PILOT PROJECT TO AID IN THE DEVELOPMENT OF A PRESERVATION PLAN FOR OLD ACOMA VILLAGE

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Inhabiting places often renders their tectonic properties less visible. The perception of spaces we inhabit is prioritized in relation to the actions we perform. In this context, significance of a building's assembly is primarily perceived through the way it is used rather than the way it works as a system of building.

The village of Old Acoma, the cultural center of the Acoma tribe, is a spiritual center of cultural significance for the community. To the outside world Old Acoma is important historically and as a work of architecture. But recent changes to the earthen architecture of the village, brought about by insufficient maintenance, put the village in jeopardy of disappearing. The soft technologies used to build the village beginning in 1629 were used for repair into the mid-20th century. These materials were from Acoma lands and required time and attention to find, process, and apply to the buildings for maintenance and repair. The introduction of hard, off-the-shelf, commercially available materials solved the problem of availability and time, but it has undermined the old village to some extent, due to the impermeable quality of the new materials against the soft underlying materials. And new additions to the houses of the village often cover the profile of the old massing, which was important to the balance of house form and solar orientation.

The aim of this project was to produce a handbook for use at by the community at Acoma to aid the preservation of their village. The result of the project was centered on the assumption that any meaningful preservation at Acoma had to be community based. The first step in the preservation process is to develop an awareness of the significance of the architecture, underscoring the vital balance of settlement and environment. The next step is to reintroduce traditional methods and materials of construction as an important factor in maintaining the village, preserving the old materials, and reviving the ceremonial traditions of building and maintenance.

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I. Introduction

The Acoma's ancestral village is located on top of a 350-foot high mesa 50 miles west of Albuquerque, New Mexico. At 6000 feet above sea level, Acoma is a part of the magnificent arid southwest whose landscape features vividly describe its geomorphic evolution. Part of the ancient New Mexico seabed, the region is rich in crustacea. Its ancient volcanoes, sacred to the people, have left great deposits of basaltic rock and lava in both high and low areas. Within the six ecozones of New Mexico, Acoma lies in the piñon-juniper/ponderosa pine elevation. The region has an enormous natural diversity of plants and animals, mostly unaffected by "scientific" agriculture and urban growth. The history of Acoma centers on the settlement and the making of place and is entirely tied to the Acoma people's identity. Past and present are interconnected through the presence of the ancestors who inhabit the earth. Time and place are joined.[1]

The Acoma people are an ancient culture. Oral history connects them with the Anasazi ('ancient enemy' in the Navajo language), a group of tribes known to have settled in the Americas during an early period of its history. The Acoma name is a derivative of the Keres word "H'aku". The archaeology of the Acoma lands places the tribe at its current mesa site from about 1200 AD, but there is evidence that their occupation of the region is from a much earlier period, some evidence showing very early (BC) settlements. Acoma oral history tells of the Acoma ancestors in search of *"Hak'u"*, a spiritual homeland prepared for their eternal settlement. Literally translated, *Ha'ku, Acu, Acuo* and *Ako* all equally applicable, mean "a place always prepared." The great mesa to the east, the "Enchanted Mesa" or *K'atzim* means "a space all by itself" or "a place left alone" or "a place left by our ancestors." The Acoma culture bridges two worlds. Like their ancestors and all descendents of the Anasazi, the people consider themselves a part of the continuum of an ancient culture that has a shared responsibility for the wellbeing of the world. Also part of the modern world and its influences, the pueblo tribes live with social systems imposed by the Spanish in the sixteenth century.

Figure 1. Photo: Dick Kent

The present village dates from about 1629. The extinct volcano, Mount Taylor, 30 miles to the north, dominates the vast landscape. As within all Anasazi tribes, Acoma's landscape features and its cardinal points form a part of the tribe's identity. The view of the village of Acoma today is one of rows of houses clustered together north of the great mission complex, San Esteban del Rey. The Old Acoma site is a National Historic Landmark, has been named an Endangered Landscape by the Cultural Landscape Foundation, and has recently been made a National Trust for Historic Preservation Partner site, all designations that signify cultural and historical significance.

The Acoma village has survived more or less intact since the 17th century. The village was fully occupied until about the mid-19th century. The mesa site sits in a plain with productive wells connected to an extensive aquifer, and family members would migrate to nearby farming villages below the mesa and to other sites as far away as 15 miles during planting and harvesting seasons. The demands of farming and the demands of the modern world from the 19th century onwards triggered shifts in living patterns. However, by the 20th century, the village was almost abandoned. Always present, however, have been the Field Chiefs who occupy a part of the mission year-round. These men are appointed to remain in seclusion, away from their families for a year, live in a group and attend to the spiritual needs of all people. These needs also include the initiation of many seasonal rituals and the guardianship of the lands. The village is the center of people's identity and a place where the most important tribal rituals and celebrations occur. The maintenance of a family dwelling in this environment connects each person with the roots of his existence.

