TOWARD A LOW-COST HOUSING PROCESS: PARLAYING THE BEST OF ON-SITE AND OFF-SITE BUILDING

by

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S.B., Massachusetts Institute of Technology

1973

SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARCHITECTURE

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 1975

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May 9, 1975

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Dean William Porter
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Dear Dean Porter:

In partial fulfillment of the requirements for the degree of Master of Architecture, I hereby submit this thesis entitled:

TOWARD A LOW-COST HOUSING PROCESS: PARLAYING THE BEST OF ON-SITE AND OFF-SITE BUILDING

Respectfully,

Michael S. Harris

ACKNOWLEDGEMENTS

The author gratefully acknowledges the following people who assisted in the development of this thesis:

Professor Arthur D. Bernhardt, Thesis Advisor, Department of Architecture;

Professors Leon Groisser, Tunney Lee and Jan Wampler, Department of Architecture;

Also: Mr. Don Bean, Moduline Industries; Mr. Lawrence Henrich, Halifax, Massachusetts; Ms. Lois Stern and Mr. Matthew Hobbs, The Massachusetts Housing Finance Agency; Ms. Eleanor White and Mr. David Myers, The U.S. Department of Housing and Urban Development; and Mr. Clayton Rock, Topsfield, Massachusetts.

And Carol Harris, the other thesis students, Fran Offenhauser and Anne Washington, whose support also made this work possible.

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Presently in this country there is an urgent need for lower-cost housing alternatives that can be afforded not only by low and moderate income families but also by middle income people who wish to devote less of their incomes to housing. Housing for low and moderate income people cannot and should not only be made available through the use of erratic government housing subsidies: the market must also eventually provide housing that is more moderately priced.

The mobile home industry offers the seed of one possible solution to the problem. However, the product presently manufactured by the mobile home industry and the delivery processes developed by that industry are not being utilized in medium densities (to lower land/unit costs) and are not resulting in high quality residential environments.

The thesis proposes a process that combines the production capabilities of the mobile home industry with the capabilities of land developers, state and federal housing agencies and communities in developing an approach based on the criteria of these groups, in order to provide lower cost, medium density, quality residential environments that are achievable today. By acting as an impartial catalyst to the development of this process, it is possible for an architect to constantly redefine the housing process, and therefore the resulting products, and for a coalition to be formed by all of the above parties in order to implement the product; traditional roles and prejudices are responsively reexamined.

The working method of the thesis was the continual refinement of a development process based on potential coalition members' criteria-based responses to various product and development concepts, until one concept was arrived at that seemed feasible for implementation in the immediate future. A site for a demonstration project was selected and a design was suggested for that site. After examination of the design and development process by the potential coalition members, a final coalition team and a procedural strategy for implementation of a similar design is outlined.

Such an approach places responsibilities on the architect not traditionally associated with the profession: that of the initiator of new housing processes and the role of an equal member of the development coalition. It suggests alternative roles for the architect, roles that imply a far greater and more responsive participation in the housing process--roles that may lead to higher quality and lower cost housing environments.

Thesis Supervisor: Arthur D. Bernhardt
Title: Assistant Professor of Architecture

PART 1

INTRODUCTION: Statement of the problem
Goal/objective statement
Background: the mobile home industry; the state of the art

SUMMARY

The options available to the consumer for low-cost housing in this country are very few. In urban areas low-cost housing is truly an anomaly. In more suburban and rural areas, the mobile home serves as the sole option. To make this low-cost housing option accessible to consumers in urban areas, it is desirable to seek a higher density application of this low-cost form of shelter and at the same time improve the quality of that shelter and the environments it creates.

By virtue of its inception and continued classification of its product as a vehicle, the mobile home industry has been able to optimize its production system—thereby achieving low costs--through the introduction of industry-wide performance building codes, the development and use of new materials, the efficient use of labor in year-round production, and the creation of material supply and distribution networks. The result is a truly low-cost form of housing from a production standpoint.

However, the mobile home's vehicular classification and the industry's non-involvement with other segments of the traditional building industry has curtailed its continued rate of growth. If the industry is to become involved in producing higher quality, higher density, living environments at a low cost, such involvement will be necessary.

THE PROBLEM:

Presently in the United States, the cost of housing is escalating at such a rate that many people are excluded from obtaining shelter at affordable costs. In urban areas most critically, there exists no such commodity as low cost shelter. Financial institutions in the business of providing capital for the development of housing as well as developers and state and federal agencies,such as the Massachusetts Housing Finance agency and the Department of Housing and Urban Development, have failed at attempts to provide high quality housing at rates affordable to every citizen without reliance on federal rental subsidy funds. In essence, the federal government has had to subsidize housing producers, albeit indirectly, for their inability and, in many cases, unwillingness, to develop and deliver housing at a reasonable rate. By no means is this an indictment aimed at creating shoddily constructed ghettos for the poor: as the cost of housing rises, every consumer's choice becomes more limited as to what is within his means. While on the other hand the financial and developmental (primarily on-site) aspects of the housing process have been well established, one must question the results.

The mobile home industry, on the other hand, has for many years been producing shelter at what seems an astoundingly low cost (as low as $5/sq.ft. FOB). Mobile homes have almost exclusively been used in rural areas due to such factors as exclusionary zoning regulations in the metropolitan areas as well as inter-industry political feuds and resistance from the on-site building trades in heavily unionized areas. While one might well question the architectural and social qualities of most

existing mobile home developments, it cannot be denied that the industry's process for producing low-cost shelter is uniquely successful and has had tremendous response in the areas in which it is permitted to operate: despite the operational boundaries imposed on the industry, last year mobile homes accounted for 35% of new single family housing starts and 25% of all housing starts in the United States and for almost 90% of the homes sold for under $20,000[1]. In some states, mobile homes account for over 90% of yearly new housing starts.

The mobile home industry has developed and operated outside the traditional building industries. By developing its own material supply, financing, delivery, and land development channels, the mobile home industry has avoided much involvement with the on-site building industries. Such non-involvement has allowed for the industry's rapid growth, but is now standing in the way of its participation in urban areas, where low-cost housing is so desperately needed.

If representatives of the mobile home industry were to form a coalition with developers, financial institutions, architects, and local, state and federal government funding and regulatory agencies--and if the emphasis were to be placed on the process of delivery housing as well as on the qualitative aspects of the product--public regulations prohibiting the involvement of the mobile home industry in metropolitan areas might be more readily revised. Assuming that each member of such a coalition

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[1]"The Great American Housing Party is Over," Forbes Magazine, November 1, 1974, p. 23.

would exercise criteria-based demands for implementation of a new urban housing process, and assuming that each member responds by continually reevaluating the process and the product, innovations in both the factory-based and the on-site processes might result in relatively low-cost communities that are responsive to the social and financial needs of the consumer.

The thesis will examine the possibility for and the dynamic implications of such a coalition of participants by attempting to establish one in Massachusetts. The thrust of the effort will be aimed at discovering and evaluating the criteria of each actor in such a coalition and developing a concept for a demonstration project that reflects these criteria, if the coalition seems promising (indeed, the thesis aims to determine whether or not such a coalition is feasible at this time, not to prove that it is). In order to examine how far the capabilities of on-site and off-site development can be carried, a design for a particular demonstration project will be developed. The developmental strategy will consider not only how much product innovation is feasible but also the financial and regulatory innovation needed to carry out such a project.

THE GOAL AND THE OBJECTIVES OF THE THESIS

The Goal

To develop a general approach for delivering low-cost, high-quality housing for low as well as high densities, activating the latent capabilities of the mobile home industry. To develop an approach that is possible to implement in the immediate future and that would increase the efficiency of, if not eliminate the need for, government subsidies.

The Objectives of the Thesis

1. To develop a plan and a developmental strategy for a demonstration project, indicating how close toward this goal it is possible to move in the immediate future in one state (Massachusetts).

2. To develop a plan for a blend (a coalition) of the vested interests who would affect and be affected by this approach, one that is practical today, in order to carry out such a demonstration project.

3. To evaluate the experience of this process and the coalition members' response to the demonstration project plans in order to suggest future steps in achieving the goal.

BACKGROUND: THE MOBILE HOME INDUSTRY AND THE DELIVERY OF THE LOW-COST HOME: THE STATE OF THE ART

The mobile home industry's growth from its inception in the late 1920's as the producers of travel trailers, to its present status of supplier of over a quarter of the nation's yearly new housing production (1973 sales of mobile homes topped 575,000 units[2]) is greatly due to the classification of the mobile home as a vehicle and not a dwelling, and the fact that mobile homes were thus ignored by the conventional housing institutions. In its infancy the mobile home--then referred to as a trailer--was in fact a vehicle and not a dwelling: trailers were carted around and sited temporarily in trailer camps by vacationers and other transients. This vehicular classification, which the industry has been very careful to maintain, enabled the industry to develop in a virtual vacuum--free of all the constraints and associations connected with a dwelling. Since the mobile home was not recognized as a house, it was not necessary for it to be produced, marketed, regulated, transported, zoned or taxed as a house. The mobile home industry zealously capitalized on this and through the efforts of the Mobile Home Manufacturer's Association it developed into an entirely different parallel industry.

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[2] Ibid., p. 24.

Production

To maintain their vehicular classification, mobiles are constructed in the factory on chassis with wheels and assembly techniques in the plant capitalized on the potential for the unit being assembled to roll past each assembly station.

At the same time the industry has encouraged, by its high production levels (some manufacturers produce over 50,000 units per year), relationships with supply industries for enormous quantities of components fabricated and prefinished explicitly for mobile home production and dimensions--at considerable savings.

Labor used in mobile home plants need not be unionized building tradespeople. Semi-skilled labor is used at a savings, and the production system allows for much higher productivity from these semi-skilled crews that are not plagued by seasonal layoffs.

At the same time, the industry has made great strides in almost all states to have inspections of construction, electrical and plumbing work done in the plant, as opposed to on the site. The resulting product is considerabley more cost-efficient than the conventionally constructed home.

Distribution and Siting

The mobile home industry, lacking effective channels for distribution, initiated a sub-industry to combat the problem: mobile homes are generally distributed by dealers. In this manner, the industry established a very comprehensive network of distribution centers.

Since mobiles are not classified as the dwellings they are, they are often excluded from residential districts or from being sited as single units. The MHMA in the 40's initiated yet another independent sub-industry: the mobile home park development industry. This industry has been largely responsible for providing sites on which to affix mobile homes. The MHMA has constantly been upgrading the standards for mobile home parks. Today parks are developed under the national park development guidelines code ANSI 119.2, which is largely responsible for the improvement of mobile home environments from squalid trailer camps with densities of up to 20 units/acre to, in many cases, lower density (the average park density is now 6-8 units/acre), well-landscaped well-serviced mobile home parks complete with recreational facilities.

Generally mobile homes are transported on their chassis to the park and placed on footings with the wheels remaining attached to the chassis. No expensive site work or foundation costs are generally incurred.

Transportation

Mobile homes being transported down the highways on their own chassis can be economically transported to the site within a radius of about 400 miles from the factory, at a cost of between $.50 and $1.00 per mile. The MHMA has made considerable gains in increasing, through legislation, the allowable size and weight limitations of each unit. The once 8-foot wide and 10-foot long mobiles have been replaced by units that are up to 72 feet long, 14 feet wide (16 feet in a few states), 13'6" high and 30 tons in gross weight, thus maximizing the square footage per dollar costs

of transportation. The truck hauling the mobile home need not be specially equipped, and it can usually haul the mobile to the site and return to the factory in one day.

Taxation

Until recently, mobile homes were never taxed as real property, being legally defined as vehicles. Rather they are either not taxed at all and a licensing tax,which is generally very low (about $30.00), is imposed on the unit, or property taxes are imposed on the units, which is still generally lower than a real property tax. This netted a savings to the consumer.

The issue of taxation is one of considerable debate in all areas at present: this will be further discussed below.

Building Code Regulations

Because the mobile home is classified as a vehicle, it is not necessary for it to conform to building codes for traditional buildings. The industry, recognizing this as an advantage, has not sought to use this to minimize the quality of the units but rather to develop a national performance code for mobile home construction , ANSI 119.1, that has been recently adapted by the industry and is recognized by most states. Not only does this eliminate the need to customize each unit for every site on which it might be placed, but the performance code allows for the use of innovative materials and building techniques. The adoption of this national code assures structurally sound, safe mobile homes that are ex-

tremely cost efficient.

Zoning

Zoning regulations administered by local communities have generally limited the extent to which mobile homes can be employed as housing in many areas. Several types of zoning exclusions are presently used in varying degrees:

1. complete exclusion of mobile homes from the community
2. exclusion of mobile homes from residential districts
3. restriction of mobile homes to mobile home parks or subdivisions
4. indirect exclusions: specifying minimum dwelling floor area, minimum bulk requirements, minimum sideyard dimensions, minimum number of bedrooms
5. limitations of the number of mobile homes and mobile home parks in a community
6. limitations on duration of stay of a mobile home or mobile home park[3]

The first three are the most prominently used. The industry reacted early to these restrictions and established the network of mobile home park developers whose function was to amass available land in allowable areas and establish mobile home parks, so as to help eliminate the need

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[3]Frank Benesh, Mobile Home Zoning Preferences of Municipalities and Their Impact on the Mobile Home Component of the Housing Market (Cambridge, 1974), p. 10.

for all potential buyers to seek single lots, which is an increasing difficulty. As the industry continues to grow, however, the supply of land for mobile home developments is becoming difficult to replenish and the industry now rates the availability of land as one of its major problems. The availability of good low cost land is diminishing.

Financing

One other way the mobile home industry has tried to keep the cost of the mobile down is by financing them as vehicles, much the same way automobiles are financed. This eliminates the need for the customary legal fees, closing costs, title search, that usually are associated with traditional homes. Also, the mobile home package includes appliances and furniture and draperies. Therefore, the consumer is purchasing the complete dwelling, and it is perceived by the consumer as a total package.

Unfortunately, the terms of this vehicular financing are often unnecessarily stringent, the rates too high, and the time period of the loan too short. But the MHMA has moved too to get the time period on mobile home loans extended, in many cases to 15 years, from the traditional 5, and pressure is bieng applied to lower the rates and change the terms of these loans. As lenders perceive the mobile home as the permanent, immobile dwelling it really is, traditional mortgage financing terms will hopefully be possible.

Also, as it becomes more apparent that mobiles are, in fact, dwellings, the FHA has begun to provide funds for the development of mobile

home parks as well as insurance on loans taken out by mobile home purchasers. In 1970, approximately 80,000 park sites were insured by the FHA[4] and FHA mortgage insurance on the mobile home units was available for up to $15,000. FHA-insured park construction loans now have a term of 40 years and cover up to 90% of the park development costs or up to $2,600 per home site.

The Other Side of the Coin

The costs of producing a mobile home in a factory cannot be matched by stick built homes and this is in great part due to its vehicular classification and the industry's efforts in legislating production related innovations. However, while the industry has been ignored for the most part by traditional building-related industries and has been able to grow because of its product classification, shortcomings of this approach are becoming increasingly more apparent and are hampering the industry's growth, diversification, innovation, and ultimately, attempts to deliver a product to the consumer at a truly low cost. Partly because of its classification, the industry has had little success in innovating in extra-production areas, namely those of zoning, mortgage financing, taxation and land development. As a result, the occupancy costs of a mobile home are often almost as high as its stick built counterpart, the single family stick built house. Through a higher degree of involvement in the entire housing process and through active participation in several extra-production areas, lower costs and better

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[4]Margaret J. Drury, Mobile Homes, the Unrecognized Revolution in American Housing (Ithaca, New York, 1967), p. 140.

environments might lead to lower costs and greater market potential.

Product and Site Design

Because mobile home parks are often relegated to undesirable tracts of land, in many cases there was little impetus at first to provide a product that was of a high architectural quality. Why should a unit designed to be placed on a barren lot be fussy in detail? After World War II when the image of the mobile home and its dweller was so denegrated by the trailer camps of the forties, park developers felt the first need to improve the quality of the park environment. First, sanitary utilities were placed in each unit rather than in central facilities. Landscaping and recreational space was upgraded. In an attempt to further improve park environments, developers decreased the density of parks from up to 20 units per acre down to 5 in some cases. More open space was the perceived panacea to unpleasant parks. When this had the effect of increasing the land costs per unit and at the same time, as the cost of land increased rapidly, the escalation of total costs for a mobile incurred. Presently the land and land development costs per unit of many parks equal or exceed the cost of the units placed on this land. Taking the easy way out and decreasing densities did not perhaps prove as beneficial as it may have to try to <u>increase</u> densities--placing the units in clusters--and concentrate on improvements in the site plans. While always thinking of the mobile home as a single box floating free on the landscape, the industry has ignored the potential to improve the quality of mobile home environments and lower the land/unit costs considerably.

The unit designs, too, have suffered because of the mobile home's vehicular classification. Because the quality of many mobile home park environments was marginal, there was little need to architecturally upgrade the old trailer. Rather it was just stretched. Since the mobile home, by virtue of its mass production, is not site specific, architectural responsiveness to site is hardly possible. But on the other hand, architectural innovations could be used to make the transition from the land to the unit more reasonable and to design units that have real fronts and backs--ceremonial front entrances and private outlooks to backyard patios and spaces. Innovations to make the decks and overhead trellises (which are so often tacked onto the units by the owners after delivery to the site) an integral part of the delivered units would improve their architectural quality by making each unit a more complete package. Such innovations would themselves strongly hint at how a unit could be sited. The unit would become more than an object floating above the landscape, a vehicle. All this could be done without appreciably increasing the cost of the home, while very appreciably increasing the quality and the image of the mobile unit as the home that it is.

Innovations in the interior design of the units should also improve the quality of the mobile home. The inclusion of dens in larger units and more private places for all members of the family would help. Possible enlargement of some rooms would be useful to families with accumulated personal belongings. Any designs that increase the choice of the consumers' use patterns would be an improvement. Building into the units flexibility for change and growth would improve the quality of life in

the units.

Innovations in finishes, both exterior and interior, would improve the image of the home, while not necessarily increasing the maintenance of the units, the freedom from which mobile home residents value so highly.

In fact, all of the above have been attempted in the past. National homes entered into a relationship with the Frank Lloyd Wright Foundation and introduced a line of high quality mobile homes which failed to attract a market. This and other similar failures should not be misinterpreted to suggest that no demand for such units exists. Their marketing failure was mostly due to the fact that few parks existed that either could accommodate such units and were of high enough environmental quality to merit the placement of these units. Also, the cost being slightly higher posed a problem. It is my contention, however, that if higher density developments were produced, thus decreasing land/unit costs, the consumer could at least receive a higher quality product for the same price. Low cost does not have to mean low quality. The mobile homes' vehicular classification has hampered any thought of these units as homes with a permanent relation to the land as well as to each other.

Taxation

While the mobile homes' vehicular classification might be viewed in some respects as a boon to the mobile home owner, it often becomes a problem when the issue of taxation arises. Not being taxed as real property has led many municipalities to legislate exclusion of mobile homes

because of their supposed burden on the school rolls and their lack of school support through taxation. This fact alone has kept people out of many communities with no other existing form of lower-priced housing. It has been argued that if mobile homes are taxed as real property, resulting revenue will constitute a more appropriate share of the tax revenue than it presently does. Frederick H. Bair, Jr., a noted authority on the mobile home industry, evaluates the taxation problem as follows:

> 1. Single family detached family dwellings produce substantially more students per unit than do other forms of housing. A recent survey in Fairfax County, Virginia, shows 1.08 student per unit in single-family and duplex housing, 0.37 per unit in mobile home parks, 0.21 in garden apartments, and 0.09 in high-rise apartments.
>
> 2. Owner-occupied homes produce a much smaller share of local revenue than is generally realized. Allen Manvel points out: '[O]nly about an eighth of the urban government bill is currently collected in the form of local property taxes on owner-occupied homes.'
>
> 3. Balancing local expenditures against revenues per dwelling unit, single-family detached housing is generally found to require greatest subsidy, garden apartments and mobile home parks come closer to paying their own way, and high-density (and particularly high-rise) apartments turn in a substantial surplus. [5]

The issue of taxation is one that requires much further examination than is possible here: nonetheless, it appears that if mobile homes that are used as permanent dwellings (and are affixed to the ground) were taxed as dwellings and were not treated as vehicles, municipalities

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[5] Ibid., p. 124.

would be more receptive to mobile home developments and tax revenues from mobiles would account for as great a share of revenue per capita as traditional single family dwellings do. Clearly, some more equitable taxation must be worked out in each state and the industry's intrenchment in the vehicular classification of its product may have to yield in order to aggregate its market and reach production capacities and continue to lower cost.

