

Site-Built Affordable Housing – A Primer

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Cover: Optimum Value Engineering (OVE) Cheat sheet for residential construction

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Introduction

The subject of housing affordability divides itself naturally along several different axes of analysis: 1) Bust-economy housing vs. boom-economy housing, 2) Rental property development vs. Starter home development, 3) Private-sector, free-market housing vs. public-sector, deed-restricted housing.

Bust-Economy Housing. Bust-economy housing issues involve a growing supply of existing structures in increasing states of disrepair, little new construction, and decreasing demand for purchase due to diminished earning potential and the unavailability of financing options. Even the inability to pay property taxes may lead to seizure and loss of housing. In the U.S. and Canada the "affordability line" is often taken to mean housing costs of less than 30% of a household's gross income, including taxes and insurance, and sometimes it is regarded as 35%, including utilities. Lowincome housing costs are calculated at an average of 65% of the Area Median Income. In a depressed economy, even with diminished raw land values, the costs of minimum infrastructure and even frugal construction practices, when done according to adopted building codes and standards, place new construction out of economic reach for many if not most of the population. The usual options are government subsidies (that least efficient of all of the uses of money), sweat equity, wherein renters and buyers contribute their labor to housing value, creative financing, and residential parks with utility hookups for semi-permanent mobile homes and recreational vehicles. A littleused device is the conversion of the spaces in these parks into resident ownership. Of further help might be the tax exemption of a minimum level of housing and property. much as a standard deduction works on income taxes. For example: the first 400 square feet of house and 1000 square feet of property each for homeowner, spouse and children might be exempted from property taxes. Another useful tool might be a revolving public housing fund or bank, but it might be a challenge for any public entity to keep the costs of maintaining and administering such a fund below its income from a reasonable interest, so that it wouldn't become a liability to the public treasury. As usual, such management would be more responsible in private hands. But the more fundamental, underlying needs remain to be addressed by the entire community with comprehensive economic redevelopment programs, such as the models developed by the Rocky Mountain Institute. Even here, the community has the uphill task of overcoming the general climate of apathy and inertia that accompanies economic depression. Luckily there are success stories for inspiration, like the community-wide development of low-tech solar energy in the San Luis Valley of Colorado during the energy crunch of the 1970's. Since this booklet will concentrate more on the development of new, site-built housing instead of rehabilitation, most of this time will be spent on:

Boom-Economy Housing. Boom-economy housing is a different animal entirely. The problems here start to take form when the demand for housing begins to exceed supply and the public begins to see uncontrolled growth as a threat to the local quality of life. Meanwhile, those with vested interests in real property wish to see their property values continue to climb, often at an accelerated rate. These are the preconditions, not the cause of housing problems. The causes tend to be twofold, and both are a direct, but unintended consequence of the local government's response to these preconditions, even though the people involved will stubbornly disclaim any responsibility for housing prices. The first cause is the tightening of the number of total residential units allowed on a given piece of residential property, accomplished through zoning laws by requiring increasingly larger minimum lot sizes per unit and

then increasingly larger minimum residential unit sizes. As the prices for these properties are bid upwards, it becomes increasingly necessary for investors to develop each property to its "highest and best use," which is almost always understood as its maximum use, in order to maximize the return on their investments. It quickly becomes less attractive financially to build smaller homes with fewer bedrooms, even on smaller lots. The area's demographic profile gradually shifts to favor the more affluent economic strata, which drives the election of public officials, and this cycle begins to compound the problems with nimby-ism, the wish to keep the view from the grand picture windows clear of any evidence of the existence of lower economic strata and service personnel. The second cause involves the gradual raising of construction standards to insure that higher quality structures are built and higher resale values are maintained. This is accomplished through the adoption of building codes and local prescriptive standards, and also the unofficial development of standards which are then enforced by planning departments and building officials. The problem with this raising of standards was summarized by Philip K. Howard in The Death of Common Sense: "The law, aspiring to the perfect housing abode, has accumulated so many good ideas that the only type of new building that is permitted must satisfy middle-class standards. A law that dictates either a model home or no home is probably fine for some, but what about those trying to provide housing for the poor?" Sometimes there is a third cause added to his mix: the local chamber of commerce or resort association begins to actively promote the area and its real estate, further accelerating growth pressures and artificially driving up the demand for residential property.

In sum, the entrenched population gains control of the housing supply. Virginia Postrel writes "Instead of inviting newcomers, this approach rewards longtime residents with big capital gains and the political clout to block projects they don't like." [The Atlantic, "A Tale of Two Town Houses," Nov, 2007]. Having priority in time of arrival wants to translate into having priority in all things. When government begins to fight free-market housing, it does so exuberantly, every step of the way, driving prices up not only with standards, but with bureaucratic delays, review fees, impact exactions and, for the exasperated, court costs.

Rental Property Development. As problems with boom-economy housing develop, socioeconomic stratification begins to push the workforce outwards - into industrial zones and bedroom communities, sited on the least or less valued lands - and seldom into ownership opportunities. Rentals begin to tighten up. In the next stage some sort of class competition begins to fester and the "losers" begin to petition their local government for some kind of help, redress or intervention. The term "housing crisis" begins to appear shortly after its driving force, "growth management," is adopted as policy. But the connection between them is seldom acknowledged. More free-market rentals are built, but the higher standards and the costs of approvals and construction drive the rents upward. Since ownership opportunities are increasingly scarce because modest housing is so financially unattractive, the young couples and professionals, such as school teachers and nurses, who should by now be buying or building starter homes, face a ladder with all of the bottom rungs gone - and so they stay within the rental market, doubling the strain on this market segment.

As the schism widens the government is pressed to "do something." Now the working renters begin to crowd the highways in their daily commutes, polluting the sky and enhancing somebody else's economy. Pent-up demand builds and emergency measures are studied, Most are heavy-handed, coercive, socialistic, bureaucratic and adversarial - and are never productive of voluntary solutions. From developers are taken inclusionary exactions (e.g. 15% of all units shall be affordable, pursuant to adopted definitions). Potential free-market rental developers are scared into the next county the

moment "rent stabilization" is mentioned. Blindly assumed is some need for subsidies and grants, which inflate rents, depress wages and double the real construction costs. The cry goes out to spend a year's wages for some out-of-town expert to do a "housing needs assessment" to tell those "in charge" what common sense wants to tell them for free. All of these solutions are failures of imagination and failures of community spirit. The free lunch is a big part of most government thinking, but only the hyenas, the consultants specially adapted to scavenge on this sort of thinking, will get one. Few people in the public sector seem capable of perceiving that at least half of the problem with shortages in rental housing comes from the bottleneck created by the lack of starter homes. In the healthiest communities, rentals are temporary - people moving permanently into the region will eventually find themselves able to start building equity. And yet the initial response of the public entity to a housing crisis is to relax the zoning just a little to allow granny flats or garage apartments, which only leads to several more years of smug complacency and even more pent-up housing demand. And when the projected crisis finally does become a true crisis, the emergency measures taken in haste usually involve the hasty copying of a handful of unsuccessful solutions from neighbors with problems only a few years more advanced. It is seldom noted or remarked that these "solutions" have track records of failure - but at least the public entity isn't risking the perceived liability involved in trying something new and visionary. Despite the more fundamental importance of ownership opportunities, rental property development has an important place in a broad housing solution. Most of the approaches to be offered here apply equally well to rental and owner-occupied housing, with a few exceptions to be noted as they surface.

Starter Home Development. Two very different species of site-built affordable housing will be discussed here as viable solutions to local housing crises. They will be termed "Private-Sector, Free-Market Housing" and "Public-Sector, Deed-Restricted Housing." A third, "Public Housing," or housing built primarily with public funds and subsidies, and managed by public entities, will be briefly discussed for the lessons it has to teach, but this kind of housing development is such a bad idea that it should be dismissed with some force. Government has no business in the housing business. It might even be impossible for a government to spend a dollar with greater than 50% of the efficiency of the private sector, largely for the reason that nobody in the public sector will be held accountable for error - and all they are spending is free money from the taxpayers, who have come to expect this sort of waste and don't seem inclined enough to rebel against it. For a fourth approach, typified by Habitat for Humanity, the reader is simply referred to: <u>Habitat-Wikipecia</u> and here: <u>Habitat-Home</u>.

Private-Sector, Free-Market Housing will be discussed first. This process involves maximizing value for cost, maintaining fiscal responsibility, and the personal accountability of real persons who have their life savings to lose. Because of this, it seems to be the area least understood by the public sector and its architects. The public sector approach to affordable housing, in other words, only rarely if ever asks the question: how do we construct affordable housing affordably? Fiscal responsibility is not a big part of its thinking.

Private-Sector, Free-Market Housing. The first large section will concentrate on what can be done to minimize building costs and maximize profitability within the constraints imposed by the purchasing power of the target buyer demographic. It will thus address the provision of housing for a slightly higher income bracket than that demographic targeted by the Public-Sector, Deed-Restricted Housing methods to follow in the next section.

Most of the principles involved in both the Private- and Public-Sector solutions apply equally well to the development of rental housing and starter housing, to stand-alone, single-family homes and to multi-family apartments and condominiums. They also apply to an enormous surge in demand now coming the market's way from the baby boomers, in the form of retiring seniors and empty-nesters, especially those with a combination of some modest equity and modest fixed incomes. The biggest difference between the owners and renters will be in the provisions made for building sweat equity. The biggest difference between the young families and the retiring seniors will be in the provisions made for the eventual physical expansion or enlargement of residential units.

There will be somewhat more public and political wariness of rental housing being developed by the private sector, even for agencies which naively assume that rentals are where all the solutions to housing problems lie. This is particularly true for the larger, multi-family apartment complexes. Some of this is due to stigma following the debacles in large, public housing projects, and some to our own cherished memories of the wild scenes and behavior in off-campus student housing. It is true that it will be in just such a complex that your debutante daughter will lose her virginity to the biker friend of the boy selling pot to your son. But that's life - suck it up and get past it. Approvals for rental projects will come easier, however, if some of the issues and stigma can be addressed in the development proposal, such as security issues, and easier approvals will translate ultimately into lower rents, since these costs are passed along and ultimately incorporated into rents. There is a frustration that accompanies the monthly vanishing of a hard-earned paycheck, there is a lack of the pride of place that comes with ownership, there is a sense of entitlement to more licentious and libertine fun and irresponsibility due to the high cost of rent, and there is in fact a somewhat higher rate for certain types of crime. Little can be done about these necessary social costs, except to either export them to distant bedroom communities or to weight the public favor towards the provision of starter homes to ease the pressure on the rental market and give renters more hope of eventual ownership and thus a longer-term sense of commitment to the community.

Public-Sector, Deed-Restricted Housing. This second section, Public-Private Partnerships, opens the discussion about what can be done to develop housing in a partnership, with each side doing what it does best and restraining itself from doing what it does badly. If the public sector has any sense, it will carry forward the affordable construction methods recommended for the private sector. It will then further reduce the overall unit costs with savings in the per-unit costs of land and infrastructure by using its discretionary powers in the modification of its own zoning laws. It might even further reduce the costs of unit construction using its ability to relax its own adopted construction standards. It is frequently suggested that the public entity take another step and waive such public charges as utility tap and use fees. This will not be recommended here as it constitutes a subsidy. The whole point of housing affordability should apply to all of the concerned parties, public and private, and projects which can demonstrate an ability to pay their own way will be the most likely models for long-range policy success.

In order to be motivated to implement an effective solution, however, the public entity will likely need to come either to a housing crisis or else to an emotionally mature understanding of its role in creating the crisis to come. The latter, of course, is preferable, and will lead to more reasoned and mature solutions. For a public entity to accept accountability for creating a problem is a rare thing indeed, and half of the budget of local governments seems spent on avoiding accountability, under its bafflegab alias of liability. But such an understanding and assumption of responsibility might bring the requisite courage to institute change, leaving only the problem of finding a workable vision. The workable vision must first of all concern and address the community's long-term socioeconomic health. Since a community is in a very real sense an ecosystem, many of the laws of ecology apply, and one of the best known of these is that the health and resilience of a system is directly proportionate to its diversity. You will of course find the same high value given to diversity or diversification in the fields of both sociology and economics. Socioeconomic diversity is the complex integration within a community of multiple levels of economic strata, lifestyles, points of view and cultural backgrounds. This is not the same as homogeneity - these elements are not just mixed or jumbled together in a textureless social mass, but they are in a dynamic proximity, interacting in a lively and productive manner, including arguing about the community's primary goals. In fact, it is the downfall of many a community when it does reach a consensus about what it is and where it is going - dissent is stifled, peer pressure is writ large into the law, and the right questions are no longer asked.

The method best suited to this public-private partnership uses a zoning category and process known as a Planned Unit Development, or P.U.D., to alter or vary the normal set of zoning standards in order to attain publicly acknowledged community goals and objectives. The laws enabling local governments to use local P.U.D.'s begin at the state level in state statutes, vary from state to state, and allow each local government its own wide latitude in interpreting the purpose, content and scope of this freedom to bend its own rules. Where I live, in Colorado, they are found in CRS Title 24. Article 67, the Planned Unit Development Act of 1972. See Appendix Two. Unfortunately, these state laws are often understood and implemented locally with a very limited vision of the potential of P.U.D's to solve a wide range of planning and design problems. A P.U.D. in many locales is little more than a sleazy excuse to subdivide, and sometimes upzone, in exchange for some open space. In fact, many of the ideas presented here are a little more visionary than most local P.U.D ordinances anticipate and would require a local government to modify its laws or to institute special P.U.D. legislation that specifically enables such public benefits as affordable housing. This is easy to do with the right combination of public pressure and public understanding, the latter being the rub.

Another key to the success of this public-private program is that the government must know when to stop governing. There is a point in the process where the government needs to turn things over to its partners in the private sector, to do what it does best, to wit, build housing units affordably in exchange for a reasonable profit. Beyond this point, the continued government management, micromanagement or interference rapidly becomes both counterproductive and needlessly expensive. To this end, contracts are written, called P.U.D. Agreements and Deed Restrictions, insuring that agreed upon terms, conditions and impact mitigation measures are performed and governing who owns or occupies these residential units and how ownership may be transferred. These are intended to secure the government and community objectives with a minimum of public cost and oversight. A government, in effect, grants a "redefinition" of allowable density and required costs and assessments in exchange for certain enforceable promises. The deed restriction, which runs with the title to the land until revoked or expired, might state, for example, that any new units created by this process will be occupied only by persons who have resided in the region for a year, who earn their primary incomes as hourly wages from businesses situated within the region, and who own no other property. Other criteria would qualify retired seniors on fixed incomes. The intent is to disqualify those who would merely invest in the project for profit, thereby eliminating much of the speculative demand which drives accelerated resale price increases. But the goals of this are primarily to keep the local workforce within the community and to maintain socioeconomic diversity, which must be seen as public benefits for the government to take special action. The goals of the

local master plan, a prominent feature of most local political archives, and the threat of disintegration of communities that fail to solve diversity problems can be cited here as rational bass of action.

While government has no business in the housing business, there are six useful services that it can perform: 1) Acknowledge its role in creating the housing problem in the first place and affirm the need to provide a relief valve for the pressures of pentup housing demand, in a way that favors new housing for those members of the community most likely to contribute to the community's overall socioeconomic health; 2) Declare socioeconomic diversity to be in the public interest, necessary to community health and worthy of instituting special zoning and standards considerations, 3) Reduce the cost of residential units by relaxing or modifying density and other zoning and building constraints, 4) Modify and/or finance tap fees and other impact exactions, perhaps to make them reflect lowered actual impacts (rather than waiving them), 5) Secure and guarantee these and other cost reductions to both the community and to its qualified members by contract and deed restriction, and 6) Step back and stop meddling when the proper time has come, relying on contracts and deed restrictions to take most of the place of micromanagement and oversight.

Part One: Free-Market Housing and Affordable Construction

Free-market housing is developed by private entrepreneurs as a response to market demand, usually with little or no cooperation from the municipality or county in which the project sits. It is more likely, in fact, that a free-market project will encounter adversarialism and even hostility from the local governing bodies if it threatens to house lower-income residents anywhere near the more upscale neighborhoods, or even to lower the mean appraised value of local housing units in the region. Whether the units are for rental or for sale, they must be constructed for, at most, a reasonable profit margin less than what renters and buyers can afford. To qualify as affordable, this in turn means housing costs below 30% of gross household income. Land, infrastructure and utility taps must be acquired at the same costs as those paid by higher-end projects, although affordable projects will likely be sited on smaller lots and lots in somewhat less demand. All of this puts the burden of affordability squarely on the shoulders of the design-build team.

Public-Private Cooperation is Limited. There are a few points of public-private contact where some savings may be found, but cooperation from the public sector will be unlikely unless public officials are under a great deal of political pressure to accommodate affordability issues. It should be understood that the public sector is by law forbidden from extending special privileges and deals which are not extended to all persons equally, and from making any special arrangements or agreements with favored parties. If a proposal is made to modify or reinterpret existing standards and rules, then the public entity must be explicitly willing to set a precedent in this direction. But it is also possible to design unassailable land use ordinances that allow review of projects on a case-by-case basis, on the specific merits of a project. I will touch briefly upon these points before proceeding to areas of guaranteed savings based solely upon private decisions. For more detail, see my somewhat angrier article in Appendix Three: Local Regulatory Obstacles to Affordable and Green Construction.

Codes. The adopted building codes often allow for "alternative materials, design and methods of construction," subject to the approval of the building official, who will almost invariably require a fairly costly certification of the alternative by a licensed architect or engineer. On rare occasions, a community may adopt a standard or uniform building code with exceptions made for violations of common sense, or an Alternative Owner-Builder Code, see Appendix One for a sample, allowing construction which "does not abnormally endanger health or safety," usually provided that the developer is willing to sign a liability waiver. Unfortunately, the carefully cultivated lack of accountability in public office very often attracts "public servants" with marked passive-aggressive personality disorders, who will quickly turn every empowering May into a Shall, and then lean back and enjoy telling the supplicants seeking permits what he "cannot" permit him to do. What is little understood by those who vote to adopt these codes is: a) there is no public liability for unsafe construction until the codes are adopted and enforced, b) these codes can me modified at the time of adoption, or at any time later, to broadly exclude any or all violations of common sense, c) the codes normally address generalized design solutions to worst-casescenarios which may not even exist, occur or be possible in the local region, and d) the structural values adopted in these codes are frequently only half of the real structural values of the building materials so rated, or conversely, the required design loads are double the maximum loads which might reasonably be expected. Safety factors of 100% are routinely built into these codes, but are completely unnecessary from the

standpoint of sound engineering and public safety, let alone public liability. Safety margins of 25 to 50% are normally perfectly adequate.

For your amusement, this is history's first building code, and a model of simplicity: "If a builder build a house for someone and complete it, he shall give him a fee of two shekels in money for each sar of surface. If a builder build a house for some one, and does not construct it properly, and the house which he built fall in and kill its owner, then that builder shall be put to death. If it kill the son of the owner the son of that builder shall be put to death. If it kill a slave of the owner, then he shall pay slave for slave to the owner of the house. If it ruin goods, he shall make compensation for all that has been ruined, and inasmuch as he did not construct properly this house which he built and it fell, he shall re-erect the house from his own means. If a builder build a house for some one, even though he has not yet completed it; if then the walls seem toppling, the builder must make the walls solid from his own means." Code of Hammurabi, King of Babylon, c. 1810 BCE – 1750 BCE.

Standards. Those standards which are not officially adopted, but are enforced by planning and building officials add another layer of "protection" and regulation to the adopted codes. Unfortunately these are often simply boilerplate items lifted from the codes of neighboring communities and more often than not are left unexamined for their scientific merits or sound engineering principles. Further, they will often compound extreme safety factors already built into the adopted codes, leading to absurd degrees of overbuilding. Good examples in southwest Colorado tend to be extreme frost depth specifications for soils in which the frost heave phenomenon, for which they are instituted, cannot physically occur, and design requirements for de facto snow depths, when all inter-multiplied safety factors are accounted for, in excess of thirty feet, or eight times anticipated maximums. It may be possible to have these standards modified locally, upon a petition from a number of architects, engineers and professional builders, but this may require that local officials admit that they have been in error. It should be noted here, however, that some of these standards tend to be more area-specific and reasonable than others: these more realistic numbers often include wind speeds, design temperatures, and flood elevations.