Figure 2. Photos: D. Playdon

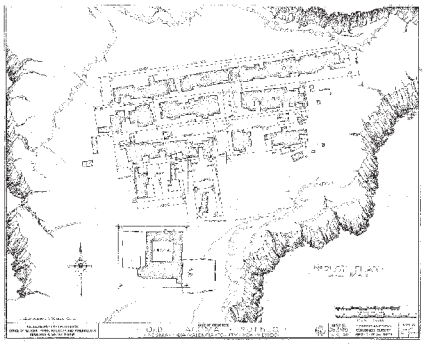


Figure 3. Photo: D. Playdon, Plan: HABS

Figure 4. Photos: D. Playdon

2. Preservation, Repair, and Maintenance of Buildings

Architectural preservation at Old Acoma has focused on the San Esteban del Rey Mission and, in the most recent cycle, has been carried out continuously since 1999. The rows of houses at Acoma, built of earthen materials, were consistently maintained until the mid twentieth century. The mission, dating from the 17th century is the largest and oldest intact earthen building in the United States. It has, like the houses of the village, been maintained over its 380 years of existence and, from time to time undergone extensive reconstruction. Earthen architecture is by nature soft, malleable, and easily affected by climate. Throughout the world this architecture has survived because the rituals of the peoples that inhabit it demand community participation in repair and maintenance. After the destruction of the village by Spanish soldiers in 1599, the site remained only sparsely inhabited for 23 years. The arrival of the Franciscan missionary Juan Ramirez, marked the beginning of the construction of the mission and the rebuilding of the village. The Acoma people carried out the massive undertaking. It is hard to grasp the enormity of the task to build the mission. The church and its *convento* occupy over 40,000 sq.ft. of ground. No materials for its construction were available on top of the mesa and all materials were transported from the valley below. The task of building the mission is remembered as a time of forced labor and much hardship. Nevertheless, the mission is central to the history and identity of the people. Care of the mission is given to two systems of caretakers, who assume the responsibilities of organizing the people in its constant cycle of repair. But the massive size of the building in the harsh high desert environment has made some of the tasks of maintenance impossible in the modern world, and as a result within the last century, major preservation efforts have been undertaken with professional help from the outside world.

The highly successful 1999 preservation effort, which is still continuing, was seen as preliminary to a preservation effort for the stepped houses of the village, now increasingly in danger of being lost. From fund-raising to technical training, the mission project is a model for the restoration of the houses. It has supported the existence of the Acoma Historic Preservation Office, set up a team of builders who have become skilled in the traditions that made the Acoma people known as much for their abilities as builders as they are as potters. Along with all of these factors, the preservation work has successfully re-established for the tribe, that the mission is a work of architecture, unique in its own right, but also uniquely a part of Acoma's heritage. It is re-emphasizing the value of traditional building materials and methods and attempting to reawaken the rituals of communal work. Transferring these ideals to the restoration of the houses is a primary goal.

A strategy for preservation of the houses includes first and foremost the establishment of the village as a work of architecture. With care of the individual house units relegated to individuals and families, the tendency is to see the unit, and not the village and its inherent cellular structure of houses in rows, organized around plazas. Recent expansion, changes of use, and building methods are submerging the true character of the traditional village. While this is a recognition of the changing circumstances within which people live, the Acoma people also recognize that the loss of the traditional house will also mean the loss of place.

There is a thorough record of the village from a survey done in 1934 by a Historic American Building Survey (HABS) team. In 1934, the village had changed very little from its 17th century character. Another HABS survey was done through aerial photography in the 1970s. The difference in the village size is dramatic. Whereas growth of the village was minor during the first 300 years, its size increased at least twofold in the next 40 years and this trend continues. To the outsider this is baffling – here is a village that is no longer a primary residence but has grown rapidly. This indicates the importance of the settlement to the Acomas and is an indication of its central importance to the tribe.

2.1 Cultural Context

"The religion of the people revolves around the land and our harmony with the universe and our Creator. The land is a living being, in and of itself. The land and the people are inseparable: they are one and the same… …this land and the people have always been part of a sacred cycle of struggle and harmony. This is the meaning of 'amuu han'u aamuu haatsi' (beloved people, beloved land): it includes all people. It means we are responsible for the values we hold precious."

-C. Maurus Chino, artist, Acoma

The spiritual role of the Acomas is to pray for the world and for the people of the world. This is the basis for a strong belief system and the maintenance of a strong society. Because of changes in the 20th century, some of the cultural aspects of the tribe were threatened. Like many ancient cultures that have been dominated by other cultures, Acoma is losing its language. An entire generation has largely lost daily use of the Keres language. These are the parents of today's children, who had been educated in "Indian Schools" away from tribal lands. Many had attended boarding schools. Realizing that the loss of language is severely eroding the Acoma identity, the tribe, together with other Keres nations, has begun an intense Language Retention Program. The traditional way of passing learning from elder to child, now eroded, has now to be supplemented by formal language programs within the schools. Still at its infancy, the program is presently only taught to preschool children and to those who join special classes away from school. What has concerned the elders of the tribe is that the severance of language and place undermines the fundamental beliefs of who the Acoma people are. Communication has, to some extent, been severed.

Figure 5. Photo: HABS

We see a parallel condition to language in the knowledge about architecture and building practice. The houses at Acoma dating from 1629 are built in balance with the whole environment. In the past 50 years, the kind of maintenance, additions, or repairs to houses is carried out for the sake of convenience – the interest is in lessening the need to care for the houses. One result of this is in the use of off-the-shelf materials. While this is not in itself a detrimental action, the methods of application of these new materials over old are seldom done with the knowledge that had been handed down over many generations. Store bought, mass-produced materials are harder and less permeable and placed together with softer, permeable materials they hasten the deterioration of the older, softer structures. This is in part due to mass-produced building components that are available to consumers. Perhaps the single most destructive change has been the importation of architectural imagery derived from a western view of Pueblo Style townhouses, unconcerned with the fundamental character of the old cellular system. Whereas Santa Fe is the model, it is ironic that the model for the Santa Fe "Style" was in fact the Acoma Pueblo.

The planning for the preservation of the houses began in 2002 under Governor Fred Vallo, who expressed concern about the condition of many of the old houses. His concern was well founded in that some collapses of a reconstructed section of the houses had already occurred. Many new major cracks were appearing in the bearing walls, brought on largely because of the incorrect use of new materials and the assumption that these new materials required no maintenance. Potential funding did not materialize because there was no comprehensive plan in place. At this stage, it was resolved that a pilot project would pave the way for a funding proposal.

From May of 2007, with the announcement of AIA funding for this pilot project, discussion and planning was carried out with the Acoma Historic Preservation Office and the Historic Preservation Advisory Board. The goal was to limit outside assistance to planning and guidance and engage the owners of the houses in a methodical assessment and repair of their own dwellings. In this way, it was hoped that the traditions of earthen building would be revived and that a regular cycle of maintenance would be more likely to occur. Restarting the process of handing down information from elder to youth, an oral tradition that also revives the use of the Keres language is seen as an inherent part of the preservation of the houses. Working on site at Acoma for a number of years we knew that a self-initiated process of building was an imperative to success. But whereas the preservation of the mission could be carried out in partnership with individuals and organizations from outside the tribe, work on the houses requires less outsider involvement. Very few houses are open to outsiders except on special feast days. In anticipation of these special visits, the houses are "prepared". No outsiders may visit Kivas, which are a part of the cellular structure of the house rows. The assessment of houses that are adjacent to Kivas is not encouraged.

