Chapter Four

A Durable Legacy
Construction and Spatial Analysis at Sand Canyon Pueblo in the Mesa Verde Country

by Bruce A. Bradley

The landscape architecture of an Ancestral Puebloan settlement often consists of a refined set of open spaces that, together with their buildings, create a strong pattern. The Ancestral Puebloan “landscape” was as distinctive and useful to its inhabitants and creators as the more familiar Italian Renaissance piazza or the patio complexes of Moorish Spain were to theirs.

Archaeologist Bruce Bradley compares the diverse landscape and architectural features of the southern Colorado Ancestral Puebloan sites of Sand Canyon and Mesa Verde in his comments on the social organization expressed in these built environments. He shows that Ancestral Puebloan people who built these communities did so in a logical and systematic way. At Sand Canyon Pueblo, “courtyard suites” form the core of residential development, while great kivas, multiwall structures, and other large features are aspects of “public-area” site development. A surprising and remarkably consistent pattern language is the result.

Ancient Puebloan architecture as an expression of social organization has been a topic of discussion in archaeological as well as popular literature for over a century. Many advances in analytical methodology have been made in the past two decades (for example, see Hillier and Hanson 1984), but few have been applied to the large late thirteenth-century sites that are known
in southwestern Colorado. Most published research has focused on the large cliff dwellings on Mesa Verde (Rohn 1971; Cattanach 1980), even though the majority of the large sites lie in the adjacent Montezuma Valley. More recent research has focused on interpretation of social organization in a late thirteenth-century Ancestral Puebloan community in the McElmo Dome area west of Cortez, Colorado (Adler 1990; Bradley 1992, 1993; Lipe and Bradley 1988; Huber 1993) (figure 4.1).

Between 1985 and 1996, I conducted research at one of these large pueblo sites. Sand Canyon Pueblo (5MT765) is a massive open-air ruin located at the head of a canyon, and it includes about 100 kivas, 420 rooms, 14 towers, a central plaza, a D-shaped bi-wall structure, a great kiva, and other architectural and landscape architectural features and open spaces (figure 4.2). My research was designed to investigate the architectural diversity within the site as well as site history, use, function, and abandonment. Excavations included six complete kiva suites, one-half of the D-shaped bi-wall building, and testing in an additional eleven kivas, the great kiva, and areas outside of the architecture.

Generally speaking, open-air Pueblo II and Pueblo III (A.D. 900–1300) household architecture is fairly standardized with a basic unit consisting of a roomblock of from eight to twelve rooms, a subterranean kiva, and a midden area. These units are usually aligned on a north-south axis with the rooms on the north and the midden to the south. T. Mitchell Prudden (1903) dubbed this form a “unit type” pueblo, interpreted as representing households whose membership was a single family of five to ten people.
Arthur Rohn (1971:37–39) has identified another form of late Ancestral Puebloan architecture in some of the thirteenth-century cliff dwellings on Mesa Verde. These units incorporate two or more suites of rooms adjacent to a courtyard, associated with a single subterranean kiva. These units are thought to represent multiple households of related families, which shared a kiva. In addition to habitations, public architecture in the form of great kivas, great houses, multiwall structures, and enclosed plazas has also been identified and described at many of the larger sites. The plaza, like the courtyard, is an important element of the landscape architecture of these sites. It is believed that these structures served special functions for large segments of or even entire communities.

Several forms of architectural units have been identified at Sand Canyon Pueblo. The basic unit is a kiva suite consisting of a kiva and associated architecture. The makeup of these suites is highly variable and there is probably a range of social units and activities represented by them. Kiva suites are organized into clusters known as architectural blocks. These in turn are spatially organized into a two-part site plan with east and west components separated by a drainage containing a spring.

Excavations in architectural units have disclosed kiva suites that consist of from ten rooms and a kiva to four rooms and a kiva (figure 4.3). Additional information about unit planning, construction, and function has been acquired and analyzed to interpret architectural unit function and to interpret the social groups that may have planned, built, and used them.
Fig. 4.3 Excavated architectural suites at Sand Canyon Pueblo: a) Block 300; b) Kiva Suite 208; c) Kiva Suites 102, 107, and 108; d) Kiva Suite 501; e) Kiva Suite 1004; and f) Kiva Suite 1206. Illustration by Bruce A. Bradley.

Determination of construction sequences of the units is critical in interpreting their degree of planning and use-histories. Analysis of construction sequences using wall ties and abutments, stratigraphy, and superposition has allowed the identification of core architectural units and subsequent additions to the core units. In one case, it has been possible to determine not only the relative construction sequence but also the time intervals between the building stages of the core unit. The core unit of Kiva Suite 1206 was completed in four stages beginning in A.D. 1260 with the construction of a two-story room (figure 4.4a), continued in A.D. 1261 with the addition of four rooms (figure 4.4b), and completed in A.D. 1262 with the addition of the kiva (figure 4.4c). Additional rooms were added as the unit was used (figure 4.4d).