Zoning

Zoning has perhaps hampered the mobile home industry's growth the most in recent years. Now that land available to mobile homes is becoming more scarce and the industry would like to move into more metropolitan areas and develop land, zoning is becoming a real problem: in some states mobiles are zoned out almost entirely. The modular housing industry has not faced such extreme problems and the product in many instances is quite similar. The mobiles' vehicular classification (as well as its aesthetic) has led municipalities to prejudge mobile home dwellers to be transients of a lower social and economic status than conventional home owners, which is not the case[6]. The low class image of mobile home parks is also an obstacle, as is the falacious belief that mobile home developments lower property values. Communities are being called upon more frequently to provide some form of low-income housing for its residents: the mobile home industry could help fill the gap if it began to develop environments and products that better matched people's expectations of what a good home should look and feel like. If this

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[6] Ibid., p. 127.

were done zoning would become less of a problem: if mobiles began to look less like trailers and more like permanent homes, new markets could be opened up in the industry and more lower-cost housing would be available to people of all incomes.

Financing

One area in which the mobile homes' vehicular classification hinders the industry's development is that of financing. While the MHMA has been active in seeking longer term loans in mobiles, the interest rates on these loans are much higher--often double--than rates on conventional dwellings. A much higher percentage of the dwelling's value is demanded as a down payment, and the term of the loan is always shorter than a conventional dwelling by at least 15 years. All these factors serve to raise the consumer's monthly costs of mobile home living. As mobile homes and mobile home developments become better environments, no doubt traditional mortgage financing will be possible. Financing a mobile home like an automobile is no longer a desirable approach, and classification of the mobile home as a dwelling in the financers' minds would enhance this shift.

It is clear through all this, nonetheless, that the mobile home industry does represent a potential source of high-quality low-cost housing in higher as well as low density situations. What is needed is a concerted effort by all those concerned with providing such housing to cooperate in developing environments that are to everyone's mutual satisfaction: by no means does this preclude the possibility of pro-

viding high-quality environments at much lower costs than are traditionally associated with the delivery of housing.

PART 2

PROCESS: THE METHODOLOGY

SUMMARY

If the mobile home industry is to enter higher density housing development and maintain its cost benefits, greater involvement with land developers, public housing agencies, financers and local taxation, zoning and building code officials will be required. In order to succeed, the traditional housing delivery approach will have to be reevaluated and dynamically altered. The probability of success will be far greater if the emphasis on housing becomes process-oriented rather than product-oriented, with the involvement of the traditional housing industry sectors and regulatory participants essential at every stage: the process will necessarily continually redefine the product in an effort to produce a plan that is feasible. In this section such a process-oriented coalition approach is outlined.

PROCESS: FORMATION OF THE INITIAL DEVELOPMENT CONCEPTS

We have seen that the mobile home industry today is the supplier of the lowest cost form of commercially available housing. We know that the industry is not fulfilling its production potential and is looking for new markets. We also know that there is a critical shortage of low cost shelter in this country and that even the middle income levels of the population are being faced with housing costs that are staggeringly high. The demand for lower cost housing is everpresent, particularly in urban areas.

The mobile home industry clearly represents one possible resource for relieving some of the crisis. However, the industry is not capable of rallying to the challenge singlehandedly: partnership with government agencies, private developers, financial insitutions, developers and designers--people outside the industry--is necessary for any effort to be successfully launched to everyone's mutual benefit. Innovations in the areas of design, production, distribution, financing, zoning and regulation are all necessary before a product manufactured by the industry will be used in high-density high-quality low-cost residential environments. But no such innovations can be executed without active support and collaboration with parties outside the industry: it is only through these parties that innovation will be technically possible and politically feasible. The solution is not a technological one; existing technology is sufficient. Rather the solution lies in collaboration and, yes, in risk-taking. If members of the mobile home industry are to take the risk of innovation, so must members of the financial and developmental communities be willing to do the same. This is not to say that the mobile home industry

must thoroughly innovate in order to meet success, nor is it to imply that the financial community must do so either. The aim of this study is to see just how far it is necessary to reach in order to deliver a high quality, low cost product, to ascertain how much risk is necessary or desirable.

The dynamics of any such coalition of industry and non-industry parties have never been defined. The criteria offered by each party as minimum and maximum conditions for involvement have to be sought out. By attempting to establish coalition in order to carry out a demonstration project the dynamics of innovation and this feasible extent to which this innovation can be carried will become apparent.

The concept of a demonstration project is not intended to be revolutionary: revolutions bear little chance for fruition. The effort is aimed rather at evolution...and results.

PROCESS: DEVELOPMENT METHODOLOGY

The Participants

The first step in conceptualizing the process for undertaking a demonstration project was to identify the participants. The major participants can be grouped into two categories: 1) those principally responsible for carrying out the demonstration project--the (financially) vested participants; and 2) those responsible for influencing the actions of the vested participants, those participants most strongly affecting and affected by the possibility of a demonstration project--the non-vested participants.

The VESTED PARTICIPANTS

- the mobile home manufacturer
- the developer
- the financial institution
- the government agencies involved in housing

The NON-VESTED PARTICIPANTS

- the consumer
- the local and state zoning authorities
- the local and state building code department
- local labor representatives

The vested participants are not site specific, but rather can be identified as regionally-specific. The non-vested participants, however, are site specific, and cannot be consulted until the site for the demonstration project is identified. Therefore, in the initial phase of conceptualizing the demonstration project it is necessary for the non-

vested participants to be anonymous; awareness of the general concerns of these groups must suffice as input.

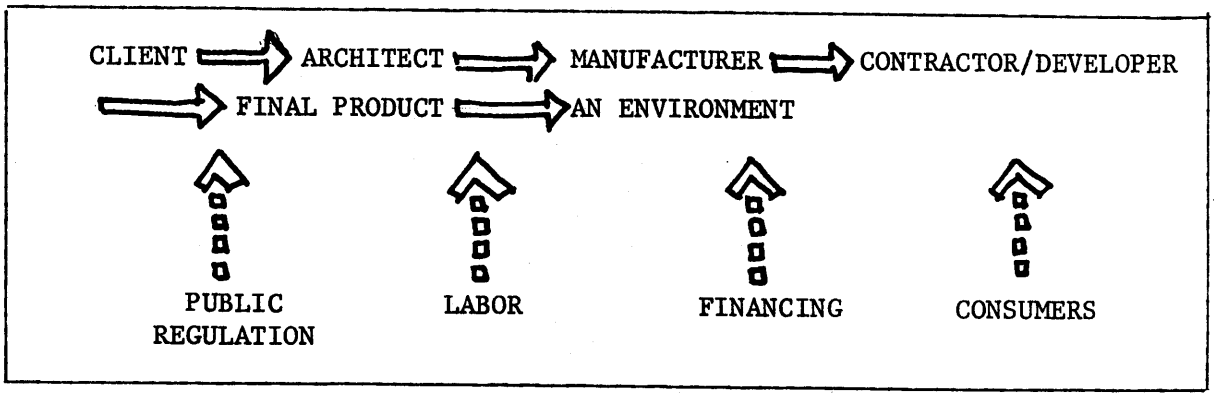
For the purpose of the thesis, the State of Massachusetts was immediately identified as the target region, and the vested participants were chosen because of their ability to operate in the State.

1. The mobile home manufacturer: Moduline Industries, Derry, New Hampshire
2. The developer: Lawrence Henrich, mobile home park developer and stick builder
3. The financial institution: The Massachusetts Housing Finance Agency
4. The government agency: The U.S. Department of Housing and Urban Development

It is important to note at this point that these participants were not identified as the sole possibilities, but as competent and representative participants.

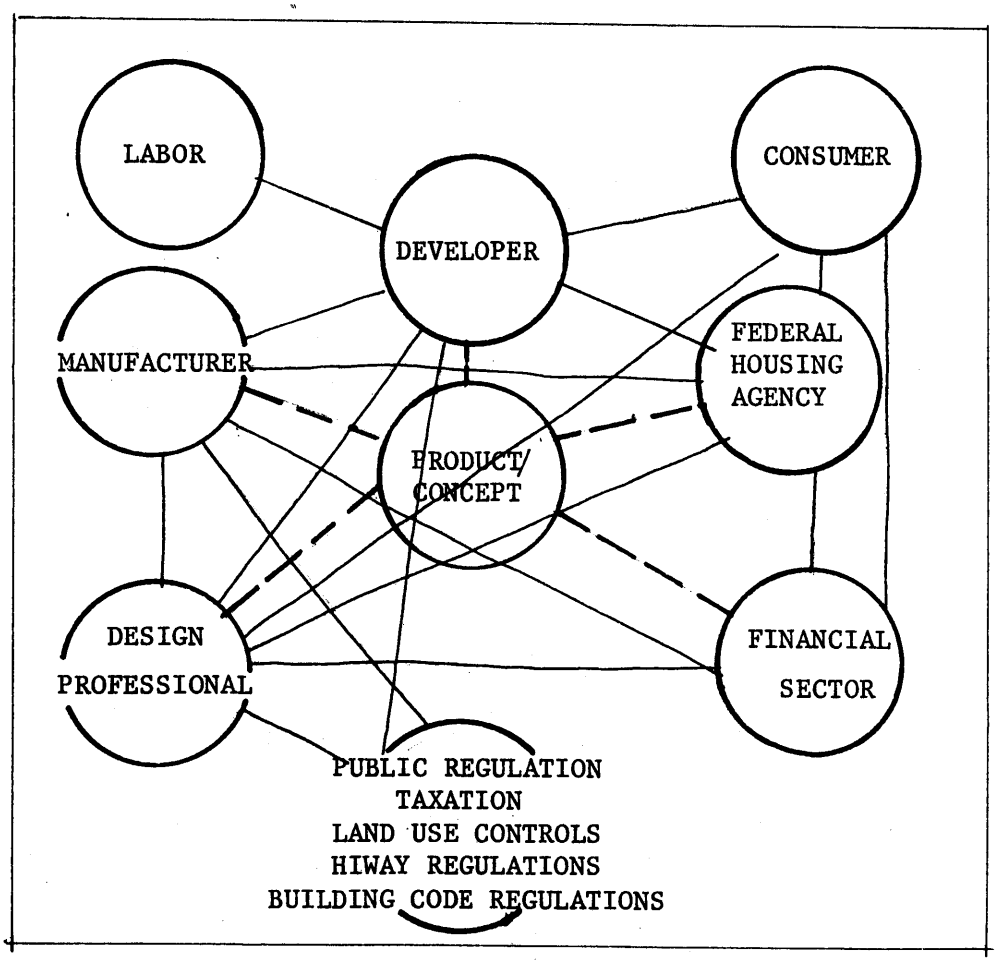
The Dynamics of the Demonstration Project

In many building projects, the vested participants are dealt with sequentially; they become involved only as the need for their services arises. Diagrammatically, the relationships might evolve as follows:



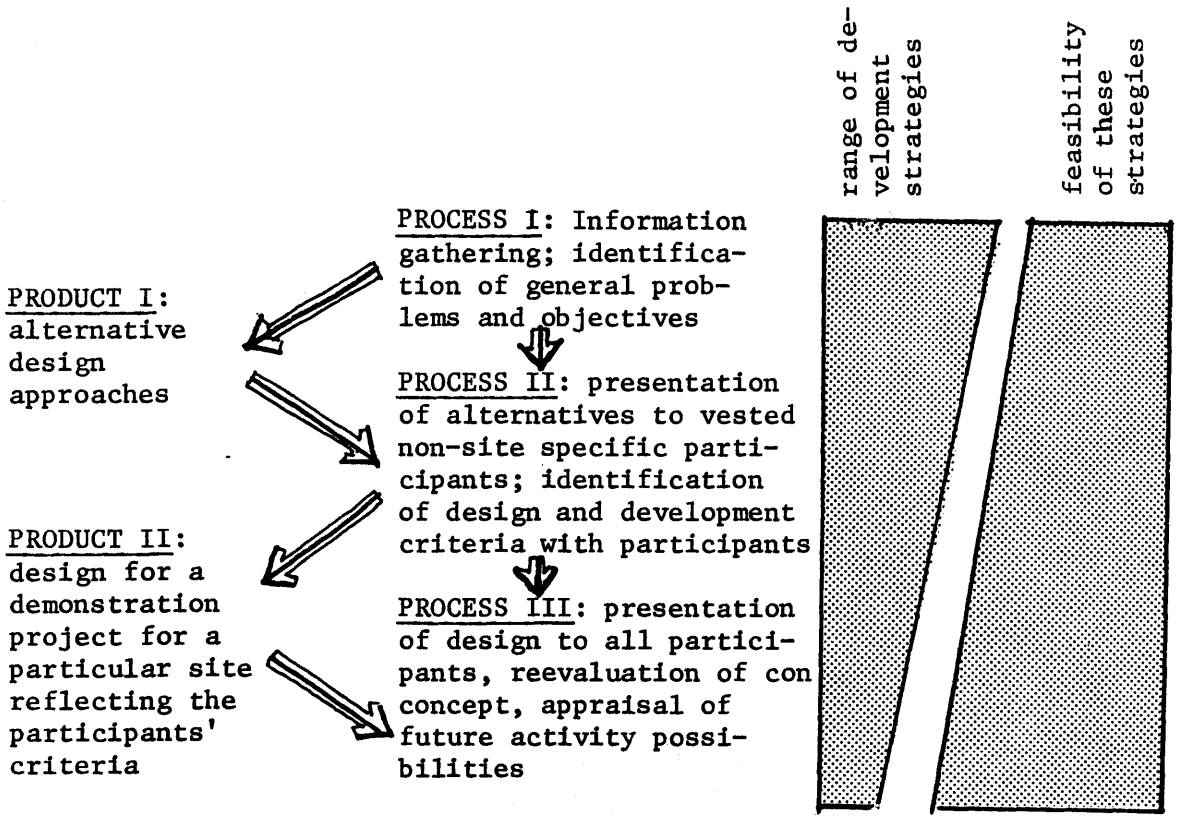
Feedback loops in the process are minimal. For example, in the above diagram, the developer has little direct effect on either the architect or the manufacturer's product. Nor does the architect have any effect on public regulation affecting the project or methods of financing the project. In such a process, with each participant having only one set of inputs, innovation is practically impossible.

For the purposes of this demonstration project, another model was employed, a model in which the dynamics are far more complex, but also far more likely to produce innovation. Diagrammatically, the relationships and influences develop simultaneously as follows:



This model implies that each participant is responsive to the others' concerns and that the product concept is a reflection of all these concerns. The process involved is far more complex than the strictly sequential process, but the potential for realizing the objectives of low cost, high density and product innovation are greatly enhanced. The process continually redefines the product by involving the participants at every stage. This emphasis on process rather than product will undoubtedly lead to a better and more feasible product.

The waking method: The method in which this model was utilized in order to arrive at an implementable product is outlined as follows:



The thesis concludes at the termination of Process III, but realistically the process might continue to the next design (product), further evaluation (process), final design stage (product), and finally to construction and occupancy (process). At each stage of the process/product evolution more participants become involved.

The product resulting from such a process is bound to be less revolutionary in terms of innovation, but far more feasible in terms of implementation and far more habitable in terms of the resulting environmental quality.

One very powerful example of why one should not employ the sequential model in an effort to innovate is the development of the Wilmot Road housing development in New Haven, Connecticut, as undertaken by Paul Rudolph. The development concept was for low-cost 236 housing using components manufactured by the mobile home industry and stacked into two-story clusters. The development was designed and approved by HUD without full knowledge of the manufacturer's capabilities, without the participation of the city building departments, and without much credence paid to the developer's concerns.[7] What resulted was a host of delays and after-the-fact (after the actual construction had begun) revisions that had to be made in the plans at a cost sufficient to raise the square footage cost of the project from $13.36 to more than $17.50. Not only was the low-cost criteria not met (however, it is im-

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[7]Tom Simmon, "The Wilmot Road Mobile Home Housing Project" (Cambridge: 1971), entire report.

portant to note that even with all these avoidable cost increases the project was still competitive within stick built costs), but the resulting product was not terribly innovative or successful in terms of environmental quality.

PART 3

PRODUCT: CONCEPT I:

The Alternative Development Approach

The Innovative Process by Alternative Approach

SUMMARY

In this section, the coalition concept is more fully defined and examined with the aim of developing low cost urban housing environments. The approach involved is to attempt to establish such a coalition project for the purpose of defining a demonstration project that employs elements manufactured by the mobile home industry.

The range of major participants in such an effort are identified, as are the process and product innovations that each would necessarily assume in order to achieve success. Three alternative design approaches are developed in light of these innovations: the single family detached approach, the one-story cluster approach, and the low rise cluster approach. The risk involved in each alternative is evaluated. The approaches will be presented to the potential primary participants in order to determine which actors might approach the concept of the coalition positively, what their criteria for involvement are, and to define a more substantive and feasible approach.

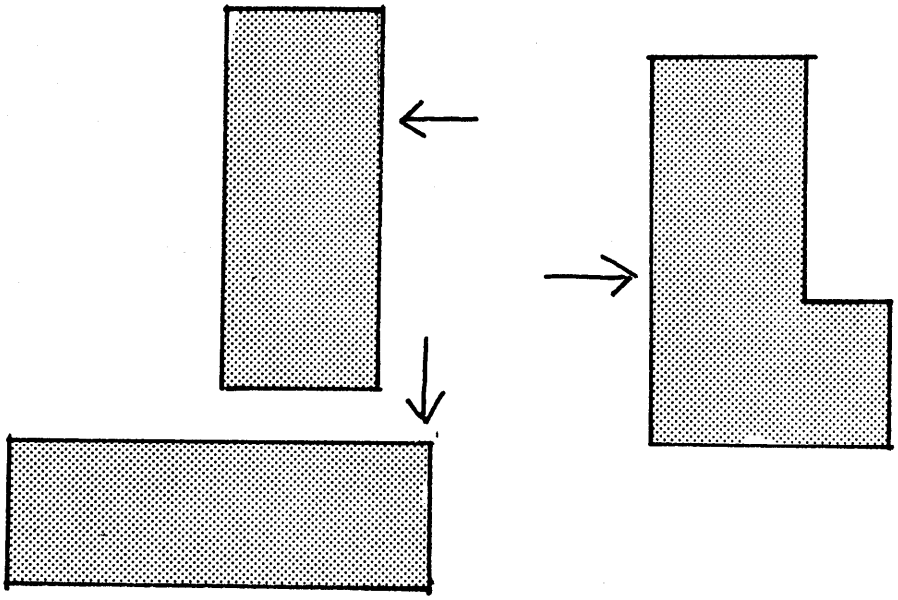
THE ALTERNATIVE DEVELOPMENT APPROACHES

Reviewing the objectives:

- to develop an approach for delivering low-cost housing, utilizing the capabilities of the mobile home industry with the aim of ultimately achieving urban densities
- to innovate all phases of the development process: both the on-site processes and the off-site processes
- to establish a coalition of participant prototypes in order to evaluate the potential for such innovation

With the above in mind, I formulated the initial product concept in the form of three alternative development prototypes. The three prototypes ranged from low to high density in character and each was represented with existing examples of innovative mobile or modular product designs in order to raise the issue of using factory-manufactured components as a framework for the development.

ALTERNATIVE I



Description: Detached, single family dwellings, each composed of one or two modules. An appropriate mix of one through four bedroom units.

Density Achievable: Between six and seven units per acre, depending on the proportion of each unit size.

Site Work: Site work in this alternative would be spread over the largest area and would probably be the most extensive in terms of utility cores, services, etc. It would be the most costly of the three alternatives, in that it would require the most resources--land, time, material, money --per unit.