Fees. Tap and impact fees might be somewhat modifiable with sufficient justification. Although many subsidized housing programs request such waivers, often waivers of such fees in full, this will not be recommended here, even for public-private partnerships and deed-restricted housing. True affordable housing should pay its way or fair share and not burden the public, or create the kind of resentments that subsidies might bring. That said, it might be plausibly or cogently argued that a small or modest house, or one with fewer than the average number of occupants, or one with strict regulations favoring water conservation, does in fact have a lesser impact on public infrastructure and many public services. Some fair fee modifications, based solely upon these considerations, might be negotiated.

Given the above constraints, the private-sector developer is left with the task of constructing acceptable residential properties at the lowest possible cost. The first dilemma to face, or choice to be made, is between site-built and manufactured housing. Clearly, if a developer wants to simply get in and out, and the success of subsequent projects will not rely on the appearance, or the neighborhood character, or the aesthetic appeal of what went before, then the "upscale trailer park" with modular housing might be the choice. But this quickest solution is not necessarily the least expensive or the most profitable path. Design limitations imposed by the dimensional constraints of unit transport across state highways, and redundant structures required by the stresses of transport, will always mean greater consumption of building materials and much less design flexibility. Standard construction details and aesthetically deficient design sense

in the manufacturer's mindset may reduce both curb appeal and buyer demand for the property. Shipping, extra site and foundation preparation, taxes and seller commissions must all be included in the budget. It may well be that site-built housing is cheaper, better looking and better for the local economy than manufactured housing. It engages the local work force and those wages are spent back into the local economy.

Life-Cycle Cost Analysis. To complicate matters, there are a handful of economic principles which, if applied in the interest of saving the renters or homeowners money over the life of the building, or even over their term of occupancy, will add significantly to the initial costs and purchase price of housing. The developer is put in the challenging position of having to educate the buyer and make a higher initial bottom line look more attractive and sensible. Building to reduce maintenance costs is one good example. If a builder spends X dollars more on fiber-cement siding to avoid an X dollar paint job every six years, the ultimate savings will be immense, but the house merely looks more expensive to the uneducated buyer. Life-cycle cost savings have this problem as well - an appliance that costs twice as much, but lasts three times as long as another, is actually more affordable in the long run. A site-built solar collector that is only half as efficient as a manufactured panel is in fact half-again more efficient if it only costs a third as much. An analysis of payback periods is advisable, and this may need to be made explicit and written down for the buyer and his banker. This can sometimes be most easily understood in terms of interest rates, or rates of return on investment: an expense with a seven-year payback can be viewed as having a fourteen percent annual return. That's an extremely attractive investment, worthy of savvy venture capitalists. In fact, any interest rate greater than the prime lending rate should be taken very seriously.

Economy of Scale. This is another important early consideration. While site-built housing might still be made competitive with modular housing on a unit-to-unit basis, the real competitiveness begins with the construction of multiple units, preferably six or more at a time, with staggered starts and dates of completion to keep smaller groups of sub-contractors happily moving in an orderly sequence through the project. Big savings can be had in purchasing six to twelve identical appliances. A little expertise in timing can help here as well - for example, pouring foundations in late fall when foundation contractors are running out of work, and then framing in early spring while most of the framing contractors are waiting in line behind concrete contractors who are waiting for the ground to thaw. It may pay to have such thoughts as "snow is easier to sweep than rain." With economy of scale it isn't necessary to build all units alike, but it will certainly help if a design solution can be applied in multiple places - the timeconsuming head scratching happens only once and then the builder is wise to the problem. Custom options on spec-built units should be kept to a very simple set of easily interchangeable ideas, and signs should even be made that tell waiting buyers that these are the only options. You can have any color you want on the Model T, as long as it's black. This is not custom home building that we are describing or doing here.

Building Size and Shape. Clearly, unit size is one of the single biggest factors in unit cost, and the question to ask is not what people want but what will they accept. A developer needs to understand the difference between the buyers' felt needs and their real needs. Yes, the glamor bath with the separate tub and shower will appeal emotionally to a young couple, but that glamorous tub might only be used a dozen times in twenty years - is it really worth five percent of the house? In cold climates, it is often mistakenly thought that airlock entries are big energy savers, but the fact is, any cold air entering the house still needs to be heated to room temperature whether it's in an airlock or not. Airlocks merely moderate the directness of cold air blasts, and this

is at the cost of an extra door and several square feet of building. Getting familiar with space-efficient floor plans will be very helpful. Some of the most efficient plans available can be found across the country in tried-and-true company and military-base housing (we're talking floor plans here, not exteriors). Some very efficient mobile home ideas are also adaptable to squarer shapes. When it comes to absolute minimum residential unit sizes. I have seen habitable efficiency units a low as 336 square feet and comfortable ones at 448. An extremely efficient three bedroom unit can fit within 768 square feet, and they are commonly found in mobile homes at 924. In most cases, given those numbers, I would not really see a need to exceed 1500 gross square feet for the largest affordable unit, a single-family starter home with up to four bedrooms. Two of the most common features of the commonly-found, affordable plans will be a main entry located close to the center of the unit and a minimum of square footage wasted in hallways, stairways or other circulation features. Simplicity of shape and form plays a big part in affordability - the basic box is of course the king of economy, and this rarely takes more than two well-proportioned additional features to make it look not like a box. Every corner and angle costs money, and every edge where materials change, so these should be used carefully; every curve - well, call those learning curves. Shed dormers, for this reason, are cheaper than doghouse or gable dormers. Design dimensions on modules or rhythms which are based on the standard sizes of building materials also play a big part in savings. For structures, these will preferentially use 4 foot, 2 foot and 16 inch increments. A 19 by 23 foot building will likely be more expensive to build than an even larger 20 foot by 24 foot building because the builder isn't cutting off wasted material and then paying to have it hauled away. Designing with other standard dimensions can help as well. A bedroom 12'2" wide will cost a lot more to carpet than 12'0" because carpet comes in 12 foot widths. Linoleum likes increments based on six feet.

Type of Construction. It is not a great cause for happiness and celebration that the conventional way of building is so for the simple reason that it provides acceptable habitable space for the lowest average cost. Numerous alternative and more environmentally friendly methods and materials vie for the developer's attention, but these will rarely offer budgets of less than 15-25% above conventional numbers, an added construction expense that must then be sold to the buyer as either aesthetics or good conscience. Often part of the reason for this is that patent holders want to reap as much profit as they can from their ideas, and a 15% surcharge seems to be what the market will pay for a cleaner conscience. It doesn't help that these newfangled building ideas make the building officials nervous enough to require either expensive engineering or redundant conventional systems. It doesn't help that the prices of mined materials, petroleum products and forest products are kept lower than they would be in a free market by subsidies and public lands resource giveaways - the prices of building materials thus do not reflect their actual scarcity or their strategic value to future generations. Sometimes these alternatives do get built more cheaply, particularly when the alternate methods and materials are very labor intensive, but this is usually with sweat equity programs, or by owner-builders and community efforts, not developers. If this is your case, certain alternatives, particularly unpatented ones like strawbale, cobb, or surface-bonded block, are certainly worth investigating. Also you might look into getting some free labor by turning the project into a hands-on educational class in that type of building. This is a fair trade of knowledge-for-labor. Generally speaking, the most affordable construction is going to roughly approximate conventional methods and materials. There may be some solace in the fact that even the greenest of alternative materials can contain vast amounts of embodied or embedded energy and water, the true environmental costs of materials. But some more satisfaction can also

be had in using these conventional materials, and their embodied environmental costs, with a much greater economy and efficiency that business-as-usual construction practices. In fact, if you can build with 20% less material you are probably doing as much for the environment as nearly any of the so-called greener solutions.

Aesthetics. When a developer is building affordable housing within a larger context of free-market development, as is often the case with inclusionary requirements, it becomes imperative to avoid dragging his own nearby land values down by erecting cheap-looking structures and setting a Dogpatch or Trailer-Park architectural theme. Surprisingly, this may need to be mentioned to some developers. Outside of this condition, curb appeal will at least play a big part later in a project's life, in permitting higher resale values. It will also reduce the developer's interest costs, as he may not have to sit as long on his unsold inventory, waiting for depressing or boring-looking units to sell. Making a project attractive isn't necessarily any more expensive either. Ways of building, and ways of making buildings look, will find their way into the vernacular architecture by satisfying a combination of needs over a long period of time, including both affordability and a sense or feeling of home. It is true that, as H. L. Mencken observed, "Nobody ever went broke underestimating the taste of the American public." One has only to look at what passes for "architecture" in the typical American suburb, or thumb through the weekly "Fine Homes" supplement in the Sunday paper. Yes, these homes were built with the builder's affordability in mind, and sold for what the market would bear. But this is not proof that bad architecture is a necessary component of affordability, any more than the bad architecture that comes to it's foundation by truck and crane. Often that heartbreakingly cute little cottage reflects a winning combination of tried and true design practices; that little victorian row-house reflects a way of building that made exceptionally good use of materials that once had to be tediously milled by hand. I have made a practice recently of photographing the television screen whenever a house is featured in a motion picture. This reflects the taste of the guy in charge of film locations, but it must also be approved or seconded by his creative superiors. I think the result speaks much more to what people want when they fantasize about a home, at least more than the typical suburban home that was used in Poltergeist to show all-around bad judgment. The location people tend to put the criminals in the ugly homes and trailer parks. So guess what styles most of the heroes live in? All of our main historical vernaculars - craftsman, more than any other, then other types of cottages and bungalows, then farmhouses, southwestern adobes and victorian era styles. All but the adobes have the nice, wide eaves with raked soffits, and all but some Craftsman homes have roof slopes above six-in-twelve, features that you just don't see on a tract home, or that you just can't get on a modular home without paying prohibitive premiums.

Site-Specific Design. One of the biggest disadvantage of modular housing is that the basic house plans are designed without any regard for a specific location or orientation, although some flexibility is still possible with mirror-plans, and north-facing windows can be shortened within the limits imposed by egress requirements. With a known site you can still customize repeatable designs and design features for multiple locations and orientations, while taking much better advantages of such variables as street orientation, site slope, solar exposure, neighborhood and views. In areas where there are mountains, great views or long winters, it is a good thing to do for the resident's state of mind to set the window rough opening heights as high as 8.5" below the top of wall, even if this doesn't align with the tops of the doors - this allows for a 5.5" header and a much better view of the horizon from deep within the room. This helps a lot with claustrophobia and seasonal affective disorder.

Square-Foot Costs. In shopping for both designers and builders, it's important to examine their abilities and track records in terms of cost per unit of building. In order to do this correctly it is equally important to ask how this is measured, to get an apples-to-apples consistency. I prefer to use the least flattering number. For a design-build team, I want to look at the cost of everything but the raw land, including the design, engineering and approval fees, tap fees and local taxes, all the way through the final landscaping. This is especially important if one is considering modular homes. If I am just looking at builders, I might leave out the design, engineering and approval fees, tap fees and local taxes, but I will do this consistently. Further, I like to make this reflect the actual costs of building a little more accurately by counting only finished habitable spaces (including exterior walls) at their full value. I will count garages, useable floor area under five feet high and unfinished basement and attic spaces at half of their actual size and porches and decks at one-fourth. When asked to bid a design, I will use a square foot number based on these figures.

The Design Team. As a self-taught building designer. I have to admit that I have no particular reason to recommend licensed architects over self-taught building designers. At eighteen I did take one semester in college as an architecture major, under Richard Neutra, but I was already earning my way through college by designing medical centers and remodeling a large hospital, with no more help than a boiler engineer and a cabinet full of old plans for reference. Like any guild monopoly, architects have their secret handshakes and bigger secrets as well. They want you to think that the educational process and apprenticeship they go through is the only way to acquire competence. They have certainly learned how to write tight contracts, for their benefit, and they are far more likely to keep current on all of the latest design fads. But it still isn't part of their curriculum to work out on the job, cursing the architects for having so little appreciation of the real building experience. And affordability will not be a primary concern when their fees are based upon a percentage of building cost. Laws regarding the necessity of licenses vary from state to state. In Colorado, a designer may go it alone if the project is less than four stories in height and all buildings are fourplexes or less. Most of the time the building inspector will require the stamp of a professional engineer, at least for the foundation and often for the major structural elements. I never complain about this - the stamp comes with the engineer's liability insurance, which designers most often will not carry. I like not carrying insurance too it makes me twice as cautious, double-checking my math, to avoid even the minor professional embarrassments. On average, including the engineer's stamp, my design work averages about a third of the cost of a licensed architect. All that is really needed in a designer, including licensed architects, is a good, working knowledge of the building trades, the kind of design sense that is learned instead of taught, a three-footlong shelf of books containing all of those big secret mysteries and formulae, a working knowledge of high school algebra and trig, and an unspecified number of years of real-world experience. I have to confess to being a dinosaur when it comes to CAD - much preferring to draw by hand, and then using the computer for the standard details and construction specifications package. But I'm starting to offer the option of subbing CAD work out for the clients who insist. Your own ideas or pre-conceptions about what is needed will decide this question. The search for a designer, particularly for affordable projects, is best focused on projected design costs, personal visits to buildings already completed, references from builders and references from clients. When you approach a potential designer with the criterion of affordability near the top of your list, just about anybody looking for work will claim that affordable design is an important part of his skill set. The cost-saving strategies and techniques outlined herein may serve you well as the basis for a pop quiz to test this claim. Most of the ideas here

are not new, even if the collection and arrangement is unique. Most of these tips have been well-published over the years in such respectable places as Fine Homebuilding magazine and the books of Taunton Press, If affordable design is truly important to this designer, he will have been paying attention. Don't let him fool you - we are talking about lots of money here.

The General Contractor or Project Manager. The same pop quiz on cost-saving strategies and techniques should be sprung on any applicant for this job as well. Sitebuilt affordable housing is not the same as custom, stick-built housing, not even close. If a true specialist in affordable construction cannot be found, this may require the careful reeducation of an experienced building contractor or sub, who may have long ago adopted certain standard ways of bidding projects and of putting materials together. This will require a sharp pencil, careful management and a sustained effort in frugality. When a particular cost-saving technique is introduced to a builder who is set in his ways, and the majority are, a typical reaction will be: "That's only a hundred dollars worth of wood. It's not worth worrying about, or the cost of changing the way I do things. There are good reasons why we do things the way that I do them." But this is also another hundred dollars in labor to install the unnecessary wood. And this also replaces insulation with thermal bridging, adding a hundred dollars to lifetime heating costs. And then there is the cumulative financing interest paid by the buyer on this three hundred dollars, amounting to an additional five hundred. And this builder has said this about at least fifty of the cost saving tips that you have wanted to put into practice. Suddenly this has added up to forty thousand dollars in savings forgone, simply because this contractor is reluctant to learn anything new. He should be paying his own tuition, you are not his parent. The fact that this guy's construction price adds up to roughly the same as normal construction in the area helps to disguise the fact that this is still the result of extremely wasteful construction practices. While interviewing an applicant, it may be a good idea to keep a running count of how many times he dismisses a cost- saving technique and how guickly - it will tell you much about how much he is willing to learn. Once again, check his references carefully, with specific attention to affordability criteria. In this case, you should also ask a few of the architects or designers that this builder has worked with about any habits or tendencies he has to deviate from plans and specifications, and whether these decisions cost or saved money, and whether these decisions improved or weakened the project. If the project manager is the developer, and he has not had a great deal of building experience, and he expects to still be able to save a lot of money, he should know that most of his expected savings should really be earmarked in advance for tuition, in the school of hard knocks, but hey - how else are you going to get experience? Finally, if you do wind up finding a builder who is willing to learn more affordable construction practices, it will still not serve your needs at all if he is not willing to modify his bidding practices and rules of thumb at the same time.

Program Development. There is a lot of dynamic tension between what buyers and renters want, what they only think they want, what they really need and what they will accept. Half of the challenge of affordable design is in finding the proper balance between all of these. With married couples, the other three-quarters [sic] is in getting the wife to approve of your decisions. A lot of questions need to be asked in the harsh light of affordability issues. Some answers become decisions that will be hard to reverse beyond even the preliminary stage of design: Are those nine-foot ceilings not more suited to custom homes? Is that glamor bath with a separate soaking tub and shower really worth the cost? Can you make the decision on behalf of the buyer to stack the washer and dryer? How much storage is needed and how much of a pain in the ass can it be to get to? And then some answers can change as you go along: How

much future flexibility do you want to build into the design? Is it enough to provide a two-foot space in the lower kitchen cabinets, with rough plumbing already in place, for a future dishwasher? How far do you go, or more often and importantly, where do you force yourself to stop, in providing what will one day be needed in an unfinished basement or attic? There is no getting around the first set of hard-to-reverse decisions. My own preferences for affordable projects are for eight-foot ceilings, shower-tub combinations, stacked two-piece laundries and plenty of storage that you don't really need to walk around in, As to the second category, in general, I tend to prefer designing for maximum flexibility, leaving open as many options as possible for future DIY and sweat-equity projects, leaving something out or unfinished whenever I can get away with it. For me there is no sense making affordable housing any less affordable up front than it needs to be. Further, the items omitted can always be placed on a punch list, to be re-included in the turn-key package if this is desired by the buyer.

Building Height. It is a too-little questioned assumption that two-story construction is cheaper to build, due to somewhat smaller foundation perimeters and more efficient coverage by the roof. This isn't always the case. You not only have to build a staircase for this, you also have to design around it, and allow for extra hallway to circulate around the stairs, and count all of that space twice in your square footage allowances against your maximums. On top of this, you begin to eliminate the growing proportion of seniors with aging knees from your pool of potential buyers. The cheapest way to build remains the single-story with a slab-on-grade foundation and floor, and a light wood truss roof system, and vaulted ceilings made with scissor trusses. If total spans remain fairly short, or if there is a central bearing wall or girder, this can be made even more efficient by using attic trusses for second-floor spaces. Balloon framing, to get partial second floors with low exterior walls, has gone out of fashion, but it remains a labor saving affordable option. It will tend to trade more cost-efficient trusses for rafters and ridge beams, and modern restrictions on the height of stud walls, combined with diminishing quality of available 10-12 foot studs, suggest using LSL studs, but these can also utilize 24" centers more comfortably than conventional studs.

Roof Pitch. Snow accumulation is not a reason to go to steeper roof pitches. Due to the ultra conservative multiplication of safety factors in codes and standards, most roofs can actually withstand eight times the maximum expected loads. Furthermore, snow accumulation on a roof acts as a blanket to help insulate the space below from the colder temperatures above. Aesthetics is a big reason. Pitches between three- and six-in- twelve, particularly with stubby gable ends and flat soffits on the rake ends, scream "double-wide" or modular, reducing curb appeal and apparent value. This association is largely a function of hauling regulations for modular units. These low pitches, even down to two-in-twelve, can be made a lot more appealing with wide, even exaggerated eaves, provided that soffits are sloped, or even better, rafter tails are exposed. This look is fairly common in craftsman-style homes. For steeper roofs, there is no need to jump all the way up to twelve-in-twelve. There are head clearance issues for sloped ceilings over partial second floors, but if the short wall is 64.5" or higher (see below), anything over seven in twelve will do. If you are really fussy about cost, the length of a roof slope may be made a multiple of 2 or 4 feet, to cut down on waste of rafter and sheathing materials. One of my favorite roof pitches is 7.5-in-12, or 5-in-8, which approximates the golden ratio and is found a lot in Craftsman and Japanese architecture.