During our visit in July 2007 and drawing from our experience in the preservation of the mission, we proposed developing a new team of skilled 'traditional' builders who would assist the people with the restoration of their houses. In this way, maintenance and long-term preservation could be more reliably carried out. Our intention to directly involve each owner's family remained. While the tribe's concern for human safety is foremost in the discussions of repair, these concerns are paired with statements about the loss of the village as a central part of Acoma's identity. This is a clear statement about the traditional architectural form of the village. A comprehensive funding plan is needed to ensure the continuity in the maintenance of any repairs.

When the preservation of the San Esteban Mission at Acoma was begun in 1999, the tribe's original plan was to work on the houses. The deterioration that was apparent in 2002 was also clear in 1999. An extensive repair effort had occurred in 1986. Funds were provided by HUD and consultants were the New Mexico State Historic Preservation Office and the Laboratory for Anthropology. The consulting team included Paul Graham McHenry Jr., AIA, an authority on earthen building materials and methods of construction. Acoma builders carried out the extensive work. The professional team measured the houses, recorded the areas in need of repair, and derived details for fixing the houses. A second team included a New Mexico State Archaeologist, Curtis Schaffsma, who worked closely with and trained William Sarracino of Acoma in the process of recording findings in a single house of the group.[2] The recorded notes from this work show careful, sensitive and conscientious attention to the cultural needs of the tribe. The written record of the archaeologists indicates that sensitive cultural items were unearthed and gives a general description of them. The field notes also indicate that the items were not photographed and catalogued, as was the norm in an archaeological dig, presumably for reasons of privacy.[3] Even though there was agreement between the tribe and the state about how to proceed with the project, there was enough distrust and disagreement in the process to create a lasting impression of an invasive archaeology.

Although the work in the 1980s was carried out in agreement with the tribe, the difficulties of cultural conflict were not to be avoided. The first group of houses is recorded as a highly successful building process that carefully followed the consultants' directives. Lack of maintenance thereafter caused rapid deterioration of the earthen materials. An examination of the record shows that many incorrect materials and techniques were used in the later part of the project. The result of these improperly built "restorations" is visible in the extensive deterioration recorded here.

Quite possibly because of the problems associated with the 1980s work, the intention in 1999 to repair the houses was postponed.[4] A careful plan to proceed with the mission preservation work as a prelude to repairing the houses was put into effect, initially with support from Save America's Treasures. With the deterioration of the houses getting worse in 2002 and as a result of the successes and smooth operation of building on the mission, the tribe appeared to be ready to start work on the houses. Lack of funding at that time has delayed the project to the present.

Our preparations to carry out the work with a team from Acoma were made prior to our arrival on site. The Acoma Historic Preservation Office and the Advisory Board made up of elders in the tribe, were supportive of the work. Requiring final permission from the tribal governor's office, we met to verify our plan to proceed. At this point, we were refused permission. However, to our benefit, the 1986 archival record of deterioration and repair is extensive. Because of this discovery, we shifted the project objectives from the case study of a small number of houses to the acquisition and inventory of all recorded information that could be used by the tribe. We have amassed a visual survey, information about preservation plans over the years, archival information, and information (an oral survey with associated demonstrations) about building techniques and materials use.

We learned from the historical record that attempts to repair the houses through a comprehensive plan, no matter how sound the information and material, have not succeeded at Acoma. This is similar to early observations when working on preservation of the Acoma mission – the strategy that emerged in that case was similar. The complexities of restoring the houses can only be fully addressed by the tribe itself. We have also learned from the early stages of the mission preservation effort that a collective awareness of the architecture and its significance is essential to any undertaking. Emergency stabilization work was coupled with re-establishing the significance of the mission as an historical monument. Because of these experiences, we realize that the fieldwork, inventory, and handbook must focus on two things – developing an understanding of the settlement as an important work of architecture within the community, and providing a source of information for homeowners to carry out the work themselves, either as families or together with experienced traditional builders.

This past summer we worked closely with Damian Garcia and Prudy Correa from the new Acoma Sky City Haak'u Museum to develop the handbook. Prudy Correa, the Haak'u Museum Planner, sees this as an initiator of cultural programming at the center. The Haak'u Museum is a new public venue at Acoma. To tourists, it is the starting point for tours of the Old Acoma Village. For both residents and visitors it houses a museum and café. It also houses classroom space, a library, a traditional garden, and a large archive and storage facility for Acoma's collection of historical and cultural items. This is the first culturally oriented public venue at Acoma and the opportunity for education and cultural event planning offers opportunities that were not available prior to the building of the cultural center.

The Haak'u Museum will initiate a series of workshops promoting the use of Acoma's traditional materials and techniques of construction. The workshops will be presented by members of the tribe with knowledge of these practices. They will be held in the courtyard of the cultural center. The workshops will be hands-on demonstrations and will use the handbook as a guide at that time. Other programming at the center will include presentations about the architecture of the village – and again this will be presented by and for Acoma community members. The third kind of programming that will be a direct outcome of this report is the upgrading of the handbook as a bilingual document (Keres and English) as well as a demonstration in video form – the logic of this is that it will reach the largest audience at Acoma. Although the project started as an effort carried out in partnership with the Acoma Historic Preservation Office, it became clear from our time there that the only way to initiate a preservation process for the houses at Acoma was to begin with a community based effort. The Haak'u Museum is first and foremost a community venue that promotes community events, and the addition of this institution in the process is a way to best ensure a wide, community-based effort.