Foundation Conditions: In this alternative, the units could remain on wheels and simply be placed on piers, or the wheels could be removed and the chassis would then be placed on a more substantial foundation.

Structural Innovations: The units being detached and only one story high, no structural innovations in the units would be necessary.

Architectural Innovations: Architectural innovations would include those in the areas of interior and exterior finish, layout, module size. Innovations in terms of the way in which each module meets the land would be desirable, as would innovations in respect to the joining of modules to form larger units.

Building, Fire Codes: Units would have to comply to ANSI 119.1, but no special firewall provisions between units would have to be employed. Development standards for a traditional mobile home park as specified in ANSI 119.1 would apply.

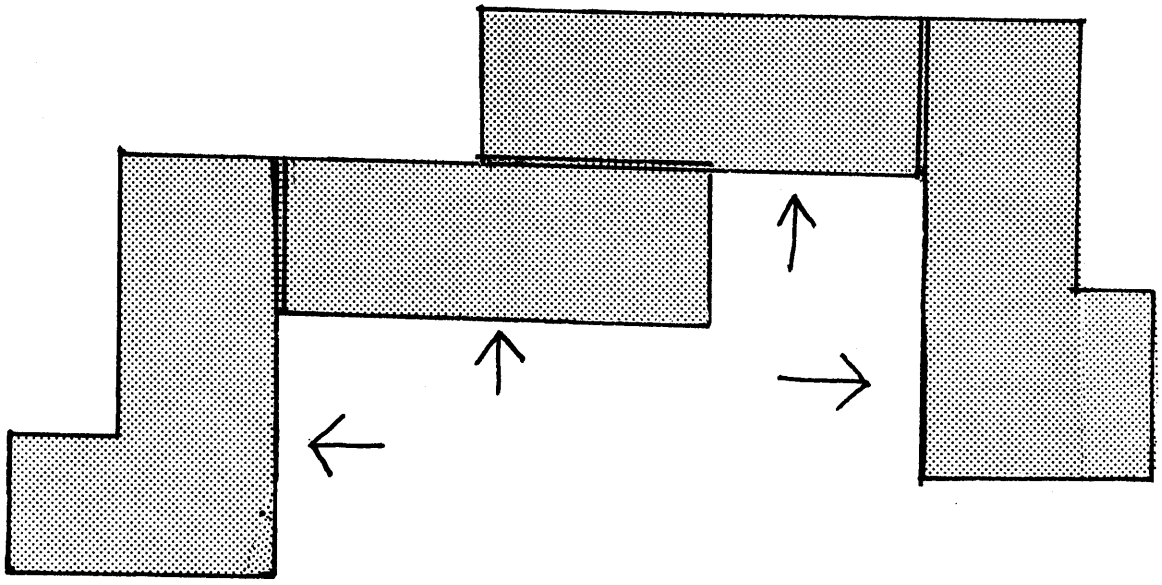
Zoning: This alternative could be employed on any site zoned so as to allow mobile home parks. If mobile home parks are not allowable on the site, a zoning variance would be necessary.

Taxation: If the units were to remain on wheels they could be taxed as mobile homes; if they were to be placed on permanent foundations with the wheels removed, they would necessarily be taxed as real property, which is advisable with respect to community support.

Financing the Development/ Construction of the Demonstration Project: FHA insured construction loans for mobile home parks is possible in this alternative. Private lenders are also a possibility. The MHFA is unlikely to be involved in this alternative.

Consumer Financing of Units: If the units are owned by the occupants, traditional 30-year mortgages (possibly FHA-insured) would be desirable. If the units are rented, rental subsidies would perhaps be in order.

ALTERNATIVE II



Description: One story attached cluster units, varying in size from one to four bedrooms. Units would be comprised of one or two modules each.

Density Achievable: Between twelve and eighteen units per acre, depending on the unit size mix.

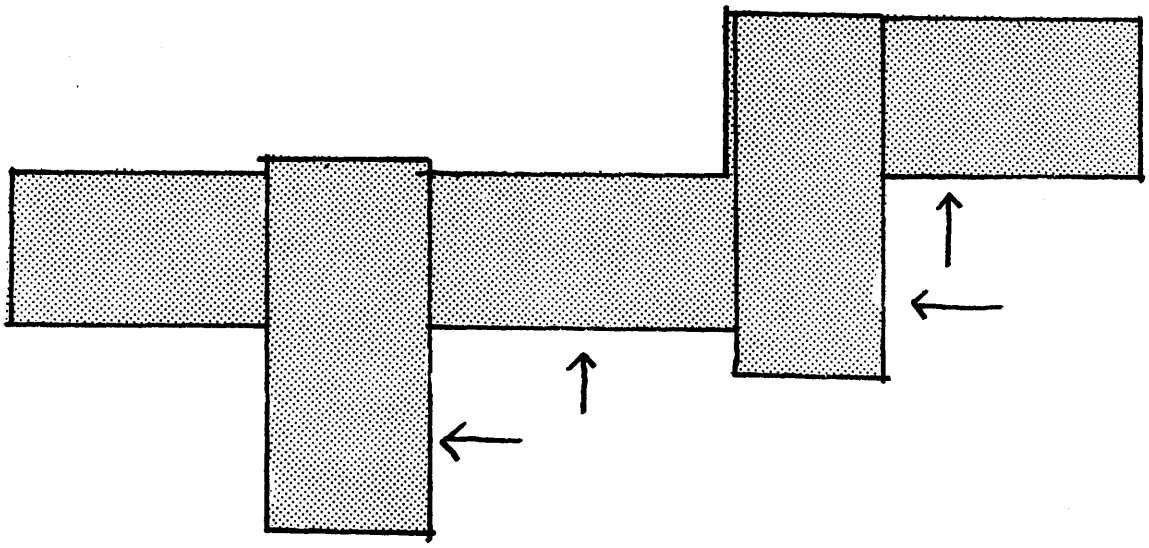
Site Work: Site work, and thus the use of some resources per unit (land, time, money), would be less than Alternative I. Other resources, namely material, would be used more extensively due to the introduction of poured-on-the-site fire walls between units. Innovative site work, with respect to mobile homes, would be necessary.

Foundation Conditions: The units would most likely have to be placed on permanent foundations, but footings for those would not be necessary. The likelihood of successfully joining units on wheels is quite low.

Structural Innovations: Units would not necessarily need to be structurally innovated. However, great care would have to be paid to the tolerances, since the joining of modules is critical.

Architectural Innovations:	Finish, connection, module size and layouts would be innovated. Also the units' relationship to the ground and the front/back relationship would be innovated to more resemble one's image of home. Clusters would be used to provide entrance courts as well as private backyard spaces. The use of masonry or concrete fire walls between units would also be used architecturally to define outdoor zones.
Building, Fire Codes:	The individual units, in addition to complying with the ANSI A119.1 building code, would have to be separated by firewalls, in order to cluster the units and maintain their classification as mobile homes in terms of building codes for each unit. There should be no need to shift to a standard stick builder's code. This is an area of great problems as soon as one departs from using mobiles in the strictly traditional modes.
Zoning:	Scheme II would only be allowable in areas zoned for mobile homes and multiple family dwellings. Otherwise, zoning variances would be necessary.
Taxation:	Since the units would most likely be placed on permanent foundations with the wheels removed, they would be taxed as real property. It is unlikely that they would be treated in any fashion other than taxed as real property once they become permanently affixed to the ground.
Financing the Development/ Construction of the Demonstration Project:	FHA financing for mobile homes or mobile home parks would no longer be available due to restrictions on the development types FHA mobile funds can be applied to. Due to the innovative nature of the project, traditional private lenders would most likely be more hesitant and unwilling to take the risk. The MHFA would have to be actively wooed for support.
Consumer Financing:	Same as Alternative I. However, traditional mortgages would be more easily obtainable due to the higher architectural quality and the image of higher permanence clustering implies. The units would no longer be taxed as vehicles.

ALTERNATIVE III



Description: Two or three story clusters, with some units most likely being duplex units. Clusters could range in size from the very small to the very large.

Density Achievable: Up to possibly fifty units per acre, depending on the size and mix of the units.

Site Work: This scheme would make the best use of the resources of land, time, materials, and possibly money. It would allow the highest density and would imply the greatest degree of innovation in terms of utility core design. As in Alternative II, the site work would be considered highly innovative with respect to mobile homes.

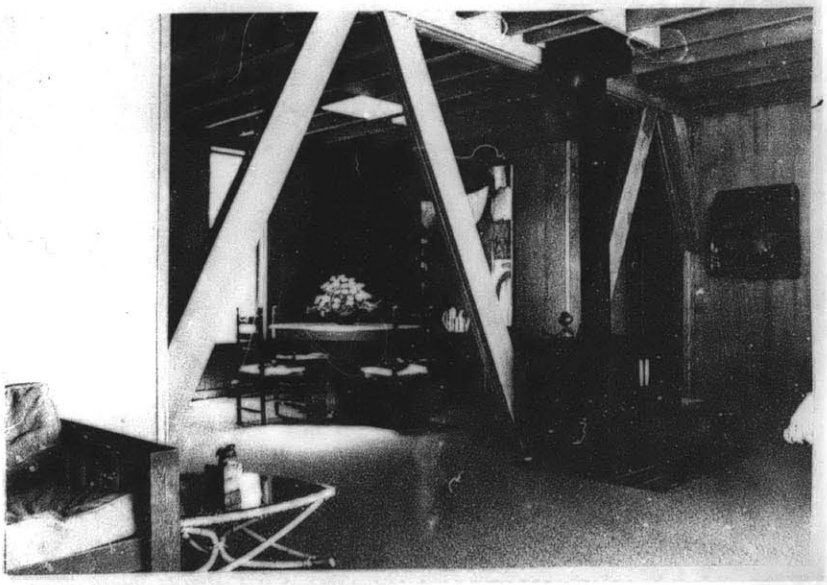
Foundation Conditions: The mobiles would certainly have to be permanently affixed to substantial foundations with footings.

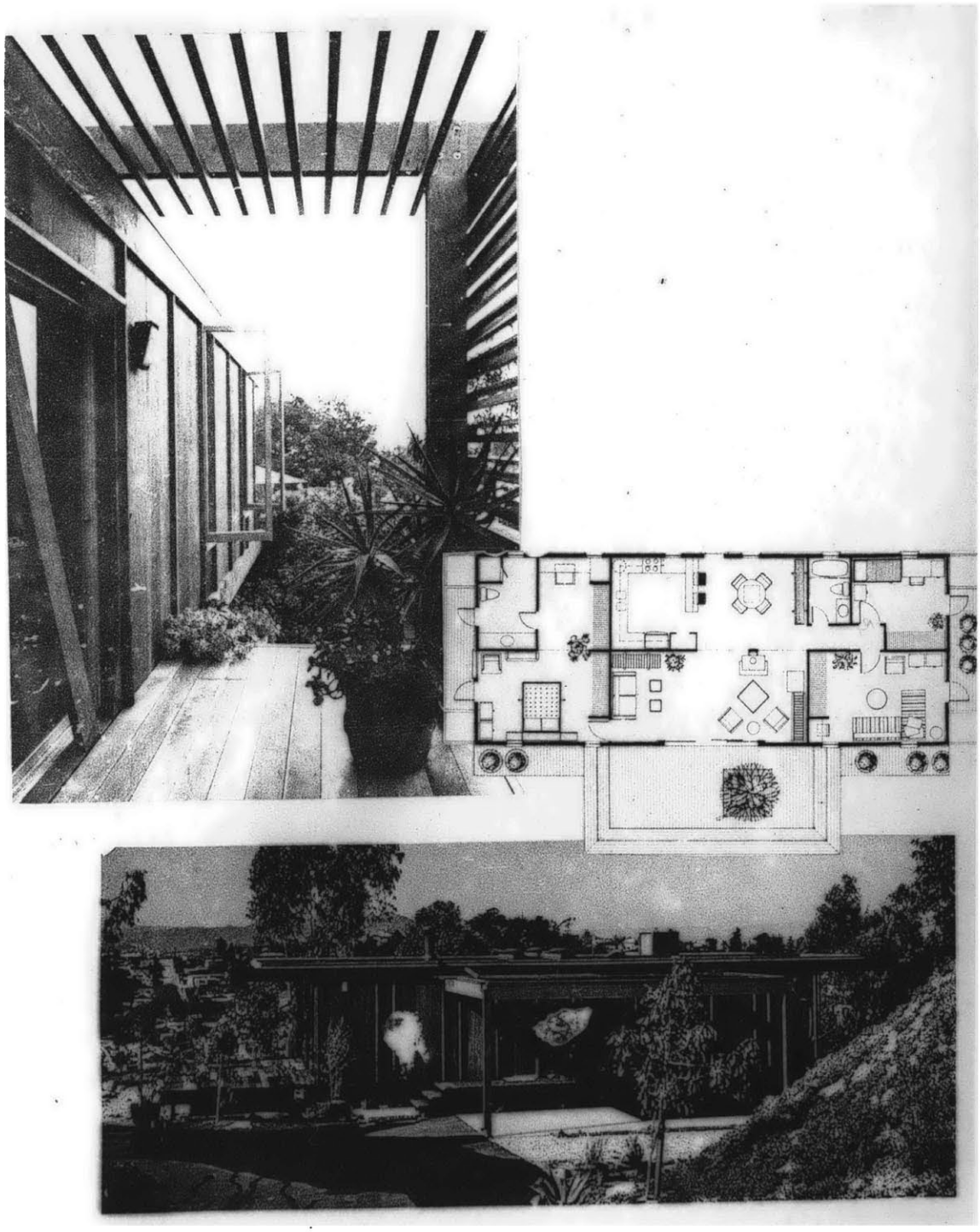
Structural Innovations: The stacking of the units would either imply 1) substantially beefing up the bearing (the outside) walls of the mobiles and perhaps going to framing materials other than wood, 2) introduction of interior load-bearing walls or columns, or 3) the introduction of a second extra-mobile framework system of exterior concrete walls and/or columns to support the upper stories. All of these would be considered drastically innovative.

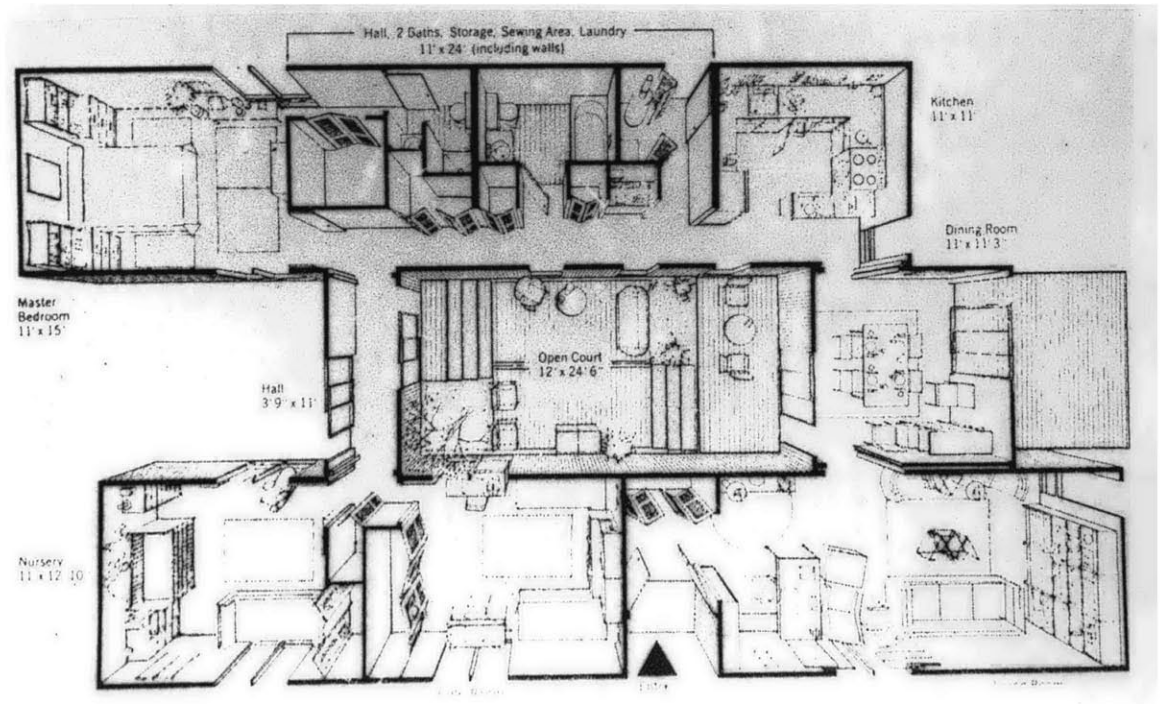
Architectural Innovations:	Same as Alternative II, except that townhouse (duplex) units would probably be introduced as would exte stairs to serve the upper level units.
Building, Fire Codes:	This alternative would be the most difficult to classify under ANSI 119.1, an absolute necessity. Firewall construction would have to be liberally employed not only horizontally between units but also vertically, if one unit were to be stacked above another.
Zoning:	Like Alternative II, this scheme would only be allowed on sites zoned both for mobile homes and multiple dwelling structures, otherwise zoning variances would be necessary.
Taxation:	Real property.
Financing of the Development/ Construction of the Demonstration Project:	Most likely the risk of innovation would be too high for a private lender. The MHFA is a strong possibility as is HUD.
Consumer Financing of Units:	Same as Alternative II.