Garages. I always thought it was a peculiar thing to build a special house for a parked car to live in, especially given that most cars already come with a few coats of waterproof paint. I also thought it peculiar that so many governments, developers and homeowners associations are so insistent that these things be provided, replacing a

relatively small artifact of colorful metal parked in the yard with a much larger, more visually intrusive structure in which to conceal it. Of course, at the same time, a garage makes a wonderful storage shed and workshop. On the whole, I would have to suggest letting the garage be a punch-list add-on, or an optional item. But it should be one that is already well thought through, with working drawings on the same set of plans as that of the main residence. This also leaves the buyer the option of setting up a less-expensive, temporary or semi-permanent backyard shed for storage and workshop space, If the aesthetic appeal of such accessory structures is particularly important, designs can be made subject to approval, according to criteria in the CC&R's.

Pre-Designing with Sub-Contractors. As soon as the preliminary plans are developed, someone on the design-build team should meet individually with the subcontractors, if known, in each of the various trades. No matter how well-informed the general team might be, the specialists are likely to know a lot more about their own fields, and particularly what's the best buy in a fixture and what's new in emerging technologies. And, just like general contractors can get set in their ways, and have their tried and true ways to bid projects based upon how things are normally done, they will treat you just like the average customer and give you average prices per fixture unit until you can convince them that you and your project are special, and in need of a sharper pencil and a closer analysis of actual costs. Of course, hand in hand with this, they need to be informed of your goal of unusual degrees of affordability and asked for their expert help in suggesting the most cost-effective way of doing things properly. Be willing to offer them an hourly fee for this time and effort. Because you are asking them to do a closer analysis and arrive at lower bid, it might also be a good idea to promise them that you won't share these lower numbers indiscriminately, or that you will tell others how pleased you were that these people were willing to work with you on developing the best cost-effective design solutions, and that was how you got the price down.

Purchasing Materials. It's always important to remember that materials are sold by salesmen, often on a commission basis. Your own goals of affordability are not in an especially harmonious resonance with this. Many, many times I have uncovered both attempted and successful end runs around very specific construction specifications, wherein the materials supplier approaches the contractor directly and convinces him to upgrade from the materials specified, or else simply supplies the unnecessary material. Generally speaking, free-market construction in a fairly prosperous economy can be thought to be one step up in almost every specification from what is truly needed in affordable construction, and from what is actually required by the already-conservative building codes. In other words, half-inch plywood is used where three-eights will do, and three-quarters is used where five-eighths will do. Studs and joists 16" on center could as easily be 19.2" on center. This relentless push to upgrade can be most annoving for a designer who is working carefully towards affordability and is using real algebra to calculate precisely what materials are actually required. I have even taken to adding a paragraph to my specifications documents, making the supplier accountable for the costs of unneeded materials, or requiring him to waive restocking fees. Finally, some sort of cursory cost-benefit analysis needs to be made on your own time and energy spent in trying to save money on materials. Clearly, time taken shopping around is an activity with diminishing returns, and there are advantages to purchasing materials and supplies from a more limited number of sources.

Site Work. A lot of time and effort can be wasted in moving things around. It is usually worth a few hours to think your staging areas through. Ideally, stocks of materials and supplies should sit where they are when unloaded, until they are moved to their final location. Of special concern is the staging of excavated materials, and one

reason for the special concern is that opportunities are often wasted. Most excavations involve at least two layers or strata of material. It is an increasingly common practice to store the topsoil in a separate place from the inorganic material in the lower layers. But suppose you have a layer of clay and a layer of well-drained material with much sand and gravel, or a layer of rubble, or a layer of stone. Since most layers have specific uses, it may be worthwhile to pile them separately. Well-drained material can be used to backfill against the foundation to reduce hydrostatic pressure and improve drainage, and can replace a specification for more expensive, imported gravel to accomplish the same purpose. Stone of course is a fine thing for landscaping. Coarse rubble can be used in a rubble-trench foundation to reduce the foundation depth. Rubble may also make a good sub-base for driveways. Clay makes a great cap layer when placed around the a house just before the topsoil - it will shed water away from the house whenever it gets wet, assuming the sense to give it some slope. Even the forces that disturb the topsoil can be put to use. It is fairly inexpensive to take a couple of topsoil samples, have them tested, and get recommendations for fertilizers and other soil amendments. Do the tests and apply these additives before the topsoil is removed, stored and replaced and they will get very well mixed in the process. Many organizations offer trees at bargain prices. There are state and university forestry and agricultural programs, environmental groups and arbor day festivities to take advantage of.

Foundations. Where required frost depths are greater than 24 inches, both rubbletrench foundations and shallow, frost-protected footings may be worth investigating. Since foundation engineering is often required anyway, the design may not be any more costly. Formed walls are still less expensive than ICF walls, at least where conditioned crawl spaces and basements are not planned, and the most cost- effective wall heights are still 4 and 8 feet even. A word should be said about the four-inch gravel base that is normally placed beneath slabs: it is normally unnecessary, unless the slab is below grade and not on well-drained soil. This habit has crept in from early engineering advice against pouring slabs on a base with rocks larger than 4 inches. This was simply a lazy way to be sure that slowly became a bad habit.

Framing. Although framing constitutes a smaller percentage of total building cost than most people outside the industry realize, a lot of valuable cost saving tricks still add up to significant savings. Most builders I have seen seem unaware of the strength of wood. A single 2x6 stud or trimmer can usually carry 4000 lbs or more. A pair of 2x6's used as a header will carry 2400 lbs across a 6 foot span; a 3.5x5.5 LSL header will do the same, but will also carry up to 10,000 lbs up to 3 feet. The sheathing above openings, if properly placed, also has a structural value not ordinarily counted. Yet many builders will routinely use a 5.5x11.25" flitch header for all loads, even on lightbearing gable walls. Sometimes headers over openings are even unnecessary: when the rim joist above has sufficient structural value, a couple of joist hangers on the rim over the opening will perform the same job. I will often see six to twelve packed studs to carry the end of a beam with an eight kip load, which may only require two studs. The 19.2" option for centers of joists and rafters is often overlooked - this divides eight foot lengths into 5 even bays instead of 6. Many studs may often be eliminated at wall intersections and corners by using drywall clips. Rim joists for upper floors, with loads of less than 1000 plf, don't need to be as strong as LSL provides - they can be ripped from sheets of 3/4" ply, if the holding strength of bolts for any ledgers is reconsidered.. The rafters in vaulted or sloped ceilings are often greatly oversized to accommodate required R-values for insulation and venting. In many cases these can be reduced to 2x6 and the roof venting eliminated by using 5.5 inches of polyurethane insulation, either foamed-in-place or as sheets caulked in place. The insulation is more expensive,

but the structural and venting savings may be favorable. Sometimes savings can be found in the specification of wall heights. A 100.5" wall height may cost less than the standard 97.125," even with the extra time it takes to cut the cheaper 96" studs to exact lengths, and this can also be a good compromise alternative to 9 foot ceilings. Codes also permit elimination of the second top plate in wall framing, assuming the use of specific connector plates and either a rim joist above or the alignment of the studs with rafters or trusses above. For half-floor pony walls bearing sloped ceiling joists, 64.5" is a good wall height, using 10- foot 2x6's cut in half, with no waste, and it is still tall enough for a 6 ft person to stand with his shoulder against it without hitting his head on the ceiling. I have already mentioned that in most practices structural sheathing exceeds the required thickness by 1/8 of an inch. The main thing to watch if using 3/8" wall sheathing for wind shear is the cost of custom jamb extensions, if you aren't already using the less expensive drywall returns, or else upgrading to 5/8" drywall to make up the difference, which you may want to do anyway if you are using studs on 24" centers. In very tight urban situations, with strict limits on site coverage and gross floor area, you might consider picking up 20-50 square feet of net floor area within the gross allowable by using 2x4 exterior walls with fairly expensive R-7 per inch insulation.

Enclosure. Many forms of sheathing require neither shear panels beneath them, nor house wrap, if the edges are sealed. Sub-sheathing is usually only required on portions of exterior walls, defined by wind-shear guidelines. Elsewhere, much of this can be replaced with lighter, better insulating materials. There are adhesive strip alternatives to house wrap for all applications. Beside T-111 siding and similar products, clear, rough-sawn 4x8,9&10 panels are available, which need only applied vertical batts over the fasteners to give a board-and-batt look. I will often use a wainscot below this if panel lengths are exceeded, to avoid unsightly Z flashing. Ungalvanized 26 ga corrugated metal, stood off 1.5" from the sheathing and flashed above, is an inexpensive material for this. Masonry stucco, maybe with a more modern color coat, should not be dismissed out of hand, since this may pay for itself in savings on maintenance. The same is true for permanently colored fiber-cement siding, provided that one is endowed with some exceptionally good taste in color selection. If you are planning to use horizontal lap siding, you may find that the slightly more expensive 5 and 6-inch reveal has a lot more curb appeal than the 8-inch. Similarly, it may prove a good aesthetic investment to add a simple touch of class to boring exterior trim. Stucco will also help break up monotony in a multi-unit development. For roof systems, three tab-shingles on felt, with baffled ridge vent and ice shield at the eaves, or simply Propanel on felt are the most straight forward. Ungalvanized 26 ga corrugated metal intended to rust is a lot less expensive than Corten, but it will rust through eventually, and so it is normally installed over a bituthene membrane covering the entire roof. I am not afraid of flat roofs as much as I'm afraid of roofing contractors who cannot install them properly, or who convince the builder to replace what is specified with systems needing frequent maintenance. I like simple sheet goods, 60 mil EPDM or TPO, or torch down, in as close to a single sheet as possible. For the flattest slopes, I make sure that there is still 1/8" per foot of positive drainage from the midpoint of the span under total load deflection.

Doors and Windows. Energy efficiency issues are simple questions of code compliance these days, leaving cost combined with durability and simplicity of installation to drive good decisions. Commercial systems, and enameled thermal-break aluminum windows (with drywall returns and waterproof interior sills) should at least be investigated. For casing and trim, MDF can pose challenges with nailing and moisture, but it's the cheapest. Paint-grade finger-jointed wood is next, if the look and

color of real wood is too expensive. The really cheap-looking, narrow streamline trim is not nice enough for affordable housing. Where it shows, you can afford to show a little class. Only one exterior door needs to be 36" wide. I like insulated fiberglass or metal doors, and sliding patio doors for cost. On interior doors, I like to take a step up and use raised 6 and even 4 panel units, but I don't know if this touch of class cuts down on the fist-holes made in rental unit doors or not. One should also go a step or two up from the cheapest polished-brass door hardware.

Plumbing and Electrical. As discussed above, details and specifications for these big-budget items should be worked out using the normally superior knowledge of their contractors. You want the most for the least, which is most often one step or grade up from the least. Don't look for the cheapest thing, but start looking at the second cheapest, while keeping life-cycle costs and durability in mind. Classic styles may offer some benefits too: fashions come and go rapidly in both plumbing and electrical fixtures, and often they go for good reasons. Definitely plan on energy-saving light bulbs throughout, even though the "waste" heat will no longer help to heat the home in winter. Fixtures and appliances are still cheapest when they are white. New technologies in both fields are worth exploring, or at least asking about, such as plumbing vent substitutes and wireless light switching.

HVAC. Buyers love radiant in-floor heating, but you cannot give this to them. It is far too expensive, and high in maintenance costs as well. New subject. Forced-air heating is still the best deal for multiple-bedroom residences, and the technology of noise reduction has been much improved with multiple-speed blowers. The main ductwork can also be provided with a number of inline retrofit options, as for airconditioners, air filters and humidifiers. Electric baseboard heaters are still the cheapest up front, but the savings still vanish in just a few years. I don't hesitate, however, to put a small one in wet rooms with plumbing walls. For smaller or simpler residential units, both free-standing and direct-vent wall-mounted heaters are an inexpensive option, with or without the glowing ceramic elements. If not centrally located, then consider an ultra low-sone method of air circulation. Low-sone blowers can also be used to bring hot air from above down to the floor or into a conditioned crawl space. A wellinsulated or winter-sealable operable window at the high point of the conditioned space, combined with equal ventilation low on the north side will cut cooling costs considerably. For hot water heating, demand heaters have attractive payback periods, which get even better in one and two person units. Check flow rates against both incoming water temperature and altitude and up-size as needed, but I still would not size a unit for two people bathing at the same time in units smaller than three or four bedrooms.

Solar. Smart energy use begins with tight design, conservation and efficiency. But efficiency is ultimately measured at the bottom line. When looking at the cost of alternate energy it is important to look at the total cost of the system after it needs complete replacement. If a system is sold with a twenty year payback and only survives fifteen, then you have spent yet another five years worth on your good conscience. Heat is the cheapest energy to gather, and water is the cheapest way to store it. Pound for pound, water will hold 4.75 times as much heat as concrete. Tubes with water, under glass, in site-built collectors is the most straightforward. The water needs to self-drain in freezing conditions, but such a system is much more cost-effective than one using antifreeze. Dual-pane, 34x76 patio door replacement glazing, salvaged if possible, is the most cost-effective glass. Save wind and photovoltaics for only the most efficient and necessary appliances and electronics. I try to discourage clients from using the term "passive solar," and also from looking to active solar as the only alternative. Hybrid solar lies between these extremes. You might allow yourself a

single pump or fan, a differential thermostat to switch it, some insulated ducts or pipes, and a tank or two. You don't have all the things to break down or go wrong that you do with active solar, and you don't need to make the whole of your design serve solar gain and shadows like you do with passive solar. You can set your collectors along a garden wall if you like. And you don't have to live in a solar oven whenever the sun comes out. Don't forget that the sun only shines from the south for one instant each day - the rest of useful daylight comes from southeast and southwest, and these want different treatments. Generally you want direct gain from southeast sunlight to warm your home in the morning, and overnight storage and re-radiation from the southwestern sun, when direct gain is too intense to enjoy.

Appliances. I will always use such resources as Consumer Reports when specifying these big-ticket items, and especially for affordability, I look first for the ones called a best buy. When I want to select a manufacturer to use throughout to achieve better quantity discounts, I look for overall trends both for that year and long- term. For affordable building, when there is a wide range of optional features to choose from, I try to go only one step up from the most stripped-down model. You start with what you absolutely can't do without, and then you grant yourself one little wish. Rating systems such as Energy Star have made evaluating certain features a lot easier - but I will still look for payback periods and avoid the items priced solely for people who want a good conscience.

Cabinetry. For built-in cabinetry, don't be too quick to dismiss using the local cabinet maker, but pay close attention to scheduling issues. At least compare prices and quality between these and the large home supply outlets. Take a close look at the quality of the boxes. Melamine and its kits (and MDF in dry locations) can make acceptable boxes, but you do not want them stapled together. Look for screws or dowels instead. And real hardwood makes a preferable door side. Shop around for real-wood and other face frames. It's often worth the money to have a better look and more durability here. For counter tops, the best bang for the buck is still shop-assembled plastic laminate tops, fastened from below with screws so that tops can be exchanged. For shelving, consider 3/4" A-C or hardwood-veneer plywood with 1/4x3/4 birch edging. You can beef up the edging to 1x2 hardwood for longer spans or heavier loads, and even back those edges with materials such as steel angle. For industrial shelving, 16 or 18-gauge sheet metal, shop-bent to 1x wood dimensions with 1/2" bottom flanges might be worth investigating.

Finishes. All that needs to be said about finishing and finishes is contained in an analysis of long-term costs, including maintenance, and of course the initial taste in color that drives the probability of replacement of permanently colored materials. If you are the kind of person who likes to install bright red metal roofs on buildings, then you don't give a damn about other people and I wish you only failure, bankruptcy and a speedy departure from the development business.

Sweat Equity. Leaving significant portions of a starter home relatively unfinished is still an underutilized strategy for keeping initial purchase prices low, despite the fairly ubiquitous unfinished basements. This is particularly useful with certain demographic profiles: young couples planning to start a family in a couple of years, workers in entry level positions who will be able to afford more space as they are promoted, contractors who lack the time to build an entire house but who can still afford to putter on weekends, do-it-yourselfers and buyers who want to add custom features. Thinking things through, envisioning how a future space "wants" to be developed, may help the buyer a great deal later on, particularly with providing major power and information wiring circuits, water and gas lines, and especially sanitary sewer lines. At the same time, the relentless temptation to do just a little bit more or make the unfinished space

just a little more presentable needs to be resisted, as it can easily drag you all the way to completing the space yourself. The minimum requirements for obtaining a certificate of occupancy establish the basic punch list. In recent years, the most expensive and relevant new requirements here concern the provision of fire-resistant membranes, such as a drywall layer, over ICF's and other flammable insulation. Unfinished spaces may also want to be set up as conditioned and therefore preinsulated spaces, and this means considering the effects of moisture and condensation in both cold and warm conditions. Beyond minimum CO requirements, I would concentrate on getting future utility lines only to a point where tie-ins will not require tearing up other parts of the house, and put the required outlet and light there. But I would also make a few hard decisions and pre-set any water closet flanges and shower/tub drains. Basement slabs may be poured later through a window, but any required vapor barriers in the ground must be protected until then, and the basement footing and wall must be designed without using the slab for lateral support.

The techniques described above are an evolving skill set. I would have to guess at the total savings involved if the majority of them were practiced with reasonable diligence. Comparing this to modestly priced tract home development, where builders are more experienced in mass production and efficient logistics, the savings might not be any better than 10-15%. Comparing this to the lower end of relatively custom resort construction, where the scales are smaller and suppliers more distant, and where building techniques are less often questioned, I would have to put savings closer to 25-45%. Prices can be driven down even lower than this when the public sector gets involved in the manner described below, but in the next section, on public housing, we'll see how badly the public sector can screw things up instead.

Part Two: Public-Private Partnerships

Public Housing, or The Wrong Path to Take

Is there a right to affordable housing? It would be silly to say that "the people" have a right to be provided with at least a minimum floor of affordable housing by their governments. The global failures of welfare states and the implosion of Soviet communism didn't convince everybody of the superiority of self-reliance and free markets, but there aren't many big believers in communism left. At the other extreme, even the right wing might agree that everyone has a right to work like a plow mule for decades to have housing that they can afford - without federal, state and local governments undermining their efforts and throwing up obstacles at every turn, as is the current situation. There is also the fact that real, unfair inequalities exist. The fundamental economic laws of first possession insure that first-comers and their heirs have a distinct opportunity advantage over newcomers and their next generations when it comes to acquiring property. Also in play are simple bad luck, hardship, old age, infirmity, disability and especially bad choices in future divorce partners. Yet the law persists in its fairness, as Anatole France pointed out: "The law, in its majestic equality, forbids the rich as well as the poor to sleep under bridges, to beg in the streets, and to steal bread."

We cannot succeed at leveling the field of opportunity by tearing down all of the high spots. But some economic redistribution is necessary, and even the most libertarian among us sees a role for government and taxation in addition to that of private charities and non-governmental organizations. We argue over what that role is, and whether it will cost taxpayer dollars. The big problem with the public entities is that they do not have a clue how to spend money well, wisely or responsibly. They do not know the nature of effective power. For the most part they should not be doing things at all - they should be facilitating things, allowing things to happen, using their abilities to open up opportunities, or to tear down the obstacles that they themselves have erected. They should be distributing private-sector booklets on how to teach a man to fish.

Public Housing, or housing designed and constructed with public funds and subsidies under the management of public and government officials, fails for a number of reasons. For a look at these, consider a typical process. Let's say that a municipality decides that it wants to construct a given number of affordable rental units. The process usually involves the following steps: 1) Allocating \$25,000 for a special consultant to perform a housing needs survey and assessment. 2) Formation of a task force or committee to develop the program.3) Hiring a project manager. 4) Investigating sources of project financing, grants, subsidies, additional mil levies, waivers of tap and use fees, municipal bonds and public election. 5) Identification of a project site, whether publicly owned or acquired on the open market or by condemnation, with the value to be assigned at market rates, 6) Locating and hiring an architectural firm with experience in public housing. 7) Extending the municipality's consulting engineer's contract to include the housing project. This is the firm that was chosen for its conservative approach to avoid public liability. 8) Preparation of construction documents and corresponding approval processes. 9) Request for bids from qualified contractors. 10) Value engineering and design modification to bring project costs down to 25% above the previously anticipated project costs. This may be the first time in the entire design process that any of the techniques of affordable construction are taken seriously. 11) Construction and project completion.