3. Old Acoma Handbook

The Old Acoma Handbook has three parts: 1) The Architecture of the Old Acoma Settlement, 2) Assessing Pathologies, Damage, Maintenance, and 3) Maintenance and Repair. We see the three as related and the root to any preservation effort in the village. They will be described in separate sections 3.1-3.3 below. The handbook is envisioned as a first step in presenting public information about the architecture of the village at Acoma. The first iteration of the handbook is easily reproducible and will be distributed at the Haak'u Museum and Cultural Center. It is meant to be taken by the Haak'u Museum and adapted to their needs. The primary audience is the Acoma community but parts of it can also be used to assist the visitor with information about the context at Acoma. The new cultural center has a well-considered collection of books for sale in its shop, but there is very little that describes the architecture of the village. The handbook is based on two models – general handbooks about earthen construction techniques, and guidebooks that explain contexts, such as those you will find when visiting a site. The two models together make the handbook specific to the context of Acoma.

The care of the Acoma Village is, on the surface a simple matter, however complex overlaps of agencies along with cultural needs in the tribe of 3300 residents explains to some extent a complexity that makes the job of preservation a very difficult one. Housing in all of Acoma is assigned to families by the head Cacique of the Acoma community. The Cacique body of elders dictates the planning of the Old Acoma village and other parts of the Acoma lands. Acoma is a matrilineal society. The house is handed down from mother to the youngest daughter. The women of the tribe are responsible for the care of the houses. In the current condition many persons work outside of the home and most persons live away from the old village for most of the year, leaving very little time for maintenance. Families are more likely to hire someone to carry out the maintenance of the houses. Planning decisions are based on accommodating the needs of families with very little consideration given to any understanding of the overall care of the environment. Decisions about building methods and materials are left to the contractors. A variety of materials and methods are preferred – and the choice of materials, styles, and methods of construction is a matter of discussion within families and between families and contractors. The decision making process is problematic. The village layout and massing is based on a contextual model that is collective in nature where an understanding of the parts of the village in balance with the whole environment needs to be considered. Traditional ways of living in this environment were in harmony with the context and depended on a collective understanding of maintenance. The context is now guided by notions of the individual house. Moreover, use of materials for maintenance is often based on uninformed opinions. New materials and methods of construction are inevitable, however application needs to be carried out knowing how the underlying structure behaves. New materials require the proper details so that they work in a compatible manner with the soft underlying structure. So much of old material has been lost in recent years because of the inadequate detailing of buildings.

In addition to the Cacique and the family, decisions about the Old Acoma context involve governmental agencies. The Acoma Housing Office is responsible for upkeep and maintenance of structures and any projects that receive federal funds. Much of the housing is substandard. There is a preservation code for the Old Acoma Village, but it is not followed. The Acoma Historic Preservation Office is in place and could implement this code, but the funding and the assignment of this task is not in place. The Old Acoma site is not a primary residence for most families, and therefore maintenance, although important, is not a first priority. There has been, in the past few years, some discussion of having a village preservation fund to which families can apply for matching monies to carry out the maintenance and repair of their structures. The fear with a program such as this is that some families will receive favored treatment over other families. An outcome of this discussion has been the establishment of a permanently employed preservation team. When perceived as a small town with a strong community, a program such as this one for Old Acoma would succeed from a preservation point of view. However, the institutional structure will need to be in place for this to occur.

The Old Acoma Handbook anticipates a community-based effort at preservation, guided by the Acoma Historic Preservation Office and the Acoma Cultural Center (Haak'u Museum). The Handbook augments efforts to create a knowledge base about the architecture of the village and the cultural traditions of building practice that are intrinsically tied to the making of the village. With the new designation of Old Acoma Village as a National Trust Partner Site in 2007, there is a great opportunity for a preservation effort, and the handbook supports this future endeavor. But this is a long term effort and the historical record about building at Acoma shows that successes are based on remembering, recalling, and passing on information within the community.

The handbook is a supplement to the traditional way of passing information orally at Acoma. It is a written and graphic record of knowledge from and about the context. Evidence from the archaeological record and the built environment on the mesa indicates that there was a strong knowledge base about the role and participation of people and their buildings in the immediate context. The original 17th century village as recorded in 1934 is literally a depiction of the manmade contribution to environmental balance. The information was probably passed down through generations, with responsibility for care of the environment carefully considered.[5] But the oral tradition has had breaks in the chain of information in recent years, and so the written and graphic record, although still not the first method of communication, can offer material close at hand so that when forgotten it is easily remembered. The handbook relies on graphic depictions and photographs of specific problems and instances ways to correct them. Each individual has his or her own way of doing things, and so the handbook works as a guide rather than a recipe of building and repair. Suggested details of repair, for example, are coupled with graphic explanations of the problems that made the repair necessary in the first place, thus giving an opportunity for discussion and remembering about ways to build that are taught and carried on through families.

3.1 Excerpts: The Architecture of the Old Acoma Settlement

The purpose of this section of the handbook is to convey the overall attributes and prominent features of the architecture. Although some text is necessary, we depend on drawings and photos more than text. Rather than rely on an historical context in written form, the use of drawings and photos allows for the context to speak. Dates and factual information have their place here, but a local understanding of the ancient context of Old Acoma to some extent transcends a temporal explanation. Knowing the context depends on knowing and remembering the pueblo logic of settlement and living in the environment. For the Acoma community the context will not be a separate entity from this. The presentation therefore focuses on depictions that will encourage discussion of the ways houses are and were occupied and used. There is an attempt to avoid interpretation; working with the record of the context allows us to bring together information now in different places. Enough information is available to allow readings of the context by the person engaged in the reading. Living in the context has changed – for example entry into the house used to be from the second level through the roof and is now from the street level through a door. But enough of the context has remained to kindle first-hand memories as well as those passed through generations – for example Kivas are still entered from the second level and photos of the context are of recognizable places and people. It is hopeful that this section of the handbook will trigger memories and encourage stories about daily events in the place.

Prominent features of the architecture of houses of Old Acoma are shared with some of the other Indian Pueblo settlements. The materials for the architecture come from the site and from the surrounding landscape. The methods of building, although they change somewhat from place to place, have consistencies. Materials and methods depend on the raw materials from the environment. The house units are based on a cellular structure of rooms, similar to other pueblo settlements and Anasazi settlements, and the massing of the units is a logical reflection of the way they are occupied. The Acoma site has one unique feature compared with other southwestern Indian Pueblo settlements. It is laid out along streets rather than around plazas.[6] So, the housing units themselves appear to be built according to a Native American principle of inhabitation. The overall layout of the city is contemporary with the building of the mission in 1629. The street structure is likely related to a European model of city layout. However the house massing is very much a description of a village in balance with the whole environment and based on a southwest Indian Pueblo model.

