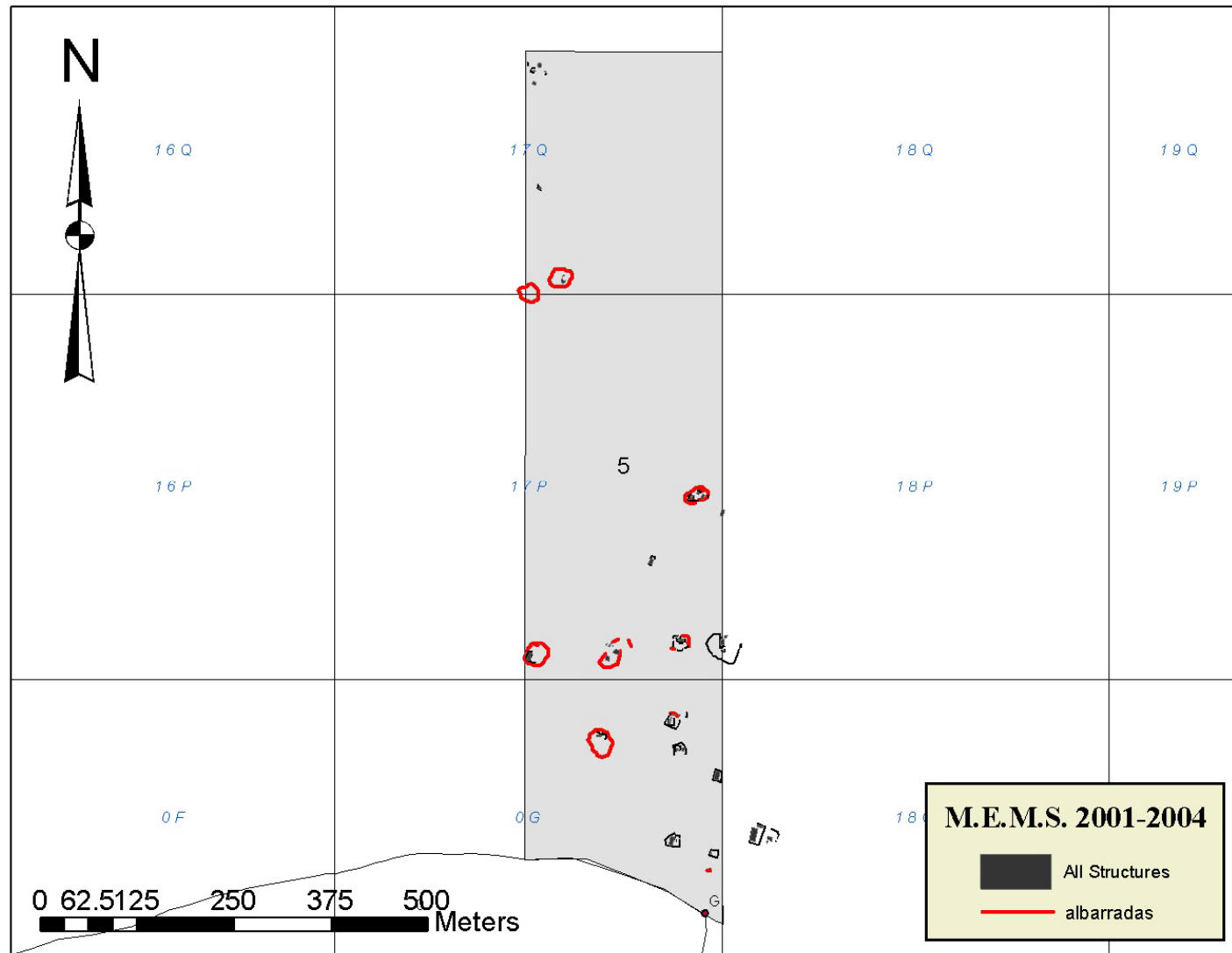


Figure 7.10 – Individual structures mapped along transect 5 (north) with albarrada and platform walls.

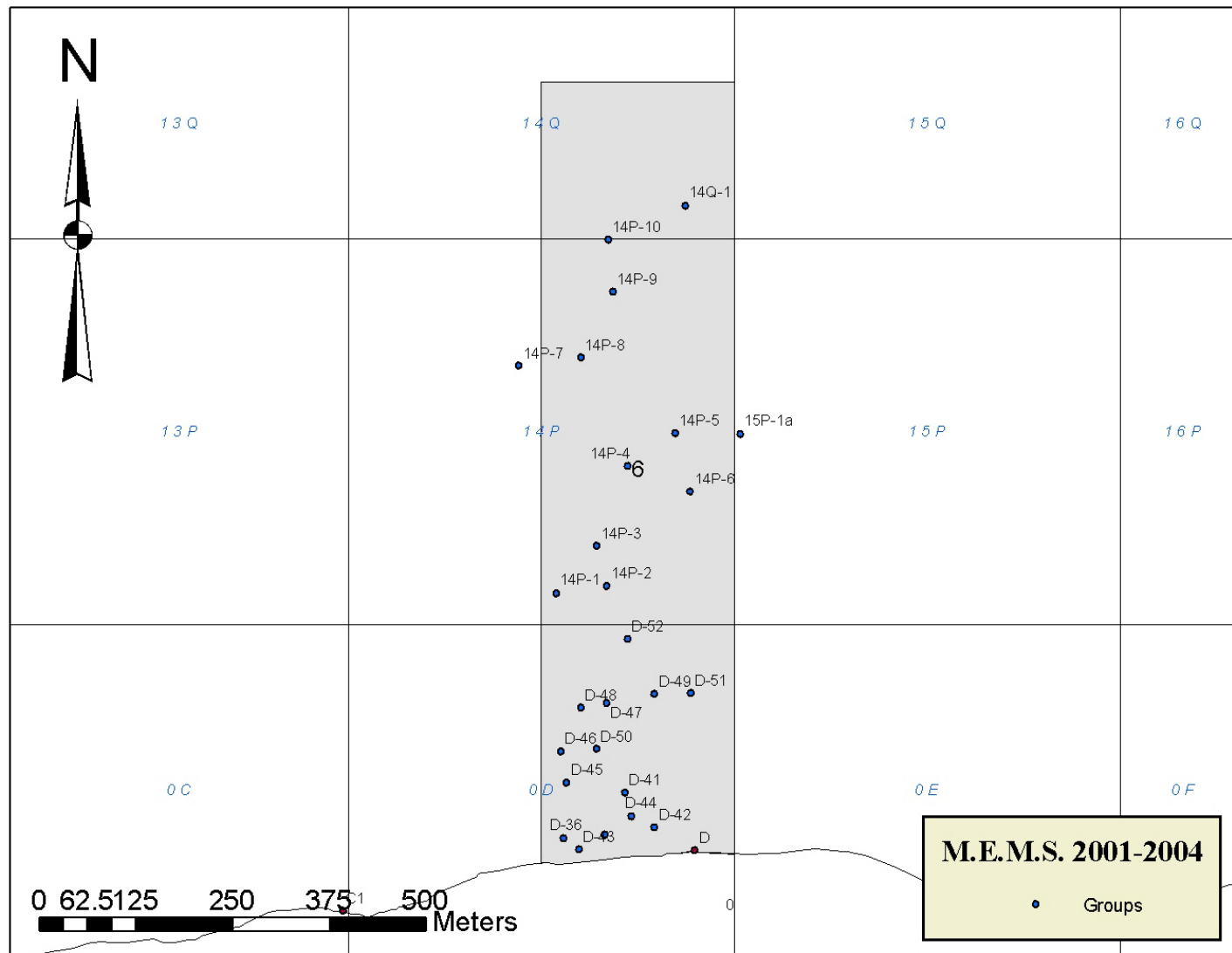


Figure 7.11 – Clusters along transect 6 (north).

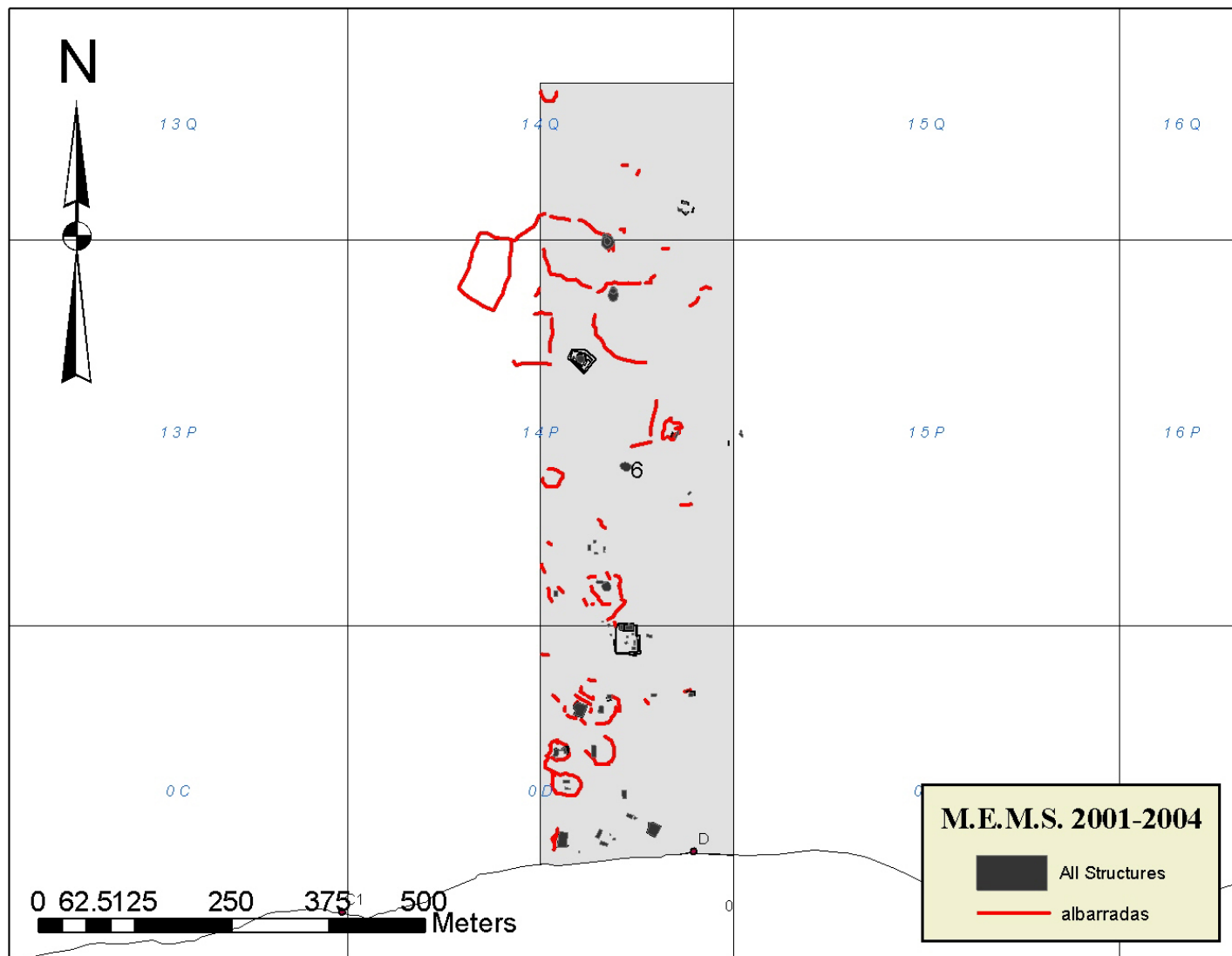


Figure 7.12 – Individual structures along transect 6 (north) with albarra and platform walls.

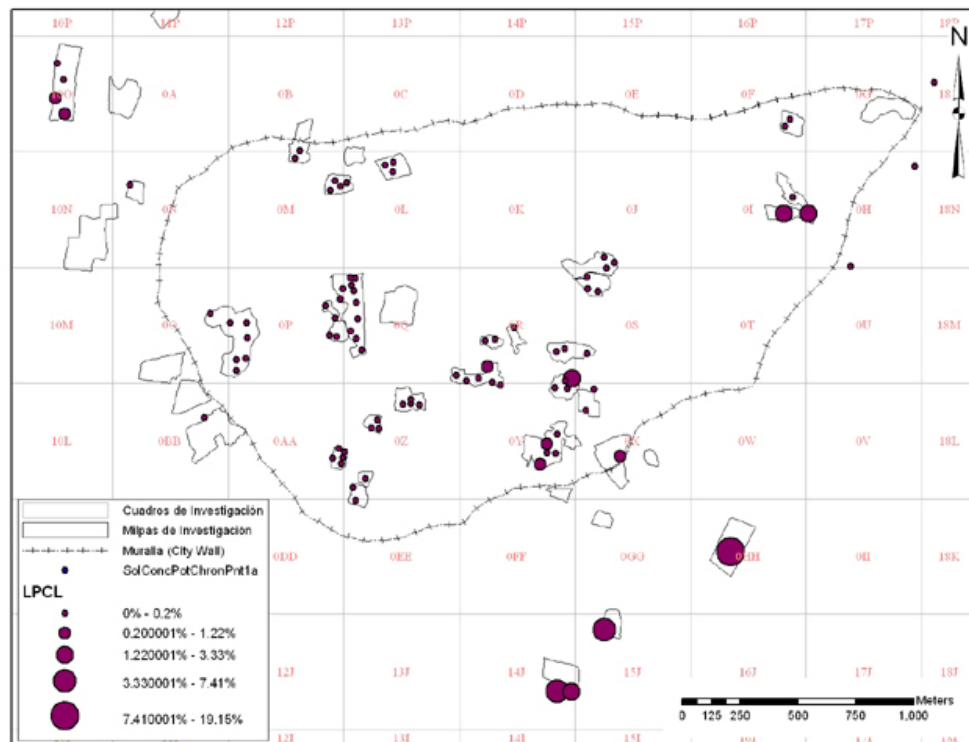
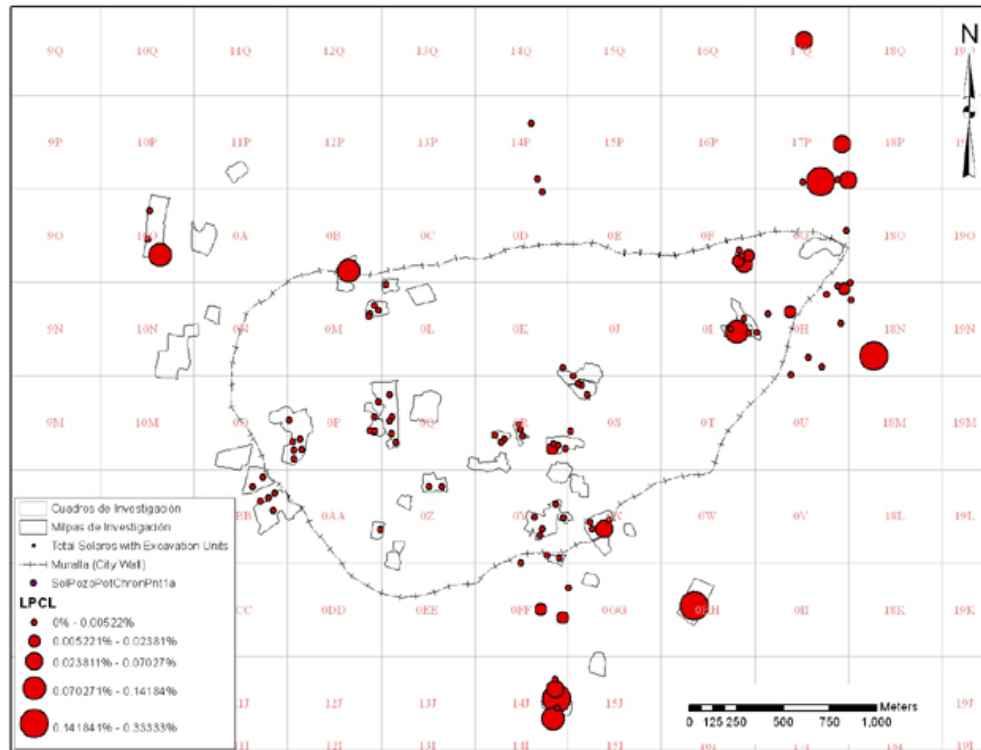
## **Settlement History in the Area Based on Distribution of Ceramics**

The distribution of ceramics in the area varied widely over time and is a direct expression of related changes in the site's settlement history. The distributions serve as clues to both settlement location and settlement density. As much of the construction in the area was perishable, and a portion of the permanent structures have been obscured or destroyed by later activity and geologic processes, the ceramics provide, in many respects, a more complete picture than can be gained by simply examining the distribution of architectural remains themselves. The combined ceramic data from surface collections and sub-surface testing documented by the Proyecto Económico de Mayapán and Mayapán Periphery Projects provide a detailed sequence of the change in ceramic distributions from the Late Preclassic through the Colonial Periods. The two data sets are largely complimentary. As would be expected, the sub-surface testing was far more successful at detecting remains from the earlier periods and provides a more complete overall picture of the changes being discussed. However, surface collections allowed sampling of a larger number of contexts.

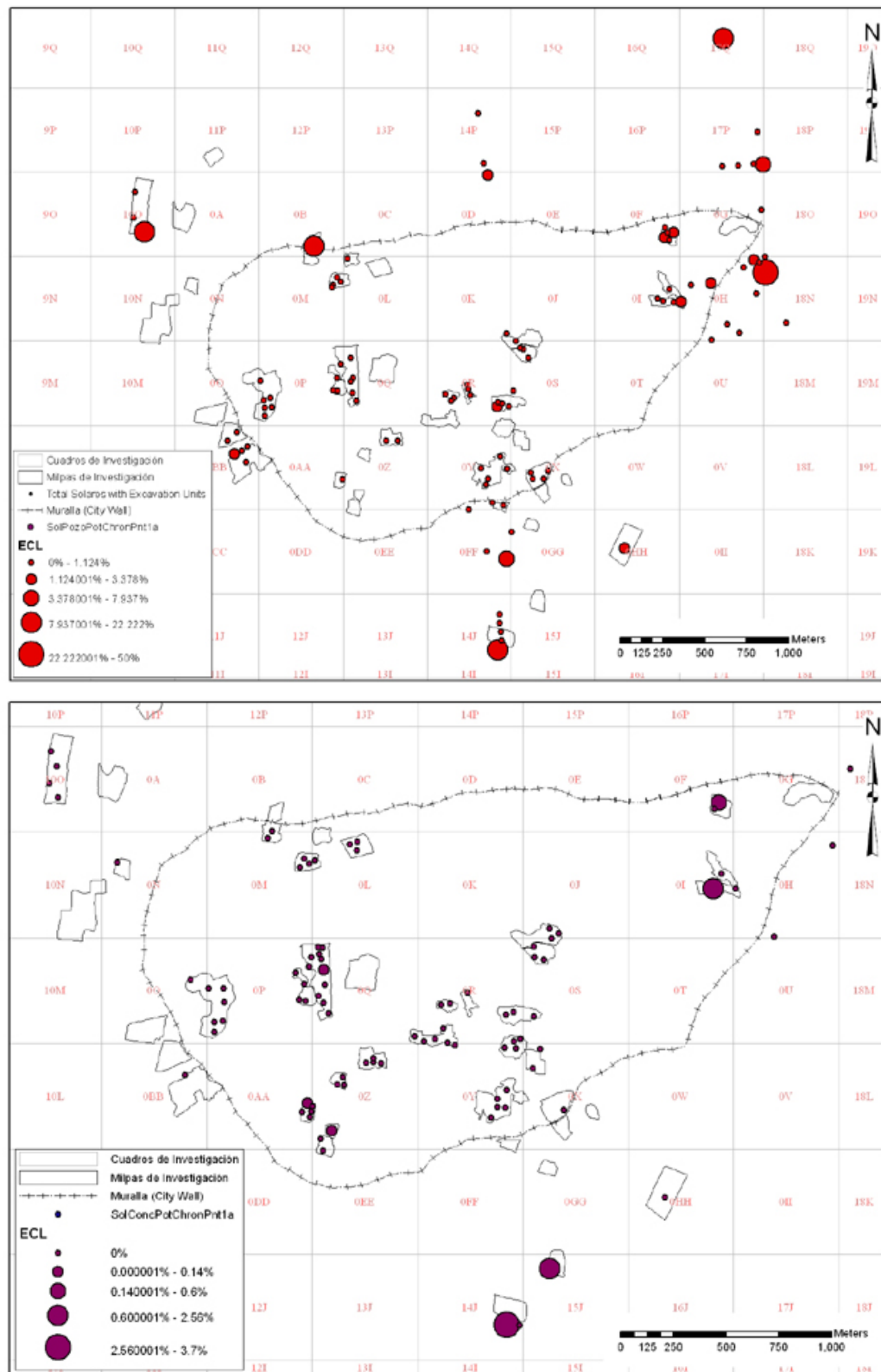
The ceramic distributions suggest that the area around Mayapán has been populated to greater or lesser degree from the Late Preclassic period. Excavations inside the wall by the Carnegie Project turned up small quantities of Preclassic, Classic and terminal Classic Period ceramics (Pollock 1962:6; Smith 1971). Similar results have come from recent excavations in the monumental center (Peraza et. al 1996, 1997, 2007; Milbrath and Peraza 2003) From the Late Preclassic through the end of the Late Classic period (Figures 7.13-7.15), settlement density remained light and was primarily clustered around

several cenotes in the area that still serve as reliable water sources today. Among these, it appears that inhabitants were living in relatively close proximity to cenotes which were easily entered. Most cenotes in the area have steep vertical entrances, a function of the processes of erosion and collapse that usually form them. However, in northeast and southern portions of the site, there are several cenotes which have formed sloping entrances that are easily climbed for access. It is around these easily accessed cenotes that the early inhabitants of the area chose to settle. Particularly noteworthy are Cenote Actun Burro (a cenote with two connected entrances) in the northeast and Cenote Madero to the south in the settlement area known as D'zan Tun Ch'en. Settlement in these two locations remained relatively constant throughout all three time periods, possibly expanding slightly with time. There was a similar pocket of settlement located in the northwest portion of the study area. The distribution of water sources in that area is lesser known. However, the presence of sustained settlement in the vicinity tends to suggest the location of a reliable water-bearing cenote nearby.

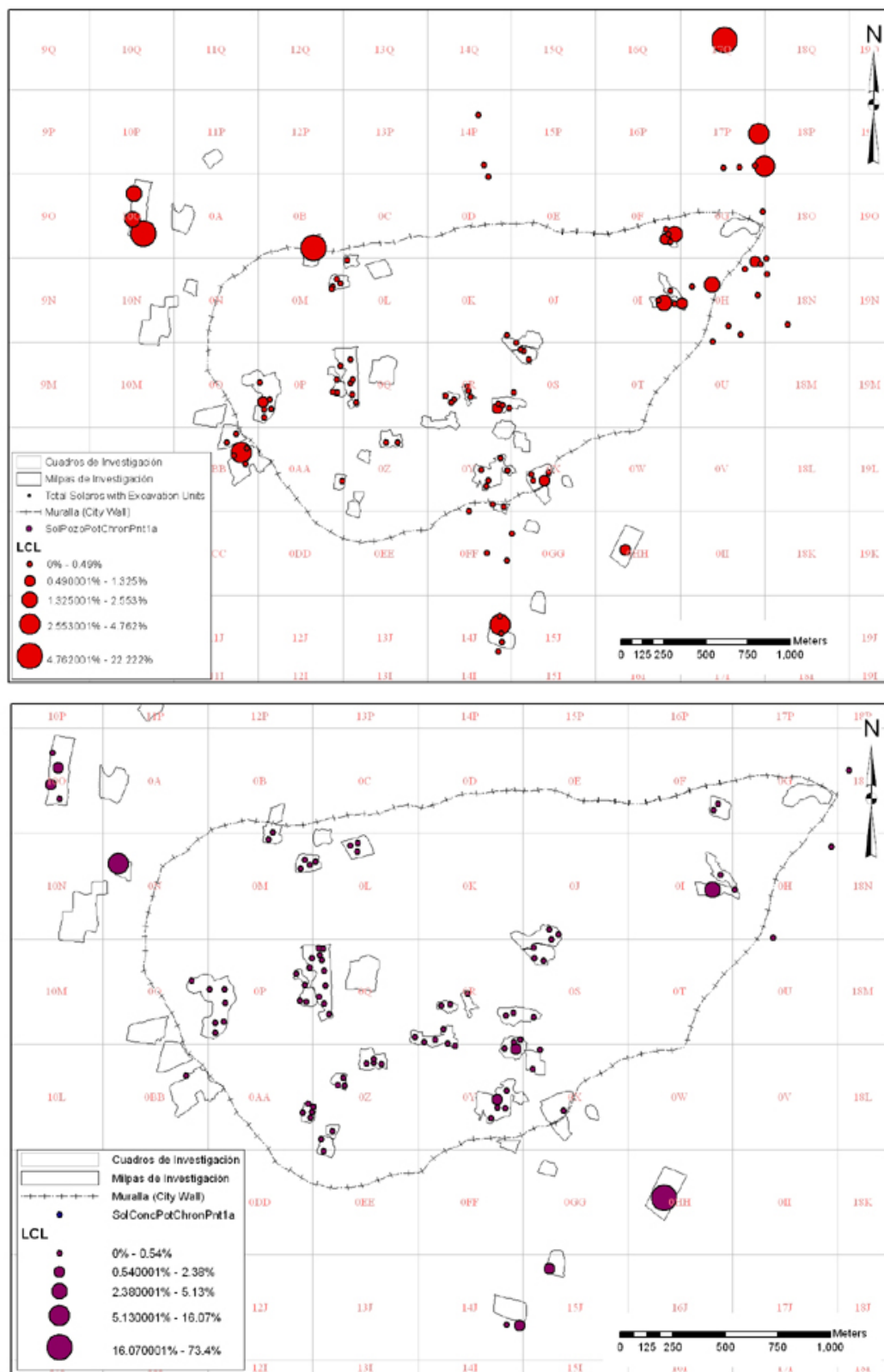




**Figure 7.13 - Frequencies of Late Preclassic ceramics recovered during excavations (top) and surface collections (bottom). Courtesy of Hare, Masson and Peraza (prepared by Timothy Hare).**



**Figure 7.14 - Frequencies of Early Classic ceramics recovered during excavations (top) and surface collections (bottom). Courtesy of Hare, Masson and Peraza (prepared by Timothy Hare).**

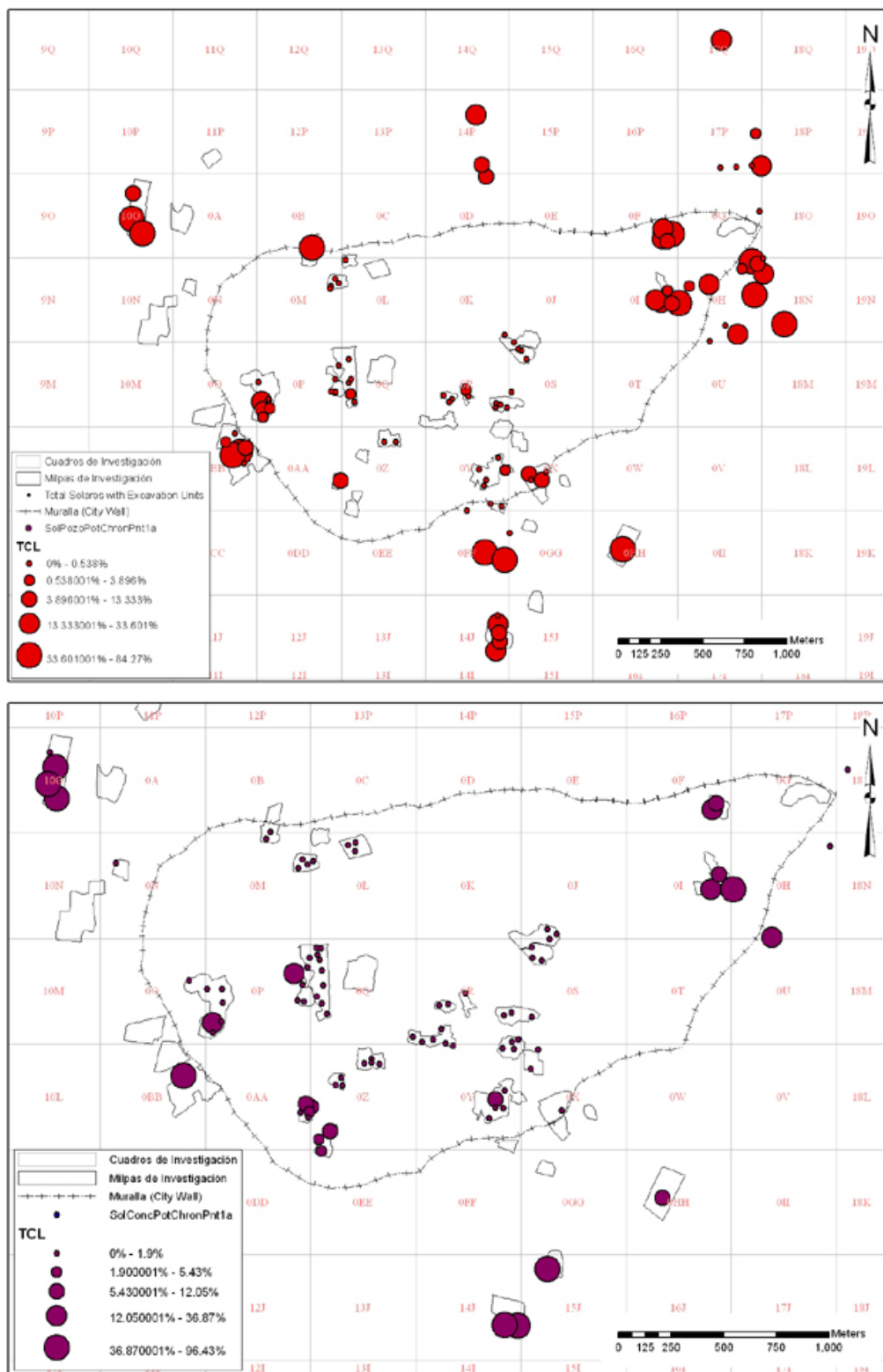


**Figure 7.15 - Frequencies of Late Classic ceramics recovered during excavations (top) and surface collections (bottom). Courtesy of Hare, Masson and Peraza (prepared by Timothy Hare).**

It is interesting to note that most of the settlement during these early periods is located outside of the area that was eventually enclosed by the city wall and the land that eventually became the site center remained essentially devoid of settlement during this time. To some degree this is a reflection of the samples represented on these maps which do not include material from previous projects. However, they too found only small quantities of material predating the main Postclassic occupation. Also of note during these periods was a lack of settlement in the southeastern portions of the study area. This area is known to have close access to several water sources and, in later periods, became one of the most heavily settled portions of Mayapán proper.

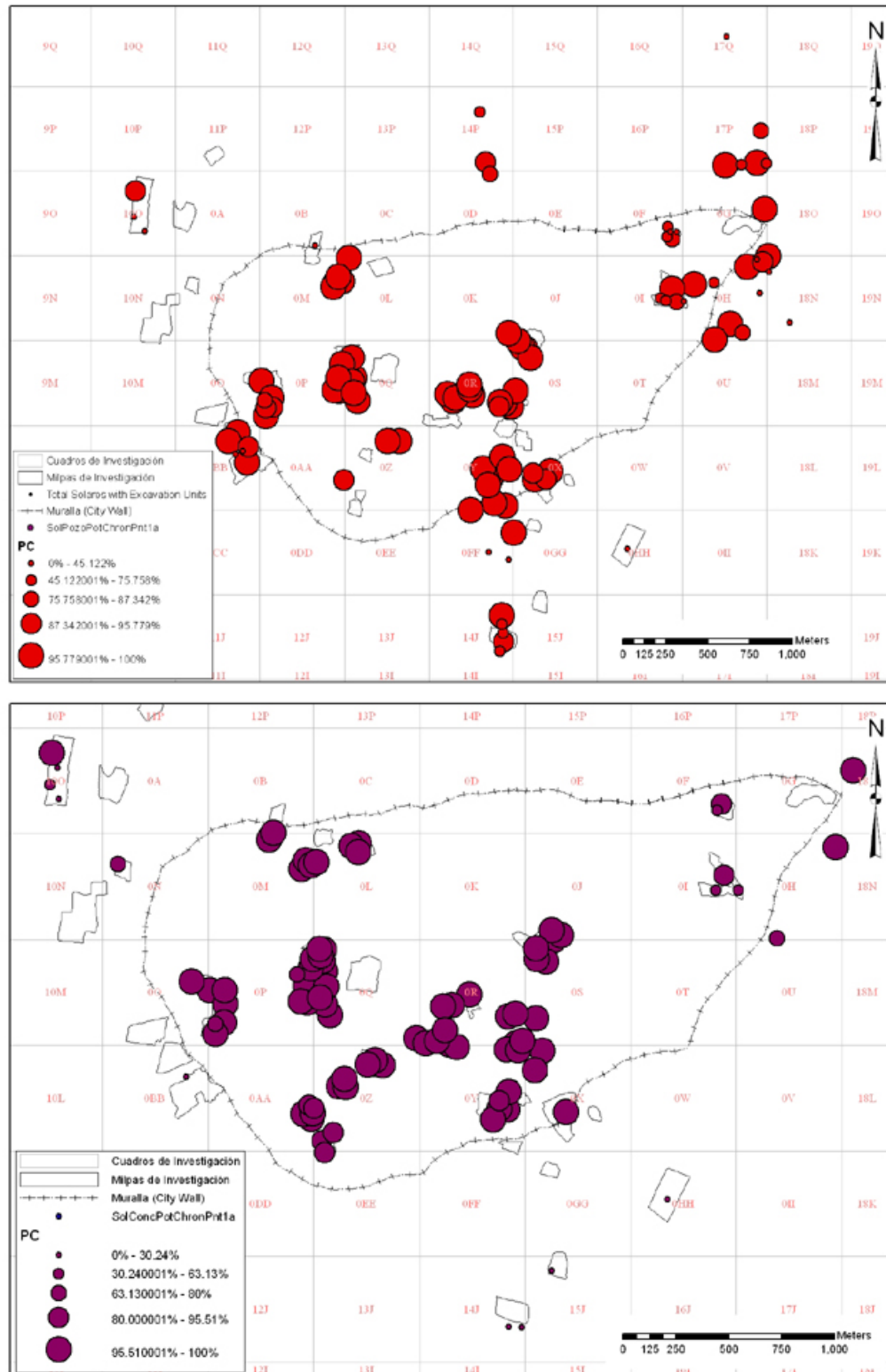
Beginning in the Terminal Classic period (Figure 7.16), we see evidence of a population expansion, again primarily taking place around what was destined to become peripheral Mayapán. Terminal classic sherds were recorded in all four directions surveyed outside of the city wall. The entire northeast portion of the study area, surrounding cenote Itzmal Ch'en and Cenotes Actun Burro apparently saw marked population growth during this period. Similar growth occurred in the south and northeastern settlement pockets. With the exception of the northeast portion of the site around Cenote Itzmal Ch'en, which saw expanded settlement during the period, most of the remaining walled portions of the site remained largely devoid of Terminal Classic pottery. It is during the Terminal Classic, that we find the first occupation of the southeast of the study area which was densely settled shortly thereafter. A light density of sherds was detected in the portion of the site set to become the site center. In this period we see the emergence of a new settlement pocket in the north, detected in the northern portion of Transect 7. It appears that this settlement is related to the late

Classic/Terminal Classic site of Telchaquillo, located in the northeast portion of my study area and centered on yet another significant water-bearing cenote that today serves as the modern town's swimming area. The overall impression is that, during the Terminal Classic, established settlement pockets grew at a moderate rate and the local population began to exploit some new areas, perhaps locations with somewhat less easily accessible water sources.



**Figure 7.16 - Frequencies of Terminal Classic ceramics recovered during excavations and surface collections. Courtesy of Hare, Masson and Peraza (prepared by Timothy Hare).**

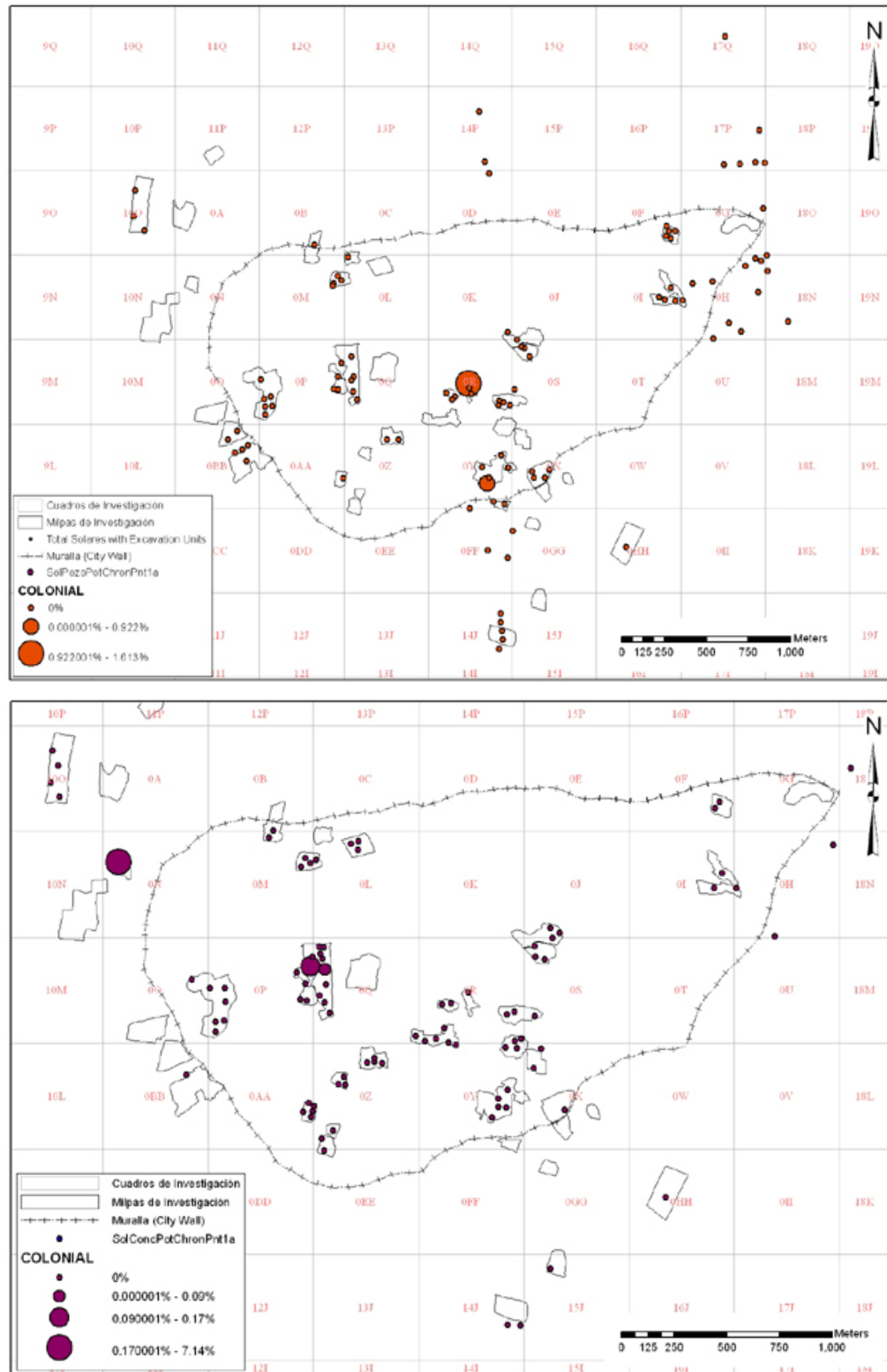
The most dramatic changes recorded in settlement density and distributions were seen in the data for the Postclassic and colonial periods. The first period is notable for its sudden population growth and the second for its dramatic collapse. The Postclassic period at Mayapán (Figure 7.17) saw a rapid increase in population, filling in from several pockets of light to moderate settlement density to become one of the most dense Maya settlements ever seen in a relatively sudden spasm of population growth. During this time, the formal site center was established and the areas that were eventually incorporated into the final walled site filled in rapidly. The pre-existing settlement pockets remained in use and grew in population. The northeast settlement pocket around Itzmal Ch'en grew and served as a second major ceremonial and residential focus for the site. The distribution of residential architecture around these dual-foci, the main ceremonial center and the temple complex at Itzmal Ch'en, suggest a sort of dual concentric zonation at the site that reflects the early settlement of the areas in the northeast of the site. More will be presented on these patterns below. It was also during this period that the southeast of the study area filled in and achieved the highest density for the site as a whole. This seems to be due to the combined attractions of proximity to the new site center and reasonably abundant water in that portion of the site. These changes resulted in a settlement that was very dense and highly compact, more similar to highland, central-Mexican sites than those seen previously for the ancient Maya.



**Figure 7.17 - Frequencies of Postclassic ceramics recovered during excavations and surface collections. Courtesy of Hare, Masson and Peraza (prepared by Timothy Hare).**



With the fall of Mayapán Katun 8 Ahau, the area was apparently completely depopulated, including those settlement pockets that had persisted since the late Preclassic period. Colonial period sherds (Figure 7.18) are virtually non-existent at the site. In the few places where they have been identified, they were found in very low densities. The ethnohistoric documents we have for the site suggest that, at its height, much of the site's population was relocated there from surrounding areas that the Mayapán elites had co-opted through warfare or diplomacy (Roys 1962). Following the final strife, the site ceased to be a political center of gravity and those residents rapidly moved out and returned to their respective homelands.



**Figure 7.18 - Frequencies of Colonial period ceramics recovered during excavations and surface collections. Courtesy of Hare, Masson and Peraza (prepared by Timothy Hare).**

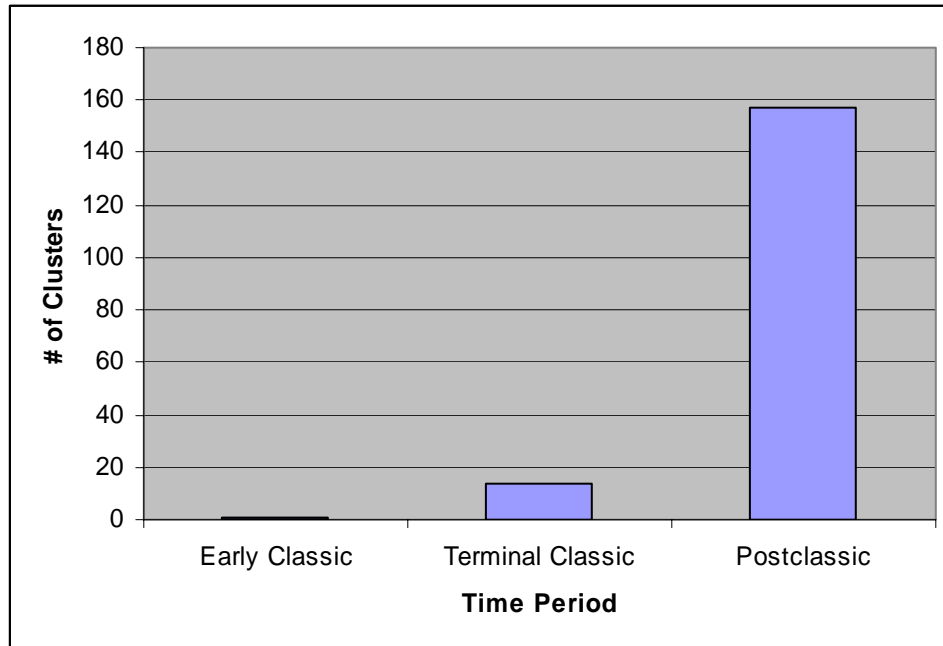
## **Chronological Change on the Rural-Urban Fringe of Mayapán**

As reviewed above, the area surrounding the city-walls of Mayapán underwent several changes over the history of settlement in the area. Figures 7.20 to 7.23 show the distribution of recorded architecture for the Early Classic, Terminal Classic and Postclassic periods. No intact architecture groups were identified for other time periods despite the presence of sherds in several locations of the study area. Chronological identifications were made based on a combination of ceramic data recovered and general architectural form.

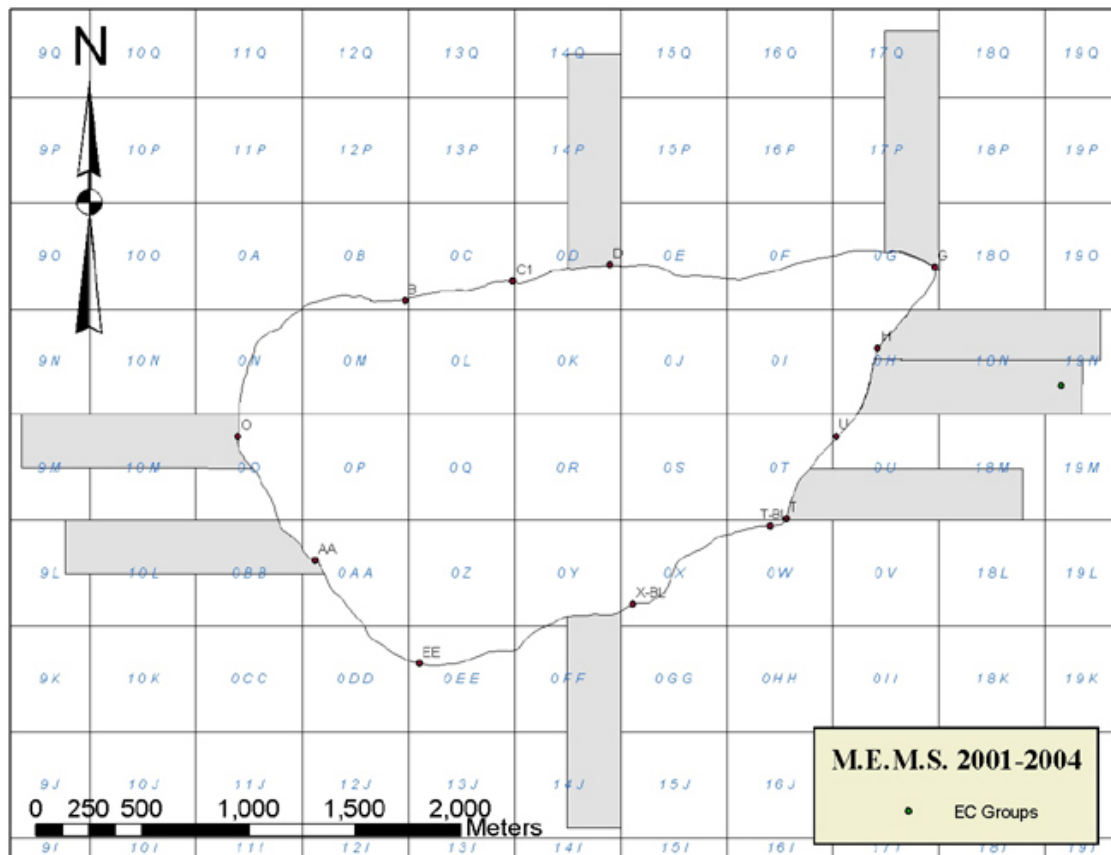
There was only one architectural group assigned to the Early Classic period (Figures 7.19-7.20; Table 7.1). It was located nearly 1 km east of the city wall near the end of Transect 3. Based on the presence of ceramics there, it is likely that further research would reveal more structures from this time period in the un-surveyed areas in the northeast of the study areas around the connected Cenotes Actun Burro. Similarly, there are probably as yet undetected Early Classic structures to be found in the south around Cenote Madero. A large sample of ceramics collected from the area around this cenote's water source showed a very consistent use of the cenote throughout all time periods discussed above.

**Table 7.1 – Structure clusters by time period.**

| <b>Time Period</b> | <b># of Clusters</b> | <b>% of Clusters</b> |
|--------------------|----------------------|----------------------|
| Early Classic      | 1                    | 0.58%                |
| Terminal Classic   | 14                   | 8.14%                |
| Postclassic        | 157                  | 91.28%               |
| <b>Total</b>       | <b>172</b>           | <b>100.00%</b>       |

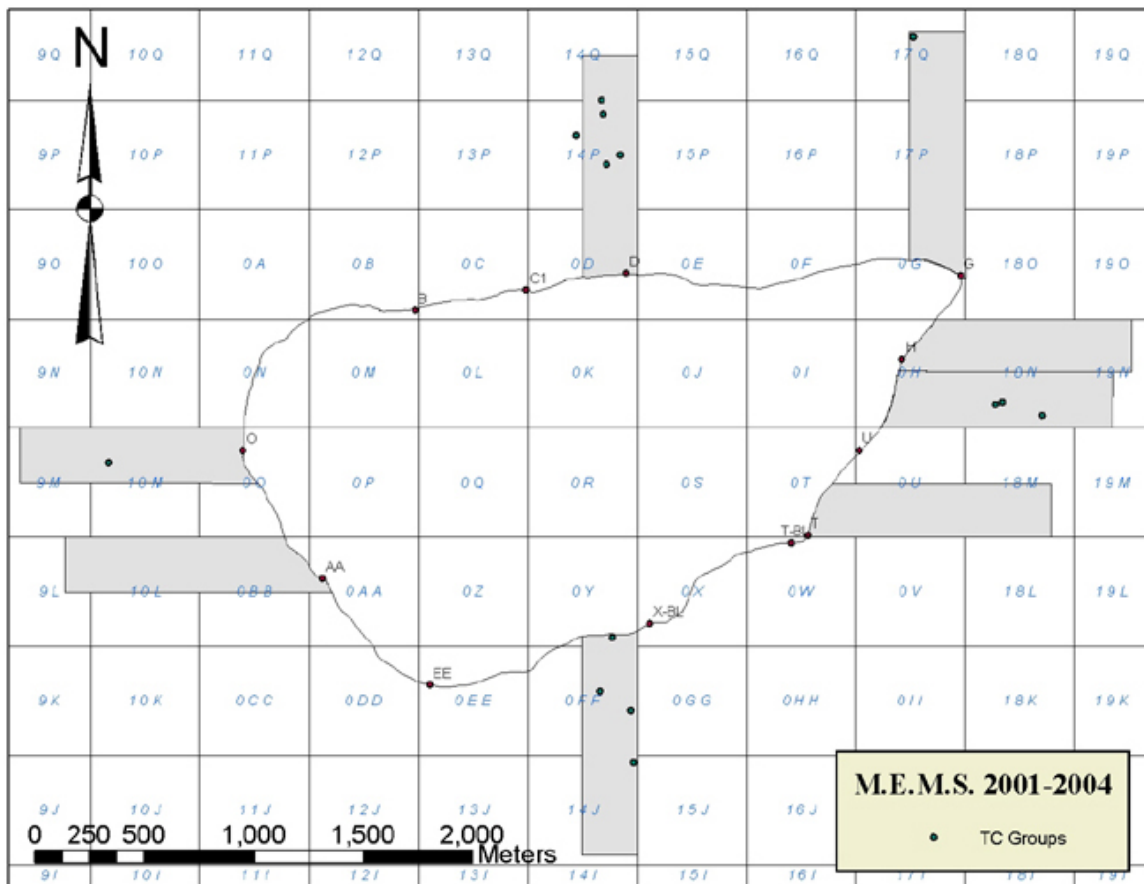


**Figure 7.19 – Chart showing frequencies of dates for the structure clusters mapped.**



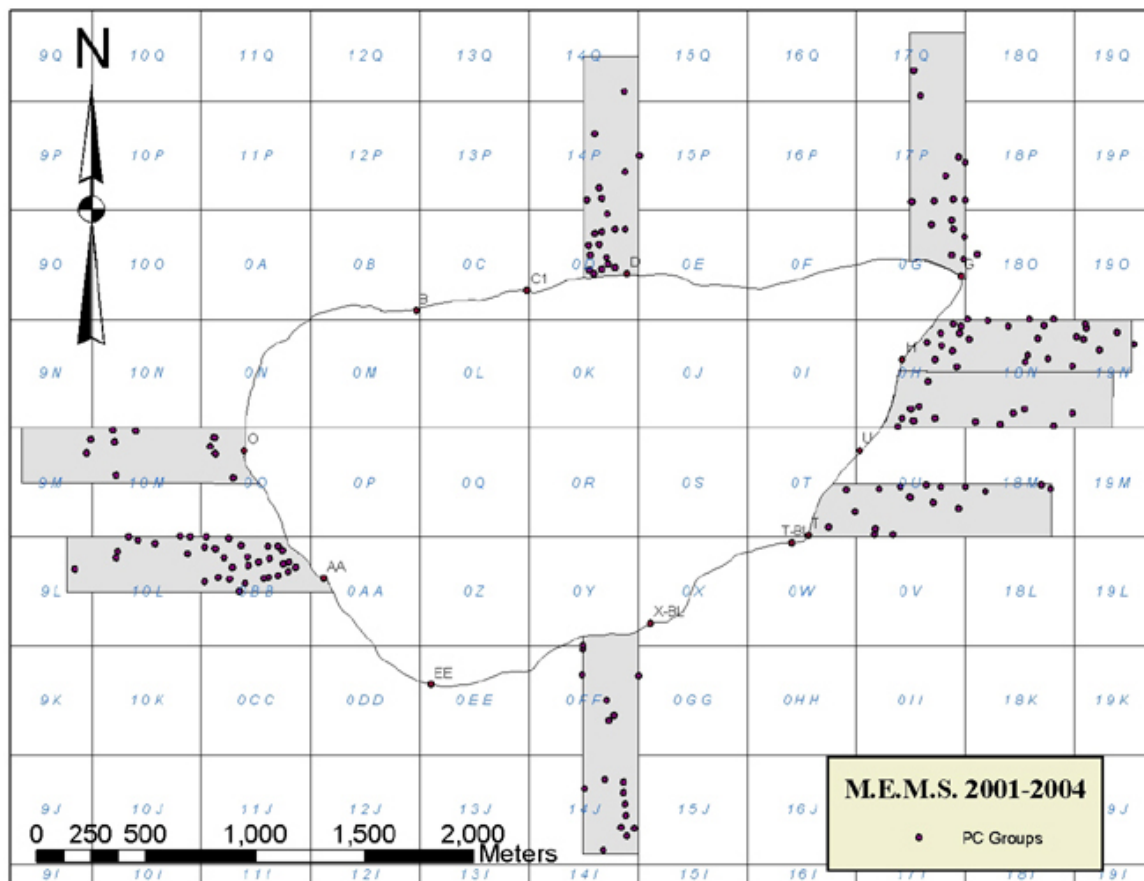
**Figure 7.20 - Distribution of Early Classic clusters mapped.**

In the Late Classic and into the Terminal (Figures 7.19 and 7.21; Table 7.1), much of the local population seems to have been clustered around the site of Telchaquillo, in the northwestern portion of the study area. We found indications of the edges of that settlement along transect 7. The most significant Terminal Classic architecture was documented along Transect 6 belonged to the earlier settlement of Telchaquillo. Notable among those structures identified was a substantial ceremonial group (group14P-8) composed of a temple pyramid with a rectangular altar at its base. Both are located on a large basal platform. This and other Terminal Classic groups in the area are oriented to the northeast, toward Telchaquillo. A straight line drawn down the stairs of the pyramid and extended out runs almost perfectly across the Telchaquillo cenote. Sparse Terminal Classic remains are found in all four directions surrounding the walled portion of the site. The eastern and southern parts of the site each contain several identified groups. We also see the first documented architecture along Transect 2 in the western portion of the study area in the form of a small residential group. In general, most of the Terminal Classic inhabitants of the area were still residing on what became Mayapán's periphery but, that was set to change rapidly in the Postclassic.

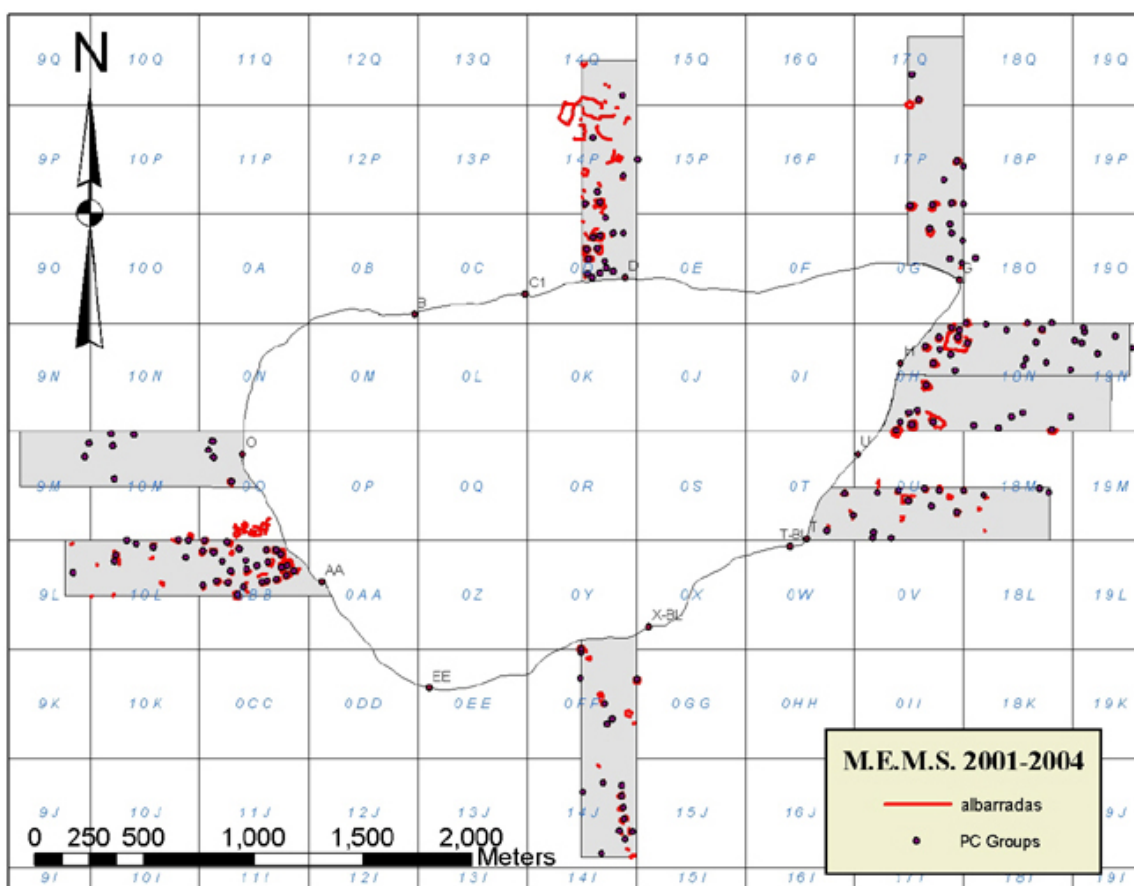


Reflecting the site-wide pattern of ceramic distributions noted above, the population of the periphery exploded in the Postclassic (Figures 7.19, 7.22-7.23; Table 7.1). Significant numbers of structures were recorded in seven of eight transects. Transect 2 presented a very unusual pattern. Very few structure groups were documented along this transect despite the fact that it lies just 250 m north of the most densely settled transect of the eight surveyed. Most of the structures along this transect were identified as lime kilns (See chapter 7 for more on lime kiln distributions). There were only three residential groups documented along this transect. Those were clustered close to the city wall along with a small ritual group. Pre-existing settlement in areas in the northeast and south grew in both size and density during this period and new areas such as the eastern portion of

the study area filled in with a moderately dense scatter of structure groups comprised of a mix of residential and agricultural architecture. Settlement along transect 7 in the southwest of the study area filled in to become the densest area documented in the site's periphery. The structures in this portion of the site were almost exclusively residential in nature.



**Figure 7.22 - Distribution of Postclassic clusters mapped.**



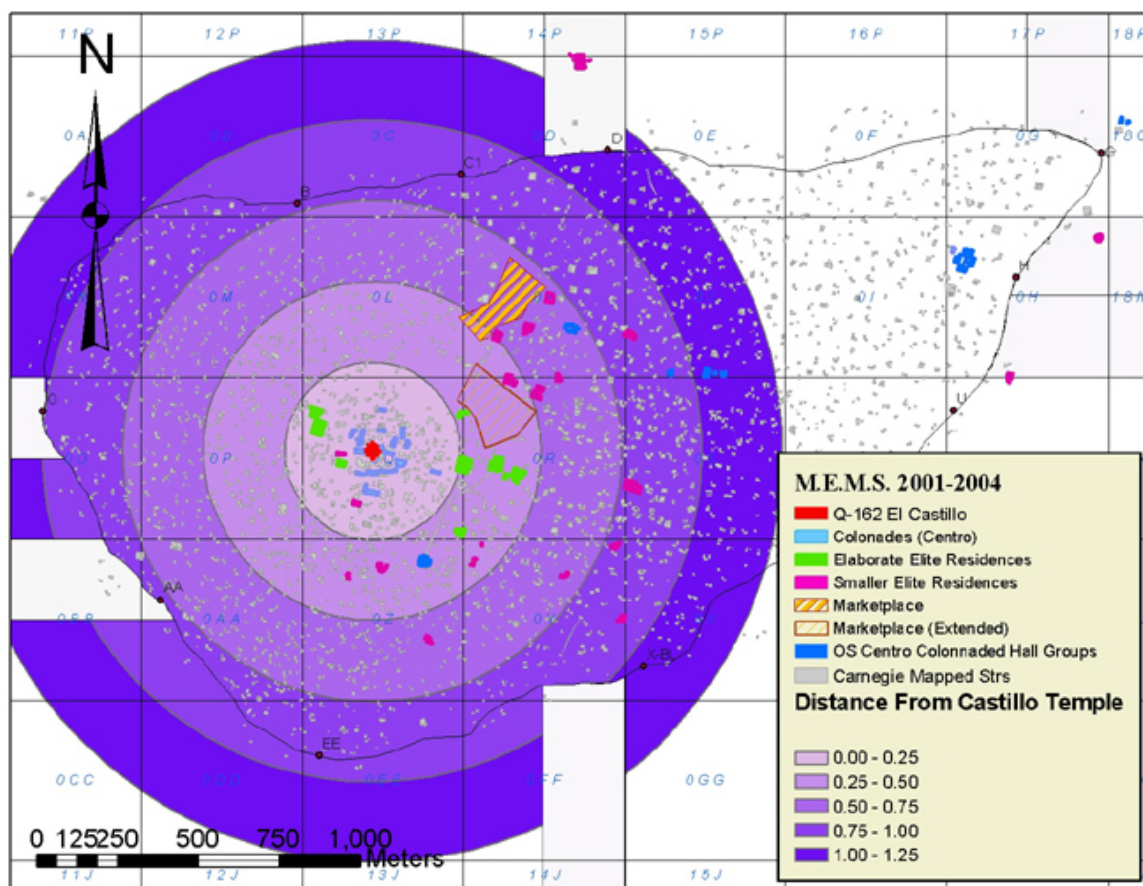
**Figure 7.23 - Distribution of Postclassic clusters mapped with albarrada walls.**

The near total abandonment in the Colonial Period also extended to the periphery. Only one location of all those tested outside the city wall contained any colonial pottery and that was found in such low frequencies as to be utterly insignificant. Clearly the forces that brought Mayapán down were wide-reaching. The periphery of what became the site was populated continuously from the Late Preclassic until the fall of the site. Its early and sustained settlement seems to have reflected prime access to water, a constant need in the northern Yucatán. These areas were also totally depopulated. It is clear that this change was very sudden. It looks more like people fled the area than that the population slowly dwindled.

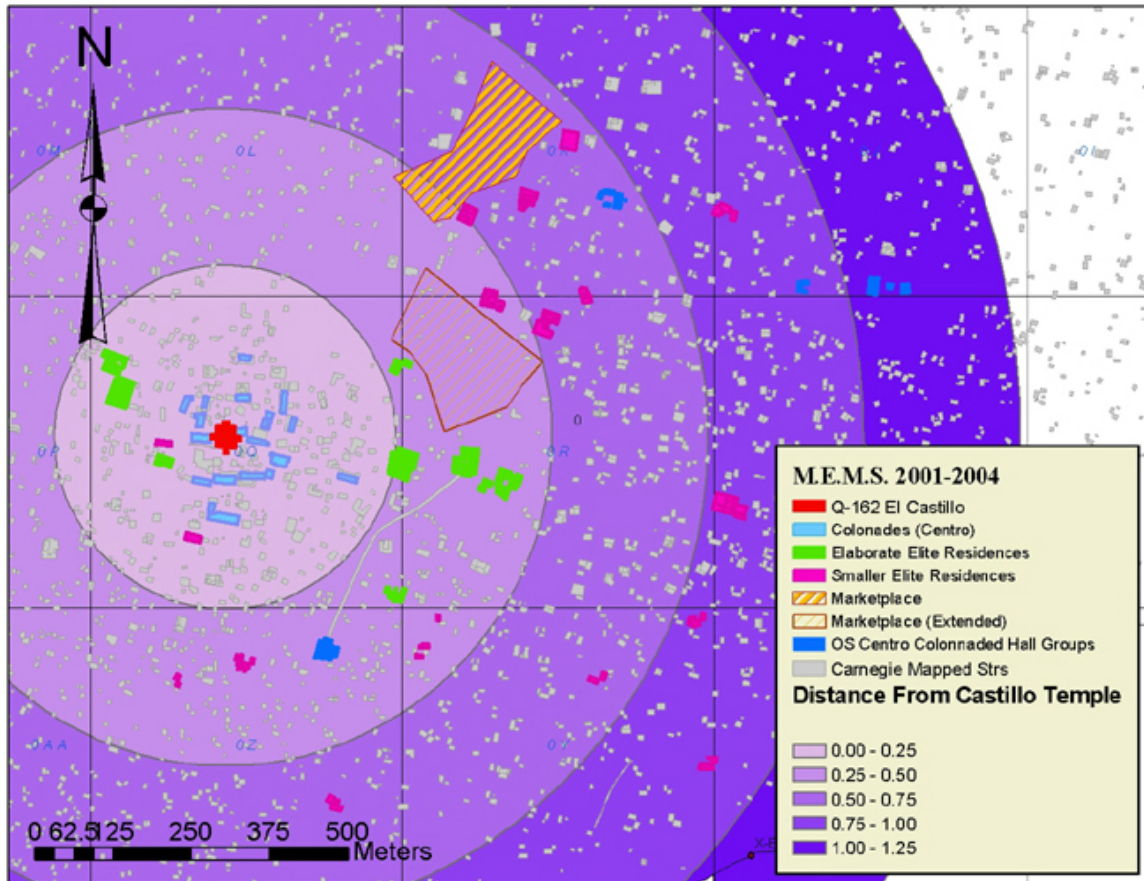


### **Concentric Zonation of Elite/Administrative Architecture**

As was common in Maya settlements, the dominant and central feature in the site distribution at Mayapán is the main site center or plaza. The main plaza contains the most important religious and administrative structures at the site. Radiating out in a roughly concentric pattern are other important features such as elite residential compounds (Figures 7.24-7.25). At the center is structure Q-162, known as “El Castillo” or the temple of Kukulcan. It is a large radial pyramid that seems to have served as both the physical and the conceptual center of Mayapán. Immediately surrounding Q-162, the vast majority of the site’s colonnaded hall groups, which are thought to have served as the main administrative complexes for the various lineages wielding political power at the site, are located (Proskouriakoff 1962). At distances ranging from approximately 200 to 500 m from the El Castillo, we find all identified elaborate elite residential architecture. The majority of the smaller elite residential groups are located at distances between 400 to 800 m from the pyramid. Several of these groups flank the two suspected market areas to the northeast of the main plaza, suggesting some connection of these elites to commercial activity at the site (A.L. Smith 1962; Hare et. al. 2006). The area between the features above is largely filled with commoner residential architecture. I will discuss the overall distribution of these features in more detail below.



**Figure 7.24 - Distribution of major settlement features in relation to the central Q 162 pyramid.**



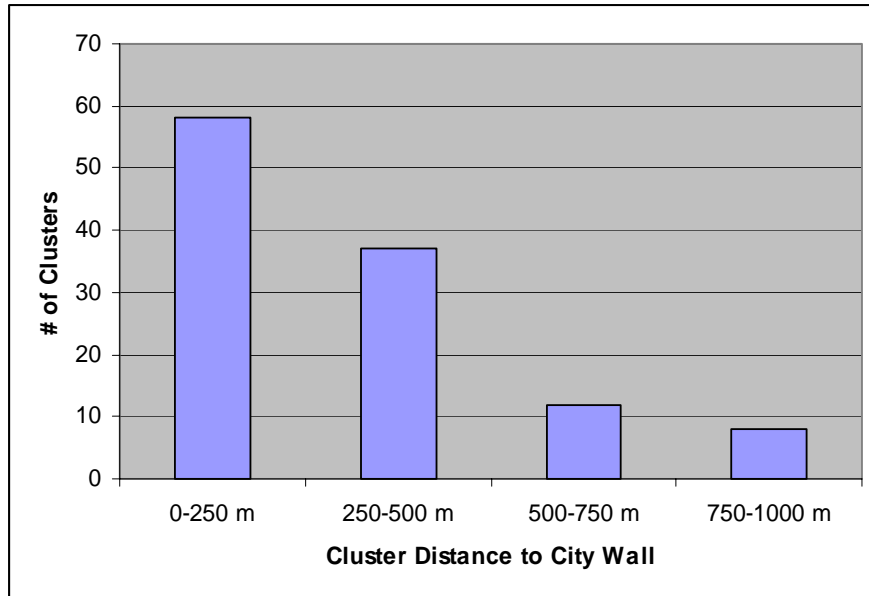
**Figure 7.25 - Distribution of major settlement features in relation to the central Q 162 pyramid (central city area).**

### Concentric Zonation on the Rural-Urban Fringe

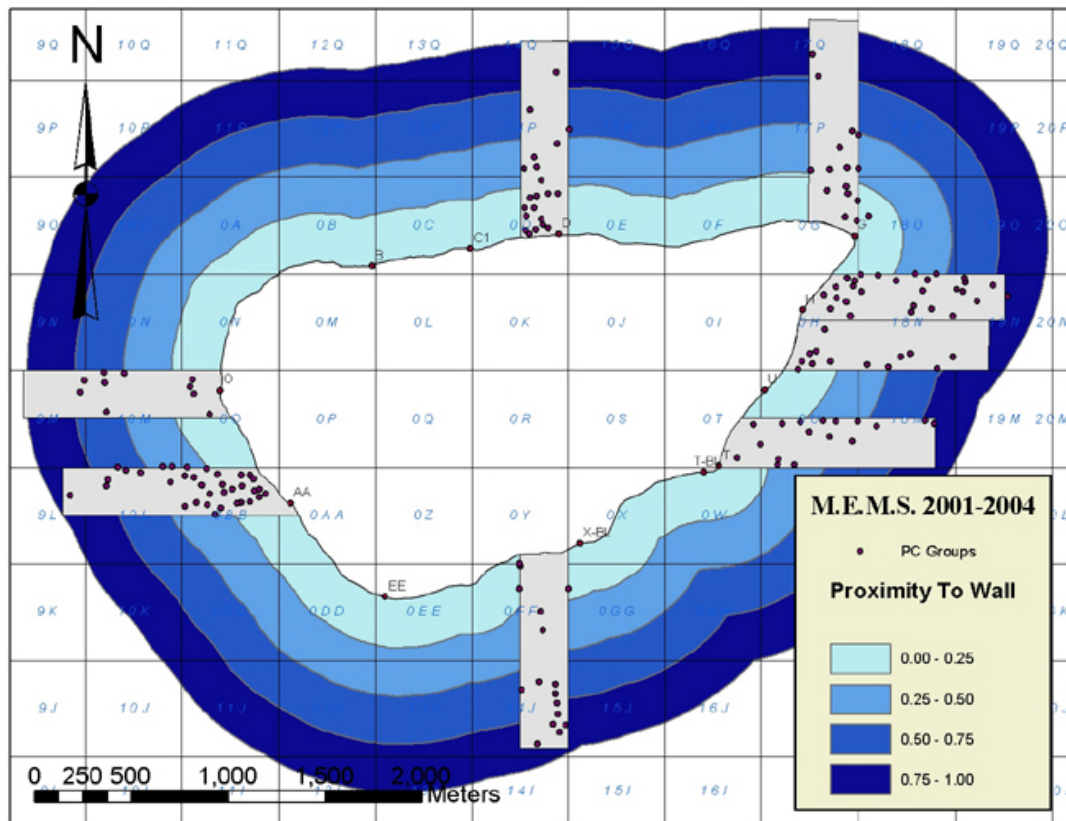
Examination of the distribution of Postclassic structures outside of the city wall reveals another kind of concentric zonation. In this portion of the site, the largest factor impacting settlement distribution seems to be proximity to the city wall. Postclassic residential clusters show a marked preference for locations within 400 to 500 m of the wall itself (Figures 7.26-7.29; Table 7.2). The pattern is even more apparent if one takes account of the functions of the structure groups in question. Figures 7.30 and 7.31 highlight the number of residential groups found within 250 m and 500 m, respectively, of the city wall. With the exception of the settlement pocket dubbed D'zan Tun Ch'en in the south of the study area, nearly all other residential structures are found within 500 m of the city wall, a prudent precaution given the defensive nature of the wall itself. These defensive concerns seem to have been far less important for groups of non-residential function. In general these non-residential activities took place further from the city wall. The majority of the agricultural groups recorded were located at least 500 m from the wall or further (Figure 7.26, 7.30-31; Table 7.3). Identified lime kilns showed a similar pattern (Figure 7.32). Six of the seven kilns identified were located 500 m or more away from the city wall.

**Table 7.2 – Distance of Postclassic residential structure clusters from the city wall.**

| <b>Distance Interval</b> | <b># of Clusters</b> | <b>% of Clusters</b> |
|--------------------------|----------------------|----------------------|
| 0-250 m                  | 58                   | 50.43%               |
| 250-500 m                | 37                   | 32.17%               |
| 500-750 m                | 12                   | 10.43%               |
| 750-1000 m               | 8                    | 6.96%                |
| <b>Total</b>             | <b>115</b>           | <b>100.00%</b>       |

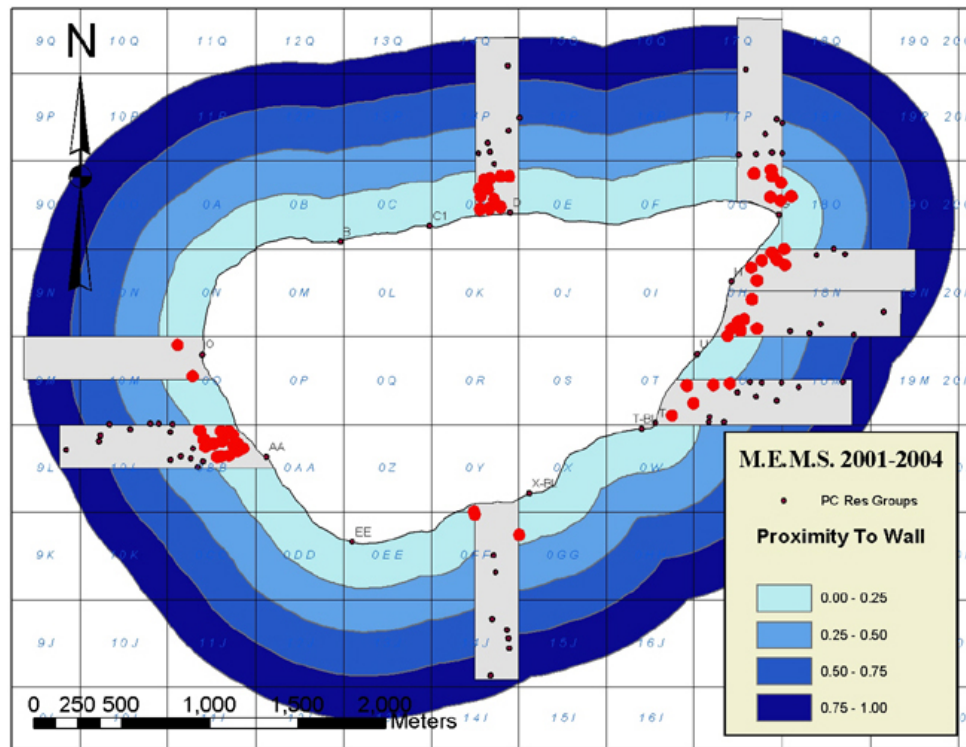


**Figure 7.26 – Chart showing distance of Postclassic residential structure clusters from the city wall.**

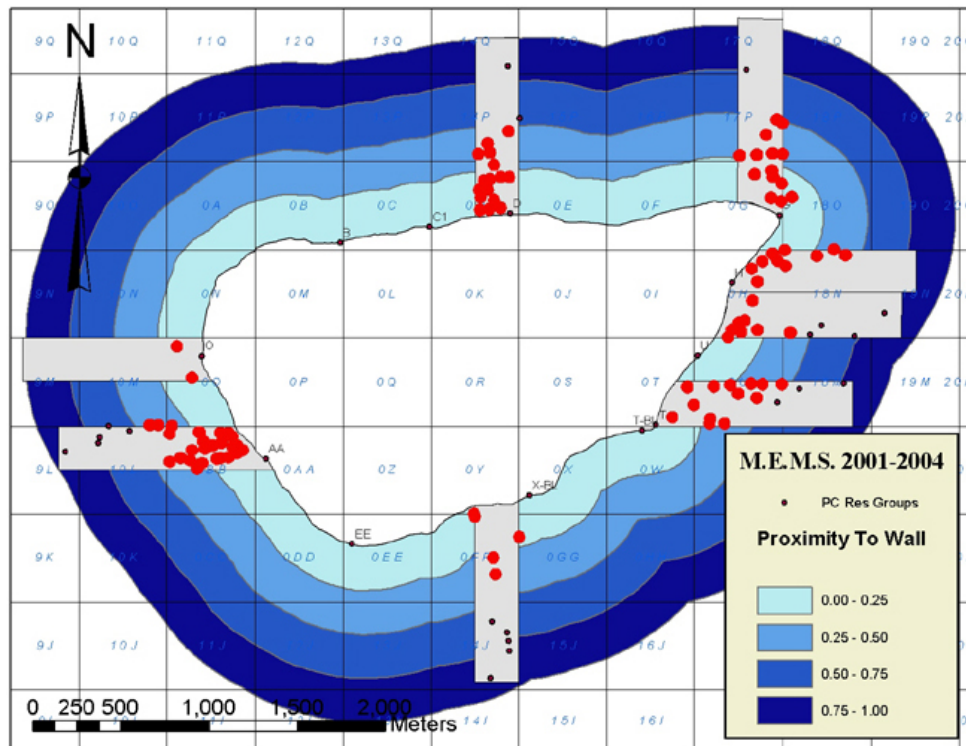


**Figure 7.27 - Distance of all Postclassic residential clusters from the city wall.**





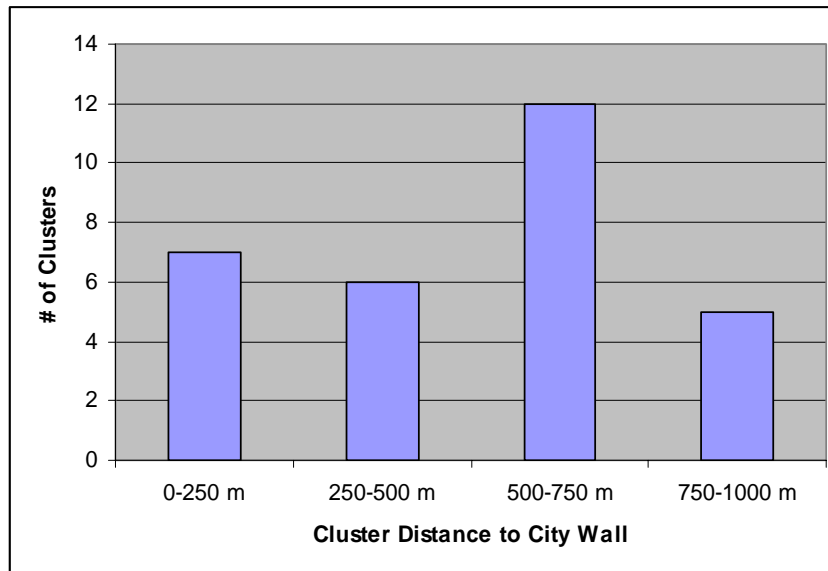
**Figure 7.28 - Postclassic residential clusters located within 250 m of the city wall (highlighted).**



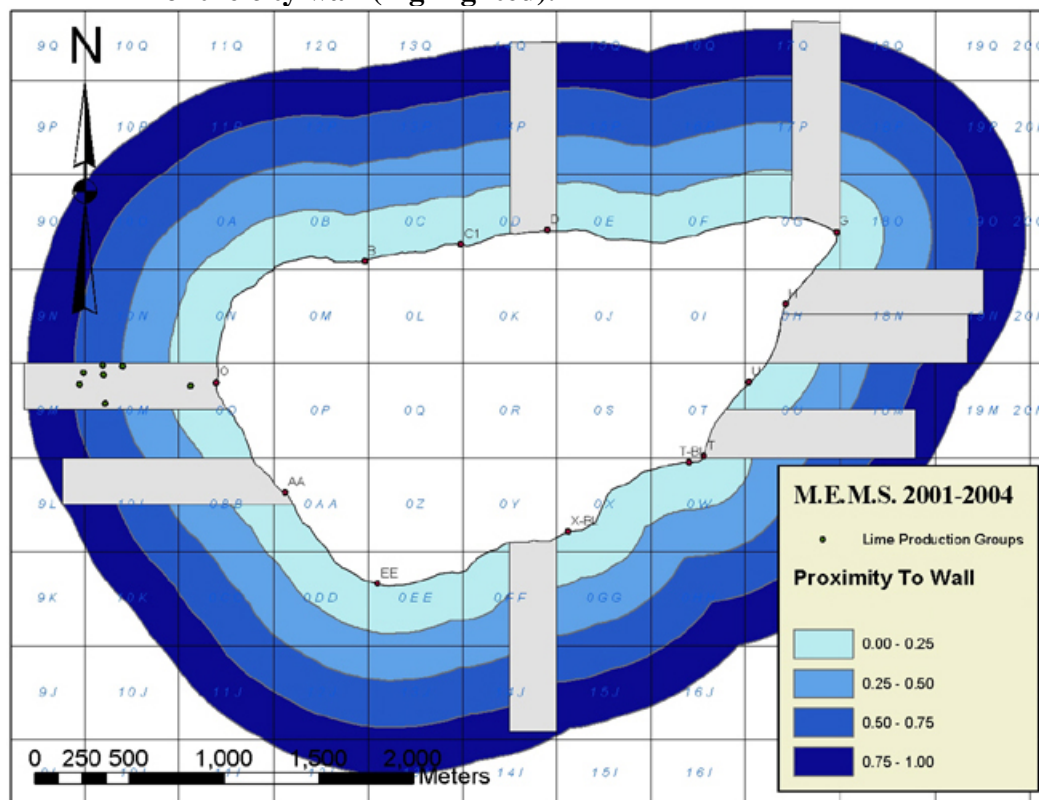
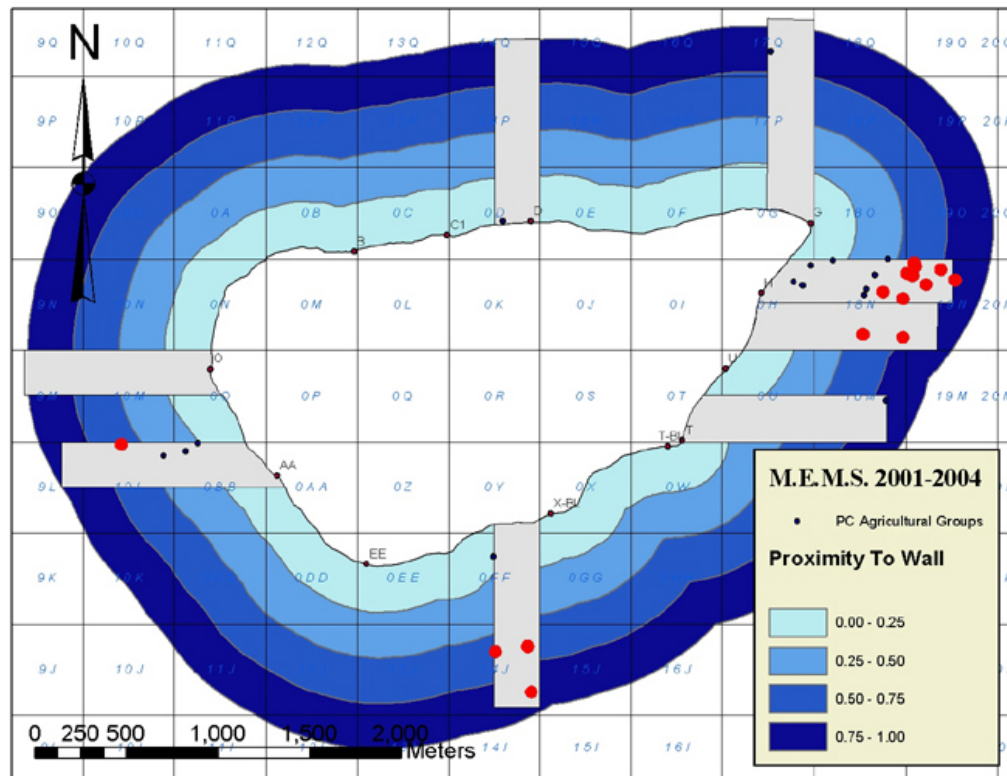
**Figure 7.29 - Postclassic residential clusters located within 500 m of the city wall (highlighted).**

**Table 7.3 – Distance of Postclassic agricultural structure clusters from the city wall.**

| <b>Distance Interval</b> | <b># of Clusters</b> | <b>% of Clusters</b> |
|--------------------------|----------------------|----------------------|
| 0-250 m                  | 7                    | 23.33%               |
| 250-500 m                | 6                    | 20.00%               |
| 500-750 m                | 12                   | 40.00%               |
| 750-1000 m               | 5                    | 16.67%               |
|                          |                      |                      |
| <b>Total</b>             | <b>30</b>            | <b>100.00%</b>       |



**Figure 7.30 – Chart showing distance of Postclassic agricultural structure clusters from the city wall.**





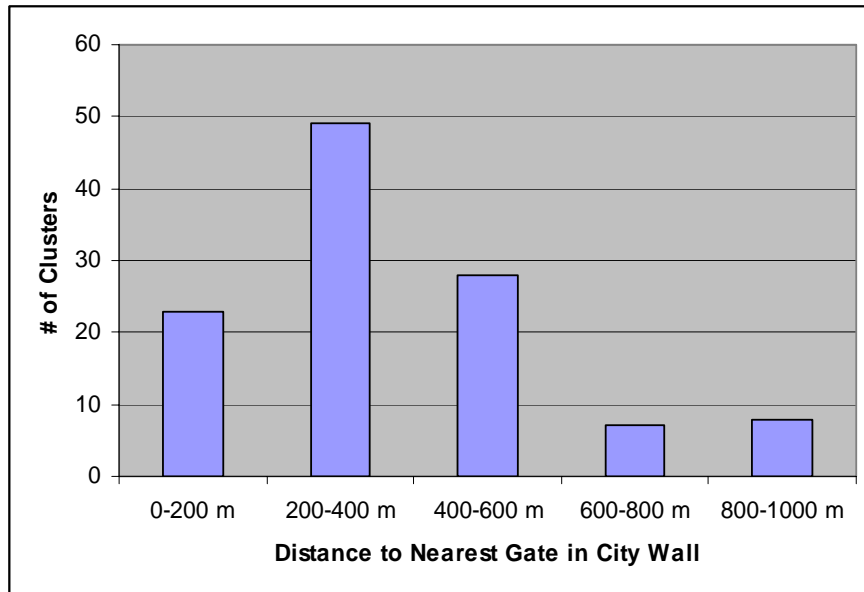
It is also helpful to examine the spatial relationships between the gates in the wall and Postclassic structure groups since the shortest distance from a structure to the city wall does not necessarily take a person to an access point in the barrier (Figures 7.33-7.36; table 7.4). I must note here that I have used GPS data collected by members of the PEMY project to mark locations of gates. The Carnegie project did not map any gates in Grid Square C. However, our team thought an opening encountered may be ancient so it was added (marked C1). Until I visit the opening myself, I remain somewhat skeptical of this identification. For the time being the identification should be considered provisional at best. However, as it was not close enough to any of my transects to impact the data presented, I left it on the map. I plan to return to all of the known gaps in the wall during future field seasons at the site in anticipation of expanding on the conclusions drawn about its function presented at the end of this volume.

Figures 7.34 and 7.35 show the distribution of residential structures to these access points in the wall. 20% all documented residences were located within 200 m of a gate. Another 42% of the remaining residences were located within 400 m of the protection afforded inside of the wall. One quarter live at the next distance range of 400 to 600 m. Beyond the 600 m interval the number of residences drops sharply. The pattern is markedly reversed for non-residential groups (Figure 7.36). Nearly all agricultural and lime production groups are located well outside of the 400 - 600 m meter radius where we find most residences. In the event of an attack, the groups would have been completely undefended and those present would have needed to flee as much as a kilometer before reaching the safety afforded by the defensive wall. These would have

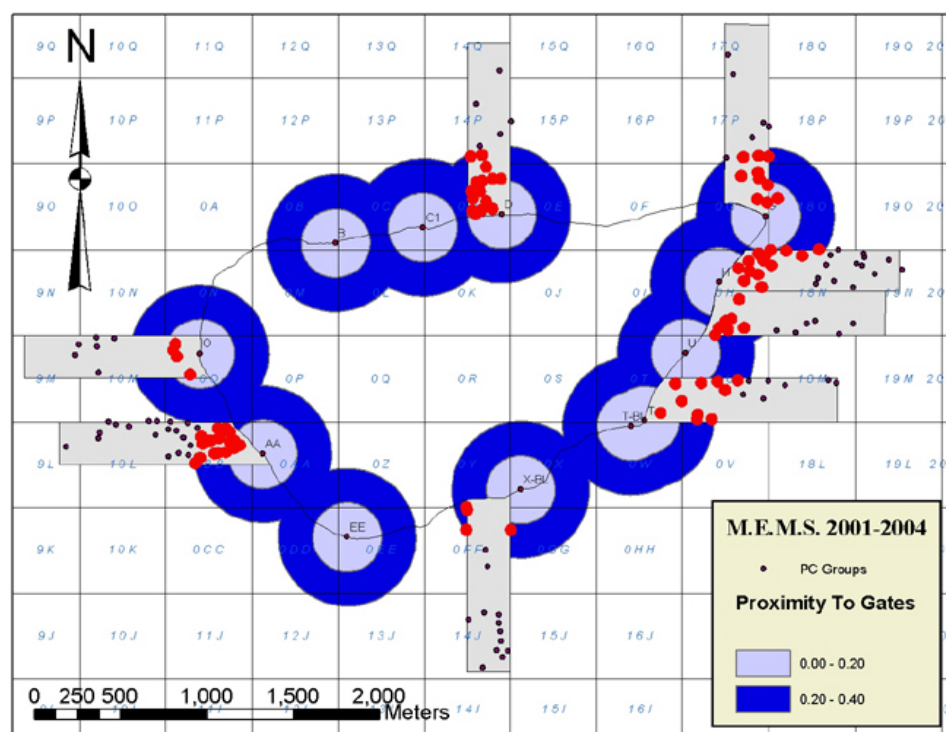
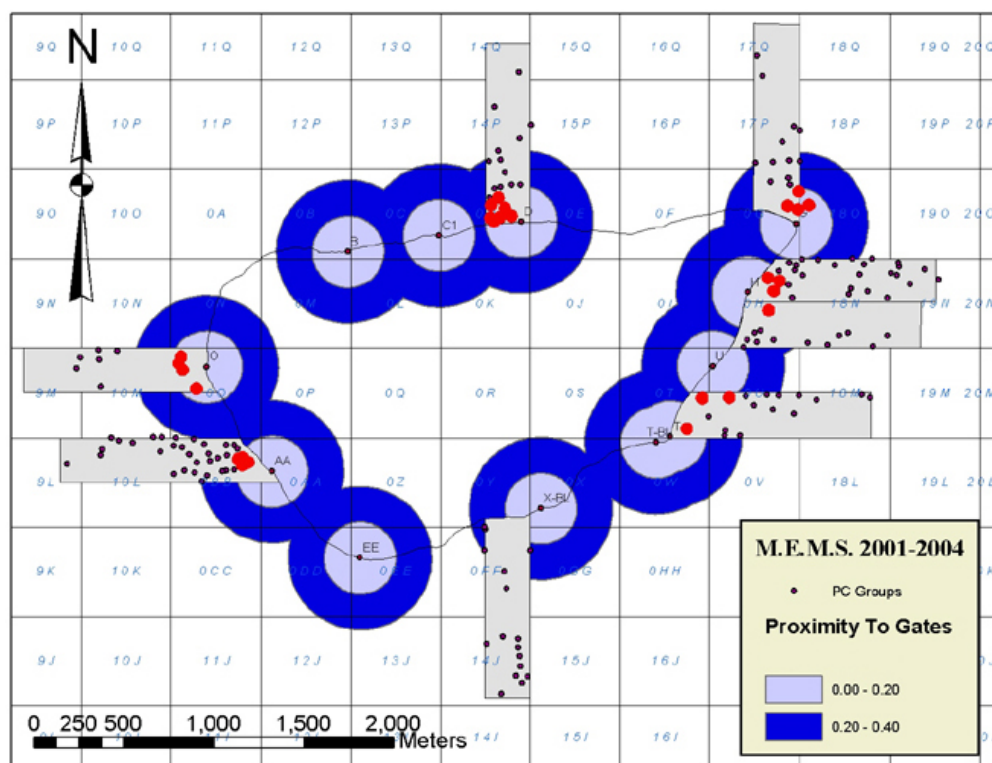
been the unlucky few unable to enter the wall in a matter of minutes under emergency conditions.

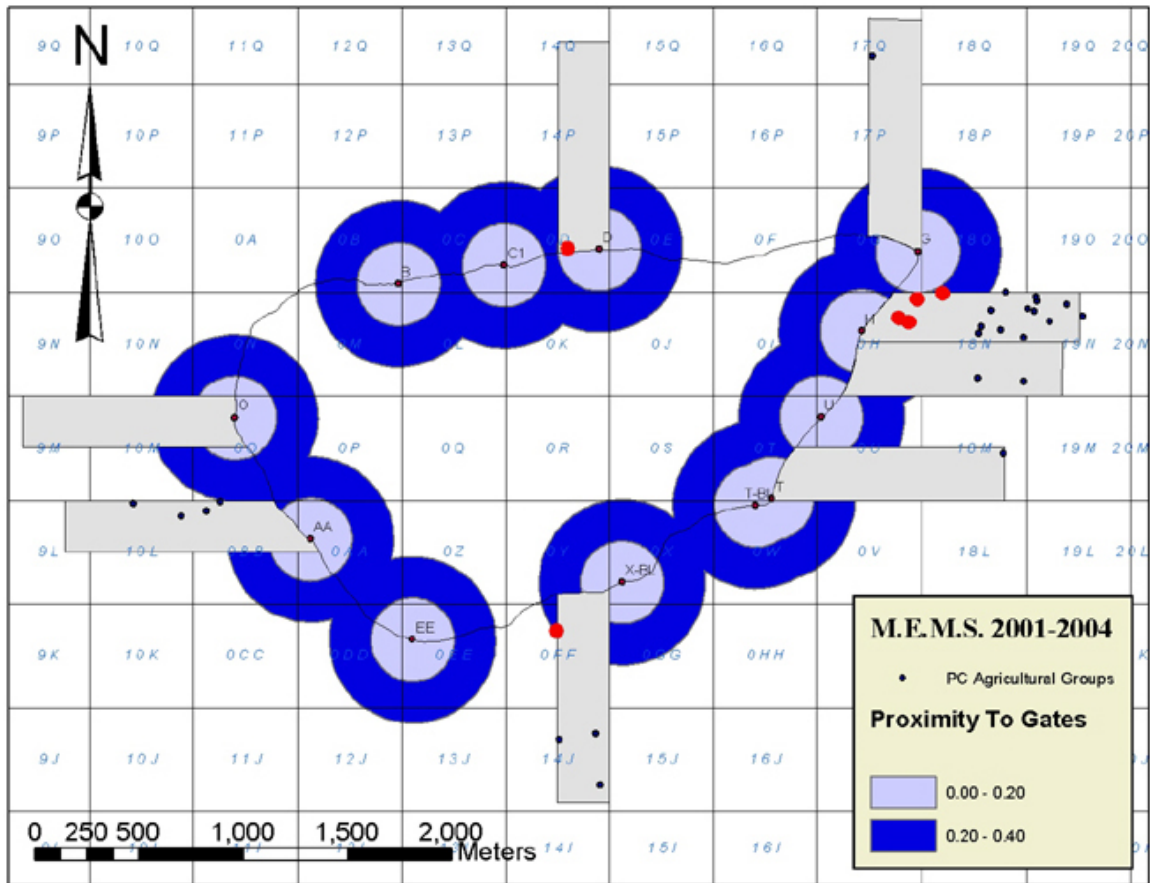
**Table 7.4 – Distance of Postclassic residential structure clusters from gates in the city wall.**

| <b>Distance Interval</b> | <b># of Clusters</b> | <b>% of Clusters</b> |
|--------------------------|----------------------|----------------------|
| 0-200 m                  | 23                   | 20.00%               |
| 200-400 m                | 49                   | 42.61%               |
| 400-600 m                | 28                   | 24.35%               |
| 600-800 m                | 7                    | 6.09%                |
| 800-1000 m               | 8                    | 6.96%                |
| <b>Totals</b>            | <b>115</b>           | <b>100.00%</b>       |



**Figure 7.33 – Chart showing frequency of Postclassic residential structure clusters based on their gates in the city wall.**





## Distribution of Structures in Relation to Potential Water Sources

The semi-arid climate and karst topography in the northern Yucatán make access to water among the most important factors in site location and general urban form of the sites themselves. The distribution of water sources (cenotes) around the Mayapán area seems to have greatly influenced the final form of the site. As noted above, the first habitation of the area was centered on several cenotes. In particular, structures were located closest to cenotes with easy access to the water table (A.L. Smith 1962; Brown 1999). With the population explosion seen in the Postclassic period, settlement began to

crop up around less easily accessed cenotes as well. Today, many of these prime cenotes are home to cattle ranches that exploit the same water access. I found in my research that every ranch with a good cenote for water also has significant ancient remains associated with it.

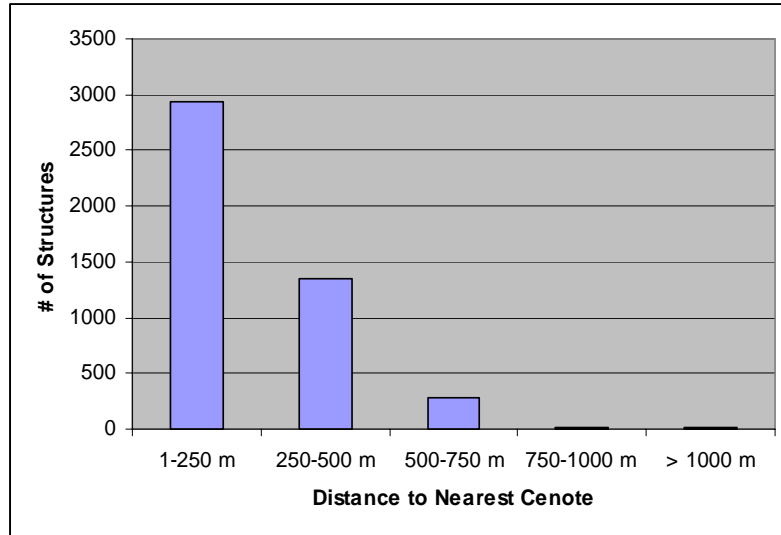
Figures 7.33 and 7.34 show the distribution of mapped structures, in relation to their distance from potential water sources. More than half of the structures are located within 250 m of a water source and nearly all structures documented are located within 500 m of a cenote. Based on this distribution, I divide the area into three strata each representing variable access to water. The first strata, located within 250 m of water I call “prime water access” areas. Those areas located between 250 and 500 m from cenotes I call, “marginal water access” areas and those farther than 500 m from water I refer to as “restricted water access” areas.

Table 7.5 shows the number and percentage of Postclassic structures as a function of distance from cenotes. As would be expected, those areas with “prime water access” are the most densely settled portions of the site. Some 64% of all structures fall at a distance of 0-250 m from a cenote (fig 7.37 and 7.38). The densest of these areas is located in the southeast portion of the site. This area provides an unusually high number of cenotes compared with the rest of the site. The dense settlement in this area was found both inside the wall and outside of it. Marginal water access areas at Mayapán are primarily located in the middle portion of the settlement. Another 29% of structures are found between distances of 250 and 500 meters from cenotes in areas deemed marginal for water access. Beyond the 500 m point the number of structures falls off to single digits. It is interesting to note that both suspected market areas are located in this marginal

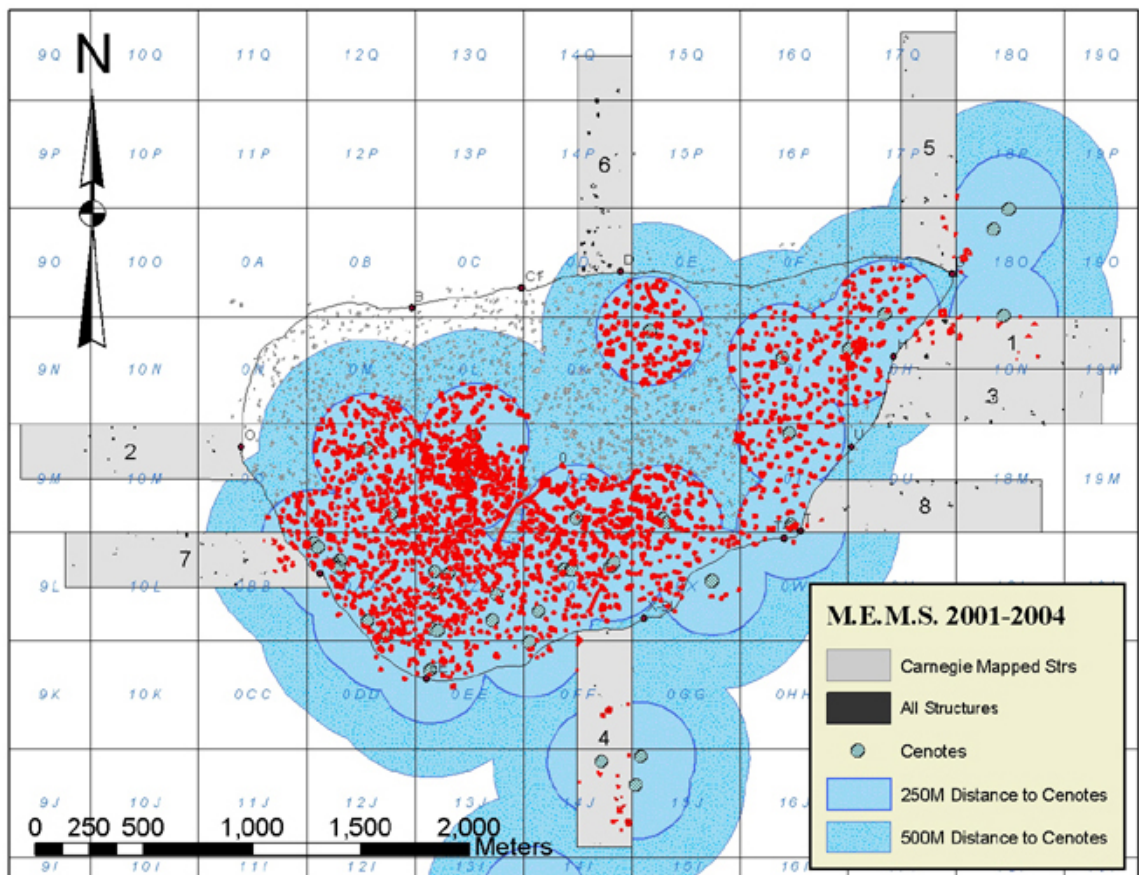
access zone. Given the total lack of structures in these areas, it is possible that their placement was intended to exploit areas less attractive for residential architecture. Very little of the site falls into the category of restricted water access. The only area fitting the definition is located in the very northeast portion of the site. Structures in this area are significantly less dense than in other parts of the site. Just 7% of structures at the site are located more than 500 m from a potential water source (Figures 7.37 and 7.39). Of those just 0.7% were located at distances greater than 750 m from these features. These patterns show a distance preference for locating structures near potential water sources. More research is required to know for sure which cenotes at the site provided constant water access and which were periodically inundated or even dry. More information on that issue will help clarify the relationship detailed here.

**Table 7.5 – Distance of Postclassic structures from nearest mapped cenote.**

| <b>Distance Interval</b> | <b># of Structures</b> | <b>% of Structures</b> |
|--------------------------|------------------------|------------------------|
| 1-250 m                  | 2935                   | 63.72%                 |
| 250-500 m                | 1348                   | 29.27%                 |
| 500-750 m                | 289                    | 6.27%                  |
| 750-1000 m               | 17                     | 0.37%                  |
| > 1000 m                 | 15                     | 0.33%                  |
| <b>Total</b>             | <b>4606</b>            | <b>99.63%</b>          |

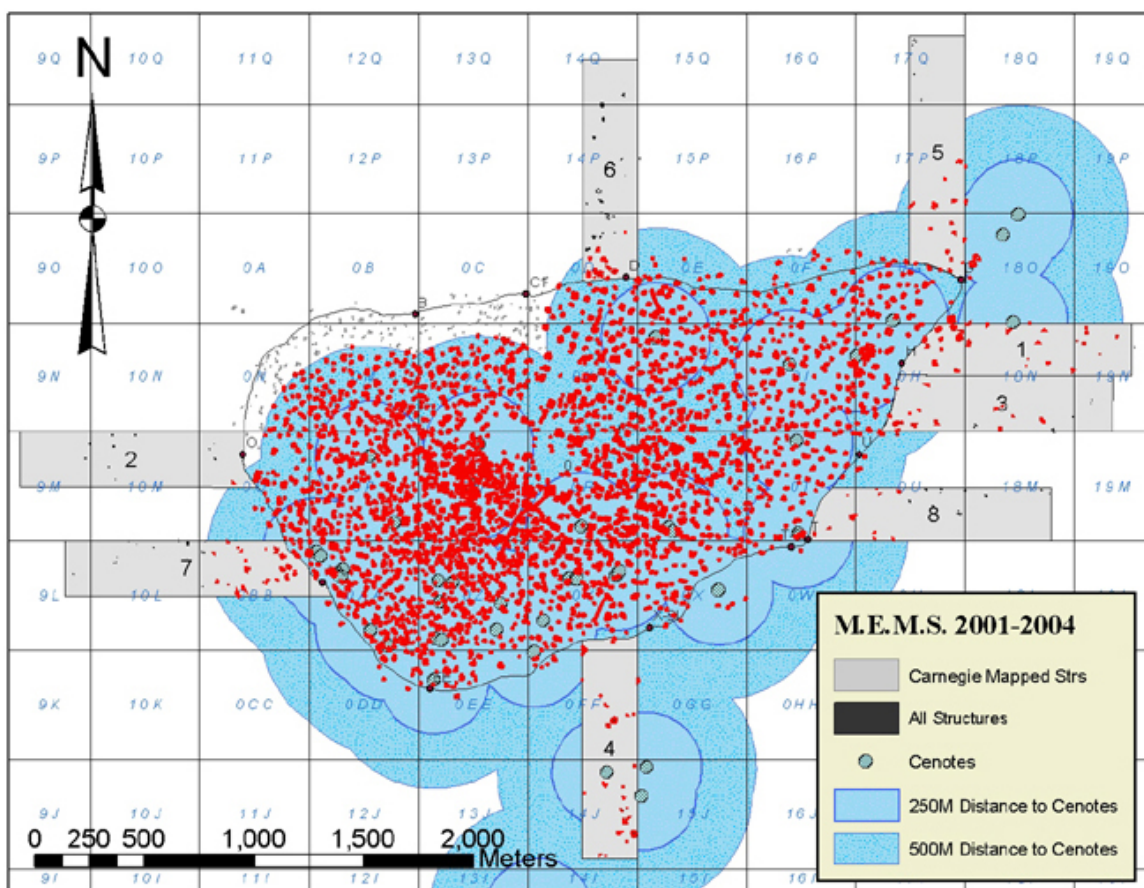


**Figure 7.37 – Chart showing distance of Postclassic structures from mapped cenotes.**



**Figure 7.38 - Mapped structures located within 250 m of a cenote (potential water source).**





**Figure 7.39 - Mapped structures located within 500 m of a cenote (potential water source).**

### **Distribution of Structures in Relation to the Two Major Administrative Centers**

Earlier, I discussed the apparent concentric zonation of major architecture around the main plaza at Mayapán. In that discussion I did not address the overall distribution of residential architecture at the site. Now that I have illustrated how the site-wide distribution of structures is affected by water access, I want to return to examine the distribution of non-elite residential architecture, which seems to have been far less clearly influenced by concentric zonation.

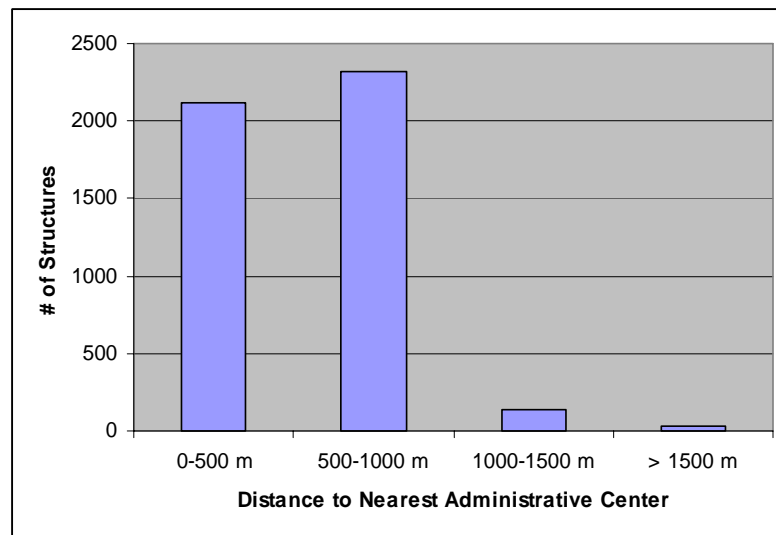


The northeast portion of the settlement is dominated by the Itzmal Ch'en temple cenote complex. The settlement history of the site shows that the northeast portion of the site was occupied much earlier than the remainder of the walled portions of the site. It seems to have served as a central point for Terminal Classic populations. It is currently unclear exactly when the Itzmal Ch'en group itself was constructed. Proskouriakoff (1962:127-129) noted "earlier" constructions contained within several final Postclassic phases. It seems clear that the cenote and the area would have had early importance which was reflected in the construction adjacent to it. The plan of the group suggests that some earlier architecture may have been modified over time. Further research is planned to help clarify the dating and construction sequence of the group. With the addition of the main plaza, the site took on an unusual form with two large public complexes (Figures 7.40-7.7.46; Table 7.6). The density of structures around the main plaza is notably greater. However, during the Postclassic, the areas around Itzmal Ch'en also grew substantially. It appears that the filling in of the areas between these two nodes through the process of conurbation resulted in the somewhat lopsided appearance of the final settlement and its city wall. The placement of Postclassic architecture in relation to these two ritual/administrative centers lacks the clear concentric zonation shown by the elite/administrative architecture at the site. In fact, more architecture is located at a distance of 500 m to 1000 m (50%) from these locations than clusters found within 500 m of one of these two centers (46%). Few structures (just 6%) however are located beyond 1 km from one of these two important locations. That architecture which falls farther from that point appear associated with outlier sites such as D'zan Tun Ch'en and Telchaquillo. The pattern appears to be far more influenced by water distribution than

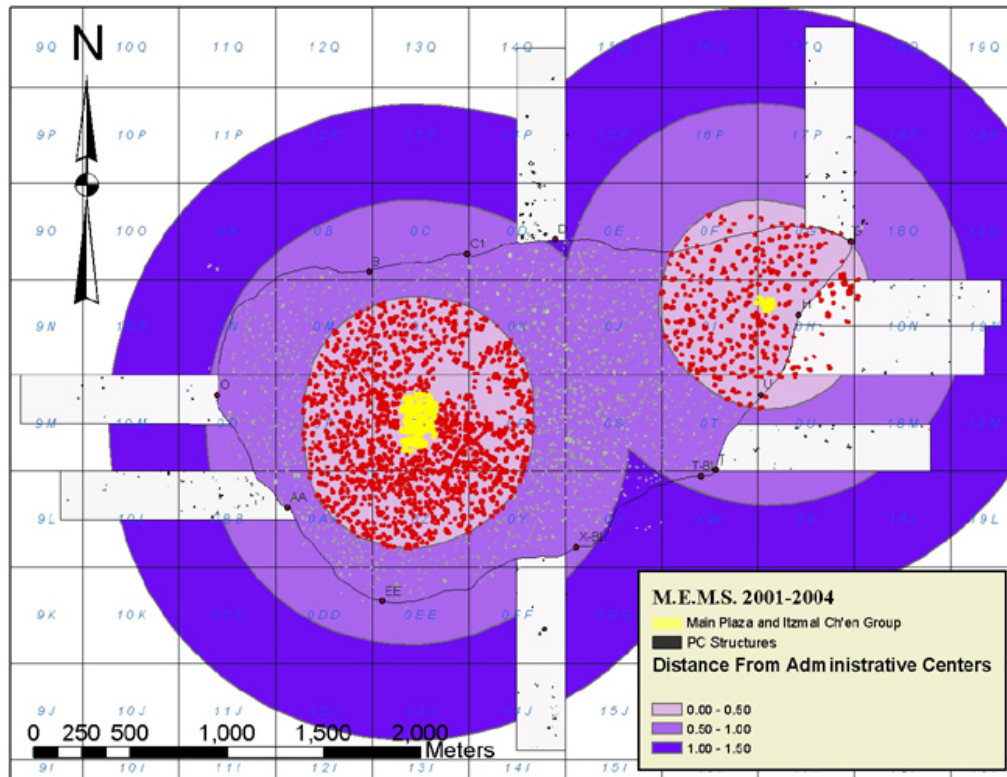
distance to centers. However, the density of structures in the southwest tends to suggest that good water access and proximity to the main plaza were both significant factors. (Figure 7.37). Where they overlap, density is highest.

**Table 7.6 – Distance of Postclassic structures from nearest administrative center (monumental center or Itzmal Ch'en).**

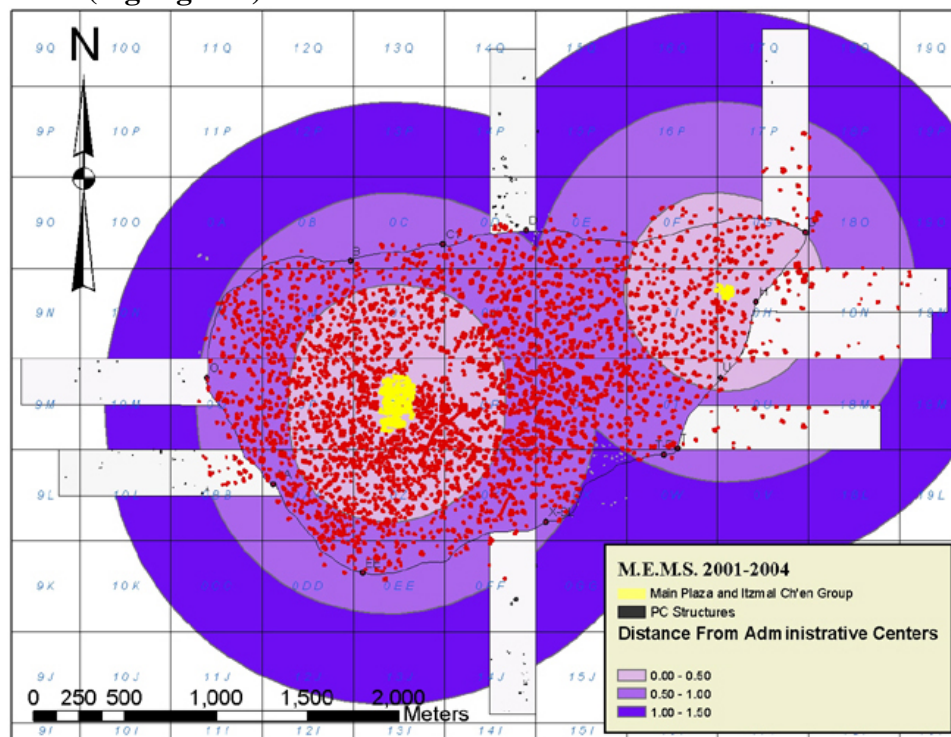
| Distance Interval | # of Structures | % of Structures |
|-------------------|-----------------|-----------------|
| 0-500 m           | 2116            | 45.94%          |
| 500-1000 m        | 2315            | 50.26%          |
| 1000-1500 m       | 143             | 3.10%           |
| > 1500 m          | 32              | 0.69%           |
| <b>Total</b>      | <b>4606</b>     | <b>100.00%</b>  |



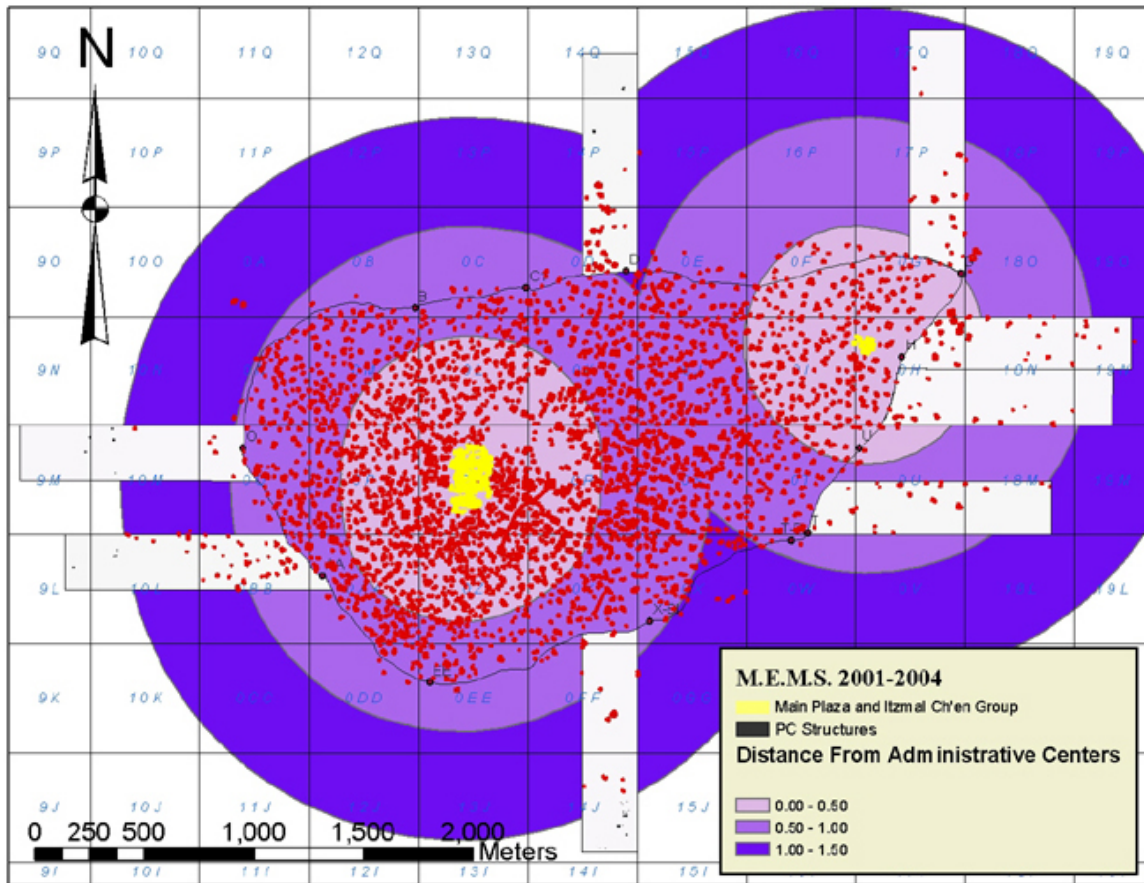
**Figure 7.40 – Chart showing distance of Postclassic structures nearest administrative center (monumental center or Itzmal Ch'en).**



**Figure 7.41 - Structures located within 500 m of a major administrative center (highlighted).**



**Figure 7.42 - Structures located within 1000 m of a major administrative center (highlighted).**

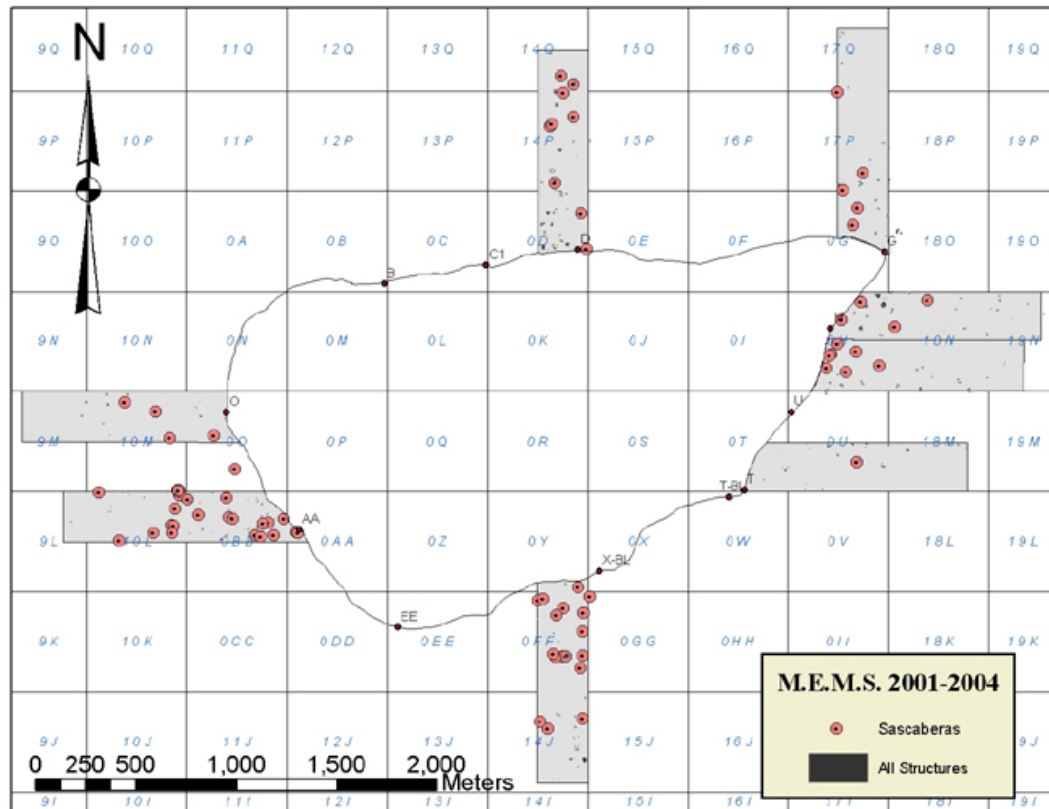


**Figure 7.43 - Structures located within 1500 m of a major administrative center (highlighted).**

### **Distribution of Sascaberas Outside of the City Wall**

While conducting the survey outside of the city wall, our team recorded the location of *sascaberas*, (Figure 7.44) small limestone quarries that were exploited for construction material. Not surprisingly, the features were heavily correlated with residential architecture. We found regular *sascaberas* mixed into all residential zones recorded (see chapter 8 for more on residential distributions). Many of these features were enclosed within the *albarrada* walls of individual family groups, suggesting family level control of

the resources. The only exceptions to this pattern were several very large pits dug out in close proximity to the city wall itself. Their association with the features and their unusually large size suggests that these features were the source of much of the raw material used to make the wall.



**Figure 7.44 – Distribution of sascaberwas (limestone quarry sites) recorded outside of the city wall.**

## **A Brief Settlement History of the Mayapán Area**

The inclusion of these new survey data and that collected by the PEMY project provide a more detailed picture of the settlement history of the Mayapán area than previously produced. Much of what has been said previously about the settlement history within the wall confirms general trends noted by the original Carnegie project. The settlement history data collected outside of the city wall provides important missing details about the changes that led up to the final explosion of settlement that culminated in the form of the final Postclassic urban center.

Evidence suggests low density and dispersed settlement took root in the periphery of the study area by the Late Preclassic period. That settlement clustered around several cenotes that provided easy access to reliable water sources. Settlement began in the northeast portion of the study area around Cenote Actun Burro and in the south of the study area around Cenote Madero. The northeastern settlement expanded through the Terminal Classic and into the Postclassic population explosion. It grew to incorporate the area around Itzmal Ch'en and eventually became a second settlement focus within the final Postclassic settlement through the processes of population growth and conurbation. The southern location expanded in density and total population into the Postclassic period and developed into the outlying Terminal and Postclassic site known as D'zan Tun Ch'en. This outlier settlement provided many of the same basic functions to its small community that we find in Mayapán proper (see Chapter 8). During the Terminal Classic period, inhabitants began to fill in the southwestern portions of the site, the area with the densest concentration of cenotes. Until this time, the area that was to become the main plaza/site

center was essentially without settlement. I infer that this fact, coupled with the available water, was an important factor in the final placement of the center.

Important architecture at the site filled in and around the main temple, Q-162 or El Castillo (Milbrath Peraza 2003; Peraza et. al. 2007; Proskouriakoff 1962). The area immediately surrounding this feature was filled with the construction of administrative colonnaded hall groups. Around these the elaborate elite residences and, around those, the smaller elite residences were located. Many of these smaller elite residences were constructed northeast of the main plaza adjacent to two likely market areas identified by the PEMY project (Hare et. al.).

The remainder of the walled portion of the site was largely occupied by commoner residences. The density of settlement was very high, exploiting nearly all open space within the walled portion of the site and a good deal of terrain around its periphery. Residential architecture placement was often influenced by the distribution of the numerous *atillos* or small hillocks that dot the Mayapán landscape. The site's ethnohistory suggests that the rapid population expansion that took place in the Postclassic was fueled by immigration and resettlement of surrounding populations. The associated Postclassic population explosion resulted in a city of some 17,000 people at its height. This general history is well supported by the massive population increase that we see in the Postclassic and the total depopulation of the same areas subsequent to the site's violent downfall.

Some indications of individual *barrios* and other major urban layouts, such as concentrations of certain distinctive pottery and architecture types, have been observed within the city wall by the PEMY project and I have found indications of east coast

ethnic affiliations for people that settled in the northeast portions of the site (discussed in more detail in chapter 8). Research inside the city wall is also revealing patterns in the informal *albarrada* boundary walls that divide the individual house groups at the site. The walkways that divided these boundary walls were the main paths of traffic through the city (Hare et. al.). These pathways can be traced from major gates in the city wall, winding through neighborhoods, market spaces and important elite architecture at both the site center and at the Itzmal Ch'en temple cenote group in the northeast portion of the site.

These data provide some support for the belief expressed by Clifford Brown (1999) and others that the wall itself may be a fairly late construction at the site. The clustering of the residential architecture around the margins of the wall indicates that much of the residential zone was probably built after the wall was constructed. However, the very sparse material remains recovered in association with these areas suggest that they were occupied for a much briefer period of time than the areas toward the center of the site. In general there is a notable drop-off in pottery sherds, lithics and other residential debris recovered as one nears and crosses beyond the city wall. As the quality of the architecture in these areas is not significantly different than we see in other commoner contexts, the most likely explanation for the pattern is short term habitation rather than a reflection of the status of those living in the more peripheral locations.

Following the documented internal strife and warfare that destroyed the site, the large population that had once squeezed, willingly or otherwise, into the dense Postclassic settlement dispersed very rapidly, leaving the entire study area devoid of habitation into the Colonial Period. The evidence suggests that even the long settled



periphery of the Mayapán area succumbed to the same forces, providing more indication that these people, despite their location beyond the large city wall, were an important and connected part of the Postclassic Mayapán whole. As the site fell, some relocated in the general region and others departed on longer journeys in search of new homes.

The combined research of the PEMY and Mayapán Periphery projects is making real progress toward discerning the complex settlement patterns and explaining the extremely diverse functions of the jumble of structures and walls that made up the final Postclassic settlement of Mayapán. Chapter 8 will focus on the variation we see in functions of both individual structures at the site and the broad spatial patterning urban functions of this important urban center.

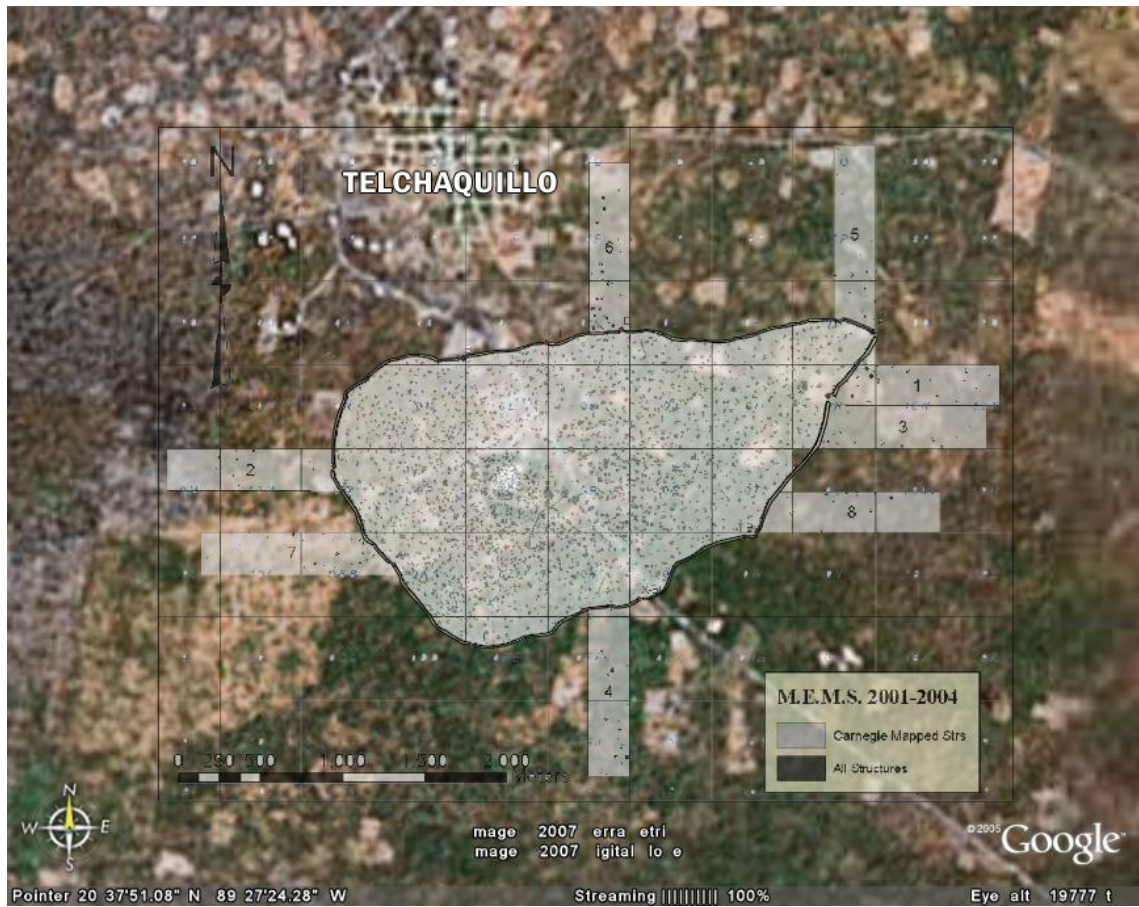
## **Chapter 8 – Formal and Functional Variation in Structures and Structure Clusters**

In the pervious chapter, I reviewed the general settlement history of Mayapán and its periphery and summarized the general findings about the final layout of the city. Now, I turn my focus toward the expression of variation among the individual structures documented and their composite clusters. The next chapter will address broad spatial variation in urban functions recorded for the city layout as a whole. Maps of all structure clusters mapped can be found in Appendix A and temporal and functional designations for all structures and structure clusters can be found listed in Appendix B.

This chapter begins with an examination of two typologies (one formal and the other functional) employed to classify the architecture documented along the eight transects that my team and I surveyed during the 2002-2004 field seasons. These typologies served as the basis for our stratification of the sub-surface testing phase of the project and the larger scale analysis of the functions represented by different architecture clusters. The distribution of these clusters then provided the basis for the broad patterns described at the end of the chapter. All assigned functions were derived through an examination of architectural form and were informed by the remains collected from a series of test pits stratified to test each of the major architectural designs documented. As work proceeded, preliminary form and function typologies were further refined to produce detailed classifications of all Postclassic architecture mapped outside of the city wall. As predicted by Carter's (1974) original model, the site's rural-urban fringe is home to a great diversity of urban functions, many of those essentially lacking in the center of the settlement and therefore not previously documented at the site.

## Ethnographic Comparisons to Modern Traditional Maya Settlement

Many of the interpretations presented in this chapter are based in part on ethnographic comparisons to structure form and function in the modern village of Telchaquillo, located just north of the ancient site of Mayapán (Figure 8.1). Smith (1962:211-212) also recorded similarities between the modern house clusters in the village and the remains of commoner house clusters found at Mayapán. Reading his observations, it is clear that the pattern that he described remains very much intact today. The main difference of note is the introduction of modern, machine-made cinder block construction. This development has resulted in a decline in the number of traditional style apsidal houses being built. Most recent constructions are rectangular and, in the case of newer clusters, wells are not as common. Smith noted the presence of wells in nearly every group in Telchaquillo. Today, most rely primarily on a municipal water supply that feeds a tap in the yard. Beyond that, the number of structures present, the composition of the family living in the compound and many other features appear virtually identical today. In a pattern that is the exact opposite of that noted for the region by Landa, the son or sons of the family generally continue to reside in the group and the daughters move in with the families of their husbands. House clusters (Figures 8.2-8.4) continue to use boundary walls. Most of them are the traditional dry laid *albarrada* configuration, although cinder block walls with metal gates are increasingly popular options.



**Figure 8.1 – Satellite image of the Mayapán area showing location of Telchaquillo in relation to the current study area.**





**Figure 8.2 – Traditional apsidal style house in Telchaquillo.**



**Figure 8.3 – Traditional apsidal style house built of stone and mortar or *mampostería* in Telchaquillo with modern roofing material replacing palm thatch.**



**Figure 8.4 – Photo of modern house group on an altillo from Telchaquillo showing a mix of traditional apsidal construction and more modern rectangular form associated with the advent of cinder block construction (although built with traditional *mampostería* construction). The boundary wall encloses among other features a household garden growing maize and other produce items.**

Much of the modern village lies in the northwestern portion of my study area (Figure 8.1) and most of our workmen lived there. Much has changed in the village in recent years with the introduction of a modern water distribution system and access to electricity. However, many in the village still live a basically traditional lifestyle that reflects their efforts to meet many of the same day to day needs that would have driven those living in the area in the Postclassic. I discussed some of the implications of the modern use of field outbuildings above. Now, I want to explore in more detail the traditional Maya house group in Telchaquillo and how the structure, form and functions



informed the interpretations about residential clusters above. I made many informal observations of family compounds over the several years we were conducting the survey. Two families, the Mena's and the Flores' in particular welcomed me into their homes, shared meals with me and became my friends. My regular visits with these two families provided the most detailed comparisons that informed my work. Both were the families of workmen employed by the project, whose contributions to our studies can not be overstated.

Telchaquillo was also the site center if the ancient settlement of the related name Telchac. Modern Telchaquillo is centered on a small plaza with an early Colonial Period church (Figure 8.5) facing a cenote with two connected mouths, side-by-side. The façade of this church contains a number of Puuc carved stones as do many of the structures at Mayapán itself. As it was in ancient times, the cenote remains the heart of the community and is a focus of much activity today (Figures 8.6-8.7). Several large platform mounds are located around the cenote. There is another large ancient mound directly behind the church.



**Figure 8.5 – Photograph of Colonial Period church from Telchaquillo in 2003 just before it was resurfaced and painted taking care not to cover Puuc stones set into façade. Spire of older portion of the church can be seen in the background.**





**Figure 8.6 – Interior view showing both mouths of Telchaquillo cenote.**



**Figure 8.7 – Interior view of Telchaquillo cenote. It serves today as a swimming spot for the local kids, fully outfitted with access stairs, platforms and electric lighting.**

Nearly every family in the village subsists primarily as agriculturalists, working plots of land known locally as *milpas*. These are small fields cleared through cutting and burning the vegetation. The location of the local *milpas* rotates frequently as the soils are thin and rapidly depleted of nutrients. *Milpa* areas are managed in part through the local *ejido* system, a collective of the village farmers with elected officials who settle disputes, assign lands, etc. Others own particular plots of land. Typically, *milpa* farmers produce maize, beans and squash. Watermelon, papaya and gourds are also popular crops locally. These fields provide the bulk of the day to day diet for most families. That labor and return is supplemented in a variety of ways.

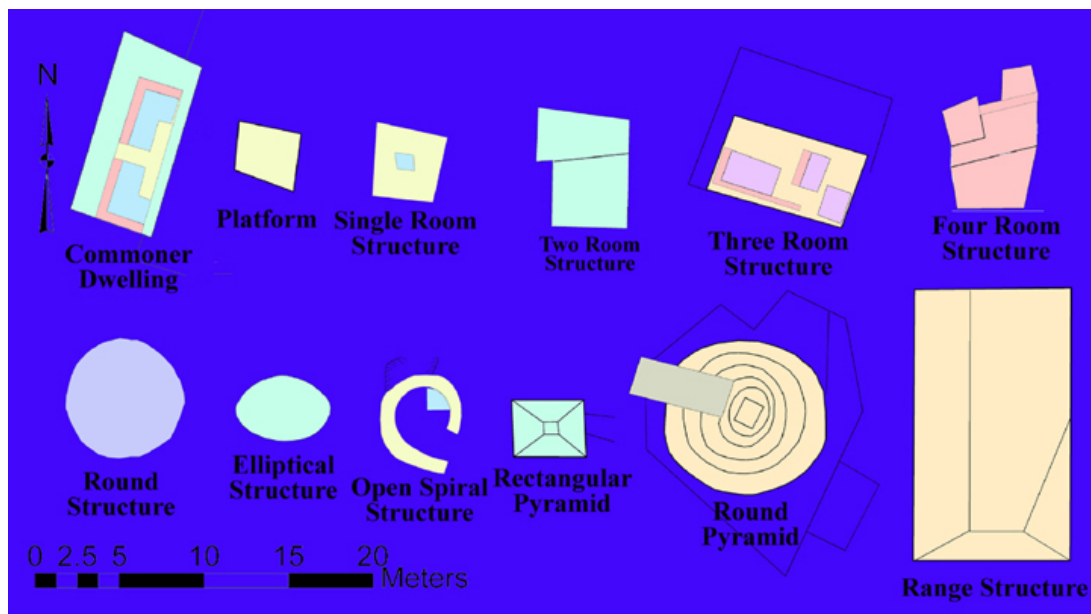
Hunting and various gardening activities also contribute greatly to the local diet. It was not uncommon for my workmen to bring to bring slingshots out on survey to hunt the odd bird or lizard as an opportunity arose. Another regular activity that took place hand-in-hand with the survey was wild honey collection. Usually, when the workers spotted a promising hive, one would climb the tree and chop down the branch from which it hung. When the nest would fall, the majority of the bees would mass and fly off to pick up the pieces and start over in a new location. Larva that remained would be collected, taken home, cooked on a griddle with some lime juice and eaten with a tortilla. Some of the honey was eaten on the spot from the extracted combs to everyone's great satisfaction, mine included, and the rest was divided and taken home. Evenings and weekends were good times for hunting larger wild game, like deer and peccary. There is also a local gopher that feeds on the roots of *milpa* plants that is considered a tasty, if somewhat rare, delicacy as well as the eggs of certain birds.

One notable difference between the modern residential group and what we recorded at Mayapán is the overall shape of the compound and use of space at the village scale. Mayapán residential clusters were usually within round, walled enclosures that generally followed the contours of naturally occurring *altillos*. Often, low areas between these features were open space, not partitioned by the group enclosures. The residential clusters in Telchaquillo conform to a more typical Spanish colonial grid pattern, in which all of the land along the street grid is divided into rectangular walled enclosures. This pattern is common throughout the area and presents one significant contrast between the two settlement periods. As you reach the periphery of the settlement, this pattern becomes looser as more un-partitioned land is available. A mix of agricultural and residential land use is evident along the settlement periphery. Land conversion from agricultural to residential use is common.

### **Formal Typologies of Structures Documented Outside of the City Wall**

The following preliminary typology (Figure 8.8) was devised following the survey phase of the study. It is based solely on the architectural characteristics of the remains recorded. It served as a basis for stratifying the sub-surface testing program along lines that would elucidate the functions of the diverse forms recorded. By testing one or more examples of each form encountered, we were able to assign a specific function to each of the individual architectural types that were recorded in the initial survey phase of the study, revealing a great deal more diversity in functions than are

reflected simply in form alone. The same testing allowed us to assign the temporal designations used above in the review of the settlement history of the site.



**Figure 8.8 – Preliminary typology of structure form used to stratify the test pit samples (Notes: 1. The three room structure shown was late reclassified as a two room structure 2. The only remaining three room structure is the 14J-5 market discussed below. The colonnaded hall is not included in this preliminary typology as it was not recorded until well after it was devised and testing complete; 3. The range structure was not tested as it was discovered after the original typology was formulated).**

#### *One-Room, Two-Room, Three-Room and Four-Room Structures*

All roughly square or rectangular structures with intact wall lines were assigned to categories determined by the number of rooms delineated by the intact wall lines. All but two of the structures designated based on room number were either one or two room structures (Figures 8.9-8.15). The 14J-4 D'zan Tun Ch'en market remains the only example of a three room structure although it could be classified as four-roomed if Str 14J-5 is considered part of the main structure. Only a single example of a four room

structure known (Y-116). The three room example shown above was determined to be only two rooms upon further inspection therefore while it was initially assigned a designation, it was not used for further work. These categories vary a great deal in layout. Essentially all were constructed on low cobble basal platforms. Most were also surfaced with a layer of limestone gravel known locally as *sascab*. The wall form varied slightly between the structures. Commonly, they would contain what we refer to as “double walls”, a low wall line composed of two rows of stones set vertically to hold wooden pole walls between them. This was an extremely popular method of construction during the Postclassic period and was found very regularly in two room structures that were determined to be dwellings. In these structures the double walls were usually located along rear and sides of the structure and often divided the front and rear rooms. Other structures used single course constructions. In Postclassic structures, the stones used in these single course walls were usually shaped into roughly rectangular blocks. In constructions that dated to earlier periods, it was more common to use large unshaped slabs of local limestone. These walls were usually tall, measuring a meter or more in height, while the Postclassic style was usually lower than one half meter in height. One Postclassic structure employed an unusual construction method for the site, stacking cut blocks flat in multiple staggered courses, similar to the pattern used in modern brickwork. This two room structure was determined to be a dwelling but it was somewhat larger and more elaborate than most contemporary commoner dwellings.





**Figure 8.9 – Two room Mayapan style dwelling, 18N-18.**



**Figure 8.10 – Two room Mayapan style dwelling, FF-3.**





**Figure 8.11 – Two room structure H-2a.**



**Figure 8.12 – H-552, a one room structure with construction similar to that used in the typical Mayapán dwelling. It has a rear double course wall but just one bench and has the appearance of just one half of a typical local house.**





**Figure 8.13 – One room structure H-2b.**



**Figure 8.14 - One room structure 18N-15a.**





**Figure 8.15 – One room shrine structure H-48b.**

### *Platforms*

Many of the structures recorded were low cobble platforms (Figures 8.16-8.17). These came in a variety of shapes and sizes. The large platforms are generally rectangular or close to it. Most of the small platforms recorded were square or rectangular in shape. A few were very small and round. All of the platforms are composed of small to medium sized cobbles. Generally these can be divided into two clusters, those platforms large enough to hold structures and those that are too small and seem to have served a purpose of their own. I will explore the differing functions associated with these variations below.





**Figure 8.16 – Small rectangular platform altar.**



**Figure 8.17 – Str. H-47a, a large residential platform lacking wall lines but which would almost certainly held one or more perishable structures.**



### *Group Platforms*

Group platforms were large platforms that served to hold a group of individual structures (Figures 8.18-8.19). They were usually constructed by leveling the sides of naturally existing *altillos* by erecting low retaining walls around the edges and filling them with soil and stone. They varied in shape and construction investment. The most common were roughly round, following the general shape of the natural *altillo*. Modification of *altillos* to expend the flat surface at the top was a common practice at the site both inside and outside of the city wall. This is not surprising considering that nearly all of the available *altillos* were utilized for residential house groups. More elaborate group platforms tended to be rectangular and involved much more modification to the natural feature. In several cases we found no detectable wall lines in the surface suggesting that, in certain cases, these constructions held perishable constructions.



**Figure 8.18 - Heavily modified altillo group platform supporting the H-40 cluster of affluent commoner residential structures.**



**Figure 8.19 – Southeast corner of large group platform supporting 18O-1 colonnaded hall.**

### *Round Structures*

Four types of round structure were encountered during the survey phase of the study (Figures 8.20-8.23). These can be broadly divided into round structures built on cobble basal platforms and those which consisted of simple wall lines on the ground. The round platform structures came in two varieties, those with a double wall line, like that described above, and those with a single course wall. These structures were generally low to the ground, measuring less than half a meter in height, the wall lines themselves



retaining rubble fill. Round structures lacking a platform were typically single course round alignments. The round ground level alignments were divided based on the presence or absence of a recognizable entrance. Most of these structures showed no evidence of a defined entrance. A cluster of these wall lines located along Transect 2 were very large single course constructions measuring between 5 and 7m in diameter. These were complete stone rings. A smaller number of round wall alignments had a clear gap in the wall line measuring roughly a meter in length that would have served as an entrance. These were much smaller than those just mentioned having diameters more typically measuring 3-4 m across.



**Figure 8.20 - 14J-5b, a small round structure attached to the D'zan Tun Ch'en marketplace.**





**Figure 8.21 – Round platform 18N-16, a lone structure located off altillo, and not surrounded by albarrada.**



**Figure 8.22 – Round platform 18N-8G. Example is part of residential group surrounded by other structures and an albarrada enclosure.**



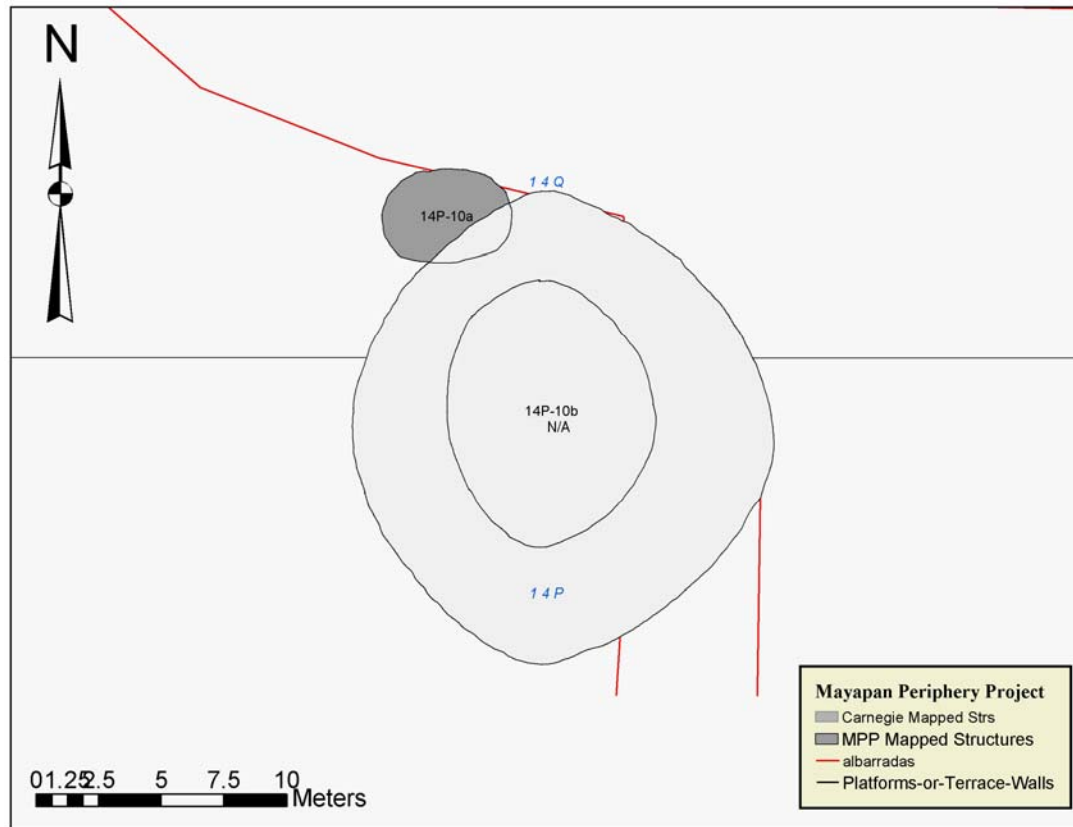


**Figure 8.23 – Round platform 14J-7, which was located not far south of the D’zan Tun Ch’en market (14J-5).**

### *Elliptical Structures*

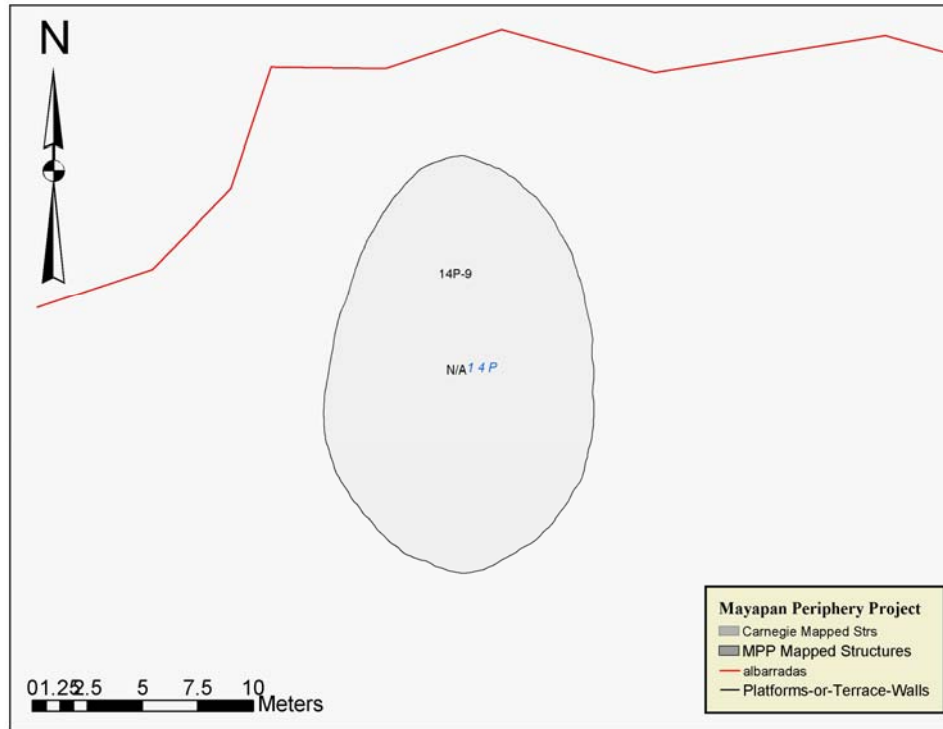
Several examples of elliptical structures were documented along the eight survey transects (Figures 8.24-8.26). Typically, these were little more than oblong wall lines measuring roughly five meters in length and between two and two and a half meters in width. There was no clear entrance to these wall lines but, the walls are rather low, measuring no more than 30cm in height. These structures were recorded both on and off of cobble basal platforms. Unlike the apsidal houses that remain common in the area today, these structures had walls which curved for their entire length. Apsidal structures

today tend to have rounded ends with parallel straight walls forming the side wall. All tested examples of these structures dated to the Terminal Classic period.

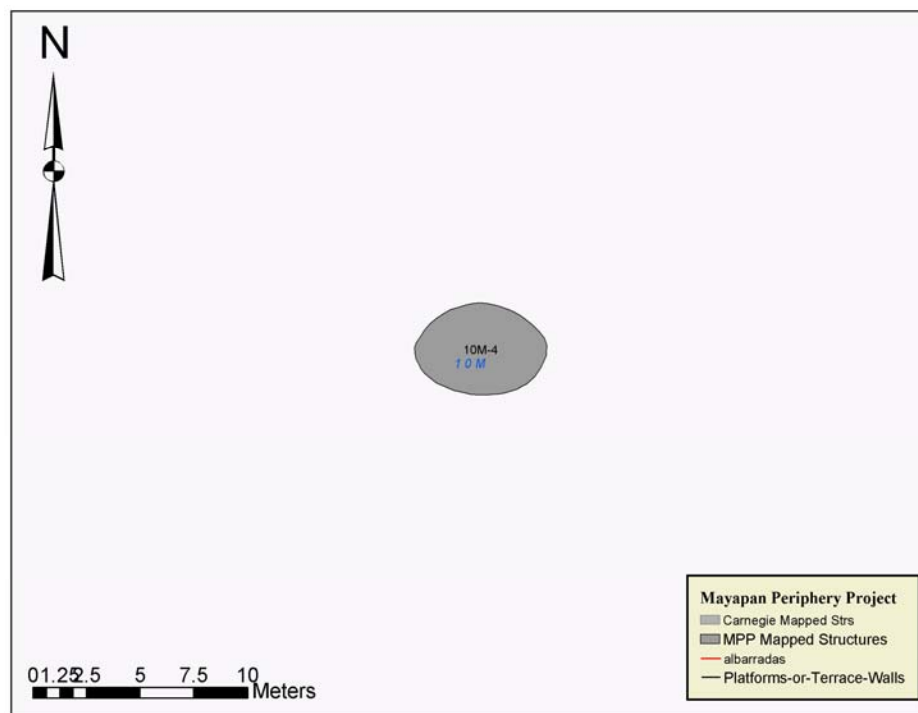


**Figure 8.24 - Elliptical structures 14P-10a and 14P-10b. The second structure is constructed on a roughly round group platform. These structures appear to be Terminal Classic residential architecture. Albarrada wall lines are part of a later Postclassic animal pen which runs across the surface of Str. 14P-10b (overlap not shown).**





**Figure 8.25 - Elliptical platform 14P-9.**



**Figure 8.26 - Elliptical platform 10M-4.**

### *Open Spiral Structures*

Group 7Q-1 contained two unusual structures not recorded anywhere else in the study area. These structures, dubbed “open spiral structures”, were composed of a single round wall line that curved around a full circle but did not meet up at the ends (Figures 8.27-8.28). One end was flared slightly out and past the first, creating a spiral that was open at the point that the two wall ends passed each other. The overall effect is that of a spiral. Both of these structures were built on top of cobble basal platforms. One of the structures was slightly more elaborate than the other (17Q-1a). Its very unusual configuration was characterized by a double course wall line composed of large unshaped slabs of local limestone. The rough blocks are far more typical of Terminal Classic construction in the area, but the double line is more reminiscent of common Postclassic construction techniques. This first example also contained a wedge shaped bench feature attached to the rear wall. The second example had no bench and was composed of a simple single course wall alignment consisting of rough limestone slabs. Subsurface tests of both structures indicated a Terminal classic date for their construction and use.



Figure 8.27 – Overview of Pozo 132 with Structure 17Q-1 in the background.

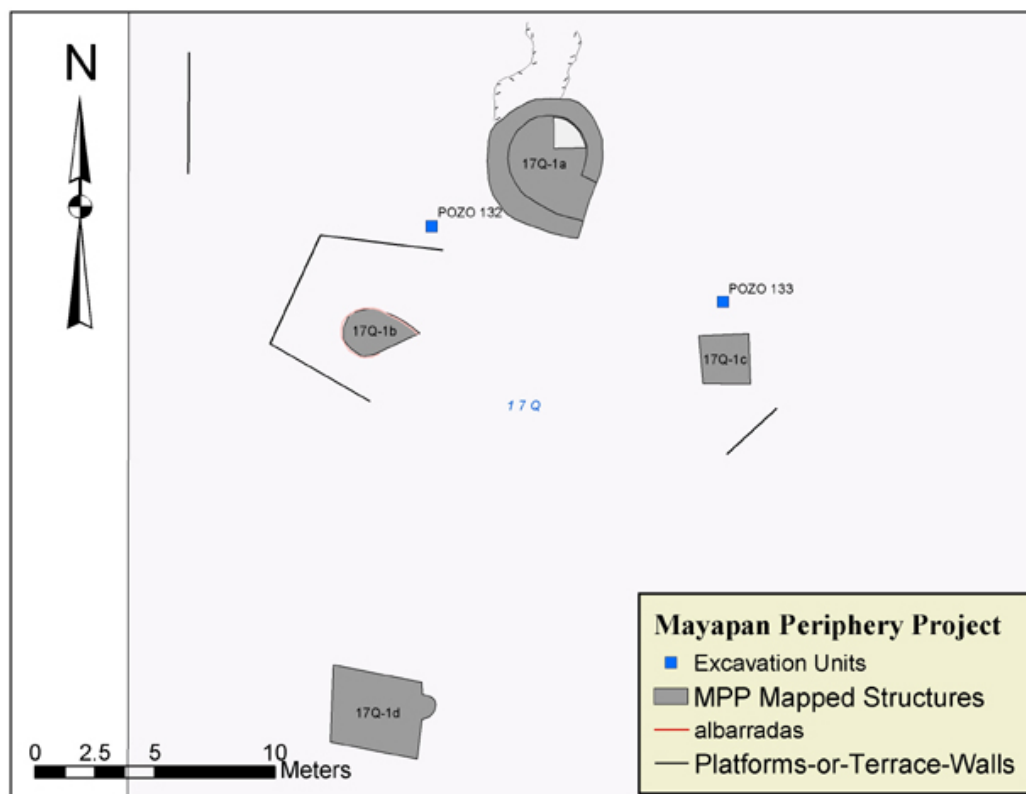


Figure 8.28 – Map of 17Q-1 group showing location of Pozo 132 in relation to Str. 17Q-1a.

### *Rectangular Pyramids*

One small rectangular pyramid was recorded along Transect 1 of the survey (Figure 8.29). This group, H-48, was composed of two structures facing each other across a large basal platform. The one room structure (H-48b) opposite the small pyramid was determined to be a shrine. The pyramid itself (H-48a) measured 5m by 3m at the base and 1.5m tall. The sides sloped up from the base to meet a small flat top measuring about 1m by 1m. No evidence was found to suggest that this small surface space held any kind of structure. The construction was composed entirely of small to medium sized limestone cobbles. No individual levels or stairway were present.



**Figure 8.29 – Structure H-48a, a small rectangular pyramid facing a one room shrine structure east of the main site.**



### *Round Pyramid*

A large round pyramid was recorded near the middle of Transect 6. This group (14P-8), consisting of a pyramid and small rectangular altar, is constructed on a large basal platform (Figures 8.30-8.31). The pyramid structure was in a poor state of preservation. However some details were clearly recognizable. It stands approximately 6m tall and had a diameter of 10m at the base. This structure was a stepped pyramid with at least 5 round levels topped by a rectangular level roughly 2m by 2m in size. A small cobble altar was located on this level. There were no intact wall lines to suggest a superstructure although a perishable structure was probably present in the past. There is a large stairway running up the northwest side of the structure which is oriented toward the Late Classic/ Terminal Classic site of Telchaquillo.



**Figure 8.30 – Round pyramid 14P-8a.**

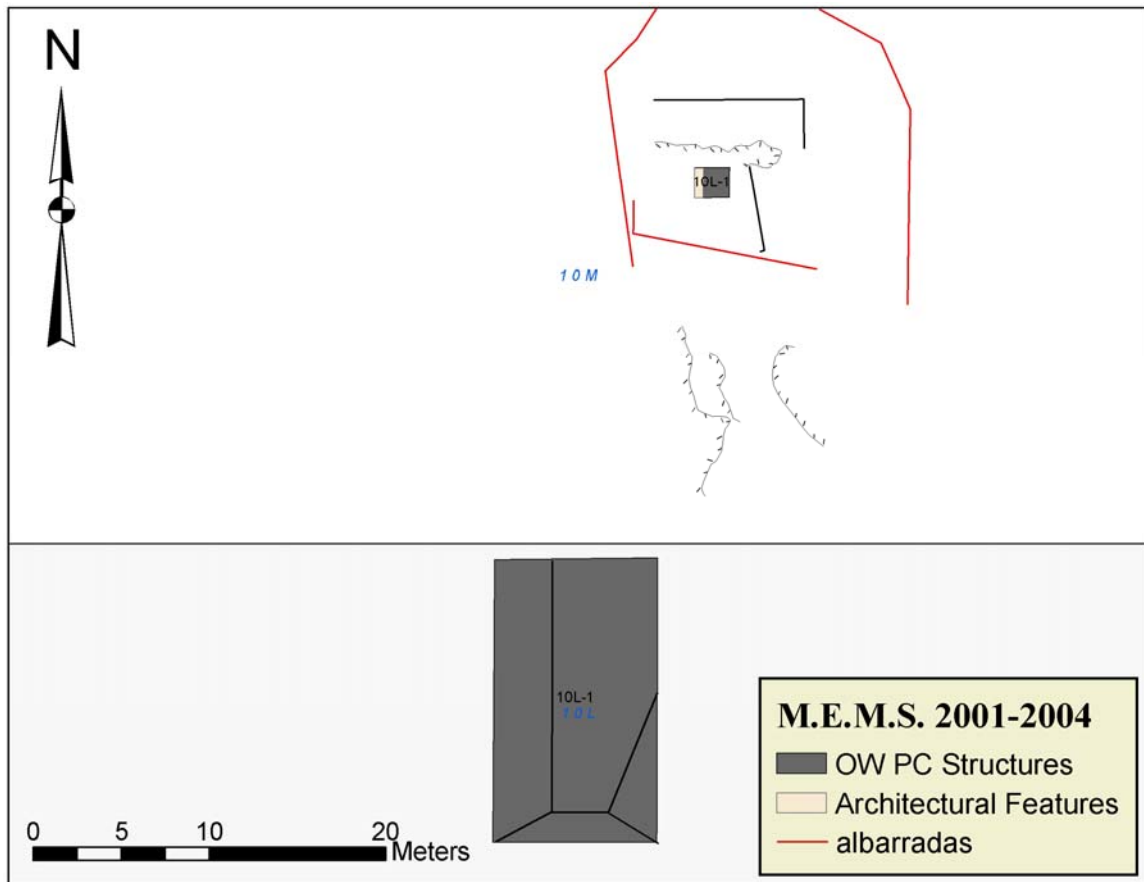


**Figure 8.31 – Mapping round pyramid 14P-8a.**

### *Range Structures*

Group 10L-1 contained a range structure, the only one of its kind documented along the transects surveyed by our team (Figure 8.32). One of the largest structures recorded during our work, the construction measured 10m wide by 15m long. It was built against a natural hillock along its east and north sides, the hill itself providing the bulk of the structure's mass. Along its west and south sides, the hill was substantially expanded to create the final range structure. These two sides slope steeply upward to meet a flat top surface measuring roughly 6m wide by 13m long. There were no indications of wall lines to suggest a construction on top of this structure. Given the size of the structure and the unusual labor investment involved in its construction, it is likely

that further excavations at the structure may uncover evidence of one or more surface structures. This structure was not tested as part of the excavation phase of the project. Its precise dating remains unclear. However, the structure is surrounded by a number of residential structure clusters with clearly Postclassic form and the construction of the small platform north of the main structure contains a rear double wall, suggesting a contemporary date. Additional testing would be required to say with a greater degree of certainty.



**Figure 8.32 - Map of 10L-1 group showing form of range structure (10L-1a) and small residential platform to its north (10L-1a).**

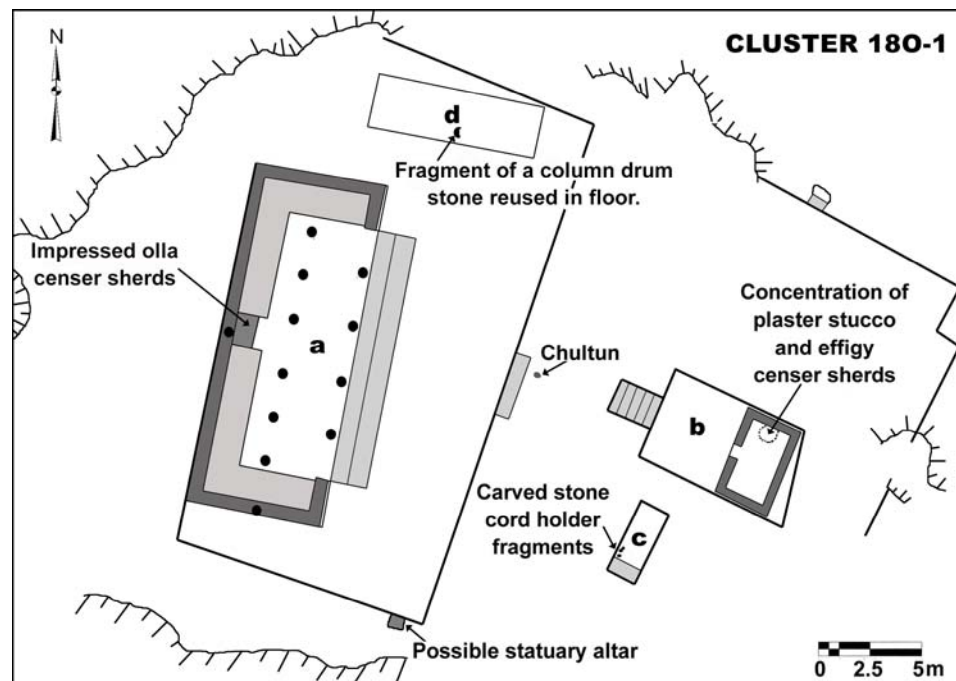
### *Colonnaded Halls*

Our team was surprised to find a colonnaded hall group, 18O-1, located outside of the northeast entrance to the city wall (Figure 8.338.36). The distribution of these structures within the wall is very restricted, being almost exclusively confined to the Itzmal Ch'en group and the main plaza of the site (Figures 8.37 and 8.38). This group was not included in our original formal typology as it was located just outside of our selected transect sample and cleared and mapped after all other work was completed.

The 18O-1a colonnaded hall structure was built on a substantial basal platform measuring approximately 1m in height. There is a single step at the center of the platform. A small altar was attached along the southern edge of this basal platform. The colonnaded hall shares this platform with a second construction that may have served as an oratory, although it lacked the two doorway columns usually associated with these structures in other known colonnaded hall clusters. The hall itself measured 7m wide by 18m long. It contained two rows of columns along its length. The front row was composed of 4 columns and was located along the open front edge of the structure. The second row, having 6 columns, was placed about 2/3 of the way toward the rear of the structure. Two additional columns were found set into the rear and south side wall. I presume that these columns may have served to support attached roofing that covered those two areas. "L" shaped benches run along the side and rear walls of the structure, divided in the center by a small rectangular altar. There is a stairway with two steps running the length of the construction. The hall faced a single room structure on a tall basal platform that matches the plan of family shrines associated with these clusters



elsewhere at the site. I will further explore the function and detailed arrangement of the group later in this chapter.



**Figure 8.33 – Map of colonnaded hall group, 180-1**



**Figure 8.34 – Fernando Flores measuring front stairs of 180-1a colonnade.**





**Figure 8.35 – corner of north and rear wall (west) “L” shaped bench.**



**Figure 8.36 – Remains of central altar located between the benches at the center of the rear wall of 18O-1a.**





Figure 8.37 – Some of the many column rum stones that litter the surface of 18O-1a.

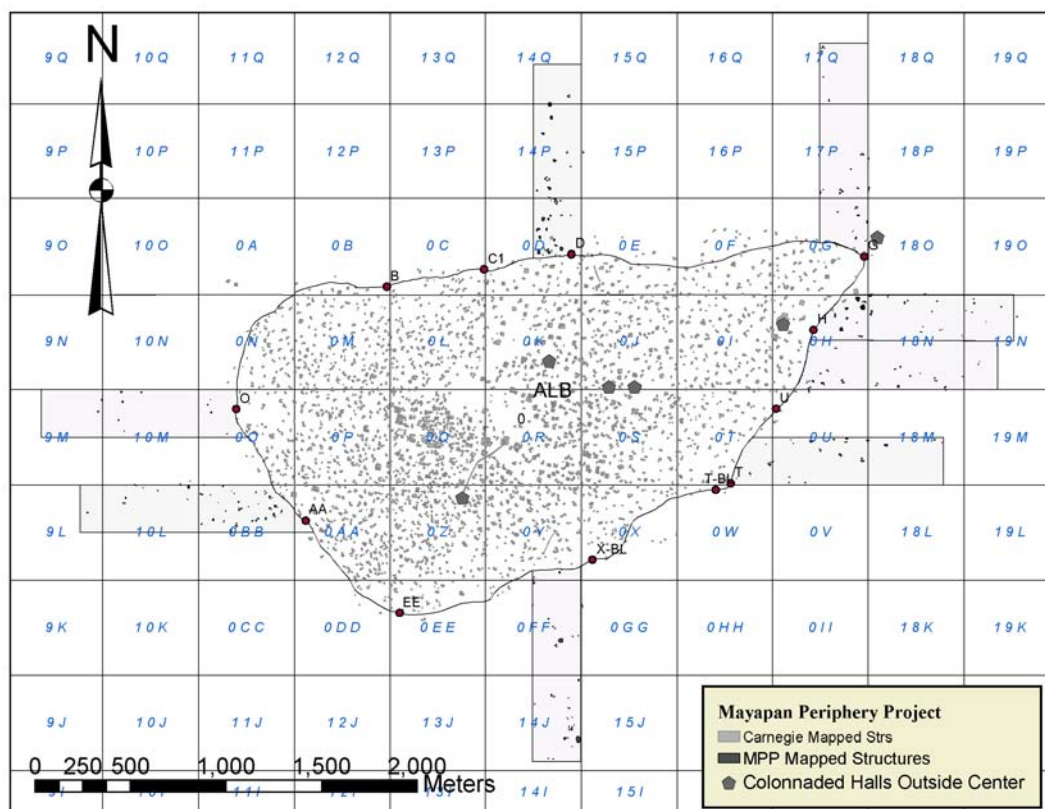
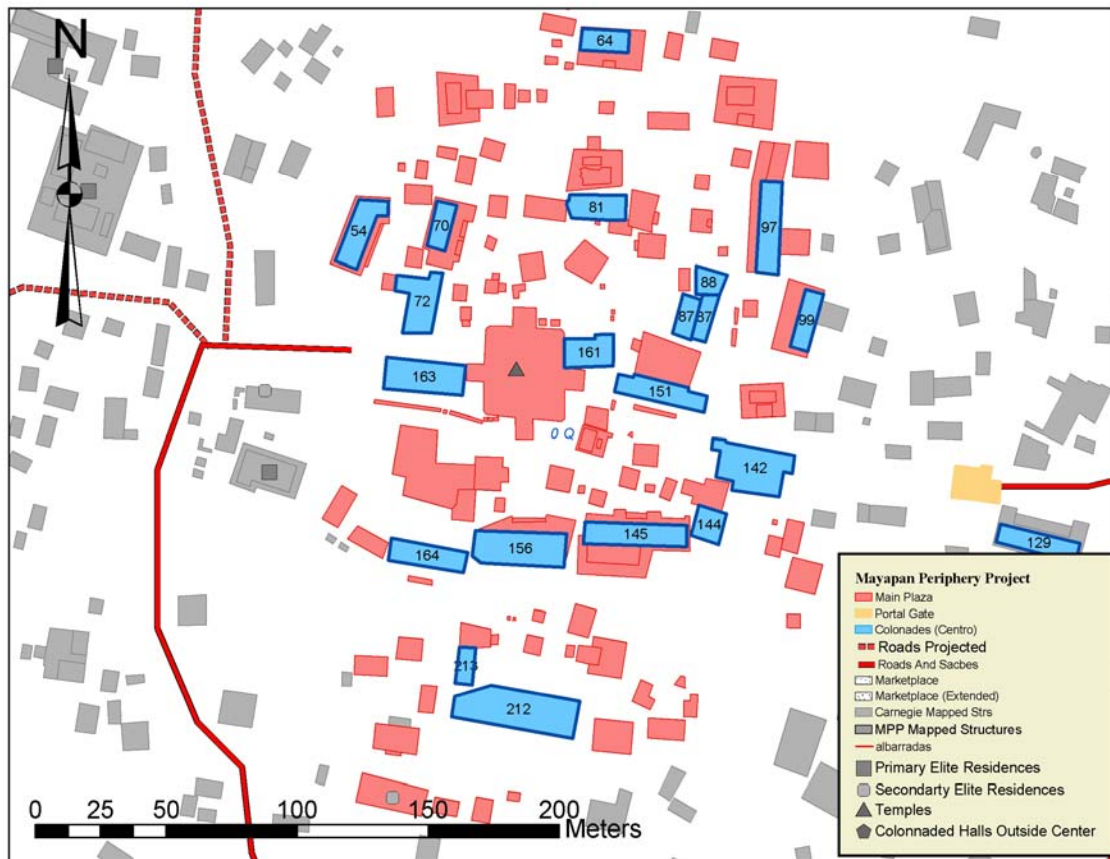


Figure 8.38 – Distribution of colonnaded hall clusters outside of the Main Plaza.



**Figure 8.39 – Distribution of colonnaded halls in the Main Plaza.**

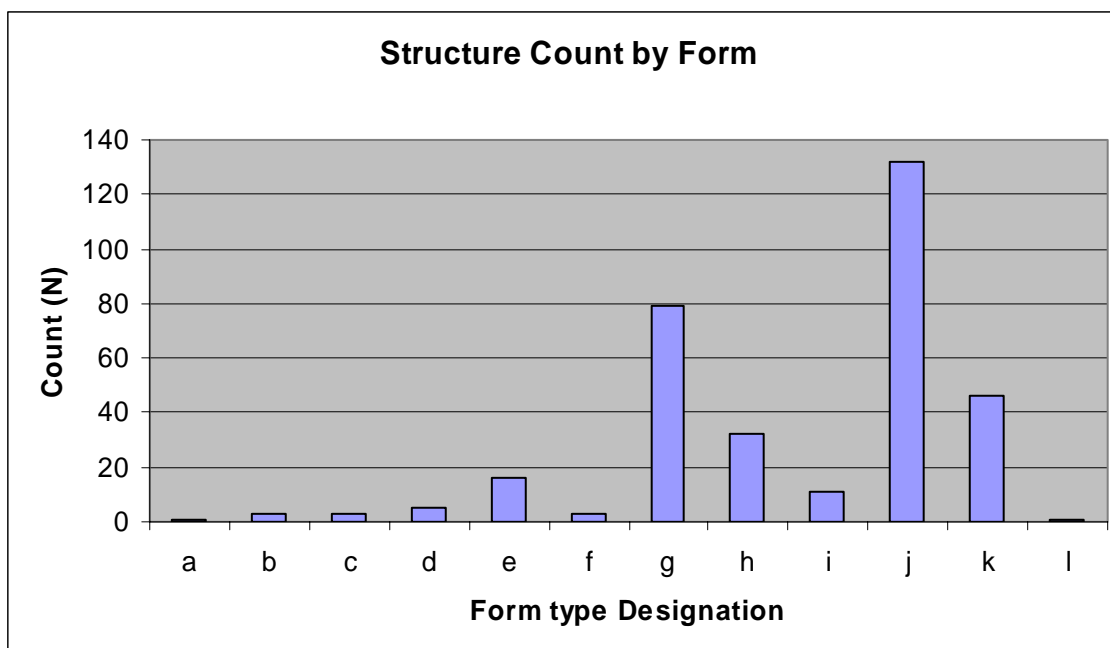
### **Final Form Based Typology**

As already noted, the results of this survey were used to devise two different typologies used to categorize the architecture encountered. The first was a form based classification developed based on the data recorded in the first six transects of survey in preparation for the test pitting phase of the study. It was the basis for the sampling that followed in that phase. Range structures were added to the typology as the remaining two transects were mapped. It does not include the colonnaded hall as it was mapped after test pitting of transect samples was complete. As survey proceeded newly encountered forms were designated codes used in the GIS process. These are very

similar in their break down to the typology discussed above. I used these as the basis of a third a somewhat more refined and complete typology of structures based on their basic form (Table 8.1). In general, this final form based typology contains fewer classes than the function based typology discussed below. The variation in form contained within these groupings is great in certain cases such as the platforms which contain structures ranging from small altars to large platforms supporting entire structure groups. Figure 8.40 shows the counts for all of the feature classed assigned.