By the time the project is done, the total dollars spent, counting up all of the "free money" from the taxpayers and foundation grants, will never be less than double the sum that a free-market entrepreneur would have spent. Never. Every dollar spent on or by the public or government sector is a dollar that would be at least twice as well and responsibly spent by more accountable agents in the private sector, agents who have more to lose than public officials have to lose. The clues to why begin at item one above: 1) Why do you need a needs survey? Common sense tells you that housing is a problem. Look around you. 2) With entrepreneurs, task force and design team are one, and much more focused on cost-benefit analyses. 3) The entrepreneur will manage the project. 4) Funding will be based solely on assessments of project viability, with no cost to the public. 5) The site will be acquired on the basis of uses by right and developed on the basis of an upzone to uses permitted on review. 6) If a non-licensed building designer can do as good a job at design as an architectural firm, at a third of the cost, then a designer will be selected. 7) An engineer will be hired based upon his ability to develop cost-effective solutions instead of his ability to protect himself from liability. 8) The approval process will likely be just as harsh for the municipality as for the entrepreneur, since boards and commissions believe that they must be either adversarial or must make a show of this. 9) The project is constructed and occupied for less than half of the public's budget.

So here's the fun question: If the private sector and free markets can do such a superior job in providing housing affordably, is there any way that the public sector can harness this force of nature to serve the public good? And how much will this cost? And shall it use sticks, or shall it use carrots?

The same mentality that fails at providing public housing also seems to favor the use of sticks. All around the country these days, whenever the private sector proposes to do a private-sector project for profit, the public sector likes to step in and say "But this will cause impacts to our growing housing crisis. You must therefore give us a percentage of your anticipated profits in impact fees so that we may spend this money to solve this problem." They have another popular trick as well, known as "inclusionary zoning," applied thus: "We see here that you claim a use by right to build twenty units of housing on your property, provided that you can convince us to grant you a subdivision. We will consider granting you this subdivision, which is a privilege and not a right, provided that you build fifteen percent of these units cheaply and sell them at cost to buyers who are authorized by us." Of course, by the time the public sector is done collecting and managing its impact fees, and spending them on housing needs assessments and housing authority salaries, it has very little left over to apply towards solving its housing crisis. And by the time it is done hounding the free-market developer throughout the adversarial process that it has set up with inclusionary zoning, and filled the affordable housing with qualified renters and buyers, and watched and micromanaged these renters and buyers for a few decades, it has spent enough taxpayer dollars for the private sector to have built several more housing units. The next section addresses the advantages of carrots, and a more cooperative, win-win process.

Incentives for the Private Sector

Preliminaries. Before proceeding to the details of public-private housing partnerships, a few pages of digression is in order, in order to examine the minimum efforts on the part of public entities that it will take to bring the private sector into the kind of willing or voluntary participation that will get housing built at the costs that only the private sector can attain. Most public-sector housing programs take a heavy handed and even coercive approach, aimed largely at the real estate and rental property developers to require them to account for their impacts on the local housing problem. This leaves the general economy contributing nothing towards the solution, although it is equally responsible for the problem. This adversarial approach is usually in the form

of housing impact fees and/or inclusionary zoning, described above. The term inclusionary zoning is derived in part from the fact that these ordinances seek to counter the zoning practices which exclude affordable housing from an area through the land use code. In practice, these policies involve placing deed restrictions on 10%-30% of new houses or apartments in order to make the costs of the housing affordable to lower income households. The mix of affordable and free-market housing in the same neighborhood is seen as beneficial by many communities. Inclusionary zoning is becoming a common tool for local municipalities in the United States to help provide a wider range of housing options than the market provides on its own. Bear in mind that this is not a free market, but one already manipulated by growth management polices. There is another reason for the term inclusionary: the affordable housing units developed under these regulations are usually included as part of the total number of residential units allowed under the current zoning. This turns the provision of housing into an assessment or exaction and sets up an adversarial process which always tends to drive affordable housing costs upwards. It also drives up the prices of the freemarket housing. And it goes nowhere towards having the local government face its own, very large portion of the responsibility for creating the housing problem in the first place.

I have suggested that the optimal solution yielding the most affordable kinds of housing is two-pronged - a public-private partnership, where each partner does what it does best, and just as importantly, refrains from doing what it does badly. When it comes to doing the actual building, government involvement and micromanagement are ridiculously expensive. A government entity needs to be satisfied that it has done its best and then get out of the way as much as is legal and reasonable. But putting the private sector to work demands adequate financial incentives than are normally explored. These do not need to be windfall profits at all, but they do need to represent a bottom line at least equal to the prospective return on doing business as usual. If there is a pent-up demand for affordable housing, and its purchase and rental costs can reflect the actual costs of providing this housing responsibly, then there will not be a great deal of risk to a developer. Here he will want to be looking at a bottom line that promises something a little higher than the prime rate for a net return on his invested capital. A developer should be able to recover land prices, together with all design, approval, infrastructure, construction, financing, operation and maintenance costs through rents or prices, plus a reasonable interest on all capital risked or invested. I would suggest that this interest be at least prime-plus-a-point, rather than bank interest. CD rates, or the consumer price index, which are often considered here, but are only the equivalents of treading water, stagnation and going nowhere. For developers of rental properties, a neutral or zero cash flow situation is often enough of a return, even where the original cost of the land is contributed gratis to the equation, because this still allows equity building over time at a rate equal to financing costs. This is similar in result to a retirement fund. It also takes the tax benefits of property depreciation, and it will sometimes allow a modest spreading of a larger, free-market project's per unit infrastructure costs.

If there is any greater risk, a developer will want to look more closely at the kind of numbers attractive to venture capital. Of course, this brings up the question of how to minimize risk. The answer to this is to make public-private solutions needs-driven and market-responsive. Then, when the need exists, risks drop and the solution becomes attractive; as needs are addressed, risk rises and the provision of additional affordable housing becomes less attractive. If this can be done, then the need for the ridiculously expensive "housing needs assessments" goes away, along with this assessment as the government's first excuse to delay action on its housing problems. To be made market-

responsive, a program needs to be made neither more nor less attractive to a developer than that development which present zoning allows. A program should contain just enough incentive to get projects built when they are needed, and not any incentive to build them when there is glut. It should mimic free-market supply and demand and therefore should avoid monetary subsidies. This feature would also allow an "affordable housing planned unit development overlay" to be used as an inclusionary subdivision requirement without being punitive or adversarial, or felt as an exaction, It would also make it easy and painless to reject a proposal which failed to address community needs. But this is the rub - a non-adversarial solution is going to be at the expense of what the local government previously determined to be peak buildout population numbers. These numbers will grow slightly, as some of the pent-up demand or pressure for housing is bled off.

A further reason to prefer low-cost zoning incentives over monetary subsidies is to demonstrate to the market that a project can be affordable and economically viable without fee waivers and subsidies. When projects can provide true affordable housing with private-sector money, while avoiding local government subsidies and other taxpayer expenses, a momentum will build in proportion to a program's merit to stand as a model. And as much to the point, neither will exactions for affordable housing or a surrender, regulatory confiscation or attachment of existing property rights be proposed.

The Marginal Value of Land. While the discussion in the next three paragraphs doesn't bear directly on affordable housing, it will have its applicable lessons, to be discussed below. There is a difference in value between a piece of land with zoned usefulness only as open space or yard and an identical piece which carries legally specified development rights and potentials. There is a difference in value between a 35 acre tract of land with zoning for a single residence and a fifty acre tract with the same zoning but no additional rights to develop. There is a baseline cost for a "right to build" and an average cost per unit of land for the area upon which to build. The latter is the "marginal value of land." This can be quantified with one or more careful appraisals. This example illustrates its importance: Where I live, the State of Colorado establishes a "use by right" to develop a single-family residence on a 35 acre parcel of land. Local governments cannot override this with their zoning laws, although many governments place restrictions on the actual development with building codes, road standards, etc., and many try to circumvent the spirit and intent of the State law by making these restrictions prohibitively expensive, counting on developers not being patient and wealthy enough to sue them on grounds of confiscatory regulation. Even further, the State allows the owner of a large tract of land a "subdivision exemption," the right to subdivide his land into as many 35 acre tracts as he wishes without having to undergo a lengthy and costly subdivision process. The ease of using this procedure inclines the landowner to do no further careful planning, nor clustering of the development, unless these other options can be made equally attractive. While local governments do a great deal of public whining and hand-wringing about rural sprawl, they almost never do anything at all to make better planning an equally attractive option.

There are a few financial advantages to voluntary clustering. Roads and other infrastructure can cost significantly less. Wells and septic systems replace more expensive water and sewer lines and treatment facilities, plus these expenses are borne by the buyer of individual lots. Lots can front upon large and attractive common open areas, giving all adjoining lot owners a big yard or private-ranch feeling. There may be significant tax benefits in dedicating conservation easements across the common open spaces, although, be warned, the entities managing conservation easements will take as much as they can of the financial benefits. These advantages do not normally come very close to outweighing the expenses of clustering, for these reasons: 1) There are much higher design and engineering costs with a subdivision process that is subject to local regulations and approvals; 2) There is an enormous cost in politicizing the development and undergoing an extended subdivision process. Emotional neighbors get involved and will likely fail to understand the planning issues and benefits. The planning and zoning body will take a perverse delight in publicly sodomizing even the most civic-minded applicant, reminding him repeatedly that "subdivision is a privilege, not a right," until he wishes to have his rights back instead; and 3) The marginal value of much of the land is lost. This last item, for example, points to the difference in value between. let's say, 350 acres divided into ten thirty-five acre tracts and ten seven-acre tracts with 280 acres of open space. The marginal value of 280 acres of land is debited against the bottom line. The 280 acres does not have anything close to the value of the twelve 35 tracts that it could be divided into, were they developable, but it might easily have the value of two. And therein lies the big clue to the solution to the problem of sprawl - the easiest and the cheapest incentive.

If the local government could come up with a fair solution to equalize the benefits and costs of clustered development, and cast it in terms of density equivalents, this problem of sprawl would start to go away. It is normally given the power to do this by the State, under Planned Unit Development statutes. But this may require an admission of responsibility that government actions are in part responsible for the sprawl problem to begin with. It may require the government to back away from its compulsion to micromanage and obstruct the subdivision process. And it will require the government to grant a modest increase in zoned density to make up for the net costs of undergoing a subdivision process and foregoing the marginal value of land. In the case above, this could be the difference between ten and thirteen units - one unit to cover the costs of the government's meddling, through the subdivision process and its tighter standards, and two units for the 280 acre of open space. Planned Unit Development regulations can be set up to allow for the customizing of such tradeoffs on a case by case basis, using licensed appraisals as needed, to balance the value of those options with greater public benefits, such as open space or the provision of affordable housing. This may also be established as a separate set of simplified review procedures, sometimes called a "rural cluster subdivision." It is not at all necessary to make the better planning options any more financially attractive than the uses by right - only equivalent, along the bottom line. Normally a developer will be inclined to do the right and conscientious thing, provided that his time delays are compensated for and that he can be seen as a benefactor to the community, rather than a public whipping boy.

So, how do the concepts above help us to frame a public-private housing solution? The same formula for the recovery of costs will be required. Conventional zoning allows a maximum number of dwelling units per acre. Developers can build up to the maximum density, but cannot create more dwelling units than is allowed. As land, infrastructure and construction costs rise, affordable housing is difficult to develop under existing density limitations and the higher land costs discourage the construction of modest-sized units. Therefore many affordable housing ordinances allow the developer to construct more dwelling units than are allowed by the zoning district. This permits the developer to spread the costs of land and infrastructure over more dwelling units, making the units more affordable. It must be understood that any market-based proposal will allow a greater number of kitchens on a given unit of land than are allowed under conventional zoning. This increase is granted in exchange for specified public benefits, mitigation measures and secure agreements, But, unfortunately, such an increase in kitchens is too often and too quickly called a "density bonus" or an

upzoning, even in cases where the modest unit sizes mean lower overall population figures, or smaller total building masses. It is the nominal increase in density that creates the knee-jerk overreactions and the most negative public comments related to affordable housing. This term implies that somebody, somewhere, is getting their grubby hands on windfall profits at some sort of expense to the noble and sacred public goals of growth management. How do we go about rendering the term "density bonus" meaningless? The beneficiaries of the action should be primarily the local community as a whole, for reasons of greater socioeconomic diversity, and the target demographic that is in need of affordable housing, the very salt of the earth.

By adding one or more kitchens to the "right to build" numbers for a given parcel, the cost-per-unit for the added units is greatly reduced. There are still additional costs to be carried by the developer, notably design, process, approval, infrastructure, and other related costs, as well as tap fees. But any savings gained from decreasing the costs of the "right to build" a residential unit, by an amount assignable to the zoning alone, should translate as directly as possible, dollar for dollar, into housing affordability. This is a direct result of government action and therefore should not serve private interests in any special way. If this can be achieved, then who is it really who gets the bonus? The goal should be to erase this misperception of bonus and eliminate the term. But, as you will recall, the right to build is only one component of the value of raw land. There remains the marginal value of the land upon which the added residential units sit. If it sits on an acre of land, then the value of that acre will approximate the difference in appraised value between a five and a six acre parcel which carry identical rights to build. The developer should at least be able to recover that marginal value, since he could easily do so by attaching the land to the parcel next door. And, of course, he should be able to realize a fair rate of return on his investment in that property, for as long as it has his capital tied up. This approach accomplishes two objectives: it guarantees that all savings resulting from government action are passed directly to the qualified project participants, not to the developer, and it demonstrates to other potential developers that true affordable housing can also pay its own expenses.

Motivating the Public Entities

Getting Local Governments to Initiate Affordable Housing Ordinances. When a public entity starts to develop an affordable housing program for itself, its first temptation will be to look around to neighboring communities and attempt to copy programs already in place which they might discover there, or at least to import large patches of boilerplate verbiage and stitch this together into a locally-customized quilt. This is a very attractive process for entities without the imagination and courage to innovate. It would even work, but for one thing - the neighboring communities have all done the same thing, and have selected their own patches based on how plausible or convincing the verbiage sounds, but usually without any regard for whether or not the programs also work. And at bottom, there is always an assumption that any affordable housing program is going to cost a lot of money in grants, subsidies and other taxpayer dollars. A local government or housing authority will need to be convinced first of the necessity of finding and implementing a viable program and second of the wisdom in taking the time and summoning the courage to create a program that actually works, even if that incurs some risk of partial failure. Convincing a public entity to take this much care and make this effort comes down to a political sales pitch. And it will not want to act at all without a great deal of persistent political pressure from both the people who need affordable housing and the people who employ them. The economic class of employers may need to be shown that a workforce not stressed by long commutes will be more productive. You cannot successfully promote affordable housing unless you have a constituency of the people most affected - people who need decent housing and can't afford it and the people who need those people nearby in order to continue to prosper. This constituency must be organized. And there have to be significant negative consequences if these politicians fail to deal with their needs and demands. Otherwise you will only get empty political rhetoric, and maybe a call for a housing needs assessment and a lot more time to study the problem.

In 1996, after writing a couple of guest editorials on affordable housing for a local paper, I was asked by county commissioners to participate in a statewide panel on the subject. This session resulted in a set of recommendations to local governments, adopted by the State of Colorado. Unfortunately this work, together with all of the work of a subsequent, local Affordable Housing Task Force and its report, was meant by the County to satisfy, in full, all of the political requirements to "do something" and nothing further has been done, pending the next big wave of public pressure to do something, and of course, contracting for yet another, updated needs assessment. I reproduce this two page recommendations document here in full because it's another way to sum up the problems and solutions, and hopefully it puts the tasks at hands into terms that some in the public sector can understand. Some of the wording will sound familiar because much of it is from my own contributions to the panel.

State of Colorado Smart Growth Housing Task Force Recommendations.

Conclusions of the State of Colorado Smart Growth Panel on Affordable Housing, 1996

Vision: Develop an adequate inventory of safe and affordable housing throughout the Region.

Issue: The lack of available and affordable rental and 1st time homes (starter).

Goal: To provide a market-responsive mix of affordable housing options, including rentals and first-time homeowner programs, that maintain and promote socioeconomic diversity in our communities.

Strategies:

1. Conduct a needs assessment which includes good demographic information about our communities.

2. Make use of government power to write legislation and zoning law to service community objectives (i.e., overlay zones, affordable housing, deed restrictions).

3. Make use of government power to waive requirements in exchange for public benefit.

4. Educate government officials about various stages of the building process where savings can be effected (i.e., fee waiver/deferred, sweat equity, pool purchasing).

5. Write PUD legislation specifically dedicated to affordable housing that is distinct from other PUD contracts (Specify specific economics, i.e., purchasing, sweat equity).

6. Create a data base of affordable housing options and ideas that is consumer friendly.

Issue: Government regulations and policies are negatively impacting the availability and mix of housing options in our communities.

Goal: To design and implement more flexible regulations, definitions and review processes that allow for alternative housing types and design and evaluate housing projects on individual merit.

Strategies:

1. Educate the regulators as to the impacts of regulation on the provision of affordable housing. Identify and quantify the cost benefit of regulations on housing in our

communities. Direct and indirect (quality of life) costs. Identify and explore workable alternatives to existing regulations and policies.

2. Encourage flexible review of development proposals which allow approvals based on positive net community benefit as opposed to rigid adherence to component performance standards.

Issue: There is an adversarial relationship between government and the private sector which eliminates incentives for market responses to build housing, leaving the task to government.

Goal: To minimize the adversarial relationship between government and the private sector in order to promote incentives that encourage market responsiveness to housing. Strategies:

1. Create local citizen task forces to identify potential areas of municipal and county cooperation and means of communication.

2. Develop utility extension (water, sewer, road) policies that encourage and reduce the cost of housing.

3. Better define the roles of government and the private sector while recognizing property rights, the value of public input and the role of government in securing public interest.

4. Provide opportunities for developers and contractors to build affordable housing on a profitable basis.

Issue: Nimby-ism exacerbates the problem of socioeconomic stratification and the lack of acceptance by the community of a variety of affordable housing options.

Goal: Eliminate Nimby-ism by becoming an educated and tolerant community that takes pride in place and supports social diversity through the acceptance of a variety of affordable housing options.

Strategies:

1. Provide education on home maintenance and retaining value of property.

2. Prepare to regulate junk and nuisances and institute design and landscaping criteria.

3. Review community comprehensive plan to ensure that they include policies that promote diversity and sustainability as a key component of a community's overall health.

Dimensions of the Problem

The three-thousand year old Chinese Book of Changes [Line 49,4, my translation] has this to say about advancing an idea for change before it's time has come: "To expedite has pitfalls. Commitment is difficult. When the talk of change has circled three times, then be sure." Well, even so, somebody has to speak up the first and second times if the change is ever to come to pass. My mistake was not in making the first effort, but in expecting results from what I assumed were reasonable human beings who were involved in local politics. I had assumed that there would be at least a little bit of vision and a little bit of courage there, for no other reason than that there was then some public pressure on them to do something. I brought forth a wonderful demonstration project incorporating all of these recommendations, and also those of the local task force. I had the needed recent experience as the assistant planner for an entire new town of 900 people, all housed in deed-restricted, affordable, mostly owner-occupied, single-family units. The late actor and environmentalist, Dennis Weaver, was going to contribute the land (and subordinate it for a creative, internal financing program). There were to be twenty-two 1/4 acre sites, on a nice, boat-able river, along a bike path, with views of 14,000 foot peaks, and 14 irrigated acres for community Permaculture gardens. The houses were expected to be occupied for less than half of the square foot cost of nearby free-market units, and still we had it planned that our benefactor would walk away from the project having made banker's interest on every dime of his investment, including the contributed land, in order to demonstrate to other potential developers that the idea was economically viable, and even reasonably profitable. He was willing to take all risks of doing a prototype because he was willing to do the project at no profit at all.