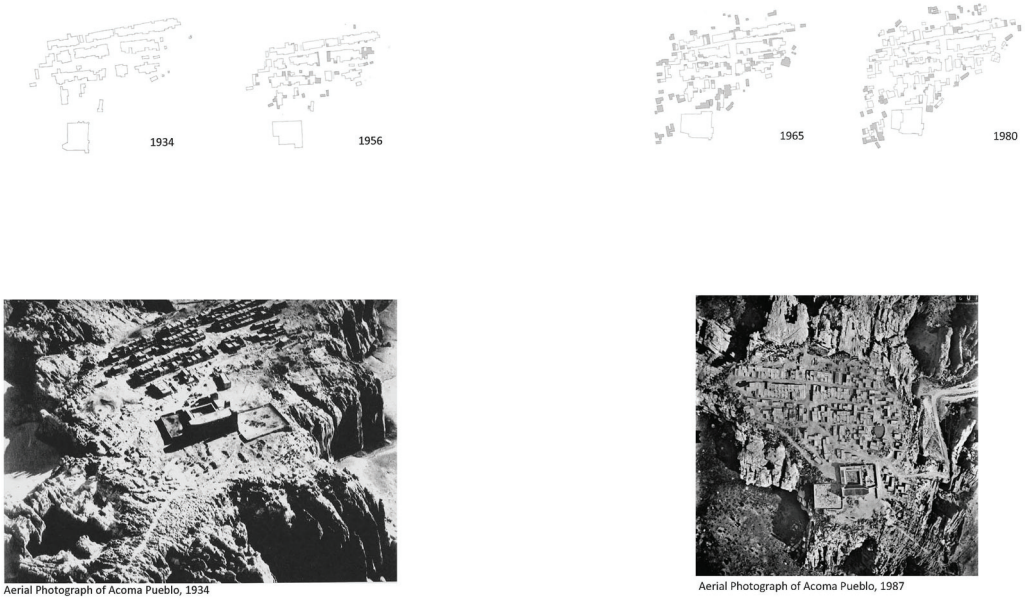
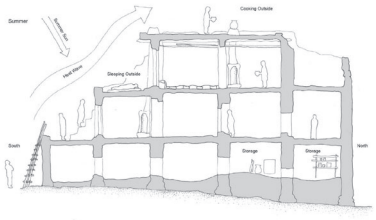


Figure 6. Drawings: A. Allwine, A. Okutani

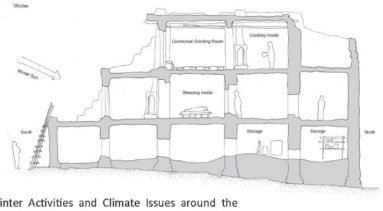
Two excerpts from Section 1 of the handbook are included here. The first is a page that describes the settlement's development since it has been recorded in photos and drawings. The early aerial photo dates from 1934. It depicts a settlement that is fairly compact in relation to the aerial photo from the 1987. The four drawings show the record of additions to the village structure. The information is from a number of sources that are available, yet they are in different places and therefore viewed separately. The combination of drawings and photos here is striking – growth of the context in the 20th century was extensive. The inclusion of multiple plans here is important to allow an understanding of the original structure and the logic of additions that were made.

The second excerpt shows the section of a house alongside photos of the exterior of a housing block. They are derived primarily from the 1934 HABS drawings of the site. Three units were recorded fully by the HABS team. There was enough information to detect similarities in all of the units of the housing block and to convey a sense of how the structure was occupied. The massing of each house is stepped back in section with the widest part of the house (north to south) at the base, and the narrowest, two rooms at the third story. Each house spans from one street to the next in section, one room wide. The ground floor is cool and dark, and was a place for the storage of foodstuffs. The second and third levels were living areas. The houses were originally entered from the roof - entry was by ladder to the second level and by means of stepped walls to the third. During the warm summer months, the lower interior rooms could be used for their cool air, whereas in winter the rooms directly facing the warm south could be inhabited. In warmer weather, the upper terraces were used for outdoor living, including the drying of food and cooking. Typically, an oven was located on the roof at the second level. The lower rooms were windowless and used for storage. This model was used throughout the pueblos as a defensive architecture that could be opened to the sun.

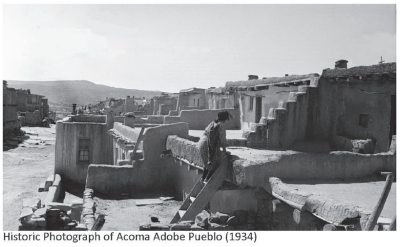
Looking at the record through drawings and photographs of houses it is immediately apparent that a collective lifestyle was practiced. The drawing is based on the record of 1934, and since the context was not fully occupied at that time, the collective lifestyle was still apparent in the way the context was made. Similar living arrangements to the ones depicted here still exist in pockets of the village. But the use of the structures overall has shifted. For example, in the current time some of the bread ovens have moved from the roofs to the ground level. In some cases the north facing porches – used as shady areas to inhabit in the hot sun – are no longer existing or not used in the same manner. The section drawn here includes the human figure. It is important to remember that the houses are human-centered environments and the scale of use and activities that take place there are central to understanding them both as individual units and as a whole system. The whole system depends on the idea of balance and is apparent in the relationship of the houses and especially apparent in the use the sun and shade. In section, the top storys can be places for human activities such as eating and sleeping. The HABS section also includes a grinding room on the second floor in one of the houses, adjacent to the lower level food storage rooms. Storage is below in the areas of the house that are cooler. It is essential to know the materials used to make the houses. Earthen materials are not only of the site, they belong to the environment. Heat storage from the sun occurs within the wall mass. So where the depths and interiors of the structures are cool and ideal for storage of food, the perimeter profile to the south (both walls and ceilings) are heated by the sun and occupied by humans in the cooler months. The northern face is cooler because of the lack of solar gain. The balance of the perimeter walls (north vs. south) in section presents the opportunity to live according to the climatic needs. The section of the upper floors shows interior and exterior living spaces. The interior spaces units in the cellular structure are small, and depending on the weather, as much of the living is outdoors as indoors. This very much conveys the best ways of living in the climate that exists at Acoma. Knowles has shown that the shadow from a southern row at Acoma was cast over the street on its northern side, never passing over the next row to the north, indicating that the use of the sun to warm and shade to cool parts of the building is not just per-unit, but considered in the overall relationships of the older sections of the village.