I have calculated relative labor investment through the construction history of architectural units by a formula that determines person hours (ph) per cubic meter of masonry construction (37.5 ph) plus estimates of roofing effort by structure type. This formula was derived through experimental building and ruin stabilization records. The amount of labor investment expended in a given amount of time on the construction of a kiva suite should help determine the size of the social unit that could have undertaken the effort. The intensity of labor investment has been determined by the amount of labor expended on an architectural unit divided by the area covered by the unit. I believe there may be a difference in intended function and symbolic value
expressed by the relative intensity of labor expended on an architectural unit. The greater the intensity (lower usable floor space per person hour of labor), the greater the probability of specialized function of the unit (for example, as seen in most monumental architecture).

Structure accessibility, through doorways and hatchways, expresses a measure of integration of structures within architectural units and is assumed to reflect unit function. The greater the degree of control of access, the greater the probability of specialized function for the structure and unit. A measure of integration (Bradley 1996) has been derived for each of the structures at Sand Canyon Pueblo, and differences between kiva suites have been noted (figure 4.5). Kiva suites with few rooms are poorly integrated, internally and with the adjacent open space, and may have served a special function, in this case ritual. Kiva suites that conform to the standard Ancestral Puebloan room-to-kiva ratio of around 10:1 are well integrated and were probably primarily habitations.
Fig. 4.5 Examples of differences in kiva suite accesses: a) a poorly integrated, special function architectural unit; and b) a well-integrated domestic habitation unit. Illustration by Bruce A. Bradley.

Two of the excavated architectural units in Sand Canyon Pueblo illustrate these differences. Structures excavated in Architectural Block 100 include two circular aboveground kivas (102 and 108), a subrectangular kiva (107), a D-shaped tower (101), and two rooms (104 and 105). These structures are bordered by the site-enclosing wall to the north, internal open space to the south and east, and an unexcavated kiva to the west. With a kiva suite being a kiva and associated nonkiva structures, this excavation area includes three separate kiva suites. The overall room-to-kiva ratio is 2:3. The site-enclosing wall, an important landscape architectural feature, and an unexcavated kiva to the west preceded the construction of Kiva 102 in or soon after A.D. 1274. This was followed by the addition of Kivas 107 and 101, and finally, Rooms 104 and 105 and Kiva 108 were added. Each of these construction episodes represents the addition of a new kiva suite. The time intervals between these construction episodes is unknown.

The function of these kiva suites is inferred to have been specialized and non-habitational based on the lack of domestic features, such as primary food processing facilities (mealing bins), the scarcity of storage space, the relative intensity of construction effort, special symbolic investment in architectural petroglyphs (rock art incorporated in structure walls or below structure floors), and the poor integration of the structures. Artifact abandonment assemblages and animal bone remains (Muir 1999) support this interpretation.

In contrast, Kiva Suite 501 was constructed in or after A.D. 1252; it began as a large room that was partitioned into two rooms (figure 4.6a), followed by the addition of two rooms and a southern retaining wall (figure 4.6b). Finally, a subterranean room and a kiva were added into the outlined area (figure 4.6c). At this stage, there were five rooms and a kiva. A prepared courtyard was present.
in front of the rooms extending across the top of the kiva roof. I consider this architecture to be the core unit of Kiva Suite 501. Although wall abutments suggest that this core unit was constructed by accretion, there is no direct evidence to indicate that any of the structures were in use while the others were being built. From this I conclude that the core unit was constructed to a plan, which was completed in three stages. I don’t know if each of the building stages was done in a different year as seen in Kiva Suite 1206. Secondary refuse accumulated east of the north rooms while they were in use, after which five rooms were added in front and extending to the east (figure 4.6d). These new rooms utilized the courtyard surface and a thin secondary refuse deposit for floors. At abandonment, Kiva Suite 501 included nine ground-level rooms, a subterranean room, a courtyard, and a kiva.

In terms of functional space, this kiva suite includes storage rooms, a living room, a primary food processing room, an adjacent courtyard space, a kiva, and a small subterranean room. Structure access ranged from unrestricted to
restricted and the unit as a whole is well integrated. Construction effort was relatively low. Remodeling is present but not extensive. Architecturally, this kiva suite is a classic “unit type” pueblo that functioned as a habitation for a single household. The size and membership of the household probably varied through time. The artifact abandonment assemblage in the kiva suggests that ritual activities may have been taking place at that time.

The presence of this domestic suite in what is otherwise a kiva-dominated architectural block (see figure 4.2) is of interest. If the surrounding architecture (consisting of individual kivas) was also domestic in function, it would indicate that traditional kiva suite form was changing fundamentally. Although possible, it is just as likely that there were different functions for the other kiva suites in this block.

The amount of preplanning that went into the construction of an architectural unit at Sand Canyon Pueblo is difficult to determine, but it is clear that core units of unit type kiva suites took several years to complete, were preplanned, included enclosed open space, and were not the result of haphazard or expedient construction. There is even tree-ring evidence that logs were being stockpiled one to two years in advance of construction.