**Table 8.1 – Final form based typology of Postclassic structures mapped outside wall with size range, mean size, median size, counts (N) and frequencies.**

| <b>Structure Form</b>           | <b>Form Designation</b> | <b>Smallest</b> | <b>Largest</b> | <b>Mean</b> | <b>Median</b> | <b>Standard Deviation</b> | <b>Count (N)</b> | <b>Percentage (%)</b> |
|---------------------------------|-------------------------|-----------------|----------------|-------------|---------------|---------------------------|------------------|-----------------------|
| Colonnaded Hall                 | a                       | 113.57          | 113.57         | 113.57      | 113.57        | N/A                       | 1                | 0.30%                 |
| Round Structure (Double Walled) | b                       | 8.30            | 18.83          | 12.08       | 18.83         | 4.79                      | 3                | 0.90%                 |
| Altar (Estimated)               | c                       | 1.82            | 3.98           | 2.76        | 1.82          | 0.90                      | 3                | 0.90%                 |
| Platform (Estimated)            | d                       | 2.50            | 15.77          | 8.19        | 5.85          | 5.38                      | 5                | 1.51%                 |
| One Room Structure (Estimated)  | e                       | 0.84            | 26.73          | 7.88        | 6.01          | 6.52                      | 16               | 4.82%                 |
| Two Room Structure (Estimated)  | f                       | 11.27           | 36.15          | 26.79       | 32.95         | 11.05                     | 3                | 0.90%                 |
| Platform                        | g                       | 1.65            | 368.44         | 37.18       | 11.80         | 65.52                     | 79               | 23.80%                |
| Round Structure                 | h                       | 0.42            | 109.27         | 13.80       | 6.14          | 20.91                     | 32               | 9.64%                 |
| Round Structure (Single Walled) | i                       | 0.74            | 53.27          | 12.83       | 5.06          | 16.48                     | 11               | 3.31%                 |
| One Room Structure              | j                       | 0.58            | 93.19          | 11.85       | 7.16          | 13.37                     | 132              | 39.76%                |
| Two Room Structure              | k                       | 4.90            | 86.70          | 28.98       | 27.21         | 17.05                     | 46               | 13.86%                |
| Four Room Structure             | l                       | 34.66           | 34.66          | 34.66       | 34.66         | N/A                       | 1                | 0.30%                 |
| <b>Totals</b>                   |                         |                 |                |             |               |                           | <b>332</b>       | <b>99.70%</b>         |



**Figure 8.40 – Chart showing counts of structures based on the final form based typological categories.**

### **Functional Typology of Structures Documented Outside of the City Wall**

Based on the initial results of the artifact analysis from the stratified sub-surface testing program, I devised the following typology to account for the variation in function of the Postclassic structure types recorded in the study area. Residents of cities have certain basic needs. Various economic, administrative and other systems which meet these needs are essential for a city to attract and retain populations. The population must be fed through either local food production, importation or a combination. Urban dwellers need access to some form of fresh water supply at the level of household collection or through a more elaborate system such as aqueducts. The list goes on to include housing for the population, distribution of essential goods, storage of surplus goods, a means of movement between the parts of the city and some form of common

defense against external threat. The methods employed to meet these needs vary from site to site. In some cases the state may become involved actively in implementing infrastructure to help meet these needs. For example, Aztec elites apparently implemented a number of systems to provide fresh water for human consumption and agricultural production including aqueducts, canals, irrigation systems and a large dike separating salty areas of the lakes surround the site from areas of fresher water. As often as not these needs are met through the collective output of more informal household level production (M.E. Smith 2003:69-73). Beyond those core needs, cities often contain means to meet other social needs such as access to religious specialists and entertainment. All of these diverse actions, going on together in the urban environment, require some form of administrative structure. In order to fully understand the organization of a site as complex and apparently haphazard as Mayapán, it is essential to localize these different functions and determine how they are influenced the final form of the city itself. This typology serves as the first step in that process.

As with the form based typology presented above, a final somewhat more refined final typology was devised and will be discussed below.

### *Residential Structures*

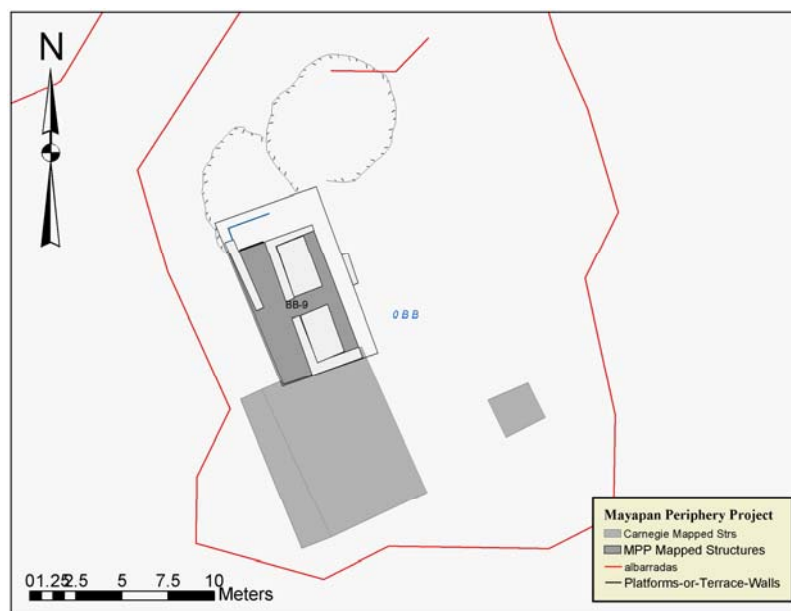
As noted above, all cities needed to house their population. By far the most common type of residential structure recorded was a low, two roomed structure, open to the front and divided lengthwise into a front and back room. Occasionally they contain a small rectangular altar along the rear wall which may or may not also have a small

doorway. Frequently, low cobble bench features are found in the front room placed along the dividing wall. The side, rear and sometimes the dividing walls of the structure were usually of the double wall type described above. The structure itself incorporated a low basal platform (Figures 8.41-8.45). The form is well known from the Carnegie team's work (Smith 1962) as the "Mayapán commoner dwelling". Wealth differences were reflected in the size, elaboration and quality of construction of these structures.

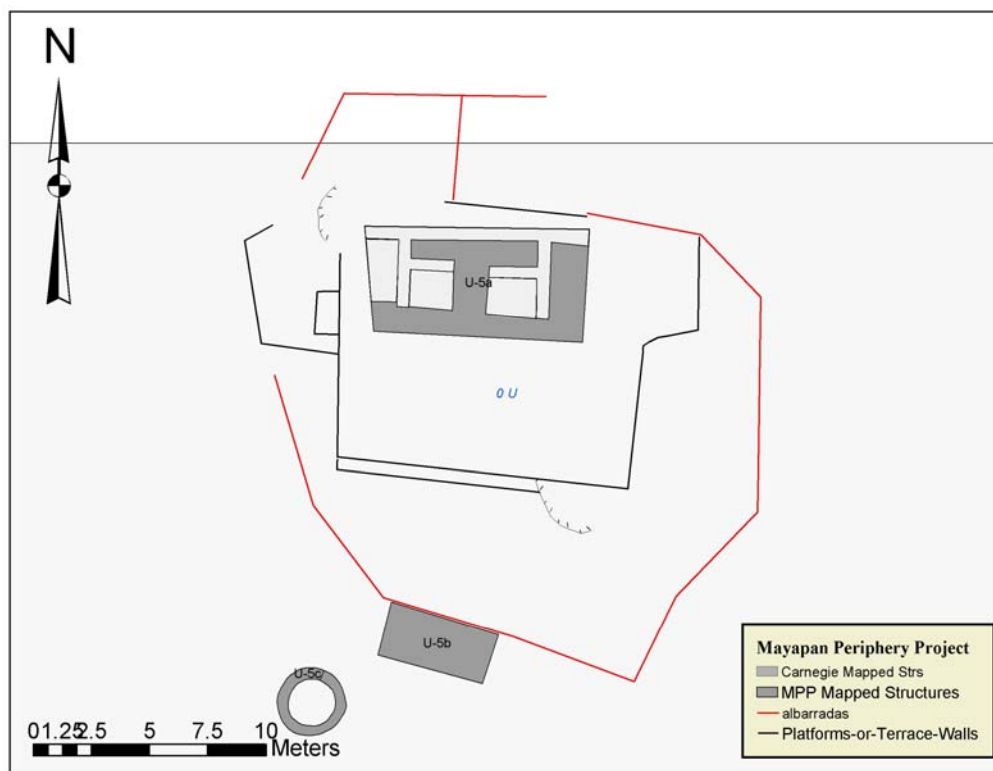
A second type was found to be common in the northeast portion of the study area. These structures were low, single room "C" shaped constructions that were also open to the front. The side walls were flared out rather than parallel as seen more common type. These structures lacked the bench features seen in the typical Mayapán arrangement (Figures 8.46-8.48). The form is far more common in contemporary sites to the east such as Cozumel (Sabloff and Rathje 1975). The clustering of these structures in the northeastern portion of the study area suggests a sort of east coast affiliated barrio. Ethnohistoric documents suggest early immigration to the area from the east, consistent with the early settlement of the area discussed in detail in Chapter 7 and extensive Mayapán contact with sites to the east that continued throughout the site's history (Roys 1962; Milbrath and Peraza 2003)..

Most of the larger platforms tested also had artifact inventories and group arrangements suggestive of the presence of perishable structures serving as dwellings. Platforms comparable to those seen below typical Mayapán commoner dwellings were therefore assigned to the residential structure category.





**Figure 8.41 – Typical Mayapán style dwelling BB-9. It exhibits key features such as a rectangular basal platform, double walls along the rear of each room and two benches in the front space. Note that the light grey rectangle just south of the structure represents the location for this structure given by the Carnegie investigators.**



**Figure 8.42 – Typical Mayapán style dwelling U-5a and surrounding group.**



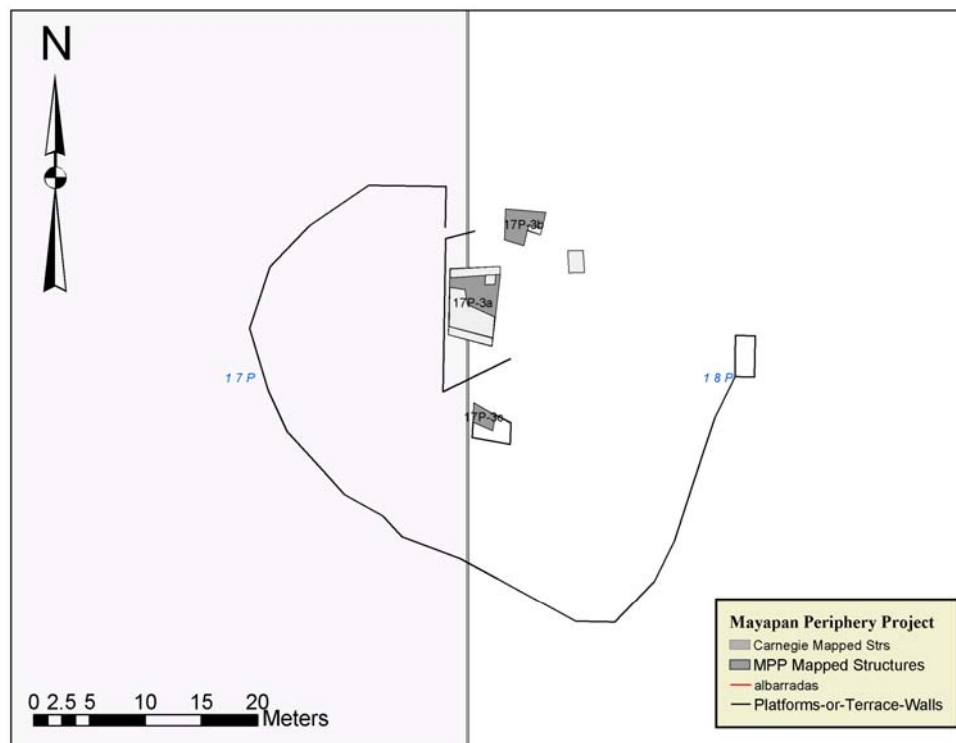
**Figure 8.43 – Three bench Mayapan style dwelling, D-50.**



**Figure 8.44 – Two room Mayapan style dwelling, 18N-18.**



**Figure 8.45 – Two room Mayapan style dwelling, FF-3.**



**Figure 8.46 – Map of east coast style, “C” shaped dwelling 17P-3a.**

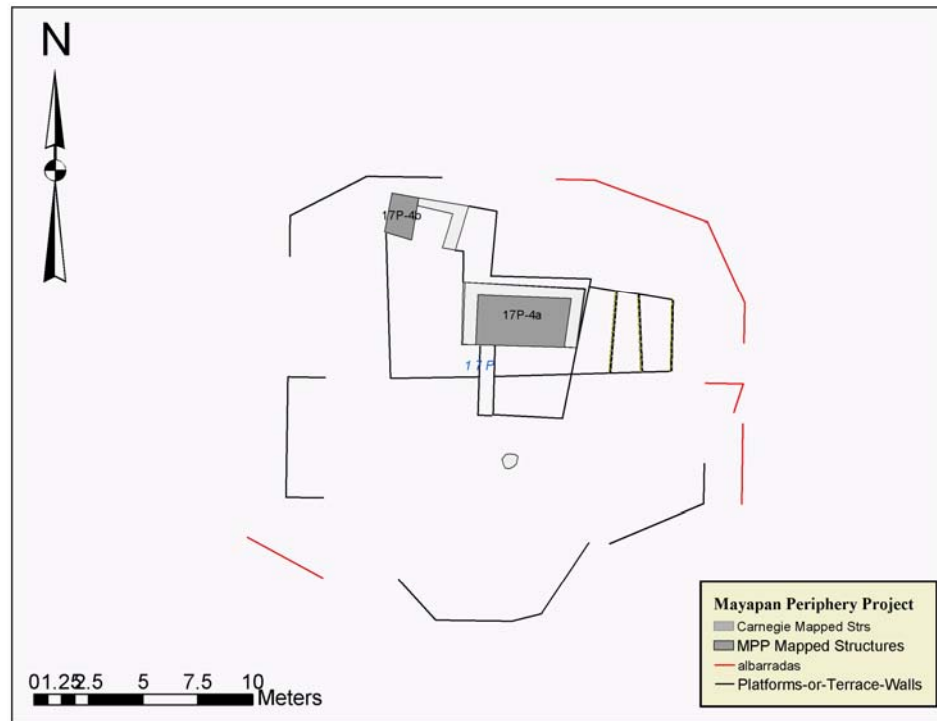
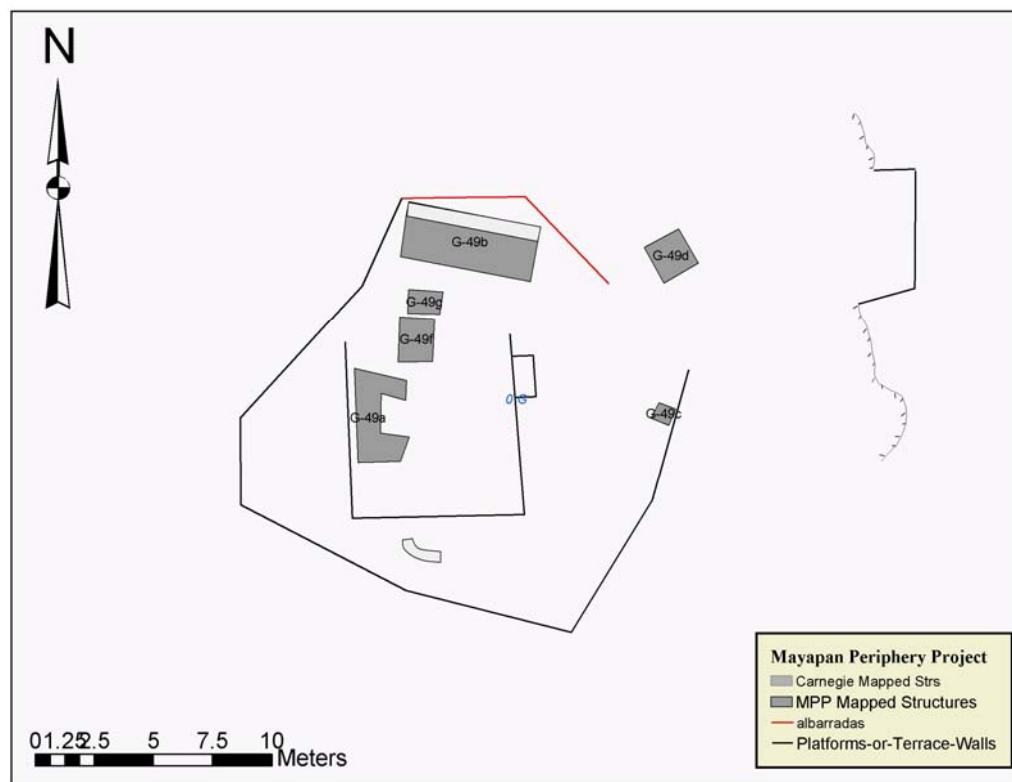


Figure 8.47 – Map of east coast style, "C" shaped dwelling 17P-4a.





**Figure 8.48 – Map of east coast style, “C” shaped dwelling G-49a.**

### *Storage Structures*

The data collected suggest storage functions for several of the form types listed above. In clusters composed of residential architecture, most of the identified storage features were round structures, low cobble platforms and simple round wall lines between 1m and 3m in diameter. These two types were generally spatially segregated from each other. The round platform type was common in the eastern portions of the site and the round wall line form far more common in areas to the south. Storage features were largely missing from the large residential zone in the southeast portion of the study area. The specific compositions of the residential clusters will be discussed in more detail below.

Larger round storage structures were common in areas with associated agricultural functions, primarily in the east of the main settlement at distances of 500m or more from the city wall. These features were located in low lying areas between the limestone *atillos* that dot the area’s landscape, in places with the deepest accumulated soils. They are typically isolated from other structures in isolated clusters of one structure near the middle of such clearings. They were usually separated from each other by hundreds of meters. On occasion, they are associated with medium-sized rectangular platforms believed to have held perishable field outbuildings similar to modern examples from the area known as *paseles*. Today these structures serve as a place to get out of the sun while working the fields, a place to eat, and to stay overnight if needed. They are



light use constructions built on rectangular platforms of perishable materials. In some cases, sheet metal or other materials are used as the roofing material. In the Postclassic, palm thatch would have been the most likely material. Since the men carry little beyond what they need to eat drink and the tools they will be using, little refuse is discarded there.. They typically contain a hammock for resting and sleeping and, occasionally, a few tools.

We also recorded small clusters of 2 to 4 small- to medium-sized rectangular cobble platforms, measuring 1 to 2m in size. Like the round platforms discussed above, these structures were also found in locations between *altillos* in soil rich areas particularly to the east of the main settlement. They were lacking in all other areas surveyed.

### *Auxiliary Structures*

Structures classed as auxiliary structures are common in residential clusters. They are small-to-medium sized rectangular platforms measuring between 1 and 4 meters per side. The specific functions of these structures are somewhat unclear and probably mixed. Modern house clusters also contain associated structures of similar form that serve a mix of functions including kitchen spaces, workshop space and storage. These structures were smaller than the basal platforms seen in the associated dwellings. They usually lacked intact wall lines, suggesting perishable materials were used in most constructions that would have occupied the platforms.

### *Agricultural Structures*

Agricultural structures are referred to above as field outbuildings. They are medium-sized cobble platforms similar in form to the auxiliary buildings described above. Unlike those structures, they are found at a distance from residential architecture and are commonly associated with storage features. They are usually located on *altillos* next to the low lying areas where the storage features are found. This would take advantage of the breeze and would avoid areas with deeper soils. The same areas are favored for *paseles* today. They are constructed on *altillos* adjacent to lower lying milpas.

### *Public Ritual Structures*

The round and square pyramids described above and the associated altars and shrine structures are classed as public ritual structures. Based on their size and locations, they appear have served the ritual needs of a larger community or barrio of the site. The form of these constructions and their associated artifacts clearly indicate a ritual function.

The H-48 group's small rectangular pyramid is located directly across its large group platform from a one room structure built on a low basal platform of its own. It is walled on all four sides and the front has a doorway opening composed of large cut blocks set vertically and measuring a height of about 1m. The ceramics recovered from test pits at the group were almost exclusively Postclassic censer sherds. The construction served the settlement zone along the east side of the Mayapán periphery. Landa's accounts of New Year's celebrations discuss the movement of processions from ritual

locations in the site centers of early colonial Maya sites in the region to sites located outside of the main site in each of the four directions. The nearby Itzmal Ch'en group was clearly the ritual focus for east and northeast of the site. Perhaps this smaller construction was the eastern point reached by the New Year's celebrants in the time of the site's occupation (more on this below).

The larger 14P-8 group, consisting of the large round pyramid and its associated altar and group platform, appears to have served the ritual needs of the earlier outlier site of Telchaquillo in the northwest portion of the study area. Its round shape is common for the earlier period in the area and its orientation is near perfectly centered on the cenote that, judging on the associated constructions from the time period, would have been the heart of ancient Telchaquillo and remains the center of the modern town today. Unfortunately, test pits adjacent to these structures failed to turn up very many artifacts. Additional excavation would be needed to confirm the hypothesis and dating. It is likely that, while constructed earlier, it remained in use into the Postclassic since it lies just 100m or so north of a recorded Mayapán settlement zone outside of gate "D", the centrally located north gate in the wall. It is certain that the local inhabitants would have been aware of this large structure, the top of which affords a direct line of sight to the Central Q-162 Castillo pyramid in the main plaza nearly 2km away.

### *Group Ritual Structures*

Group ritual structures were constructions with forms, location associated architectures and artifact assemblages that suggested they served the ritual needs of a

specific lineage or extended family. Essentially, these structures were for the practice of household ritual. It is known from the ethnohistoric documents that household ritual was common at the site. The effigy censer cult started and practiced at Mayapán was emphasized along with the group ritual discussed above, but a host of other offerings and rituals were intended to please a variety of deities having occupational, fertility, healing and other associations. Different deities served as the patron gods and goddesses for different occupations that were commonly associated with household level craft production, commerce, hunting and other productive activities that met the economic needs of individuals and the community alike. In addition, the practice of ancestor veneration was widely observed across Mesoamerica. Many of the dwellings excavated by the Carnegie project contained sub floor or sub bench tombs with the burials of family members. Therefore, it is not unexpected to find such features spread across the landscape, especially associated with residential zones.

The survey recorded a number of small square cobble constructions on *altillos* mixed among the residences, particularly in the southeast portion of the site. They were not enclosed by stone *albarrada* walls themselves, but the surrounding residential clusters were. Their placement among the various clusters was suggestive that they were available to several adjacent and probably related families. Often, they had a single double wall along the rear of the platform in other cases there were smaller cobble altars along the rear of the platform, clearly suggesting ritual functions and somewhat reminiscent of the Virgin of Guadalupe shrines that dot the modern Yucatan in people's yards, businesses, etc. They are designated spots just large enough to hold an idol or idols and their offerings.

The family shrine and possible oratory in the 18O-1 colonnaded hall group are another architectural expression of group level ritual, in this case likely family shrines for the exclusive use of the lineage controlling the colonnade group. The close association of the hall and the shrine suggest very closely held control of ritual activities in the structure. A large tree that had taken root in the floor of the shrine had fallen with a recent hurricane and pulled up with it numerous effigy censer sherds, one of which had identifiable facial features of Itzamna. That would suggest activity in the structure was not limited to ancestor veneration, if that was a focus of activity there at all. There was a small shrine located inside of the colonnaded hall itself which had a concentration of Postclassic period impressed olla censer sherds in its surface, suggesting that the colonnade itself had some ritual functions. A small rectangular altar along the south edge of the group platform probably served as a statuary altar of the type identified by Proskouriakoff (1962) and associated with the numerous colonnaded hall clusters in the main plaza.

#### *Lime Production Features*

A cluster of six lime production features were located west of the main settlement along Transect 2. They were all large round stone alignments measuring 5 to 7m in diameter. These round structures were found off altillos and were spaced relatively evenly at distances of 100 to 200m apart. Given the similarity in form, I suspect that all of these features are roughly contemporaneous. The even spacing of the features may reflect the distribution of appropriate fuel wood. In that scenario, each feature would



have been used only once or twice before the immediately surrounding wood supply was exhausted, at this point, a new feature could be quickly constructed a short distance away where there was a fresh supply of fuel material. These features were all located more than 5m from the city wall, in an area devoid of other settlement. A seventh, less clearly identified example was found about 200m from the city wall along the same transect.

The first indication of the function of these features came from Fernando Mena, one of my workers and one of the most knowledgeable individuals I have met in the area. He immediately suggested that these were the remains of lime burning. Test pits placed in the center of two of the features confirmed the hypothesis, producing dense deposits of ash, carbonized wood and burnt, fist-sized limestone cobbles consistent with the production process. The segregation of these features from other structures is particularly interesting but not unexpected. The production of lime produces great quantities of smoke, making placement of these features in the midst of other settlement very impractical. Their placement to the west of the main settlement is logical for at least two reasons. First, the prevailing wind patterns place these features downwind of the site, therefore carrying the smoke away from the settled portions of the site. Second, local informants who were consulted on traditional lime making in the area indicated that the best quality limestone for making *cal*, the local name for lime, is found in this area.

### *Commercial Structures*

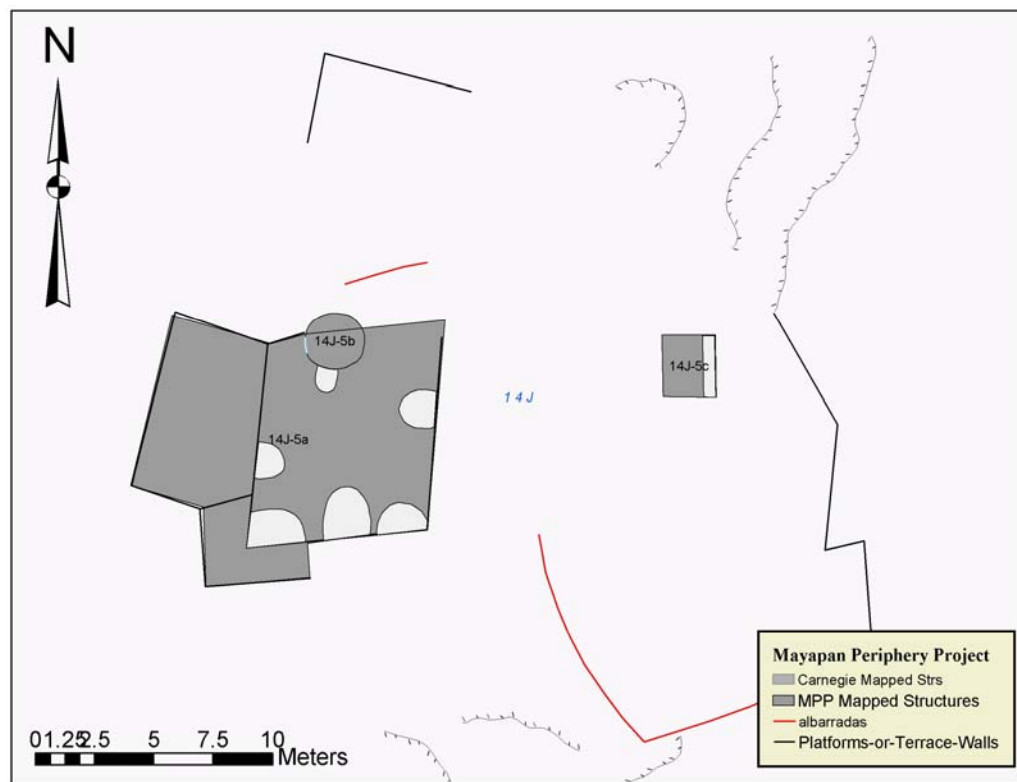
Near the center of the site, two market areas have been identified by the PEMY project. These two areas were large and open. They could have served as a place for

merchants to come and vend their goods from temporary, makeshift stalls that they were able to set up. I identified a much smaller market at the center of the outlier settlement of D'zan Tun Ch'en. This small market seems to have served the immediate need of those living in the small settlement.

Unlike the large open spaces utilized for markets in Mayapán itself, the market at D'zan Tun Ch'en was a permanent structure (14J-5) with individual benches placed along the walls to serve as market stalls (Figure 8.49). This large structure was located on an unusually large and level *altillo*. It was open to the public, not enclosed by stone walls as seen for contemporary residential clusters, which were notably restricted in their access. The structure itself contained three rooms. Each was constructed of a low cobble platform and divided by low stone wall lines. The main room was accessed by a doorway along its east side and contained 6 semi-circular benches measuring about 1m at their widest point. These benches were found attached to all the four walls. The north wall of the room contained an entrance to an attached round structure, (14J-5b) (could be considered a fourth room but was assigned a different number as it seemed to have a related by different function than the main structure) that seems to have served as a storage space. The bench attached to this wall abutted the round structure and was smaller than the others. Its smaller size and placement suggest that it may have served as something other than a market stall, perhaps as a small altar. Attached to the main room, there were two other roughly rectangular rooms. Both of these lacked the bench features seen in the main portion of the structure. A single large metate was located just to the north of the structure. Subsurface tests of the structure indicate that it may have been used as early as the Terminal Classic and into the Postclassic period. That would be

consistent with the known settlement history for this portion of the study area as reviewed in chapter 7.

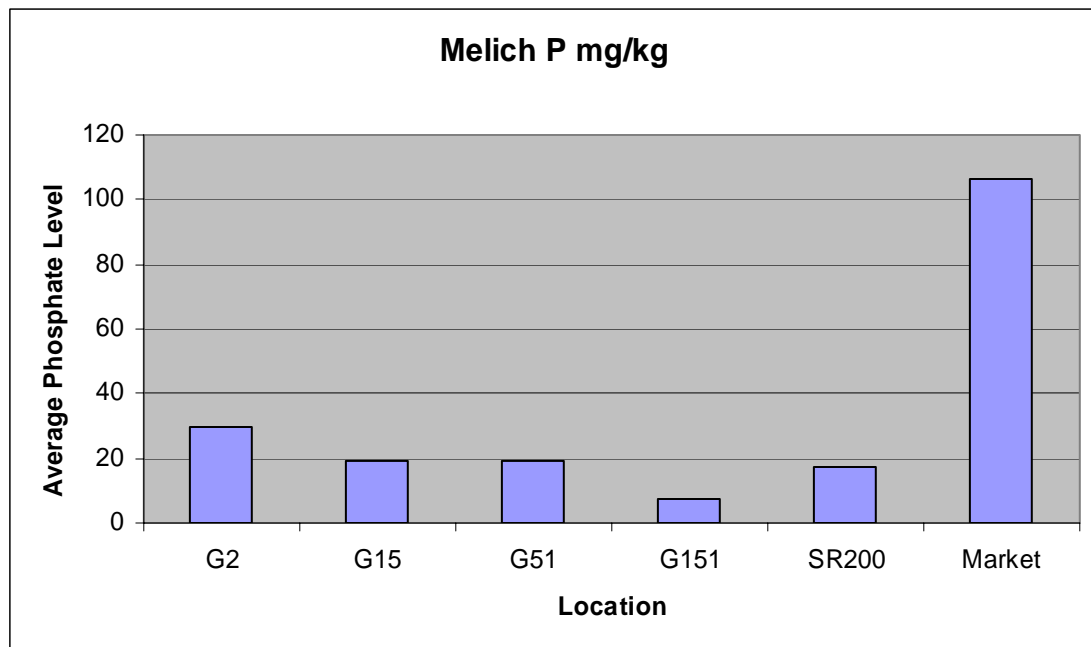
Support for the hypothesis that this structure represents a marketplace comes from soil phosphate testing that was conducted in a 1 m grid across the structure. Results showed that this group had four to five times the average level of soil phosphate than the remaining 5 groups tested, in spots the readings were extremely high, with counts over 400 mg/kg compared to the average of 18.45 for other non-market contexts (Figure 8.50; Table 8.2).



**Figure 8.49 – D'zan Tun Ch'en market structure, 14J-5.**

**Table 8.2 – Mean recorded soil phosphate concentrations for 6 groups tested showing cluster function and non-market average for comparison to levels from 14J-5 market structure.**

| Carnegie # | Function | Survey # | Phosphate mg/kg |                    |
|------------|----------|----------|-----------------|--------------------|
| H-45       | Res      | G2       | 29.81988        | Average            |
| 18N-8      | Res      | G15      | 19.14084        | Average            |
| H-40       | Res      | G51      | 18.88039        | Average            |
| BB-33      | Pen      | G151     | 7.247402        | Average            |
| 14P-2      | Pen      | SR200    | 17.13929        | Average            |
| 14J-5      | Market   | Market   | 106.2902        | Average            |
|            |          |          | 18.44556        | Non-market average |



**Figure 8.50 – Chart showing mean concentration of soil phosphates from six contexts tested. Note very high concentration of phosphates associated with the 14J-6 market.**

In the Mayapán settlement, we found that many of the secondary elite residences were located immediately adjacent to the identified markets. A similar pattern was documented for this outlier site. Located on the altillo immediately to the north of this structure, there is an unusually large residential structure. It is surrounded by 6 cobble

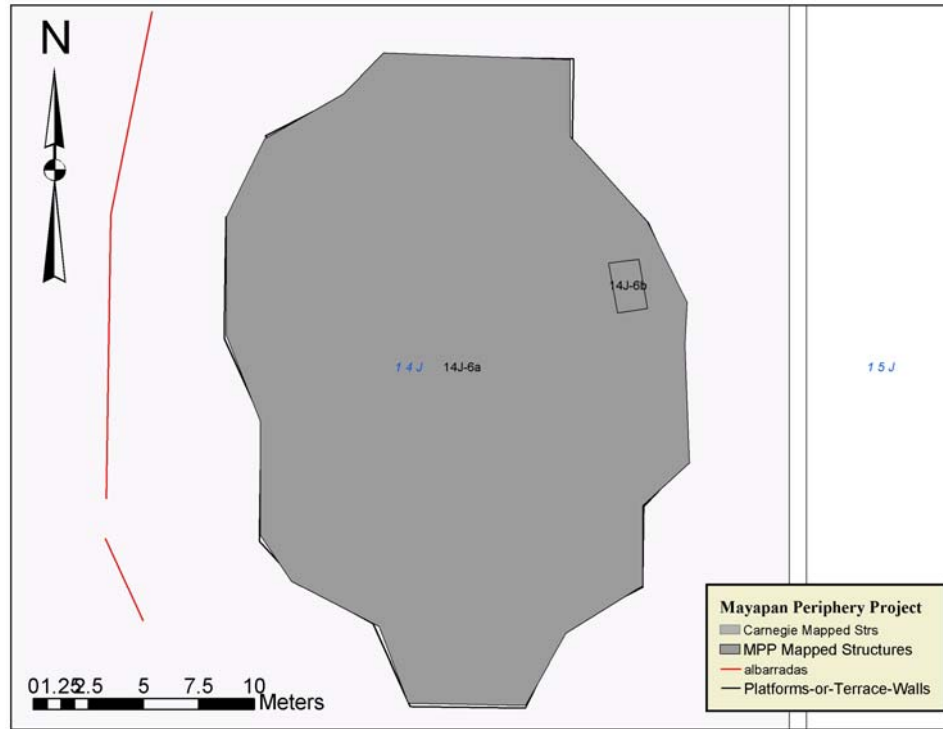
platforms lacking wall lines that probably served as storage areas for goods being sold at the nearby market. The large number of associated platforms documented around the main structure was unique in the area surveyed. The entire group was partially enclosed by two semi-circular stone *albarrada* walls. These two segments did not link up to form a full enclosure as is customary for residential clusters in the area. Therefore, the group gives the impression of being semi-private/semi-public. I believe that the main structure was home to an affluent commoner who controlled activities at the market or, possibly, served as a temporary dwelling occupied by traders coming in from other areas to sell their goods. In either case, the associated cluster of platforms likely served as storage for the goods being distributed at the market.

#### *Public Performance Structures*

A second unusual construction was documented in the D'zan Tun Ch'en outlier immediately to the east of the market addressed immediately above. Like the market, it was open to the public, lacking an enclosing *albarrada*. This structure (14J-6) was a large, flat *altillo* which had been substantially expanded and flattened to create a roughly round platform or public space capable of holding a substantial crowd (Figure 8.51). It had two notable features suggestive of public performance. Along the east side of the platform, there was a small cobble platform that was nearly 1m tall. Its position suggests that it may have served as a small elevated stage. A second "stage" was constructed along the south end of the platform. It was a roughly trapezoidal space open to the platform along its longest side and defined by side and rear walls of large uncut slabs set



vertically into the ground in the usual Terminal classic style. It was not elevated like the east side platform mentioned above, but is clearly defined and its dimensions were notably larger, suggesting a group performance space. The overall impression is that of a multi-function public space with defined areas for performance, the elevated stage serving for individual performance and the larger slab wall enclosed area serving for group performance. The remainder of the platform would have served to hold the audience to the performances in question. This space may have also functioned as a Terminal Classic market area at least at times. Construction of the 14J-5 market cluster may have led this function to shift location in the Postclassic. This structure was not test pitted. However, a large surface sample of ceramics and lithics suggested that use of this structure was primarily restricted to the Terminal Classic period. Despite that, its location in the settlement and its obvious utility would make its total abandonment in the Postclassic seem unlikely. The surface collected materials may be indicative of the fill used to level the area rather than debris associated with its use. Additional excavation and soil phosphate testing at this structure would help to clarify the picture of this group's dating and use.



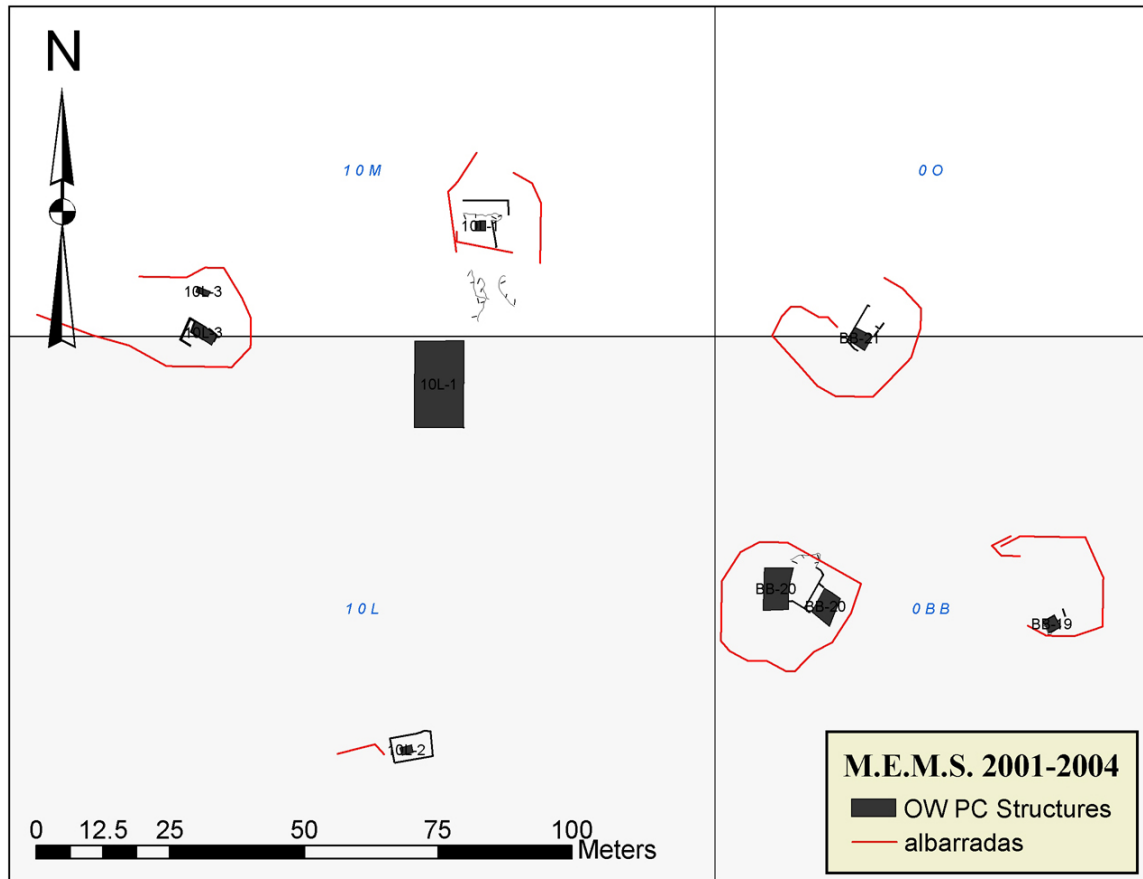
**Figure 8.51 – D'zan Tun Ch'en public performance platform.**

### *Administrative Structures*

Two likely administrative structures were recorded in the MPP survey. The first is the colonnaded hall in group 18O-1. This structure is identical in form to the colonnaded halls clustered in the main plaza of the site. Proskouriakoff (1962) originally suggested that these structures were either men's houses where young males would gather, receive an education, make weapons, etc. or administrative structures linked to the various lineages that came to reside in Mayapán as the polity expanded and incorporated new areas under their control. The latter interpretation is now preferred. The distribution of these structures at Mayapán is extremely restricted. Of the 26 previously recorded

colonnades at Mayapán, 22 are located in the ceremonial center in quadrant “Q”, three at the Itzmal Chen temple-cenote group, and one in quadrant “J” (Figures 8.4 and 8.5). This is the first example of this structure type found outside of the walls. The location of this cluster, just outside this major gate, is very interesting. It is stated in Smith’s (1962:79) discussion of the ethnohistoric sources about Mayapán that three of the four major directional gates were controlled by different lineages at the site. Specifically, he indicates that the east gate of the city was controlled by the “Couoh”. If indeed colonnaded halls are lineage-based administrative structures, this may be the location from which access to the city’s east gate was controlled. Additional survey around the remaining gates may yet reveal three more such structures controlling the other main directional gates.

The second structure with likely administrative functions is the range structure in group 10L-1. This interpretation is supported by three lines of evidence. First, the form of the structure is analogous to the range structures found in the Itzmal Ch’en group. These ranges structures served as the base for elevated colonnaded hall structures. Unfortunately, this range structure lacks intact superstructure features or the column drum stones that would be expected for such an interpretation. Second, the size of the structure suggests that it was constructed using more labor than would be provided by a single family. It is large enough that its construction probably drew on the surrounding population. Third, this structure sits at the center of a ring of several residential structure clusters (Figure 8.52). All of these factors suggest that this range structure may have been a local administrative point for the surrounding settlement zone, possible as the locus of political control for a barrio.



**Figure 8.52 - Map showing the distribution of residential groups around the 10L-1 range structure (large rectangle near center of image).**

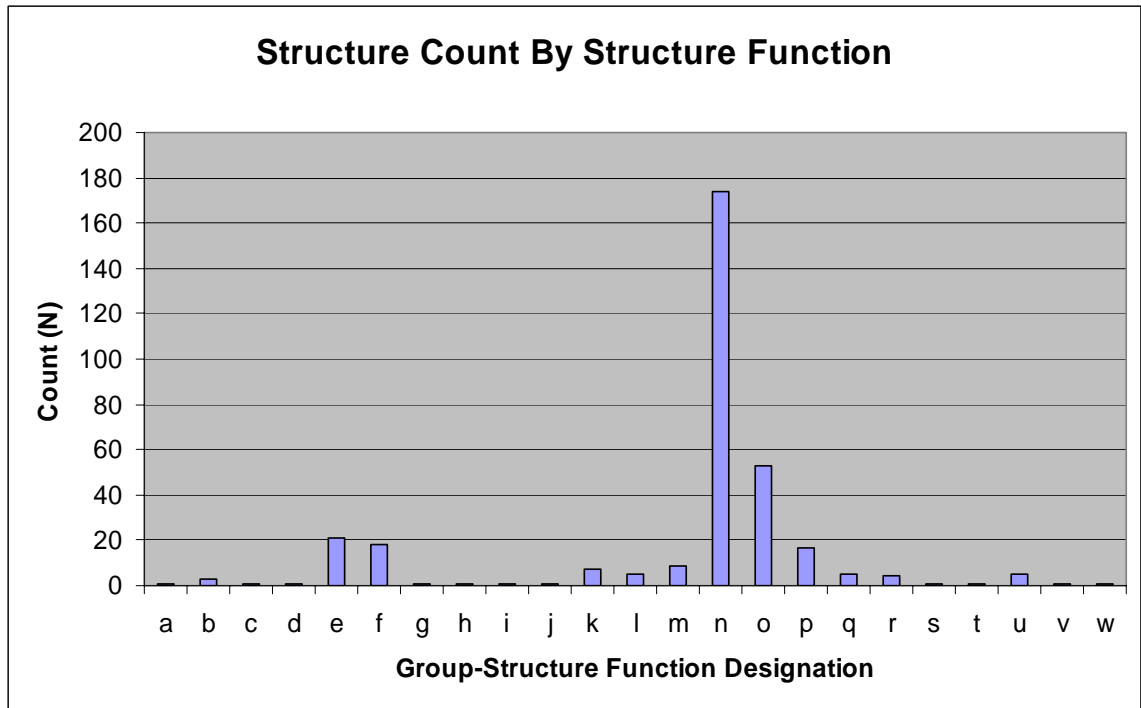
## **Final Function Based Typology**

As with the form based structure typology, a final somewhat more refined final function based typology was devised as detailed analysis of the data proceeded. The preliminary typology discussed above accounts only for the function of the individual structure, for example, storage. However, it does not account for the context in which that action takes place. Agricultural storage taking place in or near the field and storage of grain for household use while similar are in fact distance functions. Commercial apiaries may have a similar form to those found for small scale household production. But, their archaeological patterning is almost certain to vary. As such I felt it wise to expand the typology already presented by adding a more detailed classification that accounts for both the function of the structure and the function of structure cluster to which they belong. By splitting the structure function categories to account for context of the individual structures, I believe this final breakdown more accurately reflects the variability discussed within the groupings listed above, in particular, these categories more accurately reflect breaks in the size distribution of certain feature groups such as platforms. This typology was informed in great deal by the classification of group function summarized in Table 8.3. Individual counts and frequencies of these structure types are shown in Figure 8.53.



**Table 8.3 - Final function based typology of Postclassic structures mapped outside wall with size range, mean size, median size, counts (N) and frequencies.**

| Group Function         | Structure Function                       | Function Designation | Smallest | Largest | Mean   | Median | Standard Deviation | (N)        | (%)             |
|------------------------|--|----------------------|----------|---------|--------|--------|--------------------|------------|-----------------|
| Administrative         | Administration (Collonaded Hall)         | a                    | 113.57   | 113.57  | 113.57 | 113.57 | N/A                | 1          | 0.30%           |
| Administrative         | Group Ritual                             | b                    | 4.54     | 33.97   | 19.77  | 20.81  | 14.74              | 3          | 0.90%           |
| Administrative         | Residential (Servant?)                   | c                    | 3.54     | 3.54    | 3.54   | 3.54   | N/A                | 1          | 0.30%           |
| Administrative         | Residential or Public? (Range Structure) | d                    | 149.58   | 149.58  | 149.58 | 149.58 | N/A                | 1          | 0.30%           |
| Agricultural           | Agricultural (Outbuilding)               | e                    | 1.24     | 14.96   | 5.36   | 3.87   | 3.82               | 21         | 6.33%           |
| Agricultural           | Storage (Granary)                        | f                    | 2.09     | 53.27   | 12.5   | 7.57   | 13.33              | 18         | 5.42%           |
| Commercial             | Auxiliary                                | g                    | 5.91     | 5.91    | 5.91   | 5.91   | N/A                | 1          | 0.30%           |
| Commercial             | Commercial (Marketplace)                 | h                    | 110.5    | 110.5   | 110.05 | 110.05 | N/A                | 1          | 0.30%           |
| Commercial             | Auxiliary (Likely Storage Related)       | i                    | 4.85     | 4.85    | 4.85   | 4.85   | N/A                | 1          | 0.30%           |
| Group Ritual           | Group Ritual (Altar/Shrine)              | j                    | 2.48     | 2.48    | 2.48   | 2.48   | N/A                | 1          | 0.30%           |
| Lime Production        | Lime Production (Firing Site)            | k                    | 4.04     | 43.49   | 29.48  | 32.36  | 12.75              | 7          | 2.11%           |
| Public Ritual          | Temple/Shrine                            | l                    | 3.37     | 75.84   | 22.67  | 14.49  | 30.25              | 5          | 1.51%           |
| Residential            | Group Platform                           | m                    | 11.63    | 368.44  | 171.74 | 261.63 | 116.19             | 9          | 2.71%           |
| Residential            | Residence                                | n                    | 0.84     | 93.19   | 20.85  | 15.55  | 16.9               | 174        | 52.41%          |
| Residential            | Auxiliary (Kitchens, Turkey Pens)        | o                    | 0.58     | 21.16   | 4.69   | 3.37   | 4.25               | 53         | 15.96%          |
| Residential            | Storage                                  | p                    | 1.43     | 15.37   | 4.91   | 3.84   | 3.66               | 17         | 5.12%           |
| Residential            | Group Ritual (Altar/Shrine)              | q                    | 0.74     | 7.34    | 3.7    | 4.11   | 2.56               | 5          | 1.51%           |
| Residential            | Apiaries                                 | r                    | 0.42     | 3.22    | 1.27   | 0.72   | 1.32               | 4          | 1.20%           |
| Residential            | Pen                                      | s                    | 109.27   | 109.27  | 109.27 | 109.27 | N/A                | 1          | 0.30%           |
| Residential            | Sweat Bath?                              | t                    | 9.57     | 9.57    | 9.57   | 9.57   | N/A                | 1          | 0.30%           |
| Residential/Commercial | Auxiliary (Likely Storage Related)       | u                    | 4.65     | 7.14    | 5.85   | 6.51   | 0.98               | 5          | 1.51%           |
| Residential/Commercial | Residence                                | v                    | 54.85    | 54.85   | 54.85  | 54.85  | N/A                | 1          | 0.30%           |
| Residential/Commercial | Storage                                  | w                    | 8.86     | 8.86    | 8.86   | 8.86   | N/A                | 1          | 0.30%           |
| <b>Totals</b>          |  |                      |          |         |        |        |                    | <b>332</b> | <b>100.00 %</b> |



**Figure 8.53 – Chart showing counts for each of the structure function classes listed in Table 8.3.**

## Functional Typology of Postclassic Structure Clusters

Now that we have examined the function of individual structures, it is time to examine the function on the next largest scale, the structure group. The function of these clusters was determined by the function of the various structures comprising them. There is a great deal of commonality between the form and composition of these different group types.

### *Composition and Form of Commoner Residential Clusters*

The residential group is the most common group type recorded. These clusters are usually located on top of *altillos*, taking advantage of the increased breeze that is blocked by vegetation in locations off the *altillos*. These *altillos* are usually very thinly soiled if there is soil on them at all. Many are almost entirely exposed limestone. This factor offered two notable advantages. First, it reserved off-*altillo* locations and their deeper soils for agricultural uses. Second, it provided a ready supply of construction materials including limestone cobbles and *sascab*. During the rainy season, these *altillos* provide excellent drainage. The lower areas between them are subject to periodic seasonal flooding when there are heavy rains, a definite disadvantage for permanent habitation. Residential clusters are almost always enclosed with round dry-laid *albarrada* walls with one or more entrances or they are located on top of elevated group platforms. The expansions and leveling of *altillos* used to make these platforms could be quite extensive and greatly expand the useable surface space. Generally, clusters with

substantial platform modification did not have albarrada walls to restrict access and define space as the same function was provided by the platform retaining walls. Occasionally, we found clusters that employed a combination of group platforms and *albarrada* walls. In cases where only part of the natural feature was leveled, albarrada walls were usually built along the unmodified edges.

Residential clusters were usually composed of several structures. All such clusters contained one or more dwellings, usually two-roomed Mayapán commoner dwellings. The presence of multiple dwellings suggests that each of these clusters was home to an extended family group. The same is common in the modern villages in the region (see ethnographic comparisons below for more details). When there are multiple structures present, they are typically oriented toward the center of the *altillo*, forming a somewhat haphazard patio group. The dwellings were frequently augmented by a mix of storage and auxiliary structures. As noted above, the functions of the auxiliary structures were likely mixed, providing kitchen, workshop and other functions to the group. Throughout the study area, auxiliary structures were found located within an enclosing group wall or on top a group platform. Storage structures were found both inside the enclosed clusters and just outside of the enclosures. The latter pattern was far more common in the southern portions of the study area, in and around the D'zan Tun Ch'en outlier site. This configuration may reflect ethnic or temporal differences as this area was settled early in the site's history.

Several other features were often found associated with residential clusters, either within them or immediately adjacent to them. Among these were *chultuns*, which were used for storage and water retention. These features were excavated out of the bedrock

and were narrow at the entrance, widening as they deepened. As noted above, *sascaberas* were common features in the settlement zone. They are usually found within the group enclosure, suggesting that access was restricted to the family occupying the group. These features served as quarries for the raw material used in the construction of the group and may have served secondary functions as garden or orchard spaces. Several clusters contained small boxes comprised of vertical stone slabs set into the ground. Each excavated example was found to be empty. But, their placement and form suggested that these may have once held dedicatory caches, common features associated with dwellings throughout the Maya area. It is not clear whether these possible caches were emptied of their contents at the time of group abandonment or subsequently looted.

*Mena Compound, Telchaquillo, Yucatán*

Fernando Mena (Figure 8.54) was an amazing source of information to me as we worked and socialized together over the years (Figure 8.55). When he was a child of about twelve he worked with the original Carnegie team and has worked with many subsequent archaeological projects in the intervening years. He, like most men in the village, is a milpa farmer year round.



**Figure 8.54 – Fernando Mena (third from right) and Fernando Flores (second from right) in 2003 on the occasion of the Mena family *primicia* or *wajil kol*, a ritual and feast held just after the harvest of the first corn of the year and meant among other things to ensure agricultural abundance and the well being of the family livestock. The event was held at the family’s cattle ranch and one of the true highlights of my fieldwork.**

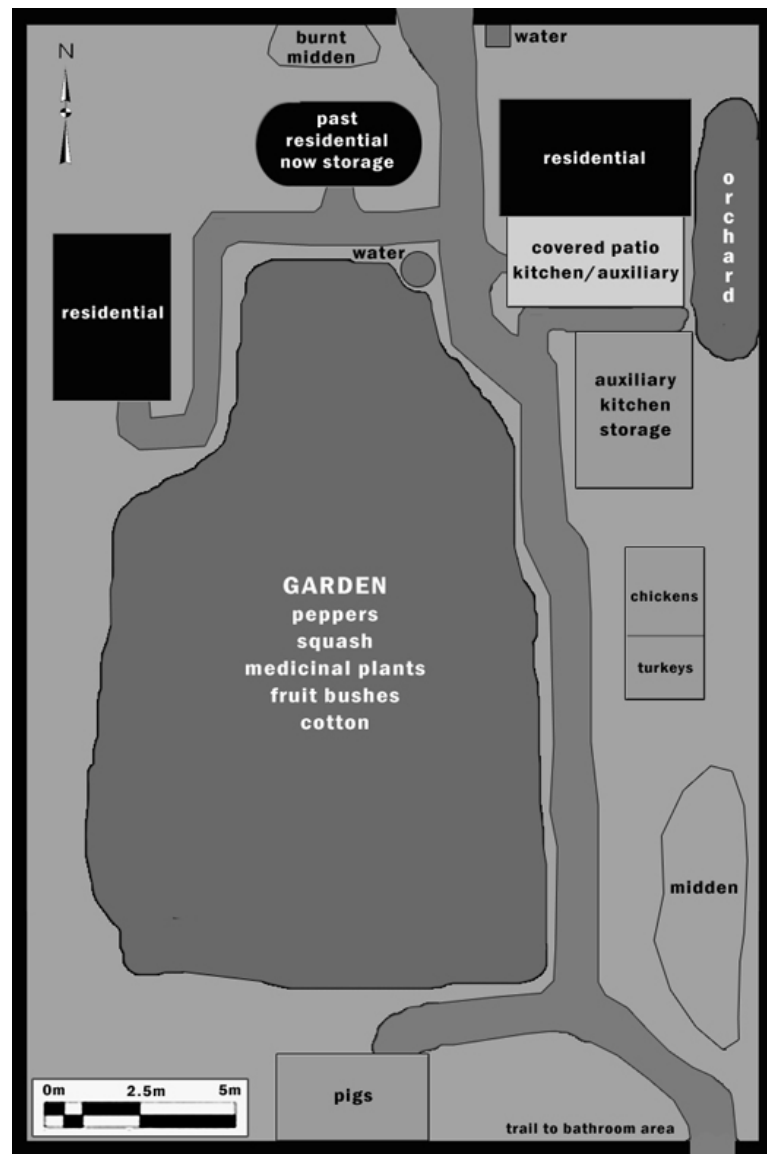
Fernando also has a cattle ranch about 1.5km from his home. As is typical for ranch land, it is located to take advantage of a water bearing cenote. He recently installed a manual pump to draw water up for his cattle. In the past it was hauled up by bucket. He and his wife, heads of an extended family three generations deep, have lived in the same location since they were married. Over the years, their family grew and the form and functions of various structures on their property changed. The current layout shows many similarities to the forms and arrangement of structures that we documented in Mayapán’s residential clusters and is instructive in how these groups grown and change over time..



Their residential compound fulfills a wide range of functions (Figure 8.56). It serves as the primary residence for Fernando, his wife, their son, his wife and their children. The family also has two daughters that are married with children and live nearby in the village. They visit nearly daily to share meals, childcare duties, etc. So, at any one time, there are as many as ten people moving around the compound, doing different things. Common activities include preparing food, cleaning, washing clothes, playing, weaving, gardening, feeding livestock, bathing and, of course, resting/sleeping. There are a total of five structures on the property. As we documented about the residential clusters at Mayapán, the structures face an open interior space, forming a patio group. There is a well that used to provide water between these two structures. It has been replaced as the main water source by the local municipal water supply which arrives at a faucet near the front entrance to the compound enclosure. The oldest structure in the group is a traditional Yucatán style apsidal structure, straight walled in the front and rear with rounded walls at the ends. It has entrances in both the front and rear. It has limestone and mortar walls and a tall, peaked roof. This limestone cobble and mortar construction style is known locally as *mamposteria*. The roofs are typically thatch covered. In recent years, other materials such as sheet metal have become popular as well. This structure was built decades ago when the couple was first married and served as their dwelling at the time. Its function has changed over time and it is now used as storage for tools, animal feed and other things.



**Figure 8.55 – Sitting in the covered patio/kitchen enjoying one of my many visits with Fernando Mena, his wife, daughter and several grandchildren. Photo by Marilyn Masson.**



**Figure 8.56 – Mena family residential compound.**

Two of the structures in the group are in current residential use. One is occupied by Fernando and his wife and the other by their son, Raul, and Raul's family. Fernando's house is located in the front of the compound near the group's entrance, on the side fronting onto the street. Raul's house is built further in from the road at a location that takes advantage of an *altillo* along the west edge of the property. Both of these structures are rectangular constructions of cinder block and mortar. The main dwelling has a

covered patio space immediately in front of it that is the real hub of group activity (Figures 8.55 and 8.57). This space contains a hearth, seating, two small tables used for food preparation and eating, a basin for washing dishes and clothing, a loom set-up used in weaving hammocks and storage space for a variety of items, particularly items used on a daily basis. The position of these items in the room shifted regularly as dictated by the activity at hand. The one constant feature was the hearth in the southeast corner of the covered patio.



**Figure 8.57 – Sitting in the covered kitchen area in front of the well (now replaced by municipal water supply) and the old apsidal house that Mena and his wife built early in their years together which is now used as storage. Photo by Marilyn Masson.**

Just south of the main dwelling are two structures that I would classify as auxiliary structures. Both are low cobble platforms with perishable superstructures. The structure immediately adjacent to the covered patio discussed above has pole walls on all

sides and a doorway that faces the covered patio. It serves as the main kitchen and a storage space. There is another hearth and a small table used for food preparation inside the structure, and the majority of pots, pans and cooking utensils are stored in this space. South of the main kitchen is another low cobble platform that serves as a coop for chickens and turkeys. It has poles at the corners that support a perishable roof and walls of wire fencing that contain the birds. The final structure is built the farthest from the others along the rear compound wall. This is a cinderblock construction which serves as a pig pen. It is partitioned into two stalls each large enough for two pigs at any given time. The number held varies. Some of the residential clusters recorded did contain albarrada wall enclosures along their group wall that could have, similarly, served as pens.

In addition to features such as the albarrada wall, the well and the structures that are likely to leave an obvious archaeological feature, there are several other activity areas which may not be as obvious to a future surface survey. There were several refuse discard areas in use; all of them are located right up against the enclosure wall. A small area marked off by fist sized stones beside the main entrance in the enclosure is used to burn trash. Two additional areas along the wall at the southeast corner of the enclosure are used as midden space. Most of the organic waste is fed to the pigs. Bathroom space is provided by an open field area 20m or so outside of the enclosure wall's southeast corner. The pathways through the group are well defined from use and connect all of the major features mentioned above. The large open area in the center of the compound is used as garden space. The bulk of the gardening in the group is done by the women and children while Fernando and Raul are doing work away from home. They grow a variety of fruits, squashes and medicinal plants for family consumption. The family recently

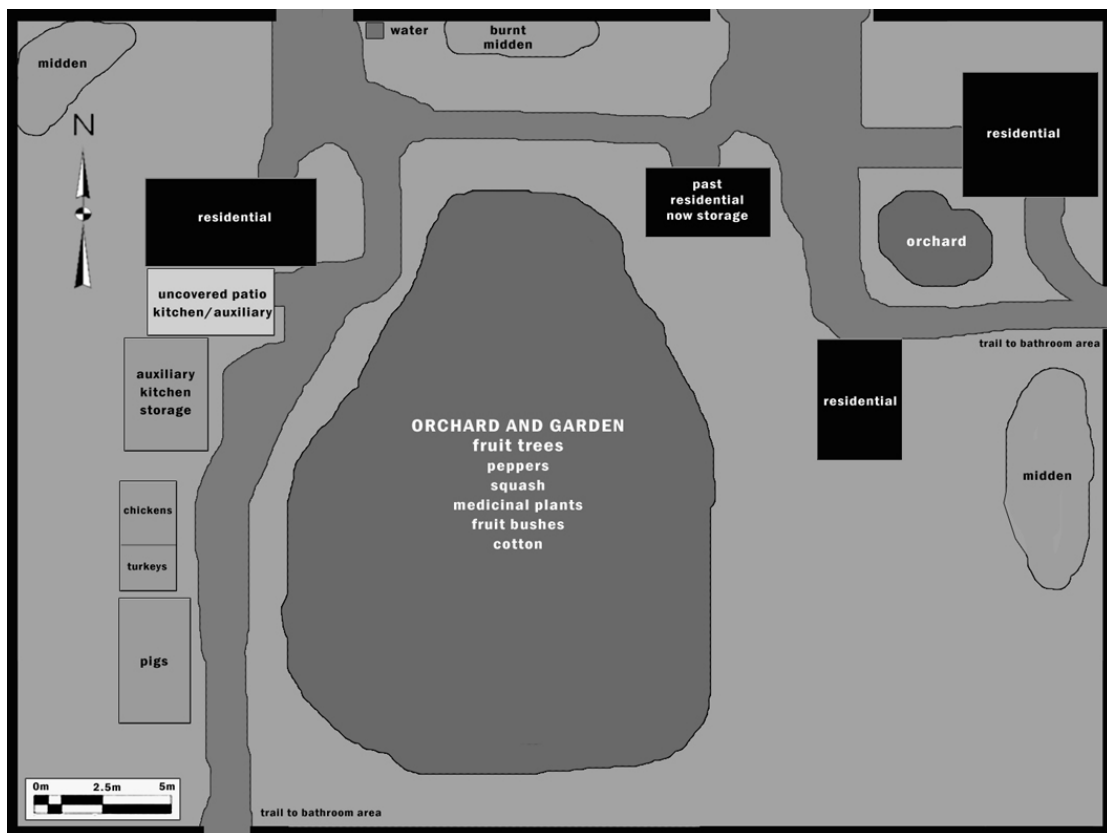
began planting cotton which Mrs. Mena intends to expand as she is able to get the seeds from each crop and get them replanted. The area between the main dwelling/covered patio and the boundary wall is a small orchard with a mix of fruit trees including oranges and limes and others with leaves that Mrs. Mena reported were medicinal in nature. Among those was one that she uses to treat her diabetes, as she does with one or two of the species of medicinal herbs she grows in the garden.

*Flores Compound, Telchaquillo, Yucatán*

Fernando Flores (Figure 8.54) also has extensive experience working with the various archaeological projects in the area. He has a milpa near the village that he tends; he also hunts and works a variety of other jobs away from the compound. The Flores family compound's (Figure 8.58) arrangement is very similar to that described above and the general lifestyle and activities are very similar. The compound is larger than the Mena compound, having about twice the width in lot size. This reflects, in part, availability of land around the group. The compound is located at the very periphery of the village, the last house group along a road leading to the nearby village of Pixya. Along this road there is cattle pasture and ranch land, milpas and several small municipal dumps where villagers dispose of refuse not burned or discarded in house group middens. The Mena ranch is also located along this road. Being peripheral, the subdivision of the land is not locked into the pre-established *albarrada* pattern seen in more central house clusters.



There are three dwellings in the group. The first belongs to Fernando, his wife and a young daughter. Fernando's mother also resides with the couple. The other two dwellings belong to his sons, one of whom is married with a child. Each son has built a home on an altillo at the eastern end of the land in recent years. All three dwellings are modern rectangular cinder block constructions rather than more traditional apsidal designs of mortar and limestone cobble. A fourth structure that I believe was older than these three was rectangular and constructed from limestone. Today it serves as a storage structure for tools and construction materials but, in the past, it was a dwelling for Fernando and his wife, one of their older daughters or both. I was unclear on that detail. The important thing is that we again observe a conversion of a structure's function from dwelling to storage over time.



**Figure 8.58 – Flores family residential compound.**

Three auxiliary structures are located, essentially, in a line south of the main dwelling. The first is a kitchen. Again, this is a low cobble platform with a perishable superstructure consisting of pole walls supported by a low double wall line. It contains a hearth and food preparation areas. The pots and utensils are stored there. There is a covered patio attached to the south side of the kitchen building that functions like the similar space between the kitchen and main Mena dwelling described above. Much of the day-to-day activity in the compound is centered in this patio space. South of the patio area is a chicken/turkey coop on a low platform with corner pole and wire construction. A pig pen is located in the rear of the property.

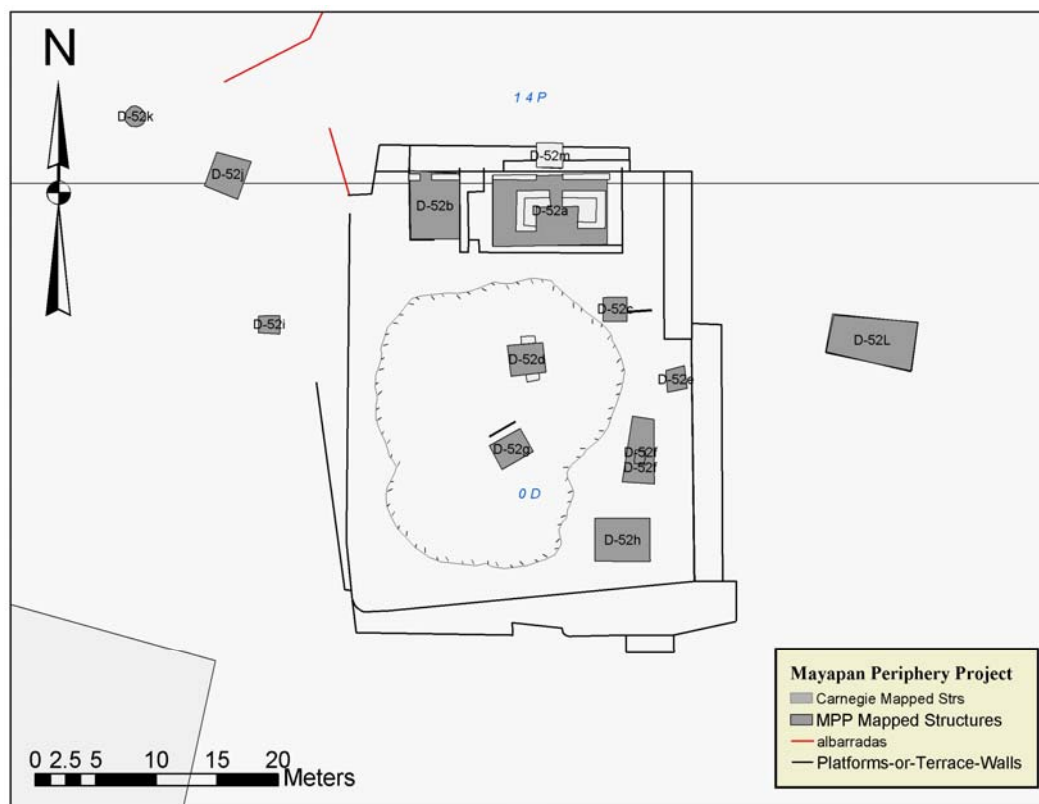
The family maintains several garden areas on the property including the area along the front wall on either side of the entrance and another east of the house and kitchen structures. They grow a mix of fruits, including watermelon, vegetables and squash in the gardens. There were a number of fruit bearing trees planted in various spots around the property producing mainly oranges and limes. Organic waste is fed to the pig and other material is discarded in a midden west of the structures along the compound wall. I know trash is also burnt, however; I am unaware of the specific location. There are two bathroom areas, one south of the compound wall and another east of the wall that serves the dwellings on that half of the property.

## **Architectural Evidence for Wealth Differences Between Mayapán's Commoner Residential Clusters**

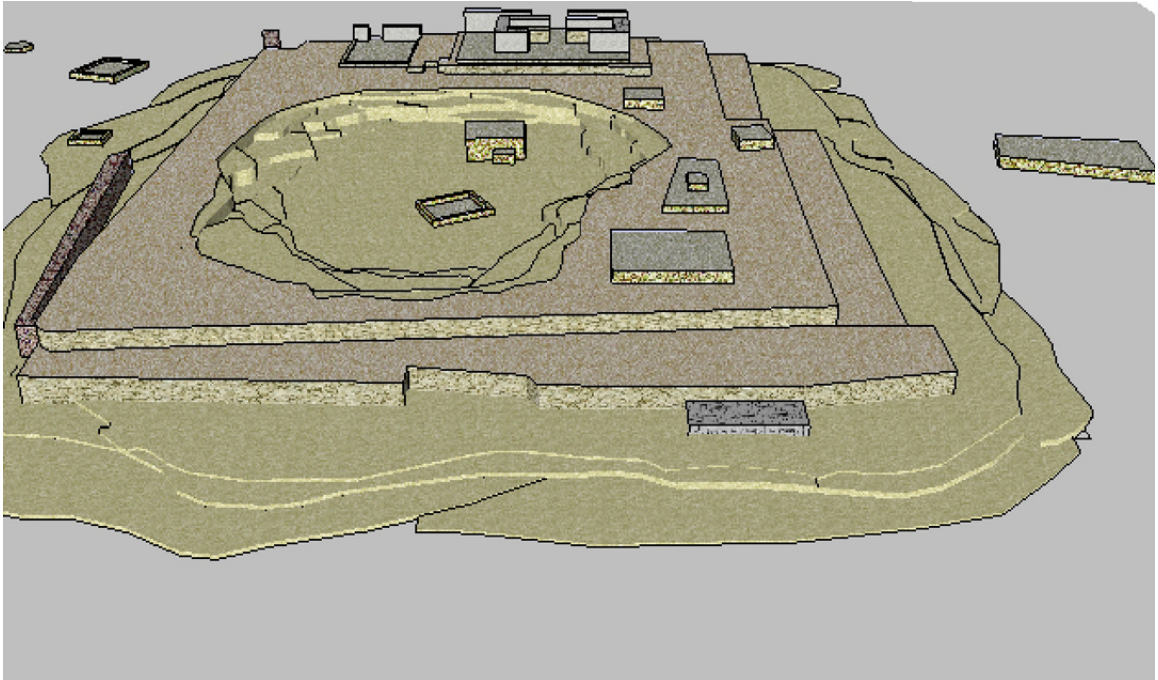
Some status distinctions were found among the commoner clusters recorded during the survey. These differences were primarily expressed through size and quality of the construction of the dwellings. The presence or absence of a well-made, rectilinear group platform seems to have been a status indicator as well. Clusters that had well defined group platforms were consistently larger and more elaborate than those lacking this feature. True elite residences of the type found surrounding the main plaza were lacking in the study area. However, several residential clusters were notably larger and more elaborate than the typical clusters recorded suggesting important differences in wealth and, possibly, political influence. To make the distinction clear, I have assigned these clusters to a class I'm calling "affluent commoner". Four such clusters are noteworthy for different reasons.

In terms of the number of structures present, Group D-52, located along Transect 6, is the largest group yet recorded at the site, inside or outside of the city wall (Figures 8.59-8.61). It consists of twelve different structures including two south facing dwellings and a mix of auxiliary, storage and group ritual structures. Eight of the twelve structures in this group are built on a very large and well made group platform which is oriented to the cardinal directions. The remaining structures are found adjacent to the platform. This cardinal orientation is unusual since most residential clusters at Mayapán have an apparently random orientation not related to the cardinal directions. Smith (1962) suggests that the mixed orientation of structure clusters at the site reflects restrictions

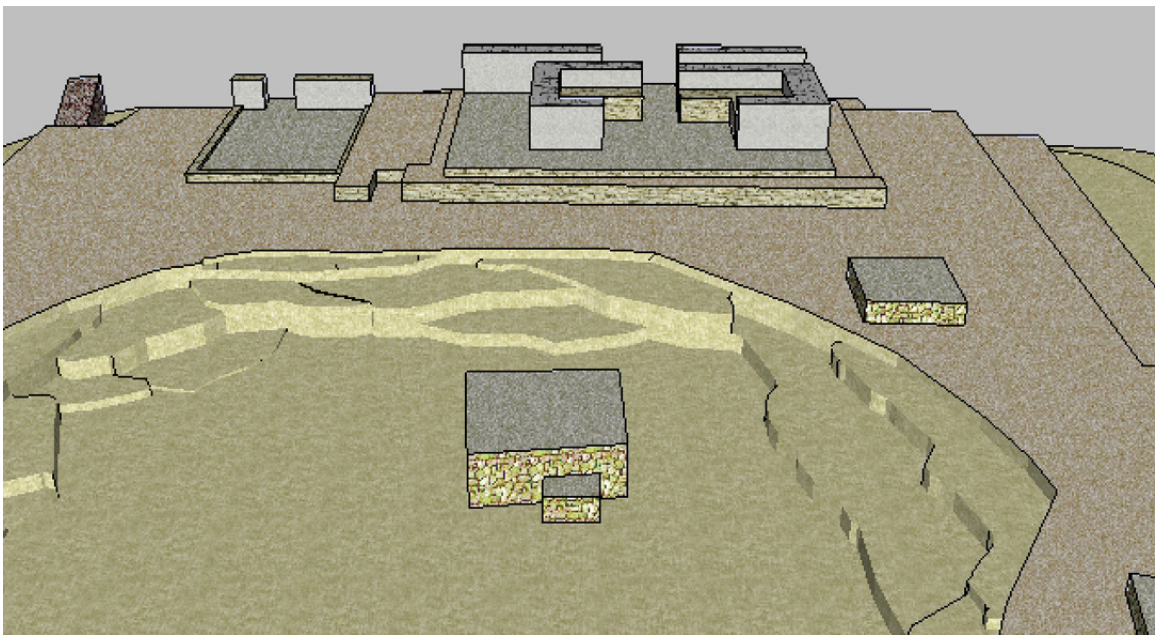
imposed by placement of these clusters on the many *atillos* that dot the landscape, the orientations reflecting the most appropriate space available on the hillocks.) There is a large *sascabera* in the middle of the platform. Two structures are located within the *sascabera* itself. There are segments of *albarrada* wall along the west side of the platform but they do not form any sort of enclosure around the group. The form of the architecture and the artifacts recovered in test excavations indicate that this group is Postclassic.



**Figure 8.59 – Affluent commoner residential cluster D-52**



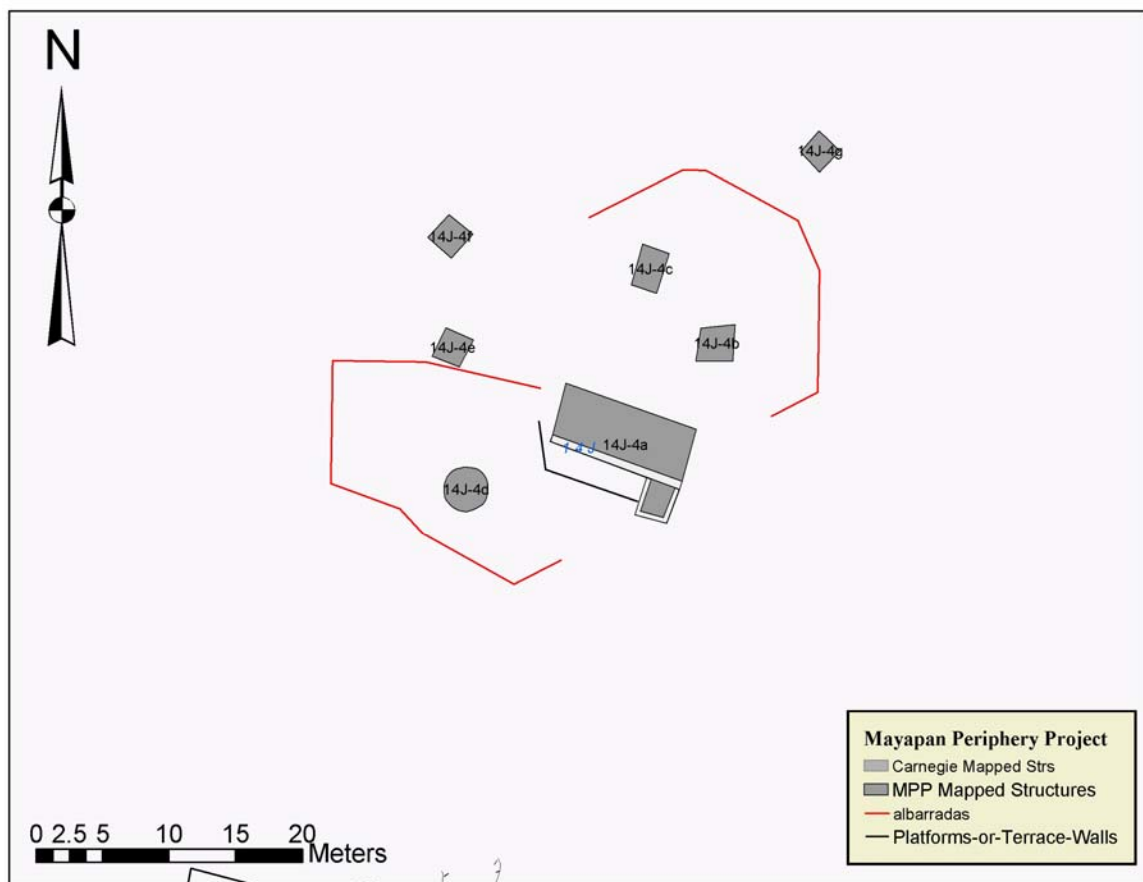
**Figure 8.60 - 3-D model of Cluster D-52.**



**Figure 8.61 - Detail of 3-D model of D-52 group showing main residential architecture and group ritual platform (in quarried out sascabera depression).**

The 14J-4 group, located on Transect 4, consists of seven structures. Its function was explored above in connection with the Market structure in the southern outlier D'zan

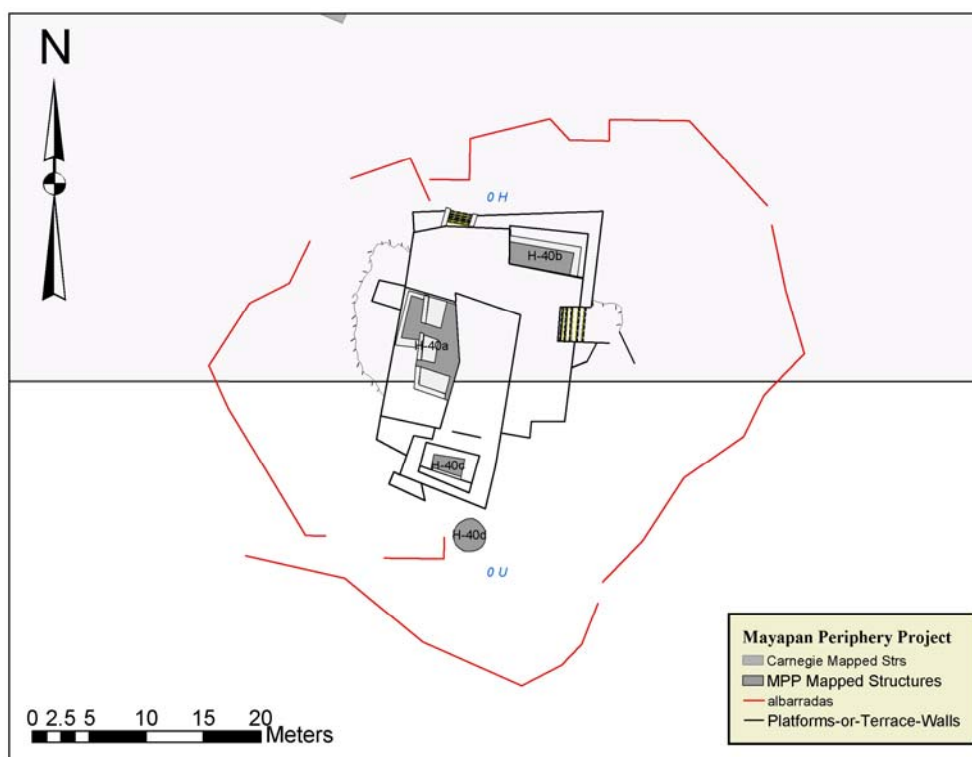
Tun Ch'en (Figure 8.62). It consists of a single very large dwelling and six adjacent storage structures. Indications are that this group housed an affluent commoner connected with commerce at the nearby market. It is also possible that the storage features and the large dwelling served as housing for traveling merchants trading at the market and storage for the goods that they were exchanging. The group was partially enclosed by two semi-circular albarrada segments, one along the north side of the group and the other along the south side. All indications are that this group dates to the Postclassic period, suggesting that it may have been constructed well after the initial use of the market itself. A final determination on that question awaits further investigation.



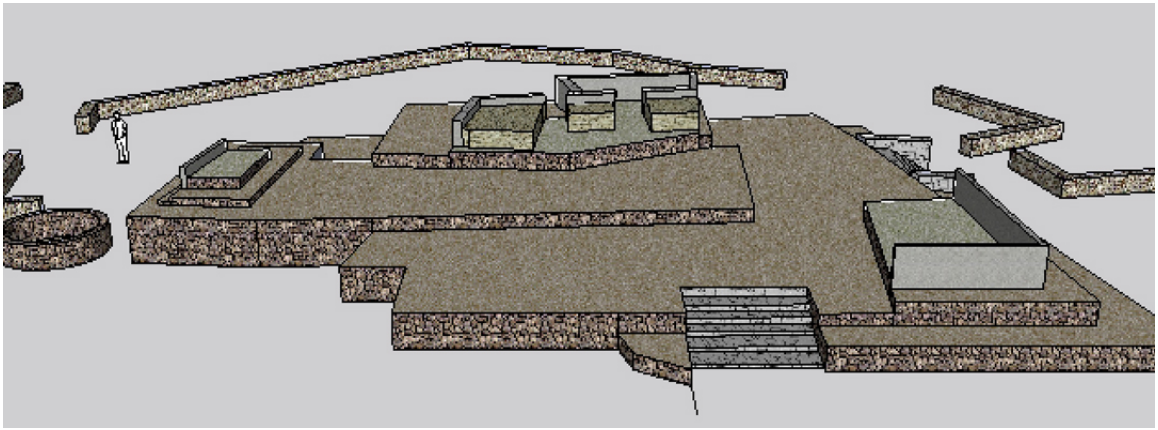
**Figure 8.62 – Affluent commoner residential cluster 14J-4.**



Group H-40, recorded near the city wall along the south edge of Transect 3, consists of four structures: two dwellings, a group ritual structure and a round storage facility (Figures 8.63-8.65). It has several unusual features that suggest higher status than the typical residential group. The most noteworthy is the large and well made group platform. This platform, constructed by substantially expanding a natural *altillo*, consisted of several distinct levels. As we saw above, this group had a clear cardinal orientation, made possible by the construction of the platform. Two stairways provided access to the platform, one along the east side the other along the north (Figure 8.66). The group is enclosed by an *albarrada* with multiple entrances. This enclosure is several times as large as the typical residential enclosure and, unlike most, encircles a great deal of the lower terrain surrounding the modified altillo/platform. The function of this closed mound area is unclear but, it is likely that it was garden or orchard space.



**Figure 8.63 – Affluent commoner residential cluster H-40.**



**Figure 8.64 – 3-D reconstruction of cluster H-40.**



**Figure 8.65 - Hypothetical artistic reconstruction of H-40 group architecture.**

The architecture of the main dwelling (H-40a), which faced east, is more elaborate and well made than typical commoner dwellings found at the site (Figure 8.67). The blocks used in its construction are more finely finished and appear to be of a more

durable limestone than most. Rather than the common two bench configuration, this structure had three benches with two openings to the rear, one entering a closed room and another leaving the structure. The year following our mapping of the group, the center bench, which had been very well preserved, was badly damaged when a tree rooted in it was knocked over by hurricane winds, pulling up most of the bench with it when it toppled. There was an entrance in the rear wall, allowing movement in and out of the structure from both sides. The second “dwelling” was a large cobble platform with walls along two sides (H-40b) (Figure 8.68). While it lacked other features associated with typical dwellings at the site, the platform was large enough to have held a perishable dwelling. Further testing would clarify whether this structure actually served as a dwelling or was, alternately, an unusually large auxiliary structure with a different function or functions. A one room structure placed along the south edge of the group platform seems likely to have a group ritual function as either a family shrine or, as suggested by several column drum stones we found in association with the structure, an oratory (H-40c) (Figure 8.69). Below this structure, near the base of the platform, we recorded a round structure with likely storage functions (H-40d). It appears that food preparation took place on the platform in front of Str. H-40a, where we found a fragmentary limestone metate immediately alongside a *molcajete* or grinding pestle ground into a small patch of surface level limestone bedrock (Figures 8.70-8.71). All indications are that this group was also from the Postclassic period.





**Figure 8.66 – North stairway leading up the H-40 group platform.**



**Figure 8.67 – Structure H-40a, a large typical Mayapan style dwelling with 3 benches.**





**Figure 8.68 – Structure H-40b, a single room structure with a low cobble floor and wall lines along the north and east sides.**



**Figure 8.69 – Structure H-40c a one room structure with a couple of extant column drum stones.**





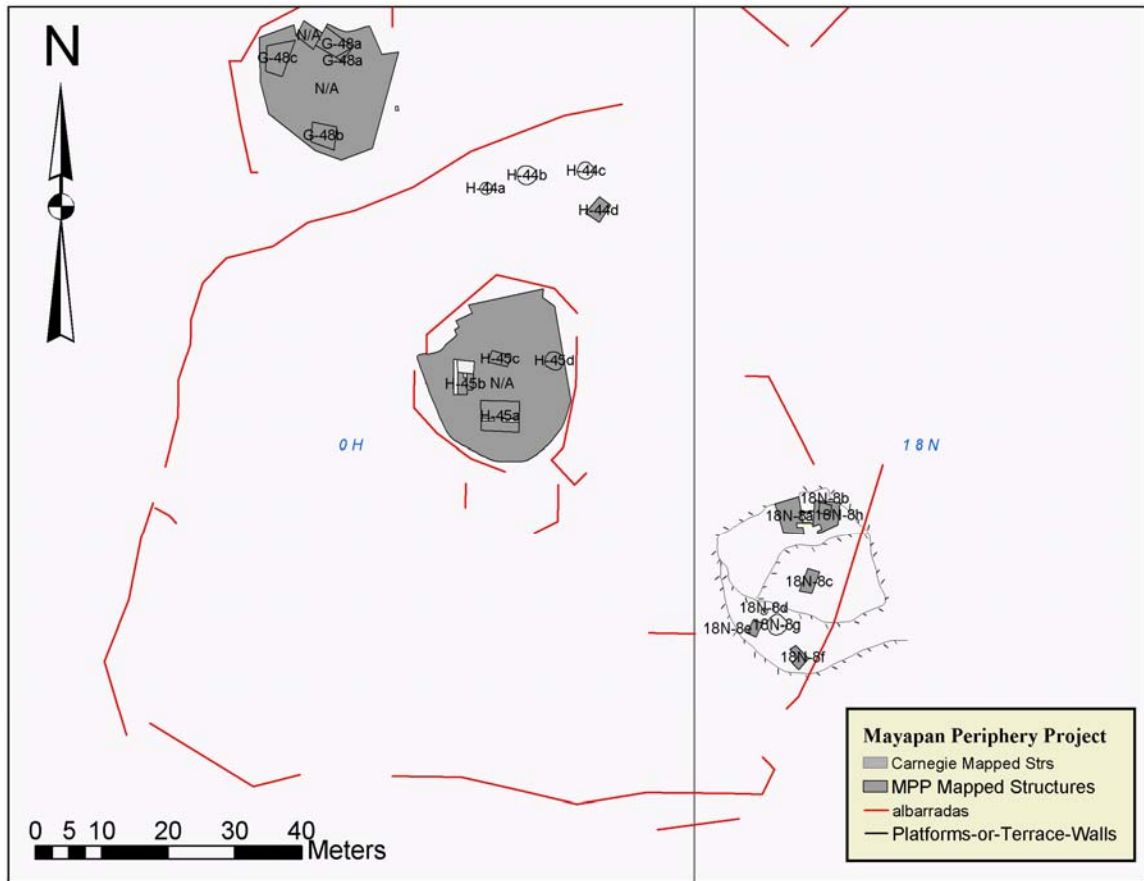
**Figure 8.70 - Metate fragment found on platform in front of Str. H-40a.**



**Figure 8.71 - Molcajete/pestle ground into surface bedrock on the platform in front of Str. H-40a (immediately adjacent to the metate fragment).**



The last affluent commoner group that I would like to highlight was one of the first recorded along Transect 1 and may be the most interesting in this category. This group (H-45) looked much like the typical commoner residential configuration in size and architectural elaboration (Figure 8.72). It was composed of three probable residential structures (a single two-room commoner dwelling, one single-room and one large platform structure) and a single round platform, which probably served a storage function, arranged around a central patio space. The whole group was built on a modified *altillo* group platform. The group was surrounded by an *albarrada* wall alignment with a single entrance. All of those features are indicative of a simple commoner residential group. However, this group had an important difference. The group was located at the center of a second very large *albarrada* enclosure that enclosed a great deal of off-*altillo* space. This enclosure was, by far, the largest documented in the study area. In fact, it was four to five times as large as the enclosure just noted for the H-40 group discussed above. Two additional structure clusters were located within this wall line. One of these clusters (H-44) was composed of four structures with storage functions. The other (18N-8) was a large group composed of seven platform structures. Based on their form, two of these were determined to be residential, three were auxiliary structures and one small, round structure appears to have functioned as a small altar for group ritual function. The super structures of these platforms would have been constructed of perishable materials, suggesting a relative lack of affluence.

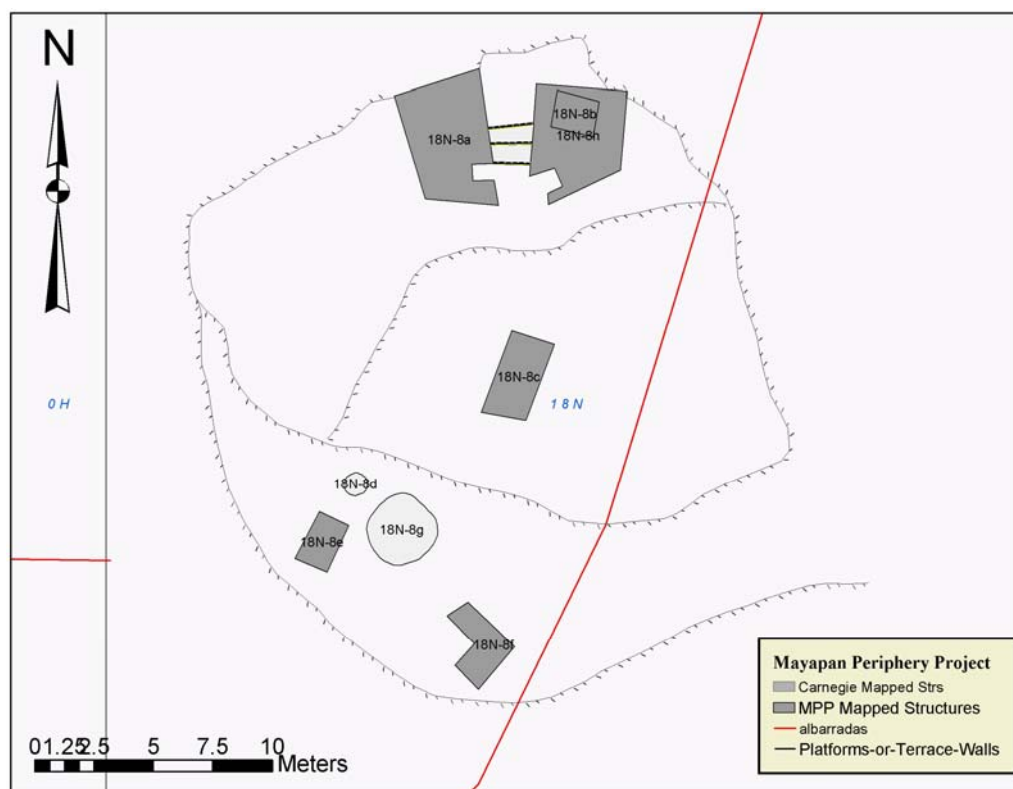


**Figure 8.72 – Affluent commoner residential cluster H-45 showing relationship to agricultural storage cluster H-44 and possible slave residential group 18N-1.**

This large enclosure was located at the outside edge of the residential zone on this side of the site and bordered the agricultural zone just to its east, not far north of the H-48 east side square temple-shrine group. I suggest that the three clusters functioned together as a larger unit for agricultural production in that zone (discussed in more detail below). I interpret the clusters as demonstrating that the residents of the main H-45 residential group controlled the other two enclosed clusters. The seven structures composing the 18N-8 group (Figures 8.73-8.78) would have been home to a group of slaves or paid laborers who worked the nearby agricultural zone. The four structures in the H-44 group

would have served as a storage area for the goods produced through their labor. This suggests that the residents of the main group were in charge of some portion of the adjacent agricultural zone and a small labor force, composed of notably less affluent individuals, actually worked the land. Some portion of that surplus would have been used by the residents of the main group and stored in the round structure enclosed within the smaller group enclosure.

It is unclear if these laborers were slaves or simply poor. However, the inclusion of the group in the large surrounding wall is suggestive of a dependent status and restrictions on where they were allowed to live and on their movement in general. Ethnohistoric documents suggest that there were slaves present at Mayapán but, this may be some of the clearest evidence yet recorded in the archaeological record for their presence and duties, especially outside of the site center. If they were slaves, this information shows that one of the functions of this class of residents was agricultural production.



**Figure 8.73 – Detailed map of 18N-8 low status/slave residential compound.**



**Figure 8.74 – Overview of 18N-8 group after extensive clearing.**





**Figure 8.75 - View down north stairs between structures 1N-8a (flagged on left) and 18N-8b (flagged on right).**



**Figure 8.76 – Structure 18N-8c, A medium sized rectangular platform in the center of the group.**





**Figure 8.77 – Structure 18N-8f, an “L” shaped platform located along the south edge of the group.**



**Figure 8.78 – Structure 18N-8g a large round platform with likely storage (granary) functions.**



## Composition and Form of Agricultural Clusters

Agricultural clusters share a number of distinct features. First, they are located in land that is suitable for cultivation. Since the soils at Mayapán are very thin, such areas are important to sustaining the population. Soils tend to accumulate in the low lying areas between *altillos*, which is where these clusters have been recorded. These clusters are not enclosed by the kind of albarrada walls that are commonly seen around residential clusters. However, perishable fences made of the trees cut in clearing are used today and likely would have been an option for Mayapán's farmers as well (Figure 8.79). The architecture observed consists of low cobble platforms which would have supported perishable structures. Often times these clusters are a single structure, usually a round platform that would have served as storage for the crops produced nearby.

Clusters of small cobble platforms have also been found in these agriculturally appropriate areas and probably served as agricultural storage features as well. Occasionally, we found these constructions in association with medium-sized, rectangular cobble platforms that almost certainly held perishable field outbuildings, known locally today as *paseles*. They were identified immediately as such by my local workmen/informants. As in the modern examples, these structures most likely served as a place for workers to get out of the sun, rest, eat, store their tools and occasionally overnight close to the fields. They are lightly used structures and little is discarded around them. As the soils in the area are rapidly depleted of nutrients by farming, the location of fields was likely moved ever few years. So, they are also occupied for short periods, which is consistent with the lack of non-perishable superstructures. Despite

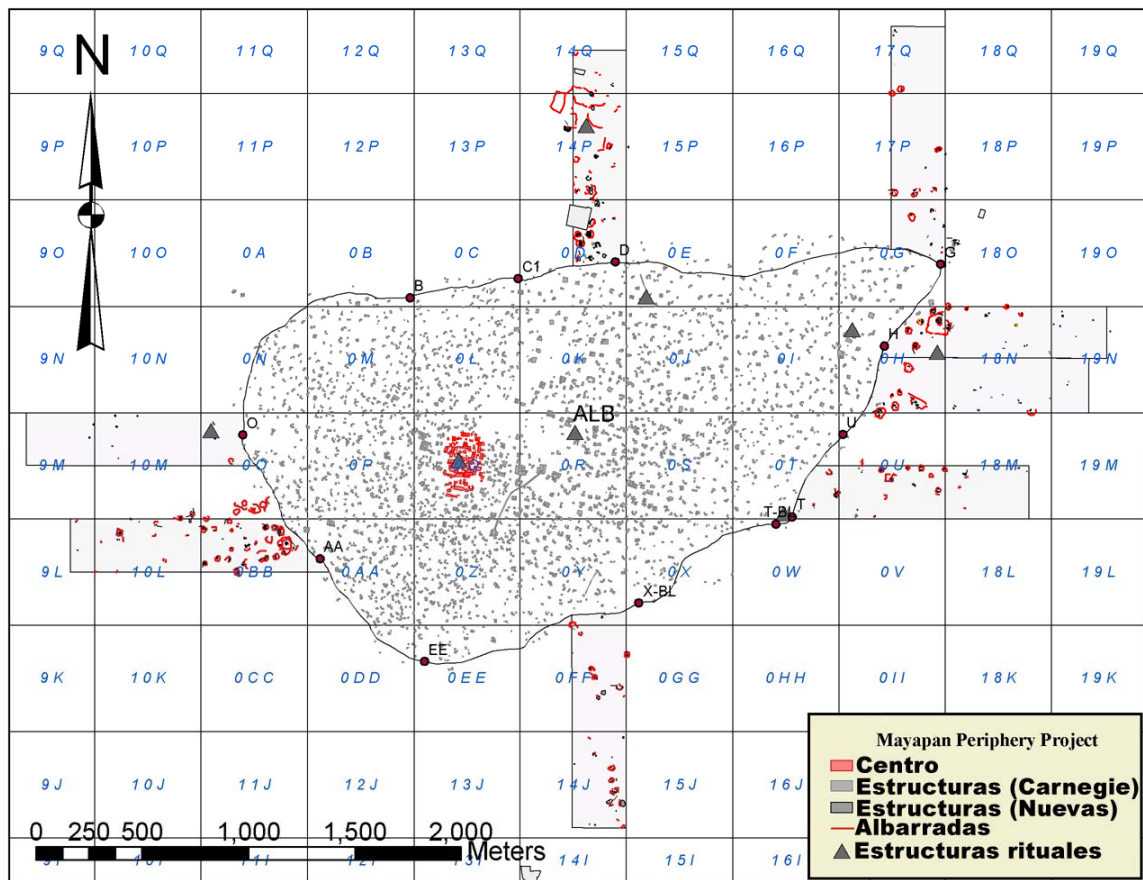
repeated attempts, test pits placed near these structures yielded very little in terms of artifacts, suggesting that there were definitely not residential in nature. As a result, dating of these structures is more ambiguous than that for residential and other clusters. However, the use of cut block double walls to retain the fill of several documented examples suggests that the recorded examples date to the Postclassic.



**Figure 8.79 – Round platform 18N-16 located in modern milpa, demonstrating among other things how modern land use around the site’s periphery overlap those seen in antiquity. Note also the wooden fence not far from the structure, a pattern that would allow for space to be divided up in antiquity without leaving a visible archaeological signature.**

## Composition and Form of Ritual Clusters

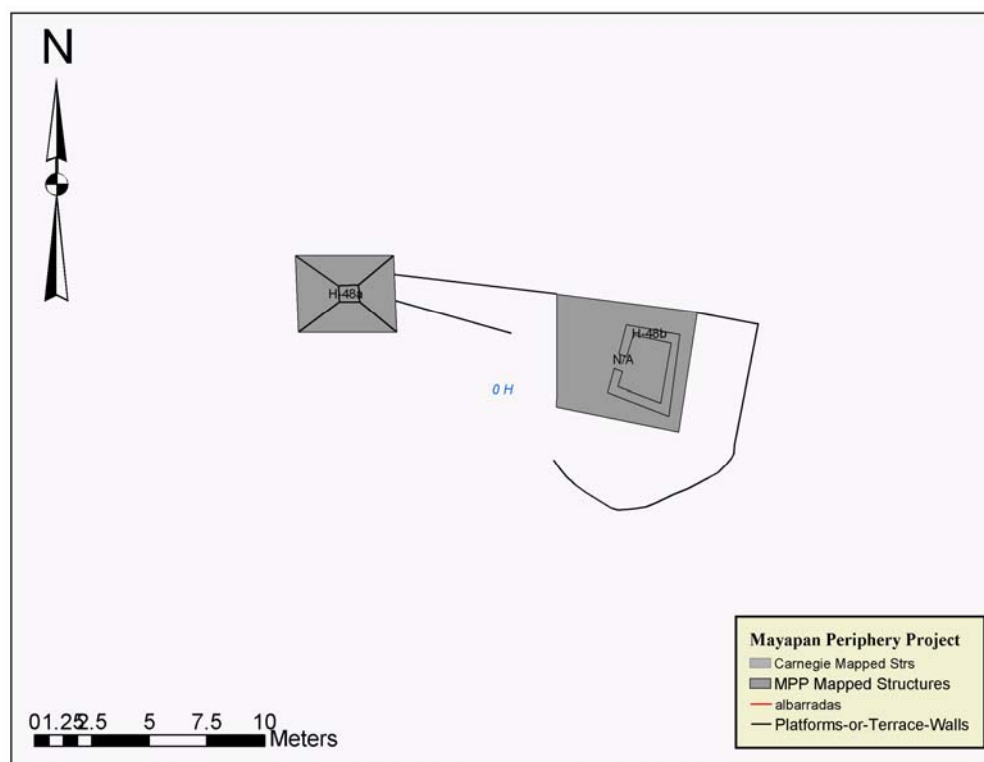
As noted above, ritual clusters at Mayapán fall into two broad categories: public ritual clusters and those that served the needs of a family of small number of families. The more complex of these were public ritual clusters. Our team recorded three examples of this group type. Two of these clusters had more than one structure. Both were located on group platforms that supported all related structures. The third example had only a single shrine structure and lacked a group platform. None of these clusters was enclosed by an *albarrada* wall and they are therefore deemed “open access”.



**Figure 8.80 - Map showing distribution of ritual architecture across the site including outside wall temples/shrines along the east, west and north sides of the site and their relationship to gates in the wall.**

Group H-48 was composed of a small rectangular cobble pyramid (H-48a) and a one-room shrine (H-48b) facing each other across a leveled group platform (Figures 8.80-8.84). The pyramid was rectangular in shape and measures roughly 2m by 2m at the base and standing roughly 1m tall. The limited space on top of the pyramid was very small, far too small to have held a structure. However it would have been large enough for the placement of idols as described by Landa in his discussion of the ritual processions associated with the New Year's or *Uayeb* ceremonies (Tozzer 1941:151-152). Therefore, this structure may represent one the four directional ritual locations described by Landa. The use of such structures was illustrated in the Dresden Codex's New Years pages (Thompson 1972:25-28). In the colonial Yucatán, these constructions were described as piles of stones located at the entrances of settlements at each of the four cardinal directions, a general description and location that match what we recorded fairly well. I do offer one reservation to this possible interpretation. Landa suggests that these stone piles were found in pairs, each facing the other. We found only one such structure in this group. However, this structure, which faced the east, did face a second one-room structure with a west facing entrance. This second structure was built on a low platform and was relatively small. It would have served as a shrine for associated ritual activity and been used to house the idol during the year each four years in accordance with the ritual calendar. Landa indicated that, at the end of the annual celebrations, the new idol was returned to the cardinal entrances of town for the year, rotating directions each year. It is possible that this second structure may have housed such an idol every fourth year if the group was indeed related to the New Year's celebrations. If this interpretation is correct, this group and small pyramid may have marked the conceptual eastern boundary

of the site to the contemporary Maya living there. Test pits at the group produced little other than Postclassic incense burner sherds.



**Figure 8.81 – Public ritual cluster H-48 (east).**





**Figure 8.82 – Structure H-48a, a small rectangular pyramid facing a one room shrine structure east of the main site.**



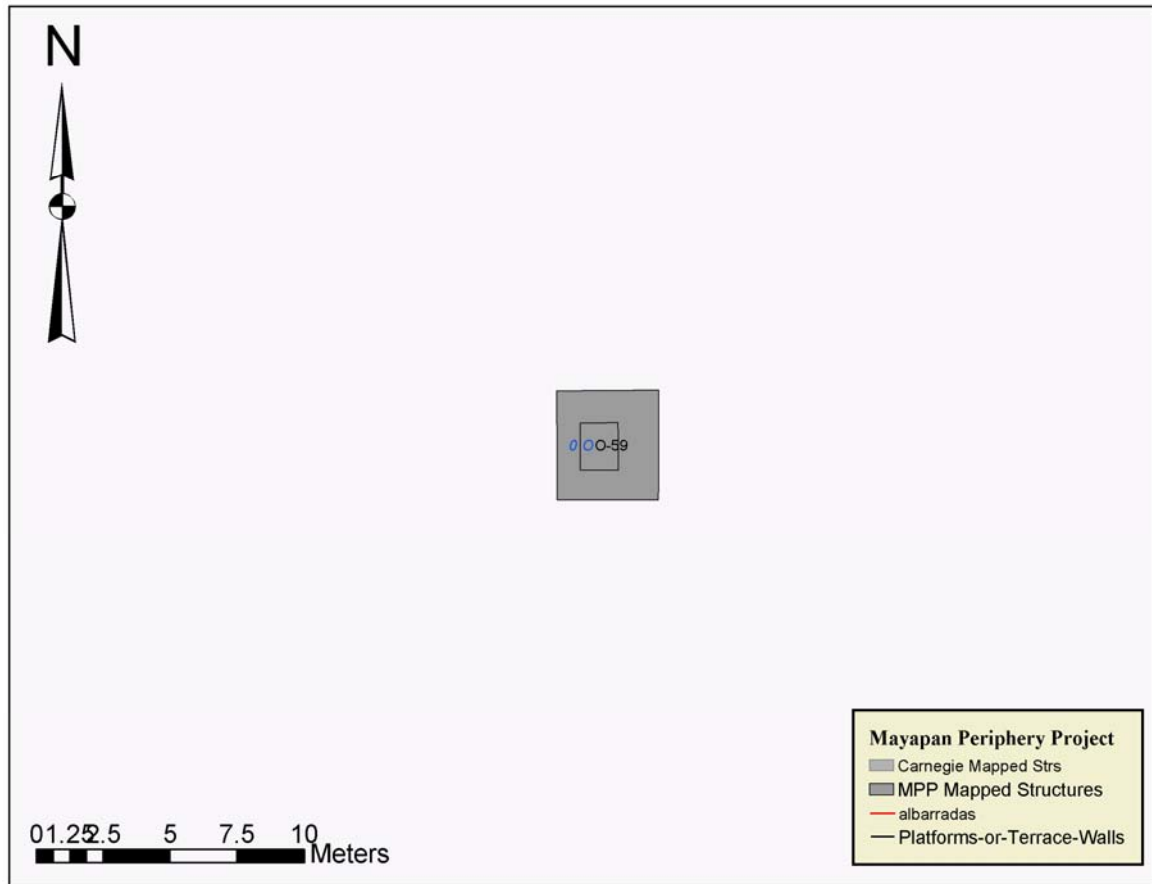
**Figure 8.83 – Structure H-48b, a one room shrine.**





**Figure 8.84 – View from interior of shrine structure H-48b with remains of doorway in mid-ground and remains of square pyramid H-48a on the right in the background.**

Group O-59, the single shrine mentioned above, occupied a position analogous to the east side group just described in reverse, being located outside the wall on a direct line from a major directional gate (Figures 8.80 and 8.85). It was also located just beyond the drop-off in residential architecture in that portion of the site. This suggests that the structure may have served a similar directional function. Unlike the two structure group to the east, this group contains only a large basal platform with a central altar. The basal platform is large enough to have held a perishable superstructure housing the altar. The location and east facing orientation of the shrine suggests that it, too, could have served as a ritual boundary for the site.

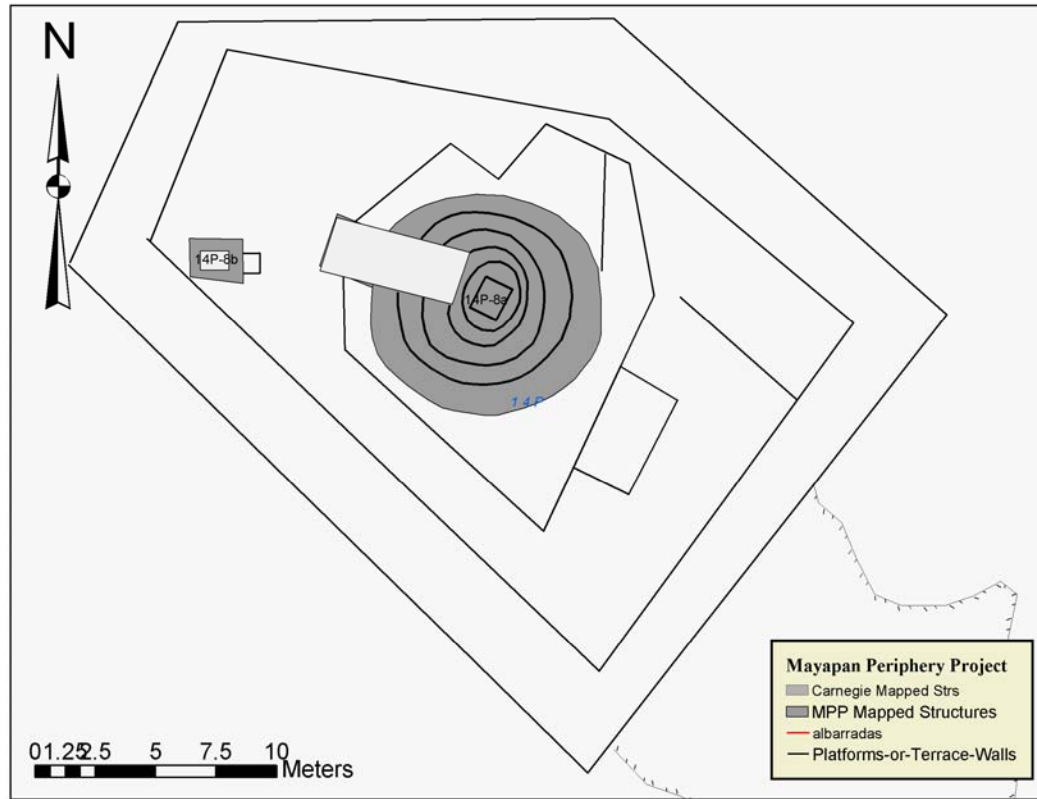


**Figure 8.85 – Public ritual cluster O-59 (west).**

The northern ritual boundary seems to be similarly marked by group 14P-8, which is between the residential zone located north of Gate “D” and the zone of large livestock pens in the northern portion of the transect (Figures 8.80 and 8.86). This positioning is very similar to that of the east and west clusters which were located between their respective residential zones and specialized agricultural and lime production located beyond them. This two structure group was built on a large group platform oriented in the direction of the cenote at the center of Telchaquillo. It is notably larger than the constructions documented in the east and west. The form and orientation of the temple suggest that it was first connected with Terminal Classic Telchaquillo. However, 75% of the sherds excavated from the group were Postclassic, suggesting that this temple

continued to be used throughout the Mayapán's Postclassic zenith. As an existing ritual feature of some size on the landscape, it seems to have remained important to those living in the north portion of the site. This is one indication that those living in the north of Mayapán were largely related to the pre-existing Telchaquillo site that had moved somewhat to the south and closer to the new center (this population shift will be explored in more detail below). Our recovered sample of ceramics was relatively small and additional excavation would be needed to confirm this interpretation.

It would not be surprising to find that shrines or temples of different forms were used in the same New Years or other directional ceremonies. Landa's descriptions make it clear that there are variations in the specific details depending which of the four directions is involved and the shrines associated with each of the four directions were maintained by different lineages or other groupings. In all three directions where public ritual architecture was recorded beyond the city wall, it was located at the very edge of the residential settlement in that direction. This distribution suggests that, despite their differences in form, all three of these clusters may have served as more accurate indications of what was and was not considered Mayapán at the time than the city wall itself which seems to exclude populations that fall within these possible ritual boundaries. If such an interpretation is correct, a fourth public ritual group would be expected to be located south of one of the other gates in the section of the wall running through grid square "EE".



**Figure 8.86 – Public ritual cluster 14P-8 (north)**

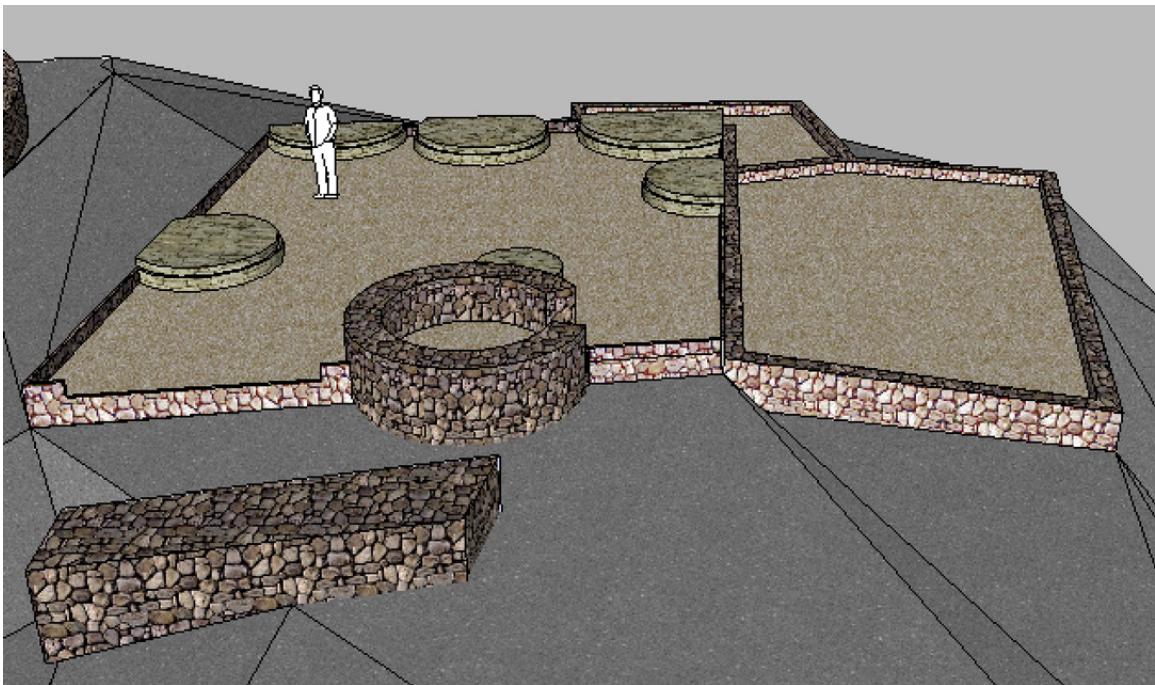


## Composition and Form of Commercial Clusters

One commercial group was identified in the study area. Based on the data collected, group 14J-5 appears to have functioned as a marketplace serving the needs of the outlier site of D'zan Tun Ch'en (Figures 8.49 and 8.87). The structures are constructed on a large flat *altillo* and lack the enclosing *albarrada* that is typical of residential clusters in the area. Portions of the *altillo* were expanded and leveled to enlarge the overall construction space available. There were two segments of *albarrada* wall present, one just north of the main structure and a second along the southeast edge of the leveled *altillo*. However, these segments were not connected and did not form an enclosure of any sort. The lack of an *albarrada* enclosure suggests open access to the structures in question.

The group consisted of three structures. The main structure of three-rooms was constructed on a low cobble platform with low wall lines separating the three rooms. The main room had a north facing entrance and a series of six small semi-circular benches lined its walls (Figure 8.88). The widest point on five of the six benches measured between 1 and 1.5m across. It is likely that these served as market stalls. The bench feature located along the north wall was notably smaller than the rest, measuring less than .5m across, and may have served as an altar. There was an entrance adjacent to this small altar/stall that opened into a connected round structure which probably served as a storage facility. This structure was only accessible from the interior of the main room. The other two rooms of the main market structure were slightly lower than the main room and lacked bench features, consisting only of the cobble platform and wall lines along

their edges. No clear entrances were found in the walls of these two rooms, suggesting that they were entered simply by stepping across the wall line onto the platform itself, either down from the main room or up from the outside ground level. The walls present were not of the type that typically held pole walls, suggesting that the structure was covered by a perishable roof supported by vertical posts at the corners and sides. The lack of evidence of pole walls indicates that this structure had an essentially open air configuration. A single metate was found just outside of the structure, suggesting that some corn was ground onsite for trade. The third structure in the group was a small cobble platform about 1m tall which had a Postclassic style double course wall line along its rear edge. It was located just east of the main market and was oriented toward it, an open area between them, serving as a small plaza space. The specific function of this structure remains unclear.



**Figure 8.87 – 3-D model of 14J-5 marketplace (looking north to south).**

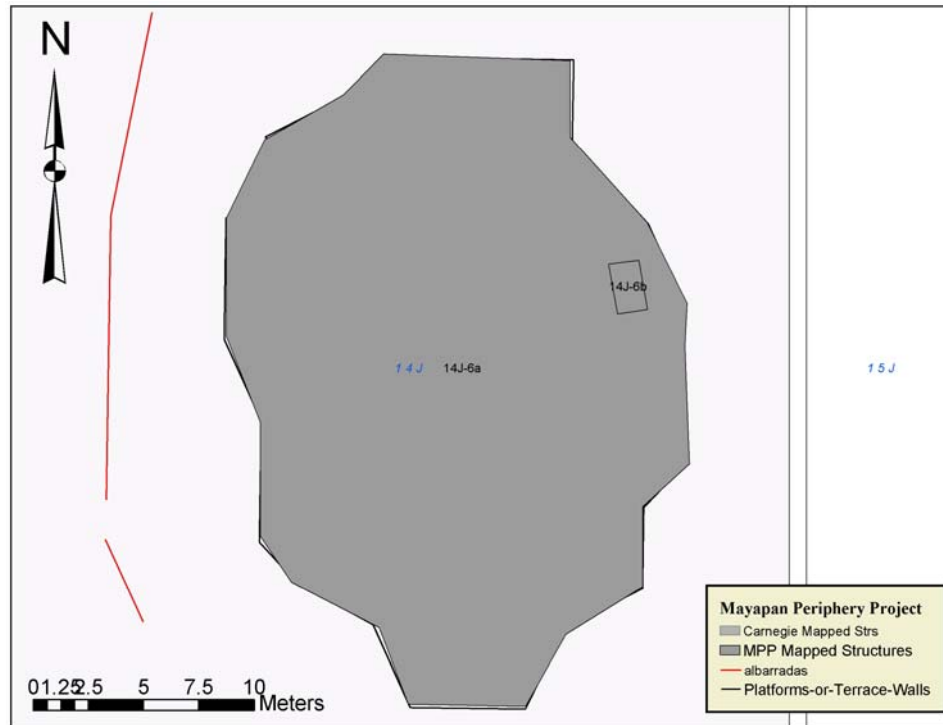


**Figure 8.88 – Semi-circular bench feature from the corner of market structure 14J-5a.**

### **Composition and Form of Public Performance Clusters**

The 14J-6 group, located just to the east of the marketplace described above, was the only group found in the study area that had apparent public performance functions (Figure 8.7). Again, this group seems to have served the needs of the southern outlier, D'zan Tun Ch'en and its community. The group consists of an open group platform constructed by extensive leveling and modification of a broad, flat *altillo*. This group lacked an *albarrada* enclosure. It did have an *albarrada* running along the length of its west side, separating it from the nearby market. This wall line had a clear entrance near its middle that would have allowed passage between the two clusters. The leveling of the

sides of the altillo created a somewhat bounded space defined by low platform walls used to retain the fill used in its modification. This platform edge was lacking along the west side of the construction roughly in line with the entrance in the *albarrada*. This opening provided a gentle slope leading up the platform and seems to have been the main entrance to the group.



**Figure 8.89 – Public platform 14J-6. The larger “stage” area discussed is trapezoidal section at the south end of the platform which was the only section with vertical walls which were composed of unusually large slabs set vertically along the edge.**

Public performance functions for the group as a whole were suggested by two “stages” found within it and the large open space of the group platform itself. The first of these was a small cobble platform (14J-6b) located along the east side of the group large group platform. It was similar in form and dimensions to the cobble platform that was the third structure recorded in the marketplace group described above. The height of the

platform would have provided a good view of activities of an assembled crowd. Its small surface area suggests that any performance held there would have been limited to just one or two individuals. A larger group performance “stage” was found along the south side of the main group platform. This space was roughly trapezoidal in shape with the long edge open to the main platform space. The outside of this space was defined by a wall constructed of large uncut limestone slabs set vertically to a height of approximately 1m. This is the only portion of the group platform which was defined by such walls. The space would have been large enough to hold several performers, unlike the much small space created by the cobble platform along the east side of the group. Both of these performance spaces would have been visible from the main area in the center that would have held the audience.

I should not overlook an alternate/related hypothesis I mentioned earlier, that this may be a commercial group in function, either an extension of the market to its east or an earlier market space that was later replaced by the formal market in the Postclassic. As a large open platform, it would have been appropriate for such a purpose. Given the layout and central location in the site, a mix of functions would not be unexpected. Further work is required to fully understand this group.

### **Composition and Form of Colonnaded Hall Group 18O-1**

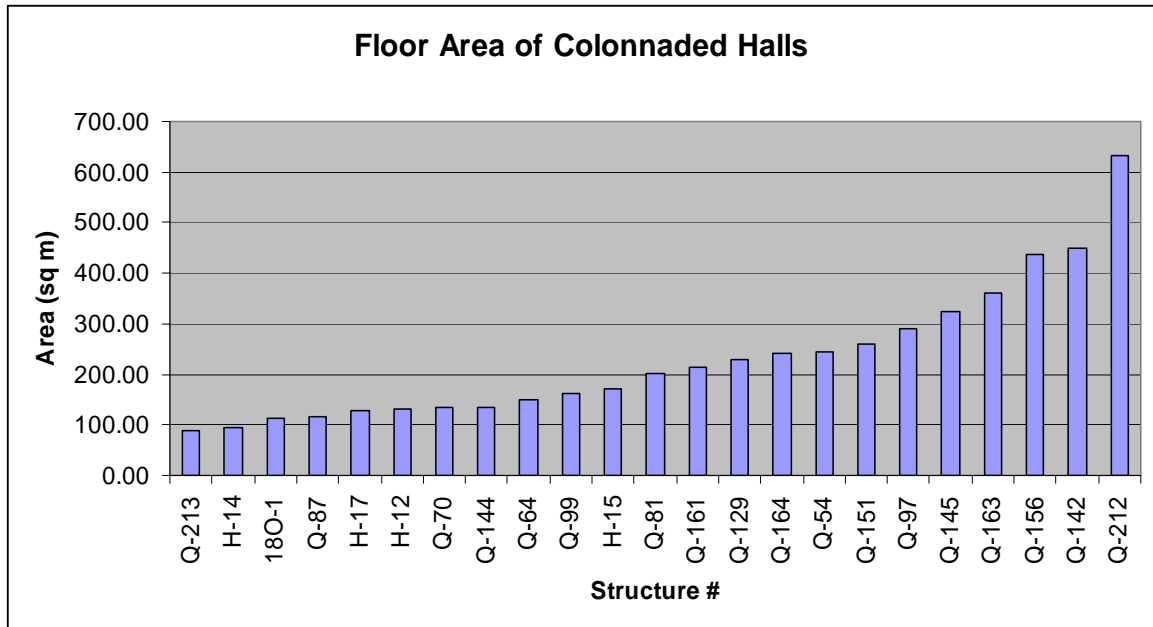
The 18O-1 colonnaded hall group recorded just northeast of Gate “G” in the city wall is very similar in form to other colonnaded hall clusters located in the site’s main plaza (Figure 8.3). This configuration was well described by Tatiana Proskouriakoff



(1962) who dubbed the arrangement of structures the “basic ceremonial group”. These clusters generally contain three structures, a colonnaded hall, a family shrine and an oratory. The 18O-1 group contains four structures. The group was built on two distinct levels, the highest level was a group platform constructed by the expansion and leveling of a natural *altillo*. Below that, a second level held the other two structures. This level was modified to a much lesser extent, primarily by leveling the northeast edge of the lower portion of the *altillo* on which the whole group rests. No *albarrada* walls were detected in association with the group. It was located just a short distance from Cenote Actun Burro, which would have provided easy access to a year round water supply. It was located roughly at the center of the northeast settlement pocket discussed in Chapter 7. Many of the surrounding structures were oriented to face this central group.

**Table 8.4 – Floor area of 18O-1 hall with colonnaded halls from site' monumental center and Itzmal Ch'en.**

| <b>Type</b> | <b>Context</b> | <b>Structure #</b> | <b>Area (sq m)</b> |
|-------------|----------------|--------------------|--------------------|
| Col         | Center         | Q-213              | 90.14              |
| Col         | Itzmal Ch'en   | H-14               | 93.24              |
| Col         | OS Wall        | 18O-1              | 113.57             |
| Col         | Center         | Q-87               | 116.56             |
| Col         | Itzmal Ch'en   | H-17               | 129.80             |
| Col         | Itzmal Ch'en   | H-12               | 130.34             |
| Col         | Center         | Q-70               | 133.67             |
| Col         | Center         | Q-144              | 134.42             |
| Col         | Center         | Q-64               | 148.56             |
| Col         | Center         | Q-99               | 161.53             |
| Col         | Itzmal Ch'en   | H-15               | 170.83             |
| Col         | Center         | Q-81               | 201.43             |
| Col         | Center         | Q-161              | 212.56             |
| Col         | Center         | Q-129              | 228.10             |
| Col         | Center         | Q-164              | 242.45             |
| Col         | Center         | Q-54               | 245.74             |
| Col         | Center         | Q-151              | 260.21             |
| Col         | Center         | Q-97               | 290.87             |
| Col         | Center         | Q-145              | 325.04             |
| Col         | Center         | Q-163              | 359.56             |
| Col         | Center         | Q-156              | 436.95             |
| Col         | Center         | Q-142              | 448.14             |
| Col         | Center         | Q-212              | 632.81             |
|             |                | <b>Mean</b>        | <b>230.72</b>      |
|             |                | <b>Median</b>      | <b>186.13</b>      |
|             |                | <b>St. Dev.</b>    | <b>129.81</b>      |



**Figure 8.90 – Chart showing range of floor areas for colonnaded hall 180-1 and those from the Monumental center and Itzmal Ch'en.**

The main structure in the group was, of course, the colonnaded hall itself. The size and form of this structure is comparable to the more modest examples in the main plaza such as Q-213, Q-87 or Q-70. It falls in roughly the same size range as three of the colonnades from the Itzmal Ch'en group (Table 8.4; Figure 8.90). The detailed form of this structure is discussed above. It was located on a substantial group platform which holds a second structure that may have served as an oratory, but seems to lack the twin stone columns that are typically found in the entrance of these structures. A single column drum stone was located in the structure but, it was fragmentary and appears to have been reused in the floor surface rather than the doorway. If the structure did serve as an oratory, it was likely constructed from perishable materials rather than the usual stone. It is possible that this construction would be better classified as an auxiliary structure. Additional testing would be required to confirm either identification.

On the lower level of the modified altillo there were two more structures. The first was a clear family shrine of the type recorded elsewhere at the site. It was a one-room structure built on a 2m tall basal platform with a stairway leading up to the structure level along the east side of the platform. A concentration of effigy incense burner sherds and floor plaster were recovered from the roots of a tree that had fallen over, pulling up a section of the interior along the side wall of the structure. The second was a low cobble platform that appears to have served as an altar or some other ritual function. It had a single step leading up from its south side and it had a concentration of Postclassic incense burner sherds covering its surface. Fragments of two limestone cord holders were recovered on the main level just beyond the entrance stair suggesting a perishable superstructure with a curtain covered doorway.

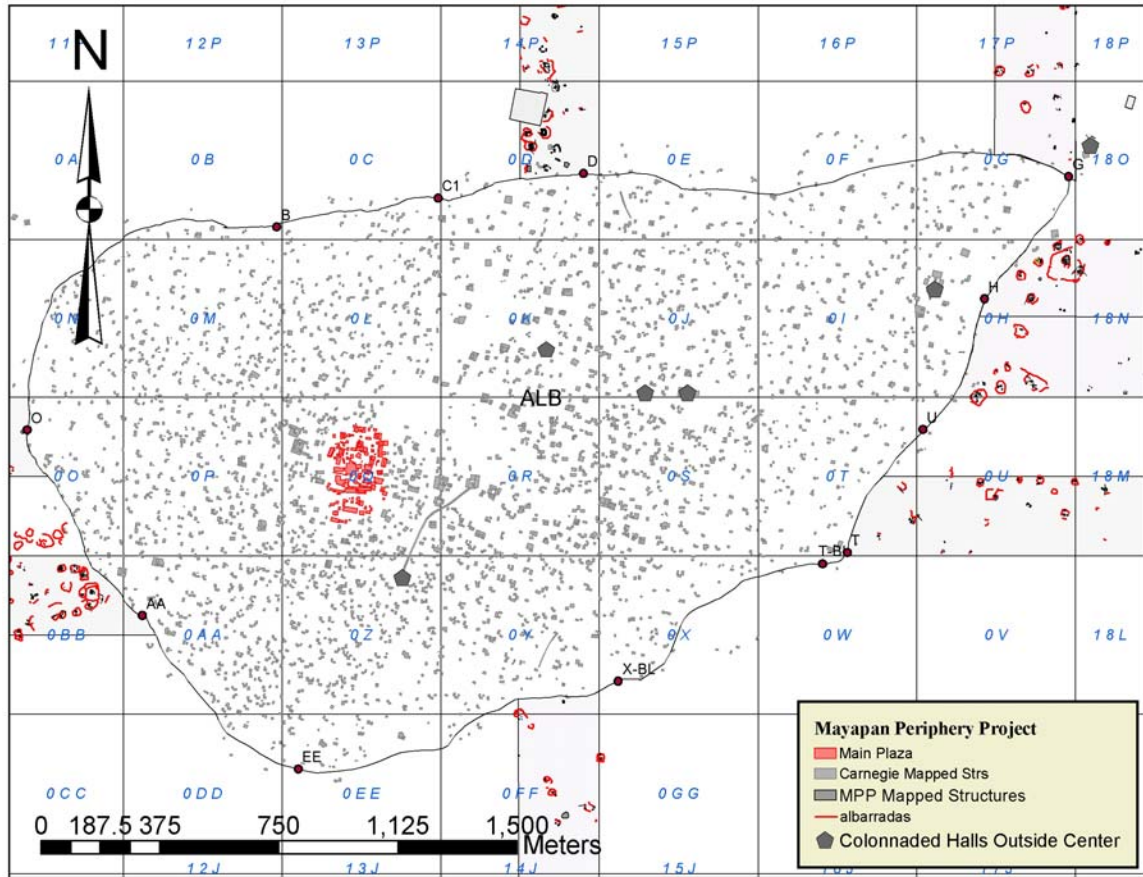
## **Chapter 9 – Site Wide Functional Variation**

Having created a typological framework to analyze the survey data, the next logical step is to integrate what has been presented and look at the broader site scale patterning revealed by the combination of the work conducted inside of the Mayapán city wall and the current survey . The addition of these new data on the settlement patterning found in the site's periphery provides a more complete picture of the full diversity of urban functions being provided by the citizens of the city, a more accurate accounting of the full population and size of the site and new insights on how environmental, historical, economic and social forces interacted to produce the final distribution of features and artifacts that we find in the archaeological record today.

### **Geographic Distribution of Administrative Functions**

The various loci of administrative control at Mayapán are inferred based on the distribution of colonnaded halls across the site (Figure 9.1). These are usually associated with additional family shrines and oratories to form “basic ceremonial groups”, as they were termed by Proskouriakoff. The vast majority of these groups are restricted to the Main Plaza in the “Q” quadrant. The halls in the Main Plaza are distributed on all sides of the central Q-162 pyramid (Figure 9.2). Structure Q-129 is located just outside of the corbelled arch gate that served as the eastern entrance to the plaza itself, in a position that would have allowed those working there to control access to the central ritual and administrative precinct.

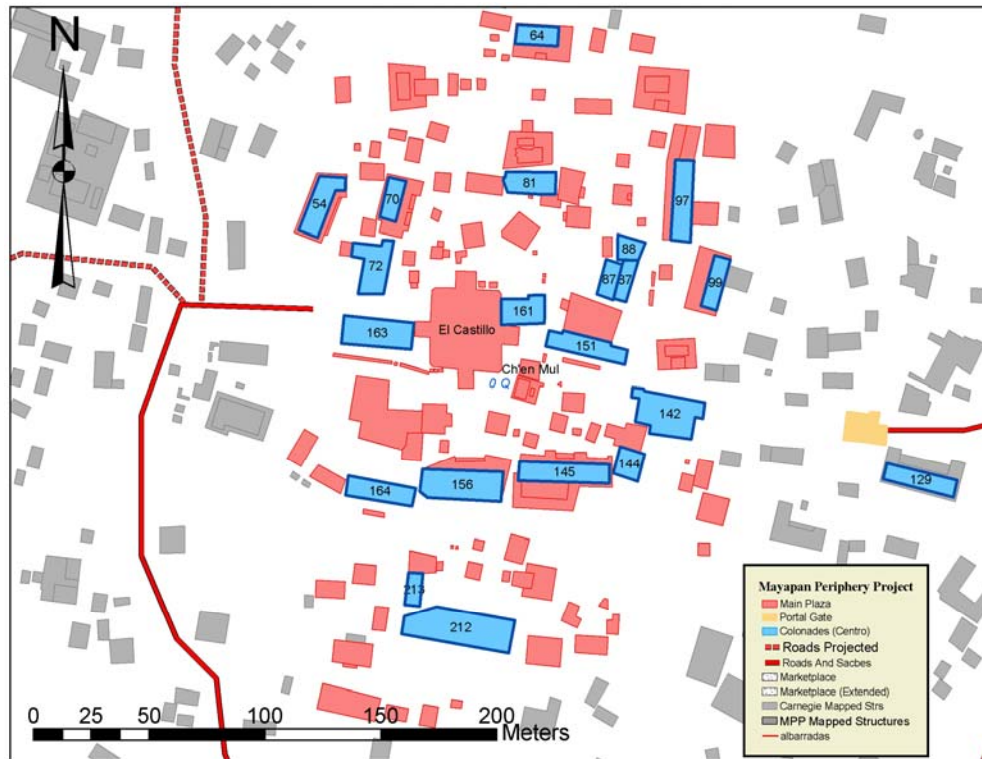




**Figure 9.1 – Distribution of colonnaded halls outside of the Main Plaza.**

Four colonnaded halls flank the plaza in front of the large Itzmal Ch'en temple. This temple/cenote complex served as the second major focus of ritual and administrative control in the city. There is another cluster of two colonnades and a temple roughly halfway between the Main Plaza and the Itzmal Ch'en complex along the southern edge of the "J" quadrant. Another colonnade has been identified in among a pocket of secondary elite residences flanking the two market areas identified in quadrants "K" and "R" that may have provided administration as dictated by the demands of the markets. Another colonnade group, in quadrant "Z", is also located adjacent to a cluster of secondary elite residences at the end of a raised *sacbe* roadway connecting it to a cluster of three elite residential compounds in quadrant "R". The 18O-1 colonnade in the

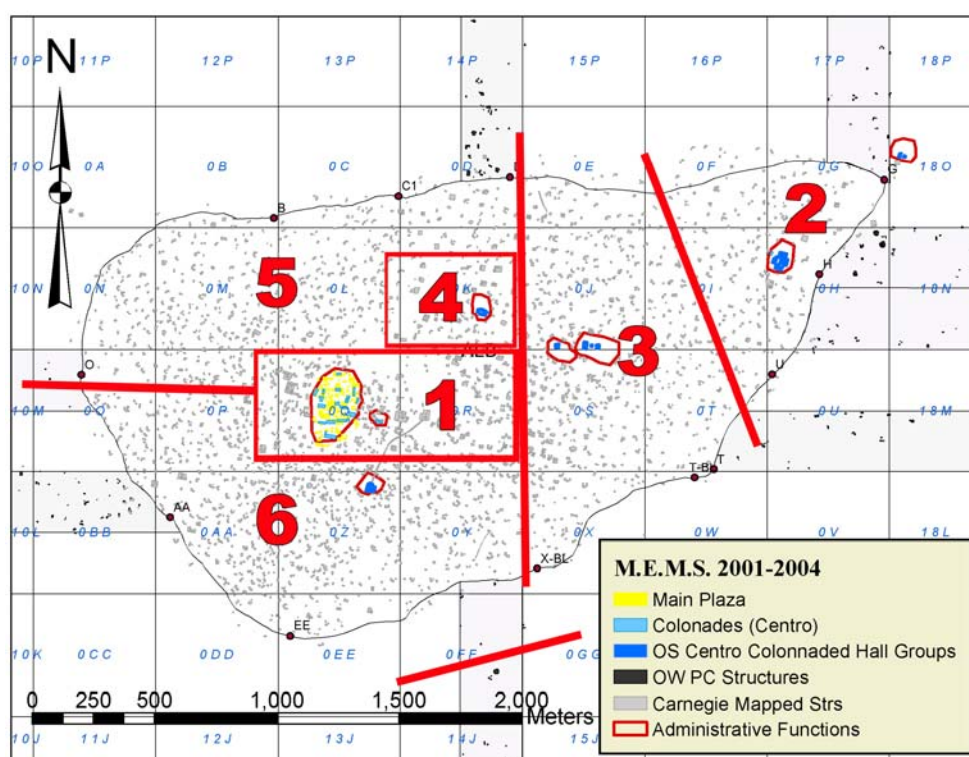
northeast portion o the study area is the first such structure yet recorded outside of the city wall itself.



**Figure 9.2 – Distribution of colonnaded halls inside of the Main Plaza.**

This distribution suggests there were several broad zones of administrative control across the city. These different zones seem to reflect a mix of the underlying distribution of barrios at Mayapán and specialized administrative activities. Two barrios have been tentatively identified. One is a possible east coast affiliated barrio encompassing part of the northeast of the site and the Itzmal Ch'en group and the other is a possible gulf coast affiliated barrio adjacent to the main plaza. Influence from these two areas was already suggested by ethnohistoric documents (more the ritual and administrative implications of Itzmal Ch'en below). The cluster of structures in quadrant “J” is surrounded mainly by commoner residential groups and may have been a third major subdivision within the city

itself. The two market spaces and the adjacent secondary elite residences shared a colonnade, suggesting an administered central market zone in the city. The colonnaded hall in Quadrant “Z” may suggest yet another administrative zone in the southern portion of the city composed of a mix of secondary elite and commoner residential groups. Based on its location, the newly recorded 18O-1 colonnade may be the administrative hub of the settlement zone in the northeast site periphery and/or it may have served a gatekeeper function akin to that inferred for Structure Q-129, restricting access to the city itself through the gate in Quadrant “G”.



**Figure 9.3 – Map showing approximate and hypothetical political administrative subdivisions within Mayapán based on distribution of public architecture (in particular colonnaded hall groups) and the reconstructed settlement history. Divisions include: 1) central city which contains monumental center and zone containing most elite residential architecture; 2) NE Mayapán zone containing Itzmal Ch'en temple-cenote complex and surrounding settlement zone; 3) central residential zone; 4) market zone; 5) northwest residential zone; 6) southwest residential zone.**

None of this diminishes the role of the main plaza for functions related specifically to the areas of the city immediately adjacent to it. The Main Plaza, by all indications, was the center of the Postclassic city. It housed the colonnades of the most powerful lineages from much of the surrounding region and the many halls clustered there suggest that the business transacted there had implications well beyond the site itself.

### **Geographic Distribution of Ritual Functions**

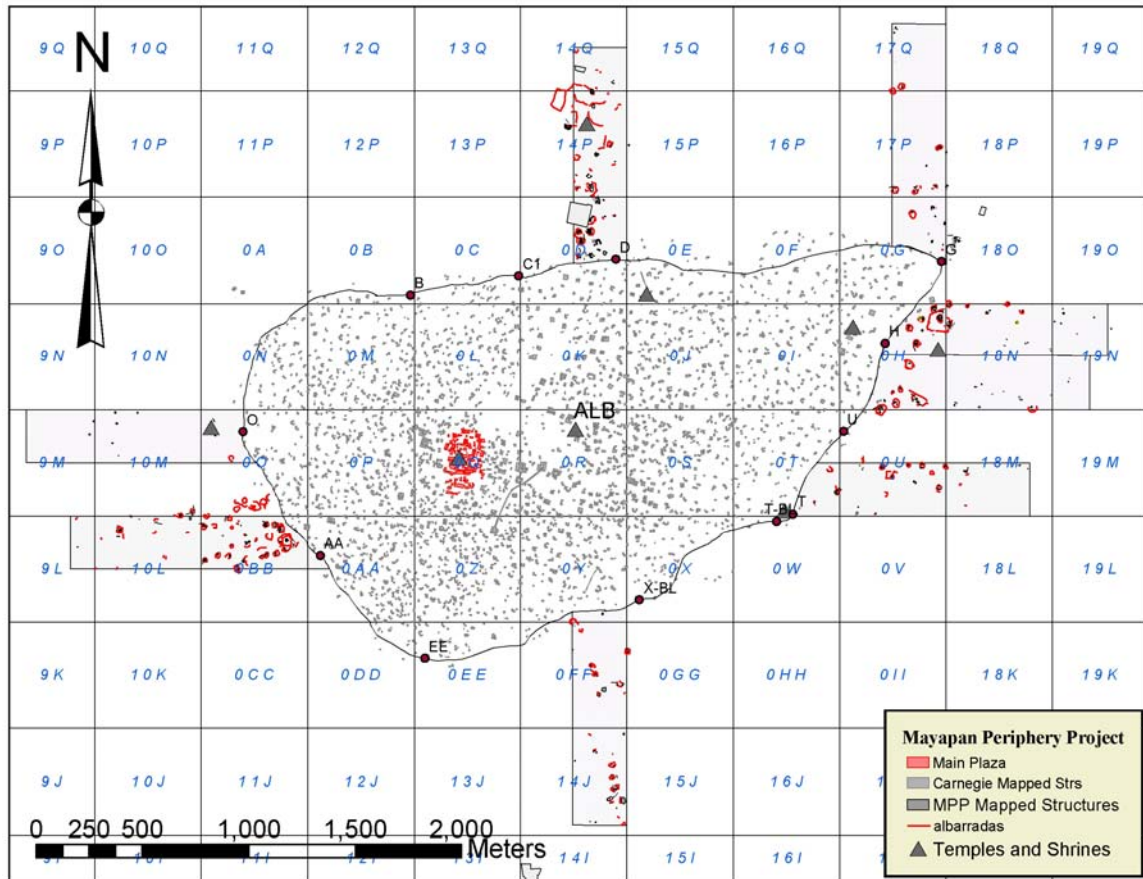
The distribution and type of ritual architecture found in and around the site provides clues to its ritual organization. Much has been documented about the distribution of these functions inside the city wall. The addition of new data from outside the wall provides a more complete record of the activities taking place at the site and where they were specifically they taking place. New finds lined up with major directional gates in the east and west provide indications of important rituals being held outside the walled portions portion of the site. A more extensive understanding of the settlement history in the northeast of the city provides new interpretations for the presence of the Itzmal Ch'en temple/cenote group and the unusual bi-polar layout of the city.

### *The Ritual Center and the Four Directions*

The dominant area of ritual importance to the residents of Mayapán was clearly the Main Plaza. This area of the site has by far the greatest number, size and quality of ritual features in the city. Landa indicated that, when occupied, this ritual/administrative precinct was a walled enclosure open in two directions. While the precinct wall he described was probably destroyed to make the slightly larger wall for the modern Rancho San Joaquin, the Q-129 colonnade and adjacent corbelled arch appear to have served as an entrance along the east side of the enclosure. Inside of that there are several temples of differing configurations, including several marked with serpent motifs. All indications are that the Q-162 radial pyramid was the conceptual, if not geographic, center of the site and its four directional stairways divided the city into zones of ritual importance relating to each of the cardinal directions.

The arrangement of structures in the center suggests that the various lineages coming together in the city to rule the wider area vied with one another for proximity to this conceptual center. The various colonnaded hall groups cluster in the large plaza surrounding the Q-162 pyramid. The Q-163 structure is a large hall that seems to have a special significance in the layout of the center as reflected in its preserved decoration. This large hall has pillars adorned by a series of full standing personages molded in stucco. This was probably the central meeting point for the different lineages and, therefore, a political/administrative center of the site. Its placement abutting the pyramid implies that there was a close link between the politics of Mayapán and matters of ritual importance to its citizens.

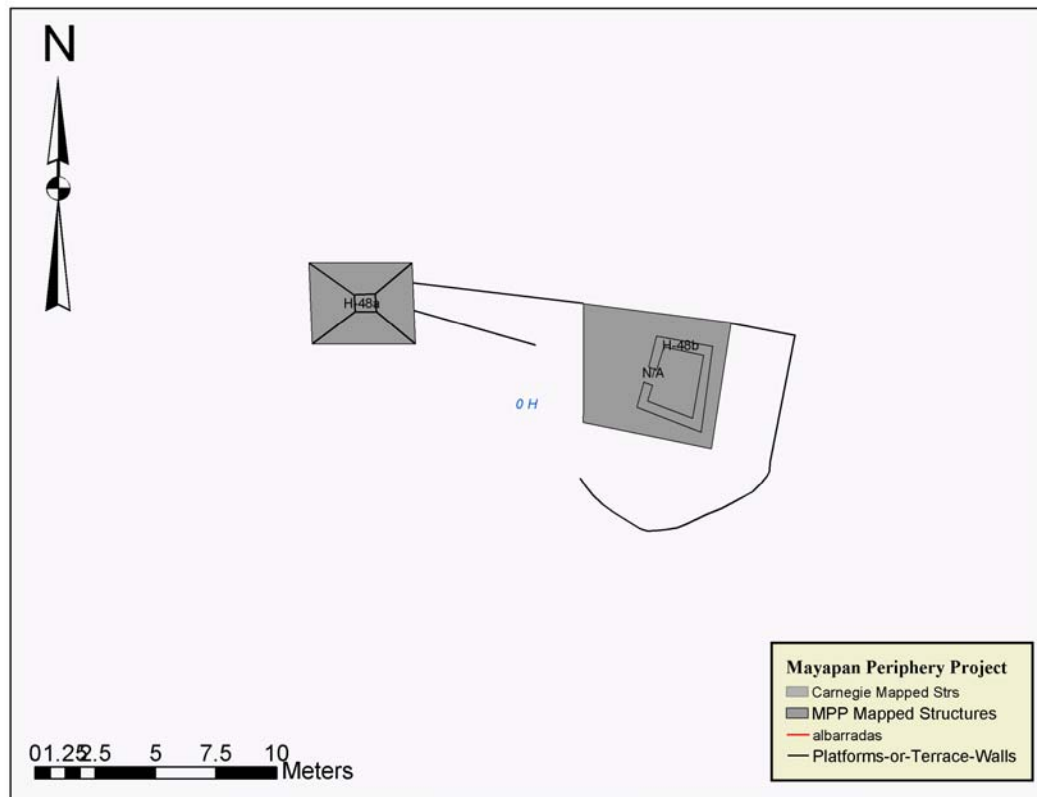




**Figure 9.4 – Distribution of temples and shrines.**

Landa also describes in some detail various rituals taking place at the entrances to colonial towns. Unless those events were held within the city wall, the original Carnegie survey, almost by definition, excluded those important ritual boundaries from the area they mapped. The newly recorded public ritual groups in the east and west of the site fill that gap to some degree. Locating structures analogous to those described by Landa's accounts of the Uayeb ceremonies would be one strong indication of the ritual layout of the city. Landa described piles of stones erected at each of the four entrances to town. Every four years, as dictated by the ritual calendar, ceremonies would have been held

there to bring in the new patron deity for the year and the idol of that deity would be placed and kept there for the duration of the year.

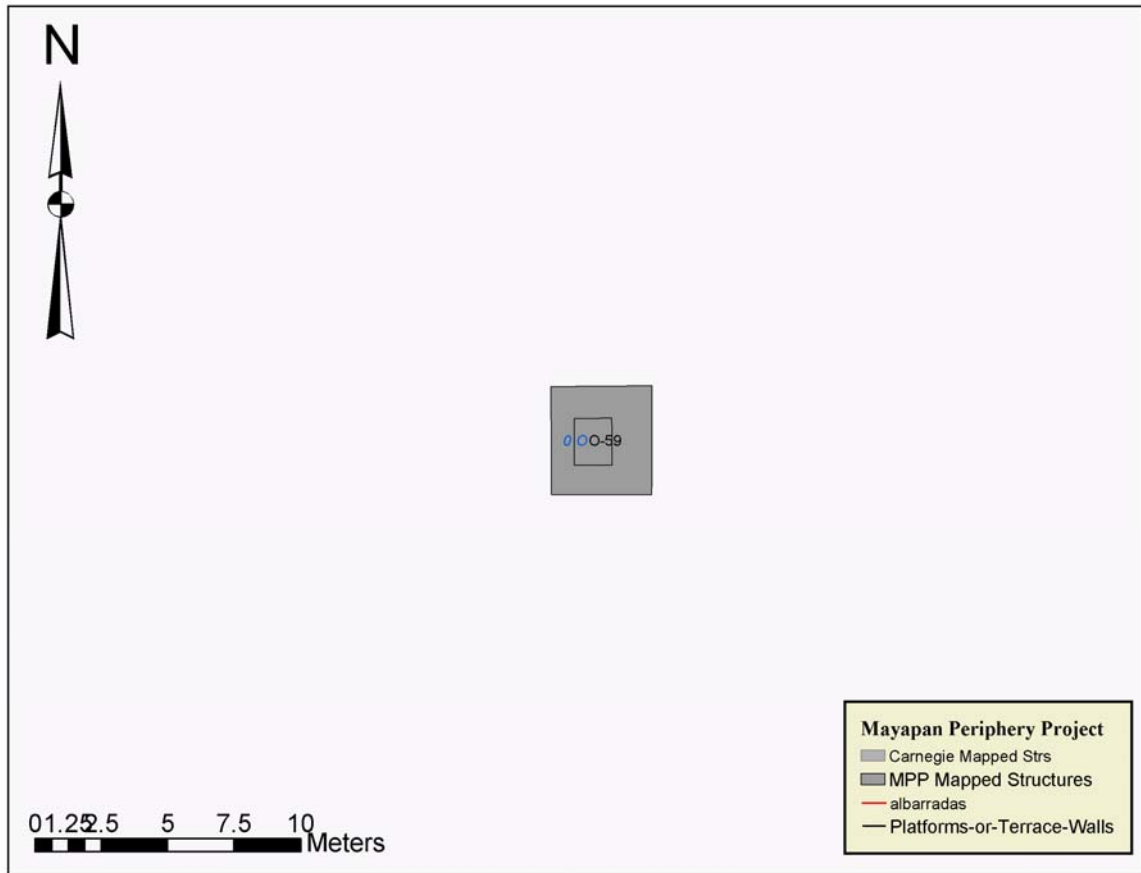


**Figure 9.5 – Public ritual group Cluster H-48 (east).**

The two structure H-48 group located east of gate “H” may be a more elaborate version of the twin stone piles described from the colonial period (Figure 9.5). The small stone pyramid has an altar-like surface size and would have been an appropriate location to display an idol for veneration and rituals and the facing one-room shrine structure would have been an appropriate place to house the idol and venerate it during the year. The west side O-59 shrine is a less straight forward analog to a twin structure group. It is an east facing shrine with a single central altar (Figure 9.6). Such a form would be appropriate to display and venerate an idol and could also have served as a place to house the idol throughout the year. There are only two structures near this shrine, one is a small

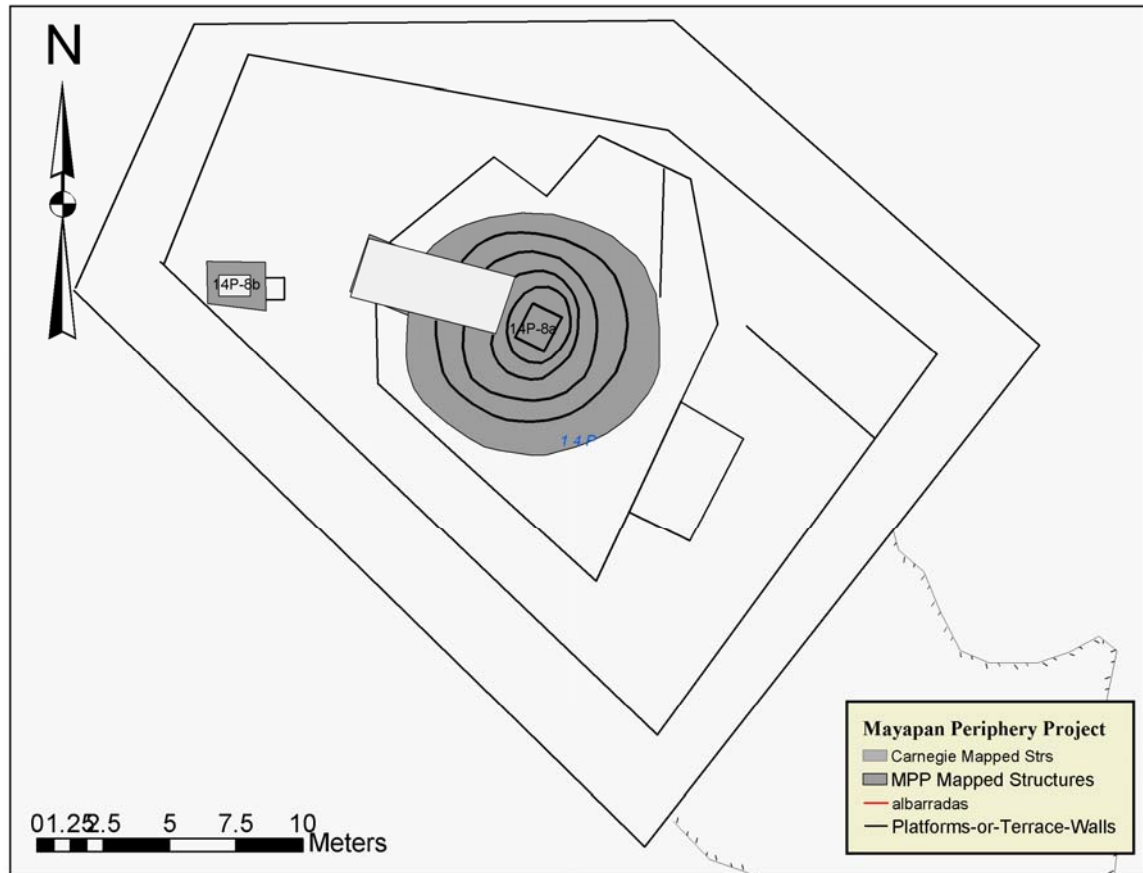
commoner residence just north of the structure and the other is a round structure just to its south that was probably a lime kiln. The clustering of the three structures in an area otherwise devoid of structures implies a link between them. It is possible that the person living in the small residence (O-58) was responsible for maintaining the shrine and may have been the priest that tended the idol throughout the year.

In both cases, these structures were found just beyond the drop off in residential structures at the point where the land use changed to other activities appropriate to the rural setting. Group 14P-8 along Transect 6 is similarly placed at the edge of the mapped Postclassic settlement (Figure 9.7). This structure appears to have been associated with the earlier ancient Telchaquillo settlement, particularly considering its orientation. Unlike the shrines just discussed, this group was not oriented to the cardinal directions, but instead faced northeast in the direction of the central cenote in Telchaquillo. However, the excavations produced more Postclassic material than Terminal Classic. It is likely that this temple was with Telchaquillo at the time of its construction during the Terminal Classic but was later used by the Postclassic residents of Mayapan. Given its location north of Gate “D” and the fact that it sits just beyond the drop-off in Postclassic residential settlement, it is not unlikely that this structure also functioned in ceremonies recognizing directionality. This hypothesis could be supported with additional research conducted outside the north gates “B”, “C” and “D” as well as gates “EE” and “X” in the south, to try to locate similar features in those two directions.



**Figure 9.6 – Public ritual group O-59 (west)**

Some remnants of these directional ritual practices remain common in the Yucatán. Many towns and villages in the area today have one-room shrines located at the edges of their towns. One nearby example lies along the road leading south out of the village of X-kanchakan, just beyond the last houses. This shrine contains a mix of imagery with both Catholic and native ritual associations. When I visited the site, I was told by a local gentleman that the shrine that is there is a fairly new construction but, that is sits on the same spot as a much older shrine that had been located there as long as the man could remember.



**Figure 9.7 – Public ritual group 14P-8 (north).**

### *Bipolar Ritual/Administrative Centers*

Even a brief inspection of the walled portion of the site suggests that the elongated oval shape of the boundary was intended to enclose important architecture in the Northeast portion of the site, including the temple cenote group at Itzmal Ch'en. A similar variation on the wall's path in the southeast of the site encloses the small temple cenote group at cenote X-coton. A variation of the city wall in the opposite direction in quadrant "X" may have served to exclude Cenote Sac Uayum from the enclosure (Brown 1999). Today this cenote still has negative ritual associations. When I visited this cenote



with Dr. Miguel Aguilera, Fernando Mena and Fernando Flores, one reason for these negative associations was clear. The entrance to this cenote is very narrow compared to most and the entrance is very dark. Without artificial light, you just peer down into a dark abyss surrounded by jagged stalactites which hang around the entrance. Put plainly, it looks mean. Entering it is probably dangerous. All of this suggests that the shape of the wall, which was influenced by the overall layout of the city, seems to be determined in part by the location of cenotes that came to have ritual importance to the inhabitants. The site center and its most important temple are located directly next to Cenote Ch'en Mul. In fact, there is a chamber of the cenote that runs to the west and under the Q-162 pyramid (Figures 9.8-9.12). In the case of the temple/cenote complex at Itzmal Ch'en, the effect on the form of the wall was far more substantial than for a small group like that associated with X-coton.



**Figure 9.8 – Main Q-162 radial pyramid flanked by colonnades Q-161 (left) and Q-163 (right) with Q-77 platform in foreground.**



**Figure 9.9 - View of Cenote Ch'en Mul and Str Q-153 from the top of Q-162 radial temple pyramid.**





**Figure 9.10 – Well preserved stucco facade of inner construction Q-162a revealed by recent INAH excavations. This façade is from the SE corner of the main temple and would have looked out over cenote Ch'en Mul in its day. The imagery features a skeletal figure with an animate flint sacrificial knife reminiscent to those pictured in Postclassic “international style” codices hovering behind him and two vultures apparently gnawing at his fingers. Head level niches are believed to have held skulls based on the presence of skull fragments in some examples. Milbrath alternately interprets the “knife” as bee wings indicative of the Bee God featured in the Madrid Codex and common along the east coast especially sites such as Tulum (Milbrath and Peraza 2003).**



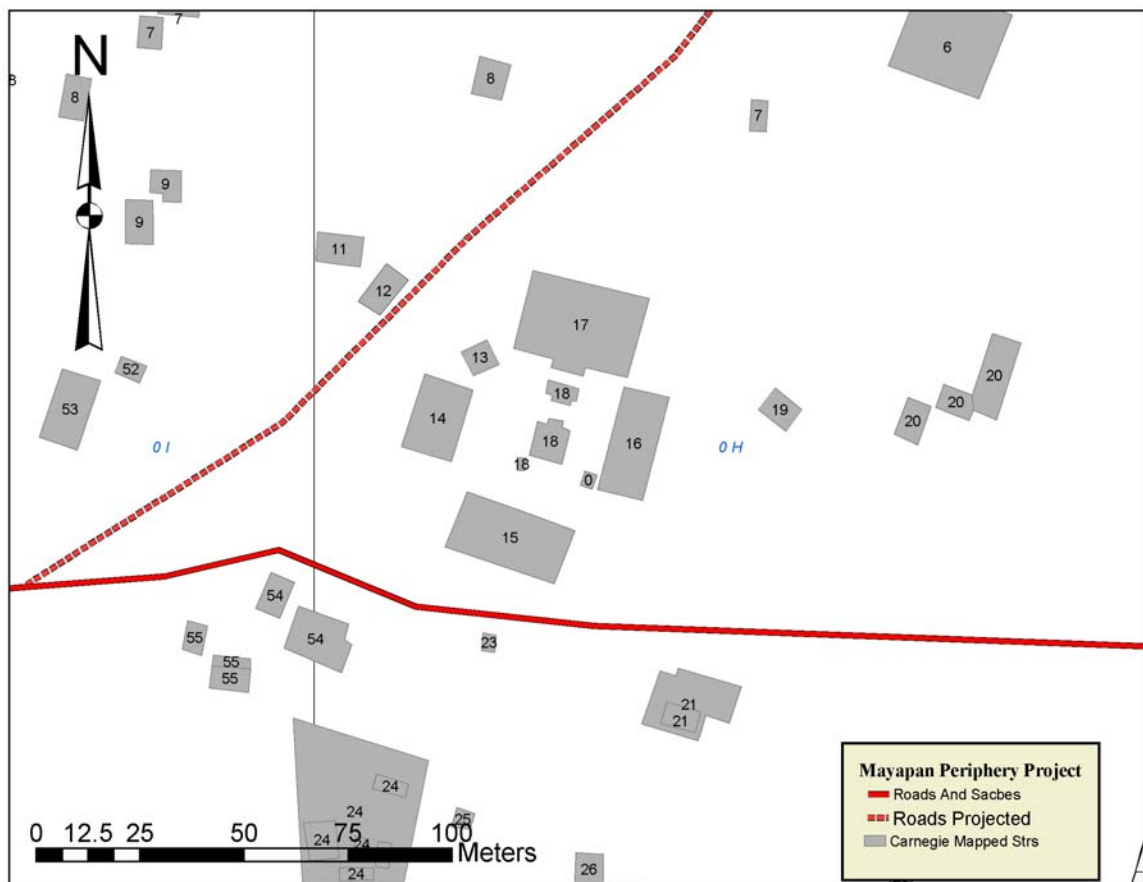
**Figure 9.11 - Two more of the skull niche figures from the Q-162 interior structure façade overlooking the cenote.**



**Figure 9.12 – Flowstone from the interior of Cenote Chen Mul carved with a pictograph of an anthropomorphic face.**



The size and composition of the Itzmal Ch'en group (Figures 9.14-9.18) make it a second major focus of ritual activity at the site. Its location within the city layout appears to reflect historical and, possibly, ethnic causes. In Chapter 7, I reviewed what is known today about the settlement history of the region immediately around the site. Several pockets of settlement were the first to sustain significant buildup of population prior to the Postclassic population explosion. The two earliest occupied pockets, the settlements around Cenote Actun Burro and Itzmal Ch'en and the settlement outlier D'zan Tun Ch'en, maintained their populations and grew into the Postclassic period. It is important to note that, until the Postclassic, there is no evidence for settlement around Cenote Ch'en Mul in the area that was destined to become the ritual center of Postclassic Mayapán.



**Figure 9.13 – Itzmal Ch'en temple-cenote group.**



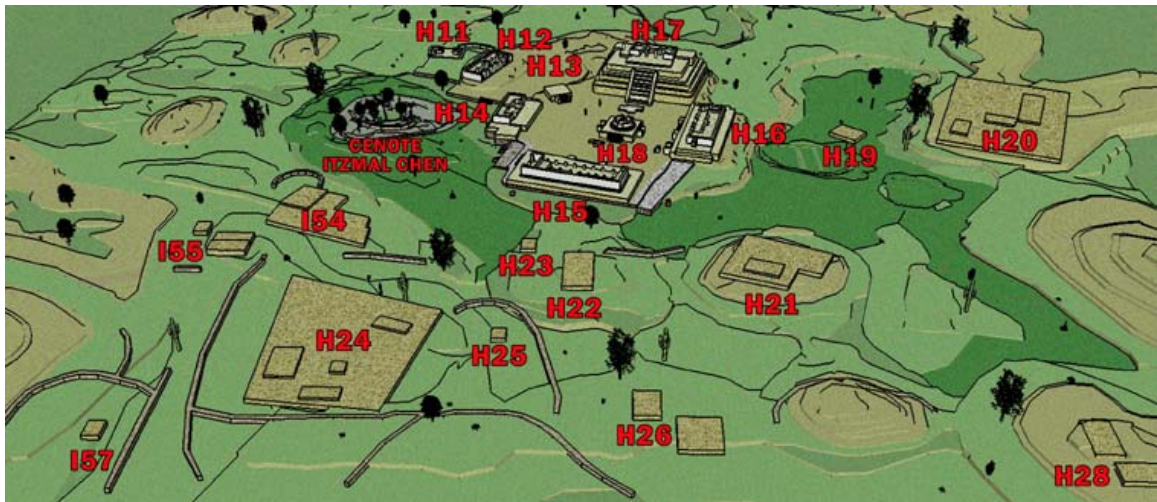


Figure 9.14 – Detailed 3-D reconstruction model of the Itzmal Chen temple-cenote group.

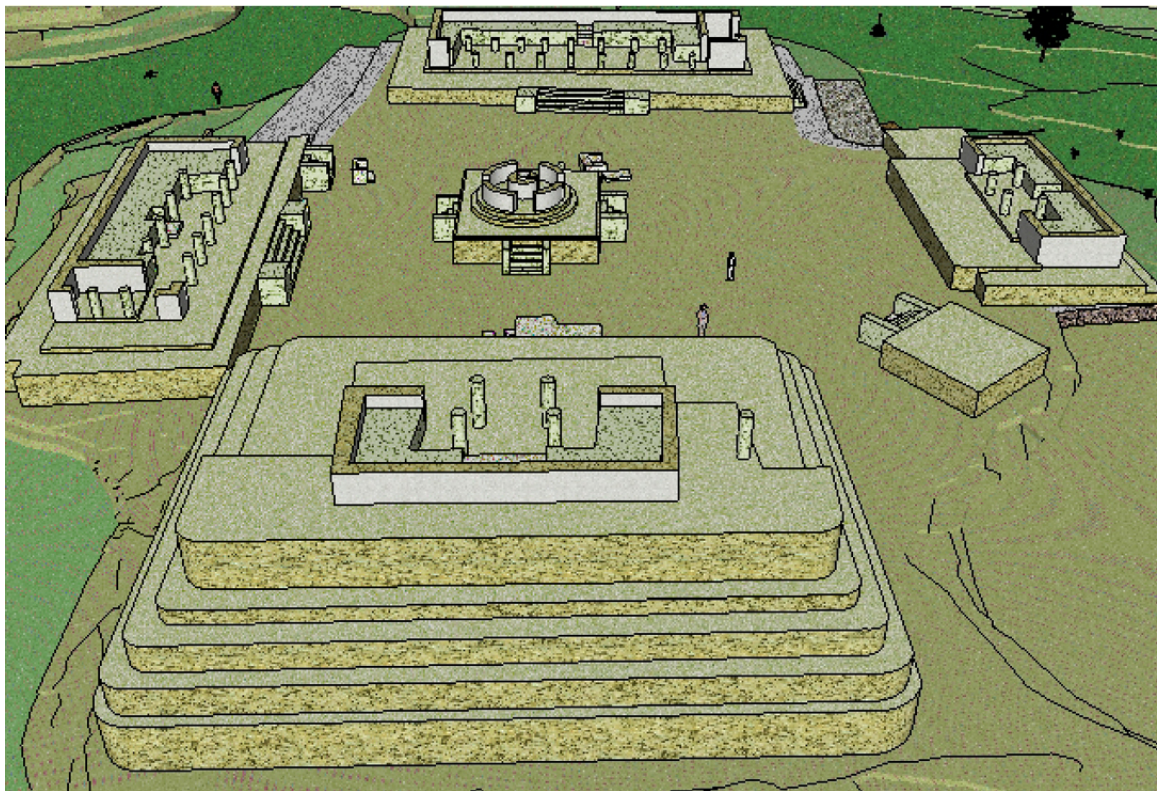


Figure 9.15 – View of main Itzmal Ch'en architecture looking north to south with Str. H-17 in the foreground.





**Figure 9.16 – The author standing on one of the platform levels of Str. H-17 which remains overgrown despite clearing for milpa around it.**



**Figure 9.17 - Cenote Itzmal Ch'en.**





**Figure 9.18 – Miguel Aguilera (left) talking with local informants along the mouth of cenote Itzmal Ch'en.**

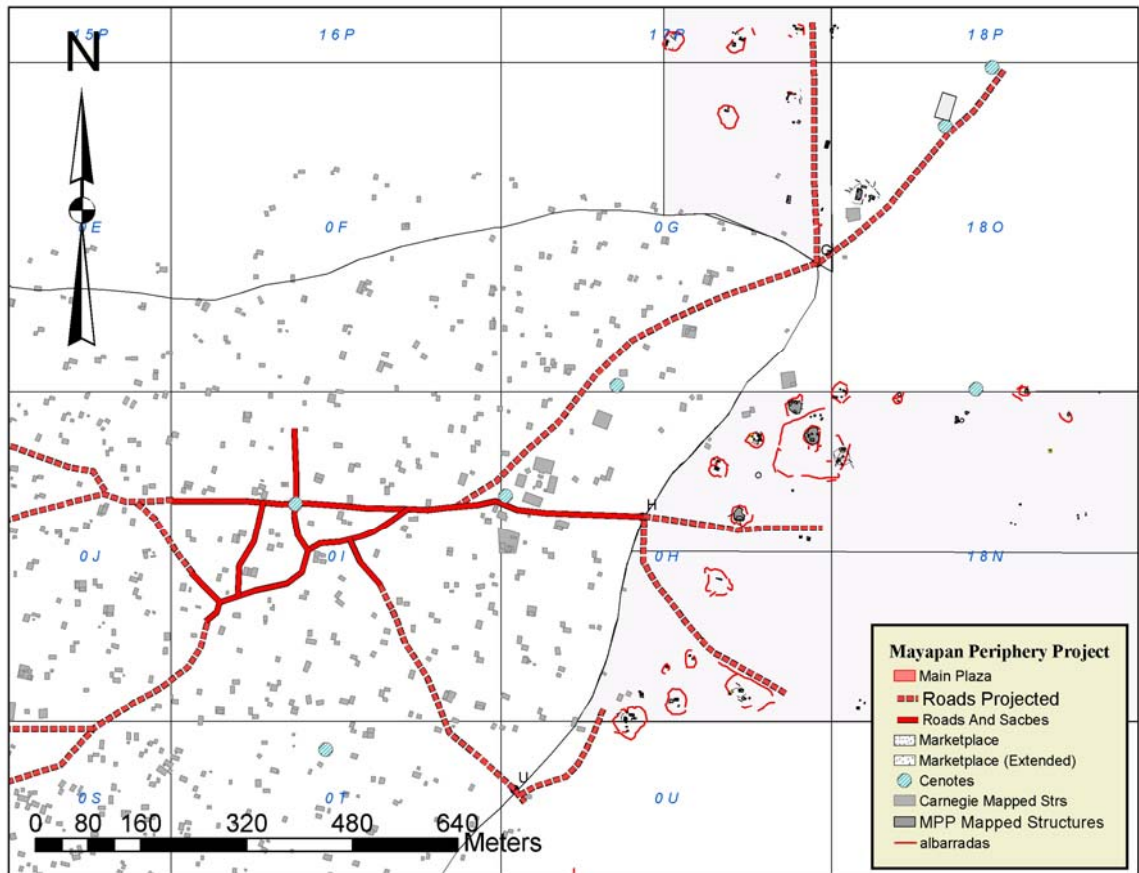
Unlike the D'zan Tun Chen settlement, which is actually closer to the site center than the Itzmal Ch'en group, the existing northeast settlement appears to have become integrated into the Postclassic city itself, forming the somewhat odd bipolar layout of the city. The temple at Cenote X-coton shows none of the administrative functions we see represented by the four colonnaded halls present at Itzmal Ch'en. The form of some of the residences in the northeast portion of the study area indicate east coast cultural affiliations. Contact with sites as far east as Tulum are well documented.

As the Main plaza was constructed, the site we think of as Mayapán came into existence. The most important ritual and administrative functions became centered there. But, the growth of the northeast preexisting settlement pocket enabled it to maintain both a population and, presumably, an independent subset of political and administrative

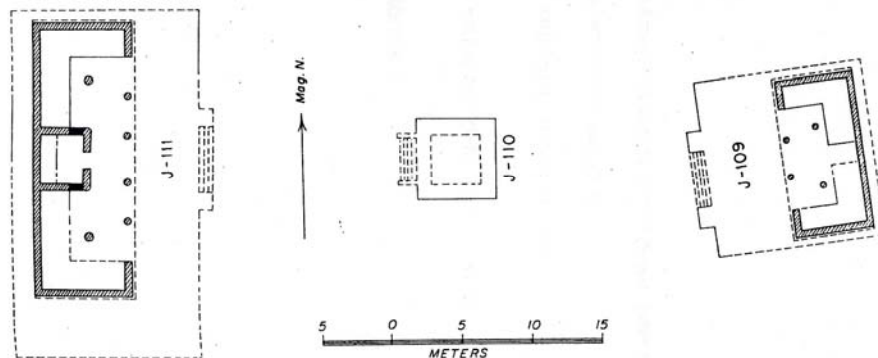
functions that would have been centered at Itzmal Ch'en. The date of construction for the Itzmal Ch'en group remains unclear. Its unusual temple style was first noted by the Carnegie project (Proskouriakoff 1962). Neither the general form of the structures nor the initial investigations carried out by the Carnegie team suggest that the group dates any earlier than Postclassic. But, they do note that the temple at Itzmal Ch'en had undergone several construction phases. More investigation will be needed to determine the initial construction of the group. It is likely that, even if they were constructed late in the site's history, the ritual associations with the cenote probably went back at least into the Terminal Classic when this area underwent a slight population increase. In certain respects this portion of the site can be thought of as "Old Mayapán" (Figure 9.19).

A similar sort of barrio may have also existed in the central portion of the site (Figure 9.3). I will call this zone the central residential zone. This area was dominated by commoner house groups. The J-111 colonnade and J-109 temple complex imply a third locus of administrative/ritual influence (Figure 9.20). This area filled rapidly during the Postclassic, connecting the newly established Main plaza to the older northeast settlement zone. A small temple in Quadrant "E" lacks indications of administrative functions. Its connecting sacbe runs in the general direction of Gate "D" but stops before reaching it. Its function remains unclear. The settlement history of the area suggests that the central portion of the site was occupied by immigrants moving in from other areas around the Yucatan as the site's influence grew. It appears these immigrants had a certain level of autonomy, at least in the heart of their residential stronghold. Of course, all such autonomy was certainly granted by the power structure residing in the Main

plaza. The same would most likely have been true of those administering affairs at Itzmal Ch'en.



**Figure 9.19 – The “Old Mayapán” section of the city in the northeast. Possibly once known as “Saclactun”.**



**Figure 9.20 – Map of colonnaded hall group composed of Strs. J-109, J-110 and J-111 (modified from Proskouriakoff 1962:Figure 2).**



We have considered those living in the central city zone, with its mix of elite and commoner residences surrounding the monumental center (Figure 9.21) and the two main residential zones in the eastern portion of the site. Another broad residential zone, encompassing the western third to half of the site (Figures 9.22-9.23), seems to have met its public ritual and administrative needs through interactions with the powers at the main plaza itself. Therefore, with the exception of a directional shrine outside of the west gate and the cluster of temples in the monumental center, no additional temples or colonnades appear to exist in this zone. Why build a neighborhood church when you can attend services at the main cathedral? A major road appears to lead from the site center west through Gate "O" which strictly in terms of settlement layout may represent another major division within the city, dividing it into northwest and southwest settlement zones. It appears that this division is also supported outside the wall as south of Gate "O" there is a very dense settlement zone and north of it very little was found.