Summer Activities and Climate Issues around the Traditional Adobe House



Winter Activities and Climate Issues around the Traditional Adobe House



Historic Photograph of Acoma Adobe Pueblo (1934)

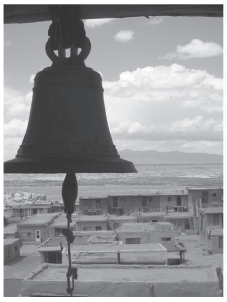


Photo: D. Playdon

Figure 7. Drawings: A. Allwine, A. Okutani

Since the 1934 HABS measurements, the village has undergone extensive change and many new houses have been added. While few families occupy the village year-round, more and more space is being sought by them. Many houses are no longer occupied from street to street, but rather occupied in ways that the cellular system will allow: a family might occupy a second and third level and not the first. Not all houses follow the one room width scheme and expand in both horizontal and vertical directions. The village changes incrementally over time. Small changes to the environment are less detectable, until they are seen over long periods. Section one of the handbook looks back to the village that existed in 1934 because changes that occurred did so in relation to principles of balance with the environment. In order to understand the reasons behind the architecture at Acoma, the present context needs to be read in relation to the underlying structure, that which was apparent in 1934.

3.2 Excerpts: Assessing Pathologies, Damage, Maintenance

The problems of structural damage and repair at Old Acoma can be categorized broadly. There are a few kinds of damage that are common and maintenance needs are usually easy to discern. Much of the damage to houses is caused by water infiltration and this occurs at joints in the structures. The best way to determine maintenance and repair needs is to look at the whole structure first. By looking at the record of photographs and drawings from the 20th century it is clear that many of the pathologies that exist today are recurring in the overall structure. It is probable that some of the areas most in need of repair have been so repeatedly over time. The strategy we used for compiling this section of the handbook was based on deriving the pathologies from first-hand experience of the structures at Acoma. This is then supplemented with historical photos and drawings and past plans for implementation. Work on the Acoma Meeting House, the San Esteban del Rey Mission, and other structures at Acoma presented earthen architecture in all areas that are problematic – the foundations, walls, floors, roofs, and at joints such as the windows and doors. Paul Graham McHenry's 1986 analysis of the north eastern block of houses shows similar pathologies and the 1934 HABS record indicates similar problems as well.

Like the first section of the handbook, this one is also focused on understanding the Old Acoma context. The structures are basically sound; however there are methods of building that have caused problematic conditions in the buildings. For example, in the cellular structure of the houses, perpendicular walls are not always tied together. This has consequences as they grow from story to story over the long term. Common solutions to roof and water runoff are not always the best solutions. The meeting of wall and roof in a parapet is sometimes preferred to an overhang. If the parapet is used, it requires specific details for long-term survival. This section of the handbook uses drawings and photographs to illustrate common problems in the structures at Old Acoma. It works in conjunction with the third section, Maintenance and Repair. The section is again intended to encourage dialog, in this case to understand what the problems are in order to apply solutions that will be lasting.

New construction and added structure are also considered here. New construction depended on rigid and hard materials and the handbook recommends they be removed because of the damage they have caused in such a short period of time. The construction carried out in 1986 did not follow recommended detailing. Inadequate connections between roofs and parapet walls, especially in the divisions between houses, allow the water to freely penetrate between the walls, causing structural deterioration on the interior. The adobe veneer shows a separation from the wall behind. There is also evidence of vertical cracking in areas such as the corners of walls, around the buried downspouts, and also at window openings.

The original use of earthen materials was consistent in all construction. All these materials can be considered "soft", having physical characteristics that permitted their integration into homogonous building systems. Today's introduction of "hard" materials such as cement plaster, plywood and roll roofing have created an incompatibility of material and are the root cause of the deterioration of the village. Combined with incorrect detailing at roof and ground levels, these incompatibilities will eventually destroy the original fabric of the buildings. Cement plaster applied to adobe or stone will initially seal the wall, but at the same time will trap any moisture within the wall. Moisture can penetrate through the cracks that will inevitably occur in the cement plaster and also by moisture rising within the wall from below. The rigid almost impermeable coating of cement plaster will destroy both stone and adobe. Earthen materials will get wet but will also dry out because of their ability to breathe. The breathe-ability of earthen structures is essential to their long-term survival. Mud plasters are generally considered to be "sacrificial" in that they protect the structure beneath and also require annual maintenance.