The proposed project failed, first before the Ouray County government, and then with an annexation proposal before the Town of Ridgway government. In both places we hit such a shocking, vertical stone wall of myopia, smugness, cowardice, ignorance and arrogance that I wasn't able to return to the public-private part of this subject until I started writing this booklet. The degree of reactionary stupidity was amazing, in front of both governments. We mentioned the word community and suddenly we were on the wrong side of the war on communism. We mentioned a common barbecue and fire-ring and suddenly we were all dancing naked around the fire, except for the babies. whom we were sacrificing to Satan. We mentioned forming a cooperative, in order to purchase building materials collectively at wholesale, and suddenly we were toiling as slaves on a Stalinist cooperative. In rural southwest Colorado, where I live and work, the politics can get pretty petty and the reactions to visionary ideas pretty reactionary. Whether the community is conservative or liberal only determines the color of the ignorance, not its degree. How on earth had I forgotten that, when humans form groups to govern themselves, their average IO drops to a dozen point below that of the slowest member, so that no fool is left behind? It's like the exact opposite of a think tank and its synergy. The point of all this is that you will need more than reason and logic to convince a local government to provide anything more than empty gestures and lip service, Ouray County has done nothing at all in the decade since. The Town of Ridgway has allowed homeowners to convert garages to "granny flats," thinking smugly that it has now done something significant and humane. And much of the workforce now arrives each morning from 25-35 miles away.

On the other hand, Lawson Hill, the new affordable housing community for 900 people that I mentioned above, was completely built out in a handful of years and continues to thrive. This was in nearby San Miguel County, where the roaring growth and prosperity of the Telluride region brought housing matters to a crisis much sooner and there was enough pressure for lower income housing to topple the local government if it had failed to actually get something done. Empty gestures and lip service would not save anything. The Town of Telluride itself had put together a miserable track record for wasting public funds, which continues to this day because nobody has thought to publish the numbers that you get when you divide the total dollars spent by the number of people housed. The project succeeded because, in addition to the political pressure, there were a couple of people with sufficient vision and courage seated on the boards and commissions and in the planning department.

Three significant mistakes were made along the way in this project. I managed to get on record as warning against all of them in advance, but I was only the assistant planner. The landowner and the politicians had other ideas. These bear mentioning here, for the lessons we learned. First, the County government was endowed with \$750,000 worth of free money, to be spent on developing a smallish portion of the project to relocate the residents of a displaced trailer park. Instead of turning this over to someone more accountable in the private sector, they did it themselves as a public housing project and wound up losing much more than the amount of their original grant. Second, the County bowed to pressures from the Town of Telluride, whose municipal boundaries were three miles distant, to force a pre-annexation agreement with Lawson Hill. This town's government is an impossible morass of fiscal foolishness - its municipal budget, thanks to a massive tax base, exceeds ten thousand dollars per capita per year, far in excess of huge big federal slice of the tax pie. It's involvement in the project, in nothing more than theory and legal maneuvering, and with no discernible contribution to services and infrastructure whatsoever, raised the price of each residential unit by more than ten thousand dollars. It was like watching a black magic show. Third, it was decided that very generous maximum home sizes were to be allowed, in most cases three thousand square feet per unit. One can imagine from this exactly how large the homes were built. This put them well out of the price range of most of the more humble service personnel, even though the deed restriction still required that they be occupied by people who worked for a living. I mention these three errors also to underscore the fact that the need for vision and courage is very real here. Public and private action both involve elements of risk. Mistakes can be made, and they can take big bites out of your dreams. Therefore, developers and public officials should listen even to such lowly sources of information as assistant planners. just in case they might be missing something.

In the next section I will outline some of the structural elements of a workable "Affordable Housing Planned Unit Development" overlay district, one that will enable public-private partnerships to provide true affordable housing at an absolute minimum of public expense. Several broad areas of public concern need to be addressed first. These are the hotter of the political issues and should probably become some of the main talking points in the effort to convince a local government or housing authority to move forward.

Assessment of Need. This, as I've said before, is the coward's way out for most politicians. "We cannot do anything about this until we have a thorough and proper community survey and housing needs assessment." performed of course by expensive consultants from some far distant city, at a cost roughly equivalent to a fourth of of a modest housing unit or a whole mobile home. But there is already a great deal of economic and demographic information available online, free of charge, individually framing nearly every small community, city and county in the country. National census data is one place to begin, but there are likely half a dozen others for every town. Specific housing needs information from each state government is probably available online or in hard copy as well. One ought not get trapped into duplicating these studies. Then, of course, there is the fact that housing needs have already generated enough pressure to bring this issue into the public dialog. I'm assuming that you aren't just reading this for fun. Further, as I have already suggested, a little finesse can construct a process that is needs-driven and market-responsive in such a manner that housing will be provided when needed and will not be proposed when this demand relaxes. Such approach renders the entire issue of needs assessment moot.

Assessment of Urgency. It may be another specious argument that the provision of affordable housing isn't really a crisis or emergency yet. But is this calm before the coming storm not the perfect time to make well thought out, rational preparations? Is emergency management in crisis mode really to be preferred? Why not a foresighted attempt to preempt the problem before it goes critical? This is, after all, the point at which the neighbors' most serious mistakes have been made. Clearly, vision is the operative notion here, and that vision needs to somehow see past the next election.

Watching the Words and Symbols. The uselessness of the term "density bonus" has already been discussed. I've also mentioned some of the surprising problems I've had using the terms "community" and "cooperative" while trying to reason with ignorant rustics. Even the word "common" might elicit unwanted knee-jerk reactions. For some reason, "co-housing" seems more palatable to most than "intentional community," but

even this is best left applied only to housing for seniors. The term "affordable housing" itself is being abused nine-tenths of the time that it's used - everyone throws this one around. I will usually preface this with either "free-market" or "deed-restricted," intending to give it some meaning. The image that people get when picturing a large block of affordable housing is not often appealing. It is much easier to paint a pleasant picture if the units in larger developments are owner-occupied. Pride of place and ownership seem to displace the pictures of crime, poor maintenance and noise with images of children laughing, bicycles and swing sets. Rental projects will be a lot easier to sell at a lower or more dispersed density, or with a good internal security plan.

Understanding the Causes. It needs to be understood by the public sector that the biggest culprit in creating a housing affordability problem, at least within a more successful economy, is invariably a public policy of growth management. This is not to judge the noble goals of growth management to be a bad thing, but merely to assert that this behavior often has serious unintended consequences that can best be remedied by people who understand their causes. Of course the big real estate developers have their negative impacts on the problem, and it is also fair to ask that they mitigate any impacts that aren't covered by their own contributions to the economy. All of the impacts of all the little guys add up too, but these are more difficult to take exactions from. Still, these are only contributing or aggravating factors, not the root cause. The main point is this: the same entity which created the problem, by the mechanism of its zoning laws, also has the means to counter some of these unintended consequences, also by means of its power to amend its zoning laws. Closely related to the broader issue of growth management is the narrower focus on that part of the housing spectrum most heavily hit by such policies - the modest or starter home. This is where the logiam or bottleneck sits, not in the rental market. Higher land prices push investors to develop properties towards their highest and best use, their maximum potential allowed under zoning. Modest or starter homes no longer make economic sense when they can only exploit a fourth to half of the potential for which land is normally priced. As newcomers, young couples, school teachers and retiring seniors cannot afford to invest, they remain in the rental market, jamming that segment up and driving rents ever higher. The idiots on the town board who think that allowing a few garages to be converted into rental studios will fix or relieve the problem may need to be shoved out of the way in a lively new election.

Positive Point Number One. The overall socioeconomic health of the community is the primary reason for backing away a few percent from the original growth management population goals. This subject has a few important dimensions. First, diversity has become a key concept in the scientific study of complex interactive systems, disciplines like sociology, economics and ecology. There is a direct correlation between diversity and and a system's health, robustness, resilience and resistance to pathogens. It is the opposite of monoculture and/or stratification. The healthiest communities represent a mix of ideas and opinions, age groups, cultural influences, purchasing preferences and economic strata. It is the community that has begun to "all think and vote the same way" that is headed for stagnation or mass delusion, that can be completely upset or even ripped apart by novel ideas. Second, keeping the workforce local keeps money in the local economy instead of exporting all of those wages and salaries to the economies of bedroom communities. This money in turn gets circulated a few times over among the local population before it heads out of town. Third, lowering the cost of lower-end housing tends to give residents higher real incomes, or greater disposable income for discretionary spending. It is important to note that this will not have any impact on the appraisals of the higher end housing because appraisals are based on comparables, not the mean or average property values of the community. Fourth, promising new members of the community are given the kind of hope that leads to commitment, a reason to invest themselves in the social fabric and support the community's ideals, once they can see a way to belong, a way to move into an equity position, instead of spending a third of their lives on landlords. I recently met a young man who taught high school math and science in the prosperous town of Vail. Without thinking it through, I remarked that that must be one helluva school system, and that he must be a very fine teacher to be selected from such a competitive field. He said no, school was taught by a mostly transient population, with little hope of staying or commitment to the long term. Of course - they have a housing problem there, with a number of associated social problems. All of those wealthy people are contributing to their own children's diminished education.

Positive Point Number Two. There is an opportunity in this form of public-private partnership, and in this Affordable Housing Planned Unit Development overlay district, to actually succeed in addressing the housing problem without any significant cost to the taxpavers, or to charities, or to foundations. If there is already a housing authority, it could be largely disbanded, or else do the unthinkable thing and not need to continue to grow, Projects can be built without public subsidies, without fee waivers, without exactions, without adversarialism - at most, with a member of government staff available part of the time to arbitrate the occasional dispute or review occupant qualifications. Once the first project or two succeeds, private money will become more available to continue the process until the need goes away. And then it will stop, as if by an invisible hand. This might argue for having a developer already on board with a prototype or demonstration project to be presented in conjunction with the proposed legislation, to help "coax" the prerequisite affordable P.U.D. ordinance, legislation or policies into existence, and in the process set a high standard and good first precedent. This should be examined within the local political climate or context, however, since asking for new legislation to enable a specific project might be misperceived as a request for extreme special favors.

Limiting Government Management and Enforcement Costs. Public entities will be justifiably wary of incurring perpetual or recurring problems of management and enforcement, even though this is the very life of their normal housing authorities. During the development and enactment of P.U.D. ordinances, certain standards are drawn up which govern the content of three relevant documents, all requiring a round of signatures prior to final project approval: 1) The P.U.D. agreement, a performance contract between the developer and the governing body with jurisdiction, spelling out the terms and conditions of the permitted variances made to normal zoning standards; 2) The covenants, conditions and restrictions (CC&R's), which among other things establish processes for internal nuisance abatement and design review and approval; and 3) The Deed Restriction, which establishes the criteria which must be satisfied before persons and families may take title to or occupy units created under the P.U.D.. as well as those conditions under which a title may be burdened by penalties, or a permission to occupy revoked. It is important to set these up so that the great majority of problems of management and enforcement require a minimum of intervention by the public authority. Projects should be self-enforcing and self-policing to the greatest extent possible, creating neither a standing government body nor any unnecessary burden on government staff. Problems will of course escape even a tight net, and find their way either to the courts or to the public signatories to the governing documents. For the latter, these documents can contain clauses which establish a loser-pays system of appeals and complaints. A complaint may be initiated with a significant filing fee that is refunded to a successful plaintiff and charged to the loser. This will tend to

suppress the frivolous complaints. The mechanism for revoking occupancy privileges will need to be carefully spelled out in the deed restriction.

Questions of Long-Term Financing. Any curbs and controls which might be placed on unit resale and pricing should also be carefully spelled out in the deed restriction. These should be objectively determinable and, very importantly, acceptable to lending and mortgage institutions. Competent representatives of these institutions should be consulted throughout the development of the deed restriction's terms and conditions. Ask what concessions will need to be made to accommodate the finance industry. The worst-case scenario is a bailout clause that is included in some deed restrictions in cases of loan default, whereby added deed-restricted units are allowed to revert to normal occupancy when an institution repossesses. This should be avoided completely.

The Risk of Loopholes. Finally, it needs to be pointed out that not all people are honest. And even the honest ones are self-interested. And life everywhere on earth is driven by some form of opportunism. No matter how carefully an ordinance is crafted, it will have weaknesses and loopholes that will not be apparent until some time after they have first been exploited. From another perspective, mistakes will be made. Some of the unforeseen tricks and tactics, loopholes and technicalities can be guarded against in advance with carefully worded statements of intent in the enabling ordinance itself. In other words, proposals must include a demonstration that they satisfy the spirit as well as the letter of the law. The ordinance should also be set up to evaluate proposals on a case-by-case basis, a proposal's specific merits, maybe even with a point system. The ordinance must remain able to "learn" quickly, incorporating an ability to close loopholes in mid-process, within constitutional limits on ex post facto laws. Still, the public entity must have the courage to risk having to enact a series of revisions, which follow on the heels of irreversible errors, in order to undo them as precedents. That's what courage is.

Part Three: Deed-Restricted Housing

Affordable Housing Planned Unit Developments

This section will suggest some of the structure and content of an ordinance enabling Affordable Housing Planned Unit Development overlay districts, which give zoning allowances in exchange for specified conditions which serve the public interest. Such an ordinance need not be restricted to affordable housing, however. A somewhat broader Public Benefit P.U.D. ordinance would also encourage a range of not-forprofit facilities needed by healthy communities and permit the development of such additional amenities as parks and recreation, playgrounds, gardens, public use buildings, educational institutions, senior care facilities and live-work light industrial zones. This is only an outline. Local public entities will want to adapt their own formulation to suit their own specific community values and master plan goals and objectives.

Statements of Purpose, Intent, Goals and Objectives. The ordinance should state an intention to encourage innovation and permit a wide range of affordable housing options, from granny flats and caretaker units, to multi-family units for sale or rent, to modest retirement housing for seniors, to cohousing and assisted living facilities for the elderly. It should specifically acknowledge that a scarcity of starter homes is also a negative impact on the rental market.

It should state an intention to keep more of the local workforce within the community to maintain both social and economic diversity and keep wages circulating within the local economy, instead of exporting them to bedroom communities.

It should state that the primary beneficiaries of this ordinance be, in addition to the local community and its economy, those individuals and families whose primary income derive from wages paid by local, county, and state governments; school districts and public utilities; small businesses and proprietorships; and large local businesses, which might be encouraged by this action to develop housing for their own employees.

If it is to be honest, it should acknowledge the role of growth management policies and practices in constricting the supply of affordable housing and therefore generating a need for exceptional action to relieve some of the artificial pressure on this market segment.

It should acknowledge he need for a rational partnership between the public and private sectors which allows each partner to perform the functions that it does best. It should state an intent to promote reduced development costs across all phases of the housing construction, and not merely stop after the simple initial reduction of "right to build" costs.

It should state an intention to minimize the costs of government subsidies, oversight and management by requiring proposals to be as self-enforcing as possible. Ideally, a government body would merely arbitrate complaints and perhaps serve as a designated housing authority as required for purposes of enforcement, occupant qualification review and applications for grants.

It should state that the intended means by which this is to be accomplished is the granting of variances and variations to certain locally adopted zoning and building standards, only as specified herein. It should acknowledge that projects are to be examined on a case-by-case basis, each on its own merits, and that an extraordinary degree of flexibility should be expected in departing from standard rules of thumb in favor of more precise and project-specific analysis of impacts and proposals for their mitigation.

It should acknowledge that a developer has a right to the recovery of all of his real costs and investments, including the marginal value of his land, and a reasonable rate of return on those investments, perhaps set not to exceed prime-plus-a-point.

It should set forth the rights and privileges of adjoiners to participate in the review of proposals, and also set appropriate limitations on those rights and privileges as a check on irrational nimby-ism. Certainly for a development within existing subdivisions, the homeowner's association or design review committee should retain all of its rights to disallow a project within the scope of its own adopted guidelines.

It should announce that, in exchange for these variances and variations, certain promises and guarantees will be required to secure the public interest, and that these are to be as set forth on Plats of Record, in Planned Unit Development Agreements, in the Covenants, Conditions and Restrictions, and in the Deed Restriction governing the terms and conditions of title and occupancy.

Introduction to Performance Zoning. The trade of variances and variations for secured public benefits is sometimes called Performance Zoning. It allows a public entity to develop a menu of specific mitigation measures with which to weigh, quantify and qualify the merits of specific projects. Within this framework, each proposal is judged on its own merits, but objectively, against a checklist of desired amenities. The items on the checklist can even be assigned point point values. Density increases can be weighed realistically against public benefit tradeoffs, and not just by simple-minded equation of numbers of units. More precise impact figures can be used in analysis: pillows or persons, actual building mass and scale, vehicle trips and actual gallons per day of water and sewer use are much more realistic measures of impact than those normally studied during subdivision review, and a deed-restricted unit averages less of all of these. Unit cost constraints should be well enough defined that the only significant variable would be the tolerance of neighbors and government for the real density impacts proposed, relative to the highest and best use or maximum development which is likely under current free-market, unrestricted development regulations. Innovation in site planning, design concepts and impact mitigation methods can be encouraged and even explicitly required.

The limited success of even the most visionary approaches to the problem of affordable housing is partially the result of beginning and ending with three things: nominal upzoning, deed restrictions, and fee modifications. Performance zoning should go well beyond this, to insure for example that construction is done affordably.

These three things might be considered necessary, but not sufficient for approval. Review should look for and require merit or performance, and reviewing bodies should be encouraged to learn from prior examples and precedents. Among those mitigation features, though not all required, for which a project might be given credit are: 1 Direct cost reduction

a. Guarantees that all land-cost-per-kitchen savings are passed along to buyers and renters with commitments limiting profits to reasonable margins

b. Commitments to reducing development costs across all phases of construction,

not only making land and rights to build available at a lowered costs, but maintaining lowered costs throughout the construction phase. This is something most other affordable housing plans and proposals fail to do, or even consider in passing

c. Commitments to reduce future energy and water consumption for financial reasons as well as the environmental reasons below

d. Limitation on unit sizes to modest maximums, thus holding down building costs and providing further disincentive to speculation

e. Use of large-scale cooperative purchase of building materials to achieve the same

economies of scale that are possible in large subdivision developments

f. Inclusion of sweat equity programs where buyers participate actively in building and/or finishing their own and others' houses

2. Provision of financing alternatives.

a. If a comprehensive program to provide and maintain affordable housing were in place, lenders might be willing to set aside or pool a certain portion of their mortgage money to provide "affordable housing" loans at reduced rates. Federal and state assistance in housing financing may be available through programs that include assistance for new construction and rehabilitation

b. A working capital fund might be provided, first for the provision of infrastructure and then for the purpose of internal construction financing, out of the proceeds from the sale of either free-market or deed-restricted lots

- 3. Resource conservation
 - a. Cost-effective energy conservation and/or use of alternative energy sources
- b. Inclusion of water conservation methods and low impact septic systems
- c. Community composting and recycling
- 4. Neighborhood compatibility
 - a. Good faith efforts to design with neighborhood input and support
 - b. Internal design review for visual impact mitigation
 - c. Extraordinary efforts to cluster development and set aside open space
- d. Internal nuisance abatement guidelines and enforcement
- 5. Common facilities and amenities
- a. Provision of common facilities, playgrounds, laundry facilities, meeting and recreation areas
- b. Inclusion of amenities available to the broader community, such as parks and trails

Variations in Zoning Standards Allowed. Limiting public review to the total number of units allowed does not take into account the real cumulative impacts that the development may or may not have on the community. Smaller unit and building sizes, shorter buildings, more efficient if unconventional infrastructure design, resource conservation measures and the actual design population of the development should also be considered and weighed along with the public benefits of housing affordability. Socalled bonuses should be termed nominal density increases instead, as they will not translate into windfall profits for buyers or developers, who ideally will remain in about the same financial position as before any exceptions were granted. Nominal density increases should be considered a community "good" and should only be granted where affordability is guaranteed. Whether creating affordable rental units or ownership opportunities, any non-subsidized affordable housing solution will reduce land cost per residential unit by allowing more kitchens on a given unit of land than permitted under normal zoning. Underlying zones remain unchanged except for the addition of those uses and densities subject to review and except for standards specifically varied. With the assessment of actual impacts, density adjustments would more likely be assessed in terms of pillows, persons or bedrooms than residential units, since affordable housing units tends to be significantly less luxurious than those that the free market builds. Even a larger population here is likely to inhabit a smaller aggregate building mass, to live on a smaller total scale, and have a smaller ecological footprint.

