When shadow fences are set only at front and back property lines but not at sidelines, solar envelopes run continuously to allow for an unbroken façade along a typical suburban street. A studio project that tests this condition replaces suburban densities of 5 to 7 du/ac (12 to 17 du/ha) with higher densities of 25 to 45 du/ac (62 to 111 du/ha). The solar envelopes rise and fall with changes in street orientation and lot size. Envelope rules provide longer periods of sunshine than in the first project: 6 hours on a winter day, 10 hours in summer. They are generated to a 6-foot (1.8 m) high shadow fence across streets at neighboring front yards and at rear property lines. Since envelopes do not drop at property sidelines as in the first project, buildings are free to run continuously along the street.

When building designs replace the envelopes, the result is remarkable innovation within harmony. The continuous envelopes allow a smooth flow of street fronts. At the same time, building types range from town houses and courtyard clusters to apartments. Individual designers are clearly exploring separate formal ideas from one parcel to another. The consequence, if these were built, would be an enormous range of diversity and choice within a neighborhood.

A Study of Development Potential in Housing

Los Angeles is the location of a rigorous 10-year housing study of the solar envelope's development potential.[7] The study sought to find an alternative to present housing practices, and to illustrate different ways Los Angeles can use the solar envelope in different circumstances. Actual sites were selected for their different land values, topographies, street orientations, and neighborhood characteristics to test the effectiveness of the envelope over a range of conditions. In most cases, the sites already had buildings on them.

Final designs of the study were not built, although test results have occasionally acted as a zoning guide for Los Angeles city planners.

Because of modern development pressures, the study tried for the highest housing densities while assuring solar access to all dwelling units during some part of the day. The research data relate *density* (a count of dwelling units per acre, generally corresponding to land values) to *S:V* (surface-to-volume ratio, an energy-related measure of building form). While some circumstances, such as commercial centers, may call for a different scale depending on community values, this relationship between density and S:V is taken as grounds for concluding that three to seven stories generally represent the best size range for urban housing in Los Angeles. These figures can vary among cities but the underlying suppositions of solar-access policy and design are broadly applicable to places of density everywhere.

Los Angeles zoning provides for a range of housing densities. It zones some open areas for densities of only one house per acre (A2) or less, while in built-up areas with high land values, it assigns densities of 200 du/ac (R5) or higher. Between the extremes of A2 and R5, chosen for the study, lies a range of other classifications that provide planners a way to match growth with community values.

Current zoning provides the urban housing reference for this study. First, the dwelling classifications are the actual ones used in the study. Second, they show in which density range Los Angeles planners officially recognize the greatest variety of housing types. Finally, each part of the range symbolizes not only different dwelling classifications but also a separate grouping of possibilities for designers, developers, and users. To evaluate these possibilities, it is useful first to establish the relationship between a measure of building form (S:V) and density.

S:V is a mathematical ratio between exposed surfaces and