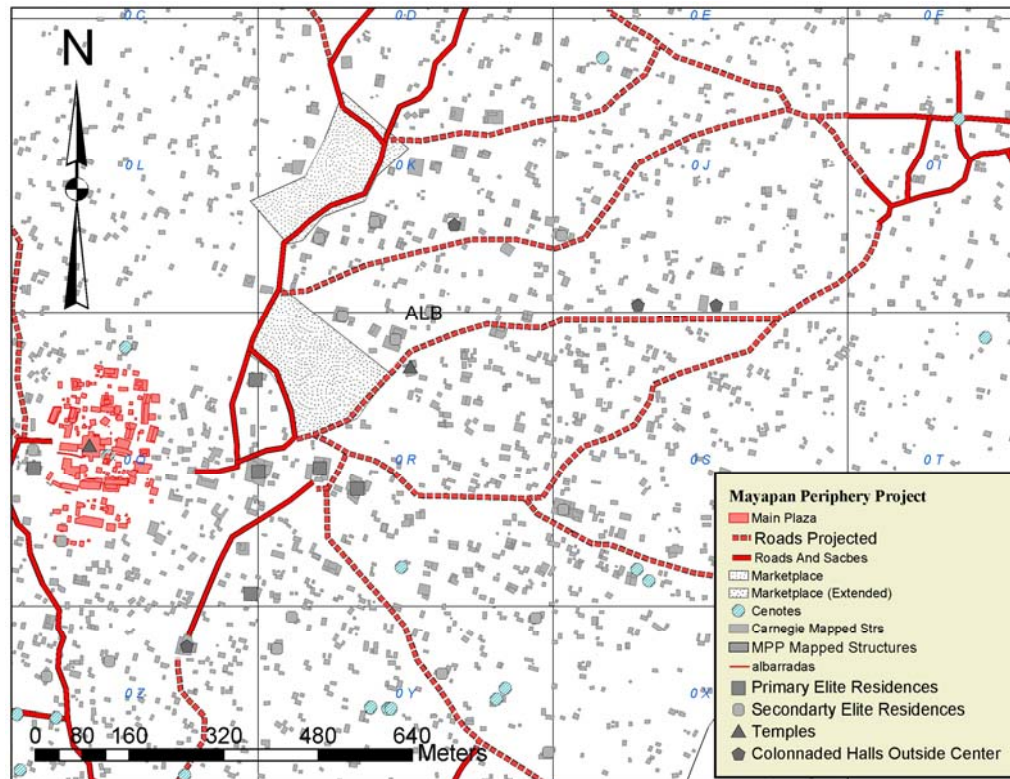


Figure 9.21 – Mayapán central city area.

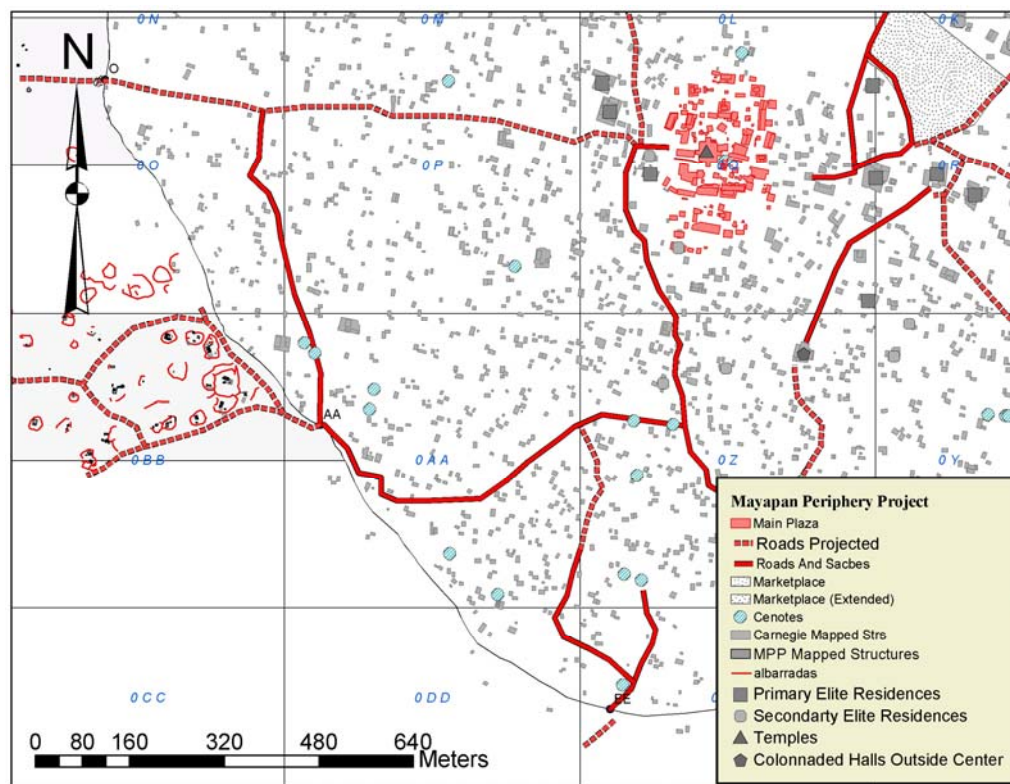
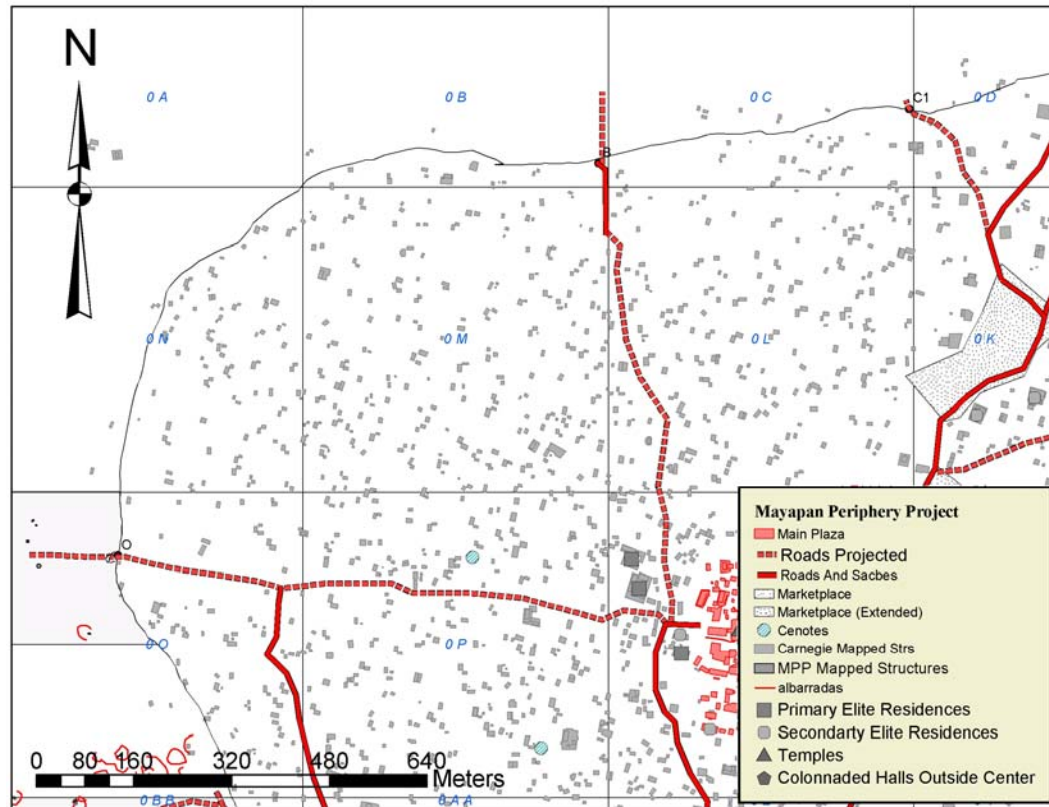


Figure 9.22 – Southwest Mayapán settlement zone.



**Figure 9.23 – Northwest Mayapán settlement zone.**

### *Public and Group Ritual*

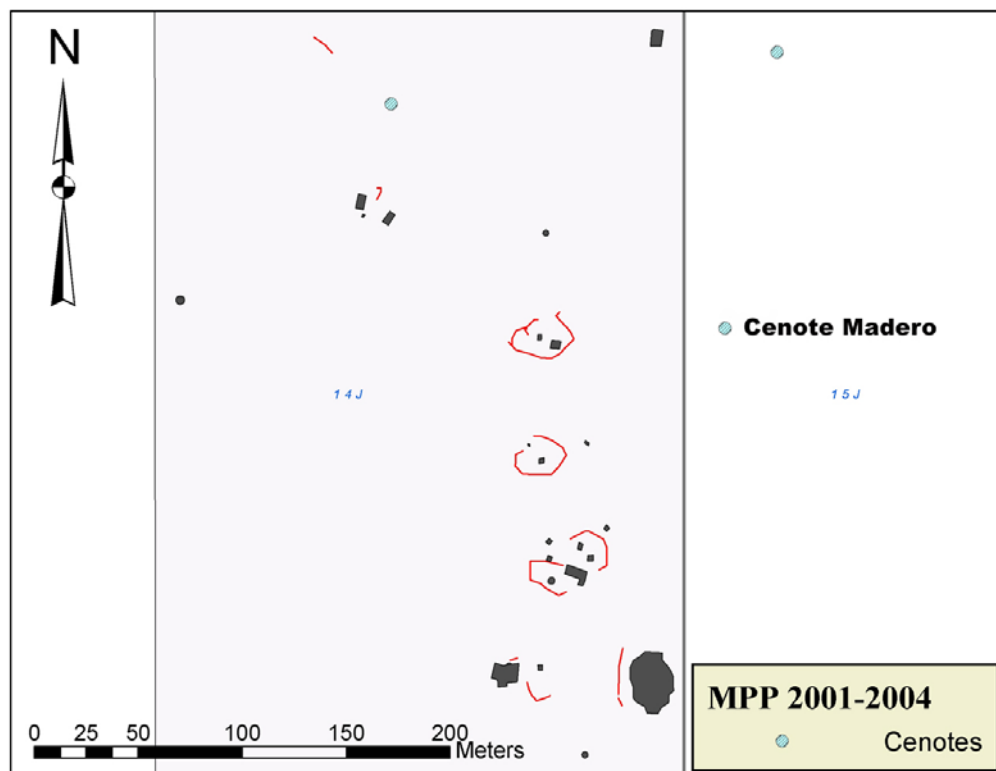
Architectural indications of group level ritual are common throughout the site of Mayapán and reflect widespread practice of household ritual including but, not limited to, ancestor veneration. Many dwellings, both elite and commoner, have altars built into their back rooms. Colonnaded hall groups usually have associated altars, family shrines and oratories. In fact, many of the structures in the main plaza are best thought of as serving group ritual functions rather than public ones, with the group being an individual family of lineage. The pattern seen inside the wall is repeated outside the wall in the residential groups. Small stone altars are common features in commoner residential

groups. The possible slaves or servants living in group 18N-8 had a small round cobble altar centrally located in the group they occupied. The affluent commoner group H-40 contains a one-room structure that many have been a family shrine or oratory. The 18O-1 colonnaded hall group contains a clear family shrine, a low platform altar, a possible oratory and one probable statuary altar. All of these are indications that household level ritual was in common practice throughout the site among the wealthiest and poorest alike.

An analogous, and related, activity is seen in many Telchaquillo house groups today. It is not uncommon for modern house groups to have small shrines as part of their layout. The most conspicuous image associated with these shrines today is the Virgin of Guadalupe. Close inspection of these shrines shows a mix of catholic saints and images with native ritual associations. They are usually small stone or brick constructions with a niche on the top that holds the central image. A small ledge at the base of the niche is used to hold additional imagery, offerings, flowers, candles, etc. It is also common today to see these shrines lit with electric light stings. These are common to house groups and are seen frequently in stores and other places of business. This blending of commerce and ritual are also indicated in the market structure recorded in D'zan Tun Ch'en which has a single small cobble bench that likely served as an altar, bringing us to the distribution of commercial functions at the site.

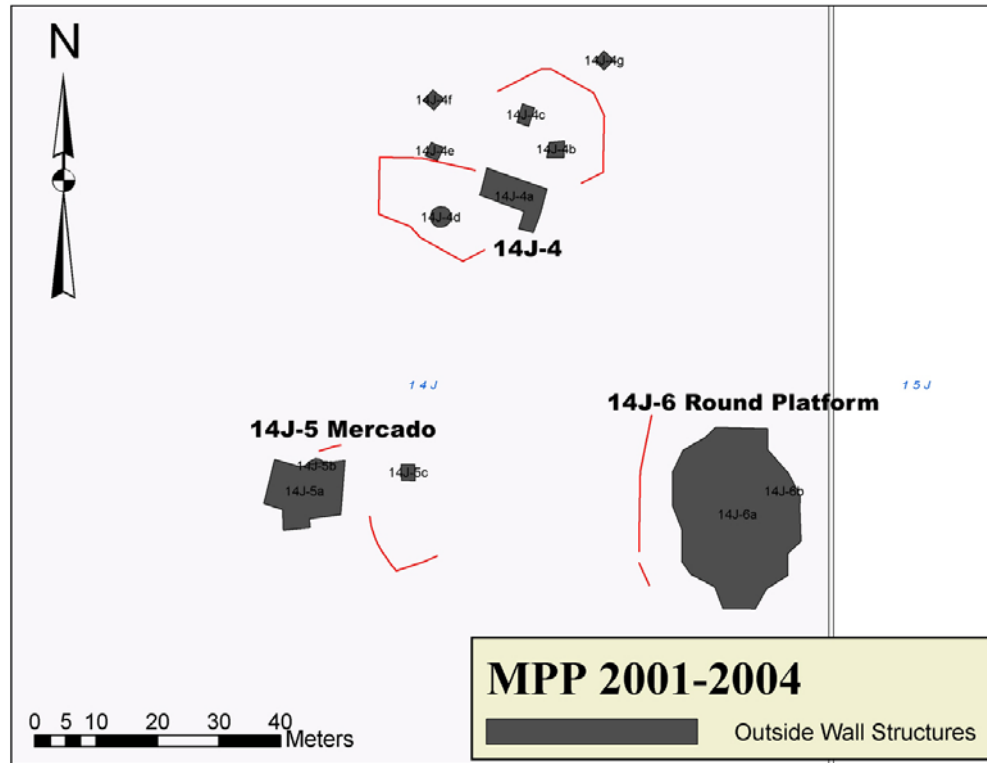
No temple or shrine structures were recorded in the D'zan Tun Ch'en settlement to the south (Figures 9.25-9.25). It is unclear whether the residents of the site came into the city to worship or unmapped portions of that settlement hold such features. The large 14J-6 performance platform may have served some ritual needs. Given the proximity of the settlement to the much larger settlement just to the north it is likely that people from

the site may have participated in group ritual functions in the Main Plaza just 2km to their north. Indicators of group ritual were not common. Alternately such a structure may well lay outside of our survey transect. One feature along the north wall of the 14J-5 market was the one likely altar recorded. More work on this question is needed in the future.



**Figure 9.24 - Map of Dzan Tun Ch'en settlement pocket.**





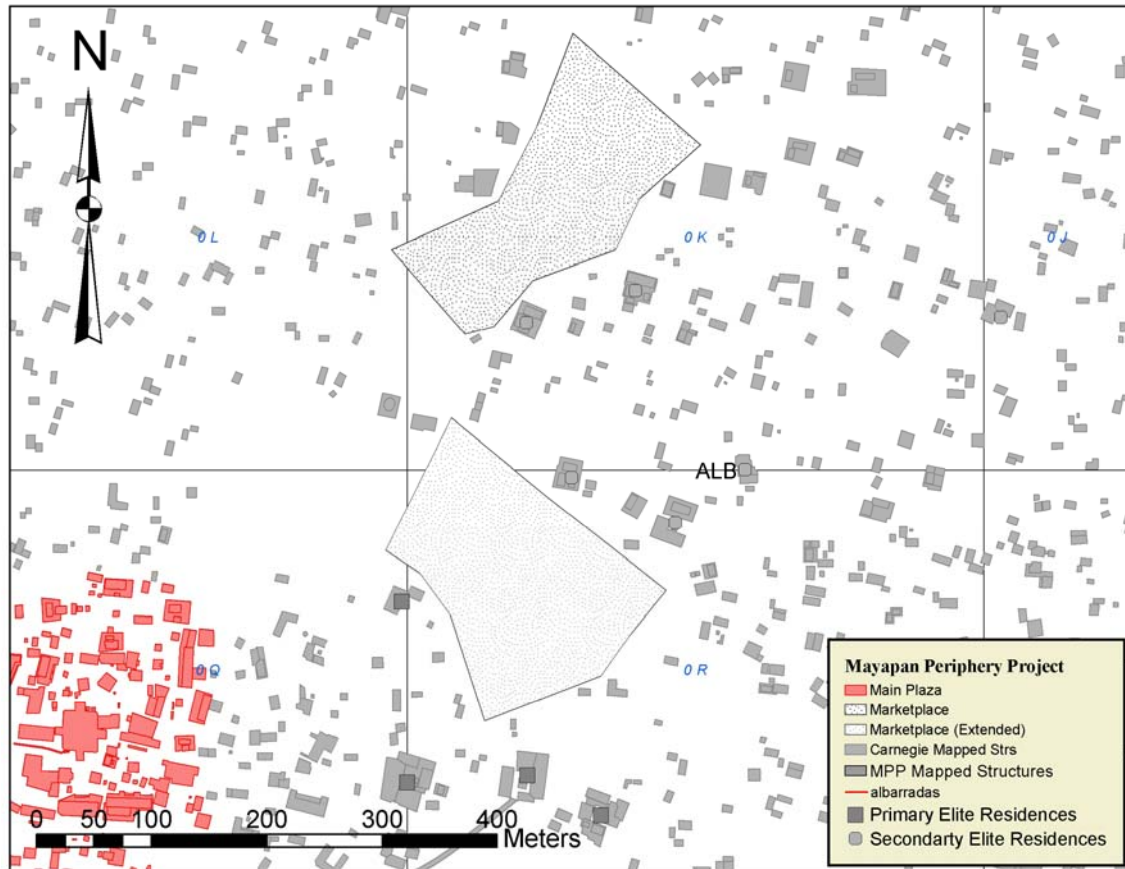
**Figure 9.25 – Main public architecture recorded for D’zan Tun Ch’en.**

### **Geographic Distribution of Commercial Functions**

Three marketplaces have been identified in the areas of the site mapped to date. Two of those are located near the geographic center of the city. The other is a much smaller market located near the center of the D’zan Tun Ch’en outlier south of the city wall. In each case, the identified markets are flanked by the houses of elites or affluent commoners who were apparently involved in some material means with the distribution of goods at the markets. The findings suggest a market economy featuring a large central urban market surrounded by smaller peripheral markets in outlying settlements.

### *Central Market Areas in Mayapán*

Within the city wall, the Proyecto Económico de Mayapán (PEMY) project has identified two likely marketplaces (Figure 9.26). These two areas are located adjacent to each other and east of the Main Plaza. These markets were located near the geographic center of the site and appear to have served the needs of the whole settlement. The area to the east of these two market spaces is dominated by the homes of secondary elites. The presence of these groups flanking the two markets suggests that commerce was the source of their wealth and status. The same was likely the case as well for several primary elite families. A cluster of five elite residential groups are located just south of the markets. Commercial interactions in a city this size would have been a complex affair, necessitating administrative control as another vital commercial function for the settlement. It appears that such administrative functions as settling disputes, collecting taxes, etc., may have been managed through activities at the K-79 colonnaded hall group. Taken as a whole, these two markets, their associated elite residences and the K-79 group can be thought of as a central business district for the city.



**Figure 9.26 – Likely central market areas.**

Of course not all commercial interactions in a settlement this size occur within the bounds of this kind of formal market exchange. Undoubtedly, household scale trade was also a common occurrence across the settlement. If ethnographic comparisons are any indication, this process would have involved face-to-face exchange between neighbors in the various parts of the city. Families with a surplus of one type of commodity or product would have been able to trade that surplus for other goods available in their local neighborhoods. Today, the Yucatán's cities, towns and villages are filled with small family run stores, butcher shops, etc. Certain goods are probably better distributed at the local barrio level, primarily those items that are highly perishable such as fruits and vegetables. One of the most prone to spoilage is meat. Given its highly perishable nature,

it is not well transported over distances without salting or other preservation. The faunal collection suggests that among other game, deer were commonly kept and slaughtered just as they reach their full adult size. Walled animal pens have been found throughout the site in commoner residential contexts. Given the amount of meat produced by one deer, it is likely that the meat was divided and distributed among more than one family. Distributing the meat through trade with immediate neighbors seems a likely approach.

In modern day Telchaquillo, most families have chickens, turkeys and at least one pig. The fowl are usually eaten individually within the day-to-day family routine or served in numbers for various celebrations and ritual feasts. People in the village divide larger game and livestock among multiple families either informally or through their local butchers. Members of an extended family, within or across individual house groups, commonly share meat hunted by one member of the family. There is a regular rotation of the “meat of the day” available for purchase in Telchaquillo. One day of the week, butchers will kill as many of a given animal as are needed to feed the village that night. The day determines whether it will be pigs, cows or another type of animal will be butchered. Most of the families will eat fresh meat that day. This sets a rotating meat diet in the village that many families share. A more spectacular example of this practice occurs during the annual bullfights in the spring. Every night of the annual bullfight the first bull brought into the ring is killed (all that follow are left unharmed). This first animal is dragged out to the center of the square and thoroughly butchered on the spot. The entire animal is sold quite rapidly right there on the street - meat, hide and all. The whole affair is usually complete in under an hour. The most common dish in the village during this week is a delicious beef soup made with the evening’s bull meat. In larger

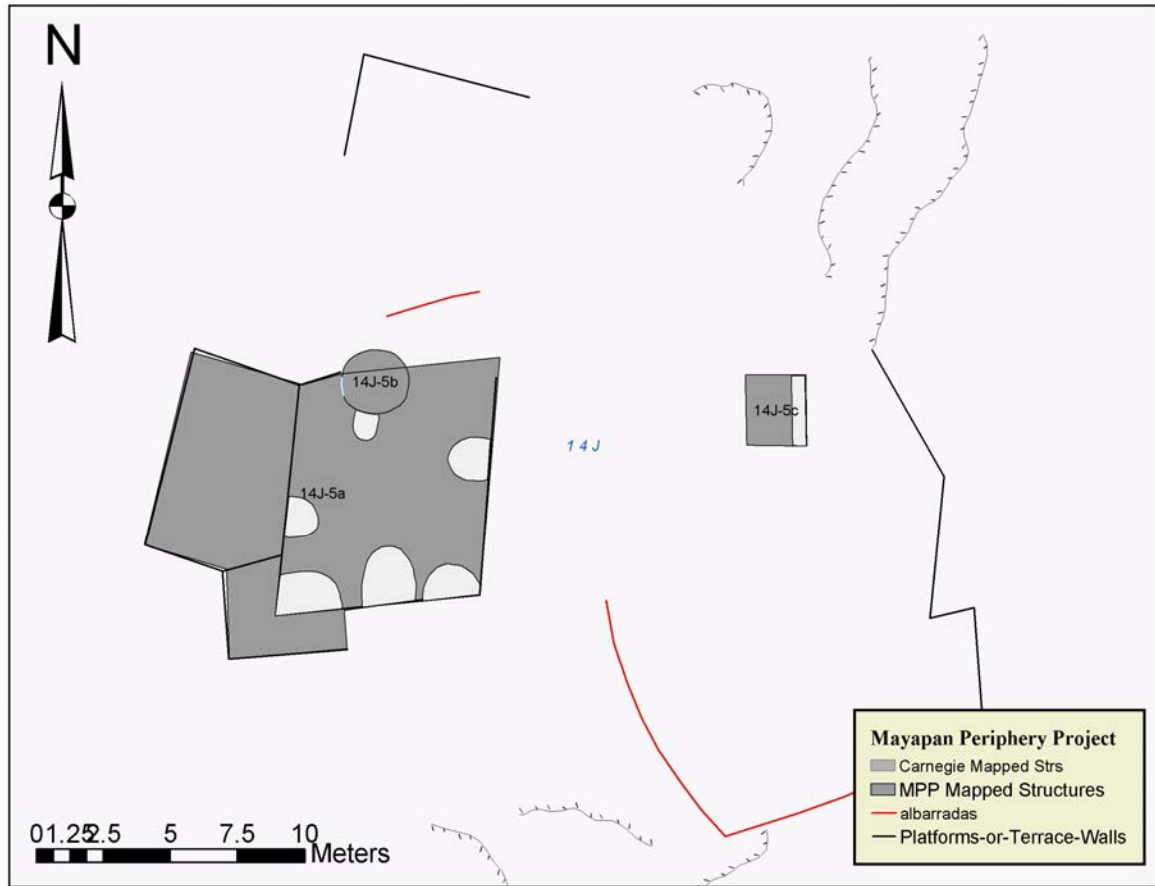
towns, the activity is quite similar, the number of bulls killed being determined by the amount of meat that can be eaten by the various families in town. Even with modern refrigeration, meat is usually still produced, sold and consumed locally at the household level. I suspect that a similar system of household exchange would have been common at Mayapán as well, especially for goods prone to spoilage.

#### *Peripheral Market Functions at D'zan Tun Ch'en*

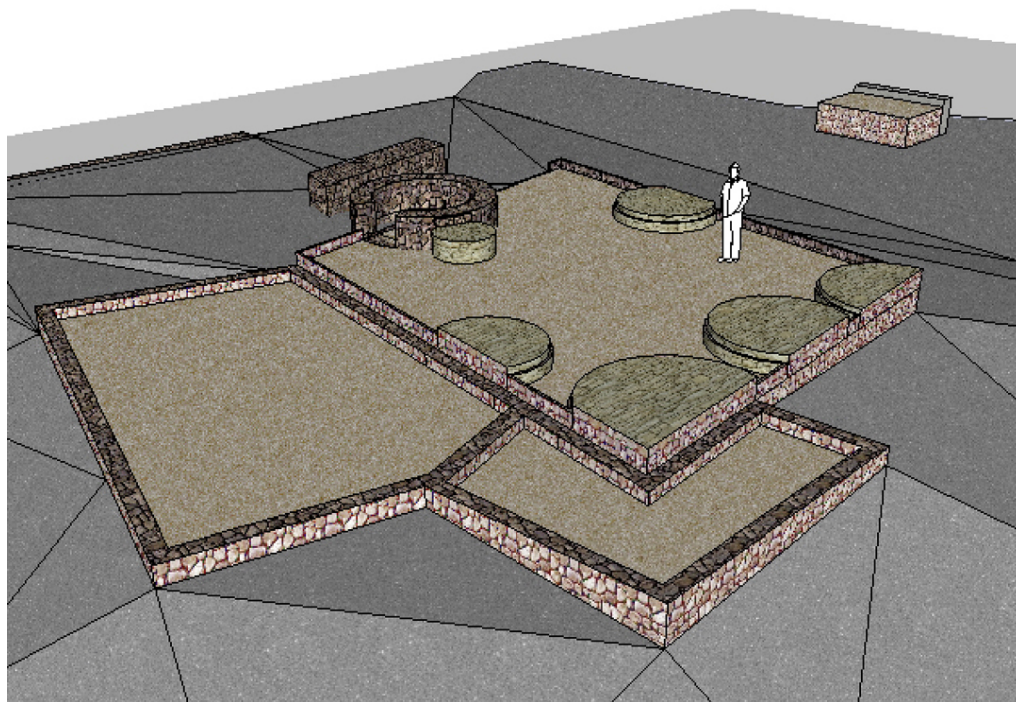
The third likely commercial area identified by this work lies south of Mayapán in the outlier settlement of D'zan Tun Ch'en (Figures 9.2-9.25). This area was one of the two earliest occupied settlement pockets. Like the "Old Mayapán" settlement pocket in the northeast of the site, this area continued to be occupied throughout the Postclassic. Unlike Itzmal Ch'en, this region never came to be integrated with the newly founded Postclassic center. This area followed a different path and became a distinct site. The residents of the site appear to have provided for some of the needs of the society locally. Based on what we know, we believe that at least some portion of the community's commercial needs were met by the market structure 14J-5 (Figures 9.28-9.29). The market area was flanked by the largest group recorded in the settlement, 14J-4, but the exact function of this group is not entirely clear (Figure 9.30). However the large number of storage features found surrounding the main central structure suggests that many of the goods sold at the adjacent market moved through the group. The large central structure may have housed an affluent local that was importing and storing goods in the group and it may have housed merchants coming in to sell their goods. Almost certainly, any



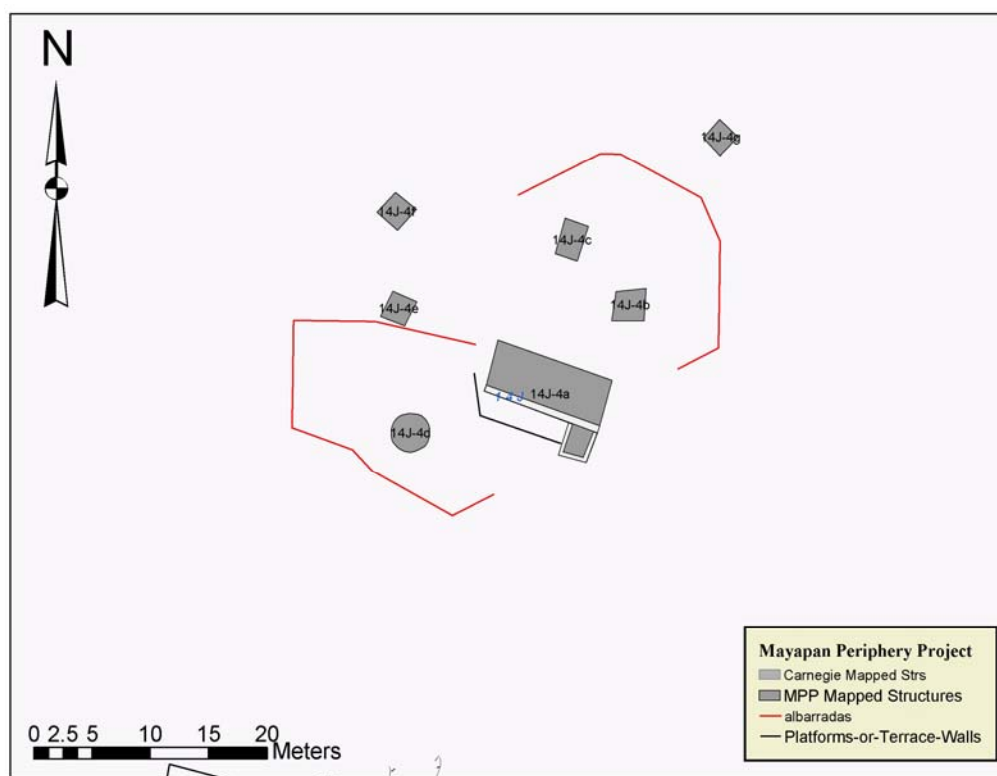
administrative decision making regarding trade at the market would have taken place there. As no more suitable feature was recorded, this may have also been the center of political control for this small site. Additional survey of this settlement area would provide a more complete picture of the layout of the site and specifically where in the settlement this group sits.



**Figure 9.28 – Peripheral market at D'zan Tun Ch'en, Cluster 14J-5.**



**Figure 9.29 – 3-D reconstruction of 14J-5 marketplace looking northeast.**



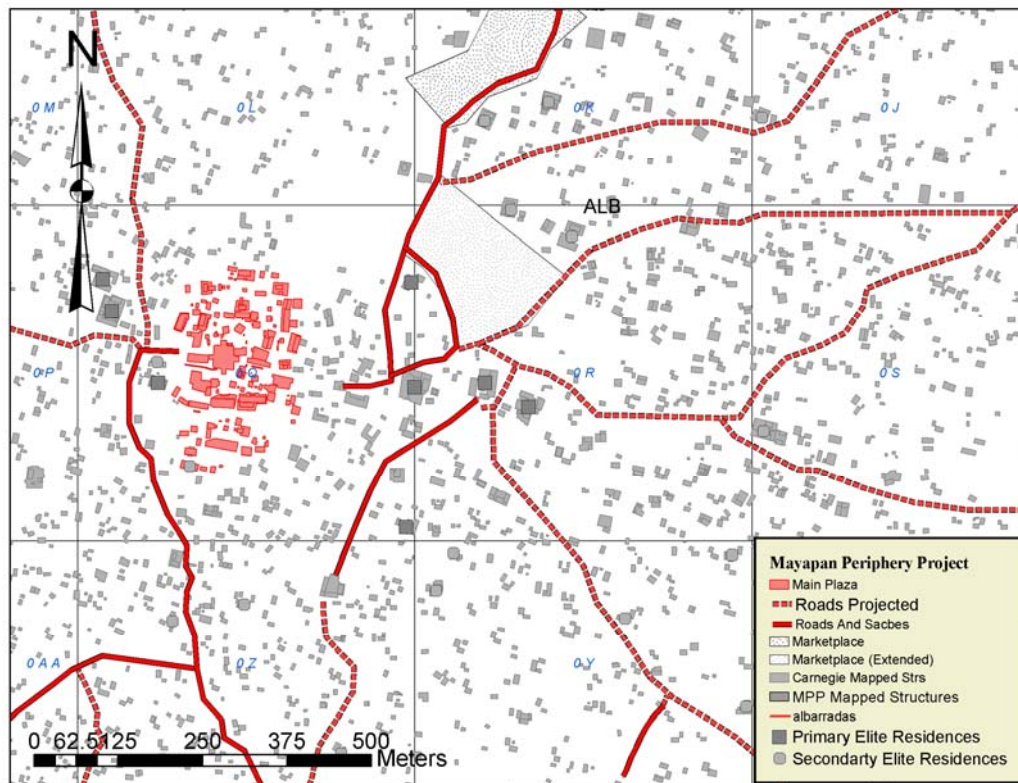
**Figure 9.30 – Cluster 14J-4, Possible storage and administration (or housing for traders) related to the D'zan Tun Ch'en Market.**

## Geographic Distribution of Primary and Secondary Elite Residences

Landa's description of settlement at Mayapán indicated that there was an inner wall at the site that contained the main ritual and administrative architecture. He indicated that the site's elites built their homes just beyond that precinct in a distribution that I have suggested was fairly concentric zonation of the type common throughout Mesoamerica. The pattern he described fits well with the archaeological evidence. I would like to make some additional observations about this distribution. As I noted, all of the primary elite architecture is located within 500m of the Q-162 pyramid (Figure 9.31). However, within that space, the distribution of these groups is not a simple ring surrounding the site, the most extreme form of concentric zonation. Instead they cluster into two distinct groups, one lying to the east of the Main Plaza and the second lying to its west. The placement of these structures seems largely determined by their relationship to major roadways running through the city (see discussion of the road system below). These house groups are notably larger than most commoner residential groupings. Therefore, they required access to the larger *altillos* in the area. The eastern cluster of these groups may also reflect the role of commerce in the enhanced status of these families as indicated by the proximity of these eastern groups to the two market areas identified by the PEMY project. The primary elite groups west of the site fall at a major road intersection.

The location of the various secondary elite groups also suggests that commercial interests probably had a strong effect on the placement of their groups around the site center. Almost all of the secondary elite groups recorded were found between 250 and

750m from the Central pyramid. However, as seen in the distribution of primary elite structures, they appear to cluster in two main areas, one to the northeast of the Main Plaza and a second to its south and southeast. The northeast cluster essentially lines the edges of the two identified markets. The associated colonnaded hall suggests some cooperation among these secondary elites in administration of the central market zone at the site. Again, the factors effecting the distribution of this second cluster remain unclear, and may reflect the distribution of various lineages or ethnic groupings around the site. These groups were less closely associated with each other than those in the northeast cluster. Therefore, these families appear to be less closely linked than those residing around, and presumably benefiting from, the market areas. As expected from the Landa description of the site, none of the elite house groups were recorded outside of the city wall.



**Figure 9.31 – Distribution of primary and secondary elite residences in relation to Mayapán’s monumental center and road network.**

## Geographic Distribution of Commoner Residential Zones

Commoner house groups are found throughout the site, both inside and outside of the city wall. Commoner groups located near the Main Plaza are usually attached to elite structures, suggesting their function as dwellings for servants, caretakers and/or slaves who worked in the central ritual/administrative precinct. Smith (1962) noted that the orientation and specific placement of commoner groups was largely determined by the distribution of locally occurring *atillos* around the site. These features are ubiquitous across the landscape at Mayapán. That explanation only takes us so far in understanding how these groups were organized into larger residential zones. New information suggests that historical and social factors were important in determining in which general areas of the city different commoners lived.

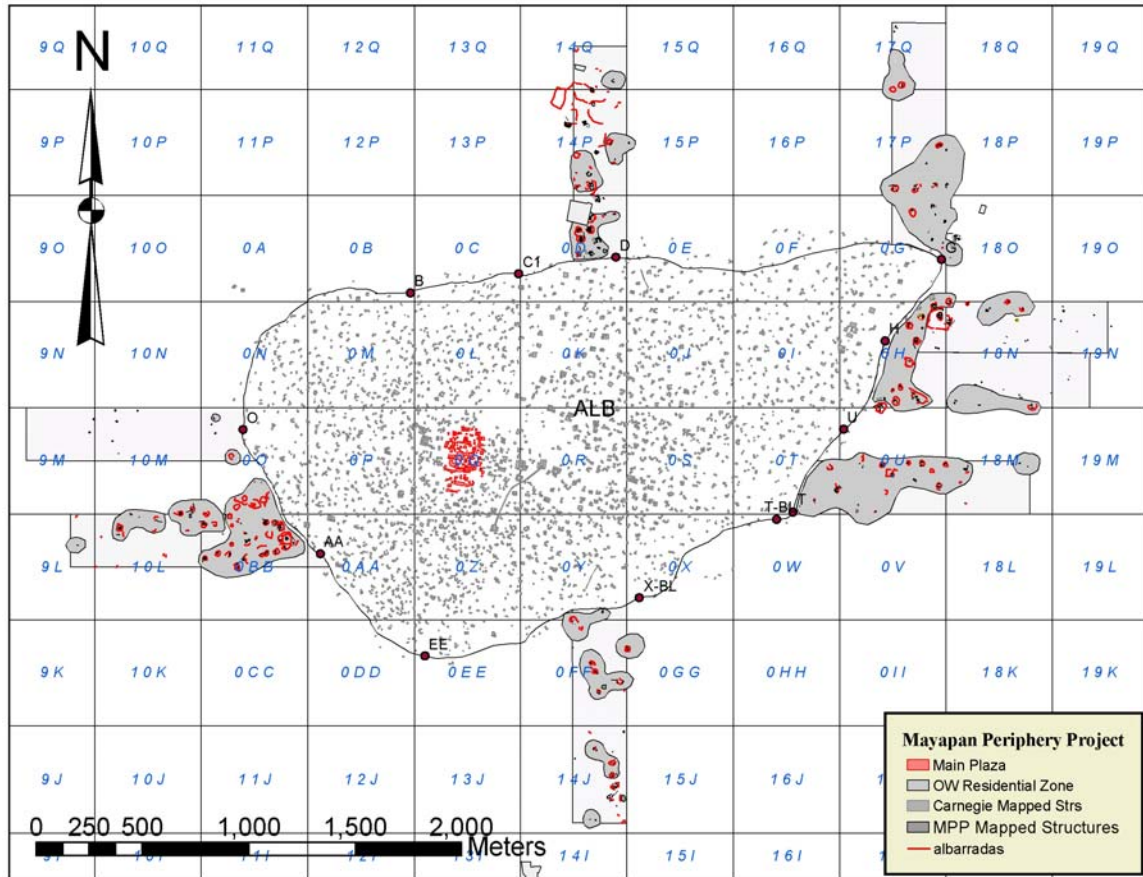
The historical and excavation data suggest that the Northeast portions of the site were occupied well before the rest of the site. I suggest that those residing in the area were the original inhabitants of Mayapan. There are indications in the form of the dwellings that the settlement in this area had strong ethnic ties with areas of the Yucatan located east of Mayapán. This information fits well with ethnohistoric accounts of early and continued contact between the site and others as far to the east as Tulum (Roys 1962, Milbrath and Peraza 2003).

The densest zone of commoner settlement lies south and west of the site. This area seems to have been well connected to the Main Plaza by virtue of the fact that it lacks its own ritual and administrative structures (as we find in the east). Strong indications of a gulf coast barrio in this area come from the distribution of distinct gulf



coast pottery found in milpa 1, lying just to the west of the Main Plaza. This settlement pocket began to form and fill during the terminal classic and grew substantially during the Postclassic period. These two areas then formed the core of Mayapán's commoner distribution in the earliest periods of the site following the founding of the Main Plaza and the formation of what we would consider Postclassic Mayapán.

A third major zone roughly the area between these two earlier zones filled almost exclusively with commoner residential structures. The ethnohistoric accounts from Landa indicate that, as the site grew in power and influence, many people relocated from various areas of the peninsula as their territory came under Mayapán control. Since we have not seen any Terminal Classic settlement in this area, the central zone was likely home to these new immigrants to the site. The presence of a single temple and colonnaded hall in the "J" quadrant probably reflects neighborhood level ritual and administration for those living in the central settlement zone and lends support to the theory that it was a distinct zone of commoner settlement.



**Figure 9.32 – Commoner residential zones outside of the city wall.**

The data collected at commoner groups outside of the city wall (Figure 9.32) suggests that those living areas outside of the city wall were extensions of the three major settlement zones just mentioned. This is particularly clear in the older northeast and southwest portions of the site. Both of these two pockets were occupied early in the site's history, almost certainly before there was a city wall in place at all. That suggests that planners of the city wall split these two areas by constructing the large feature. By extension, many of those living in these two areas did not intentionally build outside of the city wall. Rather the city wall's construction left them on the outside. The placement

of the wall and its gates more likely reflects the preexisting settlement pattern than the choice of residential locations that were close to the wall and to the various city gates,.

Whether the same pattern applied in the central zone is difficult to say based on the locations of the selected survey transects. Given the later dating of this area of the site, it is more likely that some of those living in the area had a choice of locations inside or outside the wall. However, if the wall was constructed very late in the site's history, the same pattern of divided settlement likely occurred. In either case, it now appears clear that many who we now consider part of the population outside of the wall were not cut off from the rest of the settlement by the feature when they chose a location for construction. In fact, they may not have even thought as themselves as "peripheral" given the fact that many groups located outside of the wall in the southeast settlement pocket were actually located closer to the Main Plaza than those living within the wall further to the east.

### **Geographic Distribution of Agricultural Zones**

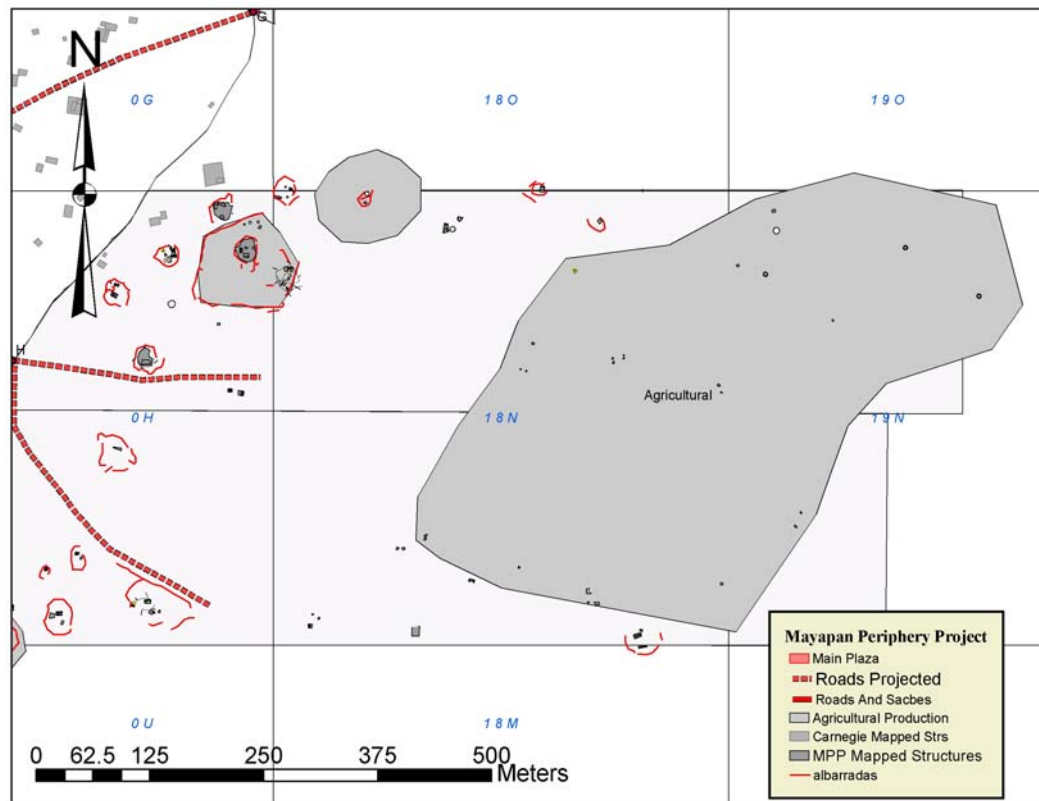
Agricultural activities at Mayapán left a number of detectable archaeological correlates. The presence of cultivated fields is indicated by the distribution of storage features and field outbuildings. Stone enclosures that may have been used as animal pens are found attached to many commoner residential group boundary walls and would have been appropriate to hold medium sized game such as deer or peccary, both of which are common in the local faunal collection. Much larger enclosures documented in the north of the study area appear to have been associated with larger scale operations, probably

raising herds of deer. Honey production is another form of agricultural activity that has deep roots in the area. At least one group recorded during the survey contains features that most likely served as apiaries. It is interesting to note the significant similarity between land use patterns evident at Mayapán and modern day land use by residents of the area. The distribution of all of these features across the landscape tells us a great deal about how the overall dietary needs of the site's large population were met.

### *Cultivated Field Agriculture*

A large number of storage features and field outbuildings were found east of the main site (Figures 9.33). The distinct zone in the east is virtually the only agricultural area detected in the study area. The full extent of it can not be judged based on the area mapped as it continued beyond Transects 1 and 3 to the north and east. No such land use was recorded along Transect 8 which was located just 250m south of Transect 3. All indications were that the unmapped area between these two transects was largely occupied by residential groups rather than functioning as an agricultural zone. These groups were consistently located in the low areas where soil accumulates between altillos. These structures are similar in form to modern buildings having similar function. Agricultural groups were not surrounded by stone albarrada walls. However, modern milpas are almost always defined by fences that ring the cleared field that are constructed using wood from the clearing process. Stone walls are not practical for marking milpas because each milpa is only planted for a few years before it must lie fallow and regenerate its nutrients. Milpas are usually household-based operations and their

locations are administrated through a local collective. Such a land use system is common in many of the villages and towns of Yucatán.



**Figure 9.33 – Locations of cultivated field areas (east) and architecture which appears tied to production in the area.**

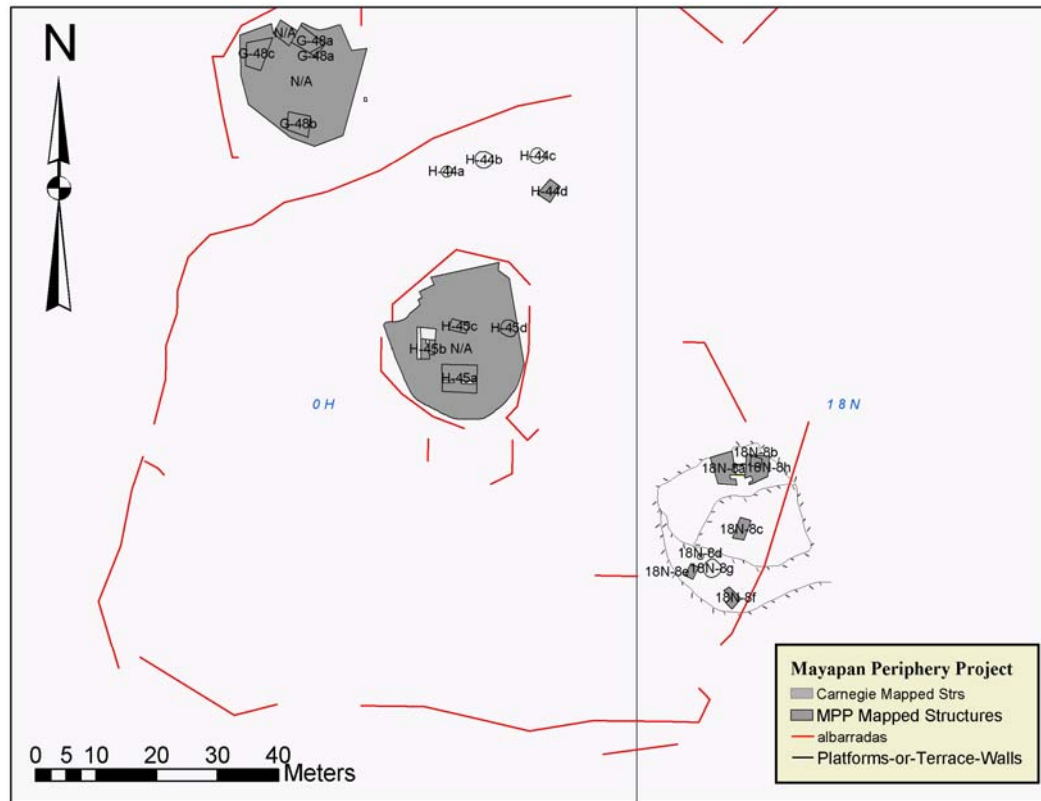
It is not unlikely that this eastern field zone would have been similarly subdivided, with individual, family farmed plots marked by perishable boundary walls. The location of the zone in the northeast “Old Mayapán” portion of the site is interesting. Perhaps those local residents that had occupied the area were the chief agriculturalists supplying locally produced crops. Of course, large areas outside the city wall have yet to be surveyed so, it is difficult to say definitively. It is also not possible to say how large this area was or accurately estimate its agricultural output. Based on what was mapped, however, it seems unlikely that this zone would have produced anything near the city’s staple crop needs, which implies importation of maize, beans and other staples from the



surrounding areas, presumably not long distances away given the constraints on moving bulk goods across land without pack animals or the wheel. It would have been feasible to transport goods into the central market zone from this area along the eastern road system entering the city wall at Gate “H” or possibly through Gate “G” at the northeast entrance. The presence of the 18O-1 colonnaded hall group adjacent to the latter gate may have enabled tax collection before goods were allowed to flow in from the area, at least after the construction of the city wall. This zone was probably utilized by residents of the area primarily in the early periods of the site’s history.

The house group H-45, discussed in more detail above, appears to have been associated with this eastern agricultural zone (Figure 9.34). It was a designated affluent commoner group on an *altillo* surrounded by a very large *albarrada* enclosure containing two other groups, one composed of four storage features (H-44) and the other (18N-8) a collection of seven structures that seems to have been a residential group of unusual form. All of the structures in the group formed a patio. It seems that all had perishable superstructures. There was a small round group altar found in the plaza area between the residential structures, suggesting household level rituals took place. Also, this group, unlike most residential groups, was built in a low area between *altillos* and lacked its own *albarrada* enclosure. Those residing here, by all indications, were under control of the people occupying the H-45 central group. They did not have the usual autonomy over the area surrounding their house group that is found in nearly all residential groups and they occupied poor quality perishable structures rather than the very common Mayapan style two-room dwelling. The presence of this cluster of groups adjacent to the agricultural zone implies that those living in group 18N-8 were slaves or poor servants working for

the family at H-45 and probably worked primarily in the eastern fields to produce crops that would have been stored in the H-44 group's storage features before final distribution.

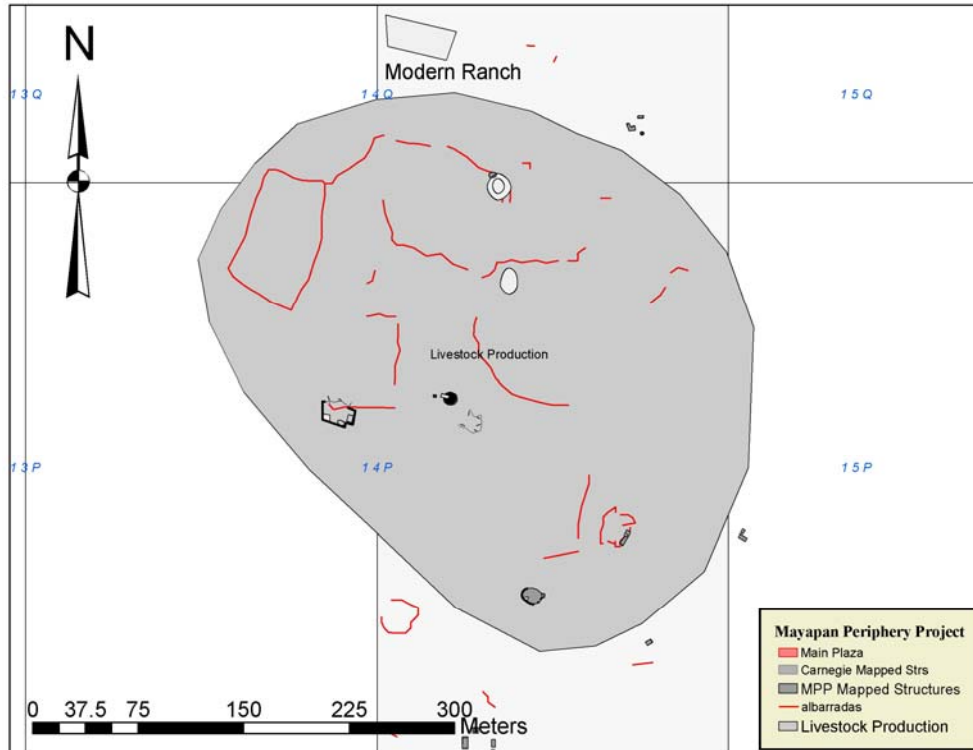


**Figure 9.34 – Clusters likely involved in agricultural production, H-45, H-44 and 18N-8.**

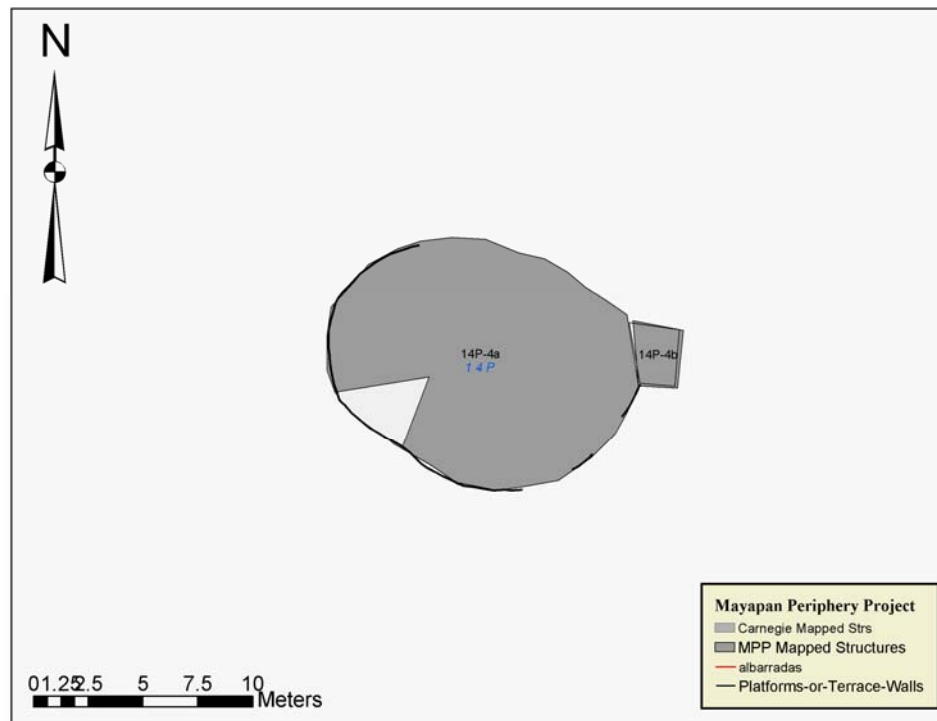
### *Livestock Production*

Evidence of livestock pens is spread throughout the residential zones of Mayapán (Figure 9.35). Many house groups contain small *albarrada* enclosures connected to the main walls defining the groups themselves. These are in the areas farthest from the other structures, usually located in the center of the *altillos*, on which these groups are placed, keeping them away from the smells associated with holding animals. The Carnegie

project was well acquainted with the boundary wall system at Mayapán, however, they only recorded these enclosures for portions of the area that they mapped inside of the wall. Some of those were published in the 1962 field report others were preserved in the notes of the original project members and are being studied by Dr. Timothy Hare of the PEMY project. All *albarradas* encountered in this survey were mapped by the PEMY project, as were all milpa locations inside the city wall. increasing the sample of these enclosures. In all areas where we recorded residential groups, we also found appropriate pen enclosures attached to various enclosure walls. These were not found in all groups but, a subset mixed throughout those groups mapped. Many of these pens would have been large enough to hold deer. It is also likely that some of the small to medium cobble platforms recorded in residential groups would have held turkey pens. Similar enclosures are common around Telchaquillo today. Larger, ground level enclosures along boundary walls usually hold pigs and fowl. These are usually raised in pens located on platforms that would be assigned to the auxiliary structure category (more on these ethnographic comparisons can be found below).



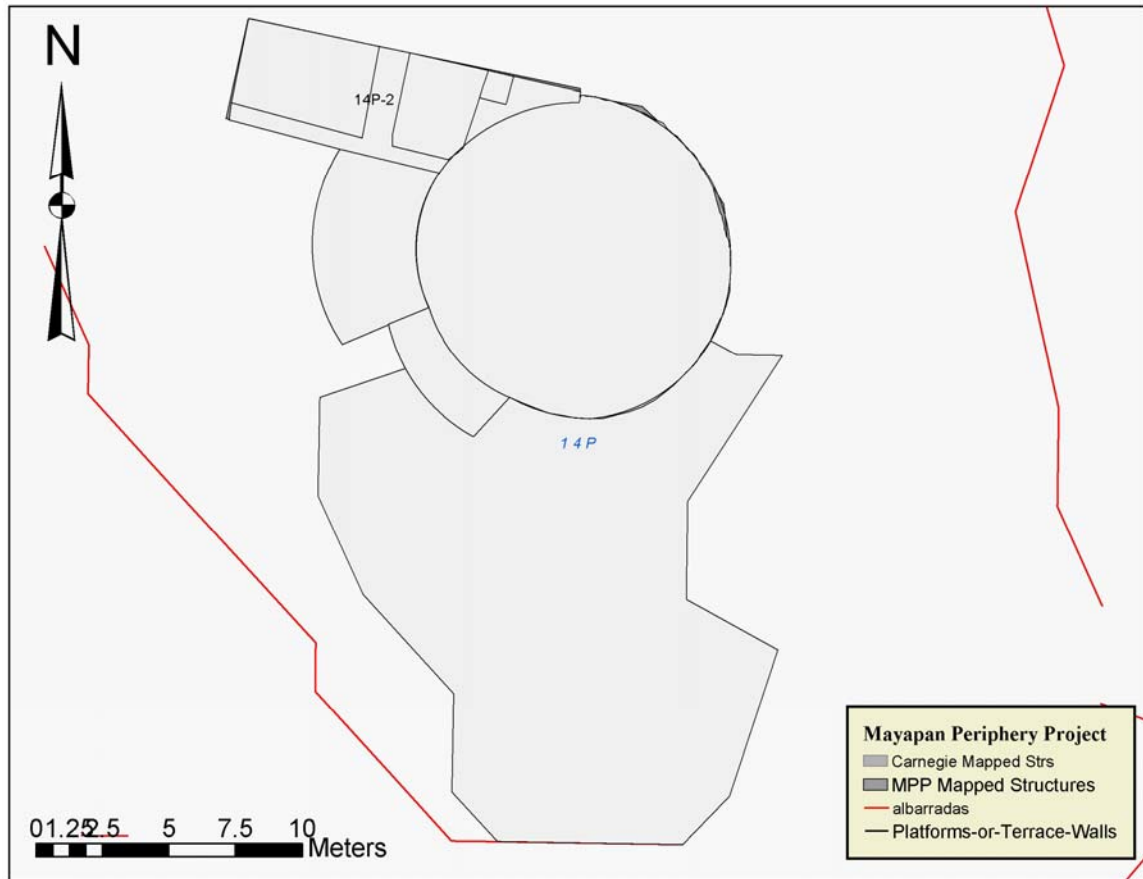
**Figure 9.35 – Livestock production zone (north).**



**Figure 9.36 – Map of group 14P-4 showing large round pen with wedge shaped bench and attached single room structure.**

Three groups mapped outside the wall appear to have been dedicated to raising larger numbers of livestock. One dated to the Terminal Classic and the other two are of Postclassic construction and use. Rather than the more common single small pen, these groups have multiple pens or an unusually large pen. Group 14P-4 is a large pen structure with two attached features, one being a wedge shaped bench feature located on the interior south wall of the pen and the other a one-room structure located on the exterior western wall (Figure 9.36). The construction of each of the features was typical of Terminal Classic construction, composed of large unshaped limestone slabs. As a pen, this structure would have been capable of holding a full herd of deer. The bench would have been an appropriate place to deliver feed and possibly water to a deer. If it was a feeding station, it would have been too tall for peccary. The single attached room would likely have held fodder for feeding the animals. The location of this group at the periphery of the ancient Telchaquillo settlement pocket is notable. It did not contain residential architecture, suggesting that the family who owned this pen would have lived in a house group in the village and walked out to tend the penned animals.

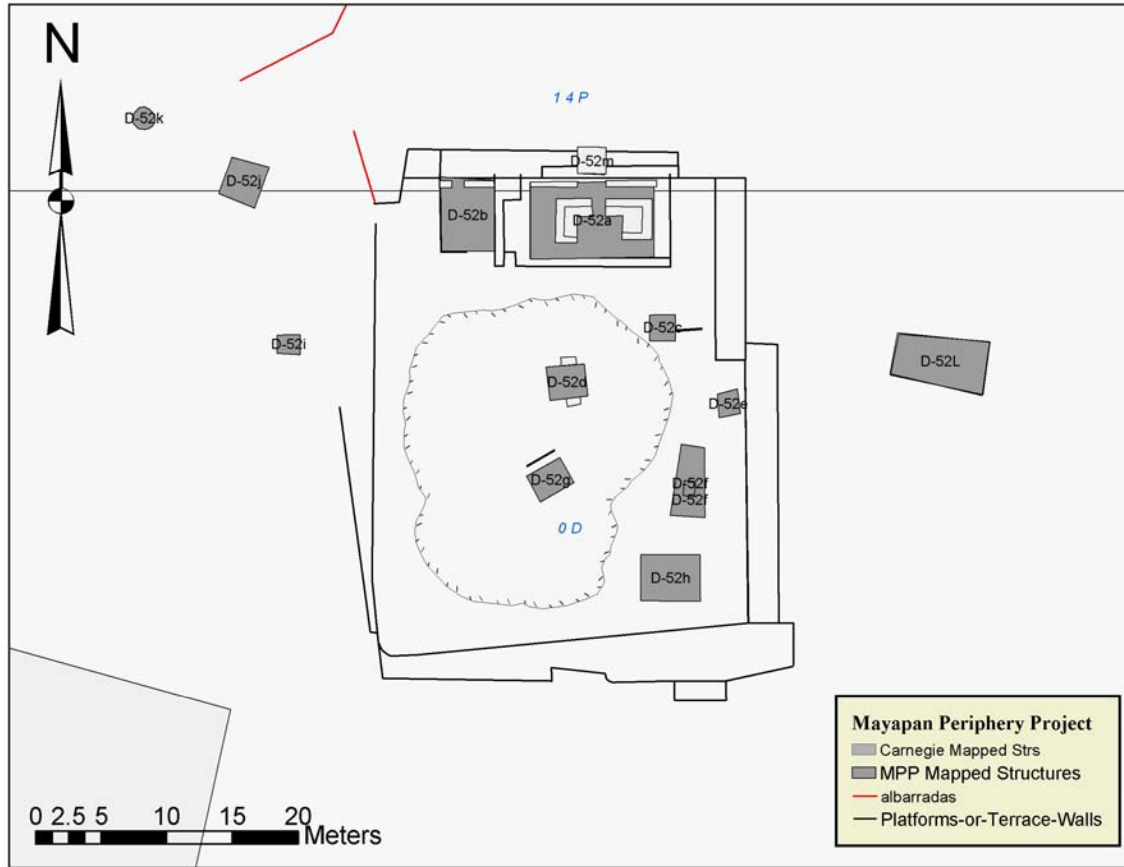




**Figure 9.37 – Cluster 14P-2, possible livestock pen.**

This is directly analogous to the way cattle are raised in the area today. Residents of Telchaquillo who have cattle keep them on ranch land outside of the village proper. The families that own the land pen areas in stone walls that contain the feed and water troughs. Typically, these ranches are located near a cenote that can be used to water the cattle. The cattle are usually allowed to browse for feed in a larger surrounding area enclosed with barbed wire or tree branch and trunk fences. I infer that the stone enclosure here may not have been the spatial extent of the livestock raising activities. This stone enclosure was likely surrounded by a certain amount of grazing land enclosed by a fence of perishable wood.

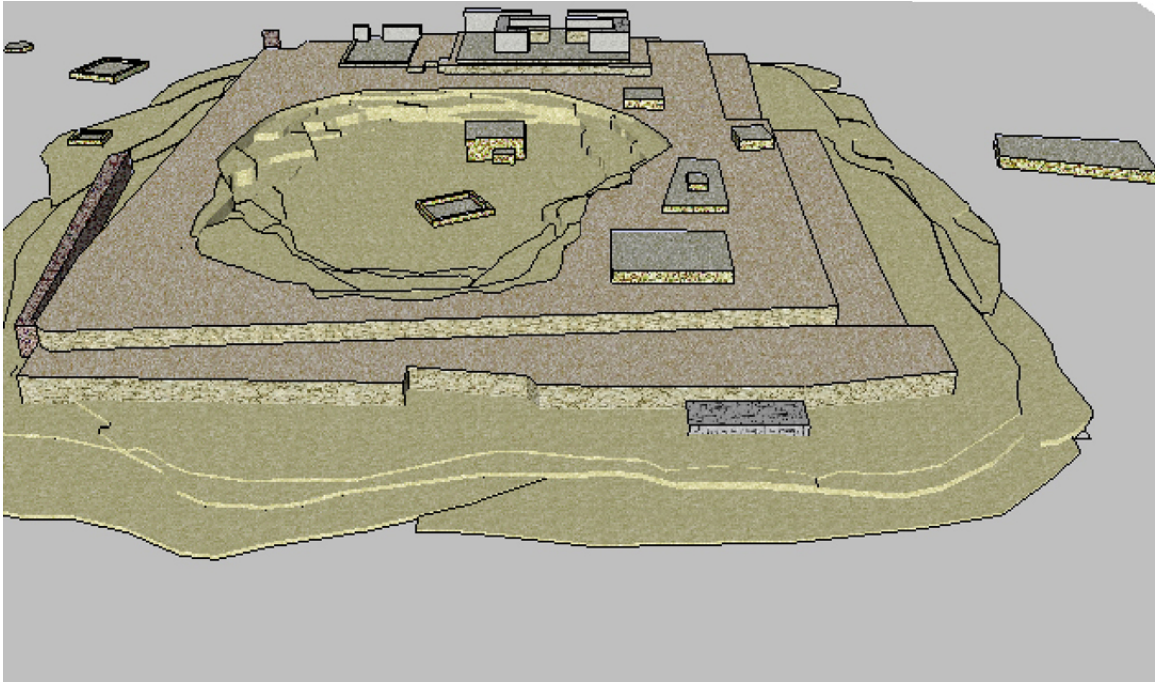
It is also interesting that this ranching/live stock production appears to have continued in the nearby northern periphery of the Postclassic Mayapán settlement. Group 14P-2, located along the same transect about 250m north of Gate “D”, was configured similarly, constructed in a style more common to the Postclassic composed of smaller cut stone and including double walls (Figure 9.37). The pen was constructed in the manner of the typical Postclassic *albarrada*, using dry laid stones chinked with smaller limestone chunks. The style remains the preferred construction method for cattle pens today. This group is composed of a large round enclosure and rectangular platforms attached to its exterior hold a residence and small alter. The entire group is roughly surrounded by a series of *albarrada* segments which open in several directions, possibly to adjacent fields for grazing. The group is located at the far northern drop-off in residential architecture at the very periphery of the settlement. The architecture suggests that someone lived here full time rather than walking out from a group closer to the site center. The D-52 (Figure 9.38-9.39) affluent commoner residential group was located immediately south of the 14P-2 group and not far from the large enclosures further north along the same transect (discussed below). This invites speculation that those living in the group may have been responsible for much of the livestock production in this northern zone. D-52 contains a larger number of structures than any group documented within the city wall. Those living in the 14P-2 group may have been family, laborers or even slaves tending the pens northern livestock pens. D-52 may have been unusually large to accommodate the dwelling, kitchen and even group ritual needs of those working in the area, whatever their specific relation to the primary residents. Several structures located in D-52 would have been appropriate for limited storage.



**Figure 9.38 – Affluent commoner cluster D-52, possibly related to livestock production.**

The 14P-2 altar suggests group level ritual was taking place adjacent to the livestock pen. Ritual associated with protecting the livestock is still common. Every spring a ritual called a *primicia* or “first fruits” is held at the ranch of each family. A local shaman performs the ceremony at the ranch, close to the cattle enclosure. I had the opportunity to attend one of these during the 2003 field season. In the example I observed, a small wooden table was brought to the site from the family’s house group and used as an altar for display of a central cross image. In this case, the image was an old black and white photograph of a cross that I was told was taken in a nearby village about forty years ago. This was set in a small frame and displayed on a small, multi-leveled wooden base reminiscent of a stepped pyramid. Candles and incense are placed in front

of the altar and lit. The entire extended family attends for the ceremony, bringing together occupants of several local house groups. Close friends are also invited. A large feast of chicken, turkey and various maize-based food and drink are prepared and the entire meal is also placed on and around the altar. An important item served is a drink of made by mixing ground up kernels and cob from the first harvested fresh corn of the season with water from the cenote next to the cattle pen. This is consumed in a group toast from plastic and gourd bowls. Following this, the shaman offers a series of prayers to a mix of Catholic saints and traditional Maya spirits, asking their protection over the family's livestock, fields and each person present in the coming year. Following these prayers, the prepared food is consumed in large quantities. What is not eaten is sent home with all of the members of the family and any guests and eaten over the course of the next several days. If someone is unable to attend due to work, illness or other reason, they are included in the prayers and a portion of the food is prepared and sent back to the individual(s).

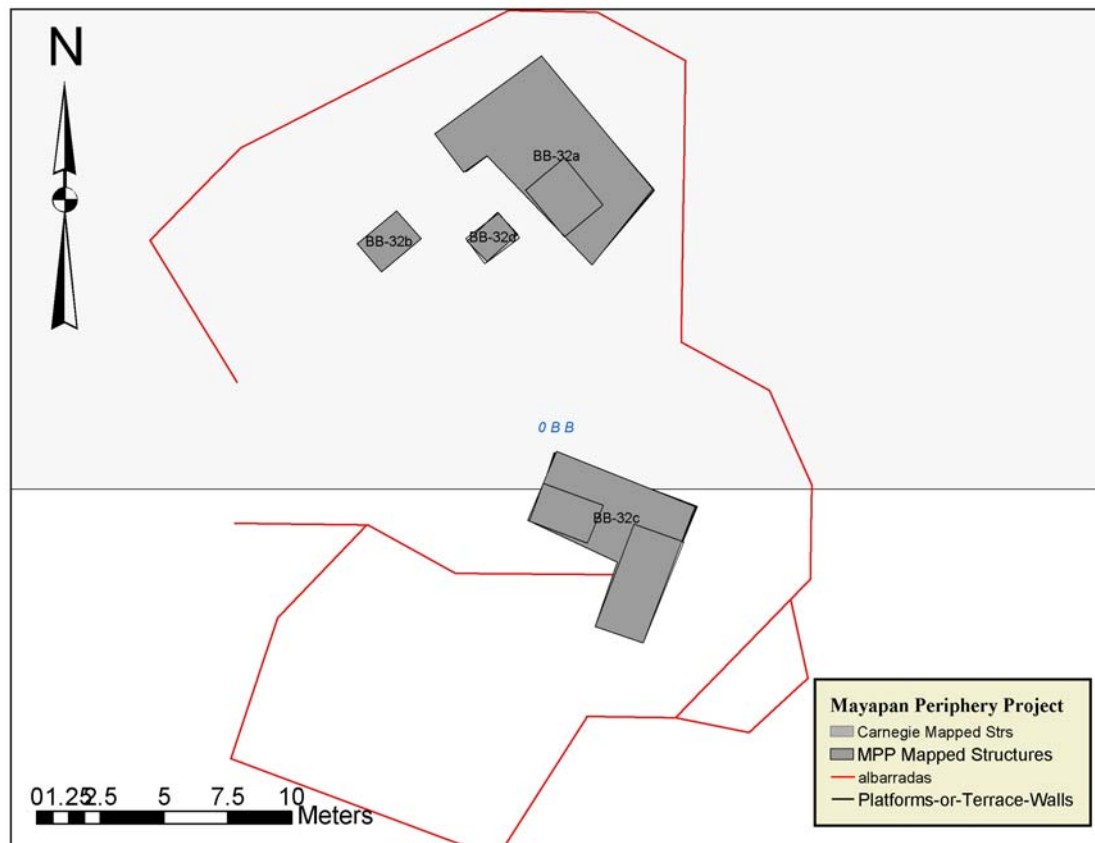


**Figure 9.39 – 3-D reconstruction of D-52 group.**

The BB-32 group (Figure 9.40) along the southern edge of Transect 7 has an *albarrada* that has several possible pen areas marked off. Two of these are fairly large and each could have held several larger animals. They had clear wall entrances that could have been closed with perishable gates or fences made of perishable materials. The third enclosure was smaller and was solid all the way around. A number of turkeys could be kept in a pen this size and the birds could just be passed over the wall when needed. The lack of an entrance makes its use as a deer or peccary pen less likely. As in the 14P-2 group described above, this appears to be a household based operation. There are two dwellings located on top of an *altillo* that is ringed with a typical group boundary wall. All three pens were located at the south end of the enclosure at a distance from most of the structures in the group. One of these was accessed from the interior of the boundary wall and is located along the slope down the hillock. The other two are located at the base of the hillock and accessed from the exterior. This group's location, toward the



western edge of the residential drop-off, is similar to the peripheral locations of the larger scale livestock production activities noted above for the two northern examples.



**Figure 9.40 – Commoner residential group BB-32, possible animal pens.**

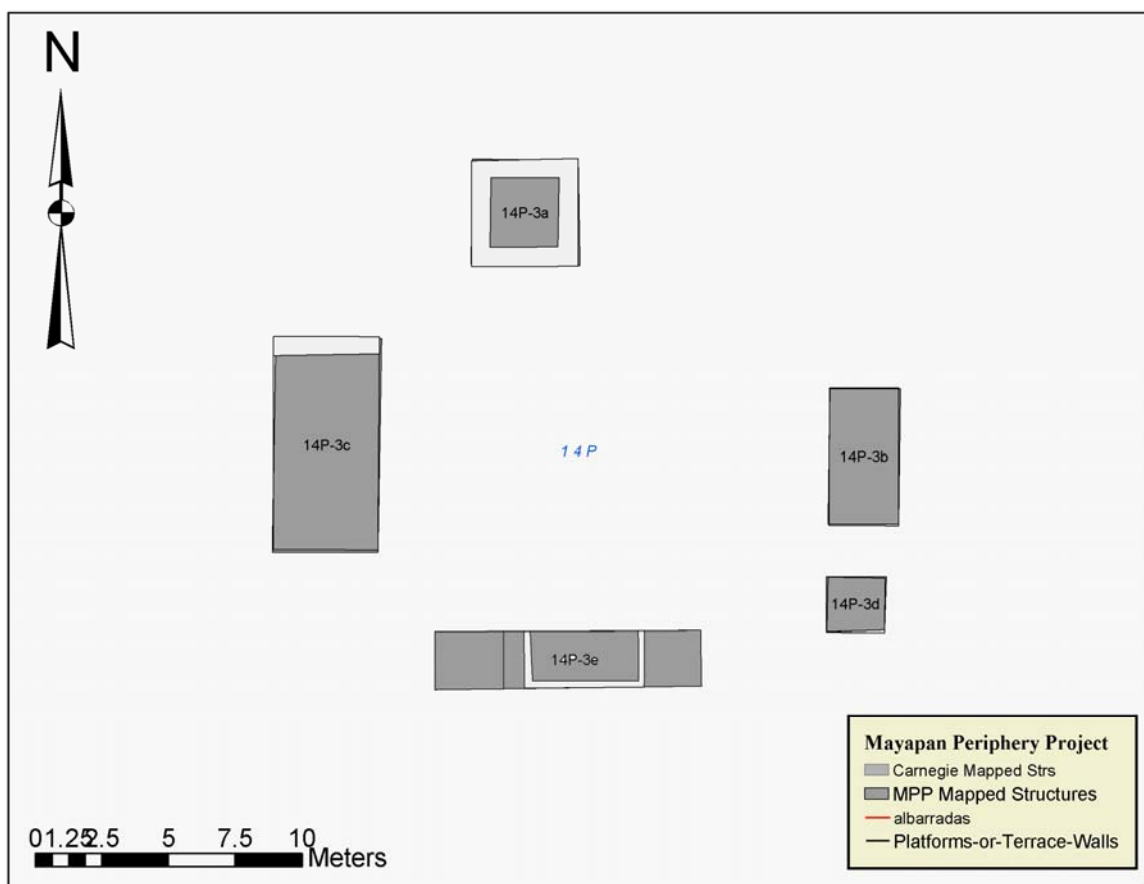
In addition to these distinct groups with pens, we also recorded a zone in the north half of transect 6 containing a number of very large field wall enclosures. These large enclosures have been scavenged for a good deal of stone and today gaps exist where more complete walls probably stood during their use. The dating of these features is uncertain. One of the walls is constructed right over the remains of a Terminal Classic residential group, suggesting a date no earlier than the late in the Terminal Classic. There are two of these round dwellings in the area, suggesting that the area was once a lightly populated area on the edge of the Terminal Classic Telchaquillo settlement. However,

the enclosures are of the Postclassic construction method rather than the large slab based walls used more commonly in the Terminal Classic. Given the widespread depopulation of the whole area after the fall of Mayapán, these are most likely either Postclassic or modern in date. The condition of preservation was very poor and many of the base stones were buried in a manner that suggests that they are Postclassic rather than modern constructions. All of the local workmen involved in the survey agreed that they were most likely not modern features. In fact, several modern ranches are located either within or adjacent to this transect. All of those have very well maintained walls that form full enclosures with straight wall segments. The features described above are round or oval enclosures with many sections that have been robbed of stone, undoubtedly much of it used in the construction of modern walls nearby. One of these modern ranch enclosures, located just 200m north of the wall, entirely surrounds two *alttillos* with Postclassic round house group enclosures and part of another. The portion of the third group enclosure wall and much of the stone used in construction has been reused in the modern wall, which one of the project's workmen reported helping to build ten to fifteen years ago.

All of the indicators above combine to make a Postclassic date for these enclosures very likely. Further excavation could provide a more definitive date. If they are Postclassic in date, it appears that the north end of this transect was filled with either large field walls defining milpa space or grazing areas associated with food production for the city. The former interpretation is less likely given rapid depletion of soils and constant movement of milpa fields. Perishable boundary walls made from locally cut wood are more likely for milpa applications. The area also has no storage or field outbuilding structures. However, the vegetation available in a walled, semi-forested area

would have been perfect for grazing deer and peccaries. The cluster of these features lies just beyond the temple at the edge of the settlement zone north of Gate “D” in a position similar to the land use sequence of residential/east-side shrine/agricultural field zone we recorded with increasing distance from the east wall of the site.

The form of group 14P-3 is also notable (Figure 9.41). This group was located about 250m south of the zone of large enclosures, north of the 14P-2 and D-52 groups discussed above. It was a well built group of structures orientated to the cardinal directions and arranged around a small central patio. It is a residential group located in an *altillo* but, it lacks the typical *albarrada* boundary wall. This group may have housed more permanent workers tending the livestock.



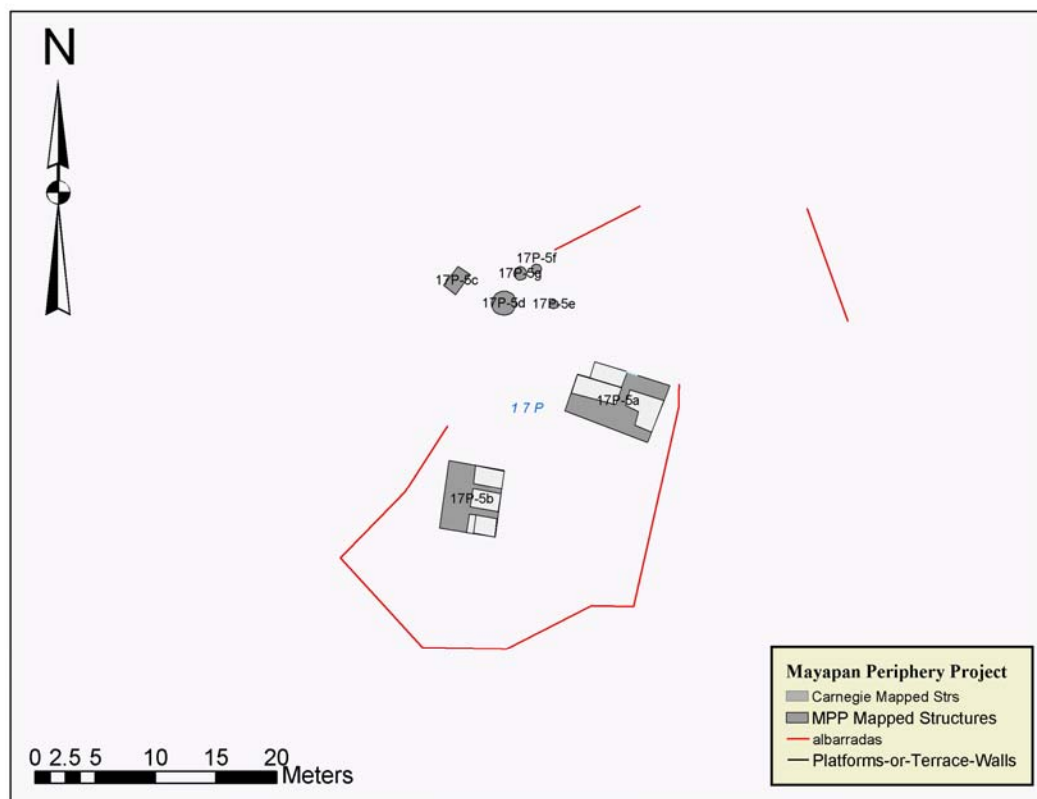
**Figure 9.41 – Map of the 14P-3 group.**

The site-wide distribution of these larger “ranches” and house group pens suggests that small scale livestock production was common throughout the settlement and larger “ranch” operations were generally located peripherally to residential settlement zones, especially the area north of the settlement. One likely reason for this is that the enclosures recorded were surrounded by larger grazing lands fenced in with perishable materials as seen today or, in some cases, very large stone *albarrada* enclosures. The locations and dating of the two northern house group examples suggest that ranching in that portion of the study area was a local activity before the rise of Mayapán and that the local residents applied those same skills along the northern edge of the Postclassic site as well. A similar pattern was seen in the northeast of the site with regard to the distribution of agricultural production fields.

### *Honey Production*

As discussed in more detail above modern residents of Telchaquillo frequently collect wild honey in the forested areas surrounding the village when they are working there. These are generally opportunistic finds. When found, they are simply cut down, and the bulk of the bees fly out to start life elsewhere. These hives hold a good amount of honey and, when encountered by Mayapán’s residents, would most certainly have made for a nice contribution to the diet. However, these finds were sporadic, making them unreliable as a source of regular household income. Many families in the village today maintain clustered bee hives some distance from the settlement zone. Most of the examples I saw were located in the northeast portion of the study area, just north of the

ancient wall and Itzmal Ch'en. Modern hives are vertically-oriented stacks of square wooden frames measuring roughly 1m to a side with lids and bases made of cinderblocks or stone. It was not uncommon to see several people arriving by truck to harvest honey from the hives while surveying in the area as. One of the apiaries was located along a major road that we used to access several of our transects in the area. Harvesting the honey inevitably involved upsetting large numbers of bees so, positioning such hives in the middle of a settlement zone would be unwise, leaving a more peripheral location the logical choice. During a recent visit with the Mena family they showed me several new hives that they had bought and intended to place out at the family ranch about 1km from the edge of the village.



**Figure 9.42 – Commoner residential group 17P-5 with possible honey production features.**

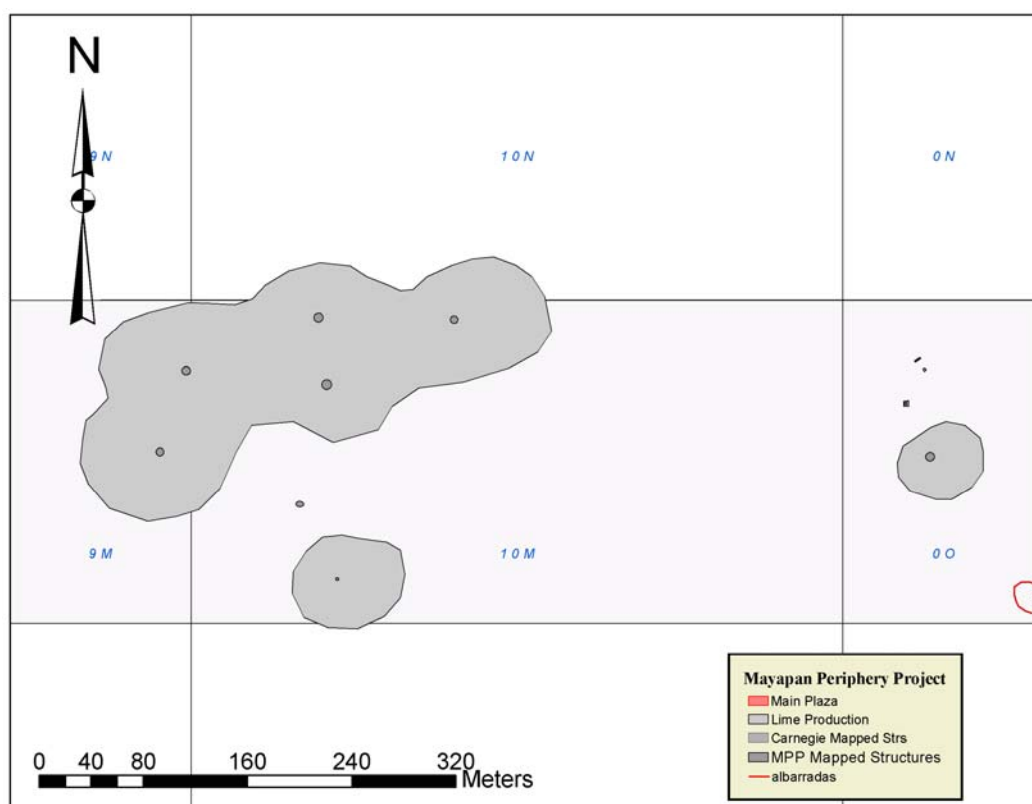


Group 17P-5 (Figure 9.42) is located not far from the modern apiaries discussed above and is located near the edge of the northeast “Old Mayapán” settlement pocket in the portion located northeast of Gate “G”. It contains a cluster of structures not documented anywhere else in the mapped survey areas, a cluster of small round features measuring roughly 1m in diameter that the indigenous workmen immediately suggested were bases for hollowed out logs used in traditional honey production. Colonial period sources also suggest that hollowed out logs with capped ends were the preferred ancient hives. The cluster of small round structures was located on the opposite side of the group’s *altillo*, as far as possible from the two dwellings and immediately adjacent to two other structures with likely storage functions. We placed excavation units in hopes of finding the rounded limestone cap stones used to plug such hives but, we did not find any. For the time being, this seems to be the best explanation of function for the structures. The inclusion of several hives within the house group implies the household was most likely producing a surplus of honey for market sale or to meet tax demands. The association of honey production with this portion of the site correlates with other indicators that those living here had affiliations with the east coast, a region well known for honey production in the Colonial period and earlier.

### **Geographic Distribution of Lime Production Features**

The use of lime plaster is common throughout Mesoamerica and it was utilized heavily throughout Mayapán as a construction material. It is found throughout the site in all contexts, from commoner house groups that used it to cover floors and wall to the

central Q-162 pyramid where it was used as a surfacing material and employed to make modeled façade details and sculptural elements. Much, if not all, of the city wall appears to have been plastered with the material. Lime would also have been used to soak maize, augmenting the calcium content of the diet and breaking down the kernel's hard exterior to facilitate the release of certain nutrients not absorbed by the human body in the absence of such processing. Despite all of this, I did not expect to encounter remains for lime production features when I began the survey. While the use of lime is common throughout Mesoamerica, a surprisingly small number of production features have ever been found archaeologically.



**Figure 9.43 – Lime production zone (west)**

Researchers interested in the economic implications of lime production are aided by ancient lime plaster production sites that have been documented in various parts of

Mesoamerica. The majority of these include pit kilns that were dug down into the ground to various depths, including examples from Copan (Whittington 1991; Abrams 1996; Abrams and Fretter 1996), and Chalcatzingo (Grove and Guillén 1987:385). Schreiner (2002:92-95) identifies a number of burned pit features from various sites around the region that may also have served this role including features from the Tehuacan Valley (Sisson 1973:98-100), Cauinal Guatemala (Fauvet and Berthelot 1980), and Pulltrowser Swamp, Belize (Ettlinger 1983:170-73). An enclosed feature from the site of Cozumel (Freidel and Sabloff 1984) may have served as a kiln for either a pottery or lime but, the latter is more likely according to Schreiner. Morris et al (1931:255) suggests that piles of burnt stones found at various locations around the Northern Yucatan may have served as open air burn sites. Another likely open air burn site was documented on Belize's Placencia Cay (MacKinnon and May 1990:198-199).

Fortunately, we located a cluster of six large lime ovens along Transect 2 (Figure 9.43). They were placed at a distance of between 500-800m west of Gate "O", at a distance from all other features recorded. A seventh, smaller example was located immediately next to the western shrine and small, associated dwelling structure. These are the large circular alignments discussed in detail above. They were unusually large features measuring between 5 and 7m across and immediately stood out as distinct from the architectural features we had been finding. When excavated, two examples were found to contain dense deposits of ash, chunks of carbonized wood and burnt, fist-sized limestone cobbles. There are several observations and inferences that can be drawn from the locations of these structures. First, they are well isolated from the densely settled residential zone to their south. There are no other structures within 200m from the main

cluster of these features. This is logical for several reasons. First, these features would have consumed large amounts of wood and appropriate fuel is less likely to be found closer to the residential zone.. Second, they were located downwind of the main settlement, allowing the great deal of smoke and steam generated by a burn of this size to blow away from populated areas. Third, according to local informants, the best quality limestone for producing lime is located in outcrops west of the main site. Fourth, the relatively even spacing of these features may tell us something about the amount of fuel being used in the burns. The excavated examples did not contain stratified burn deposits. Instead, they appeared to have been used either only once or possibly several times in quick succession. If this was the case, the spacing may well reflect the amount space needed to cut the appropriate amount of wood for a burn of that size.

Following excavation of these features, Dr. Bruce Dahlin, who works at the nearby site of Chunchucmil, and I conducted a separate ethnographic study to examine how lime has traditionally been made in the area (Russell and Dahlin 2007). We contacted three local informants from the village of Telchaquillo, Yucatán. All three had extensive experience working at the archaeological site of Mayapán under the direction of Arq. Carlos Peraza Lope and Dr. Marilyn Masson and reported that they had made cal before. Don Fernando Flores supervised the collection of materials and construction of the *calera* or lime oven. He has experience making *cal vivo* (living lime) which he distinguishes from *cal por machina* (lime from a machine), which is fired in modern gas-fueled kilns. He learned the process from his father and worked regularly preparing it for construction projects in his youth. In fact, he made his living for several of his teen years producing it. He was assisted by Norberto Uk, an experienced, elderly gentleman who

Flores regularly consulted when answering questions regarding the process. Nicefero Pat, the third informant, is a strong, hard worker whose contribution to the preparation was enormous. The three men worked a total of six (eight-hour) days on the project. In this time, they spent roughly three and one half days collecting the wood and stone required and one and one half days building the calera and a full night managing the burn (Figures 9.44-9.48).



**Figure 9.44 – Local informants Uk, Pat and Flores (left to right) constructing the pyre.**



**Figure 9.45 – The finished lime kiln ready to be burnt.**





**Figure 9.46 – State of the kiln in the wee hours of the morning as it neared the end of the burn.**



**Figure 9.47 – Remains of the kiln with newly produced quicklime after firing.**



**Figure 9.48 – Unfired limestone (left), fired limestone now called quicklime (middle) and finished slaked lime (with partially fired core showing) ready to use for construction, maize soaking, etc. (right).**

*Caleras* can vary in size and shape but are always within a range to facilitate the passage of air into the center. The wooden pyre in our calera measured 2.0 m long by 1.65 m wide by 1.5 m tall. In total, 4.9 cubic meters of wood (minus airspaces between logs) were burned as fuel during the experiment. Fernando Flores indicated that this was a rather small calera. The usual size he was familiar with is ca. 4 x 4 m with the same height, more that four times larger than our experimental pyre. A similar experiment conducted at the site of Labna, Yucatán (May and Gallareta 2003) utilized a stacking pattern with the wood laid flat in layers and radiating out from a center pole. The Labna pyre was ca. 3m in diameter and 1.4 to 1.5 m tall, falling in between the size variations above. The archaeological lime production features identified at Mayapán were very

large by these standards, measuring between 5 and 7 m in diameter as demarcated by a circular ring of large cobbles enclosing the burnt area.

Our results suggest that a typical lime production area should be in the 16 to 39 square meter range. This is significantly larger than food preparation hearths; therefore, lime producing sites would not be easily confused with them. Lime production sites should also be distinguishable from other large burn features such as ceramic firing sites and charcoal production sites. Ceramic production sites are frequently identifiable by the presence of ceramic “wasters”. Typically these are over-fired, under-fired or discarded, broken, on site. In the case of lime production, the under-fired limestone cobbles are of no use and are discarded. These should be roughly fist-sized and show evidence of extensive fire blackening on all sides. Carrying the fired cobbles away for slaking at another site would not leave a signature at the burn site itself, of course. As some cobbles do not fully convert to lime, some post-slaking blackened cores should be present in close proximity to the slaking site, but these would probably not lead to a positive identification of a slaking locus if a pit were not used. However, ethnographic examples suggest that slaking loci might be found near markets and construction sites.

The total number of burn sites securely identified so far is surprisingly small, given the widespread use of lime for both construction and food preparation throughout Mesoamerica. The paucity of documented lime production features in Mesoamerica has always been mysterious given the large amount of lime plaster recorded at most sites in the region. It is likely that these features have been overlooked, in part because they are segregated from settlements. Based on these findings, those interested in lime production should look downwind of the settlements, beyond the point where the structure density

falls off to few, if any, structures. Information on the quality of different limestone in particular areas also provides useful clues to the possible location of these features. In the Mayapán case, the best limestone is located downwind of the main settlement. However, in regions where the best quality raw materials are found upwind, that opportunity may override the benefits of being downwind. In those cases, they would probably be found at an even further distance from settlement since that would help offset the negative effects of the prevailing wind patterns. The results of our ethnographic study support Morris' 1931 suggestion that piles of burnt stones may be associated with lime production. They could well have been used to support the pyre and the blackened wasters or limestone that failed to get up to temperature required to make the chemical transition to lime and were therefore discarded at the production site. If correct, the wasters in these deposits should be roughly fist-sized cobbles and the support stones should be larger and generally located near the corners of rectangular arrangements or around the perimeter of round forms. We would also expect the smaller wasters to show heavier and more complete burning than the support stones.



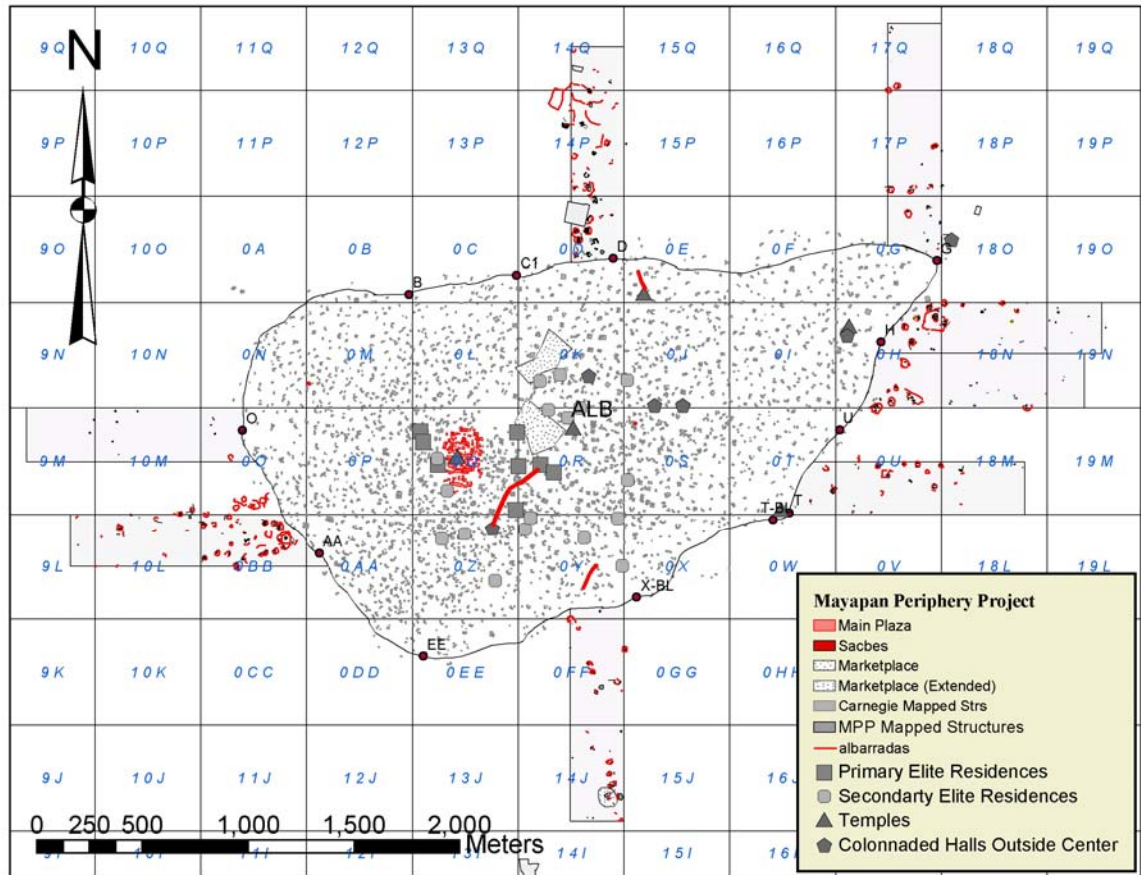
**Figure 9.49 – Comparison of fired cobbles showing: a) fully fired stones and b) partially fired stones that may be discarded on site as wasters.**



## Mayapán's Road System

It is important that there be reasonably efficient means of getting from one place to another in a settlement as large and dense as the site of Mayapán. Until now the system of *sacbes*, roadways and trails that traversed the city was largely overlooked by researchers. That is because the roadways, for the most part, were not paved. The few exceptions are the recorded *sacbes* or raised limestone roadways. There are 3 *sacbes* known inside of the wall at Mayapán (Figure 9.50). The longest and widest connects a primary elite residential group consisting of structures R-95 to R-99 with a colonnaded hall group in grid square Z (Z-50). This direct link implies that both groups were likely directly controlled by the same family or lineage. There may also be a connection to the two immediately adjacent elite residential groups. A short segment of *sacbe* runs northwest from E-11 through E-14 temple group. Its association with this group suggests that it may have been more elaborated because it served as part of a ritual pathway. Another short segment connects the Y-51 and Y-105 groups. Both of these are commoner residential groups, making the presence of the *Sacbe* segment a bit of a mystery. Perhaps it simply signifies a familial link between households.

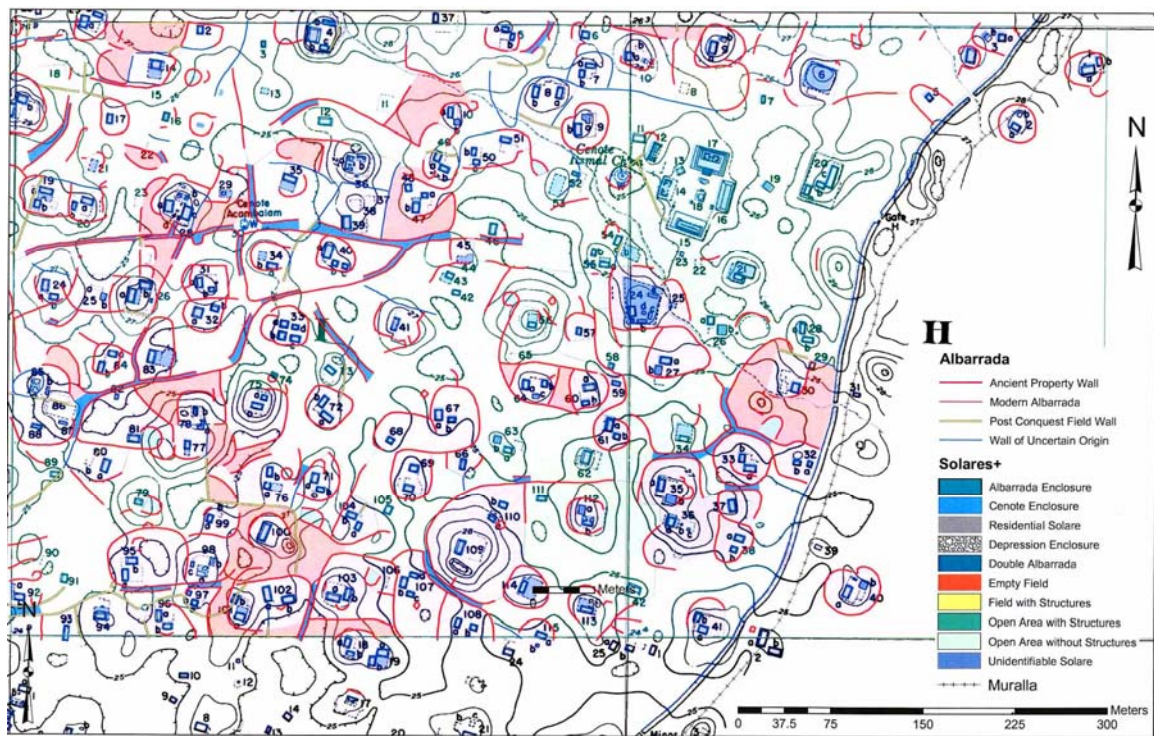




**Figure 9.50 – Sacbes at Mayapán.**

When mapped in detail, the complex set of albarrada field walls that surround most housegroups in the city provides important clues to reconstruct the other basic transportation routes used by Mayapán's pedestrian residents and visitors. The Carnegie map (Jones 1957) omits these field walls entirely. Bullard recorded albarrada walls for several sections of the city, although most were never published. Archival research at the Peabody Museum provided his hand drawn maps of these areas. The data from these was entered into the PEMY GIS database by Dr. Timothy Hare. These maps and new ones created by the PEMY project in cleared milpa locations, allows us to trace likely routes of travel winding between these walled structure clusters for specific portions of the site.

In many areas of the city, these walkways were formed by intentional space left between adjoining house group enclosures. In other areas, parallel sections of albarrada (double albarradas) were apparently constructed deliberately just to define the sides of roadways. A section of albarrada walls in grid squares H and I recorded by Bullard shows a mix of these haphazard and more deliberate double albarrada sections (Figure 9.51). The closely spaced house groups in the south eastern portion of the map form a series of double albarradas created simply by leaving space between groups. The pathways formed in this manner tend to be highly irregular and would have functioned as small side streets winding through various neighborhoods.



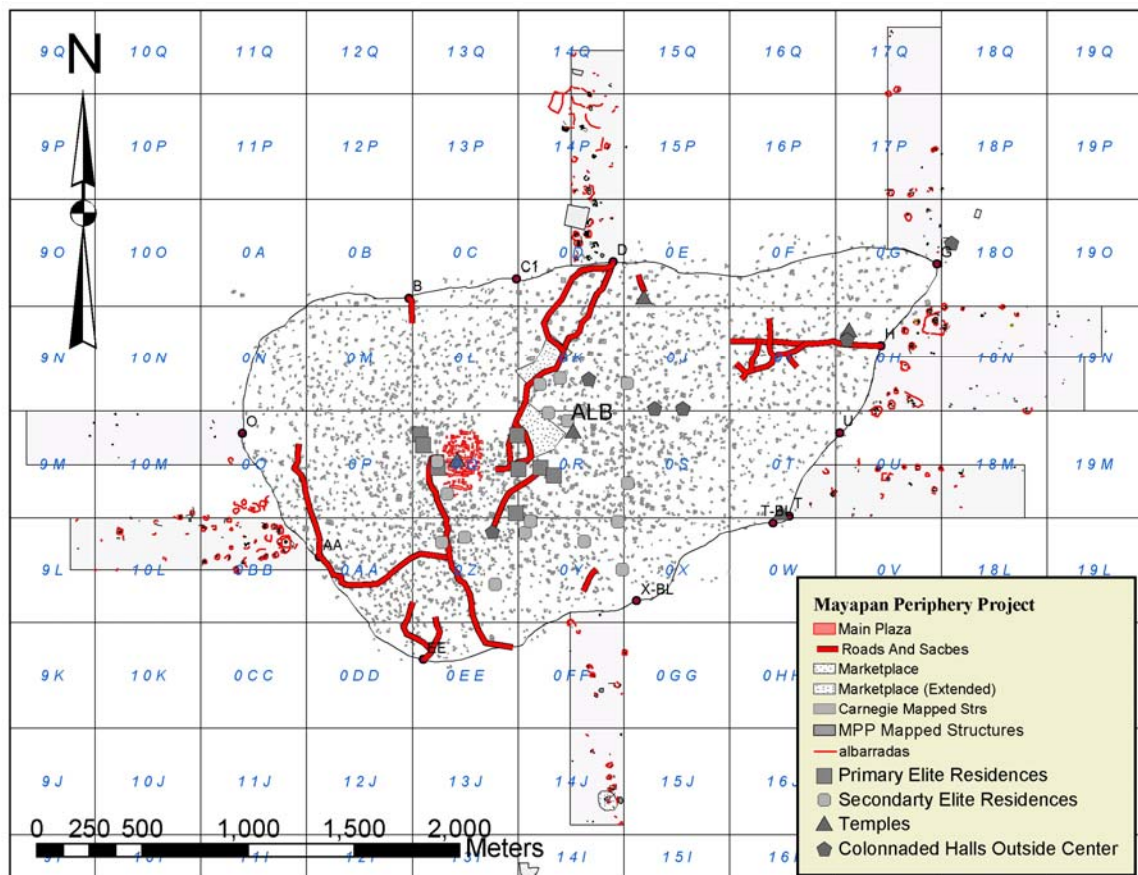
**Figure 9.51 – Double albarrada segments (highlighted in blue) from Grid Squares H and I that were mapped by Bullard. Map courtesy of Hare, Masson and Peraza. Prepared by Timothy Hare.**

Most of the double albarrada sections mapped in this area appear to have been more major streets bounded by straight and more regular wall sections that run west from

the Itzmal Ch'en group (in the northeast corner of the map) past a large water bearing cenote. This road would continue east past Itzmal Ch'en, passing through Gate H and possibly continuing on to the eastern shrine group H-48. So, in addition to serving as day to day transportation route, this roadway was probably also a ritual pathway used by various processions. Similar routes an out to the other three directional shrines recorded in this survey. Several adjoining double albarrada alignments branch off of this main road leading into the smaller network of side streets. At cenote Acambalam, an intersection is formed by this main east-west route and sections running north and south from it. The intersection of the road system at this major cenote suggests that it was held commonly and easily accessible to the public. This is in contrast to the nearby cenote Itzmal Ch'en whose access is limited by a round albarrada wall enclosure. Figure 9.52 shows all roads so far reconstructed by Marilyn Masson and Timothy Hare of the Proyecto Económico de Mayapán. This is just a partial set of the roads that crosscut the city which is. Other roads remain to be mapped as more areas of the city have their albarrada walls recorded in detail. Not surprisingly, these road sections typically link gates in the city wall with various important areas of the city such as the Main Plaza and the Itzmal Ch'en temple-cenote group.

In addition to the road system described above, several more have been mapped during this work. One runs south from Gate D, past the market areas, through the portal gate and into the east side of the Main Plaza. Another runs north from two gates in grid square EE. One section terminates in a residential zone along the south section of the city wall. This branch provided access to two connected water bearing cenotes, Yo Dzonot 1 and 2. The other longer section runs north through the residential zone and into

the Main Plaza's west side. A section road running east from Gate AA intersects this road, providing a rapid route into the center of the city from the southwest. A short section of roadway has also been mapped running south from Gate B. However the full extent of that road has yet to be mapped in detail.

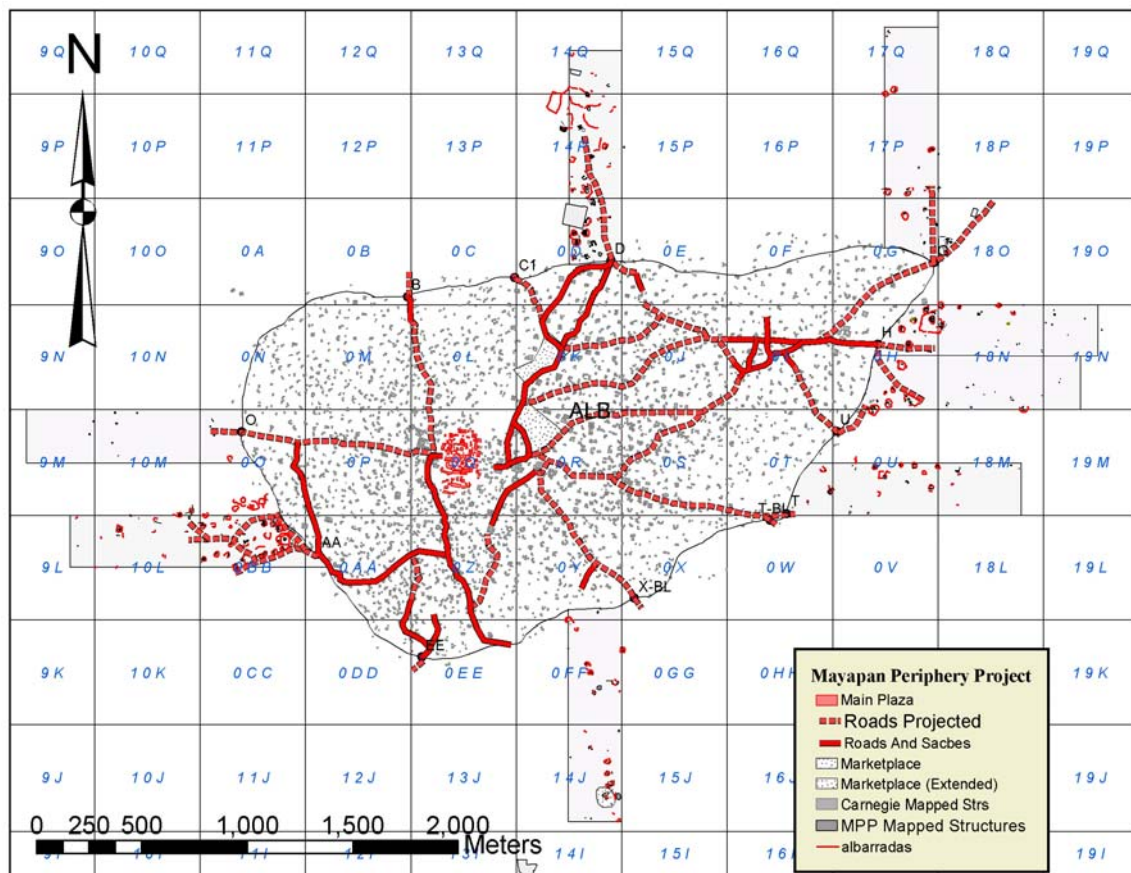


**Figure 9.52 – Sacbes and known roads at Mayapán.**

The distribution mapped architecture itself, even in the absence of information on albarrada alignments, provides some clues to other likely roads running through the city (Figure 9.53). Travelers coming in Gate AA could also travel directly north and link up with a road that almost certainly entered from Gate O (probably running directly to the western shrine group, O-59). While this route has not been mapped on the ground yet, a



close examination of the distribution of the architecture moving east from that gate directly into the west side of the Main Plaza shows a distinct linear break in the presence of architecture, suggesting strongly that the architecture clusters along the line lived adjacent to another major road/ ritual pathway.



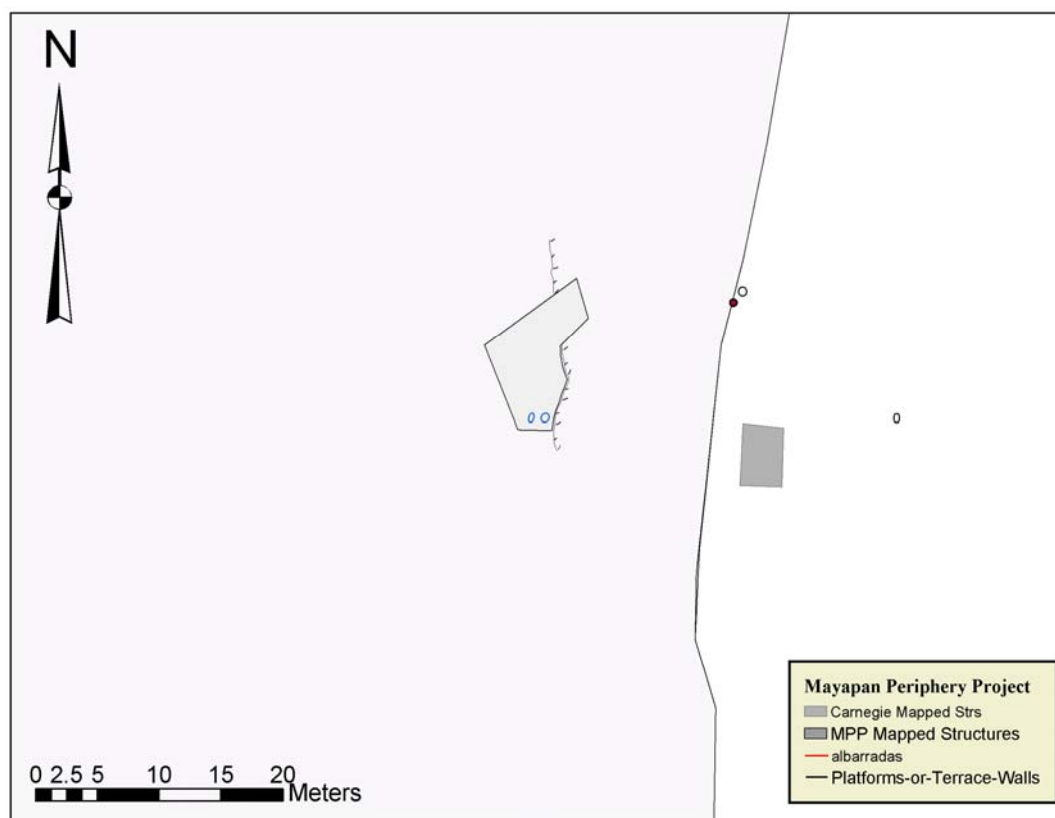
**Figure 9.53 – Sacbes, known roads and projected roads at Mayapán.**

Additional evidence for a road leading west out of the city from Gate O was found just outside of the gate where there is a natural drop off in elevation (Figure 9.54) . Gate O and its adjacent wall sections cross a rise in the natural limestone taking advantage of the added elevation for defensive reasons. To make the drop navigable by day to day traffic, the inhabitants constructed a substantial ramp between the high and



low points. This ramp was constructed of successive layers of rough limestone labs and smaller cobble fill.

As with the yet unmapped road entering Gate O, a branch of the roadway system running described above for the Itzmal Chen area can be traced from its mapped end point southwest in a line that would take it past various residential areas and connect up with the East entrance to the Main Plaza. Just such a route is suggested again by a linear break in the distribution of the architecture between these two points. Other potential roads can be mapped in this manner yielding an increasingly complex set of roads and paths that efficiently link all of the major parts of the city including the Main plaza, the markets, the central city area and its various administrative and ritual structures, the Itzmal Ch'en and X-coton temple-cenote groups and the peripheral settlement zones outside of the city's fortifications. In many different places like Cenote Acambalam (northwest corner of Figure 9.51) in grid square I and Cenotes Yo Dznot 1 and 2 in grid square Z, roadways provide access to specific water bearing cenotes. Clearly, mapping more of these likely routes in detail would be a worthwhile undertaking in the future.

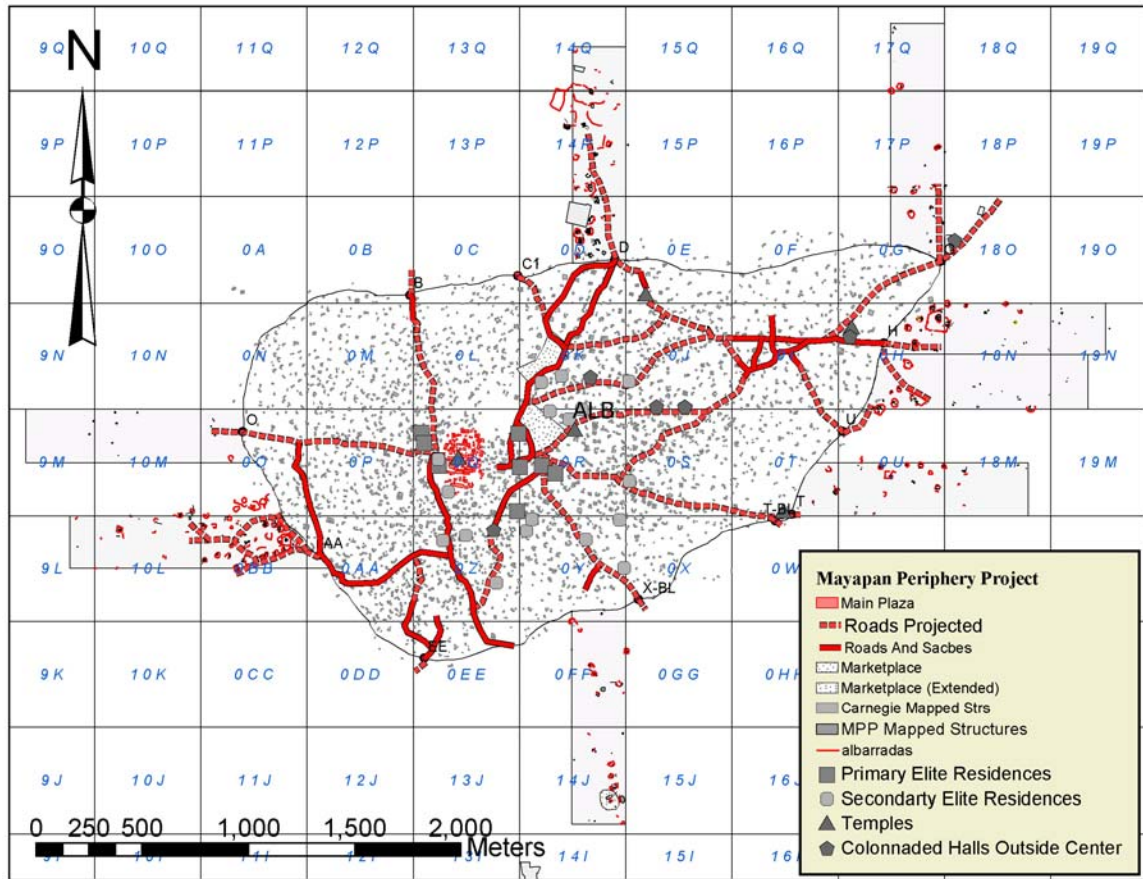


**Figure 9.54 – Ramp O located just west of Gate O in the city wall.**

By reconstructing the road system, we add a vital element to our understanding of the layout of the city and the distribution of the services described above. Figure 9.55 shows the relationship between the various major roads and important architecture such as elite residences, temples, and colonnaded hall groups. The majority of these features lie along or at the intersections of these primary routes of travel through the city. It appears that elite status is expressed in some significant degree by proximity to these roads. The Q-162 radial pyramid lies at the center of the road system. Elite residences south and west of the main plaza live the major north south rout running from Gate E past the Main plaza and north out Gate B. At the intersection of that major thoroughfare and the road running east to west between the Main Plaza and Gate O, there is a clustering of

three primary elite and one secondary elite residences. At the opposite side of the Plaza along the route running out of the portal gate east entrance, there is another concentration of four more primary elite residences. The somewhat enigmatic placement of the colonnaded hall group located in grid square J makes much more sense when we see that it lies immediately adjacent a major roadway connecting Itzmal Chen with the market areas and eventually the Main plaza. Rather than being the chaotic and jumbled space suggested by initial examination of the map, the city (both inside of the wall and out) was well integrated by the road system and followed a clear internal logic.

Remember that the form of the city wall itself made it a suitable a pathway for pedestrian travel around the settlement as well. Its modern equivalent would be the ring road that surrounds the nearby modern capital of Merida. The relatively broad and flat upper surface of the structure would have made it an efficient way to move troops to conflict points and a useful part of the civilian road system. Whether it served the needs of civilian foot traffic or not, it clearly met the needs of soldiers defending it. The final chapter contains a full discussion of the diverse functions provided by the various wall systems at the site.



**Figure 9.56 – Map showing relationships between elite architecture and the road system.**

### The City Wall

I addressed theoretical concerns regarding city walls in detail in chapter three and will return to it in the next. So, I will focus here on the main form and defensive features of this important feature. The need for defense is evident in the increased hostilities that ensue across the Northern Yucatán following the collapse of the central lowlands at the end of the Classic period. The Maya chronicles which make repeated reference to Mayapán being a “fortress”, tell of ongoing conflict in the region including some attacks that resulted in the total depopulation of certain large settlements. These events led to

repeated migrations around the Peninsula during the Postclassic period. A number of important sites adopt defensive fortifications at this time including Tulum and Peten sites like Muralla de Leon. Other sites during this time period employ natural boundaries for defense such as lakes and cliffs.

Mayapán's city wall is very unusual in anywhere in Mesoamerica in that it appears to have been a deliberately planned and constructed defensive system that enclosed the majority of the city's residents. This massive single wall is 9.1km long and encloses 4.2km<sup>2</sup> of the city containing thousands of structures. It is between 2 and 4 meters wide and roughly 2 meters tall, even in a state of partial collapse. Many of the walls encountered at sites in Mesoamerica show evidence that they were hastily constructed efforts, often incorporating stone and other construction materials stolen from nearby buildings. Typically these features enclose only a small area of the city, usually the main temples and elite residences, leaving the rest of the population undefended. This kind of wall was almost certainly not a well thought out, planned and resourced effort. The wall at Mayapán stands in stark contrast to that scenario.

It incorporated several likely defensive features. The sheer size and form of the wall make it a formidable barrier. Topping with a wooden palisade or cacti would have greatly increased its defensive capabilities. In many areas the wall crossed naturally elevated terrain taking advantage of small hills and ridges to increase its height. The entrances themselves are very restricted and some have a form that would have intentionally limited the speed with which a person could pass and the number capable of entering at one time (Figure 9.57). The gates of the city wall provide the best evidence of its unambiguous defensive function. I discuss them and why that is at length in the



conclusions chapter of this volume.. It would have been easy to block these gates off entirely in case of hostilities. These gates take different forms, but all Major gates showed evidence of defensive features such as flanking platforms where troops could have massed to repel an attack. (Figure 9.58). Its top surface was a flat walkway that would have allowed troops to stand in defense and move rapidly to places that were under attack. The front had a parapet that would have provided cover from attackers.



**Figure 9.57 – Remains of Gate “O” in 2003. Rubble on left contains the edge of remains of a large platform flanking the gate on which troops could have positioned to guard it.**



**Figure 9.58 – Remains of partially collapsed defensive platform flaking gate “O”.**

We know of no specific attempts to attack and thwart this defensive system. However, the best defensive systems stand as a deterrent to attack rather than a physical barrier when one comes. The final violent fate of the city came from inside of the walls. All in all the Mayapán wall stands out as one of the most impressive examples of pre-planned military engineering ever executed in the Mesoamerican culture area. I will explore this topic in much more detail in the following chapter.

One of our workmen has famously told the story of finding a large concentration of points just outside of the wall years ago. He says he covered them and left them in place. However, he reports that he cannot now recall their exact location. As the source is a very reliable one, I put some credence in the report. However, until someone gets out there and works the length of the wall in detail this reported find and much more remain beyond the reach of this work.

## Outlier Settlements

### *Ancient Telchaquillo*

The Telchaquillo settlement was located roughly 2km north of the site center and was centered on a large water bearing cenote. It appears to have seen population growth in the Terminal Classic period and, by that time, had expanded far enough that its periphery was documented within the northern end of Transect 4. This area appears to have been lightly settled at the time, as indicated by the presence of round dwellings typical of the less affluent commoner of the area during that period. We have evidence in the form of a large Terminal Classic pen and associated storage structure that herding livestock, most likely deer, took place at the periphery of the settlement. This peripheral location would have enabled the animals to forage for food in areas surrounding the main pen and minimized the need for individuals owning the operation to produce and distribute feed.

With the rise of the Postclassic center, the main portion of the original site was abandoned and the local population moved somewhat south toward the main site. A Postclassic pen group and a number of large enclosures, most likely of a similar date, occupied the area in the Postclassic. It is likely that people moving closer to the Postclassic city applied their livestock raising skills in much the same location, now the northern periphery of Mayapán. Today, the area is again peripheral to the modern Telchaquillo settlement and is a zone with many cattle ranches. This consistent use of the land for herding livestock suggests that the local soils, water access or some other

unidentified factor may make the area optimal for such applications. By relocating slightly to the south of their original location, the resident population was able to take advantage of the city, becoming part of its cosmopolitan mix while continuing to make a living off of the same land and skills that had been employed by several generations in the area before the main site was founded.

#### *Ancient D'zan Tun Ch'en*

The exact reason that D'zan Tun Chen retained its outlier status is not clear. This settlement pocket is roughly the same distance from the center as the Itzmal Ch'en complex. Despite this, a clear drop off in architecture is seen between the Postclassic structures near the south wall of the site and this outlier settlement. This may be due to the distribution of cenotes south of the site. I was told by workmen that there are few good cenotes located south of the city. Additional mapping efforts to the south would be required to confirm that assessment. But, the men who I was working with have repeatedly showed themselves to be very familiar with the local geography so, I tend to trust the core assessment. One of the available cenotes in the area lies at the center of D'zan Tun Ch'en, and the other is located south of transect 4 and serves as the primary water source for Rancho San Angel. Several large structures flank the San Angel cenote and the site is still home to modern *Cha Chac* ceremonies that are intended to initiate the rains in May toward the end of the dry season. More mapping would be useful to determine the limits of these two pockets and their historical relationships. However, this relative lack of cenote access does not affect central Mayapán, which may account for the

central area between the southwest and northeast areas filling in while the space between D'zan Tun Ch'en and the southern limits of Mayapán remained empty. Today, the area is largely unused and densely overgrown, with the exception of the areas immediately around the two cenotes discussed above.

This contemporary southern settlement provides a number of comparisons and contrasts that illustrate the organization of the broader regional settlement hierarchy and how it reflects the various functions being provided at sites of different scales within the regional settlement pattern. As a distinct site, it had its own site center and pattern of concentric zonation. We determined, based on our sample, that the center was probably located near the south end of Transect 4. At the center of the site, we found the market, a public performance space and a large residential/storage group associated with the adjacent market. Arranged around these central groups are a number of residential structures. The only clear agricultural field storage found outside of the site's northeast section was found west of the settlement zone in what appears to be a location peripheral to the settlement. It remains unclear whether there was a temple associated with the site or the people living in this site availed themselves of the ritual functions being provided in the Mayapán Main Plaza. With the exception of the open question of ritual structures at the site, the general patterning shows a small, relatively self-sufficient settlement raising at least some of their own crops and obtaining other goods at the local market. It is, of course, likely that the residents of the area had access to the large central markets of Mayapán just as residents of Telchaquillo have access to larger markets in Merida when needed. There does not appear to be a zone of specialized economic production located



south of the city, as is seen in all other directions. The site does not appear to have contributed much of anything economically to its larger neighbor to the north.

### **Historical and Environmental Factors Affecting the Final Form of the City**

Chapter 7 dealt with new data regarding the settlement history of the area. Examining the history of the settlement in the area provides new perspectives on the processes of urbanism that resulted in Mayapán's final form and layout. During the proceeding Terminal Classic period, four main settlement pockets existed in the study area. "Old Mayapán" in the northeast and D'zan Tun Ch'en in the south were the first occupied areas, producing evidence of settlement around two particularly easily accessed cenotes from the Late Preclassic through the fall of the Postclassic site. Population growth during the Terminal Classic period resulted in two new pockets of settlement, one around the densest concentration of cenotes at the site in the southwest of the study area and other at Telchaquillo, centered on another large water bearing cenote about 2km to the north of what became the site center during the Postclassic. The majority of the settlement during this period was located outside of the now walled portion of the Postclassic city. The area that became the Main Plaza had been essentially empty land between these four settlement pockets.

The founding of the site and its growth impacted these 4 areas differently. The "Old Mayapán" zone and the southwestern zone around the cluster of cenotes were absorbed into the final Postclassic city territory. The incorporation of the northeastern zone into the final layout of the city resulted in the unusual shape of the wall in that

section of the city. It appears that the city wall itself was built late in the site's history and left many of the residents outside of the formal boundary. This area retained some degree of autonomy or at least importance, as suggested by the ritual/administrative complex at Itzmal Ch'en and the colonnaded hall group 18O-1.

The southwestern settlement pocket grew rapidly in the Postclassic and, like the northeastern zone, was eventually divided by the construction of the city wall. This part of the city was located much closer to the Main Plaza and appears to have met all of its public ritual and administrative through that association. It is likely that this is the area that was the home of the original founders of the Main Plaza and the site we think of as Mayapán today. They appear to have been new to the immediate area, lacking the deep historical roots as the people already residing in the northeast and south that had been around since the Late Preclassic.

Given that history, these two areas became two poles in the civic and administrative affairs of the city. Most of the indications we find of the concentric zonation described by Landa are found around the Main Plaza. Sectoring also played a significant role in the distribution of specific elite architecture which tended to follow major roads and cluster at their intersections. Much of the influx of people from other parts of the Yucatán it seems to have filled the space between the two poles of the Main Plaza and Itzmal Chen as the site grew in size and influence around the Northern Yucatán. This central zone also seems to have had a locus of ritual and administrative control located in quadrants "J" and "S". This process of conurbation, or growing together of adjacent population centers, combined with other factors, primarily was access to water,

drove fully integration of these two settlement zones into the final form of the city. The other two pockets had very different histories.

The site of Telchaquillo appears to have seen a slight shift in population to the south, residents abandoning much of their earlier site but remaining with 1 or 2 km of the area. Most people seem to have relocated to the western half of the north portion of the city, to locations both inside and outside the final city wall. In short, Telchaquillo's population was incorporated into the final city while much of the original site was not. D'zan Tun Ch'en grew in size while it remained a distinct site from Postclassic Mayapán.

## Chapter 10 - Conclusions

I set out to address the following specific questions with this study, as laid out in the first chapter of this volume:

- Where does the site of Mayapán end and non-site space begin?
- To what extent is it possible to distinguish the boundaries of outlying sites?
- Was the rural-urban fringe responsible for agricultural production?
- Was there evidence of craft or other production in this zone?
- Was there evidence for social or ethnic divisions beyond Mayapán's city wall?
- Was there evidence for an ethnic or lineage based affiliation with certain cardinal directions as suggested by ethnohistoric sources (Roys 1962:42)?
- Were there significant differences in class, ethnicity or occupation between the population living within the city wall and those on the fringe?
- How are these differences reflected in the archaeological record?
- Were there other significant differences between the settlement patterns within the city wall and outside of it?
- Were these potential differences a result of temporal influences or do they reflect a functional distinction?

The research conducted by my team and I was largely successful in answering these questions. These questions can be broken down into three general groups: questions about boundaries and "site" space (with attending demographic implications), questions about urban life and comparisons between the settlement pattern inside and outside of the fortifications. This chapter will address how the findings of this survey and excavation provide answers to those key questions and how this data fits into the broader theoretical framework established in Chapter 3.

Until this study, it was largely accepted that the site of Mayapán all but ended at the imposing city wall. While trying to establish the validity and inclusiveness of the populations estimates made by the Carnegie Project A.L. Smith made the claim that; "Structures are all confined within the city wall or a short distance from it, which

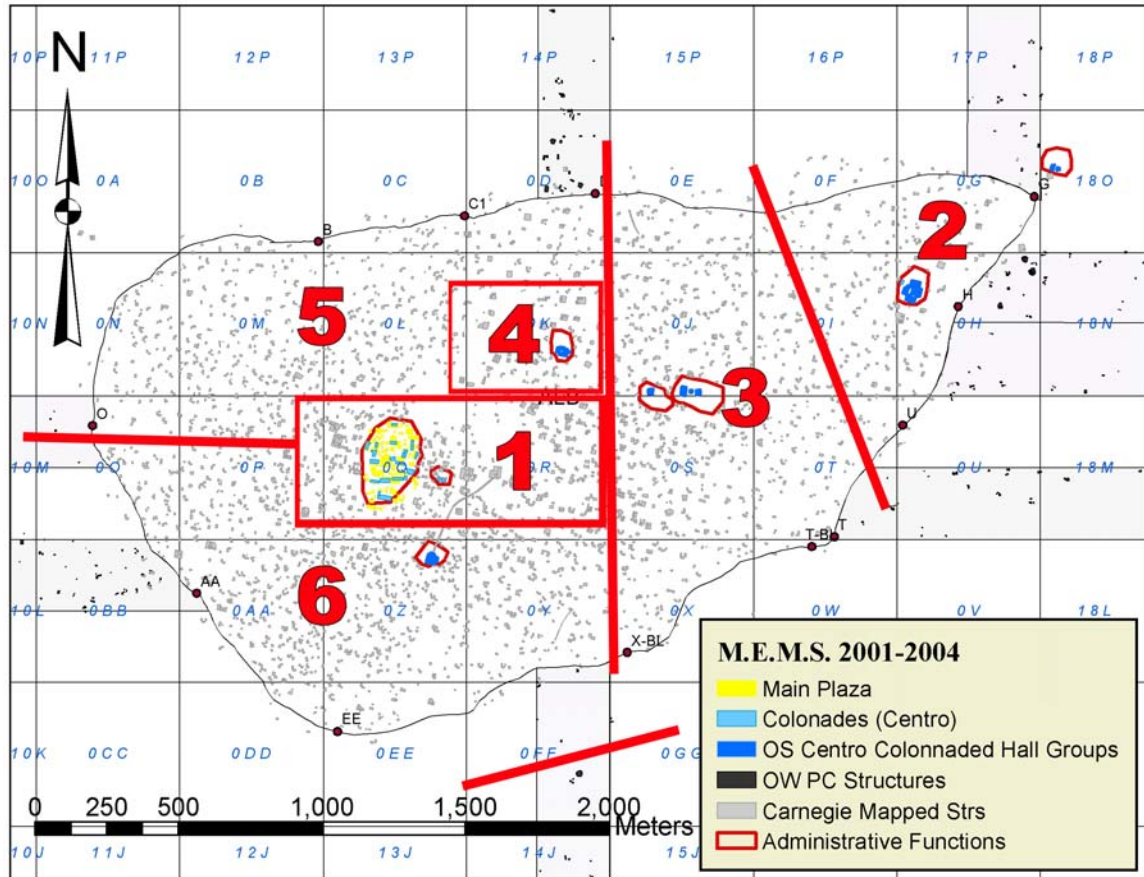
eliminates the problem of how far they extended from the site and which and which did not belong to it.” Although most extra-mural houses were located within 500 m, these new numbers make it clear that the Carnegie map did not include a significant number of residential structures. With an estimated 1,700 structures lying outside of the defensive wall, it appears that a nearly one third of all residents of the city lives outside of the areas mapped by the Carnegie Project. As noted, most residential occupation was found crowded within 500 m of the wall for apparent defensive reasons, a substantial area when you consider the 9 km length of the wall itself. Interestingly, residential zones outside of the wall appear bounded more by the presence of directional shrines than the imposing fortifications, a fact that may have important implications for the influence of the Maya concepts of “sacred space” on urban layout. The research also revealed the boundary of one outlier site in the south of the city and showed how another pre-existing settlement in the site’s northeast was integrated into the unusual form of the settlement through the process of conurbation.

### **Comparing General Settlement Patterning Inside and Outside of the City Wall**

Several differences between the settlement pattern inside and outside of the wall were noted. Inside the wall there are six main zones to consider (Figure 10.1): the central city which housed the main temples and administrative structures and elite residents; the northeast “old Mayapán” area associated with Itzmal Ch’en temple-cenote, a zone of residential settlement located between the central city and Itzmal Ch’en areas, a market zone near the center city and two more residential zones located in the west of the site.



The western half to third can be split along the line between the monumental center and Gate “O”. The southern half was densely settled beginning when the center was founded. Water in the area is abundant. By comparison the north half is sparsely settled and probably was filled in late. The residential groups were very densely clustered inside of the wall with many albarrada boundary walls abutting the adjacent group. Outside of the wall the density is notably lower. Residential group boundary walls generally form discrete rings with wide open areas found between groups. Inside the wall, neighborhoods are suggested by the distribution of colonnaded hall administrative groups, particularly those outside of the epicenter. It is possible that those contained within the plaza precinct may have been functionally distinct, dealing with broader regional government, and those scattered in a few locations within the city may have had more city-centric concerns such as neighborhood level administration and controlling access to city gates. The lower density found in the periphery made it home to productive activities that either required large amounts of land such as farming and grazing or produced noxious or unwanted by products such as large-scale lime production and the tending of bees, a common cross cultural pattern noted by Trigger (2003). These activities would have been highly restricted in the confined space closer to the center or the settlement where most green space was dedicated to small orchards and gardens within walled residential enclosures. Despite this spatial segregation, these activities provided services vital to the residents of Mayapán, who likely had access to the goods produced here through the broader market system at the site..



**Figure 10.1 - Map showing major settlement zones suggested in this study. Zones include: 1) Central city; 2) Northeast “old Mayapán” zone; 3) settlement zone between monumental center and Itzmal Ch’en; 4) market zone; 5) northwest residential zone; 6) southwest residential zone.**

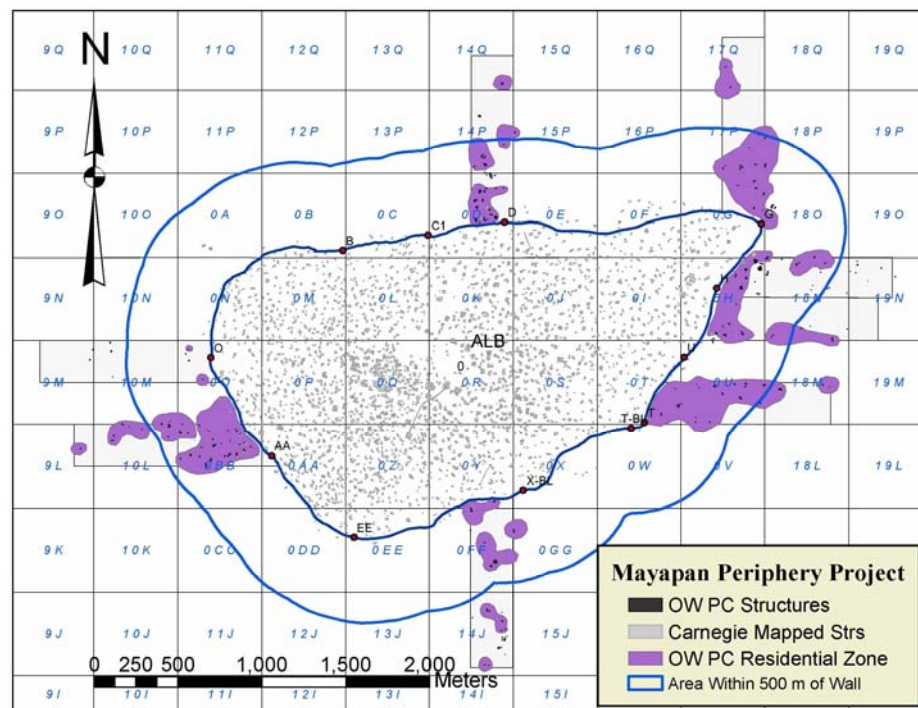
### Site Size and Demographics

This research represents a significant increase in the estimated population living at the site, expanding from the 12,000 estimated by the Carnegie project to a new estimate of 17,000 people presented here. New data regarding the site boundaries more than double the total estimated site size. Table 10.1 shows the new demographic estimates resulting from this study and how they compare with those offered by the

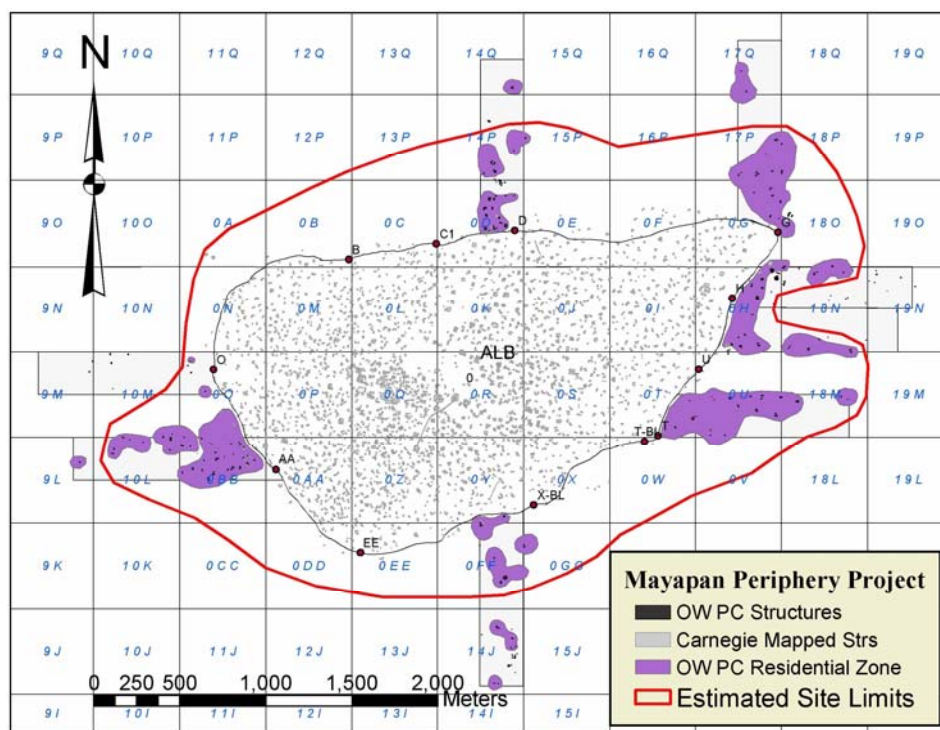
original Carnegie team (A.L. Smith 1962). The entire study area itself (everything within 1 km of the city wall) was 11.69 sq m. The actual physical size of this center is significantly larger than the 4.2 square km mapped by the Carnegie project. The total area contained within 500 m of the wall (the general point of settlement drop off) is roughly an additional 5.9 square km, for a total area of 10.1 sq km (Figure 10.2). However, using an arbitrary 500 m from the wall as a cutoff may exaggerate the size to some degree as certain portions of the study area such as the northwest of the site seem to contain little extra-mural settlement. Fitting the site boundaries to the mapped settlement zones and using my best informed judgments to fill in the gaps I have produced a second estimate for site size that I believe more accurately reflects the actual dimensions of the site (Figure 10.3). This estimate suggests that an additional 4.6 square kilometers of the area outside of the wall can be rightly considered part of Postclassic Mayapan. In total, the new estimated size of Mayapán using this method is 8.8 sq km. Based on this, two density estimates are possible. If we assume everything within 500 m of the wall to be part of the city (10.1 sq km total), then the overall density for the site drops from A.L. Smith's 1962 estimate of 2,857 persons/sq km to 1,683 persons/sq km, a drop of 1,174 persons/sq km. If we apply the estimated boundaries I produced based on the edges of residential settlement zones (8.8 sq km total), the new density works out to 1,932 persons/sq km. Further work outside of the city wall will be of course required to refine these estimates. The new estimates represent a decrease in overall site density. With inclusion of this new data, the estimated size of the site more than doubled. The estimated population grew by some 42% and the density dropped between 33 and 41%.

**Table 10.1 – Comparison of demographic estimates made by A.L. Smith (1962), those provided by Smith in 2005 and the new estimates provided here.**

| Source             | Population | Area (sq km) | Area (Hectares) | Density (# per sq km) | Density (# per Hectare) | Change in Density (# per sq km) | Change in Density (# per Hectare) |
|--------------------|------------|--------------|-----------------|-----------------------|-------------------------|---------------------------------|-----------------------------------|
| A.L. Smith 1962    | 12,000     | 4.2          | 420             | 2857                  | 28.6                    | N/A                             | N/A                               |
| MPP 500 M Estimate | 17,000     | 10.1         | 1010            | 1683                  | 16.8                    | -1174                           | -12                               |
| MPP Estimate       | 17,000     | 8.8          | 880             | 1932                  | 19.3                    | -925                            | -9                                |
| Smith 2005         | 21,000     | 4.2          | 420             | 5000                  | 50.0                    | 2143                            | 21                                |



**Figure 10.2 – Map showing newly estimated site boundaries based on an application of an assumed 500 m limit on residential settlement zones.**



**Figure 10.3 – Map showing newly estimated site boundaries based on inclusion of known settlement zones and informed judgment about those in unmapped areas.**

These new demographic estimates require that we re-evaluate where Mayapán stands in relation to other Mesoamerican sites. M.E. Smith (2005) gives estimated site areas for Late Postclassic cities across Mesoamerica, broken down by region. He ranked sites by both functional type (Table 10.2) and size class (Table 10.3). He also provided estimates for the size of site epicenters. The later in this case is clearly unaffected by the addition of new terrain outside of the wall. However, there are significant differences between these new demographic estimates and the measurements reported by Smith, which were based on early projections from the complete data presented here.

**Table 10.2 – Functional types used by Smith (2005).**

| <b>Class</b> | <b>Functional Type</b>                   |
|--------------|--|
| 0            | Uncertain                                |
| 1            | Major Political Capital                  |
| 2            | Political Town, General                  |
| 3            | Political Town, Craft Specialization     |
| 4            | Political Town, Trade Specialization     |
| 5            | Political Town, Religious Specialization |
| 6            | Town, Small                              |
| 7            | Hilltop Ceremonial Zone                  |
| 8            | Fortress                                 |

**Table 10.3 – Size classes used by Smith (2005).**

| <b>Size</b> | <b>Size Class (Quartile)</b>      |
|-------------|-----------------------------------|
| 1           | >205 ha                           |
| 2           | 90-205                            |
| 3           | 22-90                             |
| 4           | 10-22                             |
| 5           | <10 ha (not part of urban sample) |

Smith's rankings (Table 10.4) place Mayapán as the eighth largest Postclassic Mesoamerican city, even lower than the Northern Belizean site of Santa Rita which likely was subordinate to Mayapán. Notably that makes Mayapán larger than Tzintzuntzan, the imperial capital of the Tarascans. His list omits Uatlán in the Southern Maya Highlands which Wallace (1977:40) suggested could be as large as 4 square kilometers if the periphery, dense suburbs and residential terraces and platforms connected to the site by causeways and stairways are included. Updating Smith's numbers on Mayapán changes that ranking from eighth to fourth, placing it in a more logical relationship to sites like Santa Rita (Table 10.5). If Wallace is correct, Uatlán would be fifth.



**Table 10.4 – Site sizes for Type I (major political center) Postclassic cities reported by M.E. Smith (2005).**

| City           | Zone           | Type | Size (ha) | Population | Epicenter Size |
|----------------|----------------|------|-----------|------------|----------------|
| Tutepec        | Oaxaca         | 1    | 2,100     |            |                |
| Tenochtitlan   | Central Mexico | 1    | 1,350     | 212,500    | 16.9           |
| Zacapu         | West Mexico    | 2    | 1,100     | 20,000     |                |
| Tzintzuntzan   | West Mexico    | 1    | 674       | 30,000     | 34.4           |
| El Tigre       | Gulf Coast     | 4    | 500       |            |                |
| Santa Rita     | Petén/Belize   | 2    | 500       | 7,000      |                |
| Texcoco        | Central Mexico | 1    | 450       | 24,100     |                |
| Mayapán        | Yucatan        | 1    | 420       | 21,000     | 12.8           |
| Huexotla       | Central Mexico | 2    | 300       | 17,100     |                |
| Eronguáricuaro | West Mexico    | 2    | 275       |            |                |
| Chalco         | Central Mexico | 2    | 250       | 11,000     |                |
| Otumba         | Central Mexico | 2    | 220       | 10,700     |                |
| Zempoala       | Gulf Coast     | 2    | 220       |            | 16             |
| Acambaro       | West Mexico    | 2    | 215       | 6,000      |                |
| Yautepec       | Central Mexico | 2    | 209       | 15,100     |                |

**Table 10.5 – Revised site sizes for Type I (major political center) Postclassic cities reflecting both the arbitrary 500 m estimates and what I think is the more accurate estimates based on the actual edges of the residential settlement zones for Mayapán.**

| City                    | Zone           | Type | Size (ha) | Population | Epicenter Size |
|-------------------------|----------------|------|-----------|------------|----------------|
| Tutepec                 | Oaxaca         | 1    | 2,100     |            |                |
| Tenochtitlan            | Central Mexico | 1    | 1,350     | 212,500    | 16.9           |
| Zacapu                  | West Mexico    | 2    | 1,100     | 20,000     |                |
| Mayapán (MPP 500 m)     | Yucatan        | 1    | 1,010     | 21,000     | 12.8           |
| Mayapán (MPP Res Zones) | Yucatan        | 1    | 880       | 21,000     | 12.8           |
| Tzintzuntzan            | West Mexico    | 1    | 674       | 30,000     | 34.4           |
| El Tigre                | Gulf Coast     | 4    | 500       |            |                |
| Santa Rita              | Petén/Belize   | 2    | 500       | 7,000      |                |
| Texcoco                 | Central Mexico | 1    | 450       | 24,100     |                |
| Huexotla                | Central Mexico | 2    | 300       | 17,100     |                |
| Eronguáricuaro          | West Mexico    | 2    | 275       |            |                |
| Chalco                  | Central Mexico | 2    | 250       | 11,000     |                |
| Otumba                  | Central Mexico | 2    | 220       | 10,700     |                |
| Zempoala                | Gulf Coast     | 2    | 220       |            | 16             |
| Acambaro                | West Mexico    | 2    | 215       | 6,000      |                |
| Yautepec                | Central Mexico | 2    | 209       | 15,100     |                |

While Mayapán's population and site grew substantially with this work, its density fell. Smith (2005) ranked Mayapán as a medium-density site (Table 10.6). However, the lower density of the extra-mural areas caused the density to fall into the

low-density category (Table 10.7). The density remains higher than Santa Rita, leaving that logical relationship intact. More work on the peripheries of many cities listed would certainly revise this list still further.

**Table 10.6 – Site densities for Postclassic cities reported by M.E. Smith (2005).**

| Site                        | Zone           | Type | Population    | Area (ha)       | Density      |
|-----------------------------|----------------|------|---------------|-----------------|--------------|
| <i>Low-Density Sites</i>    |                |      |               |                 |              |
| Siguatecpan                 | Central Mexico | 2    | 1,100         | 106             | 10.4         |
| Santa Rita                  | Petén/Belize   | 2    | 7,000         | 500             | 14           |
| Ixtapaluca Viejo            | Central Mexico | 2    | 1,400         | 90              | 15.6         |
| Zacapu                      | West Mexico    | 2    | 20,000        | 1,100           | 18.2         |
| Acambaro                    | West Mexico    | 2    | 6,000         | 215             | 27.9         |
| <i>Medium-Density Sites</i> |                |      |               |                 |              |
| Chalco                      | Central Mexico | 2    | 11,000        | 250             | 44           |
| Tzintuntzan                 | West Mexico    | 1    | 30,000        | 674             | 44.5         |
| Otumba                      | Central Mexico | 3    | 10,700        | 220             | 48.6         |
| Mayapán                     | Yucatan        | 1    | 21,000        | 420             | 50           |
| Coatlan viejo               | Central Mexico | 2    | 800           | 15              | 53.3         |
| Cuexcomate                  | Central Mexico | 6    | 800           | 15              | 53.3         |
| Texcoco                     | Central Mexico | 1    | 24,100        | 450             | 53.6         |
| Huexotla                    | Central Mexico | 2    | 17,100        | 300             | 57           |
| Naco                        | Southeast      | 4    | 10,000        | 160             | 62.5         |
| Yautepec                    | Central Mexico | 2    | 15,100        | 209             | 72.2         |
| <i>High-Density Sites</i>   |                |      |               |                 |              |
| Tenochtitlan                | Central Mexico | 1    | 212,500       | 1.35            | 157.4        |
|                             |                |      | <b>Mean</b>   | <b>24,287.5</b> | <b>379.6</b> |
|                             |                |      | <b>St Dev</b> | <b>49,711.5</b> | <b>376.7</b> |
|                             |                |      | <b>Median</b> | <b>10,850</b>   | <b>235</b>   |
|                             |                |      |               |                 | <b>49</b>    |

**Table 10.7 – Revised site density distributions with the inclusion of the 500 m from the wall estimates and those based on the residential zones.**

| Site                                | Zone           | Type            | Population      | Area (ha)    | Density     |
|-------------------------------------|----------------|-----------------|-----------------|--------------|-------------|
| <i>Low-Density Sites</i>            |                |                 |                 |              |             |
| Siguatecpan                         | Central Mexico | 2               | 1,100           | 106          | 10.4        |
| Santa Rita                          | Petén/Belize   | 2               | 7,000           | 500          | 14          |
| Ixtapaluca Viejo                    | Central Mexico | 2               | 1,400           | 90           | 15.6        |
| Mayapán (MPP 500m)                  | Yucatan        | 1               | 17,000          | 1010         | 16.8        |
| Zacapu                              | West Mexico    | 2               | 20,000          | 1,100        | 18.2        |
| Mayapán (Settlement Zones)          | Yucatan        | 1               | 17,000          | 880          | 19.3        |
| Acambaro                            | West Mexico    | 2               | 6,000           | 215          | 27.9        |
| <i>Medium-Density Sites</i>         |                |                 |                 |              |             |
| Chalco                              | Central Mexico | 2               | 11,000          | 250          | 44          |
| Tzintuntzan                         | West Mexico    | 1               | 30,000          | 674          | 44.5        |
| Otumba                              | Central Mexico | 3               | 10,700          | 220          | 48.6        |
| Coatlan viejo                       | Central Mexico | 2               | 800             | 15           | 53.3        |
| Cuexcomate                          | Central Mexico | 6               | 800             | 15           | 53.3        |
| Texcoco                             | Central Mexico | 1               | 24,100          | 450          | 53.6        |
| Huexotla                            | Central Mexico | 2               | 17,100          | 300          | 57          |
| Naco                                | Southeast      | 4               | 10,000          | 160          | 62.5        |
| Yautepec                            | Central Mexico | 2               | 15,100          | 209          | 72.2        |
| <i>High-Density Sites</i>           |                |                 |                 |              |             |
| Tenochtitlan                        | Central Mexico | 1               | 212,500         | 1.35         | 157.4       |
| <b>MPP 500 m Estimate</b>           |                | <b>Mean 1</b>   | <b>24,037.5</b> | <b>332.2</b> | <b>46.8</b> |
|                                     |                | <b>St Dev 1</b> | <b>49,387.9</b> | <b>326.7</b> | <b>34.3</b> |
|                                     |                | <b>Median 1</b> | <b>20</b>       | <b>447</b>   | <b>46.6</b> |
| <b>MPP Settlement Zone Estimate</b> |                | <b>Mean 2</b>   | <b>23,850.0</b> | <b>318.5</b> | <b>46.9</b> |
|                                     |                | <b>St Dev 2</b> | <b>49,408.5</b> | <b>297.4</b> | <b>34.2</b> |
|                                     |                | <b>Median 2</b> | <b>20.4</b>     | <b>447</b>   | <b>46.6</b> |

As the debate between the demographic camp and the functionalists raged, Webster and Sanders (2001) suggested that Mayapán was the most “city-like” of the Maya settlements, implying that it lay just at the edge of their arbitrary demographic measures. I assume that they were basing that assessment on the published estimates of 12,000 from A.L. Smith (1962). Perhaps with the addition of this new settlement data and the significant population increase it represents, they will begrudgingly admit that the Maya had at least one center that meets both the demographic and functional definitions of the word “city”. On the other hand, they may find the low density disqualifying even still. I will leave the Classic Period folks to their own devices in this debate. Myself? I will continue to treat population and density as just one more measure of the immense variability found in urban settlements. In my mind Mayapán was a full fledged city at 12,000 residents and it is just as urban at 17,000, just larger and better understood.

### **Mayapán and Models of Urbanism**

Marcus (1983) focused on three main models of urban settlement organization: 1) the concentric model; 2) the sector model; and 3) the multiple nuclei model. Mayapán’s settlement patterning is complex. It shows indications of concentric zonation around the Main Plaza in terms of the distribution of public architecture and elite residential structures. Elite architecture shows evidence of sectoring based on proximity to major roads and road intersections. Commoner residences were spread throughout the site, their placement more determined by geography/topology and access to water than anything

else. Some evidence of sectoring is also present in the pattern, especially in terms of land use outside of the defensive wall, where patterns shows significant segregation of productive activities such as agriculture, livestock production and lime plaster production. Additionally, the settlement history described in this volume shows a pattern of conurbation between two nuclei, one represented by the Main plaza and the second represented by the Itzmal Ch'en group.

While these are not “separate but equal” nuclei as discussed by Marcus and the originators of the model (Harris and Ullman 1945), the settlement history of the pre-existing “old Mayapán” nuclei around Itzmal Ch'en clearly shaped the final form of the city. This may be why the Maya Chronicles (Roys 1962) make reference to Mayapán as “Saclactun” or “Saclactun Mayapán”, especially in prophesies relating to the early founding of the site. It is possible that the “old Mayapán” section of the city was originally known as Saclactun. Later references tend to refer just to Mayapán. A comparable situation would be if Minneapolis and St. Paul fully merged and St. Paul lost its name in the process. Whether this speculation regarding the naming is true or not, the pre-existing site was clearly dwarfed by Mayapán proper, which grew rapidly and eventually merged with the earlier settlement. However, the presence of significant public architecture in the second, smaller nucleus shows that the area never fully lost its autonomy. No single model fully captures the variability and complexity of the site's layout. However, if I were forced to shoehorn it into only one of the above, it would best fit the multiple nuclei model given the historical influences on its final form and the clear dual centers present at the site.

## **Understanding The Complex Functions of Mayapán's Various Wall Systems**

Mayapán contains a virtual rat's maze of walls dividing space at the site into smaller and smaller units. Some of these barriers were primarily defensive in nature, some served at least in part to keep commoners out of important elite areas, others channeled movement through the city directing traffic to and past key settlement features, certain examples were employed to important economic benefit and still others served to delimit restricted and private residential space. Understanding how this complex system functioned at multiple levels requires breaking down the wall system into several major parts. First, and most obvious is the roughly 9 km long city wall surrounding 4.2 sq km of the site. Next, the wall discussed by Landa as having enclosed the central precinct of the site. Third, the double albarrada walls that apparently lined major streets of the city. Fourth, the smaller albarrada enclosures that surrounded residential groups of both the elite and commoners. Also discussed are the function and distribution of animal pens and walls lining roadways in the city. All of these features functioned as key parts of a complex and integrated system designed to protect the people from threats both physical and spiritual and which facilitated wealth building, especially of the elites.

In reality, the various wall systems at the site have received only a rather cursory examination despite frequent references to them in any source on the site. Albarrada wall enclosures and alignments were largely ignored by the Carnegie researchers and do not appear on the Jones (1957) map. Mapping done over the past decade and a half including that done by this project has gone a long way toward filling the data gaps (Brown 1999; Hare et. al. 2006). The limited published maps and original field notes found in archives



are beginning to provide more and more clues about these under documented site features. The major city wall surrounding much of the site was first explored in detail when Ralph T. Patton visited the site in the late 1930's and mapped the wall and many of the structures in the site center. He did so under the auspices to the Carnegie Institution in Washington at the behest of Sylvanus Morely who found the site lacking in the grandeur that he assumed should exist at Mayapán, the last great Maya city. Unfortunately, Patton did not publish his findings. However, his notes and maps were used in the preparation of later publications on the site including the final Jones (1975) map of the site. An incomplete and unpublished manuscript from the work (Andrews and Patton, n.d.) details his initial thoughts on the defensive nature of the wall. I will return to and quote his observations on the function of the main wall at length below. This work was followed by mapping and excavation by Edwin M Shook (1952) focused primarily on specific gates in the wall. His excavations extended in a radius of 50 m from the gate and were intended to locate and associated architectural features like guard houses and to determine if there were any signs of ritual dumps of ceramics just outside of the gates. In each case, only half of the gate was excavated, leaving one half intact for future investigators. The detailed maps and observations he provided greatly inform the observations and arguments presented below.

### *Main City Wall*

Many scholars and lay people over the decades (even centuries) have claimed that Mayapán was a “fortress” that had “defensive walls”, etc. But, significant questions remain about that claim. I for one can tell you that I have found a lot of people to cite

mentioning the function of the wall but, I can't find one that goes very far in proving its function definitively. Mainly the claim seems to just be repeated and assumed based largely on the ethnohistoric record. Although I think that data is very important and will return to it below, archaeological confirmation of such claims is the gold standard so to speak. One issue is that the ethnohistoric data in question are solely focused on discussion of the military function of the barricade. This runs a significant potential to ignore important secondary functions of the feature. Careful examination of the archaeological data is required to say for certain how the wall functioned from multiple perspectives. So, how do we know that the Mayapán walls were defensive in nature from the patterning we find in the archaeological record? Reading Patton's manuscript reveals that the one researcher to date who has really tackled the wall in detail had his doubts about it being an effective defensive barrier. As his comments appear up until now to have remained largely un-circulated, I quote him here in full on the function of the wall:

#### FUNCTION OF THE WALL

It is natural to suppose that a wall encircling a city served primarily for defense. Certain characteristics of that at Mayapan, however, make it a rather poor fortification:

1. The masonry structure is low. (Added height may be given by palisades.)
2. The entrances appear to have been located for convenience rather than protection, both in number and distribution.
3. The terrain is not used to the best advantage in the course of the wall.
4. The large and irregular size of the enclosure could not have been intended to secure a maximum defensive water supply. One cenote lies just 30 m outside of the wall.
5. The size and distribution of the remains within the walled enclosure seem to lack the compactness one would expect for a defensive unit. We are ignorant of course of the extent to which the areas inside the city were populated. Nevertheless, it is the usual custom at fortified

cities to wall in only a concentrated central enclosure, thus effecting maximum economy of the actual works to be defended. The wall at Mayapan ignores this sensible usage, and would be extremely difficult to defend. It is at least five times the length of any similar construction known in New World prehistory.

There was a belief in the Yucatan at the time of the conquest that, during the period of political ascendancy of Mayapan, the nobles of all other provinces of Yucatan were forced to reside at that site as hostages for the good behavior of their subjects. Landa noted that these nobles lived alone within a wall one half kilometer in length, with only two entrances – adding that their servants and retainers were forced to live outside.

In reference to this belief, Morley has suggested in conversation that the wall may well have been ceremonial rather than military, that it perhaps served as much to keep the nobles in as to keep the common people out. It defined, in other words, the limits of their permitted wanderings. But this might be true and still not be the reason the wall was constructed. The restriction of the enclosure as we know it to the nobles, of course, is clearly ruled out by the immense quantity of occupational vestiges within – as well as by their absence without. (Andrews and Patton , n.d.:204-206)

In this passage, Patton recognized the same confusion seen by others trying to use Landa (Tozzer 1941) in which he describes a wall relatively short one half kilometer wall that contains few people then a larger city containing far more people without clarifying which (or if both) was walled in. Morley seems to have to be assuming that the larger outer wall were and that described by Landa are somehow one in the same despite the great length disparity. Patton continues first quoting Tozzer's notes on the issue:

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\* Tozzer (1941:25) offers an interesting explanation for these data.: “there seems little doubt but what there are two stone walls, the one ‘about an eight of a league’ described here by Landa and inside of which were the temples and houses of the lords and the other over five miles around and capable of having ‘within the walls’ more than ‘sixty thousand dwellings’ RY; Cf p.\_\_supra”.

He notes that it is difficult to understand why this inner wall was not found during the present survey. Unless several times larger than Landa's figure, it would enclose only a fraction of the principal group. And, if constructed as described by Landa, It would have at least one major ceremonial group (Chan

Chen) {Itzmal Ch'en today} lies near the wall at the greatest possible distance from the ceremonial center.

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Other factors indicate strongly that the wall was defensive in nature. In the first place, in a period we know as decadent to the extent that the most important ceremonial constructions were built with a minimum of care and effort, one doubts strongly whether for the purposes of mere symbolism the natives would have built a structure nine kilometers long involving the cutting, transportation and laying of well over two hundred million pounds of stone!! Knowledge gleaned from early histories indicate that in its final period the city of Mayapan enjoyed a military hegemony over large portions of an unwilling Yucatan, from whom they extracted tribute and sufficient hatred to culminate in their eventual destruction. A defensive wall would have been extremely useful. And we have no knowledge of any such constructions elsewhere in the area serving any other purpose.

A wooden palisade based upon the permanent masonry bastions around Mayapan would have made them a formidable fortification. And such palisades are known to have surrounded at least a large portion of both north and south Yucatec towns at the time of the conquest\*. Lothrop further believes that many of these were actually walled with stone.

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\* Bernal Diaz del Castillo (1927. p. 69) describes a city of the province of Cehache in the south of Yucatan as "a newly built town, fortified and barricaded, with very strong palisades in two circles, one of which was like a barbican, with loop holes and trenches sunk before it."

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(Andrews and Patton n.d.:207-207)

Patton's discussion of the "decadent" poor quality of Mayapán's architecture (which we know now was once quite impressive with stucco facades, murals, etc.) aside, his observations on the features of the wall and his recognition of the conflict between the two walls described in ethnohistoric accounts was a significant contribution as was his linkage of the form of the wall and its likely palisades with the description of early Colonial Period fortified towns noted by Bernal Diaz. In the end, he still seems to settle on defensive functions. But a look at his list of five concerns is still instructive. His first concern about the height for the wall he, answers himself through presumed application

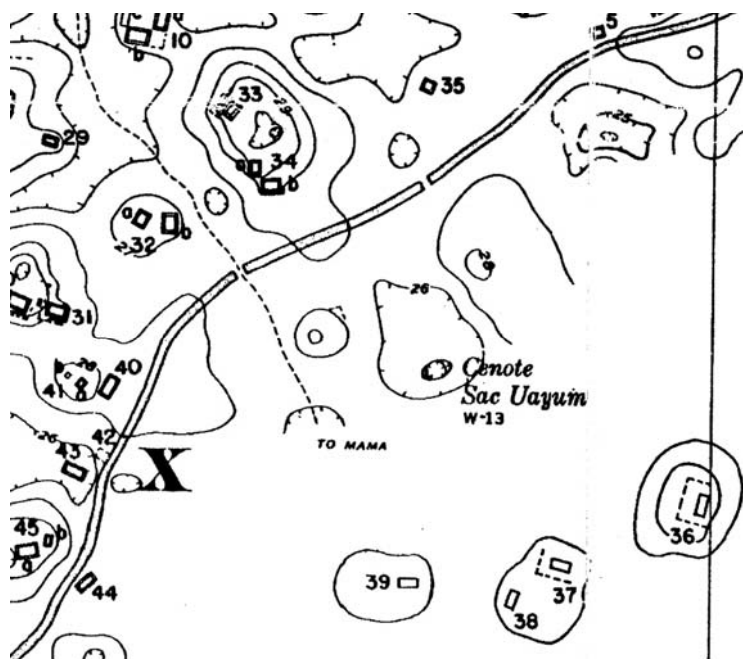
of palisades. His second concern regarding the placement and number of gates is rather impressionistic and speculative. Unfortunately he misses key point about the entrances, which I explore below, their defensive form.

His note about the use of the land is rather subjective and I do not feel supported by other evidence.. The landscape generally does not offer many steep changes in elevation (unless you step into a cenote). While it is dotted with altillos, these are so ubiquitous as to be of some value but generally the terrain is not what I would consider itself conducive to defense. The route of the wall generally does not show any preference for running over these natural features or between them. It does some of both. I doubt that the extra expense involved in maximizing the location with respect to these features was outweighed by other concerns. However, specific features, specifically the gates do show some intentional placement to take advantage of the limited natural advantages the terrain offered. Shook (1952) also noted this placement of gates on altillos in his research. Also, there are no bodies of water to take defensive advantage of as we see with the Aztec capital or many contemporary sites in northern Belize and the Petén of Guatemala. That facts alone make a good strong wall all the more desirable in militarily unstable times.

His fourth point was that the layout of the wall did not seem to take maximum advantage of all available water sources, a key resource in “stronghold fortifications” meant to hold off long sieges (see discussion below). In particular, he notes the exclusion of “one cenote” by a mere thirty meters. I can only assume from inspection of the map that he is referring to Cenote Sac Uayum in Grid Square X (Figure 10.4). As I discussed in earlier chapters, it is now believed that this cenote was specifically excluded by the

site boundary for ritual reasons. Brown reported that the locals even today consider this cenote to be home to malevolent forces, recounting one tale that it is home to a flying serpent that is occasionally seen outside of the entrance. When I visited the location with Miguel Aguilera, Fernando Mena and Fernando Flores, the later two told us similar stories, including one important observation, that it is the wide held belief to this day that is a person tries to get water from the cenote, it will begin to bubble and fill with sediment immediately making it undrinkable. In addition to the numerous tales associated with the cenote, the feature itself is the most inhospitable and uninviting I have personally seen at the site. I usually jump at the chance to enter the cenotes. But, in this case, I was in no rush to do so and would not even consider it without safety equipment. The mouth is narrow and very dark, ringed with jagged, tooth-like limestone stalactites on all sides. I was not able to see the bottom directly with the natural light of the day. Overall, it gave the impression that any attempt to access the water would have been dangerous at a level that would have made it one of the less desirable water sources in the area. If these ritual notions, whatever their origin have antiquity, it would likely not have been considered as much a water source but instead would have been thought of as a danger otherworld linked location to fear and respect. That would suggest that at least in this case the wall also served as a ritual barrier in the sense that it kept people and the evil forces of this particular cenote separated.





**Figure 10.4 – Detail of the Jones (1957) map showing relationship of wall to cenote Sac Uayum.**

His final concern was about the ability to defend a city wall 9 km long. But, even a cursory review of literature on walls would suggest that while large for the area, the enclosure was not an outlier in size on a cross-cultural level. The newly expanded population estimate of 17,000 presented here and the ethnohistoric and stylistic indications of a substantial army of mercenaries (see Milbrath and Peraza 2003 and Milbrath 2005 discussed in more detail below) brought in during the later years of the site would be a good labor force to patrol and defend where needed. If the conscription of troops from provinces took place as indicated by the ethnohistoric sources, it is more likely they were kept away from the city all together, as likely were a sizable number of those mercenaries not needed for immediate localized defense. Some of these presumably would have been away campaigning for periods. Others were likely stationed in the provinces to insure their continued cooperation. The features of the structure itself were conducive to moving those troops that were used for local defense rapidly to a

trouble spot along the barrier. In short, I do not think Patton's concerns are supported. A more thorough review of the number of troops commonly used to defend a length of wall is beyond the scope of this work and will be among the topics of follow-up research on my part.

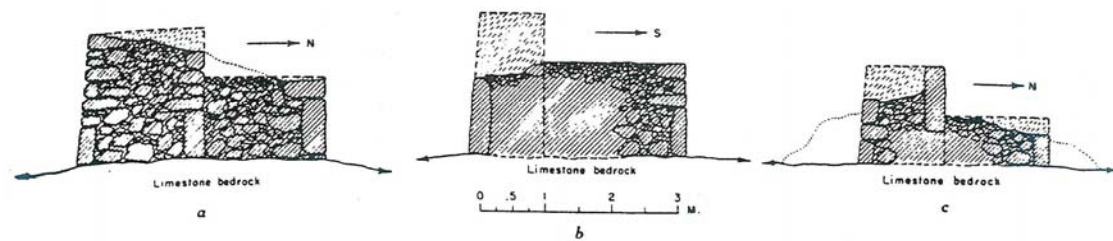
Before reviewing the physical archaeological evidence supporting the oft repeated claim that Mayapán was a fortress protected by massive walls in detail, I want to point to at least two apparent secondary functions of the wall suggested by this research. The 18O-1 colonnaded hall group which is located just to the northeast of Gate G in the very northeast corner of the wall is believed to have served as a customs control point for goods being brought into the city. In particular, it is likely that they collected taxes on crops being grown in the agricultural fields east of the city. So, the wall in addition to its defensive functions (which I will return to in a moment) were apparently a means of generating state revenue from a prosperous and reasonably unbounded market-based economy. Think of your typical national customs office today. If you are bringing goods into the country for sale, most locations want to know and want a cut of the potential profits to be generated. Goods smuggled across the border cut into state revenues. Walls and check points at their gates help prevent that from occurring. This topic is addressed below in terms of effects of the society's economic system on the city's form.

Another secondary function was just mentioned in connection to the excluded cenote Sac Uayum, a ritual barrier. I argued above that the wall placement in Grid X was intentionally intended to separate people from a particular cenote and its related evil forces. So, the basic principle that the wall can stop evil forces seems at least somewhat supported. However, below I discuss the effects of the religious beliefs of the people on

the final layout of the city. Three directional shrines were located outside of the city wall by this survey, one each in the east, north and west. I will explore their specific function in detail below. However in summary, it appears these structures housed idols associated with the annual Uayeb and New Years rituals. I explored the use of these idols in My master's thesis (Russell 2000) and found that both ethnohistoric and ethnographic evidence suggested that these idols were believed to gather negative energy throughout the year and at the end of the appointed period were disposed of in ritual dumps that were taboo with regard to further contact. The location of these dumps is commonly outside of cities and towns where they cannot contaminate the local surroundings or people. Some evidence suggests that large dumps that may fit this activity were sealed under floor deposits in the main plaza (Peraza et. al. 1996, 1997, Milbrath and Peraza 2003, Milbrath 2005). At Caye Coco in Northern Belize, the dump was located segregated from the main Postclassic settlement on an island in Progresso Lagoon. It was found on a small nearby island appropriately called Caye Muerto today. This suggests that Postclassic island sites could have received the same ritual protection from water barriers. The key here is the fact that the idols were housed outside of the settlement for fear of ritual contamination during the year (Russell 2000). Apparently the barrier was sufficient to segregate the people from majority of residents from the possible ill effects of close contact with the powerful forces these idols were imbued with.