What would be the mandatory requirements for all affordable housing projects, and which standards should not be amendable through the P.U.D. process? Setbacks, at least at the perimeter of the project, building heights and overall building mass and scale, total maximum site coverage and gross floor area maximums, minimum off-street parking spaces per kitchen, and all off-site impact regulations. for example,

should probably not be loosened except for compelling reasons. It might be desirable, on a case-by-case basis, to place even stricter than normal constraints on the maximum size and height of residences within the project. This will also serve to further constrain both construction costs and resale prices.

Additional accessory uses might be allowed on review to provide for a number of cohousing-type facilities and other community amenities, such as a community playground and park, laundry, library, gardening tool shed, meeting room, shared parking structures, etc., to reduce the need to provide redundant individual facilities.

In cases where a developer is only providing small, deed-restricted affordable lots for later development by others, it may be particularly important to lock in future commitments to affordable construction practices made on behalf of future builders and buyers. Many of the tips and techniques discussed above under free-market housing could be required, or at least a performance-zoning punch list could be provided, requiring that a percentage of these methods be used. This might also include requiring cost-effective, environmentally friendly construction materials, methods and technologies. As a rule, these tend to be more labor-intensive than materially expensive and so would contribute to educational local employment, as well as encourage sweat equity participation. Another program might involve the creation of "time dollars," or "local money" and other barter programs, particularly in sweat equity. Groups of owners might be at least advised of the wisdom in the cooperative purchase of building materials and supplies at wholesale prices. Such a coop could be set up to survive the construction phase and reduce the ongoing cost of living of the project's residents.

In cases where a project's total original amount of land, divided by the total number of residential units allowed on a parcel of that size, leaves a remainder of land greater than half of that required for a minimum lot, or in rural areas, greater than the minimum parcel size required for a well and septic system, the developer might be allowed an additional deed-restricted unit on that remaindered parcel, with its value established at its marginal value, plus the cost of improvements. In rural areas, the remaindered parcel might be permitted several lots, each of a size permitting well and septic systems.

In urban areas, a developer might simply be allowed a larger number of kitchens provided only that he scale down the originally permitted height, mass and scale by a specified amount, say to 75% of original values. This lessens the likelihood of a net population increase while producing modest units and reducing mass and scale impacts.

In cases where an inclusionary zoning requirement is already in place, and is likely to remain so, the affordable housing planned unit development should be offered as an alternative to all of those provisions and requirements. The developer would then be permitted to use his full free-market density, provided that he also provide the P.U.D. either within that project, or on land elsewhere within the jurisdiction. It might even be required as a condition of subdivision that he exceed the affordable density specified in the inclusionary requirement, since this no longer an exaction with a punitive or adversarial approach. This will not cost him any money and in fact will return a modest profit.

Variations in Improvements Standards Allowed. If the project is located in an outof-the-way place, in an enclave of its own, or at the end of a road, it may be worth considering a less upscale set of improvement standards than those enforced to keep local appraisals high. Road pavement and sidewalks may not be necessary. Off-street parking might be reduced to one car per unit and garages need not be required at all. Minimum building size requirements might be waived. Obviously all standards related to public and traffic safety should be preserved, but this need not include street lighting as burglars are less attracted to these neighborhoods and starlight is getting more popular these days.

Fee modifications should be used judiciously, and should be based upon actual modifications of anticipated impacts. Waivers of fees, particularly tap fees, should not be considered, unless the reason for the fee in the first place can be shown to no longer exist. The public entities, and the services they provide, should not be unnecessarily or disproportionately burdened by these projects. Tap fees could, however, be financed, amortized across a number of years, and payments, with interest, could be added to monthly utility bills. The impacts of development are real and free rides only create community resentment. Projects should pay their fair share, particularly if successful program ideas are to propagate in the future. The possible disadvantages of unfounded fee modifications include issues of fairness, shortages of funds when needed for new or upgraded public or quasi-public facilities, and strain on current-year public budgets.

Variances in Regulatory Barriers to Affordable Construction Allowed. It can be explicitly recognized that locally adopted codes and construction requirements may be unnecessarily conservative in a way that is detrimental to affordable housing objectives, particularly in their application of generalizations about worst-case scenarios and in their multiplication of safety factors. This cannot, however, exempt compliance with statewide electrical and plumbing codes. Exceptions may be granted beyond those specifically allowed within the building code, provided that the exceptions can be justified on the basis of a site-specific evaluation of the local conditions and sound engineering practices applied to the actual strength of the materials to be used and the reasonably expected maximum structural stresses, at 100 year frequencies as needed. It may also be required that these exceptions be certified by the appropriate design professionals, but an appeal to reason, common sense and simple thought experiment might also be allowed. Signed waivers of public liability for exemptions from these standards can be required, and filed for public record so that they appear on subsequent title reports. Extremely simplified codes, sometimes called Alternative Owner-Builder codes (AOBC's) might allow, beyond a small handful of stated requirements. any design "which does not abnormally endanger health or safety." A sample document of this type is given in Appendix One.

The Plat of Record and the P.U.D. Agreement. These two documents contain the record of all of the customized changes to the standard zoning uses by right and uses on review, together with the new dimensional and numerical standards, minimums and maximums. It also contains the subdivision improvements agreement, detailing the commitments to provide infrastructure and the mitigation measures promised for the impacts proposed. Items not covered in these documents are cited here as being contained in the CC&R's and the Deed Restriction, described below. This document is a binding contract between the developer and the public entity with jurisdiction.

Covenants, Conditions and Restrictions. This legal document contains a) The establishment, structure and duties of the homeowner's association; b) The commitments made to provide and maintain common facilities; c) The provisions made for utility, energy and resource conservation; d) The internal nuisance regulations and the procedures for their abatement, including air, water, light and noise pollution, animal control, and minimum maintenance standards; and e) The internal design and landscaping regulations, the establishment of a design review board and it's review procedures.

The Deed Restriction. The purpose of the Deed Restriction is two-fold: 1) By excluding the majority of potential buyers and renters, it strictly constrains any excessive demands on the finite supply of affordable residences, thus keeping prices suppressed without the problems that are invariably associated with rent and price

controls. It is assumed that a deed-restricted property will be less attractive as a speculative investment than a free-market property, and it will not tend to appreciate as quickly; 2) The set of qualifications constrains the benefits conferred by zoning flexibility to within the jurisdiction of the entity which grants those benefits. Buyers and occupants are screened according to specified qualification criteria by a body or authority legally empowered to do so. Qualification should not create rights or entitlements, except as carefully specified. Deed restrictions are enforceable by powers of injunction and eviction. Special provisions might be made for the involuntary unemployment of a long-term resident who is otherwise an asset to the community.

Suggested owner and occupant qualification criteria include:1) The majority of householder and/or household income must derive from wages and salaries from employment based within the jurisdiction, or else the applicant must provide proof of a fixed retirement income as his primary means of support and which places his income at or below two-thirds of the mean household income within the jurisdiction; 2) The owners or occupants must be able to document and/or establish either: a) sole residency within the jurisdiction for at least one year prior to occupancy, or b) employment within the jurisdiction for at least one year that is the primary source of household income, and which is at or below two-thirds of the mean household income within the jurisdiction; or c) the existence of a signed contract for employment within the jurisdiction for at least one year and occupants do not own any other habitable residential property. It is fair to the community that the owner or occupant qualifications be made enough of a gauntlet to test an applicant's long-term commitment to the community.

Provisions for shared and assisted living facilities for a growing population of senior citizens should be incorporated into the terms of the deed restriction. Provisions for retired seniors in general should exclude those who have amassed a large amount of equity over their lifetimes. The size of personal retirement funds may be capped by the terms of the deed restriction. They may be limited, for example, to the purchase price of the residence, provided that draws upon them are also limited to the specified income criteria.

The owners of long-term rental properties need not be qualified under the deed restriction, provided that they do not occupy the rental units. The owner and occupant qualifications need not differ, except that unqualified cosigners of mortgages may be allowed to hold nominal title to the deed-restricted properties, provided that are not the occupants. This would allow, for example, the parents of a young couple to help them purchase their first home. Short-term rentals should either be prohibited altogether or strictly limited to two or three vacation weeks a year.

Perhaps the trickiest aspect of the deed restriction concerns the accommodations made for the comfort and benefit of lending institutions. In some places, documents contain an escape or bailout clause which takes automatic effect in cases of loan default, whereby the added deed-restricted units revert to normal occupancy and can then be resold on the open market to previously unqualified buyers. This is a much bigger problem in those jurisdictions where the deed restriction incorporates controls on resale prices and/or rates of appreciation. This underscores the need to use passive constraints on demand as the primary method of keeping resale prices in check. Active price and rent controls should be avoided completely, and possibly even prohibited in the P.U.D. agreement. Whatever terms are used to satisfy the foreclosure, repossession and resale concerns of potential lending institutions, they should be developed in cooperation with local representatives of these institutions.

Four Examples

The zoning laws of counties and municipalities can vary widely from jurisdiction to jurisdiction, and even from year to year, so that is unlikely that any of the four examples below will fit any specific location. These are simply intended to illustrate some of the potential of flexibility in planning and zoning to address problems of housing affordability.

Example A. Citizen A has two lots in a small town. An assessment of zoning and site constraints suggests that he could build a single-family residence of 3000 square feet, up to the height limit, plus a two-car garage. Even the new Affordable Housing P.U.D. overlay option states clearly that he will not be allowed to exceed these maximums. What he would like to do is build two units - 2000 square feet to live in and 1000 square feet to rent. But the P.U.D. ordinance also states that, in addition to deed restricting that apartment and contracting not to condominiumize it, he must also meet three-fourths of the following criteria:

a) Total construction will not exceed 75% of the zoning height, area and coverage maximums,

b)Two off-street parking spaces must be provided for each kitchen, c) Enforceable lease provisions must be in place to contain nuisances in the neighborhood,

d) Plans have been shared with the owners of adjacent properties and no protest is registered,

e) Low-flow shower-heads and water-conserving toilets must be specified on plans, f) [and a few other performance zoning criteria].

You should have the picture - the conditions of approval serve to trim and mitigate the impacts of the proposal so that there is less of a real difference in overall impact between one kitchen under present zoning and two kitchens in the developed proposal. Housing is gained without creating windfall profits for individuals (but yes, a modest return on investment). The property values, and those next door, should stay about the same. Profit-taking is not the point.

Example B. Citizen B has an identical property, but she is a senior widow who wants to build a 2600 square foot home for herself and three other seniors, to share the costs and security. But although there are only four persons, the dream is to have five kitchens - four of these being the tiny plug-in units integrated with private spaces within the residence, for convenience and to preserve a sense of independence and privacy, and a "real" kitchen for their common meals and entertaining family.

Ordinary zoning calls this a five-unit complex, demanding ten residential lots, and the city engineer insists that five kitchens will always mean 2000 gallons a day of water and sewer, not the more likely 400. The P.U.D. allows the government to judge the proposal with greater common sense, on its own merits, simply by allowing a flexible relationship between the concept "kitchen" and the concept "unit" and comparing real impacts. The engineer can be told to quit being a belligerent idiot.

Example C. Citizen C has 40 acres of land in the agricultural zone in the county. If he meets the requirements for a regular P.U.D. he has a use permitted on review of one unit per six acres, so he might split parcel this into 10 acres of open space, 3 acres of right of way and six lots of 4.5 acres each (because 40 is divisible by the 6-acres-perunit allowance 6 times, with a remainder of 4 acres).

Now the Public Benefit P.U.D. could be applied to this remainder of four acres to create an affordable housing lot for a buyer who qualifies under the new deed restriction. The new P.U.D. sets a minimum lot size of 1 acre (as does the state for septic systems) and has a fifty percent open space requirement. So 2 one-acre deed restricted residential lots might be created, plus a two-acre open-space tract on which

the county might want to put a playground, a school bus stop or a road maintenance shed. Why would Citizen C volunteer to do this? Because the county's new P.U.D. ordinance allows him to recover the marginal value of his four acres (calculated as the difference in appraised value between free-market single-family lots of of 4.5 acres and 8.5 acres) plus a fair percentage of his total infrastructure costs for the 40 acre development, plus additional planning, design and public process expenses incurred, plus interest at prime-plus-a-point for the capital actually tied up. The two-acre lot sells for a third of the cost of its neighbors, and not to a speculator because future buyers must be local wage earners. Nobody loses here. But if there is not enough incentive to make it happen, it will not get done. Now the restricted lots are occupied by two working couples, including two school teachers who would otherwise have needed to move on in three years. And these two have just vacated the rental apartment and house they have occupied, returning these units to the rental market.

Example D. Citizen D also has 40 acres in the agricultural zone in the county, but her property borders on one of the city limits, where it might one day be annexed and a higher density would be appropriate. For these cases, the new P.U.D. ordinances might say that density is based on as little as 10,000 square feet per unit with a 50% open space requirement, provided that city utilities can be provided and that the public interest is served, an amenity/mitigation checklist is addressed and the written acquiescence of the municipality is secured. So Citizen D could take her "extra" four acres and create a 17-unit affordable-housing hamlet, plus a two acre future town park.

The 5000 square foot affordable lots, perhaps zoned for 1400 square foot maximum cottages to keep resale prices suppressed, might be made to sell for a third the price of town lots, and still the developer gets her money back with banker's interest.

The county could even require that the 17 qualified families form a cooperative prior to construction to purchase building materials at wholesale and pool a per-family sweat equity requirement. The hamlet as a whole could negotiate tap fees with the neighboring town based on water conservation proposals and actual use, and the town might agree to finance the tap fees at interest, billable along with monthly use fees.

These are not the only possibilities allowed for in this section as presented, but they should serve to illustrate how affordable housing can be developed to the community's benefit without significant government subsidies and without an adversarial process set between the public and private sector. These are win-win scenarios. But they require either vision and courage on the part of the public-sector representatives, or a threat from the voters to replace them in the next election.

Appendix One: A Sample "Alternative Owner-Builder Code" from Inyo, CA

ORDINANCE

AN ORDINANCE ADOPTING SPECIAL BUILDING AND SANITATION STANDARDS FOR OWNER-BUILT RURAL RESIDENTIAL DWELLINGS IN THE TOWNSITE OF DARWIN

The Board of Supervisors of the County of Inyo do ordain as follows:

SECTION 1 SHORT TITLE

The following ordinance shall be known as the Darwin Rural Residential Building Code.

SECTION 2 AUTHORITY

The following ordinance is adopted pursuant to Section 1098 et seq. of Article 8, Chapter 1, Title 25 of the California Administrative Code (Housing and Community Development) which authorizes local general purpose governments to enact modifications to the uniform building codes for owner-built rural residential structures when "local conditions" exist to warrant such modifications.

SECTION 3 FINDINGS OF LOCAL CONDITIONS~DARWIN SPECIFIC PLAN The Inyo County Board of Supervisors hereby finds that local conditions exist in the Rural Community of Darwin which warrant the modifications to the uniform building codes contained herein. Such local conditions are defined and described in the Darwin Specific Plan, prepared pursuant to Section 65450 et seq. of the Government Code and adopted by the Inyo County Board of Supervisors pursuant to Resolution 78-_____. The Darwin Rural Residential Building Code is adopted in accordance with the policies and recommendations contained in the Darwin Specific Plan.

SECTION 4 PURPOSE

The purpose of these regulations is to provide minimum requirements for the construction of owner-built residential dwellings and appurtenant structures in the rural residential community of Darwin, California in

order to protect the public health and safety, while allowing for maximum flexibility as to design and materials. In making such modifications to the uniform building codes, the Board of Supervisors

recognize that, in regard to building practices which raise questions of public health and safety, the Building Official may use particular provisions of the adopted uniform codes as a guide for determining acceptability.

SECTION 5 APPLICABILITY

The Darwin Rural Residential Building Code shall apply only to the construction, enlargement, conversion and alteration of dwellings and appurtenant structures within the townsite of Darwin as described in the

Darwin Specific Plan. "Owner-built" shall mean a dwelling and appurtenant structures, not exceeding two stories in height, constructed by the property owner directly and not intended for sale, lease or rent.

SECTION 6 MODIFICATION TO UNIFORM CODES LIMITATIONS Except as otherwise indicated in these regulations, dwellings and appurtenant

structures constructed pursuant to these regulations need not comply with construction requirements contained in the adopted editions of the Uniform Building, Plumbing or Mechanical Codes of Article Five and Seven of Chapter One of Title 25 of the California Administrative Code. Nothing contained in these regulations shall be construed as preventing any structure which constitutes a hazard to health or safety from being declared a public nuisance which shall be abated by repair, rehabilitation or removal pursuant to the applicable provisions of Title 25 of the California Administrative Code.

SECTION 7 DARWIN RURAL RESIDENTIAL CODE - CONTENTS The Darwin Rural Residential Code consists of the following structural and sanitation requirements:

A SANITATION REQUIREMENTS

1. A supply of potable running water approved by the Health Officer to all permanent dwellings although this water may not have to be heated. A minimum pressure of 25 pounds per square inch to all dwellings shall be provided unless an exemption is granted pursuant to Title 17, Article 1, Section 7057 (B).

2. Disposal of toilet wastes (black water) must be accomplished through a water carriage facility although approved water conservation methods may be used. Subsurface disposal of toilet wastes must be approved by the Health Officer. (Pit privies, compost privies are not acceptable.)

3. A bathtub or shower and a lavatory (or other bathing and washing facilities approved by the Health Officer) shall be provided to the dwelling site.

4. A system for the disposal of greywater which has been approved by the Health Officer shall be provided for the dwelling site. "Greywater" means the waste water from the dwelling site (exclusive of toilet wastes) such as water from a laundry, bath, shower or sink.

B STRUCTURAL REQUIREMENTS

I. Each structure shall be constructed in a safe and sound condition, to protect the health and safety of the occupants, including protection from fire and vertical and lateral forces to which the structure may be subjected~

2. Footings and foundations: Pier foundations, pressure treated lumber, or equivalent materials may be used, provided that the bearing is sufficient for the purpose intended. If steel poles are used, they shall

be protected as required by the building official. Where the foundation is not reinforced, the minimum footing width shall not be less than twelve inches and the overall unsupported height of footing and foundation shall not exceed 24 inches, and the load of such foundation and footing shall not exceed 600 pounds per lineal foot of exterior wall for single story dwellings. When foundations support structures over one story in height, they shall be sufficient to support the entire structure.

3. Lumber: Salvaged lumber or owner-produced new lumber may be used, unless found by the Building Official to contain dry rot, excessive splitting, or other defects obviously rendering the material unfit as lumber or not of sufficient strength or durability to perform the function intended.

4. Shingles and shakes: Owner-produced wood shingles and shakes may be used unless found by the Building Official not to be of sufficient quality or durability to perform the function intended.

Mechanical requirements.

5. Fireplaces and heating and cooking appliances shall be installed and vented in accordance with the requirements of the latest edition of the Uniform Mechanical Code, and Chapter 37 of the Uniform Building Code, except that an alternate method of venting shall be allowed if substantially equivalent in safety, and approved by the

Building Official.

Electrical requirements.

6. Whatever electrical or electrical systems are installed shall be installed in accordance with the adopted Uniform Electrical Code and National Electrical Code. Plumbing requirements.

7. Whatever plumbing or piping systems are installed shall be installed in accordance with the adopted Uniform Plumbing Code. Room dimension requirements.

8. No habitable room shall be less than seven (7) feet in any dimension or less than 70 square feet in area.

Mobile home requirements.

9. All mobile homes shall be installed in accordance with the provisions of Title 25, Chapter 5 of the California Administrative Code.

SECTION 8 ADMINISTRATIVE PROVISIONS

The administrative provisions contained in the adopted Uniform Codes shall be applicable to buildings and structures built under the construction standards specified in this ordinance. In all cases a permit, including

payment of applicable fees, shall be obtained from the Inyo County Building Department before any structure is erected in conformance with the provisions of this ordinance.