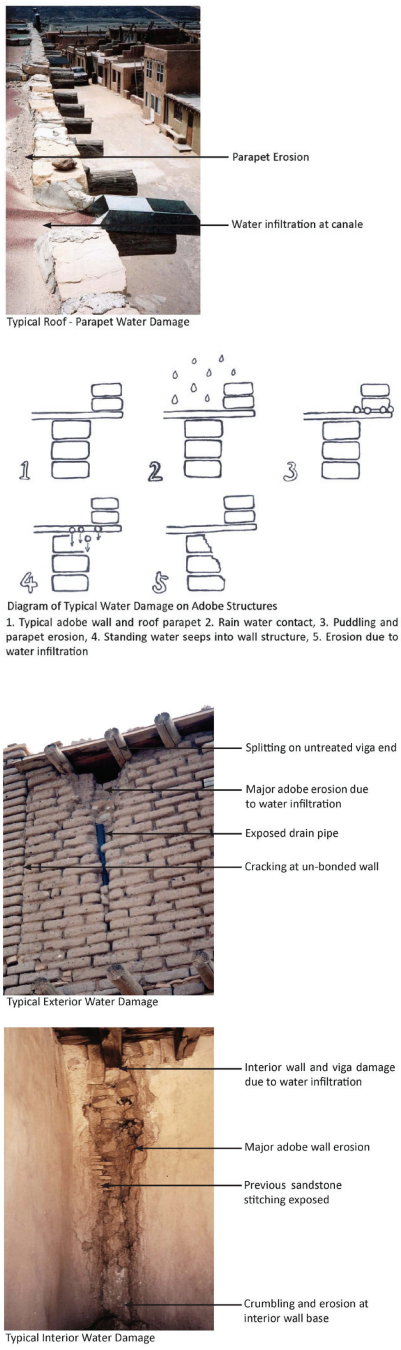


Figure 8. Drawings: A. Allwine, A. Okutani

A commonly held belief about earthen structures is that the application of new materials will result in longer lasting structures and require less maintenance. This section also serves to explain the pathologies that are the consequences of using newer, hard materials. Importantly, new or old materials do not offer solutions to repeated maintenance of earthen structures. That people live in balance with the environment is fundamental to the restoration process at Acoma. Care for the environment includes repeated maintenance – this would be true of any structure. In recent years there have been advances in material application to earthen structures. Plaster mixes, for example, can be easily controlled to provide porosity and the ability to breathe while providing weather protection. Improved mud mixes are needed for earthen structures in order to provide longer periods of time between maintenance cycles. Families have moved away from collective care of the houses at Acoma. Timing of maintenance is perhaps one of the key problems in the village, and an understanding of the use of materials is imperative for families when making decisions with contractors who will carry out maintenance work.

The outline of this section is as follows.

Detecting Pathologies:
Basal, Walls, Vigas and Walls, Roofs, Doors and Windows,
Cement Plasters and Rigid Materials, Metal Windows and Doors
Analysis/Assessment
Choosing Areas for Stabilization
Demolition and Stabilization
Repair
Maintenance

The excerpt from the handbook (previous page) is a diagrammatic explanation that shows how damage is caused over a period of many years. Water infiltration is the primary cause of damage to the earthen structures at Old Acoma. An understanding of the way the environment engages the buildings is strived for here. Particular cause and effect relationships are presented in this section and the next so that cause and effect are understood prior to repair. Photo surveys of the present conditions and past conditions reveal repeated problems in different areas of the village. We hope this section will reveal the problematic conditions so that repairs can be understood.

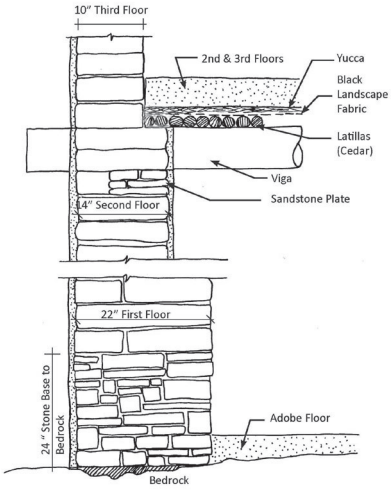
3.3 Excerpts: Maintenance and Repair

Construction techniques and preferred materials at Acoma are still passed through families and clans. When working with the San Esteban del Rey Restoration crew (SEDRR) we discovered that there are variations on building techniques. However, these are within a range of preferences. Traditional techniques rely for the most part on available natural resources and this is guided by what can be derived from Acoma lands. Addition of modern materials increases every year. There is less time and more money available to repair houses, making the use of mass-produced materials for repair more appealing.

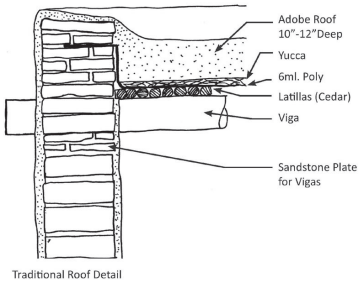
Maintenance is essential to the Old Acoma village. Even if there is an effort on the part of the tribe to carry out extensive repair of the village, there is still need to apply continual maintenance. This has not always been understood, and repairs that have occurred are often more detrimental in the long term because of the disconnect between repair and maintenance. Recently, repair has been carried out by work crews and maintenance is the responsibility of the individual families. There are a variety of ways to add to and repair the adobe structures at Acoma. This section of the handbook draws on techniques that are preferred in the tribe – this assumes that the cultural memory of making is an important factor in the ongoing repair and maintenance of the buildings. The cultural memory of making is not forgotten at Acoma, but it is important for the community to continually remind themselves that building techniques are as much a part of their culture as their language and other rituals and practices. Maintenance is practiced differently than in the past. We assume here that this is a given condition in the current and future cultural context at Acoma. Even though families are less likely to carry out maintenance for themselves, there still needs to be an understanding of maintenance. Techniques for maintenance and repair that are used by the Acomas are often accompanied by stories and memories. The two together are essential to the overall conception of the village and its future.

The plans of the village in the first section of the handbook show that growth of the village occurred. We assume here that continued growth will likely occur. As growth continues it is important to be aware of the underlying village structure. Extensive repair has been made to the houses over time, and the walls of the houses are like a record of growth through many eras. This is detectable visually through the use of materials. The base of the structures is usually stone on bedrock – some of this is contemporary with the village and some is older foundations. The 1629 village is made of adobe bricks that are unusually large compared to the current day bricks and of a superior quality. As the wall goes up, there is evidence of much repair in some areas of the village. This is usually done with stone inserted into adobe walls. In some cases there is more stone than adobe. The houses at Acoma contain many cycles of building over a long period of time and with many kinds of materials. What is best for each situation depends on what is already in place. But in every case, the pre-20th century structure will be of soft materials. An understanding of how to read the different materials is essential to repair. This section of the handbook exhibits cases that exist at Acoma and like the other sections assumes that this is the best way to remember how to understand repair and maintenance by families and in the community.