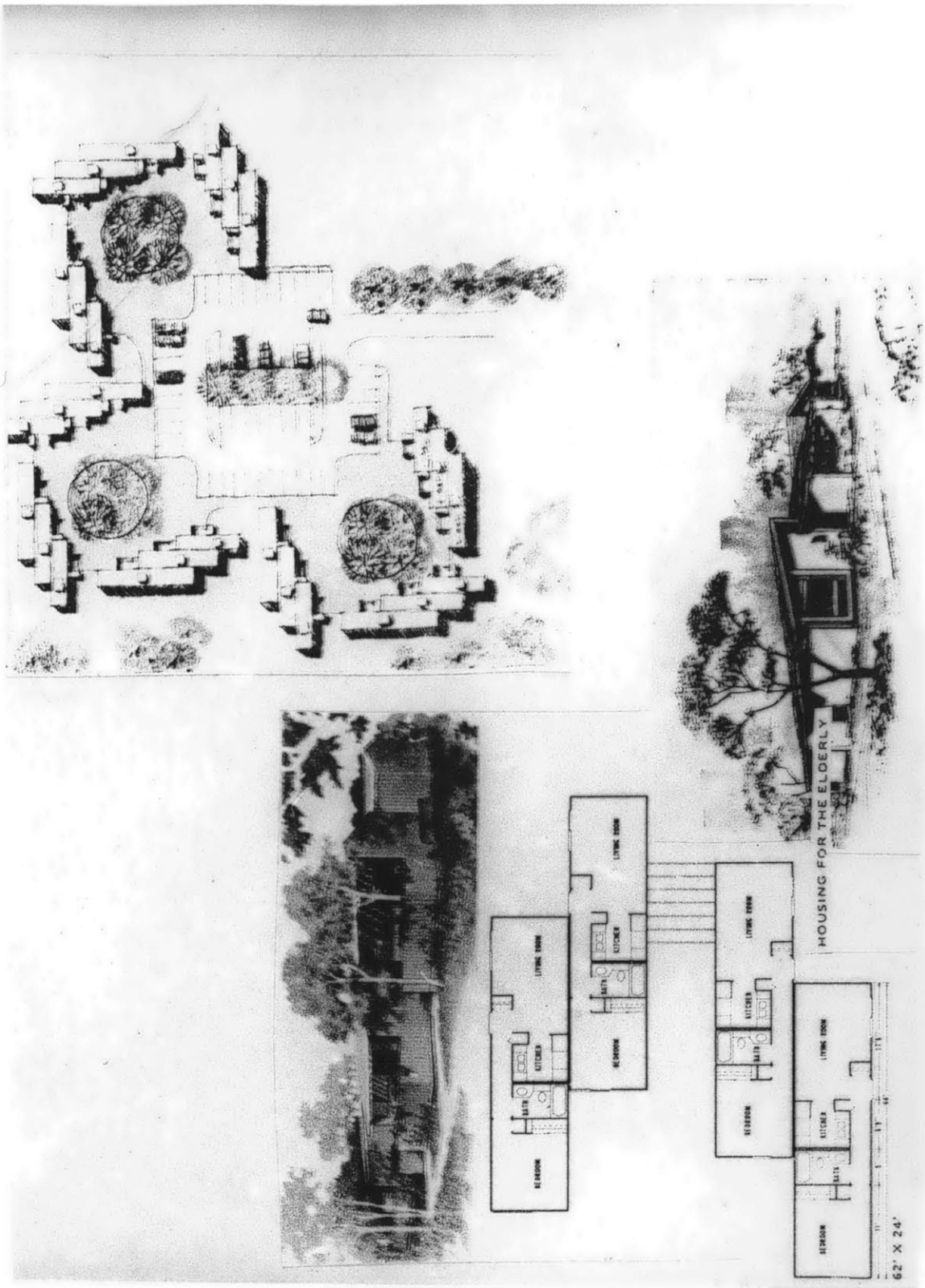
Presentation Material

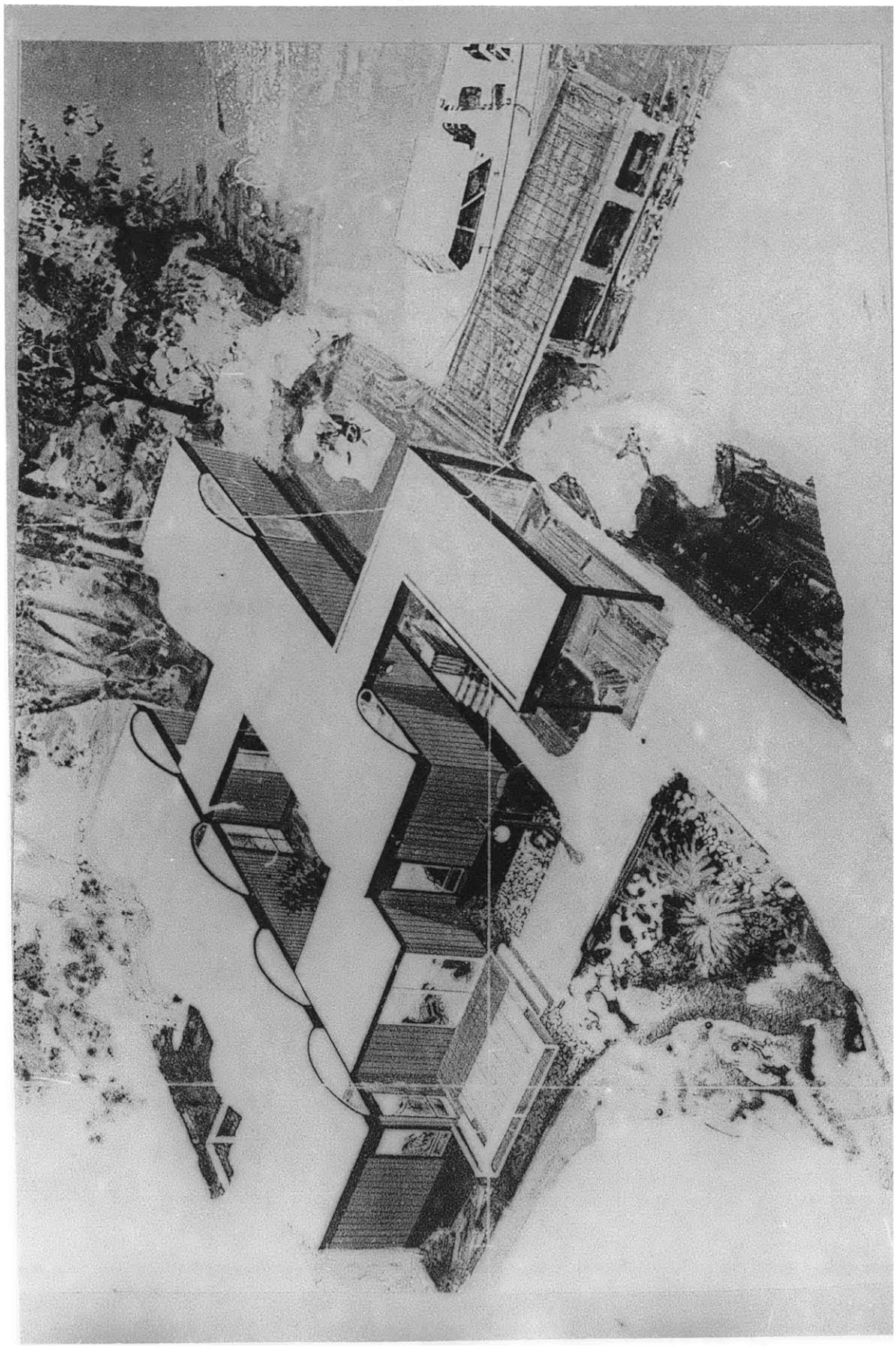
The following nine pages contain excerpts from the presentation panels illustrating the three alternatives described above. All the housing shown utilizes mobile home production technology, or could be designed to do so. The material is intended to give the potential coalition members some idea of the types of physical possibilities suggested by the three alternatives:

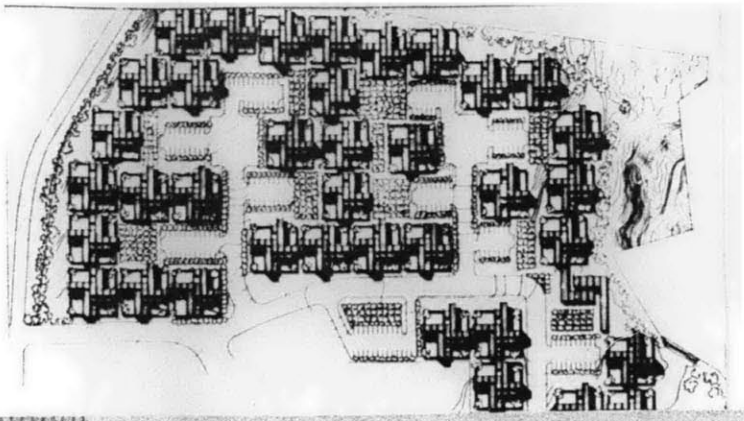


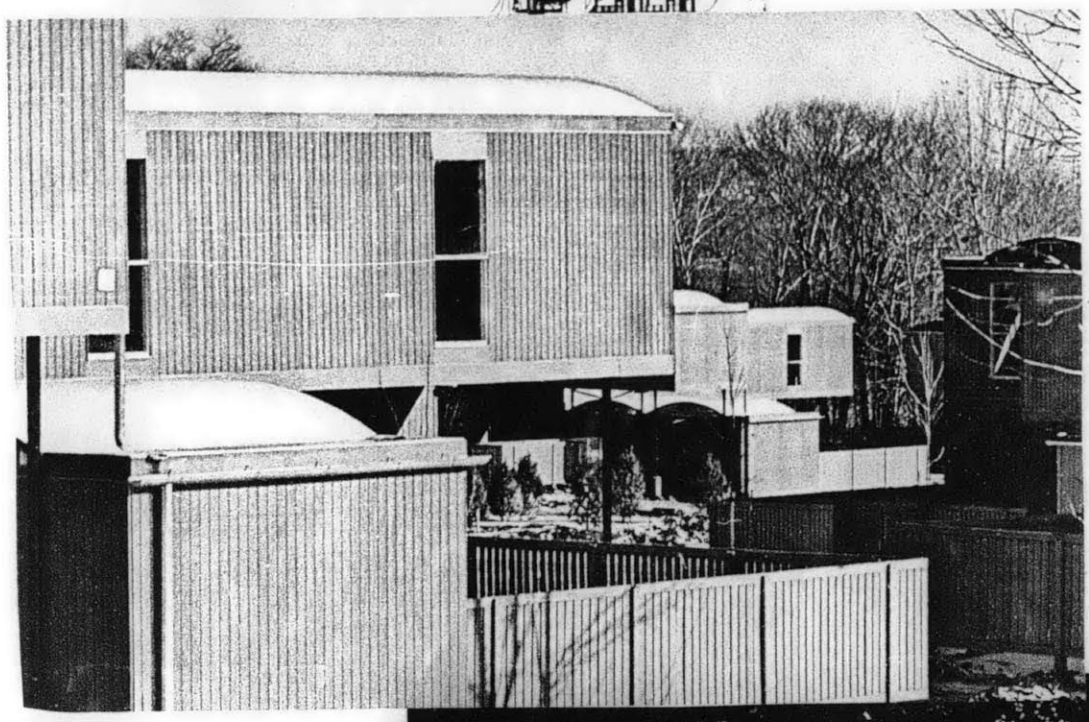


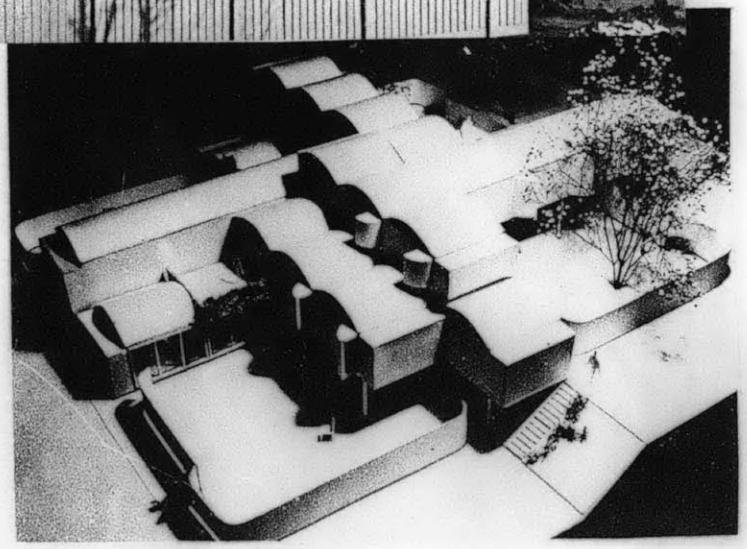

Hall, 2 Baths, Storage, Sewing Area, Laundry
11' x 24' (including walls)
Kitchen
11' x 11'
Dining Room
11' x 11' 3"
Master
Bedroom
11' x 15'
Open Court
12' x 24' 6"
Hall
3' 9" x 11'
Nursery
11' x 12' 10"

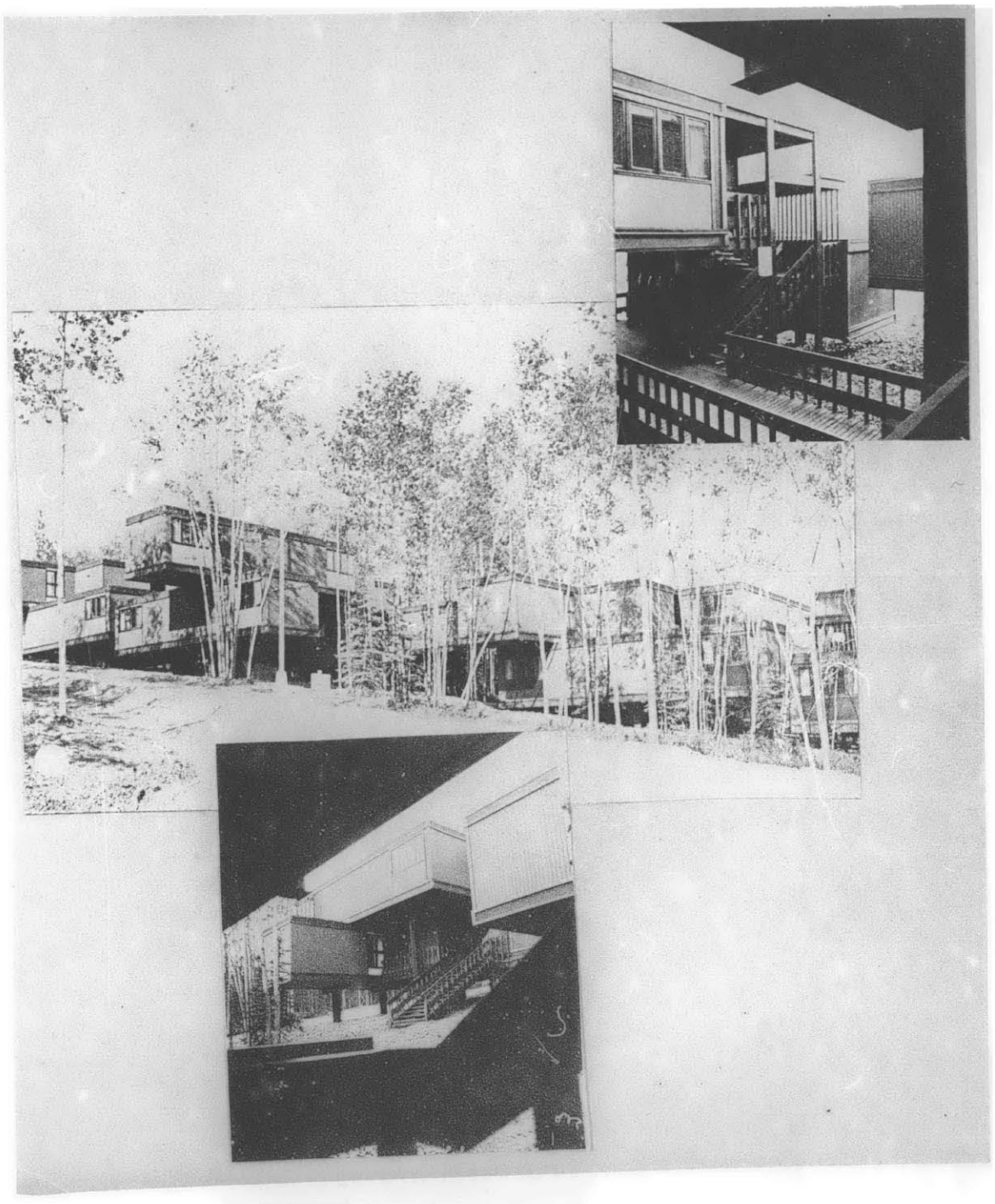

HOUSING FOR THE ELDERLY
62' X 24'