SECTION 9 DECLARATIVE COVENANT REQUIRED

The Inyo County Building and Safety Department, prior to issuing a permit under the provisions of this ordinance, shall require evidence from the property owner that a declaration of covenants shall have been recorded. The declaration of covenants shall be substantially in the following form.'

DECLARATION OF COVENANTS

We ______, as the owners of the real property herein after described, do hereby covenant and agree with the County of Inyo, that: We will give notice to subsequent purchasers and lenders of the rural residential building permit issued by the County of Inyo for the erection of improvements on said real property containing waivers of certain building or code requirements. That this covenant and agreement is executed and recorded in consideration of the issuance by the County of Inyo of a building permit for rural residential structures and appurtenant structures as authorized pursuant to Section 1098 et seq. of Article 8, Chapter 1, Title 25 of the California Administrative Code.

It is understood and agreed that this covenant shall continue for sixty (60) years. or until such time as a new building permit is issued by the County of Inyo without such waivers contained therein, whichever comes first

The real property subject hereof is described as follows:

STATE OF CALIFOR	NIA	
COUNTY OF INYO		
On	19 , before me, the undersig	ned, a
Notary Public in and fo	or said County, personally appeared	
	known to me to be the p	person(s) whose
name (s) is/are subscrib	bed to the within instrument, and acknow	vledged
to me that	he	executed the
same.		

Notary Public in and for said County and State

SECTION 10 SEVERABILITY

If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason held to be invalid or unconstitutional by a court of competent jurisdiction in the State of California, such invalidity or unconstitutionality shall not affect the validity or constitutionality of the remaining portions of this ordinance.

SECTION 11 ORDINANCE IN EFFECT

This ordinance shall take effect and be in full force and effect, except as herein limited, thirty (30) days after its adoption and following the completion of the filing requirements of the State Department of Housing and Community Development pursuant to existing state law. This ordinance, unless otherwise extended by the Board, shall expire and become null and void within two (2) years from the date of effect in accord with the policies of Board Resolution 78-______. Before the expiration of fifteen (15) days from the adoption hereof, the ordinance shall be published for one week in a newspaper of general circulation printed and published in the County of Inyo, State of California. The ex-officio Clerk of the Board is hereby instructed and ordered to so publish this ordinance together with the names of the Board voting for and against the same.

Passed and Adopted this _____ day of _____, 197 ____

Richard McDonald, Chairman Inyo County Board of Supervisors

NOTE - The ordinance may be revised to a limited degree to reflect the proposed code's integration into the Inyo County Code and the necessary cross reference amendments to the code sections adopting the Uniform Codes. Unfortunately the ordinance adopting the latest additions of the uniform codes and integrating them into the County Code has not vet been adopted. Thus, some changes may be made in the actual final ordinance on which the Board of Supervisors will act.

Appendix Two: The State of Colorado Planned Unit Development Act of 1972

ARTICLE 67 - PLANNED UNIT DEVELOPMENT ACT OF 1972

Section

24-67-101. Short title.

24-67-102. Legislative declaration.

24-67-103. Definitions.

24-67-104. Implementation of article.

24-67-105. Standards and conditions for planned unit development.

24-67-105.5. Review of planned unit development.

24-67-106. Enforcement and modification of provisions of the plan.

24-67-107. Application and construction of article.

24-67-108. Model resolutions - subdivisions - improvement notices.

24-67-101. Short title.

This article shall be known and may be cited as the "Planned Unit Development Act of 1972".

History

Source: L. 72: p. 508, § 1. C.R.S. 1963: § 106-6-1. Annotations

ANNOTATION Annotations

Law reviews. For article, "1974 Land Use Legislation in Colorado", see 51 Den. L. J. 467 (1974). For article, "Local Government Exactions from Developers After Beaver Meadows", see 16 Colo. Law. 42 (1987).

Applied in C & M Sand & Gravel v. Bd. of County Comm'rs, 673 P.2d 1013 (Colo. App. 1983); Beaver Meadows v. Bd. of County Comm'rs, 709 P.2d 928 (Colo. 1985).

24-67-102. Legislative declaration. Statute text

(1) In order that the public health, safety, integrity, and general welfare may be furthered in an era of increasing urbanization and of growing demand for housing of all types and design, the powers set forth in this article are granted to all counties and municipalities for the following purposes:

(a) To provide for necessary commercial, recreational, and educational facilities conveniently located to such housing;

(b) To provide for well-located, clean, safe, and pleasant industrial sites involving a minimum of strain on transportation facilities;

(c) To ensure that the provisions of the zoning laws which direct the uniform treatment of dwelling type, bulk, density, and open space within each zoning district will not be applied to the improvement of land by other than lot-by-lot development in a manner which would distort the objectives of the zoning laws;

(d) To encourage innovations in residential, commercial, and industrial development and renewal so that the growing demands of the population may be met by greater variety in type, design, and layout of buildings and by the conservation and more efficient use of open space ancillary to said buildings;

(e) To encourage a more efficient use of land and of public services, or private services in lieu thereof, and to reflect changes in the technology of land development so that resulting economies may inure to the benefit of those who need homes;

(f) To lessen the burden of traffic on streets and highways;

(g) To encourage the building of new towns incorporating the best features of modern design;

(h) To conserve the value of the land;

(i) To provide a procedure which can relate the type, design, and layout of residential, commercial, and industrial development to the particular site, thereby encouraging preservation of the site's natural characteristics; and

(j) To encourage integrated planning in order to achieve the above purposes. History

Source: L. 72: p. 508, § 1. C.R.S. 1963: § 106-6-2.

24-67-103. Definitions. Statute text

As used in this article, unless the context otherwise requires:

(1) "Common open space" means a parcel of land, an area of water, or a combination of land and water within the site designated for a planned unit development designed and intended primarily for the use or enjoyment of residents, occupants, and owners of the planned unit development.

(2) "Plan" means the provisions for development of a planned unit development, which may include, and need not be limited to, easements, covenants, and restrictions relating to use, location, and bulk of buildings and other structures, intensity of use or density of development, utilities, private and public streets, ways, roads, pedestrian areas, and parking facilities, common open space, and other public facilities. "Provisions of the plan" means the written and graphic materials referred to in this definition.

(3) "Planned unit development" means an area of land, controlled by one or more landowners, to be developed under unified control or unified plan of development for a number of dwelling units, commercial, educational, recreational, or industrial uses, or any combination of the foregoing, the plan for which does not correspond in lot size,

bulk, or type of use, density, lot coverage, open space, or other restriction to the existing land use regulations. History

Source: L. 72: p. 509, § 1. C.R.S. 1963: § 106-6-3.

24-67-104. Implementation of article. Statute text

(1) Any county with respect to territory within the unincorporated portion of the county or any municipality with respect to territory within its corporate limits may authorize planned unit developments by enacting a resolution or ordinance which:

(a) Refers to this article;

(b) Includes a statement of objectives of development;

(c) Designates the board, which may be a commission, board, or the governing body of the county or municipality, authorized to review planned unit development applications as set forth in this article;

(d) Sets forth standards of development consistent with the provisions of section 24-67-105;

(e) Sets forth the procedures pertaining to the application for, hearing on, and tentative and final approval of a planned unit development which shall afford procedural due process to interested parties. The resolution or ordinance shall establish maximum time periods within which any application shall be reviewed and approved, disapproved, or conditionally approved. At least one public hearing shall be held by the board designated pursuant to paragraph (c) of this subsection (1) prior to approval, disapproval, or conditional approval of a planned unit development. Public notice of the public hearing shall be given in the manner prescribed by section 30-28-116 or 31-23-304, C.R.S., whichever is applicable, for the amendment of zoning resolutions and ordinances. Written notice of the public hearing shall be delivered or mailed, first-class postage prepaid, at least fifteen days prior to the public hearing to adjoining landowners.

(f) Requires a finding by the county or municipality that such plan is in general conformity with any master plan or comprehensive plan for the county or municipality.

(2) The enactment of the resolution or ordinance provided for in this section and the enactment of any amendment thereto shall be in accordance with the procedures required for the adoption of an amendment to a zoning resolution or ordinance as prescribed by section 30-28-116 or 31-23-305, C.R.S., whichever is applicable. History

Source: L. 72: p. 509, § 1. C.R.S. 1963: § 106-6-4. L. 75: (1)(e) and (2) amended, p. 1270, § 6, effective July 1. Annotations

ANNOTATION Annotations

Section requires a county or municipality to find that a planned unit development is in general conformity with any master plan or comprehensive plan before the county or municipality approves the planned unit development. Accordingly, board erred in approving an application to rezone land without finding that the application was in general conformance with the county's use plans. Canyon Area Residents for the Environment v. Jefferson County Bd. of County Comm'rs, ___ P.3d __ (Colo. App. 2006).

24-67-105. Standards and conditions for planned unit development. Statute text

(1) Every resolution or ordinance adopted pursuant to the provisions of this article shall set forth the standards and conditions by which a proposed planned unit development shall be evaluated, which shall be consistent with the provisions of this section. No planned unit development may be approved by a county or municipality without the written consent of the landowner whose properties are included within the planned unit development.

(2) Such resolution or ordinance shall set forth the uses permitted in a planned unit development and the minimum number of units or acres which may constitute a planned unit development.

(3) Such resolution or ordinance may establish the sequence of development among the various types of uses.

(4) Such resolution or ordinance shall establish standards governing the density or intensity of land use, or methods for determining such density or intensity, in a planned unit development.

(5) Such resolution or ordinance shall specify information which shall be submitted with the planned unit development application to ensure full evaluation of the application, and the board designated pursuant to section 24-67-104 (1) (c) may require such additional relevant information as it may deem necessary.

(6) (a) Such resolution or ordinance may provide standards for inclusion of common open space.

(b) The ordinance or resolution may require that the landowner provide for and establish an organization for the ownership and maintenance of any common open space or that other adequate arrangements for the ownership and maintenance thereof be made.

(c) In the event that the organization established to own and maintain common open space, or any successor organization, fails at any time after establishment of the planned unit development to maintain the common open space in reasonable order and condition in accordance with the plan, the county or municipality may serve written notice upon such organization or upon the residents of the planned unit development setting forth the manner in which the organization has failed to maintain the common open space in reasonable condition, and said notice shall include a demand that such deficiencies of maintenance be cured within thirty days thereof and shall state the date and place of a hearing thereon which shall be held within fourteen days of the notice. At such hearing the county or municipality may modify the terms of the original notice as to deficiencies and may give an extension of time within which they shall be cured. If the deficiencies set forth in the original notice or in the modifications thereof are not cured within said thirty days or any extension thereof, the county or municipality, in order to preserve the taxable values of the properties within the planned unit development and to prevent the common open space from becoming a public nuisance, may enter upon said common open space and maintain the same for a period of one year. Said entry and maintenance shall not vest in the public any right to use the common open space except when the same is voluntarily dedicated to the public by the owners. Before the expiration of said year, the county or municipality shall, upon its initiative or upon the written request of the organization theretofore responsible for the maintenance of the common open space, call a public hearing upon notice to such organization or to the residents of the planned unit development to be held by the board designated by the county or municipality, at which hearing such organization or the residents of the planned unit development shall show cause why such maintenance by the county or municipality shall not, at the election of the county or municipality, continue for a succeeding year. If the board designated by the county or municipality determines that such organization is ready and able to maintain said common open space in reasonable condition, the county or municipality shall cease to maintain said common open space at the end of said year. If the board designated by the county or municipality determines that such organization is not ready and able to maintain said common open space in a reasonable condition, the county or municipality may, in its discretion, continue to maintain said common open space during the next succeeding year and, subject to a similar hearing and determination, in each year thereafter.

(d) The cost of such maintenance by the county or municipality shall be paid by the owners of properties within the planned unit development that have a right of enjoyment of the common open space, and any unpaid assessments shall become a tax lien on said properties. The county or municipality shall file a notice of such lien in the office of the county clerk and recorder upon the properties affected by such lien within the planned unit development and shall certify such unpaid assessments to the board of county commissioners and county treasurer for collection, enforcement, and remittance in the manner provided by law for the collection, enforcement, and remittance of general property taxes.

(7) Design, construction, and other requirements applicable to a planned unit development may be different from or modifications of the requirements otherwise applicable by reason of any zoning or subdivision regulation, resolution, or ordinance of the county or municipality as long as such requirements substantially comply with the subdivision provisions of part 1 of article 28 of title 30 or part 2 of article 23 of title 31, C.R.S., whichever is applicable, and appropriate regulations promulgated thereunder. Subdivision regulations applicable to planned unit developments may differ from those otherwise applicable. History

Source: L. 72: p. 510, § 1. C.R.S. 1963: § 106-6-5. L. 75: (7) amended, p. 1271, § 7, effective July 1. Annotations

ANNOTATION Annotations

Zoning is not a condition precedent to adoption of planned unit development regulations, nor do defects in the adoption of a county master plan under § 30-28-108 render such regulations null and void. Best v. La Plata Planning Comm'n, 701 P.2d 91 (Colo. App. 1984).

The Planned Unit Development Act authorizes the collection of fees for the maintenance of the common open space, not for school construction. County Comm'rs of Douglas County v. Bainbridge, 929 P.2d 691 (Colo. 1996).

24-67-105.5. Review of planned unit development. Statute text

(1) The county planning commission or governing body may request redesign of all or any portion of a planned unit development submitted for approval, but any such request shall include specific, objective criteria. If the applicant redesigns the planned unit development in accordance with the request, no further redesign shall be required unless necessary to comply with a duly adopted county resolution, ordinance, or regulation.

(2) Nothing in this section shall be construed to preclude a county from taking any action permitted by law based on the consideration of the rights and privileges of the owners of subsurface mineral interests and their lessees pursuant to section 30-28-133 (10), C.R.S.

(3) Any required public hearing on any planned unit development shall be conducted expeditiously and concluded when all those present and wishing to testify have done so. No public hearing shall continue for more than forty days from the date of commencement without the written consent of the applicant. Any continuation of a public hearing shall be to a date certain.

(4) Unless withdrawn by the applicant, any planned unit development that has been neither approved, conditionally approved, nor denied within a time certain mutually agreed to by the county and the applicant at the time of filing shall be deemed approved. Such time period may be extended by the county to receive a recommendation from an agency to which a planned unit development was referred, but such extension shall not exceed thirty days unless the agency has notified the county that it will require additional time to complete its recommendation.

(5) Any requirement set forth in this section may be waived in writing by the applicant. History

Source: L. 96: Entire section added, p. 1838, § 2, effective June 5.

24-67-106. Enforcement and modification of provisions of the plan. Statute text

(1) To further the mutual interest of the residents, occupants, and owners of a planned unit development and of the public in the preservation of the integrity of the plan, the

provisions of the plan relating to the use of land and the location of common open space shall run in favor of the county or municipality and shall be enforceable at law or in equity by the county or municipality without limitation on any power or regulation otherwise granted by law.

(2) All provisions of the plan shall run in favor of the residents, occupants, and owners of the planned unit development, but only to the extent expressly provided in the plan and in accordance with the terms of the plan, and, to that extent, said provisions, whether recorded by plat, covenant, easement, or otherwise, may be enforced at law or in equity by residents, occupants, or owners acting individually, jointly, or through an organization designated in the plan to act on their behalf. However, no provisions of the plan shall be implied to exist in favor of residents, occupants, and owners except as to those portions of the plan which have been finally approved.

(3) All those provisions of the plan authorized to be enforced by the county or municipality may be modified, removed, or released by the county or municipality, subject to the following:

(a) No modification, removal, or release of the provisions of the plan by the county or municipality shall affect the rights of the residents, occupants, and owners of the planned unit development to maintain and enforce those provisions at law or in equity as provided in subsection (1) of this section.

(b) Except as otherwise provided in paragraph (b.5) of this subsection (3), no substantial modification, removal, or release of the provisions of the plan by the county or municipality shall be permitted except upon a finding by the county or municipality, following a public hearing called and held in accordance with the provisions of section 24-67-104 (1) (e) that the modification, removal, or release is consistent with the efficient development and preservation of the entire planned unit development, does not affect in a substantially adverse manner either the enjoyment of land abutting upon or across a street from the planned unit development or the public interest, and is not granted solely to confer a special benefit upon any person.

(b.5) (I) Subject to the requirements of subparagraph (II) of this paragraph (b.5), in the case of any land located within a planned unit development that has been set aside for a governmental use or purpose as specified in the plan, the plan agreement, or related documents, a governmental entity that holds legal title to the land may, with the approval of the county or municipality in which the land is located, as applicable, and following a public hearing called for and held in accordance with the provisions of section 24-67-104 (1) (e), do any of the following, singularly or in combination:

(A) Subdivide all or any portion of the land;

(B) Remove or release all or any portion of the land from any limitations on its use or purpose by the governmental entity as specified in the plan, the plan agreement, or related documents; or

(C) Sell or otherwise dispose of all or any portion of the land.

(II) Any action authorized in accordance with the requirements of subparagraph (I) of this paragraph (b.5) shall only be undertaken upon a finding by the county or

municipality, as applicable, following the public hearing required pursuant to subparagraph (I) of this paragraph (b.5) that all or any portion of the land is not reasonably expected to be necessary for a governmental use or purpose or that the governmental use or purpose will be furthered by disposal of the land. Notwithstanding any other provision of this paragraph (b.5), where action has been undertaken in accordance with the requirements of this paragraph (b.5), the future use of all or any portion of the land shall in all other respects be consistent with the efficient development and preservation of the entire planned unit development and with the plan.

(c) Residents and owners of the planned unit development may, to the extent and in the manner expressly authorized by the provisions of the plan, modify, remove, or release their rights to enforce the provisions of the plan, but no such action shall affect the right of the county or municipality to enforce the provisions of the plan. History

Source: L. 72: p. 512, § 1. C.R.S. 1963: § 106-6-6. L. 2005: (3)(b) amended and (3) (b.5) added, p. 695, § 1, effective June 1. Annotations

Editor's note: Section 2 of chapter 200, Session Laws of Colorado 2005, provides that the act amending subsection (3)(b) and enacting subsection (3)(b.5) applies to any planned unit development approved prior to, on, or after June 1, 2005. Annotations

ANNOTATION Annotations

Notice of restrictive provisions. Where a deed by which plaintiff obtained property mentioned specifically a planned unit development (PUD), plaintiff was on notice and should have read the plan to determine its exact provisions. South Creek Associates v. Bixby, 753 P.2d 785 (Colo. App. 1987), affd, 781 P.2d 1027 (Colo. 1989).

A setback requirement contained within a duly adopted planned unit development plat is a building restriction concerning real property as contemplated by § 38-41-119. McDowell v. U.S., 870 P.2d 656 (Colo. App. 1994).

Equitable relief and money damages barred. The word "enforce", as used in § 38-41-119 in relation to contractual obligations, embraces a remedy of money damages as well as equitable relief. Section 38-41-119 was meant to apply to any action to enforce a building restriction, regardless of the nature of the relief requested. The nature of the right that plaintiff seeks to exercise controls the applicability of the statute of limitations. Therefore, plaintiff's tardy claim for equitable relief, in the form of removal of encroaching improvements that violate the PUD setback area requirement, and money damages is barred by the statute of limitations of § 38-41-119. McDowell v. U.S., 870 P.2d 656 (Colo. App. 1994).

This section requires notice and a public hearing, but not consent of the landowners, to modify an existing PUD. Whatley v. Summit County Bd. of County Comm'rs, 77 P.3d 793 (Colo. App. 2003).

24-67-107. Application and construction of article. Statute text

(1) The provisions of this article shall apply to home rule municipalities unless superseded by charter or ordinance enactment.

(2) Any county or municipality which has enacted, prior to May 21, 1972, a resolution or ordinance providing for planned unit developments may continue to follow the provisions established therein, and any amendments thereto in lieu of electing to follow the provisions of this article.

(3) Nothing in this article shall be construed to impair, affect, or invalidate any rights vested in connection with planned unit developments for which applications were filed prior to May 21, 1972.