Now, we return to archaeological indications of defensive functions of the enclosures at Mayapán. As direct evidence of fighting at defensive structures is rare, Webster (1978) suggests that establishing the primary function lies in eliminating competing explanations as well as demonstrating "that the size and configuration of

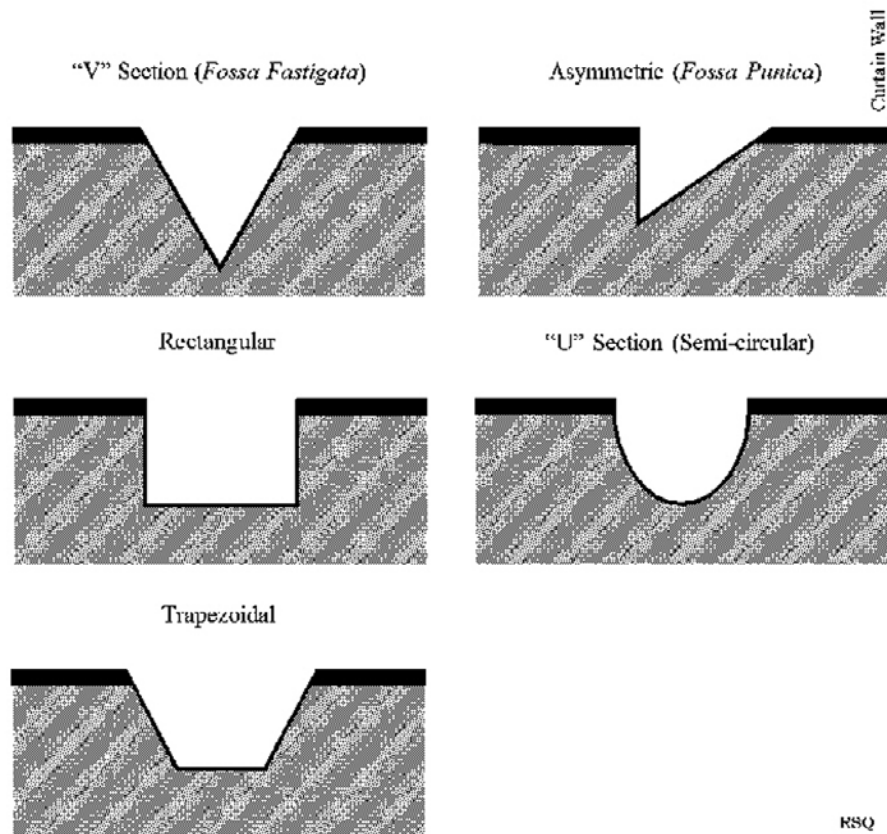
boundary features are consistent with defensive functions.” This approach only takes us so far. A more recent study by Keeley, Fontana and Quick provide a more specific, rigorous and cross-culturally applicable set of features to look for in a defensive fortification: V-sectioned ditches outside of defensive curtains, defensible gates and bastions. The authors found that these features had broad cross-cultural commonality despite the time period, size of settlement, level of political complexity of the society in question, even the construction materials and techniques used to build the enceinte or enclosure. This commonality in forms presumably flows from the general effectiveness of the features in question. They do not rely on such features as strategic placement of constructions on the landscape or the presence or absence of certain features like crenellations that may not have unambiguous military function or are not likely to preserve well archaeologically. The parapet along the outside of Mayapán’s wall would fall into this category (Figure 10.5). The researchers do not deny that these features if present could provide support for a defense hypothesis, just that they are not consistently military in application or available to the archaeologist in many cases. In my analysis below, I do discuss these features to a degree. But, they are not the core on which my arguments are built. In keeping with the approach employed by Keeley and his colleagues, I will compare the features of the Main Mayapán wall that suggest unambiguous defensive functions to the three key features they observed cross-culturally.



**Figure 10.5 – Three cross section drawings of various points along the wall showing parapet along the outside of the wall and walkway along the inside of the wall. Parapet most likely supported a perishable palisade for added height (modified after Shook 1952:Figures 1a-1c).**

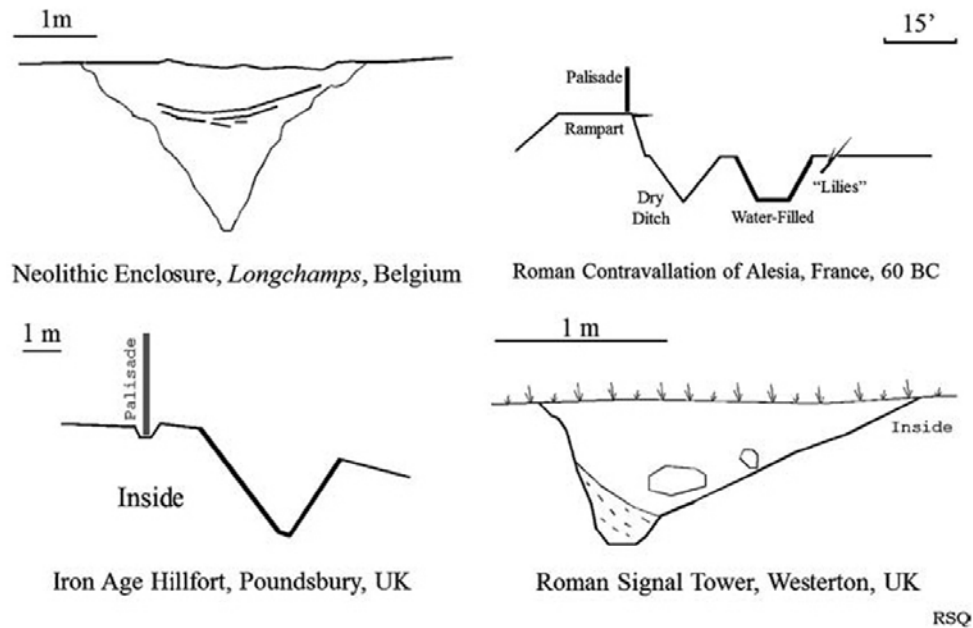
The first unambiguously defensive feature that Keeley and his colleagues highlighted were V-sectioned ditches located outside of the defensive curtain (Figures 10.6-10.7). The shape of these ditches offer several advantages not seen in ditches of other shapes. In particular, the angle of the walls provides a clear line of attack for defenders on the wall. The lack of a flat bottom in V-sectioned ditches prevents attackers from getting a solid foothold on approach. The steep walls make climbing out either forward or in retreat difficult. All of these features make this shape the cross-culturally preferred form. In certain cases the V shape is altered to create a steep wall on approach and a less severe incline as the attacker moves forward. These ditches are typically found farther from the enceinte and the altered form reflects the lower angle of projectiles as distance increases. The retreat remains blocked effectively by the steep angled outer wall. These features also serve to prevent attacker from undermining the wall through tunneling at the ditch often cuts lower than the wall forcing tunnels to end in the ditch or it increases the likelihood of collapse for deeper tunnels by weakening overlying strata. The authors suggest that these ditches need not be very deep nor very wide to be useful, suggesting that 1.5 m wide by between 1 and 3 meters deep was both effective and

efficient. Ditches of other shapes contain dead zones behind the inward wall where attackers can cower and avoid defensive fire. The authors suggest that ditches of other shapes frequently contained water filled moats. In many cases, several rings combining these different features and ditch shapes were documented. Of course, these ditches also frequently provide the fundamental materials used to construct the walls.



**Figure 10.6 – Schematic drawings of various ditch designs in cross section (modified after Keeley et. al 2007: Figure 1).**



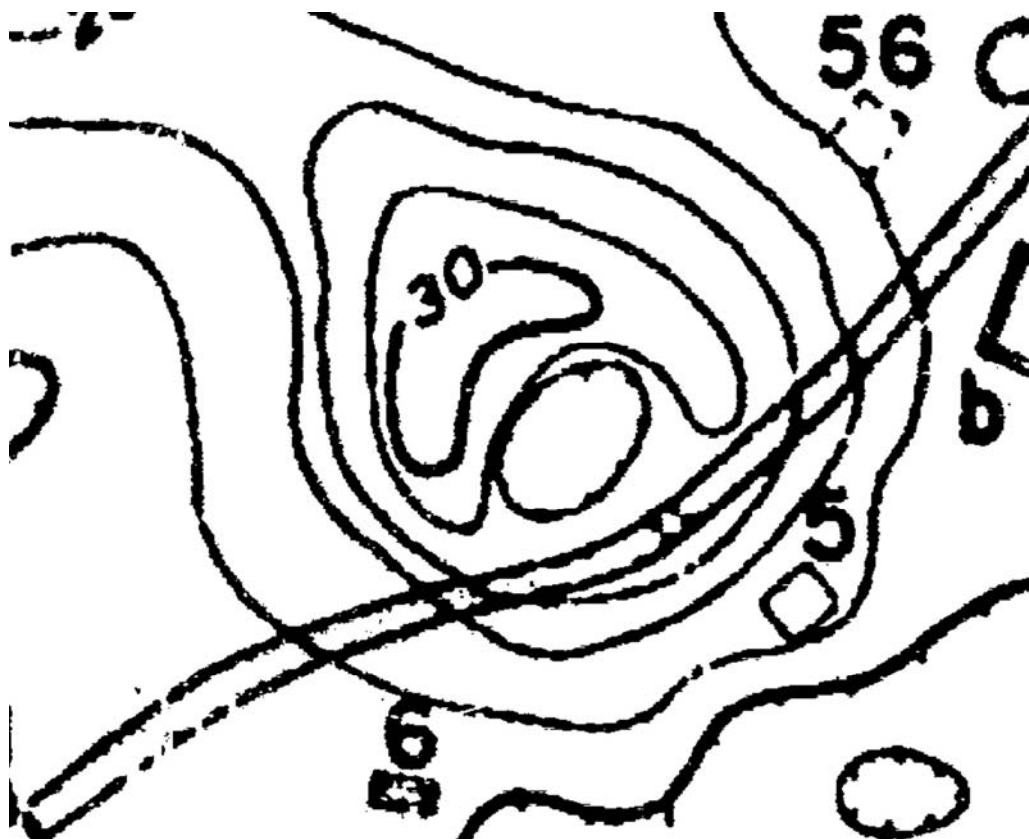


**Figure 10.7 – Illustrations of various ditch designs from actual archaeological contexts (modified after Keeley et. al 2007: Figure 2).**

At Mayapán the terrain is largely exposed limestone bedrock. That which is not exposed can usually be found beneath less than 40-50 cm of soil. As a result, cutting a 9 km ditch to match the wall at the site was far from practical given stone tool that would have been for excavation of the fill. Material for the wall that was excavated (largely the softest limestone rock and *sascab*, an unconsolidated limestone gravel) was quarried close to the wall. In the case of the largest slabs, many appear to have been cut in place and simply set up on end to retain the fill within. Substantial and sometimes rather deep *sascaberas* (quarries), many linear in form and following the wall itself, are known but have not been systematically recorded. However, they do not form a complete line. Keeley, Fontana and Quick address discontinuous ditches around sites suggesting that the most likely reflect one of two origins. Either they were once continuous ditched and have

slumped with exposure to water, erosion and time or they may reflect details about the organization of the work parties involved.

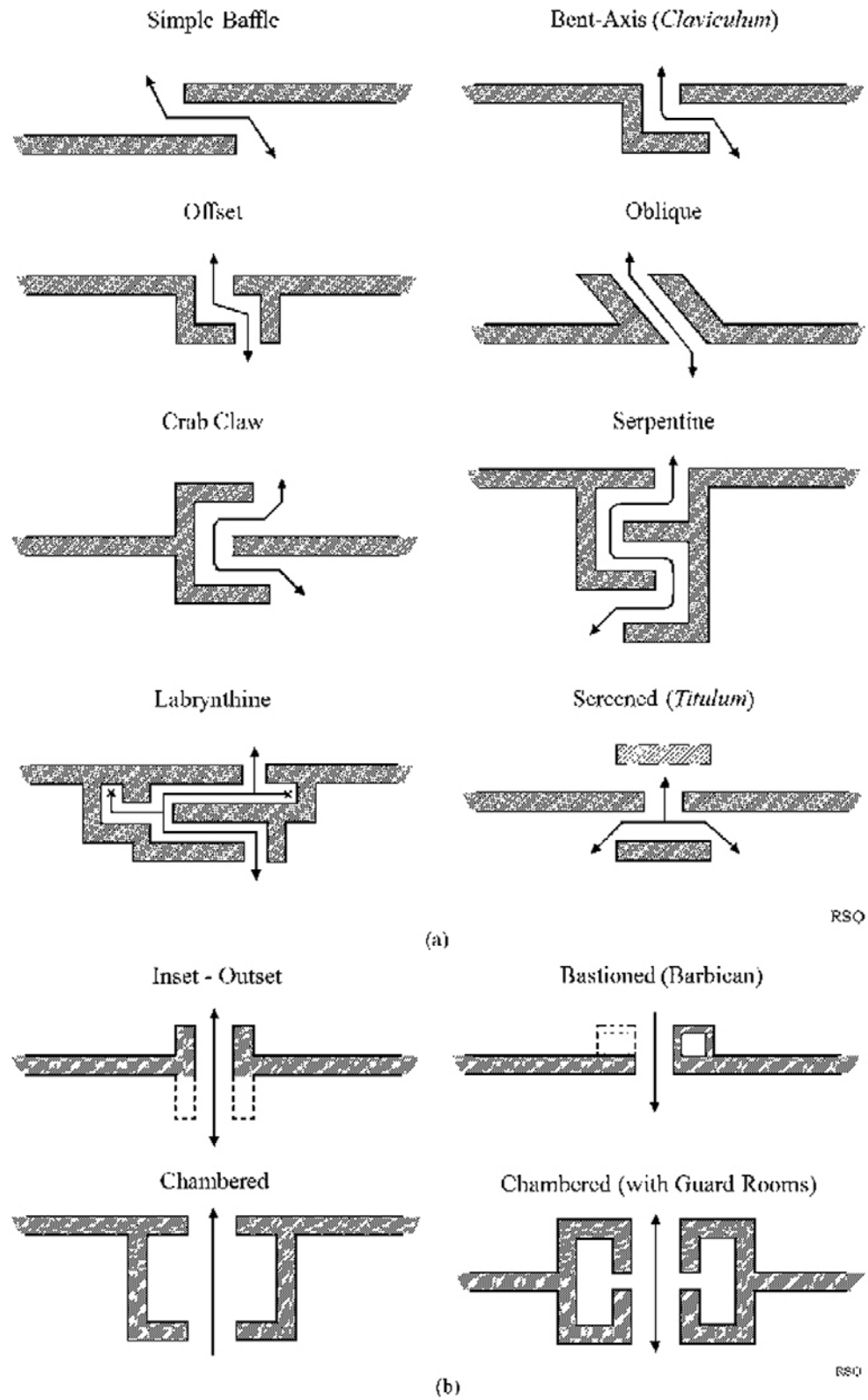
In the latter case, defensive functions were probably largely incidental. This is most likely the case with the *sascaberas* surrounding the wall (Figure 10.8). The irregular shaped of the features suggest simple quarrying. The fact that they appear largely restricted to the outside of the wall suggests some intended defensive function even if all it did was channel the movement of attackers. I caution with this observation that a systematic survey would be required to confirm my impressionistic observation. The depth and shape of many of these features would cause many to be skirted by advancing troops, possibly of some of military value. Shallower examples at least slow movement through them to some degree. Similarly, I encountered a 4 to 5 m deep liner cave opening that ran parallel to the wall along Transect 4 just outside of the wall in Grid Square Y. We climbed down into it carefully and slowly. But, an attacker most certainly would not have chosen to do so under fire, unless of course they needed cover, in which case it may well be beneficial to risk jumping or scrambling down. The fact that the wall runs along the feature which is natural suggests that Mayapán's engineers may have considered that placement beneficial. At the minimum they were apparently not overly concerned about it working against them. Further research documenting the full range of locations, sizes and shapes of these features would be required to determine if there was a pattern suggesting their placement was driven at least in part by defensive concerns. Strictly speaking in terms of this study, they are ambiguous as to and at best of limited defensive value. It can safely be said that it does not appear organized V-sectioned ditches were utilized at the site.



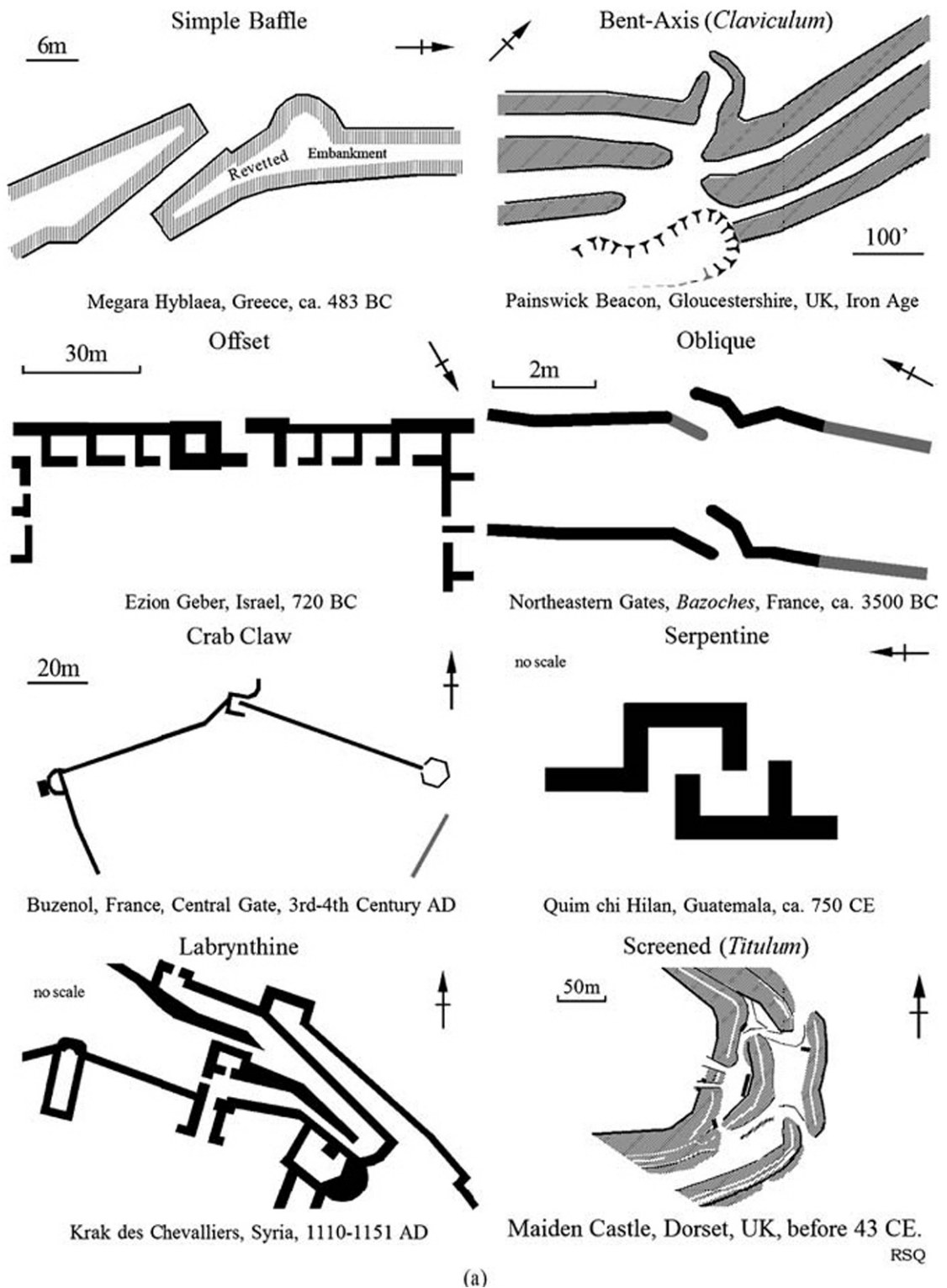
**Figure 10.8 - Section of wall along northeast section of wall in Grid Square N with a depression that is most likely a sascabera excavated out of a natural altillo on its outside. Total depth from top of altillo to bottom of sascabera is 3 meters (modified after Jones 1957).**

Unlike ditches, Mayapán's enceinte has numerous gates whose form and placement on the landscape provide a wealth of support for the defensive nature of the wall. Unfortunately, the draft manuscript that contains the observations from Patton (Andrews and Patton, n.d.) contains only the hand drawn squares with labels marking where the maps he made of the gates that he made were to have gone...eventually. To the best of my knowledge these have not appeared elsewhere. I'd be pleased to find out otherwise. A trip to the archives of Carnegie material at the Peabody Museum may be

beneficial in locating this information. A similar trip yielded unpublished maps that have allowed us to better understand the distribution and form of residential albarrada walls (discussed in more detail below). Fortunately, we have excellent illustrations of the gates from Shook (1952). As noted above, I plan a follow up publication on this issue with new maps and photos of the gates and wall that I plan to take when I return to the site beginning this summer. The maps that Patton made did inform the later maps made of the site including the Jones (1975) maps of the walled portions of the site. While the scale of the map does not allow us to discern a huge amount of detailed information about construction methods, state of preservation, etc., it does provide a good enough representation for us to compare them to known defensive gates published by Keeley et. al. (Figures 10.9-10.11) and understand the surrounding topography.

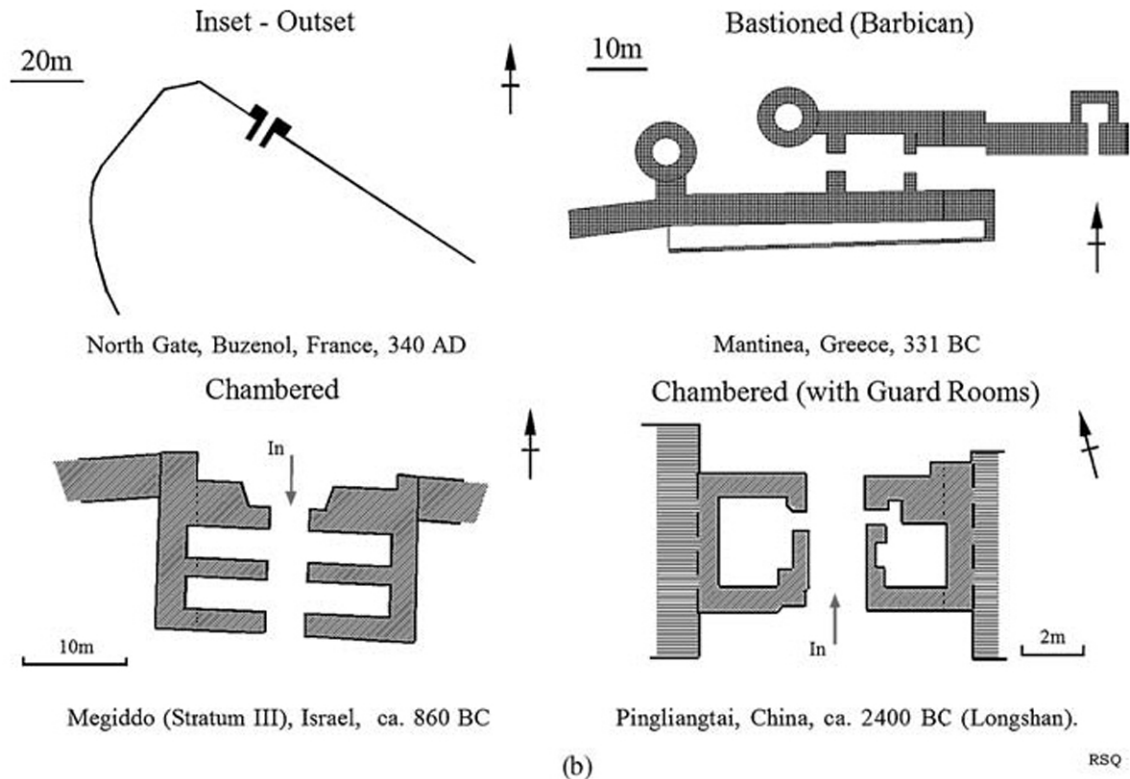


**Figure 10.9 – Schematic drawings of common baffled gate systems (modified after Keeley et. al 2007: Figure 4).**



**Figure 10.10 – Illustrations of archaeologically documented defensive gate systems (modified after Keeley et. al 2007: Figure 5).**





**Figure 10.11 – Illustrations of archaeologically documented defensive gate systems (cont.) (modified after Keeley et al 2007:Figure 6).**

The research by Keeley et al (2007) published 12 specific plans for defended gates. Among this diversity, the authors identify three main forms of defended gate: baffled gates, screened gates and flanked gates. Among the most popular forms worldwide are baffled gates (also known as lateral, bent axis, offset, staggered, crab-claw, serpentine and labyrinthine). The goal of these gates is to slow entry, and force attackers to turn a corner, thereby exposing their flanks if carrying a shield. These features range in complexity of design. They can be as simple as overlapping the segments of the wall to as complex as the labyrinthine designs which involve many turns and even dead ends or traps. The authors suggest that because these gates are difficult for everyday traffic to negotiate, they are primarily used for narrow secondary gates or “sally

ports”, gates used to launch counter-attacks from within the wall. Early baffled gates are found in many regions including Africa, Mesoamerica, and eastern North America. They note that even after gun powder weapons such as cannons were developed, these gates remained popular. Screened gates are essentially double facing baffled gated formed by placing a screen or wall section in front of the gate, behind it or both. This design was popular with Roman fortifications and fortified camps. Flanked gates are entrances with straight or direct pathways. However, they were also flanked on one or both sides by walls or towers that served as platforms for massing fire on attackers. These gates form straight passageways that can be blocked on one or both ends. Attackers can be forced to breach a second, inner entrance under tight space and heavy fire conditions. Worse yet, they can’t be sure what lies behind the first breach. Leading attackers who enjoy a moment of victory as they pass through the outer blockage may find that feeling short-lived as they find themselves trapped in the small space between that and the second entrance and under a hail of stones, arrows or other weapons. The authors correlate this form with “main gates” where everyday peacetime traffic is better accommodated by them. Several variants of these gates exist. Chambered gates have an inner and outer portal separated by a small open space or guard rooms. In some cases these portals project outward from the wall (barbican gates). The authors suggest that the open spaces or chambers in these gates served as space for people monitoring traffic flow, collecting taxes, tolls, etc. Manhattan accomplishes the same function today by setting up toll booths at tunnels and bridges entering the city, the natural choke points for traffic flow.

As suggested by the Keeley research, defensive city walls typically exhibit a mix of gate forms reflecting their individual functions. Some facilitate larger scale movement

of peacetime traffic. Others were designed to slow attackers and force them to expose their flanks to attackers while entering. Still others are essentially complex traps awaiting those successful enough to get that far. All gates restricted the number of people who could pass at one time to lesser or greater degrees. Given the number and variable placement of gates around Mayapán's enceinte, we should expect to find a mix of defended gate forms employed if the wall was defensive. Close examination of the Jones (1957) map reveals just such a mix of gate features. The Carnegie team (and presumably Patton) identified two main classes of gates, "major gates" and "minor gates". They are distinguished in part by the presence of clear defensive features. Minor gates generally lack the tell-tale features of defended gates (Figures 10.12-10.17). Minor Gate B (Figures 10.12-10.13) was slightly thickened walls and does seem to have a single pillar baffle set inside of the entrance creating a very basic screened entrance (shown on Jones' 1957 map). They are very narrow and it is likely that in times of conflict the minor gates were simply walled up. Minor Gate X was in fact found blocked up when encountered by Shook in 1952 (Figure 10.15). This and blocked Gate T (discussed below) may suggest just that kind of response to hostilities. On the other hand, it is possible they were blocked to channel peace time traffic in ways more beneficial to those controlling the barrier. Certain openings in the enclosure have clearly conscious and unambiguously defensive design features incorporated by the builders. These were classed as "major gates" and have a mix of clear defensive features depending on the gate being examined.

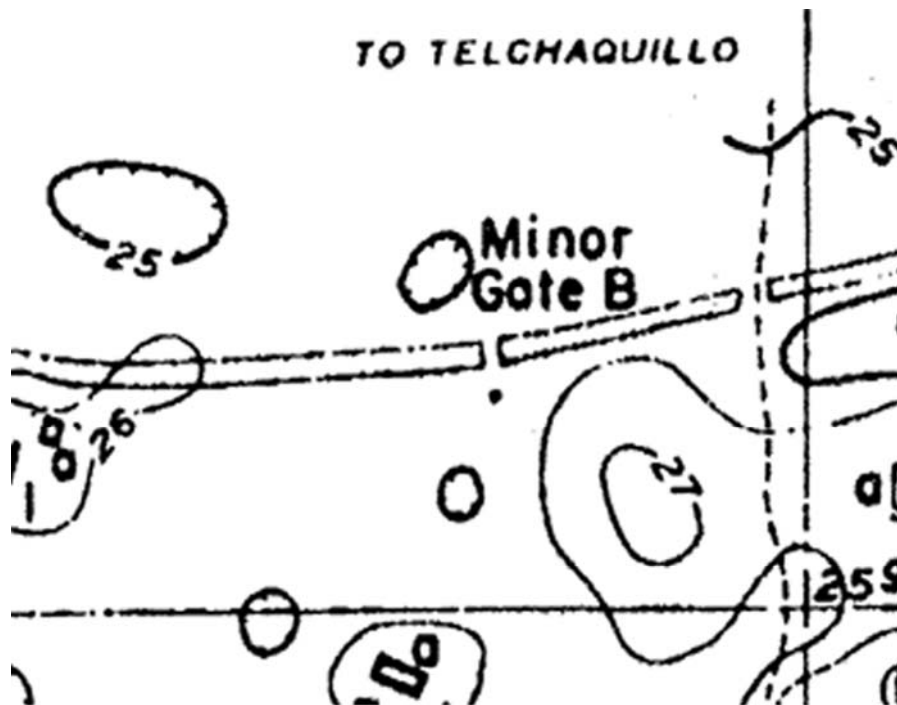


Figure 10.12 – Detail of Jones (1957) map showing features of Minor Gate B.

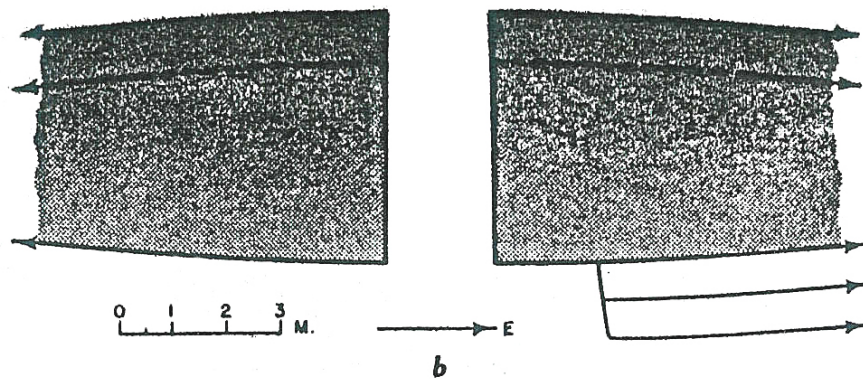


Figure 10.13 – Plan of Minor Gate B (modified after Shook 1952:Figure 3b).

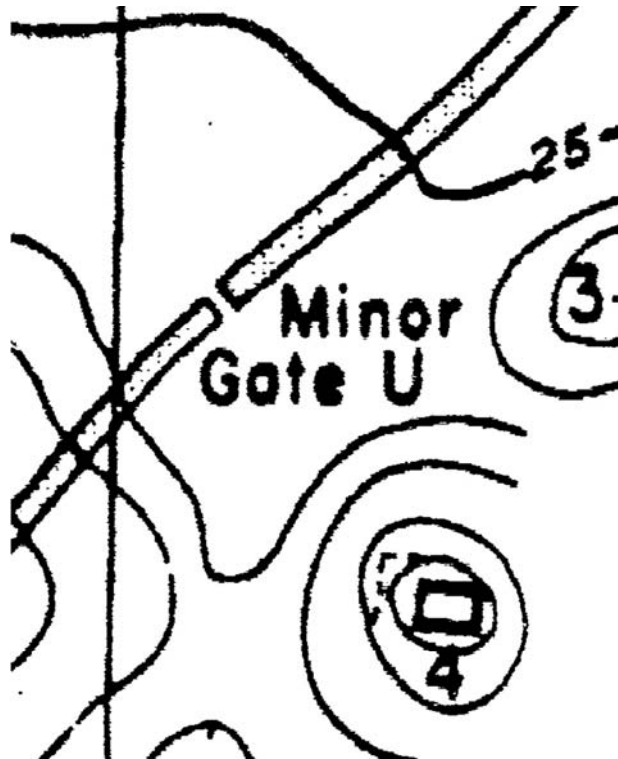


Figure 10.14 – Detail of Jones (1957) map showing features of Minor Gate U.

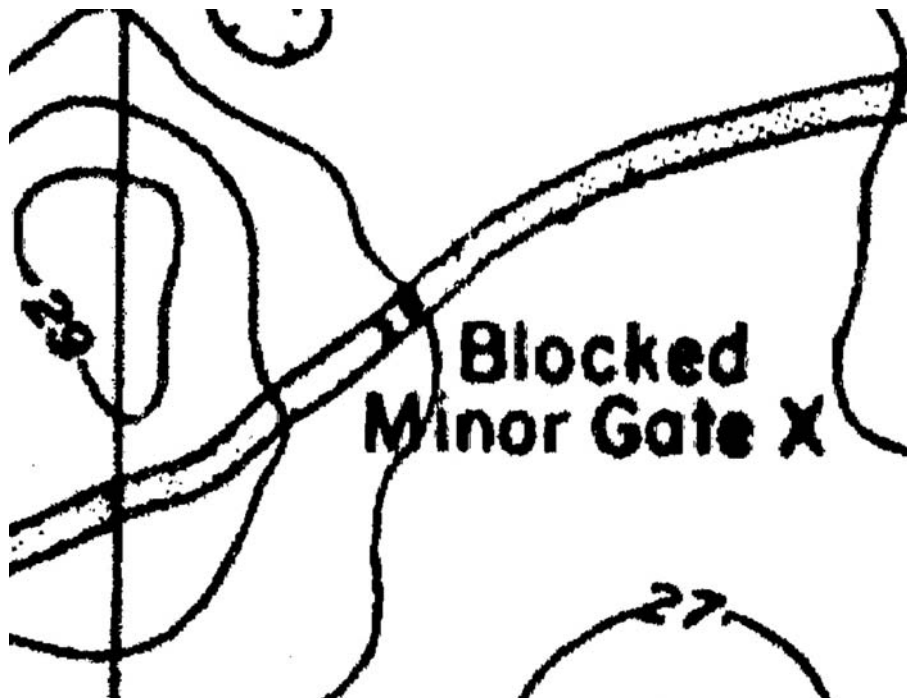


Figure 10.15 – Detail of Jones (1957) map showing features of Blocked Minor Gate X.

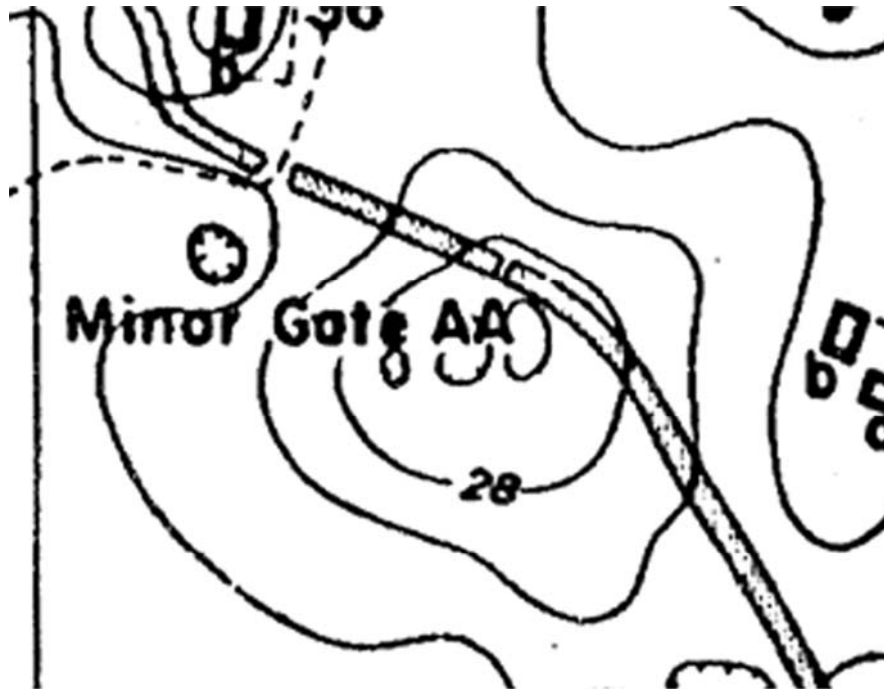


Figure 10.16 – Detail of Jones (1957) map showing features of Minor Gate AA.

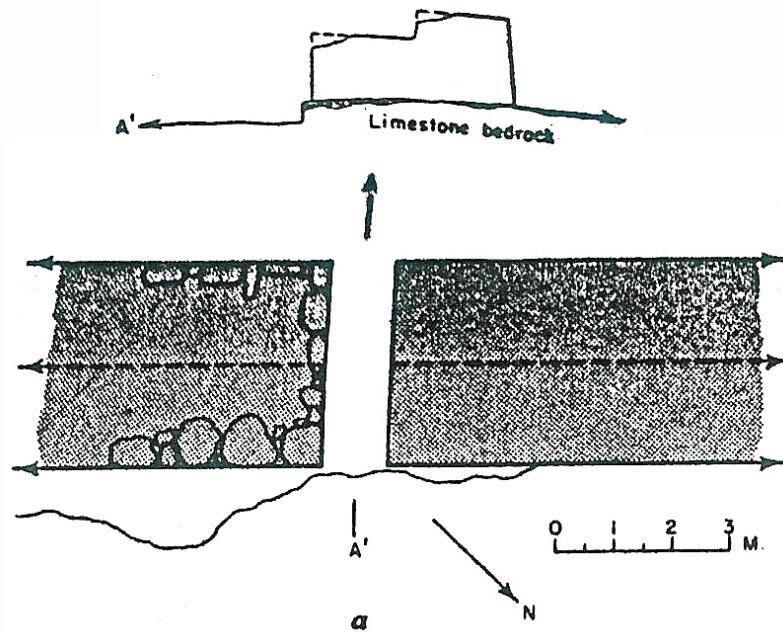
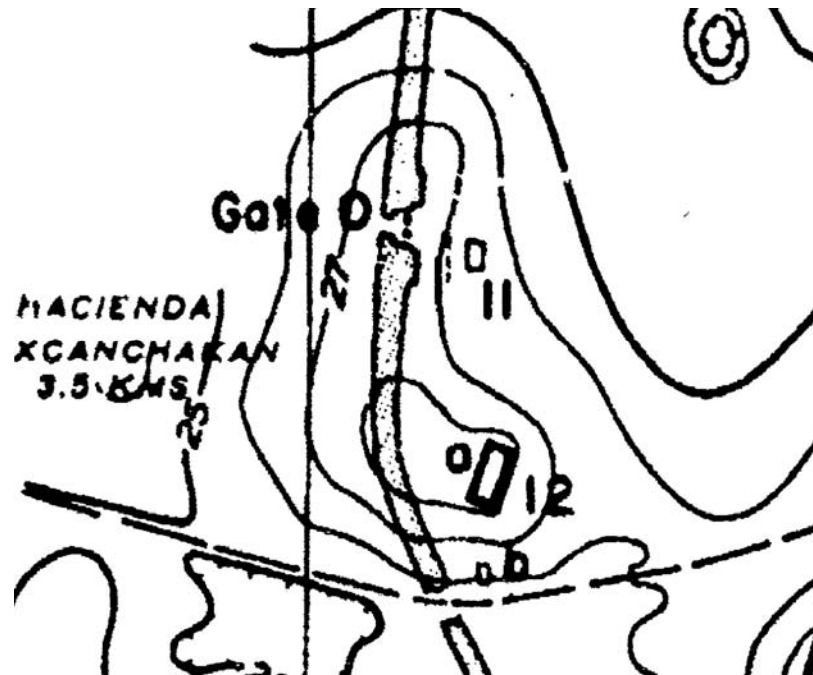


Figure 10.17 – Plan and cross section drawings of Minor Gate A (modified after Shook 1952:Figure 3a).



Before proceeding, a note is called for. It is common to find later gaps made along the ancient wall including where colonial or modern foot trails cross (or crossed in the past) the enclosure. People have simply removed the impediments represented by the wall. It is less effort to move all of that stone creating an opening than to cross it over and over on a regular walking route. This is a noteworthy testament to the very real barrier to movement that the enceinte represents, even without its palisade. Sections have also been cut away for modern roads, including the highway that cross-cuts the site and provides access to the INAH administered monumental center of the site. Another cut was made in the wall during the Colonial Period to facilitate passage of the *transvia*, a narrow gauge railroad that ran between the Hacienda Xcanchacan and Rancho San Joaquin located just north of the IHAN zone. It was used to transport henequen from the Hacienda to the Rancho for shipment and sale. The feature appears on the Jones map running approximately from the site center west though a cap they cut just south of Gate O. Fortunately for us, they did not choose to run it through the pre-existing gate. But, as we will see that may also be a reflection of the defensively strategic placement of the gate itself. The bed for the railway ran along the majority of west side transect that we surveyed (Figures 10.18-10.20) which was centered on the gate in question. These post occupation gaps in the wall were mapped and included on Jones' final product. But they are not labeled. Recent work by the PEMY project involved remapping the wall with modern GPS techniques. The gates used on the maps in this dissertation contain one recorded as being located along the north of the site in Grid Square C. I caution that this may well be a post-occupational disturbance as well. I left it on the maps in this volume as it did not seem to effect my conclusions in any real way, given that there were no

transects located near it. A more detailed examination of all of these various wall gaps will help ensure that none which are marked as ancient are modern or vice versa. For the present discussion I limit consideration to the gates identified by the Carnegie researchers.



**Figure 10.18 – Detail of Jones (1957) map showing Relationship of break in wall made for the Colonial Period *transvia* railway connecting Hacienda Xcanchacan to Rancho San Joaquin to Gate O.**



**Figure 10.19 – View of the remains of the bed for the Colonial Period *transvia*.**



**Figure 10.20 – Side view of the remains of the bed for the Colonial Period *transvia*.**

Returning to the main point of this discussion, Mayapán's major gates provide the most unambiguous support for the defensive function of the barrier. Beginning with Gate D located roughly in the center of the north portion of the wall. I saw this gate early on in my investigations. Unfortunately my photos of it did not turn out. However, as shown in Figures 10.21 and 10.22, the gate takes the form of an outward projecting *barbican* style gate. It is definitely worth noting that this is the same type of gate referred to above in the quote from Bernal Diaz. He clearly considered the feature unambiguously defensive as he was trying to breach it. Placed at the center of the gate is a single large (roughly 2 m tall) pillar that forces incoming traffic to divert to the right or left to enter. We will see that even with the diversity of entrances forms present at the site, these pillar baffles were common features used to control movement. In this case the pillar is made of stacked stone slabs. In other cases, a single large monolith does the job. Either or both entrances in this gate could easily have been blocked off providing a second point that would have to be breached to storm the enclosure. These channels are quite narrow and would have seriously limited the number of attackers able to enter at one time. It is worth noting how the gate is located at the top of a low altillo that would have offered some height advantage to defenders. This strategic placement of gates at the site is reasonably common at the site. While not an unambiguous defensive feature, this observation refutes Patton's observation that the wall and the gates themselves appeared randomly placed with respect to number and location.

The barbican gates that Keeley and his colleagues document are straight passages. This gate incorporates the basic element of baffling in a combination not seen in the examples presented by the authors. As noted, this use of large pillars is common. In the

absence of a term in their typology, I suggest pillar-baffled gate as a general form. In this case a pillar-baffled barbican gate (also present pillar-baffled, flanked gates and pillar baffled, chambered gates). The authors note that barbican gates are usually main gates for the city as their straight passageways facilitate maximum movement of peacetime traffic. In this case, the most direct peacetime routes are actually offered by the other forms present at the site. However, it appears clear that this is the largest and most complex gate along the north of the city.

There are a number of large modified altirillo platforms located just north of this gate. Most lacked wall lines indicating structures but were classed residential in the assumption that they would have been more than larger enough for the purpose and the fact that D-45 has non-perishable residential construction. The form of these groups is different than the typical Mayapán residential groups recorded as they lack typical albarrada walls, the platforms apparently serving to delimit space. These group platforms were more rectilinear than most at the site which simply expanded the round altirillo tops somewhat. The clustering of these unusual features in the area outside of this major fortified gate suggests some sort of barrio. However, I really cannot say at this time if it was an ethnic grouping, some form of craft specialization, or some other factor. One possibility is that it was housing for slaves, a well documented group at the site and people you may want to keep segregated from the rest of the population. The lack of non-perishable housing suggests low status and the large size of the platforms would have been capable of holding numbers of people that were notably larger than the typical group platform.





Figure 10.21 – Detail of Jones map showing plan of Gate D with routes of movement superimposed (modified after Jones 1957).

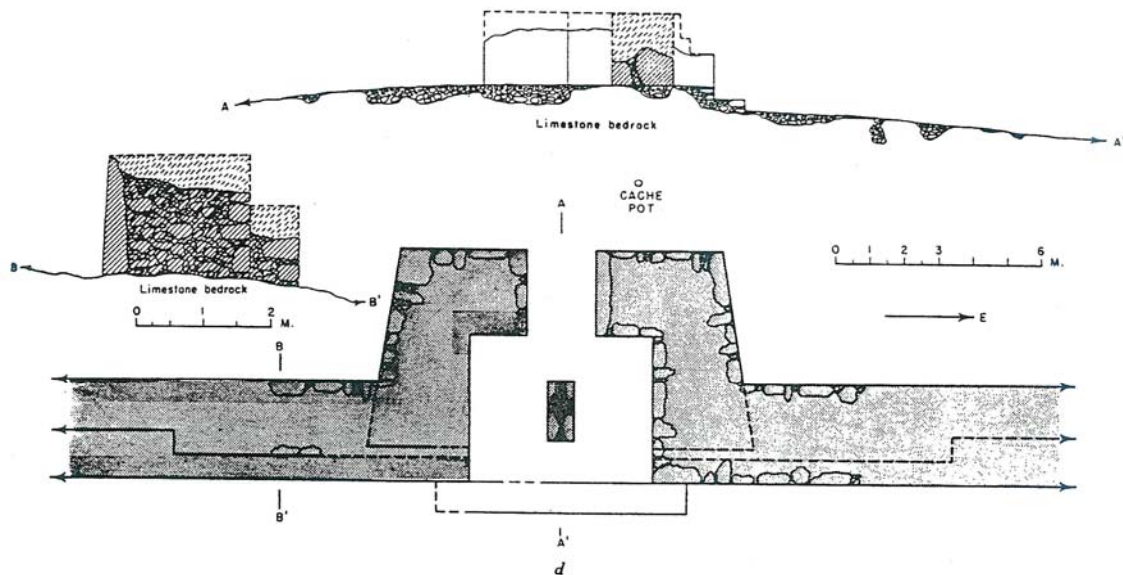


Figure 10.22 – Plan and cross section drawings of Gate D (modified after Shook 1952:Figure 1d).



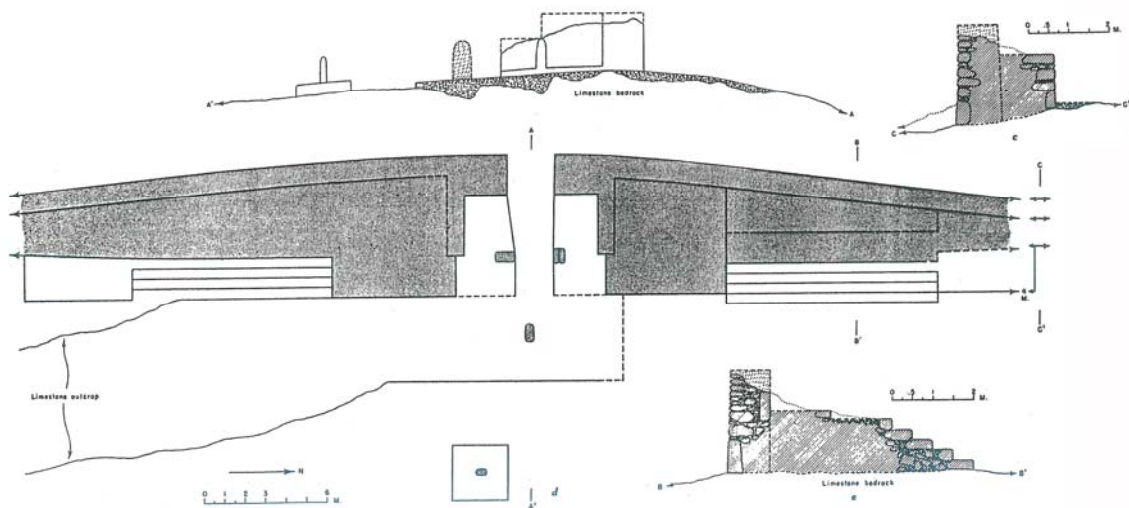
Gate O in the west takes the form of a pillar-baffled, flanked gate by virtue of the twin pillars used to divide traffic into three possible access routes, any or all of which would be easy to block off, and the flanking platforms and stairway features located on either side (Figures 10.23-10.24). I also visited this gate as it fell along one of my west side transects. And fortunately my shots turned out much better (Figures 10.26-10.28) than those I took of Gate D. The platforms are poorly preserved and overgrown today, like much of the wall. However, they were immediately recognizable in form on the ground. They were substantial enough to support a good number of defenders. Looking at the map published by Shook, it appears that this gate may once have had an inset form and the platforms added somewhat later. Shook (1952) noted that the wall was built in two phases, first the outer wall with parapet then an inner lower level built against it. So, modification to add the flanking platforms (or expand them) would not be out of character.

As we saw with Gate D, the placement of this gate does seem to take advantage of the natural topography. It is placed atop a long linear shaped altillo rising approximately 3 m to the level of the gate. The drop-off is unusually abrupt for the area's terrain. When we surveyed the area, we recorded a wedge-shaped feature constructed with stacked flat limestone slabs just beyond the limits of the Jones (1957) map that we designated Ramp O (Figure 10.25). It starts near the base of this drop-off and reduced the incline of the approach. Oddly, this feature was not noted by Shook who undertook his most extensive investigations at this gate. While it makes the walk up easier for peacetime traffic, it also narrows the approach to about 10 meters in diameter causing traffic to bottleneck to some

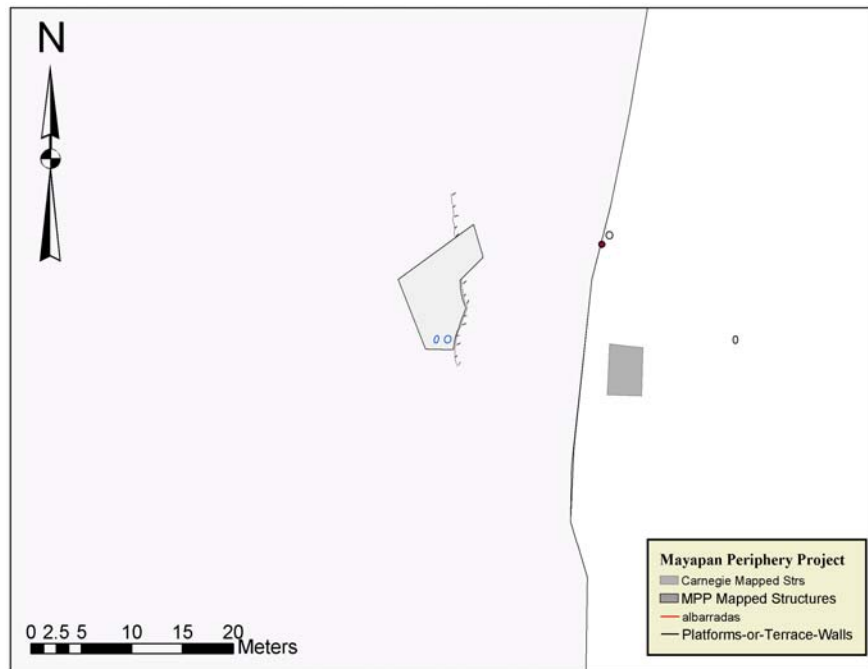
degree at the feature. The bedrock outcrops flanking it would have been much more difficult to scale under fire from troops on the flanking platforms.



**Figure 10.23 – Detail of Jones map showing plan of Gate O with routes of movement superimposed (modified after Jones 1957).**



**Figure 10.24 – Plan and cross section drawings of Gate O (modified after Shook 1952:Figures 3c-3e).**



**Figure 10.25 – Map showing relationship of Ramp O to defensive Gate O.**



**Figure 10.26 – View of gate O from the exterior. One of the pillar-baffles discussed can be seen in the background. Photo by author in 2003.**





**Figure 10.27 – View of Gate O from the interior. One pillar baffle can be seen in the foreground on the right and edge of the flaking platform can be seen on the left.**



**Figure 10.28 – View of the stairs leading up the flanking platform for Gate O.**

Two gates in the wall along Grid Square T are particularly interesting. Blocked Gate T (2) takes the form of an inset gate as identified by Keeley et. al. (2007). Figures 10.29-10.31 shows both gates. I have superimposed routes of movement over both despite the blockage. Based primarily on the form of this gate which is similar to many others at the site, the route drawn for the blocked gate assumes that when in use the gate probably had twin pillar baffles as seen in the nearby unblocked gate as suggested by Shook. But, that is just conjecture at this point. The unique inset form of this gate does raise the possibility that a different baffle system may have once existed or even none at all. The close spacing of the two gates in this grid square is unique at the site, suggesting that the two gates did not function simultaneously. If the second was constructed when the first was sealed, the pillars there may simply have been relocated the short distance. More research would be required to determine a construction sequence for the two entrances. The relationship of the two gates in Grid Square to the X-coton temple-cenote group is noteworthy. It is possible that the change in wall was simply made to manage movement of people around that group. Perhaps the blockage was associated with specific construction in the group, another question for future research. Note that a modern road ran through the middle of these two gates fortunately leaving each intact.

The form of the unblocked gate (Major Gate T (1)) is the most common form for major gates at the site and is seen in all remaining examples to be discussed (Figures 10.29 and 10.31). The best preserved examples show that the wall around the gate is thickened with the outer portion projecting farther into the opening. Inside of this, the space between the walls widens into that Shook called a portico and two pillar baffles are

set vertically to divide the traffic flow into three channels. As noted for previous gates, blocking these channels to channel traffic or provide defense would have been easy to do.

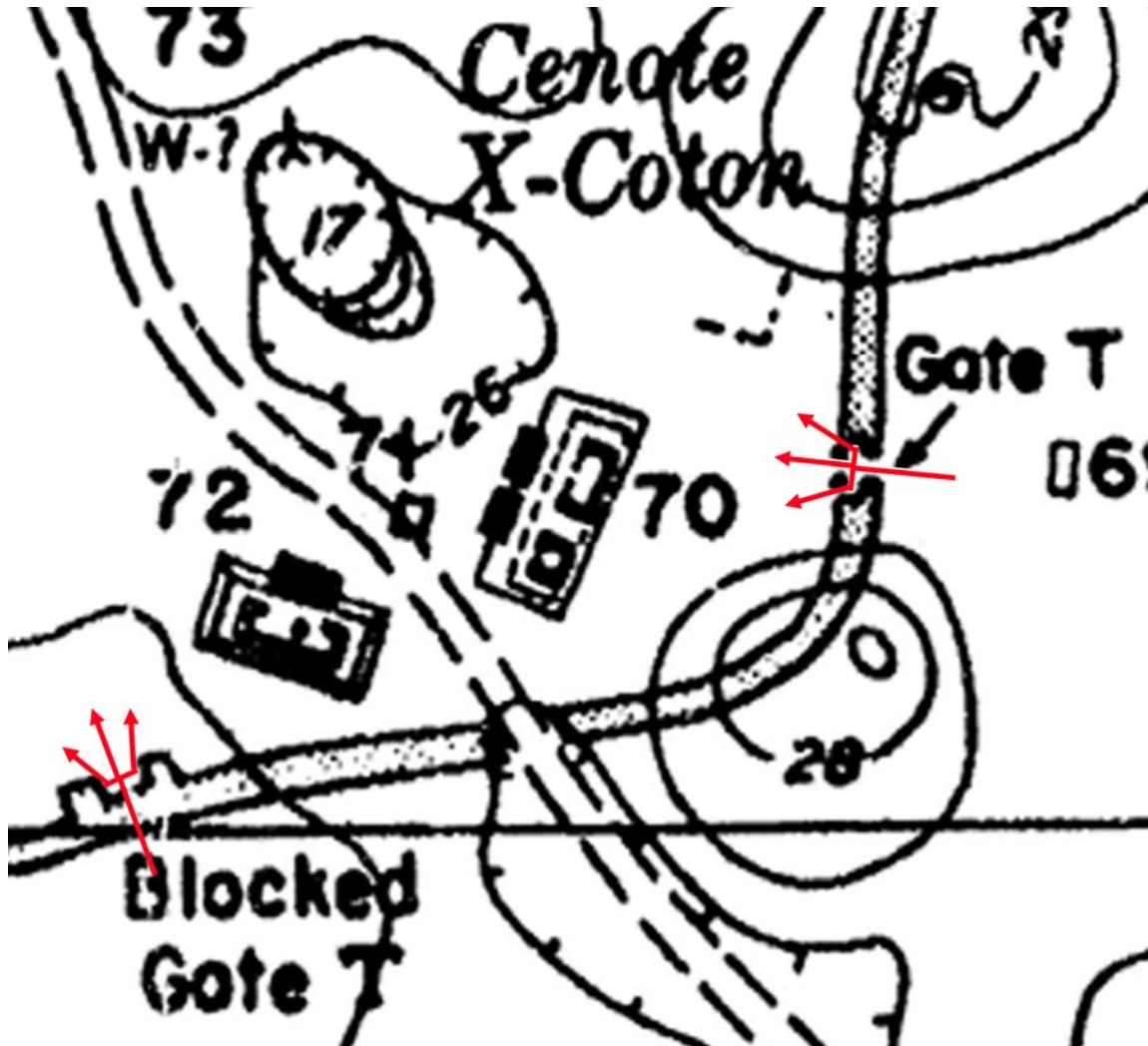
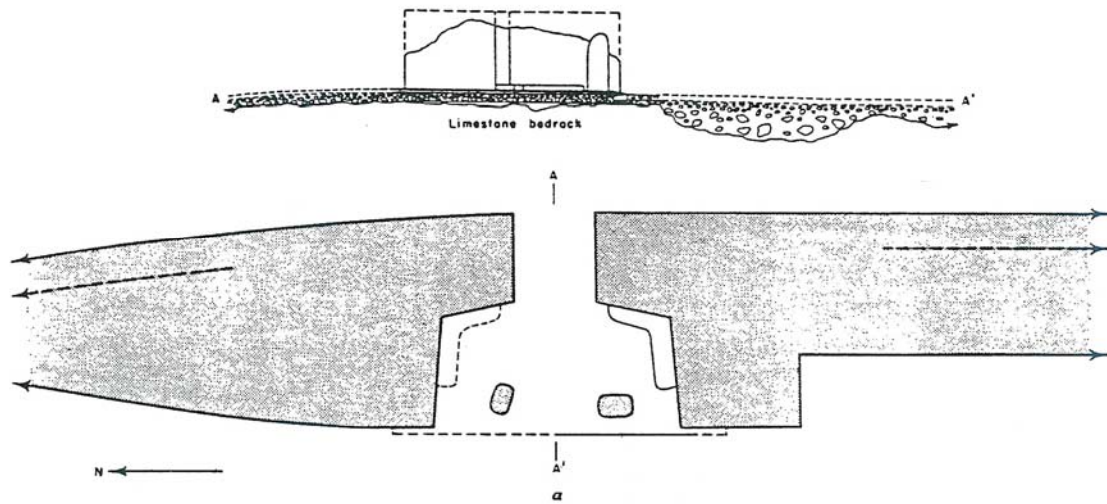
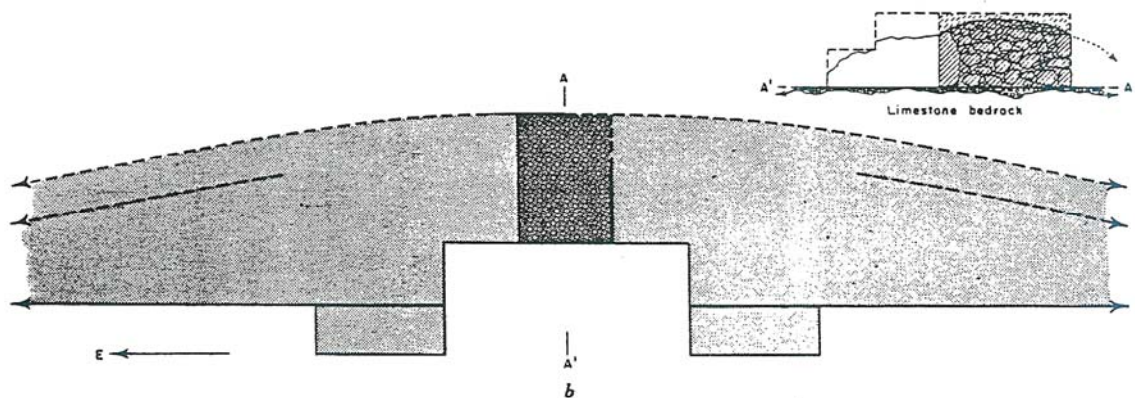


Figure 10.29 – Detail of Jones map showing plan of Gate T (1) and Blocked Gate T (2) with routes of movement superimposed (modified after Jones 1957). Note modern road running right through the middle of the two.





**Figure 10.30 – Plan and cross section drawings of Gate T (modified after Shook 1952:Figure 2a).**



**Figure 10.31 – Plan and cross section drawings of Gate t (modified after Shook 1952:Figure 2b).**

As noted, the remaining gates appear to share the same form seen in Major Gate T (1). This form is probably best described as chambered since the space where the pillars were placed created a chamber between the walls with three exits, each of which would be easy to control or monitor (Keeley et. al. 2007). As seen in previous examples, Gate

G seems strategically placed atop a natural altillo, with 2-3 meters of rise on approach. In the case of Gate G (Figures 10.32-10.33), only one of the pillar baffles remain. In other cases, no pillars were mapped in place (Figures 10.26-10.27). But, the form of the wall at the openings, with the inward facing projections narrowing the gap at the front of the wall and widening to a portico between inner portions of the wall is quite consistent with well preserved examples like Gate T, suggests that they were also present at one time (Figures 10.28-10.29). The access routes are drawn accordingly on the figures. However, I should stress that more research is required to confirm these assumptions. The depiction of the form of Gate EE in the Jones (1957) map is somewhat unclear (Figure 10.36). However, the maps by Shook (1952) are quite detailed, showing the opening again flanked by stepped platforms and a single pillar baffle routing movement much like that seen in Gate D from the north (Figure 10.37).



Figure 10.32 – Detail of Jones map showing plan of Gate G with routes of movement superimposed (modified after Jones 1957).

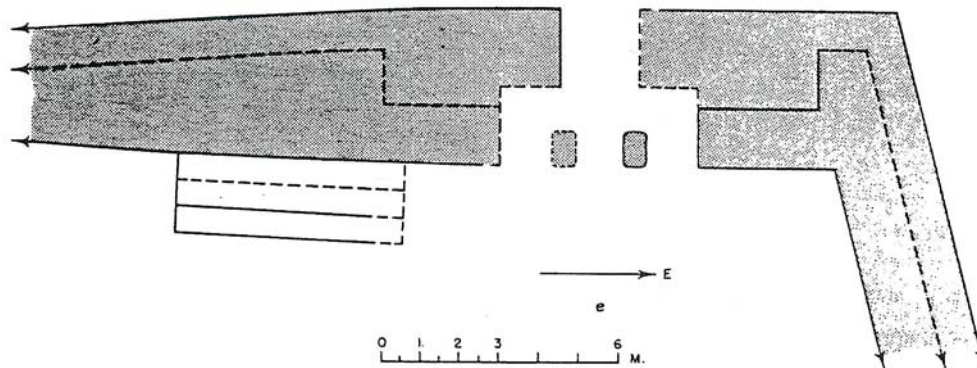


Figure 10.33 – Plan drawing of Gate G (modified after Shook 1952:Figure 1a).

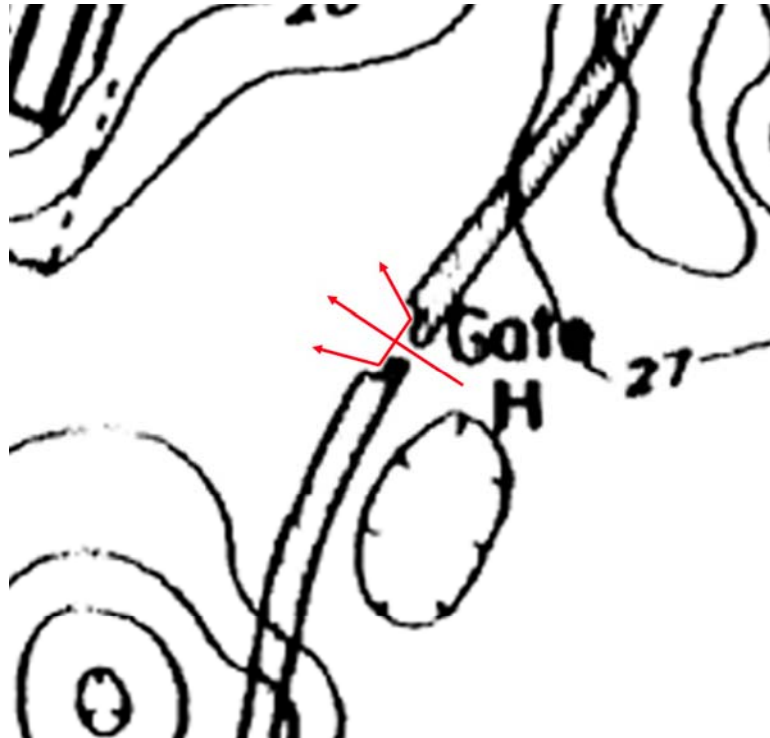


Figure 10.34 – Detail of Jones map showing plan of Gate H with routes of movement superimposed (modified after Jones 1957).

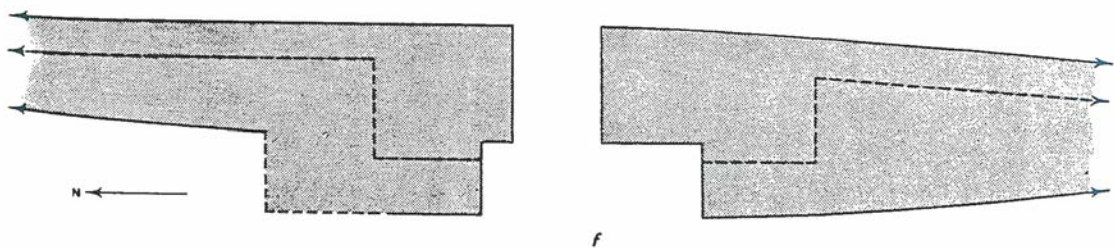


Figure 10.35 – Plan drawing of Gate H (modified after Shook 1952:Figure 1f).



Figure 10.36 – Detail of Jones map showing plan of Gate EE with routes of movement superimposed (modified after Jones 1957).

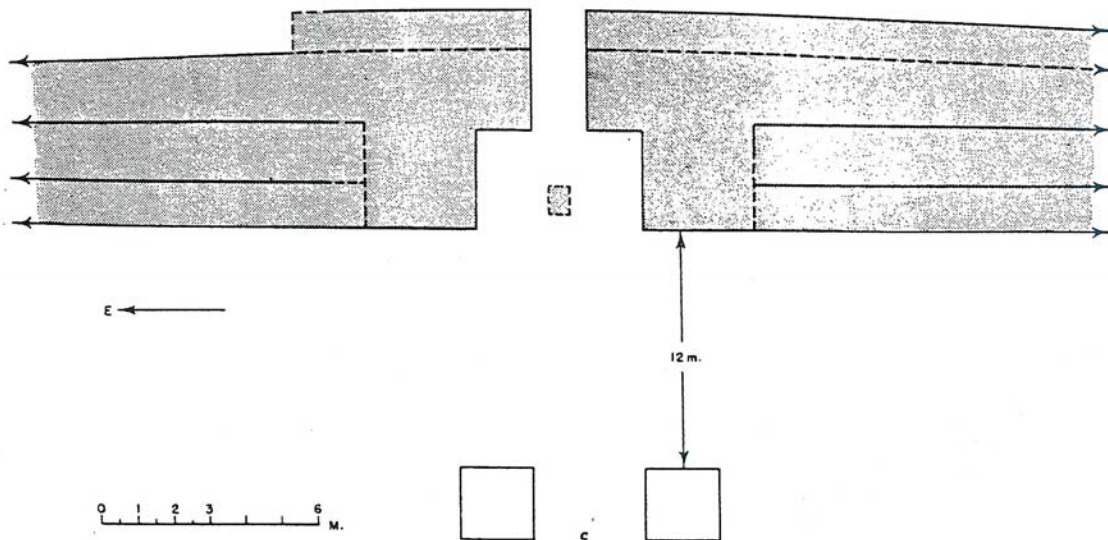


Figure 10.37 – Plan drawing of Gate EE (modified after Shook 1952:Figure 1f).

What can we say about these features in summary? Table 10.8 lists the details about form, direction, number of baffles and state of the gates securely identified on the main Carnegie map of the site (Jones 1957). A note should be made that it is still not entirely clear to me if any other gaps in the wall were also ancient. Further research will clarify that question. The chambered pillar-baffled gates and modified versions like Gate O, with its flanking defensive platforms are interesting when compared with the examples document by Keeley et. al (2007). The triple passageway they create would have been easy to control. In peacetime, leaving the center passage open allowed wanted traffic to move directly through. In times of hostility, the configuration could rapidly be change by blocking off sections. In this way, the gate could have been rapidly converted into a screened gate by blocking the center path or a left of right offset gate by blocking an end and the center. The innovative form allows a great deal more flexibility than the various cross-culturally common forms documented above.



**Table 10.8 – Details concerning gates on Jones’ (1957) map of the walled portions of the city which was based in part on the original late 1920’s survey of the barrier by Patton (Andrews and Patton, n.d.).**

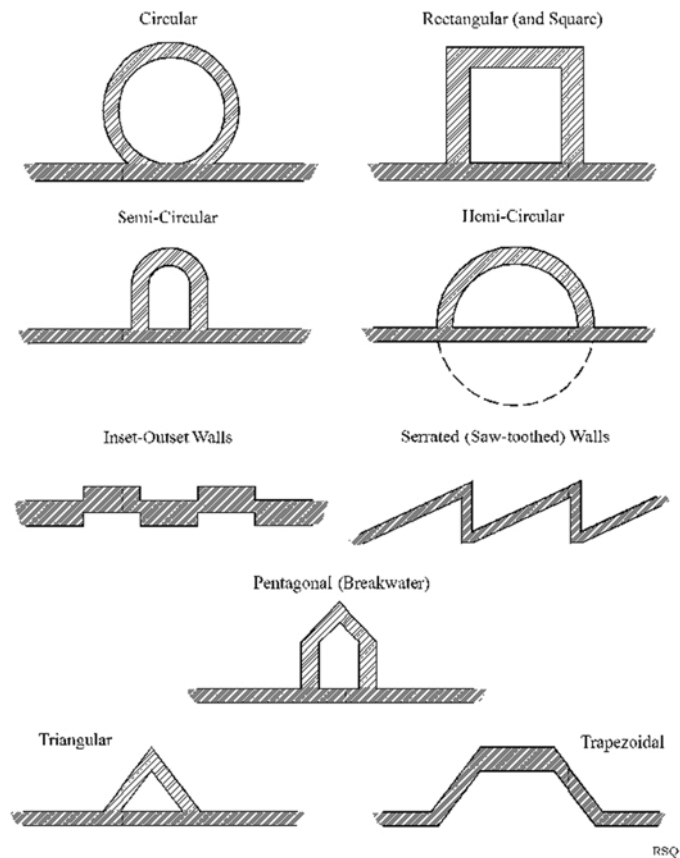
| <b>Details, Direction, Form and # of Baffles present for all Gates on Carnegie Map (Jones 1957)</b> |                  |                          |                                     |                 |
|---|------------------|--------------------------|-------------------------------------|-----------------|
| <b>Gate Designation</b>   | <b>Direction</b> | <b>Gate Form</b>         | <b>Number of<br/>Pillar Baffles</b> | <b>Blocked?</b> |
| Minor Gate B  | North            | Screened                 | 1                                   | No              |
| Minor Gate X  |                  | Apparently<br>Undefended | 0                                   | Yes             |
| Minor Gate U  | East             | Apparently<br>Undefended | 0                                   | No              |
| Minor Gate AA   |                  | Apparently<br>Undefended | 0                                   | No              |
| Gate D  | North            | Barbican                 | 1                                   | No              |
| Gate O  | West             | Flanked                  | 2                                   | No              |
| Gate T (1)  | East             | Chambered                | 2                                   | No              |
| Gate T (2)  | South            | Inset                    | 2 Presumed                          | Yes             |
| Gate G  | Northeast        | Chambered                | 1 Present and 1<br>presumed         | No              |
| Gate H  | East             | Chambered                | 2 Presumed                          | No              |
| Gate EE   | South            | Flanked                  | 1                                   | No              |

All in all, the approach taken by Mayapán’s military engineers appears a flexible and innovative means to achieve the basic goals of baffled, screened and flanked gates, constriction of passage and forcing the defender to expose their flanks on entry. Gate D in the north with its outward projecting barbican gate varies from this form and rather than providing a more straight flow of traffic, is in fact, more constricted, eliminating the center passage. While Keeley and his colleagues suggest that barbican gates are usually main gates, it would not appear that this form offered the advantaged of free flow that would have been provided by fully open chambered pillar-baffled gates. I would suggest that the later would be better examples for “main gates” however, being that there are multiple examples, the name does not seem to fit, with its implication that all other gates are somehow more restricted access. Given that there were four of these chambered, pillar-baffled gates, I was kind of hoping to see a clear pattern in these gates with respect

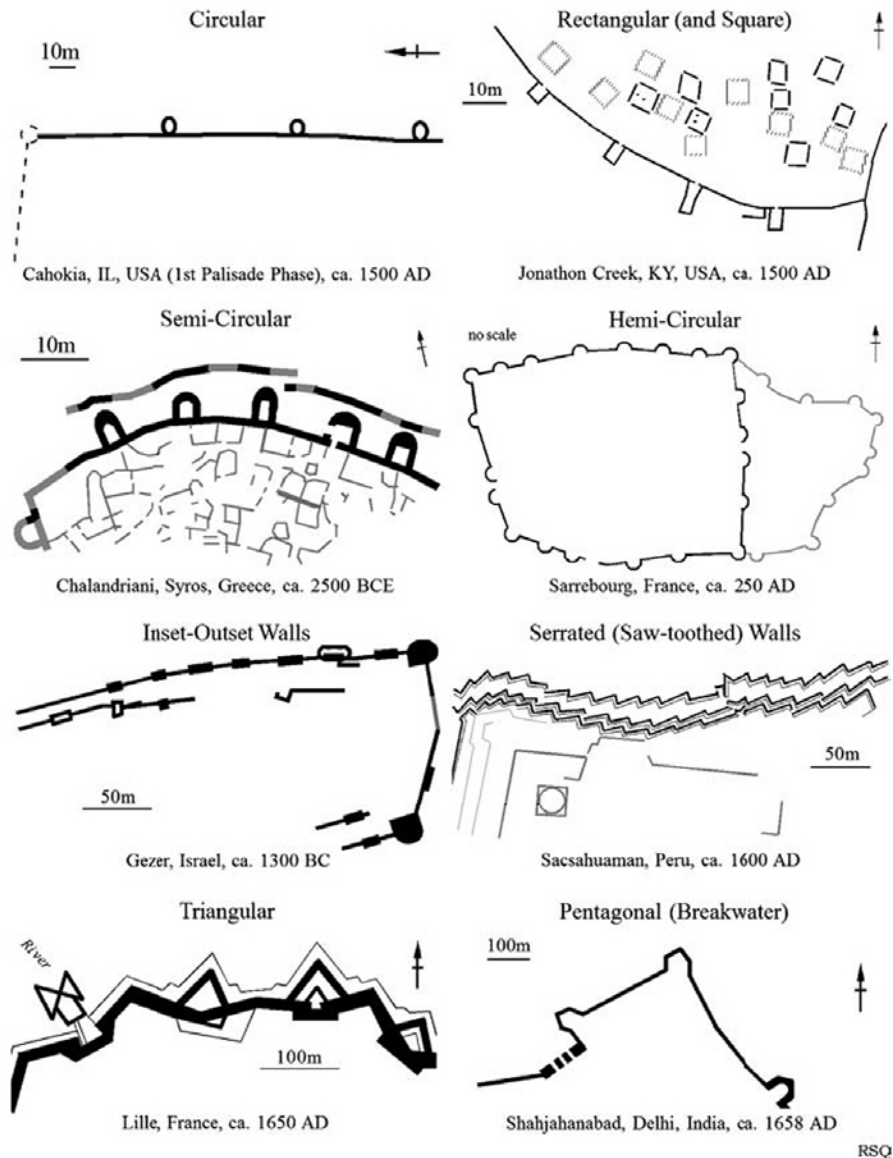
to the cardinal directions. No such pattern exists as three of the four are found along the east of the site, farthest from the monumental center. The fourth is along the south wall roughly aligned with the monumental center. Perhaps this suggests the flow of peacetime traffic and by extension of settlement nears those gates was greater. It is not clear at this time. It may also suggest that the gates were designed to accommodate the bulk agricultural goods moving in from the east of the site. It should also be observed that Gate O with its flanking platforms, strategic placement on a low ridge and ramp restricting movement on approach, seems more fortified than most.

The third major class of unambiguously defensive features that were identified cross-culturally by Keeley et. al (2007) consists of bastions of various forms (Figures 10.38-10.39). Bastions function to allow defenders to repel attackers who approach the base of the wall. This is a vulnerable point in all defensive walls. A dead zone exists at the base where, in the absence of bastions, defenders can huddle to undermine the wall, erect ladders to scale, etc. Defenders are then forced to stick out over the edge of the wall to fire below. This of course exposes them to unwanted risk. So, bastions are common and historically well documented features of defensive walls. They usually take the form of towers or platforms or various shaped that protrude forward from the walls allowing defender to hit targets along the wall. Typically these bastions are placed at intervals that allow cross-fire from adjacent structures to cover the length of the wall. Therefore, the distance between bastions reflects the range of defensive weapons used to protect them. Accordingly the authors found that over time the trend has been for these features to become increasingly spaced out reflecting advances in weapon technology. In some cases the form of the wall can contain outset and inset sections or take a serrated or saw-

toothed shape and accomplish the same goals as is known from the Sacsahuaman fortress overlooking the Inca imperial capital of Cuzco. There is no evidence that these features were used in any way at Mayapán. This may suggest that sudden sally attacks to repel attackers who reach the base of the walls was a preferred tactic. It also suggests that the technology to tunnel under or otherwise undermine the fortification were not in general use. This is not surprising as the area has such shallow soils that such operations would not be practical. Scaling the wall seems the most rapid and effective method of attack.



**Figure 10.38 – Schematic drawing showing form of various bastion systems documented by Keeley et. al. (2007).**



**Figure 10.39 – Illustrations showing form of various archaeologically known bastion systems documented by Keeley et. al. (2007).**

Careful examination of the available evidence suggests that the Mayapán enceinte involved a complex system of defended gates showing variation that reflects practical factors such as natural topography, traffic volume, approach direction of the threat, goods being moved, etc. The exact weight of these and other possible factors is not fully understood. However, I plan additional research on the issue which I hope will answer

some outstanding questions such as: establishing the precise dating of the wall's construction, confirming the original placement of pillar baffles where they are apparently missing from some gates (test pits looking for the holes made for their placement should suffice to resolve this issue), and determining the sequence of construction for the two gates near the X-coton complex in Grid Square T. Even with these outstanding issues, we can say some things definitively at this point. The use of pillar baffles to direct traffic flow at all major gates and one minor one is the feature that best tied the diverse forms together suggesting coordinated design as of course would the precise geometric forms used for features such as the projecting barbican Gate O and the defensive platforms flanking either side of Gates O and EE.

This clear coordinated design of the gate system suggests a carefully planned defensive system that was designed to take best advantage of natural features along its path, factored in location specific concerns for specific gates and would have served as a highly effective barrier in both wartime and peacetime. Thus we can safely say that the archaeological evidence supports ethnographic accounts of the wall being defensive. Or more accurately, claims that this barrier was primarily defensive in function. Secondary functions noted above, should not be forgotten. Notably, these secondary functions were invisible to us from the documentary record. The 10O-1 colonnaded hall group seems to have served as a customs checkpoint, monitoring the flow of and collecting the state's share of agricultural goods coming in from the east. The presence of the only major identified agricultural field zone, located along this side of the city may explain why three of the four chambered, pillar-baffled gates are located on this side of the enclosure. Bulk goods could pass straight through these gates unencumbered. As discussed below, a

likely slave residential group was located outside of this east wall at the edge of the field zone. The wall may have segregated slaves at the site from free residents within. Additionally, the placement of the identified directional shrines to the east, north and west of the site that likely housed ritually dangerous idols and the apparent exclusion of Cenote Sac Uayum, with its possible association with negative supernatural forces suggests that the barrier also served to keep the malevolent forces of the universe at bay. All in all the archaeological data fully support the hypothesis that the much discussed 9 km long wall surrounding major portions of the site was primarily defensive in function. However, it was designed very deliberately in ways that provided maximum control of the flow of goods into the city while segregating its residents from the supernatural threats that were perceived by its planners. One final note, the presence of two blocked gates in the southeast of the site suggest that if evidence of battle at the wall is to be found, that area would be a good place to start looking.

#### *Landa's Reported Central Precinct Wall*

As discussed in the early chapters of this work, Landa (Tozzer 1941:25) reported that there was once a wall with two entrances surrounding the “temples and houses of the lords”. As mentioned in chapter 2 of this volume, there are historiographic issues with the Landa accounts (Restall and Chuchiak 2002). These include major potential problems like the presence of more than one handwriting in the passages later attributed to Landa suggesting more authors at work than just Landa and the much discussed biases of his primary informants, descendents of the two main competing lineages at the site



who strove to exaggerate their family's importance, justify the actions take by their ancestors and minimize historic tribute demands made by Mayapán, I hopes of reducing those made by the newly arrived Spaniards. With regard to the accuracy of his description of the form of the city itself, he (or they) was hit and miss. His description of the residential two roomed Mayapán style dwelling is spot on. However, he follows his description of the wall around the central prediction with estimates of the site's composition as some 60,000 of these homes, clearly far off of the 2,500 recorded by Carnegie researchers and the 1,7000 additional I project were within 1 km of the wall based on my new sample. So, it is clear that his track record on this issue is mixed at best. The fact that the wall has not been found by archaeologists is certainly a major concern.

Brown (1999:497-498) suggests that it is likely that the original walls surrounding the elite monumental precinct were shifted somewhat in locations to form the Colonial Period Rancho San Joaquin cattle pen (Figure 10.40). He marshals evidence based on the larger than usual size and form of the wall that it is originally of Pre-Hispanic design. In particular he noted that it has in sloping walls formed of two rows of stones leaning in against each other, resulting in a trapezoidal cross-section. He notes that local masons indicated that this form was used to support taller more solid walls than the typical albarrada used today. The wall itself is some 2 m tall and obscures the view of those looking in from ground level. These features are not typically associated with cattle pens. But, Brown found a local rancher with an enclosure featuring the same construction. The rancher told him that he had found the majority of the enclosure and shifted sections to fit the new shape he wanted. Admittedly it does seem odd from a purely functional

standpoint to choose from all of the possible local terrain and its abundant stone building material the very ranch land that is largely occupied by mounds. But, talking advantage of the pre-existing enclosure and adjusting it to fit their needs may have offset that concern.



**Figure 10.40 – Detail of Jones map showing location of Rancho San Joaquin wall system and its relationship to the site's monumental center (modified after Jones 1957).**

If Brown is correct and Landa's wall did exist (and still exists in a modified form), it would be significant. Among other things it would suggest a wall around the central

precinct that was roughly 2 m tall. It would have had a related but somewhat different construction technique than both the large outer wall and the smaller residential albarradas use at the site. That seems appropriate given the relative areas contained in and the possible threats posed to each. More research on the San Joaquin wall, which remains largely in place could certainly provide more answers to the questions that remain about this feature. It would have to be established to be the wall in question for any of its features to have meaning. However, as far as I know there is nothing to suggest any of the key defensive features noted by Keeley and his colleagues (2007) are present in the remaining Rancho wall. Defense would likely have been at least a secondary concern of this inner precinct wall. Certainly Landa's description of the wall in question with its focus on the separation of elite contexts and commoner areas, would suggest it was primarily a ritual and social status boundary. The fact that Landa's account ends in the breaking down of this wall in the final upheaval could have been to eliminate its apparently limited defensive capabilities, to destroy a social boundary whose symbolism now offended or a combination of the two. On the other hand it may just be an offshoot of the confusion about his descriptions discussed above. Patton's manuscript discusses another interesting possible function for this inner wall if it did exist, that given the history of moving nobles from their home provinces into the site center (sometimes against their will), such a wall could have functioned as much to keep the nobles in as to keep the commoners out, a suggestion he attributed to Morely (Andrews and Patton , n.d.).

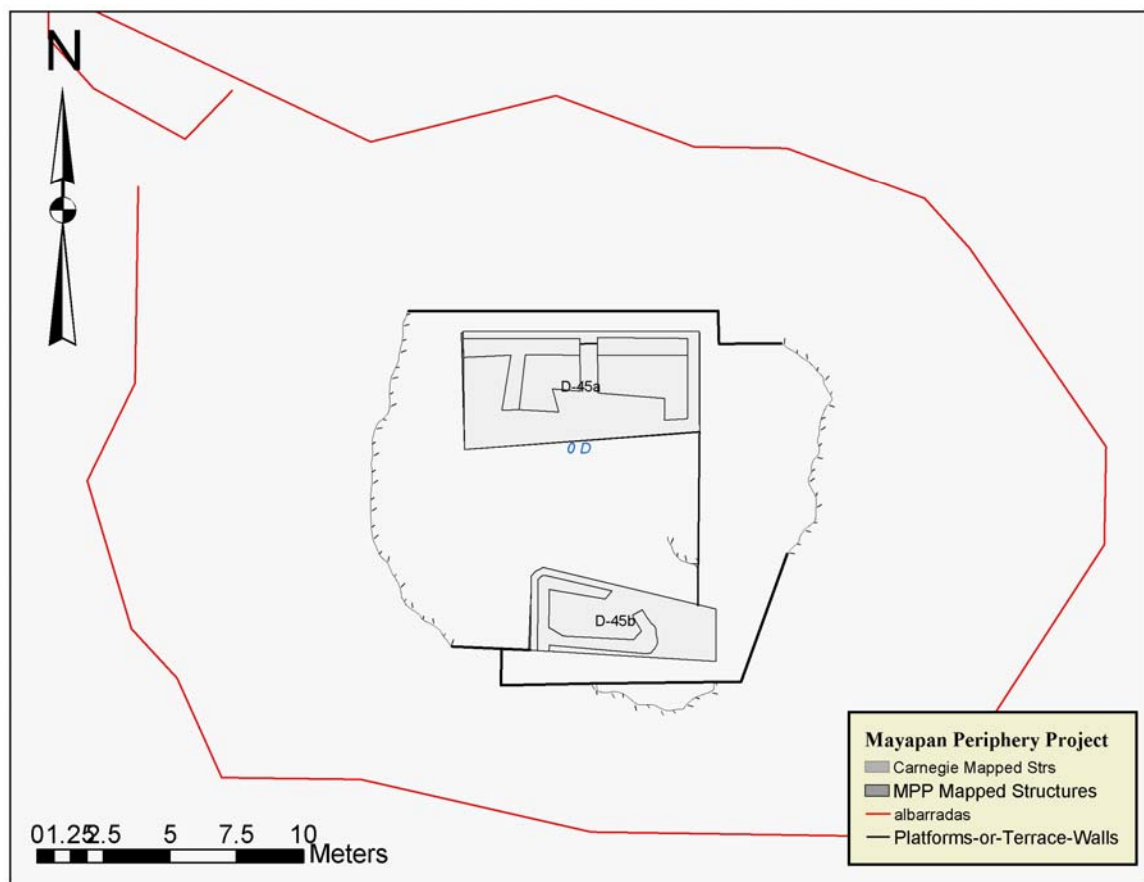
If this inner wall was not there in the first place, it is interesting that it would be reported by Landa's informants who were not that far removed from the site in terms of

years since its fall. Perhaps they were reflecting the Maya Chronicles (Roys 1962) and their regular association of the site with walls. Perhaps they were vaguely familiar with the larger known wall and simply misplaced it in their story telling. Either way, it is clear that native informants for both sources were under the impression that some significant wall existed at the site. About that much both sources are correct.

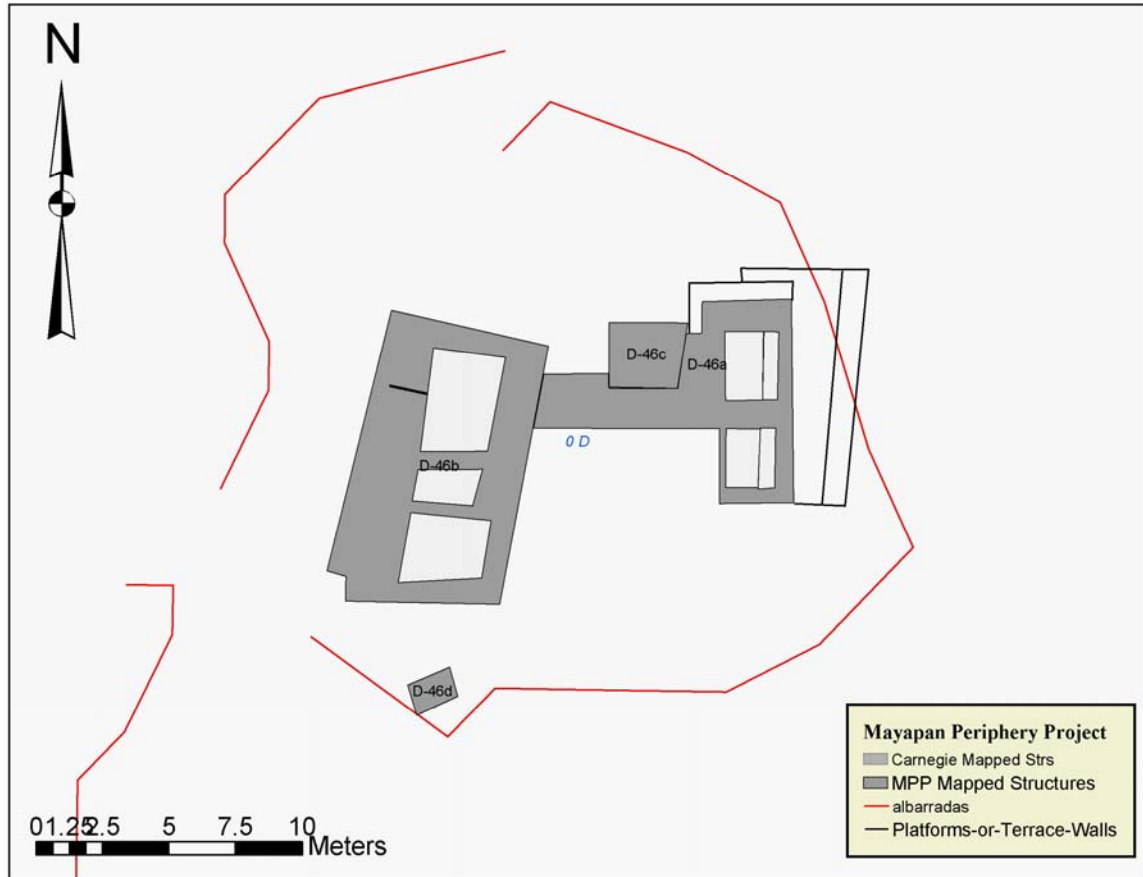
### *Houselot Enclosures*

The dense maze of albarrada walls that surround the vast majority of the residential groups at the site are a crucial source of information of the composition of families and neighborhoods. They have only recently really begun to be deciphered. However, recent work has provided a very good picture of their form and function (Brown 1999; Hare et. al. 2006). I have left the really detailed discussion to these two authors largely because my finds simply repeat what they have found inside the walls with the exception that the density of the features outside of the wall is notably lower. Generally these walls appear simply to divide personal space controlled by families, give them some degree of privacy, etc. A few examples from outside of the city wall do illustrate some interesting features that are worth highlighting here. In general these constructions surrounded residential groups, ringing the top of the albarradas in which they are typically located (Figures 10.41-10.43). They are not substantial to look at today. Modern examples from local villages only come only about to my waist. Of course they have no serious threat of attack or theft. Maybe they would fortify a bit if that was an issue. The material present in the ancient walls suggests similar or shorter heights. In

larger towns in the area and of course the much larger city of Merida walled residential enclosures with taller walls, locked gates and iron spikes or broken glass along the top are not uncommon at all. The Mayapán enclosures generally have only one or two entrances. Often times the entrance is formed by angling one side of the wall inward slightly. In one case (Group 17P-1), there was a well formed inset entrance to the group with unusually tall walls (Figure 10.43). Group GG-1 had an unusual configuration of albarradas that included an offset entrance running up the altillo on which it is located (Figure 10.44). If needed, residents could have hurled rocks and projectiles down on intruders as they tried to enter



**Figure 10.41 – Map of Group D-45 showing form of typical Mayapán residential albarrada enclosure.**

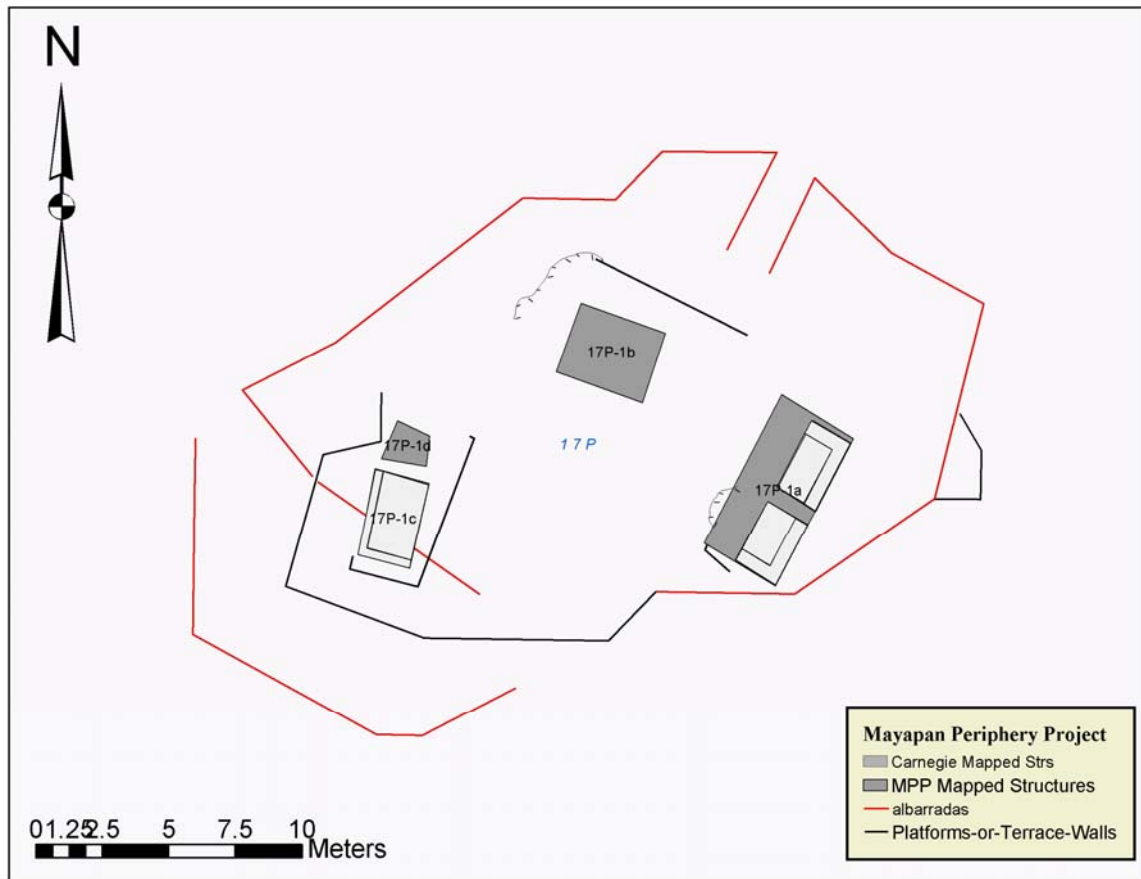


**Figure 10.42 – Map of Group D-46 showing form of typical Mayapán residential albarrada enclosure.**

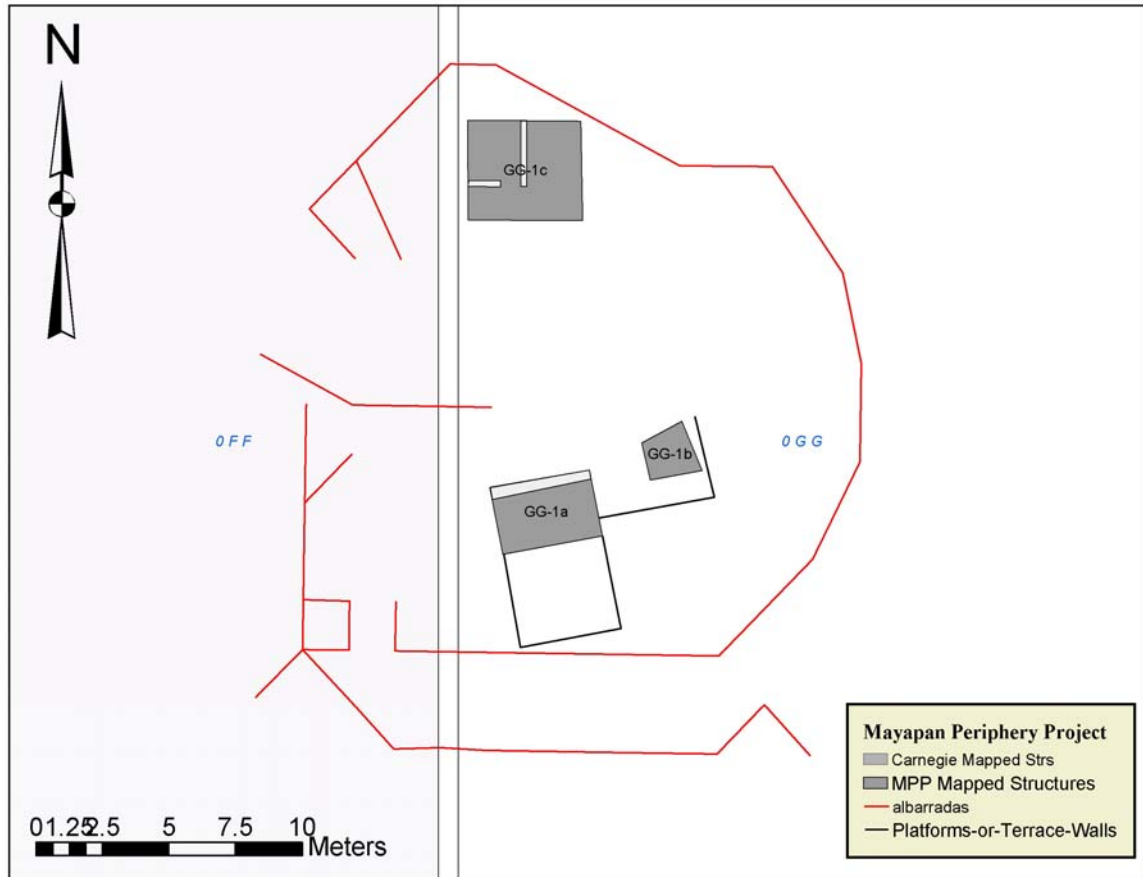
This all raises the possibility that these walls had limited and secondary defensive functions. Outside of the main wall, groups would have been very vulnerable during raids. Marilyn Masson and I have often remarked when viewing these groups that they resemble small hill forts. By topping these natural albarrada wall structures with palisades, you could create a small defensible enclosure with an elevation advantage for the defenders. Inside the wall, such features could make hand to hand urban warfare difficult if the wall were breached. They would have limited line of site from the exterior and access to possible thieves or other intruders, a sort of defensive function. Outside of Gate D in the north are a number of large platforms constructed by squaring and filling in



around existing altillos. In these cases and others in the northeast, the boundary of the group platform seems to have served the same function of delimiting residential space. Clearly they would not have made much of a contribution to possible defense concerns. However, these groups were close to the barbican gate in the north and retreat inside of the wall would have been the logical choice unless taken by complete surprise, Definitely the preferred approach for anyone living outside of the wall that has the time to do so.



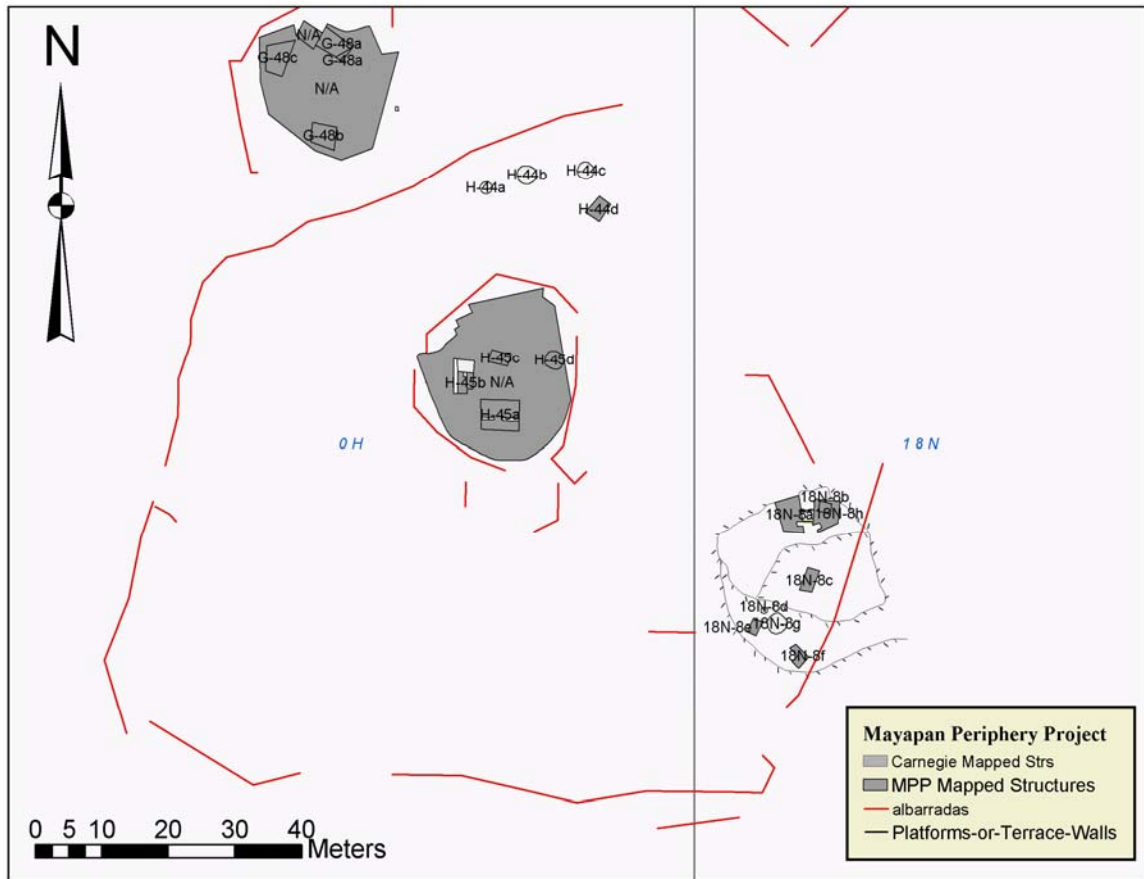
**Figure 10.43 – Map of Group D-45 showing form of typical Mayapán residential albarrada enclosure. Note inset entrance along north portion of the enclosure and that the northwest section of the albarrada wall runs over the top (not shown) of Str. 17P-1c, suggesting that structure was abandoned by the time the enclosure was built.**



**Figure 10.44 – Map of Group GG-1 showing form of residential albarrada enclosure. Note long baffled entrance along south side of the group.**

A third function for these enclosures is suggested by the large albarrada enclosure surrounding groups H-44, H-45 (itself ringed by a typical residential enclosure) and 18N-8, an unusual group of platforms that I think may have represented slave quarters (Figure 10.45). The larger platforms holding perishable residences and the others serving as kitchens, auxiliary structures, storage and even a small round altar. It is located immediately adjacent to the agricultural field zones east of the city. The H-44 group is a cluster of 4 structures that I would class as agricultural storage or granaries. The centrally located and separately ringed H-45 group seem to be the owners if the residents

of 18N-8 were indeed slaves. Even if these folks were low status paid labor, the residents of the group apparently did not merit their own private walled albarrada space. In addition to protecting the grain theoretically stored in the H-44 structures, the larger outer albarrada surrounding all there groups seems intended more to keep the residents of 18N-8 in than provide them private personal space. One pictures the H-45 folks coming and going from their group at will. While, the wall around the central group almost certainly excluded these low-status residents. So, these enclosures were apparently used, at least in certain cases, to contain the movement of slaves or laborers. Slaves are references frequently in the ethnohistory for the site. As noted above, restricting slave residences to locations outside of the wall would have reduced any threat that they posed to the power structure. Of course more examples of the pattern would have to be found to support that hypothesis.

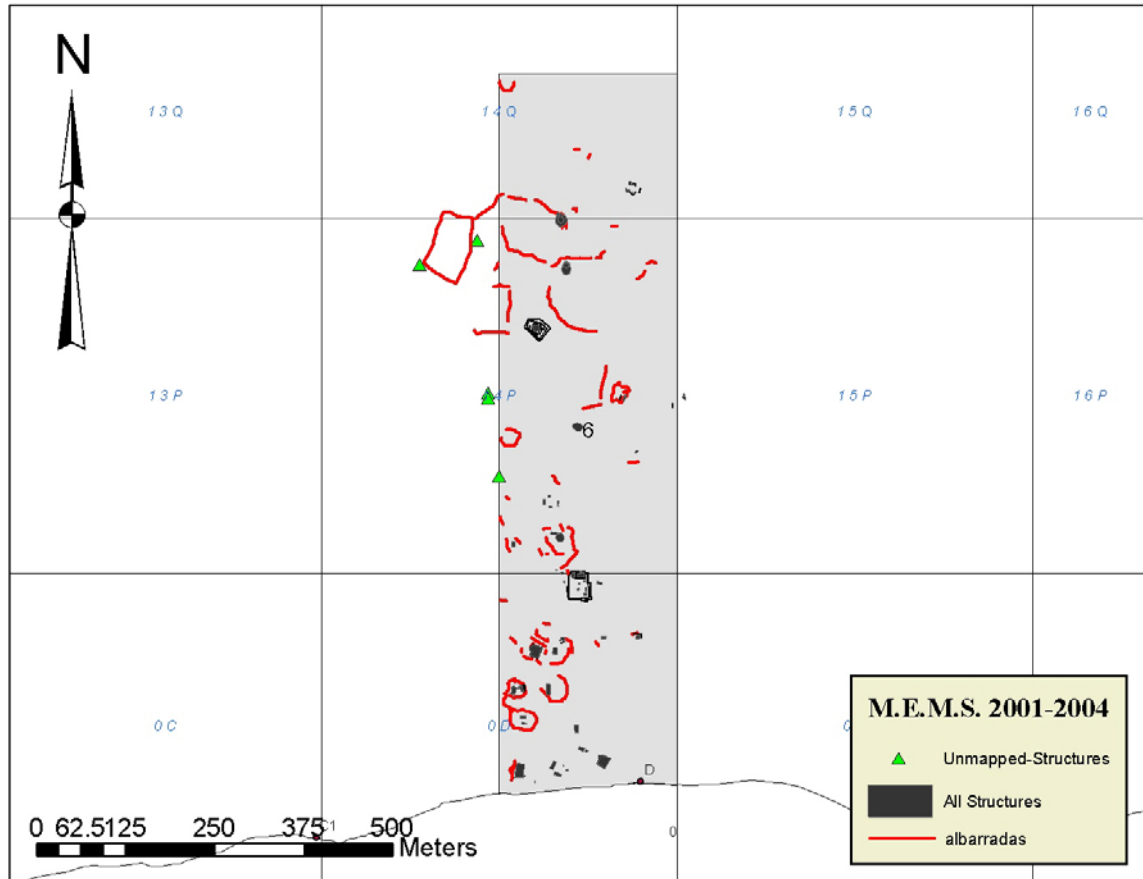


**Figure 10.45 – Map of large enclosure containing groups H-44, H045 and 18N-8. It is suggested that the residents of 18N-8 were likely slaves or at least low-status laborers.**

### *Pen Enclosures*

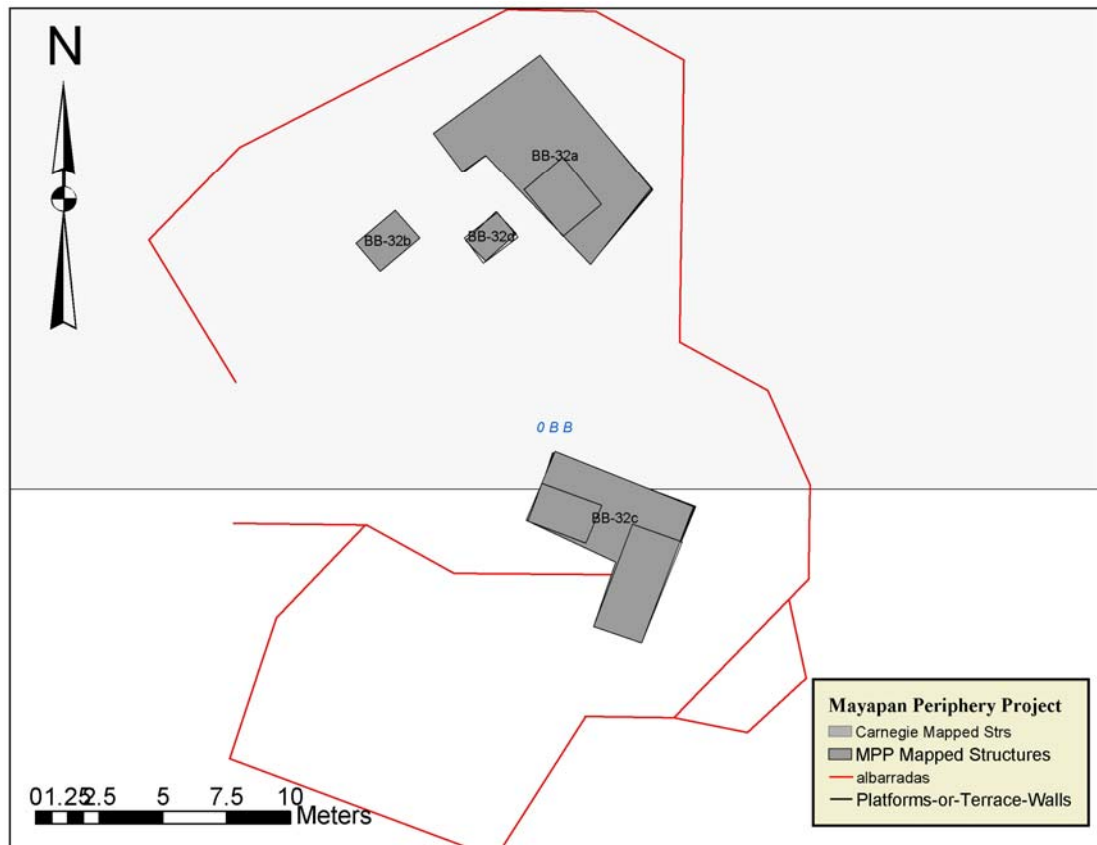
Pen enclosures are common at the site. They essentially appear in two sizes, the large pens identified in this study along the north end of Transect 6 (and apparently extending to either side) (Figure 1.46). Large scale pens protecting herds are well known cross-culturally. Given the population of the site, large scale production of animals like deer and peccary would have provided a stable meat supply to the city. That was supplemented by widespread household level meat production. Smaller pen enclosures are constructed within residential albarrada enclosures both inside and outside of the wall.

Group BB-32 is a good example of these structures (Figure 10.47). It has two pens along the south side of the group enclosure, a smaller one with no entrances that could have held turkeys or similar sized game and a larger one whose entrance is next to one of the residential platforms in the group and would likely have been closed off with a perishable gate of some sort. All of these patterns, pens constructed against enclosure walls, residential rearing of livestock (turkeys, chickens and pigs), and large scale livestock conducted in peripheral ranch locations, remain ubiquitous in the area today as discussed in Chapter 7. In times of conflict, residential groups producing meat resources would have been able to provide a more limited but better protected food supply where large scale production outside of the wall would have been forced to suspend operation. This mimics the function of field gardens and orchards that are found throughout the site. Again we see how defensive concerns were served by the organization of economic activities around the site, which involved placing some food production (as well as key water sources) inside the walls where it could sustain the population if under prolonged attack and large scale production in areas with the space to support it during peacetime.



**Figure 10.46 – Map of Survey Transect 6 showing albarrada wall alignments associated with large scale livestock production (north end of transect).**





**Figure 10.47 – Map of Group BB-32 showing two likely animal pens constructed along the south end of the residential albarrada enclosure.**

### *Double Albarrada Wall Segments*

Linear sections of wall have been recorded in some sections of the city. These appear to line some of the major roadways connecting various neighborhoods in the city to key features such as cenotes, gates in the wall and the two groups of monumental public architecture. I discussed these albarrada alignments in detail during the discussion what we have learned about the city's road system in Chapter 9. They are not what one typically considers an enclosure. Their linear form contrasts radically with the shape of other uses of albarrada walls at the site such as the round residential enclosures discussed

above. However, in reality these too are enclosures, lost narrow linear ones. Then are explicitly intended and designed restrict and channel movement. This was essential during normal peacetime operation. Just as essential as any road system. In the even that attackers did breach the main wall, these features may have restricted their movement to a great degree as the case in any urban warfare situation. Forcing attackers to follow predictable and therefore defensible routes toward the site center. This effect would be exaggerated by the maze of individual, less-planned walls dividing up the various residential zones of the city.

#### *Walls Within Walls – Understanding Complex Functions*

Given the fact that you cannot trip over one jagged chunk of surface limestone at this site without falling on another (which I know from painful personal experience), it seems logical that the ever present limestone cobbles were employed extensively in the construction of walls (and other architectural features). This would have turned a potential annoyance into a vital building resource and cleared the ground for other structures and planting. As we have seen in this volume and related research (Russell and Dahlin 2007), it was even burnt to make the lime plaster that faced virtually every surface of the city. The complex inter-connected systems of walls reviewed above served a number of different functions, each playing a specific function in defense and either economic production or taxation of that production. These were obviously two major concerns for the elites of a political capital known for military expansionism and tribute extraction. Defense appears to be the primary function of the large outer wall. From a

defensive perspective the main wall provided a formidable barrier stopping attackers (hostile armies and possibly uprising slaves) from passing into the densest parts of the site. The sascaberas from which non-surface collected construction material was excavated may also have played a limited defensive role. If aggressors did make it past these outer defenses, they would have to fight through an urban maze of planned and unplanned walls and streets if they wanted to attack the site's center. If they got to the central precinct alive and still able to fight, they may have been faced with yet another substantial wall (if it did exist) to breach before doing damage to the elites and their symbols of power. That is, after they had marched through the very inhospitable terrain extending dozens of kilometers in all directions from the city. It would certainly have been be a "long, hard slog" for anyone brave, equipped, trained and downright tough enough to make it from a distant center to Mayapán's well guarded main temples and colonnaded hall groups. Accordingly, there is little indication that any army accomplished or even attempted such a feat. Of course there was always the Achilles' heal of the city, internal strife which these walls provided very little if any defense from.

From an economic perspective the main city wall served as a customs barrier where incoming goods (both locally produced and imported from a distance) could be monitored and taxed by representatives of the state. The location of the 18O-1 group strongly suggests this function. The presence of an effigy censer fragment featuring the nose of the Postclassic patron god of merchants, Ek Chuah at the shrine in this group was particularly interesting in this regard. It seems that traders from a distance may have stopped off both to ask the blessings of their patron before entering to make her profits or the folks operating the hall group tax collection wanted to keep him happy to keep profits

rolling in. Either underscores the interesting link between ritual and nearly all aspects of ancient Maya life at the site. Economic production of livestock was also greatly aided by albarrada walls, both in terms of large scale production and that taking place at the household level. The gates and production areas were linked to the main markets through a system of roads in part lined by albarrada walls. Another checkpoint at the portal gate east of the ceremonial center suggests another level of control of those entering the center, either just keeping the riff-raff out or possibly collecting additional taxes, in would be one way to tax goods produced within the wall.

We have also seen that these walls likely had ritual significance, acting as a barrier between the bulk of the population and supernatural threats associated with specific ritual paraphernalia or sacred locations. The wall seemed to have intentionally excluded cenote Sac Uayum, a pattern that Patton noted long ago but which I think he misinterpreted. He suggested that it was a strike against the military utility of the wall. I and others (Brown 1999) suggest instead that it protected people from threats associated with the cenote. The well documented placement of calendric Uayeb idols outside of the walls at shrines in associated with the cardinal directions (explored more in detail below) was likely intended to keep these powerful and potentially dangerous objects safely outside of the city where they could do no harm to its residents. These later functions of this feature are completely ignored by the literary sources with the exception of a report in Landa of three lineages controlling access to the city from three of the four cardinal directions. This archaeological examination should go a long way to resolving the outstanding questions about the function of not just the large main wall, but the smaller

nested system of walls is surrounds. I plan to explore this topic in more detail in the future once I have the opportunity to collect more data from the gates themselves.

### **Regional Approaches to Warfare In Mesoamerica**

Certainly the construction of large city walls was a clearly common response to warfare, a near universal in human cultures, the greater the threats or perceived threats, the larger and more resistant the defenses. From the above discussion, it seems clear that Mayapán's city wall was first and foremost a defensive fortification (Shook 1952; Proskouriakoff 1955:102; Sharer 1994:201; Smith 1962:204). Webster (1998:324-325) suggested that there were three main types of Maya fortification. First, there are those systems which protected large areas and functioned as "distant defensive screens" such as have been recorded at Tikal (Puleston and Callender 1967) and Los Naranjos (Baudez and Becquelin 1973). Second are those that were erected immediately around site centers to protect the ruling elite such as those found at Tulum (Sanders 1960), Ek Balam ((Bey, Hansen and Ringle 1997), Becán (Webster 1976b), Chacchob, Cuca and Dzont Aké (Webster 1978, 1980). The third kind of fortification, found only at Chunchucmil and Mayapán, was intended to protect large segments of the urban population from attackers. Webster' (1976a) article on *Lowland Maya Fortifications* provides a comprehensive review of walled sites in the lowlands.

Most of the fortifications found in the Maya lowlands are what Webster (1998:324-325) described as "emergency fortifications" such as are found at Chunchucmil (Dahlin 2000; Demarest et. al. 1997' Palka 998), Dos Pilas, Aguateca and

Punta de Chimino (Demarest 1993). These rapidly constructed defenses are clearly built under duress as a last ditch holdout for a besieged population, often more barricade than formal wall and constructed in whole or part from stone and other materials robbed from nearby preexisting structures, a make shift version of Kagan's (2000) "refuge". In some cases, emergency fortifications cross right over important structures themselves, making no attempt to route around them. Dahlin (2000) argued that in cases where we find this kind of fortification intact, it suggests the total abandonment of the site following defeat at the hands of those that motivated the construction. Formal walls such as those at Mayapán are not panicked attempts to stave off final defeat. They are built during peacetime in anticipation of future hostilities or better yet to prevent attack by making it too costly to adversaries. These large scale civic projects required massive planning, labor and materials. Unlike emergency fortifications, these constructions do not rely on materials stolen from the site's structures. Rather the material is brought to the construction site, often from nearby barrow pits or quarries. Substantial limestone quarries are found in many locations in close proximity to the Mayapán defensive structure. The wall at this site clearly undulates and curves to intentionally include or exclude pre-existing architecture and natural features. It does not typically cross or incorporate architecture.

It is also useful to establish the motive for building such a massive structure. In few cases were the defenses apparently part of the original urban plan, the exceptions being Chacchob (Webster 1978, 1980) and Muralla de León (Rice and Rice 1981). In the later case, Preclassic earthworks were reoccupied during the Postclassic as part of a general trend at that time toward more defensible settlements. But what would motivate



such a change? The trend began in the Terminal Classic period with the disruption of the Maya political and social structure associated with the Maya “collapse”. Into this vacuum flowed various Mexicanized and militant groups looking to establish themselves. Ethnohistoric documents make frequent reference to warfare and conflict that resulted from these events (see below for a fuller accounting of these conflicts). Several northern Yucatan sites such as Ek Balam, Mayapán, Tulum and Dzoonot Aké adopted walled defensive systems. In the south at this time, we find that many settlements such as those in the Peten Lakes region of Guatemala (Rice 1987:235-240; Rice and Rice 1981) and like Caye Coco, and Laguna de On (Masson 2000) along the waterways of Belize cropped up on islands, relying on the water to help block an attack. Others like Punta de Chimino (Demarest 1993) chose locations that were bounded on multiple sides by water then employed additional fortifications on the vulnerable side, even digging canals cutting them off from land entirely. Of course, such a pattern is reminiscent of the Aztec capital of Tenochtitlan on a much smaller scale.

The final key piece of evidence comes from the unusually detailed ethnohistoric record we have for this late site. In addition to stories of centers being repeatedly attacked and depopulated throughout this time period, the Maya chronicles (Roys 1962:68-77) also make it clear that the ancient Maya considered Mayapán’s walls to be defensive fortifications. There are repeated references to Mayapán as a “fortress” in the stories of the later days of the site. One such passage from the *Tizimin Chronicle* reads, “8 Ahau was when there was fighting with stones in the fortress of Mayapan, because of the seizure of the wall, because of the joint government within the town of Mayapan.” Another refers to the results of this fighting saying, “Katun 4 Ahau was when occurred

when the pestilence, When the vultures entered the houses within the fortress.” The remaining chronicles also make similar references which are variously translated as “fortress” or “walled enclosure”. Ultimately, this “seizure” of the walls took place from within, a logical consequence of bringing so many competing factions into the city, with or without their consent.

The fortifications at Mayapán are among the largest ever constructed at any Maya site and appear to have been built sometime after settlement patterning had been well established. The specific labor force used to build the wall remains unclear. Undoubtedly, the site’s unusually densely centralized population helped facilitate this grandiosity. However, the site’s ethnohistory speaks of Itza rulers “enslaving” the poor population of the city toward the end of the site’s history. It is possible that, with the help of their imported mercenary muscle, the ruling elites conscripted a large amount of the labor for the project from the local population. In that instance, the city wall may have been as much prison as it was defense for much of the population. The mercenary troops themselves were also probably available for construction at certain times. Remember that Roman troops built the vast majority of their many city walls. It is a good use of available man power and it keeps them busy and therefore out of trouble when they are not fighting. In the end, the residents of the city could never build walls strong enough to protect against the internal tensions inherent in their political structure that would eventually destroy the city from within.

## **Economic Production on Mayapán's Periphery**

The settlement pattern documented along the rural-urban fringe of Mayapán tells us a great deal about the way of life practiced in this previously unstudied portion of the site and how it integrated with the broader community. As predicted by the model of settlement on the rural-urban fringe (Carter 1976:304-311), this zone had a very heterogeneous mix of land uses. Beyond the residential zones and directional shrines discussed above, varied land use provided a mix of economic resources to the urban population. This area is home to farm land, grazing land and pens for domesticated animals, honey production, and lime plaster production, each segregated from other activities. The strict segregation and the apparent scale of these productive activities suggest that they were meant to provide for more than just individual family units. These appear to be larger, more organized pursuits that probably produced goods that were distributed through the site's centrally located markets. It is not clear if the organizing agent was the state or were simply enterprising entrepreneurs looking to increase their personal wealth. However, the latter is implied by the presence of affluent commoner groups in association with both livestock production areas and agricultural field zones. It appears clear that Mayapán was home to a large number of agriculturalists and its layout incorporates a patchwork of house lot gardens and orchards. Trigger (2003) linked these features with city-state political capitals where defense of the city was localized as opposed to broader state defense made living in the countryside riskier.

## Historical and Environmental Determinants of Mayapán's Urban Form

The organization of residential settlement zones seems to reflect a mix of largely historical and environmental determinants. All of these groups tended to build residential architecture on natural *atillos*, thereby tying settlement distribution at the site closely to topography. Environmental factors like typography, soil depth and fertility, availability of good grazing land and location of limestone appropriate for lime production seem to have conditioned the selection of location for these activities. The present day distribution of these activities closely mirrors that seen for Postclassic Mayapán, even though people from the modern village may have to walk farther than those who originally farmed the land. Hopefully the use of bikes and road vehicles makes up for the extra distance.

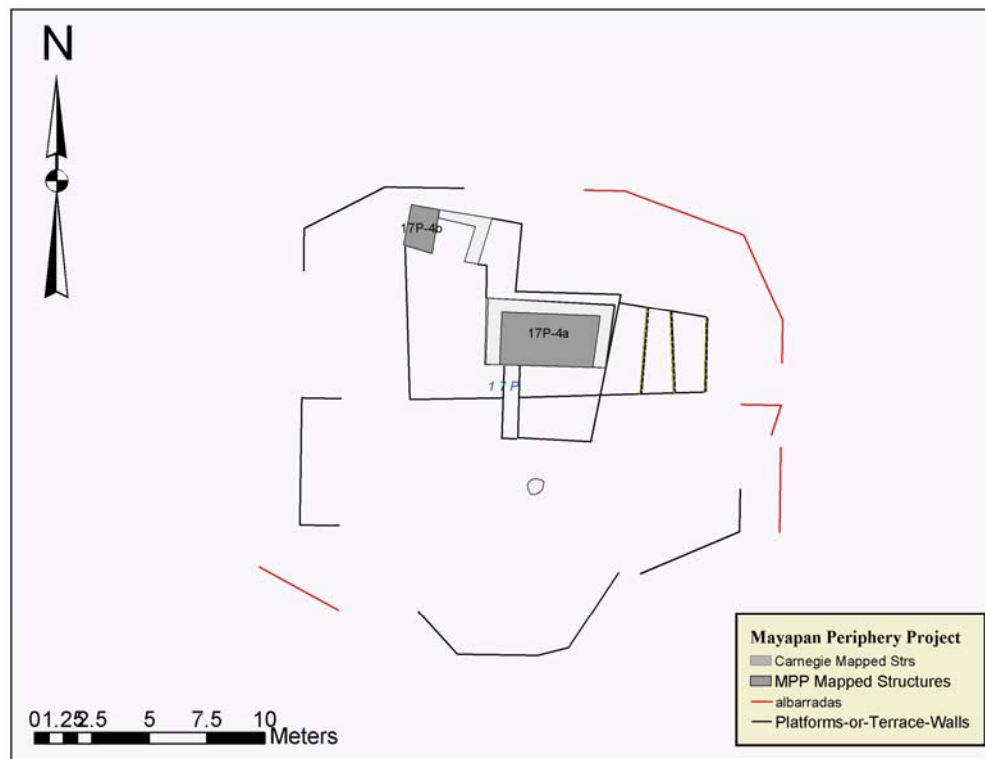


Figure 10.48 - East coast style “C” shaped dwelling 19P-4a.

The northeast sector of the final city was occupied early by a possibly ethnically distinct group as evidenced by a number of structures in this area exhibiting a “C” shaped plan more at home as far east as Cozumel (Figure 10.48). This is significant as it suggests that a group of folks with east coast affiliations but not related to the later arriving Itza arrived in the area rather early (before the founding of the site and construction of the monumental center). It is also worth noting that near these groups was another that seems to have been producing honey, a commodity with well established east coast links. The presence of easily accessed cenotes in that area and in the south of the site led to the early clustering of population in both spots. It seems that with the decline of Chichén Itzá and the founding of the Mayapán’s monumental center (possibly by Itza refugees moving west), the focus shifted from this “Old Mayapán” settlement. A sudden influx of population filled in first around the southwest of the site, where good water sources were plentiful. This suggests at least two basic populations, those Maya already living in the area and those newcomers associated with the founding of the new site center, apparently the Itza “foreigners” discussed in the Maya Chronicles (Roys 1962). A third group were the individuals that filled in the areas between these two as Mayapán’s hegemony spread and rural populations moved in with their newly incorporated local elites. Their ethnic composition is somewhat unclear but they most likely mixed Maya and Itza groups from the various city-state centers being brought under Mayapán’s control. A fourth group represented the influx of mercenaries with central Mexican roots. Further testing would be required to establish the detailed patterns with respect to ethnicity. However, it is clear that Mayapán was a multi-cultural city

exhibiting a variety of stylistic and cultural influences (Milbrath and Peraza 2003; Milbrath 2005).

These four groups formed basic divisions in the settlement layout, the most obvious two being the northeast Itzmal Ch'en group presumably local Maya and the southwest zone population associated with the monumental center. The third group is presumed to have occupied the remaining land between these centers. The Canul mercenaries are less clear. As they arrived late, it seems they would not have had access to prime land. It could be that they filled in the more water marginal northwest zone or mixed into the area between the two centers as well. It seems that only once these basic residential zones were already established, the wall was constructed, leaving some sections outside of the new impressive boundary. Bruegmann (2001) argued based on cross cultural comparisons of settlement zones outside ancient city walls that urban sprawl is not a modern phenomenon. The pattern at Mayapán would tend to support this assertion rather clearly.

This history and ethnohistory implies that lineage was a major organizing principle at the site, a common pattern for ancient political capitals. Evidence was found for ethnic or lineage based control of Gate G in the northeast portion of the site, with the 18O-1 group possibly representing Couoh family control of access to the city (Roys 1962:70, 79). No formal divisions (walls, etc.) between residential zones are present at the site with the exception of the division created by the city wall itself, which seems a side effect rather than goal of construction. The large number of similar colonnaded halls at Mayapán suggests that specific elite lineages exercised some degree of control of discrete populations within the city and across the broader region and if part of their goal



is to organize labor or extract tribute, they would benefit from territorial/population divisions such as Aztec *calpolli* that would facilitate administration (M.E. Smith 2003:128, 137, 148). However, mapping colonnaded halls to any particular neighborhood of the city is far beyond the data we have at hand.

### **Effects of the Economic System and Status on Settlement Layout**

Settlement does not appear to be heavily segregated by wealth. Even the areas where elite residences cluster are often home to a mix of lower status residents and attached servant's residents. Rather than the outer periphery of the site being home to exclusively the city's poorest residents, as might be predicted by concentric zonation models or urban form, there was evidence for a mix of economic statuses among the inhabitants outside of the wall as suggested by distributions within it (Chase 1986, Masson and Peraza 2004:214). This pattern is similar to those recorded for Yoruban cities where neighborhoods were organized by lineage rather than wealth (Krapf-Askari 1969).

As noted in the previous chapter, we found very affluent commoner families living on the periphery with the mass of typical commoners, probably so that they could coordinate and profit from the production going on in this outer zone. Local economic productions of items in shell and lithic do not appear to be clustered. Production sites are found dispersed around the site (Brown 1999). One group (18N-8) contained indications of having been home to low-status agricultural laborers, possibly slaves. An elite administrative presence outside of the wall is suggested the newly documented 18O-1

colonnaded hall group, which appears to have functioned as a checkpoint controlling access to the Gate “G” in the Northeast corner of the city wall. It is likely that taxation of incoming goods from the east side agricultural zone would have been among likely functions of the group. This suggests that rather than directly running production, elites at the site simply took a share of the goods off of the top before they were allowed to enter the city for distribution. Apparently as well as being a defensive barrier, the city wall also functioned to facilitate elite control over the market system. Another colonnaded hall located near the central market itself further implies administrative control.

This taxation and administration are important measures of “boundedness” in the market system (C.A. Smith 1976). If the system was heavily bounded as may be implied by walls, checkpoints, taxation and administration, then the distribution of imported goods such as obsidian would be primarily restricted to high status. However, the distribution of imports shows them to be widespread and common. A quick look through the chapter on excavations at residential contexts outside of the wall shows that clearly. This implies that the system was unbounded at least when compared to patterns from major Classic Period centers (Masson and Peraza 2007; Masson, Peraza, and Hare 2006; Sabloff et. al. 1974; Sabloff and Rathje 1975). The powerful apparently applied a light touch (if you disregard the fact that the people themselves were apparently subject to enslavement and sale in those markets). All indications are that the economic system at Mayapán was not unlike that administered by contemporary Aztec elites (M.E. Smith 2003:106-124).

## Mayapán's Political Organization and Urban Form

The unusually large and dense nature of Mayapán has always made it an object of interest to those studying the rise of cities in ancient Mesoamerica and the determinants of urban form. It stands in marked contrast to the relatively lightly occupied, “garden cities” of the Classic period Maya, bearing more resemblance to centers associated with the Central Mexican tradition. Among other things, that probably reflects strategies of domination and political control that came into the area with the fall of the Classic period kings and their competing city states. The history, ethnohistory and archaeological patterning of Mayapán all suggest that its form was also greatly influenced by the *mul tepal* system of joint government or confederation. This system was directly responsible for the rapid population growth in the city as elites from newly incorporated areas of its control built themselves administrative halls and residences and as many in their local populations followed them to the capital. Pre-existing settlement patterns and environment, combined with this rapid growth in population, accounts for much of the final form of Postclassic Mayapán.

Trigger (2003) correlated the level of socio-political complexity of city-state and territorial state capitals with specific patterns in urban form and life. Table 10.9 summarizes the general cross cultural patterns that he noted. Mayapan seems to show a mix of the features that he noted. It is the clear primate center in the region and is surrounded by a nested hierarchy of subordinate centers and rural communities, many of which would have been directly represented in the site's center. That fits the typical pattern for a territorial state. The 17,000 population estimate falls in the ranges set out

but the size of the retaining population is larger than would be typical for a city-state entity if you consider Mayapán's wide hegemony over the peninsula as far south as the Petén, also a trait of a territorial state. However, there are many features of a city-state polity present as well, including: a large number of at least part-time agriculturalists; craft specialists located around the city (although more data on the countryside would be required to fully make this assessment); large areas of the city which were dedicated to garden and orchard production; the presence of a market system for the distribution of goods; a mix of planned and unplanned settlement; a site center that contains most of the temples and colonnaded halls, which can be considered governmental palace structures (Flannery 1998) (elite residences, our equivalent of residential palace structures cluster just outside monumental center); a road network that connects all parts of the site; residential zones that are most likely divided along ethnic and kinship lines; administrative architecture associated with the central market and Gate "G" entry point; a formal boundary wall with a zone of suburban settlement containing agricultural fields and livestock production (orchards likely existed but are unproven at this point). Conversely, many features of a territorial state such as large rural populations, elite estates and evidence of shifting capitals (although the polity was short lived) are absent at Mayapán.

**Table 10.9 – Common features of city state and territorial state empires from Trigger 2003:123-131.**

|                                    | <b>City State Capitals</b>   | <b>Territorial State Capitals</b>  |
|------------------------------------|--|--|
| <b>Regional Settlement Pattern</b> | largest site near center of territory surrounded by rural settlements if small and by smaller administrative centers and rural settlements if large  | Single large capital near center of territory surrounded by nested hierarchy of subordinate centers and rural communities  |
| <b>Populations</b>                 | Several thousand to 50,000   | Several thousand to 50,000 (despite larger sustaining populations)   |
| <b>Common Features</b>             | <p>Large number of agriculturalists (up to 80%)</p> <p>Most craft specialists located in city where access to raw materials and markets is good</p> <p>Many residents split time between agriculture and craft production providing large flexible labor pool</p> <p>Large areas of city dedicated to gardens and orchards to serve as an emergency food supply</p> <p>Markets are critical to the distribution of goods</p> <p>Show a strong mix of planned and unplanned growth</p> <p>Center contains temples and palaces</p> <p>Residential zones are divided into neighborhoods along ethnic or kinship lines</p> <p>These zones are connected by road network</p> <p>Specialized areas like ports and markets have their own administration</p> <p>Formal boundary such as a city wall common</p> <p>Beyond boundary lies a suburban zone (rural-urban fringe) with orchards and agricultural fields</p> | <p>Few agriculturalists</p> <p>Most residents were craft people, laborers, administrators and elites</p> <p>Agriculturalists protected by more powerful state military are free to live in the country near fields</p> <p>Elite often maintain rural estates</p> <p>Many have more than one capital over time</p> <p>Subordinate centers have smaller palaces for visiting rulers</p> <p>Elite residences, temples and burial grounds often cluster in the site center and are frequently walled off</p> <p>Around that central zone are the homes of craft people, laborers and administrators.</p> |

The odd mix of territorial state features and city state features at Mayapán suggests that Trigger's dichotomy is may not be adequate to explain the manifestation we see at the site. It begs the question of just what kind of political capital Mayapán was. One possibility is that Mayapán was the capital of a hegemonic empire (M.E. Smith and Montiel 2001). Hegemonic empires exert informal control over other societies and invest little in provincial infrastructure, unlike the territorial empires discussed by Trigger (2003) that exerted much more direct control. According to Smith and Montiel, Mesoamerican empires tend to be of the hegemonic type. Following Doyle's (1986:30) definition of empire as "effective control, whether formal or informal, of a subordinated society by an imperial society." the authors offer an archaeological model for detecting empires; both hegemonic and territorial (Table 10.10).

While it is beyond the scope or goals of this volume to conclusively argue that Mayapán was a hegemonic imperial capital, I believe that even a superficial review of what we currently know about the site suggests that it is possible if not downright likely. As political organization closely maps to certain settlement patterns, it is all but essential to establish where the site fits along the continuum of political complexity. The site itself certainly qualifies as a large and complex urban center. As seen above, it is the fourth largest Postclassic city based on current maps and it is the lone center even near its size in the Yucatán. Significantly, new estimates provided here suggest that the site was larger in size than the Tarascan imperial capital of Tzintzuntzan, Michoacán. This suggests that Mayapán exceeds the minimum size requirements for an imperial capital. While its population density was still in the low range for Mesoamerican cities, it was more than



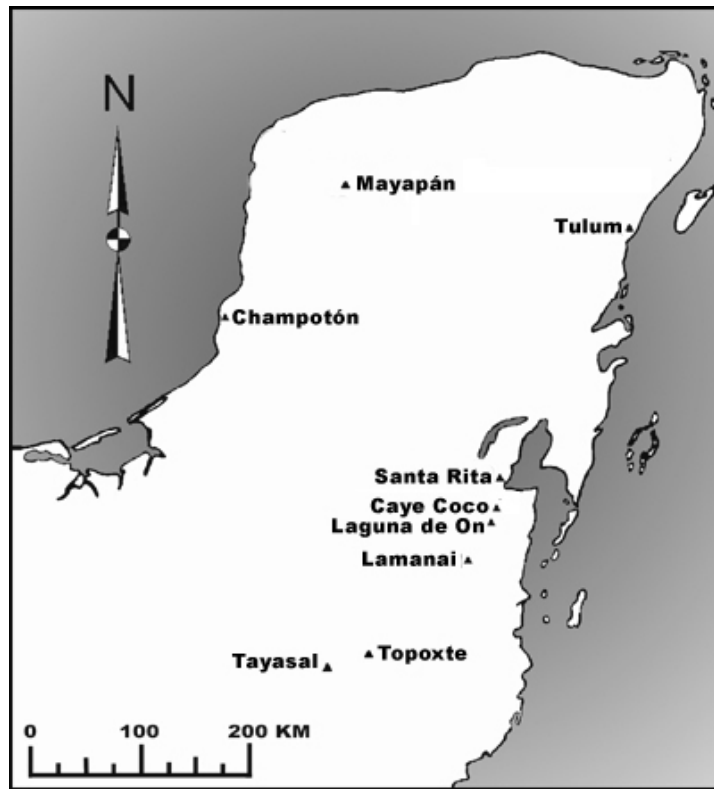
twice as dense as its subordinate center at Santa Rita. The full complexity of the site's settlement organization should be clear from the research presented here.

**Table 10.10 – Smith and Montiel's (2001) criteria for the archaeological detection of an empire.**

| Features   | Examples  |
|--|---|
| <i>1. The imperial capital</i><br>A. Large, complex urban center<br>B. Proclamations of imperial ideology                          | 1. Militarism<br>2. Glorification of king or state  |
| <i>2. Domination of a territory</i><br>A. Economic exchange between capital and provinces<br><br>B. Political control of provinces | 1. Provincial goods found at capital<br>2. Imperial goods found in provinces<br><br>1. Military conquest<br>2. Construction of imperial infrastructure<br>3. Imposition of tribute or taxes<br>4. Reorganization of settlement systems<br>5. Imperial co-option of local elites |
| <i>3. Projection of influence in a larger international context</i><br>A. Economic influence                                       | 1. Trade with extraimperial regions   |
| B. Political influence   | 1. Military engagement and activities along enemy borders<br>2. Centralization or militarization of extraimperial polities  |
| C. Cultural influence  | 1. Adoption of imperial gods or rituals by distant peoples<br>2. Emulation of imperial styles and traits by distant peoples   |

Imagery glorifying elites, the state and featuring militaristic themes are abundant at the site (Milbrath and Peraza 2003; Milbrath 2005). Elites constructed large monumental architecture featuring among other themes extensive use of serpent imagery directly linked to the Itza Cocom lineage. In addition, they featured messages of clear militaristic themes, such as the skeletal stucco figures, a bound captive and an associated animated flint knife depicted on the inner construction of the Q-162 radial pyramid

(Susan Milbrath alternately interpreted the object behind this skeletal figure as a bee wing, suggesting that he was a skeletal anthropomorphic Bee God in 2003), itself dedicated to Kukulcan and decorated with serpent imagery. They are known to have conducted public human sacrifice and several temples have publicly viewable sacrificial altars and deep shafts that contain the jumbled bones of the sacrificed individuals. Q-77 is a dance platform of the sort associated with Venus war cults at Chichén Itzá. According to Milbrath and Peraza (2007), a Mayapán style colonnaded hall was added to the sacbe leading to the Sacred Cenote at Chichen in the Late Post-Classic, suggesting control of that area. The Q-161 colonnaded hall is decorated with elaborate militaristic murals celebrating the Central Mexican Canul mercenaries (Milbrath and Peraza 2003; Milbrath 2005). This is just a sample of the militaristic state propaganda. A more complete catalog will have to wait for another day. These messages competed with a sub-stratum of more pure Maya artwork and styles including reused Puuc Chac masks and stela monuments.



**Figure 10.49 – Map showing distribution of selected sites reporting Chen Mul effigy censers or local variants suggesting limits of Mayapán’s influence.**

Clearly Mayapán dominated a substantial territory. The presence of economic exchange between the capital and its provinces is fairly well understood at this point. Mayapán was well integrated into the coastal trade networks of the Postclassic. These networks brought in various goods such as obsidian from beyond the areas of their immediate control and other goods such as shell, salt and fish from provinces under their sway. Mayapan also sent certain goods out to the provinces. Ceramics associated with Mayapán such as Mama Red and Chen Mul modeled incense burners have a distribution that closely parallels the areas generally believed to fall under Mayapán’s control (Carmack 1983:386) (Figure 10.49). More sourcing studies are needed to know exactly where these items are coming from.

Political control of provinces is well established. While details remain unclear as to which areas Mayapán may have militarily conquered and which it incorporated through diplomacy, the Maya Chronicles (Roys 1962) suggest extensive conflict between major centers possibly even the outright conquest of the declining Chichén Itzá. The ethnohistoric accounts (Roys 1862) make it clear that Mayapán conscripted troops and employed large numbers of foreign mercenaries with Mexican roots who became integrated into the site structure and whose influence can also be seen in the art of the site. One particularly impressive example of this group's stylistic influence were the recently discovered murals from the small Q-161 colonnade (Figures 10.50-10.54) attached to the central Q-162 pyramid which depict standard bearers flanking a figure of a diving god in a Central Mexican style sun disk. These bearers are reminiscent of murals from Phase II at the Templo Mayor in the known imperial capital of Tenochtitlan (Milbrath and Peraza 2003). The importation of a large mercenary army certainly makes it clear that force was one major means of projecting their influence. We know also that Mayapán engaged in tribute collection from provinces that they controlled. Much information was available on this issue once the Spaniards started trying to sort out local tribute potential and figure out relationships between local nobles from various areas (Roys 1962). The rapid population and then rapid depopulation of the site suggests that forced nucleation and resettlement of rural populations into the city was a primary factor relating to the site's history and form. Provincial elites were co-opted in a most visible and well documented manner; they simply resettled the local elites in the capital and included them in the *mul tepal* confederation government.



**Figure 10.50 – One panel from the recently excavated murals from colonnaded hall Q-161 depicting standard bearers flanking a descending figure in a Central Mexican style sun disk.**



**Figure 10.51 – Detail of standard bearer with jaguar headdress from Q-161 murals.**





**Figure 10.52 – Detail of standard bearer from Q-161 murals.**

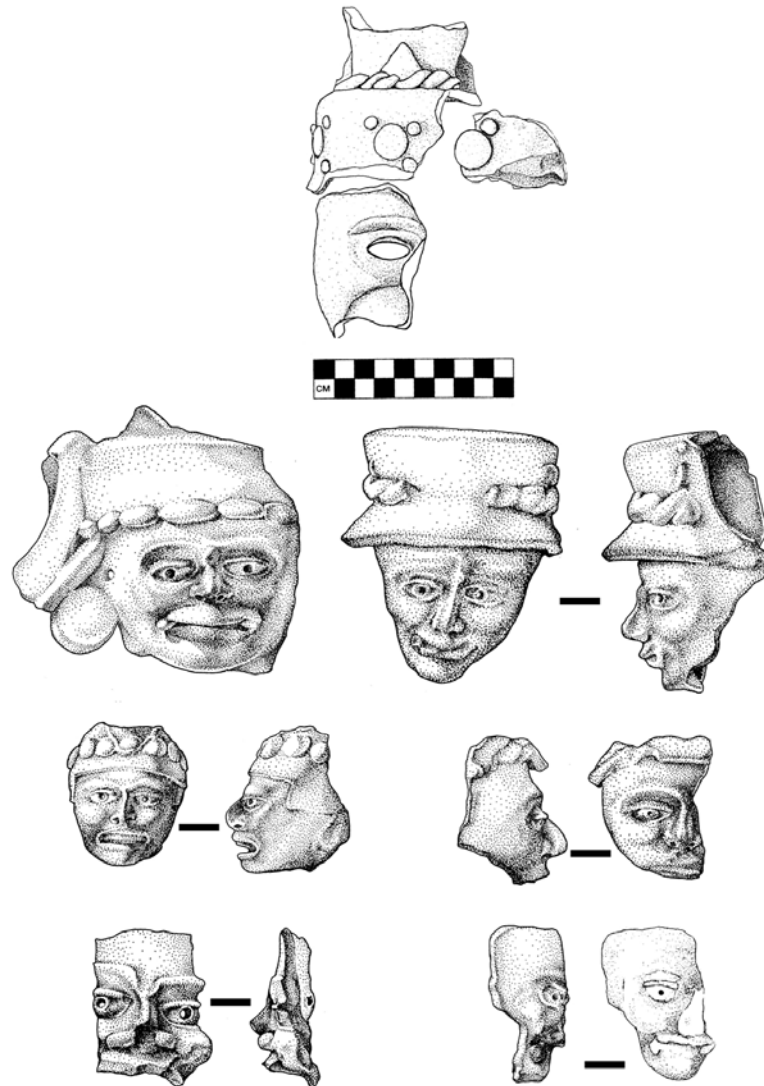


**Figure 10.53 – Standard bearer from Q-161 murals (left) with detail of figure's face (right).**





**Figure 10.54 – Detail of central descending figure in sun disk from Q-161 murals.**



**Figure 10.55 – Effigy censer faces recovered from a deposit from a ritual dump on a small island adjacent to Caye Coco on the Freshwater Creek drainage in Northern Belize. The top example is believed to be an import from Mayapán based on the large size, the high quality production and the flat eye indicative of a painted pupil as opposed to the punctated pupils seen on the other locally produced Kol Modeled emulations of the style (Russell 2000).**

There are also strong indications of Mayapán projecting its influence out to the broader international context. Trade with regions beyond their control for goods such as obsidian and greenstone are clearly established by the large quantities found on site. So,

its economic influence is in little doubt. Its political influence remains one of the hardest to evaluate given what we know about the societies on the edges of Mayapán's dominated territory. Again cross border conflict with polities that fell to Mayapán is spelled out in the ethnohistory (Roys 1962). So that seems pretty clear although could be far better supported with archaeological evidence. If evidence for centralization and/or militarization of extraimperial polities is to be found, a good place to begin looking may well be Coba which seems to have been a lone holdout resisting Mayapán's influence in the north. The Aztec empire too had pockets such as Tlaxcala which resisted their rule and a series of fortified settlements along the border with the Tarascans in the West (Smith 2003). However, evidence for conflict in these zones is better spelled out than what we see for Mayapán and its neighbors. The widespread cultural influence of the site is well demonstrated by the rapid spread of Mayapán's effigy censer cult. I analyzed a censer deposit from the northern Belizean Postclassic center of Caye Coco in my master's thesis (Russell 2000). The deposit seemed to contain at least one example which appears to have been a direct import from Mayapán and a large number of locally produced examples emulating those forms found at the capital suggesting the adoption of Mayapán's gods and emulation of its imperial styles (Figure 10.55). Effigy censers from Champotón have been chemically sourced and appear to be locally made emulations of the style promoted by Mayapán (Milbrath et. al. 2007).

Given this brief overview, I do not think it out of bounds to suggest that Mayapán may well have qualified for the title of empire, albeit a short lived one. This may explain the interesting mix of features noted by Trigger as being associated with either city-states or territorial ones. Much like Tenochtitlan, Mayapán apparently began as one of several

competing polities. Much of the site layout would have taken form during this time when they were essentially operating in a city-state environment. As they took control of their neighbors, they grew rapidly, incorporating much of the populations they gained control of. In the end, the site grew to such a size that it totally eclipsed everything else in the settlement hierarchy through out the peninsula and down to the Petén. In the end, the site looked like a very large city-state capital, but had the nested hierarchy of subordinate sites and rural communities and had a large sustaining population beyond that which would be expected for a city-state. The pattern seen at Mayapán may represent the effects of a transition from a competing city-state to a full fledged hegemonic empire, the former period greatly shaping the city layout, the latter resulting in the broader regional settlement pattern of a territorial state. Rather than the Postclassic being a “decadent” wasteland resulting from the collapse that it was depicted as by the Carnegie researchers, it appears that it may have been the time when the Maya area saw the rise of a Maya/Itza empire.

A parallel argument could likely be made for Uxatlán (Carmack 1983:380-388) holding similar status in the southern highlands. There are significant similarities in site size, settlement layout, architectural assemblages, etc. between these two centers which I will return to below. Rather than the patchwork of competing city-states we see in the Classic, the Postclassic may have been dominated by two apparently friendly hegemonic empires. This is a topic that I intend to return to and flesh out in detail in the near future.

## **Ritual and Urban Form at Mayapán**

Urban planning expressions of Maya notions of sacred space relating to the cardinal directions and the center as well as associations between specific ritual architecture and cenotes have been suggested by previous researchers (Brown 1999; Milbrath and Peraza 2003, Pugh 2001). While I remain wary of ascribing overall site planning to emulation of a quadripartite cosmogram, it is clear from both archaeological and ethnohistoric data that these concerns were reflected in the placement of individual ritual structures (temples, shrines, altars, oratories) around the site. This survey has revealed the presence of shrines or temples outside of the wall in three of the four cardinal directions.

Landa's (Tozzer 1941) careful observation of the entire annual ritual cycle of Maya residents of Yucatán provided an unusually detailed picture of the ritual practices of the early Colonial Period Maya of the area (Russell 2000) that provides significant clues as to the archaeological patterning that might be associated with the practices. He recorded the details of 29 different rituals (Tozzer 1941:128-166). The direct historic connections between his informants and residents of the site of Mayapán which was abandoned quite recently before the author's time are strong and clear. It seems clear from his descriptions that the practices in place were very similar to those Landa observed and recorded. His description of the annual New Year's or Uayeb ceremonies refer explicitly to processions moving idols between three important locations, dual piles of stone that face each other and are located outside the town in each cardinal direction, elite residences and temples (both concentrated in the central city zone at Mayapán).

Tables 10.11a-10.11d show the archaeological contexts, participants, potential archaeological correlates and other details of the Uayeb and New Year's ceremonies as they were described by Landa. According to his observations Kan years began in the south with the creation of an idol appropriate to the year (Table 10.11b). That idol was placed at the south piles of stones (shrine). Elites and priests processed to the south shrine where they conducted several rituals before placing the idol on a litter and carrying it to the house of an elite at the center of the site. It was placed there with a stone idol that was believed to help activate its power and various offerings and rituals preformed depending on the year in question. It remained there for the five day Uayeb period after which it was moved to the east shrine where it remained for the year. At the same point a stone idol was moved to the temple where it was venerated with additional rituals and offerings. The stone idol remained until there until needed again. That creation of an idol, movement to the home of an elite and then movement of the idol to the next directional shrine in the sequence was repeated year after year in a cycle. Clearly this pattern sounds much like that documented in the town of Zinacantan by Evan Vogt (1969).



**Table 10.11a – Contexts, idols, and vessels associated with various stages of Uayeb rituals as recorded by Landa (Tozzer 1941).**

| Ritual                | Month | Context                 | Clay Idols | Wood Idols | Stone Idols | Generic Idols | Pottery Statues | Woode Statues | Brasiers | Urns |
|-----------------------|-------|-------------------------|------------|------------|-------------|---------------|-----------------|---------------|----------|------|
| Uayeb Kan years       | Uayeb | stone pile edge of town | X          |            |             |               |                 |               | X        |      |
| Uayeb Kan years       | Uayeb | elite residence         | X          |            | X           |               |                 |               |          |      |
| Uayeb Kan years       | Uayeb | temple                  | X          |            |             |               |                 |               |          |      |
| Uayeb Muluc Years     | Uayeb | stone pile edge of town | X          |            |             |               |                 |               | X        |      |
| Uayeb Muluc Years     | Uayeb | elite residence         | X          |            | X           |               |                 |               |          |      |
| Uayeb Muluc Years     | Uayeb | temple                  | X          |            | X           |               |                 |               |          |      |
| Uayeb Ix Years        | Uayeb | stone pile edge of town | X          |            |             |               |                 |               | X        |      |
| Uayeb Ix Years        | Uayeb | elite residence         | X          |            | X           |               |                 |               |          |      |
| Uayeb Ix Years        | Uayeb | temple                  | X          |            | X           |               |                 |               |          |      |
| Uayeb Ix Years        | Uayeb | oratories               | X          |            |             |               |                 |               |          |      |
| Uayeb Cauac Years     | Uayeb | stone pile edge of town | X          |            |             |               |                 |               | X        |      |
| Uayeb Cauac Years     | Uayeb | elite residence         | X          |            | X           |               |                 |               |          |      |
| Uayeb Cauac Years     | Uayeb | temple                  | X          |            |             |               |                 |               |          |      |
| New Years celebration | Pop   | temple                  |            |            |             | X             |                 |               | X        |      |

**Table 10.11b – Participants and deities associated with various stages of Uayeb rituals as recorded by Landa (Tozzer 1941).**

| Ritual                | Participants            | Associated Deities   |
|-----------------------|-------------------------|--|
| Uayeb Kan years       | elites, priests         | Kan u Uayeyab(Bacab)   |
| Uayeb Kan years       | community at large      | Bolon Dzacab, Kan u Uayeyab(Bacab), Kanal Acantun                                    |
| Uayeb Kan years       | priests, old women      | Itzamna Kauil, Bolon Dzacab  |
| Uayeb Muluc Years     | elites, priests         | Chac u Uayeyab(Bacab)  |
| Uayeb Muluc Years     | community at large      | Kinich Ahau, Chac u Uayeyab(Bacab), Chac Acantun                                     |
| Uayeb Muluc Years     | priests, old women      | Yax Cocah Mut, Kinich Ahau, Chac Acantun   |
| Uayeb Ix Years        | elites, priests         | Sak u Uayeyab(Bacab)   |
| Uayeb Ix Years        | community at large      | Itzamna, Sak u Uayeyab(Bacab), Sac Acantun   |
| Uayeb Ix Years        | men, priests, old women | Itzamna, Kinich Ahau Itzamna, Sac Acantun  |
| Uayeb Ix Years        | community at large      | Kinich Ahau Itzamna  |
| Uayeb Cauac Years     | elites, priests         | Ek u Uayeyab(Bacab)  |
| Uayeb Cauac Years     | community at large      | Uac Mitun Ahau, Ek u Uayeyab(Bacab), Ekel Acantun                                    |
| Uayeb Cauac Years     | community at large      | Uac Mitun Ahau, (4 idols)Chi Chac Chob, Ek Balam Chac, Ah Canuol Cab, Ah Buluc Balam |
| New Years celebration | men, priests, old women | variable based on year   |

**Table 10.11c – Sacrifices and offerings associated with various stages of Uayeb rituals as recorded by Landa (Tozzer 1941).**

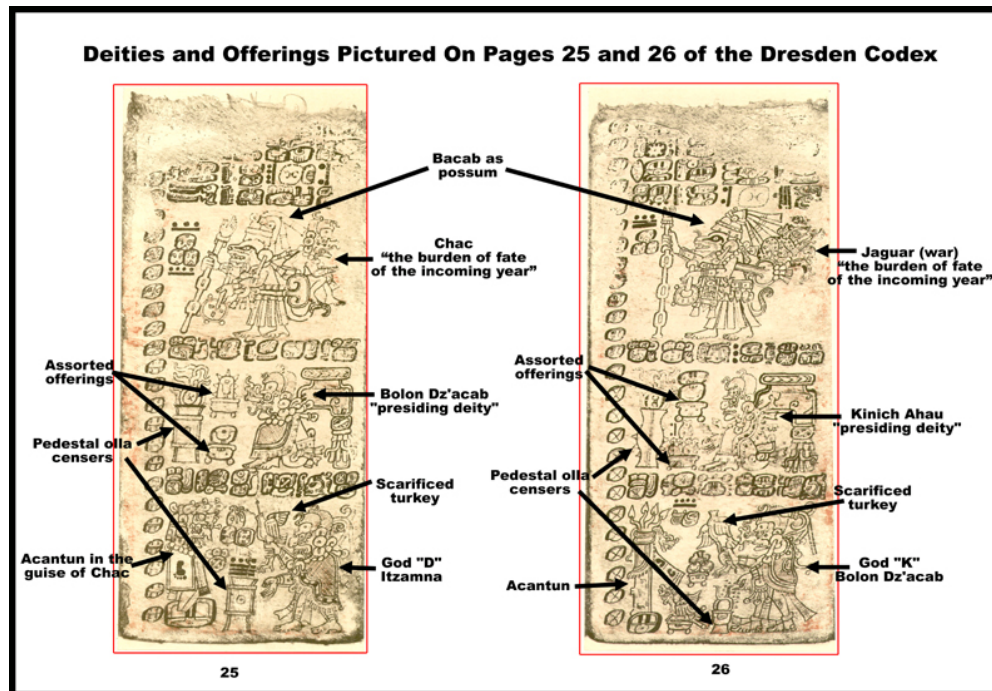
| Ritual                | Incense | Food Offering | Drink offering | Human sacrifice | Faunal Sacrifice | Blood Offering | Textile Offering    | Other Offerings                 |
|-----------------------|---------|---------------|----------------|-----------------|------------------|----------------|---------------------|---------------------------------|
| Uayeb Kan years       | X       | X             |                |                 | turkey           |                |                     | X                               |
| Uayeb Kan years       | X       | X             | X              |                 |                  | X              |                     |                                 |
| Uayeb Kan years       | X       | X             |                | X               | dog              |                |                     | beads, 2 plates                 |
| Uayeb Muluc Years     | X       | X             |                |                 | turkey           |                |                     |                                 |
| Uayeb Muluc Years     | X       | X             | X              |                 |                  | X              |                     |                                 |
| Uayeb Muluc Years     | X       |               |                | X               | dog, squirrels   | X              | unembroidered cloth | beads, pottery dogs             |
| Uayeb Ix Years        | X       | X             |                |                 | turkey           |                |                     |                                 |
| Uayeb Ix Years        | X       | X             | X              |                 |                  | X              |                     |                                 |
| Uayeb Ix Years        | X       | X             | X              |                 | unspecified      |                |                     | beads                           |
| Uayeb Ix Years        | X       | X             |                |                 |                  |                |                     |                                 |
| Uayeb Cauac Years     | X       | X             |                | X               | turkey           |                |                     |                                 |
| Uayeb Cauac Years     | X       | X             | X              |                 |                  | X              |                     |                                 |
| Uayeb Cauac Years     | X       | X             |                |                 | iguana           |                |                     | flowers, precious stones, beads |
| New Years celebration | X       |               |                |                 |                  |                |                     |                                 |

**Table 10.11d – Activities associated with the Uayeb rituals and citations for Landa's descriptions of them.**

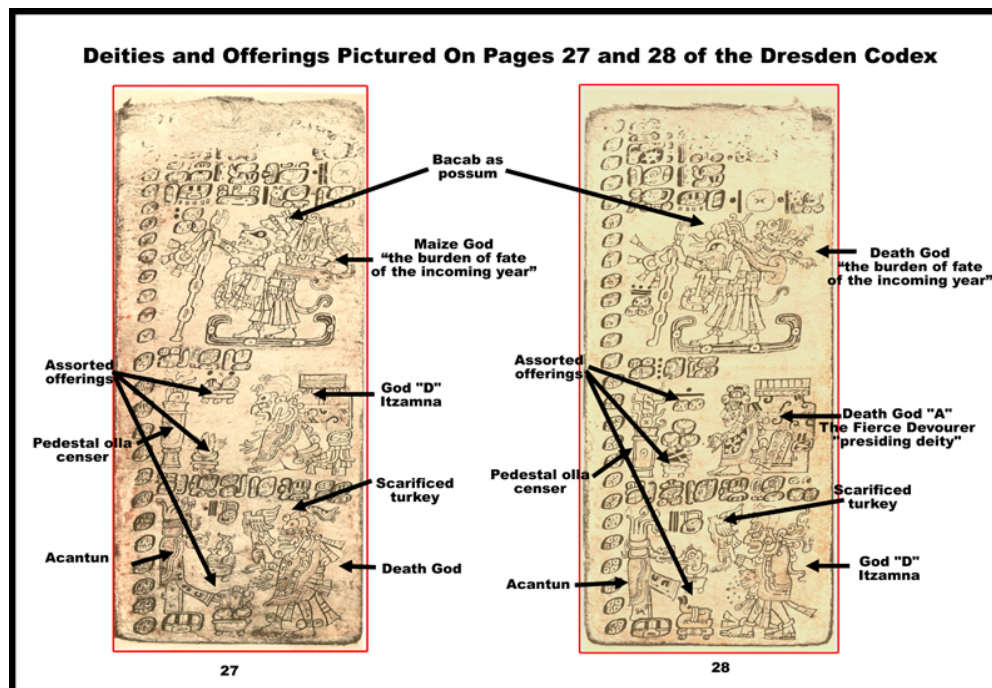
| Ritual                | Prayer | Feasting | Drinking | Manipulation of skeletal remains | Music | Dancing | Citation                 |
|-----------------------|--------|----------|----------|----------------------------------|-------|---------|--------------------------|
| Uayeb Kan years       | X      |          |          |                                  |       | X       | Tozzer 1941:139-143      |
| Uayeb Kan years       | X      | X        | X        |                                  |       | X       | Tozzer 1941:139-143      |
| Uayeb Kan years       | X      | X        |          |                                  |       | X       | Tozzer 1941:139-143, 166 |
| Uayeb Muluc Years     | X      |          |          |                                  |       | X       | Tozzer 1941:144-145      |
| Uayeb Muluc Years     | X      | X        | X        |                                  |       | X       | Tozzer 1941:144-145      |
| Uayeb Muluc Years     | X      |          |          |                                  |       | X       | Tozzer 1941:144-145, 166 |
| Uayeb Ix Years        | X      |          |          |                                  |       | X       | Tozzer 1941:145-147      |
| Uayeb Ix Years        | X      | X        | X        |                                  |       | X       | Tozzer 1941:145-147      |
| Uayeb Ix Years        | X      | X        | X        |                                  |       | X       | Tozzer 1941:145-147, 166 |
| Uayeb Ix Years        | X      | X        | X        |                                  |       | X       | Tozzer 1941:147          |
| Uayeb Cauac Years     | X      |          |          |                                  |       | X       | Tozzer 1941:147-149      |
| Uayeb Cauac Years     | X      | X        | X        |                                  |       | X       | Tozzer 1941:147-149      |
| Uayeb Cauac Years     | X      |          | X        |                                  | X     | X       | Tozzer 1941:147-149, 166 |
| New Years celebration | X      | X        | X        |                                  |       | X       | Tozzer 1941:151-153      |

Support for the validity of Landa's (Tozzer 1941:139-153) observations and their projection back into the Postclassic comes from the New Year's pages of the Dresden Codex (Förstemann 1880) and other Postclassic codices. A recent book on the Madrid Codex by Vail and Aveni (2004) compares and contrasts the various Uayeb imagery from several of these ancient screen-fold books. Figures 10.56 and 10.57 show pages 25-28 of the Dresden Codex. I have added labels to quickly identify the actors (in this case the actual gods rather than priests and elites perform the ceremonies) and ritual actions taking place. The pages follow the same sequence as the years listed in tables 10.11a-10.11d, beginning with Kan and ending with the ill-fated Cauac. The images are divided into three registers that reflect the activities taking place at the various locations described by Landa. The top register shows the Bacab for the year (in the guise of an opossum) carrying in the burden of the incoming year. The action is equivalent to the movement of the newly made idol by procession from the directional shrine where the new idol was placed to the home of the elite described by Landa. The central register depicts the five days of Uayeb ceremonies at the home of the elite. The final register depicts the rituals venerating the stone idol (Acantuns) now located at the temple.





**Figure 10.56 – Gods and rituals associated with New Year’s rituals depicted on pages 25 and 26 of the Dresden Codex (modified after Förstemann 1880).**



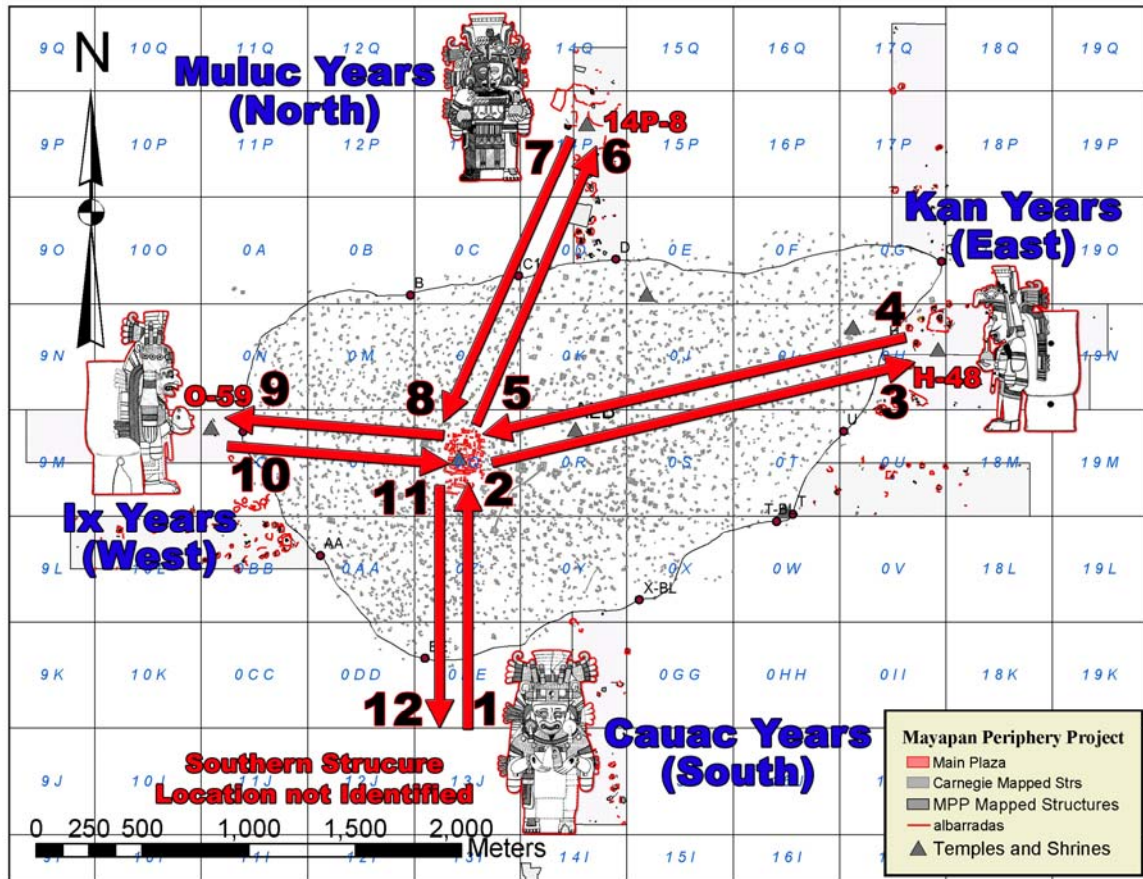
**Figure 10.57 – Gods and rituals associated with New Year’s rituals depicted on pages 27 and 28 of the Dresden Codex (modified after Förstemann 1880).**

During this survey, I encountered three ritual groups outside of the wall (H-48, O-59 and 14P-8) which seem to have been the city's manifestation of the later Colonial Period stone piles. All were placed at the point where residential settlement stopped and some other land use began. That placed them not just outside of the wall, but just beyond the very edge of the actual city. H-48 and O-59 were purely Postclassic constructions and were placed a few hundred meters directly outside of major gates, H-48 in the east and O-59 in the west. Group 14P-8 is a larger structure and is located farther outside of the wall than the previous two groups but still at the cutoff of residential settlement. In fact, the placement of these ritual structures seems to be a better marker of the true dimensions of the site than the city wall itself. The north group seems to date originally to the Terminal Classic. But, ceramics collected from test excavations suggested it continued to be used into well into the Postclassic. Its orientation facing ancient Tecchaquillo suggests it was originally associated with that settlement.

The form of the architecture involved raised some questions. The main structure of group 14P-8 is interesting as the association between round structures and the deity Ehecatl, the Central Mexican wind god and a figure frequently conflated with Kukulcan (Milbrath and Peraza 2003). The spread of a Kukulcan cult is associated with the Itza occupation of Chichén Itzá which would overlap in dating with ancient Telchaquillo. It is possible that this temple had some such association. The form of the H-48 group with its small square flat topped temple and adjacent one room shrine face each other in just the manner that Landa described for his dual piles of stones. Assuming that Landa's descriptions reflect in large degree practices at Mayapán, one would expect that the

structures where these rituals occurred would be larger, better built and more elaborate. As the center of spread for the censer cult that Landa witnessed, one would expect the most elaborate expression of it at this site. That is certainly supported by the distribution of effigy censers throughout the Yucatán and into the Petén. As one moves away from the center, the size of censers become reduced in size, the number of gods represented becomes more restricted and the production quality drops noticeably (Russell 2000, Milbrath 2007). It is somewhat bothersome that the form of the three groups varies. But, the reuse of existing sacred architecture in the north accounts for that form well enough. The fact that each year's rituals varied in many details such as: associated deities, participants, offerings, dances, etc. makes some variation in the three known and one still hypothetical group more reasonable.





**Figure 10.58 – Application of Landa’s description of the ritual movement of idols associated with a full cycle of four Uayeb and New Year’s ceremonies to the mapped distribution of ritual features at Mayapán.** Actions are as follows: 1) new idol placed at south shrine where elites and priests perform ceremonies; 2) that idol is moved in procession to the center to reside in colonnaded hall (or possibly elite residence) for five day Uayeb period of offerings, sacrifice and ritual alongside a stone idol; 3) idol then moved to east shrine where it resides for the year; 4) newly made second year idol placed at east shrine and ceremonies performed by elites and priests (presumably old idol disposed of); 5) second year idol is moved in procession to center for five days of Uayeb rituals; 6) second year idol moved to north shrine where it resides for the year; 7) newly made third year idol placed at north shrine and ceremonies performed; 8) third year idol moved in procession to center for Uayeb period rituals; 9) third year idol moved to west shrine for the year; 10) newly made forth year idol placed at west shrine and ceremonies performed; 11) forth year idol moved in procession to center for five days of rituals; 12) cycle completed as forth year idol is moved to the south shrine for the year.

Figure 10.58 shows the likely movement of Uayeb ritual activities between the known ritual and colonnaded hall locations at Mayapán, tracking the movement of ceramic idols (effigy censers) from place to place as described by Landa. Some words of caution about spatial application of this model to the distribution of ritual groups are in order. First, Landa discussed the idols spending the five day Uayeb period in an elite residence. Elite residences were also important in ritual at Zinacantan. I briefly mentioned above that at Mayapán, we should expect palace structures and it appears that colonnaded halls functioned as governmental palaces while elites maintained separate residences that functioned as residential palaces (Flannery 1998). The sheer number of confederated lineages at the site created a proliferation of these structures. The large number of effigies found in association with colonnaded halls in the center and the dense deposits there which may represent ritual dumps (Milbrath 2007), suggest strongly to me that these structures probably housed the idols during the Uayeb. Taking them straight to the monumental center would convey the prestige of the elites involved in a very public way. As part of the activity Landa recorded for this period takes place at the temple, it appears that the logical ritual focus for the idols would also be in the center where the main temple resides. All that being said, it is still quite possible that the idols were instead transported to the zone of elite residences just outside of the monumental center. In either case, the dichotomy of the center and the cardinal directions would remain intact.

Second, I am quite confident linking the H-48 (east) and O-59 (west) groups with this system. I am somewhat less certain about the 14P-8 group which may have served a different function entirely. Its placement at the edge of the residential zone is analogous to that seen in the east and west, one strong argument that it is part of the system. If it is

not part of the system, it would be logical to expect another north shrine somewhere near Gate “B” (Gate C shown remains speculative and I am skeptical that it is accurate) as we have already surveyed north from Gate “D”. However, being that Gate B is a minor gate that seems unlikely. Additional significant support for the claim that the structure identified is the north shrine comes from the gate south of it.. The form of that gate being the single barbican gate does suggest that perhaps this would have been considered the main north gate. It is notably more complex in design than the alternatives. No related south side ritual structures were recorded. However, just looking at the placement of the gates makes the area outside of Gate “EE” is the most likely location for such a structure group. Clearly this is an area that could use more research.

### **Assessing Urban Planning and Meaning of the Site Layout and Architecture**

M.E. Smith’s (2007) recently published approach to analyzing form and meaning in ancient cities provides a framework for summarizing the work presented in this now rather long volume. Table 10.12 lists the criteria that Smith proposes be examined when analyzing urban form. Application of these criteria to Mayapán’s settlement layout will make up the bulk of the rest of this chapter.

**Table 10.12 – Criteria for analysis of urban form as proposed by M.E. Smith (2007).**

| <b>Criteria for Assessing Form and Meaning in Ancient Cities (Smith 2007)</b> |   |
|---|---|
| <i>Coordination</i>   | Arrangement of buildings<br>Formality and monumentality of buildings<br>Orthogonal arrangements<br>Other geometric arrangements<br>Visibility |
| <i>Standardization</i>  | Of inventories<br>Of spatial patterns<br>Of orientation<br>Of metrology   |
| <i>Meaning</i>  | High-level<br>Middle-Level<br>Low-level   |

Smith's measures of *coordination* include: 1) arrangement of buildings; 2) formality and monumentality of buildings; 3) the presence or absence of orthogonal arrangements; 4) the presence or absence of other geometric arrangements; 5) coordination of viewsheds or visibility. Structures located in the epicenter of the site show clear but cluttered coordination. The structures in the monumental center of the site are arranged in discrete groups that were originally discussed by Proskouriakoff (1962) colonnaded hall groups provide a good example. The "basic ceremonial assemblage" typically consists of a colonnaded hall with a shrine facing it across an open plaza space and an oratory set at a right angle to the hall. The "temple assemblage" contains a temple set at right angles to a colonnaded hall and oratory with a shrine facing it from the central plaza formed by the arrangement. These patterns are repeated numerous times with some variation in the site center, repetition that most likely reflects the presence of so many

competing lineages in the city. The repetition and limited space for new construction in the defined epicenter has left a pattern that at initial glance seems cluttered and cramped. These groups themselves seem to have been intentionally arranged around the central Q-162 radial pyramid. In two cases, Q-161 and Q-163 (Figure 10.59) structures were attached right to the temple or placed immediately adjacent on an attached platform. As is common in Mesoamerica, structures arranged around open plaza space are the dominant pattern both among high status as well as in commoner residential contexts.



**Figure 10.59 – View of colonnaded hall Q-163 from top of Q-162, the site’s main temple.**

As is implied by the repeated use of the term “monumental center” in this volume, there is little question as to whether there was substantial and formal monumental

architecture at the site. Clearly the most massive of these monumental constructions is the central pyramid. This structure has long been considered a smaller copy of the Castillo at Chichén Itzá, one part of the case for the Cocom lineage being related to the site. There are numerous other substantial temples in the site center that would rightly be called monumental. Some smaller colonnaded halls (including the 18O-1 colonnade documented in this study) were probably not fitting Trigger's (1990) definition of monumentality as they were probably not particularly oversized for their utilitarian purpose. However, halls at the large end of the size spectrum such as Q-212 seem to exceed likely functional requirements. The size of these halls seems to serve as a display of status (in this case mainly to other competing elite lineages) and therefore may cross that definitional threshold. Unlike most Mesoamerican centers, Mayapan has a second locus of monumental construction at Itzmal Ch'en. As already discussed, these structures and groups are arranged in a clear formal plan, around open plazas.

While the orientations of structures in the epicenter tend to conform to the cardinal directions, I would not call the arrangement orthogonal. Even when they share orientations, buildings do not line up with each other in any regular way. Beyond the center, there is no evidence for geometric arrangements at all. The location of many structures and groups on natural atillos by and large would prohibit the development of such a pattern even if desired. The same natural features by extension determine to a large degree where pathways and roads can be located. No other geometric arrangements are clear.