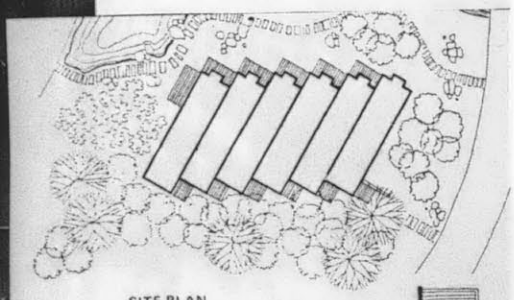




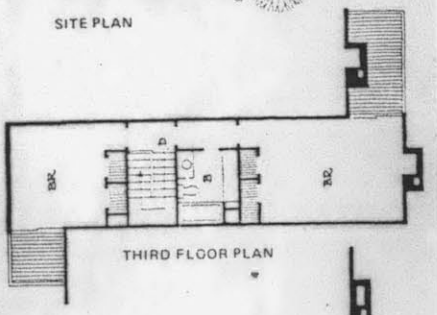




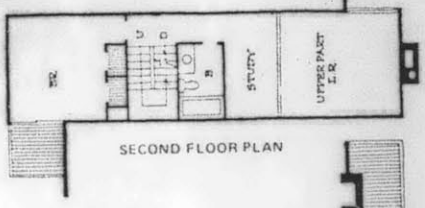




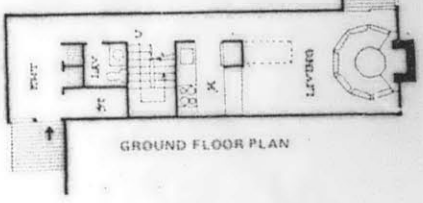
SITE PLAN



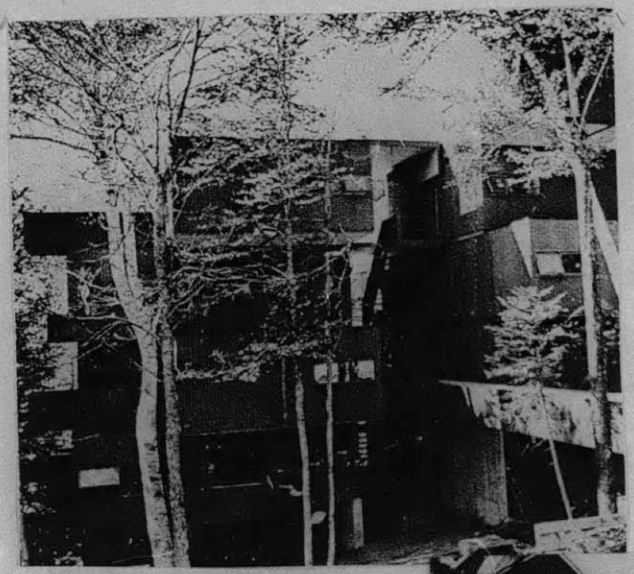
THIRD FLOOR PLAN

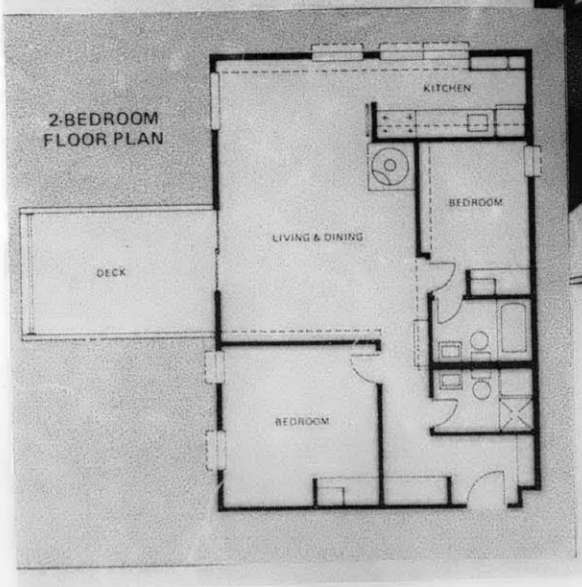


SECOND FLOOR PLAN



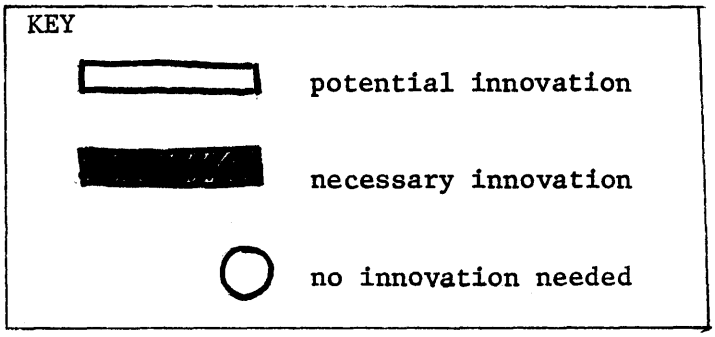
GROUND FLOOR PLAN

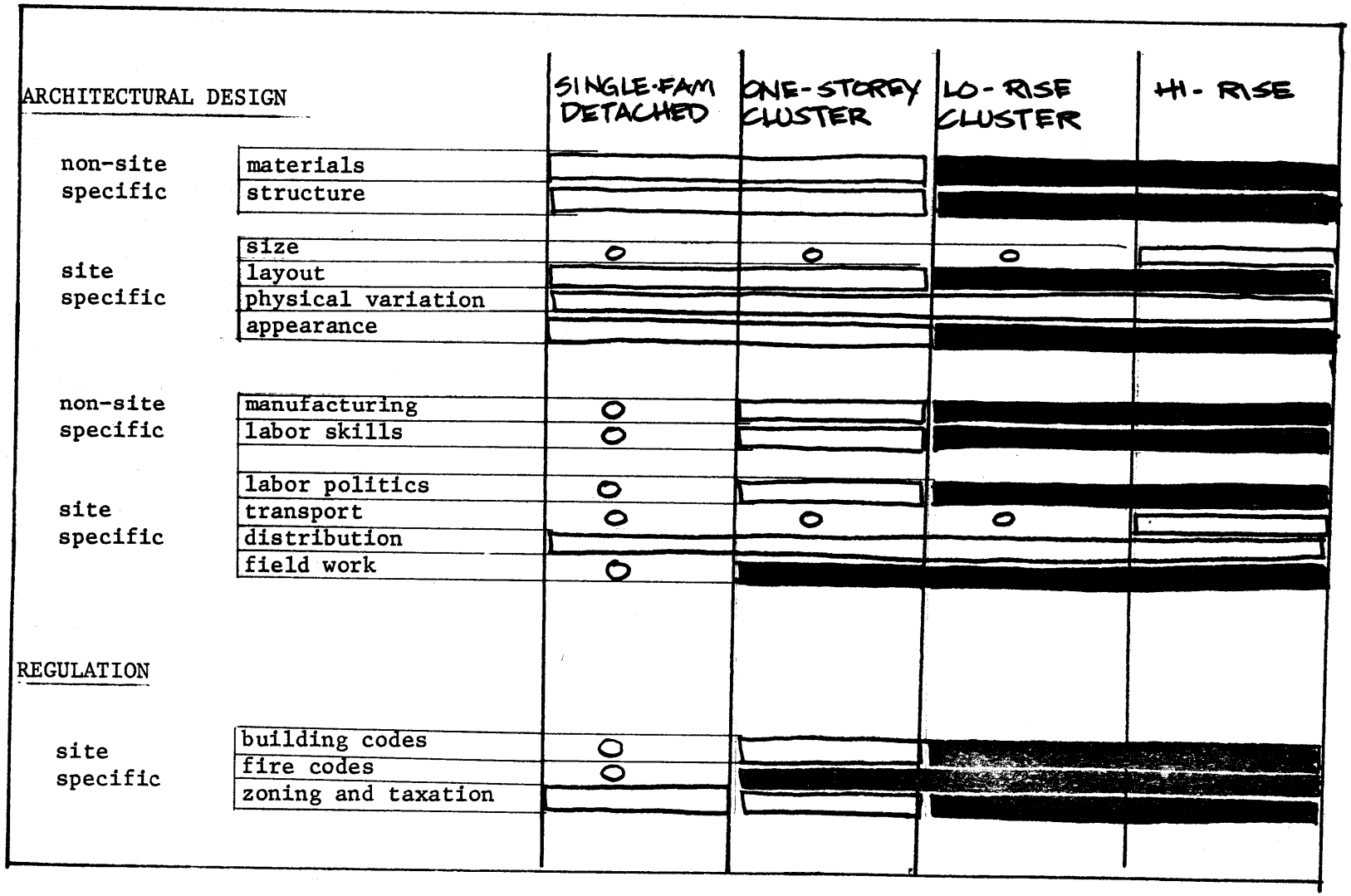



2-BEDROOM
FLOOR PLAN
KITCHEN
BEDROOM
LIVING & DINING
DECK
BEDROOM

THE INNOVATIVE PROCESS BY ALTERNATIVE APPROACH

It is now possible to identify the innovations that each alternative implies in an organizational and procedural sense as the alternatives progress from detached single family dwellings to low-rise clusters and to match this progression with each participant's degree of departure from traditional practices. Drawing also on research information supplied by MIT's Project Industrialization the following procedural innovations--and the necessity for those innovations--is identified:

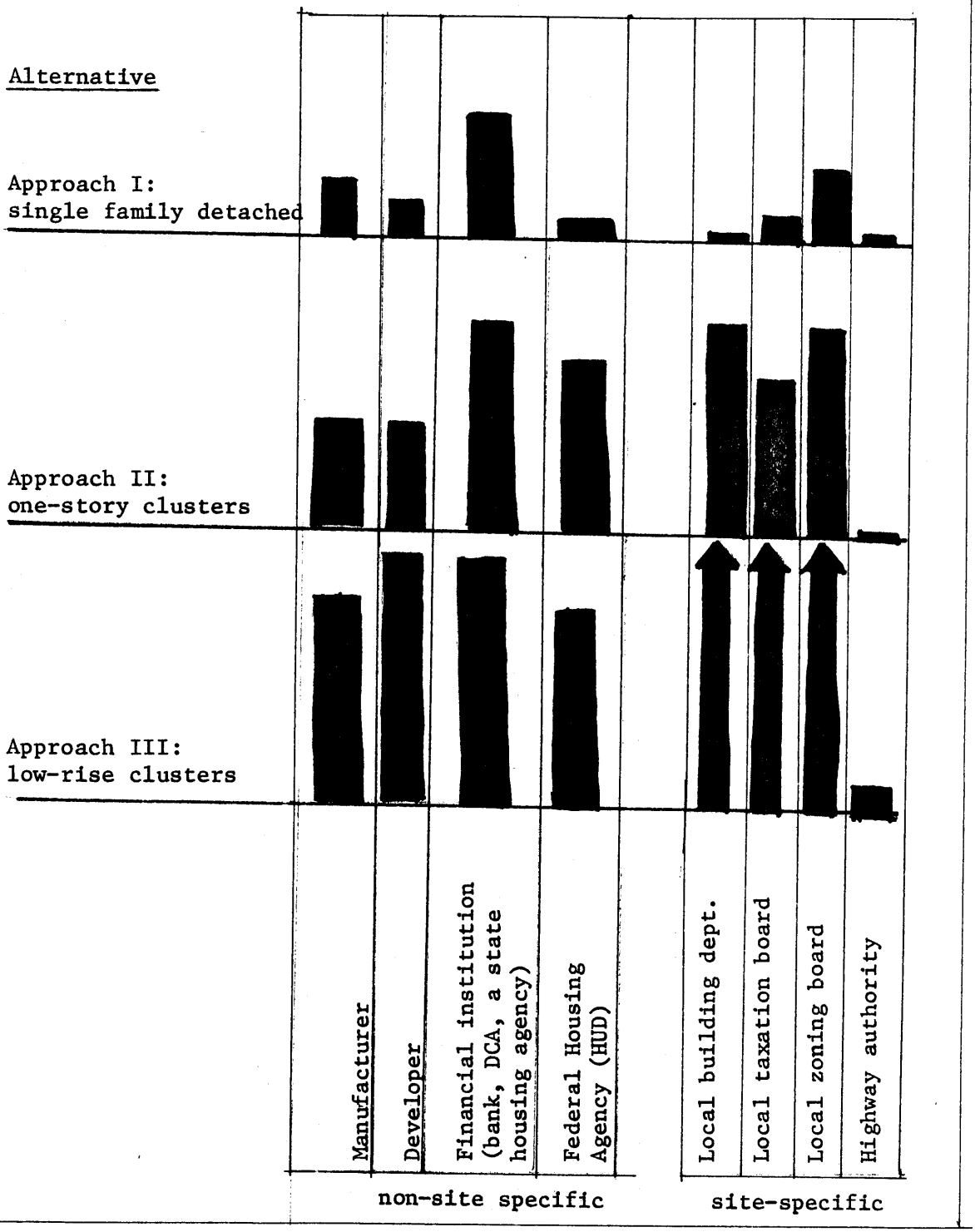



ARCHITECTURAL DESIGN
SINGLE-FAM DETACHED
ONE-STOREY CLUSTER
LO-RISE CLUSTER
HI-RISE
non-site specific
materials
structure
site specific
size
layout
physical variation
appearance
non-site specific
manufacturing
labor skills
site specific
labor politics
transport
distribution
field work
REGULATION
site specific
building codes
fire codes
zoning and taxation

It is clear that while architectural innovation may be desirable from the outset, it is innovation on the regulatory front that will be necessary as soon as the units change in character from detached to attached dwellings. These innovations are all site specific in nature and make it impossible to assume anything concrete about them until a site is chosen for the project. Nonetheless, awareness of the nature of the problems will be an important determinant in site selection. No great technical innovations will be necessary until the low-rise stage in either the manufacturing process or in the field work process, although sophistication of the latter would certainly be desirable.

The implications of these innovations to degree of departure from traditional practice is highly important. While a change in finish materials on the manufacturer's part might not connote a radical procedural departure from traditional practice, such a change might have a considerable effect on how a public housing agency or a local zoning board receives the product. If one assumes that <u>both</u> the desirable and necessary procedural innovations are undertaken by each participant, the comparative desired degrees to which these innovations affect the overall practice of these participants is illustrative:

COMPARATIVE DESIRED DEGREE TO WHICH DESIGN ALTERNATIVES AFFECT THE OVERALL PRACTICE OF PARTICIPANTS



If one is to equate innovation with risk, it would appear that maintaining present densities and innovating the mobile home unit only (producing a glorified mobile home park) represents little risk in general, but also results in little progress in achieving our objectives. In contrast, the risks involved in employing one-story clusters become quite high for the site specific and regulatory participants and remains comparatively stable for the manufacturer and the developer. As one achieves yet higher densities through low-rise clusters the risks become enormous for all the participants, perhaps insurmountable for a demonstration project (extrapolating still further, the risks involved in high-rise construction for these participants become astronomical!). From a general standpoint, employing the one-story cluster model would seem to be a feasible and still innovative approach.

The task at hand is to present the three alternative approaches to the particular participants in order to test these hypotheses, to ascertain how much of that risk they are willing to take, and to establish the criteria for that innovation.

PART 4

PROCESS: Presentation of alternative approaches to vested participants

Evaluation of participant responses

Establishment of Concept II criteria

SUMMARY

The three alternative approaches are presented to the candidate participants and criteria for each participant's involvement in a demonstration project are identified.

In light of these criteria for a demonstration project, the issues of innovation extent, cost, the participant mix, and architectural quality are evaluated in terms of the three approaches and an assessment of which approach will have the highest ratio of innovation to feasibility is undertaken. What results is affirmation of the feeling that while drastic revolution of the process and product would be desirable, this is not possible presently. It will be far more advantageous to pursue an approach that is more humble in terms of density but bolder in terms of the quality of the environment that results; the demonstration project would be an educative first step in the process of innovation.

The development criteria for the demonstration project design are finalized; a design involving the use of medium density one-story clusters is embarked upon.

PRESENTATION OF THE ALTERNATIVE APPROACHES TO THE PARTICIPANTS: RESPONSES

The Mobile Home Manufacturer
Don Bean, Plant Director
Moduline Industries; Derry, New Hampshire

Moduline is the closest mobile home manufacturer to the Boston area; it produces rather standard twelve- and fourteen-foot wide, single width mobile homes. Moduline was approached because of their unique proximity --accessibility--to the area and because of Mr. Bean's past expressions of interest in a demonstration for new uses of mobiles.

In general, Bean expressed a high degree of interest and excitement in actually innovating his product. However, his enthusiasm was tempered by his keen awareness of his plant's capabilities, the risks involved in innovating, and a general lack of understanding of the architectural specifics involved in innovation.

The alternative schemes: Bean expressed little interest in pursuing the single family detached route, which he suggested was just like "dressing up" a mobile home and not really enhancing its market possibilities. "If you're going to do it, you might as well really do it," he kept saying. The notion of single story detached clusters (alternative II) received the most positive reaction from him. He felt that the units could be innovated which would not differ significantly in terms of production from the present mobiles he is producing, other than the aspect of making double-wide units, units composed of two joined mobiles, though requiring a high degree of skill and care in the factory.

The multi-story cluster approach (alternative III) was not well re-

ceived by Bean. All the examples I showed him looked to him like "a stack of boxes, a bunch of boxes piled up." Not only does stacking make architectural innovation of the units themselves more difficult and less of an issue, it removes some of the character of the single family identifiable dwelling the one-story cluster manages to maintain. Most difficult of all, though Bean cautioned that it introduced structural as well as fire and building problems that would be next to impossible for the first run: the multi-story cluster implies a whole new structural system for the mobile--stronger outside walls, load bearing interior walls and columns. It implies to Bean a whole new product--a revolution, and therefore and impossibility. Alternative III he felt would involve teaching new techniques in the factory, buying new jigs for assembly both in the factory and on the site, and possibly changing the assembly line production system, all of which he would prefer to avoid for a possibly one-shot demonstration project. He felt that doing this would add so much cost to the units the first time that the whole issue of low cost would be lost. Also, involvements with the fire code people would be so complicated once you go above one-story, that it might become impossible. Also, going to three stories involves a product that is not marketable by itself, one aspect that Bean felt not only reduced the risk and the cost of the demonstration project for his company, but would supply an innovated product to the mobile home market in general.

Architectural innovation: Bean agreed that module layouts could be extensively redesigned, as could finishing materials, as long as they

could be easily and quickly applied and were virtually maintenance-free. He emphasized that the first thing he would do would be to try another exterior finish than aluminum. Bean also felt that as long as we kept on a 12' or 14' chassis, the length of the modules could be varied. Also he felt that double-wide, add-on roll-out or fold-out rooms presently used by other manufacturers could be used by Moduline in order to improve the product. At the same time he cautioned about introducing too many on-site procedures that involved the mobiles. Bean felt the ideal demonstration would be to use units that were employed in one-story clusters but could also be marketed as individual units. He would insist on building the units on their chassis with the wheels and axles removed after the units have been rolled onto foundations on the site.

Finances: When I approached Bean with the idea of Moduline's doing a demonstration as a break-even (non-profit) venture to make an educative point and to aggregate the industry's market, he scoffed at it and said, "If you're not in the business to make a profit, you're not in the business at all." He would, however, be willing to sell the units to the developer at dealer costs and bypass the dealer. He felt that the innovations would add to the cost of the unit, but would not necessarily bring them much above the present average of $8.00 per square foot manufacturer's cost. Cost increases could be kept at a minimum if we eliminated the furniture and much of the built-in bedroom furniture, which tends not only to limit the user's choice about room arrangements, but also precludes the possibility of using his own furniture--a commodity

which many families own and cherish. In terms of a new market, this would make a lot of sense; the new product could be aimed not at a first or last (retirement) home market, but the middle-family market, one that the industry presently does a poor job addressing.

Bean estimated that Moduline would have to have a guarantee of 100 floors (approximately 90,000 square feet) before they could get involved in a demonstration project.

In terms of a demonstration project, he re-emphasized that if engineering costs, training costs, and new material costs were kept at a minimum, the demonstration project (if it were one-story clusters) would still possibly be low-cost. However, he also emphasized that we should not preclude the possibility of getting federal subsidy money to pay for the first cost over runs. At its worst the demonstration project could be competitive with traditional built houses of the same type. The economies would improve after the first run.

Codes and Taxation: With regards to building codes applied to mobile homes (A119.1), Bean emphasized that Moduline would insist on dealing with the code people directly; the zoning hassle could be handled by the developer. In terms of taxation, he felt the only appropriate way to proceed was to remove the wheels and thus have the units taxed as real property: "Let the towns get their tax money. This is going to be a home, not a mobile home." Bean feels the demonstration project would be highly educative to public officials and the general public if it were well done.

The Developer
Lawrence Henrich
Halifax, Massachusetts

Mr. Henrich is owner and developer of what is probably the finest mobile home parks in New England, Halifax Estates, a 250-home park in Halifax. He is also one of the largest stick built subdivision builders on the South Shore of Massachusetts. Mr. Henrich also serves on the Governor's Advisory Committee on Mobile Homes and Mobile Home Parks. Because of his unique combination of areas of expertise, and because of his real interest in mobile homes from the governmental standpoint, his views were of particular interest to me.

One of Mr. Henrich's limitations, if it could be called that, is that he is very reluctant to discuss the use of mobile homes, or components manufactured by the mobile home industry, in any other setting than a good traditional park. He is a real proponent of park living, and is not afraid to let that be known. It seems difficult for him to envision the industry manufacturing anything other than aluminum boxes.

The alternative approaches: When I showed Henrich the three alternatives he reacted very strongly against the low-rise clusters, saying it was foolish to think that as a demonstration project it could be done at any substantial savings over traditional construction. One of the big savings of traditional parks comes from the fact that no equipment is needed in order to site the unit. The multi-story clusters represent much higher costs in the form of cranes and other on-site equipment needed, foundation costs, unit redesign in terms of structural capabili-

ties, and the addition of a support system for the boxes. He felt one would have to spend so much money doing that well, that real improvements in the aesthetic, if you will, could not be concentrated on. He felt that if one is really determined to improve the product and its image and to keep costs down, it's better to begin in a less extreme way, proving one's point that mobiles can be the framework of a good environment and use this experience as an educative tool. Going to extremes and failing is a bigger blow to the industry and the cause than doing nothing at all. Henrich insisted that it was a more worthwhile venture to remain at lower densities and work out the other problems at first.

Alternative II, the one-story cluster, however, did represent to Henrich a strong possibility for innovation, especially in terms of site work. Regular (in terms of structure) mobiles could be used and literally placed on foundations but kept as separate entities apart from the fire walls. In that way, marketing the units would be possible for the manufacturer, the site work would be simple for the developer, and the resulting environment could not only be a quite pleasant community, but would also be at least on the way to higher density. Clustering the units does imply permanence, Henrich felt, which might help in financing the units as well as in improving the image of the mobile home, if that is one's concern. He did admit that Alternative I, the detached single-family, was the easiest to do and the most attractive to him, but he also admitted that it barely addressed a higher density objective. He felt that as long as the units could be transported on their own chassis,

be sited on simple foundations without the use of much special equipment or on-site building systems that have to be intricately connected to the units (precast columns, etc.), the cost benefits of using mobiles could be preserved.

Henrich also stressed that unless the new designs were produced in a significant volume (an entire subdivision), and unless the units were fairly close to present mobile homes in production, delivery and set-up characteristics, he could stick build a comparable product for about the same price.

Community opposition: The largest stumbling block to more prolific use of mobiles Henrich felt to be community opposition in terms of zoning based on: 1) the mobile's bad image as structurally unsound tin boxes for lower income people; 2) taxation problems with mobiles. He admitted that the demonstration project would be a good opportunity to provide an attractive enough environment in order to get the zoning changed and to set a precedent. If the demonstration project is somehow seen as a boon to the community rather than an insult, it will be worthwhile. The problems lie in image, services, and taxation. While Henrich would admit that taxation is a sore spot with communities, he was strongly opposed to legislating a real estate tax on mobile homes; the compromise might be worth making, in specific cases. He also argued that he would try to keep the development as a community for adults or elderly only. The unit sizes he felt are more appropriate to these groups, and the absence of children makes the development more acceptable in the community's eyes. I cannot condone this approach personally; I

feel it is relinquishing too much in order to innovate. Exclusionary environments should not be the outcome of any demonstration project that is aiming at eliminating the exclusionary practices of communities.

First Run Costs

Henrich suggested, like Bean, that part of the cost savings he achieved in his mobile home park and his stick built subdivisions come through repetition of the production processes. The demonstration project we envision will incur cost overruns, as an on-site labor force will have to familiarize itself with new techniques, as well as with a certain amount of new machinery. It might be possible to keep these first run added costs to a minimum, but he felt that any additional projects after a demonstration project could be executed at a more representative and efficient cost.

State and Federal Government Involvement

Henrich stated repeatedly that he would, as a developer of a demonstration project, try to avoid involvement with the state and federal government housing agencies. He felt that such involvements only introduce delays, red tape, and aggravation. He did say, however, that he would not exclude the possibility of their involvement by creating an environment that does not meet their standards (e.g., the FHA minimum property standards). Every attempt should be made to produce a low enough cost environment so as to be able to offer occupancy to all income levels with no subsidies. Another way of approaching the problem, however, if

first run costs are too high to carry out the project without subsidies, is to prove that the demonstration project would provide much more for the occupants for the same subsidy dollar.

The Department of Housing and Urban Development
Ms. Elenor White
Director of New Programs
HUD Area Office, Boston

Ms. White's general feeling about mobile homes surfaced at the outset of our meeting when she said she thought traditional trailers were a blight on the landscape and that she wouldn't want them allowed in her community. When I showed her some of my visual material, she agreed that the examples were not what she considered trailers, and that most of them were at least visually acceptable to her. More than anything else, she felt that the image problem was the one the industry had to work on most. If an architecturally pleasant proposal is introduced, most of the other problems with the community will dissolve. It's the visual image of the trailer that solicits such visceral reactions from communities.