I have assessed site-wide planning in terms of the distribution of kiva suite types (defined by room-to-kiva ratios), architectural blocks, open spaces, and public architecture. Planning of community-level construction is present at the beginning of site formation as evidenced by the enclosing wall, the great kiva, and the D-shaped building (figure 4.7a). Although it would take total excavation of the site to determine the construction sequence of each of the architectural blocks, I see pioneer units (figure 4.7b) followed by additions through time. Domestic architecture (that is, habitation units) is present in both sides of the site; however, the western component has a greater proportion of kiva-dominated suites (greater than five rooms per kiva), as well as all of the public architecture. This distribution indicates to me that site-level planning was essentially functional zoning and that it was accomplished before any construction began.

The degree to which comparisons can be made between Sand Canyon Pueblo and contemporary sites on Mesa Verde is limited by the comparability of the available data. Generally speaking, there are a large number of similarities but there are also some distinct differences. Architectural units at Sand Canyon Pueblo consist either of single household kiva suites or special-function kiva suites and public architecture. Single household and multihousehold kivas suites are the rule in the Mesa Verde cliff dwellings where room-to-kiva ratios are consistently between 8:1 and 12:1.

Another matter that needs evaluation is the scale at which comparisons are made. Sand Canyon Pueblo may be considered either a site or a community. As a site, comparisons are made between it and other sites, such as Cliff Palace. On
the other hand, if Sand Canyon Pueblo is thought of as a community, a more valid comparison is between it and the Cliff Palace Community (figure 4.8). I consider the Cliff Palace Community to include Fire Temple, New Fire House, Oak Tree House, Mummy House, Sun Temple, Cliff Palace, and Sunset House. At this scale there are some striking similarities, not just in general content, but also in overall layout and locations of functional units.

At Sand Canyon Pueblo there are two distinct community structures: the D-shaped building and the great kiva. The D-shaped building is situated near the center of the site, on top of and near the edge of a cliff. It commands a dominant position. The same is true for Sun Temple in the Cliff Palace Community. These two structures share many internal features such as a D-shape (a half-radial structure) with a straight side on the south, surrounding rooms, and two internal circular structures. The great kiva at Sand Canyon Pueblo is near the southwestern area of the site and west of the D-shaped building. An equivalent structure is found in a similar relative position to Sun Temple. This is the site called Fire Temple, which has been interpreted as functionally a great kiva (Ferguson and Rohn 1987:99).

In both communities there are clear habitation units and it is curious that the largest (Block 1200 at Sand Canyon Pueblo and Cliff Palace in the Cliff Palace Community) in both are to the northeast of the D-shaped buildings. All of this may be coincidence, but I think it unlikely. Several years ago I proposed a theory that envisioned a region-wide revitalization movement that incorporated architectural symbolism (Bradley 1996:241–55). I submit that the similarities between Sand Canyon Pueblo and the Cliff Palace Community are expressions of this symbolism.

In conclusion, site planning is evident at Sand Canyon Pueblo in terms of overall boundaries, as indicated by the site-enclosing wall, east and west divisions, siting of public architecture, and the distribution of architectural blocks dominated
by special-function kiva suites. The systematic design and construction of both structures and open space are essential aspects of settlement development and are, of course, primary characteristics of thoughtful landscape planning. The content and layout of the site may have been part of a regional development and may have had symbolic meaning. Standard domestic/habitation architectural suites were built with preplanned core units that grew through time by the addition of rooms and other features. Kiva suites range from the standard form of eight to ten rooms per kiva to individual kivas not associated with any rooms. Multihousehold courtyard units do not seem to be present. Their occurrence in the large cliff dwellings on Mesa Verde may be the result of the need to pack people into a restricted space or may represent a different social organization.

Kiva suites ranged in use from domestic habitations to specialized, probably ritual functions. The ritual kiva suites may have been used intermittently and may have involved activities of non-kin-related groups such as sodalities and/or medicine societies. Sand Canyon Pueblo also served as a locus of habitation for a large proportion, perhaps 75 percent, of the members of a complete community. It also may have served the community as a religious center that functioned to integrate the community, and possibly even a larger area, economically, socially, and politically.

Comparative architectural studies with contemporary Mesa Verde sites are possible because of the relatively large amount of work that has been done in
the past century, as well as innovative theoretical approaches (Rohn 1977). What is lacking is comparable excavation data from the large aggregated Pueblo III sites in southwestern Colorado and southeastern Utah. Without this information it will be very difficult to ascertain whether the differences between Sand Canyon Pueblo and the large cliff dwellings on Mesa Verde represent different cultural expressions or if they may be parts of a larger integrated subregional system. Large-scale excavations and analyses will need to be done to even begin to answer many of the questions posed here. Are the specialized architectural forms a product of different organizational or belief systems? Is there a size threshold at which aggregations of people need additional mechanisms of social integration? Could the specialized architectural forms at Sand Canyon Pueblo represent the development of a new social order that is also expressed on Mesa Verde? Additional research is needed to answer these questions and will undoubtedly raise even more of them. Ancestral Puebloan architecture and landscape architecture are indeed a durable legacy, but unless they continue to be studied on an adequate scale and new data are collected, the history of the Ancient Ones will continue to remain a mystery.

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