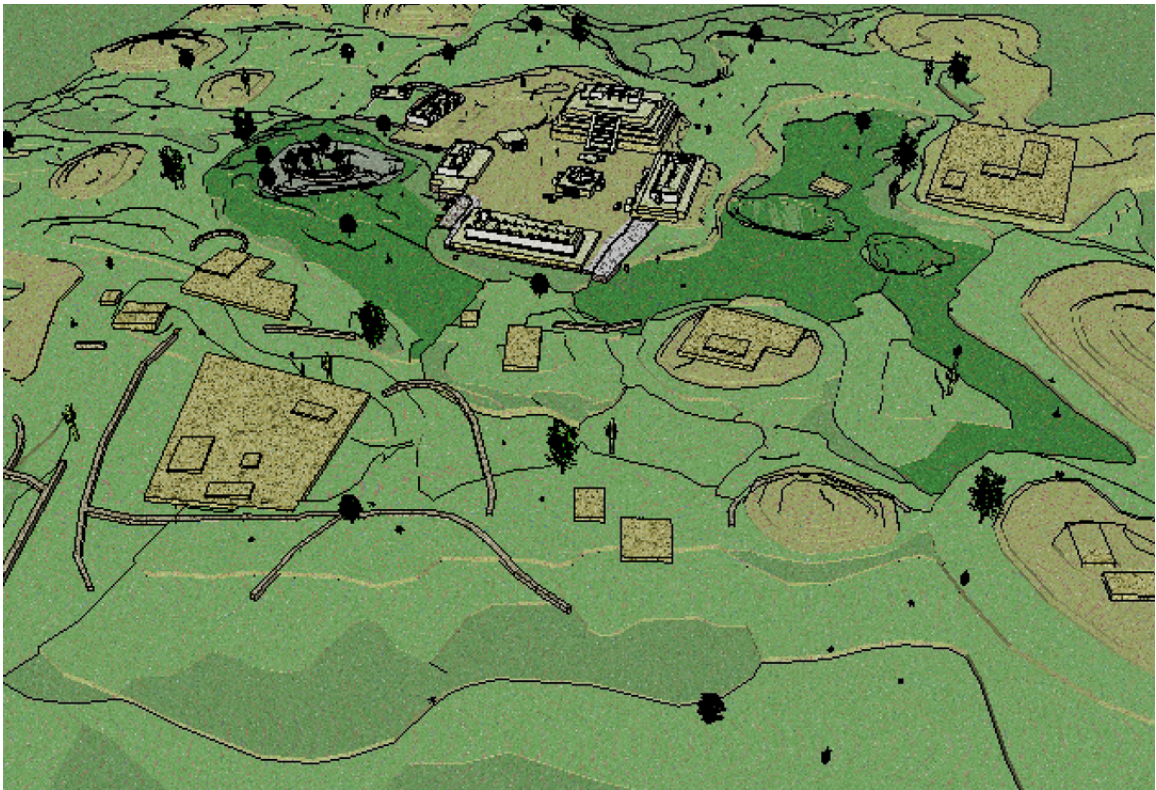
The issue of access is an important one at the site. Clearly the large defensive wall surrounding the city limited access in important ways. I addressed above how this



limit on access may have gone beyond keeping enemies at bay. The newly recorded 18O-1 colonnaded hall appears to have served as control point for access to the city from the area containing its main (thus far identified) agricultural zone. Those entering the city were likely obliged to stop and pay their share of taxes to the state. So, this feature generated revenue for the state by limiting access much the way a toll booth does today. Landa discussed a wall surrounding the epicenter of the site. No traces of the wall exist today. However, reuse of the wall and its stone in the hacienda era is likely. The claim of a wall with two entrances is supported in part by the presence of a portal gate and another apparent colonnaded hall access point located along the east side of the precinct. Residential space is also restricted in access. Inside the city walls where the density is highest, these groups are closely spaced and often share boundary walls. In such a congested setting, formal divisions make a lot of sense. On the periphery, groups were more dispersed, yet the walls continued to be used. Albarrada walls also limited access to other features such as cenotes and sascaberas. Conversely walls at the site can be used to create public access to a cenote as we see with the pattern of albarrada lanes that converge at Cenote Acambalam in Grid Square "I".

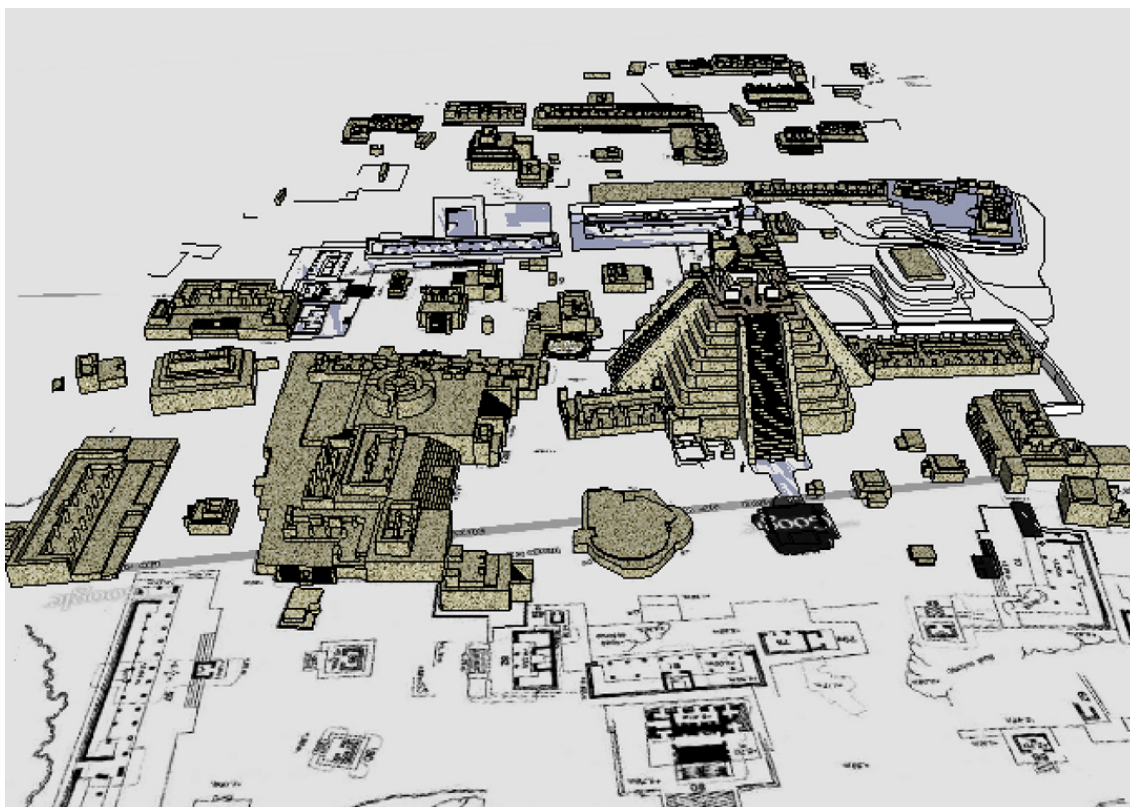
A study of visibility is beyond the limits of this study. However, I am currently constructing 3-D models of significant architecture at the site using Google SketchUp software for future analysis of the issue. Having a desktop version of the monumental center and Itzmal Ch'en groups will greatly facilitate this work. Both models are based on maps produced by Tatiana Proskoriakoff (1957, 1962) which have been georeferenced. The detailed elevations measurements, especially on her map of the center, have made it possible to scale these models very accurately. The topographic data recorded by Jones

(1957) provides the information to reproduce the terrain and fit the architecture appropriately. Figures 10.60-10.61 show the completed Itzmal Ch'en model and the model of the site center in progress. Figures 10.62-10.64 show sample views that can be generated with the method.

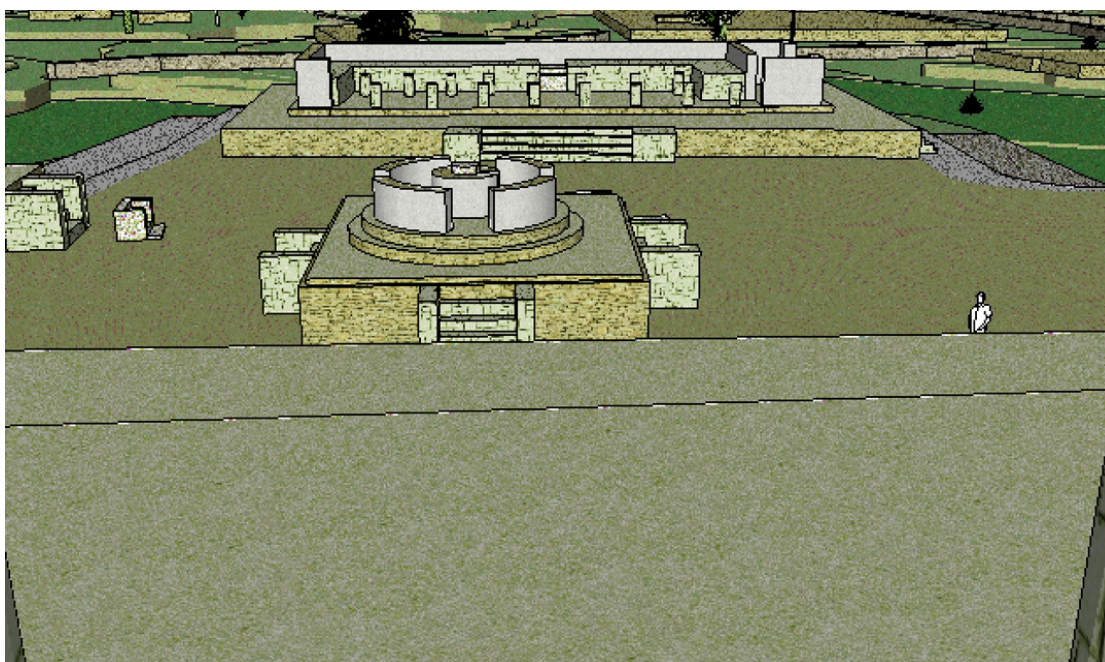


**Figure 10.60 – 3-D model of Itzmal Ch'en group and surrounding area based on Proskouriakoff's (1962) map of the group and the Jones (1957) topographic map of the area inside the city wall.**





**Figure 10.61 – 3-D model of Mayapán’s monumental center based on Proskouriakoff’s (1957) map of the precinct.**

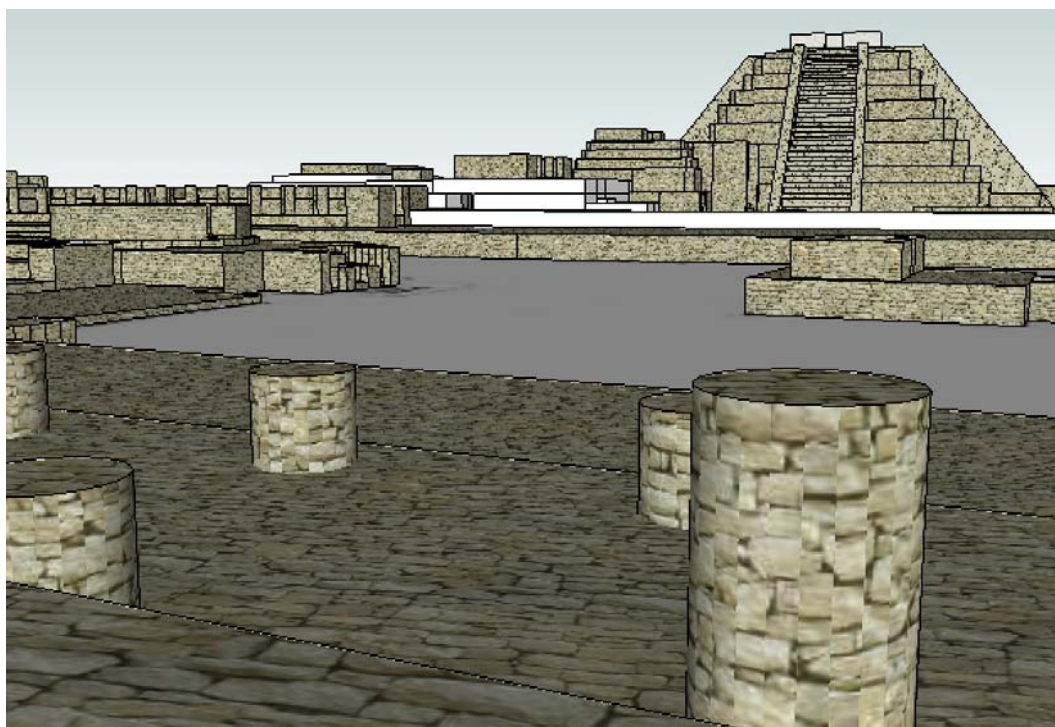


**Figure 10.62 – Sample view of Itzmal Ch'en group from the doorway of the H-17 temple.**





**Figure 10.63 – Sample view of Q-151 colonnaded hall and the Q-152 round temple from the doorway of shrine structure Q-148.**



**Figure 10.64 – Sample view of plaza and Q-162 radial temple from the center of colonnaded hall Q-212.**

## Assessing the Degree of Planning, Urban Form and Meaning of Mayapán

The next major dimension we must examine is M.E. Smith's (2007) notion of *standardization* between architectural assemblages, spatial patterns and the orientation and metrology of related sites. Significant similarities exist in the architectural assemblages at Mayapán and related sites like Chichén Itzá and Uxatlán (Figure 10.65). The replication of the form of key architecture from Chichén Itzá is readily apparent and has been noted from the earliest days of work at the site (Milbrath and Peraza 2003). Both sites share a large, central radial pyramid, multiple serpent temples, colonnaded halls and a round temple/observatory. Other key features such as ball courts are not replicated. The lack of ball courts at Mayapán stands in clear contrast with the vast majority of Mesoamerican sites across both cultures and time. The apparent lack of these features remains puzzling. Carmack detailed at length the similarities and difference between the Quiché capital of Uxatlán and Mayapán (Carmack 1983:380-388). Among the similarities he notes are the presence of a central feathered serpent temple (although the three sided form Uxatlán's Tojil temple is somewhat different) and large colonnaded halls or "big houses" that seem to relate to the number of competing lineages at the center. However, as seen with Chichén Itzá, Uxatlán has ball courts lacking at Mayapán. The arrangement of groups at Uxatlán closely mirrors the arrangement of the basic ceremonial assemblages and temple assemblages. All three sites arrange architecture around plazas and have more planned epicenter with less planned residential zones beyond, a common pattern throughout the culture area (M.E. Smith 2007:27). Both Uxatlán and Mayapán are centered on epicenters arranged around plazas generally oriented roughly to the cardinal

directions, as are their main feathered serpent temples. Chichén Itzá's main temple and plaza are notably shifted off of this orientation. Carmack (1983:382) traces these similarities in both architectural assemblages and spatial patterns to common roots for both the Itza and Quiché who "were part of the major diaspora of hybrid Mexican-Mayan military groups moving out of the Gulf Coast area around the beginning of the thirteenth century." Any similarities in metrology are beyond the data we currently have at hand.



**Figure 10.65 – Map of Utatlán, Guatemala (modified after Carmack 1983: Figure 8.3).**

Meaning in urban layouts was broken down to three levels by (Rapoport 1990): high-level meanings which refer to cosmological and supernatural symbolism represented in the urban form; middle level meanings which refer to explicit messages about identity and status being conveyed by the designers and builders; and low-level meanings which



deal with how the layout effects individual behavior and movement. High level meanings have been attributed to various layouts by numerous scholars chief among them Kevin Lynch (1981) and Paul Wheatly (1971). M.E. Smith criticizes attribution of high-level meanings to layouts on two main grounds. First, he argues that few ancient religious systems are well enough documented to serve as a basis for cosmological models or urban form. Second, that many ancient people expressed belief through symbols that do not match physical reality. Keeping these critiques in mind, I believe that a strong case does exist to attribute the directional placement of certain ritual features around the city. The detailed accounts of rituals observed by Landa (Tozzer 1941) and the close match they have to New Year's rituals depicted in the Postclassic codices provides an unusually detailed picture of at least that element of the belief system. I believe that it can be convincingly argued that the three ritual groups detected in the east, north and west of the site, just beyond the end of residential settlement are directly analogous to dual piles of stone maintained as shrines outside of Yucatecan towns at each of the cardinal directions. Beyond that, I will refrain from trying to apply any such model to the overall distribution of features, wards, etc. around the city.

In terms of middle-level meanings, the site of Mayapán is rich in expressions of both status and group affiliation. Clearly the monumentality of the site center conveys status and the ability to mobilize labor. The same could be said of the massive 9 km wall surrounding the site. The labor required to construct the major would have been massive. I argued previously in this volume that many of the residents of the site were probably forced into slavery or other coerced labor by the site's elites and their Canul enforcers. The presence of local Maya, Itza and Canul mercenaries at the site created a complex and

multi-layered symbol system (Milbrath and Peraza 2003). The size and quality of colonnaded halls varies and is likely an expression of the power of the groups maintaining each. The association of ritual and governmental architecture expresses a clear link to control over ritual and power. The Q-151 colonnaded hall group contains several reused Puuc Chac masks, conveying local Maya ethnic identity of the group operating there, most likely the powerful Xiu lineage (Milbrath and Peraza 2003:33-34; Ringle and Bey 2001:286). Maya identity was also expressed at least in the early years of the site by the erection of carved stela monuments around the Q-84 platform. The association of serpent temples such as Q-159, Q-143 and Q-218 with other hall groups likely expresses Itza ethnicity. Canul group affiliation appears to be well expressed through features such as the mural paintings at the Q-161 colonnade and Aztec style imagery from locations such as temple structure Q-95. The physical link of Q-161 to the central Kukulcan temple implies the close link that we know existed between the ruling Cocombs and their imported muscle. Many other explicit messages of status and group affiliation exist at this diverse and cosmopolitan center. For a full review see Milbrath and Peraza (2003) which details them at length.

Low-level meaning at the site (access and visibility) was dealt with in detail above. In general several patterns are clear; the main city wall restricts access significantly. This serves both the obvious defensive and less obvious administrative functions as taxes can be collected at access points. The site center's administrative/ritual precinct appears to have been controlled access space as well, restricted either through a wall of the sort described by Landa (Tozzer 1941) or at the minimum by movement of people past the portal gate/colonnaded hall group that exists as an apparent control point

just east of the zone. Residential groups had restricted access and boundary walls even in low density locations. The albarrada walls dividing these groups and some apparently specially designed to form pathways facilitated movement through the city. In particular cases, like at the cenotes Acambalam and Yo Dzonot in Grid Square “Z” the pathways converge on and provide access to these key water sources.

### **Summary**

The research presented in this volume represents a significant contribution to our understanding of the city of Mayapán and the Maya Postclassic in general. It contributes new information on demographics at the site which suggest that the city is more than twice the size previously known and had a population of 17,000 residents, up from previous estimates of 12,000. The increase in site size moves Mayapán from the eighth largest Postclassic city to fourth place, a more logical result given the site’s apparent political relationship to the rest of the region. New data on the economic system provides important insight as to how the residents of the site met their basic subsistence needs, showing that economic production from agricultural fields, animal husbandry and lime production were restricted to the periphery of the site. Despite this, the market system at the site allowed producers to move their goods to the central (and peripheral) market areas for distribution. Those goods were apparently taxed through a system of customs checkpoints at restricted access points to the walled portion of the site as exemplified by the 18O-1 colonnaded hall group and likely others known to exist near the central market and monumental center. The 14J-5 market structure in the southern outlier settlement of

D'zan Tun Ch'en suggests that there was a broad regional market system extending beyond the city. New data on lime producers was one of the important finds of the study as the number of identified examples of lime production features remains surprisingly small considering that the use of lime plaster was common throughout Mesoamerica. Archaeological data collected and the results of an experimental study of traditional burnt-lime production (Russell and Dahlin 2007) suggests that these sites may be being largely overlooked as they are likely to be found beyond the residential limits of centers, where access to fuel was good and the smoke would not bother neighbors. They also indicate that the production of lime at the site would have constituted a significant industry employing the labor of (minimally) hundreds of the city's residents.

The results offered here have important implications for the discussion of the level of socio-political complexity represented by the city. Comparisons of Mayapán settlement design to cross-cultural examples of city-state and territorial state patterns suggests that Mayapán's urban form looked much like a typical city state capital but that the regional settlement pattern better fit expectations for a territorial state. I suggested based on archaeological criteria set out by Smith and Montiel (2001) for detecting the archaeological signature of an empire and the known site history, promotion of cults, long distance trade and other documented features that the center is most likely the capital of a hegemonic empire, its urban form largely determined by its early years when it was still in competition with other small polities, and its growth to a significant primate center reflecting its gradual expansion in influence and incorporation of new areas. More research is required to make that case firmly. But, a cursory overview of the topic suggests that it is very likely an accurate assessment.

Data presented here concerning the socio-economic status of residents living outside of the wall support previous conclusions that economic status is not a significant factor in structuring neighborhoods. Divisions along ethnic or lineage lines fit the pattern well, as they do in certain Yoruban cities (Krapf-Askari 1969). Crafts people do not show strong signs of clustering into neighborhoods at the site. Workshops for items such as lithic tools and shell ornaments are dispersed throughout the site. These findings are all consistent with notions that the Postclassic was a period known for mercantilism, long distance trade contacts and relatively open market systems as compared with the preceding Classic Period Maya centers.

Mayapán was clearly a very important force in the Postclassic lowlands. Despite dismissive and condescending interpretations of the period representing a “decadent” post-collapse wasteland of sorts, it appears that re-evaluation of the importance of the site resulting from now a more than a decade of research by INAH and other projects is finally beginning to give this center its due. Rather than some degenerated remnant of Classic Period grandeur, this site appears to have been extremely complex in its political, social, economic and religious systems. What has been interpreted in the past as signs of social decay are better thought of in less loaded terms of changing social forms. We now know that the site was quite impressive in its day. The extensive use of lime plaster to face and decorate buildings has merely resulted in greater decay of the structures than we see in many stone faced Classic Period centers. The modern appearance is simply a result of architectural design choices and does not reflect some broad breakdown of Maya society as once interpreted by the Carnegie project and others. Recent work at the site

has greatly improved the state of preservation of the structures and now allows us to more fully appreciate the site's architectural and artistic aesthetic.

It appears that in many regards Mayapán shares more features with the Aztec capital of Tenochtitlan than it does with Classic Period Maya centers. The possibility that Mayapán was an imperial level capital, certain to be controversial, represents a rather radical revision of our views of the Postclassic or at least the terminology we use to discuss it. Mayapan is frequently discussed in terms of a confederation and military domination of surrounding regions. But, the term empire is not typically applied. This seems an odd oversight. It would do us good to recall that the Aztecs became an empire by forming a voluntary treaty with other members of the Aztec Triple Alliance. This often under-considered and under-appreciated time period displays a new and vibrant fusion of traditional Maya society with that of the newly arrived and intrusive Central Mexican and Gulf Coast immigrants. The result of that fusion produced an interesting new political and economic structure unknown in the lowlands during earlier periods.



## References Cited

- Abrams, Elliot  
1996 Evolution of Plaster Production and the Growth of the Copan Maya State. In *Arqueologico Mesoamericana: Homenaje a William T. Sanders*. INAH, Mexico.
- Abrams, Elliot and Anncorrinne Freter  
1996 Late Classic Lime Plaster Kiln at the Maya Centre of Copan, Honduras. *Antiquity* 70:422-428.
- Adams, R.E.W. and Richard C. Jones  
1981 Spatial Patterns and Regional Growth among Classic Maya Cities. *American Antiquity* 46(2):301-322.
- Alcock, Susan E.  
1991 Urban Survey and the Polis of Phlius. *Hesperia* 60(4):421-463.  
  
2000 Extracting Meaning from Ploughsoil Assemblages: Assessment of the Past, Strategies for the Future. In *Extracting Meaning from Ploughsoil Assemblages*, edited by Riccardo Francovich, pp. 1-4. Oxbow Books, Oxford.
- Alexander, Diana A.  
1983 The Limitations of Traditional Surveying Techniques in a Forested Environment. *Journal of Field Archaeology* 10:177-186.
- Ammerman, Albert J.  
1981 Surveys and Archaeological Research. *Annual Review of Anthropology* 10:63-88.
- Andrews, Anthony P.  
1995 *First Cities*. Smithsonian Institution Press, Washington, DC.
- Andrews, E. Wyllys and Ralph T. Patton  
n.d. A Preliminary Study of the Ruins of Mayapan, Yucatan, Mexico (unpublished report).
- Arnold, Jeanne E. and Anabel Ford  
1980 A Statistical Examination of Settlement Patterns at Tikal, Guatemala. *American Antiquity* 45(4):713-726.
- Ashmore, Wendy  
1989 Construction and Cosmology: Politics and Ideology in Lowland Maya Settlement Patterns. In *Word and Image in Maya Culture: Explorations in Language, Writing and Representation*, edited by William F. Hanks and Don S. Rice. University of Utah Press, Salt Lake City.

- Ashmore, Wendy and Jeremy A. Sabloff  
2002 Spatial Orders in Maya Civic Plans. *Latin American Antiquity* 13(2):201-216.
- Ball, Joseph W. and Richalene G. Kelsay  
1992 Prehistoric Intrasettlement land Use and Residual Soil Phosphate Levels in the Upper Belize Valley. In *Gardens of Prehistory: The Archaeology of Settlement Agriculture in Greater Mesoamerica*, edited by Thomas W. Killion, pp. 234-262. University of Alabama, Tuscaloosa.
- Banning, Edward B.  
2002 *Archaeological Survey*. Kluwer Academic Press, New York.
- Barnhart, Edwin L.  
2001 *The Palenque Mapping Project: Settlement and Urbanism at an Ancient Maya City*. Doctoral Dissertation, University of Texas at Austin.
- Barrera Rubio, Alfredo  
1998 Informe de los Recorridos de Superficie Realizados entre el 28 de Enero y el 20 de Marzo en Los Ejidos Telchaquillo y Xcanchacan, Mpio. Techo, Con el Objeto de Ubicar, Registrar y Delimitar Sitios Arqueológicos Dentro de sus Terrenos, como Parte de la Participación del INAH Ante el Procede en el Estado de Yucatán. Centro INAH de Yucatán, Merida, Mexico.
- Bar-Yosef, Ofer  
1986 The Walls of Jericho: An Alternative Interpretation. *Current Anthropology* 27:157-162.
- Ben-Dor, Eyal, Juval Portugali, Moshe Kochavi, Michal Shomoni and Lipaz Vinitzky  
1999 Airborne Thermal Video Radiometry and Excavation Planning at Tel Leviah, Golan Heights, Israel. *Journal of Field Archaeology* 26(2):117-127.
- Berdan, Francis F., Richard E. Blanton, Elizabeth H. Boone, Mary G. Hodge, Michael E. Smith and Emily Umberger  
1996 *Aztec Imperial Strategies*. Dumbarton Oaks, Washington, DC.
- Binford, Lewis R.  
1964 A Consideration of Archaeological Field Design. *American Antiquity* 29:425-441.
- Bintliff, John L and Kostas Sbonias (Editors)  
1999 *Reconstructing Past Population Trends in Mediterranean Europe (3000 BC - AD 1800)*. The Archaeology of Mediterranean Landscapes Vol. 1. Oxbow Books, Oxford.

- Bintliff, John L. and Anthony Snodgrass  
1988 Mediterranean Survey and the City. *Antiquity* 62:57-71.
- Blanton, Richard E.  
1976 Anthropological Studies of Cities. *Annual Review of Anthropology* 5:249-264.  
  
1978 Monte Alban: Settlement Patterns in the Ancient Zapotec Capital. Academic Press, New York.  
  
1981 The Rise of Cities. In *Archaeology*, edited by Jeremy A. Sabloff, pp. 392-400. *Handbook of Middle American Indians, Supplement. vol. 1.* University of Texas Press, Austin.  
  
1982 Urban Beginnings: A View from Anthropological Archaeology. *Journal of Urban History* 8:427-446.  
  
1994 Houses and Households : A Comparative Study. Interdisciplinary contributions to archaeology. Plenum Press, New York.  
  
1996 A consideration of causality in the growth of empire: A comparative analysis. In *Aztec Imperial Strategies*, edited by Francis F. Berdan, Richard E. Blanton, Elizabeth H. Boone, Mary G. Hodge, Michael E. Smith and Emily Umberger, pp. 219-225. *Dumbarton Oaks*, Washington, DC.
- Blanton, Richard E., Stephen A. Kowaleski, Gary M. Feinman and Laura M. Finsten  
1993 Ancient Mesoamerica: A Comparison of Change in Three Regions. 2 ed. Cambridge University Press, New York.
- Braidwood, Robert J., Halet Cambel and Wulf Schirmer  
1981 Beginnings of Village-Farming Communities in Southeastern Turkey: Cayönü Tepesi. *Journal of Field Archaeology* 8:249-258.
- Brown, Clifford T.  
1999 Mayapán Society and Ancient Maya Social Organization. Ph. D. dissertation, Department of Anthropology. Tulane University, New Orleans.
- Brueggemann, Robert  
2001 Urban Sprawl. In *International Encyclopedia of the Social and Behavioral Sciences*, edited by Neil J. Smelser and Paul B. Baltes, pp. 16087-16092. Pergamon, Oxford.
- Bullard, William R., Jr.  
1952 Residential Property Walls at Mayapán. In *Current Reports*, pp. 234-253. vol. No. 3. Carnegie Institution of Washington, Department of Anthropology, Washington DC.

Burgess, Ernest W.

1925 The Growth of the City: An introduction to a research project. In *The City*, edited by Robert E. Park, Ernest W. Burgess and Roderick D Mackenzie. University of Chicago Press, Chicago.

Cabrera Castro, Rubén, Ignacio Rodríguez García and Noel Morelos García

1982 Memoria del Proyecto Teotihuacan 80-82. Colección Científica 132. Instituto Nacional de Anthropología e Historia, Mexico City.

Carmack, Robert M.

1981 The Quiché Mayas of Utlán : The Evolution of a Highland Guatemala Kingdom. 1st ed. University of Oklahoma Press, Norman.

Carr, R.F. and J.E. Hazard

1961 Map of the Ruins of Tikal, El Petén, Guatemala. Tikal Reports, Museum Monographs 11. The University of Pennsylvania Museum, Philadelphia.

Carter, A.

1978 Sampling in a Medieval Town: The Study of Norwich. In *Sampling in Contemporary British Archaeology*, edited by John F. Cherry, Clive Gamble and Stephen Shennan, pp. 263-277. BAR British Series. vol. 50. British Archaeological Reports, Oxford.

Carter, Harold

1976 The Study of Urban Geography. 2d ed. Wiley, New York.

1983 An Introduction to Urban Historical Geography. E. Arnold, London ; Baltimore, Md.

Cascio, Lisa M.

1991 Politics and Settlement: A Survey in the Copán Valley, Honduras. Doctoral Dissertation, Northern Illinois University.

Chang, Kwang-Chih (editor)

1986 Studies of Shang Archaeology : Selected Papers from the International Conference on Shang Civilization. Yale University Press, New Haven.

1976 Towns and Cities in Ancient China. In *Ancient Chinese Civilization: Anthropological Perspectives*, edited by Kwang-Chih Chang, pp. 61-71. Harvard University Press, Cambridge.

Chang, Sen-Dou

1977 The Morphology of Walled Capitals. In *The City in Late Imperial China*, edited by G. William Skinner, pp. 75-100. Stanford University Press, Stanford.

- Charlton, Thomas H., Deborah L. Nichols and Cynthia L. Otis Charlton  
2000 The Otumba Project: A Review and Status Report. In *The Teotihuacan Valley Project, Final Report, Vol. 5: The Aztec Occupation of the Valley. Part 2: Excavations at T. A. 40 and Related Projects*, edited by William T. Sanders and Susan T. Evans, pp. 841-887. *Occasional Papers in Anthropology*. vol. 26. Department of Anthropology, Pennsylvania State University, University Park.
- Chase, Diane Z., Airlen F. Chase and William A. Haviland  
1990 The Classic Maya City: Reconsidering the "Mesoamerican Urban Tradition". *American Anthropologist* 92(2):499-506.
- Christaller, Walter  
1966 *Central Places in Southern Germany*. Translated by Carlisle W. Baskin. Prentice-Hall, Englewood Cliffs, N.J.
- Ciudad Ruiz, Andres, Iglesias Ponce De Leon and Maria Del Carmen M. Josefa Martinez Martinez  
2001 *Reconstruyendo la Ciudad Maya : El urbanismo en las Sociedades Antiguas*. Sociedad Española de Estudios Mayas, Madrid.
- Connah, Graham  
2000 *African City Walls: A Neglected Source?* In *Africa's Urban Past*, edited by David M. Anderson and Richard Rathbone, pp. 36-51. Heinemann, Portsmouth, N.H.  
  
2001 *Contained Communities in Tropical Africa*. In *City Walls: The Urban Enceinte in Global Perspective*, edited by James D. Tracy, pp. 19-45. Cambridge University Press, New York.
- Conyers, Lawrence B. and Dean Goodman  
1984 *Ground-Penetrating Radar: An Introduction for Archaeologists*. Altamira, Walnut Creek, CA.
- Cottier, John W.  
1982 *Dizbilchaltun Survey: Consideration of the Test-Pitting Data*, University of Missouri, Department of Anthropology.
- Cowgill, George  
1983 *Rulership and the Ciudadela: Political Inferences from Teotihuacan, Architecture*. In *Civilization in the Ancient Americas : Essays in Honor of Gordon R. Willey*, edited by Richard M. Leventhal and Alan L. Kolata, pp. 313-343.
- Cowgill, George L.  
1997 *State and Society at Teotihuacan, Mexico*. *Annual Review of Anthropology* 26:129-161.

- 2003 Teotihuacan: Cosmic Glories and Mundane Needs. In *The Social Construction of Cities*, edited by Monica L. Smith, pp. 37-55. Smithsonian Books, Washington, D.C.
- 2004 Origins and Development of Urbanism: Archaeological Perspectives. *Annual Review of Anthropology* (33):525-549.
- Cowgill, George L., Jeffrey H. Altschul and Rebecca S. Sload  
 1984 Spatial Analysis at Teotihuacan, A Mesoamerican Metropolis. In *Intrasite Spatial Analysis in Archaeology*, edited by Harlod J. Heitala, pp. 154-195. Cambridge University Press, New York.
- Cox, Chris  
 1992 Satellite Imagery, Aerial Photography and Wetland Archaeology: An Interim Report on an Application of Remote Sensing to Wetland Archaeology: The Pilot Study in Cumbria, England. *World Archaeology* 24(2):249-267.
- Culbert, Patrick T. and Don S. Rice (editors)  
 1990 Precolumbian Population History in the Maya Lowlands. University of New Mexico Press, Albuquerque.
- Custer, Jay F., Timothy Eveleigh, Vytautas Klemas and Ian Wells  
 1986 Application of LANDSAT Data and Synoptic Remote Sensing to Predictive Models for Prehistoric Archaeological Sites: An Example from the Delaware Coastal Plain. *American Antiquity* 51(3):572-588.
- Davis, Jack L., Susan E. Alcock, John Bennet, Yannis G. Lolos and Cynthia W. Shelmerdine  
 1997 The Pylos Regional Archaeological Project Part I: Overview and the Archaeological Survey. *Hesperia* 66(3):391-494.
- De La Croix, Horst  
 1972 Military Considerations in City Planning. Braziller, New York.
- Deagan, Kathleen A. (editor)  
 1995 Puerto Real : the archaeology of a sixteenth-century Spanish town in Hispaniola. University Press of Florida, Gainesville.
- Deagan, Kathleen A. and José María Cruxent  
 2002 Columbus's Outpost Among the Taínos : Spain and America at La Isabela, 1493-1498. Yale University Press, New Haven, Conn.
- Drennan, Robert D.  
 1996 Statistics for Archaeologists: A Commonsense Approach. Plenum, New York.



- Duffy, Christopher  
1997 *Siege Warfare : Fortress in the Early Modern World 1494-1660*.  
Routledge, New York.
- Dunning, Nicholas P.  
1992 *Lords of the Hills: Ancient Maya Settlement in the Puuc Region, Yucatán, Mexico*. Monographs in World Archaeology, No. 15. Prehistory Press, Madison.
- Eliade, Mircea  
1959 *The Sacred and the Profane*. Harcourt Brace, New York.
- Ettlinger, Nancy  
1983 *the Excavations at Southern Kokeal*. In *Pulltrouser Swamp*, edited by P.D. Harrison and B.L. Turner. University of Texas Press, Austin.
- Fash, William L.  
1986 *History and Characteristics of Settlement in the Copan Valley, and Some Comparisons with Quiriguá*. In *The Southeast Maya Periphery*, edited by Patricia A. Urban and Edward M. Shortman, pp. 72-93. University of Texas Press, Austin.
- Fauvet-Berthelot, Marie-France  
1980 *Taille de L'Obsidienne et fabrication de la Chaux: Deux Exemples d'Activite Specialisee a Cauinal*. In *Cahiers de la R.C. p. 500 2 Rabinal et la Vallee Moyenne de Roi Chixoy, Baja Verapaz - Guatemala*. Centre National de la Recherche Scientifique. Institute d'Ethnologie, Paris.
- Fei, Hsiao-Tung  
1953 *China's Gentry: Essays in Rural-Urban Relations*. University of Chicago Press, Chicago.
- Feinman, Gary M. and Linda M. Nicholas  
2000 *Intensive Survey of Three Hilltop Terraced Sites in Oaxaca, Mexico*. *Antiquity* 74(283):21-22.
- Finsten, Laura  
1995 *Jalieza, Oaxaca: Activity Specialization at a Hilltop Center*. Vanderbilt University Publications in Anthropology 48. Department of Anthropology, Vanderbilt University, Nashville.
- Flannery, Kent V.  
1998 *The Ground Plans of Archaic States*. In *Archaic States*, edited by Gary M. Feinman and Joyce Marcus, pp. 15-58. School of American Research Press, Santa Fe.

- Folan, William J., Ellen R. Kintz and Laraine A. Fletcher  
1983 *Coba: A Classic Maya Metropolis*. Academic Press, New York.
- Folan, William J., Ellen R. Kintz, Laraine A. Fletcher and Burma H. Hyde  
1982 An Examination of Settlement Patterns at Coba, Quintana Roo, Mexico and Tikal, Guatemala: A Reply to Arnold and Ford. *American Antiquity* 47(2):430-436.
- Ford, Anabel and Jeanne Arnold  
1982 A Reexamination of Labor Investments at Tikal: Reply to Haviland, and Folan, Kintz, Fletcher and Hyde. *American Antiquity* 47(2):436-440.
- Fox, John W.  
1978 *Quiche Conquest : Cetratism and Regionalism in Highland Guatemalan State Development*. 1st ed. University of New Mexico Press, Albuquerque,.  
  
1994 Political Cosmology Among the Quiche Maya. In *Factional Competition and Political Development in the New World*, edited by Elizabeth Brumfiel and John W. Fox, pp. 158-170. Cambridge University Press, Cambridge.
- Fox, Richard G.  
1977 *Urban Anthropology: Cities in their Cultural Settings*. Prentice-Hall, Englewood Cliffs.
- Francovich, Riccardo, Helen Patterson and Graeme Barker (Editors)  
2000 *Extracting Meaning from Ploughshare Assemblages. The Archaeology of Mediterranean Landscapes Vol. 5*. Oxbow Books, Oxford.
- Freidel, David A. and Richard M. Leventhal  
1975 Settlement Survey. In *A Study of Changing Pre-Columbian Commercial Systems: the 1972-1973 Seasons at Cozumel*, edited by Jeremy A. Sabloff and William L. Rathje, pp. 60-76. Harvard University, Peabody Museum of Anthropology and Ethnology, Cambridge, MA.
- Freidel, David A. and Jeremy A. Sabloff  
1984 *Cozumel: Late Maya Settlement Patterns*. Academic Press, Orlando.  
  
1984 *Cozumél: Late Classic Settlement Patterns*. Academic Press, Orlando.
- Friedel, David A.  
1981 The political economics of residential dispersion among the lowland Maya. In *Lowland Maya Settlement Patterns*, edited by Wendy Ashmore, pp. 371-382. University of New Mexico Press, Albuquerque.

- Garner, B. J.  
1967 Models of urban geography and settlement location. In *Models in Geography*, edited by R. Haggett and Chorley. Methuen, London.
- Geertz, Clifford  
1980 *Negara: The Theater State in Nineteenth Century Bali*. Princeton University Press, Princeton.
- Gillings, Mark, David Mattingly and Jan Van Dalen (Editors)  
1999 *Geographical Information Systems and Landscape Archaeology. The Archaeology of Mediterranean Landscapes Vol. 3*. Oxbow Books, Oxford.
- Grove, David C. and Ann Cyphers Guillén  
1987 The Excavations. In *Ancient Chalcatzingo*, edited by David Grove, pp. 21-62. University of Texas Press, Austin.
- Hardoy, Jorge  
1968 *Urban Planning in Pre-Columbian America*. Braziller, New York.
- Hare, Timothy S. and Marilyn A. Masson  
2008 Intermediate-Scale Patterns in the Urban Environment of Postclassic Mayapán. Paper presented at the 73rd Annual Meeting of the Society for American Archaeology, Vancouver, BC.
- Hare, Timothy S., Marilyn A. Masson and Carlos Peraza Lope  
2006 The Spatial and Social Organization of Mayapán. Paper presented at the 71st Annual Meeting of the Society for American Archaeology, San Juan, Puerto Rico.
- Haviland, William A.  
1970 Tikal, Guatemala and Mesoamerican Urbanism. *World Archaeology* 2(2):186-198.
- Hendon, Julia A.  
1992 Interpretation of Survey Data: two case studies from the Maya area. *Latin American Antiquity* 3(1):22-42.
- Herbert, David T. and Colin J. Thomas  
1982 *Urban Geography : a First Approach*. Wiley, Chichester ; New York.
- Hernandez, Martinez  
1929 *Diccionario de Motul: atribuido a Fray Antinio de Ciudad Real*. Compania Tipographica Yucateca, Merida.

- Higham, Charles  
2002 The Civilization of Angkor. University of California Press, Berkeley and Los Angeles.
- Hirth, Kenneth  
1984 Xochicalco: urban growth and state formation in Central Mexico. *Science* 255:579-587.
- Hirth, Kenneth G.  
1980 Eastern Morelos and Teotihuacan: A Settlement Survey. Vanderbilt University Publications in Anthropology no. 25. Vanderbilt University, Nashville.
- Hirth, Kenneth G.  
1995 Urbanism, Militarism, and Architectural Design: An Analysis of Epiclassic Sociopolitical Structure at Xochicalco. *Ancient Mesoamerica* 6:237-250.  
  
2000 Archaeological Research at Xochicalco: 1. Ancient Urbanism at Xochicalco: The Evolution and Organization of a Pre-Hispanic Society. University of Utah Press, Salt Lake City.  
  
2000a Archaeological Research at Xochicalco: 2. The Xochicalco Mapping Project. University of Utah Press, Salt Lake City.
- Hodge, Mary G.  
1984 Aztec City States. University of Michigan, Museum of Anthropology, Memoirs no. 18, Ann Arbor.
- Hodge, Mary G. and Michael E. Smith (editors)  
1994 Economies and Politics in the Aztec Realm. Institute for Mesoamerican Studies, Albany.
- Hope-Simon, Richard  
1984 The Analysis of Data from Surface Survey. *Journal of Field Archaeology* 11:115-117.
- Hoyt, Homer  
1933 One Hundred Years of Land Values in Chicago; The relationship of the growth of Chicago to the rise in its land values. The University of Chicago press, Chicago, Ill.,.  
  
1939 The Structure and Growth of Residential Neighborhoods in American Cities. The Federal Housing Administration, Washington, DC.

- Hsi-Chang, Yang  
1986 The Shang Dynasy Cemetery System. In *Studies of Shang Archaeology*, edited by K.C. Chang, pp. 49-64. Yale University, Cambridge.
- Hutson, Scott R. and Richard E. Terry  
2006 Recovering Social and Cultural Dynamics from Plaster Floors: Chemiocal Analyses at Ancient Chunchucmil, Yucatan, Mexico. *Journal of Archaeological Science* 33:391-404.
- Insoll, Timothy  
2004 *Archaeology, Ritual, Religion*. Routledge, New York.
- Isendahl, Christian  
2002 *Common Knowledge: Lowland Maya Urban Farming at Xuch*. University of Uppsala, Department of Archaeology and Ancient History.
- Johnson, Allen W. and Timothy K. Earle  
1987 *The Evolution of Human Societies: From Foraging Group to Agrarian State*. Stanford University Press, Stanford.
- Jones, Morris R.  
1957 *Topographic Map of the Ruins of Mayapan, Yucatan, Mexico*. Carnegie Institution of Washington, Department of Archaeology, Washington.
- Judge, James W.  
1981 *Transect Sampling in Chaco Canyon - Evaluation of a Survey Technique*. In *Archaeological Surveys of Chaco Canyon*, edited by A.C. Hays and D.M. Brugge. Interagency Archaeological Services, Department of the Interior, Washington D.C.
- Keay, Simon, John Creighton and David Jordan  
1991 *Sampling Ancient Towns*. *Oxford Journal of Archaeology* 10:371-383.
- Keay, Simon, John Creighton and José Remesal Rodriguez  
2000 *Celti (Peñaflor): The Archaeology of a Hispano-Roman Town in Baetica. Survey and Excavations 1987-1992*. Oxbow Books, Oxford.
- Keeley, Lawrence H., Marisa Fontana and Russell Quick  
2007 *Baffles and Bastions: The Universal Features of Fortifications*. *Journal of Archaeological Research* (15):55-95.
- Keith, Kathryn  
2003 *The Spatial Patterns of Everyday Life*. In *The Social Construction of Ancient Cities*, edited by Monica L. Smith, pp. 56-80. Smithsonian Institution Press, Washington, DC.

- Kemp, Barry J.  
1991 Ancient Egypt: Anatomy of a Civilization. Rutledge, New York.
- Kenoyer, Jonathan M.  
1992 Harappan Craft Specialization and the Question of Urban Segregation and Stratification. *Eastern Anthropologist* (45):39-54.  
  
1998 Ancient Cities of the Indus Valley Civilization. Oxford University Press, Karachi and New York.
- Kent, Susan  
1990 A cross-cultural study of segmentation, architecture, and the use of space. In *Domestic Architecture and the Use of Space: An Interdisciplinary, Cross-Cultural Study*, edited by Susan Kent, pp. 127-157. Cambridge University Press, Cambridge.
- Killion, Thomas W., Jeremy A. Sabloff, Gair Tourtellot and Nicholas P. Dunning  
1989 Intensive Surface Collection of Residential Clusters at Terminal Classic Sayil, Yucatan, Mexico. *Journal of Field Archaeology* 16:273-294.
- Kintigh, Keith W.  
1988 The Effectiveness of Subsurface Testing: A Simulation Approach. *American Antiquity* 53:686-707.
- Kolb, Michael J. and James E. Sneed  
1997 It's a Small World After All: Comparative Analyses of Community Organization in Archaeology. *American Antiquity* 62(4):609-628.
- Kostof, Spiro  
1985 A History of Architecture : Settings and Rituals. Oxford University Press, New York.  
  
1991 The City Shaped : Urban Patterns and Meanings Through History. Little Brown, Boston.  
  
1992 The City Assembled : The Elements of Urban Form Through History. 1st North American ed. Little Brown, Boston.
- Kostof, Spiro and Greg Castillo  
1995 A History of Architecture : Settings and Rituals. 2nd ed. Oxford University Press, New York.
- Kowalewski, Stephen A.  
1990 The Evolution of Complexity in the Vallay of Oaxaca. *Annual Review of Anthropology* 19:39-58.



- 1997 A Spatial Method for Integrating Data of Different Types. *Journal of Archaeological Theory and Method* 4(3):287-306.
- Krapf-Askari, Eva  
1969 Yoruba Towns and Cities: An Enquirey into the Nature of Urban Social Phenomena. Oxford University Press, London.
- Krohn-Hansen, Christian  
2001 A tomb for Columbus in Santo Domingo. Political cosmology, population and racial frontiers. *Social Anthropology* Vol. 9(02):165-192.
- Kurjack, Edward B.  
1974 Prehistoric Lowland Maya Community and Social Organization: A Case Study at Dizbilchaltun, Yucatan. Middle American Research Institute Publication 38. Tulane University, New Orleans.  
  
1978 Introduction to the Map of the Ruins of Dzibilchaltun, Yucatan,. Mexico. Middle American Research Institute, Publication 47. Tulane University, New Orleans.
- Kurjack, Edward .B. and Silva T. Garza  
1981 Pre-Columbian Community Form and Distribution in the Northern Maya Area. In *Lowland Maya Settlement Patterns*, edited by Wendy Ashmore. University of New Mexico Press, Albuquerque.
- Kurjack, Edward B. and E. Wyllys Andrews V  
1976 Early Boundary Maintainance in Northwest Yucatan. *American Antiquity* 41(3):318-325.
- Kvamme, Kenneth L.  
2001 Current Practices in Archaeophysics: Magnetism, Resistivity, Conductivity, and Ground-Penetrating Radar. In *Earth Sciences and Archaeology*, edited by Paul Goldberg, Vance T. Holliday and C. Reid Ferring, pp. 353-384. Kluwer, New York.
- Landa, Friar Diego De  
1941 Landa's *Relacion de las cosas de Yucatan*. Translated by Alfred Tozzer. *Papers of the Peabody Museum of Archaeology and Ethnology* 18. Harvard University Press, Cambridge.
- Leeds, Anthony  
1980 Towns and villages in society: Hierarchies of order and cause. In *Cities in a Larger Context*, edited by T. Collins, pp. 6-33. University of Georgia Press, Athens.

- Lees, Andrew  
1985 *Cities perceived : urban society in European and American thought, 1820-1940*. Manchester University Press, Manchester.
- Lewarch, Dennis E. and Michael O'brien  
1981 The Expanding Role of Surface Assemblages in Archaeological Reserch. *Advances in Archaeological Method and Theory* 4:297-342.
- Lightfoot, Kent G.  
1986 Regional Surveys in the Eastern United States: The Strengths and Weaknesses of Implementing Subsurface Testing Programs. *American Antiquity* 51(3):484-504.  
  
1989 A Defense of Shovel Test Sampling: A Reply to Shott. *American Antiquity* 54(2):413-416.
- Lovis, William A.  
1976 Quarter Sections and Forests: An Example of Probability Sampling in the Northeastern Woodlands. *American Antiquity* 41:364-372.
- Lynch, Kevin  
1981 *A Theory of Good City Form*. MIT Press, Cambridge.
- Mackinnon, Jefferson J. and Emily M. May  
1990 Small Scale Lime Making in Belize: Ancient and Modern. *Ancient Mesoamerica* 1(2):197-203.
- Mannikka, Eleanor  
1996 *Angkor Wat: Time, Space, and Kingship*. University of Hawaii Press, Honolulu.
- Manzanilla, Linda, Luis Barba, René Chávez, Andrés Tejero, Gerardo Cifuentes and Nayeli Peralta  
1994 Caves and Geophysics: An Approximation to the Underworld of Teotihuacan. *Archaeometry* 36(1):141-157.
- Marcus, Joyce  
1983 On the Nature of the Mesoamerican City. In *Prehisoric Settlement Patterns: Esaays in honor of Gordon R. Willey*, edited by Evon Z. Vogt and Richard M. Leventhal, pp. 195-242. University of New Mexico Press, Albuquerque.  
  
2003 Monumentality in Archaic States: Lessons Learned from Large Scale Excavations of the Past. In *Theory and Practice in Mediterranean Archaeology: Old World and New World Prespectives*, edited by John K. Papadopoulos and Richard M. Leventhal. Cotsen Institute, UCLA, Los Angeles.

Masson, Marilyn A.

2000 In the Realm of Nachan Kan. University Press of Colorado, Boulder.

in press Kukulcan's Realm: The Postclassic City of Mayapán. University Press of Colorado, Boulder.

Masson, Marilyn A., Timothy S. Hare and Carlos Peraza Lope

2003 Postclassic Maya Society Regenerated at Mayapán. Paper presented at the 68th Annual Meetings of the Society for American Archaeology, Salt Lake City.

2006 Postclassic Maya Society Regenerated at Mayapán. In *After Collapse: The Regeneration of Complex Societies*, edited by Glenn M. Schwartz and John J. Nichols, pp. 188-207, Tucson, AZ.

Masson, Marilyn A. and Carlos Peraza Lope

2001 Proyecto Los fundamentos del Poder Económico de Mayapan, Temporada Verano 2001. Informe para el Consejo Nacional de Arqueología. UALBANY - SUNY and Centro INAH - Yucatán, On file at the Consejo Nacional, México, D.F. and Department of Anthropology, UALBANY - SUNY, Albany, NY.

2002 Proyecto Los fundamentos del Poder Económico de Mayapan, Temporada 2002. Informe para el Consejo Nacional de Arqueología. UALBANY - SUNY and Centro INAH - Yucatán, On file at the Consejo Nacional, México, D.F. and Department of Anthropology, UALBANY - SUNY, Albany, NY.

2003 Proyecto Los fundamentos del Poder Económico de Mayapan, Temporada Verano 2003. Informe para el Consejo Nacional de Arqueología. UAlbany - SUNY and Centro INAH - Yucatán, On file at the Consejo Nacional, México, D.F. and Department of Anthropology, Ualbany - SUNY, Albany, NY.

2004 A New Look at Household and Administrative Facilities at the Postclassic Maya City of Mayapán. Paper presented at the 69th Annual Meetings of the Society for American Archaeology, Montreal, Canada.

Masson, Marilyn A. and Carlos Peraza Lope

2004 Commoners in Postclassic Maya Society. In *Ancient Maya Commoners*, edited by Jon Lohse and Fred Valdez, pp. 197-224. University of Texas Press, Austin.

2004 Spatial Patterns of Effigy Use at Mayapán. Paper presented at the American Anthropological Meetings, Atlanta.

2005 Nuevas Investigaciones en Tres Uidades Residenciales Fuera del Area Monumental de Mayapán. In *Investigadores de La Cultura Maya, Tomo II*, pp. 411-424. Universidad Autónoma de Campeche, Campeche Mexico.

2006 Figurines and Social Diversity at Mayapán. Paper presented at the International Congress of Americanistas, Sevilla, Spain, July 20.

2007 Craft Specialization at Mayapán. Paper presented at the 72nd Annual Meetings of the Society for American Archaeology, Austin, TX.

In Press Evidence for Maya-Mexican Interaction in the Archaeological Record of Mayapán. In *Astronomers, Scribes and Priests: Intellectual Exchange Between the Northern Maya Lowlands and Highland Mexico in the Late Postclassic Period*, edited by Gabrielle Vail and Christine Hernandez. Dumbarton Oaks, Washington DC. (Presented at the Dumbarton Oaks Conference, October 2006).

In Press Animal Use at Mayapán. In Theme issue from Conference on Archaeozoology, Mexico City, *Journal Quaternary International*.

n.d. Urban Life at Mayapán Monograph Report in preparation for Consejo de Arqueología, INAH, Mexico City. To be Submitted to the University of Pittsburgh Press.

Masson, Marilyn A., Carlos Peraza Lope and Timothy S. Hare

2006 The Political Economy of Mayapán. Paper presented at the 71st Annual Meetings of the Society for American Archaeology, San Juan, Puerto Rico.

Masson, Marilyn A., Carlos Peraza Lope and Timothy S. Hare

In Press A Postclassic Maya Economic Heterogeneity at Mayapán. In *El Urbanismo en Mesoamerica/Urbanism in Mesoamerica*, Volume 3, edited by William T. Sanders and Robert H. Cobean. INAH/Penn State University, University Park, PA. (Presented at the Penn Urbanism Conference).

Mattingly, David J.

1992 The Field Survey: Strategy, Methodology, and Preliminary Results. In *Leptiminus (Lamta): A Roman Port City in Tunisia*, edited by David J. Mattingly and Nejib Ben Lazreg, pp. 89-114. vol. 4. *Journal of Roman Archaeology*, Supplement.

Mattingly, David J.

2000 Methods of Collection, Recording and Quantification. In *Extracting Meaning from Ploughsoil Assemblages*, edited by Riccardo Francovich, pp. 5-15. Oxbow Books, Oxford.

Mazar, Amihai

1995 The Fortification of Cities in the Ancient Near East. In *Civilizations of the Ancient Near East*, edited by Jack M Sasson, John Baines, Gary M. Beckman and Karen Sydney Robinson, pp. 1523-1538. vol. 3. Scribners, New York.

- Mcguire, Randall H.  
1983 Breaking down cultural complexity: Inequality and heterogeneity. *Advances in Archaeological Method and Theory* 6:91-142.
- Milbrath, Susan  
2005 Last Great Capital of The Maya. *Archaeology* March/April:27-29.
- Milbrath, Susan, James Aimers, Carlos Peraza Lope and Lynda Florey Folan  
2007 Effigy Censers of the Chen Mul Ceramic System and their Implications for Late Postclassic Maya Interregional Interaction (unpublished manuscript).
- Milbrath, Susan and Carlos Peraza Lope  
2003 Revisiting Mayapán: Mexico's Last Maya Capital. *Ancient Mesoamerica* (14):1-46.
- Millon, Rene  
1981 Teotihuacan: City, State, and Civilization. In *Archaeology*, edited by Jeremy Sabloff, pp. 198-243. *Handbook of Middle American Indians, Supplement. vol. 1.* University of Texas Press, Austin.
- Millon, René  
1992 Teotihuacan Studies: From 1950 to 1990 and Beyond. In *Art, Ideology and the City of Teotihuacan*, edited by Janet C. Berlo. Dumbarton Oaks, Washington, DC.
- Millon, René F.  
1974 Study of Urbanism at Teotihuacan, Mexico. In *Mesoamerican Archaeology: New Approaches*, edited by Norman Hammond. University of Texas Press, Austin.
- Millon, René F.  
1981 Teotihuacan: City, State, and Civilization. In *Handbook of Middle American Indians*, edited by Jeremy Sabloff, pp. 198-243. University of Texas Press, Austin.
- Milner, George R.  
2001 Palisaded Settlements in Prehistoric Eastern North America. In *City Walls: The Urban Enceinte in Global Perspective*, edited by James D. Tracy, pp. 46-70. Cambridge University Press, New York.
- Moore, Jerry D.  
1996 Architecture and Power in the Ancient Andes: The Archaeology of Public Buildings. Cambridge University Press, New York.

- Morris, A. E. J.  
1994 History of Urban Form : Before the Industrial Revolutions. 3rd ed.  
Longman Scientific & Technical : Wiley, Harlow, Essex, England, New York.
- Morris, Craig  
1975 Sampling in the Excavation of Urban Sites: The Case of Huanuco Pampa.  
In Sampling in Archaeology, edited by James W. Mueller, pp. 192-208.  
University of Arizona Press, Tucson.
- Morris, Earl H., Jean Charlot and Ann Axtell Morris  
1931 The Temple of the Warriors. Publication 406. Carnegie Institution,  
Washington.
- Mumford, Lewis  
1938 The Culture of Cities. Harcourt Brace and company, New York,.  
  
1961 The City in History: its origins, its transformations, and its prospects. 1st  
ed. Harcourt Brace & World, New York,.  
  
1981 The Culture of Cities. Greenwood Press, Westport, Conn.
- Nance, Jack D. and Bruce F. Ball  
1986 No Surprises? The Reliability and Validity of Test Pit Sampling.  
American Antiquity 51:457-483.
- Neff, Linda S., C. Robin, K. Schwartz and M.K. Morrison  
1995 The Xunantunich Settlement Survey. In Xunantunich Archaeological  
Project: 1995 Field Season, pp. 139-163. University of California, Institute of  
Archaeology, Los Angeles.
- Nichols, Deborah L.  
1994 The Origin of Provincial Craft Production and the Aztec City-State of  
Otumba. In Economies and Politics in the Aztec Realm, edited by Mary G. Hodge  
and Michael E. Smith, pp. 175-194. Institute for Mesoamerican Studies, Studies  
on Culture and Society, Volume 6, Albany.
- Nishimura, Yasushi  
2001 Geophysical Prospection in Archaeology. In Handbook of Archaeological  
Sciences, edited by D.R. Brothwell and A.M. Pollard, pp. 545-553. John Wiley  
and Sons, New York.
- Nuttall, Zelia  
1921 Royal Ordinances Concerning the Laying Out of New Towns. Hispanic  
American Historical Review 4:743-753.



- Orton, Clive  
2000 *Sampling in Archaeology*. Cambridge Manuals in Archaeology. Cambridge University Press, New York.
- Ozanne, Paul  
1969 A New Archaeological Survey of Ife. *Odu* 1:28-45.
- Padilla, Efran  
2005 *Perspectives on Urban Society: Preindustrial to Postindustrial*. Allyn & Bacon, Upper Saddle River, NJ.
- Park, Robert E., Ernest W. Burgess and Roderick D Mackenzie  
1925 *The City*. University of Chicago Press, Chicago.
- Parkinson, William A. and Paul R. Duffy  
2007 Fortifications and Enclosures in European Prehistory. *Journal of Archaeological Science* (15):97-142.
- Parnell, J. Jacob, Richard E. Terry and Charles Golden  
2001 Using in-field phosphate testing to rapidly identify middens at Piedras Negras, Guatemala. *Geoarchaeology* 16(8):855-873.
- Parnell, J. Jacob, Richard E. Terry and Z. Nelson  
2002 Soil chemical analysis applied as an interpretive tool for ancient human activities at Piedras Negras, Guatemala. *Journal of Archaeological Science* 29:379-404.
- Parten, Mildred  
1950 *Surveys, Polls, and Samples*. Harper and Brothers, New York.
- Pasquinucci, Marinella and Frédéric Trément (Editors)  
2000 *Non-Destructive Techniques Applied to Landscape Archaeology*. The Archaeology of Mediterranean Landscapes Vol. 4. Oxbow Books, Oxford.
- Peel, J.D.Y.  
1983 *Ijeshas and Nigerians: The Incorporation of a Yoruba Kingdom, 1890's-1970's*. Cambridge University Press, New York.
- Peraza Lope, Carlos  
2006 *La Cronología de Mayapán*. Paper presented at the Internacional Congress of Americanistas, Sevilla, Spain.

- Peraza Lope, Carlos, Masson Marilyn A and Bradley W. Russell  
 In Press Spatial Patterns of Effigy Censer and Sculpture Use at Mayapán.  
 In Conference Proceedings of the 2nd Congreso Internacional de Mayasistas (2005),  
 edited by Alfredo Barrera Rubio and Ruth Keble, Merida, Mexico.
- Peraza Lope, Carlos, Marilyn A. Masson, Timothy S. Hare and Pedro Candelario  
 Delgado Kú  
 2007 The Late Postclassic Chronology of Mayapán: New Radiocarbon evidence.  
*Ancient Mesoamerica* (17):153-176.
- Pirenne, Henri and Frank Davis Halsey  
 1925 *Medieval Cities; Their Origins and the Revival of Trade*. Princeton  
 University Press, Princeton,.
- Plog, Stephen  
 1976 Relative Efficacies of Sampling Techniques for Archaeological Surveys.  
 In *The Early Mesoamerican Village*, edited by Kent V. Flannery, pp. 136-158.  
 Academic Press, New York.
- Pollock, H.E.D.  
 1962 Introduction. In *Mayapan Yucatan Mexico*, edited by H.E.D. Pollock,  
 Ralph L. Roys, Tatiana Proskoriakoff and A. Ledyard Smith, pp. 1-22. Occasional  
 Publication 619. Carnegie Institution of Washington, Washington.
- Pollock, Harry E.D.  
 1980 *The Puuc: An Archaeological Survey of the Hill Country of the Yucatan  
 and Northern Campeche, Mexico*. *Memoirs of the Peabody Museum*, Vol. 19.  
 Harvard University, Cambridge.
- Pollock, H.E.D., Ralph L. Roys, Tatiana Proskouriakoff and A. Ledyard Smith (editors)  
 1962 *Mayapan, Yucatan, Mexico*. Carnegie Institution of Washington,  
 Washington.
- Pope, Kevin O. and Bruce H. Dahlin  
 1989 Ancient Maya Wetland Agriculture: New Insights from Ecological and  
 Remote Sensing Data. *Journal of Field Archaeology* 16(1):87-106.
- Pradines, Stéphane  
 2004 *Fortifications et urbanisation en Afrique Orientale*. *British Archaeological  
 Reports, International Series* vol. S1216. Archaeopress, Oxford.
- Proskoriakoff, Tatiana  
 1955 *Mayapan: The Last Stronghold of Civilization*. *Archaeology* 7(2):96-103.

Proskouriakoff, Tatiana

1957 Mayapan, Plan of the Main Group of Ruins. Carnegie Institution of Washington Publication 619.

1962 Civic and Religious Structures at Mayapan. In *Mayapan Yucatan Mexico*, edited by H.E.D. Pollock, Ralph L. Roys, Tatiana Proskoriakoff and A. Ledyard Smith, pp. 87-164. Occasional Publication 619. Carnegie Institution of Washington, Washington.

Pugh, Timothy W.

2001 Flood reptiles, serpent temples, and the Quadripartite Universe: the imago mundi of Late Postclassic Mayapán. *Ancient Mesoamerica* (12):247-258.

2003 A cluster and spatial analysis of ceremonial architecture at Late Postclassic Mayapan. *Journal of Archaeological Science* (30):941-953.

2003 The Exemplary Center of the Late Postclassic Kowoj Maya. *Latin American Antiquity* 14(4):408-430.

Puleston, Dennis E.

1974 Intersite Areas in the Vicinity of Tikal and Uaxactun. In *Mesoamerican Archaeology: New Approaches*, edited by Norman Hammond, pp. 303-311. University of Texas Press, Austin.

1983 The Settlement Survey of Tikal. Tikal Report 13. University of Pennsylvania, University Museum, Pennsylvania.

Rapoport, Amos

1982 *The Meaning of the Built Environment: A Nonverbal Communication Approach*. Sage, Beverly Hills.

1993 On the Nature of Capitals and Their Physical Expression. In *Capital Cities, Le Capitales: Perspectives Internationales, International Perspectives*, edited by John Taylor, Jean G. Lengellé and Caroline Andrew, pp. 31-67. Carleton University Press, Ottawa.

Rathje, William L.

1971 The Origin and Development of Lowland Classic Maya Civilization. *American Antiquity* 36(3):275-285.

Rathje, William L. and Jeremy A. Sabloff

1975 Summary. In *A Study of Changing Pre-Columbian Commercial Systems: the 1972-1973 Seasons at Cozumel*, edited by Jeremy A. Sabloff and William L. Rathje, pp. 136-138. Harvard University, Peabody Museum of Anthropology and Ethnology, Cambridge, MA.

Redfield, Robert

1941 The folk culture of Yucatan. The University of Chicago Press, Chicago, Ill.,.

1950 A village that chose progress; Chan Kom revisited. University of Chicago Press, Chicago.

1956 Peasant society and culture; an anthropological approach to civilization. University of Chicago Press, Chicago.

Redfield, Robert and Alfonso Villa Rojas

1934 Chan Kom, a Maya village. Carnegie Institution of Washington publication no. 448. Carnegie institution of Washington, Washington, D.C.

Redfield, Robert and Alfonso Villa Rojas

1962 Chan Kom, a Maya village. University of Chicago Press, Chicago.

Redman, Charles L.

1973 Multistage Fieldwork and Analytical Techniques. American Antiquity 38:61-79.

1975 Productive Sampling Strategies for Archaeological Sites. In Sampling in Archaeology, edited by James W. Mueller, pp. 147-154. The University of Arizona Press, Tucson.

1987 Surface Collection, Sampling, and Research Design: A Retrospective. American Antiquity 52(2):249-265.

Redman, Charles L. and Ronald D. Anzalone

1980 Discovering Archaeological Patterning at a Complex Site. American Antiquity 45:284-290.

Renfrew, Colin

1994 The Archaeology of Religion. In the Ancient Mind: Elements of Cognitive Archaeology, edited by Ezra B. W. Zubrow, pp. 47-54. Cambridge University Press, New York.

Renfrew, Colin and Paul G. Bahn

2000 Archaeology : Theories, Methods, and Practice. 3rd ed. Thames and Hudson, New York.

Restall, Mathew and John F. Chuchiak, IV

2002 A Reevaluation of the Authenticity of Fray Diego de Landa's Relación de Yucatán. Ethnohistory (49):651-670.

Robertson, Ian

1999 Spatial and Multivariate Analysis, Random Sampling Error, and Analytical Noise: Empirical Bayesian Methods at Teotihuacan, Mexico. *American Antiquity* 64:137-152.

Roys, Ralph L.

1962 Literary Sources for the History of Mayapan. In *Mayapan Yucatan Mexico*, edited by H.E.D. Pollock, Ralph L. Roys, Tatiana Proskoriakoff and A. Ledyard Smith, pp. 25-86. Occasional Publication 619. Carnegie Institution of Washington, Washington.

Russell, Bradley W.

2000 Pottery Censer Form, Function and Symbolism in the Postclassic Maya Lowlands. Master's Thesis, State University of New York at Albany.

2004 Settlement Patterns in the Rural-Urban Fringe of Mayapán. Yucatán, Mexico: Preliminary Results. Paper presented at the 69th Annual Meetings of the Society of American Archaeologists, Montreal, Canada.

2007 Colonnaded hall group discovered outside Mayapán city walls. *Mexicon* vol.XXIX(August):93-94.

2007 The Economic Organization of Peripheral Mayapán. Paper presented at the 72nd Annual Meetings of the Society of American Archaeologists, Austin, Texas.

2008 Settlement Survey of Peripheral Mayapán: Results of the Mayapan Periphery Project. Poster presented at the 73rd Annual Meetings of the Society of American Archaeologists, Montreal, Canada.

Russell, Bradley W. and Bruce H. Dahlin

2007 Traditional Burnt-Lime Production at Mayapán, Mexico. *Journal of Field Archaeology* vol. 32(4):407-423.

Russell, Bradley W. and Travis Ormsby

2004 Settlement Patterns Outside of the City Wall of Mayapán, Yucatan, Mexico. Paper presented at the 69th Annual Meetings of the Society of American Archaeologists, Montreal, Canada.

Sabloff, Jeremy and William L. Rathje (editors)

1975 A Study of Changing Pre-Columbian Commercial Systems : The 1972-1973 Seasons at Cozumel, Mexico. Peabody Museum of Archaeology & Ethnology, Cambridge.

Sabloff, Jeremy A.

1997 *The Cities of Ancient Mexico: Reconstructing a Lost World*. Rev. ed. Thames & Hudson, New York.

2007 *It Depends on How We Look at Things: New Perspectives on the Postclassic Period in the Northern Lowlands*. *Proceedings of the American Philosophical Society* vol. 151(No. 1, March):11-26.

Sabloff, Jeremy A. and Gair Tourtellot

1984 *Sayil Settlement Survey: some preliminary observations*. *Mexicon* 6(6):84-85.

Sanders, William T.

1956 *The Central Mexican Symbiotic Region: A Study in Prehistoric Settlement patterns*. In *Prehistoric Settlement Patterns in the New World*, edited by Gordon R. Willey. Viking Fund Publications in Anthropology, no. 23. Wenner Gren, New York.

1960 *Prehistoric Ceramics and Settlement Patterns in Quintana Roo, México*. *Contributions to American Anthropology and History* 12(60).

1996 *Teotihuacan Valley Project: Final Report:3. The Teotihuacan Period Occupation of the Valley; Part 3: The Surface Survey*. Pennsylvania State University, Matson Museum of Anthropology, University Park.

2000 *Methodology*. In *The Teotihuacan Valley Project, Final Report, Vol. 5: The Aztec Occupation of the Valley. Part 2: Excavations at T. A. 40 and Related Projects*, edited by William T. Sanders and Susan T. Evans, pp. 59-84. *Occasional Papers in Anthropology*. vol. 26. Department of Anthropology, Pennsylvania State University, University Park.

2001 *Surface Collection Techniques in Field Archaeology: Theory and Practice*. In *Handbook of Archaeological Sciences*, edited by D.R. Rothwell and A.M. Pollard, pp. 529-541. John Wiley and Sons, New York.

Sanders, William T., Jeffrey R. Parsons and Robert S. Santley

1979 *The Basin of Mexico: Ecological Processes in the Evolution of a Civilization*. Academic Press, New York.

Sanders, William T. and Barbara J. Price

1968 *Mesoamerica: The Evolution of a Civilization*. Random House, New York.

Sanders, William T. and David Webster

1988 *The Mesoamerican Urban Tradition*. *American Anthropologist* 90:521-546.



- Scarborough, Vernon L.  
1991 Archaeology at Cerros, Belize, Central America: Volume III The Settlement System in a Late Preclassic Maya Community. Southern Methodist University Press, Dallas.
- Scargill, David Ian  
1979 The Form of Cities. St. Martin's Press, New York.
- Schiffer, Michael B., Alan P. Sullivan and Timothy C. Klinger  
1978 The Design of Archaeological Surveys. *World Archaeology* 10:1-28.
- Schreiner, Thomas  
2002 Traditional Maya Lime Production: Environmental and Cultural Implications of a Native American Technology. Ph.D. Dissertation, University of California, Berkeley.
- Sheehy, James J.  
1996 Ethnographic Analogy and the Royal Household in 8th Century Copan. In *Arqueología Mesoamericana: Homenaje a William T. Sanders*, edited by Alba Guadalupe Mastache, Jeffrey R. Parsons, Robert S. Santley and Marre Carmen Serra Puche, pp. 253-276. vol. 2. Instituto Nacional de Anthropología e Historia, Mexico City.
- Shott, Michael J.  
1989 Shovel Test Sampling in Archaeological Survey: Comments on Nance and Ball, and Lightfoot. *American Antiquity* 54:396-404.
- Sisson, Edward B.  
1973 Annual Report of the Cacaxtlan Project. Tehuacan Reports No. 3. Robert S. Peabody Foundation for Archaeology. Phillips Foundation, Andover.
- Sjoberg, Gideon  
1960 The Preindustrial City, Past and Present. Free Press, Glencoe, Ill.,  
  
1965 The Origin and Evolution of Cities. *Scientific American* (September).  
  
2002 The Preindustrial City. In *Urban Life: Readings in Urban Anthropology*, edited by George Gmelch and Walter Zenner, pp. 20-31. 4th ed. Waveland Press, Prospect Heights, IL.
- Smith, A. Ledyard  
1962 Residential and Associated Structures at Mayapan. In *Mayapan Yucatan Mexico*, edited by H.E.D. Pollock, Ralph L. Roys, Tatiana Proskouriakoff and A. Ledyard Smith, pp. 165-320. Occasional Publication 619. Carnegie Institution of Washington, Washington.

Smith, Carol A.

1976 Exchange Systems and the Spatial Distribution of Elites: The Organization of Stratification in Agrarian Societies. In *Regional Analysis*, volume 2, Social Systems, edited by Carol A. Smith, pp. 309-374. Academic Press, New York.

Smith, Michael E.

1989 Cities, Towns and Urbanism: Comments on Sanders and Webster. *American Anthropologist* 91:454-461.

1994 Social complexity in the Aztec countryside. In *Archaeological Views from the Countryside: Village Communities in Early Complex Societies*, edited by Glenn Schwartz and Steven Falconer, pp. 143-159. Smithsonian Institution Press, Washington, D.C.

1997 The Mesoamerican Urban Landscape From Teotihuacan to the Aztecs. Paper presented at the Conference, "Archaeology of Complex Societies: Centripetal and Centrifugal Forces," October 21, 1995. California State University, San Bernardino.

1997a City Planning: Aztec City Planning. In *Encyclopedia of the History of Non-Western Science, Technology, and Medicine*, edited by Helaine Selin. Kluwer Academic Publishers, Dordrecht.

2002 The Earliest Cities. In *Urban Life: Readings in Urban Anthropology*, edited by George Gmelch and Walter Zenner, pp. 3-19. 4th ed. Waveland Press, Prospect Heights, IL.

2003 The Aztecs. *The peoples of America*. Blackwell Publishers, Oxford, UK ; Cambridge, Mass.

2005 City Size in Late Postclassic Mesoamerica. *Journal of Urban History* Vol. 31(Number 4):403-434.

2007 Form and Meaning in the Earliest Cities: A New Approach to Ancient Urban Planning. *Journal of Urban Planning* Vol. 6(1):3-47.

2007 Tula and Chichén Itzá: Are We Asking the Right Questions? In *Twin Tollans: Chichén Itzá, Tula, and the Epiclassic-Early Postclassic Mesoamerican World.*, edited by Cynthia Kristan-Graham and Jeff Karl Kowalski, pp. 559-597. Dumbarton Oaks, Washington, DC.

Smith, Michael E., Cynthia Heath-Smith, Ronald Kohler, Joan Odess, Sharon Spanogle and Timothy Sullivan

1994 The Size of the Aztec City of Yuatepec: Urban Survey in Central Mexico. *Ancient Mesoamerica* 1:1-11.

- Smith, Michael E. and Lisa Montiel  
 2001 The Archaeological Study of Empires and Imperialism in Pre-Hispanic Central Mexico. *Journal of Anthropological Archaeology* (20):245-284.
- Smith, Monica L. (editor)  
 2003 The Social Construction of Ancient Cities. Smithsonian Institution Press, Washington, D.C.
- 2003a Introduction: The Social Construction of Cities. In *The Social Construction of Cities*, edited by Monica L. Smith, pp. 1-36. Smithsonian Books, Washington, D.C.
- Smith, Robert Elliot  
 1971 The Pottery of Mayapán. *Papers of the Peabody Museum of Archaeology and Ethnology* vol. 66. Harvard University, Cambridge.
- Smyth, Michael P.  
 1994 Maya Urbanism at Sayil, Yucatan. *National Geographic Research and Exploration* 10:38-55.
- 1998 Surface Archaeology and Site Organization: New Methods for Studying Urban Maya Communities. In *Surface Archaeology*, edited by III Alan P. Sullivan, pp. 43-60. University of New Mexico Press, Albuquerque.
- 1998a An Early Classic Center in the Puuc Region: New Data from Chac II, Yucatan, Mexico. *Ancient Mesoamerica* 9:233-257.
- Smyth, Michael P., Christopher D. Dore and Nicholas P. Dunning  
 1995 Interpreting Prehistoric Settlement Patterns: Lessons from the Maya Center of Sayil, Yucatan. *Journal of Field Archaeology* 22:321-347.
- Snodgrass, Anthony M. and John L. Bintliff  
 1991 Surveying Ancient Cities. *Scientific American* March:88-93.
- Spence, Michael W.  
 1987 The Scale and Structure of Obsidian Production in Teotihuacan. In *Teotihuacan" Nuevos Datos, Nuevas Sintesis, Neuvas Problemas*, edited by Emily McClung de Tapia and Evelyn C. Rattray, pp. 439-450. Instituto de Investigaciones Antropológicas, Universidad Autónoma de Mexico, Mexico City.
- Steinhardt, Nancy Shatzman  
 1990 Chinese Imperial City Planning. University of Hawaii Press, Honolulu.

- Stuart, George E., John C. Scheffler, Edward B. Kurjack and John W. Cottier  
1979 Map of the Ruins of Dzibilchaltun. Middle American Research Institute, Publication 47. Tulane University, New Orleans.
- Terry, Richard E., Fabian G. Fernandez, J. Jacob Parnell and Takeshi Inomata  
2004 The story in the floors: chemical signatures of ancient and modern Maya activities at Aguateca, Guatemala. *Journal of Archaeological Science* 31(9):1237-1250.
- Thomas, Prentice M.  
1981 Prehistoric Maya Settlement Patterns at Becan, Campeche, Mexico. Middle American Research Institute, Publication 45, New Orleans.
- Tourtellot, Gair, Gloria Everson and Norman Hammond  
2003 Suburban Organization: Minor Centers at La Milpa. In *Perspectives on Rural Complexity*, edited by Gyles Iannone and Samuel V. Connell, pp. 95-107. Cotsen Institute of Archaeology, UCLA, Los Angeles.
- Tourtellot, Gair and Jeremy A. Sabloff  
1990 Community Structure at Sayil: A Case Study of Puuc Settlement. In *Hidden Among the Hills: Maya Archaeology of the Northwest Yucatan*, First Maler Symposium, Bonn 1990, edited by Hanns J. Prem, pp. 71-92. Verlag Von Flemming, Markt Schwaben.
- Tourtellot, Gair III  
1983 Ancient Maya Settlement at Seibal, Petén, Guatemala: Peripheral Survey and Excavation. Doctoral Dissertation, Harvard University.  
  
1988 Excavations at Seibal: Peripheral Survey and Excavation: Settlement and Community Patterns. *Memoirs of the Peabody Museum* 16. Harvard University, Cambridge.
- Tozzer, Alfred M. (Editor and Translator)  
1941 Landa's *Relación de las Cosas de Yucatán*. Papers of the Peabody Museum of American Archaeology and Ethnology Vol. XVII. Harvard University, Cambridge.
- Tracy, James D. (editor)  
2001 *City Walls: The Urban Enceinte in Global Perspective*. Cambridge University Press, New York.
- Trigger, Bruce G.  
1968 The Determinants of Settlement Patterns. In *Settlement Archaeology*, edited by K. C. Chang. National Press Books, Palo Alto.

- 1972 Determinants in Urban Growth in Pre-Industrial Societies. In *Man, Settlement, and Urbanism*, edited by Peter J. Ucko, Ruth Tringham and G. Dimbleby, pp. 579-599. Schenkman, Cambridge.
- 1990 Monumental Architecture: A Thermodynamic Explanation of Symbolic Behavior. *World Archaeology* vol. 22(2):119-132.
- 2003 *Understanding Early Civilizations: A Comparative Study*. Cambridge University Press, New York.
- Ullman, Chauncy and Edward Harris  
 1945 The Nature of Cities. *Annals of the American Academy of Political and Social Sciences* 242.
- Vlcek, David T. and William L. Fash Jr.  
 1986 Survey in the outlying areas of the Copán region, and the Quiriguá connection. In *The Southeast Maya Periphery*, edited by Patricia A. Urban and Edward M. Schortman, pp. 102-113. University of Texas Press, Austin.
- Vogt, Evon Z.  
 1969 *Zinacantan: A Maya Community in the Highlands of Chiapas*. Belknap Press, Cambridge.
- Voorhies, Barbara  
 1972 Settlement Patterns in Two Regions of the Southern Maya Lowlands. *American Antiquity* 37(1):115-126.
- Wallace, Dwight T.  
 1977 Archaeology and ethnohistory of the Central Quiché. Institute for Mesoamerican Studies Publication no. 1, Albany.
- Wallerstein, Immanuel Maurice  
 1974 *The Modern World-System*. Academic Press, New York,.  
 1984 Household structures and labor-force formation in the capitalist world economy. In *Households and the World Economy*, edited by Joan Smith, Immanuel Maurice Wallerstein and Hans-Dieter Evers. Sage, Beverley Hills.
- Wandsnider, Luann and Eileen L. Camilli  
 1992 The Character of Surface Archaeological Deposits and Its Influence on Survey Accuracy. *Journal of Field Archaeology* 19(169-188).
- Weber, Max  
 1958 *The City*. Free Press, Glencoe, Ill.,.

- Webster, David and William T. Sanders  
 2001 The Ancient Mesoamerican City: Theory and Concept. In *Reconstruyendo la Ciudad Maya: El Urbanismo en Las Sociedades Antiguas*, edited by Andres Ciudad Ruiz, Iglesias Ponce de Leon, M. Josefa and Maria del Carmen Martinez, pp. 34-64. Vol. 6. Sociedad Espanol de Estudios Mayas, Madrid.
- Webster, David L., Ann Corinne Freter and Nancy Gonlin  
 2000 Copan : The Rise and Fall of an Ancient Maya Kingdom. Case studies in cultural anthropology. Harcourt College Publishers, Fort Worth.
- Wheatley, Paul  
 1963 What the greatness of a city is said to be: Reflections on Sjoberg's "Preindustrial City". *Pac. Viewpoint* 4:163-188.
- 1971 Pivot of the Four Corners: A Preliminary Enquiry into the Origins and Character of the Ancient Chinese City. Aldine, Chicago.
- Whittington, Stephen L.  
 1991 The Ostuman Archaeological Project. Final; Report to the National Science Foundation. National Science Foundation, Arlington.
- Wilk, Richard R.  
 1991 Household Ecology : Economic Change and Domestic Life among the Kekchi Maya in Belize. *Arizona studies in human ecology*. University of Arizona Press, Tucson.
- Willey, Gordon R.  
 1953 Prehistoric Settlement Patterns in the Virú Valley, Peru. Smithsonian Institution, Washington.
- Willey, Gordon R., William R. Bullard Jr., John B. Glass and James C. Gifford  
 1965 Prehistoric Maya Settlements in the Belize Valley. *Papers of the Peabody Museum of Archaeology and Ethnology*, Vol. 54. Harvard University, Cambridge.
- Willey, Gordon R. and Richard Leventhal  
 1979 Prehistoric Settlement at Copan. In *Maya Archaeology and Ethnohistory*, edited by Norman Hammond and Gordon R. Willey, pp. 75-102. University of Texas Press, Austin.
- Winter, Frederick E.  
 1971 Greek Fortifications. University of Toronto Press, Toronto.
- Winters, Howard D.  
 1955 Excavation of a Colonnaded Hall at Mayapan. In *Carnegie Institution of Washington, Current Reports I(31)*, pp. 381-396, Cambridge.

Wirth, Louis

1938 Urbanism as a Way of Life. *American Journal of Sociology* 44:1-24.

Woolley, Leonard

1938 *Ur of the Chaldees : a record of seven years of excavation*. Penguin Books, Harmondsworth, Engl.

1946 *Ur : The First Phases*. Penguin Books, London ; New York.

Woolley, Leonard and P. R. S. Moorey

1982 *Ur of the Chaldees : the final account, Excavations at Ur. Rev., enl. ed.* Herbert Press, London.

Woolley, Leonard and E. A. Speiser

1933 *Excavations at Ur*. University Museum, Philadelphia.

Zephir, Thierry

1998 *Khmer, The Lost Empire of Cambodia*. Abrams, New York.



## **Project Bibliography for Proyecto Económico de Mayapán and Mayapan Periphery Projects**

Hare, Timothy S. and Marilyn A. Masson

2008 Intermediate-Scale Patterns in the Urban Environment of Postclassic Mayapán. Paper presented at the 73rd Annual Meeting of the Society for American Archaeology, Vancouver, BC.

Hare, Timothy S., Marilyn A. Masson and Carlos Peraza Lope

2006 The Spatial and Social Organization of Mayapán. Paper presented at the 71st Annual Meeting of the Society for American Archaeology, San Juan, Puerto Rico.

Masson, Marilyn A.

2000 In the Realm of Nachan Kan. University Press of Colorado, Boulder.

Masson, Marilyn A.

In Press Kukulcan's Realm: The Postclassic City of Mayapán. University Press of Colorado, Boulder.

Masson, Marilyn A., Timothy S. Hare and Carlos Peraza Lope

2003 Postclassic Maya Society Regenerated at Mayapán. Paper presented at the 68th Annual Meetings of the Society for American Archaeology, Salt Lake City.

2006 Postclassic Maya Society Regenerated at Mayapán. In *After Collapse: The Regeneration of Complex Societies*, edited by Glenn M. Schwartz and John J. Nichols, pp. 188-207, Tucson, AZ.

Masson, Marilyn A. and Carlos Peraza Lope

2001 Proyecto Los fundamentos del Poder Económico de Mayapan, Temporada Verano 2001. Informe para el Consejo Nacional de Arqueología. UALBANY - SUNY and Centro INAH - Yucatán, On file at the Consejo Nacional, México, D.F. and Department of Anthropology, UALBANY - SUNY, Albany, NY.

2002 Proyecto Los fundamentos del Poder Económico de Mayapan, Temporada 2002. Informe para el Consejo Nacional de Arqueología. UALBANY - SUNY and Centro INAH - Yucatán, On file at the Consejo Nacional, México, D.F. and Department of Anthropology, UALBANY - SUNY, Albany, NY.

2003 Proyecto Los fundamentos del Poder Económico de Mayapan, Temporada Verano 2003. Informe para el Consejo Nacional de Arqueología. UALBANY - SUNY and Centro INAH - Yucatán, On file at the Consejo Nacional, México, D.F. and Department of Anthropology, UALBANY - SUNY, Albany, NY.

2004 A New Look at Household and Administrative Facilities at the Postclassic Maya City of Mayapán. Paper presented at the 69th Annual Meetings of the Society for American Archaeology, Montreal, Canada.

2004 Commoners in Postclassic Maya Society. In *Ancient Maya Commoners*, edited by Jon Lohse and Fred Valdez, pp. 197-224. University of Texas Press, Austin.

2004 Spatial Patterns of Effigy Use at Mayapán. Paper presented at the American Anthropological Meetings, Atlanta.

2005 Nuevas Investigaciones en Tres Unidades Residenciales Fuera del Área Monumental de Mayapán. In *Investigadores de La Cultura Maya, Tomo II*, pp. 411-424. Universidad Autónoma de Campeche, Campeche Mexico.

Masson, Marilyn A. and Carlos Peraza Lope

2006 Figurines and Social Diversity at Mayapán. Paper presented at the International Congress of Americanistas, Sevilla, Spain, July 20.

2007 Craft Specialization at Mayapán. Paper presented at the 72nd Annual Meetings of the Society for American Archaeology, Austin, TX.

In Press Evidence for Maya-Mexican Interaction in the Archaeological Record of Mayapán. In *Astronomers, Scribes and Priests: Intellectual Exchange Between the Northern Maya Lowlands and Highland Mexico in the Late Postclassic Period*, edited by Gabrielle Vail and Christine Hernandez. Dumbarton Oaks, Washington DC. (Presented at the Dumbarton Oaks Conference, October 2006).

In Press Animal Use at Mayapán. In Theme issue from Conference on Archaeozoology, Mexico City, *Journal Quaternary International*.

n.d. Urban Life at Mayapán Monograph Report in preparation for Consejo de Arqueología, INAH, Mexico City. To be Submitted to the University of Pittsburgh Press.

Masson, Marilyn A., Carlos Peraza Lope and Timothy S. Hare

2006 The Political Economy of Mayapán. Paper presented at the 71st Annual Meetings of the Society for American Archaeology, San Juan, Puerto Rico.

Masson, Marilyn A., Carlos Peraza Lope and Timothy S. Hare

In Press A Postclassic Maya Economic Heterogeneity at Mayapán. In *El Urbanismo en Mesoamerica/Urbanism in Mesoamerica, Volume 3*, edited by William T. Sanders and Robert H. Cobean. INAH/Penn State University, University Park, PA. (Presented at the Penn Urbanism Conference).

Peraza Lope, Carlos

2006 La Cronología de Mayapán. Paper presented at the Internacional Congress of Americanistas, Sevilla, Spain.

Peraza Lope, Carlos, Masson Marilyn A and Bradley W. Russell

In Press Spatial Patterns of Effigy Censer and Sculpture Use at Mayapán.  
In Conference Proceedings of the 2nd Congreso Internacional de Mayistas (2005),  
edited by Alfredo Barrera Rubio and Ruth Kubler, Merida, Mexico.

Peraza Lope, Carlos, Marilyn A. Masson, Timothy S. Hare and Pedro Candelario  
Delgado Kú

2007 The Late Postclassic Chronology of Mayapán: New Radiocarbon evidence.  
Ancient Mesoamerica (17):153-176.

Russell, Bradley W.

2004 Settlement Patterns in the Rural-Urban Fringe of Mayapán. Yucatán,  
Mexico: Preliminary Results. Paper presented at the 69th Annual Meetings of the  
Society of American Archaeologists, Montreal, Canada.

2007 Colonnaded hall group discovered outside Mayapán city walls. Mexican  
vol.XXIX(August):93-94.

2007 The Economic Organization of Peripheral Mayapán. Paper presented at  
the 72nd Annual Meetings of the Society of American Archaeologists, Austin,  
Texas.

2008 Settlement Survey of Peripheral Mayapán: Results of the Mayapan  
Periphery Project. Poster presented at the 73rd Annual Meetings of the Society of  
American Archaeologists, Montreal, Canada.

Russell, Bradley W. and Bruce H. Dahlin

2007 Traditional Burnt-Lime Production at Mayapán, Mexico. Journal of Field  
Archaeology vol. 32(4):407-423.

Russell, Bradley W. and Travis Ormsby

2004 Settlement Patterns Outside of the City Wall of Mayapán, Yucatan,  
Mexico. Paper presented at the 69th Annual Meetings of the Society of American  
Archaeologists, Montreal, Canada.

## **Appendix A: Maps of all Clusters by Transect**

## Transect 1

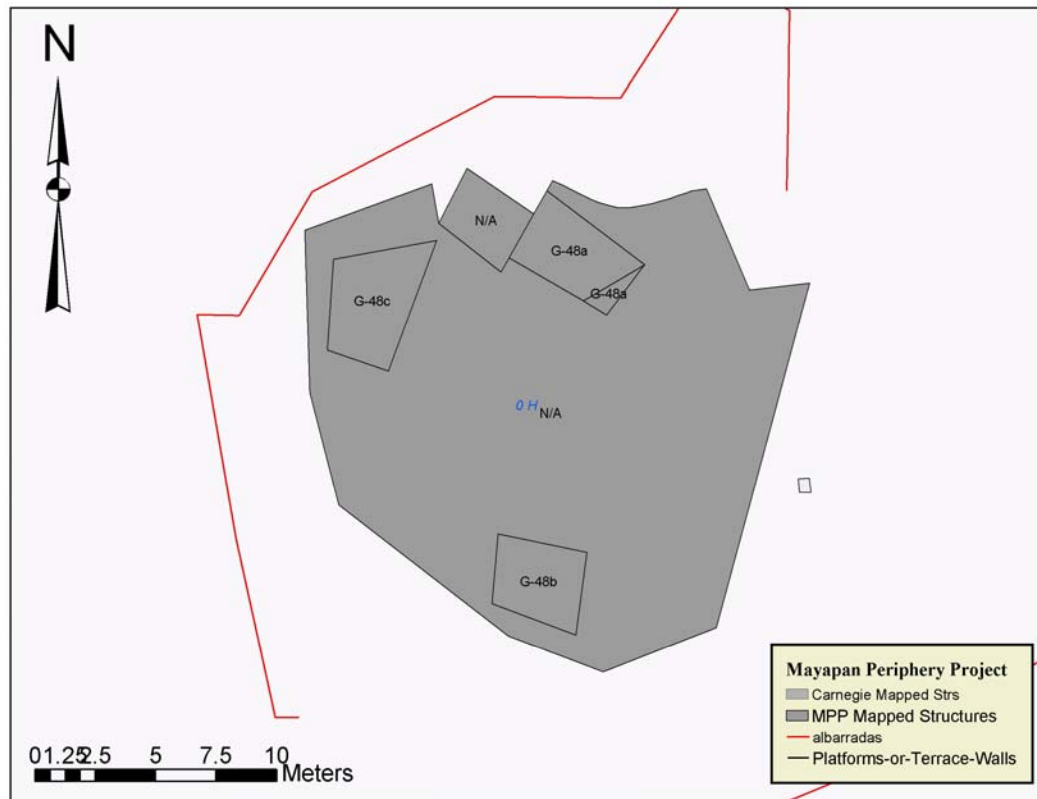


Figure 1 – Transect 1, Cluster G-48

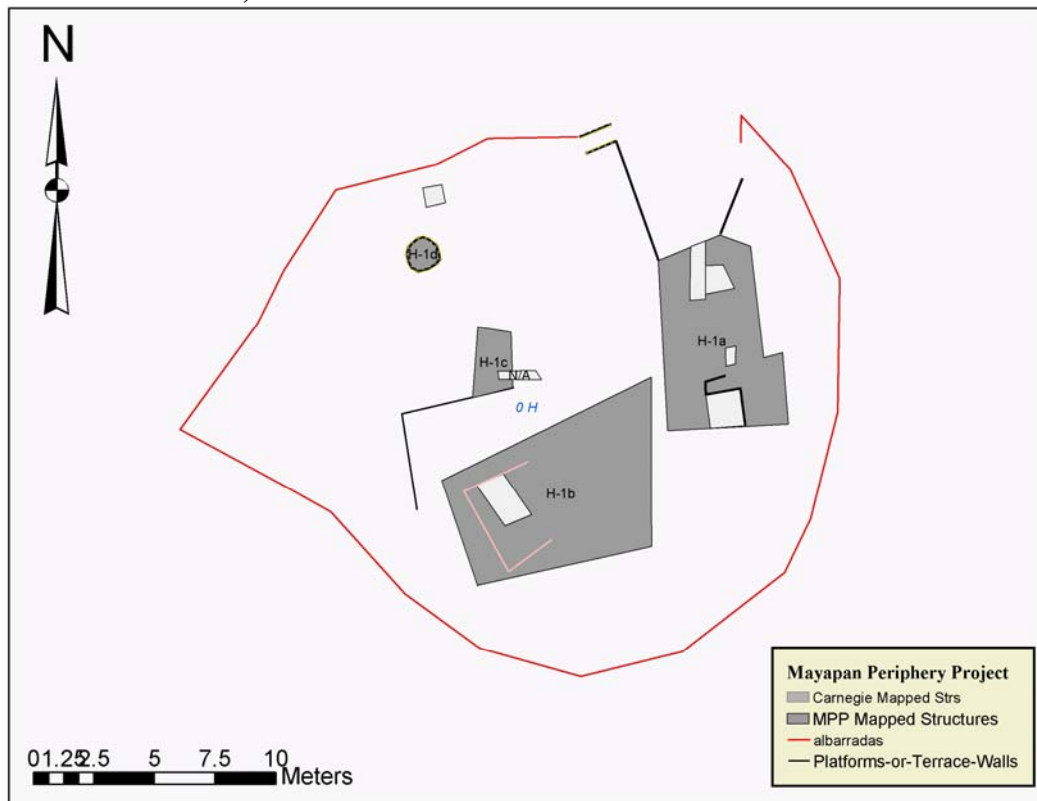


Figure 2 – Transect 1, Cluster H-1

## Transect 1

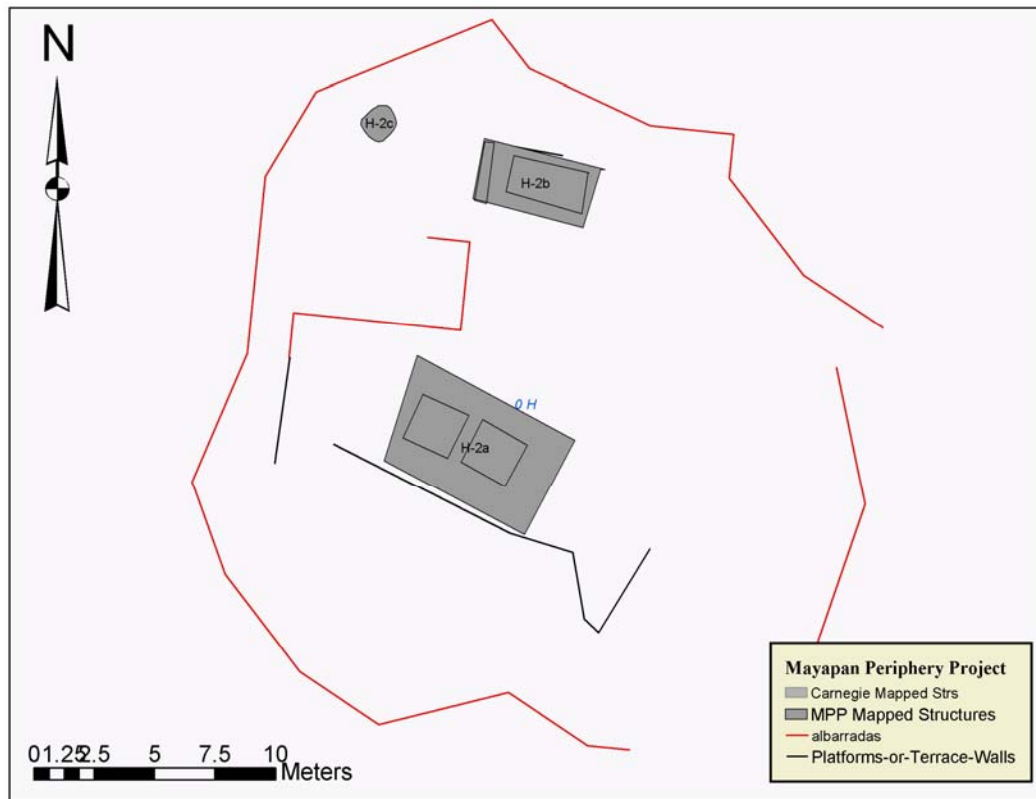


Figure 3 – Transect 1, Cluster H-2

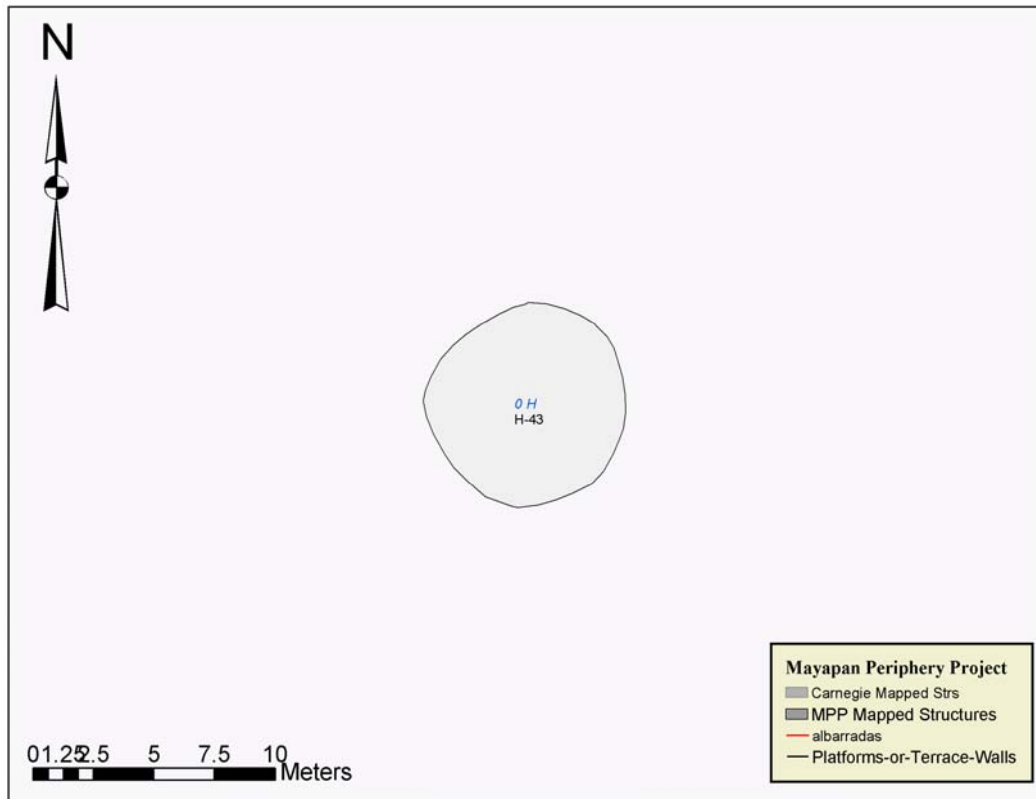


Figure 4 – Transect 1, Cluster H-43

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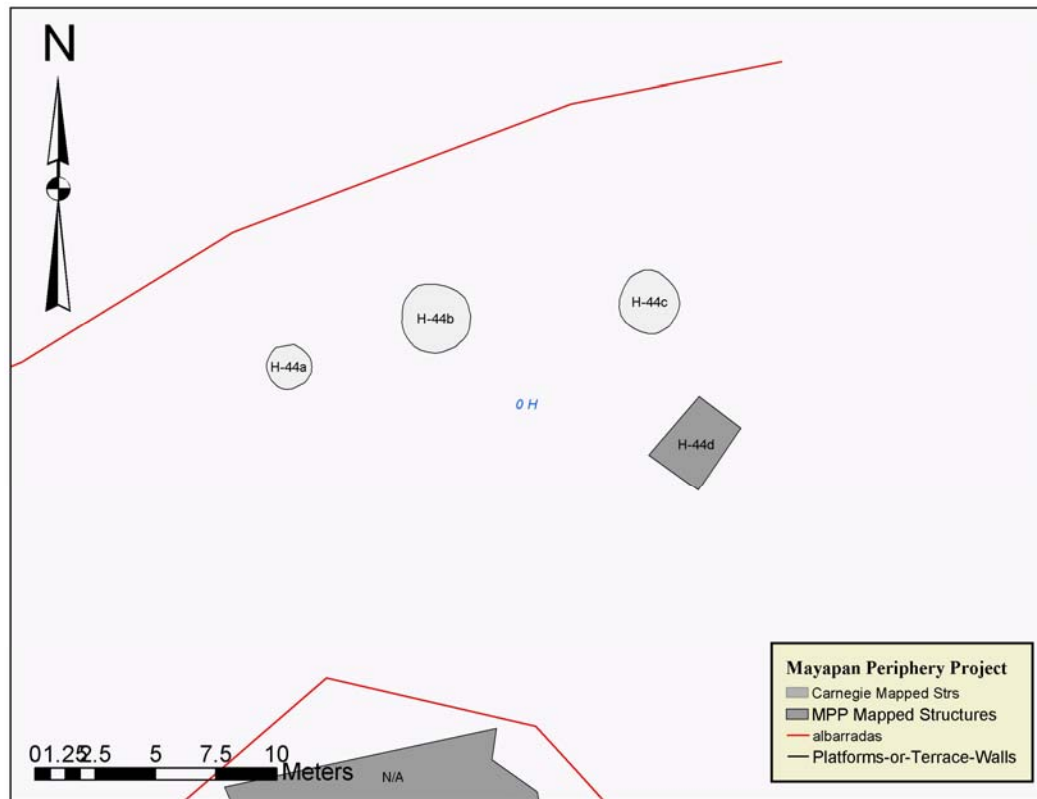


Figure 5 – Transect 1, Cluster H-44

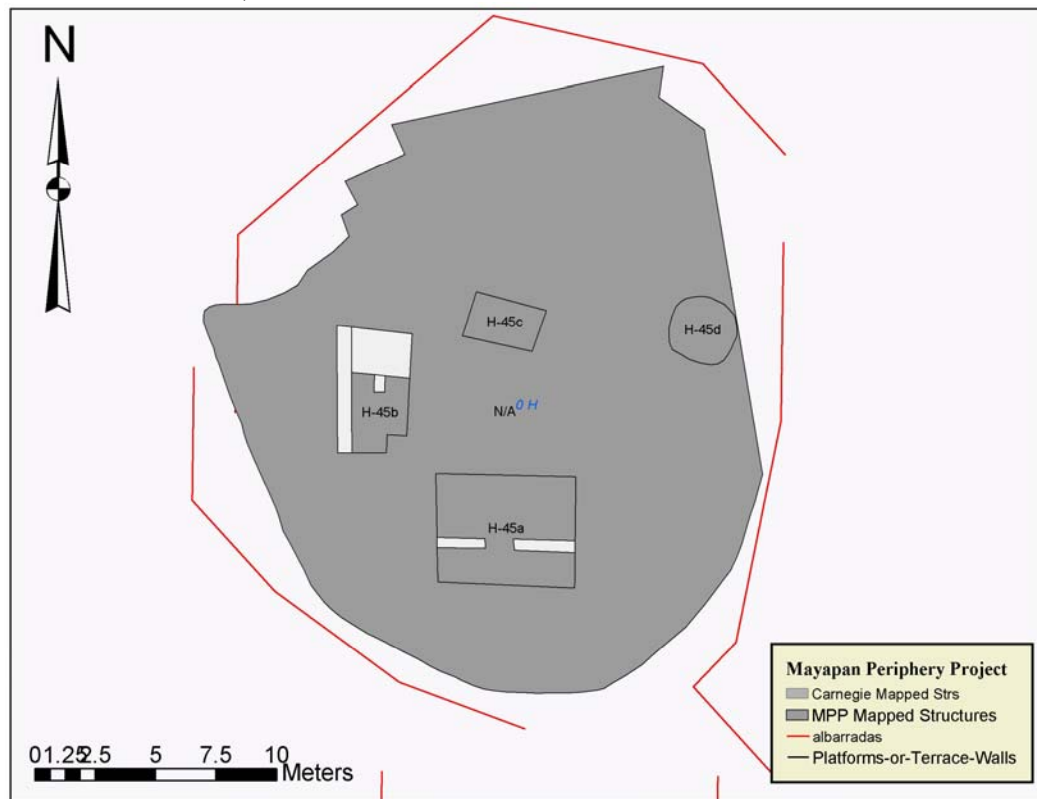


Figure 6 – Transect 1, Cluster H-45



## Transect 1

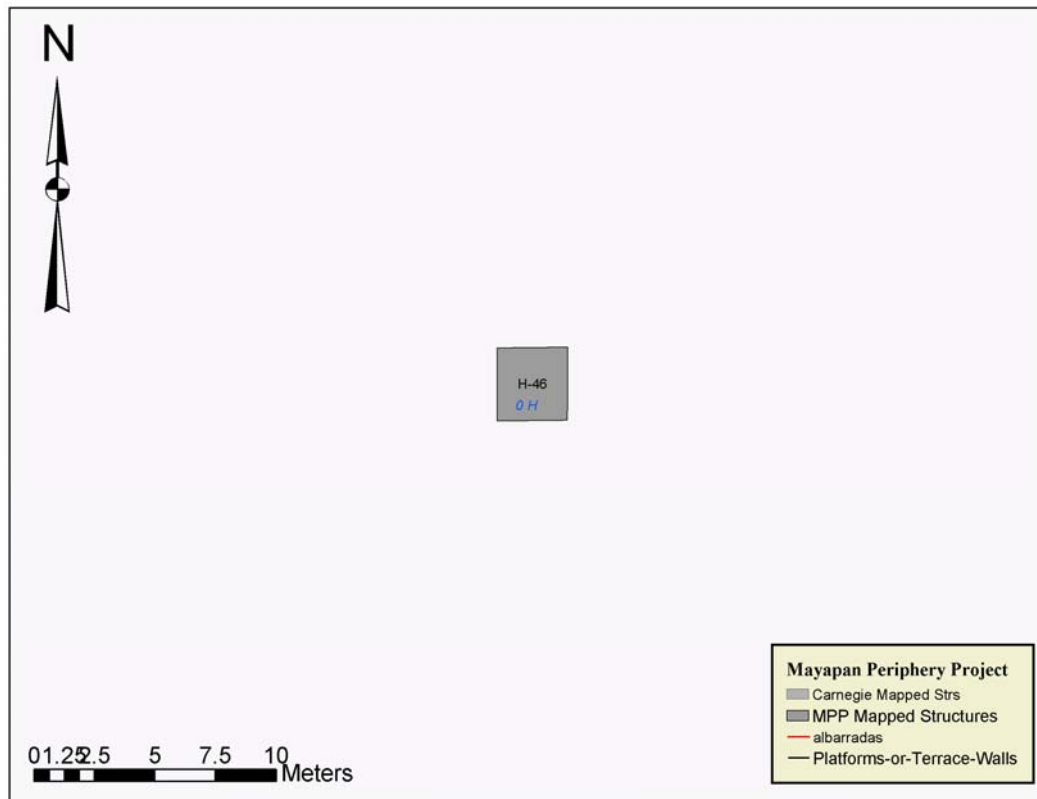


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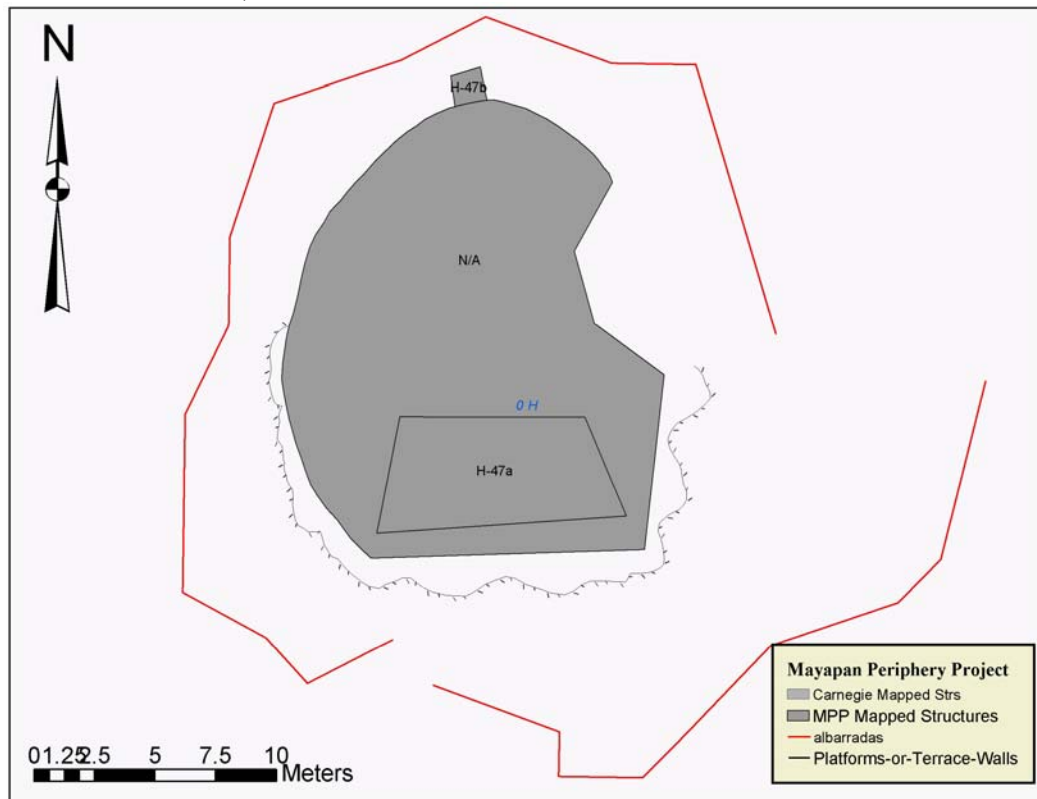


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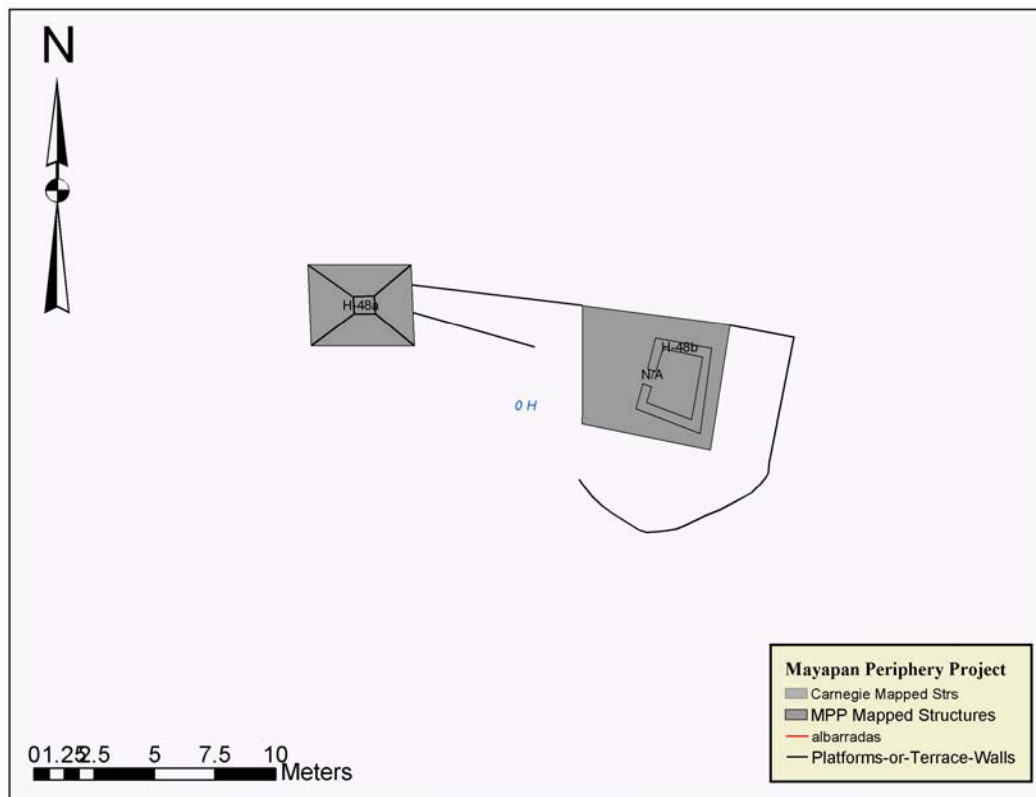


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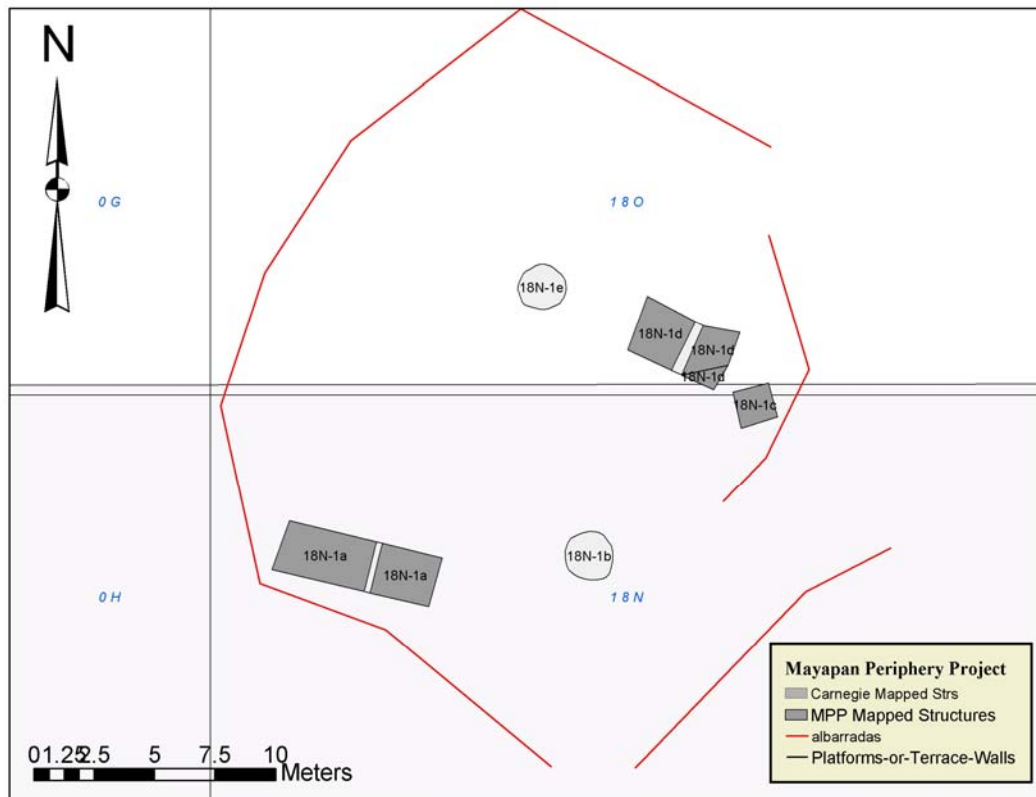


Figure 10 – Transect 1, Cluster 18N-1

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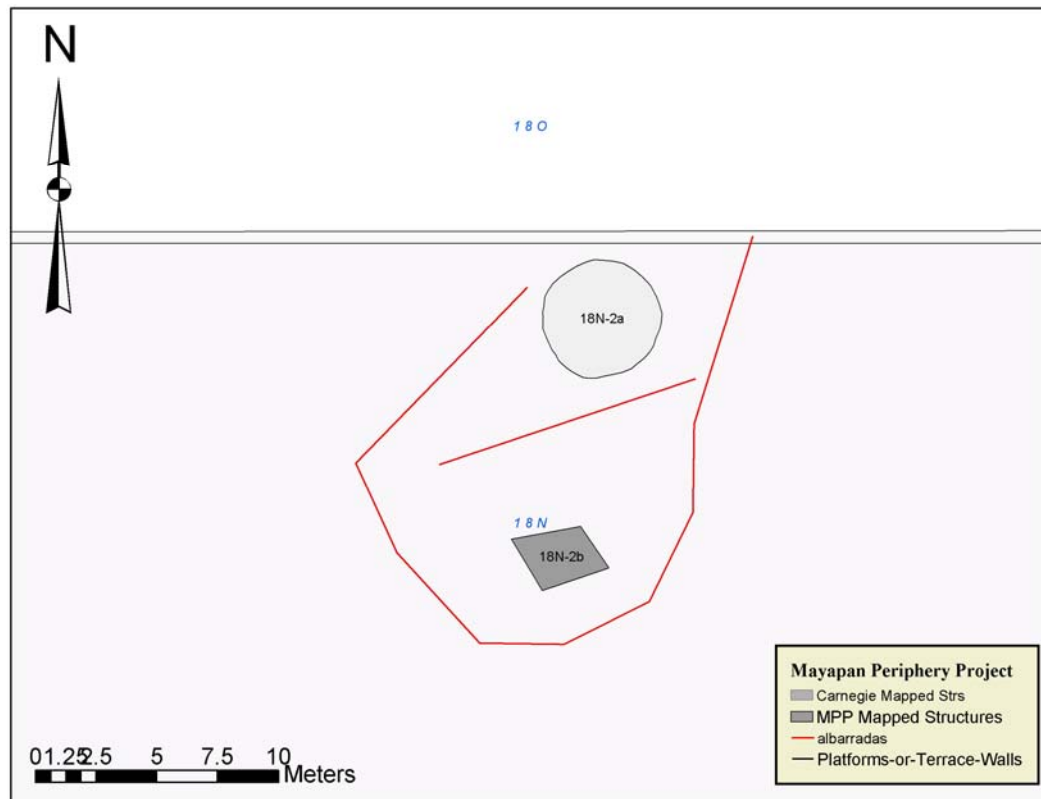


Figure 11 – Transect 1, Cluster 18N-2

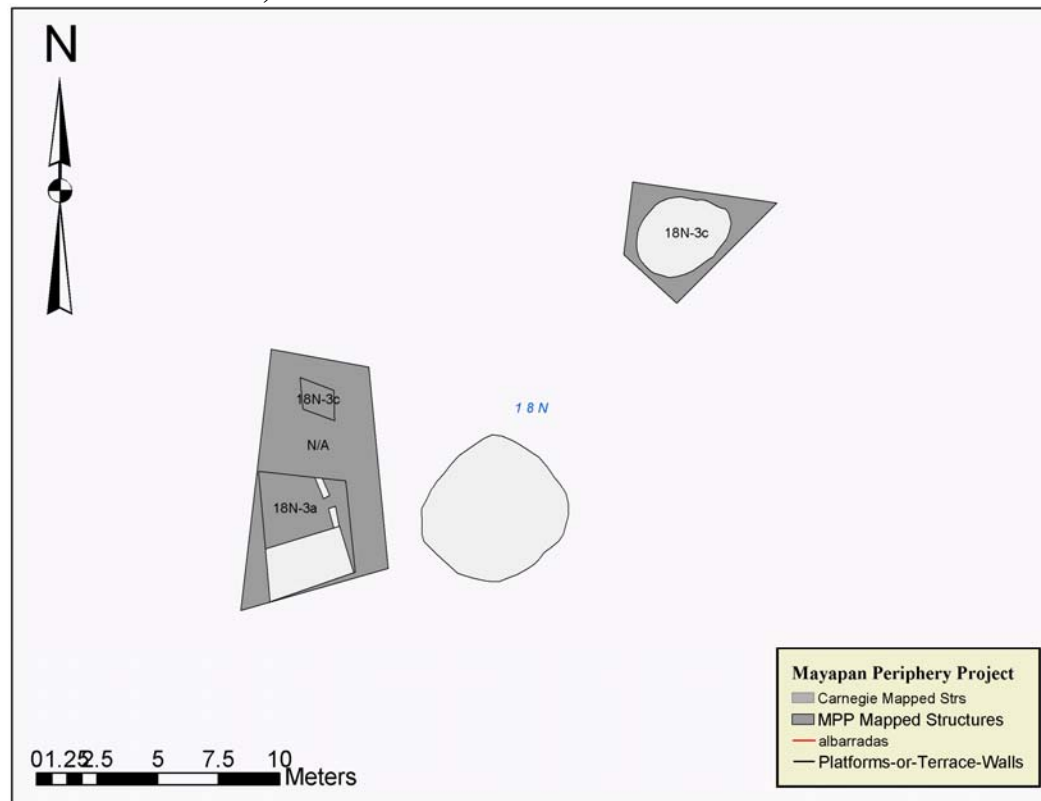


Figure 12 – Transect 1, Cluster 18N-3

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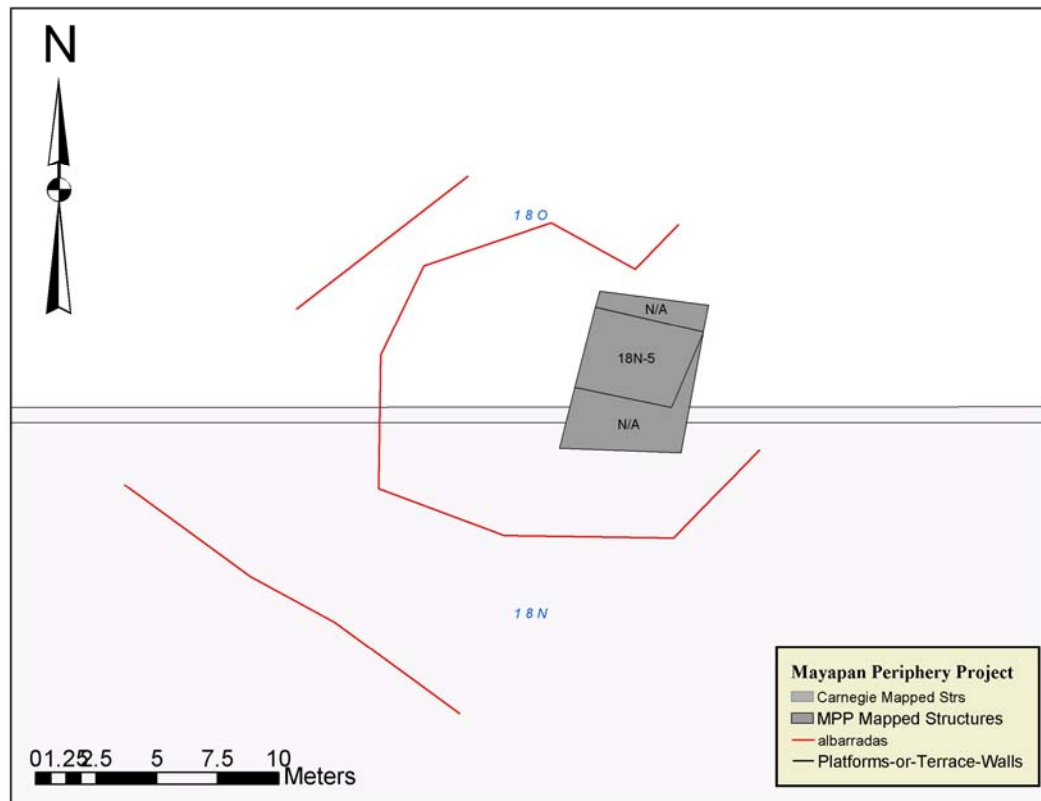


Figure 13 – Transect 1, Cluster 18N-5

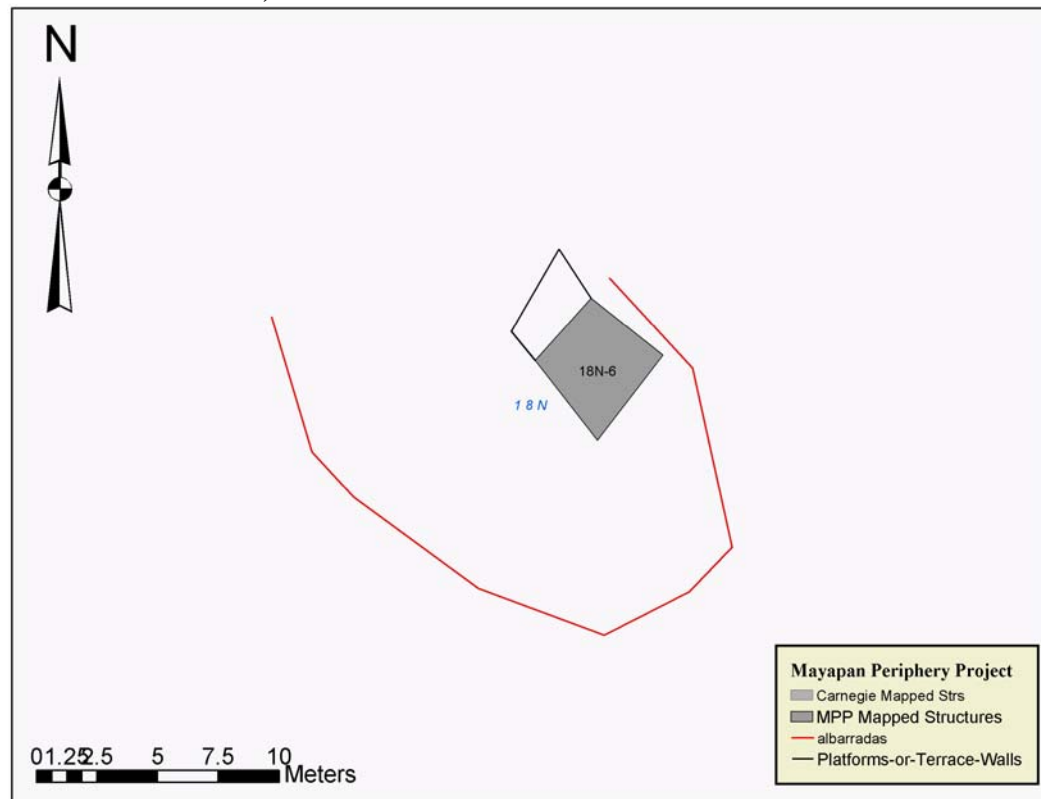


Figure 14 – Transect 1, Cluster 18N-6

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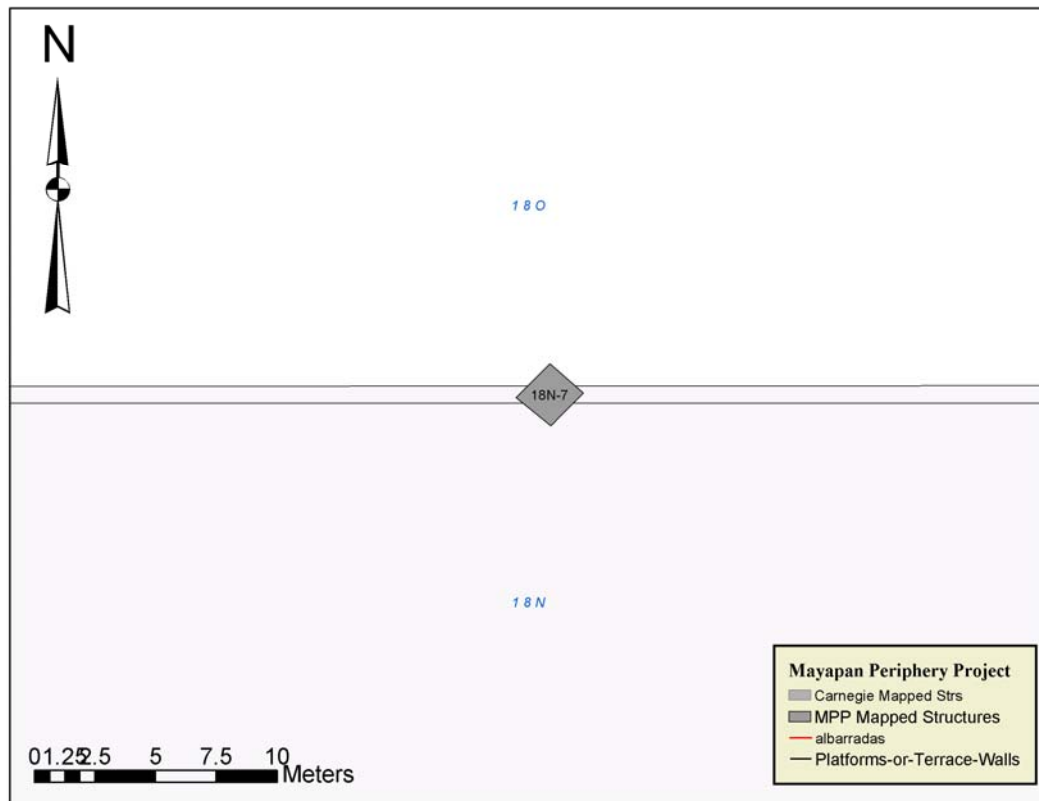


Figure 15 – Transect 1, Cluster 18N-7

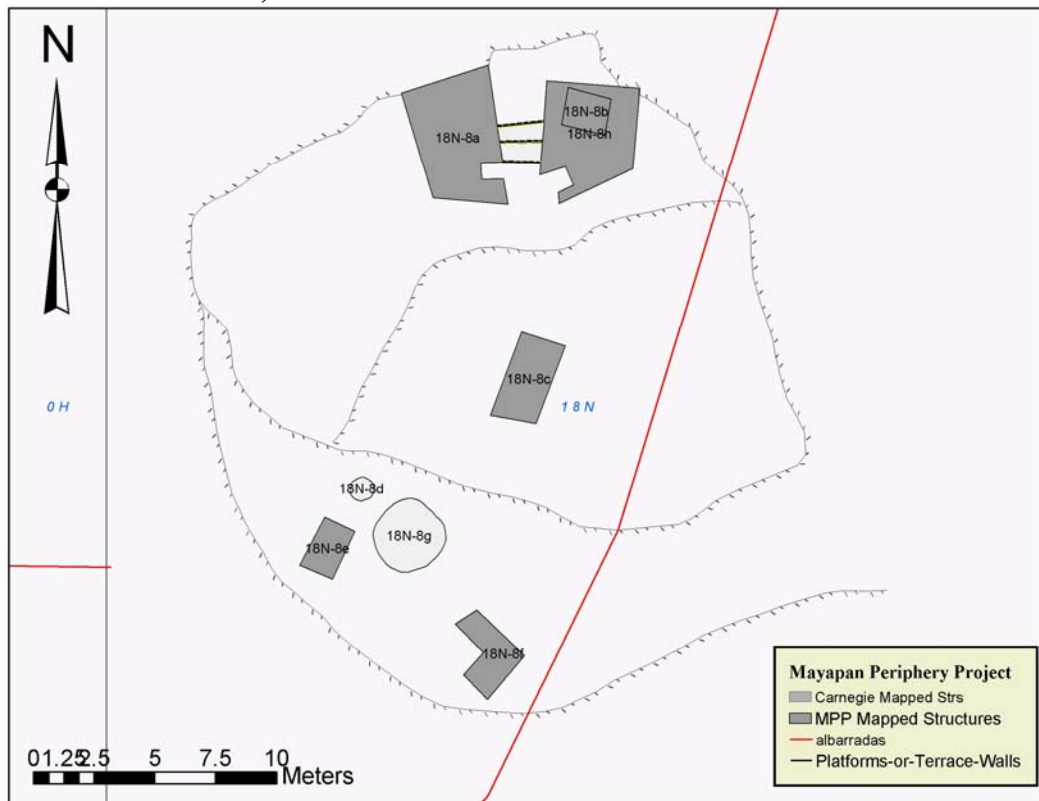


Figure 16 – Transect 1, Cluster 18N-8

## Transect 1

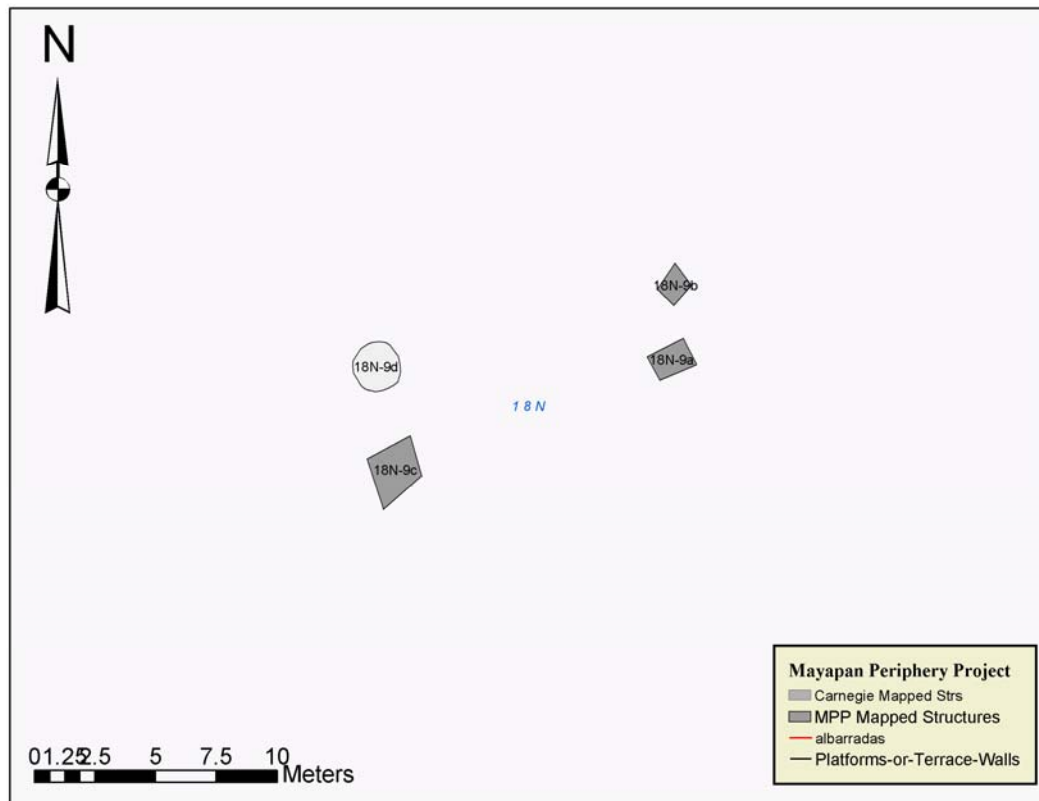


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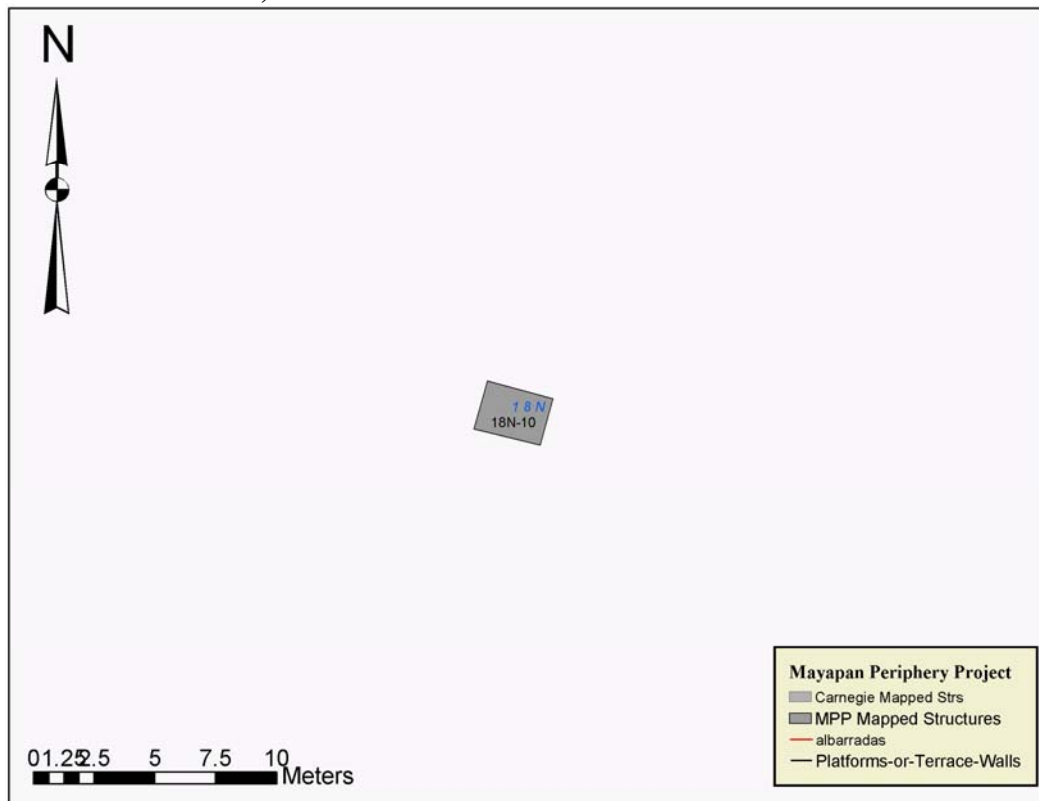


Figure 18 – Transect 1, Cluster 18N-10

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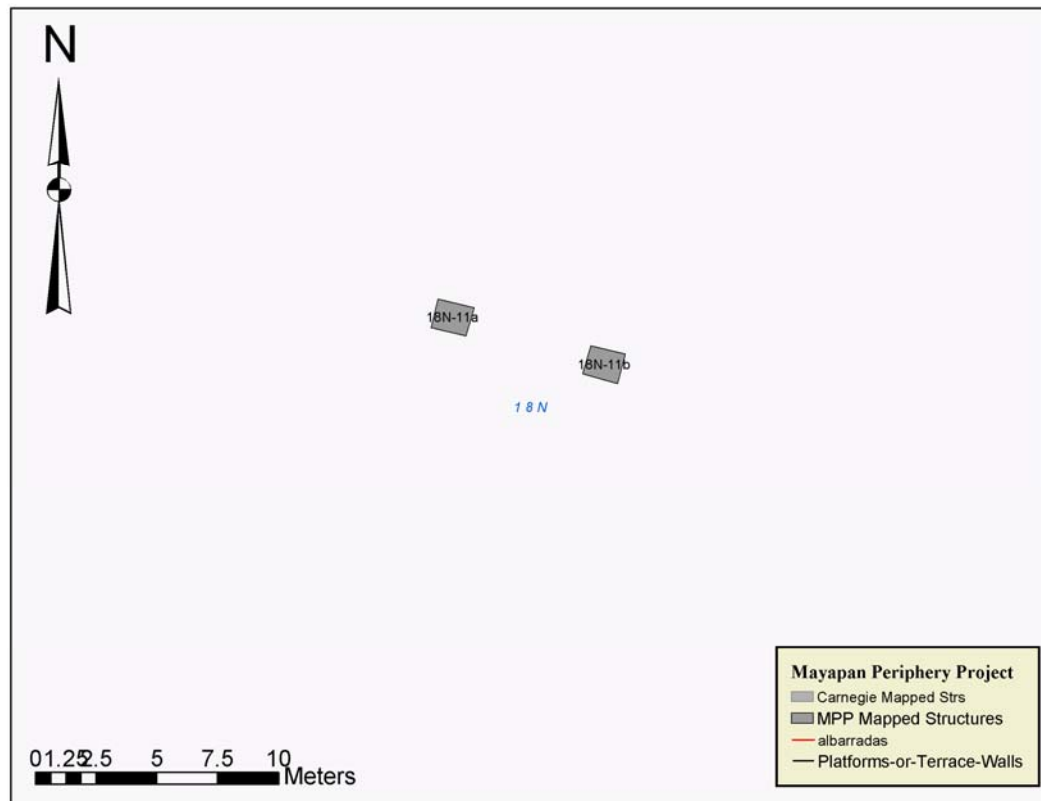


Figure 19 – Transect 1, Cluster 18N-11

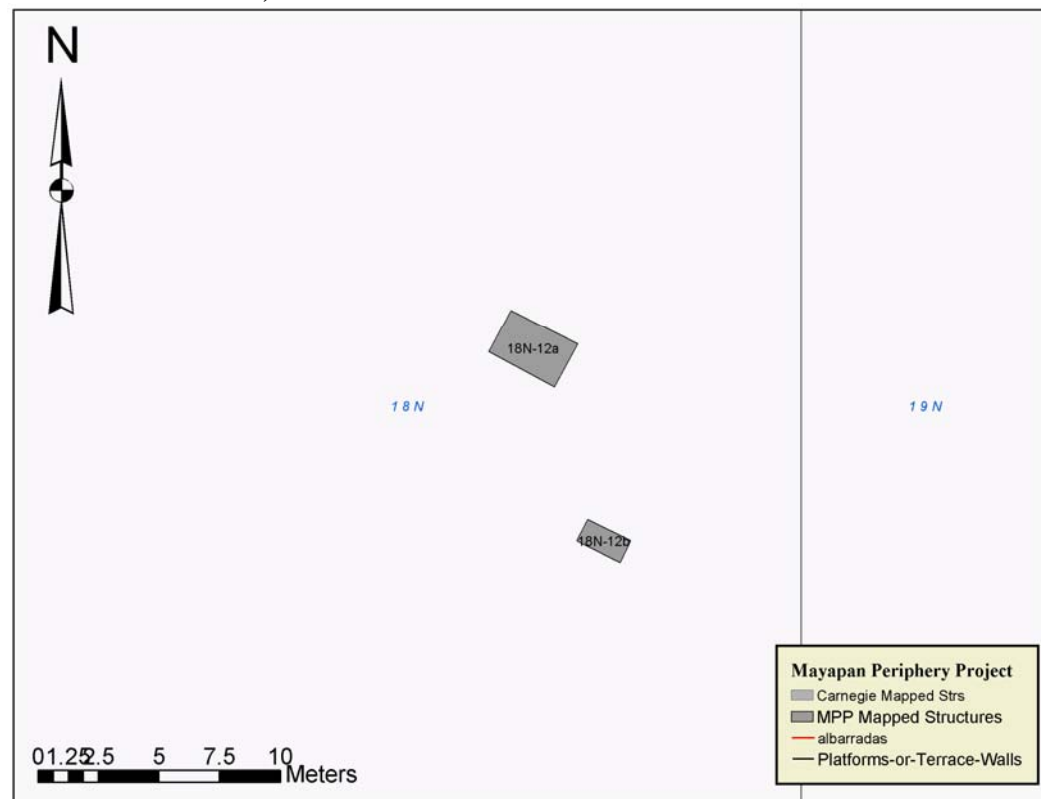


Figure 20 – Transect 1, Cluster 18N-12



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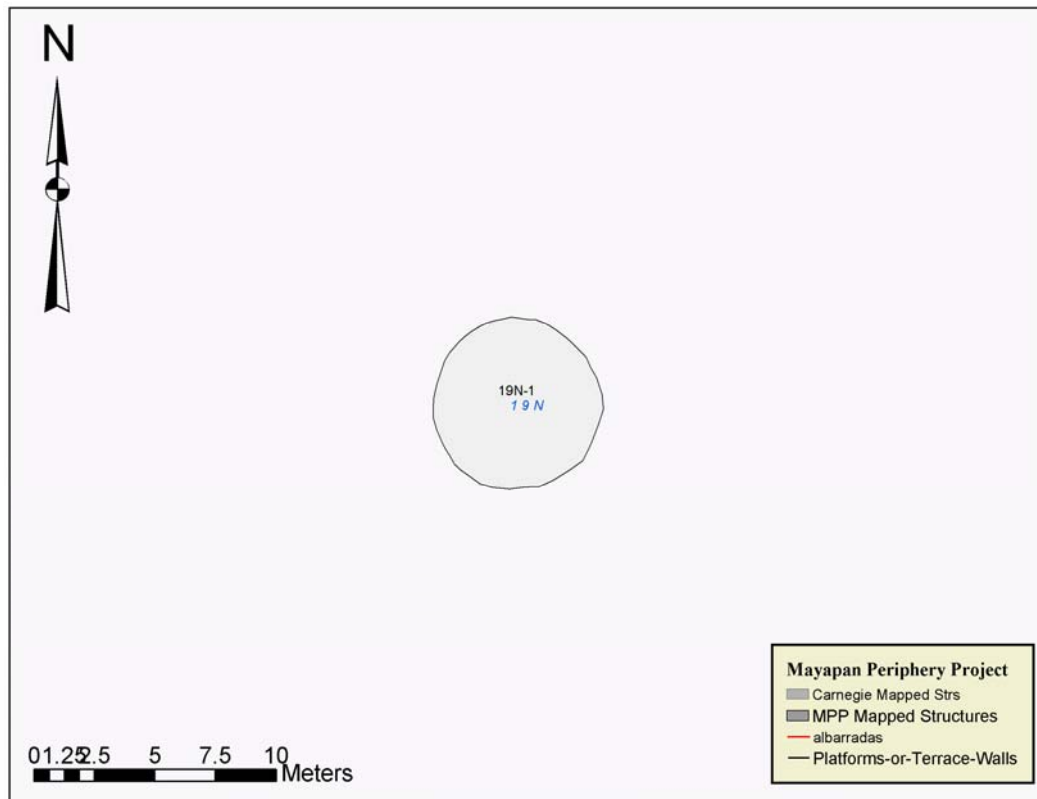


Figure 21 – Transect 1, Cluster 19N-1

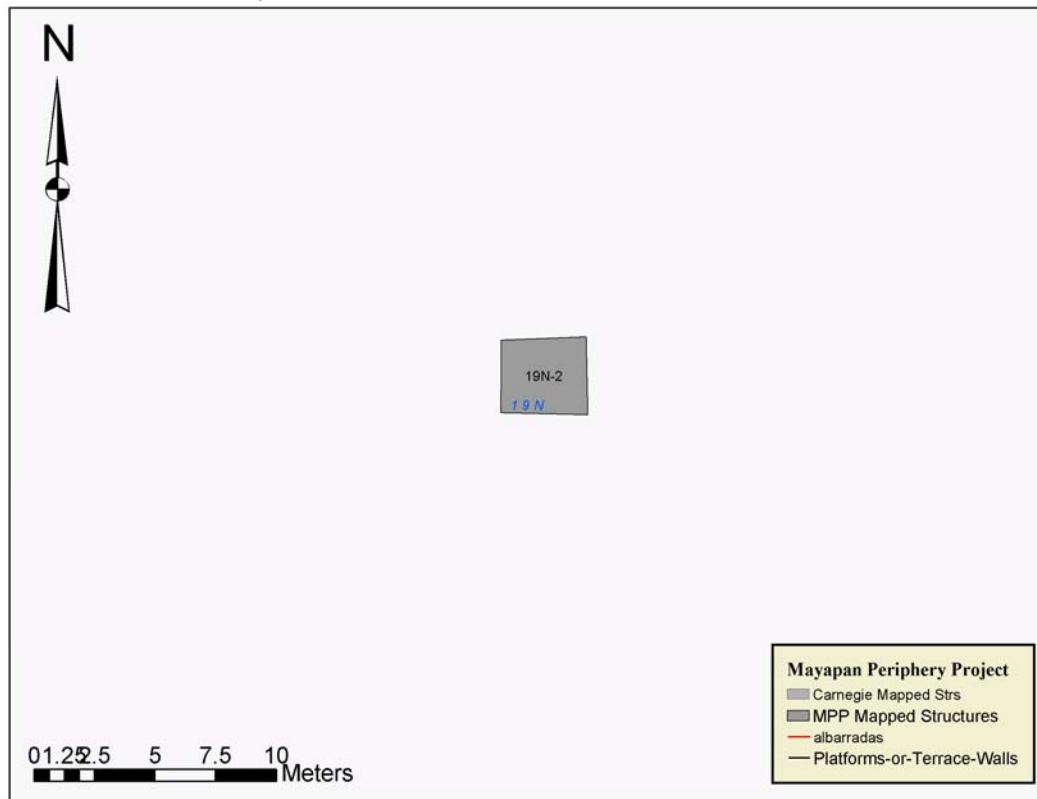


Figure 22 – Transect 1, Cluster 19N-2

## Transect 1

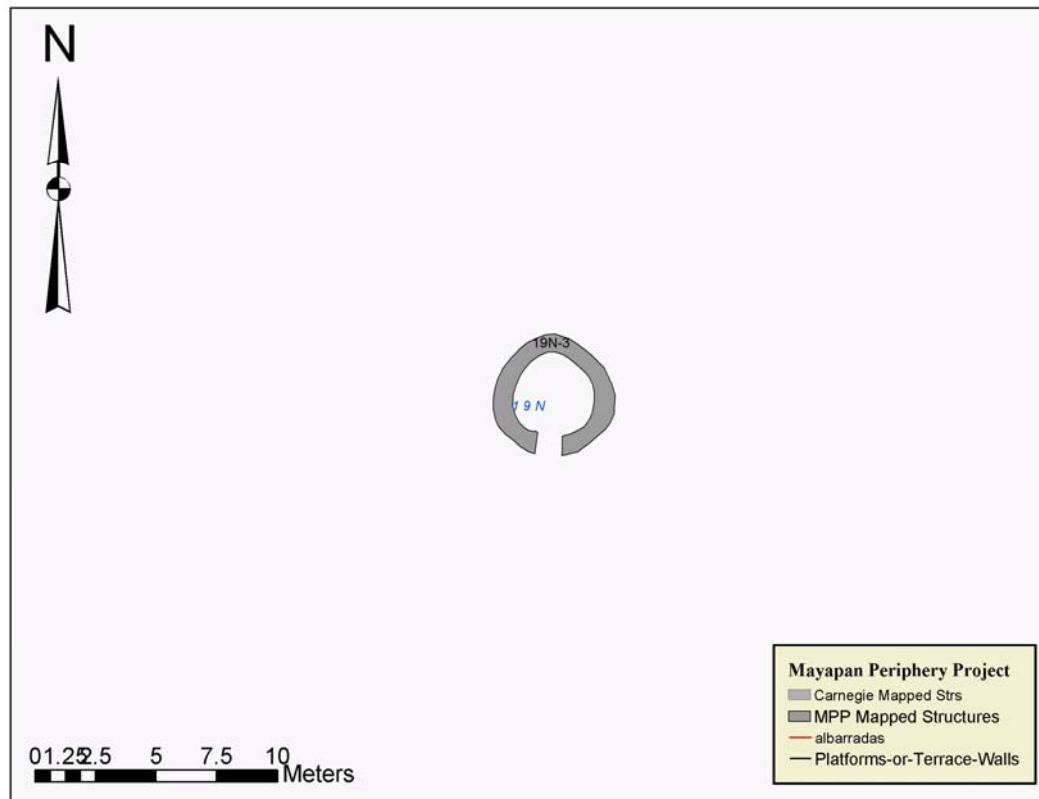


Figure 23 – Transect 1, Cluster 19N-3

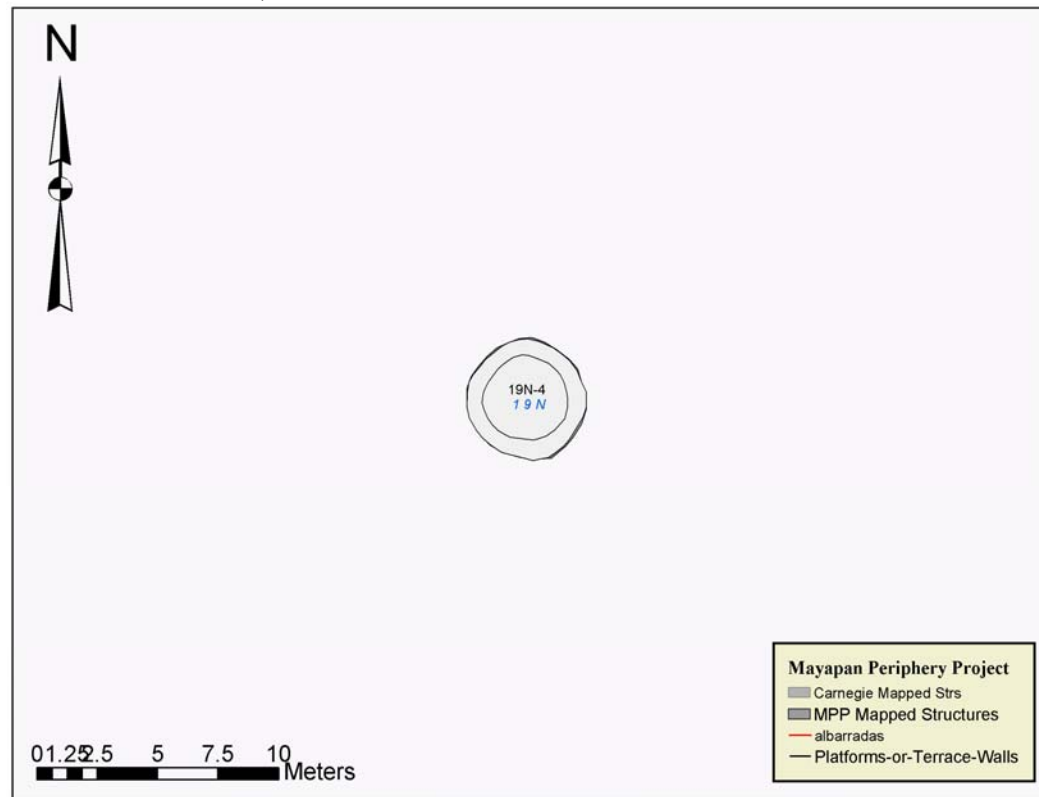


Figure 24 – Transect 1, Cluster 19N-4

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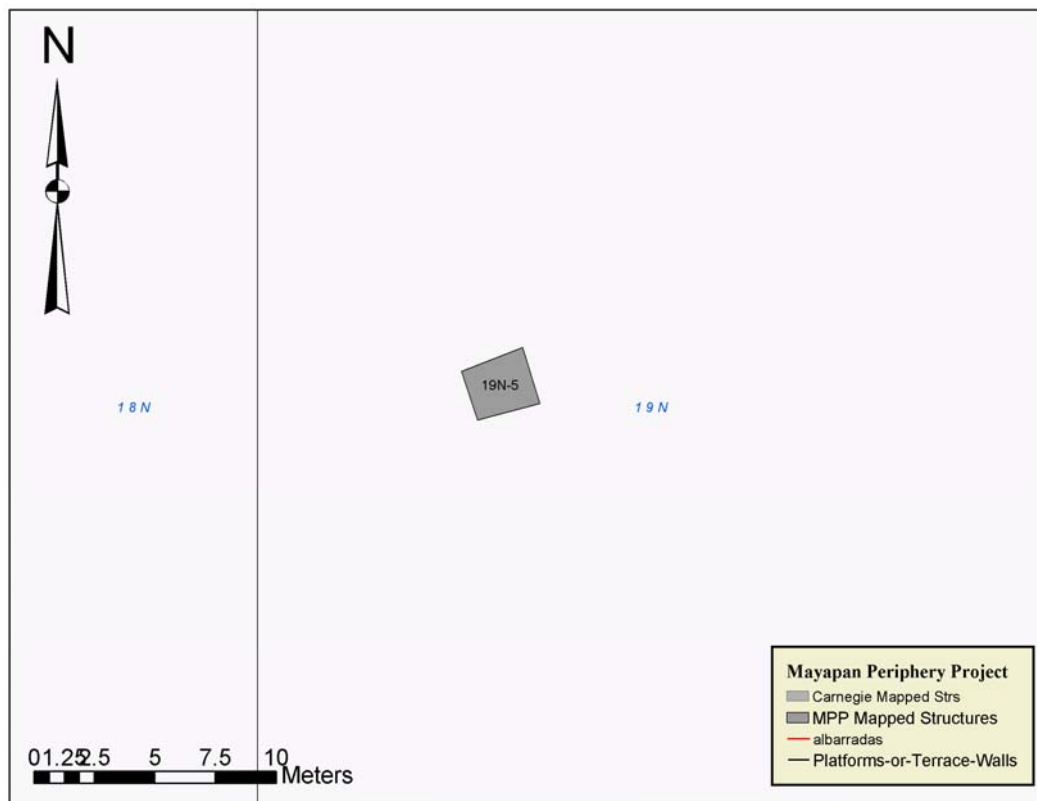


Figure 25 – Transect 1, Cluster 19N-5

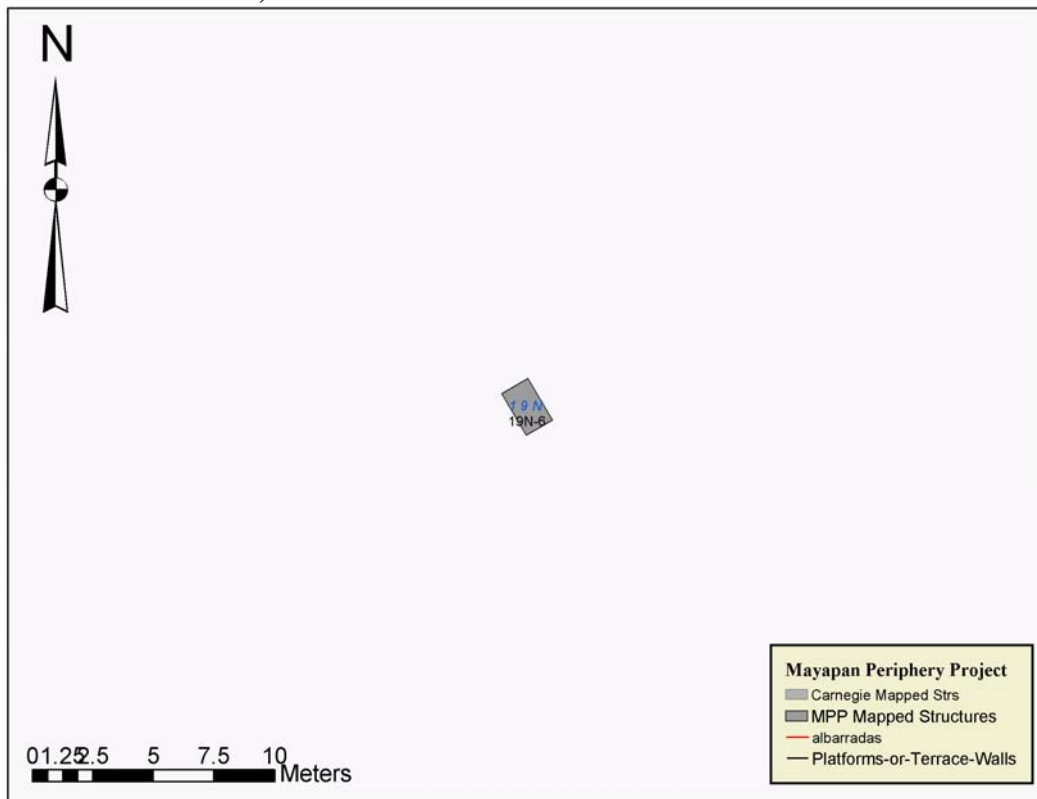
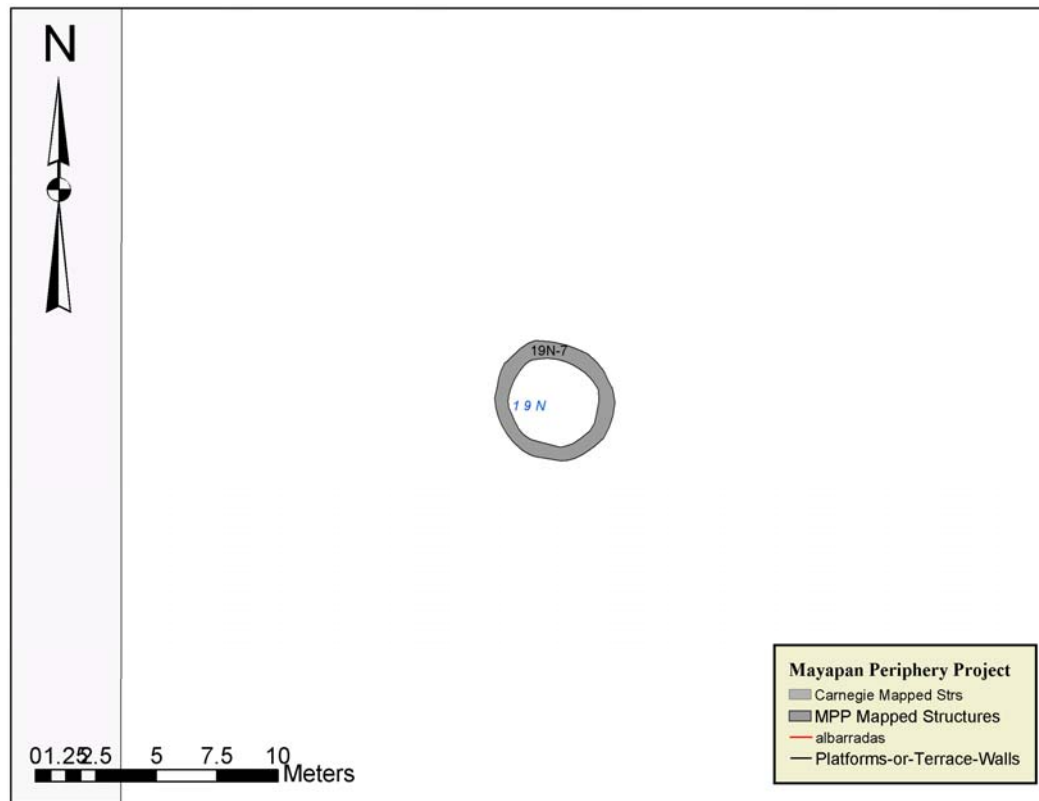


Figure 26 – Transect 1, Cluster 19N-6

# **Transect 1**



**Figure 27 – Transect 1, Cluster 19N-7**

## Transect 2

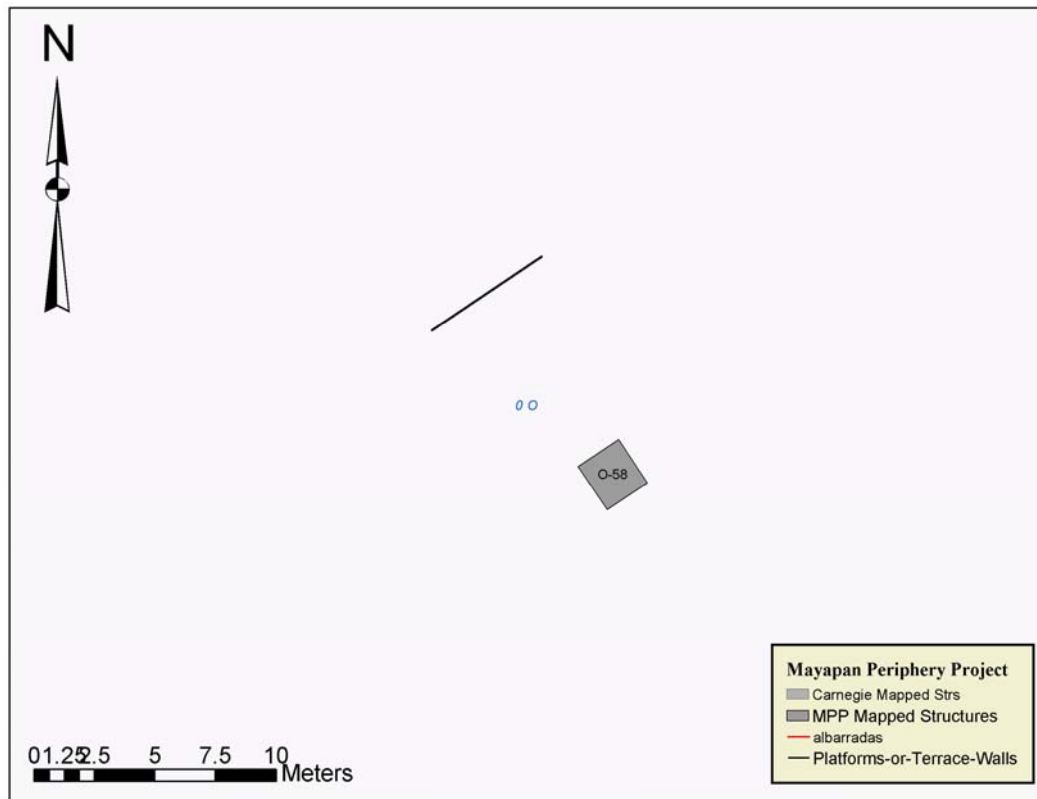


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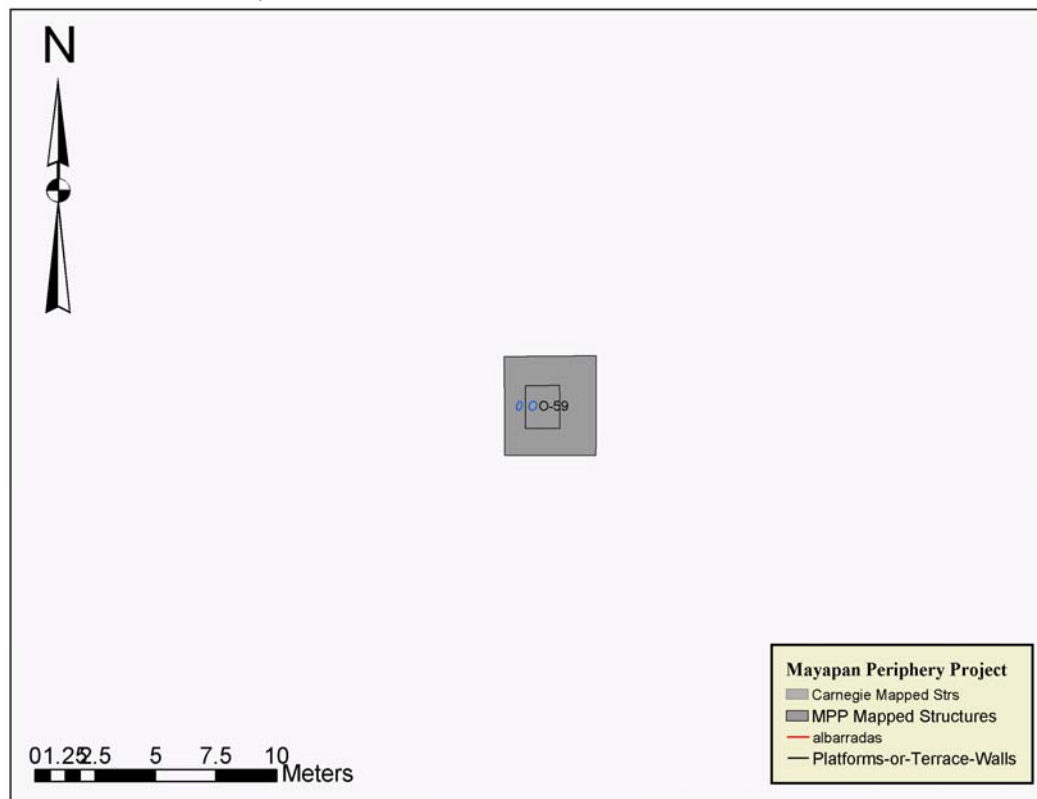


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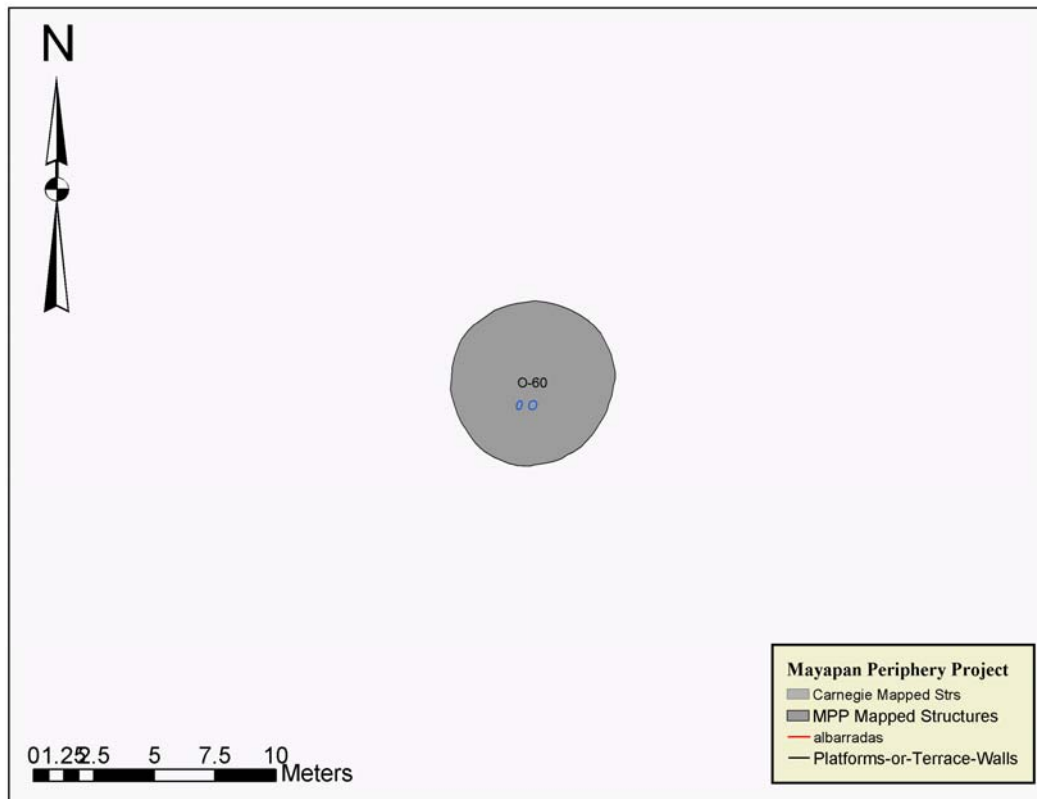


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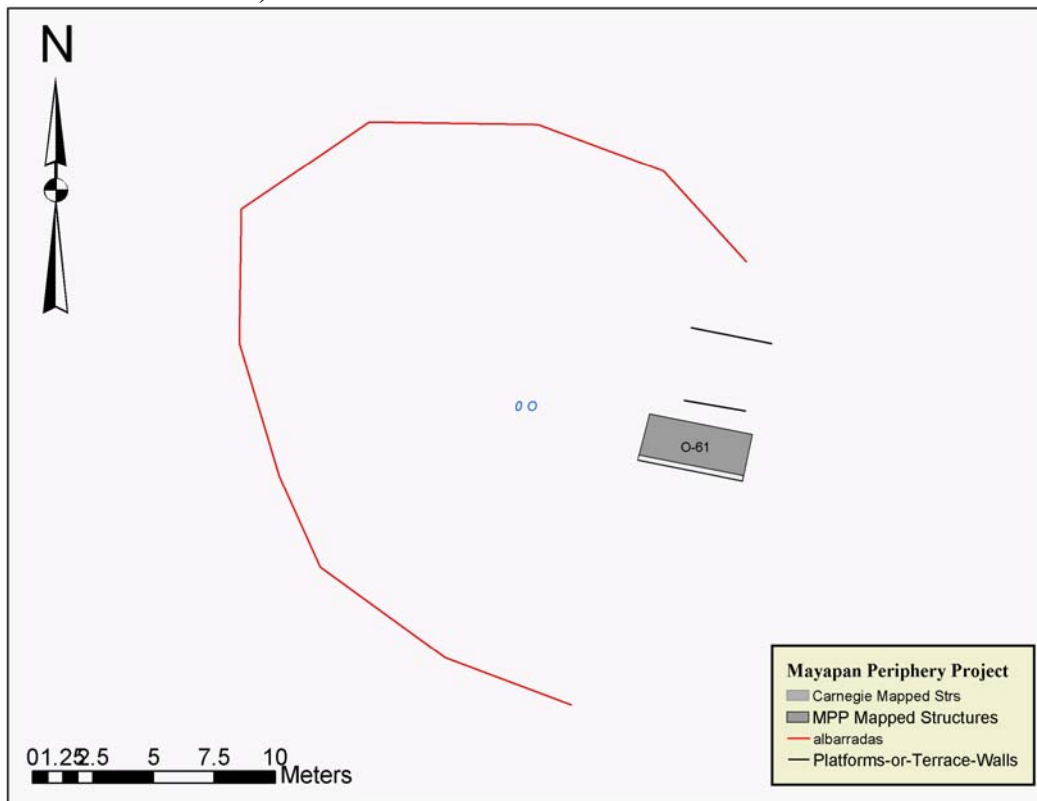


Figure 31 – Transect 2, Cluster O-61

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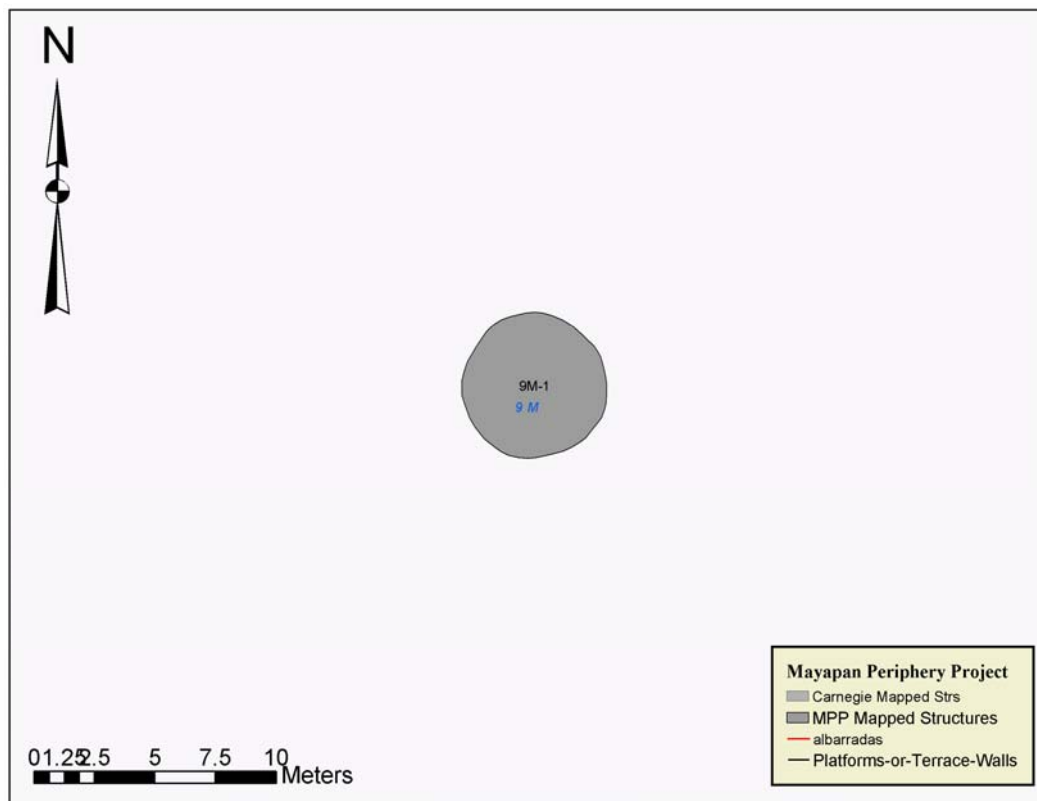