Alternate schemes: Ms. White offered no preference in terms of which alternative I should pursue. She did say, however, that as soon as one gets to clustering the two HUD funding programs for mobile home parks and mobile home units would be inappropriate. In that event, the most probable source of HUD funding would be under the Section 8 rental subsidy program. $30,555,000 of Section 8 funding has been allocated to the State of Massachusetts under the Community Development Act of 1974. Eligible tenants will pay approximately 20% of their income toward their rent and the federal funds will pay the remainder of the market rent. Ms. White felt therewas no specific term of the program that prohibited

the use of manufactured housing.

Ms. White emphasized the benefits of getting Section 8 money for a project financed by a local or state housing authority is that the subsidy then carries a maximum term of 40 years; if the project is privately financed, the maximum term is 20 years.

In order to receive Section 8 funding, the site and unit designs would have to comply with the HUD Minimum Property Standard Guidelines. These are the most stringent requirements that the project would be tested against, except in the area of room sizes, where the MHFA's requirements are more demanding.

The developer of a Section 8 project may be a profit, non-profit, a limited dividend developer; HUD has no objection to anyone reaping a fair profit on the projects.

When asked what criteria for a site the Department imposes, Ms. White answered that there are three major grounds for approval:

1. Market need for subsidized housing must be exhibited.
2. Environmental concerns
3. Equal Opportunity Concerns: if the development is to be in a predominantly minority populated area, White felt that the likelihood of sponsorship is less than in a non-minority area that needs housing for low-income, elderly and minority citizens and doesn't presently have it.

Ms. White emphasized that after HUD's disasterous Operation Breakthrough attempt, it would be very unwise to tout the demonstration project, while it was clearly of a different nature from Breakthrough, as a scheme whose merit was that it was factory-produced. If the architectural

quality is up to HUD standards and the process can provide more to the residents for less subsidy money, Ms. White felt that nothing would stand in the way of obtaining the funding. Once again, it is the image of the project that is really at the heart of the decision. As an architect, that is heartening news.

The State Housing Agency
The Massachusetts Housing Finance Agency

1. Ms. Lois Stern
   Design Review Board

In general, Ms. Stern was not overly enthusiastic about the MHFA becoming involved in manufactured housing; she did not feel it was very appropriate for MHFA projects. The MHFA is into the business of providing housing that can be rented at market rates and therefore has to look like middle class, well-designed, well-constructed housing. She had no way of rejecting the examples I showed her on the grounds that they were poorly constructed or less well designed than many MHFA financed projects; her reactions, I feel, were based on the unavoidable image the manufactured home conjures up. Despite her lack of enthusiasm, it is important to pursue the MHFA, as they are the chief suppliers of subsidized housing in the state. Our meeting was satisfying, however, in that she came a long way in understanding the potential for a demonstration project and defining for me design parameters the project would have to follow.

The MHFA does not initiate projects. Potential developers must approach them with a fully-worked out and costed plan before they will

examine the plan and approve it or not. Thus, in many ways, they are a passive agency. As a "bank," they have a responsibility to their investors to partake in projects that are low risk undertakings; they are not at all willing to take a risk on any projects they are not sure of for any reason. In the past the agency was involved in two Breakthrough projects. One, Mystic Valley Towers, was a real failure in that its concrete panels are beginning to deteriorate already. The other, Lincoln Village in Worcester, is better, but the portion of the development that was stick built (the Breakthrough system was the Hercoform modular system) was produced at a lower cost and at a higher quality than the Breakthrough portion. Lois acknowledged that it is unsound to discard this possibility because of two unrelated experiences; but she insisted that by the time the mobiles were up to MHFA design and construction standards , it could not possibly cost less than its stick-built counterpart.

This was one area I didn't care to dispute at that point; only future work will prove or disprove her theory. I must submit, however, that it was the "mobile home" image that was the main barrier in the discussion; she rejected all the examples I showed her that resembled boxes. Quite rightfully, she did criticize the quality embodied by present mobile homes, particularly the interior layouts and finishes.

The Alternative Approaches

Lois felt that the single family detached model was inappropriate in that it required too much land per unit. The small one-story cluster

scheme was more attractive in that it made better use of the land and still afforded all the occupants of direct ground access, yards, etc. This is particularly important for large units. While the low-rise cluster alternative made still better use of land, we agreed that the configurations necessarily began to assume a more boxlike configuration. If this approach could be effectively designed it would be preferable to the MHFA, as they like the two level unit for larger families. Most important, however, is that the image of the housing not be boxlike and manufactured-looking. The housing must be good enough to be rented at market rents.

Whatever approach is employed the following unit mix should be achieved in order to get MHFA financing:

no studio apartments		
1 bedroom units	50%	at least 600 square feet
2 bedroom units	25%	at least 900 square feet
3 bedroom units	25%	1200-1500 square feet
4 bedroom units		1450-1850 square feet

Rent levels:

Market rents:	25% of total units
Low Income:	25% of total units
Moderate Income:	50% of total units

Development Size

The MHFA has financed new housing developments ranging from 100 to 1200 units in size. Whatever size is chosen, appropriate community and recreational space for that number of units must be prowided.

A Sample Cost of MHFA Projects:

Approximately $4000.00 per room for new construction; 1973 levels.

1 BD.....	classified as	4 rooms	($16,000.00)
2 BD.....	"	5 rooms	($20,000.00)
3 BD.....	"	7 rooms	($28,000.00)
4 BD.....	"	8 rooms	($32,000.00)

It is safe to assume that these costs have since been inflated by about 10% and that it should be well within the capabilities of the mobile home manufacturer and the developer to provide a project below these costs.

Other criteria

The finish materials must be materials standard in market homes and apartments. Kitchens must have windows and be the eat-in variety; there should actually be a choice as to where to eat; each three and four bedroom unit should have one undesignated room (a den or playroom); electric heat is not permissible and air-conditioning in the main living spaces is mandatory. The operation costs must be competitive.

It is clear that few traditional mobile homes meet these criteria; but we are not speaking of traditional mobile homes. The entry conditions of most mobile homes are dreadful; there are no mud areas, or covered entries. The room dimensions are too small and do not permit flexibility. The corridors are too long. Ms. Stern and I did agree, however, that these are all problems that can be dealt with. What is questionable to her is the cost of this and the image the final product will project.

2. Mr. Mathew Hobbs
Administrative Assistant to the Director

Ms. Stern provided me with the design criteria for a feasible project; she is not, however, the originator of non-design policy in the agency. Mr. Hobbs is more in touch with those issues. He nonetheless received the idea of a demonstration project using components manufactured by the mobile home industry with the same attitudes as Ms. Stern. Hobbs was extremely skeptical about the entire concept of using mobile homes to produce a quality environment, one of high enough quality to be marketable by the MHFA.

Once again Operation Breakthrough and the MHFA's experience with it led Hobbs to this conclusion. He said that after seeing many Breakthrough systems the agency decided most of them were of low quality, used cheap materials, felt unstable, had substandard room sizes, were not capable of producing large family units, were no less costly than traditional building systems, and were architecturally uninteresting. Unfortunately, Breakthrough seems to have turned the MHFA off to manufactured housing and its potential. While it is not my role to defend or condemn Operation Breakthrough, I submit it differs in concept from this effort so widely that I must not let the comparisons hold me back.

<u>If</u> it were possible to produce a reasonable environment with manufactured components, Hobbs cautioned me on other points:

<u>Cost</u>: It must be proven to the MHFA that the cost would be less than stick built. I find that requirement rather strange in that the MHFA doesn't apply such prejudicial requirements on other projects. The

prejudice against the image of the manufactured home is so strong that it will be more critically appraised than other forms of housing by the MHFA. I would venture to say that even if it is cost competitive with stick built housing, it should be acceptable on those grounds.

Labor problem: Hobbs warned me against pressure from local union groups. In this economy local labor might view this demonstration project as a threat. I submit it depends on how the developer communicates with labor groups.

Zoning and code problems: Hobbs was well aware of the building code and zoning problems that the project might encounter. He said all such problems are the developer's responsibility to iron out. Here too, I do not feel so threatened; once the project is up to the community's liking in terms of aesthetics and the services it provides the community, these problems might become less critical.

Once again, it seems that the problem is one of architectural quality, cost and public regulation. If the first problem is addressed, I am convinced the others will become less important. If is the image of the manufactured house that stands in the way more than anything else.

EVALUATION OF PARTICIPANT RESPONSES: DEMONSTRATION PROJECT CONCEPT REFINEMENT

The participants' reactions to the initial alternative concepts raise several issues that must be confronted before any decision regarding the nature and scope of the actual demonstration project can be resolved. These are primarily issues of: 1) the extent to which the project can attempt innovation and still be feasible; 2) cost and cost overruns for the demonstration project; 3) the importance of the participant mix of the final development team; and 4) the architectural quality of the demonstration project.

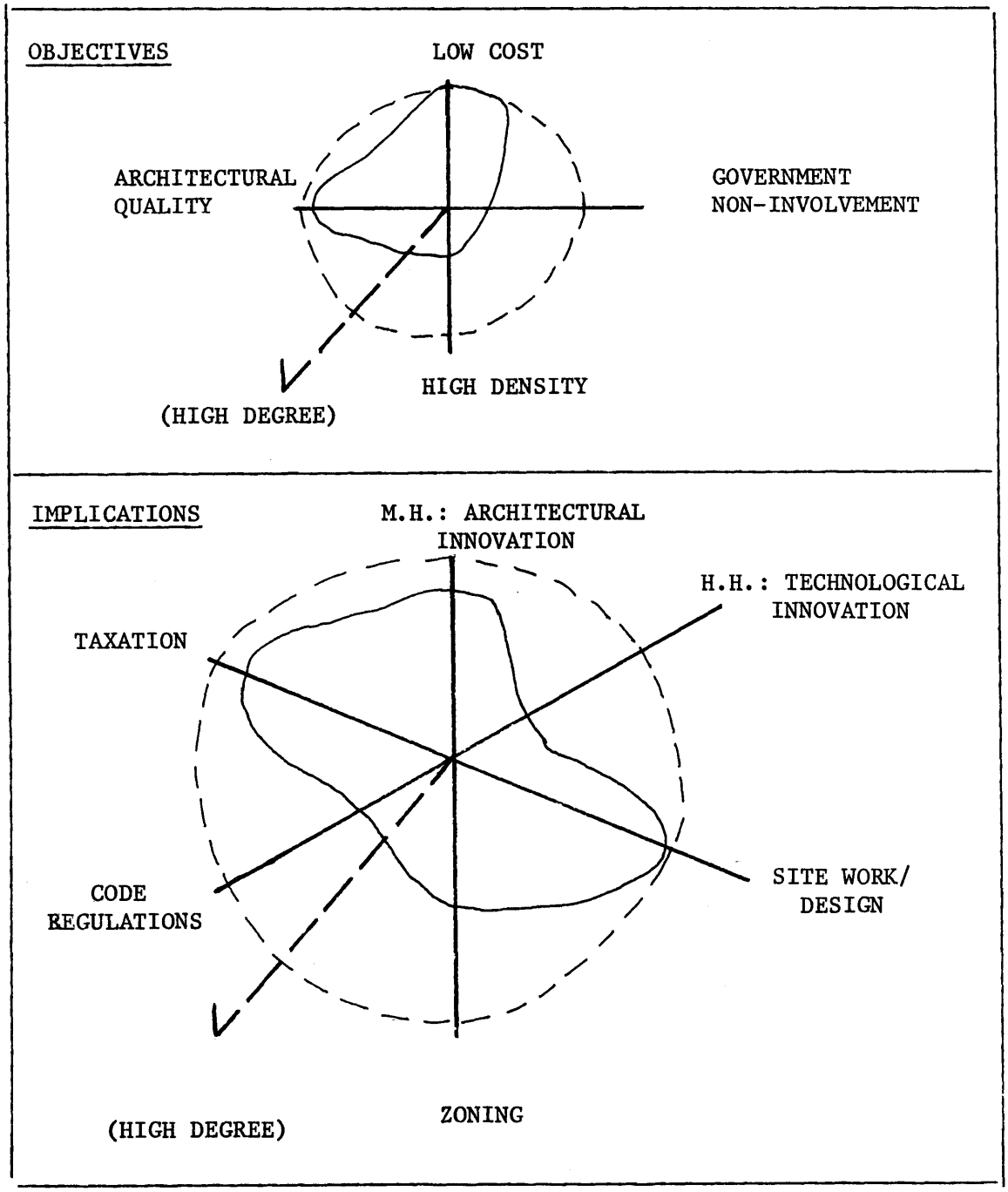
Innovation

The participants' comments reiterated the soundness of the evolutionary--as opposed to the revolutionary--approach. While a more humble approach to the demonstration project relegates it to the position of a humble first step, that may well be the only realistic approach. The specific implications of the evolutionary approach can be diagrammed:

ACHIEVING THE GOAL: INNOVATIONS

The Demonstration Project:
The evolutionary approach vs. the revolutionary approach

——— evolutionary approach — — — — revolutionary approach



While the objectives of government non-involvement and high density will not be specifically addressed by the initial demonstration project, it will be possible to innovate in terms of providing a low cost form of housing in an environment substantially superior to that of a mobile home park or public housing--one comparable to anyone's expectations of market housing. In the process, considerable progress in the architectural innovation of mobile home environments and site design of mobile home environments will be possible. As a first step, the demonstration project will be most useful if it represents a positive step in terms of design; it seems that the regulatory environment will improve once the end product is more palatable to both the communities and government.

Cost and Cost Overruns

The specific cost of the demonstration project cannot be computed until a design is completed. Moreover, it is not in the scope of the thesis to prove that the product will be of substantially lower cost than traditionally built housing of the same type. It is, however, clear that the process of involving all the participants in the planning stages of the environment will lead to the most cost efficient product these particular actors can produce. It should be the work of later studies to evaluate the specific costs of the demonstration project.

It is possible, however, in light of all the information gathered in this process, to understand where the cost savings and increases for the demonstration project will occur, and to try to maximize the savings and minimize the increases in the chosen design concept.

Comparing the determinants of mobile home and traditional stick building process costs, differences can readily be recognized. There are several areas in which the use of the mobile home industry in a demonstration project can reap considerable cost savings:

1. Utilization of factory production: by building the units in a factory the costs of several aspects of production are minimized.
   a. Labor costs: mobile home manufacturers employ non-union labor and provide them with steady employment, at lower rates.
   b. Production line costs: factory labor in the mobile home industry compares in productivity to on-site construction at a ratio of about 5:3.
   c. Enormous purchasing power of materials and the use of prefinished materials: mobile home manufacturers are difficult to compete with in material costs in stick built developments because of their buying power.
   d. Steady, year-round production.
2. Savings in construction financing: Since site preparation can take place simultaneously with factory production of the units, the total length of development time can be shortened considerably. The length of the term of construction financing can be minimized.
3. Time savings: In other respects than construction financing the time saving element can mean cost savings; the full time develop-

ment staff's commitment is shortened; also the development can start earning income--amortizing its mortgage more quickly.

4. Volume production
5. On-site development costs: in all cases but the multi-story approach, site work for the mobile home development will be less extensive in terms of foundation work than the stick built version. The most developed aspects of on-site construction may be utilized. Less equipment is needed for the on-site erection.

Cost Increases Over Traditional Construction

1. Transportation costs: mobile units do cost about 65¢ per mile to transport.
2. Political costs: involved in clearing up regulatory restraints involved in doing the demonstration project.

One cannot deny the potential for enormous cost savings. Harold Davidson illustrates the point by comparing the cost of three identical 1290 square foot homes, excluding land costs, produced conventionally, and in modular and mobile factories in 1970[8]:

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[8]Harold A. Davidson, Housing Demand: Mobile, Modular or Conventional? (New York, 1973), p. 101.

	Modular	Mobile	Conventional
construction costs (includes labor, materials, and factory overhead where applicable)	$9670	$8490	$12,270
on-site costs (includes utilities, driveways, walks, concrete block foundations, screw jacks, garage slab)	1880	1080	1880
delivery and set-up	650	400	--
construction finance	900	230	1730
builder's overhead	750	--	1000
construction and development total (real costs only)	13,850 (10.74/ sq.ft.)	10,200 (7.90/ sq.ft.)	16,880 (13.10/ sq.ft.)

Granted, these comparisons reflect single houses only and not large scale developments. Also they do not reflect land costs; but this would not enter into the picture unless one is comparing modular cluster to conventional high rise costs, which is an unfair comparison. All the figures point out is that these are real possibilities for cost-savings and that the issue is well worth pursuing.

Second, by comparing the demonstration project with a traditional mobile home park environment, which represents the lowest cost housing now available, it is easy to see that costs would perhaps be slightly higher than traditional parks.

Sources of higher costs: the demonstration project vs the traditional mobile home park

1. Site work costs: the costs of foundations and firewalls would be considerable.
2. Taxation of the units as real property: it may desirable, in order to gain community support, to contribute taxes to a municipality school budget (it should be noted that this also does give the owner some source of tax deduction, resulting in savings, when the unit is taxed as real property; therefore the increase is not as dramatic as it may seem at first).
3. Higher land costs: as one gets nearer to urban areas, the cost of land appreciates considerably.
4. Materials: the use of higher quality materials and construction standards than those presently in use will upgrade the architectural quality of the dwelling and meet FHA minimum property standards.
5. Possible transportation costs: if the dwelling units are composed of much smaller modules and therefore require more modules per unit (more than 1 for one- and two-bedroom units and 2 for the larger units).

In addition to these costs increases, others perhaps would be incurred for the demonstration project as first time contingency costs. These cost additions would not reoccur if the same manufacturer and developer were to undertake additional projects. The emphasis in design will be to

minimize these, too:

6. Labor: teaching new production techniques and site-work techniques
7. Machinery: the possible necessity for new jigs in the plant and other new equipment on the site
8. Workmanship: if components are to be joint tolerance, related workmanship must be very precise
9. Political costs: time spent by the developer working with zoning, code regulation, and community people.

At the same time there are ways in which costs can be appreciably cut in the demonstration project; the costs saving aspects can be maximized in the project design in order to maintain costs competitive with mobile home parks.

Sources of cost savings: demonstration project - widespread use vs traditional mobile home parks:

1. Higher density use: by employing the modules in clusters the possibility of utilizing more dwelling units per acre is realized. The savings in land per unit as density almost doubles is considerable.
2. Good coordination of the developer, manufacturer and financers.
3. More efficient site and unit design.
4. Elimination of the mobile home dealer: dealers whose profits range from 30% to 100% (!) of the wholesale cost of the units

would be circumvented as the units would be delivered directly to the site by the manufacturer. Little interim financing and warehousing costs would be incurred.