(4) Nothing in this article shall be construed to waive the requirements for substantial compliance by counties and municipalities with the subdivision requirements of part 1 of article 28 of title 30 and part 2 of article 23 of title 31, C.R.S., respectively, and appropriate regulations promulgated thereunder. Counties and municipalities, including home rule cities, shall comply with the requirements of article 65.5 of this title. Subdivision regulations applicable to planned unit developments may differ from those otherwise applicable. In order to facilitate processing of applications, however, a county or municipality, pursuant to resolution or ordinance, may provide for concurrent or simultaneous processing of planned unit development and subdivision applications.

(5) No county or municipality shall adopt pursuant to this article any resolution or ordinance which limits development exclusively to planned unit development districts.

(6) This article shall be liberally construed in furtherance of the purposes of this article and to the end that counties and municipalities shall be encouraged to utilize planned unit developments. Enactment of this article by the general assembly is declared to be for the purpose of supplementing the provisions of part 1 of article 28 of title 30 and article 23 of title 31, C.R.S., as the same relate to and authorize planned unit developments. History

Source: L. 72: p. 513, § 1. C.R.S. 1963: § 106-6-7. L. 75: (4) amended, p. 1271, § 8, effective July 1. L. 2001: (4) amended, p. 490, § 3, effective July 1. Annotations

ANNOTATION Annotations

Law reviews. For article, "1974 Land Use Legislation in Colorado", see 51 Den. L. J. 467 (1974). For article, "Unrecorded PUD Plans: On the Frontier of New Diligence", Colo. Law. 1089 (1990).

Planned Unit Development Act of 1972 held not to apply to case where home rule city adopted its own planned unit development ordinance. South Creek Associates v. Bixby, 781 P.2d 1027 (Colo. 1989).

24-67-108. Model resolutions - subdivisions - improvement notices. Statute text

The department of local affairs shall develop model resolutions and ordinances to serve as guidelines for counties and municipalities in enacting enabling resolutions and ordinances pursuant to this article. History

Source: L. 72: p. 513, § 1. C.R.S. 1963: § 106-6-8.

Appendix Three Local Regulatory Obstacles to Affordable and Green Construction

The saying "think globally, act locally" tries to leave us with some hope that we can take our greater vision and just dig right into our own back yards and start trying out inventive solutions to the habitation problems cropping up around the world. But, surprisingly only to some, a huge amount of resistance to the local application of innovative design comes from local government. Great obstacles to the design and the construction of eco-friendly structures and more sustainable human communities are built into the boilerplate verbiage of local regulations. Most of these obstacles are set in our way by the very entities that claim to constitute our local leadership, and who praise themselves for their local concerns.

Part of the problem is that the very institution of an idea, no matter how liberal at the root, seems to put it into a defensive or conservative position. Also, when those in power and office represent only the majority, and the majority has no clue about the extent of the trouble we are in, the visionary will be marginalized and denial will be the norm. Neither is any sort of institutionalized entity likely to give much encouragement to an entity seeking to replace it. Fear and ignorance combine to build a regulatory wall against the unfamiliar.

Another difficulty lies in the fundamental differences between the regulatory mentality in general and the sort of problem solving behavior that leads to optimum solutions to specific design problems. The foremost among these differences lies in the approach to risk. The regulators tend to identify worst-case scenarios independent of local contexts, identify design solutions to eliminate all risk of design failure anywhere, and then multiply the strength factors of these designs by a safety factor of two for an extra margin of safety. While they may claim they are doing this for reasons related to public liability, they fail to grasp that the public entity incurs no liability at all until these regulations are put into place. This circular reasoning more often than not leaves local, niche- and context-specific design solutions four to eight times as strong as they need to be, and thus using twice as much material as necessary.

I share a few examples of the economic effects of misguided local regulation, drawn from experience in my own region of southwest Colorado: A few years ago, a private non-profit was formed in my community to construct an eight-foot wide hiking trail and bike path from the town park to the reservoir. It was nearly three miles long and involved the restoration of an old railroad bridge and a new public park. They passed their hats and brought the completed project in at a very reasonable cost of \$12 per running foot. At about the same time the government of the nearby town of Telluride constructed a very similar project, an eight-foot wide asphalt path, three miles long, including an underpass beneath a rural highway. This public entity brought its project in at a cost of \$170 per running foot. Granted, fourteen times the cost is not the norm for public works, but public projects and works are always at least double what the private sector would pay. Why? When the public acts they act with free money from the taxpayers. With responsibility spread around and nobody being held accountable there is nothing personal perceived to be lost. Not even jobs are at stake when everyone acts the same way. Plus, they are being "extra safe" and not sorry. It is always worth a chuckle when a government hires an ultra-conservative engineering firm to put the thumbscrews on local developers, but then turns around and hires that same firm for its own project. Then it screams and whines when the bids for its new bridge come in at triple what they should be. This would be more comical if the pathology were not gradually being forced onto the private sector, precisely concurrent with the transition of the society from "land of the free" to "land of the lawyers." But who else did "the people" think would rule them, once the rule of law was entrenched? This illness is spreading. This is in part because the waste is more expensive, and so it contributes to job growth, the economy and the GNP.

Governments are set up to grow, and not to shrink, and they will tend to move rather mindlessly towards their most nourishing food sources and to establish new outposts and departments wherever they can. This is "growth for the sake of growth, the ideology of the cancer cell," as Edward Abbey warned. It is selforganization run amuck. You can call this "mission creep" or metastasis: either way, it refers to parts of social organisms that have moved beyond their limits and designated places and don't know how or where to stop. If a government derives revenue as a percentage of gross construction costs, it will not be very eager at all to take steps to reduce these costs. If it derives revenue from a sales tax on building materials, it is not likely to implement measures to reduce material use, even if these mean a great reduction in waste. If it derives most of its revenue from the appraised value of land and improvements, it can be counted upon to do all it can to keep those appraisals inflated and growing, even if its stated intentions are otherwise. This is why your community has no more affordable housing, or even small houses. In most cases, small houses are even prohibited under zoning law: they drag the appraisals down. This is another part of the reason that your local codebooks get lots of new added standards that cost the private sector more millions, but none that will save it a dime.

The bureaucrat's habit of mandating professional studies and certifications in situations where common sense, basic arithmetic, or simple thought experiments would provide ample justification for a design, amounts to unfunded mandates on the private sector and adds large sums of money to unnecessary project costs. These unnecessary expenditures, when totaled across the bureaucrat's domain, normally well exceed the bureaucrat's salary. This should start registering somewhere on somebody's books if the true costs of government to affordable construction are ever to be made widely known. Such requirements for studies and certifications are always encouraged at least tacitly by the guild monopolies of architects, engineers, surveyors, etc. but often concerted lobbying efforts by monopolies have led to the requirements being mandated by State law. Even here, laws might only read that an official may require a particular study or stamp. The tendency of the official of course will be to interpret may as shall because this increases his sense of power and authority and decreases his sense of liability and accountability. For the large numbers of bureaucrats with passive-aggressive personality disorders, this may is a gate to heaven. Since state law is so difficult to change, it is up to local pressure on local government to prevent this.

Much of the machinery of local government is justified on the grounds of reducing the public liability. But with regard to liabilities incurred in commitments to the enforcement of building-and-zoning standards and codes, we are seldom reminded that no liability is incurred by this entity at all until such standards and codes are voluntarily adopted and enforced. This convenient omission seems to cast some suspicion on the question of this being a question of public liability at all. Perhaps it is more a matter of the employees and appointees of government justifying their workloads and evading personal accountability. This is the problem of standing governments.

There never seems to be enough micromanagement and meddling in the public arena. And the voters refuse to learn, granting more power and money and less accountability to their so-called public servants with every new request. This seems to increase geometrically with community size. Throw more government at the problem and eventually it will get governed? Both elected and appointed boards and commissions, in addition to attracting occasional able-minded members, seem more often to attract the meddlesome citizens. This is too often like putting art critics in charge of art, and it tends to place the amateurs on an unequal footing above the professionals. Entrenched positions involving the interpretation and enforcement of codes and ordinances, particularly where there is limited accountability, are especially attractive to the passive-aggressive personality types, who can just hide behind rules and enjoy telling others what they may not do. And, finally, let's face it: the pay in the public sector does not tend to attract the finest of minds to begin with.

A subset of the metastasis problem is the mindless replication of "boilerplate," the verbiage passed from community to community by second-rate attorneys who are reluctant to attempt localized reformulations. These paragraphs are usually adopted wholesale into local codes with perhaps a few additions, but seldom any deletions. This is a form of peer pressure writ large: we do it this way because this is how all of our neighboring communities are doing it. It is too seldom asked, however, whether what the neighbors are doing actually works. It is more important that we are the same.

An adversarial relationship is usually assumed between the public and private interests. The public interest, having no actual mind of its own, is quick to understand itself as more sovereign than the individuals, who do possess real-live minds and consciences. It will see itself as the source of such things as property rights and civil liberties, and then, often successfully, will convince its subjects of this truth. This synthesis of parts eventually mistakes itself to be the original reality. Ross Perot said this about that: "As a private citizen, believe me, you are looked on as a major nuisance. The facts are, you now have a government that comes at you and you're supposed to have a government that comes from you". That's that in a nutshell.

A truly sustainable design is going to be a localized, creative response by an entity, organism, or population to a very specific environmental niche, one with a known climate, a realistic set of anticipated stresses, etc. It will employ a working knowledge of the materials it is proposing for use and what their limitations are. Then it will meet these needs with an economy of materials and costs and try to minimize waste. The public design philosophy, in contrast, as it is most often expressed in the adoption of codes and standards, is to find a worst-case scenario occurring in nearly any niche or climate, double the anticipated severity of this, just to be safe, and then prescribe a generalized design solution to be everywhere applied. But just to be safer still, the materials used in this solution are to be assumed to have only half of their measured strength. And of course a public entity will have an entirely different understanding of the word "economy" when

setting forth the materials list. What you tend to get from all of this non-specific engineering is bad design decisions made into law by ignorant politicians on the advice of second-rate consultants, lawyers, planners, and engineers and then interpreted by people with little or no understanding of the engineering involved. The material waste factors involved can often run much higher than fifty-percent. And then there are the labor costs required to install all of the useless material, and the assessments on these labor costs for workman's compensation. These things add up quickly, but it isn't the bureaucrats' money.

The use of local, non-manufactured materials, such as adobe, straw bale, cob, or rammed earth, is a poor source of public revenue. But it is also problematic to the standardizers because the priests of the established faith have not blessed the structural or strength ratings of these materials. On occasion it is possible to locate a professional engineer willing to use common sense to quantify his level of risk without doubling all of the numbers, and to put his insurance on the line with his stamp. But otherwise, one again must use at least twice the material needed. Even free materials require twice the labor.

Here is an example of the problem with the multiplying of safety factors: I live in a location where, over fifteen years. I have observed up to two feet of fresh snow on the ground after a storm, and up to fifteen inches of more compacted snow, but I have heard from the old timers of events with 2 1/2 feet and 1 1/2 feet respectively. This makes me want to design for three feet and two feet for a 100year event. I want to see what the material I will be using is really capable of, so I build a press and break several samples under known stresses and calculate their strength. Just to be safe. I add a 25% safety factor. My roof has a 45-degree slope. and I know from avalanche reports that beyond 20 degrees (30 percent) the snow will resist accumulating and will avalanche over itself, so I factor this into my design. Of course if I have a north-facing valley, I will treat this as a special condition and design that part of the roof accordingly. I now have a roof that will resist anything that a 100-year storm will throw at me. Three feet of snow comes down, half slides off. Sound rational and sensible? The local ordinance says I need to design for a snow load of forty-seven pounds per square foot. On top of this, the adopted code says that my rafters are only half as strong as they really are. On top of this, the building inspector has made a little policy that says snow will not slide off a roof unless the roofing material is slick. So, how much snow do they want me to design for? It is now eighteen feet deep, and this is not even trying to slide from a 12-in-12 pitch. Since lumber depth varies with the square of the load for breaking strength, my rafters must be twice as deep to accommodate four times the load. Our houses will be standing in 300 years, but our forests will not. The builders in nearby Telluride, where snowfalls can be as much as 42 inches deep, need to build for a thirty-one foot pasting, using double the wood in the process. But out of their other faces their oh-so-hip and liberal bureaucrats are congratulating themselves on their greenness.

Here is an example of the problem with generalizing designs to worst case scenarios: There can occur, in certain soil conditions, a phenomenon called frost heave, which can create uplift forces due to the formation of expanding ice lenses within the soil. The building code recommends a 12-inch minimum foundation depth to penetrate below this phenomenon, in the absence of a foundation investigation. It has been observed in my community that on a plowed surface in deep winter shade the frost may be expected to penetrate a full 40 inches during a 100-year winter cold snap. The government amends the building code accordingly. It wants to generalize the condition, and perhaps, in the interest of fairness, eliminate the clause referring to site-specific foundation investigations. And, just to be safe, the frost penetration is assumed to be no different beneath a southfacing wall with no plowing than it is beneath a plowed, north-facing driveway, even though the former will never exceed three inches. And, to be safer still, the county building inspector insists that frost depth be measured to the top of the footing, regardless of its thickness, instead of the depth to which it actually penetrates as the code reads. Please note that the purpose of all this is not to keep concrete from freezing: in theory it can do this anywhere above the frost depth. So, being an obedient designer. I specify a concrete stem wall foundation system that is 54 inches high instead of 22 inches. How much safer are we now? Frost heave requires a pre-existing soil condition where there is high silt content in close proximity to both frost line and groundwater. More than a century of building in this County has not uncovered a single instance of this phenomenon. Further, the scary term "heave," as this phenomenon occurs in it's nearest location, refers to movements of less than a sixteenth of a inch under forces smaller than the dead weight of the unloaded foundations. So, in following these rules, all I have done is use three times the necessary concrete and money. It wasn't the bureaucrats' money, and the voters will not think to account this as an unnecessary cost of government, but when you add up all the waste across all of the building permits, it certainly exceeds the cost of the building department salaries several times over. And, of course, the manufacture of concrete does account for seven percent of global warming.

Here is an example of what happens when you think outside the box: I have a great idea for a south-facing mass wall, maybe adobe, maybe cob. It will sit in the sun all day, warming up, tempering my direct solar gain and radiating it into the house at night when I want it. What a wall! What a great thing to do to save a third of the energy costs over ordinary construction. Unfortunately, the new energy code requires that I make this wall behave exactly like ordinary construction, with the minimum R-value placed somewhere in the wall thickness to block the same transfer of heat that saves me so much energy. I can only get around this by hiring an engineer to bless this idea, at a cost roughly equal to the cost of the wall itself, and also equal to the cost of the energy that this wall design will save me. This is an energy code? I also have to burn a lot of hydrocarbons driving to work to get the money to pay for this waste. Go GNP.

Here are two examples of another problem with redundancy requirements for unfamiliar methods and materials: It doesn't really matter that straw bales have been holding up floors and roofs for centuries - modern bureaucrats and engineers were not employed to supervise this way back then. If I want to build a straw bale wall, I might be allowed to do it, if I build another wall system around it to do all the work of holding up the floor above and the roof. Similarly, I might be allowed by the State to install a composting toilet and gray water septic system, as long as I place an even more expensive conventional system right alongside it. Just to be extra safe. The above examples of waste might add up to a fourth of the cost of my house. If I want to look at what I will really be paying, I might triple this figure so that it includes the long-term financing costs. Being just an ordinary slob, this comes out to about 500 days of commuting back and forth to work, burning up fossil fuels on the drive, and participating in a globally devastating and unsustainable economy. While this may be the biggest environmental cost of them all, it keeps the wheels of progress turning.

The above items concerned impediments to the goal of sustainable building design, most of which will treat much truly green building as code and standards violations. There is another set of impediments to sustainable community design, most of which will treat such communities as a set of zoning violations. "You are being cited for having more than two adults with different last names living together," and other horrors like that. You have more than two poultry-type entities, instead of two bird-killing cats. You have a goat instead of barking or deer-chasing dogs. The goal seems to be one monotonous, homogeneous spread of expensive sameness across the land.

In rural Colorado the state establishes a minimum property use-by-right of one residential unit, with a well, per thirty-five acres. In a very large number of cases, the process required to further subdivide this, or to exercise anything other than this use by right, is so arduous, drawn out and costly that a majority of developers simply elect to dice their larger parcels into process-exempt 35-acre ranchettes and move on. A great deal of whining is heard from the public entities about the consequent sprawl and their seeming inability to do anything about it. But this problem is entirely the local government's fault. Believing itself to be the source and wellspring of all things of value, believing that its act of granting permission to do something is the same thing as granting a right, indeed, refusing to comprehend what a property right really is, they are too dense to understand that a property owner also has a right to the same return on his investment that a use by right confers. Anything less is confiscatory, or a *de facto* taking. If he is being asked to drastically reduce the 35-acre parcel size to provide large tracts of open space, he can only recover this loss by being allowed more lots with more residential units. Period. Yes, there are savings in reduced road and infrastructure costs associated with the clustering of permitted numbers of units into hamlets, and there may be a conservation easement opportunity in the deal. These do not cover the loss. The county board says we cannot just "give" you that density bonus. But even if they do have the sense to do that and to find a fair equation to conserve comparable land values, the neurotic and compulsive urge of the planning and zoning board members to micromanage the project and meddle with its design will only ensure that the developer will still spend his next two years being sodomized in public forums. Again, he makes a sprawl of process-exempt ranchettes and walks away.

Evolutionary psychology is starting to point to an optimum size or scale for human communities, or at least for community-like cells within larger populations. This represents the levels of familiarity, intimacy, social complexity, emotional stress, novelty, child safety and supervision, etc., that we have genetically adapted to over the many millennia prior to civilizing ourselves. Not surprisingly, this is pointing to group sizes typically seen in extended families, small villages, tribes and hunter-gatherer bands. These days we may use terms like neighborhood, intentional community, think tank, co-housing development, or eco-village. We can no longer use the words commune or even community in these parts, or we risk getting on the wrong side of the war on communism, which to stupid people isn't over yet. Certainly there is a great public suspicion held out against many communities of this size, even monasteries, or the Amish and Mennonites. There's polygamy and devil-worship going on there. There's mandatory Kool-aid and space ships hiding in the comet's tail. There are groups that dare to practice both the First and Second Amendments at the same time, even when the FBI threatens to burn them down and kill all their children. Xenophobia has always been a problem with groups of this size, whether inside looking out, or vice versa. The problem is, the larger groups aren't working out very well at all, and they may need to be replaced soon. It really is long past the time to start experimenting again. And this must begin with newer and more visionary ideas about zoning, both urban and rural.

Communities or populations, just like organisms, also occupy and adapt to environmental niches, such as watersheds. This long-term process of adaptation is supposed to change them: this is the nature of adaptation. The real nature of fitness is the talent for fitting in, not some ability to be the biggest bully, as this term is commonly misunderstood. These small communities and neighborhoods are supposed to be unique. To stay unchanged by a place is to be maladaptive. Also, and this is very important, the ones which are maladaptive, or founded upon bad ideas, are supposed to fail. They need to be permitted to try out their bad ideas and fail. That is precisely how everybody else gets to see and learn just how bad those ideas really were. This is the greatest lesson about liberty: it teaches. Failure is actually one of the finest reasons that exists for tolerance. This is one of the reasons that a system's diversity is the best measure of its strength: it is a measure of a system's ability to learn.

Local governments, on the other hand, do not seem so interested in learning. This is because they already know everything that they will need to know over the next two years. The budgets are already projected. We need to learn to let go of our obsession with standardization and uniformity. We need the diversity right in our own back yards, where the health can be more contagious and better examples can be set. But to do this is a long process of educating our local officials, or replacing them with people more capable of learning, and courageous enough to overturn old errors. Is this even remotely possible until "business-as-usual" has proven itself a failure, beyond the vast human potential for denial, and civilization has gone into a steep enough decline to force a search for design solutions that actually work in an economical way? We are going to be able to answer this question quite soon.