Figure 32 – Transect 2, Cluster 9M-1

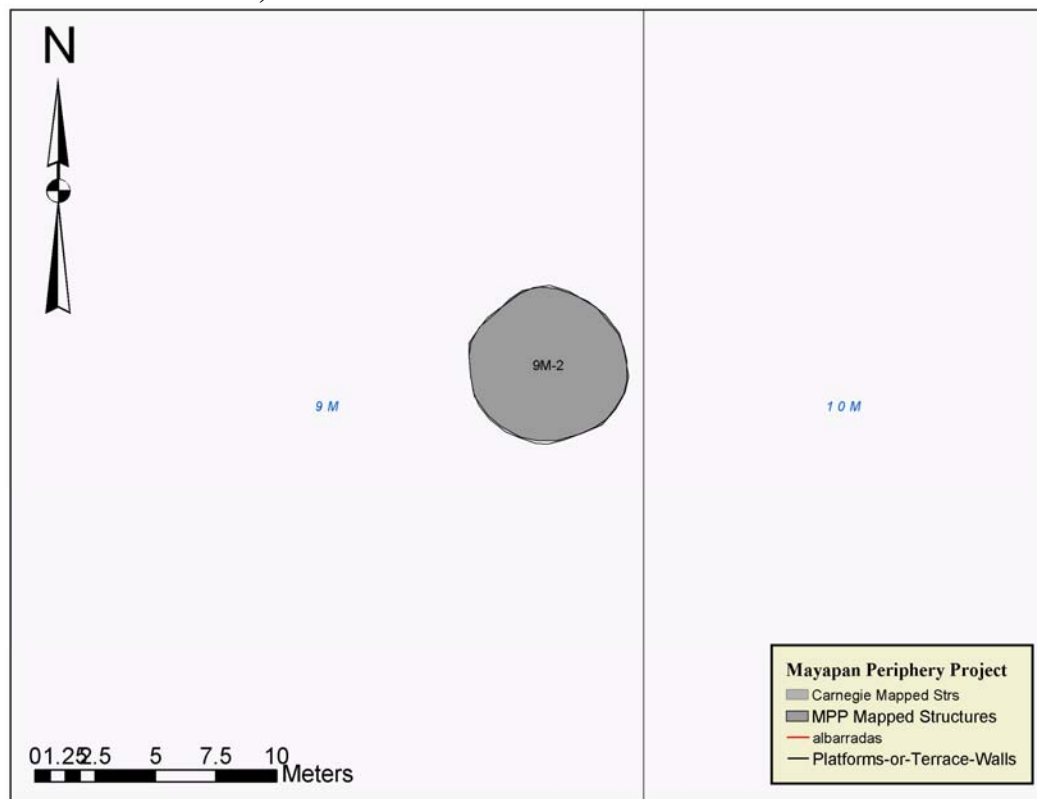


Figure 33 – Transect 2, Cluster 9M-2



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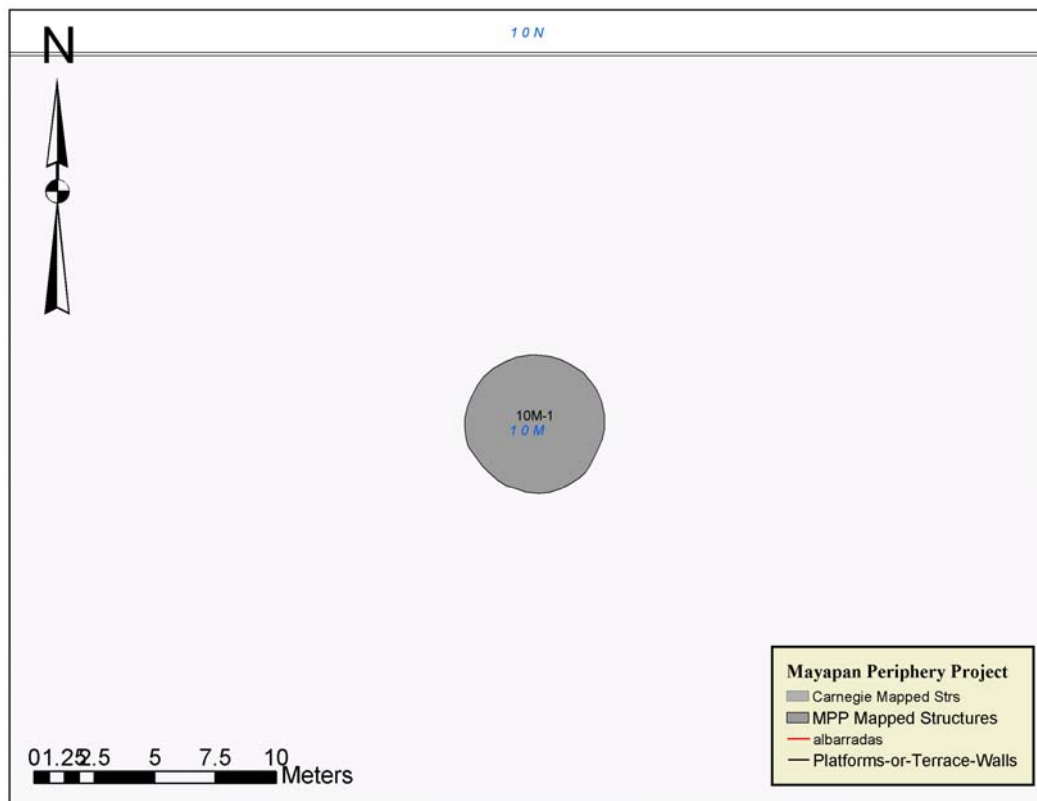


Figure 34 – Transect 2, Cluster 10M-1

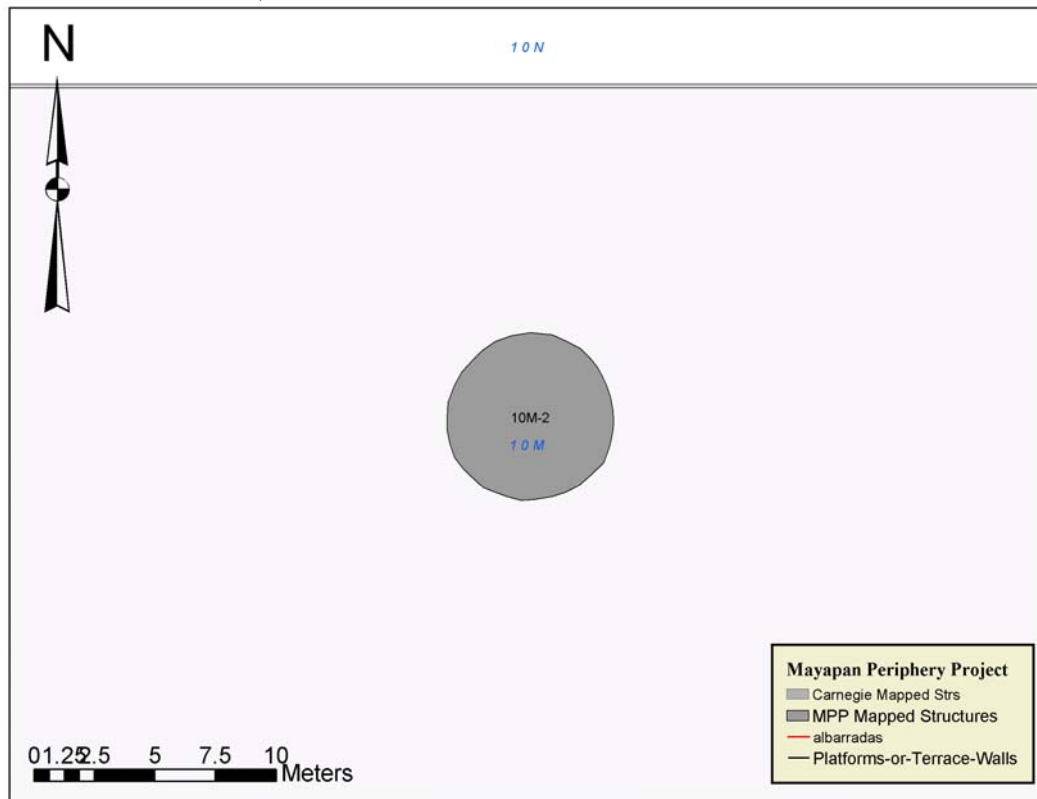


Figure 35 – Transect 2, Cluster 10M-2

## Transect 2

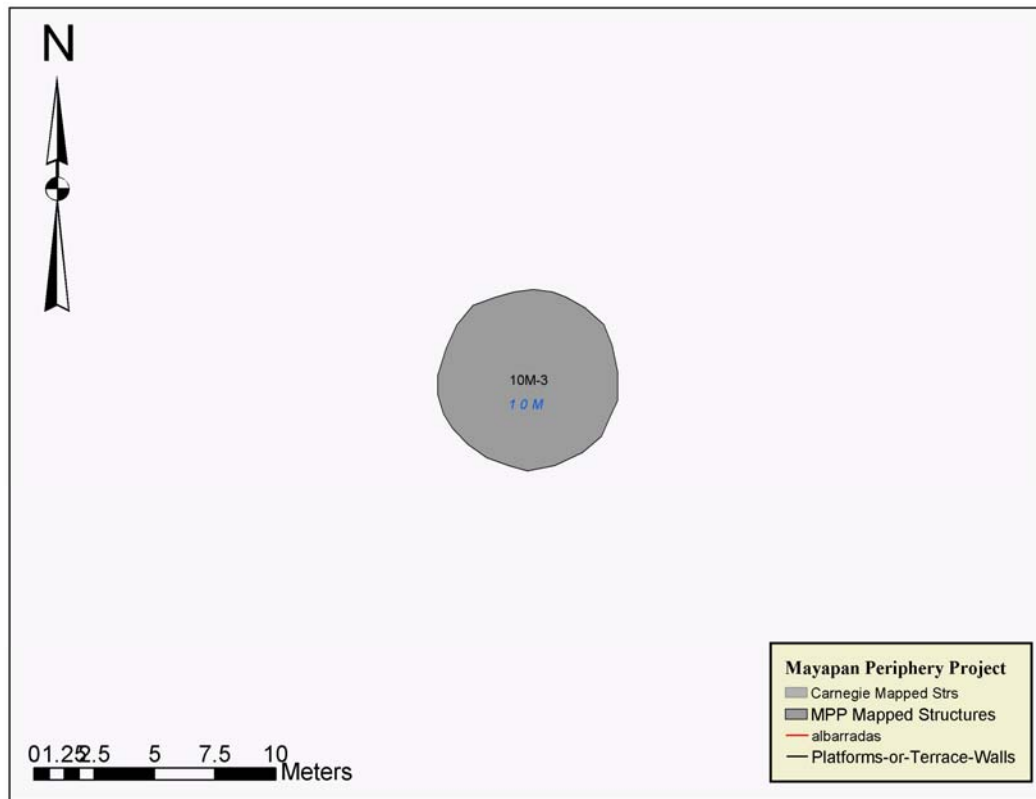


Figure 36 – Transect 2, Cluster 10M-3

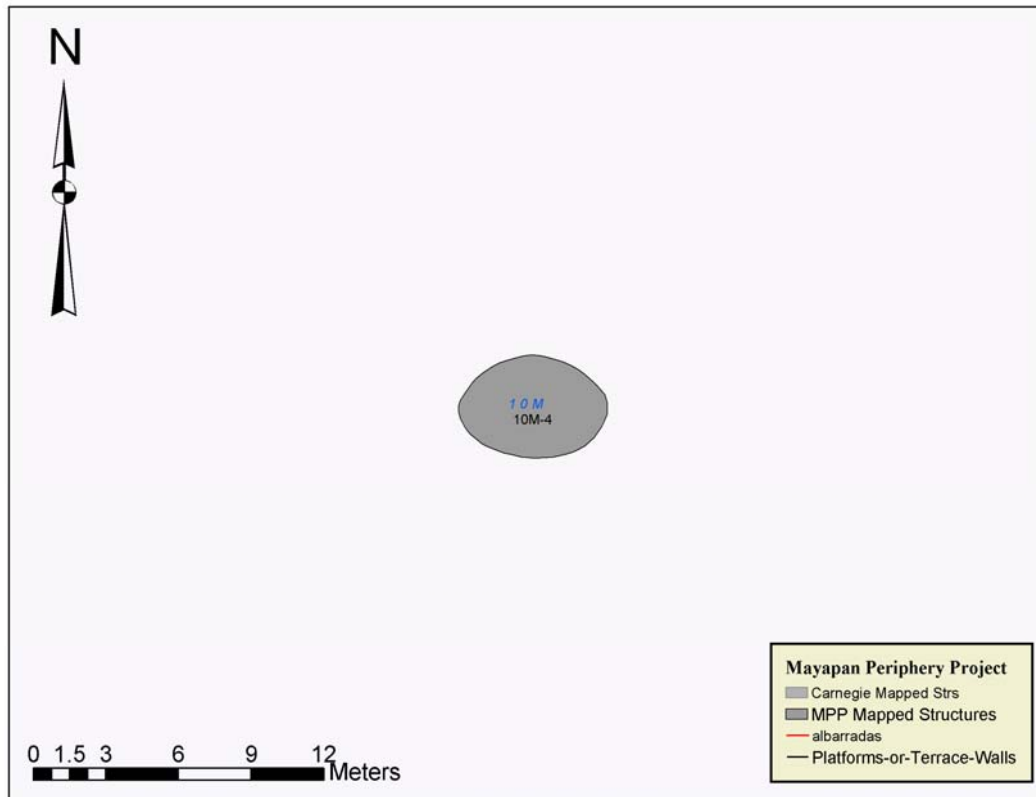


Figure 37 – Transect 2, Cluster 10M-4

## Transect 2

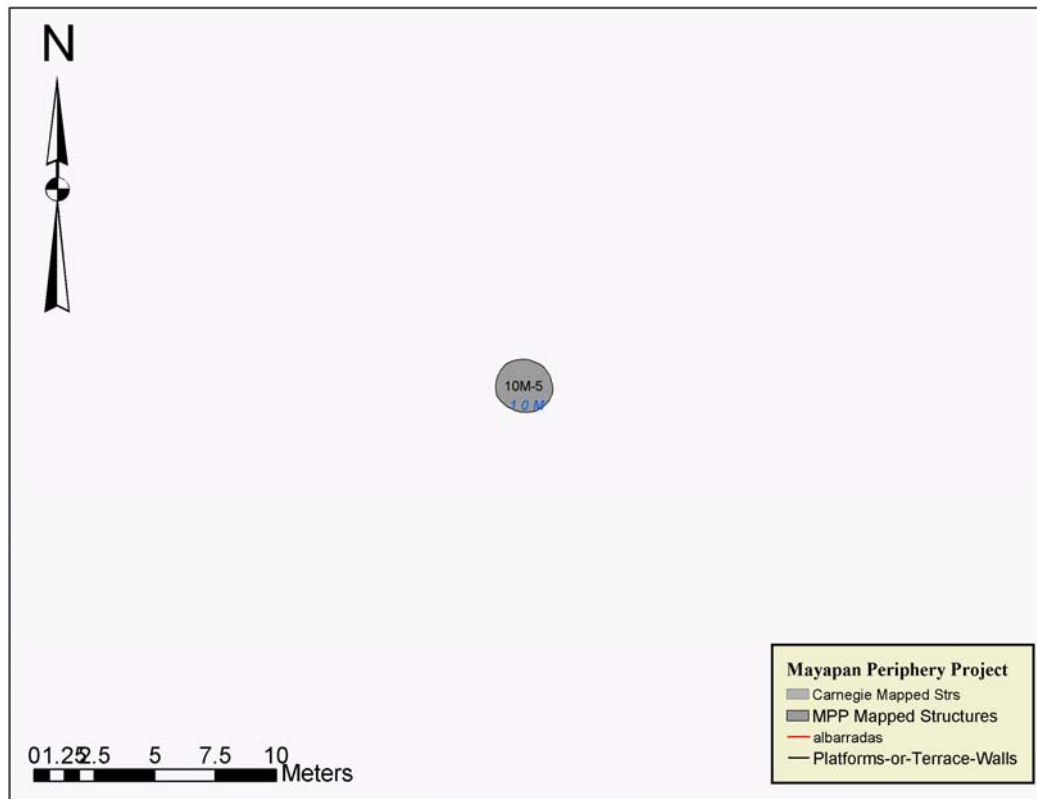


Figure 38 – Transect 2, Cluster 10M-5

### Transect 3

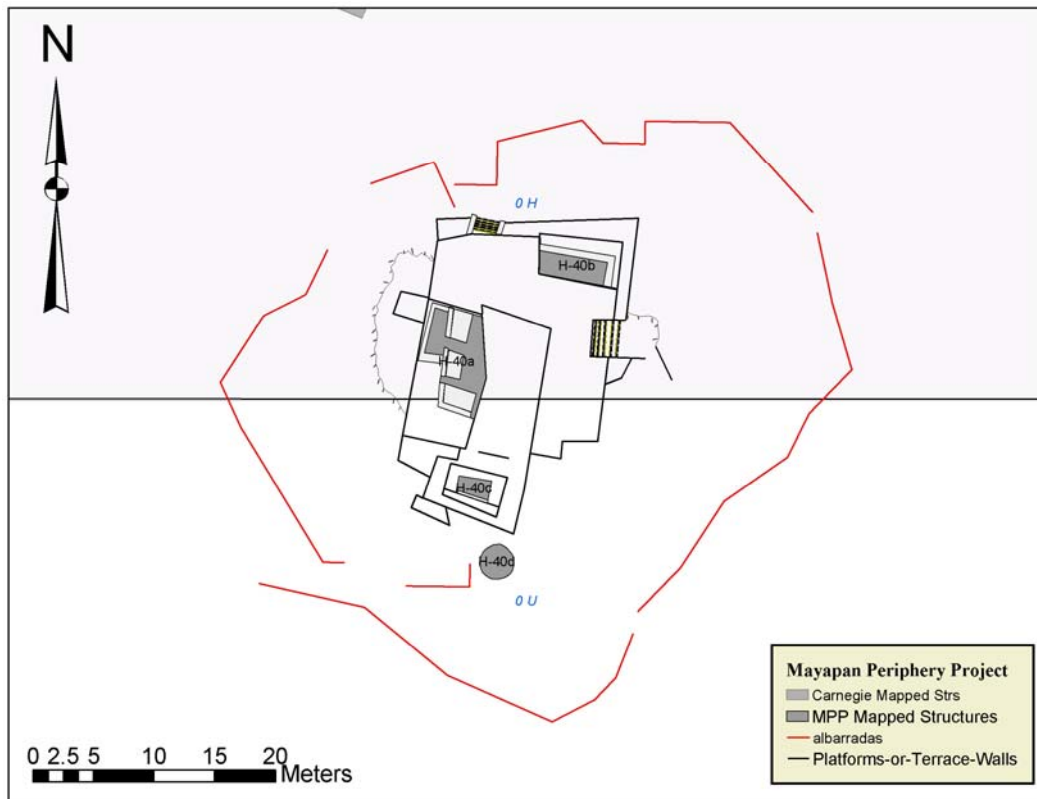


Figure 39 – Transect 3, Cluster H-40

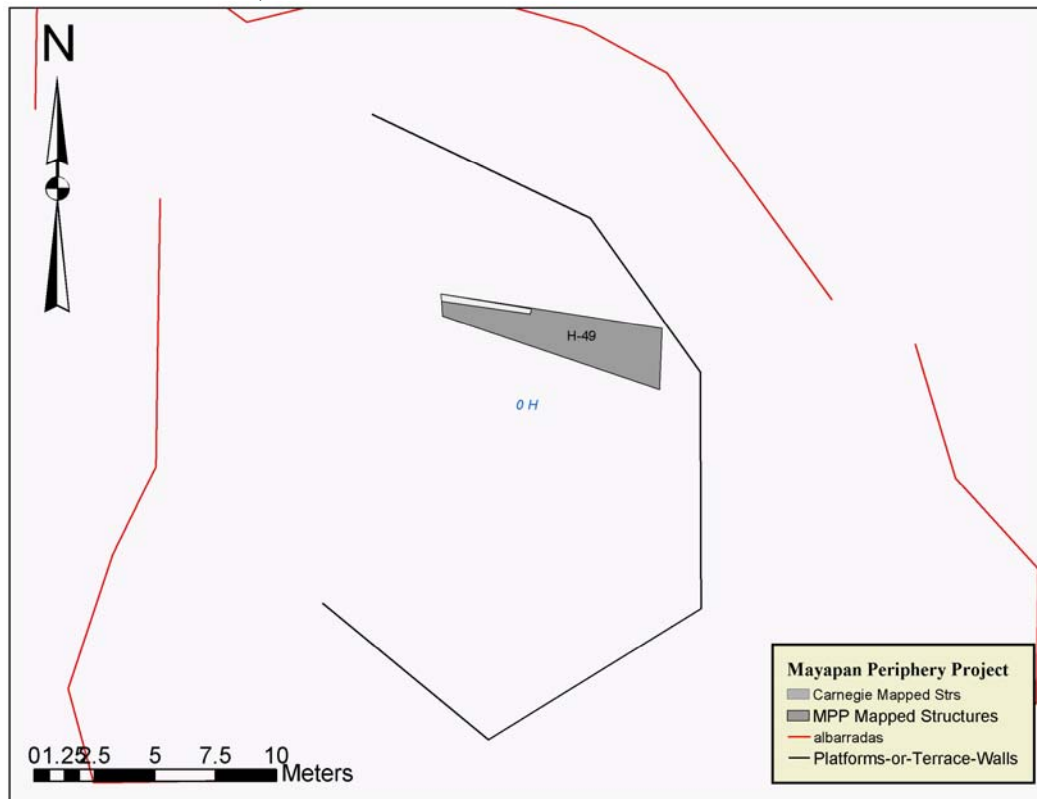


Figure 40 – Transect 3, Cluster H-49

### Transect 3

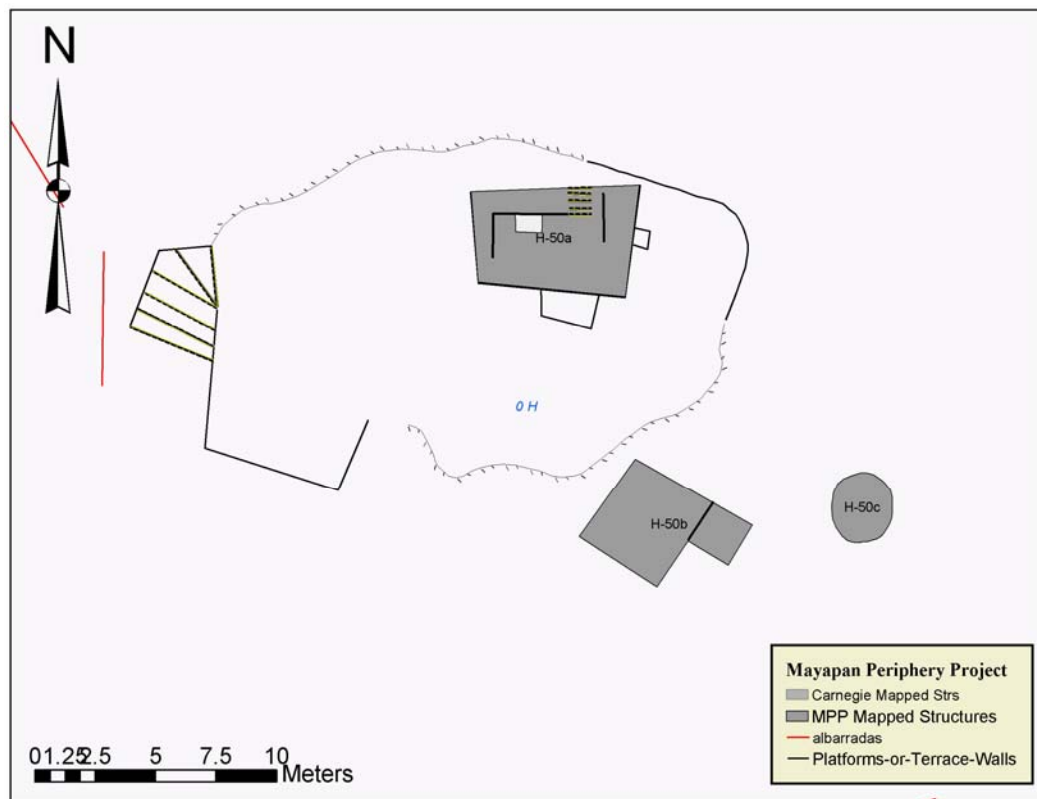


Figure 41 – Transect 3, Cluster H-50

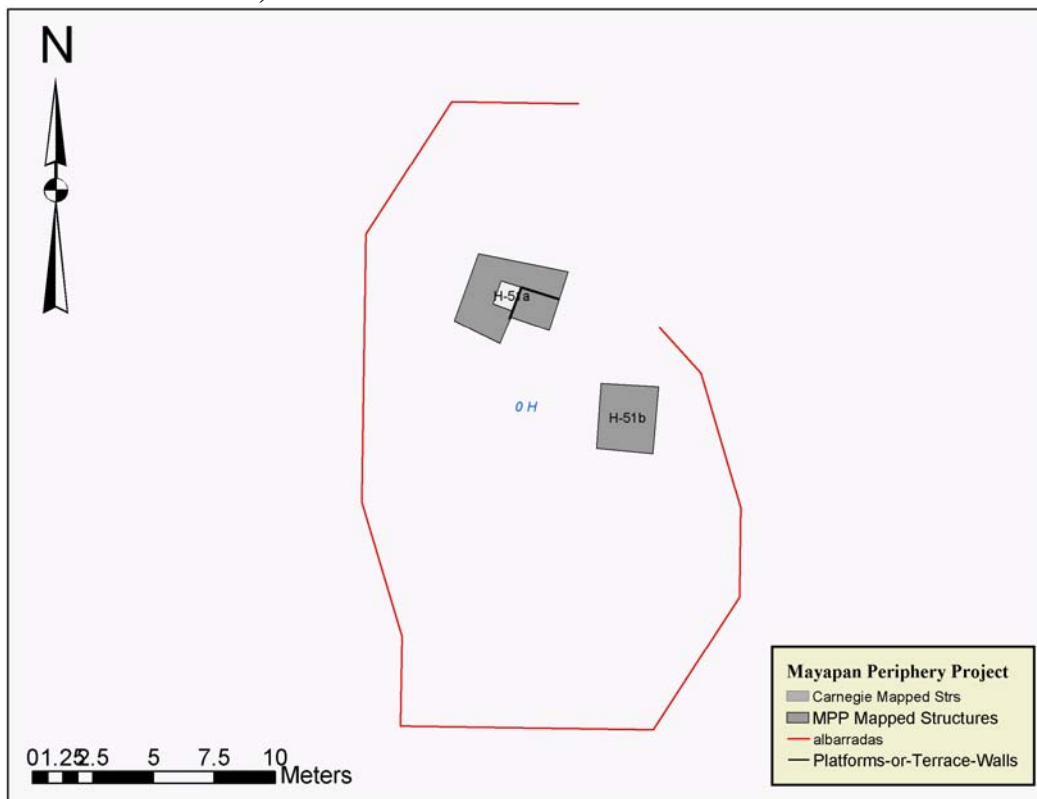


Figure 42 – Transect 3, Cluster H-51

### Transect 3

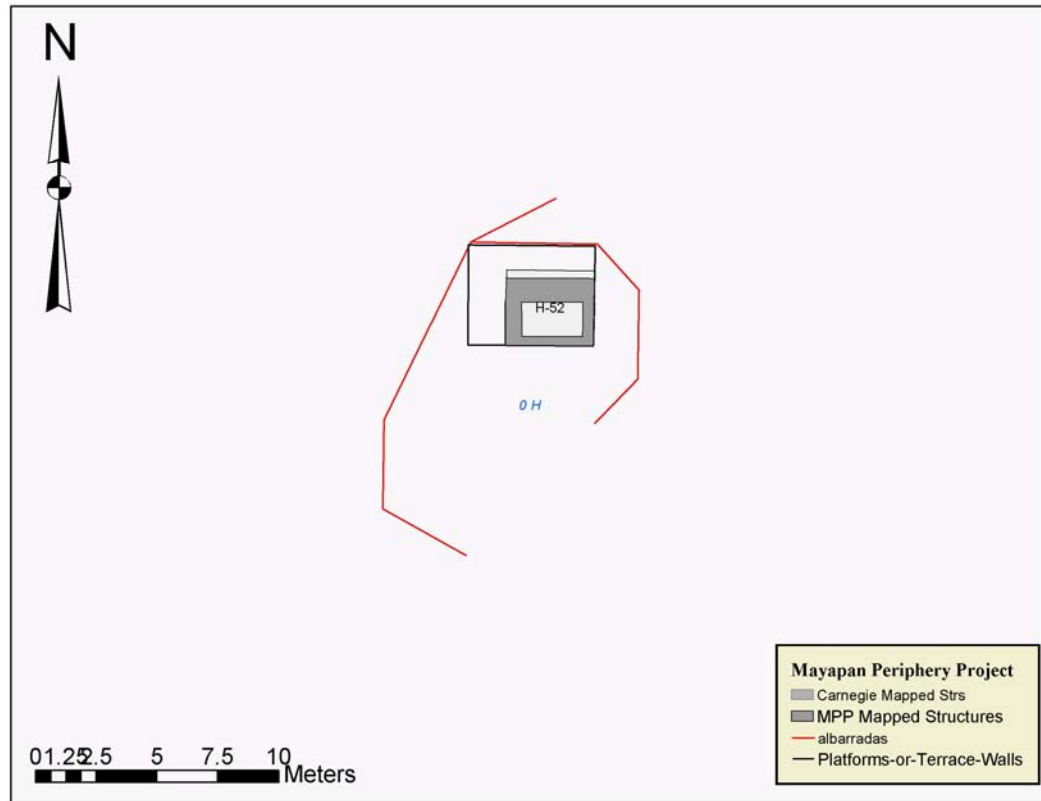


Figure 43 – Transect 3, Cluster H-52

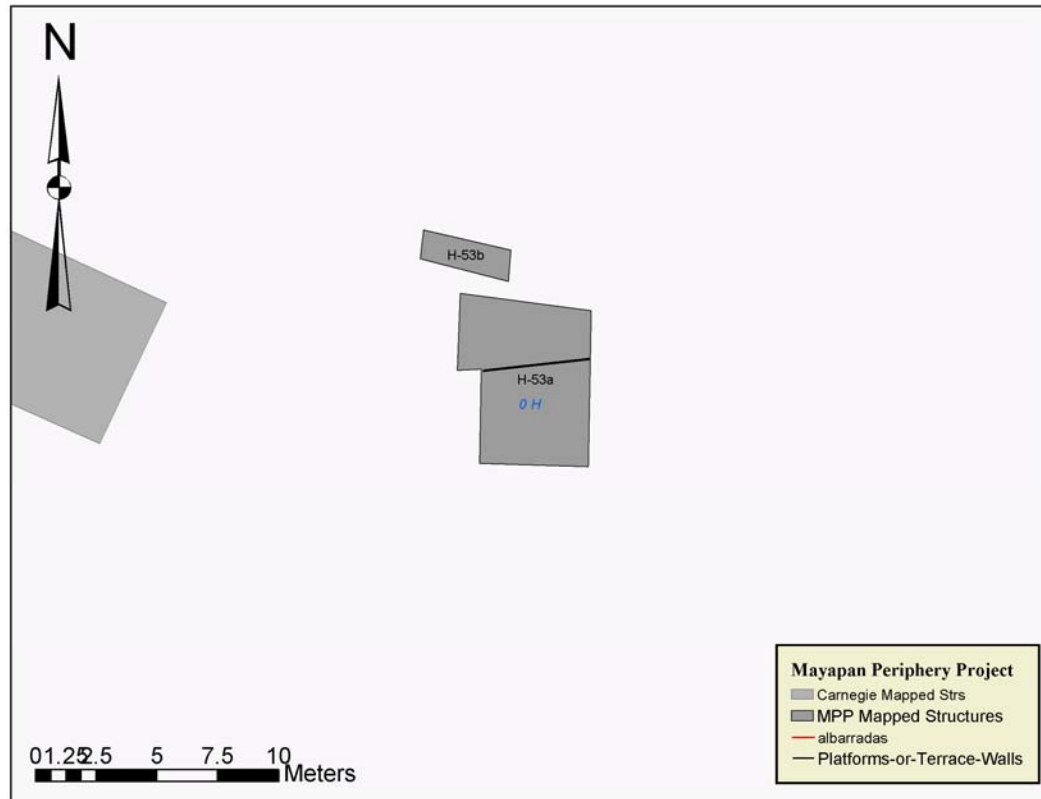


Figure 44 – Transect 3, Cluster H-53

### Transect 3

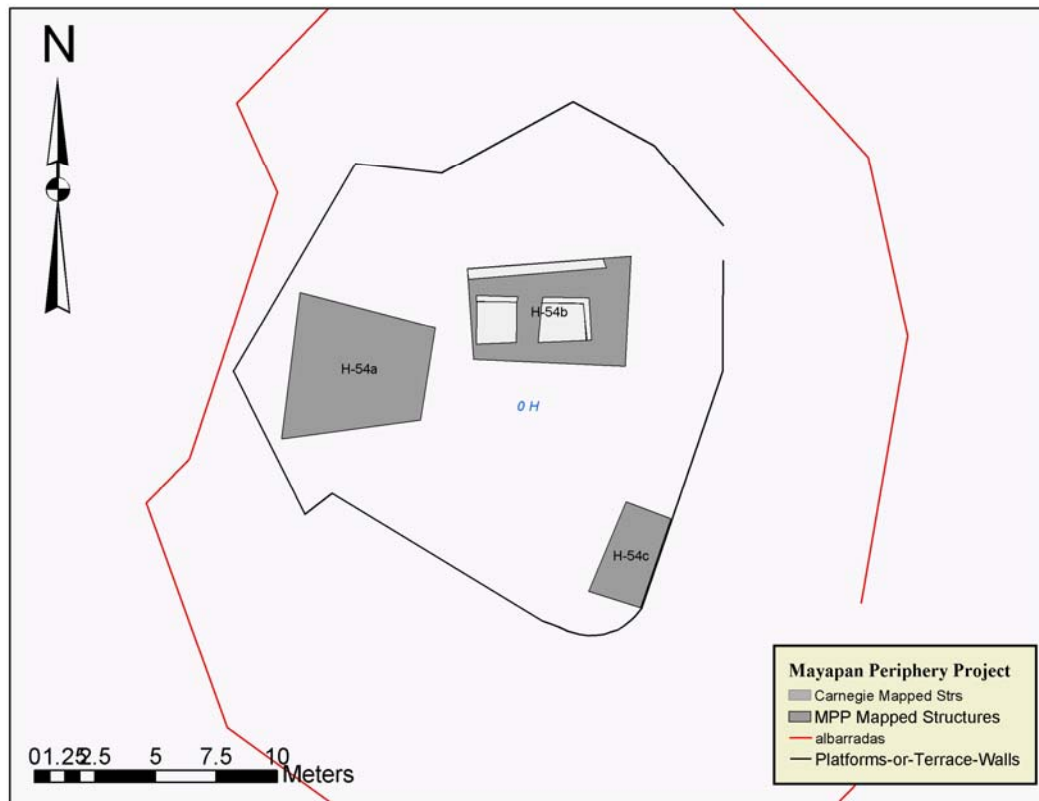


Figure 45 – Transect 3, Cluster H-54

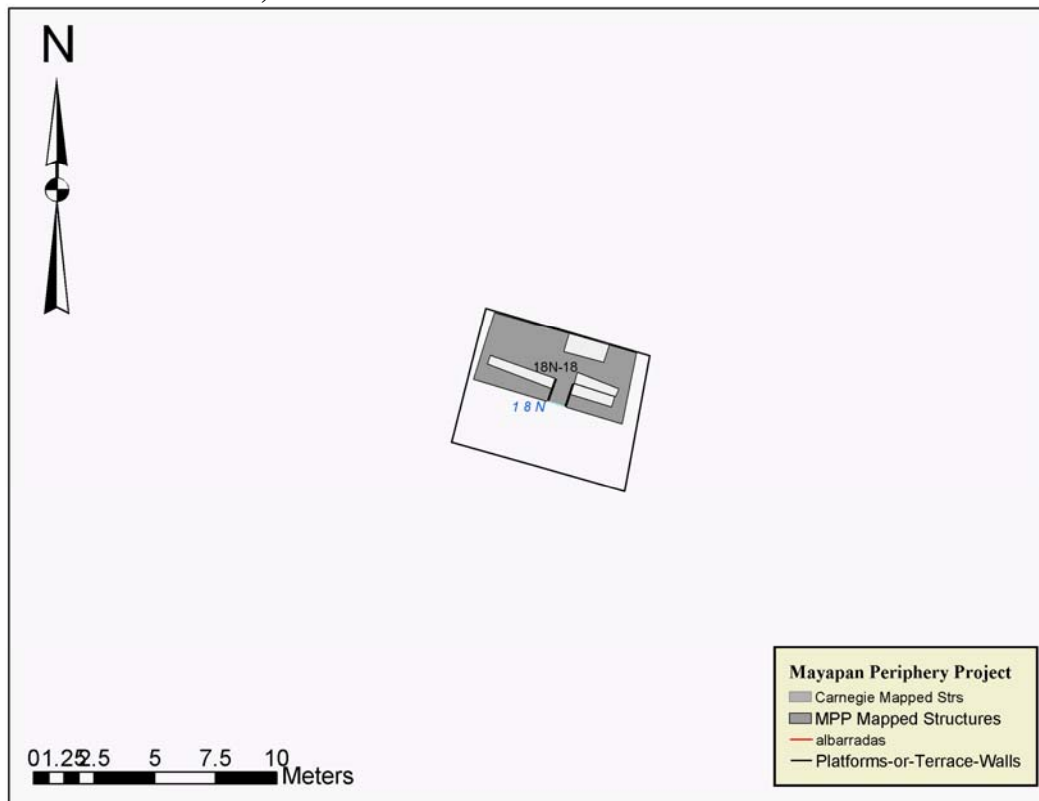


Figure 46 – Transect 3, Cluster 18N-8



### Transect 3

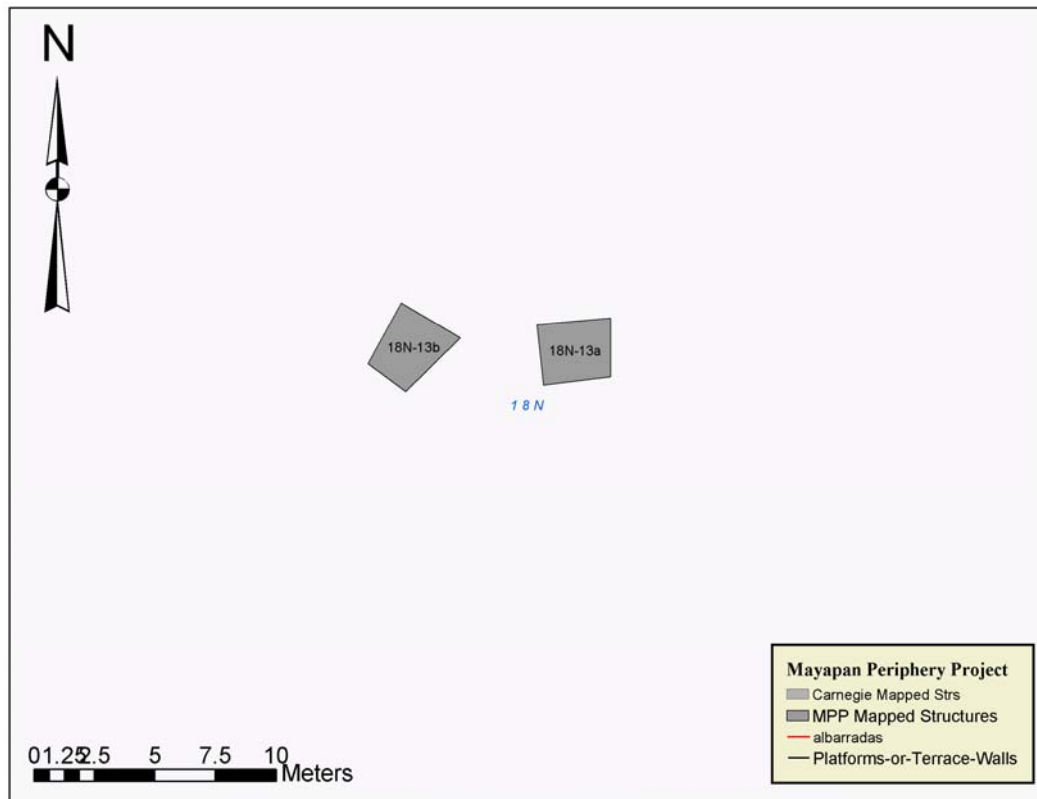


Figure 47 – Transect 3, Cluster 18N-13

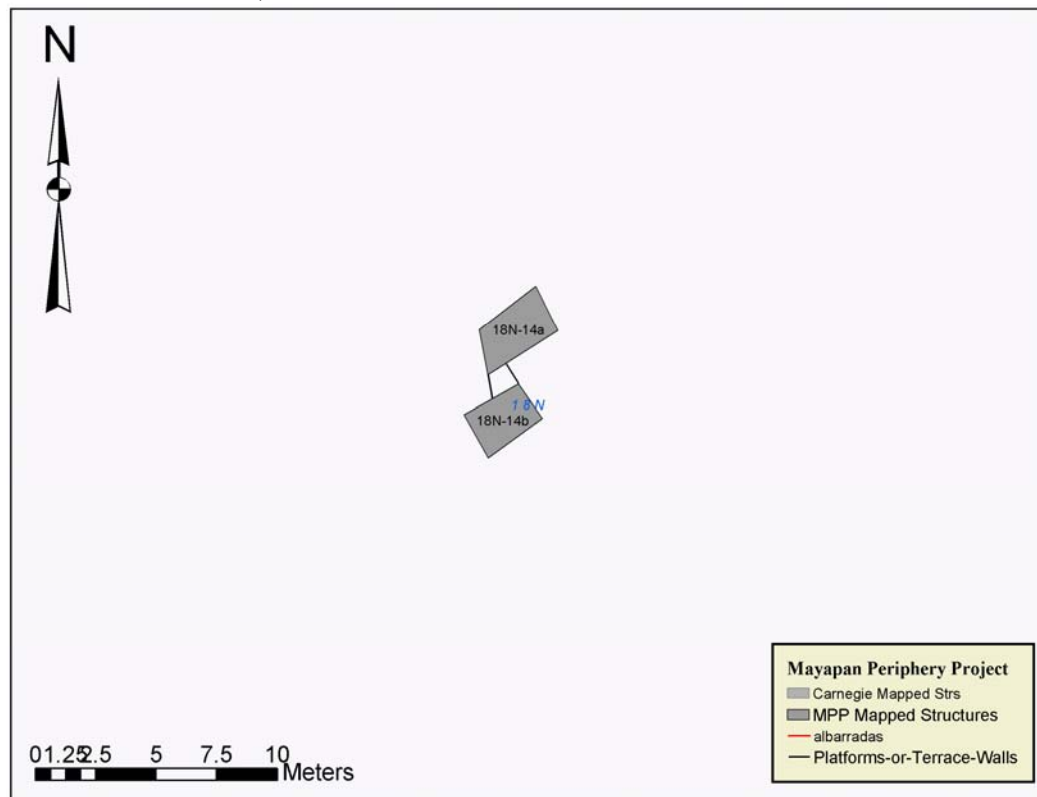


Figure 48 – Transect 3, Cluster 18N-14

### Transect 3

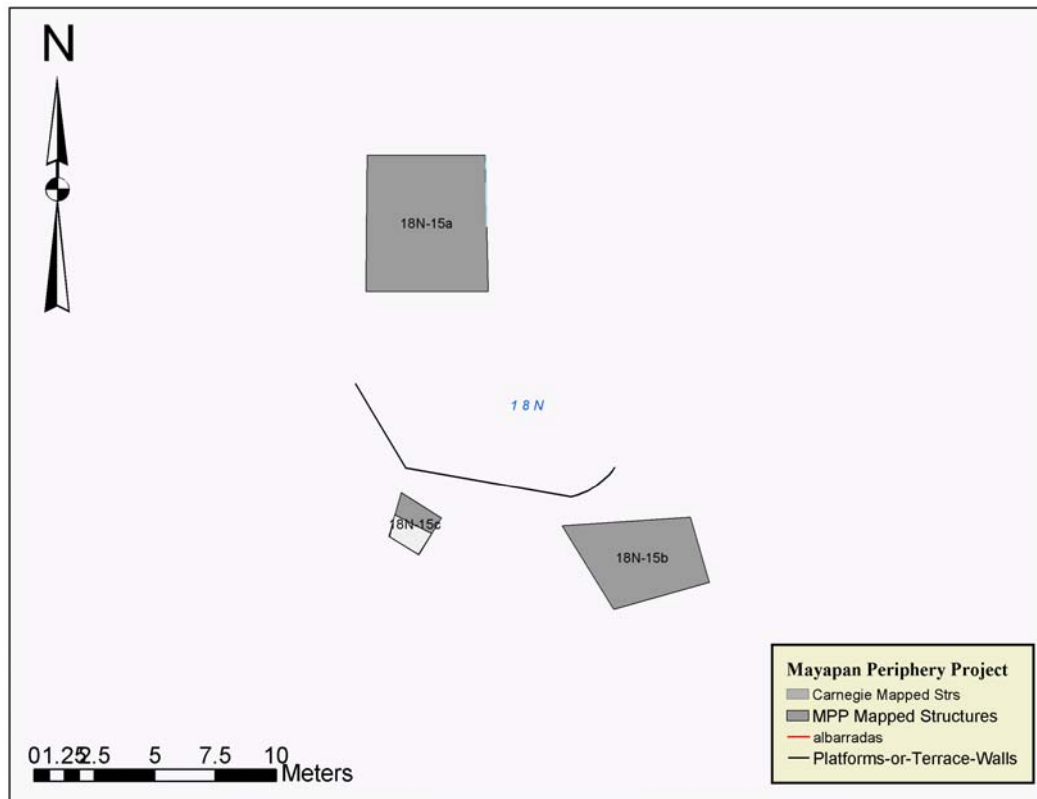


Figure 49 – Transect 3, Cluster 18N-15

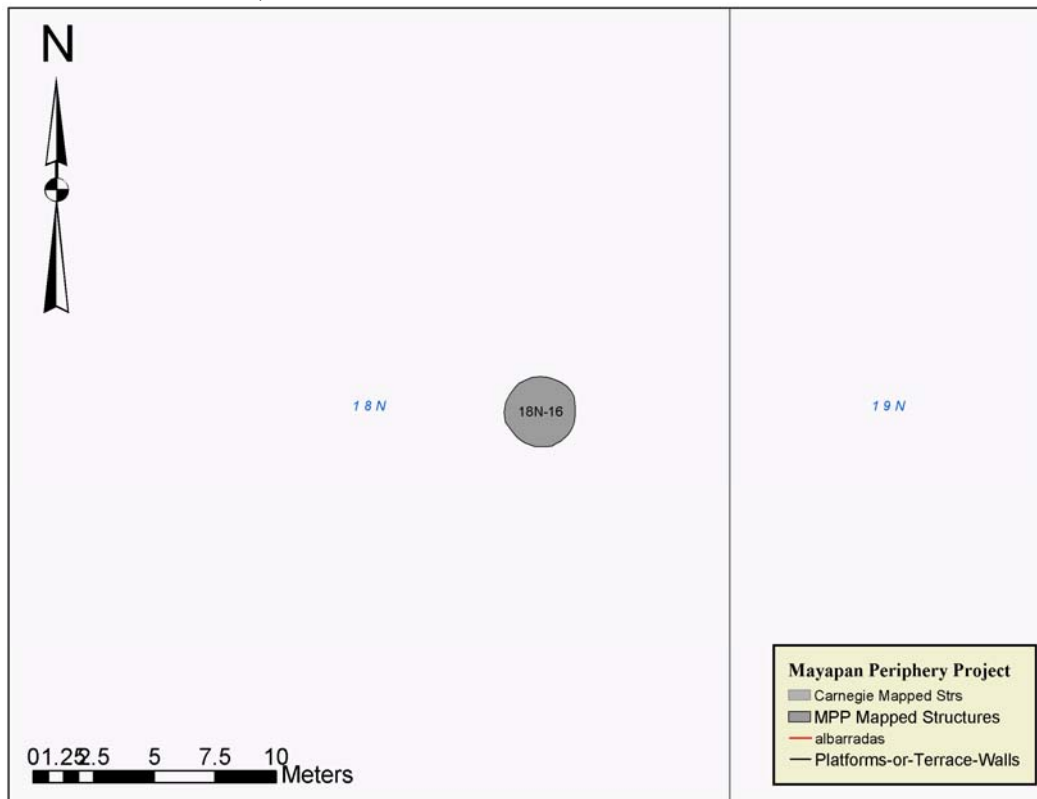


Figure 50 – Transect 3, Cluster 18N-16

### Transect 3

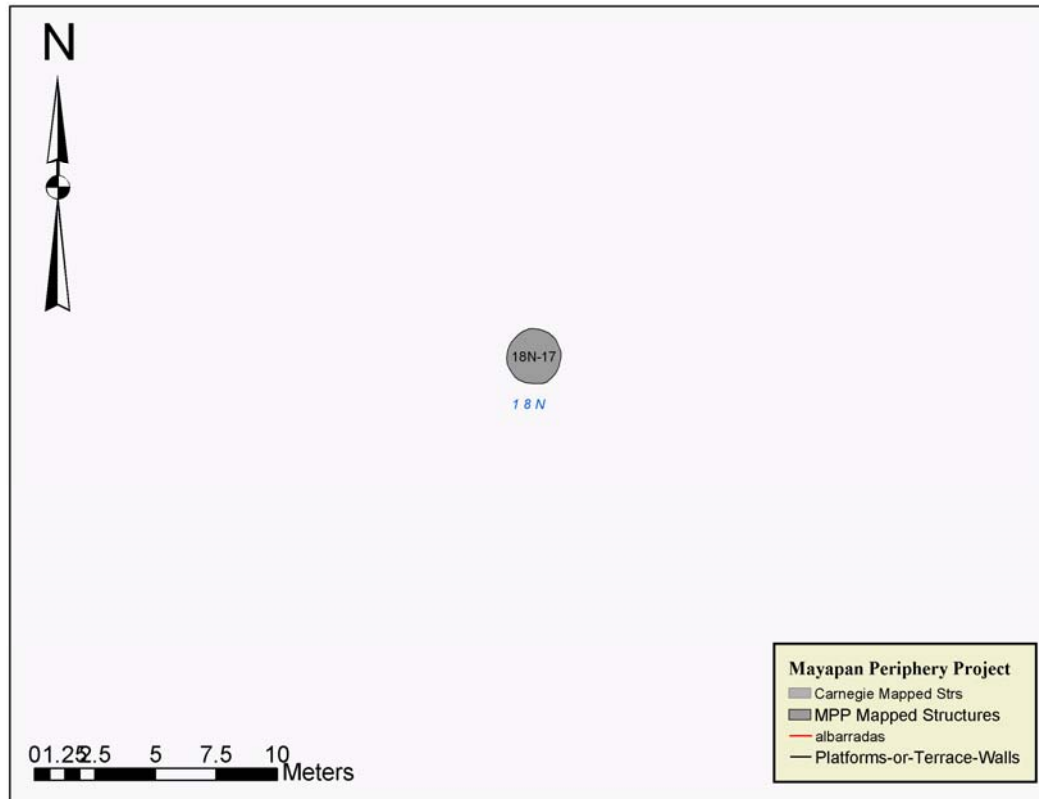


Figure 51 – Transect 3, Cluster 18N-17

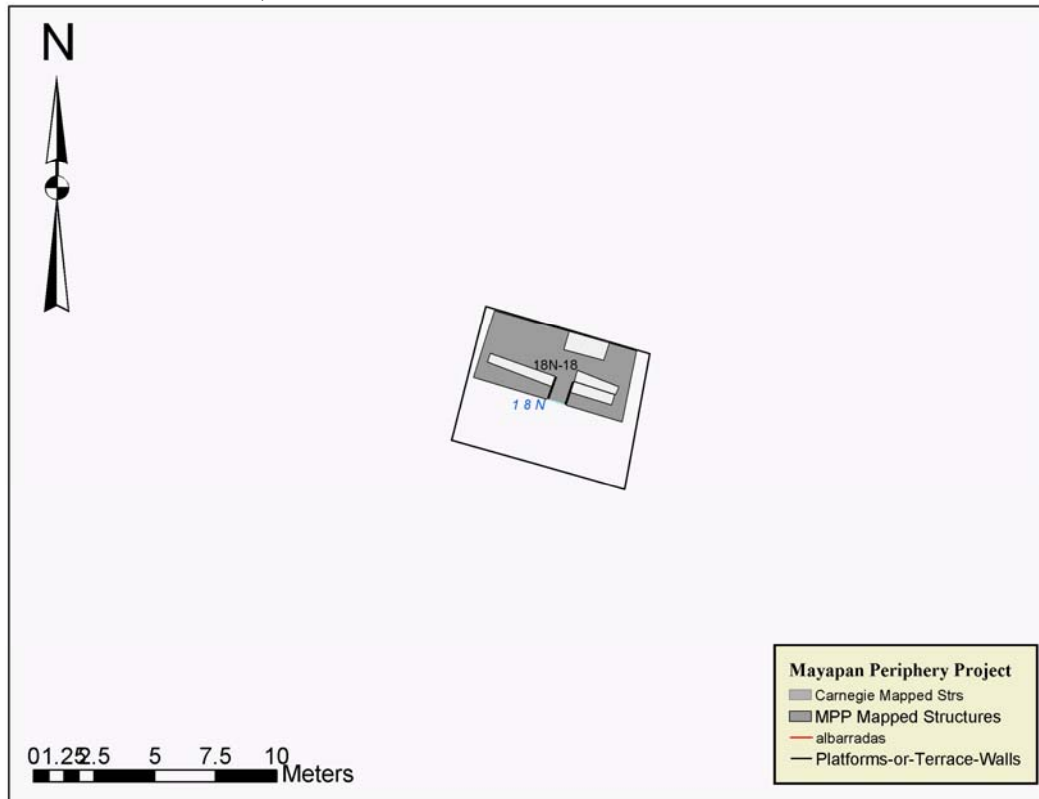


Figure 52 – Transect 3, Cluster 18N-18

### Transect 3

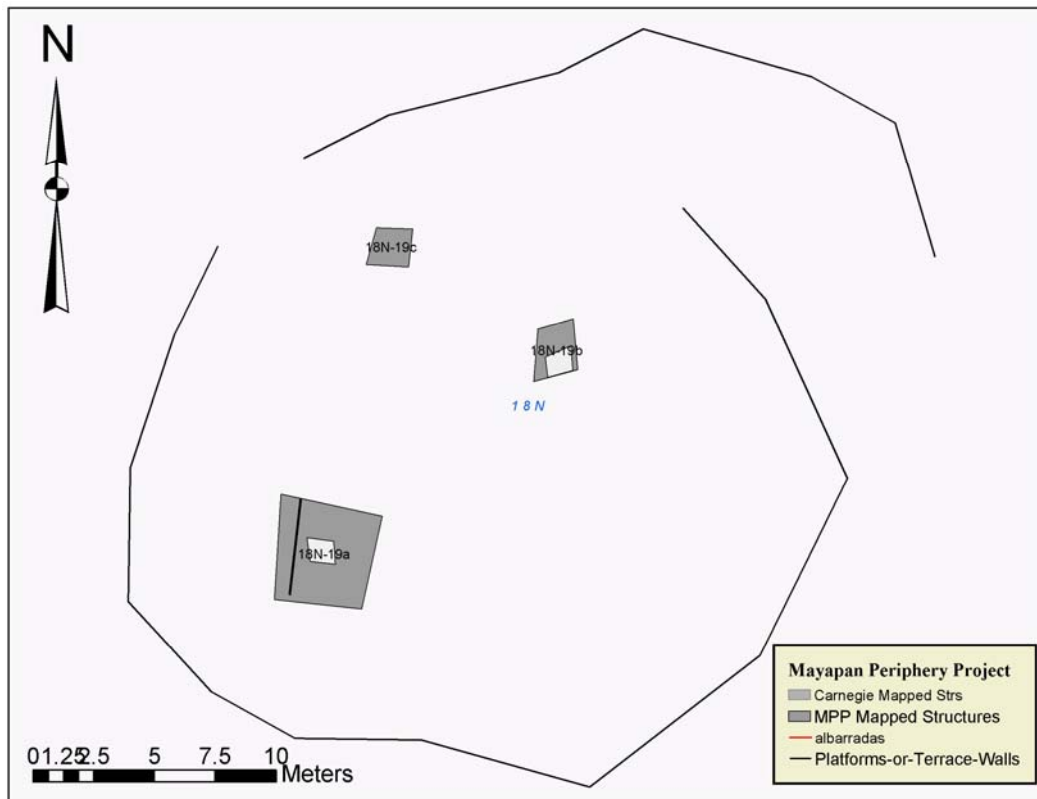


Figure 53 – Transect 3, Cluster 18N-19

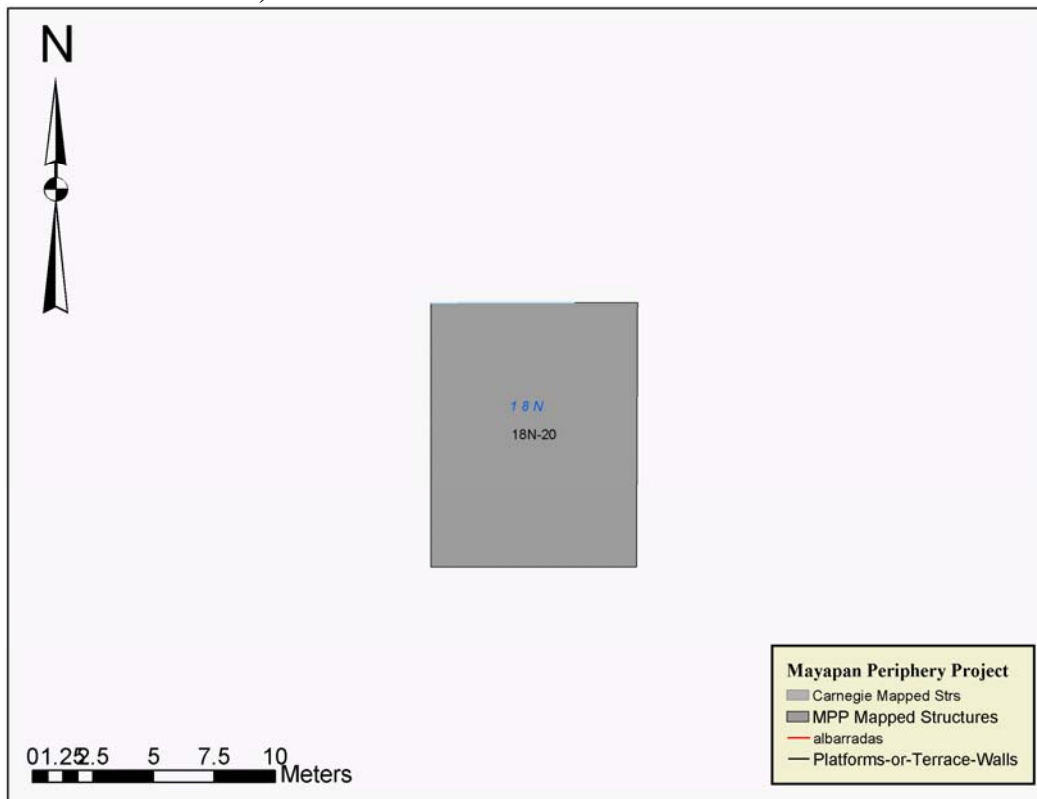


Figure 54 – Transect 3, Cluster 18N-20

### Transect 3

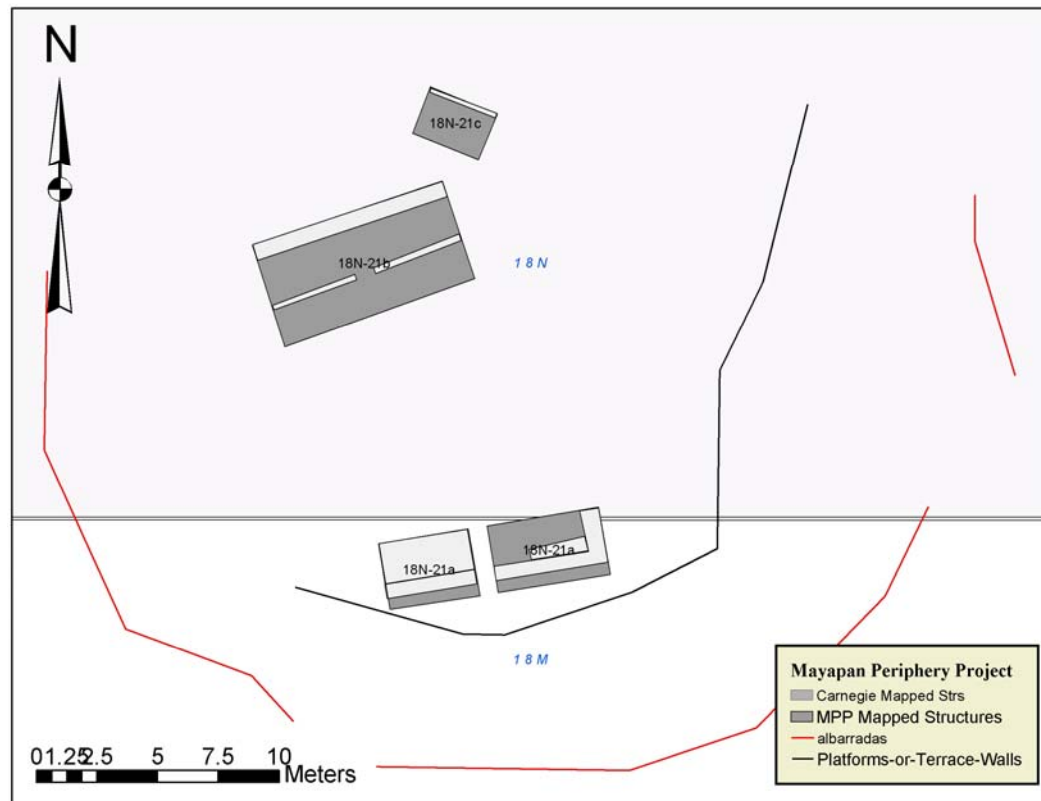
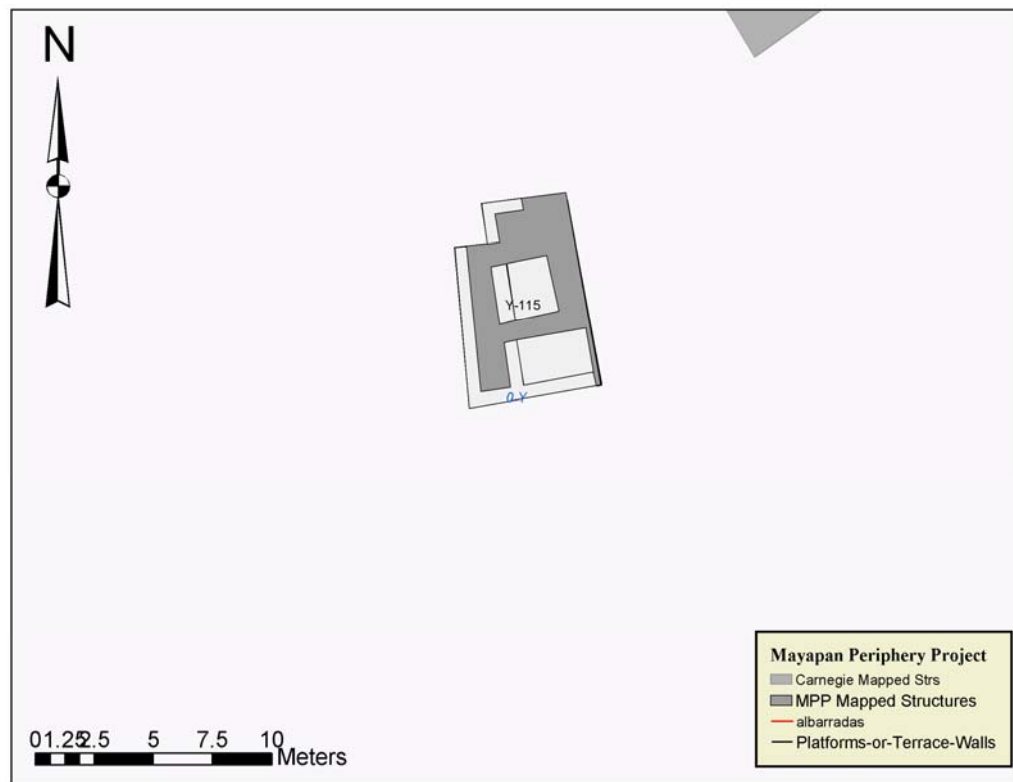
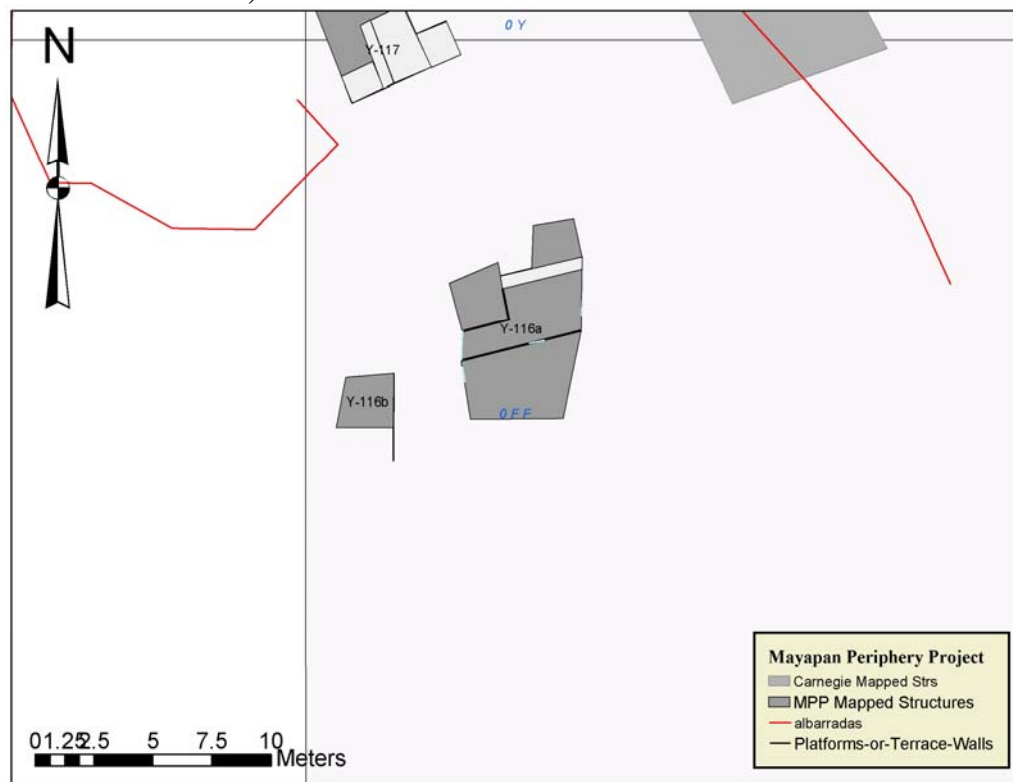


Figure 55 – Transect 3, Cluster 18N-21

# **Transect 4**



**Figure 56 – Transect 4, Cluster Y-115**



**Figure 57 – Transect 4, Cluster Y-116**

### Transect 4

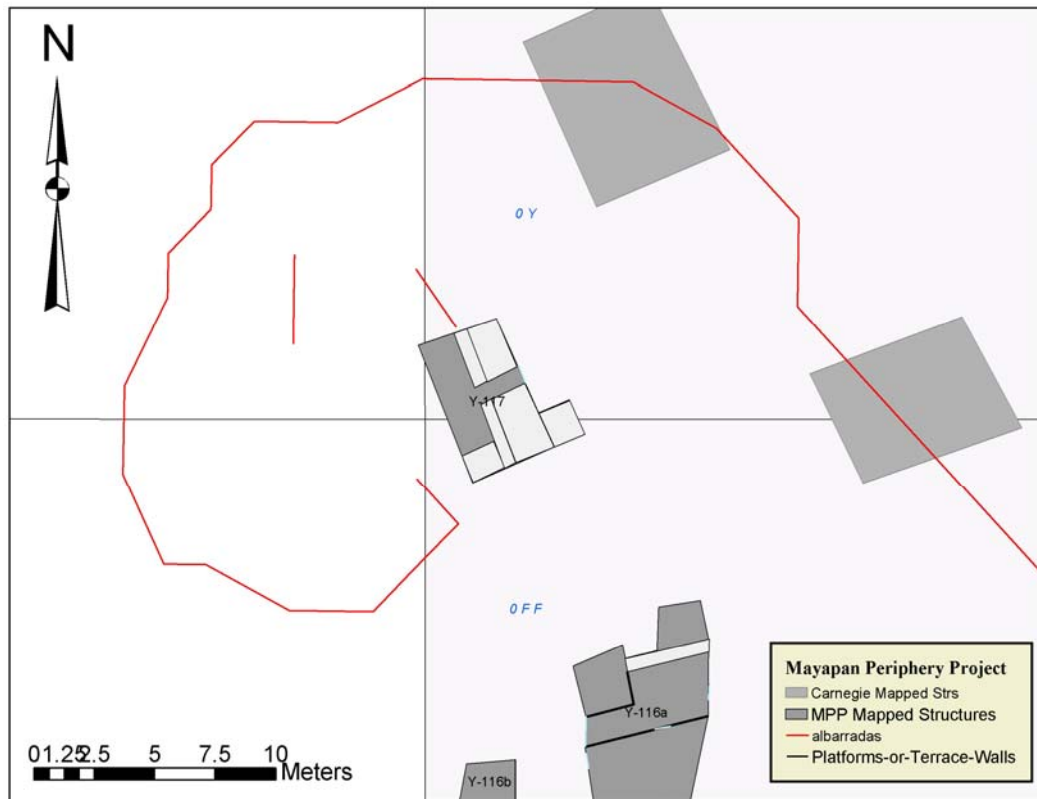


Figure 58 – Transect 4, Cluster Y-117

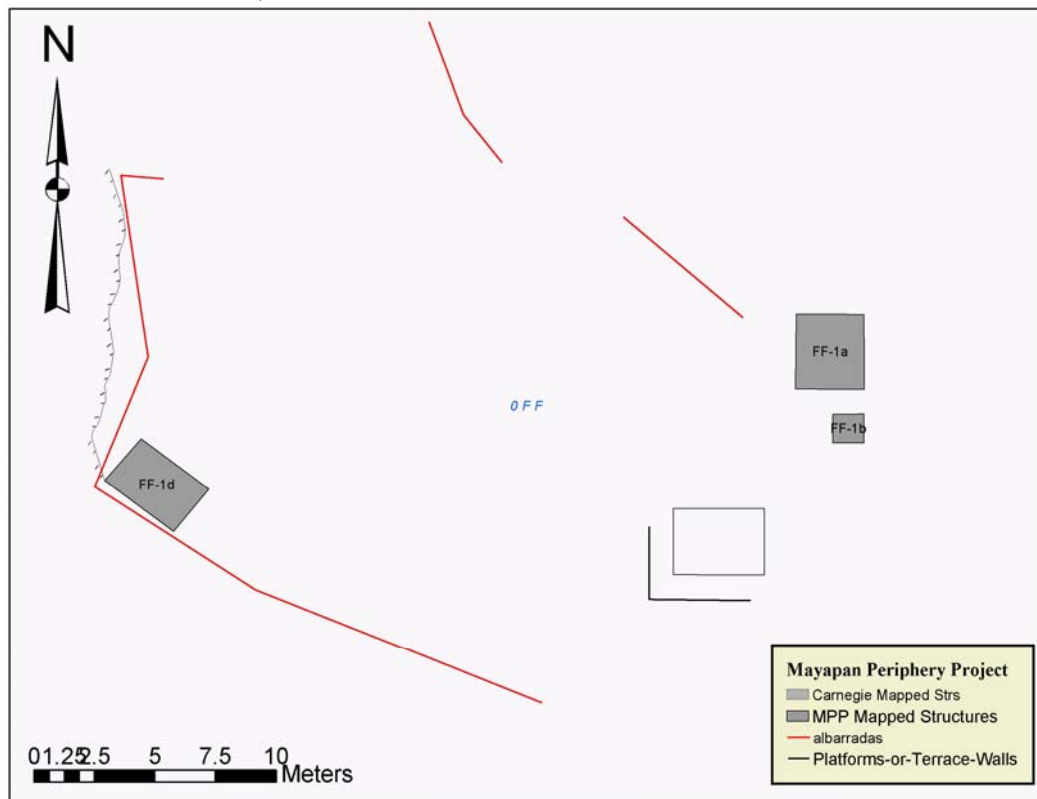


Figure 59 – Transect 4, Cluster FF-1



## Transect 4

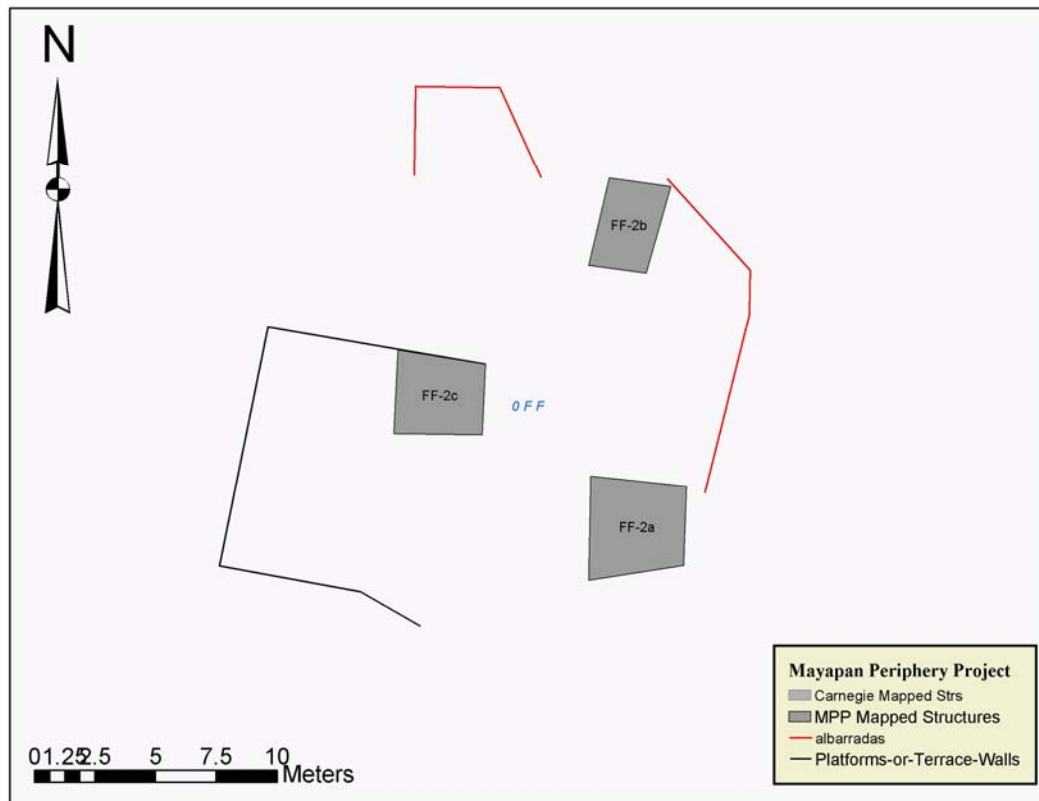


Figure 60 – Transect 4, Cluster FF-2

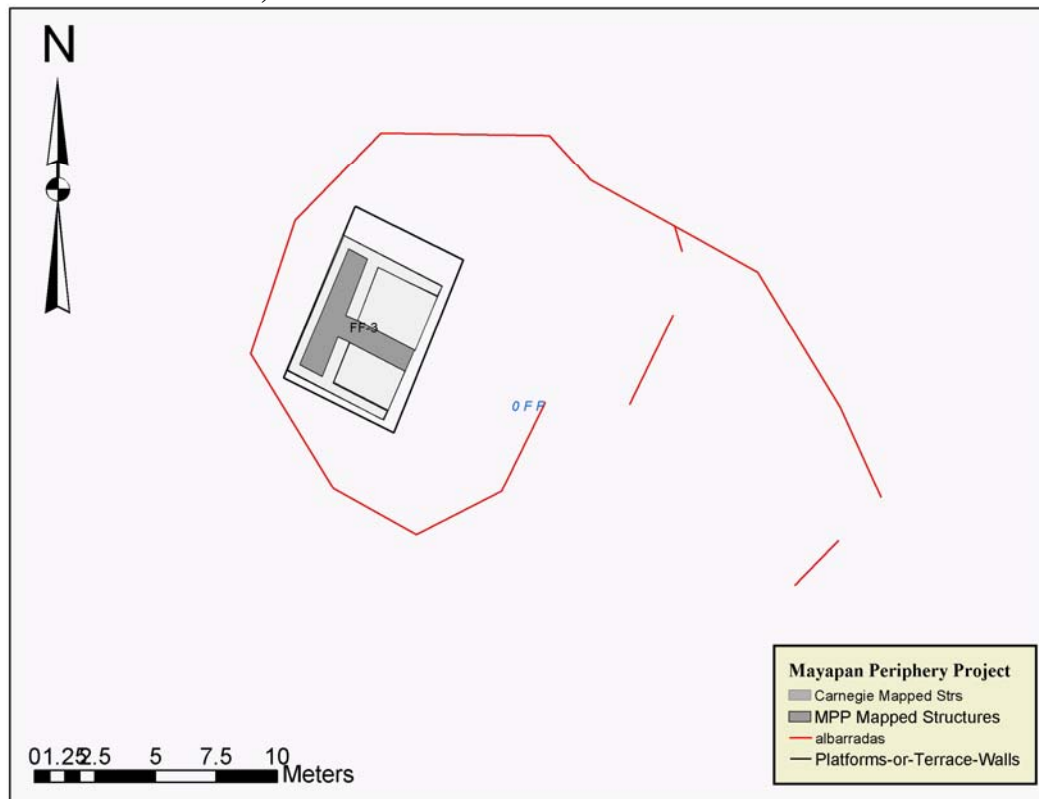


Figure 61 – Transect 4, Cluster FF-3

## Transect 4

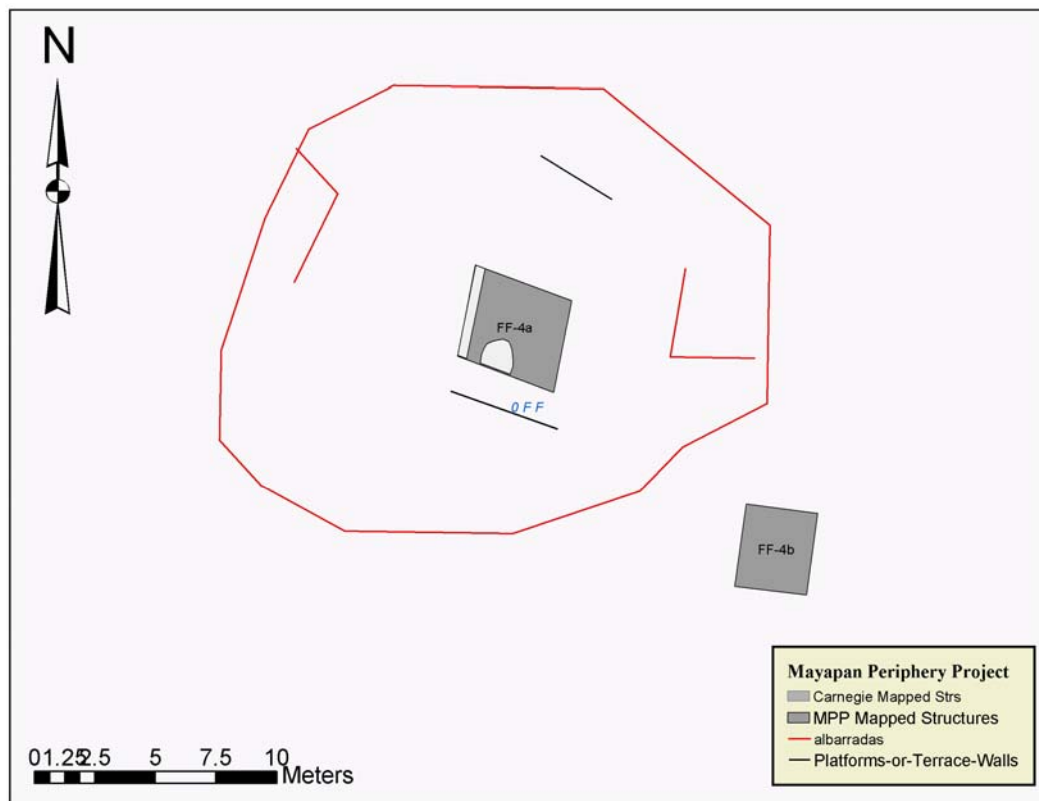


Figure 62 – Transect 4, Cluster FF-4

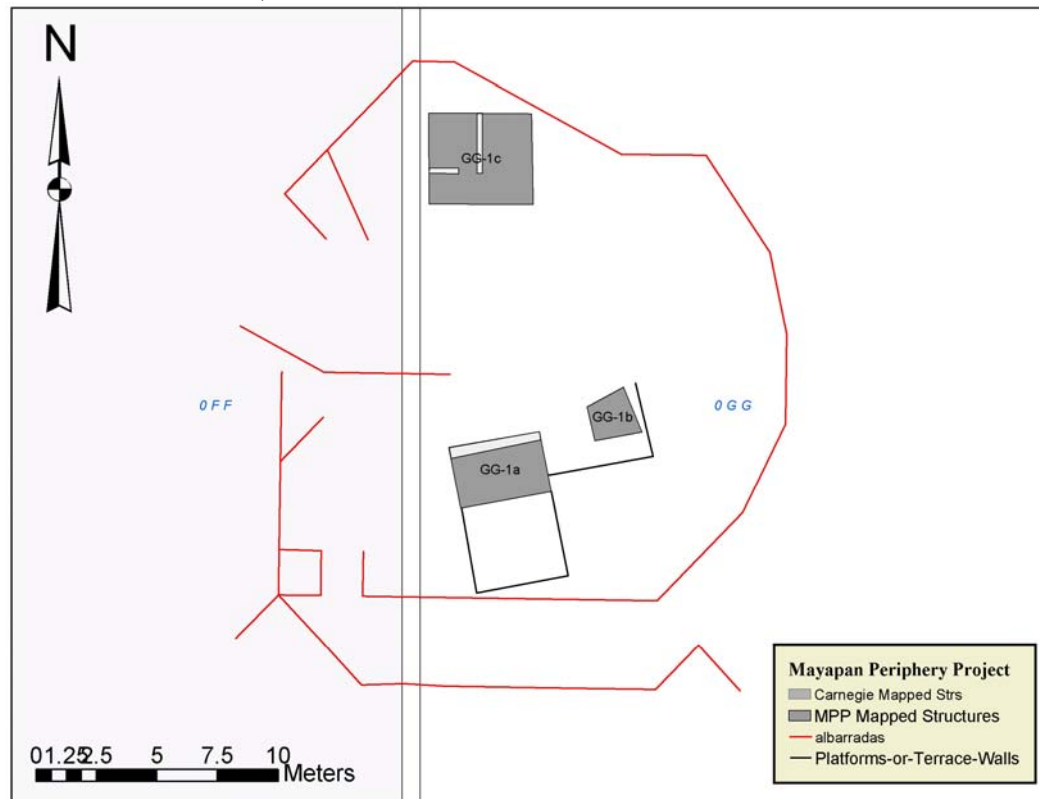


Figure 63 – Transect 4, Cluster GG-1

## Transect 4

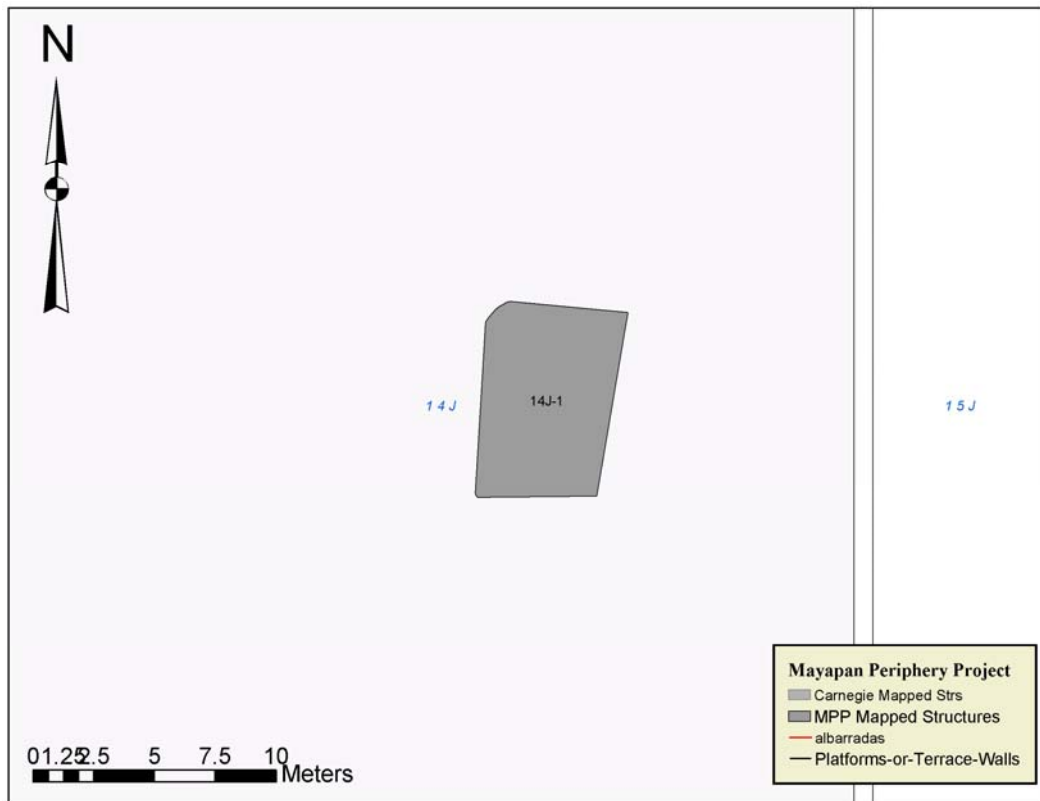


Figure 64 – Transect 4, Cluster 14J-1

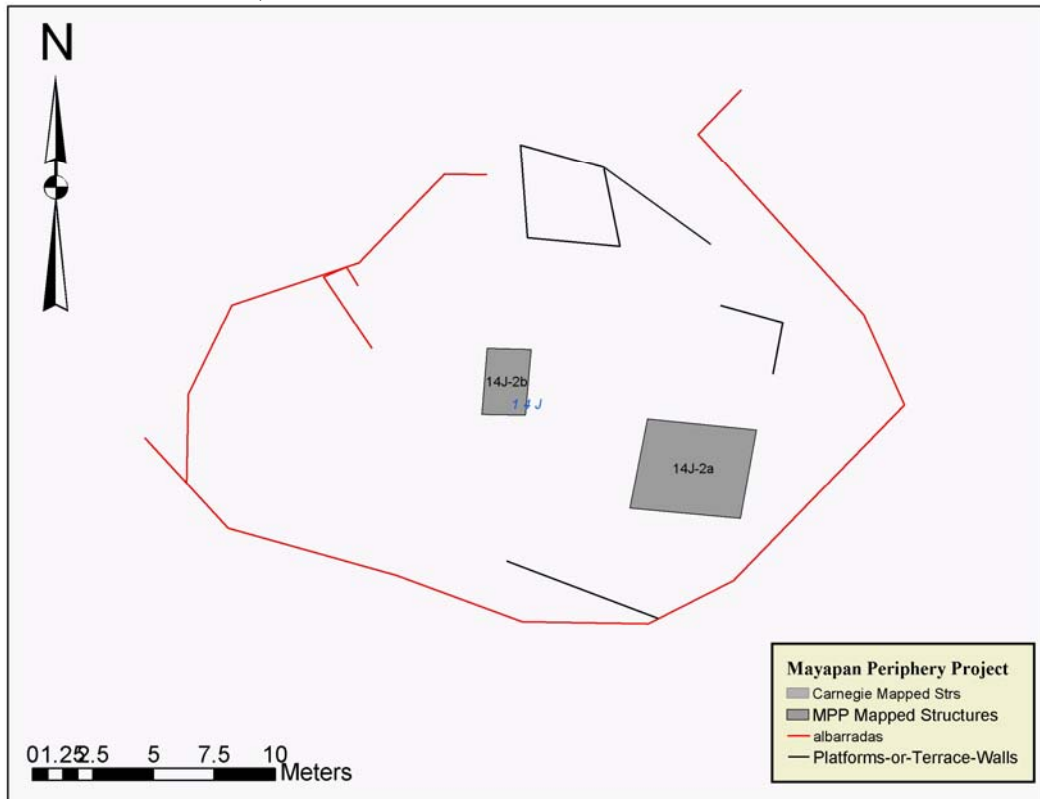


Figure 65 – Transect 4, Cluster 14J-2

## Transect 4

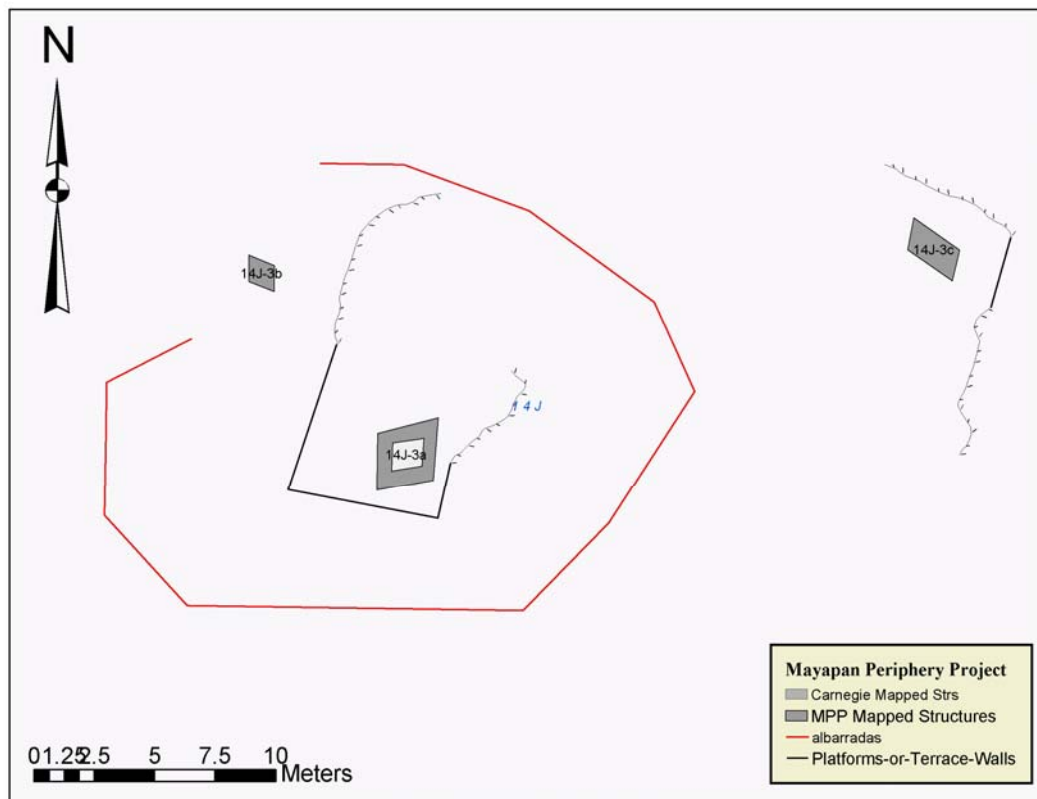


Figure 66 – Transect 4, Cluster 14J-3

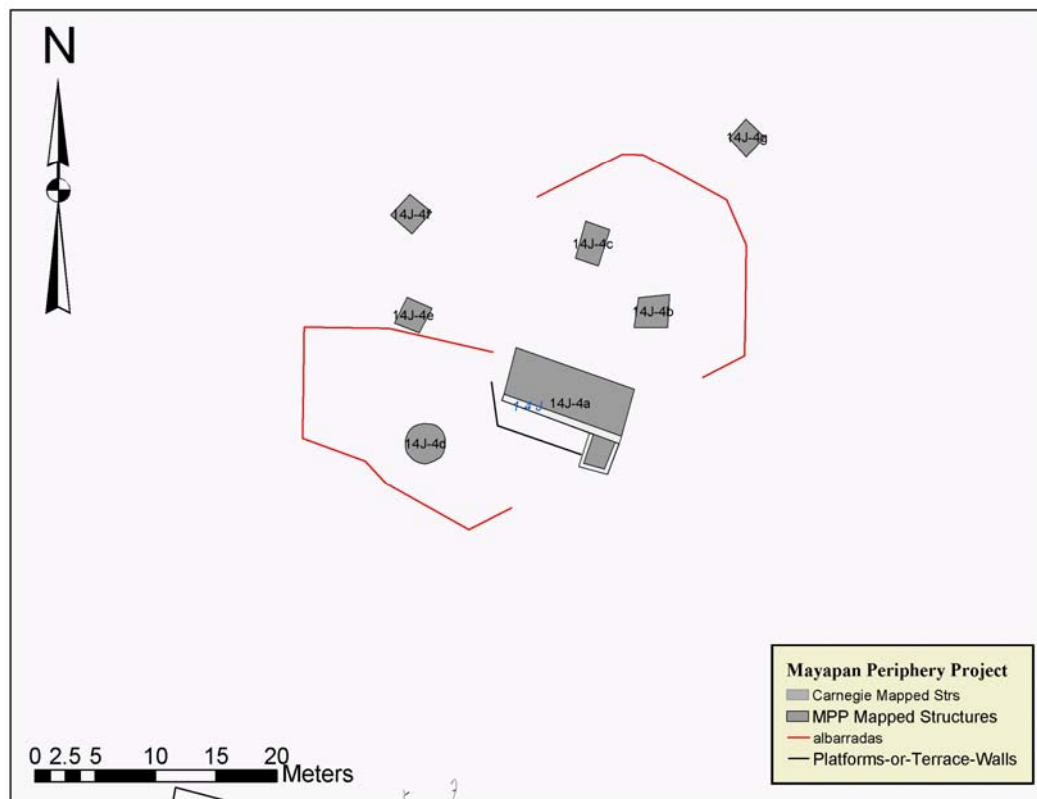


Figure 67 – Transect 4, Cluster 14J-4

## Transect 4

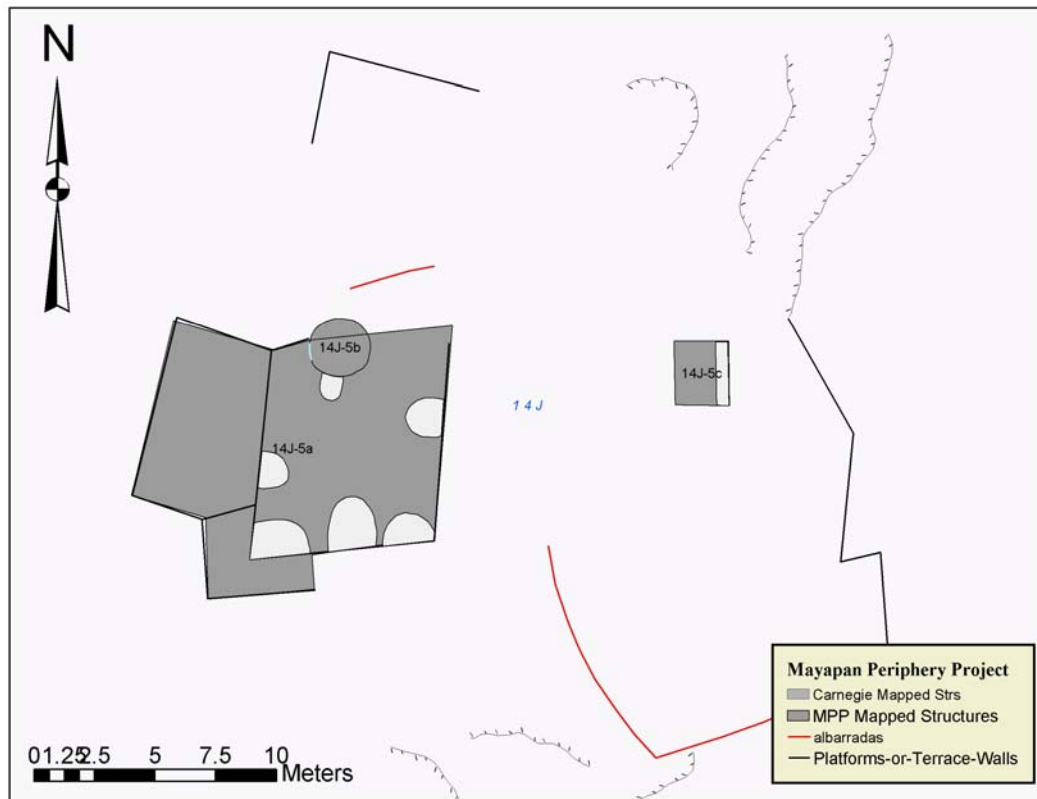


Figure 68 – Transect 4. Cluster 14J-5

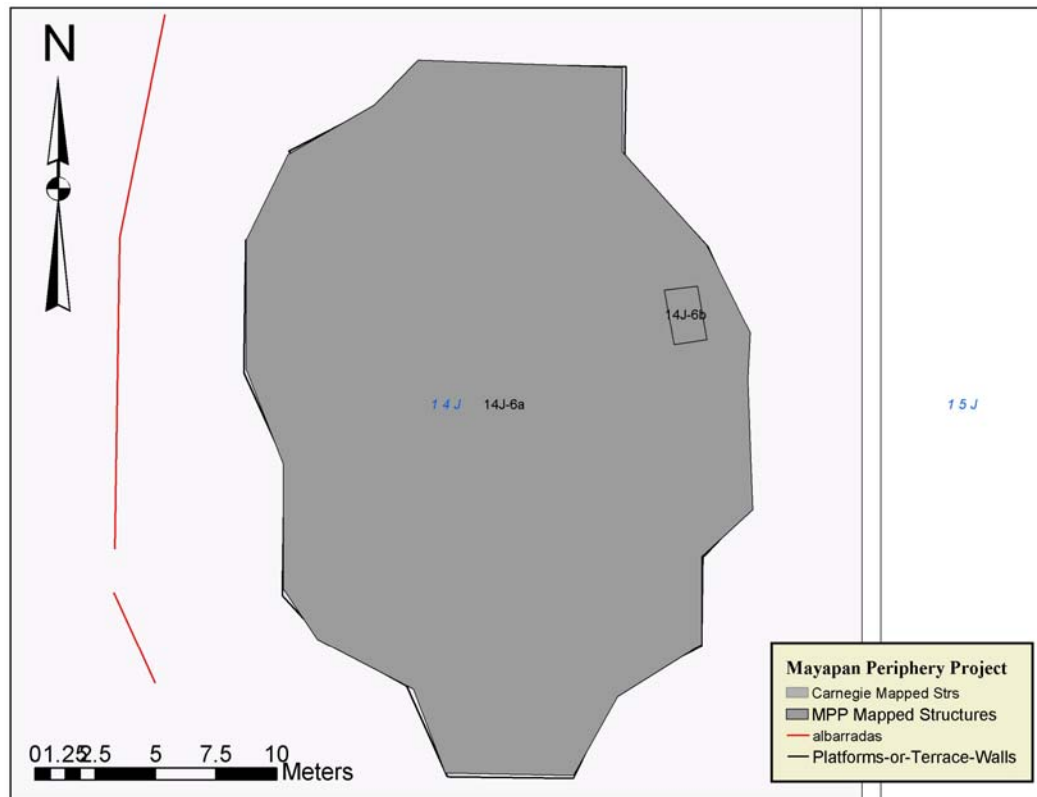


Figure 69 – Transect 4, Cluster 14J-6

## Transect 4

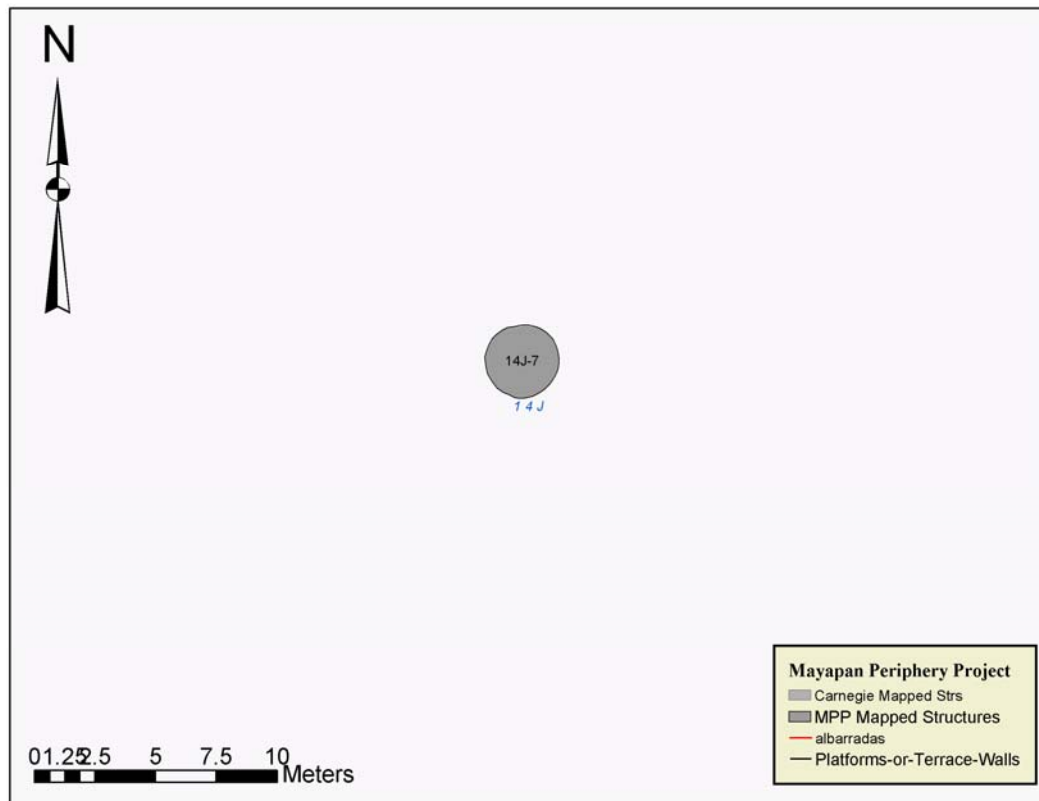


Figure 70 – Transect 4, Cluster 14J-7

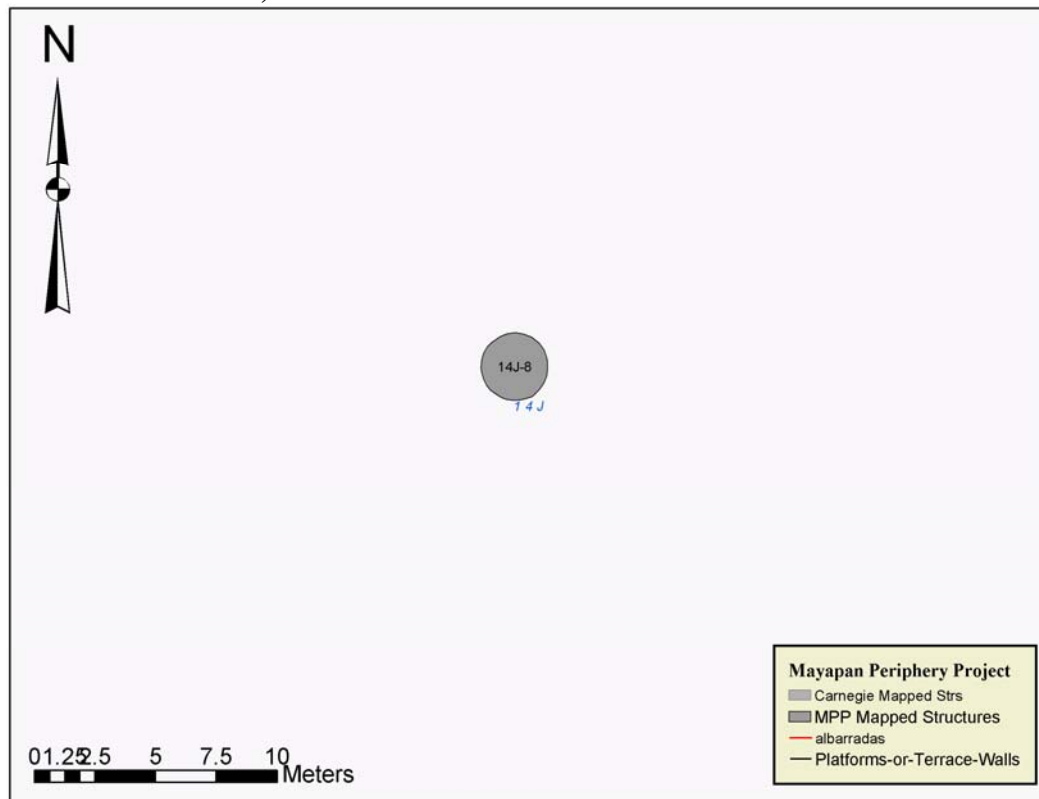


Figure 71 – Transect 4, Cluster 14J-8

## Transect 4

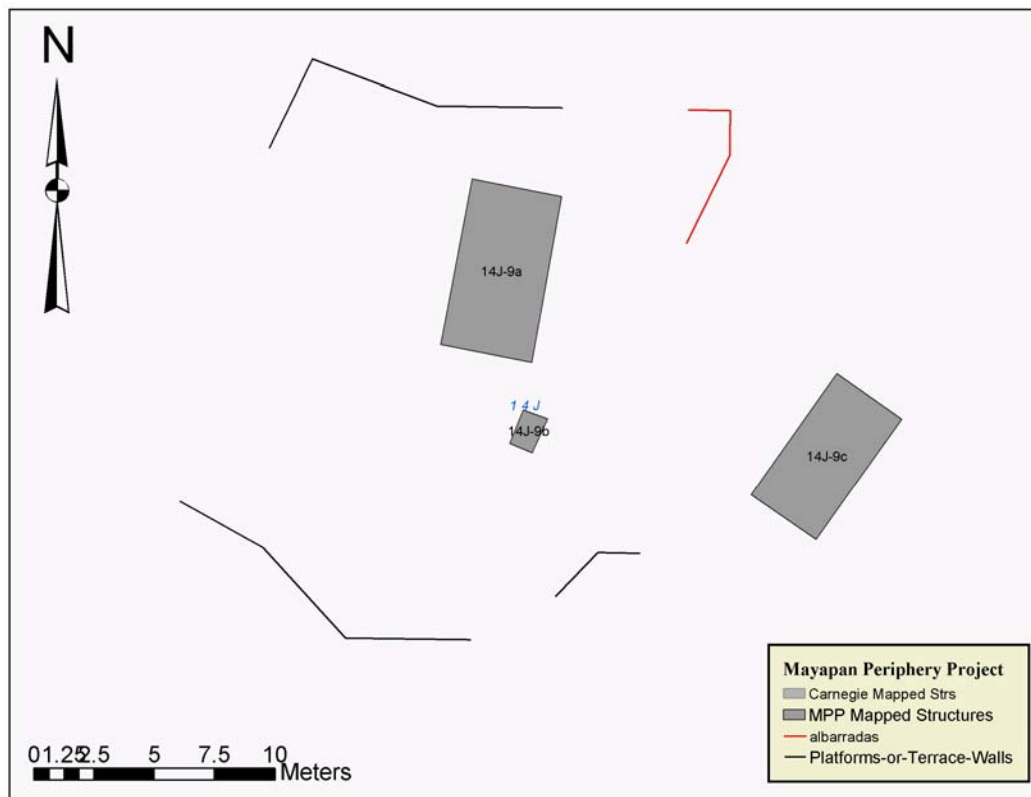


Figure 72 – Transect 4, Cluster 14J-9

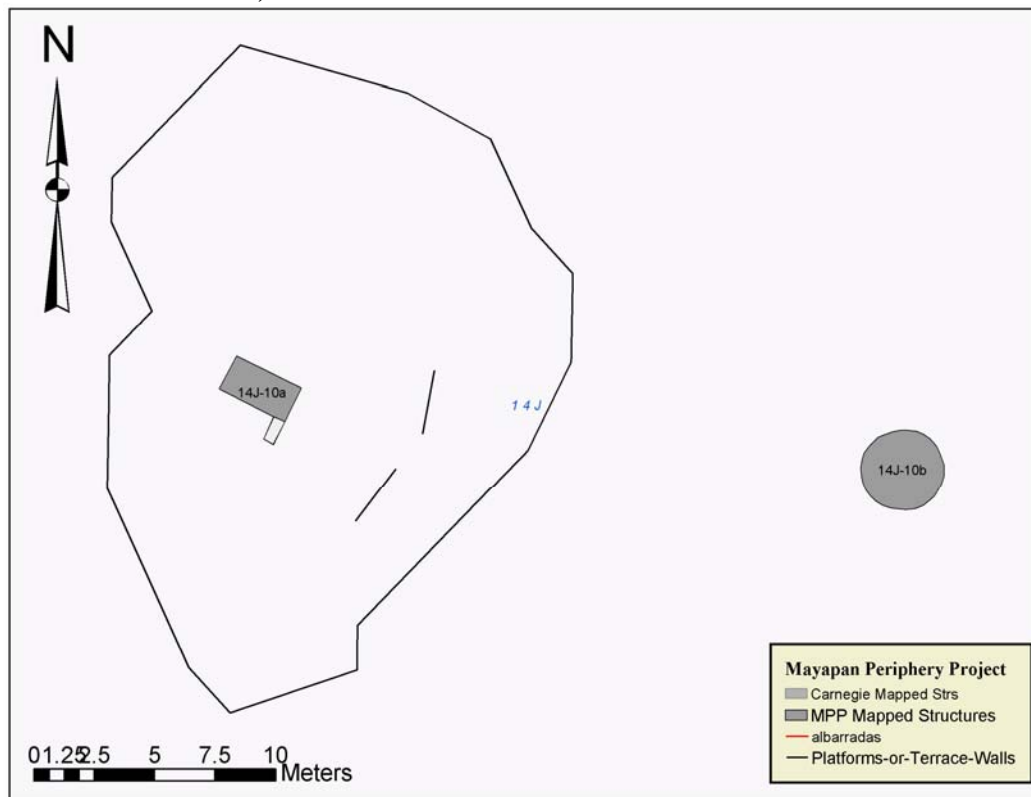
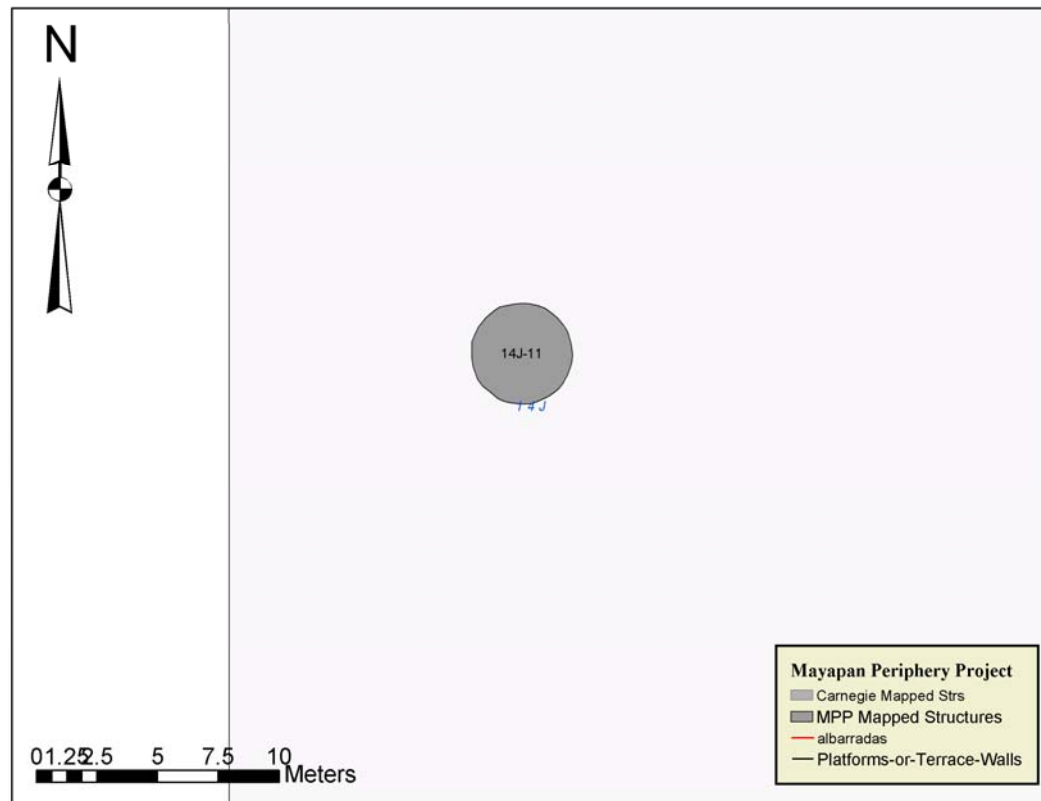