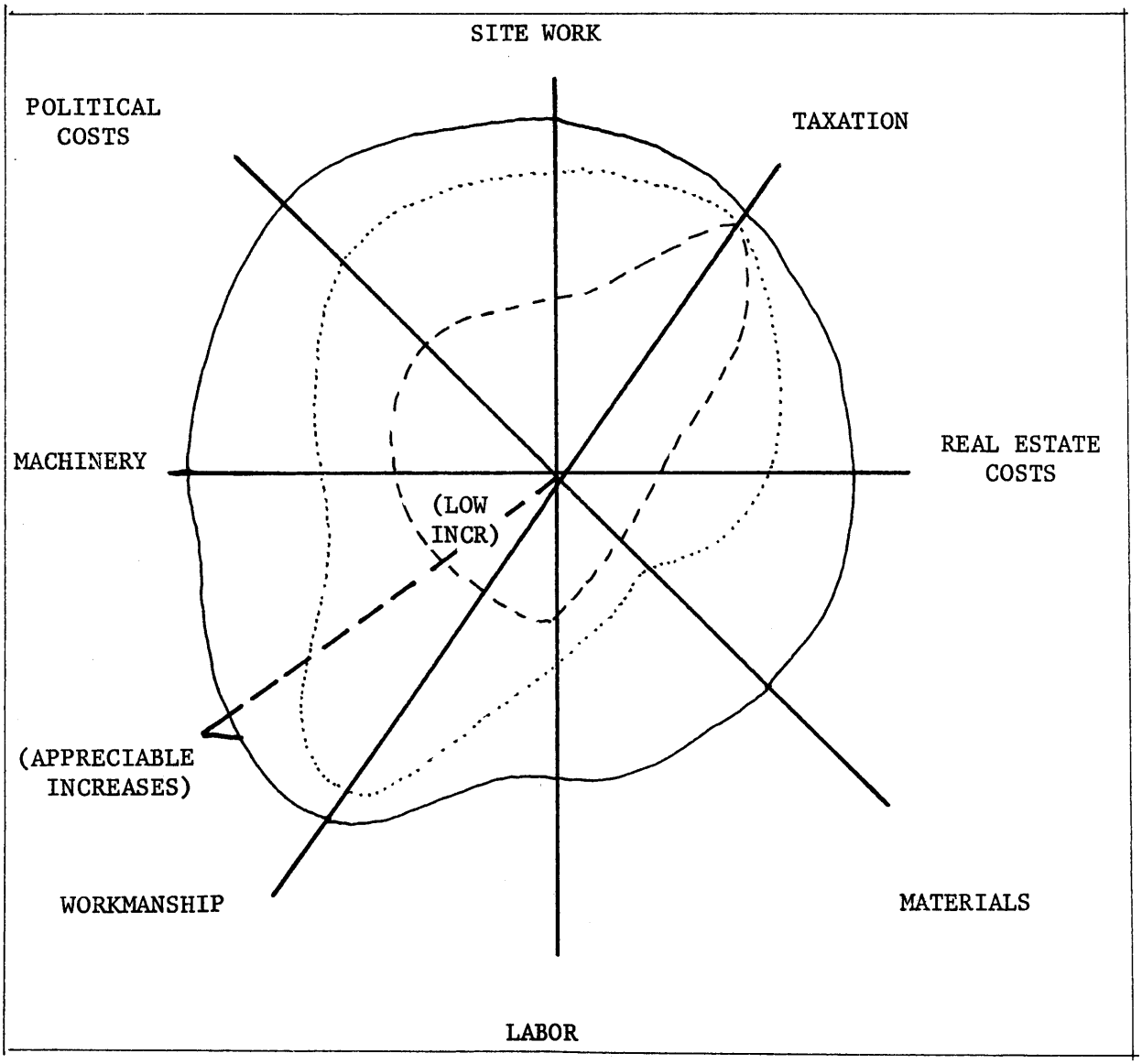
5. Less depreciation: if the imageable and real quality of the units is increased, and if the units are permanently placed on foundations, the dwelling units should appreciate like standard dwellings rather than depreciate. Even a standard mobile home on the market today does not physically depreciate any faster than a conventional home if the maintenance is comparable.
6. Traditional mortgage financing: since there would be nothing "mobile" about the development and since the units' depreciation performance will be better, longer term, lower rate (interest rates on mobiles is generally double traditional rates) mortgages will become possible.
7. Choice of manufacturer and developer: with necessary equipment chosing a developer with expertise in both mobile home developing and stick building (like Mr. Henrich) would help minimize costs.

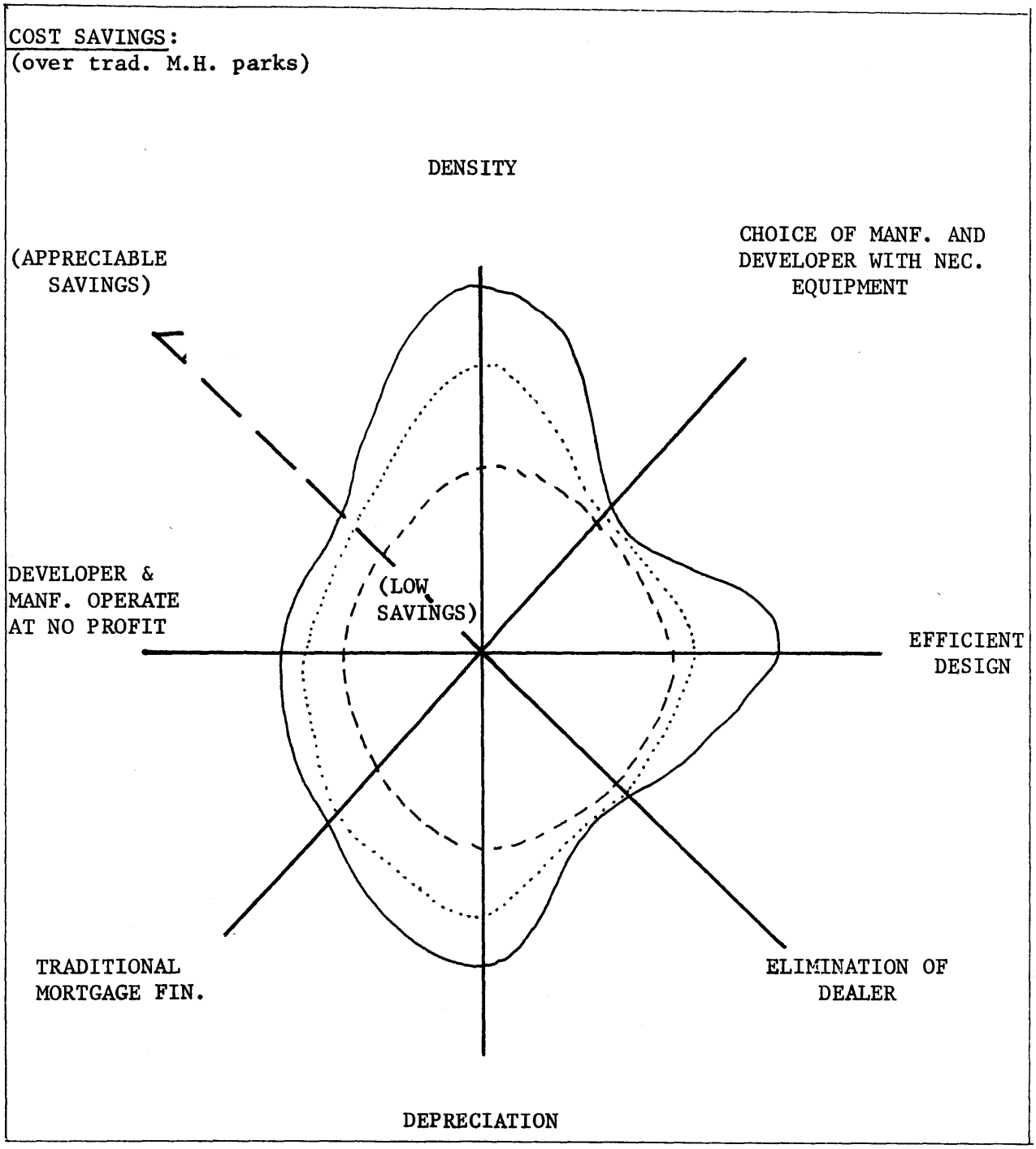
The cost increases and savings for each alternative scheme for the demonstration project are graphically represented on the following page:

COMPARATIVE COST CUTS AND INCREASES
The Demonstration Project:
Schemes I, II, III. (in cost/unit)

Alternative I – – – – – – – (detached singles)
Alternative II ..... (one-story clusters)
Alternative III ——— (low-rise clusters)

INITIAL COST INCREASES:
(over traditional M.H. parks)




COST SAVINGS:
(over trad. M.H. parks)
DENSITY
(APPRECIABLE SAVINGS)
CHOICE OF MANF. AND DEVELOPER WITH NEC. EQUIPMENT
DEVELOPER & MANF. OPERATE AT NO PROFIT
(LOW SAVINGS)
EFFICIENT DESIGN
TRADITIONAL MORTGAGE FIN.
ELIMINATION OF DEALER
DEPRECIATION

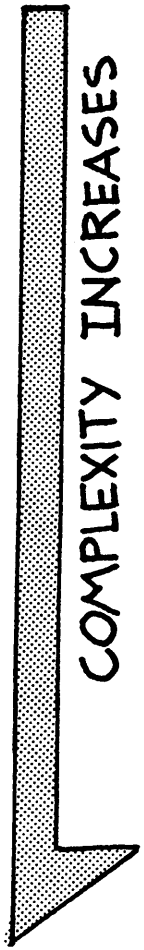
It would seem that the potential increases involved in Alternative III, weighed against the savings, concur with the manufacturer's and developer's feeling that as a first step Alternative II shows the most promise in terms of cost.

Participant Mix

It is critical at this point to re-examine the potential participants in such a demonstration project in order to make a firm decision as to what the participant mix should be. The following chart illustrates the range of possibilities:

	PARTICIPANTS	TYPE OF PARTICIPANT INVOLVEMENT	PROS/CONS	TYPE OF DEVELOPMENT IMPLIED
1.	Developer Private Lender	Developer buys/sets up plant, sells outright to the consumer	No profit in order to deliver demo. Too much capital investment/risk. Entering into area of no expertise.	Very large scale Continual market needed.
2.	Manufacturer Private Lender	Manufacturer also acts as developer.	Same problems as #1	Same as #1
3.	Developer M.H. Manufacturer Private Lender	Dev. does site work. Manufacturer produces units. No gov't involvement necessary.	Sets up dangerous monopoly possibilities. No profit at demo. stage in order to sell at low cost.	Large scale Continual market needed.
4.	Developer M.H. Manufacturer Private Lender MHMA (or other consortium of industry leaders)	Developer dev. site. Manf. produces units. MHMA provides first time overrun costs in interest of continuance.	Sets national precedent. MHMA would not participate unless it was of nat. import. Too much M.H. industry control: not enough innovation.	One time participation by MHMA. Could be a one-shot deal. No need to continue.

continued...



	PARTICIPANTS	TYPE OF PARTICIPANT INVOLVEMENT	PROS/CONS	TYPE OF DEVELOPMENT IMPLIED
5.	Developer M.H. Manufacturer Private lender HUD/FHA	Dev: develops site Manuf: supplies units HUD supplies rental subsidies to lower consumer costs. Also could supply R&D funds.	Begins to get involved in gov. red tape. Too much dependence on gov. and not enough on private initiative.	May be demo only or continual market. Mixed income/ elderly. Regulated Rental or owned
6.	Developer M.H. Manufacturer FHA/HUD MHFA as bank only	MHFA acts as a surrogate bank only, not as a manager, etc. HUD supplies Sec. 8 money	Getting more red tape. Imposition of MHFA income mix requirements. MHFA provides credibility, organizational commitment.	Must be rental. Must be mixed income or elderly. Could be one time only arrangement. No need to repeat in order for manf., developer to profit.
7.	Developer M.H. Manufacturer MHFA as bank/holder	MHFA acts as more than bank: organizes, reviews, oversees, provides subsidies, and holds.	Gets benefits of MHFA as well as the restraints applied by that agency. More red tape.	Must be rental. Must be mixed income or elderly. Could be one time only. No need for continuation after demo. project.

1. DEVELOPER
   PRIVATE LENDER

In this mix too much of the responsibility must be borne by the developer; the developer invests in a mobile home plant and handles the entire development single-handedly. This requires too much capital investment for any developer for such a high risk project with no promise for continuance after the initial demonstration project. It also enters the developer into an area in which he has no expertise--mobile home production.

2. MANUFACTURER
   PRIVATE LENDER

This approach, too, requires too great a risk on the manufacturer's part. It also implies entry into the field of land development, an area in which few manufacturers have expertise. This approach has been tried by many manufacturers; most attempts have ended in financial failure.

3. DEVELOPER
   MANUFACTURER
   PRIVATE LENDER

The main problem with this approach is that it implies that both parties operate at a breakeven point for the demonstration project in order to provide a price competitive product in the face of initial cost overruns. Few private lenders would get involved in such a project without some token assistance from a state or federal housing agency, or some other subsidizer, the risk being too high.

4. DEVELOPER
MANUFACTURER
PRIVATE LENDER
MOBILE HOME MANUFACTURERS' ASSOCIATION

This mix implies that the manufacturer and developer can operate on a profit-making basis, with contingency costs for the first run (the demonstration project) being supplied by the MHMA. Not only would this set a national precedent and require a more national scope than one regional project only, which is not particularly desirable, but it places too much leverage in the MHMA's hands; the project could result in only an uninnovative reflection of their concerns.

While the above approaches show little promise, the following participant mixes are much stronger possibilities, although the coalition makeup and the dynamics of the demonstration project become very complex.

5. DEVELOPER
MANUFACTURER
PRIVATE LENDER
HUD/FHA

In this mix, HUD, through Section 8 rental subsidies and mortgage insurance programs, accounts for the initial cost overruns, allowing the manufacturer and developer to operate on a profit-making basis. HUD support would also increase the likelihood of obtaining financing from a private lender.

6,7. DEVELOPER
MANUFACTURER
(HUD/FHA)
MHFA

The involvement of the MHFA is desirable in that the agency not

only represents one of the most available funding sources but it would also lend credence to the project. Involving the MHFA would also insure rather high design and construction standards, since the agency acts as construction supervisor. The MHFA's involvement would also be helpful in dealing with community groups, since they have such a high reputation for quality developments. Employing Section 8 funding through the MHFA would also insure a 40-year duration for that funding. It would imply good maintenance of the project.

While involving either HUD or the MHFA introduces a lot of red tape and possible delays, the possibilities of their involvements must not be precluded by disregarding either groups' development and design minimum standards. The most reasonable approach is to design an environment that hopefully will have appeal to both in hopes of getting their support; while relying on their support is equally unwise, it would be foolish to exclude the possibility of their involvement. If such involvement does not materialize then it will always be possible to pursue one of the other participant mix approaches.

Architectural Quality

Responses from the manufacturer and the developer reinforce the impression that a great deal of innovation can take place without complicating the development process to that point where it becomes uneconomical. Design emphasis should be concentrated in two main areas: unit design and site design.

Unit Design: Using traditionally sized mobile home components, it is possible to innovate in many respects:

- Improved relationship to ground. The use of fold down decks and roofs to ease the transition from the outside to the inside. Use of floor to ceiling windows and window/doors to allow surveillance of the ground immediately adjacent to the unit.

- Improved front/back relationships. Treating the broad side of the unit as the front and not one of the unit's ends.

- Improved entry conditions. The inclusion of covered louvred porches and mud areas as part of the units.

- Better egress conditions from points within the units.

- Window variations in different rooms related to the use of the rooms and their view to the outside. More vertical emphasis of fenestration.

- Layout changes to allow a better use of spaces and family space zoning. Inclusion of dens and play areas in larger units. Larger room sizes to meet MHFA requirements.

- Inclusion of more private living spaces.

- Different finishes. Both exterior and interior. Room to room variation in texture, color of interior finish.

- Interior and exterior details to allow personalization of units.

- Units designed to be marketable as single units.

Site Design:

- clustering units to define exterior spaces, e.g., private backyards and public entry courts

- clustering the units in groups of 4-6 to allow neighborhood formation

- the use of land contours to provide variation in cluster plans

- the use of unit masonry firewalls as architectural elements in defining private outdoor spaces and entry conditions

- improved relationship of group parking to clusters and community spaces to clusters

None of these innovations present any technical--from a developer's or manufacturer's standpoint--impossibilities. They are simply not issues the industry has involved itself with in the past--design decisions that the introduction of outside conerns--the architect's and, more importantly, HUD's and the MHFA's--make necessary.

CONCEPT II: THE DEMONSTRATION PROJECT

It is now necessary to more realistically appraise the development parameters for the demonstration project.

Description: One story clusters, ranging in size from four to six living units each, forming small neighborhoods. The basic unit building block is a 14-foot wide mobile module approximately 65 feet in length. Three and four bedroom units will be composed of two modules.

Density: The density achievable if the entire site is to be devoted to housing is between 10 and 18 units.

Site Work: Unit clusters will be arranged utilizing the contours of the site. Land excavation will be necessary in order to prepare the land for masonry unit foundations. Site work will also include the installation of utility hookups, cluster parking, landscaping, and street development. All the site work will be completed while the units are manufactured in the mobile home factory; the finished site will accept the units as they are delivered with no delay time necessary. Afterwards, only some planting and the finish layer of the streets will need to be undertaken. Also, staging connections of the units to the firewalls will be necessary.

Foundation Conditions: The finished but unattached units will be wheeled onto permanent masonry foundations (no slabs will be needed under the units); the wheels and axles will then be removed from units and returned to the factory. The unit masonry foundations will extend vertically and laterally beyond the units to suggest private yard enclosures as well as to support fold downs and tip-outs from the units.

Structural Innovations: None other than insuring good tolerances where the halves of individual dwelling units (two mobiles) will be joined. The dwelling units will not be structurally attached to each other. The structurally independent units can also be marketed by the manufacturer as a new line of mobile homes that would require site spaces similar to those presently utilized by single and double-wides.

Architectural Innovations: With the ultimate aim of achieving the architectural objectives outlined in previous sections, architectural innovations will include the use of fold down and roll out units, to create exterior covered areas and to alter the very linear nature of the units. Better window design and placement will be tackled. Higher quality finishes--scored and treated plywood on the exteriors and a variety of colored and textured finishes on the inside--will be upgraded. Layouts will be improved to allow more privacy spaces, choice in furniture arrangement, larger rooms, fewer corridors and better entry conditions.

The clusters will be aimed at providing a sense of small neighborhoods, with entry courts and private backyard spaces defined by the configuration of the units coupled with the use of unit masonry elements.

Building, Fire Codes: Dwelling units will comply with ANSI A119.1 codes and arrangements with the fire department will have to be worked out to allow clustering; the inclusion of firewalls between units will be a considerable help in this respect. This is a more site-specific problem that will be identified once a site is chosen.

Zoning: This is also a site specific problem that will be handled when a site is chosen.

Taxation: Because the units will be placed on permanent foundations with the wheels and axles removed, the dwellings will be taxed as real property, contributing significantly to the municipality's tax rolls.

Financing the Development/ Construction of the Project: MHFA financing is the objective. Construction financing will be at a minimum, since the unit production and site work will be simultaneous, cutting the development time at least to a third.

Consumer financing: If the MHFA finances the project, the units will be rentals, with some rented at market rates and others subsidized through Section 8 or other rental subsidies, if these are obtainable. (If they are not, it is hoped that market rents would be significantly lower than traditional stick-built housing and will be obtainable by a larger market.)

PART 5:

PRODUCT: The Demonstration Project Preliminary Design

Site Selection

The Site and Its Context

The Design and the Development Strategy

SUMMARY

In this section, site selection criteria are established, the design for a demonstration project in the town of Topsfield is described, and its procedural implications are outlined.

The site design employs the use of five cluster types, each quite different from the others in terms of topographic conditions needed and location, and the resulting social environments. The site is developed as a community filled with a variety of dwelling and open-space types. Suggested uses for six existing buildings as community resources not only for the residents of the development but also for members of the community at large are suggested. Emphasis is placed on suggesting an environment that would be a resource, not a burden, to the town.

The specific design raises a complex set of procedural issues (related to zoning, taxation, building code, interpretation, etc.) and problems that must be addressed not only by the manufacturer, the developer, and the financers of the project, but also by a community in support of the project. The importance of the working coalition becomes painfully obvious.

SITE SELECTION:

In selecting a site for the demonstration project, several important considerations were raised:

1. Site Availability: It was determined from the outset that whatever tract of land was chosen by necessity had to be available for development and could possibly be purchased at a low cost.

2. Site Location: In order to be attractive to potential financers, especially those traditionally associated with mixed income housing, the site had to be located in a community with a need for such housing. The location of the site should also make it accessible to commercial activities associated with housing: grocery stores and the like. The site should also be within reasonable distance to schools, public libraries, and other community facilities. Also, the community's schools should not already be overcrowded: the desire for more students was deemed helpful.

Not only should the site be located within reasonable distance from the manufacturer, but it should be close to major highways. (This is not only important for transportation purposes, but it was deemed reasonable to locate the demonstration project in a location that would be clearly accessible to visitors and other parties possibly interested in follow-up projects.)

3. Community Interest: The community's interest in the site is difficult to measure, but is nonetheless an important consideration. To locate a site that has caught the community's eye as a good location for a residential development is ideal. To locate a site where develop-

ment for other uses (commercial, institutional, or whatever) has met with fear and community opposition is also ideal: the attractiveness of housing becomes quite strong as an alternative use.