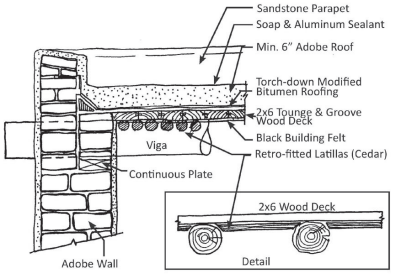
From the point of view of balance in the environment, the use of new materials is problematic. Earthen materials need to expand and contract and tend to take in and release water. Earthen materials, when they do fail, go back into the earth – there is no waste as they become raw materials that can be reused or redistributed. For this and other reasons, the use of earthen materials as a primary solution to repair and maintenance would offer the best methods. This is not something that can be attained through this handbook or through outside consulting. This can only be achieved within the Acoma community.



Second and Third Floors Exterior Wall



Traditional Roof Detail



Modified Roof Detail

Figure 9. Drawings: A. Allwine, A. Okutani

The outline of this section follows.

General Repairs
- Foundations, Walls, Floors, Roofs, Windows and Doors

Materials and Their Sources
- Clays and Aggregates; mixes/plasters/floors
- Timbers and Preparation
- Sandstone, Quarrying and Preparation

Section 3 follows on the structure and information from Section 2, and assumes a reading between cause/effect and solution will be done.

The drawings (above) are samples of the kind of information conveyed in this section. Although it is hard to call any wall at Old Acoma typical, these sections show the most likely condition of a well-repaired wall. These drawings are coupled with photographs and other more illustrative diagrams that convey the sense of the structure along with this more detailed section. The combination of photos with these other two types of drawings allows for readings in a cursory manner and a more detailed manner, thus engaging different kinds of audiences.

4. Conclusions

There are many handbooks that describe techniques of adobe construction and repair. Many of them can be applied to any earthen context, however a specific context has problems that are architectural in nature rather than based on materials and methods. The Acoma Handbook is very specific to the context of Old Acoma. It assumes that comprehensive understanding of the architecture of the settlement is needed to fully understand the importance of repair and maintenance. This is better understood as care for the environment. The handbook presents optimal solutions of repair and maintenance for individuals and families as well as the community as a whole, and assumes that understanding the structures will lead to these solutions.

The handbook conveys a visual reading of the context. This is done to reach as large an audience as possible. It assumes that understanding of the context can occur at many levels. We envision this as a seed project. The cultural center can use it to initiate other activities such as community workshops, video demonstrations, and an addition to the handbook in the Keres language. It is encouraging to note that the newly constructed Haak'u Museum and Cultural Center at Old Acoma provides a formal public setting for handbook distribution within the community. Parts of it can be used to supplement the tourist experience as well, as there is very little written on the architecture of the Acoma village. All of these endeavors need to be community based and it is encouraging that members of the tribe are willing to carry out these initiatives.

The handbook in conjunction with all other materials gathered in the process of research will be made available in the library of the cultural center. This will aid in any future plans for preservation of the village, whether they be small initiatives or large ones.

Acknowledgements

We would like to thank Andy Allwine and Ayako Okutani for major contributions to the Old Acoma Handbook. They were asked to think about the problems explained pictorially and given the task of translating technical information to make it more easily accessible in graphic form. They were also involved along with Pat Playdon in on-site research and development during the summer of 2007 at the Pueblo of Acoma. The three Temple University students came to Acoma with open eyes and ears and acted as great advocates for the work and the reasons it needed to be carried out.

Bobbie Greene, Director of Save American Treasures, gave her support to this proposal.

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At Acoma, we are grateful to Damian Garcia and Prudy Correa at the Pueblo of Acoma Cultural Center for their contributions and their interest in continuing the work started by this grant. Former Governor Fred Vallo has long been an advocate for Old Acoma and initiated this process. Theresa Pasqual with the assistance of Subina Jackson of the Acoma Historic Preservation Office contributed greatly to the early stages of this project. The Historic Preservation Advisory Board and the San Esteban del Rey work crew met with us several times.

During our time at Acoma this past summer we were invited to join William Dupont from the University of Texas San Antonio and the National Trust for Historic Preservation and his students who were at Acoma for a study tour. We were able to attend the series of lectures and tours that were so well organized by Bill and offered as a part of his program. The opportunity gave us great insights and great company. As part of his program we were able to discuss issues with Barbara Campagna and others from the National Trust. Strong support came from James Vaughan, Vice President, Stewardship of Historic Sites, National Trust for Historic Preservation. Because of Acoma's status as a National Trust Partner Site, their role in the future of preservation of the Old Acoma Village will be essential.

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[1] Acoma is estimated to be the oldest inhabited settlement in the United States, a known occupation since approximately A.D. 1200.

[2] Willliam Sarracino led the restoration crew in the 1999 effort to repair the mission of San Esteban del Rey.

[3] This is consistent with state practice. During work on the mission, we met with Pilar Medina Cannizarro, the state historic preservation architect because there was federal money involved in the project. She reiterated the need for cultural practices to be separated from the need to record. If while working on the building, sensitive materials were uncovered or work was done on the ground, it was acceptable to rebury the material without keeping any kind of record. It is assumed from the field notes of 1986 that this was the policy, although the difference was that there was a general description of artifacts found.

[4] Vallo, Brian, in a presentation at Acoma, July 2007. Mr. Vallo was the first Director of the Acoma HPO, the Founding Director of the Acoma Haak'u Museum, and is now Museum Director of Albuquerque's Indian Pueblo Cultural Center. The preservation construction history of the 20th century, recorded in various reports, includes records of many delays. The governing system at Acoma appears to be the common cause in all of these incidents – there is a system of checks and balances in the governing of the tribe where progress in the modern sense is made, then checked so that a reflective look at the balance between progress and tradition can be examined.

[5] Schaffsma, Curtis J. (1986). *Field Journal*, p. 6, states, "Room 1 is also *very* valuable in providing an archaeological continuum…it shows the transition to a modern market economy from the local subsistence system… There would seem to be less difference between Level 8 and c A.D. 986 (1000 years ago) than there is between Level 8 and upper levels." No date is given for level 8 of the archaeological dig inside a house in the northeast quadrant at Acoma, but as an example of proximity Level 5, the floor of fill level 6 is from the late 1960s or early 1970s and Level 7 is a floor for the fill of Level 8. This is very much in keeping with the evidence of the architecture – there was very little change and then rapid change in less than a century.

[6] Playdon, Dennis (2003), *Field Notes.*