Figure 73 – Transect 4, Cluster 14J-10



# **Transect 4**



**Figure 74 – Transect 4, Cluster 14J-11**

## Transect 5

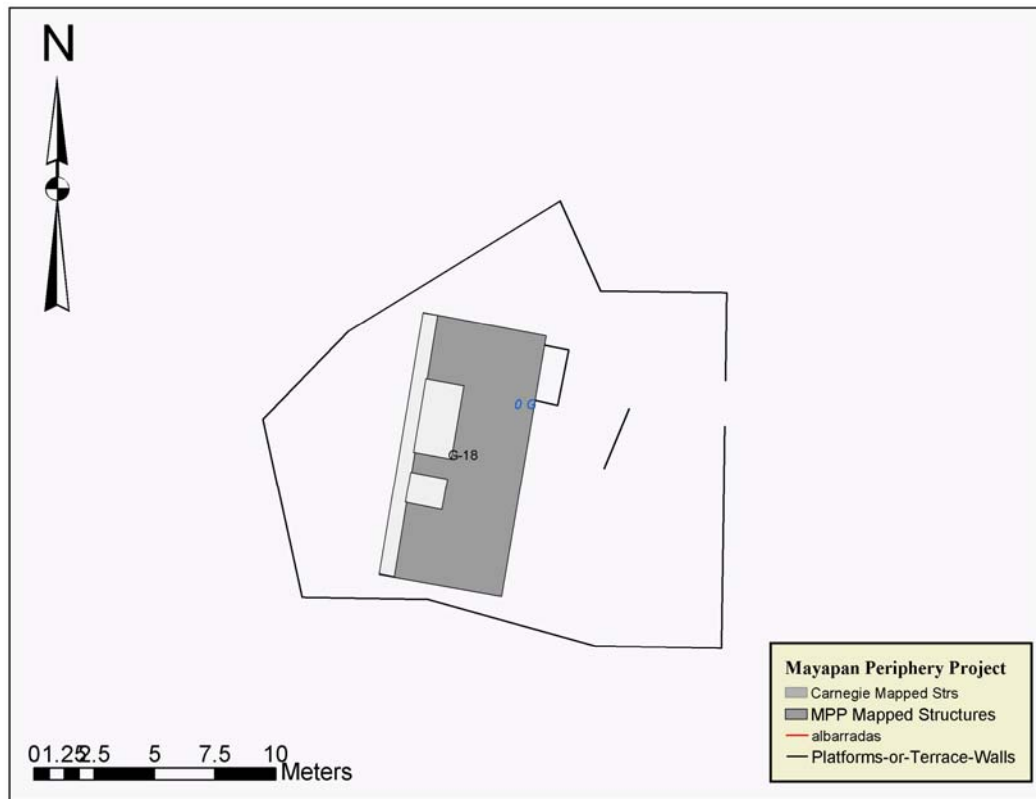


Figure 75 – Transect 5, Cluster G-18

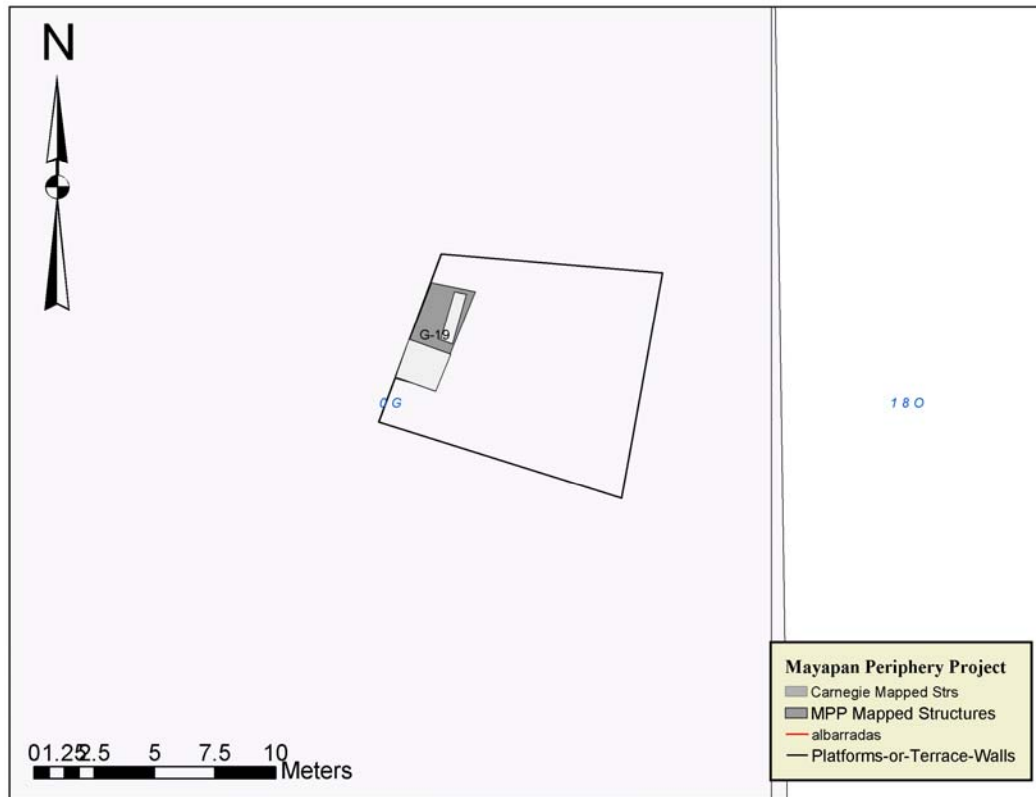


Figure 76 – Transect 5, Cluster G-19

## Transect 5

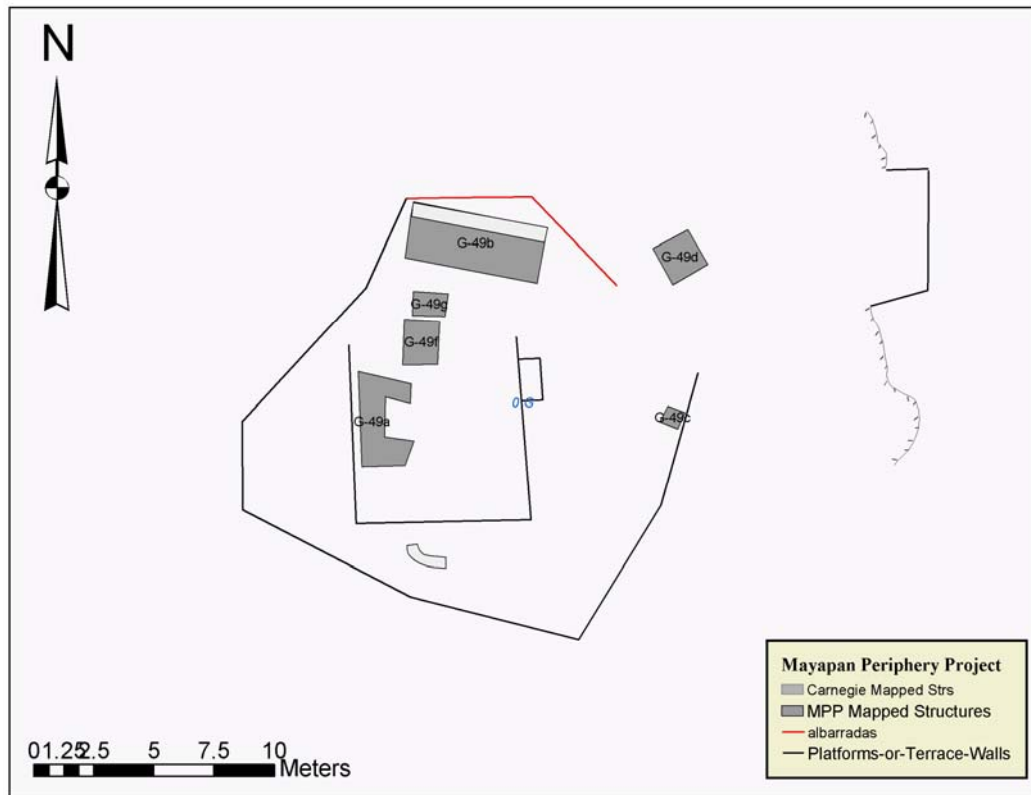


Figure 77 – Transect 5, Cluster G-49

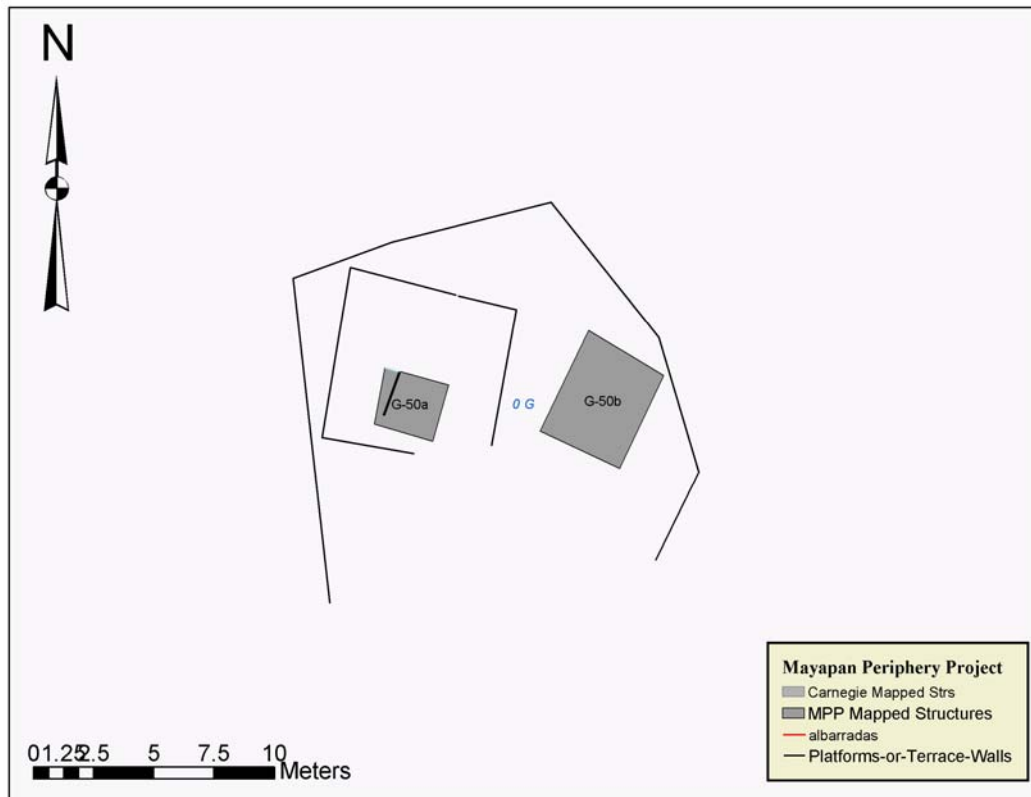


Figure 78 – Transect 5, Cluster G-50

## Transect 5

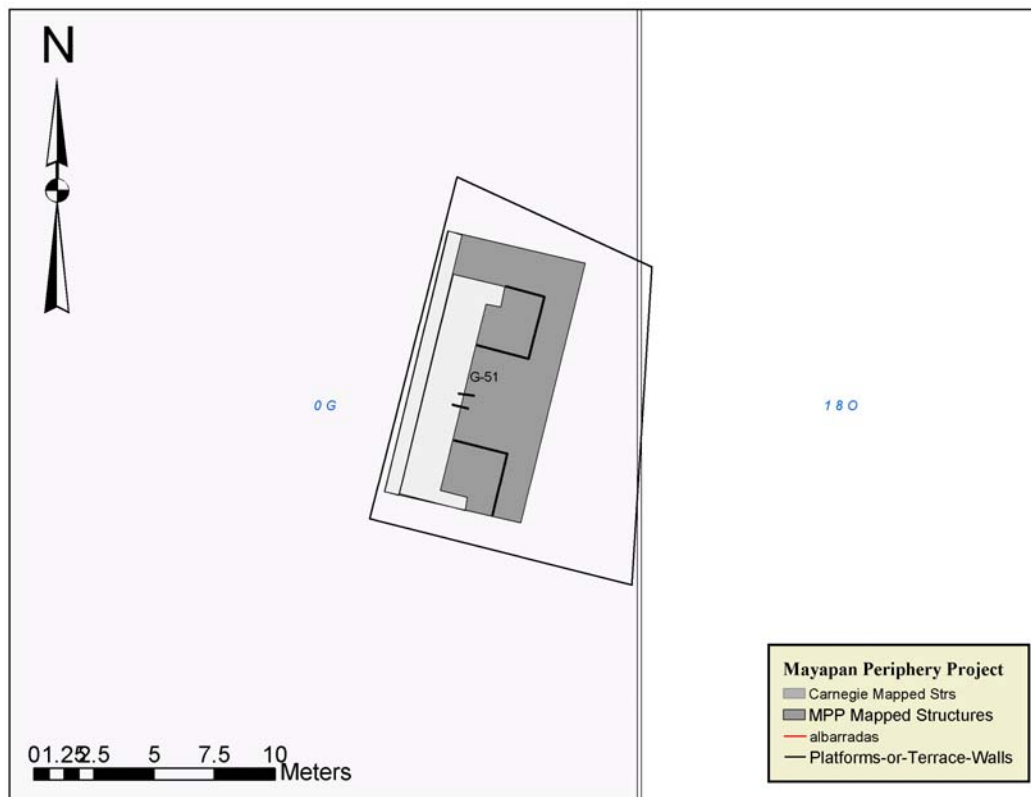


Figure 79 – Transect 5, Cluster G-51

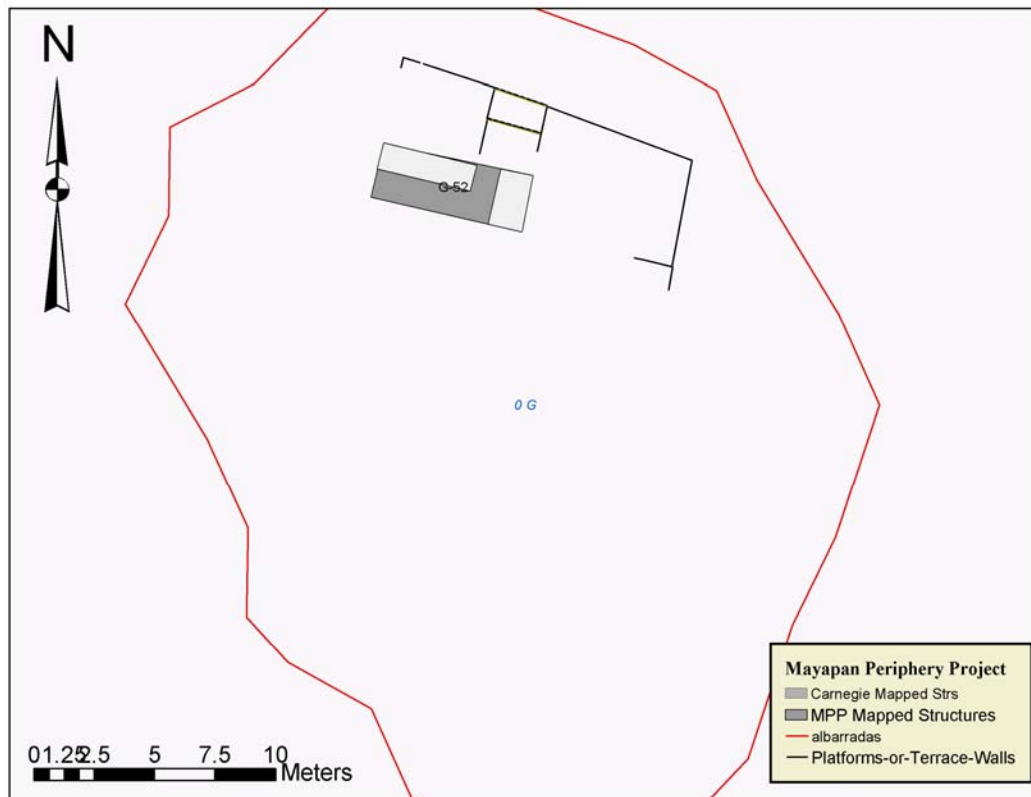


Figure 80 – Transect 5, Cluster G-52

## Transect 5

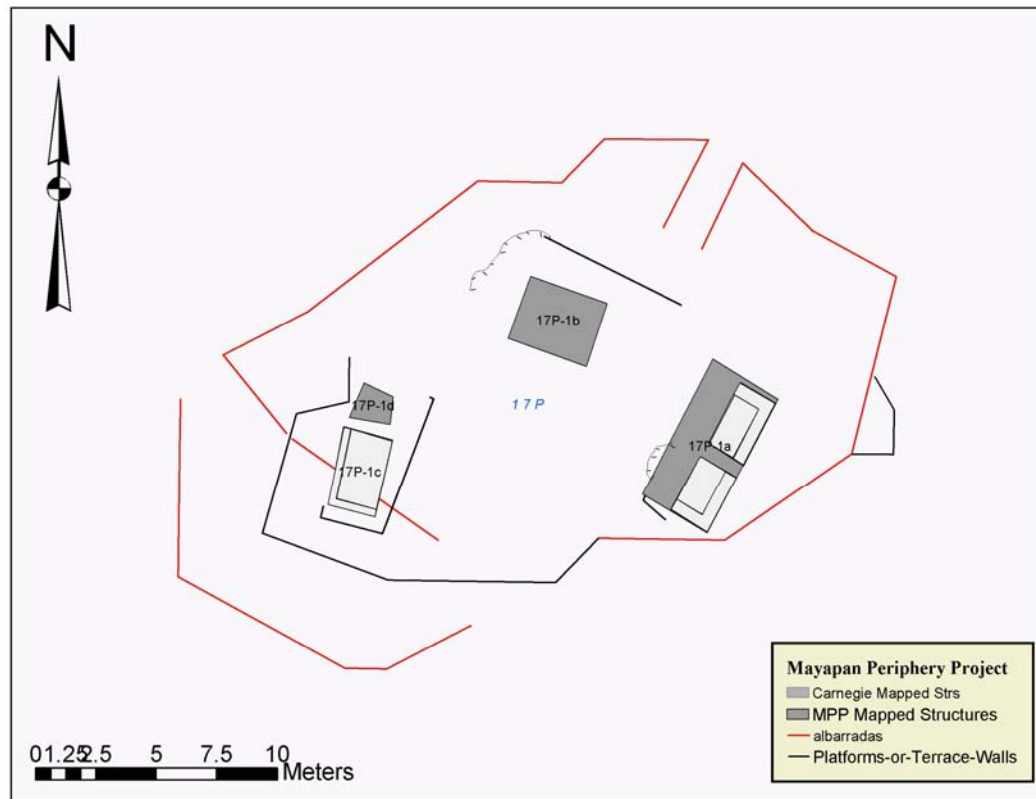


Figure 81 – Transect 5, Cluster 17P-1

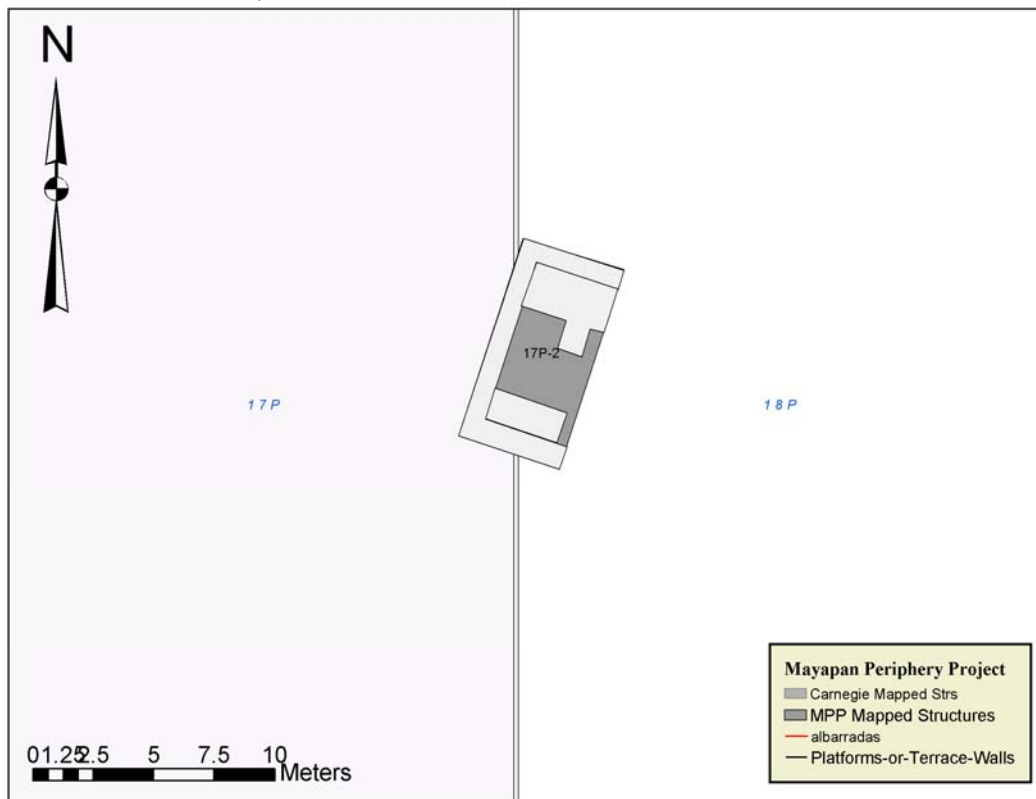


Figure 82 – Transect 5, Cluster 17P-2

## Transect 5

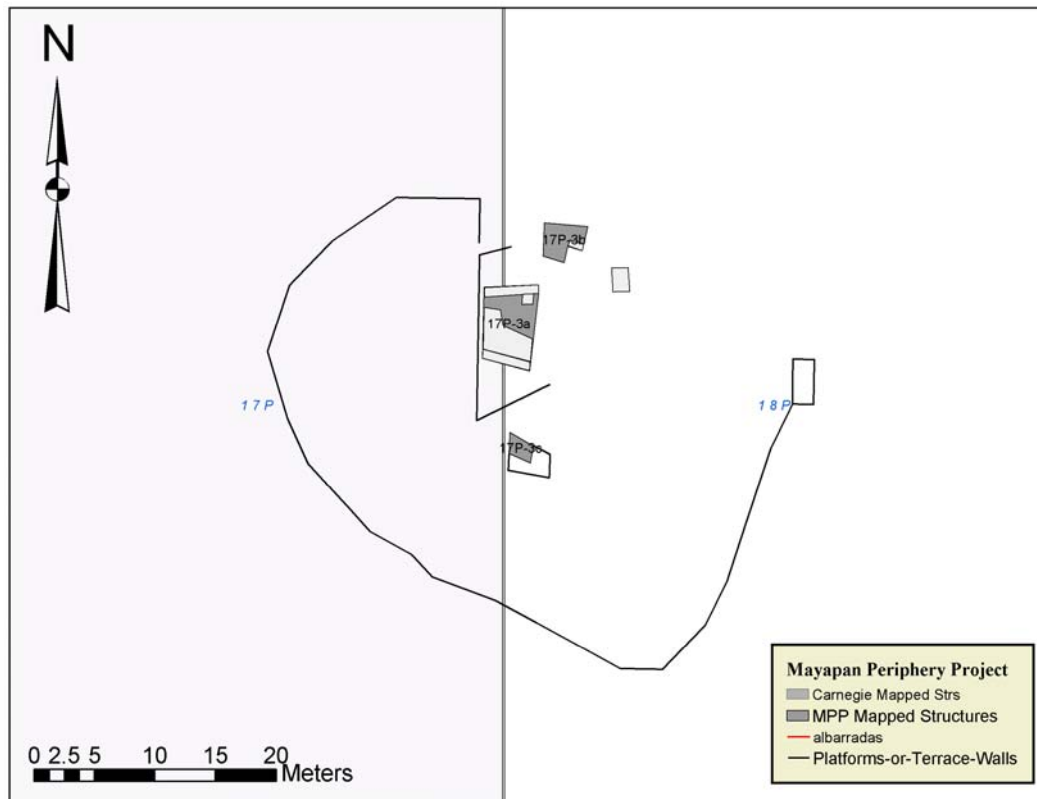


Figure 83 – Transect 5, Cluster 17P-3

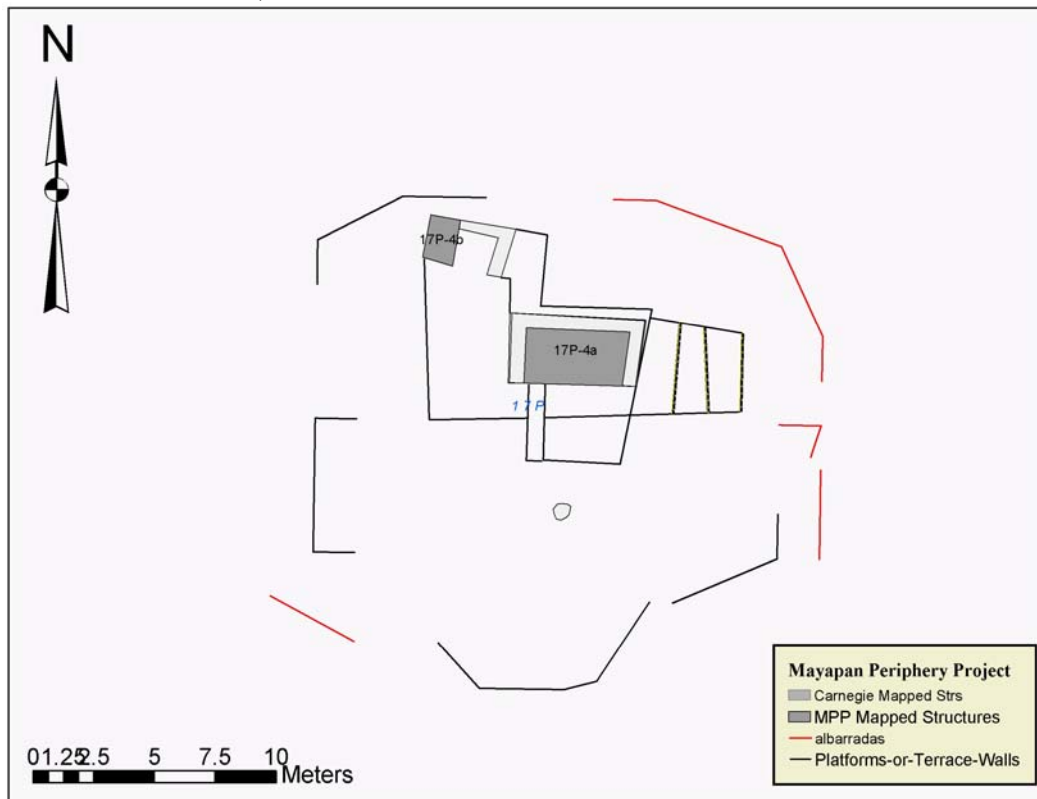


Figure 84 – Transect 5, Cluster 17P-4

## Transect 5

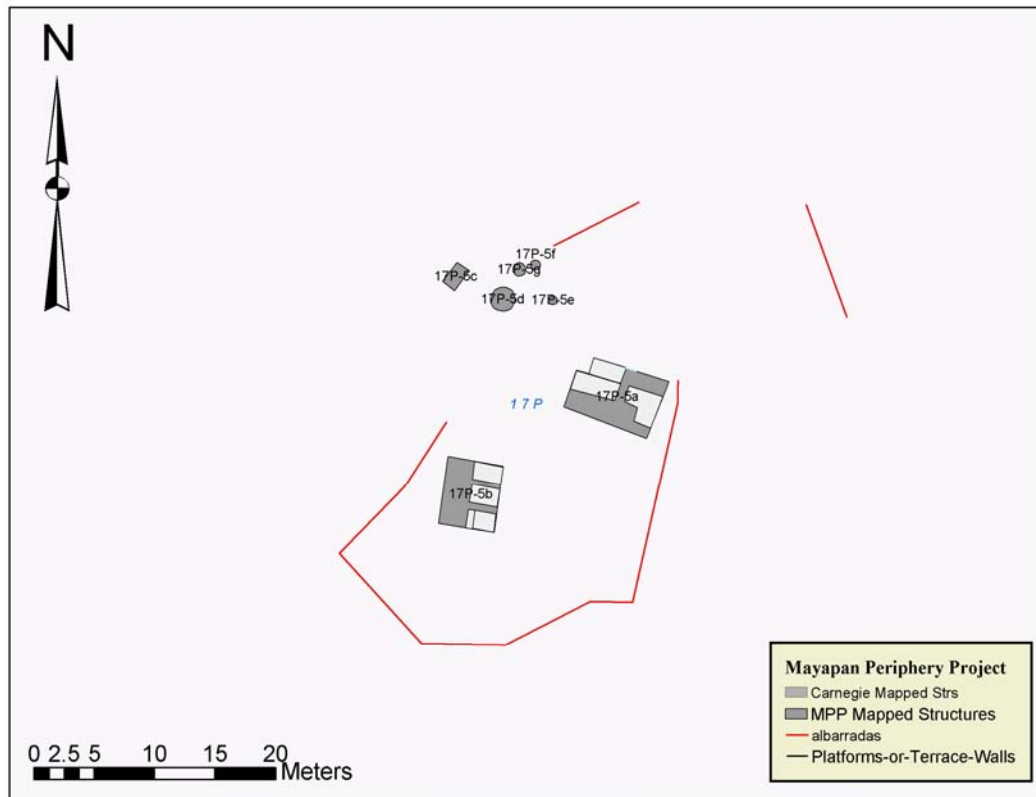


Figure 85 – Transect 5, Cluster 17P-5

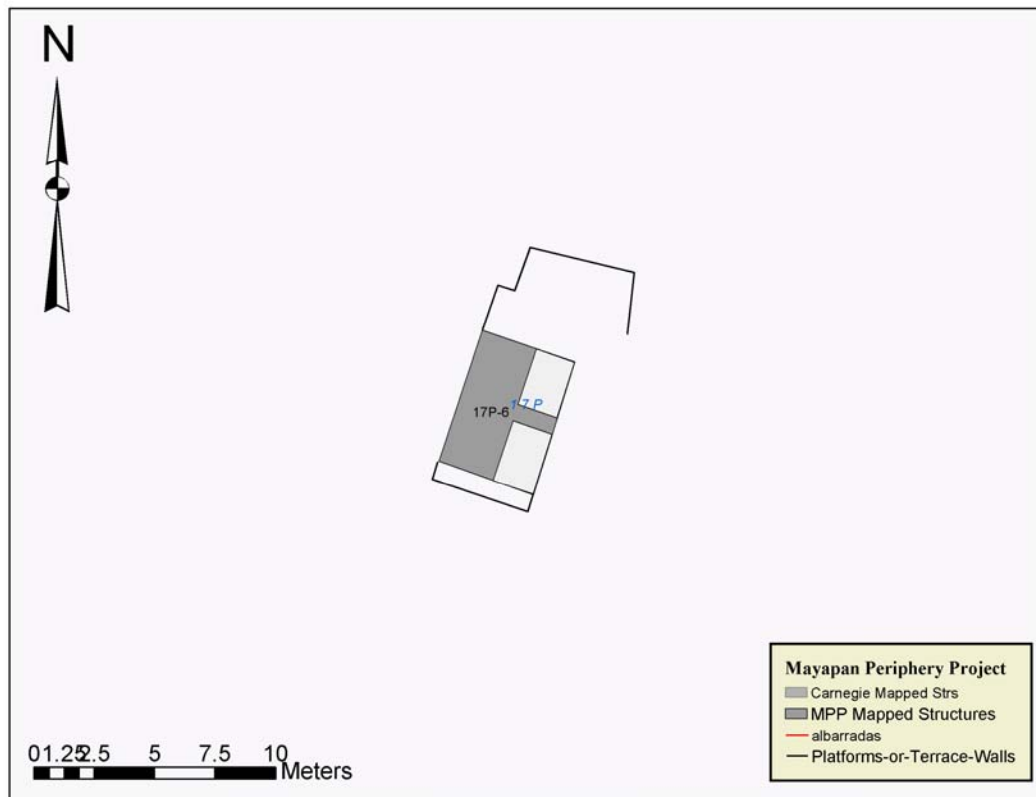


Figure 86 – Transect 5, Cluster 17P-6



## Transect 5

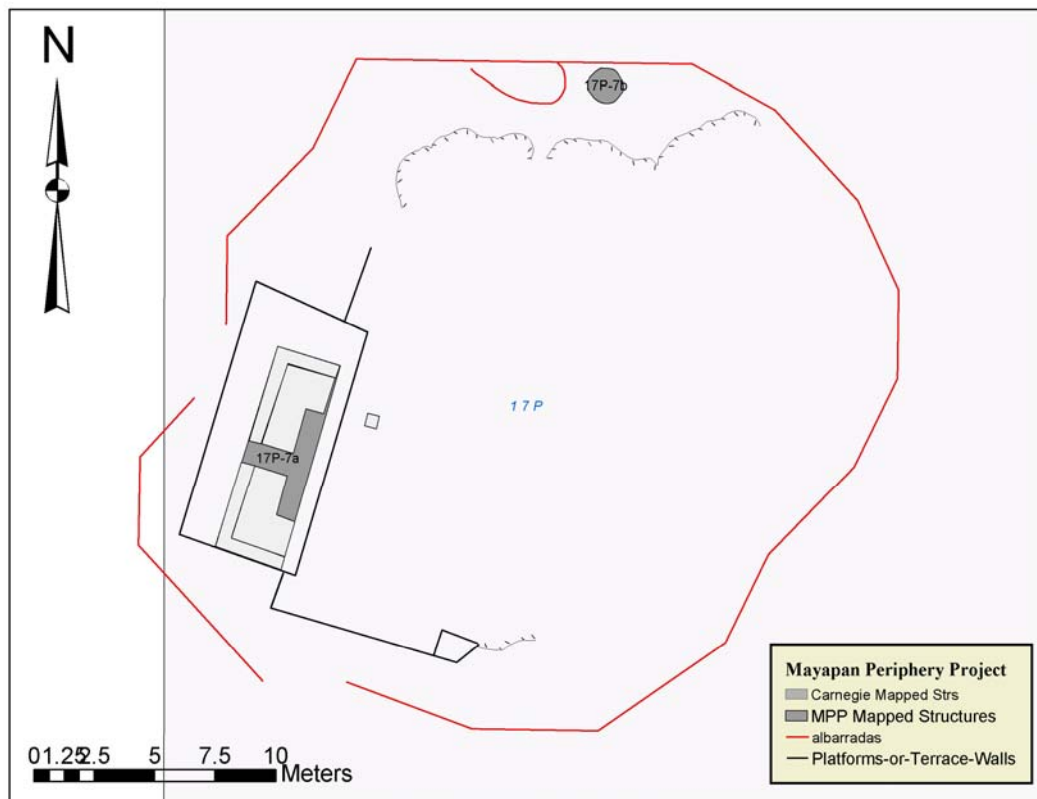


Figure 87 – Transect 5, Cluster 17P-7

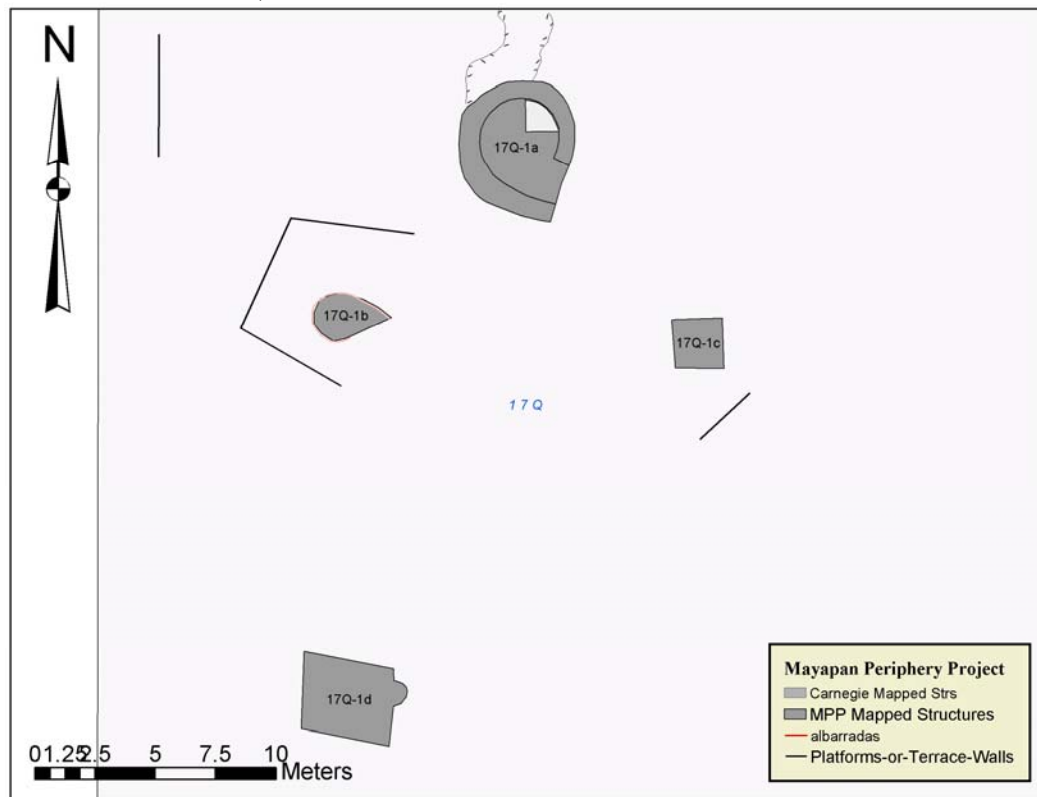


Figure 88 – Transect 5, Cluster 17Q-1

## Transect 5

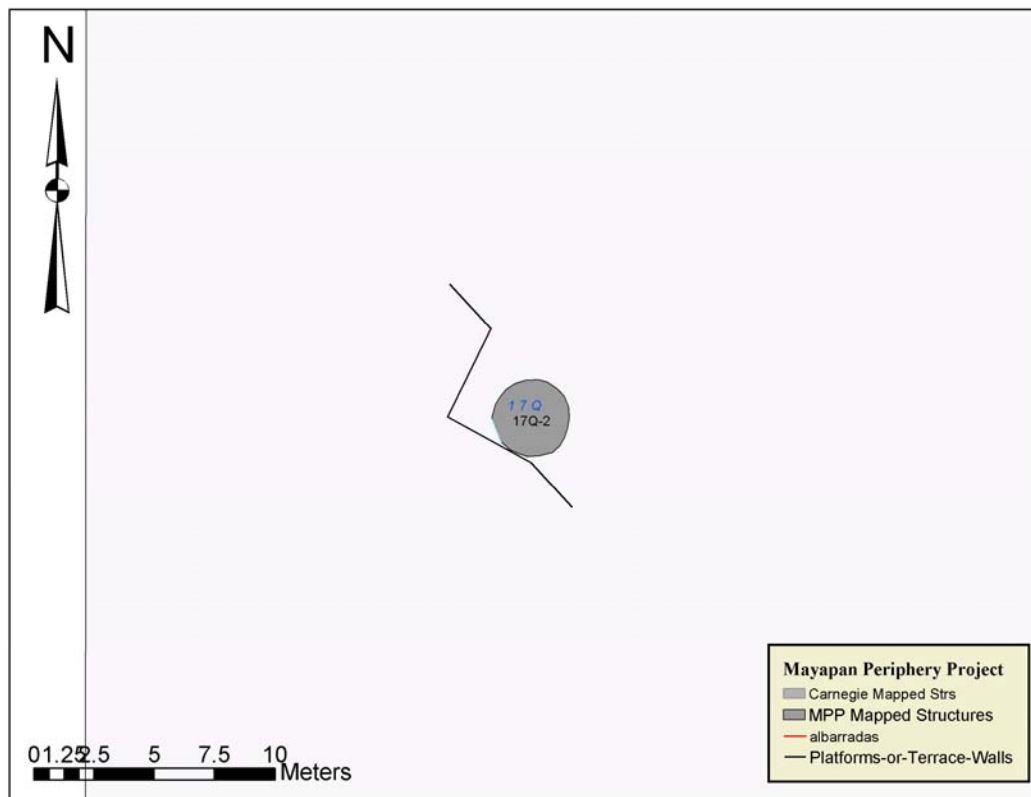


Figure 89 – Transect 5, Cluster 17Q-2

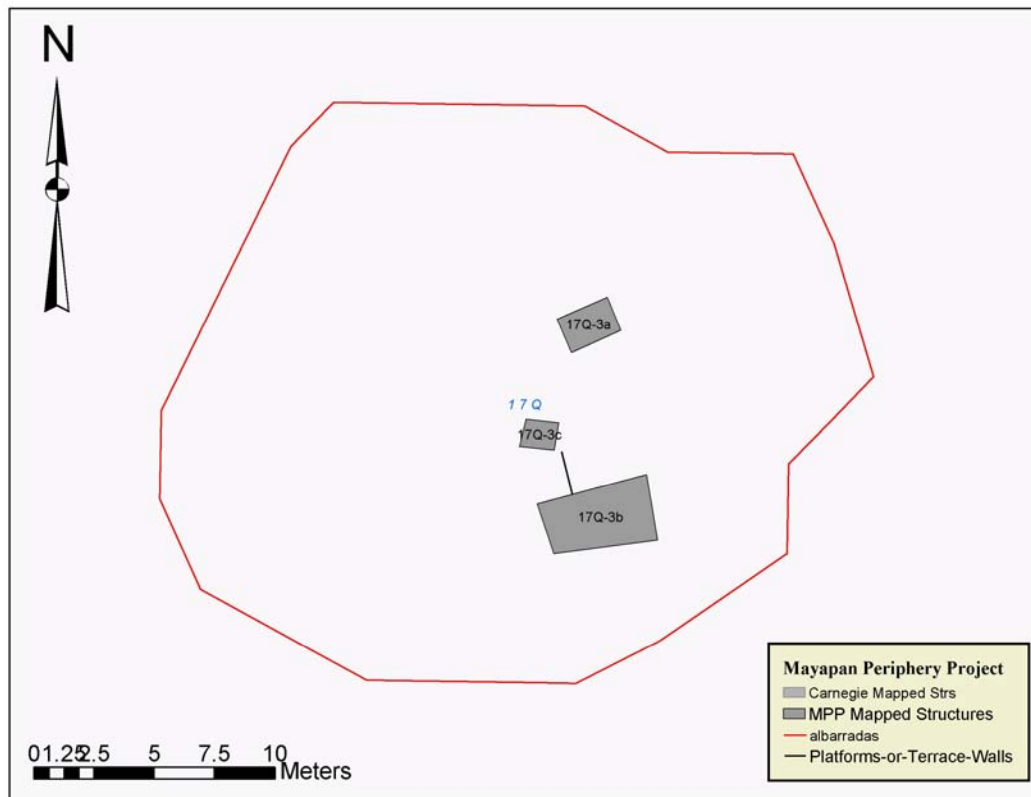


Figure 90 – Transect 5, Cluster 17Q-3

## Transect 6

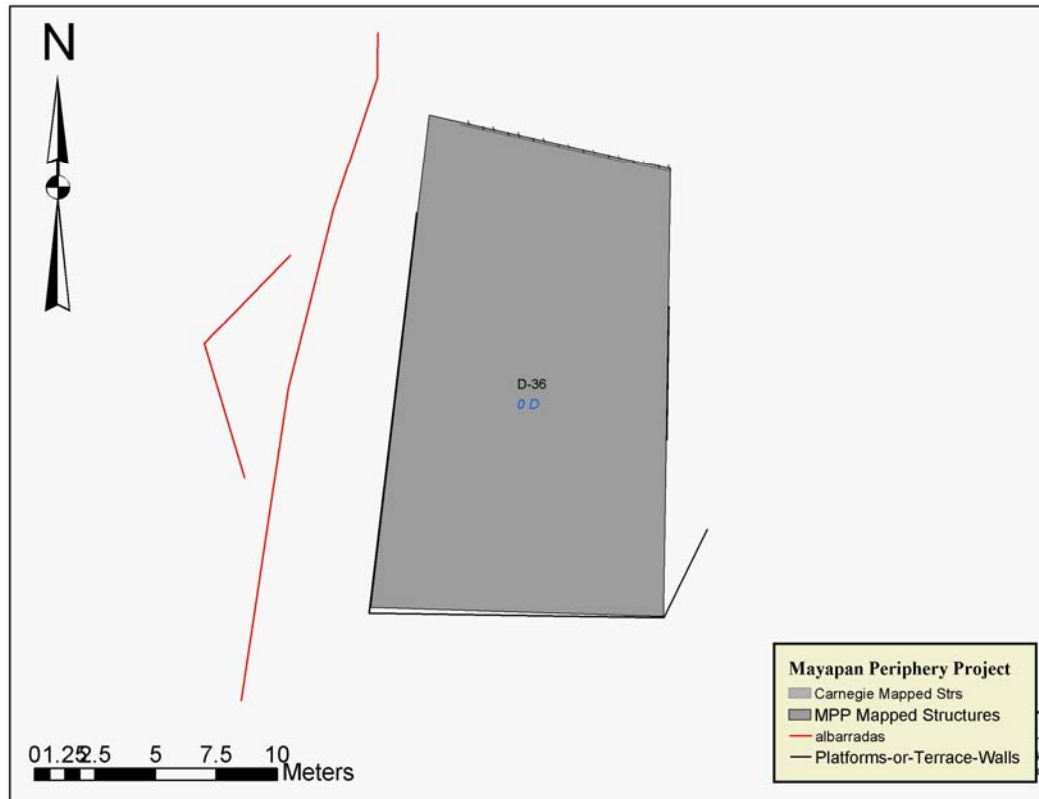


Figure 91 – Transect 6, Cluster D-36

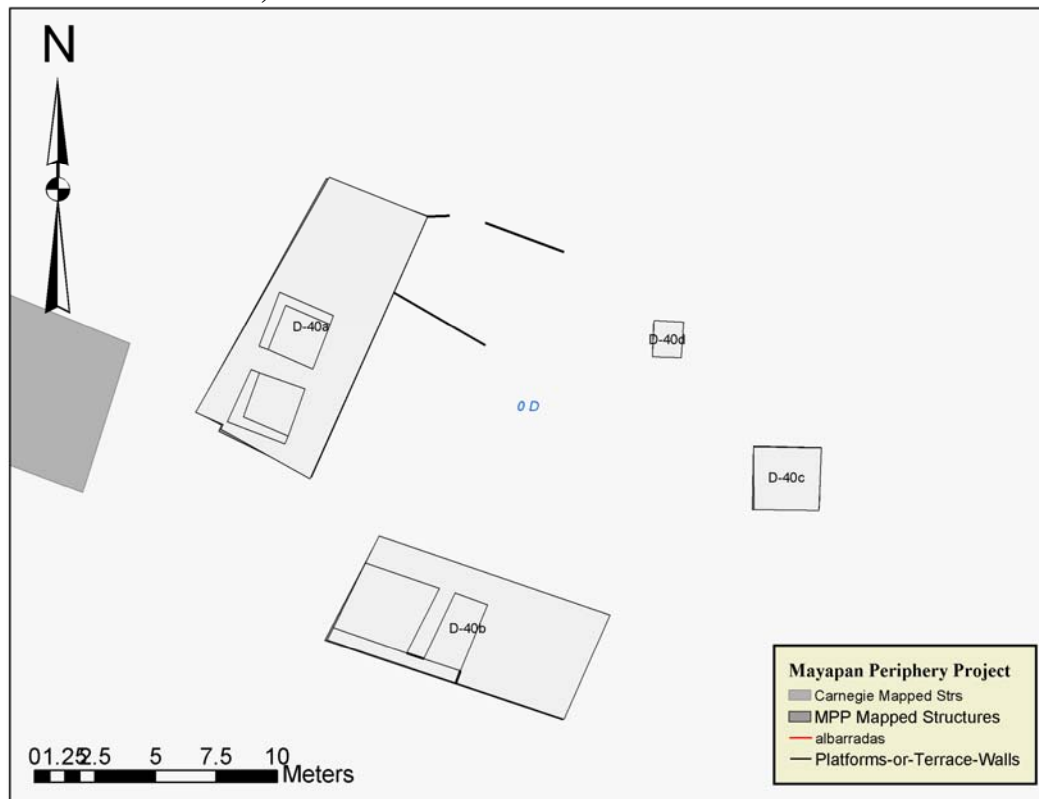


Figure 92 – Transect 6, Cluster D-40

## Transect 6

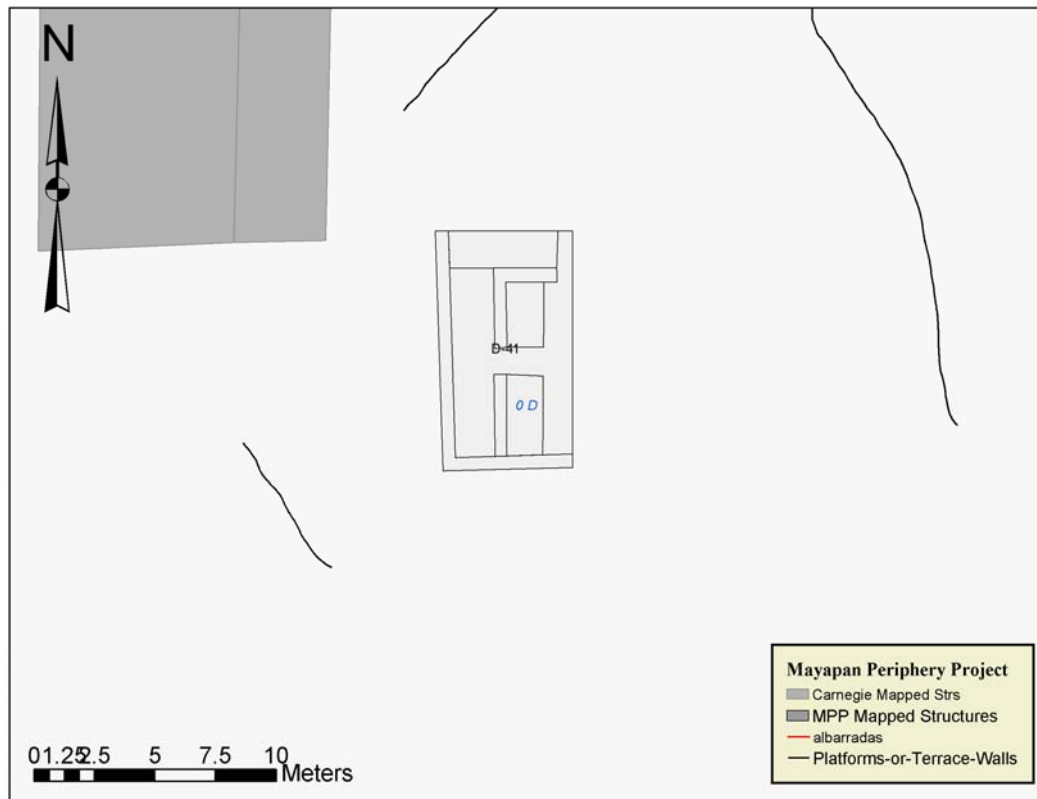


Figure 93 – Transect 6, Cluster D-41

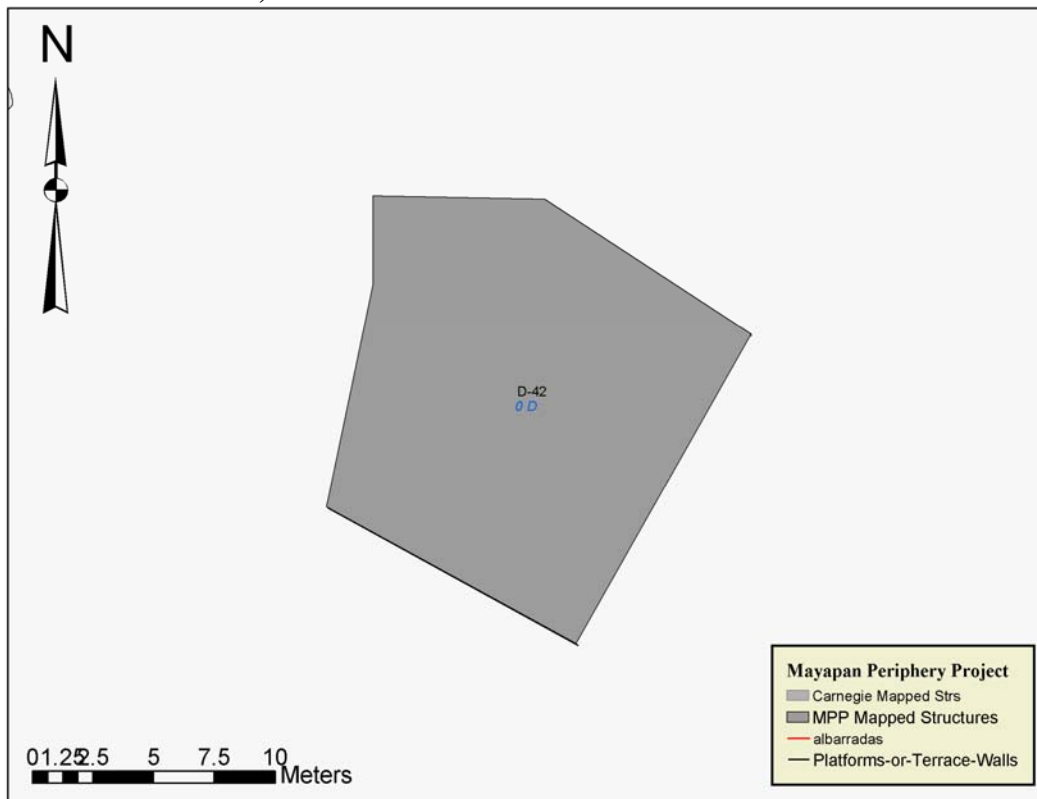


Figure 94 – Transect 6, Cluster D-42

## Transect 6

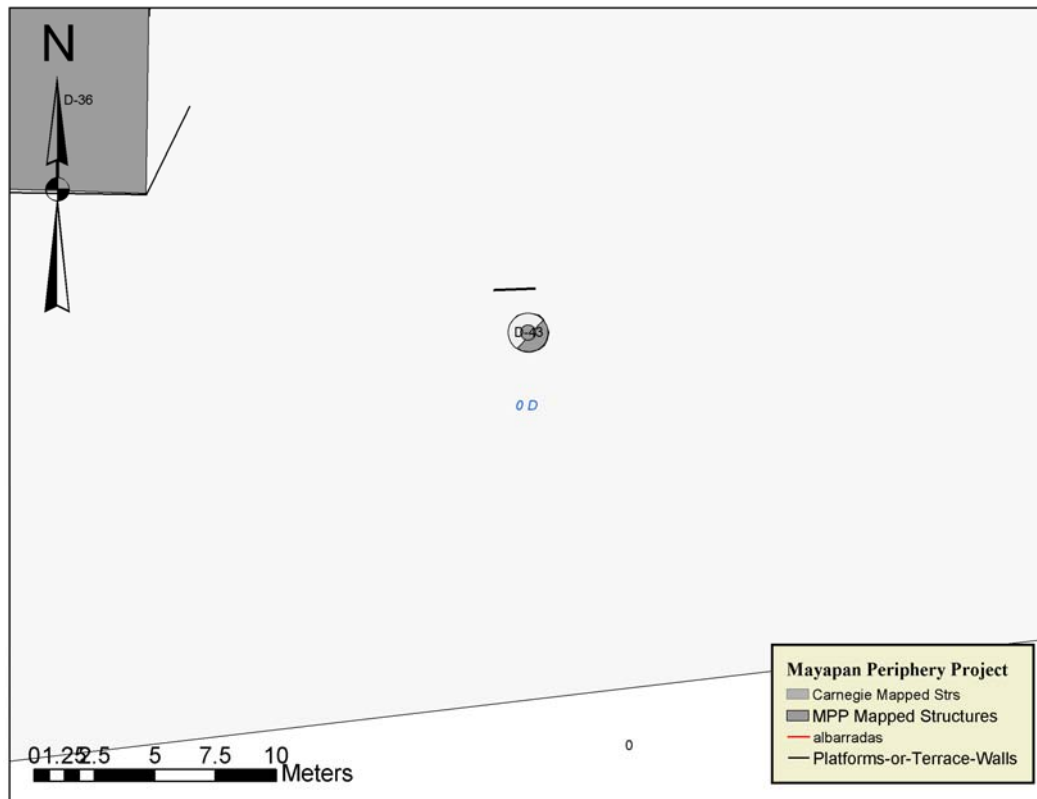


Figure 95 – Transect 6, Cluster D-43

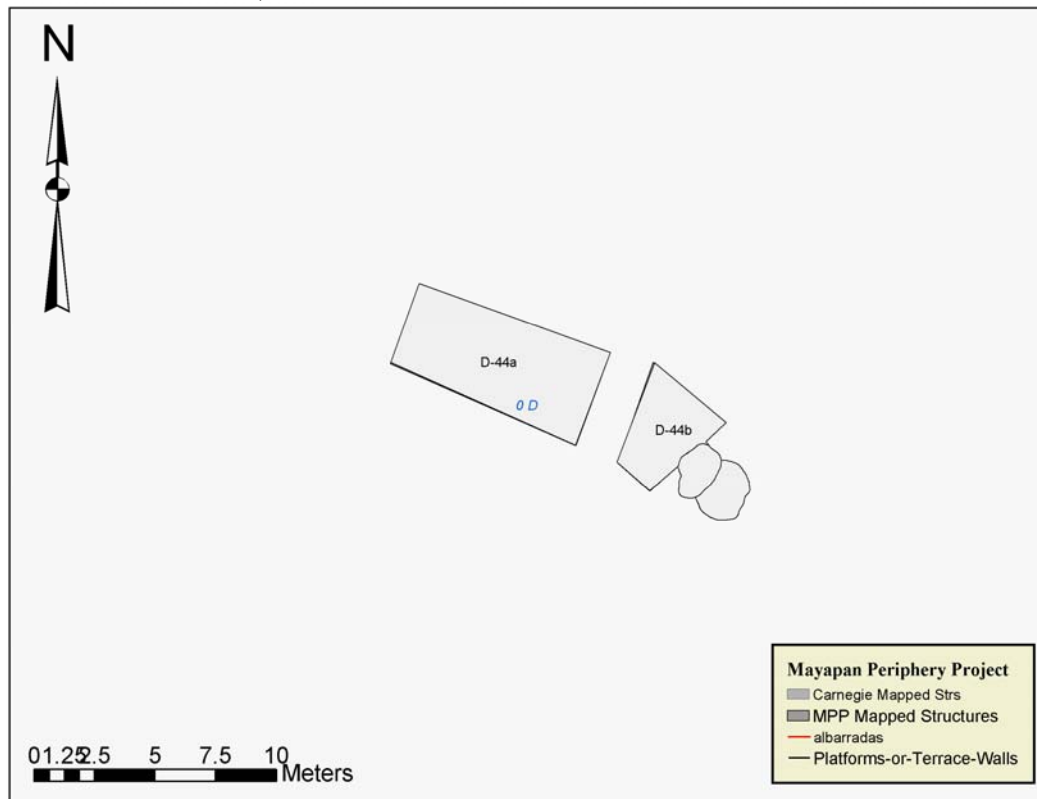


Figure 96 – Transect 6, Cluster D-44

## Transect 6

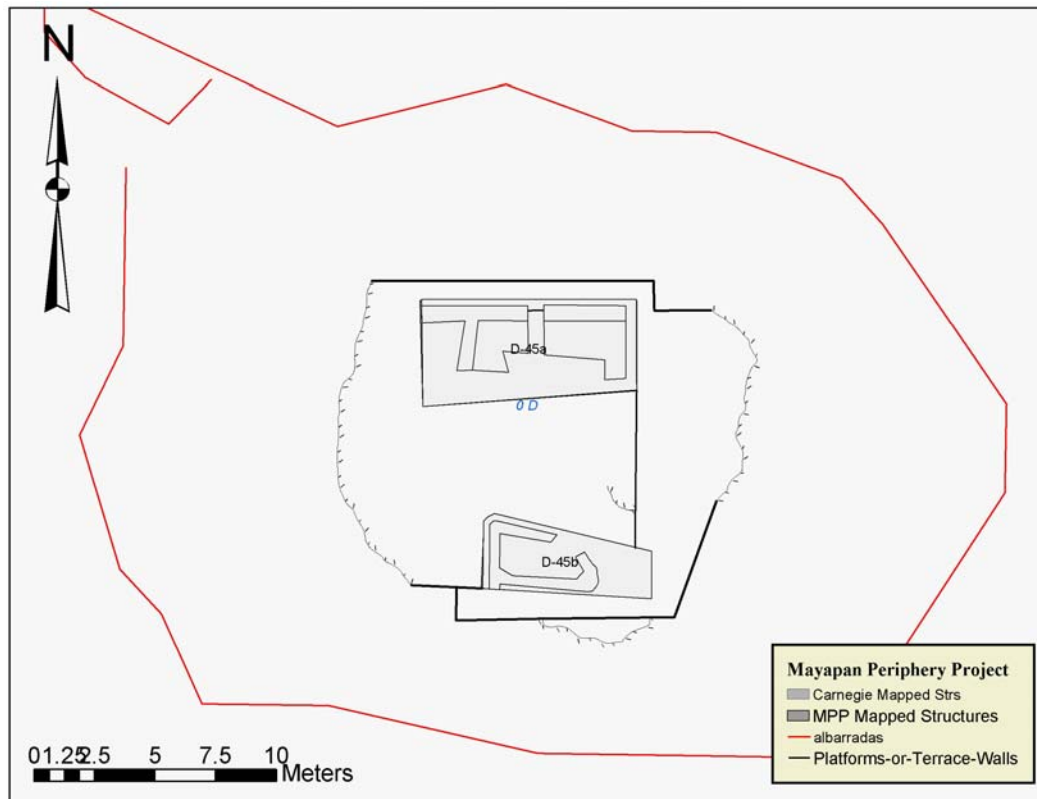


Figure 97 – Transect 6, Cluster D-45

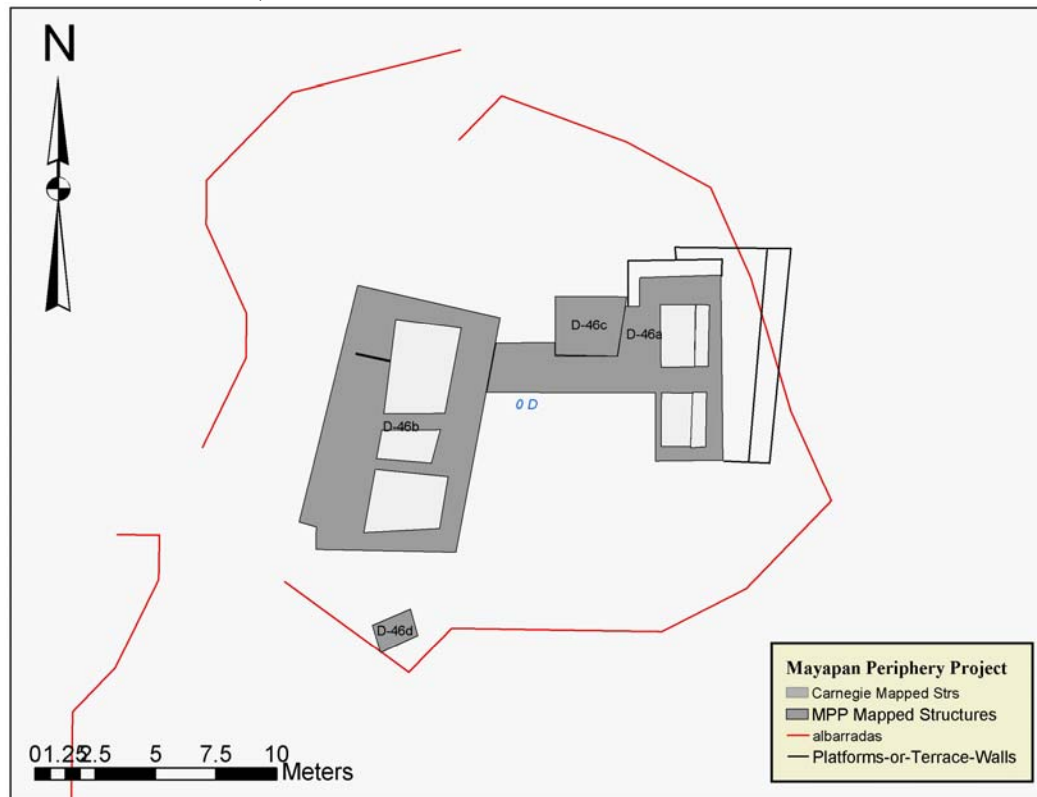


Figure 98 – Transect 6, Cluster D-46

## Transect 6

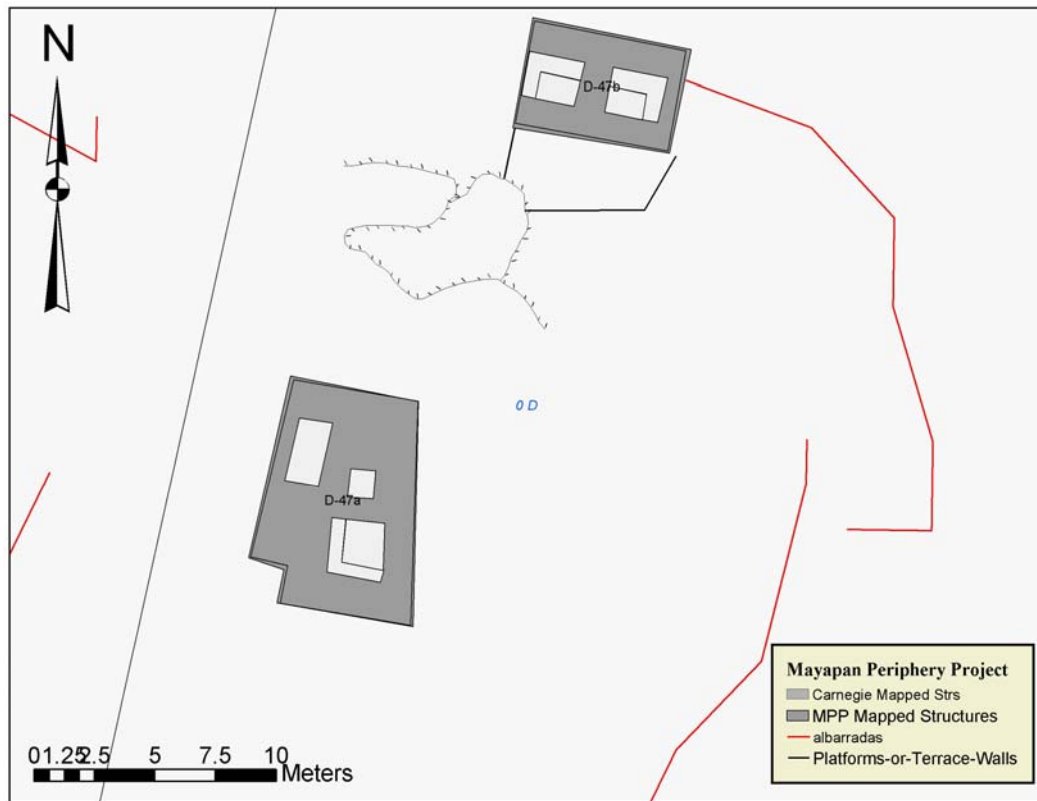


Figure 99 – Transect 6, Cluster D-47

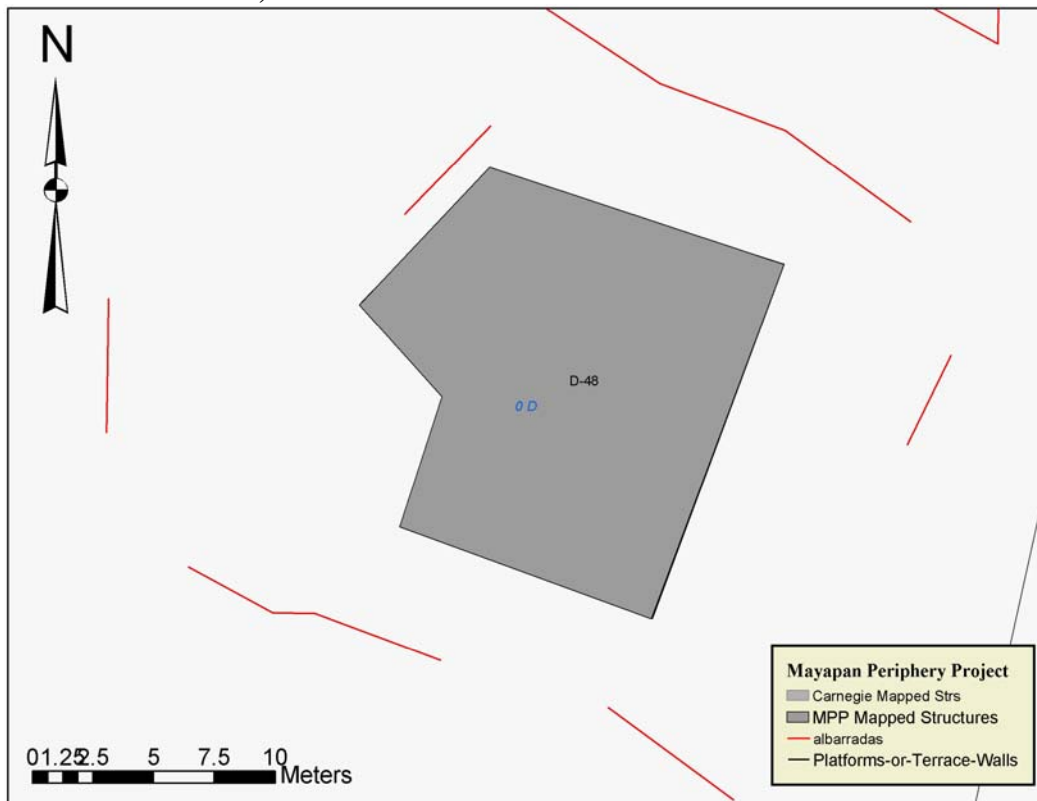


Figure 100 – Transect 6, Cluster D-48



## Transect 6

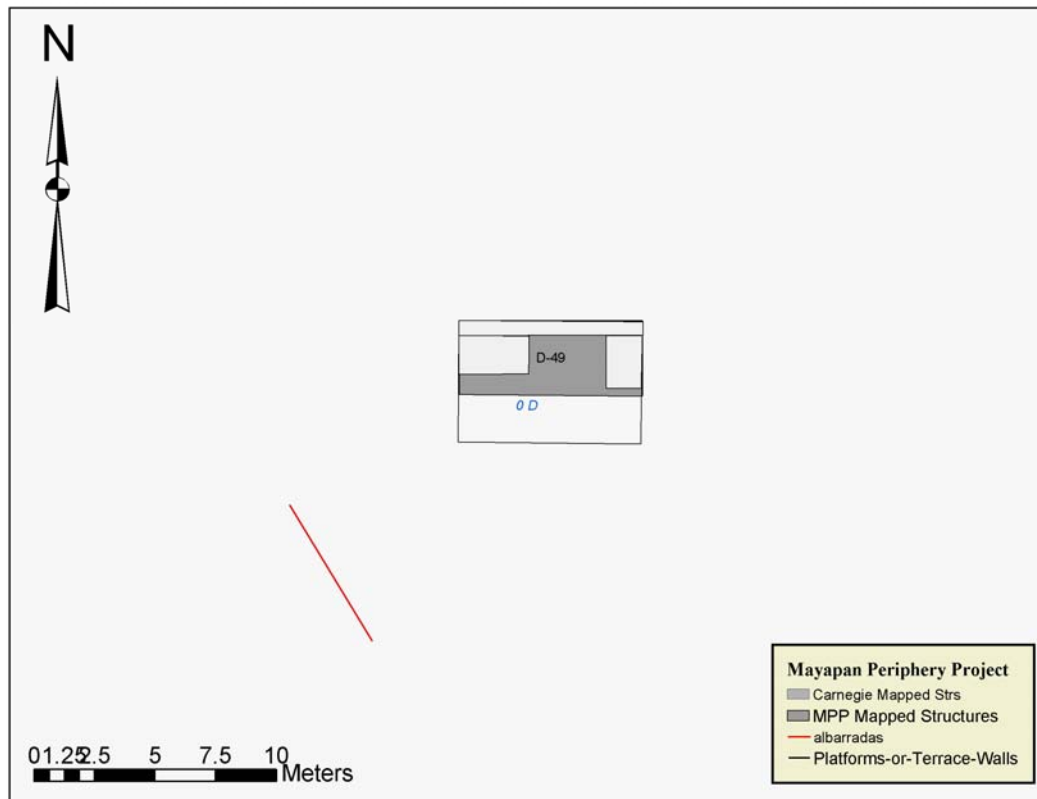


Figure 101 – Transect 6, Cluster D-49



Figure 102 – Transect 6, Cluster D-50

## Transect 6

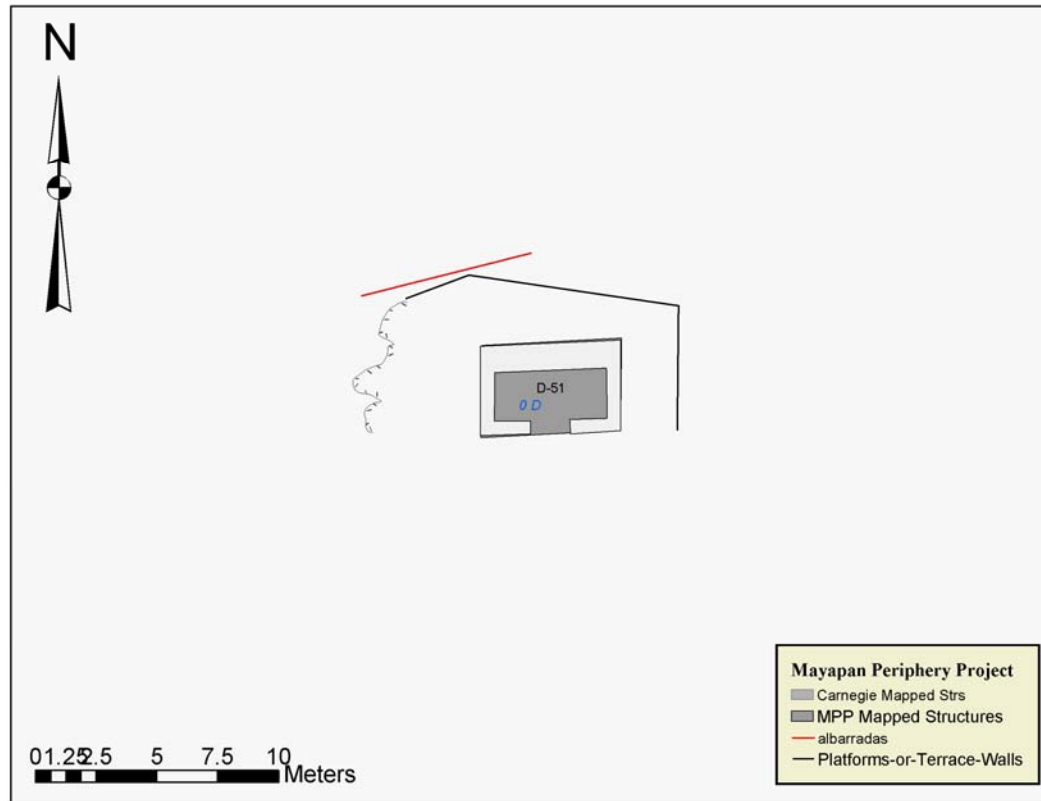


Figure 103 – Transect 6, Cluster D-51

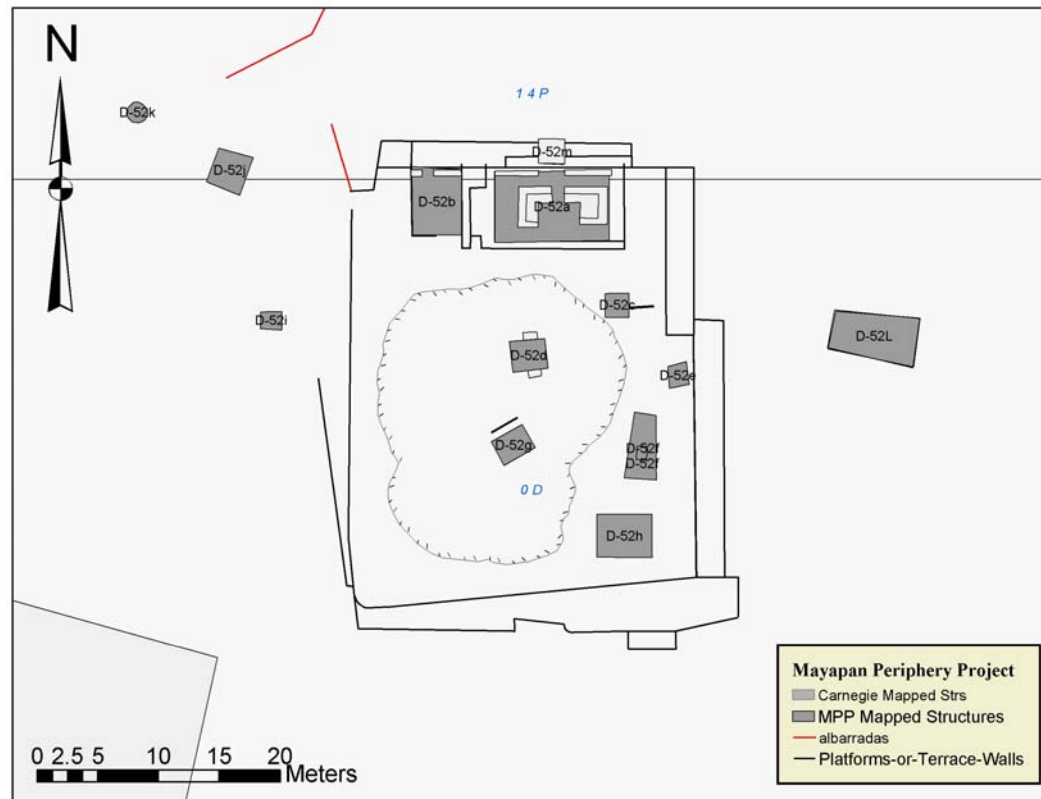


Figure 104 – Transect 6, Cluster D-52

## Transect 6



Figure 105 – Transect 6, Cluster 14P-1

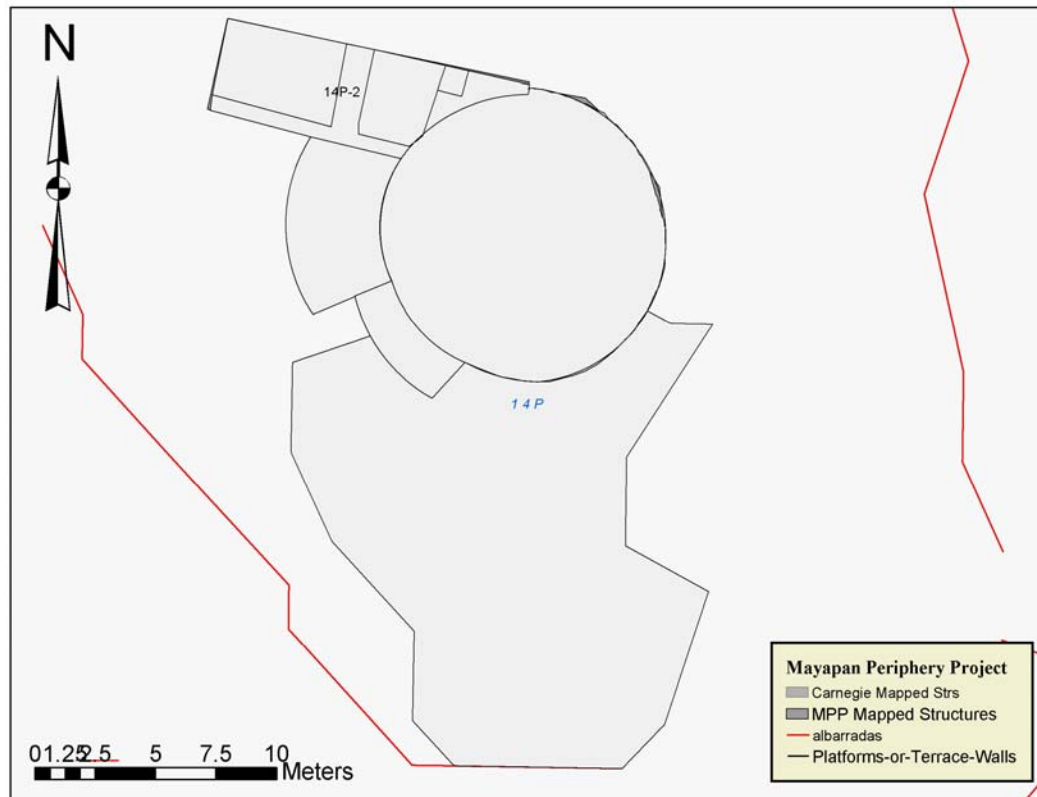


Figure 106 – transect 6, Cluster 14P-2

## Transect 6

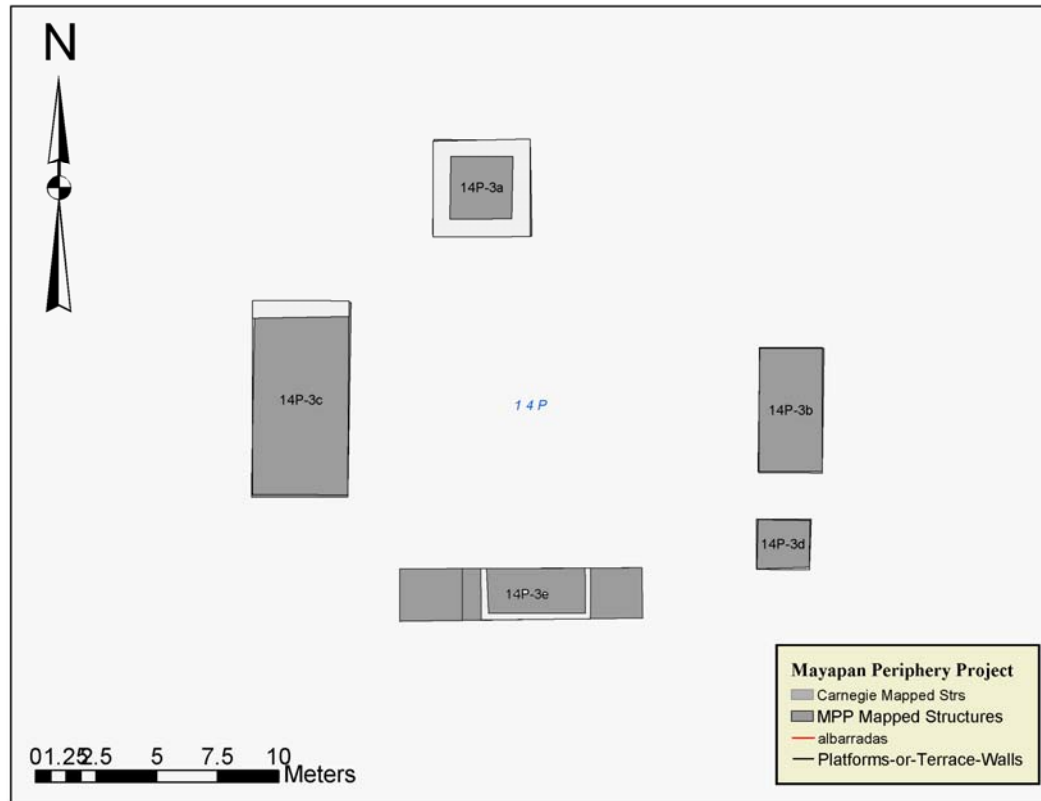


Figure 107 – transect 6, Cluster 14P-3

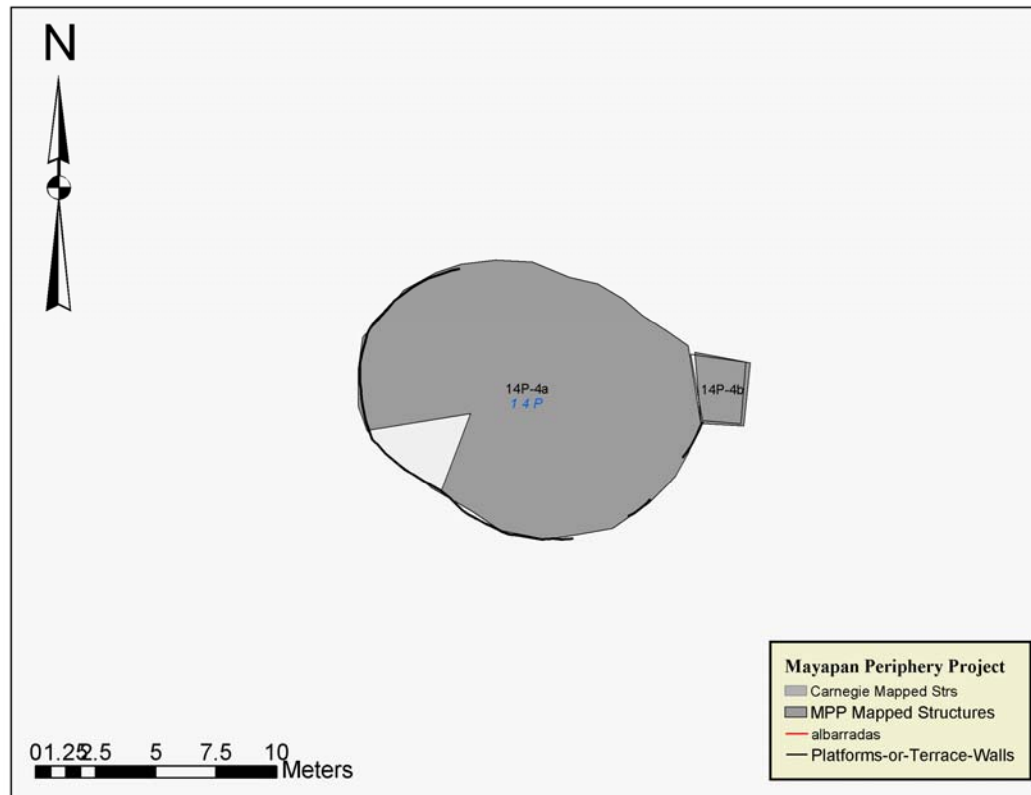


Figure 108 – Transect 6, Cluster 14P-4

## Transect 6

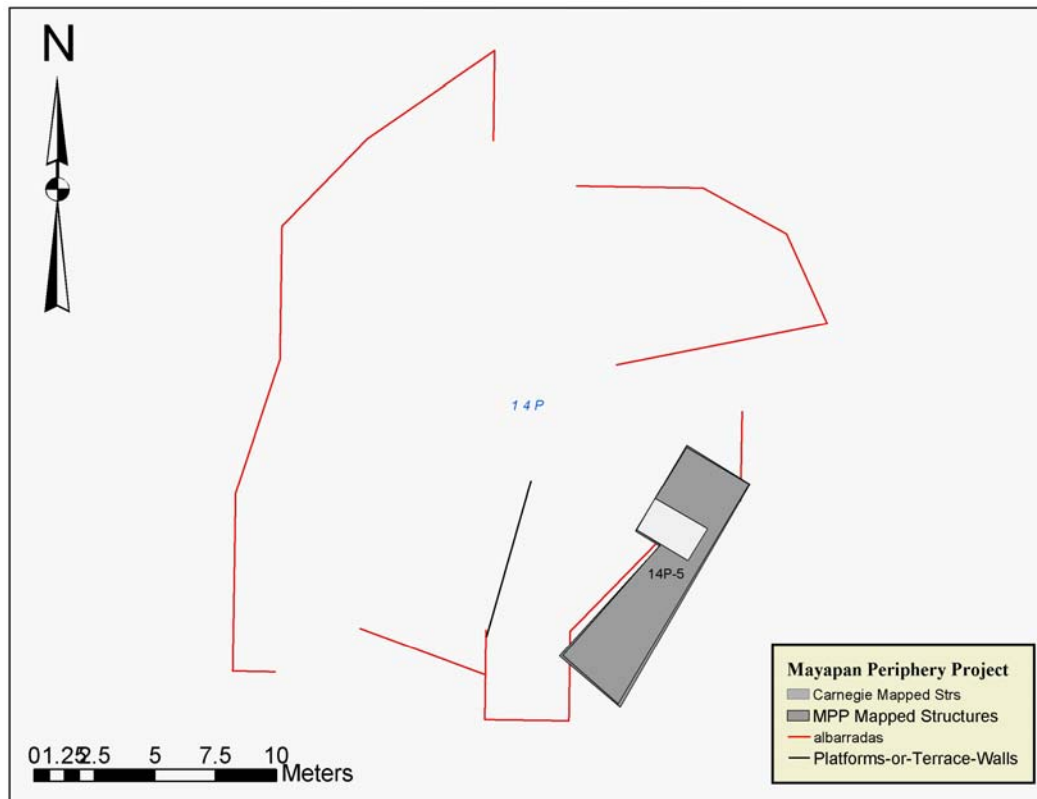


Figure 109 – Transect 6, Cluster 14P-5

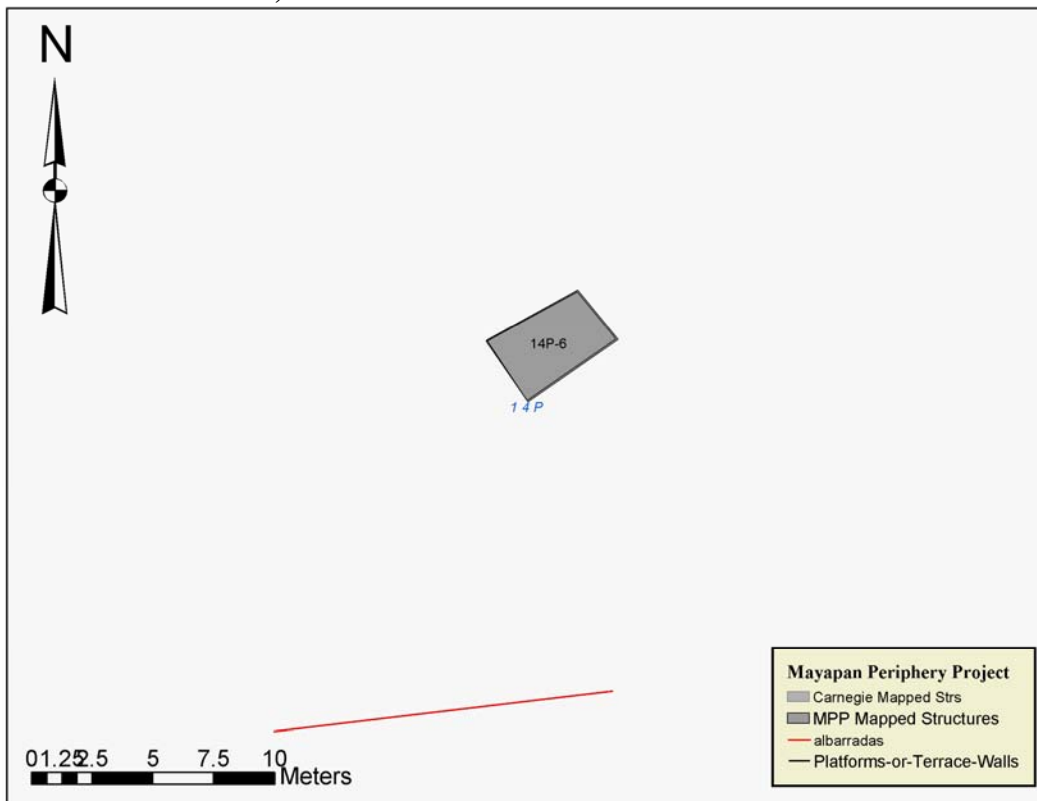


Figure 110 – Transect 6, Cluster 14P-6

## Transect 6

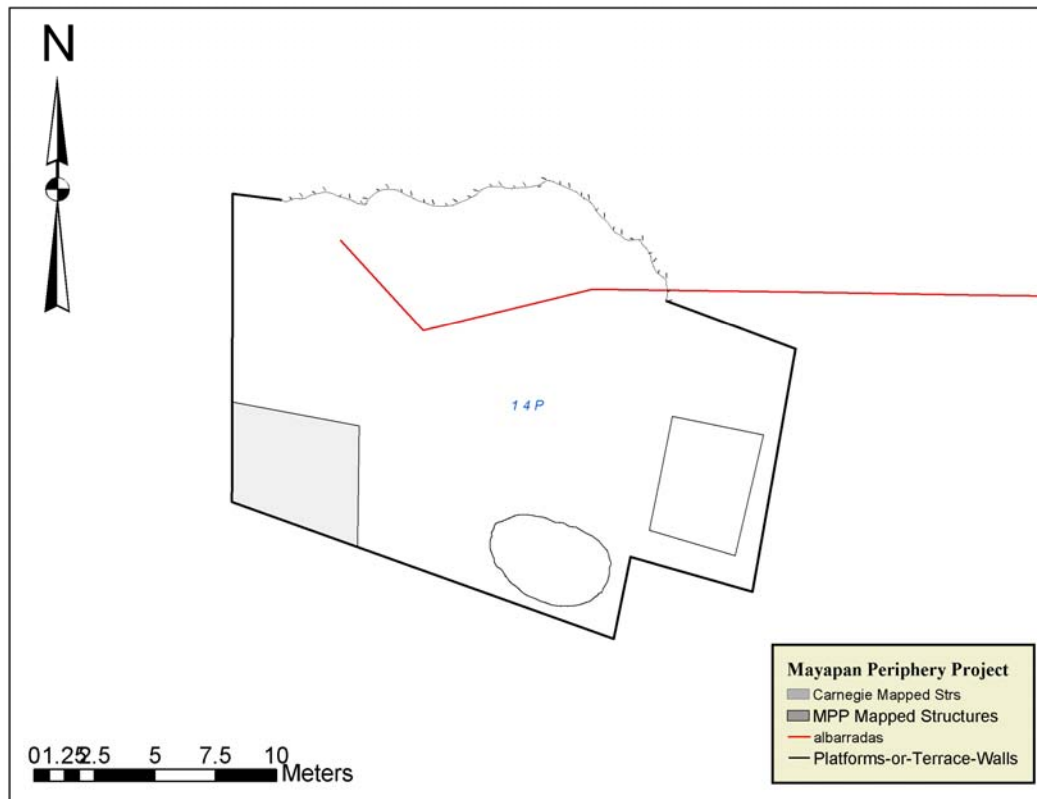


Figure 111 – Transect 6, Cluster 14P-7

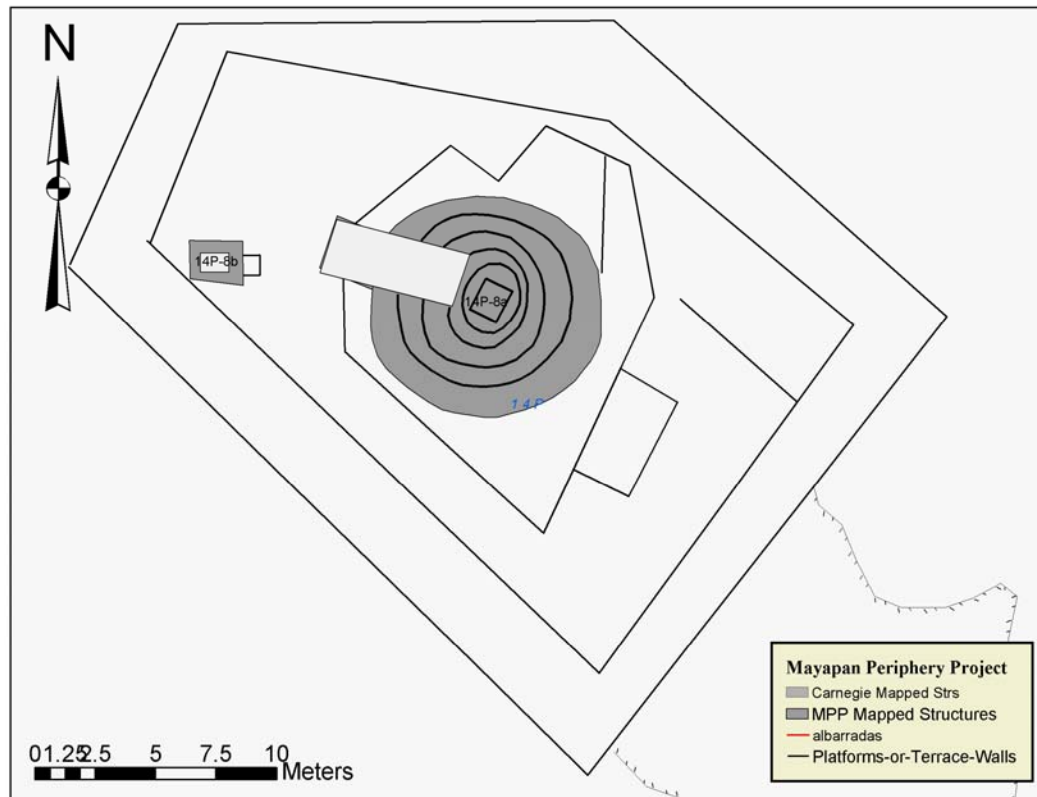


Figure 112 – Transect 6, Cluster 14P-8

## Transect 6

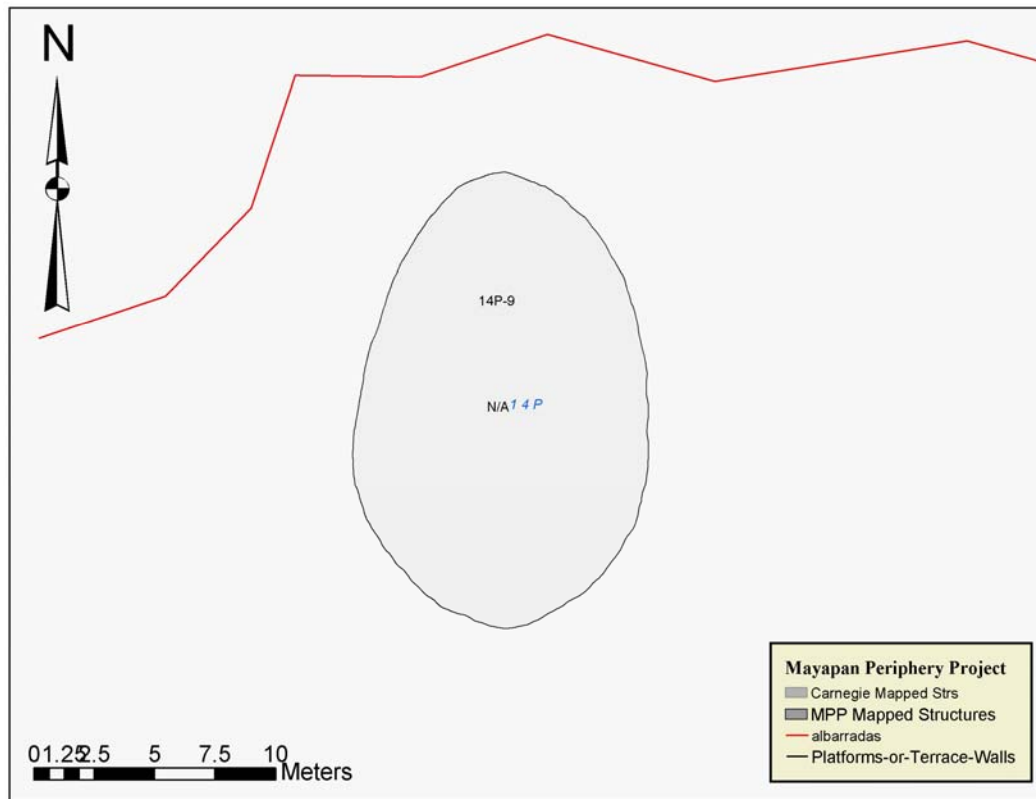


Figure 113 – Transect 6, Cluster 14P-9

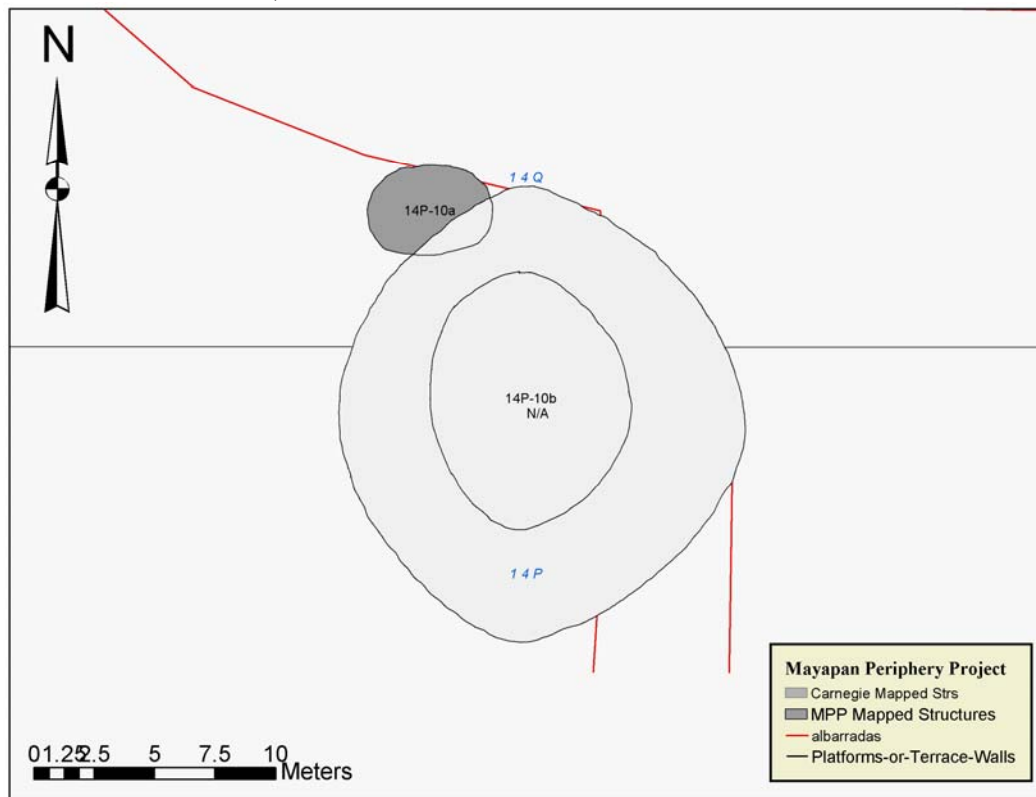


Figure 114 – Transect 6, Cluster 14P-10



## Transect 6

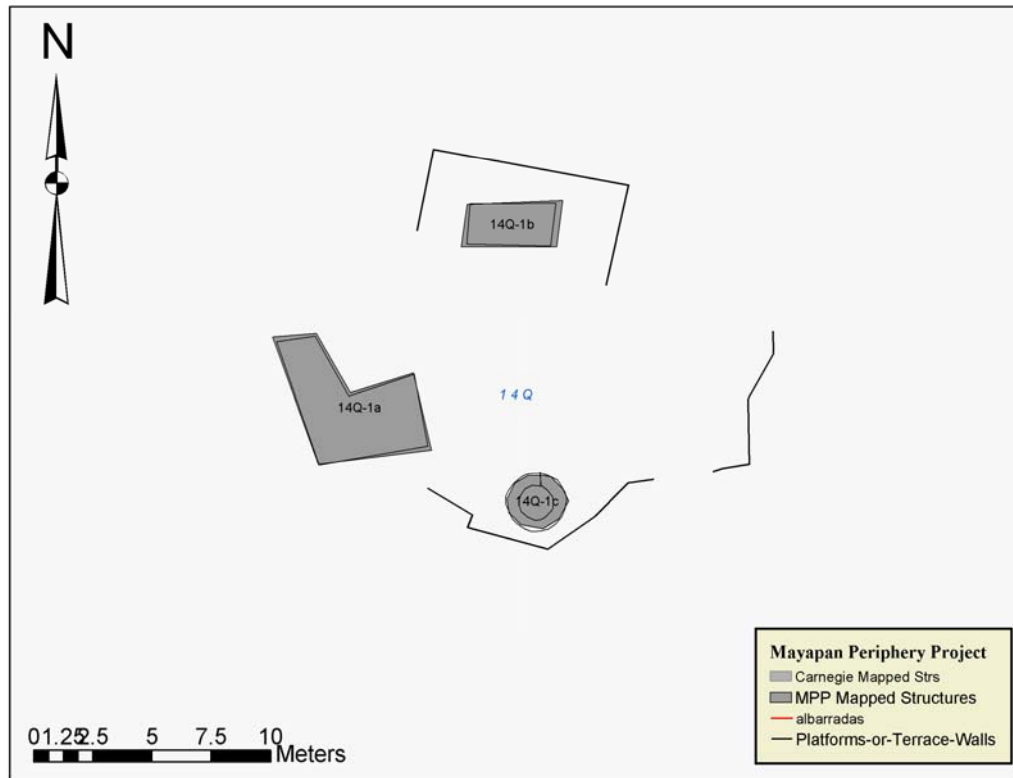


Figure 115 – Transect 6, Cluster 14Q-1

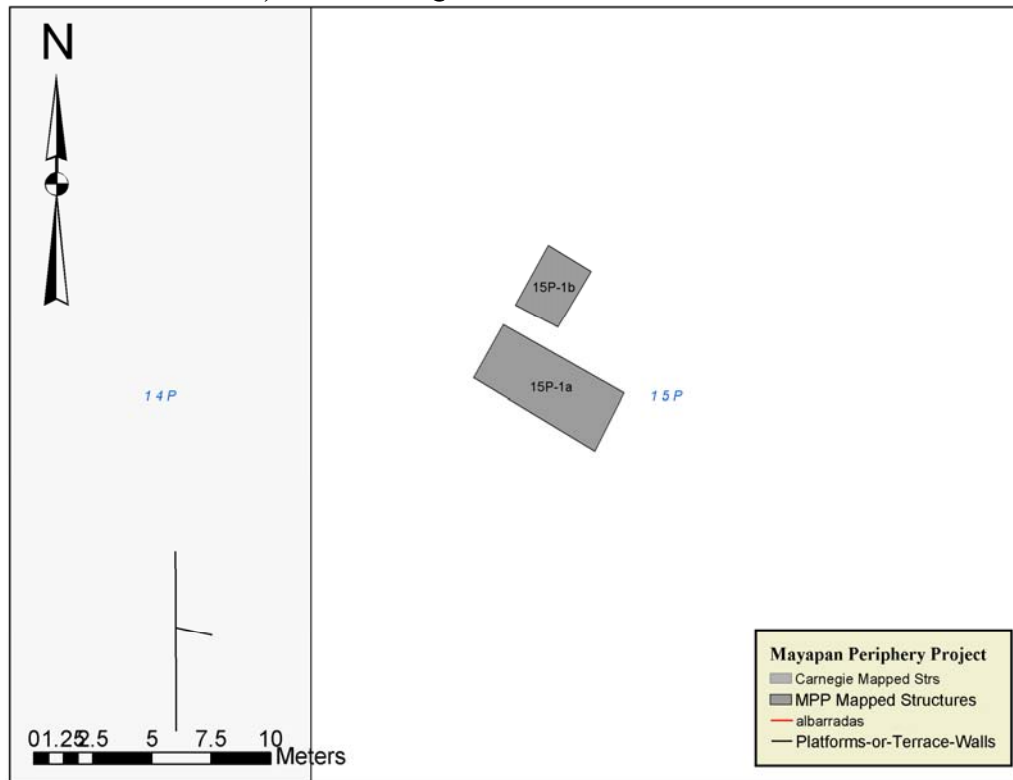


Figure 116 – Transect 6, Cluster 15P-1

## Transect 7

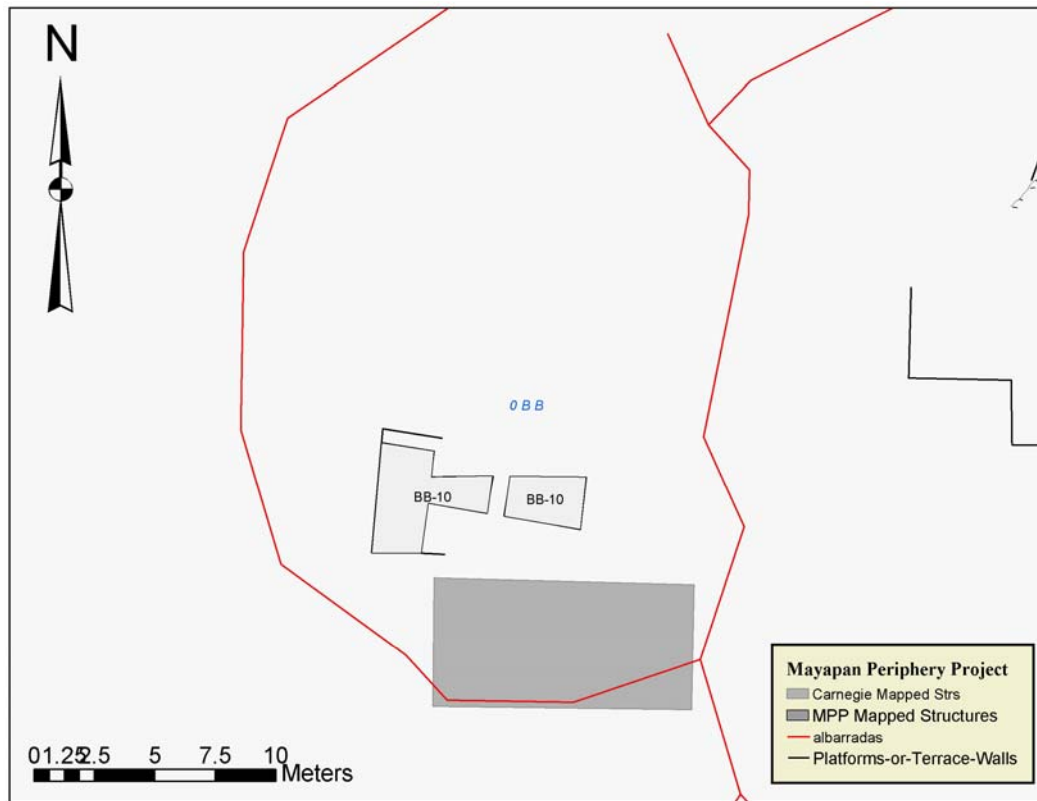


Figure 117 – Transect 7, Cluster BB-10

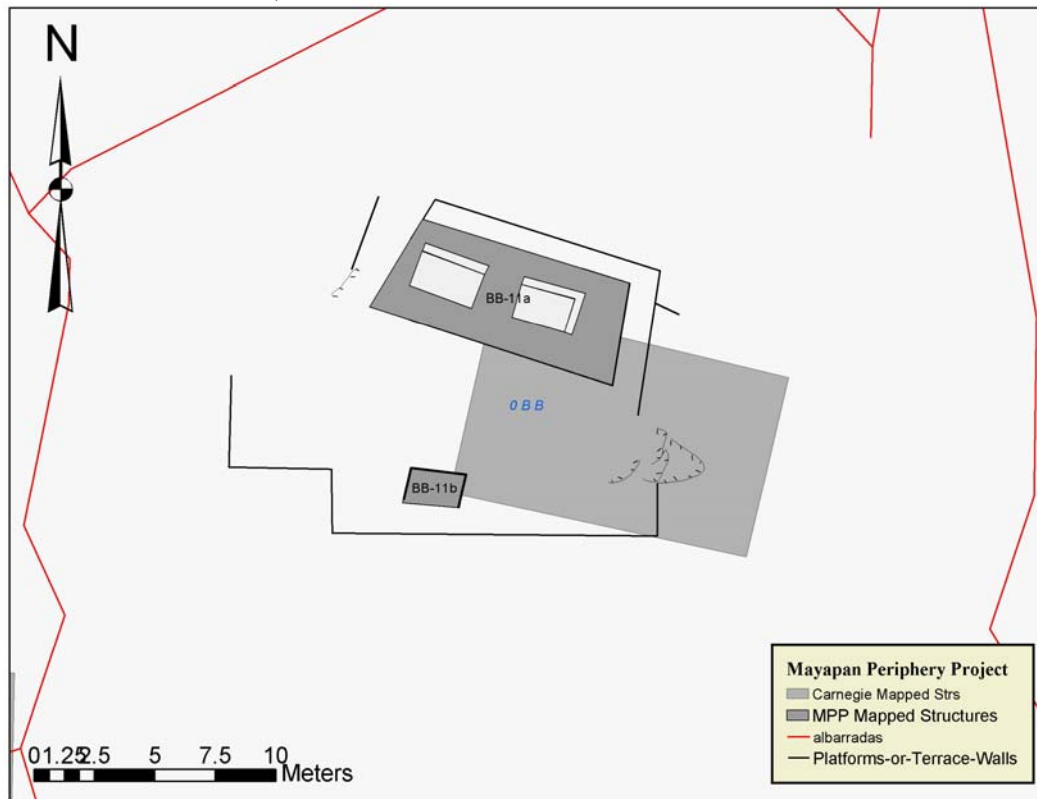


Figure 118 – Transect 7, Cluster BB-11

## Transect 7

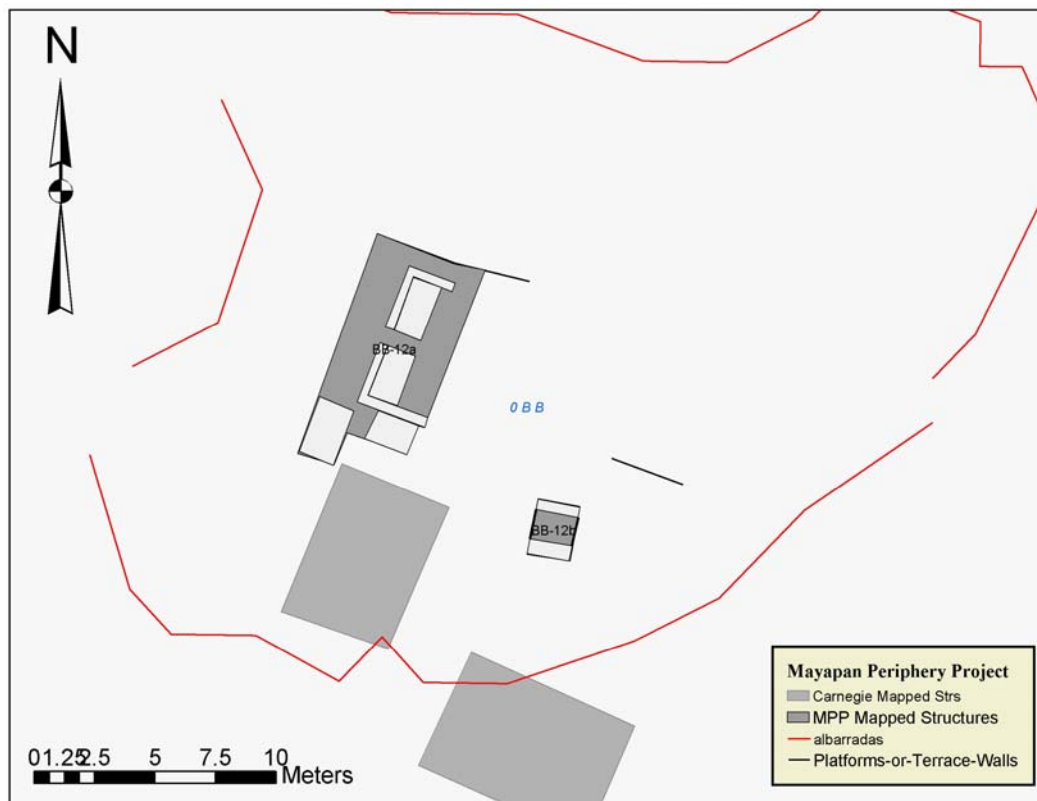


Figure 119 – Transect 7, Cluster BB-12

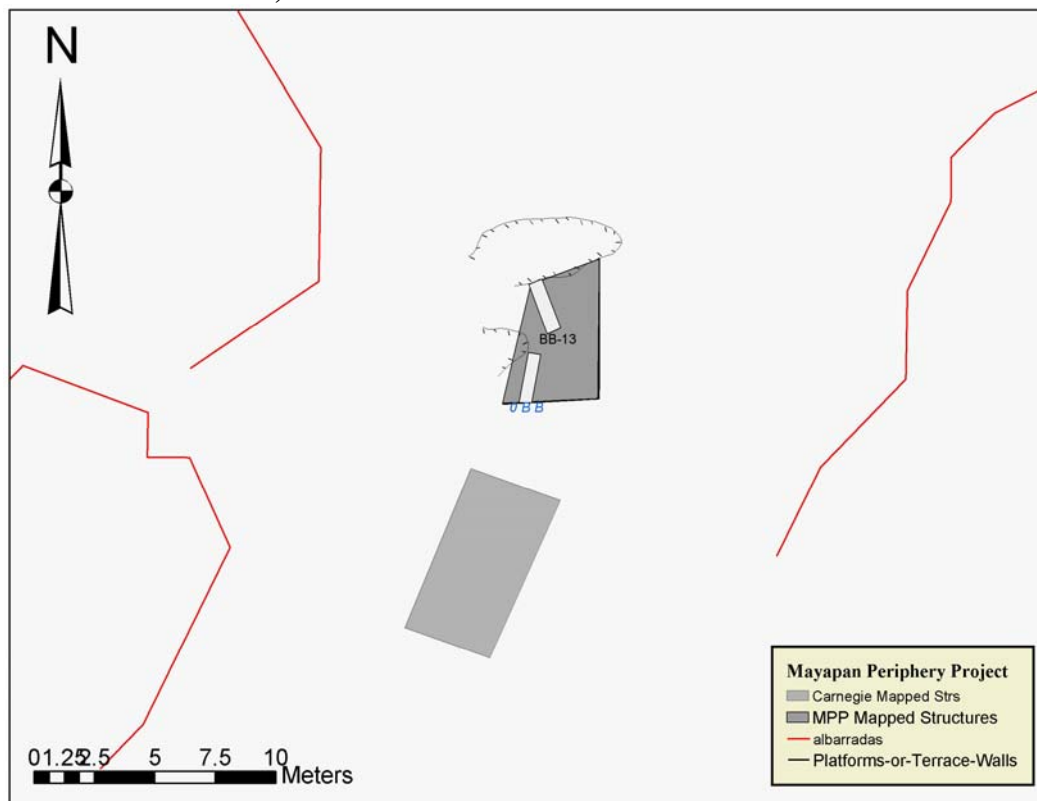


Figure 120 – Transect 7, Cluster BB-13

## Transect 7

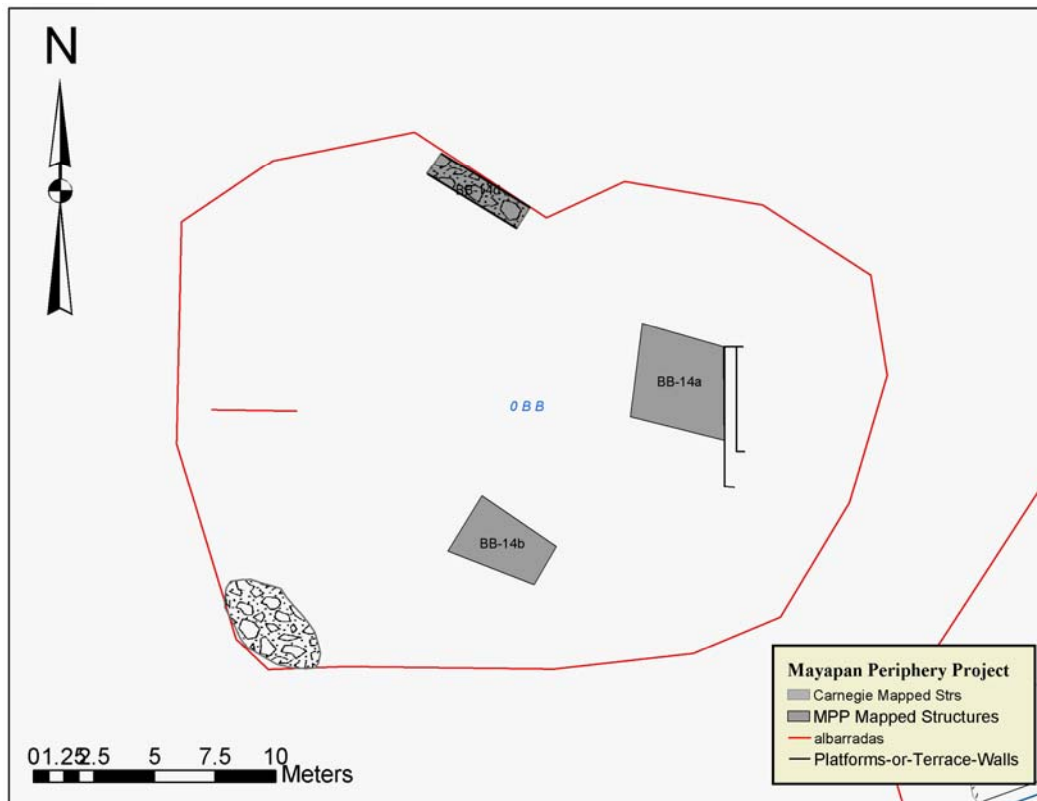


Figure 121 – Transect 7, Cluster BB-14

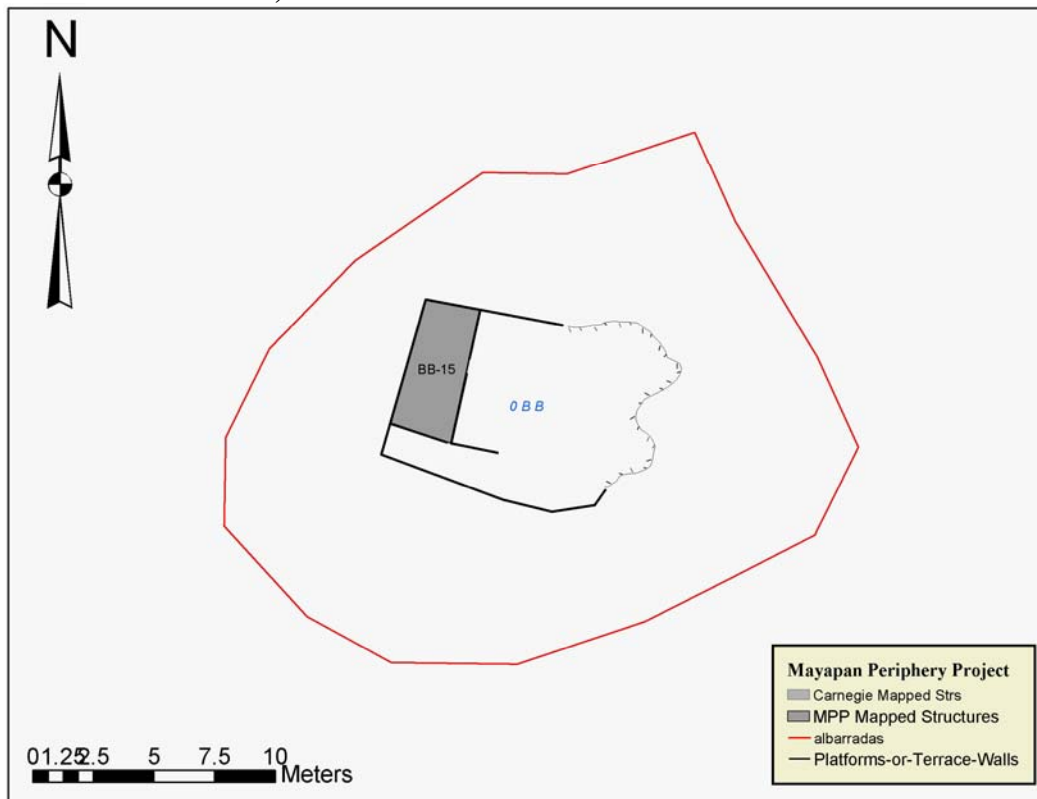


Figure 122 – Transect 7, Cluster BB-15

## Transect 7

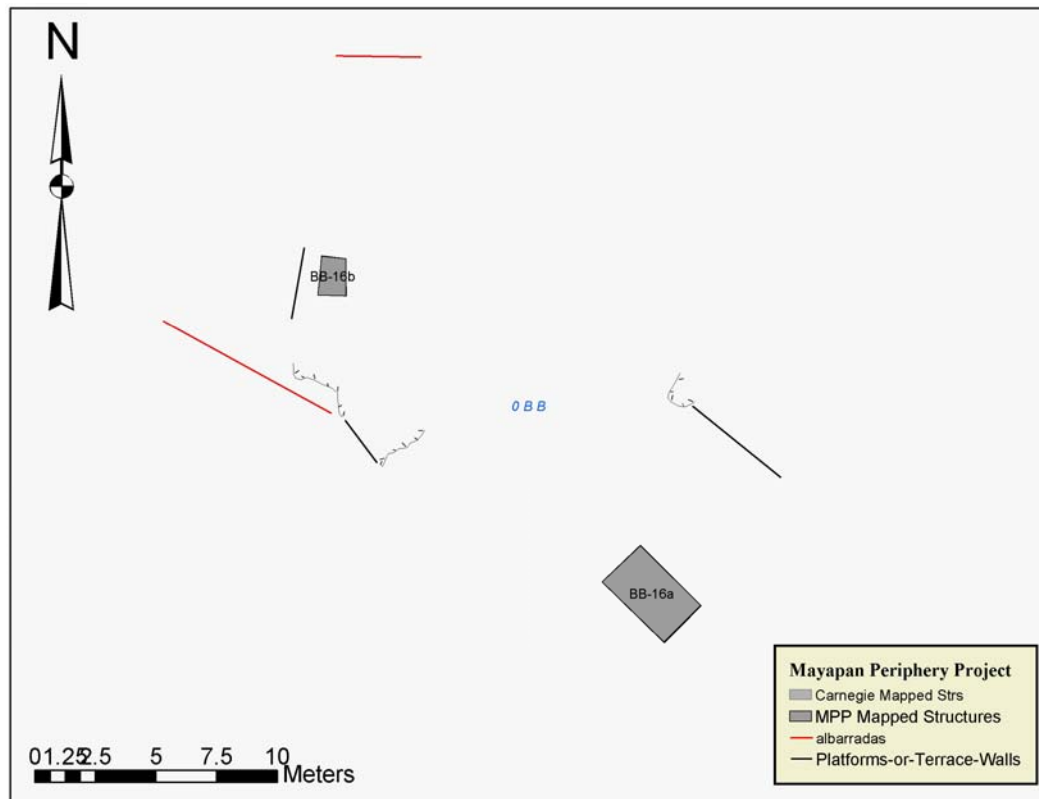


Figure 123 – Transect 7, Cluster BB-16

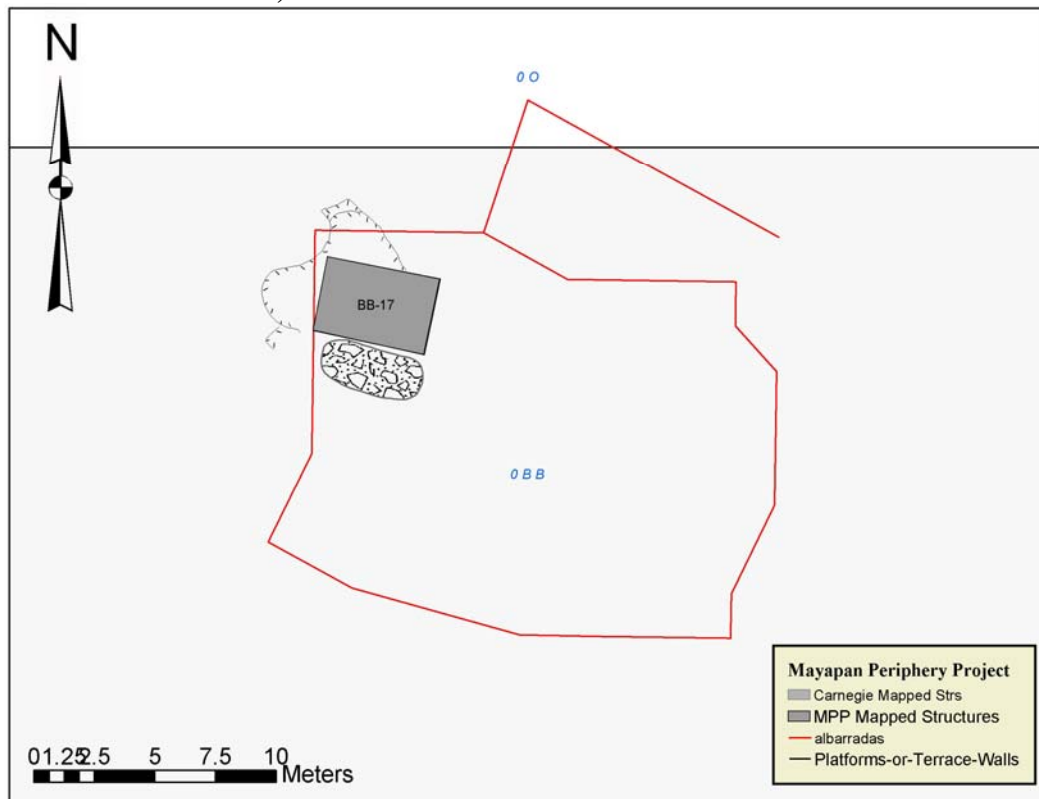


Figure 124 – Transect 7, Cluster BB-17

## Transect 7

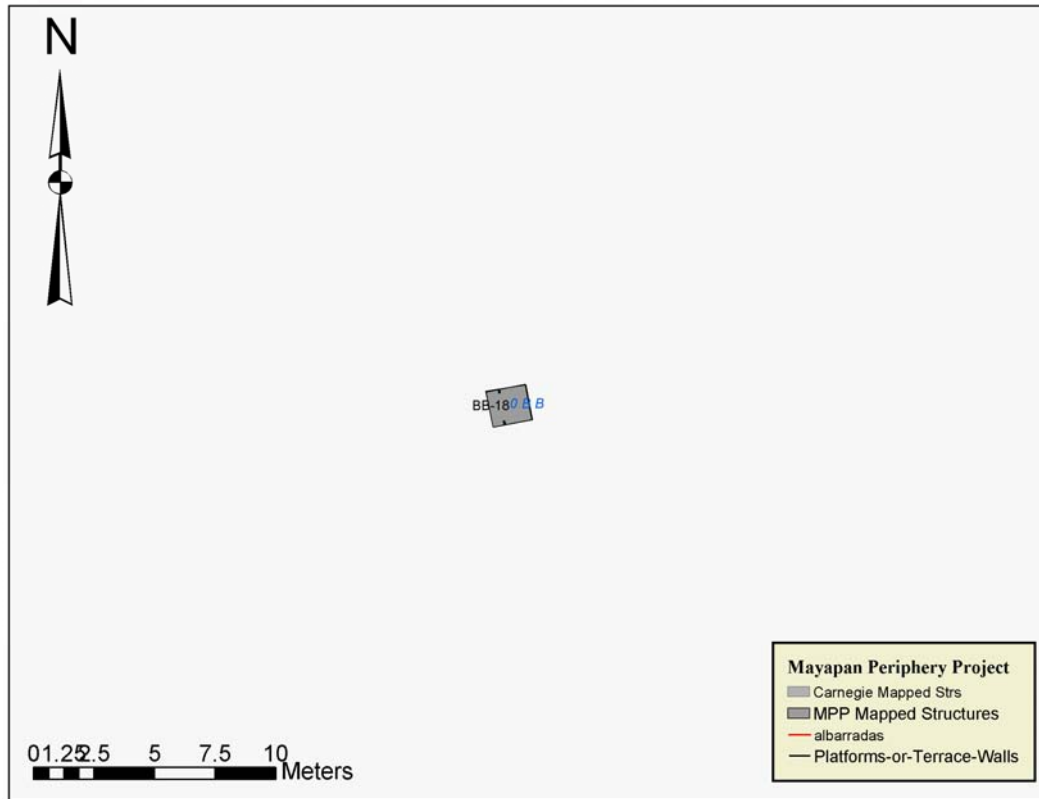


Figure 125 – Transect 7, Cluster BB-18

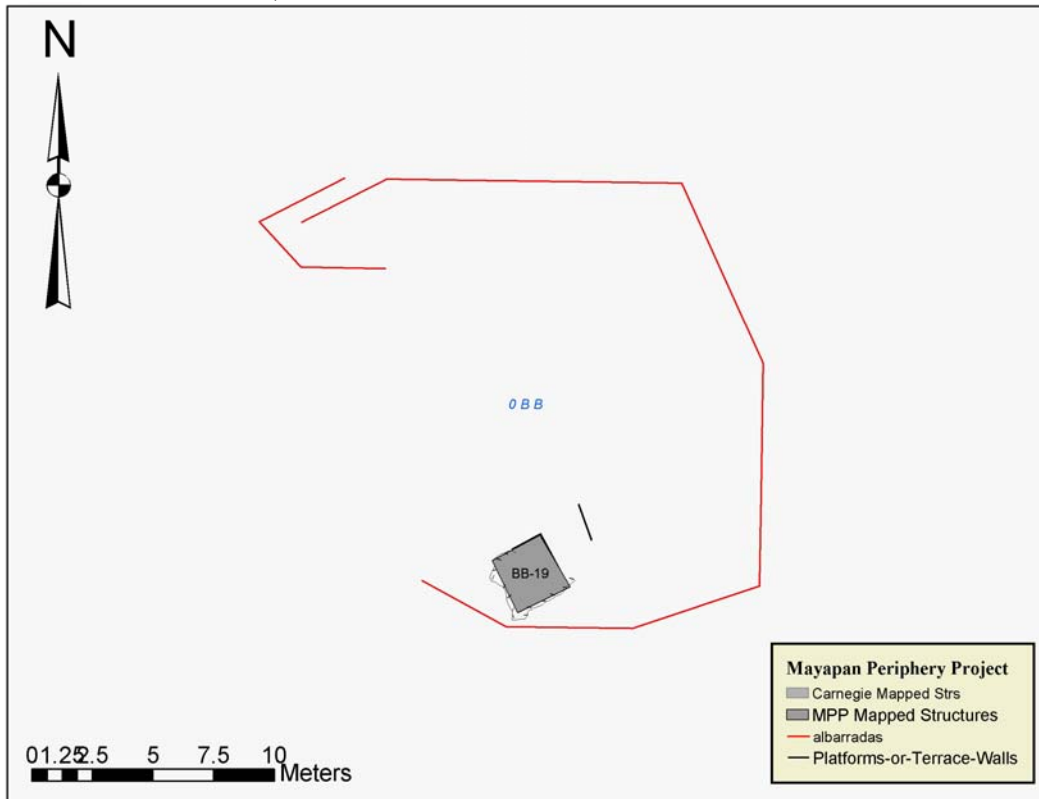


Figure 126 – Transect 7, Cluster BB-19

## Transect 7

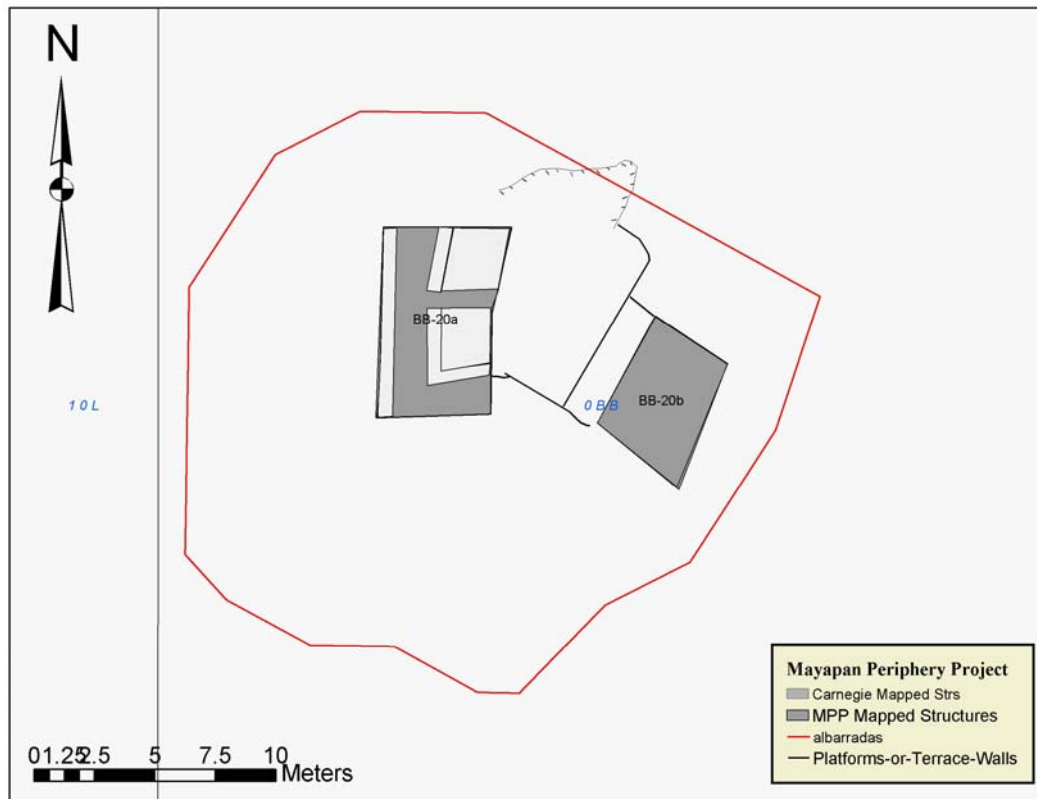


Figure 127 – Transect 7, Cluster BB-20

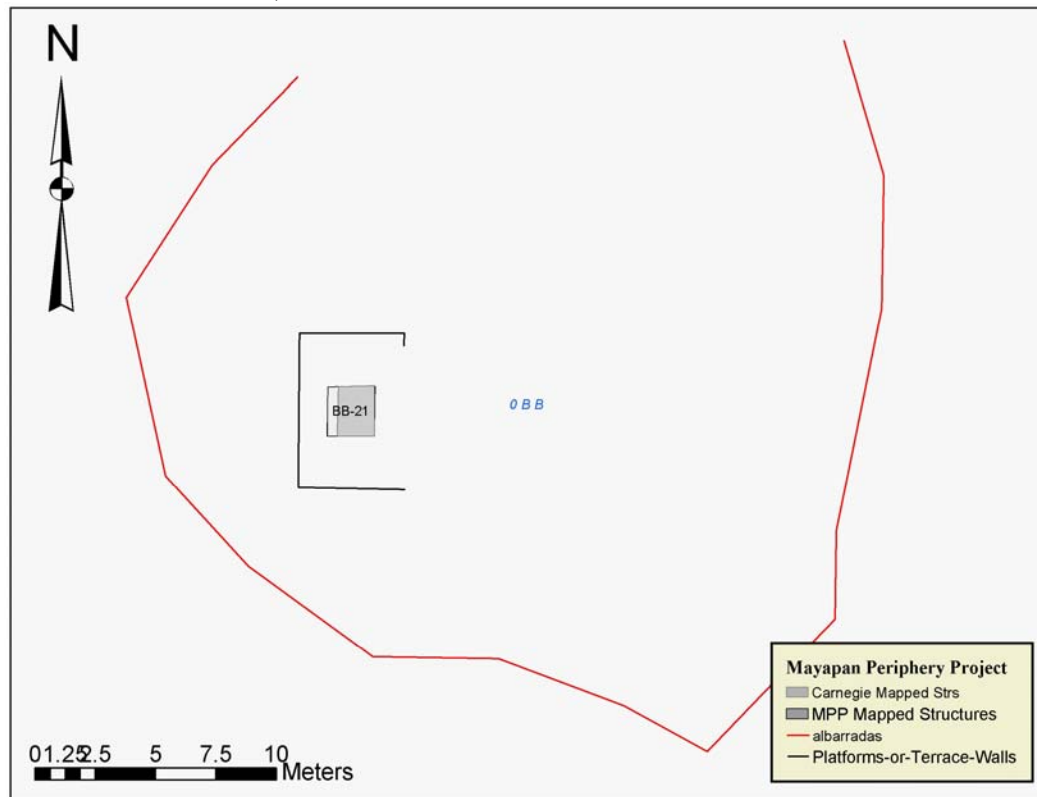


Figure 128 – Transect 7, Cluster BB-21



## Transect 7

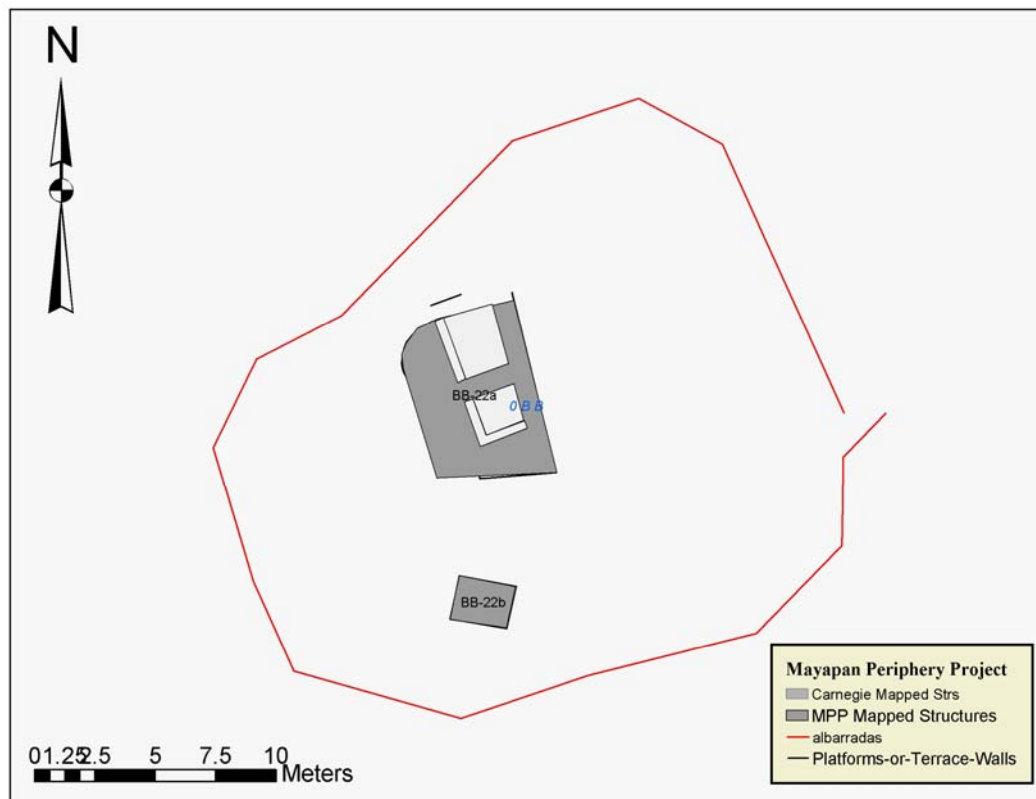


Figure 131 – Transect 7, Cluster BB-22

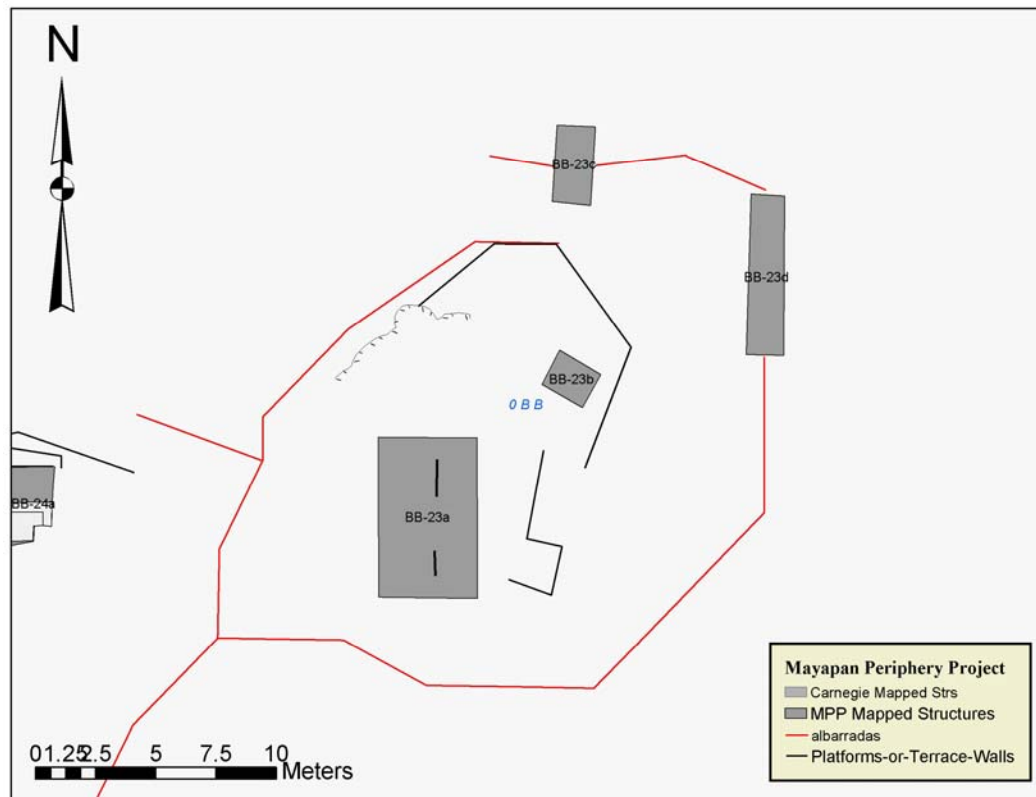


Figure 132 – Transect 7, Cluster BB-23

## Transect 7

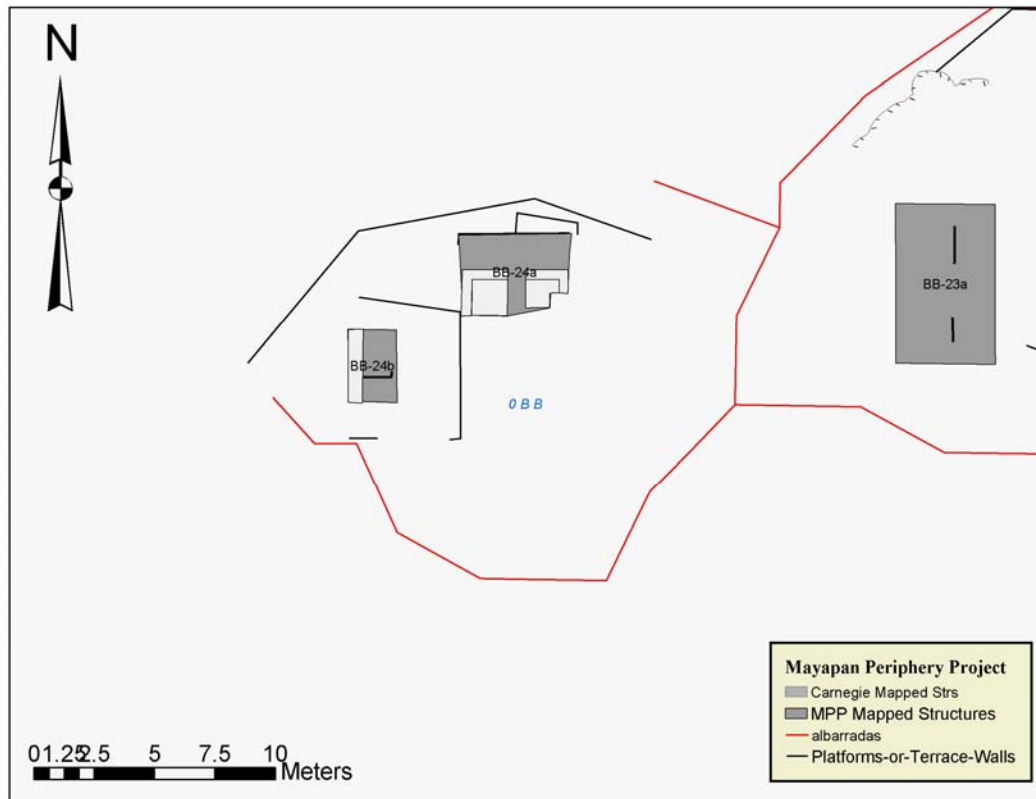


Figure 133 – Transect 7, Cluster BB-24

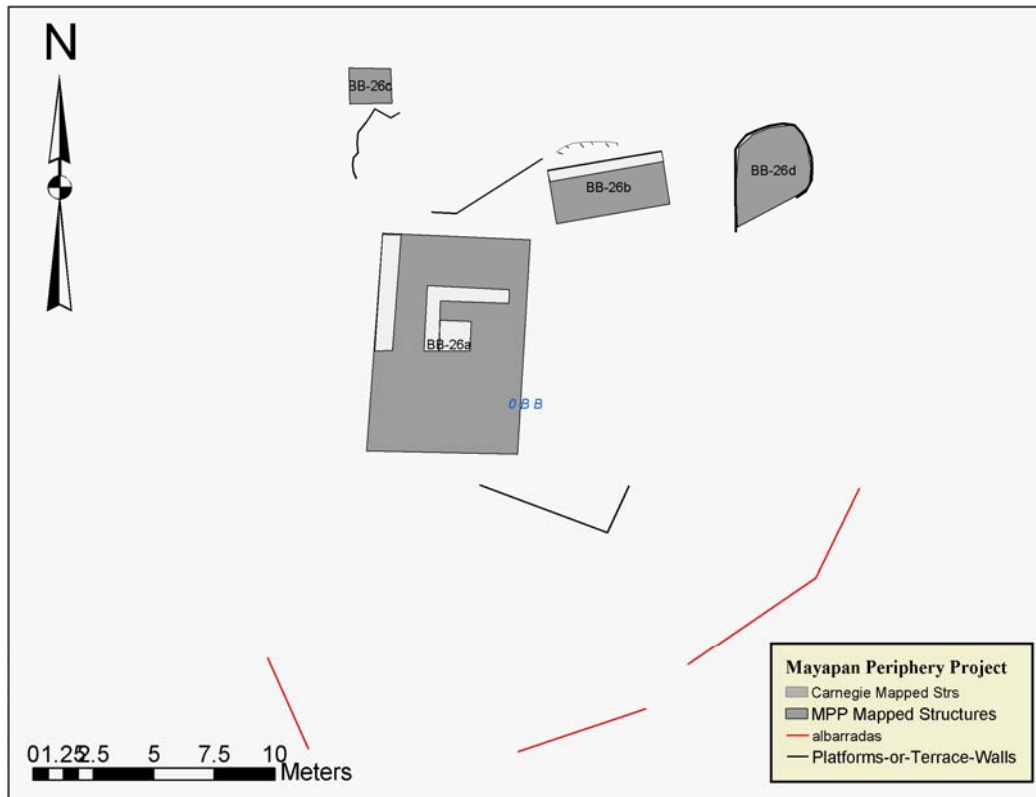


Figure 134 – Transect 7, Cluster BB-25

## Transect 7

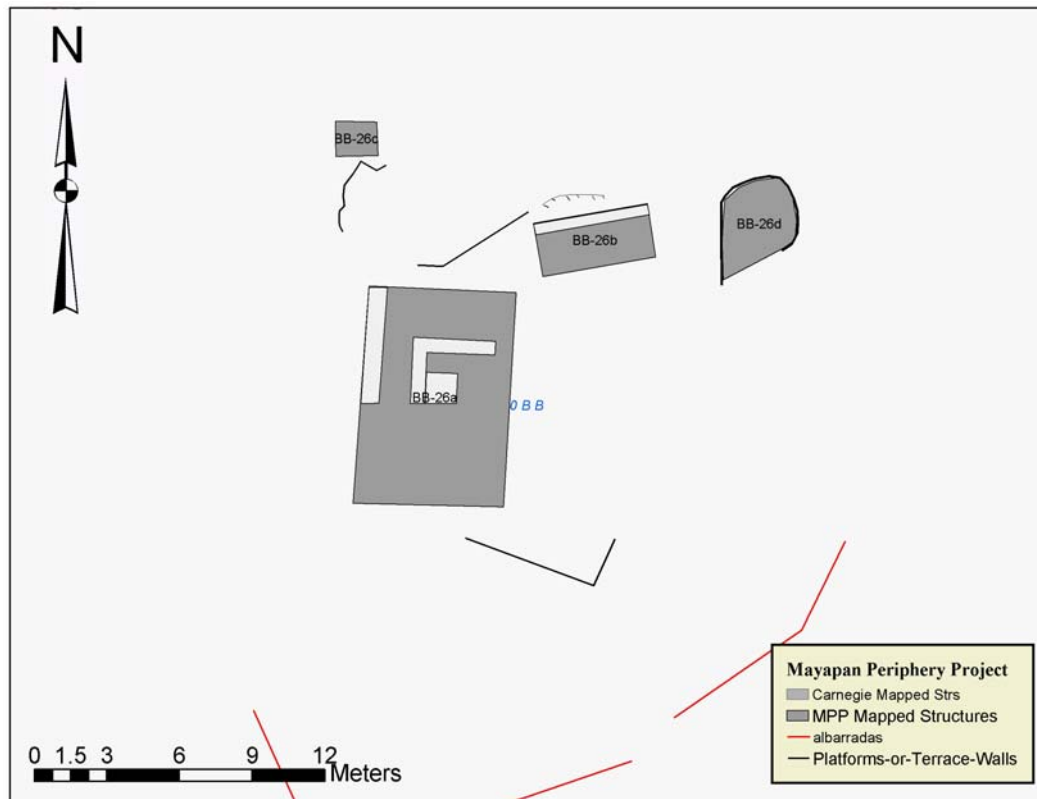


Figure 135 – Transect 7, Cluster BB-26

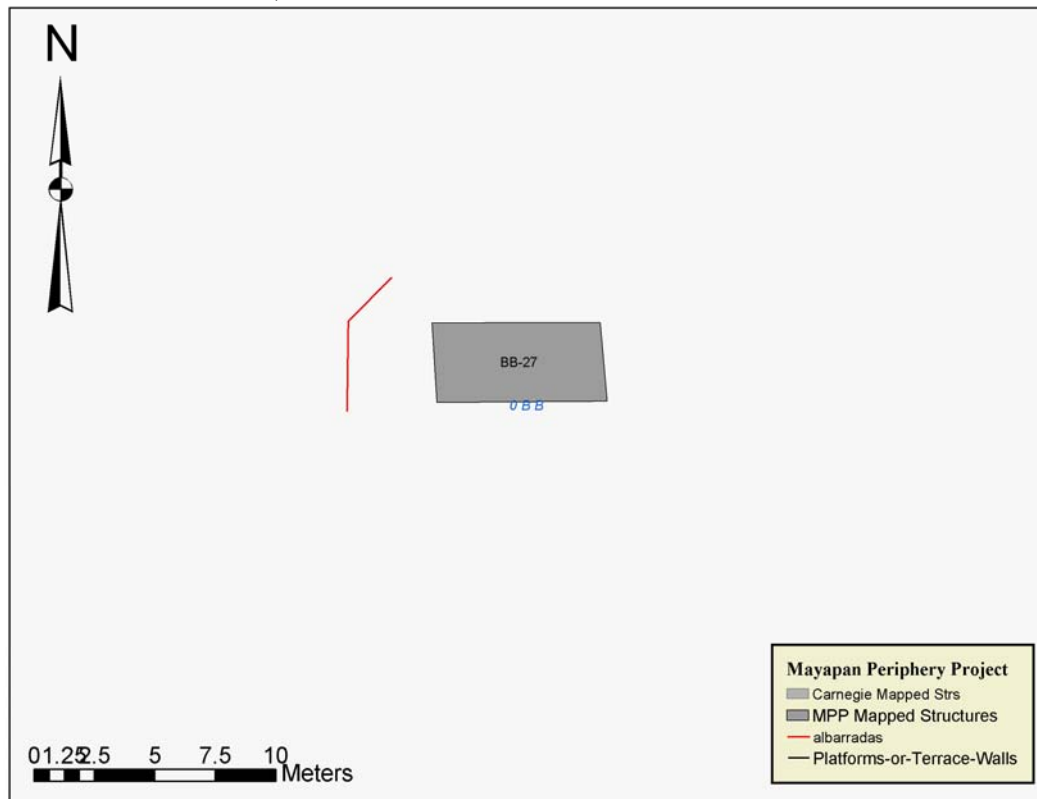


Figure 136 – Transect 7, Cluster BB-27

## Transect 7

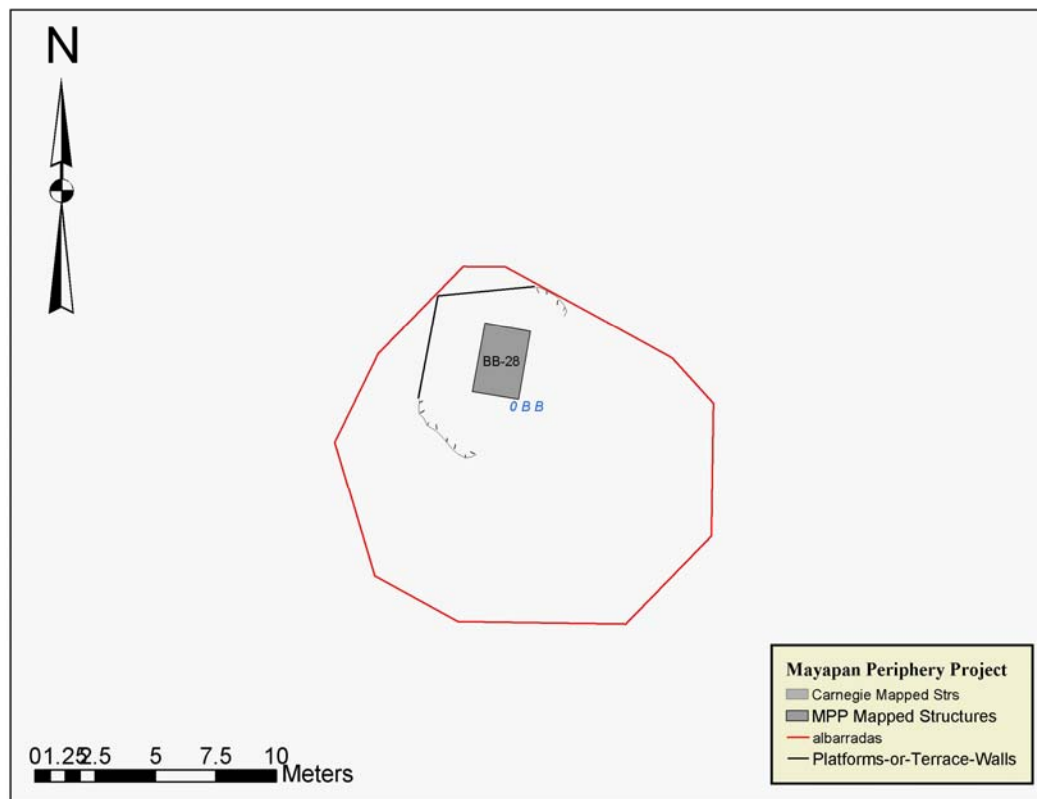


Figure 137 – Transect 7, Cluster BB-28

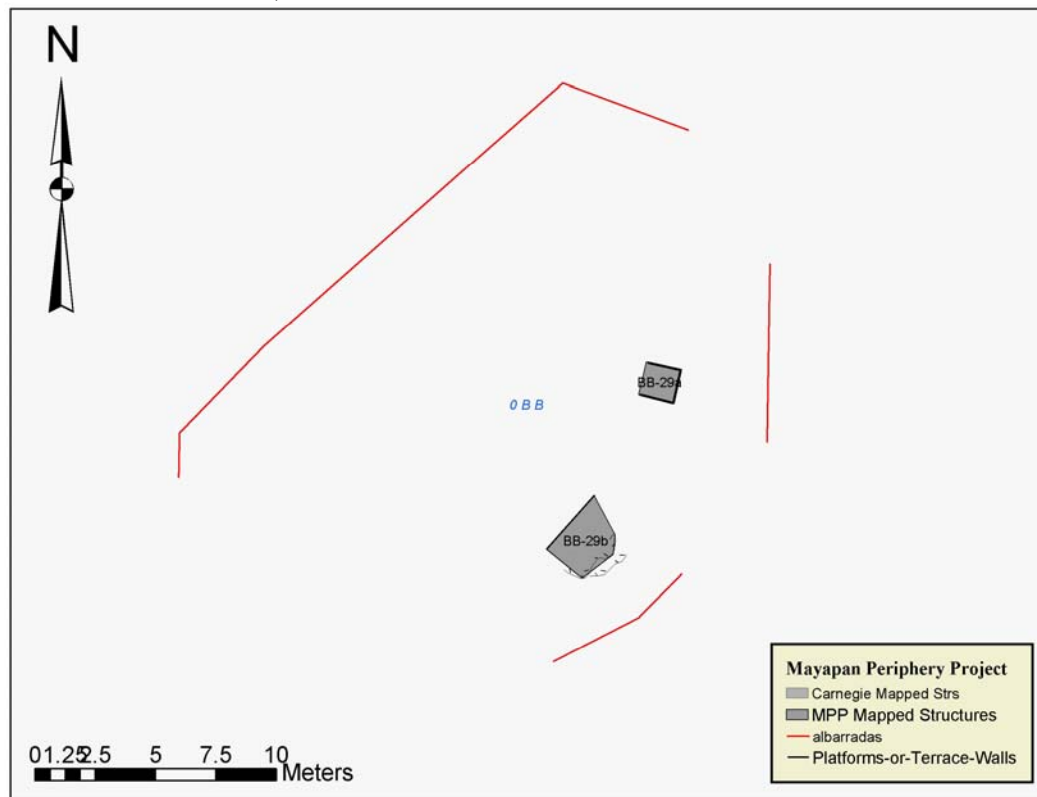


Figure 138 – Transect 7, Cluster BB-29

## Transect 7

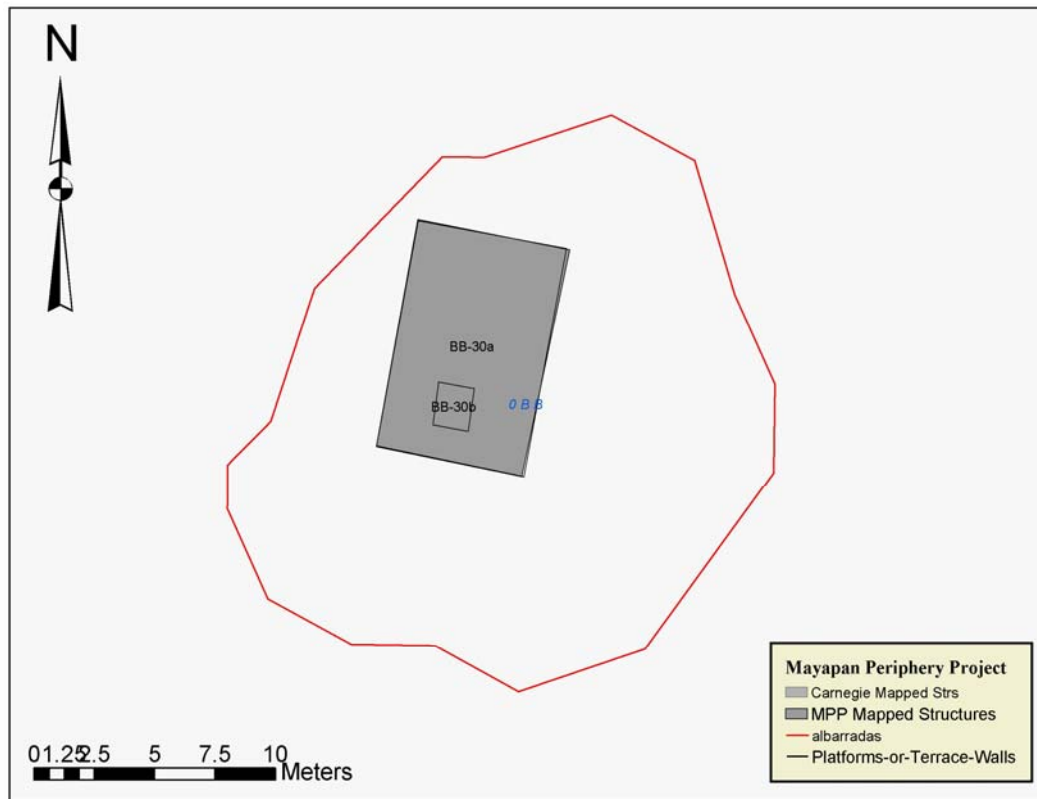


Figure 139 – Transect 7, Cluster BB-30

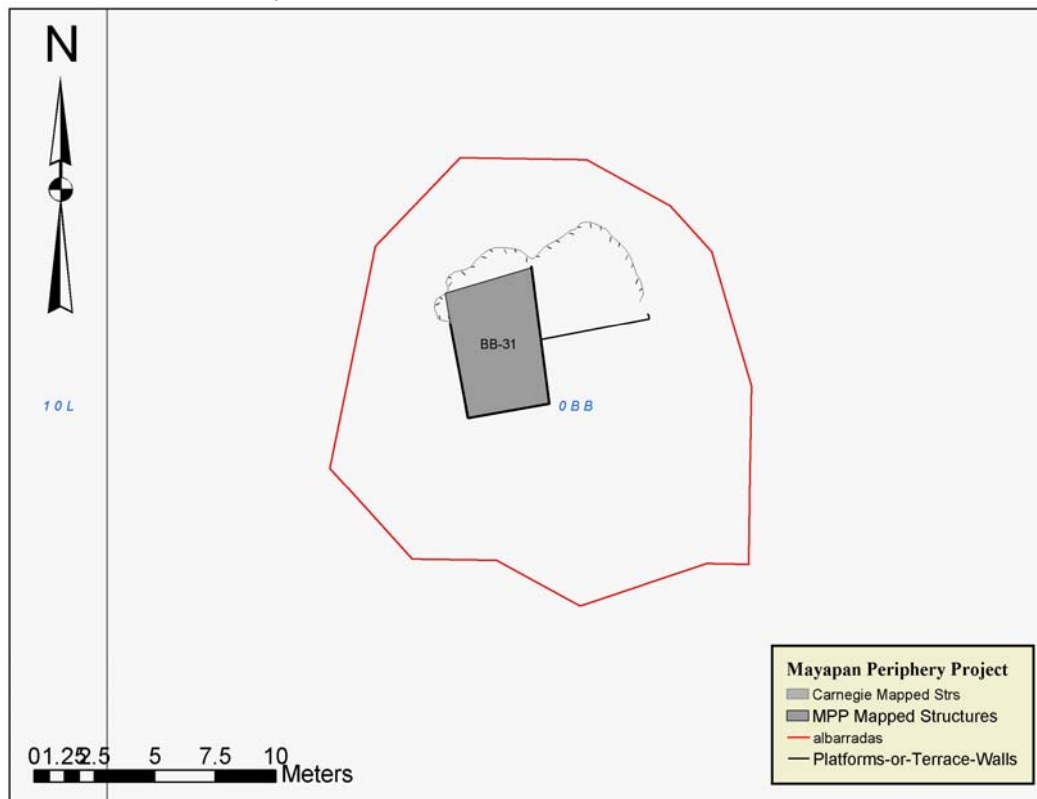


Figure 140 – Transect 7, Cluster BB-31

## Transect 7

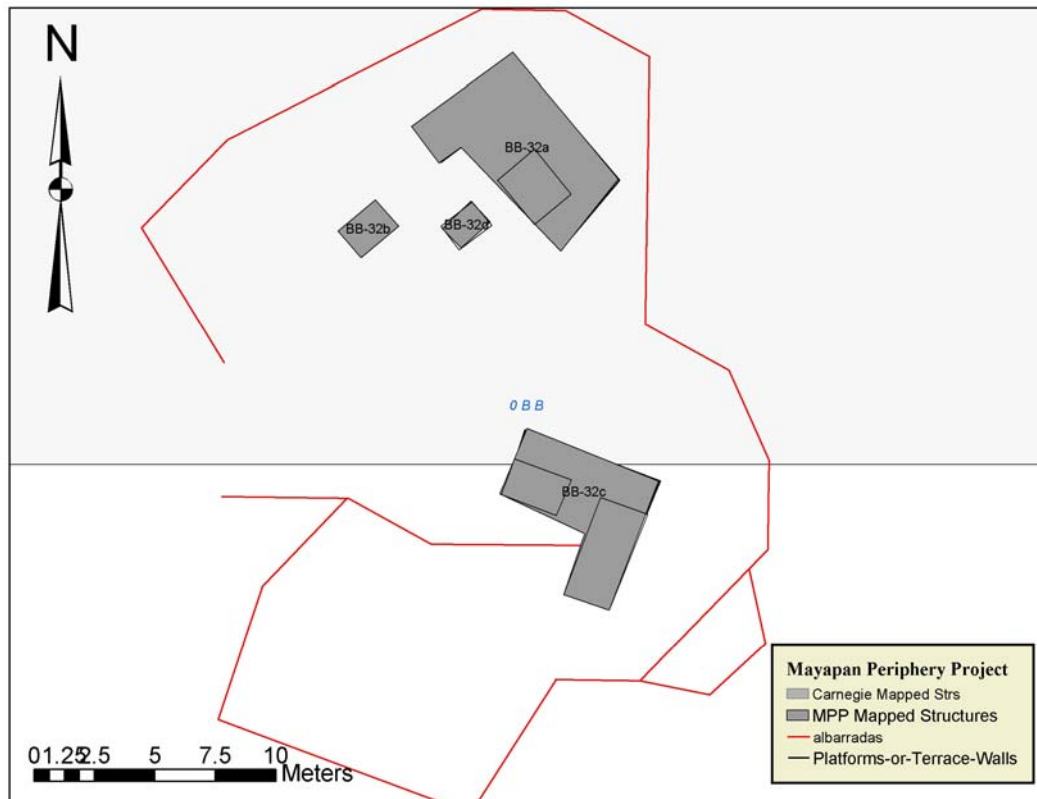


Figure 141 – Transect 7, Cluster BB-32

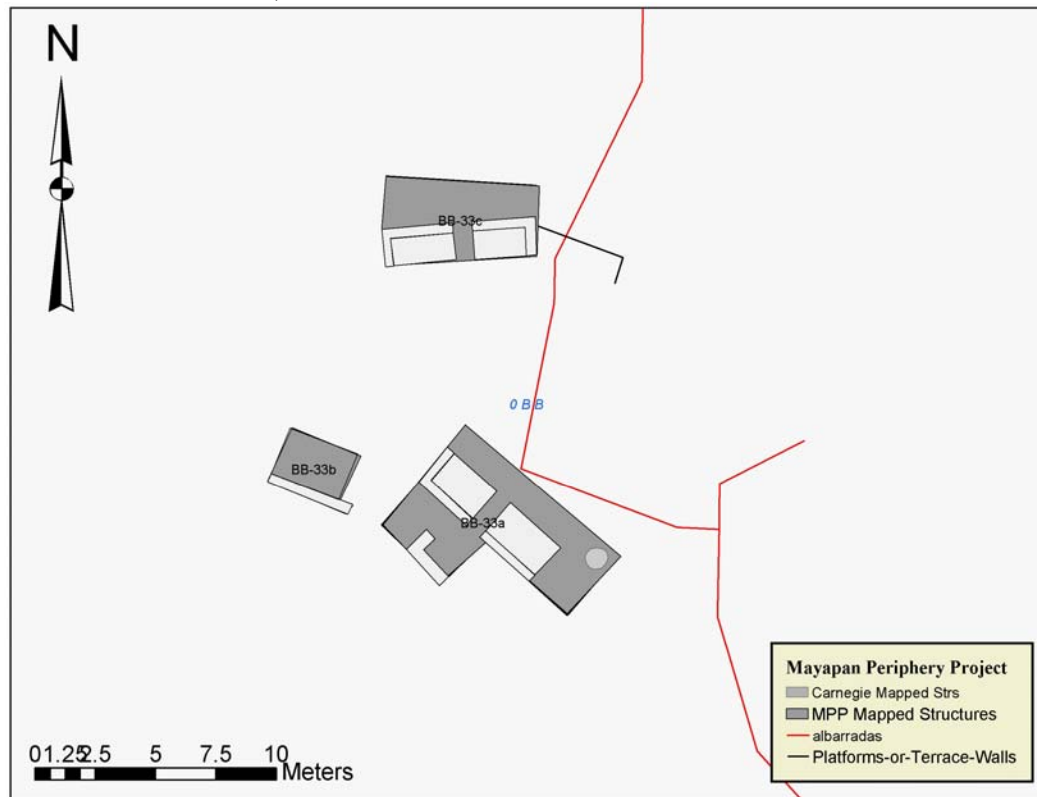


Figure 142 – Transect 7, Cluster BB-33

## Transect 7

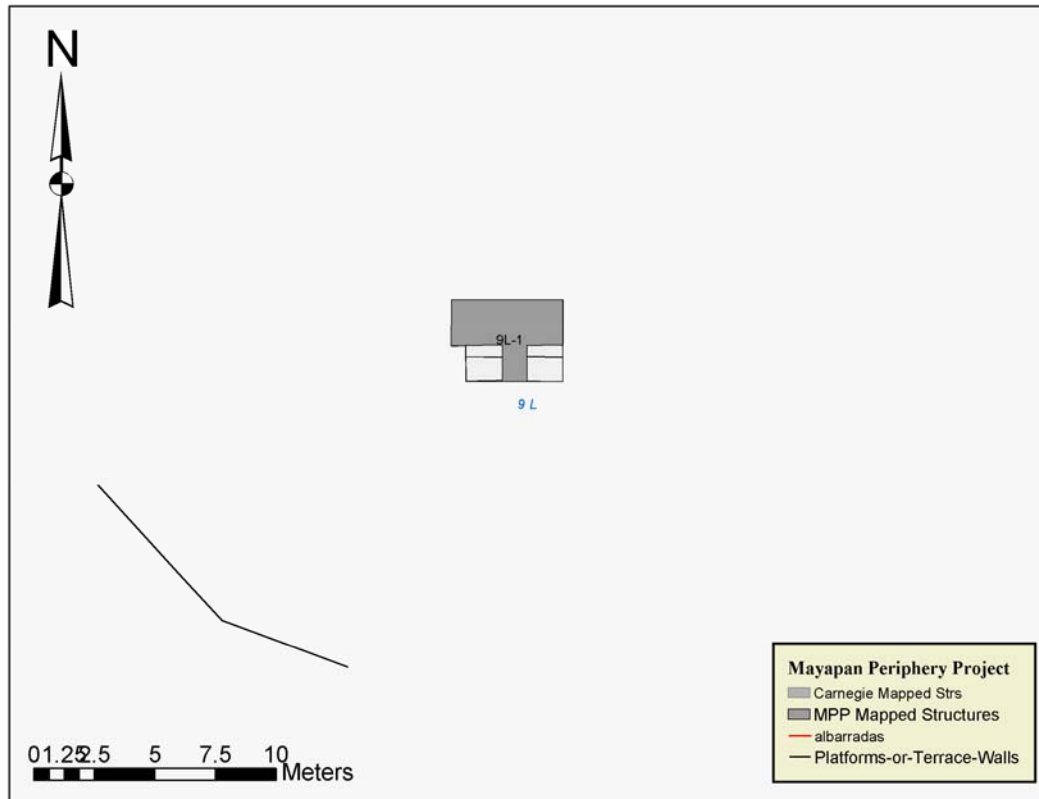


Figure 143 – Transect 7, Cluster 9L-1

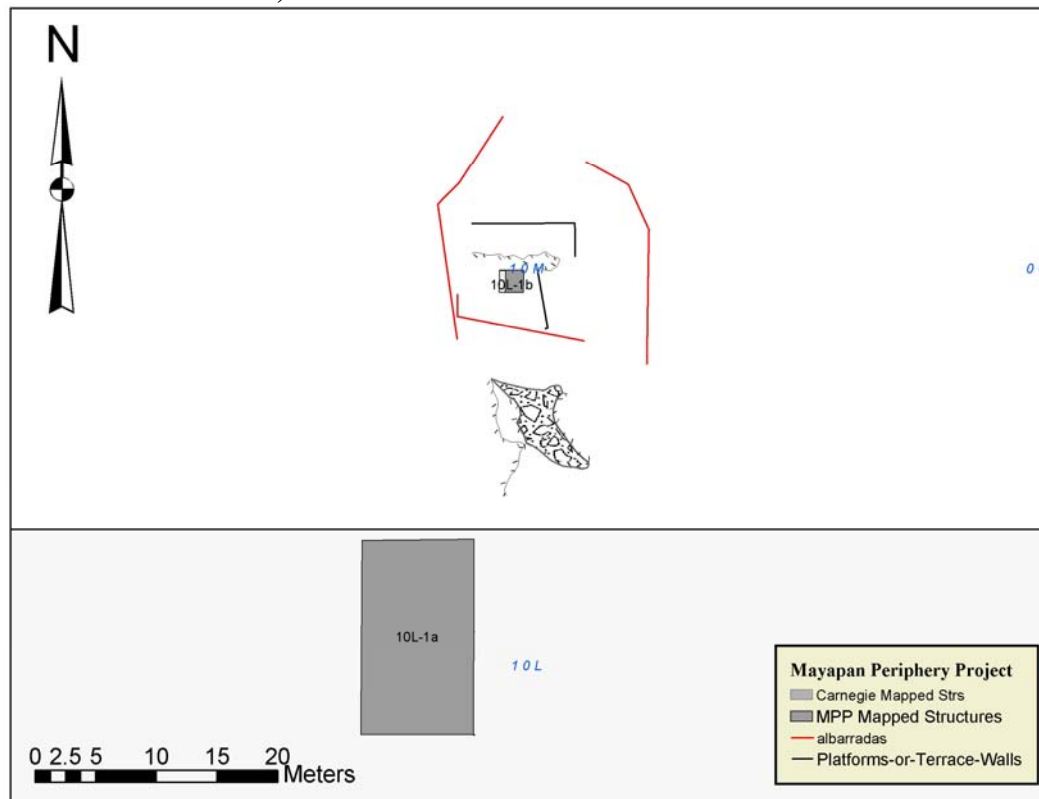


Figure 144 – Transect 7, Cluster 10L-1



## Transect 7

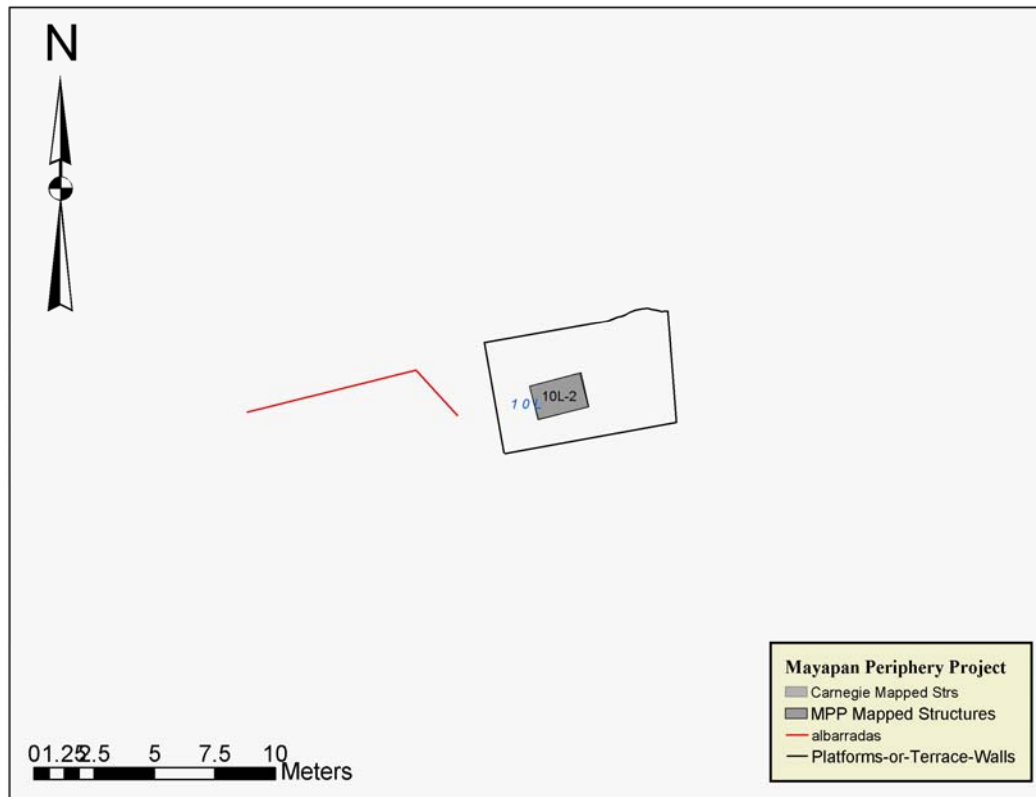


Figure 145 – Transect 7, Cluster 10L-2

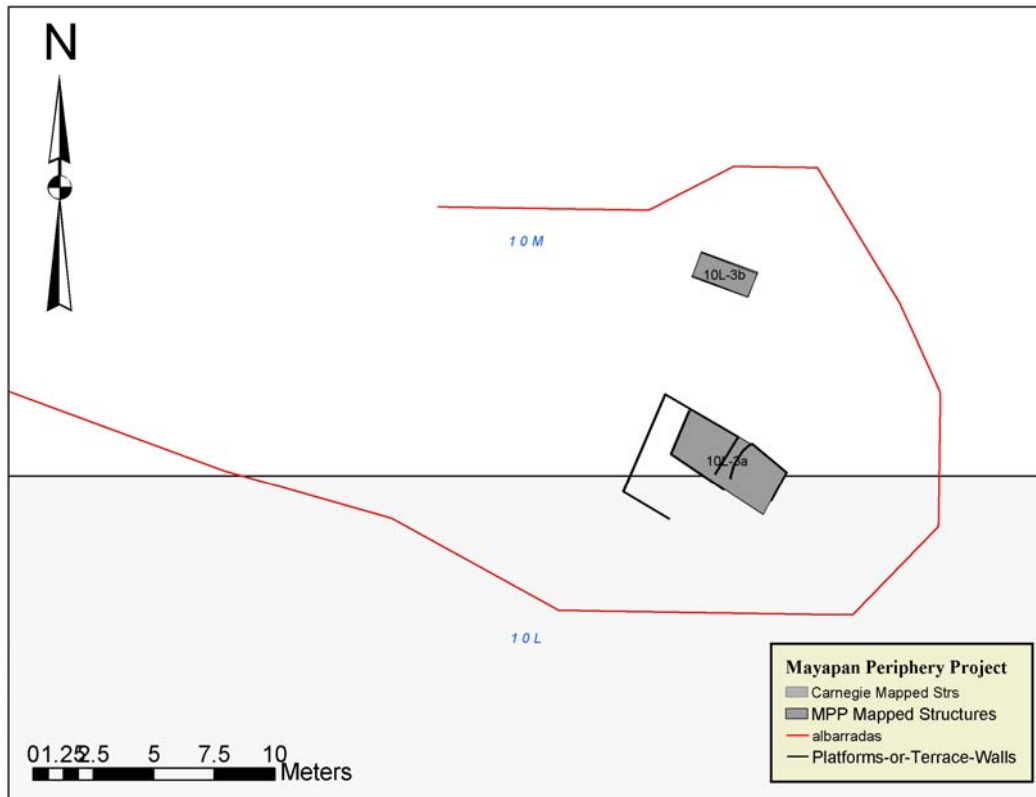


Figure 146 – Transect 7, Cluster 10L-3

## Transect 7

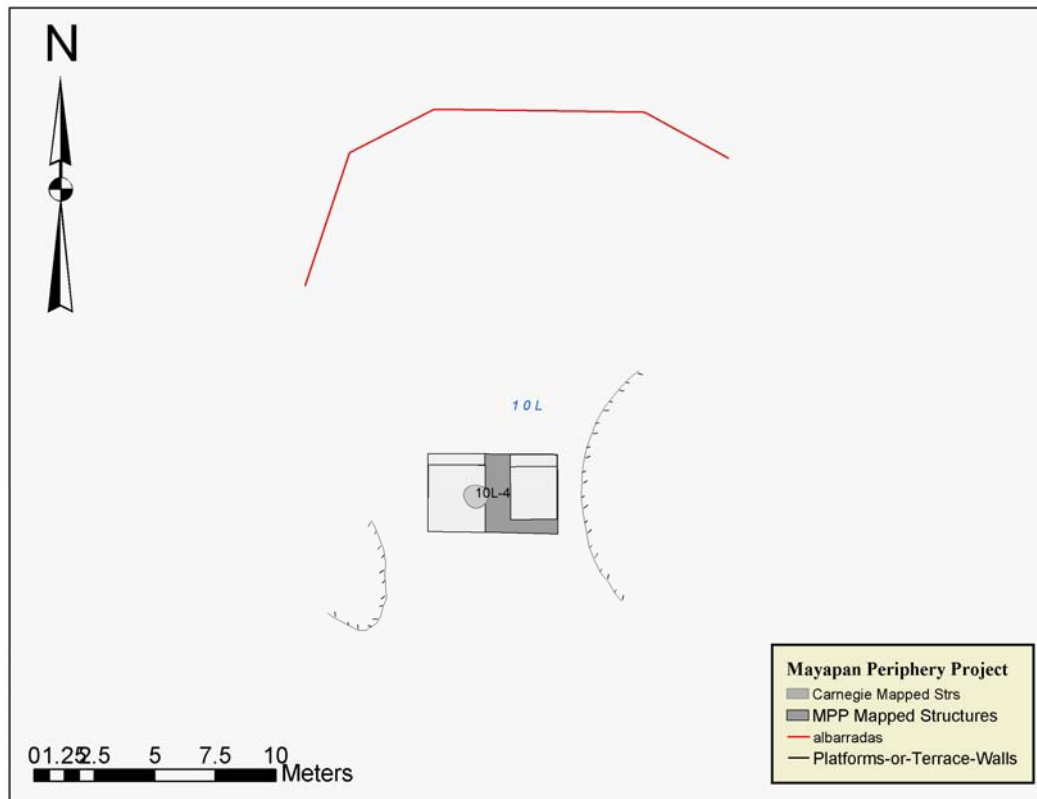


Figure 147 – Transect 7, Cluster 10L-4

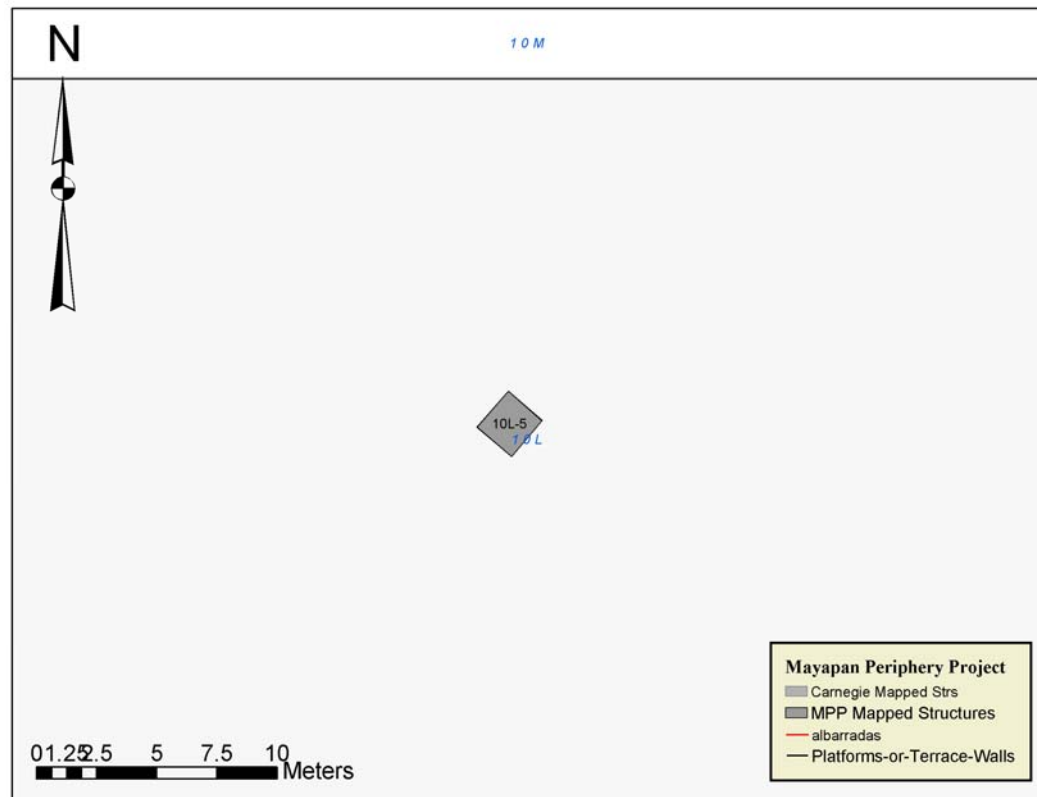


Figure 148 – Transect 7, Cluster 10L-5

## Transect 7

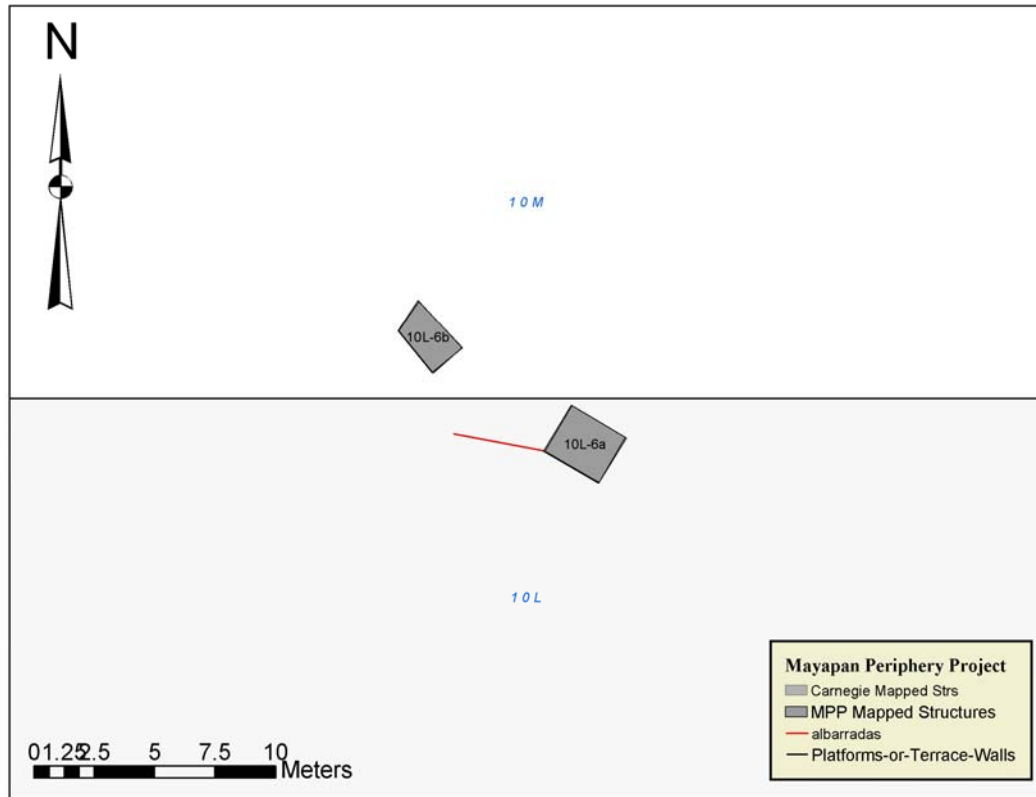


Figure 149 – Transect 7, Cluster 10L-6

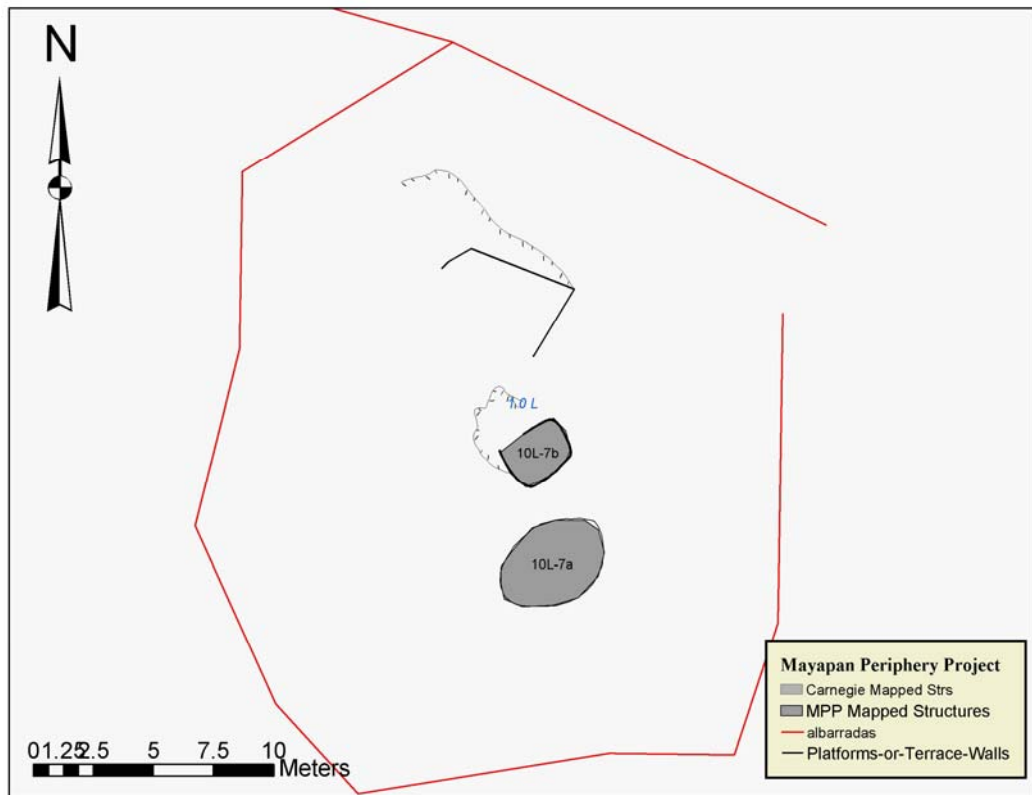


Figure 150 – Transect 7, Cluster 10L-7

## Transect 7

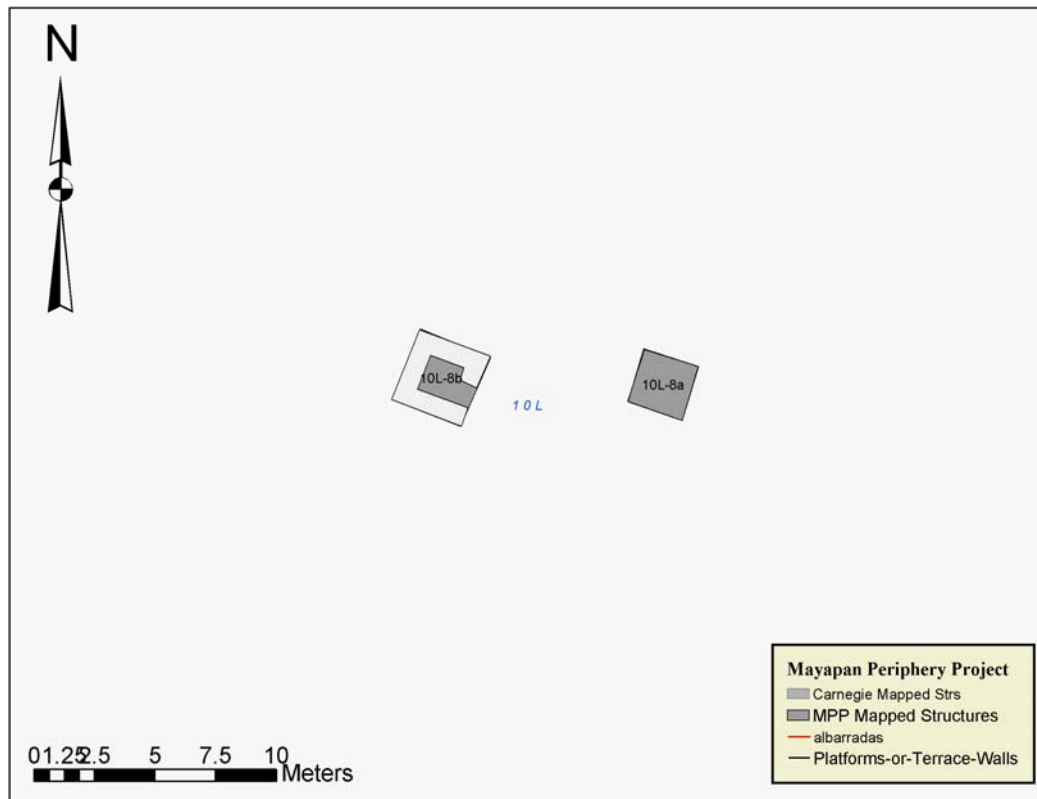


Figure 151 – Transect 7, Cluster 10L-8

## Transect 8

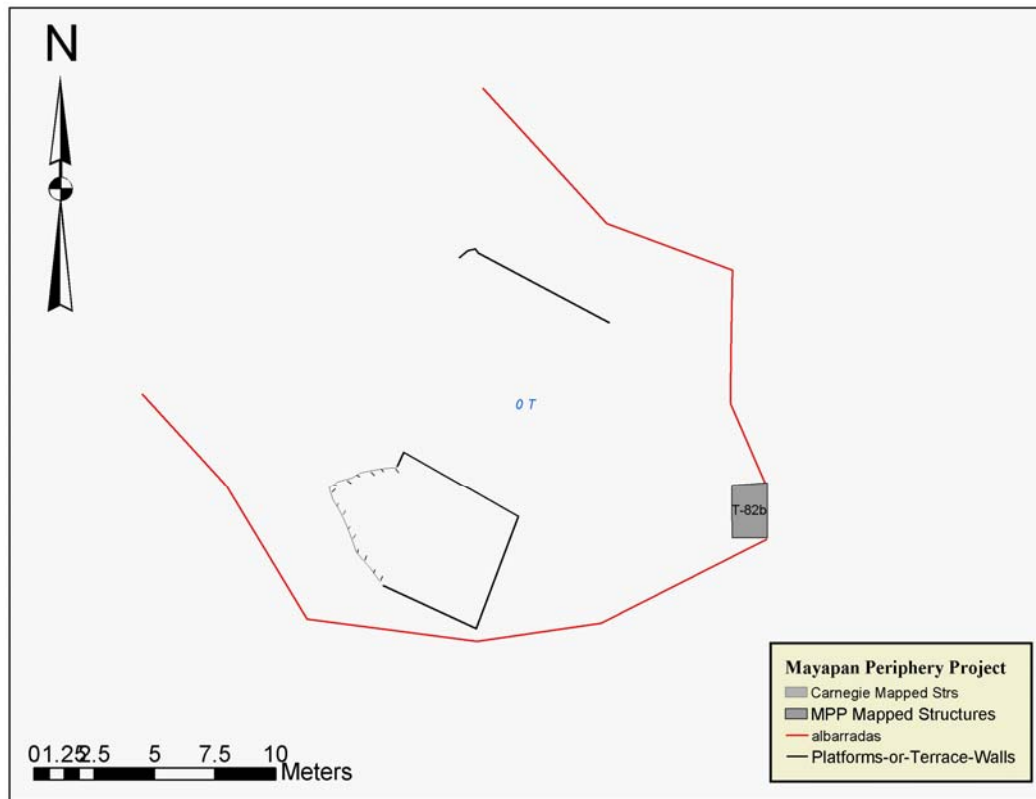


Figure 152 – Transect 8, Cluster T-82

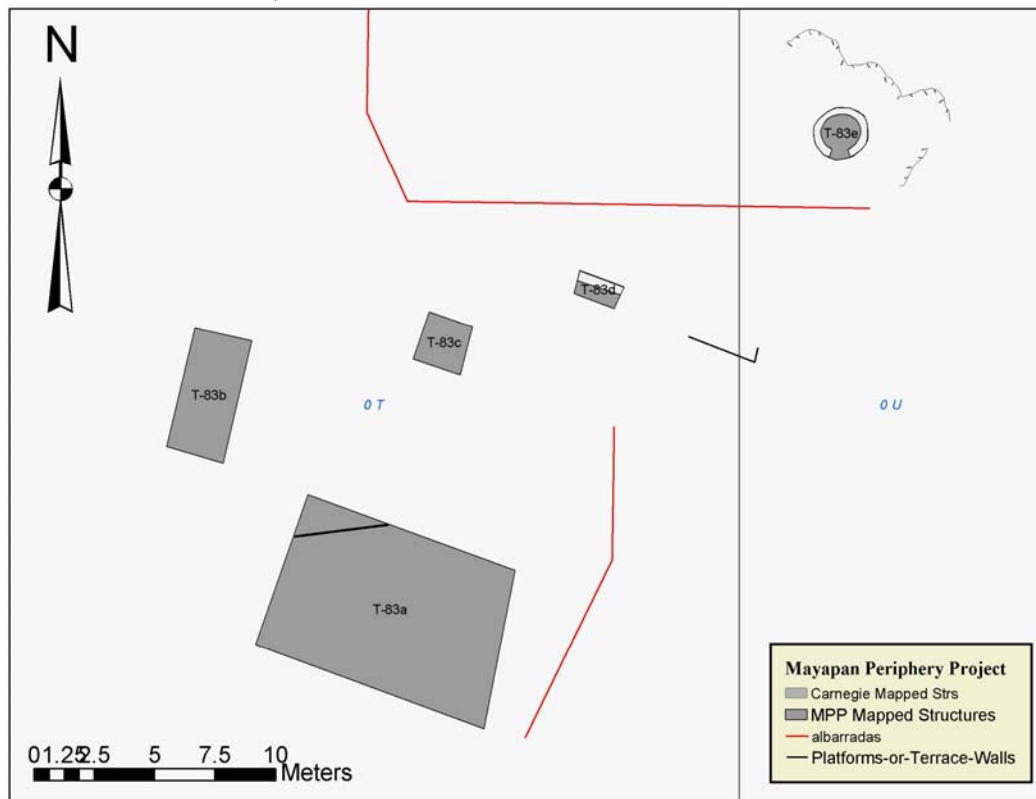


Figure 153 – Transect 8, Cluster T-83

## Transect 8

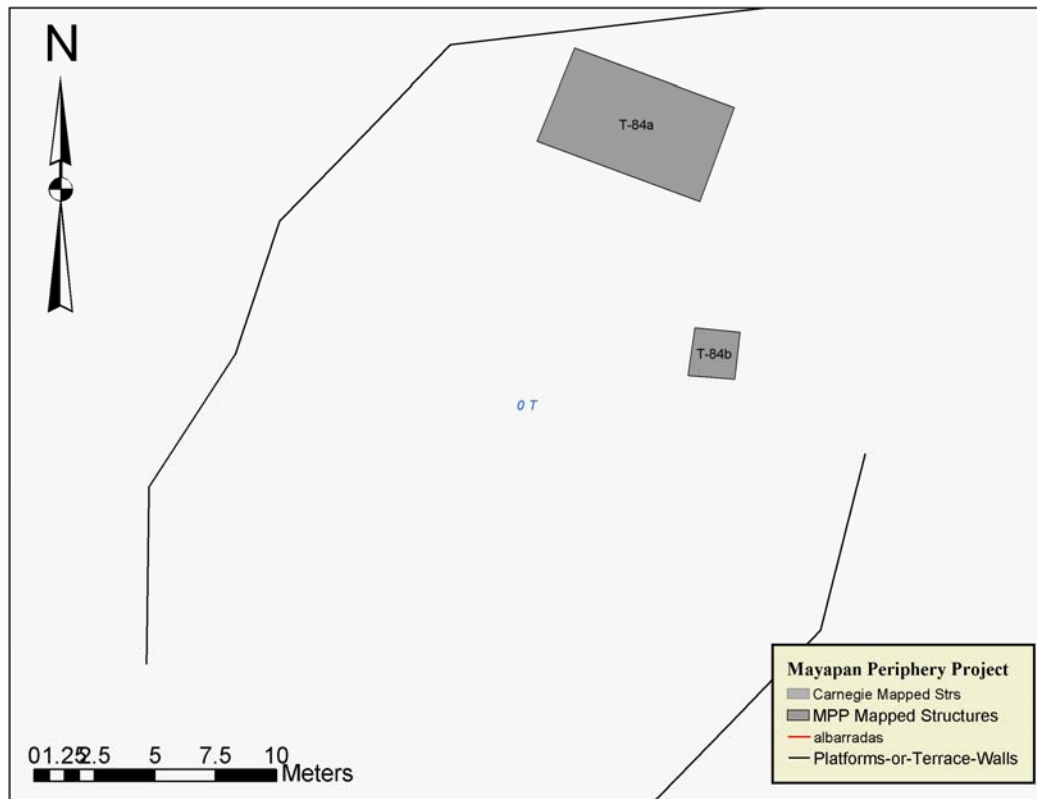


Figure 154 – Transect 8, Cluster T-84

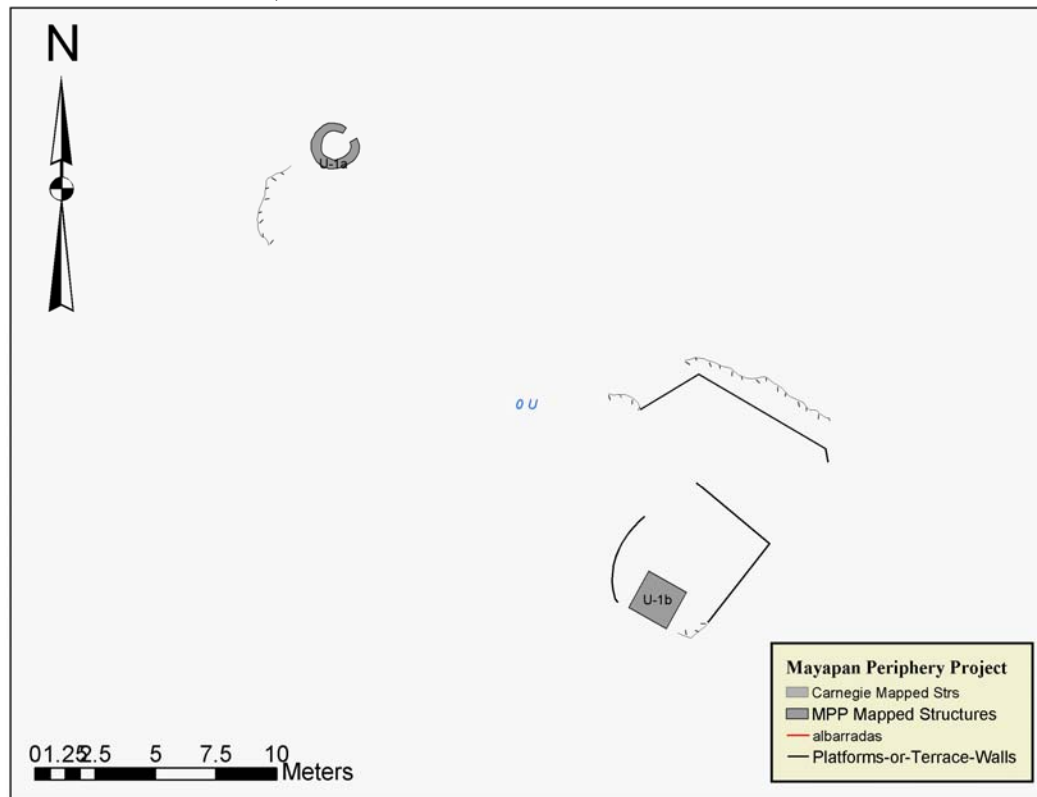


Figure 155 – Transect 8, Cluster U-1

## Transect 8

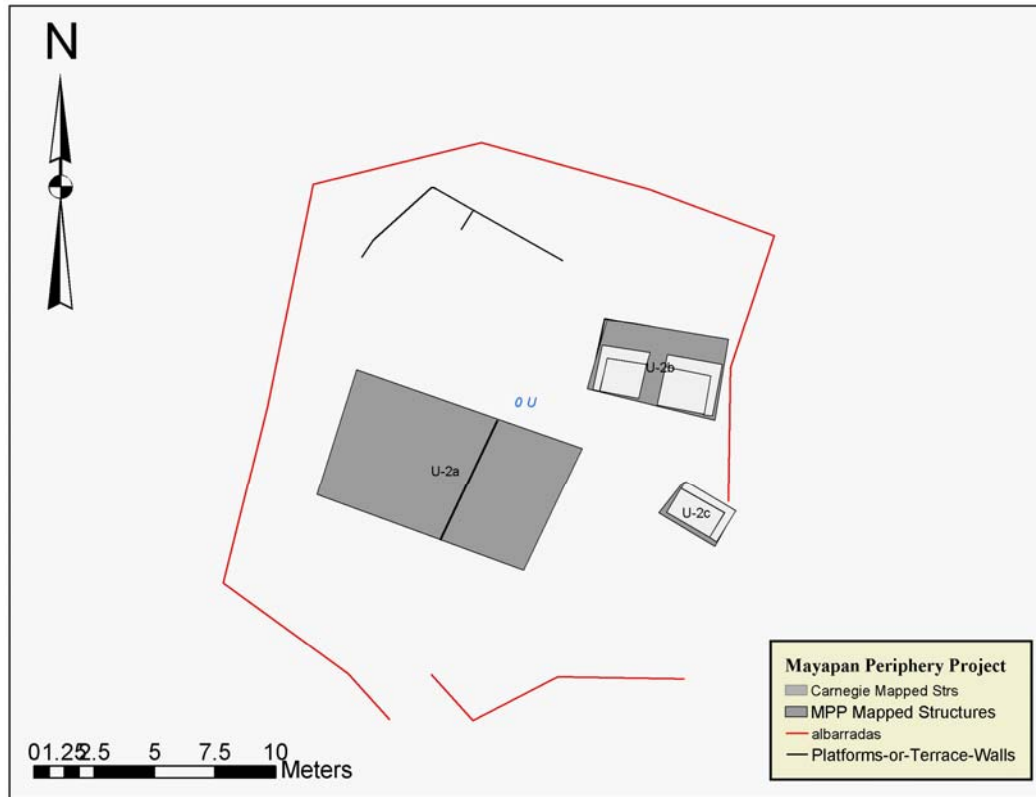


Figure 156 – Transect 8, Cluster U-2

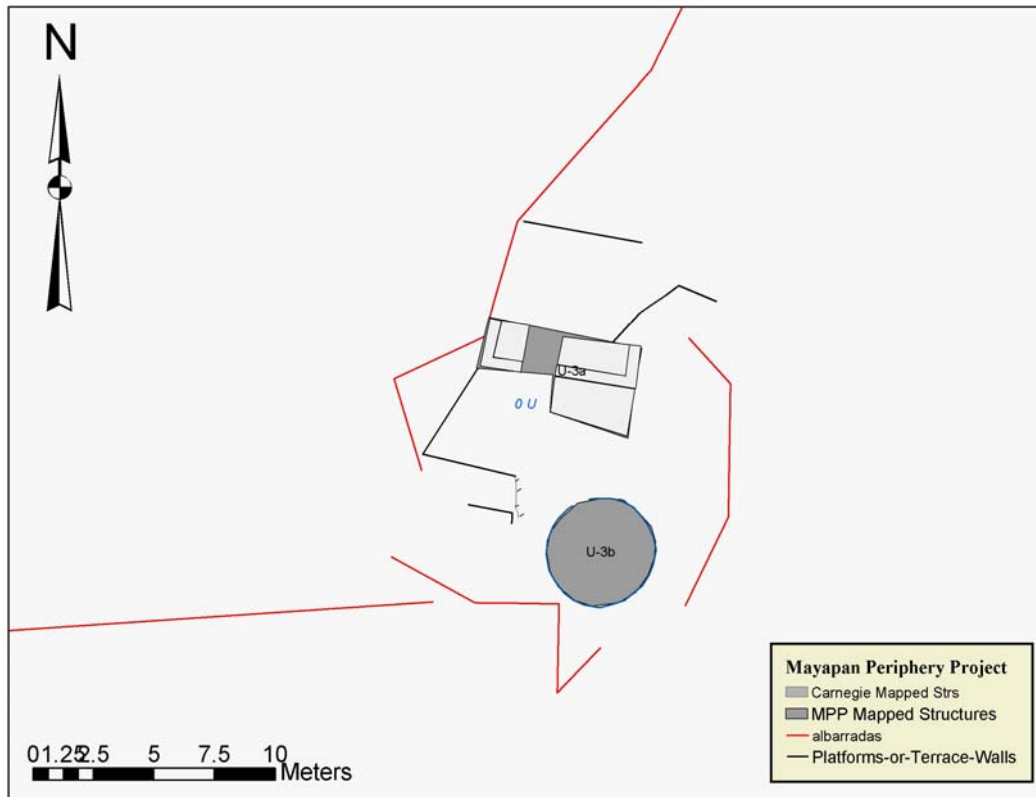


Figure 157 – Transect 8, Cluster U-3



## Transect 8

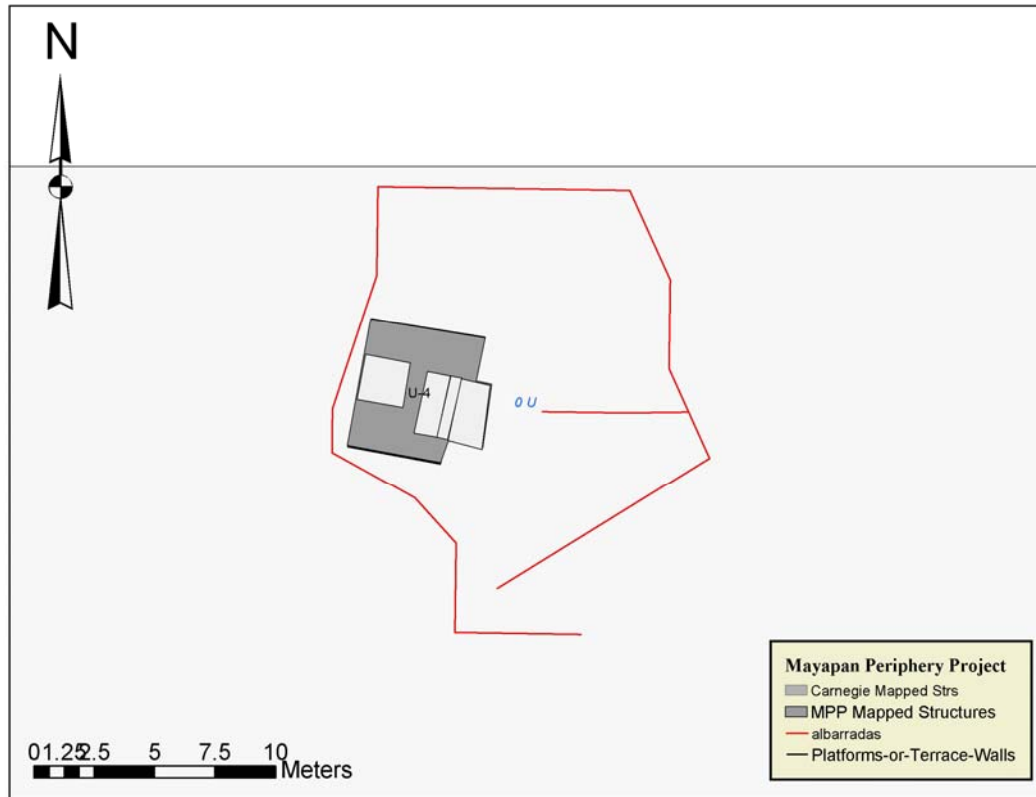


Figure 158 – Transect 8, Cluster U-4

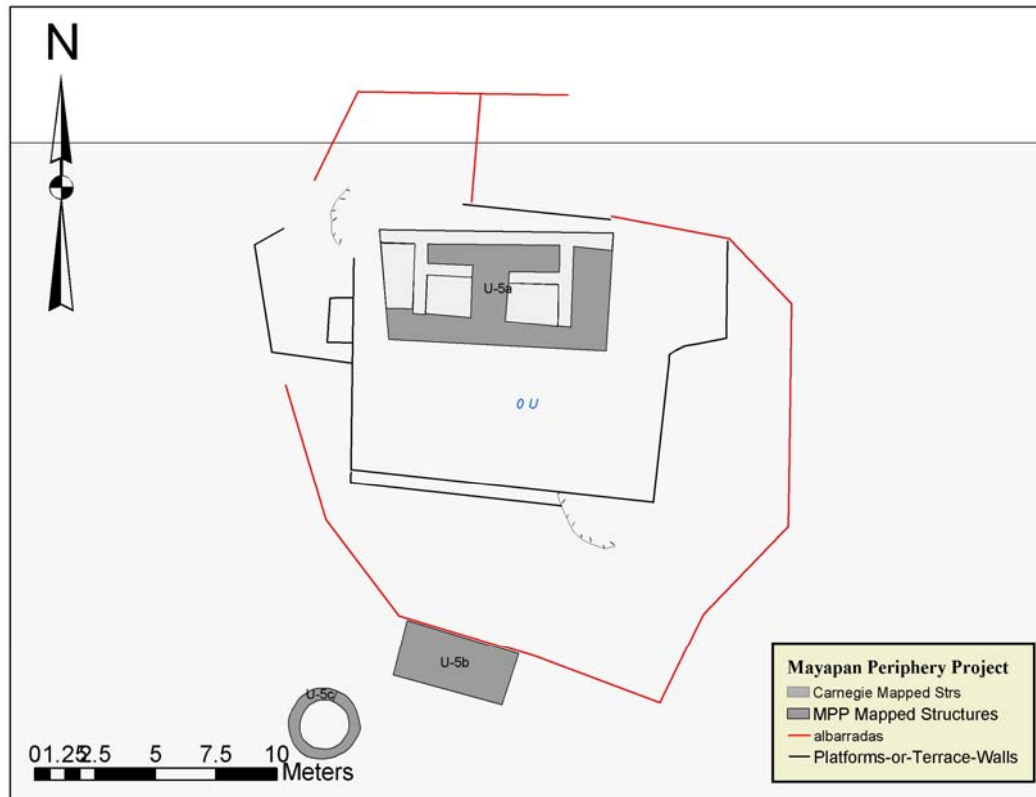


Figure 159 – Transect 8, Cluster U-5

## Transect 8

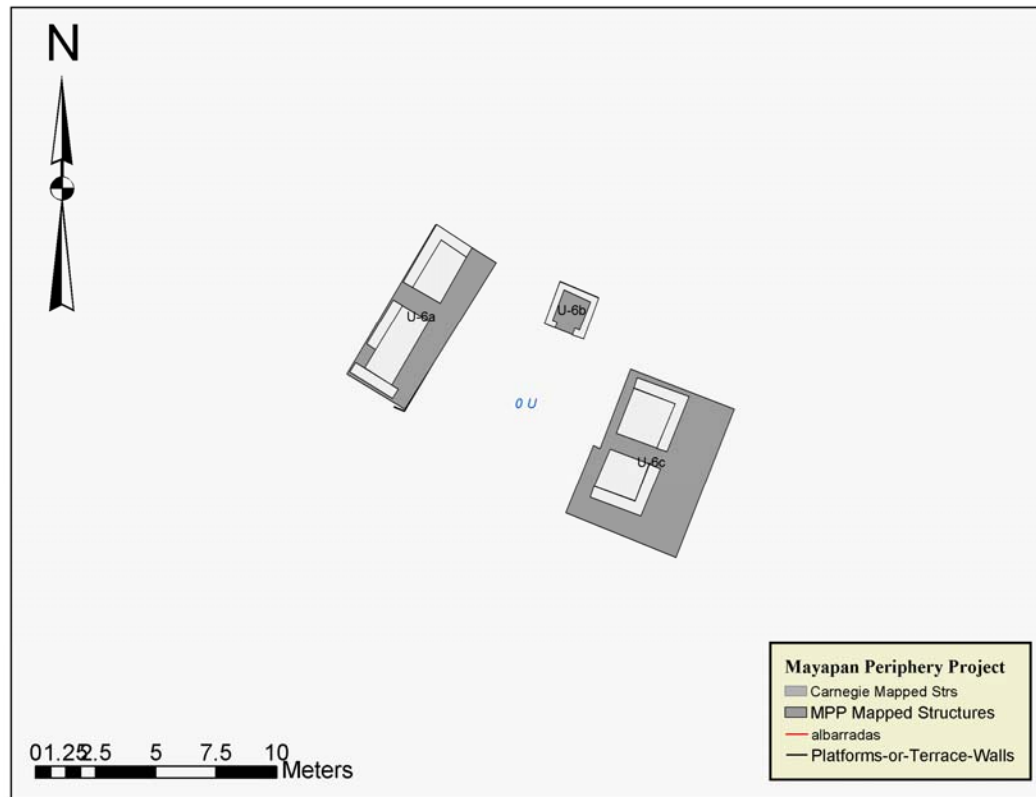


Figure 160 – Transect 8, Cluster U-6

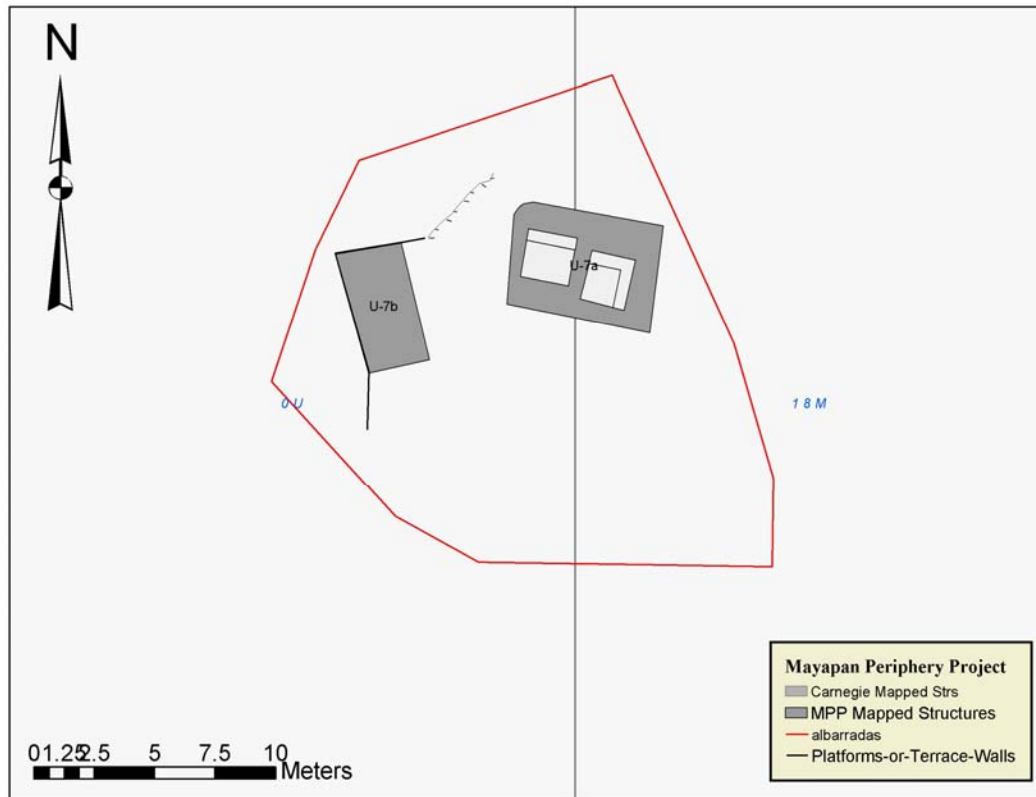


Figure 161 – Transect 8, Cluster U-7

## Transect 8

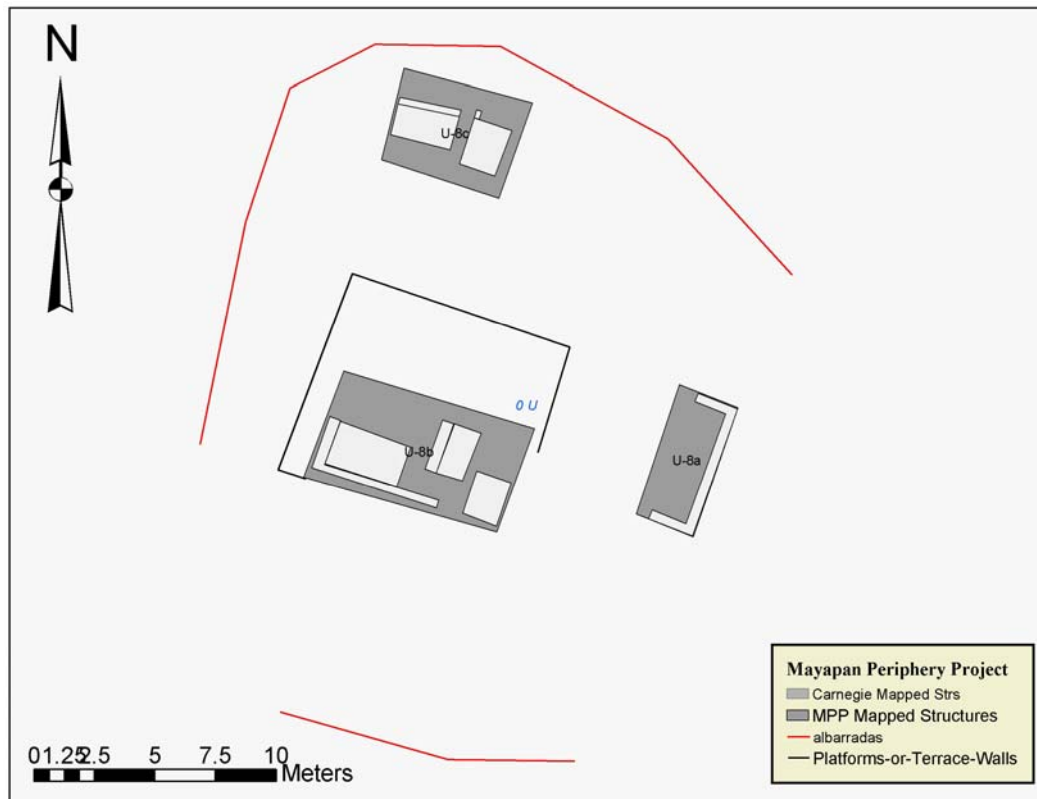


Figure 162 – Transect 8, Cluster U-8



Figure 163 – Transect 8, Cluster U-9

## Transect 8

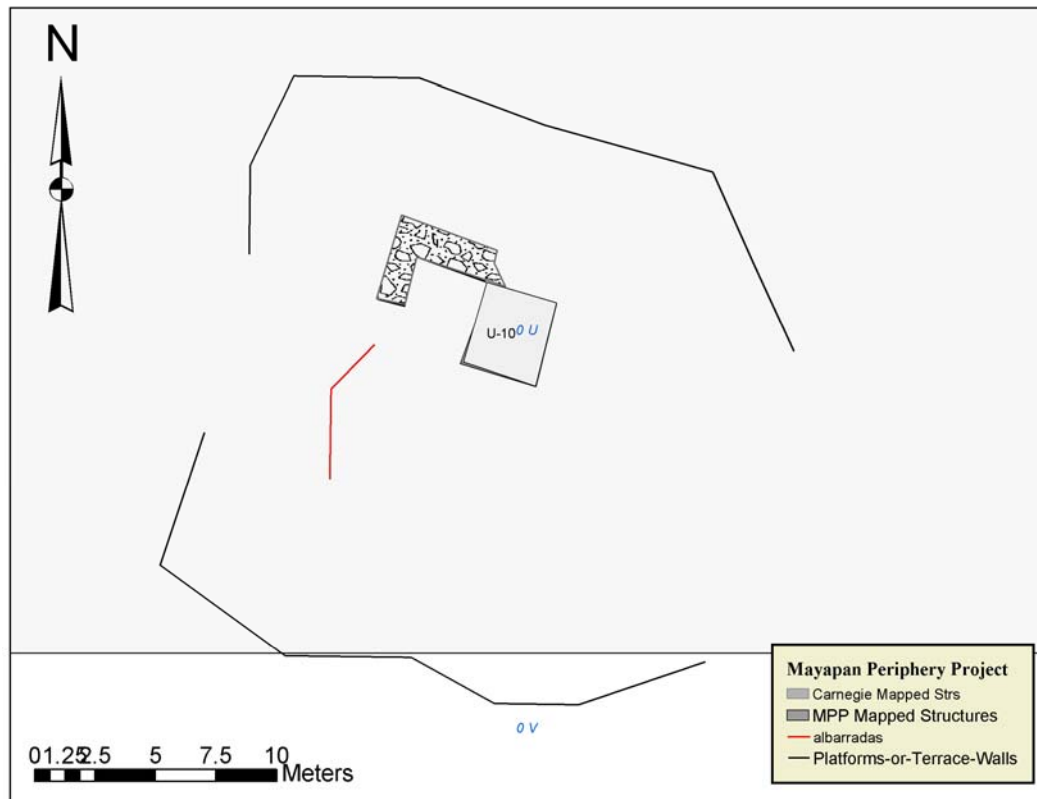


Figure 164 – Transect 8, Cluster U-10

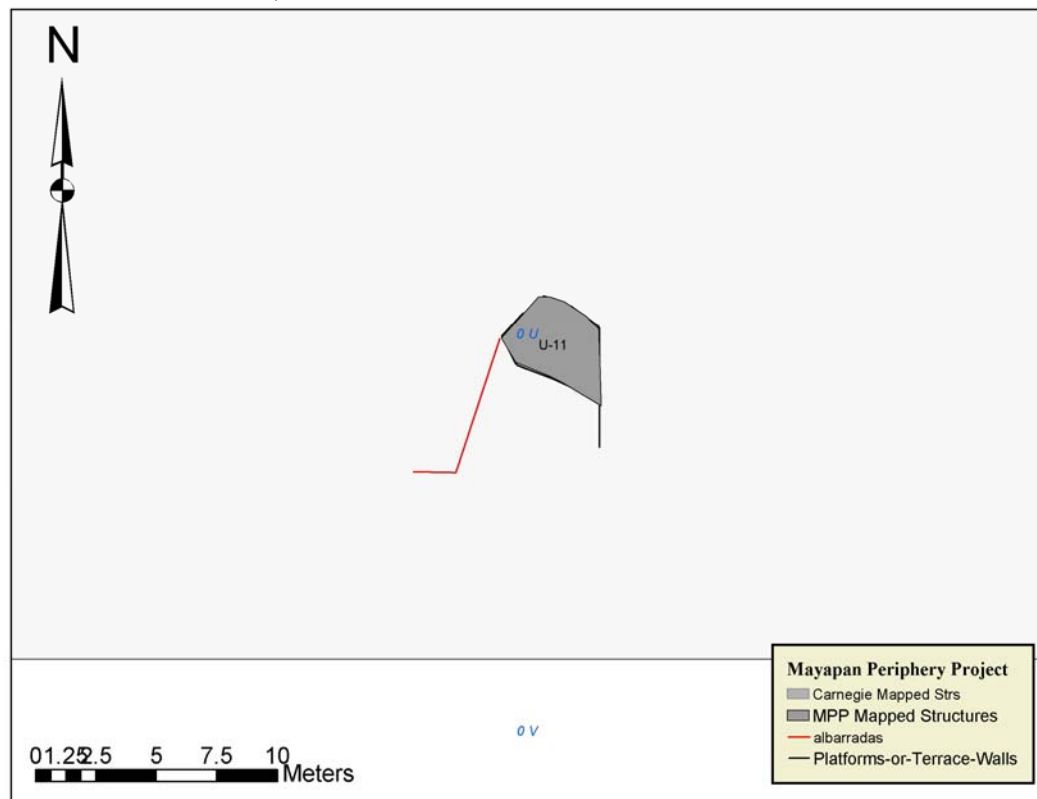


Figure 165 – Transect 8, Cluster U-11

## Transect 8

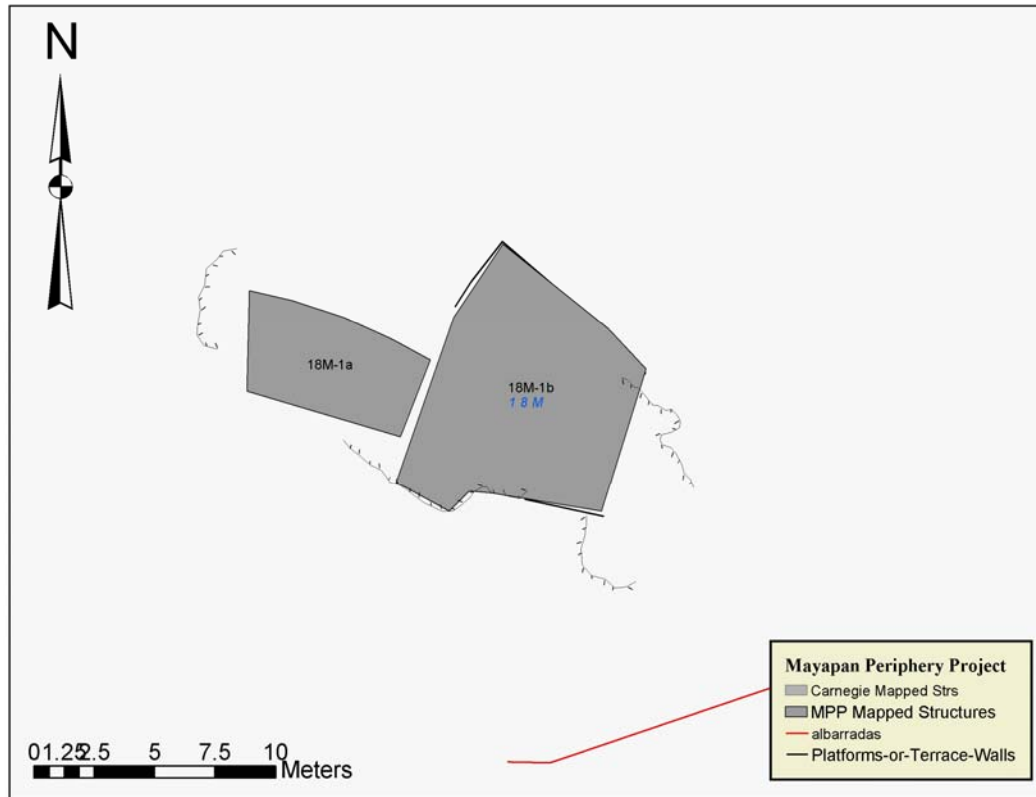


Figure 166 – Transect 8, Cluster 18M-1

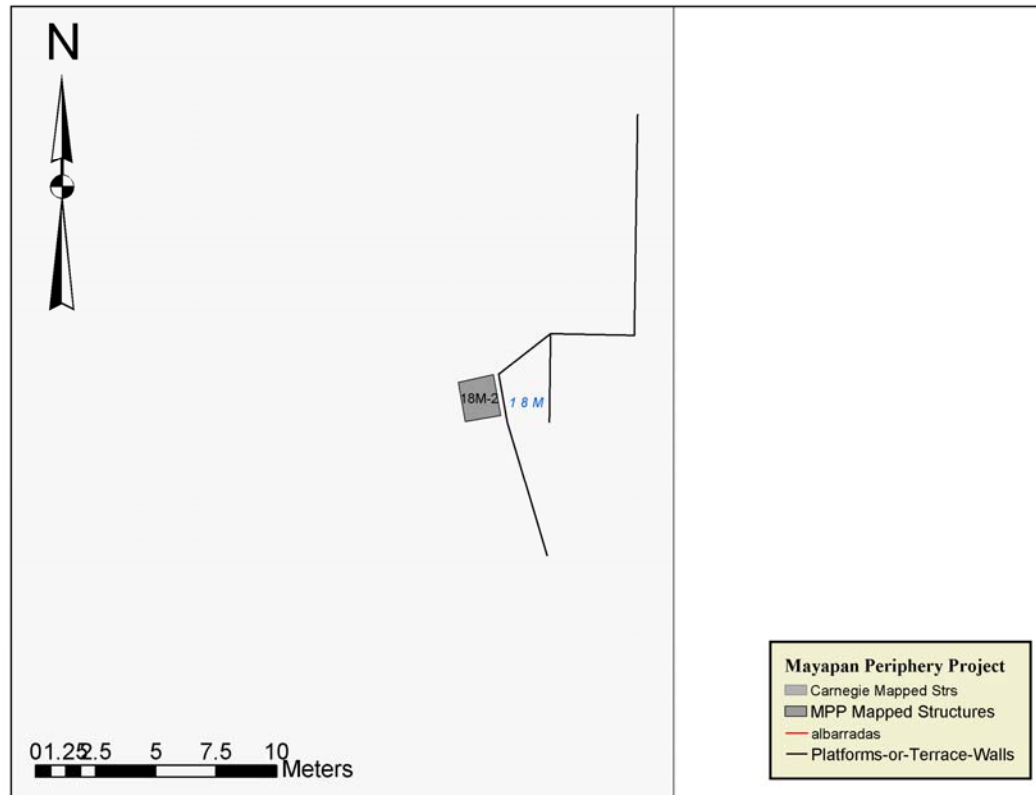


Figure 167 – Transect 8, Cluster 18M-2

## Transect 8

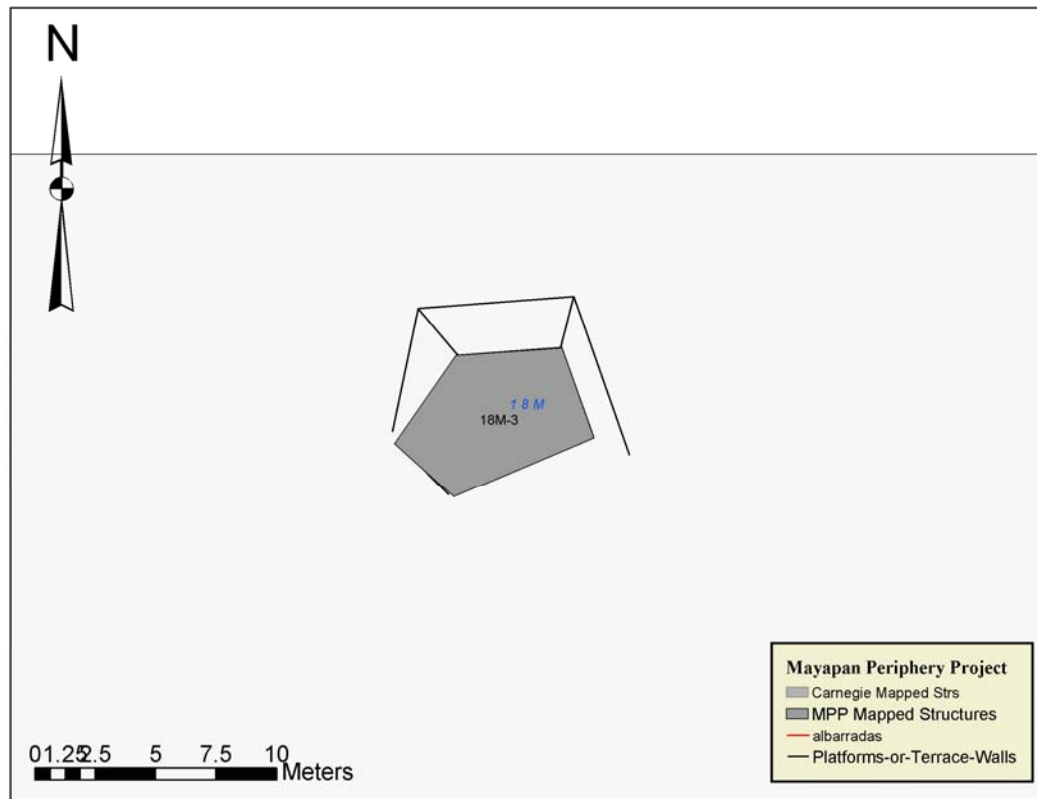
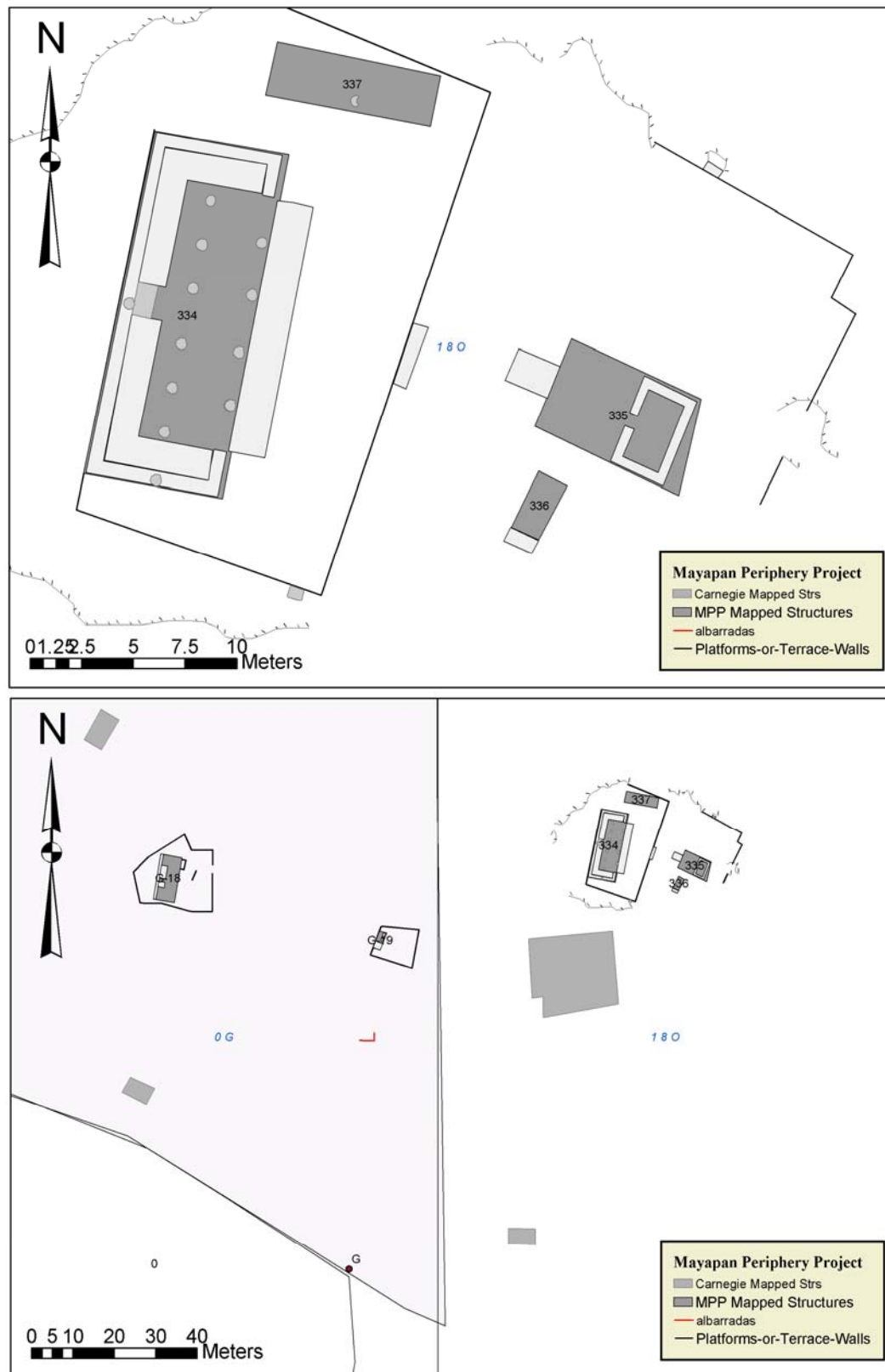


Figure 168 – Transect 8, Cluster 18M-3



**Figure 169 – Colonnaded Hall Group, Cluster 180-1 (top) and its relationship to Gate G (bottom)**



## **Appendix B – Temporal and Functional Designations for all Structures Mapped**

| Transect # | Direction | Survey Cluster # | Survey Structure # | Carnegie # | Structure Type        | Structure Orientation | Dominant Ceramic Period (Excavations) | Dominant Ceramic Period (Surface) | Time Period             | Structure Function | Group Function | NOTES  |
|------------|-----------|------------------|--------------------|------------|-----------------------|-----------------------|---------------------------------------|-----------------------------------|-------------------------|--------------------|----------------|--|
| 1          | East      | 1                | 1                  | G-48b      | Platform              | N                     | Terminal Classic                      |                                   | Postclassic             | Residential        | Residential    | Terminal 55%, Postclassic 42% Postclassic With Terminal Fill |
| 1          | East      | 1                | 2                  | G-48c      | Platform              | E                     | Terminal Classic                      |                                   | Postclassic             | Residential        | Residential    |  |
| 1          | East      | 1                | 1A                 | G-48a      | Platform              | S                     | Terminal Classic                      |                                   | Postclassic             | Residential        | Residential    |  |
| 1          | East      | 2                | 3                  | H-45a      | Two Room Structure    | N                     |                                       | Postclassic                       | Postclassic             | Residential        | Residential    |  |
| 1          | East      | 2                | 4                  | H-45b      | Single Room Structure | E                     |                                       | Postclassic                       | Postclassic             | Residential        | Residential    |  |
| 1          | East      | 2                | 5                  | H-45c      | Platform              | S                     |                                       | Postclassic                       | Postclassic             | Residential        | Residential    |  |
| 1          | East      | 2                | 6                  | H-45d      | Round Structure       | W                     |                                       | Postclassic                       | Postclassic             | Storage            | Residential    |  |
| 1          | East      | 3                | 7                  | 18N-1a     | Two Room Structure    | N                     | Postclassic                           |                                   | Postclassic             | Residential        | Residential    |  |
| 1          | East      | 3                | 8                  | 18N-1b     | Round Structure       | N                     | Postclassic                           |                                   | Postclassic             | Storage            | Residential    |  |
| 1          | East      | 3                | 9                  | 18N-1d     | Two Room Structure    | S                     | Postclassic                           |                                   | Postclassic             | Residential        | Residential    |  |
| 1          | East      | 3                | 9A                 | 18N-1c     | Platform              | W                     | Postclassic                           |                                   | Postclassic             | Auxiliary          | Residential    |  |
| 1          | East      | 3                | 9B                 | 18N-1e     | Round Structure       | S                     | Postclassic                           |                                   | Postclassic             | Storage            | Residential    |  |
| 1          | East      | 4                | 10                 | H-44a      | Round Structure       | E                     |                                       |                                   | Postclassic (Estimated) | Storage            | Agricultural   |  |

|   |      |    |     |        |                    |     |  |  |                         |              |              |  |
|---|------|----|-----|--------|--------------------|-----|--|--|-------------------------|--------------|--------------|--|
| 1 | East | 4  | 11  | H-44c  | Round Structure    | S   |  |  | Postclassic (Estimated) | Storage      | Agricultural |  |
| 1 | East | 4  | 12  | H-44d  | Platform           | NW  |  |  | Postclassic (Estimated) | Agricultural | Agricultural |  |
| 1 | East | 4  | 24  | H-44b  | Round Structure    | SW  |  |  | Postclassic (Estimated) | Storage      | Agricultural |  |
| 1 | East | 5  | 13  | 18N-2a | Round Structure    | S   |  |  | Postclassic (Estimated) | Storage      | Agricultural |  |
| 1 | East | 5  | 14  | 18N-2b | Platform           | N   |  |  | Postclassic (Estimated) | Agricultural | Agricultural |  |
| 1 | East | 6  | 15  | 18N-3a | Two Room Structure | E   |  |  | Postclassic (Estimated) | Residential  | Residential  |  |
| 1 | East | 6  | 15A | 18N-3b | Platform           | S   |  |  | Postclassic (Estimated) | Residential  | Residential  |  |
| 1 | East | 7  | 17  | 18N-5  | Platform           | W   |  |  | Postclassic (Estimated) | Residential  | Residential  |  |
| 1 | East | 8  | 18  | 18N-6  | Platform           | SW  |  |  | Postclassic (Estimated) | Residential  | Residential  |  |
| 1 | East | 9  | 19  | 18N-7  | Platform           | UID |  |  | Postclassic (Estimated) | Agricultural | Agricultural |  |
| 1 | East | 10 | 20  | 19N-1  | Round Structure    | N   |  |  | Postclassic (Estimated) | Storage      | Agricultural |  |
| 1 | East | 10 | 20a | 19N-2  | Platform           | S   |  |  | Postclassic (Estimated) | Agricultural | Agricultural |  |
| 1 | East | 11 | 21  | 19N-3  | Round Structure    | S   |  |  | Postclassic (Estimated) | Storage      | Agricultural |  |
| 1 | East | 12 | 22  | 19N-4  | Round Structure    | UID |  |  | Postclassic (Estimated) | Storage      | Agricultural |  |
| 1 | East | 13 | 25  | 19N-5  | Platform           | UID |  |  | Postclassic (Estimated) | Agricultural | Agricultural |  |
| 1 | East | 14 | 26  | 18N-7  | Round Structure    |     |  |  | Postclassic (Estimated) | Agricultural | Agricultural |  |
| 1 | East | 15 | 27  | 18N-8a | Platform           | E   |  |  | Postclassic (Estimated) | Residential  | Residential  |  |
| 1 | East | 15 | 28  | 18N-8b | Platform           | W   |  |  | Postclassic (Estimated) | Residential  | Residential  |  |
| 1 | East | 15 | 29  | 18N-8b | Platform           | W   |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |  |
| 1 | East | 15 | 30  | 18N-8c | Round Altar        | N   |  |  | Postclassic (Estimated) | Group Ritual | Residential  |  |
| 1 | East | 15 | 31  | 18N-8d | Platform           | N   |  |  | Postclassic (Estimated) | Agricultural | Residential  |  |
| 1 | East | 15 | 32  | 18N-8e | Platform           | N   |  |  | Postclassic (Estimated) | Agricultural | Residential  |  |
| 1 | East | 15 | 33  | 18N-8f | Round Structure    | N   |  |  | Postclassic (Estimated) | Storage      | Residential  |  |

|   |      |    |    |         |                       |     |             |  |                         |              |              |                                       |
|---|------|----|----|---------|-----------------------|-----|-------------|--|-------------------------|--------------|--------------|---------------------------------------|
| 1 | East | 16 | 34 | H-1a    | Three Room Structure  | W   | Postclassic |  | Postclassic             | Residential  | Residential  |                                       |
| 1 | East | 16 | 35 | H-1b    | Single Room Structure | N   | Postclassic |  | Postclassic             | Residential  | Residential  |                                       |
| 1 | East | 16 | 36 | H-1c    | Single Room Structure | E   | Postclassic |  | Postclassic             | Group Ritual | Residential  |                                       |
| 1 | East | 16 | 37 | H-1d    | Round Structure       | SE  | Postclassic |  | Postclassic             | Storage      | Residential  |                                       |
| 1 | East | 17 | 38 | H-2a    | Platform              | N   |             |  | Postclassic (Estimated) | Residential  | Residential  |                                       |
| 1 | East | 17 | 39 | H-2a    | Platform              | N   |             |  | Postclassic (Estimated) | Residential  | Residential  | Combined numbers 28 and 391 structure |
| 1 | East | 17 | 40 | H-2b    | Platform              | S   |             |  | Postclassic (Estimated) | Residential  | Residential  |                                       |
| 1 | East | 17 | 41 | H-2c    | Round Structure       | SE  |             |  | Postclassic (Estimated) | Storage      | Residential  |                                       |
| 1 | East | 18 | 42 | H-43    | Round Structure       | UID |             |  | Postclassic (Estimated) | Storage      | Agricultural |                                       |
| 1 | East | 19 | 43 | 19N-6   | Platform              | UID |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 20 | 44 | 19N-7   | Round Structure       | UID |             |  | Postclassic (Estimated) | Storage      | Agricultural |                                       |
| 1 | East | 21 | 45 | 18N-9a  | Platform              | E   |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 21 | 46 | 18N-9b  | Platform              | E   |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 21 | 47 | 18N-9c  | Platform              | W   |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 21 | 48 | 18N-9d  | Round Structure       | W   |             |  | Postclassic (Estimated) | Storage      | Agricultural |                                       |
| 1 | East | 22 | 49 | 18N-10  | Platform              | UID |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 23 | 50 | 18N-11a | Platform              | UID |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 23 | 51 | 18N-11b | Platform              | UID |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 24 | 52 | H-46    | Platform              | UID |             |  | Postclassic (Estimated) | Agricultural | Agricultural |                                       |
| 1 | East | 25 | 53 | H-47a   | Platform              | N   |             |  | Postclassic (Estimated) | Residential  | Residential  |                                       |
| 1 | East | 25 | 54 | H-47b   | Platform              | S   |             |  | Postclassic (Estimated) | Auxiliary    | Residential  | Small Platform In residential         |

|   |      |    |     |         |                       |     |                  |  |                              |                 |                 | group                         |
|---|------|----|-----|---------|-----------------------|-----|------------------|--|------------------------------|-----------------|-----------------|-------------------------------|
| 1 | East | 26 | 55  | H48a    | Rectangular Pyramid   | E   | Terminal Classic |  | Terminal Classic/Postclassic | Public Ritual   | Public Ritual   | Terminal 55%, Postclassic 45% |
| 1 | East | 26 | 56  | H48b    | Single Room Structure | W   | Terminal Classic |  | Terminal Classic/Postclassic | Public Ritual   | Public Ritual   | Terminal 55%, Postclassic 45% |
| 1 | East | 27 | 57  | 18N-12a | Platform              | SW  |                  |  | Postclassic (Estimated)      | Agricultural    | Agricultural    |                               |
| 1 | East | 27 | 57A | 18N-12b | Platform              | NE  |                  |  | Postclassic (Estimated)      | Agricultural    | Agricultural    |                               |
| 2 | West | 28 | 58  | O-58    | Single Room Structure | NW  |                  |  | Postclassic (Estimated)      | Residential     | Residential     |                               |
| 2 | West | 29 | 59  | 10M-1   | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Lime Production | Lime Production |                               |
| 2 | West | 30 | 60  | 10M-2   | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Lime Production | Lime Production |                               |
| 2 | West | 31 | 61  | 9M-1    | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Lime Production | Lime Production |                               |
| 2 | West | 32 | 62  | 9m-2    | Round Structure       | UID |                  |  | Postclassic                  | Lime Production | Lime Production | Carbon Dated Late Postclassic |
| 2 | West | 33 | 63  | 10M-3   | Round Structure       | UID |                  |  | Postclassic                  | Lime Production | Lime Production | Carbon Dated Late Postclassic |
| 2 | West | 34 | 64  | O-59    | Single Room Structure | S   |                  |  | Postclassic (Estimated)      | Public Ritual   | Public Ritual   | Central Altar                 |
| 2 | West | 35 | 65  | O-60    | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Lime Production | Lime Production |                               |
| 2 | West | 36 | 66  | 10M-4   | Elliptical structure  | UID |                  |  | Terminal Classic (Estimated) | Residential     | Residential     |                               |
| 2 | West | 37 | 67  | 10M-5   | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Storage         | Agricultural    |                               |
| 2 | West | 38 | 68  | O-61    | Single Room Structure | N   |                  |  | Postclassic (Estimated)      | Residential     | Residential     |                               |

|   |      |    |    |         |                       |     |                  |  |                              |             |              |  |
|---|------|----|----|---------|-----------------------|-----|------------------|--|------------------------------|-------------|--------------|--|
| 3 | East | 39 | 69 | H-49    | Single Room Structure | S   |                  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 3 | East | 40 | 70 | 18N-13a | Single Room Structure | N   | Terminal Classic |  | Terminal Classic             | Residential | Residential  |  |
| 3 | East | 40 | 71 | 18N-13b | Single Room Structure | W   | Terminal Classic |  | Terminal Classic             | Residential | Residential  |  |
| 3 | East | 41 | 72 | 18N-14a | Single Room Structure | S   |                  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 3 | East | 41 | 73 | 18N-14b | Single Room Structure | N   |                  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 3 | East | 42 | 74 | 18N-8a  | Single Room Structure | NW  | Early Classic    |  | Early Classic                | Residential | Residential  | EC 50%, Terminal 25%, Postclassic 25% (4 sherds total) |
| 3 | East | 42 | 75 | 18N-8b  | Single Room Structure | SE  | Early Classic    |  | Early Classic                | Auxiliary   | Residential  |  |
| 3 | East | 43 | 76 | 18N-16  | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Storage     | Agricultural |  |
| 3 | East | 44 | 77 | 18N-15a | Single Room Structure | E   |                  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 3 | East | 44 | 78 | 18N-15b | Single Room Structure | N   |                  |  | Terminal Classic (Estimated) | Auxiliary   | Residential  |  |
| 3 | East | 44 | 79 | 18N-15c | Single Room Structure | N   |                  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 3 | East | 45 | 80 | 18N-17  | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Storage     | Agricultural |  |
| 3 | East | 46 | 81 | 18N-18  | Single Room Structure | S   |                  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 3 | East | 47 | 82 | 18N019a | Single Room Structure | N   |                  |  | Postclassic (Estimated)      | Residential | Residential  |  |

|   |      |    |    |         |                       |     |             |             |  |                         |              |             |                           |
|---|------|----|----|---------|-----------------------|-----|-------------|-------------|--|-------------------------|--------------|-------------|---------------------------|
| 3 | East | 47 | 83 | 18N-19b | Single Room Structure | W   |             |             |  | Postclassic (Estimated) | Group Ritual | Residential |                           |
| 3 | East | 47 | 84 | 18N-19c | Platform              | S   |             |             |  | Postclassic (Estimated) | Auxiliary    | Residential |                           |
| 3 | East | 48 | 85 | H-50a   | Single Room Structure | S   | Postclassic |             |  | Postclassic             | Residential  | Residential |                           |
| 3 | East | 48 | 86 | H-50b   | Two Room Structure    | UID | Postclassic |             |  | Postclassic             | Residential  | Residential |                           |
| 3 | East | 48 | 87 | H-50c   | Round Structure       | UID | Postclassic |             |  | Postclassic             | Storage      | Residential |                           |
| 3 | East | 49 | 88 | H-51a   | Two Room Structure    | S   | Postclassic |             |  | Postclassic             | Residential  | Residential |                           |
| 3 | East | 49 | 89 | H-51b   | Platform              | W   | Postclassic |             |  | Postclassic             | Residential  | Residential |                           |
| 3 | East | 50 | 90 | H-52    | Single Room Structure | S   |             |             |  | Postclassic (Estimated) | Residential  | Residential |                           |
| 3 | East | 51 | 91 | H-40a   | Two Room Structure    | W   | Postclassic | Postclassic |  | Postclassic             | Residential  | Residential | Elite Residential Complex |
| 3 | East | 51 | 92 | H-40b   | Single Room Structure | S   | Postclassic | Postclassic |  | Postclassic             | Residential  | Residential |                           |
| 3 | East | 51 | 93 | H-40c   | Single Room Structure | N   | Postclassic | Postclassic |  | Postclassic             | Group Ritual | Residential |                           |
| 3 | East | 51 | 94 | H-40d   | Round Structure       | N   | Postclassic | Postclassic |  | Postclassic             | Storage      | Residential |                           |
| 3 | East | 52 | 95 | H-53a   | Two Room Structure    | W   |             |             |  | Postclassic (Estimated) | Residential  | Residential |                           |
| 3 | East | 52 | 96 | H-53b   | Platform              | S   |             |             |  | Postclassic (Estimated) | Auxiliary    | Residential |                           |
| 3 | East | 53 | 97 | H-44a   | Two Room Structure    | E   | Postclassic |             |  | Postclassic             | Residential  | Residential |                           |
| 3 | East | 53 | 98 | H-54b   | Single Room Structure | S   | Postclassic |             |  | Postclassic             | Residential  | Residential |                           |
| 3 | East | 53 | 99 | H-54c   | Single Room Structure | W   | Postclassic |             |  | Postclassic             | Residential  | Residential |                           |



|   |       |    |     |         |                       |     |                         |  |                              |             |             |  |
|---|-------|----|-----|---------|-----------------------|-----|-------------------------|--|------------------------------|-------------|-------------|--|
| 3 | East  | 54 | 100 | 18N-20  | Single Room Structure | UID |                         |  | Postclassic (Estimated)      | Residential | Residential |  |
| 3 | East  | 55 | 101 | 18N-21a | Single Room Structure | N   |                         |  | Postclassic (Estimated)      | Residential | Residential |  |
| 3 | East  | 55 | 102 | 18N-21b | Two Room Structure    | S   |                         |  | Postclassic (Estimated)      | Residential | Residential |  |
| 3 | East  | 55 | 103 | 18N-21c | Platform              | S   |                         |  | Postclassic (Estimated)      | Auxiliary   | Residential |  |
| 4 | South | 56 | 104 | GG-1a   | Single Room Structure | N   | Postclassic             |  | Postclassic                  | Residential | Residential |  |
| 4 | South | 56 | 105 | GG-1b   | Platform              | N   | <b>Postclassic</b>      |  | Postclassic                  | Auxiliary   | Residential |  |
| 4 | South | 56 | 106 | GG-1c   | Single Room Structure | S   | Postclassic             |  | Postclassic                  | Residential | Residential |  |
| 4 | South | 57 | 107 | FF-1a   | Platform              | W   | Terminal Classic        |  | Terminal Classic             | Residential | Residential |  |
| 4 | South | 57 | 108 | FF-1b   | Platform              | W   | Terminal Classic        |  | Terminal Classic             | Auxiliary   | Residential |  |
| 4 | South | 57 | 109 | FF-1c   | Platform              | N   | Terminal Classic        |  | Terminal Classic             | Residential | Residential |  |
| 4 | South | 57 | 110 | FF-1d   | Platform              | NE  | <b>Terminal Classic</b> |  | Terminal Classic             | Residential | Residential |  |
| 4 | South | 58 | 111 | 14J-1   | Single Room Structure | E   |                         |  | Terminal Classic (Estimated) | Residential | Residential |  |
| 4 | South | 59 | 112 | 14J-2a  | Single Room Structure | W   | <b>Postclassic</b>      |  | Postclassic                  | Residential | Residential |  |
| 4 | South | 59 | 113 | 14J-2b  | Single Room Structure | E   | Postclassic             |  | Postclassic                  | Auxiliary   | Residential |  |
| 4 | South | 60 | 114 | 14J03a  | Single Room Structure | N   | <b>Postclassic</b>      |  | Postclassic                  | Residential | Residential |  |
| 4 | South | 60 | 115 | 14J-3b  | Platform              | E   | Postclassic             |  | Postclassic                  | Auxiliary   | Residential |  |
| 4 | South | 60 | 116 | 14J-3c  | Platform              | S   | Postclassic             |  | Postclassic                  | Auxiliary   | Residential |  |

|   |       |    |     |        |                       |    |             |                  |                  |             |               |  |
|---|-------|----|-----|--------|-----------------------|----|-------------|------------------|------------------|-------------|---------------|--|
| 4 | South | 61 | 117 | 14J-4a | Two Room Structure    | N  | Postclassic |                  | Postclassic      | Residential | Residential   | Elite Residential Complex,                           |
| 4 | South | 61 | 118 | 14J-4b | Single Room Structure | N  | Postclassic |                  | Postclassic      | Auxiliary   | Residential   | Storage for adjacent market 14J-5 group              |
| 4 | South | 61 | 119 | 14J-4c | Single Room Structure | E  | Postclassic |                  | Postclassic      | Auxiliary   | Residential   | Storage for adjacent market 14J-5 group              |
| 4 | South | 61 | 120 | 14J-4d | Round Structure       | N  | Postclassic |                  | Postclassic      | Storage     | Residential   | Storage for adjacent market 14J-5 group              |
| 4 | South | 61 | 121 | 14J-4e | Single Room Structure | E  | Postclassic |                  | Postclassic      | Auxiliary   | Residential   | Storage for adjacent market 14J-5 group              |
| 4 | South | 61 | 122 | 14J-4f | Single Room Structure | SE | Postclassic |                  | Postclassic      | Auxiliary   | Residential   | Storage for adjacent market 14J-5 group              |
| 4 | South | 61 | 123 | 14J-4g | Single Room Structure | SW | Postclassic |                  | Postclassic      | Auxiliary   | Residential   | Storage for adjacent market 14J-5 group              |
| 4 | South | 62 | 124 | 14J-5a | Platform              | N  | Postclassic |                  | Postclassic      | Market      | Market        | Postclassic 58%, Terminal 20%, Soil Phosphate Tested |
| 4 | South | 62 | 125 | 14J-5b | Round Structure       | W  | Postclassic |                  | Postclassic      | Storage     | Market        | Soil Phosphate Tested                                |
| 4 | South | 62 | 126 | 14J-5c | Single Room Structure | W  | Postclassic |                  | Postclassic      | Auxiliary   | Market        |  |
| 4 | South | 63 | 127 | 14J-6  | Single Room Structure | W  |             | Terminal Classic | Terminal Classic | Auxiliary   | Public Ritual | Small structure on large public platform -           |

|   |       |    |     |         |                       |     |             |  |                              |             |              |                            |
|---|-------|----|-----|---------|-----------------------|-----|-------------|--|------------------------------|-------------|--------------|----------------------------|
|   |       |    |     |         |                       |     |             |  |                              |             |              | (stage?)                   |
| 4 | South | 64 | 128 | 14J-7   | Round Structure       | UID |             |  | Terminal Classic (Estimated) | Storage     | Agricultural |                            |
| 4 | South | 65 | 129 | N/A     | Round Structure       | W   |             |  | Terminal Classic (Estimated) | Storage     | Residential  | Dropped - Outside Transect |
| 4 | South | 65 | 130 | N/A     | Single Room Structure | E   |             |  | Terminal Classic (Estimated) | Residential | Residential  | Dropped - Outside Transect |
| 4 | South | 66 | 131 | 14J-8   | Round Structure       | UID | Postclassic |  | Postclassic                  | Storage     | Agricultural |                            |
| 4 | South | 67 | 132 | FF-2a   | Single Room Structure | N   |             |  | Postclassic (Estimated)      | Residential | Residential  |                            |
| 4 | South | 67 | 133 | FF-2b   | Single Room Structure | E   |             |  | Postclassic (Estimated)      | Residential | Residential  |                            |
| 4 | South | 67 | 134 | FF-2c   | Single Room Structure | S   |             |  |                              | Residential | Residential  |                            |
| 4 | South | 68 | 135 | Y115    | Two Room Structure    | E   |             |  | Postclassic (Estimated)      | Residential | Residential  |                            |
| 4 | South | 69 | 139 | 14J-9a  | Single Room Structure | E   |             |  | Postclassic (Estimated)      | Residential | Residential  |                            |
| 4 | South | 69 | 140 | 14J-9b  | Single Room Structure | NW  |             |  | Postclassic (Estimated)      | Residential | Residential  |                            |
| 4 | South | 69 | 141 | 14J-9c  | Platform              | N   |             |  | Postclassic (Estimated)      | Auxiliary   | Residential  |                            |
| 4 | South | 70 | 142 | 14J-10a | Platform              | NW  |             |  | Postclassic (Estimated)      | Residential | Residential  |                            |
| 4 | South | 70 | 143 | 14J-10b | Round Structure       | UID |             |  | Postclassic (Estimated)      | Storage     | Residential  |                            |
| 4 | South | 71 | 144 | 14J-11  | Round Structure       | UID |             |  | Postclassic (Estimated)      | Storage     | Agricultural |                            |
| 4 | South | 72 | 145 | FF-5    | Round Structure       | UID |             |  | Postclassic (Estimated)      | Storage     | Agricultural |                            |
| 4 | South | 73 | 146 | Y-116a  | Four room structure   | N   | Postclassic |  | Postclassic                  | Residential | Residential  |                            |

|   |       |     |     |        |                       |    |                         |  |                              |             |             |                      |
|---|-------|-----|-----|--------|-----------------------|----|-------------------------|--|------------------------------|-------------|-------------|----------------------|
| 4 | South | 73  | 147 | Y-116b | Single Room Structure | N  | Postclassic             |  | Postclassic                  | Auxiliary   | Residential |                      |
| 4 | South | 73  | 148 | Y-117  | Two Room Structure    | E  | <b>Postclassic</b>      |  | Postclassic                  | Residential | Residential |                      |
| 4 | South | 67A | 136 | FF-3   | Two Room Structure    | E  |                         |  | Terminal Classic (Estimated) | Residential | Residential |                      |
| 4 | South | 68A | 137 | FF-4a  | Single Room Structure | N  | <b>Terminal Classic</b> |  | Terminal Classic             | Residential | Residential |                      |
| 4 | South | 68A | 138 | FF-4b  | Single Room Structure | E  | Terminal Classic        |  | Terminal Classic             | Auxiliary   | Residential |                      |
| 5 | North | 74  | 149 | 17P-1a | Two Room Structure    | NW | <b>Postclassic</b>      |  | Postclassic                  | Residential | Residential |                      |
| 5 | North | 74  | 150 | 17P-1b | Single Room Structure | S  | Postclassic             |  | Postclassic                  | Residential | Residential |                      |
| 5 | North | 74  | 151 | 17P-1c | Platform              | E  | Postclassic             |  | Postclassic                  | Residential | Residential |                      |
| 5 | North | 74  | 152 | 17P-1d | Single Room Structure | E  | Postclassic             |  | Postclassic                  | Auxiliary   | Residential |                      |
| 5 | North | 75  | 153 | 17P-2  | Single Room Structure | W  |                         |  | Postclassic (Estimated)      | Residential | Residential |                      |
| 5 | North | 76  | 154 | 17P-3a | Single Room Structure | E  | Postclassic             |  | Postclassic                  | Residential | Residential |                      |
| 5 | North | 76  | 155 | 17P-3b | Platform              | S  | Postclassic             |  | Postclassic                  | Residential | Residential |                      |
| 5 | North | 76  | 156 | 17P-3c | Single Room Structure | N  | <b>Postclassic</b>      |  | Postclassic                  | Auxiliary   | Residential |                      |
| 5 | North | 77  | 157 | 17P-4a | Single Room Structure | S  | Postclassic             |  | Postclassic                  | Residential | Residential |                      |
| 5 | North | 77  | 158 | 17P-4b | Single Room Structure | S  | <b>Postclassic</b>      |  | Postclassic                  | Residential | Residential |                      |
| 5 | North | 78  | 159 | G-49a  | Single Room Structure | E  |                         |  | Postclassic (Estimated)      | Residential | Residential | "C" Shaped Structure |

|   |       |    |      |        |                       |     |             |  |                         |             |             |                  |
|---|-------|----|------|--------|-----------------------|-----|-------------|--|-------------------------|-------------|-------------|------------------|
| 5 | North | 78 | 160  | G-49b  | Single Room Structure | S   |             |  | Postclassic (Estimated) | Residential | Residential |                  |
| 5 | North | 78 | 161  | G-49c  | Platform              | W   |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                  |
| 5 | North | 78 | 162  | G-49d  | Platform              | SW  |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                  |
| 5 | North | 78 | 159a | G-49e  | Platform              | E   |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                  |
| 5 | North | 78 | 159b | G-49f  | Platform              | E   |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                  |
| 5 | North | 79 | 163  | G-50a  | Single Room Structure | N   |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                  |
| 5 | North | 79 | 164  | G-50b  | Single Room Structure | W   |             |  | Postclassic (Estimated) | Residential | Residential |                  |
| 5 | North | 80 | 165  | G-51   | Single Room Structure | E   | Postclassic |  | Postclassic             | Residential | Residential |                  |
| 5 | North | 81 | 166  | G-18   | Single Room Structure | E   |             |  | Postclassic (Estimated) | Residential | Residential |                  |
| 5 | North | 82 | 167  | G-19   | Single Room Structure | E   |             |  | Postclassic (Estimated) | Residential | Residential |                  |
| 5 | North | 83 | 168  | 17P-5a | Two Room Structure    | S   | Postclassic |  | Postclassic             | Residential | Residential |                  |
| 5 | North | 83 | 169  | 17P-5b | Two Room Structure    | W   | Postclassic |  | Postclassic             | Residential | Residential |                  |
| 5 | North | 83 | 170  | 17P5c  | Single Room Structure | SE  | Postclassic |  | Postclassic             | Auxiliary   | Residential |                  |
| 5 | North | 83 | 171  | 17P-5d | Round Structure       | UID | Postclassic |  | Postclassic             | Apiary      | Residential | Honey Production |
| 5 | North | 83 | 172  | 17P-5e | Round Structure       | UID | Postclassic |  | Postclassic             | Apiary      | Residential | Honey Production |
| 5 | North | 83 | 173  | 179-5f | Round Structure       | UID | Postclassic |  | Postclassic             | Apiary      | Residential | Honey Production |
| 5 | North | 83 | 174  | 17P-5g | Round Structure       | UID | Postclassic |  | Postclassic             | Apiary      | Residential | Honey Production |
| 5 | North | 84 | 175  | 17P-6  | Two Room Structure    | W   |             |  | Postclassic (Estimated) | Residential | Residential |                  |

|   |       |    |      |         |                       |     |                  |  |                              |               |               |  |
|---|-------|----|------|---------|-----------------------|-----|------------------|--|------------------------------|---------------|---------------|--|
| 5 | North | 85 | 176  | 7Q-1a   | Open Spiral           | SE  | Terminal Classic |  | Terminal Classic             | Residential   | Residential   | Terminal 33%, Late Classic 22%, Early Classic 22% - Triangular Bench |
| 5 | North | 85 | 177  | 7Q-1b   | Open Spiral           | SE  | Terminal Classic |  | Terminal Classic             | Residential   | Residential   | Terminal 33%, Late Classic 22%, Early Classic 22%                    |
| 5 | North | 85 | 178  | 7Q-1c   | Platform              | W   | Terminal Classic |  | Terminal Classic             | Auxiliary     | Residential   |  |
| 5 | North | 85 | 179  | 7Q-1d   | Platform              | N   | Terminal Classic |  | Terminal Classic             | Residential   | Residential   |  |
| 5 | North | 86 | 180  | 17Q-2   | Round Structure       | NE  |                  |  | Postclassic (Estimated)      | Storage       | Agricultural  |  |
| 5 | North | 87 | 181  | 17Q-3a  | Platform              | S   |                  |  | Postclassic (Estimated)      | Auxiliary     | Residential   |  |
| 5 | North | 87 | 182  | 17Q-3b  | Platform              | N   |                  |  | Postclassic (Estimated)      | Residential   | Residential   |  |
| 5 | North | 87 | 183  | 17Q-3c  | Platform              | E   |                  |  | Postclassic (Estimated)      | Auxiliary     | Residential   |  |
| 5 | North | 88 | 184  | 17P-7a  | Two Room Structure    | E   |                  |  | Postclassic (Estimated)      | Residential   | Residential   |  |
| 5 | North | 88 | 185  | 17P-7b  | Round Structure       | UID |                  |  | Postclassic (Estimated)      | Storage       | Agricultural  |  |
| 5 | North | 89 | 186  | G-52    | Single Room Structure | N   |                  |  | Postclassic (Estimated)      | Residential   | Residential   |  |
| 6 | North | 90 | 187  | 14P-10a | Round Structure       | S   |                  |  | Terminal Classic (Estimated) | Storage       | Residential   |  |
| 6 | North | 90 | 187a | 14P-10b | Elliptical Structure  | W   |                  |  | Terminal Classic (Estimated) | Residential   | Residential   |  |
| 6 | North | 91 | 188  | 14P-9   | Elliptical Structure  | S   |                  |  | Terminal Classic (Estimated) | Residential   | Residential   | Two Triangular Benches   |
| 6 | North | 92 | 189  | 14P-8a  | Round Pyramid         | NW  | Postclassic      |  | Postclassic                  | Public Ritual | Public Ritual | Postclassic 75%, Terminal 25% - 8                                    |

|   |       |    |     |        |                             |   |                    |  |                                 |               |               | Sherds   |
|---|-------|----|-----|--------|-----------------------------|---|--------------------|--|---------------------------------|---------------|---------------|--|
| 6 | North | 92 | 190 | 14P-8b | Platform                    | E | Postclassic        |  | Postclassic                     | Public Ritual | Public Ritual | Postclassic<br>75%,<br>Terminal<br>25% - 8<br>Sherds |
| 6 | North | 93 | 191 | 14P-7a | Single<br>Room<br>Structure | E |                    |  | Terminal Classic<br>(Estimated) | Residential   | Residential   |  |
| 6 | North | 93 | 192 | 14P-7b | Round<br>Structure          | N |                    |  | Terminal Classic<br>(Estimated) | Residential   | Residential   |  |
| 6 | North | 94 | 193 | 15P-3a | Single<br>Room<br>Structure | S |                    |  | Postclassic (Estimated)         | Auxiliary     | Residential   |  |
| 6 | North | 94 | 194 | 14P-3b | Platform                    | W |                    |  | Postclassic (Estimated)         | Residential   | Residential   |  |
| 6 | North | 94 | 195 | 14P-3c | Platform                    | E |                    |  | Postclassic (Estimated)         | Residential   | Residential   |  |
| 6 | North | 94 | 196 | 14P-3d | Platform                    | W |                    |  | Postclassic (Estimated)         | Auxiliary     | Residential   |  |
| 6 | North | 94 | 197 | 14P-3e | Single<br>Room<br>Structure | N |                    |  | Postclassic (Estimated)         | Residential   | Residential   |  |
| 6 | North | 95 | 198 | 14P-2a | Single<br>Room<br>Structure | S | <b>Postclassic</b> |  | Postclassic                     | Residential   | Residential   |  |
| 6 | North | 95 | 199 | 14P-2b | Two Room<br>Structure       | S | Postclassic        |  | Postclassic                     | Residential   | Residential   |  |
| 6 | North | 95 | 200 | 14P-2c | Round<br>Structure          | W | <b>Postclassic</b> |  | Postclassic                     | Pen           | Residential   | Soil<br>Phosphate<br>Tested                          |
| 6 | North | 96 | 201 | D-52a  | Two Room<br>Structure       | S | Postclassic        |  | Postclassic                     | Residential   | Residential   | Elite<br>Residential<br>Complex                      |
| 6 | North | 96 | 202 | D-52b  | Single<br>Room<br>Structure | S | Postclassic        |  | Postclassic                     | Residential   | Residential   |  |
| 6 | North | 96 | 203 | D-52c  | Platform                    | W | Postclassic        |  | Postclassic                     | Auxiliary     | Residential   |  |
| 6 | North | 96 | 204 | D-52d  | Altar                       | N | <b>Postclassic</b> |  | Postclassic                     | Group Ritual  | Residential   |  |
| 6 | North | 96 | 205 | D-52e  | Platform                    | W | <b>Postclassic</b> |  | Postclassic                     | Auxiliary     | Residential   |  |
| 6 | North | 96 | 206 | D-52f  | Platform                    | W | Postclassic        |  | Postclassic                     | Residential   | Residential   |  |



|   |       |     |     |       |                       |    |             |  |                         |             |             |                     |
|---|-------|-----|-----|-------|-----------------------|----|-------------|--|-------------------------|-------------|-------------|---------------------|
| 6 | North | 96  | 207 | D-52g | Single Room Structure | NW | Postclassic |  | Postclassic             | Residential | Residential |                     |
| 6 | North | 96  | 208 | D-52h | Platform              | N  | Postclassic |  | Postclassic             | Residential | Residential |                     |
| 6 | North | 96  | 209 | D-52i | Single Room Structure | E  | Postclassic |  | Postclassic             | Auxiliary   | Residential |                     |
| 6 | North | 96  | 210 | D-52J | Single Room Structure | SE | Postclassic |  | Postclassic             | Auxiliary   | Residential | See below for D-52L |
| 6 | North | 96  | 211 | D-52k | Round Structure       | SE | Postclassic |  | Postclassic             | Storage     | Residential |                     |
| 6 | North | 97  | 212 | 14P-1 | Single Room Structure | E  |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 98  | 213 | D-46a | Two Room Structure    | W  |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 98  | 214 | D-46b | Two Room Structure    | E  |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 98  | 215 | D-46c | Single Room Structure | S  |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                     |
| 6 | North | 98  | 216 | D-46d | Single Room Structure | NW |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                     |
| 6 | North | 99  | 217 | D-45a | Single Room Structure | S  |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 99  | 218 | D-45b | Single Room Structure | N  |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 100 | 219 | D-36  | Platform              | E  |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 101 | 220 | D-40a | Single Room Structure | SE |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 101 | 221 | D-40b | Single Room Structure | NE |             |  | Postclassic (Estimated) | Residential | Residential |                     |
| 6 | North | 101 | 222 | D-40c | Single Room Structure | W  |             |  | Postclassic (Estimated) | Auxiliary   | Residential |                     |

|   |       |     |     |        |                       |     |  |  |                              |             |              |  |
|---|-------|-----|-----|--------|-----------------------|-----|--|--|------------------------------|-------------|--------------|--|
| 6 | North | 101 | 223 | D-40d  | Single Room Structure | W   |  |  | Postclassic (Estimated)      | Auxiliary   | Residential  |  |
| 6 | North | 102 | 224 | D-43   | Round Structure       | UID |  |  | Postclassic (Estimated)      | Storage     | Agricultural |  |
| 6 | North | 103 | 225 | D-44a  | Platform              | S   |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 103 | 226 | D-44b  | Platform              | S   |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 104 | 227 | D-41   | Two Room Structure    | E   |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 105 | 228 | D-50   | Two Room Structure    | E   |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 106 | 229 | D-47a  | Two Room Structure    | E   |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 107 | 230 | D-47b  | Two Room Structure    | S   |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 108 | 231 | D-42   | Platform              | SE  |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 109 | 232 | D-48   | Platform              | SE  |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 110 | 233 | D-49   | Single Room Structure | S   |  |  | Postclassic (Estimated)      | Residential | Residential  |  |
| 6 | North | 111 | 234 | D-52L  | Single Room Structure | S   |  |  | Postclassic                  | Residential | Residential  | Part of cluster 52. Picked up on second pass |
| 6 | North | 112 | 235 | 14P-4a | Round Structure       | N   |  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 6 | North | 112 | 236 | 14P-4b | Single Room Structure | W   |  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 6 | North | 113 | 237 | 14P-5  | Two Room Structure    | NE  |  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 6 | North | 114 | 235 | 14Q-1a | Platform              | E   |  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 6 | North | 114 | 236 | 14Q-1b | Single Room Structure | S   |  |  | Terminal Classic (Estimated) | Residential | Residential  |  |
| 6 | North | 114 | 237 | 14Q-1c | Round Structure       | N   |  |  | Terminal Classic (Estimated) | Storage     | Residential  |  |

|   |       |     |      |         |                       |    |  |  |                         |              |              |                      |
|---|-------|-----|------|---------|-----------------------|----|--|--|-------------------------|--------------|--------------|----------------------|
| 6 | North | 115 | 238  | 15P--1a | Platform              | NE |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 6 | North | 115 | 238a | 15P-1b  | Platform              | SE |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 6 | North | 116 | 239  | 14P-6   | Single Room Structure | SE |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 6 | North | 117 | 240  | D-51    | Single Room Structure | S  |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 118 | 241  | BB-9a   | Two Room Structure    | E  |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 119 | 242  | BB-14a  | Single Room Structure | W  |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 119 | 243  | BB-14b  | Single Room Structure | N  |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 119 | 244  | BB-14c  | Platform              | NE |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |                      |
| 7 | West  | 119 | 245  | BB-14d  | Platform              | SW |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |                      |
| 7 | West  | 120 | 246  | BB-15   | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 121 | 247  | BB-16a  | Single Room Structure | NE |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 121 | 248  | BB-16b  | Single Room Structure | E  |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |                      |
| 7 | West  | 122 | 249  | BB-17   | Single Room Structure | S  |  |  | Postclassic (Estimated) | Auxiliary    | Agricultural |                      |
| 7 | West  | 123 | 250  | BB-18   | Altar                 | E  |  |  | Postclassic (Estimated) | Group Ritual | Group Ritual |                      |
| 7 | West  | 124 | 251  | BB-19   | Platform              | NE |  |  | Postclassic (Estimated) | Auxiliary    | Residential  | Possibly Residential |
| 7 | West  | 124 | 252  | BB-20a  | Two Room Structure    | E  |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 124 | 253  | BB-20b  | Single Room Structure | NW |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |
| 7 | West  | 125 | 254  | BB-21   | Single Room Structure | NE |  |  | Postclassic (Estimated) | Residential  | Residential  |                      |

|   |      |     |     |        |                       |     |  |  |                         |              |              |   |
|---|------|-----|-----|--------|-----------------------|-----|--|--|-------------------------|--------------|--------------|---|
| 7 | West | 126 | 255 | 10L-1a | Range Structure       | E   |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 126 | 256 | 10L-1b | Single Room Structure | E   |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |   |
| 7 | West | 127 | 257 | 10L-2  | Single Room Structure | N   |  |  | Postclassic (Estimated) | Agricultural | Agricultural |   |
| 7 | West | 128 | 258 | 10L-3a | Two Room Structure    | NE  |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 128 | 259 | 10L-3b | Platform              | SW  |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |   |
| 7 | West | 129 | 260 | 10L-4  | Single Room Structure | S   |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 130 | 261 | 10L-5  | Platform              | UID |  |  | Postclassic (Estimated) | Agricultural | Agricultural |   |
| 7 | West | 131 | 262 | 10L-6a | Platform              | NE  |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 131 | 263 | 10L-6b | Platform              | SW  |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |   |
| 7 | West | 132 | 264 | 10L-7a | Round Structure       | NW  |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 132 | 265 | 10L-7b | Single Room Structure | NW  |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 133 | 266 | 1-L-8a | Platform              | W   |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 133 | 267 | 10L-8b | Single Room Structure | E   |  |  | Postclassic (Estimated) | Sweatbath?   | Residential  | Very thick walls and depressed floor (sweatbath?) |
| 7 | West | 134 | 268 | BB-11a | Two Room Structure    | S   |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 134 | 269 | BB-11b | Single Room Structure | N   |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |   |
| 7 | West | 135 | 270 | BB-13  | Single Room Structure | E   |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 136 | 271 | BB-12a | Two Room Structure    | E   |  |  | Postclassic (Estimated) | Residential  | Residential  |   |
| 7 | West | 136 | 272 | BB-12b | Altar                 | W   |  |  | Postclassic (Estimated) | Group Ritual | Residential  |   |

|   |      |     |      |        |                       |    |  |  |                         |             |             |  |
|---|------|-----|------|--------|-----------------------|----|--|--|-------------------------|-------------|-------------|--|
| 7 | West | 137 | 273  | BB-21  | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 138 | 274  | BB-10  | Platform              | N  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 138 | 274a | BB-10  | Platform              | N  |  |  | Postclassic (Estimated) | Residential | Residential | Combined 274 and 274a into one structure |
| 7 | West | 139 | 275  | BB-22a | Two Room Structure    | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 139 | 276  | BB-22b | Single Room Structure | N  |  |  | Postclassic (Estimated) | Auxiliary   | Residential |  |
| 7 | West | 140 | 277  | BB-23a | Two Room Structure    | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 140 | 278  | BB-23b | Platform              | SW |  |  | Postclassic (Estimated) | Auxiliary   | Residential |  |
| 7 | West | 140 | 279  | BB-23c | Platform              | W  |  |  | Postclassic (Estimated) | Auxiliary   | Residential |  |
| 7 | West | 140 | 280  | BB-23d | Platform              | S  |  |  | Postclassic (Estimated) | Auxiliary   | Residential |  |
| 7 | West | 141 | 281  | BB-24a | Two Room Structure    | S  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 141 | 282  | BB-24b | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 142 | 283  | BB-25  | Platform              | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 143 | 284  | BB-26a | Two Room Structure    | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 143 | 285  | BB-26b | Single Room Structure | S  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 143 | 286  | BB-26c | Platform              | S  |  |  | Postclassic (Estimated) | Auxiliary   | Residential |  |
| 7 | West | 143 | 287  | BB-26d | Round Structure       | S  |  |  | Postclassic (Estimated) | Storage     | Residential |  |
| 7 | West | 144 | 288  | BB-27  | Platform              | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 145 | 289  | BB-28  | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential | Residential |  |
| 7 | West | 146 | 290  | BB-29a | Single Room Structure | W  |  |  | Postclassic (Estimated) | Residential | Residential |  |

|   |      |     |      |        |                       |    |  |  |                         |             |             |                        |
|---|------|-----|------|--------|-----------------------|----|--|--|-------------------------|-------------|-------------|------------------------|
| 7 | West | 146 | 291  | BB-29b | Platform              | W  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 147 | 292  | BB-30  | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 148 | 293  | 9L-1   | Two Room Structure    | S  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 149 | 294  | BB-31  | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 150 | 295  | BB-32a | Two Room Structure    | SW |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 150 | 296  | BB-32b | Single Room Structure | SW |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 150 | 297  | BB-32c | Platform              | SE |  |  | Postclassic (Estimated) | Auxiliary   | Residential |                        |
| 7 | West | 150 | 298  | BB-32d | Platform              | SW |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 151 | 300a | BB-33a | Platform              | N  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 151 | 300b | BB-33b | Two Room Structure    | NE |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 7 | West | 151 | 300c | BB-33b | Two Room Structure    | S  |  |  | Postclassic (Estimated) | Residential | Residential | Combined 300a and 300b |
| 8 | East | 152 | 301  | U-1a   | Round Structure       | NE |  |  | Postclassic (Estimated) | Storage     | Residential |                        |
| 8 | East | 152 | 302  | U-1b   | Single Room Structure | NW |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 8 | East | 153 | 303  | U-2a   | Two Room Structure    | N  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 8 | East | 153 | 304  | U-2b   | Single Room Structure | S  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 8 | East | 153 | 305  | U-2c   | Single Room Structure | S  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 8 | East | 154 | 306  | U-3a   | Two Room Structure    | N  |  |  | Postclassic (Estimated) | Residential | Residential |                        |
| 8 | East | 154 | 307  | U-3b   | Round Structure       | N  |  |  | Postclassic (Estimated) | Storage     | Residential |                        |











|   |      |     |     |        |                       |    |  |  |                         |              |              |        |
|---|------|-----|-----|--------|-----------------------|----|--|--|-------------------------|--------------|--------------|--------|
| 8 | East | 155 | 308 | U-4    | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 156 | 309 | U-5a   | Two Room Structure    | S  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 156 | 310 | U-5b   | Platform              | N  |  |  | Postclassic (Estimated) | Auxiliary    | Residential  |        |
| 8 | East | 156 | 311 | U-5c   | Round Structure       | N  |  |  | Postclassic (Estimated) | Storage      | Residential  |        |
| 8 | East | 157 | 312 | U-6a   | Single Room Structure | SE |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 157 | 313 | U-6b   | Single Room Structure | SW |  |  | Postclassic (Estimated) | Group Ritual | Residential  | Shrine |
| 8 | East | 157 | 314 | U-6c   | Two Room Structure    | NE |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 158 | 315 | U-7a   | Two Room Structure    | S  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 158 | 316 | U-7b   | Platform              | E  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 159 | 317 | 18M-1a | Platform              | N  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 159 | 318 | 18M-1b | Platform              | S  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 160 | 319 | 18M-2  | Single Room Structure | W  |  |  | Postclassic (Estimated) | Agricultural | Agricultural |        |
| 8 | East | 161 | 320 | 18M-3  | Platform              | S  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 162 | 321 | U-8a   | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 162 | 322 | U-8b   | Three Room Structure  | N  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 162 | 323 | U-8c   | Two Room Structure    | S  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 163 | 324 | T-83a  | Two Room Structure    | N  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |
| 8 | East | 163 | 325 | T-83b  | Single Room Structure | E  |  |  | Postclassic (Estimated) | Residential  | Residential  |        |



|     |            |      |      |        |                       |    |  |                    |                         |              |             |                           |
|-----|------------|------|------|--------|-----------------------|----|--|--------------------|-------------------------|--------------|-------------|---------------------------|
| 8   | East       | 163  | 326  | T-83c  | Single Room Structure | S  |  |                    | Postclassic (Estimated) | Residential  | Residential |                           |
| 8   | East       | 163  | 327  | T-83d  | Altar                 | S  |  |                    | Postclassic (Estimated) | Group Ritual | Residential |                           |
| 8   | East       | 163  | 328  | T-83e  | Round Structure       | S  |  |                    | Postclassic (Estimated) | Storage      | Residential |                           |
| 8   | East       | 164  | 329  | T-84a  | Platform              | S  |  |                    | Postclassic (Estimated) | Residential  | Residential |                           |
| 8   | East       | 164  | 330  | T-84b  | Platform              | E  |  |                    | Postclassic (Estimated) | Auxiliary    | Residential |                           |
| 8   | East       | 165  | 331  | U-9    | Single Room Structure | E  |  |                    | Postclassic (Estimated) | Residential  | Residential |                           |
| 8   | East       | 166  | 332  | U-10   | Platform              | S  |  |                    | Postclassic (Estimated) | Residential  | Residential |                           |
| 8   | East       | 167  | 333  | U-11   | Single Room Structure | E  |  |                    | Postclassic (Estimated) | Residential  | Residential |                           |
| 8   | East       | 150a | 299  | T-82a  | Platform              | NE |  |                    | Postclassic (Estimated) | Residential  | Residential |                           |
| 8   | East       | 150a | 299a | T-82b  | Single Room Structure | W  |  |                    | Postclassic (Estimated) | Auxiliary    | Residential |                           |
| N/A | North East | 168  | 334  | 18O-1a | Collonade             | E  |  | <b>Postclassic</b> | Postclassic             | Residential  | Residential | Elite Residential Complex |
| N/A | North East | 168  | 335  | 18O-1b | Shrine                | S  |  | <b>Postclassic</b> | Postclassic             | Group Ritual | Residential |                           |
| N/A | North East | 168  | 336  | 18O-1c | Altar                 | W  |  | <b>Postclassic</b> | Postclassic             | Group Ritual | Residential |                           |
| N/A | North East | 168  | 337  | 18-1d  | Single Room Structure | S  |  | <b>Postclassic</b> | Postclassic             | Oratory      | Residential | Possibly Auxiliary        |
| N/A |            | N/A  | N/A  |        | N/A                   |    |  |                    |                         |              |             | Misnumbered               |
| NA  |            | NA   | 23   |        | NA                    |    |  |                    | Postclassic (Estimated) |              |             |                           |

**Appendix C – Counts and Frequencies for Ceramics from Pozo Collections by Time Period**

## COLOR KEY

|   |  |
|---|--|
|  | RED SLIPPED WARES                      |
|  | IMPORTED RED SLIPPED WARES             |
|  | BUFF SLIPPED WARES                     |
|  | MODELED CENSER WARES                   |
|  | UNSLIPPED AND MODELED OR INCISED WARES |
|  | ORANGE WARES                           |
|  | CREAM SLIPPED WARES                    |
|  | BLACK SLIPPED WARES                    |
|  | UNSLIPPED WARES                        |
|  | UNSLIPPED STRIATED WARES               |

**POZO COLLECTION POSTCLASSIC # CERAMICS (MPP)**

| TRANSECT/MILPA | STRUCTURE             | POZO     | GROUP       | Mama rojo: Mama | Papacal inciso: Papacal | Chapab modelado: Chapab | Pencuyut inciso: Pencuyut | Palmul inciso: Palmul | Payil rojo: Payil | Polbox bayo: Polbox | Tecoh rojo/bayo: Tecoh | Chen Mul modelado: Chen Mul | Chenkeken inciso: Chenkeken | Matillas naranja: Matillas | Villahermosa inciso: Villahermosa | Kukula crema: Kukula | Matillas negro/crema: Xcanchakan | Sulche negro: Sulche | Navula burdo: Navula | Yacman estriado: Yacman | TOTAL |
|----------------|-----------------------|----------|-------------|-----------------|-------------------------|-------------------------|---------------------------|-----------------------|-------------------|---------------------|------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------------|----------------------|----------------------------------|----------------------|----------------------|-------------------------|-------|
| 21             | 10-O2                 | 155      | 66          | 43              |                         |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  | 2                    | 37                   | 3                       | 85    |
| 21             | 10-O1                 | 154      | 215         | 64              | 1                       | 2                       |                           | 1                     |                   |                     |                        |                             |                             | 1                          |                                   | 13                   | 8                                |                      | 83                   | 42                      | 215   |
| 8              | HH-2a                 | 148      | 239         |                 |                         |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  |                      | 16                   |                         | 16    |
| Transect-4     | 59/112                | 141      | Group 14J-2 | 31              |                         |                         |                           |                       |                   |                     |                        | 2                           |                             |                            |                                   |                      |                                  | 1                    | 20                   | 21                      | 75    |
| Transect-4     | 60/114                | 140      | Group 14J-3 | 10              |                         |                         |                           |                       |                   |                     |                        | 1                           |                             |                            |                                   |                      |                                  |                      | 7                    | 15                      | 33    |
| Transect-4     | 61/117                | 139      | Group 14J-4 | 6               |                         |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  |                      | 1                    | 3                       | 10    |
| Transect-4     | 62/125                | 138, 142 | Group 14J-5 | 4               |                         |                         |                           |                       |                   |                     |                        | 4                           |                             |                            |                                   |                      |                                  |                      | 13                   | 14                      | 35    |
| Transect-4     | 66/131                | 143      | Group 14J-8 |                 |                         |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  |                      | 1                    |                         | 1     |
| Transect 6     | Str 200 (Cluster 95?) | 202, 203 | Group 14P-2 | 30              |                         |                         |                           |                       |                   | 1                   |                        | 2                           |                             |                            |                                   |                      |                                  |                      | 11                   |                         | 44    |
| Transect 6     | Str 189 (Cluster 92?) | 200, 201 | Group 14P-8 |                 |                         |                         |                           |                       |                   |                     |                        | 3                           |                             |                            |                                   |                      |                                  |                      | 1                    | 2                       | 6     |
| Transect-5     | 74/149                | 134, 135 | Group 17P-1 | 65              |                         |                         |                           |                       |                   |                     |                        | 1                           | 2                           |                            |                                   |                      |                                  |                      | 57                   | 33                      | 158   |
| Transect-5     | 76/156                | 126      | Group 17P-3 | 48              |                         |                         |                           | 1                     |                   |                     |                        |                             |                             |                            |                                   | 1                    |                                  |                      | 17                   | 31                      | 98    |
| Transect-5     | 77/158                | 127, 128 | Group 17P-4 | 3               |                         |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  |                      | 11                   | 3                       | 17    |
| Transect-5     | 83/172,173            | 129      | Group 17P-5 | 15              |                         |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  |                      |                      | 10                      | 25    |
| Transect-5     | 88/184                | 130      | Group 17P-7 | 6               | 1                       |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  |                      | 1                    | 2                       | 10    |
| Transect-1     | 3/7                   | 100, 101 | Group 18N-1 | 50              | 3                       |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   | 2                    |                                  | 1                    | 24                   | 64                      | 144   |
| Transect-3     | 42/74                 | 121      | Group 18N-8 | 1               |                         |                         |                           |                       |                   |                     |                        |                             |                             |                            |                                   |                      |                                  |                      |                      |                         | 1     |

**POZO COLLECTION POSTCLASSIC # CERAMICS (MPP)**

| TRANSECT/MILPA | STRUCTURE                      | POZO             | GROUP                   | Mama rojo: Mama<br>Papacal inciso: Papacal<br>Chapab modelado: Chapab<br>Pencuyut inciso: Pencuyut | Palmul inciso: Palmul<br>Payil rojo: Payil | Polbox bayo: Polbox<br>Tecoh rojo/bayo: Tecoh | Chen Mul modelado: Chen Mul | Chenkeken inciso: Chenkeken | Matillas naranja: Matillas<br>Villahermosa inciso: Villahermosa | Kukula crema: Kukula<br>acanducan negro/crema:<br>Xcanchakan | Sulche negro: Sulche | Navula burdo: Navula | Yacman estriado: Yacman | TOTAL |
|----------------|--------------------------------|------------------|-------------------------|--|--|---|-----------------------------|-----------------------------|---|--|----------------------|----------------------|-------------------------|-------|
| Transect-5     | 85/176,177                     | 132, 133         | Group 7Q-1              | 1  |  |   |                             |                             |   |  |                      | 2                    | 2                       | 5     |
| Transect 6     | Str 204 (Cluster 96?)          | 204, 205         | Group D-52              | 118  |  |   | 3                           | 1                           |   | 20   | 1                    | 48                   | 85                      | 276   |
| Transect-4     | 57/110                         | 146              | Group FF-1              | 4  |  |   |                             |                             |   |  |                      | 9                    | 1                       | 14    |
| Transect-5     | 80/165                         | 131              | Group G-19              | 10   |  |   |                             |                             |   | 1  |                      |                      | 4                       | 15    |
| Transect-1     | 1/ofrenda?                     | 102, 103,<br>104 | Group G-48              | 81 1   | 1  |   |                             |                             | 1   | 2 2  |                      | 47                   | 62                      | 207   |
| Transect-4     | 56/106                         | 145              | Group GG-1              | 2  |  |   |                             |                             |   |  |                      | 2                    | 1                       | 5     |
| Transect-1     | 16/34                          | 105              | Group H-1               | 38 1 1   |  |   |                             |                             |   | 1  |                      | 14                   | 17                      | 72    |
| Transect-3     | 51/91                          | 110, 111         | Group H-40              | 237 1  |  | 4 26  | 4                           |                             | 1   | 1 1  | 1                    | 143                  | 163                     | 582   |
| Transect-3     | 51/97, 98                      | 109              | Group H-40              | 46 2   |  | 1 2   |                             |                             | 1   | 2 1  |                      | 13                   | 17                      | 85    |
| Transect-1     | 26/55                          | 106, 107,<br>108 | Group H-48              | 11 1   |  |   | 3                           |                             |   | 2 1  |                      | 17                   | 2                       | 37    |
| Transect-3     | 48/86                          | 112              | Group H-50              | 11 1   |  | 1   | 1                           |                             |   |  |                      | 4                    | 5                       | 23    |
| Transect-3     | 49/88                          | 113              | Group H-51              | 1  |  |   |                             |                             | 2   | 5  |                      | 2                    |                         | 10    |
| Transect-4     | 68/137                         | 147              | Y-115                   | 4  |  |   |                             |                             |   |  |                      | 6                    | 1                       | 11    |
| 21             | open area (SW corner of milpa) | RS56             | Milpa 21 open area RS56 |  |  |   |                             |                             |   | 1  |                      |                      |                         | 1     |
| Transect-4     | 73/148                         | 144              | Y-117                   | 1  |  |   |                             |                             |   |  |                      | 4                    | 3                       | 8     |

**Total 2324**

POZO COLLECTION POSTCLASSIC % CERAMICS (MPP)

| TRANSECT/MILPA | STRUCTURE             | POZO     | GROUP       | Mama rojo: Mama | Papacal inciso: Papacal | Chapab modelado: Chapab | Pencuyut inciso: Pencuyut | Palmul incised | Payil red | Polbox Group (Polbox/Tecoh R/B/Pele) | Tecoh rojo/bayo: Tecoh | Chen Mul modelado: Chen Mul | Chenkeken inciso: Chenkeken | Matillas Fine Orange | Villahermosa incised | Kukula crema: Kukula | Xcanchakan negro/crema: Xcanchakan | Sulche black | Navula burdo: Navula | Yacman estriado | total solare |
|----------------|-----------------------|----------|-------------|-----------------|-------------------------|-------------------------|---------------------------|----------------|-----------|--------------------------------------|------------------------|-----------------------------|-----------------------------|----------------------|----------------------|----------------------|------------------------------------|--------------|----------------------|-----------------|--------------|
| 21             | 10-O2                 | 155      | 68          | 58.6%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 2.4%         | 43.5%                | 3.5%            | 100.0%       |
| 21             | 10-O1                 | 154      | 215         | 28.8%           | 0.5%                    | 0.0%                    | 0.9%                      | 0.0%           | 0.5%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.5%                 | 0.0%                 | 6.0%                 | 3.7%                               | 0.0%         | 38.6%                | 19.5%           | 100.0%       |
| 8              | HH-2a                 | 148      | 239         | 0.0%            | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 100.0%               | 0.0%            | 100.0%       |
| Transect-4     | 59/112                | 141      | Group 14J-2 | 41.3%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 2.7%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 1.3%         | 26.7%                | 28.0%           | 100.0%       |
| Transect-4     | 60/114                | 140      | Group 14J-3 | 30.3%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 3.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 21.2%                | 45.5%           | 100.0%       |
| Transect-4     | 61/117                | 139      | Group 14J-4 | 60.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 10.0%                | 30.0%           | 100.0%       |
| Transect-4     | 62/125                | 142      | Group 14J-5 | 11.4%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 11.4%                       | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 37.1%                | 40.0%           | 100.0%       |
| Transect-4     | 66/131                | 143      | Group 14J-8 | 0.0%            | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 100.0%               | 0.0%            | 100.0%       |
| Transect 6     | Str 200 (Cluster 95?) | 203      | Group 14P-2 | 88.2%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 2.3%                                 | 0.0%                   | 4.5%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 25.0%                | 0.0%            | 100.0%       |
| Transect 6     | Str 189 (Cluster 92?) | 201      | Group 14P-8 | 0.0%            | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 50.0%                       | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 16.7%                | 33.3%           | 100.0%       |
| Transect-5     | 74/149                | 134, 135 | Group 17P-1 | 41.1%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.8%                        | 1.3%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 36.1%                | 20.9%           | 100.0%       |
| Transect-5     | 76/156                | 126      | Group 17P-3 | 48.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 1.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 1.0%                 | 0.0%                               | 0.0%         | 17.3%                | 31.6%           | 100.0%       |
| Transect-5     | 77/158                | 127, 128 | Group 17P-4 | 17.6%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 64.7%                | 17.6%           | 100.0%       |
| Transect-5     | 83/172,173            | 129      | Group 17P-5 | 60.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 0.0%                 | 40.0%           | 100.0%       |
| Transect-5     | 88/184                | 130      | Group 17P-7 | 80.0%           | 10.0%                   | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 10.0%                | 20.0%           | 100.0%       |
| Transect-1     | 3/7                   | 100,     | Group 18N-1 | 34.7%           | 2.1%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 1.4%                 | 0.0%                               | 0.7%         | 16.7%                | 44.4%           | 100.0%       |



**POZO COLLECTION POSTCLASSIC % CERAMICS (MPP)**

| TRANSECT/MILPA | STRUCTURE                      | POZO           | GROUP                   | Mama rojo: Mama | Papacal inciso: Papacal | Chapab modelado: Chapab | Pencuyut inciso: Pencuyut | Palmul incised | Payil red | Polbox Group (Polbox/Tecoh R/B/Pele) | Tecoh rojo/bayo: Tecoh | Chen Mul modelado: Chen Mul | Chenkeken inciso: Chenkeken | Matillas Fine Orange | Villahermosa incised | Kukula crema: Kukula | Xcanchakan negro/crema: Xcanchakan | Sulche black | Navula burdo: Navula | Yacman estriado | total solare |
|----------------|--------------------------------|----------------|-------------------------|-----------------|-------------------------|-------------------------|---------------------------|----------------|-----------|--------------------------------------|------------------------|-----------------------------|-----------------------------|----------------------|----------------------|----------------------|------------------------------------|--------------|----------------------|-----------------|--------------|
|                |                                | 101            |                         |                 |                         |                         |                           |                |           |                                      |                        |                             |                             |                      |                      |                      |                                    |              |                      |                 |              |
| Transect-3     | 42/74                          | 121            | Group 18N-8             | 100.0%          | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 0.0%                 | 0.0%            | 100.0%       |
| Transect-5     | 85/176,177                     | 132, 133       | Group 7Q-1              | 20.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 40.0%                | 40.0%           | 100.0%       |
| Transect 6     | Str 204 (Cluster 967)          | 204, 205       | Group D-52              | 42.8%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 1.1%                        | 0.4%                        | 0.0%                 | 0.0%                 | 7.2%                 | 0.0%                               | 0.4%         | 17.4%                | 30.8%           | 100.0%       |
| Transect-4     | 57/110                         | 146            | Group FF-1              | 28.6%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 64.3%                | 7.1%            | 100.0%       |
| Transect-5     | 80/165                         | 131            | Group G-19              | 66.7%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 6.7%                 | 0.0%                               | 0.0%         | 0.0%                 | 26.7%           | 100.0%       |
| Transect-1     | 1/ofrenda?                     | 102, 103, 104  | Group G-48              | 44.0%           | 0.5%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.5%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.5%                 | 0.0%                 | 1.0%                 | 1.0%                               | 0.0%         | 22.7%                | 30.0%           | 100.0%       |
| Transect-4     | 56/106                         | 145            | Group GG-1              | 40.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 40.0%                | 20.0%           | 100.0%       |
| Transect-1     | 16/34                          | 105, 110,      | Group H-1               | 52.8%           | 1.4%                    | 1.4%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 1.4%                 | 0.0%                               | 0.0%         | 19.4%                | 23.6%           | 100.0%       |
| Transect-3     | 51/91                          | 111            | Group H-40              | 40.7%           | 0.2%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 5.2%                                 | 7.6%                   | 0.7%                        | 0.0%                        | 0.0%                 | 0.2%                 | 0.2%                 | 0.2%                               | 0.2%         | 24.6%                | 28.0%           | 100.0%       |
| Transect-3     | 51/97, 98                      | 109, 106, 107, | Group H-40              | 54.1%           | 2.4%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 3.5%                                 | 0.5%                   | 0.0%                        | 0.0%                        | 1.2%                 | 0.0%                 | 2.4%                 | 1.2%                               | 0.0%         | 15.3%                | 20.0%           | 100.0%       |
| Transect-1     | 26/55                          | 108            | Group H-48              | 29.7%           | 2.7%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 8.1%                        | 0.0%                        | 0.0%                 | 0.0%                 | 5.4%                 | 2.7%                               | 0.0%         | 45.9%                | 5.4%            | 100.0%       |
| Transect-3     | 48/86                          | 112            | Group H-50              | 47.8%           | 4.3%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 4.3%                                 | 0.0%                   | 4.3%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 17.4%                | 21.7%           | 100.0%       |
| Transect-3     | 49/88                          | 113            | Group H-51              | 10.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 20.0%                | 0.0%                 | 50.0%                | 0.0%                               | 0.0%         | 20.0%                | 0.0%            | 100.0%       |
| Transect-4     | 68/137                         | 147            | Group Y-115             | 36.4%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 54.5%                | 9.1%            | 100.0%       |
| 21             | open area (SW corner of milpa) | RS56           | Milpa 21 open area RS56 | 0.0%            | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 100.0%                             | 0.0%         | 0.0%                 | 0.0%            | 100.0%       |
| Transect-4     | 73/148                         | 144            | Y-117                   | 12.5%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%           | 0.0%      | 0.0%                                 | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                               | 0.0%         | 50.0%                | 37.5%           | 100.0%       |



**POZO COLLECTION POSTCLASSIC % CERAMICS (MPP)**

| TRANSECT/MILPA | STRUCTURE             | POZO     | GROUP       | Mama rojo: Mama | Papacal inciso: Papacal | Chapab modelado: Chapab | Pencuyut inciso: Pencuyut | Palmul incised<br>Payil red | Polbox Group (Polbox/Tecoh<br>R/B/Pele) | Tecoh rojo/bayo: Tecoh | Chen Mul modelado: Chen Mul | Chenkeken inciso: Chenkeken | Matillas Fine Orange | Villahermosa incised | Kukula crema: Kukula | Xcanchakan negro/crema:<br>Xcanchakan | Sulche black | Navula burdo: Navula | Yacman estriado | total solare |
|----------------|-----------------------|----------|-------------|-----------------|-------------------------|-------------------------|---------------------------|-----------------------------|---|------------------------|-----------------------------|-----------------------------|----------------------|----------------------|----------------------|---------------------------------------|--------------|----------------------|-----------------|--------------|
| 21             | 10-O2                 | 155      | 66          | 50.8%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 2.4%         | 43.5%                | 3.5%            | 100.0%       |
| 21             | 10-O1                 | 154      | 215         | 29.8%           | 0.5%                    | 0.0%                    | 0.9%                      | 0.0%                        | 0.5%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.5%                 | 0.0%                 | 6.0%                 | 3.7%                                  | 0.0%         | 38.6%                | 19.5%           | 100.0%       |
| 8              | HH-2a                 | 148      | 239         | 0.0%            | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 100.0%               | 0.0%            | 100.0%       |
| Transect-4     | 59/112                | 141      | Group 14J-2 | 41.3%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 2.7%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 1.3%         | 26.7%                | 28.0%           | 100.0%       |
| Transect-4     | 60/114                | 140      | Group 14J-3 | 30.3%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 3.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 21.2%                | 45.5%           | 100.0%       |
| Transect-4     | 61/117                | 139      | Group 14J-4 | 60.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 10.0%                | 30.0%           | 100.0%       |
| Transect-4     | 62/125                | 138, 142 | Group 14J-5 | 11.4%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 11.4%                       | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 37.1%                | 40.0%           | 100.0%       |
| Transect-4     | 66/131                | 143      | Group 14J-8 | 0.0%            | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 100.0%               | 0.0%            | 100.0%       |
| Transect 6     | Str 200 (Cluster 95?) | 202, 203 | Group 14P-2 | 68.2%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 2.3%                   | 0.0%                        | 4.5%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 25.0%                | 0.0%            | 100.0%       |
| Transect 6     | Str 189 (Cluster 92?) | 200, 201 | Group 14P-8 | 0.0%            | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 50.0%                       | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 16.7%                | 33.3%           | 100.0%       |
| Transect-5     | 74/149                | 134, 135 | Group 17P-1 | 41.1%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.6%                        | 1.3%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 36.1%                | 20.9%           | 100.0%       |
| Transect-5     | 76/156                | 126      | Group 17P-3 | 49.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 1.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 1.0%                 | 0.0%                                  | 0.0%         | 17.3%                | 31.6%           | 100.0%       |
| Transect-5     | 77/158                | 127, 128 | Group 17P-4 | 17.6%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 64.7%                | 17.6%           | 100.0%       |
| Transect-5     | 83/172,173            | 129      | Group 17P-5 | 60.0%           | 0.0%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 0.0%                 | 40.0%           | 100.0%       |
| Transect-5     | 88/184                | 130      | Group 17P-7 | 60.0%           | 10.0%                   | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 0.0%                 | 0.0%                                  | 0.0%         | 10.0%                | 20.0%           | 100.0%       |
| Transect-1     | 3/7                   | 100,     | Group 18N-1 | 34.7%           | 2.1%                    | 0.0%                    | 0.0%                      | 0.0%                        | 0.0%                                    | 0.0%                   | 0.0%                        | 0.0%                        | 0.0%                 | 0.0%                 | 1.4%                 | 0.0%                                  | 0.7%         | 16.7%                | 44.4%           | 100.0%       |

**POZO COLLECTION TERMINAL CLASSIC CERAMICS # (MPP)**

| TRANSECT/MILPA | STRUCTURE                | POZO     | GROUP          | Muna pizarra: Muna | Chumayel rojo/pizarra: Chumayel | Dzitas pizarra: Dzitas | Teabo rojo: Teabo | Unto negro/estriado: Unto | Nohcacab compaesto: Nohcacab | Yokat estriado: Yokat | Chum burdo: Chum | TOTAL |
|----------------|--------------------------|----------|----------------|--------------------|---------------------------------|------------------------|-------------------|---------------------------|------------------------------|-----------------------|------------------|-------|
| 21             | 10-O2                    | 155      | 66             | 48                 | 1                               |                        | 6                 |                           |                              | 88                    | 1                | 144   |
| 21             | 10-O1                    | 154      | 215            | 1                  |                                 |                        |                   |                           |                              | 2                     | 10               | 13    |
| 8              | HH-2a                    | 148      | 239            | 8                  |                                 |                        |                   |                           |                              | 56                    | 13               | 77    |
| Transect-4     | 59/112                   | 141      | Group<br>14J-2 | 5                  |                                 |                        | 1                 | 3                         |                              | 29                    | 3                | 41    |
| Transect-4     | 60/114                   | 140      | Group<br>14J-3 |                    |                                 |                        |                   |                           |                              | 1                     | 2                | 3     |
| Transect-4     | 61/117                   | 139      | Group<br>14J-4 | 1                  |                                 |                        |                   |                           |                              |                       |                  | 1     |
| Transect-4     | 62/125                   | 138, 142 | Group<br>14J-5 |                    |                                 |                        |                   | 2                         |                              | 10                    |                  | 12    |
| Transect 6     | Str 200 (Cluster<br>95?) | 202, 203 | Group<br>14P-2 |                    |                                 |                        |                   |                           |                              | 3                     |                  | 3     |
| Transect 6     | Str 189 (Cluster<br>92?) | 200, 201 | Group<br>14P-8 |                    |                                 |                        |                   |                           |                              | 2                     |                  | 2     |
| Transect-5     | 74/149                   | 134, 135 | Group<br>17P-1 | 1                  |                                 |                        |                   |                           |                              | 5                     |                  | 6     |
| Transect-5     | 76/156                   | 126      | Group<br>17P-3 | 12                 | 1                               |                        |                   |                           |                              | 20                    | 8                | 41    |

| POZO COLLECTION TERMINAL CLASSIC CERAMICS # (MPP) |                       |               |                    |  |   |   |   |                           |                              |                       |                  |       |
|---|-----------------------|---------------|--------------------|--|---|---|---|---------------------------|------------------------------|-----------------------|------------------|-------|
| TRANSECT/MILPA                                    | STRUCTURE             | POZO          | GROUP              | Muna pizarra: Muna<br>Chumayel rojo/pizarra: Chumayel<br>Dzitas pizarra: Dzitas<br>Teabo rojo: Teabo |   |   |   | Unto negro/estriado: Unto | Nohcacab compaesto: Nohcacab | Yokat estriado: Yokat | Chum burdo: Chum | TOTAL |
| Transect-3  | 40/70,71              | 125           | Group 18N-13       | 5  |   |   |   |                           |                              | 13                    |                  | 18    |
| Transect-3  | 42/74                 | 121           | Group 18N-8        |  |   |   |   |                           |                              | 1                     |                  | 1     |
| Transect-5  | 85/176,177            | 132, 133      | Group 7Q-1         |  |   |   |   |                           |                              | 3                     | 6                | 9     |
| Transect 6  | Str 204 (Cluster 96?) | 204, 205      | Group D-52         | 1  |   |   |   |                           |                              | 25                    | 7                | 33    |
| Transect-4  | 57/110                | 146           | Group FF-1         | 3  |   |   |   |                           |                              | 41                    | 47               | 91    |
| Transect-1  | 1/ofrenda?            | 102, 103, 104 | Group G-48         | 45   | 3 | 1 | 5 |                           | 1                            | 205                   | 8                | 268   |
| Transect-1  | 16/34                 | 105           | Group H-1          | 1  |   |   |   |                           |                              |                       |                  | 1     |
| Transect-3  | 51/91                 | 110, 111      | Group H-40         | 1  |   |   |   |                           |                              | 1                     |                  | 2     |
| Transect-3  | 51/97, 98             | 109           | Group H-40         | 3  |   |   |   |                           |                              | 3                     | 1                | 7     |
| Transect-1  | 26/55, 56             | 106, 107, 108 | Group H-48         | 16   | 1 |   |   |                           |                              | 25                    | 3                | 45    |
| Transect-3  | 48/86                 | 112           | Group H-50         | 1  |   |   |   |                           |                              | 4                     |                  | 5     |
| Transect-4  | 68/137                | 147           | Group Y-115        | 12   | 1 |   | 1 |                           |                              | 48                    | 13               | 75    |
| Milpa 21  | 10-O2                 | 155           | Milpa 21 open area |  |   |   |   |                           |                              |                       | 4                | 4     |
|   |                       |               |                    |  |   |   |   |                           |                              |                       | Total            | 902   |

**POZO COLLECTION TERMINAL CLASSIC CERAMICS % (MPP)**

| TRANSECT/MILPA | STRUCTURE             | POZO     | GROUP        | Muna Slate | Chumayel Red Slate | Dzitas Slate | Teabo Red | Unto Black/Striated | Nohcacab compaesto: Nohcacab Composite | Yokat estriado: Yokat Striated | Chum Unslipped | TOTAL SOLARE |
|----------------|-----------------------|----------|--------------|------------|--------------------|--------------|-----------|---------------------|--|--------------------------------|----------------|--------------|
| 21             | 10-O2                 | 155      | 66           | 33.3%      | 0.7%               | 0.0%         | 4.2%      | 0.0%                | 0.0%                                   | 61.1%                          | 0.7%           | 100.0%       |
| 21             | 10-O1                 | 154      | 215          | 7.7%       | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 15.4%                          | 76.9%          | 100.0%       |
| 8              | HH-2a                 | 148      | 239          | 10.4%      | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 72.7%                          | 16.9%          | 100.0%       |
| Transect-4     | 59/112                | 141      | Group 14J-2  | 12.2%      | 0.0%               | 0.0%         | 2.4%      | 7.3%                | 0.0%                                   | 70.7%                          | 7.3%           | 100.0%       |
| Transect-4     | 60/114                | 140      | Group 14J-3  | 0.0%       | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 33.3%                          | 66.7%          | 100.0%       |
| Transect-4     | 61/117                | 139      | Group 14J-4  | 100.0%     | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 0.0%                           | 0.0%           | 100.0%       |
| Transect-4     | 62/125                | 138, 142 | Group 14J-5  | 0.0%       | 0.0%               | 0.0%         | 0.0%      | 16.7%               | 0.0%                                   | 83.3%                          | 0.0%           | 100.0%       |
| Transect 6     | Str 200 (Cluster 95?) | 202, 203 | Group 14P-2  | 0.0%       | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 100.0%                         | 0.0%           | 100.0%       |
| Transect 6     | Str 189 (Cluster 92?) | 200, 201 | Group 14P-8  | 0.0%       | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 100.0%                         | 0.0%           | 100.0%       |
| Transect-5     | 74/149                | 134, 135 | Group 17P-1  | 16.7%      | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 83.3%                          | 0.0%           | 100.0%       |
| Transect-5     | 76/156                | 126      | Group 17P-3  | 29.3%      | 2.4%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 48.8%                          | 19.5%          | 100.0%       |
| Transect-3     | 40/70,71              | 125      | Group 18N-13 | 27.8%      | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 72.2%                          | 0.0%           | 100.0%       |
| Transect-3     | 42/74                 | 121      | Group 18N-8  | 0.0%       | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 100.0%                         | 0.0%           | 100.0%       |
| Transect-5     | 85/176,177            | 132, 133 | Group 7Q-1   | 0.0%       | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 33.3%                          | 66.7%          | 100.0%       |
| Transect 6     | Str 204 (Cluster 96?) | 204, 205 | Group D-52   | 3.0%       | 0.0%               | 0.0%         | 0.0%      | 0.0%                | 0.0%                                   | 75.8%                          | 21.2%          | 100.0%       |

**POZO COLLECTION TERMINAL CLASSIC CERAMICS % (MPP)**

| TRANSECT/MILPA | STRUCTURE  | POZO      | GROUP              | Muna Slate | Chumayel Red Slate | Dzitas Slate | Teabo Red | Unto Black/Striated | Nohcacab compaesto: Nohcacab Composite | Yokat estriado: Yokat Striated | Chum Unslipped | TOTAL SOLARE |
|----------------|------------|-----------|--------------------|------------|--------------------|--------------|-----------|---------------------|--|--------------------------------|----------------|--------------|
| Transect-4     | 57/110     | 146       | Group FF-1         | 3.3%       |                    |              |           |                     |  |                                |                |              |
|                |            | 102, 103, |                    |            |                    |              |           |                     |  |                                |                |              |
| Transect-1     | 1/ofrenda? | 104       | Group G-48         | 16.8%      | 1.1%               | 0.4%         | 1.9%      |                     | 0.4%                                   | 76.5%                          | 3.0%           | 100.0%       |
| Transect-1     | 16/34      | 105       | Group H-1          | 100.0%     |                    |              |           |                     |  |                                |                | 100.0%       |
| Transect-3     | 51/91      | 110, 111  | Group H-40         | 50.0%      |                    |              |           |                     |  | 50.0%                          |                | 100.0%       |
| Transect-3     | 51/97, 98  | 109       | Group H-40         | 42.9%      |                    |              |           |                     |  | 42.9%                          | 14.3%          | 100.0%       |
|                |            | 106, 107, |                    |            |                    |              |           |                     |  |                                |                |              |
| Transect-1     | 26/55, 56  | 108       | Group H-48         | 35.6%      | 2.2%               |              |           |                     |  | 55.6%                          | 6.7%           | 100.0%       |
| Transect-3     | 48/86      | 112       | Group H-50         | 20.0%      |                    |              |           |                     |  | 80.0%                          |                | 100.0%       |
| Transect-4     | 68/137     | 147       | Group Y-115        | 16.0%      | 1.3%               |              | 1.3%      |                     |  | 64.0%                          | 17.3%          | 100.0%       |
|                |            |           | Milpa 21 open area |            |                    |              |           |                     |  |                                |                |              |
| Milpa 21       | 10-O2      | 155       |                    |            |                    |              |           |                     |  |                                | 100.0%         | 100.0%       |



| POZO COLLECTION LATE CLASSIC CERAMICS # (MPP) |                                   |          |                        |                                    |                           |                              |                           |                          |       |
|---|-----------------------------------|----------|------------------------|------------------------------------|---------------------------|------------------------------|---------------------------|--------------------------|-------|
| TRANSECT/MILPA                                | STRUCTURE                         | POZO     | GROUP                  | Ticul pizarra<br>delgado:<br>Ticul | Conkal<br>rojo:<br>Conkal | Kinich<br>naranja:<br>Kinich | Tekit<br>inciso:<br>Tekit | Saban<br>burdo:<br>Saban | TOTAL |
| 21  | 10-O2                             | 155      | 66                     | 4                                  |                           |                              | 2                         |                          | 6     |
| 21  | 10-O1                             | 154      | 215                    |                                    |                           |                              |                           | 5                        | 5     |
| 8   | HH-2a                             | 148      | 239                    |                                    | 1                         |                              |                           |                          | 1     |
| Transect-4                                    | 59/112                            | 141      | Group 14J-2            |                                    |                           |                              |                           | 4                        | 4     |
| Transect-5                                    | 74/149                            | 134, 135 | Group 17P-1            |                                    |                           |                              |                           | 6                        | 6     |
| Transect-5                                    | 76/156                            | 126      | Group 17P-3            |                                    |                           |                              |                           | 8                        | 8     |
| Transect-5                                    | 85/176,177                        | 132, 133 | Group 7Q-1             |                                    |                           |                              |                           | 6                        | 6     |
| Transect-1                                    | 1/ofrenda?                        | 104      | Group G-48<br>Milpa 21 | 2                                  |                           | 1                            | 3                         |                          | 6     |
| 21  | open area (SW<br>corner of milpa) | RS56     | open area<br>RS56      | 1                                  |                           |                              |                           |                          | 1     |
|   |                                   |          |                        | 7                                  | 1                         | 1                            | 5                         | 29                       | 43    |
| Total   |                                   |          |                        |                                    |                           |                              |                           |                          | 86    |

| POZO COLLECTION LATE CLASSIC CERAMICS % (MPP) |                                   |               |                            |                |               |                  |                  |                    |                 |
|---|-----------------------------------|---------------|----------------------------|----------------|---------------|------------------|------------------|--------------------|-----------------|
| TRANSECT/MILPA                                | STRUCTURE                         | POZO          | GROUP                      | Ticul<br>Slate | Conkal<br>Red | Kinich<br>Orange | Tekit<br>Incised | Saban<br>Unslipped | TOTAL<br>SOLARE |
| 21  | 10-O2                             | 155           | 66                         | 66.7%          | 0.0%          | 0.0%             | 33.3%            | 0.0%               | 100.0%          |
| 21  | 10-O1                             | 154           | 215                        | 0.0%           | 0.0%          | 0.0%             | 0.0%             | 100.0%             | 100.0%          |
| 8   | HH-2a                             | 148           | 239                        | 0.0%           | 100.0%        | 0.0%             | 0.0%             | 0.0%               | 100.0%          |
| Transect-4                                    | 59/112                            | 141           | Group 14J-2                | 0.0%           | 0.0%          | 0.0%             | 0.0%             | 100.0%             | 100.0%          |
| Transect-5                                    | 74/149                            | 134, 135      | Group 17P-1                | 0.0%           | 0.0%          | 0.0%             | 0.0%             | 100.0%             | 100.0%          |
| Transect-5                                    | 76/156                            | 126           | Group 17P-3                | 0.0%           | 0.0%          | 0.0%             | 0.0%             | 100.0%             | 100.0%          |
| Transect-5                                    | 85/176,177                        | 132, 133      | Group 7Q-1                 | 0.0%           | 0.0%          | 0.0%             | 0.0%             | 100.0%             | 100.0%          |
| Transect-1                                    | 1/ofrenda?                        | 102, 103, 104 | Group G-48                 | 33.3%          | 0.0%          | 16.7%            | 50.0%            | 0.0%               | 100.0%          |
| 21  | open area (SW<br>corner of milpa) | RS56          | Milpa 21 open<br>area RS56 | 100.0%         | 0.0%          | 0.0%             | 0.0%             | 0.0%               | 100.0%          |

**POZO COLLECTION LATE PRECLASSIC CERAMICS % (MPP)**

| TRANSECT/MILPA | STRUCTURE                         | POZO     | GROUP                   | Sierra Red | Tipikal Red Striated | Chunhinta Black | Laguna Verde Incised | Chancenote Striated | Tancah Unslipped | TOTAL SOLARE |
|----------------|-----------------------------------|----------|-------------------------|------------|----------------------|-----------------|----------------------|---------------------|------------------|--------------|
| 21             | 10-O1                             | 154      | 215                     | 100.0%     | 0.0%                 |                 |                      |                     |                  | 100.0%       |
| 8              | HH-2a                             | 148      | 239                     | 93.9%      | 0.0%                 | 2.0%            | 4.1%                 |                     |                  | 100.0%       |
| Transect-4     | 59/112                            | 141      | Group 14J-2             | 100.0%     | 0.0%                 |                 |                      |                     |                  | 100.0%       |
| Transect-4     | 60/114                            | 140      | Group 14J-3             | 20.0%      | 80.0%                |                 |                      |                     |                  | 100.0%       |
| Transect-4     | 62/125                            | 138, 142 | Group 14J-5             | 66.7%      | 16.7%                |                 |                      | 16.7%               |                  | 100.0%       |
| Transect-5     | 74/149                            | 134, 135 | Group 17P-1             | 53.8%      | 46.2%                |                 |                      |                     |                  | 100.0%       |
| Transect-5     | 76/156                            | 126      | Group 17P-3             | 70.0%      | 0.0%                 |                 |                      | 30.0%               |                  | 100.0%       |
| Transect-5     | 83/172,173                        | 129      | Group 17P-5             | 100.0%     | 0.0%                 |                 |                      |                     |                  | 100.0%       |
| Transect-1     | 6/15                              | 114      | Group 18N-3             | 100.0%     | 0.0%                 |                 |                      |                     |                  | 100.0%       |
| Transect-5     | 85/176,177                        | 132, 133 | Group 7Q-1              | 100.0%     | 0.0%                 |                 |                      |                     |                  | 100.0%       |
| Transect-4     | 57/110                            | 146      | Group FF-1              | 33.3%      | 66.7%                |                 |                      |                     |                  | 100.0%       |
| Transect-3     | 51/97, 98                         | 109      | Group H-40              |            |                      |                 |                      |                     | 100.0%           | 100.0%       |
| Transect-4     | 68/137                            | 147      | Group Y-115             | 50.0%      |                      |                 |                      | 50.0%               |                  | 100.0%       |
|                | open area<br>(SW corner of milpa) |          |                         |            |                      |                 |                      |                     |                  |              |
| 21             |                                   | RS56     | Milpa 21 open area RS56 | 100.0%     |                      |                 |                      |                     |                  | 100.0%       |



**POZO COLLECTION LATE PRECLASSIC CERAMICS # (MPP)**

| TRANSECT/MILPA | STRUCTURE     | POZO     | GROUP       | Sierra<br>rojo:<br>Sierra | Tipikal<br>rojo/estriado:<br>Tipikal | Chunhinta<br>negro:<br>Chunhinta | Laguna<br>Verde inciso:<br>Laguna<br>Verde | Chancenote<br>estriado:<br>Chancenote | Tancah<br>burdo:<br>Tancah | Total |
|----------------|---------------|----------|-------------|---------------------------|--------------------------------------|----------------------------------|--|---------------------------------------|----------------------------|-------|
| 21             | 10-O1         | 154      | 215         | 1                         |                                      |                                  |  |                                       |                            | 1     |
| 8              | HH-2a         | 148      | 239         | 46                        |                                      | 1                                | 2  |                                       |                            | 49    |
| Transect-4     | 59/112        | 141      | Group 14J-2 | 5                         |                                      |                                  |  |                                       |                            | 5     |
| Transect-4     | 60/114        | 140      | Group 14J-3 | 2                         | 8                                    |                                  |  |                                       |                            | 10    |
| Transect-4     | 62/125        | 138, 142 | Group 14J-5 | 4                         | 1                                    |                                  |  | 1                                     |                            | 6     |
| Transect-5     | 74/149        | 134, 135 | Group 17P-1 | 7                         | 6                                    |                                  |  |                                       |                            | 13    |
| Transect-5     | 76/156        | 126      | Group 17P-3 | 7                         |                                      |                                  |  | 3                                     |                            | 10    |
| Transect-5     | 83/172,173    | 129      | Group 17P-5 | 8                         |                                      |                                  |  |                                       |                            | 8     |
| Transect-1     | 6/15          | 114      | Group 18N-3 | 9                         |                                      |                                  |  |                                       |                            | 9     |
| Transect-5     | 85/176,177    | 132, 133 | Group 7Q-1  | 1                         |                                      |                                  |  |                                       |                            | 1     |
| Transect-4     | 57/110        | 146      | Group FF-1  | 1                         | 2                                    |                                  |  |                                       |                            | 3     |
| Transect-3     | 51/97, 98     | 109      | Group H-40  |                           |                                      |                                  |  |                                       | 1                          | 1     |
| Transect-4     | 68/137        | 147      | Group Y-115 | 1                         |                                      |                                  |  | 1                                     |                            | 2     |
|                | open area     |          | Milpa 21    |                           |                                      |                                  |  |                                       |                            |       |
|                | (SW corner of |          | open area   |                           |                                      |                                  |  |                                       |                            |       |
| 21             | milpa)        | RS56     | RS56        | 1                         |                                      |                                  |  |                                       |                            | 1     |
| Total          |               |          |             |                           |                                      |                                  |  |                                       |                            | 119   |

**POZO COLLECTION EARLY CLASSIC CERAMICS % (MPP)**











| TRANSECT/MILPA | STRUCTURE             | POZO      | GROUP             | Aguila Orange | Timucuy Orange Polychrome | Saxche Orange Polychrome | Maxcanu Buff | TOTAL SOLARE |
|----------------|-----------------------|-----------|-------------------|---------------|---------------------------|--------------------------|--------------|--------------|
| 8              | HH-2a                 | 148       | 239               |               | 100.0%                    |                          |              | 100.0%       |
| Transect-4     | 62/125                | 138, 142  | Group 14J-5       |               | 100.0%                    |                          |              | 100.0%       |
| Transect-5     | 74/149                | 134, 135  | Group 17P-1       |               | 100.0%                    |                          |              | 100.0%       |
| Transect-5     | 76/156                | 126       | Group 17P-3       | 18.2%         | 54.5%                     |                          | 27.3%        | 100.0%       |
| Transect-3     | 42/74                 | 121       | Group 18N-8       |               | 100.0%                    |                          |              | 100.0%       |
| Transect-5     | 85/176,177<br>Str 204 | 132, 133  | Group 7Q-1        |               | 100.0%                    |                          |              | 100.0%       |
| Transect 6     | (Cluster 96?)         | 204, 205  | Group D-52        |               | 100.0%                    |                          |              | 100.0%       |
| Transect-4     | 57/110                | 146       | Group FF-1        | 10.0%         | 30.0%                     |                          | 60.0%        | 100.0%       |
|                |                       | 102, 103, |                   |               |                           |                          |              |              |
| Transect-1     | 1/ofrenda?            | 104       | Group G-48        |               | 11.1%                     | 11.1%                    | 77.8%        | 100.0%       |
| Transect-3     | 51/97, 98             | 109       | Group H-40        |               | 100.0%                    |                          |              | 100.0%       |
| Transect-4     | 68/137                | 147       | Group Y-115       |               |                           |                          | 100.0%       | 100.0%       |
|                |                       |           | Milpa 21          |               |                           |                          |              |              |
| Milpa 21       | open area             | RS58      | open area<br>RS58 |               | 100.0%                    |                          |              | 100.0%       |

**POZO COLLECTION EARLY CLASSIC CERAMICS # (MPP)**

| TRANSECT/MILPA | STRUCTURE             | POZO     | GROUP                      | Aguila<br>naranja:<br>Aguila | Timucuy<br>naranja<br>policroma:<br>Timucuy | Saxche<br>naranja<br>policroma:<br>Saxche | Maxcanu<br>bayo:<br>Maxcanu | TOTAL |
|----------------|-----------------------|----------|----------------------------|------------------------------|---|---|-----------------------------|-------|
| 8              | HH-2a                 | 148      | 239                        |                              | 5   |   |                             | 5     |
| Transect-4     | 62/125                | 138, 142 | Group 14J-5                |                              | 7   |   |                             | 7     |
| Transect-5     | 74/149                | 134, 135 | Group 17P-1                |                              | 2   |   |                             | 2     |
| Transect-5     | 76/156                | 126      | Group 17P-3                | 2                            | 6   |   | 3                           | 11    |
| Transect-3     | 42/74                 | 121      | Group 18N-8                |                              | 2   |   |                             | 2     |
| Transect-5     | 85/176,177<br>Str 204 | 132, 133 | Group 7Q-1                 |                              | 6   |   |                             | 6     |
| Transect 6     | (Cluster 96?)         | 204, 205 | Group D-52                 |                              | 7   |   |                             | 7     |
| Transect-4     | 57/110                | 146      | Group FF-1                 | 1                            | 3   |   | 6                           | 10    |
| Transect-1     | 1/ofrenda?            | 104      | Group G-48                 |                              | 1   | 1   | 7                           | 9     |
| Transect-3     | 51/97, 98             | 109      | Group H-40                 |                              | 1   |   |                             | 1     |
| Transect-4     | 68/137                | 147      | Group Y-115                |                              |   |   | 1                           | 1     |
| Milpa 21       | open area             | RS58     | Milpa 21 open area<br>RS58 |                              | 1   |   |                             | 1     |
| Total          |                       |          |                            |                              |   |   |                             | 62    |

**Appendix D – Counts and Frequencies for Ceramics from Surface Collections by Time Period**

## COLOR KEY

|   |  |
|---|--|
|  | RED SLIPPED WARES                      |
|  | IMPORTED RED SLIPPED WARES             |
|  | BUFF SLIPPED WARES                     |
|  | MODELED CENSER WARES                   |
|  | UNSLIPPED AND MODELED OR INCISED WARES |
|  | ORANGE WARES                           |
|  | CREAM SLIPPED WARES                    |
|  | BLACK SLIPPED WARES                    |
|  | UNSLIPPED WARES                        |
|  | UNSLIPPED STRIATED WARES               |

# **SURFACE COLLECTION POSTCLASSIC CERAMICS # (MPP)**

| TRANSECT/<br>MILPA | STRUCTURE                                      | COLLECTION     | GROUP              | Mama<br>reja:<br>Mama | Papacal<br>inciso:<br>Papacal | Chen Mul<br>modelado:<br>Chen Mul | Thul<br>aplicado:<br>Thul | Matillas<br>naranja:<br>Matillas | Villahemosa<br>inciso:<br>Villahemosa | Kukula<br>crema:<br>Kukula | Xcanchakan<br>negro/crema:<br>Xcanchakan | Navula<br>burdo:<br>Navula | Yacman<br>estriado:<br>Yacman | total<br>solare |
|--------------------|--|----------------|--------------------|-----------------------|-------------------------------|-----------------------------------|---------------------------|----------------------------------|---------------------------------------|----------------------------|--|----------------------------|-------------------------------|-----------------|
| 31A                | 124 (14J-5a)                                   |                | 31                 | 1                     |                               |                                   |                           |                                  |                                       |                            |  | 6                          |                               | 7               |
| 21                 | 10-O2  | 10-O-3, 10-O-4 | 66                 | 42                    | 1                             |                                   |                           |                                  |                                       | 1                          | 2  | 52                         | 14                            | 112             |
| 21                 | 10-O1  | 10-O-1         | 215                | 15                    |                               |                                   |                           |                                  |                                       | 2                          |  | 31                         | 2                             | 50              |
| 31A                | 124 (14J-5a), 125,<br>(14J-5b)                 |                | 229                | 10                    |                               | 2                                 |                           |                                  |                                       |                            |  | 48                         | 2                             | 62              |
| MEMS               | cenote madero                                  |                | cenote madero      | 51                    | 1                             | 2                                 |                           |                                  |                                       |                            |  | 8                          | 19                            | 81              |
| 21                 | 10-O8  | 10-O-2         | Group 10-O8        | 1                     |                               |                                   |                           |                                  |                                       |                            |  | 8                          | 1                             | 10              |
| Transect 4?        | Group 63 large round platform<br>Dzan Tun Chen |                | Group 14J-6        | 1                     |                               |                                   |                           |                                  |                                       |                            |  | 6                          | 1                             | 8               |
| Hall group         | 334, 335, 336                                  |                | Group 18O-1        | 15                    | 2                             | 78                                | 1                         |                                  |                                       |                            |  | 26                         | 16                            | 138             |
| Transect 3?        | GROUP 51                                       |                | Group H-40         | 3                     |                               |                                   |                           |                                  |                                       |                            |  |                            | 1                             | 4               |
| Transect-1?        | GROUP 2  |                | Group H-45         | 4                     | 1                             |                                   |                           |                                  |                                       |                            |  |                            |                               | 5               |
| 21                 | open   | 10-O-5         | Milpa 21 open area | 2                     |                               |                                   |                           |                                  |                                       |                            |  | 1                          |                               | 3               |
| 22                 | open   | 10-O-6         | Milpa 22 open area | 15                    |                               |                                   |                           |                                  |                                       | 3                          |  | 36                         | 4                             | 58              |
| 23                 | open   | 10-O-7         | Milpa 23 open area | 3                     | 1                             |                                   |                           |                                  |                                       |                            |  | 39                         |                               | 43              |
| 28                 | N-59   | N-1            | STR N-59           |                       |                               |                                   |                           | 36                               | 3                                     |                            |  |                            | 4                             | 43              |
| 31A                |  |                | Milpa 31           |                       |                               |                                   |                           |                                  |                                       |                            |  | 3                          |                               | 3               |
| TOTAL              |  |                |                    |                       |                               |                                   |                           |                                  |                                       |                            |  |                            |                               | 627             |

**SURFACE COLLECTION POSTCLASSIC CERAMICS% (MPP)**

| TRANSECT/MILPA | STRUCTURE   | COLLECTION     | GROUP                       | Mama<br>rojo:<br>Mama | Papacal<br>inciso:<br>Papacal | Chen Mul<br>modelado:<br>Chen Mul | Thul<br>aplicado:<br>Thul | Matillas<br>naranja:<br>Matillas | Villahermosa<br>inciso:<br>Villahermosa | Kukula<br>crema:<br>Kukula | Xcanchakan<br>negro/crema:<br>Xcanchakan | Navula<br>burdo:<br>Navula | Yacman<br>estriado:<br>Yacman | total<br>solare |
|----------------|---|----------------|-----------------------------|-----------------------|-------------------------------|-----------------------------------|---------------------------|----------------------------------|---|----------------------------|--|----------------------------|-------------------------------|-----------------|
| 31A            | 124 (14J-5a)  |                | 31                          | 14.3%                 |                               |                                   |                           |                                  |   |                            |  | 85.7%                      |                               | 100%            |
| 21             | 10-O2   | 10-O-3, 10-O-4 | 66                          | 37.5%                 | 0.9%                          |                                   |                           |                                  |   | 0.9%                       | 1.8%                                     | 46.4%                      | 12.5%                         | 100%            |
| 21             | 10-O1   | 10-O-1         | 215                         | 30.0%                 |                               |                                   |                           |                                  |   | 4.0%                       |  | 62.0%                      | 4.0%                          | 100%            |
| 31A            | 124 (14J-5a),<br>125, (14J-5b)                          |                | 229                         | 16.1%                 |                               | 3.2%                              |                           |                                  |   |                            |  | 77.4%                      | 3.2%                          | 100%            |
| MEMS           | cenote<br>madero  |                | cenote<br>madero            | 63.0%                 | 1.2%                          | 2.5%                              |                           |                                  |   |                            |  | 9.9%                       | 23.5%                         | 100%            |
| 21             | 10-O8   | 10-O-2         | Group<br>10-O8              | 10.0%                 |                               |                                   |                           |                                  |   |                            |  | 80.0%                      | 10.0%                         | 100%            |
| Transect 4?    | Group 63<br>large round<br>platform<br>Dzan Tun<br>Chen |                | Group<br>14J-6              | 12.5%                 |                               |                                   |                           |                                  |   |                            |  | 75.0%                      | 12.5%                         | 100%            |
| Hall group     | 334, 335, 336   |                | Group<br>18O-1              | 10.9%                 | 1.4%                          | 56.5%                             | 0.7%                      |                                  |   |                            |  | 18.8%                      | 11.8%                         | 100%            |
| Transect 3?    | GROUP 51  |                | Group<br>H-40               | 75.0%                 |                               |                                   |                           |                                  |   |                            |  |                            | 25.0%                         | 100%            |
| Transect-1?    | GROUP 2   |                | Group<br>H-45               | 80.0%                 | 20.0%                         |                                   |                           |                                  |   |                            |  |                            |                               | 100%            |
| 21             | open  | 10-O-5         | Milpa 21<br>open<br>area    | 66.7%                 |                               |                                   |                           |                                  |   |                            |  | 33.3%                      |                               | 100%            |
| 22             | open  | 10-O-6         | Milpa 22<br>open<br>area    | 25.9%                 |                               |                                   |                           |                                  |   | 5.2%                       |  | 62.1%                      | 6.9%                          | 100%            |
| 23             | open  | 10-O-7         | Milpa 23<br>open<br>area    | 7.0%                  | 2.3%                          |                                   |                           |                                  |   |                            |  | 90.7%                      |                               | 100%            |
| 28             | N-59  | N-1            | STR N-<br>59<br>Milpa<br>31 |                       |                               |                                   |                           | 83.7%                            | 7.0%                                    |                            |  |                            | 9.3%                          | 100%            |
| 31A            |   |                |                             |                       |                               |                                   |                           |                                  |   |                            |  | 100.0%                     |                               | 100%            |



**SURFACE COLLECTION TERMINAL CLASSIC CERAMICS # (MPP)**

| TRANSECT<br>/MILPA | STRUCTURE  | COLLECTION     | GROUP                 | Muna<br>pizarra:<br>Muna | Chumayel<br>red | Teabo<br>rojo:<br>Teabo | Unto<br>negro/estriado:<br>Unto | Akil<br>improso:<br>Akil | Oxkutzcab<br>aplicado:<br>Oxkutzcab | Chum<br>burdo:<br>Chum | Sisal<br>burdo:<br>Sisal | Yokat<br>estriado:<br>Yokat | Piste<br>Striated | total<br>solare |
|--------------------|--|----------------|-----------------------|--------------------------|-----------------|-------------------------|---------------------------------|--------------------------|-------------------------------------|------------------------|--------------------------|-----------------------------|-------------------|-----------------|
| 31A                | 124 (14J-5a)   |                | 31                    | 3                        |                 |                         |                                 |                          |                                     | 14                     |                          |                             |                   | 17              |
| 21                 | 10-O2  | 10-O-3, 10-O-4 | 66                    | 91                       | 1               | 3                       |                                 | 1                        |                                     | 33                     | 2                        | 74                          | 2                 | 207             |
| 31A                | 124 (14J-5a),<br>125, (14J-5b)                       |                | 229                   | 49                       |                 | 5                       |                                 |                          |                                     | 19                     |                          | 47                          |                   | 120             |
| 8                  | HH-1   | HH-1           | 240                   | 6                        |                 |                         |                                 |                          |                                     |                        |                          | 1                           |                   | 7               |
| MEMS               | cenote madero  |                | cenote<br>madero      | 15                       |                 |                         | 3                               |                          |                                     |                        |                          | 4                           |                   | 22              |
| 21                 | 10-O8  | 10-O-2         | Group 10-O8           | 25                       |                 |                         |                                 |                          | 1                                   | 3                      |                          | 17                          |                   | 46              |
| Transect 4?        | Group 63 large<br>round platform<br>Dzan Tun<br>Chen |                | Group 14J-6           | 61                       |                 | 1                       |                                 |                          |                                     | 11                     |                          | 33                          |                   | 106             |
| Hall group         | 334, 335, 336  |                | Group 18O-1           | 1                        |                 |                         |                                 |                          |                                     |                        |                          |                             |                   | 1               |
| Transect 3?        | GROUP 51   |                | Group H-40            | 1                        |                 |                         |                                 |                          |                                     |                        |                          |                             |                   | 1               |
| 21                 | open   | 10-O-5         | Milpa 21 open<br>area | 44                       | 3               | 3                       |                                 |                          |                                     | 3                      |                          | 55                          |                   | 108             |
| 22                 | open   | 10-O-6         | Milpa 22 open<br>area | 1                        |                 |                         |                                 |                          |                                     | 1                      |                          | 2                           |                   | 4               |
| 23                 | open   | 10-O-7         | Milpa 23 open<br>area | 1                        |                 |                         |                                 |                          |                                     | 18                     |                          |                             |                   | 19              |
| 31A                |  |                | Milpa 31              | 18                       |                 |                         |                                 |                          |                                     |                        |                          | 5                           |                   | 23              |
| TOTAL              |  |                |                       |                          |                 |                         |                                 |                          |                                     |                        |                          |                             |                   | 681             |

**SURFACE COLLECTION TERMINAL CLASSIC CERAMICS % (MPP)**

| TRANSECT/MILPA | STRUCTURE                                   | COLLECTION     | GROUP              | Muna pizarra: Muna | Chumayel red | Teabo rojo: Teabo | Unto negro/estriado: Unto | Akil improso: Akil | Oxkutzcab aplicado: Oxkutzcab | Chum burdo: Chum | Sisal burdo: Sisal | Yokat estriado: Yokat | Piste Striated | total solare |
|----------------|---|----------------|--------------------|--------------------|--------------|-------------------|---------------------------|--------------------|-------------------------------|------------------|--------------------|-----------------------|----------------|--------------|
| 31A            | 124 (14J-5a)                                |                | 31                 | 17.6%              |              |                   |                           |                    |                               | 82.4%            |                    |                       |                | 100.0%       |
| 21             | 10-O2                                       | 10-O-3, 10-O-4 | 66                 | 44.0%              | 0.5%         | 1.4%              |                           | 0.5%               |                               | 15.9%            | 1.0%               | 35.7%                 | 1.0%           | 100.0%       |
| 31A            | 124 (14J-5a), 125, (14J-5b)                 |                | 229                | 40.8%              |              | 4.2%              |                           |                    |                               | 15.8%            |                    | 39.2%                 |                | 100.0%       |
| 8              | HH-1  | HH-1           | 240                | 85.7%              |              |                   |                           |                    |                               |                  |                    | 14.3%                 |                | 100.0%       |
| MEMS           | cenote madero                               |                | cenote madero      | 68.2%              |              |                   | 13.6%                     |                    |                               |                  |                    | 18.2%                 |                | 100.0%       |
| 21             | 10-O8                                       | 10-O-2         | Group 10-O8        | 54.3%              |              |                   |                           |                    | 2.2%                          | 6.5%             |                    | 37.0%                 |                | 100.0%       |
| Transect 4?    | Group 63 large round platform Dzan Tun Chen |                | Group 14J-6        | 57.5%              |              | 0.9%              |                           |                    |                               | 10.4%            |                    | 31.1%                 |                | 100.0%       |
| Hall group     | 334, 335, 336                               |                | Group 18O-1        | 100.0%             |              |                   |                           |                    |                               |                  |                    |                       |                | 100.0%       |
| Transect 3?    | GROUP 51                                    |                | Group H-40         | 100.0%             |              |                   |                           |                    |                               |                  |                    |                       |                | 100.0%       |
| 21             | open  | 10-O-5         | Milpa 21 open area | 40.7%              | 2.8%         | 2.8%              |                           |                    |                               | 2.8%             |                    | 50.9%                 |                | 100.0%       |
| 22             | open  | 10-O-6         | Milpa 22 open area | 25.0%              |              |                   |                           |                    |                               | 25.0%            |                    | 50.0%                 |                | 100.0%       |
| 23             | open  | 10-O-7         | Milpa 23 open area | 5.3%               |              |                   |                           |                    |                               | 94.7%            |                    |                       |                | 100.0%       |
| 31A            |   |                | Milpa 31           | 78.3%              |              |                   |                           |                    |                               |                  |                    | 21.7%                 |                | 100.0%       |

**SURFACE COLLECTION LATE CLASSIC CERAMICS # (MPP)**

| TRANSECT<br>/MILPA | STRUCTURE   | COLLECTION     | GROUP                                   | Ticul<br>pizarra<br>delgado:<br>Ticul | Conkal<br>rojo | Sacalum<br>negro/pizarro:<br>Sacalum | Flor<br>crema:<br>Flor | Tekit<br>inciso:<br>Tekit | Saban<br>burdo:<br>Saban | total<br>solare |
|--------------------|---|----------------|---|---------------------------------------|----------------|--------------------------------------|------------------------|---------------------------|--------------------------|-----------------|
| 21                 | 10-O2   | 10-O-3, 10-O-4 | 66                                      |                                       | 1              |                                      |                        | 1                         | 3                        | 5               |
| 31A<br>8           | 124 (14J-5a),<br>125, (14J-5b)<br>HH-1            | HH-1           | 229<br>240<br>cenote<br>madero          | 1                                     |                |                                      | 1                      |                           | 2<br>68                  | 3<br>69         |
| MEMS               | cenote madero                                     |                | Group 10-<br>O8                         |                                       |                | 20                                   |                        |                           |                          | 20              |
| 21                 | 10-O8   | 10-O-2         |   |                                       |                |                                      |                        | 1                         |                          | 1               |
| Transect 4?        | Group 63 large round<br>platform Dzan Tun<br>Chen |                | Group<br>14J-6<br>Milpa 23<br>open area |                                       |                | 2                                    |                        |                           |                          | 2               |
| 23                 | open  | 10-O-7         |   |                                       |                |                                      |                        |                           | 9                        | 9               |
| <b>TOTAL</b>       |   |                |   |                                       |                |                                      |                        |                           |                          | <b>109</b>      |

| SURFACE COLLECTION LATE CLASSIC CERAMICS % (MMP) |   |                |   |                                       |                |                                      |                        |                           |                          |                 |
|--|---|----------------|---|---------------------------------------|----------------|--------------------------------------|------------------------|---------------------------|--------------------------|-----------------|
| TRANSECT<br>/MILPA                               | STRUCTURE   | COLLECTION     | GROUP                                   | Ticul<br>pizarra<br>delgado:<br>Ticul | Conkal<br>rojo | Sacalum<br>negro/pizarro:<br>Sacalum | Flor<br>crema:<br>Flor | Tekit<br>inciso:<br>Tekit | Saban<br>burdo:<br>Saban | total<br>solare |
| 21   | 10-O2   | 10-O-3, 10-O-4 | 66                                      |                                       | 20.0%          |                                      |                        | 20.0%                     | 60.0%                    | 100%            |
| 31A  | 124 (14J-5a),<br>125, (14J-5b)                    |                | 229                                     | 33.3%                                 |                |                                      |                        |                           | 66.7%                    | 100%            |
| 8  | HH-1  | HH-1           | 240                                     |                                       |                |                                      | 1.4%                   |                           | 98.6%                    | 100%            |
| MEMS   | cenote madero                                     |                | cenote madero                           |                                       |                | 100.0%                               |                        |                           |                          | 100%            |
| 21   | 10-O8   | 10-O-2         | Group 10-O8                             |                                       |                |                                      |                        | 100.0%                    |                          | 100%            |
| Transect 4?                                      | Group 63 large<br>round platform Dzan<br>Tun Chen |                | Group 14J-6<br>Milpa 23<br>open<br>area |                                       |                | 100.0%                               |                        |                           |                          | 100%            |
| 23   | open  | 10-O-7         |   |                                       |                |                                      |                        |                           | 100.0%                   | 100%            |

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**SURFACE COLLECTION EARLY CLASSIC CERAMICS # (MPP)**

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| TRANSECT/MILPA | STRUCTURE                      | COLLECTION | GROUP            | Xanaba<br>rojo:<br>xanaba | Timucuy<br>naranja<br>policroma:<br>Timucuy | total<br>solare |
|----------------|--------------------------------|------------|------------------|---------------------------|---|-----------------|
| 31A            | 124 (14J-5a)                   |            | 31               |                           | 100.0%                                      | 100.0%          |
| 31A            | 124 (14J-5a),<br>125, (14J-5b) |            | 229              |                           | 100.0%                                      | 100.0%          |
| MEMS           | cenote<br>madero               |            | cenote<br>madero | 55.6%                     | 44.4%                                       | 100.0%          |

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| SURFACE COLLECTION EARLY CLASSIC CERAMICS # (MPP) |                                |            |                  |                           |   |                 |
|---|--------------------------------|------------|------------------|---------------------------|---|-----------------|
| TRANSECT/MILPA                                    | STRUCTURE                      | COLLECTION | GROUP            | Xanaba<br>rojo:<br>xanaba | Timucuy<br>naranja<br>policroma:<br>Timucuy | total<br>solare |
| 31A   | 124 (14J-5a)                   |            | 31               |                           | 1   | 1               |
| 31A   | 124 (14J-5a),<br>125, (14J-5b) |            | 229              |                           | 5   | 5               |
| MEMS  | cenote madero                  |            | cenote<br>madero | 10                        | 8   | 18              |
| TOTAL   |                                |            |                  |                           |   | 24              |

**SURFACE COLLECTION LATE PRECLASSIC CERAMICS # (MPP)**

| TRANSECT<br>/MILPA | STRUCTURE   | COLLECTION     | GROUP                    | Sierra<br>rojo:<br>Sierra | Tipikal<br>rojo/estriado:<br>Tipikal | Chunhint<br>a negro:<br>Chunhint<br>a | Laguna<br>verde<br>inciso:<br>Laguna<br>verde | Chancenote<br>estriado:<br>Chancenote | Tancah<br>burdo:<br>Tancah | total<br>solare |
|--------------------|---|----------------|--------------------------|---------------------------|--------------------------------------|---------------------------------------|---|---------------------------------------|----------------------------|-----------------|
| 31A                | 124 (14J-5a)                                      | 10-O-3, 10-O-4 | 31                       | 2                         |                                      |                                       |   |                                       |                            | 2               |
| 21                 | 10-O2   |                | 66                       | 4                         |                                      |                                       |   |                                       |                            | 4               |
| 31A                | 124 (14J-5a),<br>125, (14J-5b)                    | HH-1           | 229                      | 8                         | 6                                    | 1                                     |   |                                       |                            | 15              |
| 8                  | HH-1  |                | 240                      | 13                        | 2                                    |                                       | 1   | 2                                     |                            | 18              |
| MEMS               | cenote madero                                     |                | cenote<br>madero         | 2                         | 3                                    |                                       |   | 5                                     | 1                          | 11              |
| Transect 4?        | Group 63 large<br>round platform<br>Dzan Tun Chen |                | Group<br>14J-6           | 3                         |                                      |                                       |   |                                       | 1                          | 4               |
| 21                 | open  | 10-O-5         | Milpa 21<br>open<br>area |                           |                                      |                                       |   |                                       | 1                          | 1               |
| 23                 | open  | 10-O-7         | Milpa 23<br>open<br>area | 8                         |                                      | 2                                     |   |                                       |                            | 10              |
| <b>TOTAL</b>       |   |                |                          |                           |                                      |                                       |   |                                       |                            | <b>65</b>       |



**SURFACE COLLECTION LATE PRECLASSIC CERAMICS % (MMP)**

| TRANSECT/MILPA | STRUCTURE   | COLLECTION     | GROUP                    | Sierra<br>rojo:<br>Sierra | Tipikal<br>rojo/estriado:<br>Tipikal | Chunhinta<br>negro:<br>Chunhinta | Laguna<br>verde<br>inciso:<br>Laguna<br>verde | Chancenote<br>estriado:<br>Chancenote | Tancah<br>burdo:<br>Tancah | total<br>solare |
|----------------|---|----------------|--------------------------|---------------------------|--------------------------------------|----------------------------------|---|---------------------------------------|----------------------------|-----------------|
| 31A            | 124 (14J-5a)                                      | 10-O-3, 10-O-4 | 31                       | 100.0%                    |                                      |                                  |   |                                       |                            | 100%            |
| 21             | 10-O2   |                | 66                       | 100.0%                    |                                      |                                  |   |                                       |                            | 100%            |
| 31A            | 124 (14J-5a),<br>125, (14J-5b)                    | HH-1           | 229                      | 53.3%                     | 40.0%                                | 6.7%                             |   |                                       |                            | 100%            |
| 8              | HH-1  |                | 240                      | 72.2%                     | 11.1%                                |                                  | 5.6%  | 11.1%                                 |                            | 100%            |
| MEMS           | cenote<br>madero                                  |                | cenote<br>madero         | 18.2%                     | 27.3%                                |                                  |   | 45.5%                                 | 9.1%                       | 100%            |
| Transect 4     | Group 63 large<br>round platform<br>Dzan Tun Chen |                | Group<br>14J-6           | 75.0%                     |                                      |                                  |   |                                       | 25.0%                      | 100%            |
| 21             | open  | 10-O-5         | Milpa 21<br>open<br>area |                           |                                      |                                  |   |                                       | 100.0%                     | 100%            |
| 23             | open  | 10-O-7         | Milpa 23<br>open<br>area | 80.0%                     |                                      | 20.0%                            |   |                                       |                            | 100%            |

**Appendix E – Raw Data for all Obsidian Artifacts Collected**

Obsidian Analysis Form - Mayapan  
2003

| Milpa/Str | Pozo | Lot  | Leve<br>I | Blades<br>Proximal | Blades<br>Medial | Blades<br>Distal | Blades<br>Whole | Blades<br>Core | Flakes | Chi<br>p | Chunk | Other<br>(Specify) | Width | Thickne<br>ss | Wear<br>L, M, H |
|-----------|------|------|-----------|--------------------|------------------|------------------|-----------------|----------------|--------|----------|-------|--------------------|-------|---------------|-----------------|
| Str 7     | 100  | 1602 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 10.00 | 2.10          | M               |
| Str 7     | 100  | 1602 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 9.00  | 2.00          | M               |
|           | 100  | 1608 | 4         |                    | X                |                  |                 |                |        |          |       |                    | 11.40 | 2.80          | T               |
| Str 8     | 101  | 1601 | 1 X       |                    |                  |                  |                 |                |        |          |       |                    | 15.50 | 3.50          | M               |
| Str 8     | 101  | 1601 | 1 X       |                    |                  |                  |                 |                |        |          |       |                    | 7.90  | 2.00          | H               |
| Str 8     | 101  | 1601 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 13.00 | 2.10          | M               |
| Str 8     | 101  | 1601 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 5.10  | 1.10          | L               |
| Str 8     | 101  | 1601 | 1         |                    |                  |                  |                 |                | X      |          |       |                    | 13.80 | 1.80          | L               |
| Str 8     | 101  | 1601 | 1         |                    |                  |                  |                 |                | X      |          |       |                    | 8.90  | 1.90          | M               |
| Str 8     | 101  | 1603 | 2 X       |                    |                  |                  |                 |                |        |          |       |                    | 13.00 | 3.20          | M               |
| Str 8     | 101  | 1603 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 7.20  | 2.10          | M               |
| Str 8     | 101  | 1603 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 8.00  | 2.00          | L               |
| Str 8     | 101  | 1603 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 10.90 | 2.00          | L               |
| Str 8     | 101  | 1603 | 2         |                    |                  | X                |                 |                |        |          |       |                    | 8.00  | 2.00          | M               |
| Str 8     | 101  | 1607 | 4 X       |                    |                  |                  |                 |                |        |          |       |                    | 12.90 | 3.00          | H               |
| Str 8     | 101  | 1607 | 4         |                    | X                |                  |                 |                |        |          |       |                    | 10.00 | 2.80          | M               |
| Str 8     | 101  | 1607 | 4         |                    | X                |                  |                 |                |        |          |       |                    | 6.80  | 2.20          | L               |
|           | 102  | 1609 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 9.80  | 3.00          | M               |
|           | 102  | 1619 | 3         |                    |                  |                  |                 |                |        | X        |       |                    | 13.00 | 2.10          | L               |
| Str 1     | 103  | 1612 | 1 X       |                    |                  |                  |                 |                |        |          |       |                    | 8.00  | 2.00          | M               |
| Str 1     | 103  | 1612 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 10.00 | 1.90          | M               |
| Str 1     | 103  | 1612 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 15.80 | 4.00          | H               |
| Str 1     | 103  | 1612 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 12.00 | 3.00          | L               |
| Str 1     | 103  | 1613 | 2 X       |                    |                  |                  |                 |                |        |          |       |                    | 14.40 | 3.00          | H               |
| Str 1     | 103  | 1613 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 10.20 | 2.10          | M               |
| Str 1     | 103  | 1617 | 3         |                    |                  |                  | X               |                |        |          |       |                    | 11.00 | 3.80          | H               |
| Str 1     | 103  | 1617 | 3         |                    |                  |                  |                 |                |        | X        |       |                    | 12.50 | 1.10          | L               |
| Str 1     | 103  | 1625 | 7 X       |                    |                  |                  |                 |                |        |          |       |                    | 8.00  | 2.10          | H               |
| Str 1     | 103  | 1625 | 7         |                    | X                |                  |                 |                |        |          |       |                    | 11.70 | 2.20          | M               |
| Str 2     | 104  | 1614 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 9.00  | 3.00          | M               |
| Str 2     | 104  | 1614 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 15.00 | 2.90          | M               |
| Str 2     | 104  | 1614 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 10.00 | 2.80          | M               |
| Str 2     | 104  | 1615 | 2 X       |                    |                  |                  |                 |                |        |          |       |                    | 10.10 | 3.20          | M               |
| Str 2     | 104  | 1615 | 2         |                    | X                |                  |                 |                |        |          |       |                    | 10.10 | 1.20          | M               |
| Str 2     | 104  | 1616 | 3 X       |                    |                  |                  |                 |                |        |          |       |                    | 6.80  | 1.80          | L               |
| Str 2     | 104  | 1616 | 3         |                    | X                |                  |                 |                |        |          |       |                    | 6.90  | 2.10          | H               |
| Str 2     | 104  | 1616 | 3         |                    | X                |                  |                 |                |        |          |       |                    | 15.90 | 3.10          | H               |
| Str 2     | 104  | 1616 | 3         |                    | X                |                  |                 |                |        |          |       |                    | 12.00 | 3.90          | M               |
| Str 2     | 104  | 1616 | 3         |                    | X                |                  |                 |                |        |          |       |                    | 9.90  | 2.80          | H               |
| Str 2     | 104  | 1616 | 3         |                    |                  |                  |                 |                |        |          | X     |                    | 13.10 | 3.90          | L               |
| Str 34    | 105  | 1620 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 9.20  | 1.90          | M               |
| Str 34    | 105  | 1620 | 1         |                    | X                |                  |                 |                |        |          |       |                    | 9.40  | 2.20          | M               |
| Str 34    | 105  | 1624 | 3         |                    |                  |                  |                 |                |        |          |       | point              | 7.70  | 2.90          | M               |
| Str 56    | 107  | 1631 | 2         |                    |                  |                  |                 |                | X      |          |       |                    | 11.00 | 3.10          | L               |

Obsidian Analysis Form - Mayapan  
2003

| Milpa/Str        | Pozo | Lot  | Blades<br>Leve<br>I | Blades<br>Proximal | Blades<br>Medial | Blades<br>Distal | Blades<br>Whole | Blades<br>Core | Flakes | Chi<br>p | Chunk | Other<br>(Specify) | Width | Thickne<br>ss | Wear<br>L, M, H |
|------------------|------|------|---------------------|--------------------|------------------|------------------|-----------------|----------------|--------|----------|-------|--------------------|-------|---------------|-----------------|
| Str 56           | 107  | 1632 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 7.50  | 1.80          | M               |
| Str 97           | 109  | 1641 | 1 X                 |                    |                  |                  |                 |                |        |          |       |                    | 7.90  | 2.10          | L               |
| Str 97           | 109  | 1641 | 1                   |                    | X                |                  |                 |                |        |          |       |                    | 11.40 | 2.00          | M               |
| Str 97           | 109  | 1641 | 1                   |                    | X                |                  |                 |                |        |          |       |                    | 13.00 | 3.00          | L               |
| Str 97           | 109  | 1641 | 1                   |                    |                  | X                |                 |                |        |          |       |                    | 11.90 | 1.10          | M               |
| Str 47           | 109  | 1642 | 2 X                 |                    |                  |                  |                 |                |        |          |       |                    | 9.50  | 2.90          | H               |
| Str 47           | 109  | 1642 | 2                   |                    | X                |                  |                 |                |        |          |       |                    | 3.10  | 0.90          | L               |
| Str 47           | 109  | 1642 | 2                   |                    | X                |                  |                 |                |        |          |       |                    | 10.90 | 2.30          | M               |
| Str 47           | 109  | 1642 | 2                   |                    | X                |                  |                 |                |        |          |       |                    | 9.20  | 2.70          | M               |
| Str 47           | 109  | 1642 | 2                   |                    | X                |                  |                 |                |        |          |       |                    | 7.00  | 1.90          | M               |
| Str 47           | 109  | 1652 | 3 X                 |                    |                  |                  |                 |                |        |          |       |                    | 11.20 | 3.00          | H               |
| Str 47           | 109  | 1652 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 9.10  | 1.50          | L               |
| Str 47           | 109  | 1652 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 8.10  | 3.00          | H               |
| Str 47           | 109  | 1652 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 10.00 | 2.10          | H               |
| Str 94           | 111  | 1646 | 2 X                 |                    |                  |                  |                 |                |        |          |       |                    | 9.00  | 3.00          | M               |
| Str 81           | 123  | 1688 | 1                   |                    |                  | X                |                 |                |        |          |       |                    | 10.80 | 1.40          | L               |
| Str 156          | 126  | 1693 | 1                   |                    | X                |                  |                 |                |        |          |       |                    | 6.10  | 1.20          | M               |
| Str 156          | 126  | 1712 | 6 X                 |                    |                  |                  |                 |                |        |          |       |                    | 15.80 | 3.10          | H               |
| Str 156          | 126  | 1712 | 6                   |                    | X                |                  |                 |                |        |          |       |                    | 13.20 | 2.10          | M               |
| Str 156          | 126  | 1723 | 7                   |                    | X                |                  |                 |                |        |          |       |                    | 12.60 | 2.90          | M               |
| Str 184          | 130  | 1702 | 2 X                 |                    |                  |                  |                 |                |        |          |       |                    | 5.80  | 1.90          | L               |
|                  | 130  | 1706 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 7.00  | 2.00          | M               |
| Str 184          | 130  |      |                     |                    |                  |                  |                 |                |        |          |       | point              | 10.80 | 3.00          | M               |
| Str 184          | 130  |      |                     |                    |                  |                  |                 |                |        |          |       |                    | 8.90  | 2.30          | L               |
| Str 184          | 130  |      |                     |                    |                  |                  |                 |                |        |          |       |                    | 8.00  | 2.50          | L               |
| Str 184          | 130  |      |                     |                    |                  |                  |                 |                |        |          |       |                    | 10.00 | 2.70          | M               |
| Str 184          | 130  |      |                     |                    |                  |                  |                 |                |        |          |       |                    | 5.60  | 1.30          | L               |
| Str 165          | 131  | 1707 | 1                   |                    |                  | X                |                 |                |        |          |       |                    | 7.00  | 3.50          | M               |
| Str 165          | 131  | 1707 | 1                   |                    | X                |                  |                 |                |        |          |       |                    | 10.00 | 2.90          | L               |
| Str 177          | 132  | 1713 | 1                   |                    | X                |                  |                 |                |        |          |       |                    | 10.80 | 1.90          | H               |
| Str 177          | 132  | 1713 | 1                   |                    |                  |                  |                 |                | X      |          |       |                    | 11.10 | 3.00          | H               |
| Str 177          | 132  | 1719 | 2                   |                    |                  |                  |                 |                | X      |          |       |                    | 18.10 | 2.90          | L               |
| Gr 85 Str<br>177 | 132  | 1722 | 4 X                 |                    |                  |                  |                 |                |        |          |       |                    | 10.70 | 2.70          | H               |
| Gr 85 Str<br>177 | 132  | 1722 | 4                   |                    | X                |                  |                 |                |        |          |       |                    | 9.90  | 2.00          | M               |
| Str 149          | 134  | 1715 | 1                   |                    |                  |                  |                 |                |        | X        |       |                    | 9.10  | 1.90          | L               |
| Str 152          | 135  | 1716 | 1                   |                    | X                |                  |                 |                |        |          |       |                    | 5.80  | 1.00          | L               |
| Str 112          | 141  | 1734 | 2                   |                    | X                |                  |                 |                |        |          |       |                    | 4.10  | 2.90          | L               |
| Str 112          | 141  | 1736 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 10.90 | 2.10          | M               |
| Str 112          | 141  | 1736 | 3                   |                    |                  | X                |                 |                |        |          |       |                    | 7.00  | 1.90          | M               |
| Str 68           | 153  | 1781 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 8.10  | 1.00          | H               |
| 21               | 154  | 1790 | 3 X                 |                    |                  |                  |                 |                |        |          |       |                    | 13.70 | 3.00          | M               |
| 21               | 154  | 1790 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 10.90 | 2.00          | M               |
| 21               | 154  | 1790 | 3                   |                    | X                |                  |                 |                |        |          |       |                    | 8.90  | 3.00          | M               |
| 21               | 154  | 1790 | 3                   |                    |                  | X                |                 |                |        |          |       |                    | 16.00 | 1.70          | M               |

**Appendix F – Raw Data for all Lithic Tools Collected**

**MPP LITHIC TOOLS**

| MILPA | STR<br>#             | Pozo<br>(Unit) | Level<br>(Nivel) | Lot<br>(Capa) | Solare<br>#  | TYPE                                  | total | Function                    | PORTION         | length | width | thickness | material   | color                                     | patination | COMMENTS  |
|-------|----------------------|----------------|------------------|---------------|--------------|---------------------------------------|-------|-----------------------------|-----------------|--------|-------|-----------|------------|---|------------|---|
| 2003  |                      | 100            | 1                | 1600          | brad         | projectile<br>point                   | 1     | unifacial                   | all but<br>base |        | 1.4   | 0.3       | chalcedony | lt brn                                    | patin      | side notched,<br>cannot<br>diagnose<br>base type,<br>made on flk<br>ventral surf,<br>barely flaked                |
| 2003  |                      | 105            | 1                | 1620          | brad         | projectile<br>point                   | 1     | unifacial                   | whole           | 2.2    | 1.4   | 0.25      | chalcedony | heated lt<br>pink                         | patin      | square base,<br>side notch  |
| 2003  |                      | 105            | 3                | 1624          | brad         | Biface<br>stem or<br>narrow<br>biface | 1     | narrow,<br>parallel<br>side | proximal        |        | 1.1   | 0.3       | chert      | buff tan w/<br>lt gray strip              |            | strange little<br>object,<br>probably<br>microtool, no<br>evidence for<br>nicelt steed<br>artifacts at<br>mayapan |
| 2003  | Transect<br>1, 16/34 | 105            | 3                | 1624          | Group<br>H-1 | projectile<br>point                   | 1     |                             |                 |        | 0.77  | 0.29      | obsidian   |   |            |   |
| 2003  |                      | 107            | 6                | 1633          | brad         | Pointed<br>biface                     | 1     | converging<br>base          |                 |        | 4.1   | 1.4       | chalcedony | lt gray w/<br>black cry<br>inc.           | patin      | hard to know<br>if little point<br>was used or<br>not, heavily<br>resh  |
| 2003  |                      | 91             | 109              | 1641          | brad         | uniface                               | 1     |                             | distal          |        |       | 0.7       | chert      | buff, lt tan<br>and md.<br>Brown,<br>burn |            | likely<br>scraper?  |

MPP LITHIC TOOLS

| MILPA | STR # | Pozo (Unit) | Level (Nivel) | Lot (Capa) | Solare # | TYPE                 | total | Function                    | PORTION | length | width | thickness | material   | color  | patination | COMMENTS  |
|-------|-------|-------------|---------------|------------|----------|----------------------|-------|-----------------------------|---------|--------|-------|-----------|------------|--|------------|---|
| 2003  | 91    | 110         | 6             | 1661       | brad     | Pointed biface       | 1     | converging rectilinear base | whole   | 6.2    | 2.1   | 1         | chalcedony | gray   | patin      | no major dulling, nice and sharp  |
| 2003  | 149   | 134         | 1             | 1715       | brad     | projectile point     | 1     | unifacial                   | whole   | 1.9    | 1.1   | 0.1       |            |  |            | round base, side notch, super-thin                                      |
| 2003  | 149   | 134         | 1             | 1715       | brad     | projectile point     | 1     | unifacial                   | whole   | 2.9    | 1.6   | 0.3       | chalcedony | lt brn, fireclouded                          | patin      | square base, side notch, nice bevelling dorsal/ventral                  |
| 2003  | S-125 | 138         | 1             | 1730       | brad     | projectile point     | 1     | unifacial                   | distal  |        | 1.2   | 0.3       | chalcedony | white  |            | probable blank,   |
| 2003  | 114   | 140         | 1             | 1732       | brad     | Bifacial frag        | 1     | lenticular poss             | medial  |        | 2.3   | 0.7       | chert      | burned buff, w/ brown gray line through half |            | hard to know what type bif this was, could be base of lentic/ wedge bif |
| 2003  | 124   | 142         | 2             | 1741       | brad     | Thin biface (Type 3) | 1     |                             | whole   | 6.7    | 2.5   | 1.3       | chert      | lt gray/brown, and cry inc                   | patin      | narrow pted biface  |



**Appendix G – Raw Data for all Non-Utilized Lithic Flakes**

### Non-Utilized Flakes

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### Non-Utilized Flakes

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### Non-Utilized Flakes

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## **Appendix H – Raw Data for all Utilized Flakes Collected**

# MPP LITHIC FLAKES

| PORTION     | length           | width         | Description                                   |
|-------------|------------------|---------------|---|
| pozo 200    | 1                | 1800          | patin, f.clouded,calc                         |
| pozo 204    | 1                | 1806          | patin,f clouded,calc.                         |
| pozo 204    | 1                | 1808          | patin,trans brown calc w/<25% cortex          |
| pozo 204    | 1                | 1808          | patin,calc w/cry inc                          |
| pozo 204    | 1                | 1808          | patin,trans brown calc w/<25% cortex          |
| pozo 204    | 1                | 1808          | patin gray/brown calc                         |
| pozo 204    | 2                | 1810          | patin gray/brown calc                         |
| pozo 204    | 2                | 1810          | patin gray/brown calc                         |
| pozo 204    | 2                | 1810          | patin calc/chert w/ cry inc                   |
| pozo 204    | 2                | 1810          | patin gray/brown calc                         |
| pozo 204    | 2                | 1810          | patin calc                                    |
| pozo 204    | 2                | 1810          | patin fine clouded gray/brown calc            |
| pozo 205    | 4                | 1816          | patin,fire clouded, chert                     |
| pozo 205    | 2                | 1811          | patin,fire clouded calc w/ cry inc            |
| pozo 205    | 2                | 1811          | patin,chert/calc                              |
| pozo 205    | 2                | 1811          | patin,fire clouded calc w/<25% cortex         |
| pozo 205    | 1                | 1809          | patin calc w/<25% cortex                      |
| Pozo (Unit) | Level<br>(Nivel) | Lot<br>(Capa) | material                                      |
| grp 51      | surf coll        |               | patin tan calc w/ 25% cortex                  |
| cenote      |                  |               |   |
| madero      | surf coll        |               | patin,fire crazzed, fire clouded calc         |
| Dzan Tun    |                  |               | patin,fire clouded 7 popped gray/brown calc 2 |
| Chen        | surf coll        |               | re  |
| 31a         |                  |               | trans br.chal,firepop,fireci                  |
| 31a         |                  |               | unknown chal fireci                           |
| Str 124     |                  |               | pat chert,unknown,fireci                      |
| Str 124     |                  |               | white,pat chert,br.incla                      |

## **Appendix I – Raw Data for all Utilized Flakes Collected**

# MPP LITHIC FLAKES

| PORTION     | length    | width  | Description                                   |
|-------------|-----------|--------|---|
| pozo 200    | 1         | 1800   | patin, f.clouded,calc                         |
| pozo 204    | 1         | 1806   | patin,f clouded,calc.                         |
| pozo 204    | 1         | 1808   | patin,trans brown calc w/<25% cortex          |
| pozo 204    | 1         | 1808   | patin,calc w/cry inc                          |
| pozo 204    | 1         | 1808   | patin,trans brown calc w/<25% cortex          |
| pozo 204    | 1         | 1808   | patin gray/brown calc                         |
| pozo 204    | 2         | 1810   | patin gray/brown calc                         |
| pozo 204    | 2         | 1810   | patin gray/brown calc                         |
| pozo 204    | 2         | 1810   | patin calc/chert w/ cry inc                   |
| pozo 204    | 2         | 1810   | patin gray/brown calc                         |
| pozo 204    | 2         | 1810   | patin calc                                    |
| pozo 204    | 2         | 1810   | patin fine clouded gray/brown calc            |
| pozo 205    | 4         | 1816   | patin,fire clouded, chert                     |
| pozo 205    | 2         | 1811   | patin,fire clouded calc w/ cry inc            |
| pozo 205    | 2         | 1811   | patin,chert/calc                              |
| pozo 205    | 2         | 1811   | patin,fire clouded calc w/<25% cortex         |
| pozo 205    | 1         | 1809   | patin calc w/<25% cortex                      |
|             | Level     | Lot    |   |
| Pozo (Unit) | (Nivel)   | (Capa) | material                                      |
| grp 51      | surf coll |        | patin tan calc w/ 25% cortex                  |
| cenote      |           |        |   |
| madero      | surf coll |        | patin,fire crazzed, fire clouded calc         |
| Dzan Tun    |           |        | patin,fire clouded 7 popped gray/brown calc 2 |
| Chen        | surf coll |        | re  |
| 31a         |           |        | trans br.chal,firepop,fireci                  |
| 31a         |           |        | unknown chal fireci                           |
| Str 124     |           |        | pat chert,unknown,fireci                      |
| Str 124     |           |        | white,pat chert,br.incla                      |

**Appendix J – Raw Data for all Faunal Material Collected**

**MPP Faunal**

| POZO | LOT  | LEVEL | SPECIES              | COUNT | PORTION                        | BONE      | SIDE | COMMENT |
|------|------|-------|----------------------|-------|--------------------------------|-----------|------|---------|
| 126  | 1724 | 8     | small<br>mammal/bird | 1     | long bone shaft<br>frag.       |           |      |         |
| 126  | 1724 | 8     | lg.mammal            | 3     | long bone<br>frags.            |           |      |         |
| 126  | 1724 | 8     | turkey               | 1     | tarsometatarsus<br>shaft frag. |           |      |         |
| 126  | 1726 | 10    | iguana               | 1     | pelvis                         |           |      |         |
| 126  | 1726 | 10    | VID                  | 2     | bone                           |           |      | 1 burnt |
| 126  | 1726 | 10    | lg.mammal            | 1     | long bone frag.                |           |      |         |
| 126  | 1723 | 7     | wt.deer              | 1     | tibia frag.                    |           | L    |         |
| 126  | 1723 | 7     | small<br>mammal      | 1     | long bone shaft.               |           |      |         |
| 126  | 1723 | 7     | lg.mammal            | 4     | long bone<br>frags.            |           |      | 2 burnt |
| 126  | 1725 | 9     | lg.mammal            | 1     | long bone<br>frags.            |           |      |         |
| 126  | 1725 | 9     | med.mammal           | 1     | long bone<br>frags.            |           |      |         |
| 126  | 1725 | 9     | iguana               | 1     | vertebra                       |           |      |         |
| 126  | 1725 | 9     | iguana               | 1     | tibia                          |           |      |         |
| 126  | 1725 | 9     | iguana               | 1     | VID long bone<br>shaft         |           |      |         |
| 102  | 1609 | 2     | iguana               | 1     |                                | quadrate  |      |         |
| 102  | 1609 | 2     | unidentified         | 2     |                                | bone      |      |         |
| 102  | 1609 | 2     | jack rabbit          | 1     |                                | pelvis    | L    |         |
| 102  | 1610 |       | iguana               | 1     |                                | vert.     |      |         |
| 102  | 1605 | 1     | turtle               | 3     | frags.                         |           |      |         |
| 102  | 1605 | 1     | unidentified         | 9     | frags.                         |           |      |         |
| 102  | 1605 | 1     | small<br>mammal      | 1     |                                | phalange  |      |         |
| 102  | 1605 | 1     | iguana               | 1     |                                | dentary   | L    |         |
| 102  | 1605 | 1     | iguana               | 2     |                                | pelvis    | L    |         |
| 102  | 1605 | 1     | iguana               | 1     |                                | articular | R    |         |
| 102  | 1605 | 1     | iguana               | 3     |                                | limb      |      |         |
| 102  | 1605 | 1     | iguana               | 1     |                                | tooth row |      |         |
| 102  | 1605 | 1     | iguana               | 1     |                                | pterygoid |      |         |
| 102  | 1605 | 1     | iguana               | 1     | frag.                          | skull     |      |         |
| 102  | 1605 | 1     | iguana               | 5     | frags.                         | vert.     |      |         |
| 102  | 1619 | 3     | wt.deer              | 1     |                                | ulna      | R    |         |

| MPP Faunal |      |       |         |       |                  |            |      |         |
|------------|------|-------|---------|-------|------------------|------------|------|---------|
| POZO       | LOT  | LEVEL | SPECIES | COUNT | PORTION          | BONE       | SIDE | COMMENT |
| 102        | 1619 | 3     | catfish | 1     | dorsal           | spine      |      |         |
| 102        | 1619 | 3     | turtle  | 3     | frag.            | shell      |      |         |
| 102        | 1619 | 3     | VID     | 1     |                  | phalange   |      |         |
| 102        | 1619 | 3     | VID     | 3     |                  | limb/ribs  |      |         |
| 102        | 1619 | 3     | iguana  | 2     |                  | dentary    | R    |         |
| 102        | 1619 | 3     | iguana  | 1     |                  | tooth row  |      |         |
| 102        | 1619 | 3     | iguana  | 2     |                  | limbs      |      |         |
| 102        | 1619 | 3     | iguana  | 5     | frags.           | vert.      |      |         |
| 102        | 1619 | 3     | iguana  | 2     | occipital frags. | skull      |      |         |
| 102        | 1619 | 3     | iguana  | 2     | frags.           | cranial    |      |         |
| 102        | 1619 | 3     | iguana  | 1     |                  | prefrontal |      |         |
| 102        | 1619 | 3     | iguana  | 1     |                  | articular  | R    |         |



## **Appendix K – Raw Data for all Shell Artifacts Collected**

| MPP SHELL |      |                |      |      |       |              |                         |     |           |            |     |     |     |     |         |
|-----------|------|----------------|------|------|-------|--------------|-------------------------|-----|-----------|------------|-----|-----|-----|-----|---------|
| Group     | Surf | Str            | Pozo | Lot  | Level | Genus        | Species                 | Num | Size      | Portion    | Per | Cut | Oth | T/D | Descrip |
| MPP       | yes  | Cenote Madero  |      |      |       | Strombus     | Strombus costatus       | 1   | 2.3/1.7cm | bofy       | no  | yes | no  | no  |         |
| MPP       | yes  | Cenote Madero  |      |      |       | Strombus     | Strombus costatus       | 1   | 2.2/2cm   | bofy       | no  | yes | no  | no  |         |
| MPP       | yes  | Large Platform |      |      |       | Dinocardium  | Dinocardium r. robustum | 1   | <2.1cm    | bofy       | yes | no  | no  | no  |         |
| MPP       | yes  | P-51           |      |      |       | Busycotypus  | Busycotypus spiratum    | 1   | 2.3/2.2cm | body       | yes | no  | no  | no  |         |
| MPP       |      |                | 101  | 1604 | 3     | Dosinia      | Dosinia elegans         | 1   | 2.5/2.5cm | body       | yes | no  | no  | no  |         |
| MPP       |      |                | 101  | 1607 | 4     | Dinocardium  | Dinocardium r. robustum | 1   | 1.2/2.5cm | VM         | yes | no  | no  | no  |         |
| MPP       |      |                | 103  | 1612 | 1     | Strombus     | Strombus gigus          | 1   | 2.5cm     | Spire      | yes | no  | no  | no  |         |
| MPP       |      |                | 103  | 1625 | 7     | unidentified | unidentified            | 1   | 3.8/.6c,  | body       | yes | no  | no  | no  |         |
| MPP       |      |                | 104  | 1616 | 3     | Strombus     | Strombus gigus          | 2   | <2.5      | Body       | yes | no  | no  | no  |         |
| MPP       |      |                | 109  | 1653 | 3     | Strombus     | Strombus gigus          | 1   | <1.8cm    | Spire      | yes | no  | no  | no  |         |
| MPP       |      |                | 126  | 1712 | 6     | Dinocardium  | Dinocardium r. robustum | 1   | 5cm       | VM         | yes | no  | no  | no  |         |
| MPP       |      |                | 130  | 1702 | 2     | Dinocardium  | Dinocardium r. robustum | 1   | 3.1/1.2cm | body       | yes | no  | no  | no  |         |
| MPP       |      |                | 135  | 1718 | 2     | Strombus     | Strombus gigus          | 1   | 1.8c,     | node/spire | yes | no  | no  | no  |         |
| MPP       |      |                | 146  | 1748 | 1     | Unidentified | unidentified            | 1   | 2.4cm     | Body       | yes | no  | no  | no  |         |
| MPP       |      |                | 146  | 1748 | 1     | Phacoides    | Phacoides nassula       | 1   | .6cm      | Bk, DM     | yes | no  | no  | no  |         |
| MPP       |      |                | 146  | 1748 | 1     | Unidentified | unidentified            | 1   | 1.9cm     | DM         | yes | no  | no  | no  |         |
| MPP       |      |                | 146  | 1749 | 2     | Unidentified | unidentified            | 1   | 5/3.8cm   | VM         | yes | no  | no  | no  |         |
| MPP       |      |                | 146  | 1749 | 2     | Phacoides    | Phacoides nassula       | 1   | .6cm      | VM         | yes | no  | no  | no  |         |

|     |     |     |      |   |              |                             |   |            |            |     |     |     |     |  |
|-----|-----|-----|------|---|--------------|-----------------------------|---|------------|------------|-----|-----|-----|-----|--|
| MPP |     | 146 | 1749 | 2 | Dinocardium  | Dinocardium r. robustum     | 1 | <2.4cm     | Body       | yes | no  | no  | no  |  |
| MPP |     | 146 | 1749 | 2 | Unidentified | unidentified scallop        | 2 | 2.5 & <1.8 | DM, bd     | yes | no  | no  | no  |  |
| MPP |     | 146 | 1753 | 3 | Anadara      | Anadara notabilis           | 1 | 1.2cm      | w. side    | no  | no  | yes | no  |  |
| MPP |     | 146 | 1753 | 3 | Unidentified | Anadara Species             | 2 | 2.5 & <1.8 | VM         | yes | no  | no  | no  |  |
| MPP |     | 146 | 1753 | 3 | Phacoides    | Phacoides nassula           | 4 | 2.5 & sm   | 3bd, 1DM   | yes | no  | no  | no  | DM sl burn   |
| MPP |     | 146 | 1756 | 5 | Unidentified | unidentified scallop        | 2 | 1.9 & sm   | 1VM, 1bd   | yes | no  | no  | no  |  |
| MPP |     | 146 | 1757 | 6 | Phacoides    | Phacoides nassula           | 2 | 1.9 & 1.2  | VM         | yes | no  | no  | no  |  |
| MPP |     | 146 | 1757 | 6 | Unidentified | unidentified Strombus gigus | 1 | 1.2cm      | VM         | yes | no  | no  | no  |  |
| MPP |     | 149 | 1715 | 1 | Strombus     | Strombus gigus              | 1 | 2.5/1.2cm  | inner body | yes | no  | no  | no  |  |
| MPP |     | 149 | 1715 | 1 | Mercenaria   | Mercenaria campechiensis    | 1 | 3cm/2.9cm  | Body       | no  | yes | no  | yes | sno, cut sl angle along VM heavily burned and shattered. |
| MPP | 124 |     | 5    | 1 | unknown      | unknown Strombus gigus      | 1 | 3.8cm      | VM         | yes | no  | no  | no  |  |
| MPP | 47  | 109 | 1642 | 2 | Strombus     | Strombus gigus              | 1 | <2.1cm     | body       | yes | no  | no  | no  |  |
| MPP | 91  | 110 | 1653 | 4 | Dinocardium  | Dinocardium r. robustum     | 3 | 5cm        | VM         | yes | no  | no  | no  | refit  |

**Appendix L – Raw Soil Phosphate Data for all Samples Collected**

| #   | ST Sample |      | % trans. | .01% trans. | Coefficients |          |          |          | Mehlich P  |
|-----|-----------|------|----------|-------------|--------------|----------|----------|----------|------------|
|     |           |      |          |             | Intercept    | 0.212252 |          |          | mg/kg soil |
|     |           |      |          |             | X Variable 1 | -0.01535 |          |          |            |
| 39  | 252       | G1   | 1.01     | 61.46       | 0.196747     | 157.3067 | -0.73124 | 185.6774 | 185.6774   |
| 38  | 1         | G15  | 64.17    |             | -0.77284     | 16.87163 |          |          | 16.87163   |
| 219 | 2         | G15  | 72.8     |             | -0.90533     | 12.43583 |          |          | 12.43583   |
| 18  | 3         | G15  | 42.62    |             | -0.44202     | 36.13917 |          |          | 36.13917   |
| 241 | 4         | G15  | 79.02    |             | -1.00081     | 9.981358 |          |          | 9.981358   |
| 135 | 5         | G15  | 80.69    |             | -1.02645     | 9.409204 |          |          | 9.409204   |
| 46  | 6         | G15  | 75.83    |             | -0.95184     | 11.17276 |          |          | 11.17276   |
| 119 | 7         | G15  | 90.03    |             | -1.16983     | 6.763499 |          |          | 6.763499   |
| 28  | 8         | G15  | 57.52    |             | -0.67076     | 21.3424  |          |          | 21.3424    |
| 250 | 9         | G15  | 77.94    |             | -0.98423     | 10.36977 |          |          | 10.36977   |
| 145 | 10        | G15  | 46.49    |             | -0.50143     | 31.51872 |          |          | 31.51872   |
| 238 | 11        | G15  | 29.1     | 98.94       | -0.23447     | 58.28117 | -1.30661 | 49.3618  | 58.28117   |
| 251 | 12        | G15  | 93.34    |             | -1.22064     | 6.016702 |          |          | 6.016702   |
| 176 | 13        | G15  | 71.31    |             | -0.88245     | 13.10836 |          |          | 13.10836   |
| 47  | 14        | G15  | 63.92    |             | -0.76901     | 17.02138 |          |          | 17.02138   |
| 48  | 15        | G15  | 72.23    |             | -0.89657     | 12.68894 |          |          | 12.68894   |
| 9   | 16        | G15  | 87       |             | -1.12331     | 7.52811  |          |          | 7.52811    |
| 8   | 17        | G15  | 82.49    |             | -1.05408     | 8.829182 |          |          | 8.829182   |
| 74  | 18        | G15  | 68.04    |             | -0.83225     | 14.71456 |          |          | 14.71456   |
| 146 | 19        | G15  | 72.96    |             | -0.90778     | 12.3657  |          |          | 12.3657    |
| 245 | 20        | G15  | 78.55    |             | -0.9936      | 10.14857 |          |          | 10.14857   |
| 49  | 21        | G15  | 66.75    |             | -0.81245     | 15.40106 |          |          | 15.40106   |
| 232 | 22        | G15  | 7.06     |             | 0.103872     | 127.0199 |          |          | 127.0199   |
| 177 | 23        | G15  | 65.91    |             | -0.79955     | 15.8652  |          |          | 15.8652    |
| 50  | 24        | G15  | 72.51    |             | -0.90087     | 12.56397 |          |          | 12.56397   |
| 260 | 25        | G15  | 26.39    |             | -0.19287     | 64.14021 |          |          | 64.14021   |
| 113 | 26        | G15  | 87.37    |             | -1.12899     | 7.430293 |          |          | 7.430293   |
| 118 | 27        | G15  | 76.64    |             | -0.96427     | 10.8574  |          |          | 10.8574    |
| 244 | 28        | G15  | 84.31    |             | -1.08202     | 8.27906  |          |          | 8.27906    |
| 141 | 29        | G15  | 82.05    |             | -1.04732     | 8.967576 |          |          | 8.967576   |
| 15  | 30        | G15  | 74.46    |             | -0.93081     | 11.72713 |          |          | 11.72713   |
| 225 | 31        | G15  | 59.97    |             | -0.70837     | 19.57188 |          |          | 19.57188   |
| 221 | 32        | G15  | 76.68    |             | -0.96489     | 10.84206 |          |          | 10.84206   |
| 240 | 33        | G15  | 81.41    |             | -1.0375      | 9.172758 |          |          | 9.172758   |
| 259 | 34        | G15  | 89.25    |             | -1.15785     | 6.952571 |          |          | 6.952571   |
| 235 | 35        | G15  | 68.59    |             | -0.8407      | 14.43125 |          |          | 14.43125   |
| 174 | 160       | G151 | 80.32    |             | -1.02077     | 9.533072 |          |          | 9.533072   |
| 123 | 167       | G151 | 100      |             | -1.32288     | 4.75465  |          |          | 4.75465    |
| 258 | 172       | G151 | 83.99    |             | -1.07711     | 8.373239 |          |          | 8.373239   |
| 100 | 174       | G151 | 91.91    |             | -1.19869     | 6.328647 |          |          | 6.328647   |
| 7   | 36        | G2   | 70.46    |             | -0.8694      | 13.50819 |          |          | 13.50819   |
| 96  | 37        | G2   | 58.1     |             | -0.67966     | 20.9093  |          |          | 20.9093    |
| 181 | 38        | G2   | 69.02    |             | -0.8473      | 14.21356 |          |          | 14.21356   |
| 246 | 39        | G2   | 7.09     | 98.44       | 0.103411     | 126.8853 | -1.29893 | 50.24197 | 50.24197   |
| 27  | 40        | G2   | 44.31    |             | -0.46797     | 34.04352 |          |          | 34.04352   |

|     |     |     |       |       |          |          |          |          |
|-----|-----|-----|-------|-------|----------|----------|----------|----------|
| 6   | 41  | G2  | 82.47 |       | -1.05377 | 8.835426 |          | 8.835426 |
| 82  | 42  | G2  | 79.69 |       | -1.0111  | 9.747746 |          | 9.747746 |
| 183 | 43  | G2  | 69.77 |       | -0.85881 | 13.8417  |          | 13.8417  |
| 72  | 44  | G2  | 47.13 |       | -0.51126 | 30.81369 |          | 30.81369 |
| 140 | 45  | G2  | 14.09 | 82.14 | -0.00405 | 99.07221 | -1.04871 | 89.39093 |
| 198 | 46  | G2  | 0.61  | 45.76 | 0.202888 | 159.5467 | -0.49022 | 323.4261 |
| 202 | 47  | G2  | 66.67 |       | -0.81122 | 15.44467 |          | 15.44467 |
| 133 | 48  | G2  | 79.54 |       | -1.00879 | 9.799568 |          | 9.799568 |
| 267 | 49  | G2  | 58.68 |       | -0.68856 | 20.48499 |          | 20.48499 |
| 134 | 50  | G2  | 53.56 |       | -0.60997 | 24.54905 |          | 24.54905 |
| 249 | 51  | G2  | 65.65 |       | -0.79556 | 16.01168 |          | 16.01168 |
| 44  | 52  | G2  | 55.8  |       | -0.64435 | 22.68024 |          | 22.68024 |
| 175 | 53  | G2  | 54.02 |       | -0.61703 | 24.15311 |          | 24.15311 |
| 162 | 54  | G2  | 39.72 |       | -0.3975  | 40.04028 |          | 40.04028 |
| 200 | 55  | G2  | 52.12 |       | -0.58786 | 25.83096 |          | 25.83096 |
| 152 | 178 | G2  | 68.68 |       | -0.84208 | 14.38542 |          | 14.38542 |
| 199 | 179 | G2  | 43.37 |       | -0.45354 | 35.19368 |          | 35.19368 |
| 264 | 180 | G2  | 75.16 |       | -0.94155 | 11.44052 |          | 11.44052 |
| 248 | 181 | G2  | 37.51 |       | -0.36358 | 43.29359 |          | 43.29359 |
| 108 | 182 | G2  | 53.68 |       | -0.61181 | 24.44514 |          | 24.44514 |
| 237 | 183 | G2  | 75.68 |       | -0.94954 | 11.23215 |          | 11.23215 |
| 274 | 184 | G2  | 86.68 |       | -1.1184  | 7.613746 |          | 7.613746 |
| 212 | 185 | G2  | 62.59 |       | -0.74859 | 17.84071 |          | 17.84071 |
| 228 | 186 | G2  | 76.37 |       | -0.96013 | 10.96152 |          | 10.96152 |
| 21  | 187 | G2  | 42.53 |       | -0.44064 | 36.25433 |          | 36.25433 |
| 71  | 188 | G2  | 48.9  |       | -0.53843 | 28.94489 |          | 28.94489 |
| 20  | 189 | G2  | 26.53 |       | -0.19502 | 63.82359 |          | 63.82359 |
| 19  | 190 | G2  | 41.44 |       | -0.42391 | 37.67843 |          | 37.67843 |
| 73  | 191 | G2  | 45.33 |       | -0.48362 | 32.83796 |          | 32.83796 |
| 85  | 192 | G2  | 69.81 |       | -0.85942 | 13.82214 |          | 13.82214 |
| 266 | 193 | G2  | 37.26 |       | -0.35974 | 43.67786 |          | 43.67786 |
| 262 | 194 | G2  | 64.39 |       | -0.77622 | 16.74093 |          | 16.74093 |
| 220 | 195 | G2  | 51    |       | -0.57067 | 26.87411 |          | 26.87411 |
| 89  | 196 | G2  | 64.51 |       | -0.77806 | 16.67007 |          | 16.67007 |
| 255 | 197 | G2  | 56.75 |       | -0.65894 | 21.93127 |          | 21.93127 |
| 70  | 198 | G2  | 51.36 |       | -0.57619 | 26.5343  |          | 26.5343  |
| 187 | 199 | G2  | 71.87 |       | -0.89105 | 12.85144 |          | 12.85144 |
| 36  | 200 | G2  | 85.69 |       | -1.1032  | 7.8849   |          | 7.8849   |
| 213 | 201 | G2  | 61.19 |       | -0.7271  | 18.7458  |          | 18.7458  |
| 168 | 202 | G2  | 71.17 |       | -0.8803  | 13.17339 |          | 13.17339 |
| 22  | 203 | G2  | 66.65 |       | -0.81091 | 15.45559 |          | 15.45559 |
| 84  | 204 | G2  | 58.93 |       | -0.6924  | 20.30476 |          | 20.30476 |
| 106 | 205 | G2  | 78.98 |       | -1.0002  | 9.99548  |          | 9.99548  |
| 214 | 206 | G2  | 72.43 |       | -0.89965 | 12.59955 |          | 12.59955 |
| 3   | 56  | G51 | 82.81 |       | -1.05899 | 8.729876 |          | 8.729876 |
| 109 | 57  | G51 | 53.29 |       | -0.60582 | 24.78446 |          | 24.78446 |
| 256 | 58  | G51 | 63.99 |       | -0.77008 | 16.97932 |          | 16.97932 |
| 30  | 59  | G51 | 49.85 |       | -0.55301 | 27.98904 |          | 27.98904 |
| 171 | 60  | G51 | 60.52 |       | -0.71681 | 19.19505 |          | 19.19505 |
| 58  | 61  | G51 | 59.3  |       | -0.69808 | 20.04093 |          | 20.04093 |

|     |     |     |       |       |          |          |          |          |
|-----|-----|-----|-------|-------|----------|----------|----------|----------|
| 254 | 62  | G51 | 110.5 |       | -1.48407 | 3.280421 |          | 3.280421 |
| 169 | 63  | G51 | 93.07 |       | -1.2165  | 6.074399 |          | 6.074399 |
| 159 | 64  | G51 | 93.76 |       | -1.22709 | 5.928037 |          | 5.928037 |
| 51  | 65  | G51 | 69    |       | -0.84699 | 14.22362 |          | 14.22362 |
| 165 | 66  | G51 | 86.47 |       | -1.11518 | 7.670473 |          | 7.670473 |
| 52  | 67  | G51 | 87.89 |       | -1.13698 | 7.294966 |          | 7.294966 |
| 236 | 68  | G51 | 74.71 |       | -0.93465 | 11.62395 |          | 11.62395 |
| 53  | 69  | G51 | 79.91 |       | -1.01447 | 9.672237 |          | 9.672237 |
| 269 | 70  | G51 | 76.03 |       | -0.95491 | 11.09405 |          | 11.09405 |
| 5   | 71  | G51 | 20.76 | 99.2  | -0.10644 | 78.26335 | -1.3106  | 48.91022 |
| 16  | 72  | G51 | 39.22 |       | -0.38983 | 40.75424 |          | 40.75424 |
| 142 | 73  | G51 | 53.69 |       | -0.61196 | 24.4365  |          | 24.4365  |
| 31  | 74  | G51 | 56.48 |       | -0.65479 | 22.14159 |          | 22.14159 |
| 75  | 75  | G51 | 55.75 |       | -0.64358 | 22.72036 |          | 22.72036 |
| 215 | 76  | G51 | 89.34 |       | -1.15924 | 6.930488 |          | 6.930488 |
| 265 | 77  | G51 | 110.5 |       | -1.48407 | 3.280421 |          | 3.280421 |
| 59  | 78  | G51 | 58.8  |       | -0.69041 | 20.39828 |          | 20.39828 |
| 60  | 79  | G51 | 70.02 |       | -0.86265 | 13.71992 |          | 13.71992 |
| 32  | 80  | G51 | 70.64 |       | -0.87217 | 13.42251 |          | 13.42251 |
| 137 | 81  | G51 | 82.45 |       | -1.05347 | 8.841675 |          | 8.841675 |
| 163 | 81  | G51 | 73.19 |       | -0.91131 | 12.26557 |          | 12.26557 |
| 230 | 83  | G51 | 73.86 |       | -0.9216  | 11.9785  |          | 11.9785  |
| 170 | 84  | G51 | 85    |       | -1.09261 | 8.079577 |          | 8.079577 |
| 54  | 85  | G51 | 87.19 |       | -1.12623 | 7.47772  |          | 7.47772  |
| 37  | 86  | G51 | 82.52 |       | -1.05454 | 8.819824 |          | 8.819824 |
| 197 | 87  | G51 | 91.82 |       | -1.19731 | 6.348813 |          | 6.348813 |
| 139 | 88  | G51 | 53.99 |       | -0.61657 | 24.17873 |          | 24.17873 |
| 43  | 89  | G51 | 56.5  |       | -0.6551  | 22.12594 |          | 22.12594 |
| 261 | 90  | G51 | 55.61 |       | -0.64144 | 22.83307 |          | 22.83307 |
| 164 | 91  | G51 | 50.4  |       | -0.56146 | 27.45016 |          | 27.45016 |
| 138 | 92  | G51 | 89.22 |       | -1.15739 | 6.959948 |          | 6.959948 |
| 29  | 93  | G51 | 47.14 |       | -0.51141 | 30.8028  |          | 30.8028  |
| 61  | 94  | G51 | 41.27 |       | -0.4213  | 37.90553 |          | 37.90553 |
| 239 | 95  | G51 | 74    |       | -0.92375 | 11.91937 |          | 11.91937 |
| 17  | 96  | G51 | 56.56 |       | -0.65602 | 22.07906 |          | 22.07906 |
| 157 | 97  | G51 | 57.96 |       | -0.67751 | 21.01303 |          | 21.01303 |
| 55  | 98  | G51 | 37.02 |       | -0.35605 | 44.04998 |          | 44.04998 |
| 122 | 100 | G51 | 0.71  | 51.28 | 0.201353 | 158.9837 | -0.57496 | 266.0944 |
| 158 | 101 | G51 | 37.8  |       | -0.36803 | 42.85206 |          | 42.85206 |
| 253 | 102 | G51 | 91.53 |       | -1.19286 | 6.414228 |          | 6.414228 |
| 56  | 103 | G51 | 72.96 |       | -0.90778 | 12.3657  |          | 12.3657  |
| 263 | 104 | G51 | 72.22 |       | -0.89642 | 12.69342 |          | 12.69342 |
| 114 | 105 | G51 | 100   |       | -1.32288 | 4.75465  |          | 4.75465  |
| 194 | 105 | G51 | 100   |       | -1.32288 | 4.75465  |          | 4.75465  |
| 33  | 106 | G51 | 73.21 |       | -0.91162 | 12.25691 |          | 12.25691 |
| 161 | 108 | G51 | 81.07 |       | -1.03228 | 9.283663 |          | 9.283663 |
| 62  | 109 | G51 | 53.9  |       | -0.61518 | 24.25578 |          | 24.25578 |
| 2   | 110 | G51 | 57.56 |       | -0.67137 | 21.31225 |          | 21.31225 |
| 189 | 111 | G51 | 68.52 |       | -0.83962 | 14.46701 |          | 14.46701 |
| 205 | 112 | G51 | 41.55 |       | -0.4256  | 37.53221 |          | 37.53221 |

|     |     |     |       |       |          |          |          |          |          |
|-----|-----|-----|-------|-------|----------|----------|----------|----------|----------|
| 63  | 113 | G51 | 10.59 | 84.88 | 0.049682 | 112.1196 | -1.09077 | 81.13921 | 81.13921 |
| 224 | 114 | G51 | 17.81 | 97.19 | -0.06116 | 86.86501 | -1.27974 | 52.51167 | 52.51167 |
| 91  | 115 | G51 | 100   |       | -1.32288 | 4.75465  |          |          | 4.75465  |
| 222 | 116 | G51 | 75.96 |       | -0.95384 | 11.12153 |          |          | 11.12153 |
| 206 | 117 | G51 | 82.35 |       | -1.05193 | 8.872983 |          |          | 8.872983 |
| 101 | 118 | G51 | 100   |       | -1.32288 | 4.75465  |          |          | 4.75465  |
| 115 | 119 | G51 | 82.36 |       | -1.05208 | 8.869847 |          |          | 8.869847 |
| 13  | 120 | G51 | 57.14 |       | -0.66492 | 21.63101 |          |          | 21.63101 |
| 45  | 121 | G51 | 43.39 |       | -0.45384 | 35.16881 |          |          | 35.16881 |
| 93  | 122 | G51 | 62.64 |       | -0.74936 | 17.8092  |          |          | 17.8092  |
| 226 | 123 | G51 | 60.36 |       | -0.71435 | 19.30392 |          |          | 19.30392 |
| 23  | 124 | G51 | 70.25 |       | -0.86618 | 13.60883 |          |          | 13.60883 |
| 242 | 125 | G51 | 72.01 |       | -0.8932  | 12.788   |          |          | 12.788   |
| 223 | 126 | G51 | 71.33 |       | -0.88276 | 13.0991  |          |          | 13.0991  |
| 57  | 127 | G51 | 82.85 |       | -1.05961 | 8.717541 |          |          | 8.717541 |
| 188 | 128 | G51 | 75.44 |       | -0.94585 | 11.32785 |          |          | 11.32785 |
| 1   | 129 | G51 | 86.15 |       | -1.11027 | 7.757729 |          |          | 7.757729 |
| 271 | 130 | G51 | 73.97 |       | -0.92329 | 11.93202 |          |          | 11.93202 |
| 160 | 131 | G51 | 4.69  | 78.26 | 0.140254 | 138.1193 | -0.98914 | 102.5313 | 102.5313 |
| 268 | 132 | G51 | 54.89 |       | -0.63038 | 23.42164 |          |          | 23.42164 |
| 172 | 133 | G51 | 48.8  |       | -0.53689 | 29.04738 |          |          | 29.04738 |
| 203 | 134 | G51 | 95.57 |       | -1.25487 | 5.560643 |          |          | 5.560643 |
| 167 | 135 | G51 | 87.22 |       | -1.12669 | 7.469795 |          |          | 7.469795 |
| 83  | 136 | G51 | 74.84 |       | -0.93664 | 11.57066 |          |          | 11.57066 |
| 154 | 137 | G51 | 61.48 |       | -0.73155 | 18.55462 |          |          | 18.55462 |
| 64  | 138 | G51 | 84.52 |       | -1.08524 | 8.217832 |          |          | 8.217832 |
| 102 | 139 | G51 | 100   |       | -1.32288 | 4.75465  |          |          | 4.75465  |
| 65  | 140 | G51 | 74.52 |       | -0.93173 | 11.70228 |          |          | 11.70228 |
| 136 | 141 | G51 | 71.86 |       | -0.89089 | 12.85598 |          |          | 12.85598 |
| 191 | 142 | G51 | 27.92 |       | -0.21636 | 60.76351 |          |          | 60.76351 |
| 190 | 143 | G51 | 70.97 |       | -0.87723 | 13.26685 |          |          | 13.26685 |
| 103 | 144 | G51 | 100   |       | -1.32288 | 4.75465  |          |          | 4.75465  |
| 186 | 145 | G51 | 86.94 |       | -1.12239 | 7.544093 |          |          | 7.544093 |
| 66  | 146 | G51 | 74.72 |       | -0.9348  | 11.61985 |          |          | 11.61985 |
| 4   | 147 | G51 | 94.22 |       | -1.23415 | 5.832427 |          |          | 5.832427 |
| 149 | 148 | G51 | 92.3  |       | -1.20468 | 6.242002 |          |          | 6.242002 |
| 216 | 149 | G51 | 58.1  |       | -0.67966 | 20.9093  |          |          | 20.9093  |
| 116 | 150 | G51 | 43.22 |       | -0.45123 | 35.38078 |          |          | 35.38078 |
| 231 | 151 | G51 | 98.64 |       | -1.302   | 4.988804 |          |          | 4.988804 |
| 86  | 152 | G51 | 75.83 |       | -0.95184 | 11.17276 |          |          | 11.17276 |
| 229 | 153 | G51 | 91.19 |       | -1.18764 | 6.491781 |          |          | 6.491781 |
| 252 | 154 | G51 | 105   |       | -1.39964 | 3.984391 |          |          | 3.984391 |
| 273 | 155 | G51 | 110.7 |       | -1.48714 | 3.257312 |          |          | 3.257312 |
| 107 | 156 | G51 | 85.03 |       | -1.09307 | 8.071014 |          |          | 8.071014 |
| 143 | 157 | G51 | 83.72 |       | -1.07296 | 8.453535 |          |          | 8.453535 |
| 243 | 158 | G51 | 91.56 |       | -1.19332 | 6.40743  |          |          | 6.40743  |
| 67  | 159 | G51 | 84.29 |       | -1.08171 | 8.284915 |          |          | 8.284915 |
| 217 | 161 | G51 | 82.58 |       | -1.05546 | 8.801139 |          |          | 8.801139 |
| 68  | 162 | G51 | 77.35 |       | -0.97517 | 10.5883  |          |          | 10.5883  |
| 204 | 164 | G51 | 100   |       | -1.32288 | 4.75465  |          |          | 4.75465  |



|     |     |         |       |          |          |          |
|-----|-----|---------|-------|----------|----------|----------|
| 121 | 165 | G51     | 56.37 | -0.6531  | 22.22785 | 22.22785 |
| 218 | 166 | G51     | 78.46 | -0.99221 | 10.1809  | 10.1809  |
| 120 | 169 | G51     | 88.29 | -1.14312 | 7.192547 | 7.192547 |
| 69  | 170 | G51     | 77.67 | -0.98009 | 10.46921 | 10.46921 |
| 184 | 171 | G51     | 97.06 | -1.27775 | 5.275353 | 5.275353 |
| 182 | 173 | G51     | 98.38 | -1.29801 | 5.034864 | 5.034864 |
| 94  | 175 | G51     | 69.51 | -0.85482 | 13.9695  | 13.9695  |
| 104 | 176 | G51     | 74.85 | -0.9368  | 11.56657 | 11.56657 |
| 144 | 177 | G51     | 84.97 | -1.09215 | 8.088149 | 8.088149 |
| 151 | 174 | SR200   | 60.87 | -0.72218 | 18.95904 | 18.95904 |
| 95  | 71  | STR 200 | 71.21 | -0.88092 | 13.15478 | 13.15478 |
| 257 | 170 | STR200  | 55.39 | -0.63806 | 23.01133 | 23.01133 |
| 185 | 172 | STR200  | 70.62 | -0.87186 | 13.432   | 13.432   |