4. Zoning: It is unlikely that a site located on an area described above would be zoned for mobile homes:however, the area should at least be zoned as residential, and hopefully allowing for multi-family clusters. This would facilitate the project's development if the dwellings can come to be regarded in the same light as traditionally constructed dwellings.

5. Topography: For the purposes of the demonstration project, it seemed particularly appropriate to seek out a site that had a variation in topography to allow for a variety of interesting cluster arrangements. A site with interesting topography and natural features and foliage is preferable. While site work costs on a hilly site would be considerably higher than on a flat tract, it is also in the interest of the thesis to show even on such sites not traditionally associated with mobile homes, that final costs can be kept below traditional "stick-building"costs.

6. Size: The size of the site should be manageable: large enough to allow considerable but not overgenerous open and wooded space while accepting between 100 and 150 dwellings.

Within the time limitations imposed by a thesis, it is extremely difficult (if not impossible) to locate a site that fits all of the above criteria; to describe my wanderings and encounters in search of such a tract of land would be to describe an adventure no less humorous

or frustrating than that of Diogenes in search of the Truth.

Early in the search, it was determined that it might be possible to obtain a parcel of state owned land that the state had declared surplus; the purchase price for such a parcel might be quite low and the likelihood of the state's making special financial concessions in order for the site to be redeveloped as mixed income housing seemed quite high. By matching a list of surplus state-held land (this information was obtained from the Massachusetts Department of Natural Resources) with the above site selection criteria and with the accessible information regarding local housing needs in the state, it was possible to select a site that seems at least initially appropriate.

THE ACTUAL SITE AND ITS CONTEXT:

The site ultimately selected for the demonstration project lies within the town of Topsfield. The 19-acre tract of land is presently held by the State of Massachusetts, and title has recently been transferred to the Department of Administration and Finance from the Department of Children, which purchased the land in 1969 from the Maryknoll Sisters with the intention of establishing a regional home for delinquint boys. While the community of Topsfield has no jurisdiction over the land's use, it voiced enough opposition to the Department of Children's plans (the community viewed a delinquent boys' center as a threat to safety) that the plans were dropped; the land has subsequently been declared surplus by the State (1974) and knowledgeable sources hold that the land will be up for auction during the summer of 1975. While the community can see no use for the site as it exists, it views the eventual owner's plans, whatever they may be, as a potential source of worry. Community interest in the site seems to be quite high, but unorganized.

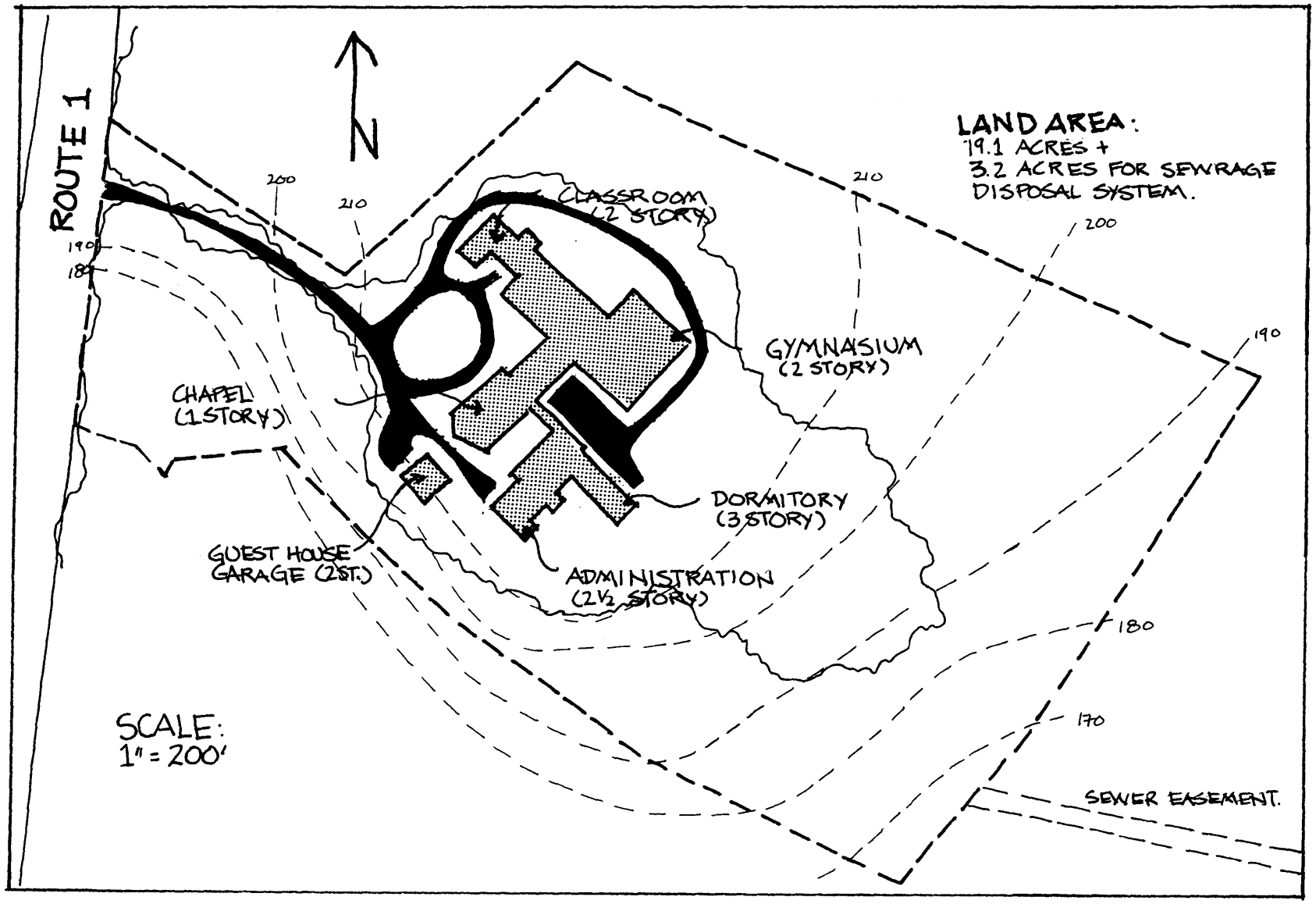
Six brick buildings of varied age, architectural quality and interest and of varied condition stand in a group on the property (photographs of some of these and of other parts of the site are found on pages 109-119). The oldest, an Administration Building (constructed in 1900) is a distinguished 2-1/2 story structure ideal for community services, but in need of considerable repair. Another, "The Lodge" (also 1900) is a magnificent building that was used as a classroom building and could, with little work, be converted into a child care

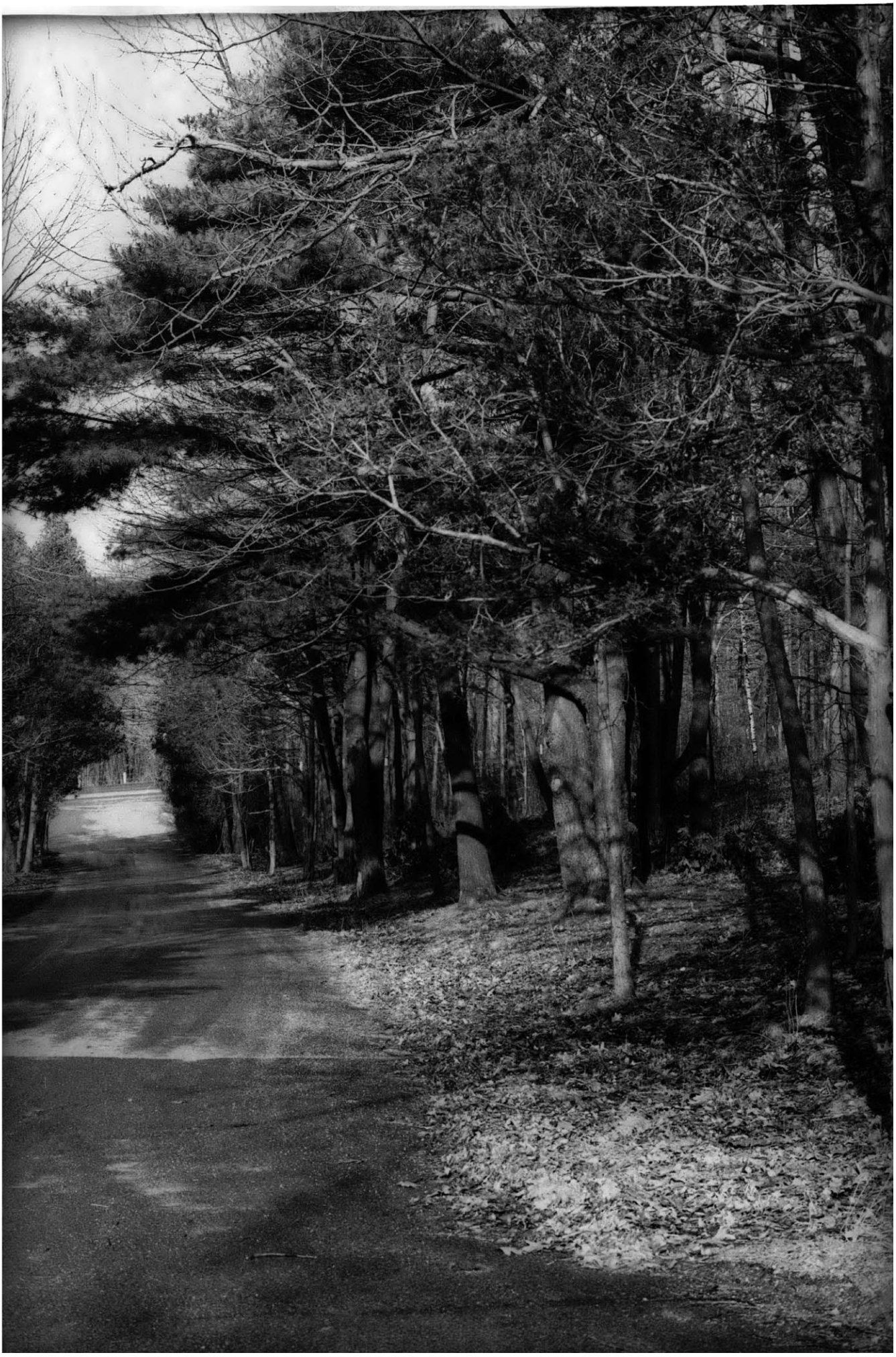
center or school. Adjacent to this and of less architectural distinction is a large gymnasium and library (1959), a three-story dormitory (1959) appropriate for one and two bedroom apartments, a chapel/auditorium (1959) replete with stained glass windows and an ornately panelled interior, and a "Guest House" and garage (1963) appropriate for management office and maintenance service garage respectively. These six structures and the adjacent parking lots occupy approximately five of the nineteen acres.

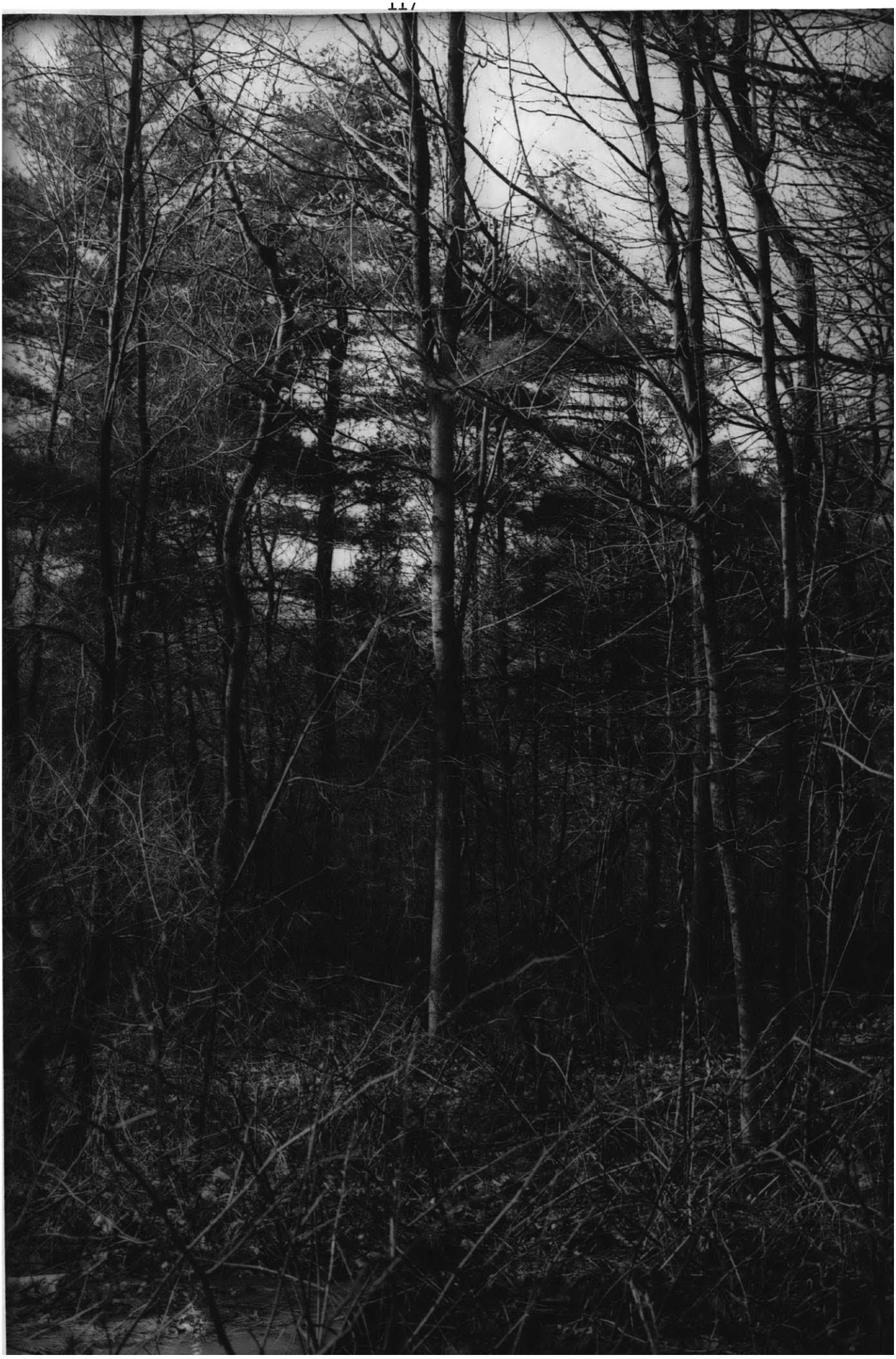
The remainder of the site is undeveloped. A steep approach drive off Route 1 and the surrounds (approximately three acres) is heavily wooded with mature and healthy trees. The change of elevation from the entrance to the buildings is approximately 45 feet (from elevation 180' to 225'). The remaining eleven acres slope down from the crest of the hill (where, of course, the six buildings are situated), changing elevation fifty-five feet over a run of nearly six hundred feet. Much of this acreage is heavily wooded, but only the trees near the site boundaries seem to be very healthy; much of the other foliage is deep brush. At the center of the undeveloped land is an extensive field of high grass sloping down from the crest of the hill: the view from the existing buildings is quite magnificent, this field being a focal point. A built grotto and an outdoor fireplace overlook the field, which is bounded on the north by a two-foot high stone wall that is quite overgrown with brush.

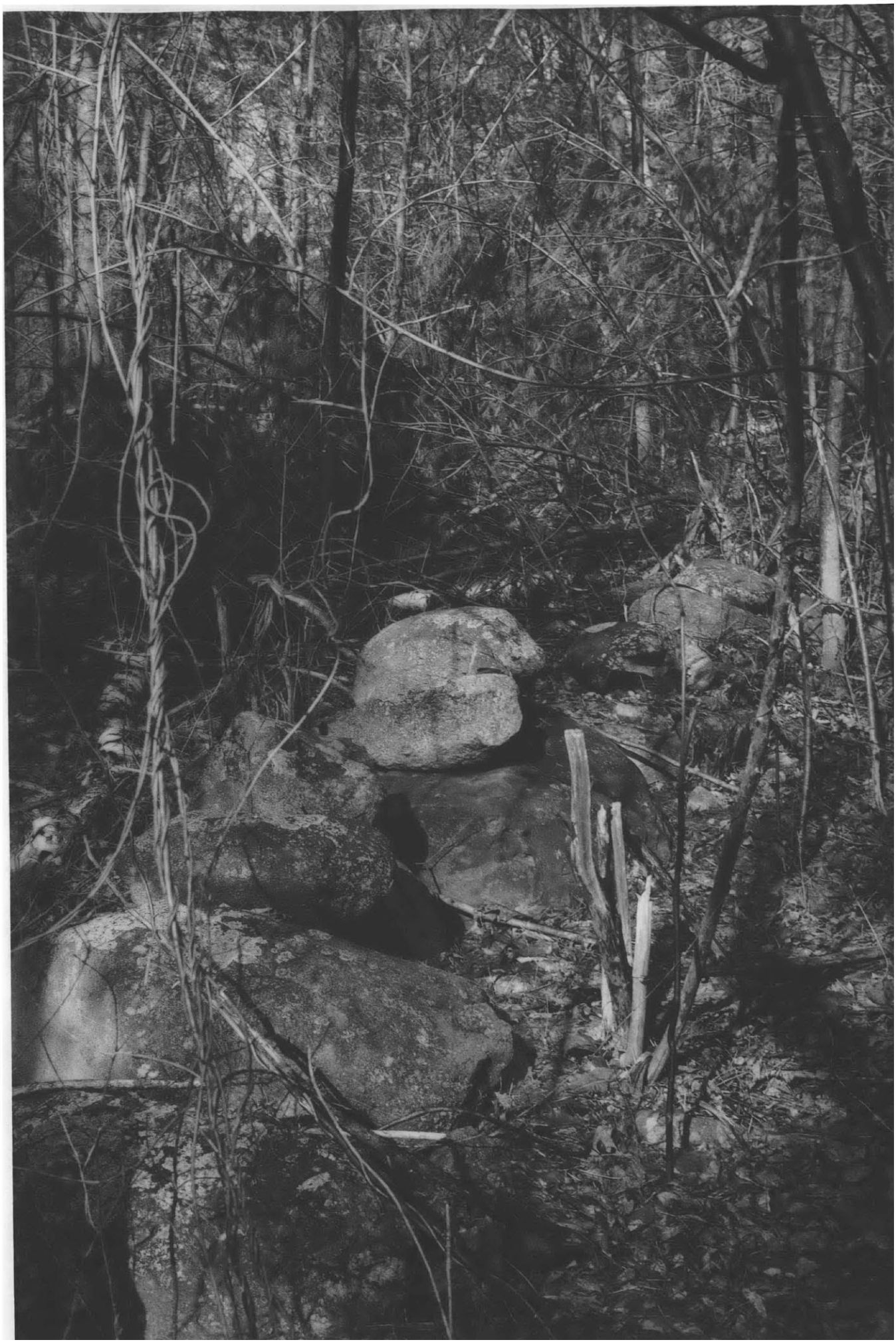
A sketch of the property as it exists as well as photographs of the site are on the following pages:

(Explanatory note on the illustrations that follow:)


ROUTE 1
N
200
210
190
180
CLASSROOM (2 STORY)
GYMNASIUM (2 STORY)
CHAPEL (1 STORY)
DORMITORY (3 STORY)
GUEST HOUSE GARAGE (2 ST.)
ADMINISTRATION (2½ STORY)
LAND AREA:
19.1 ACRES +
3.2 ACRES FOR SEWRAGE DISPOSAL SYSTEM.
210
200
190
180
170
SEWER EASEMENT.
SCALE:
1" = 200'







The site is zoned as residential (but for 20,000 square foot lots), although while the state holds the land that can be superseded. The site is surrounded by dense woods on three sides, Route 1 is to the west. The surrounding neighborhood is predominantly large single family wooden homes. The center of the town--the library, commercial strip, schools and town hall--are within half a mile. The site is about 25 miles from Boston (Route 95 joins Route 1 a few miles south of Topsfield) and within a few miles of Danvers, Saugus, Haverhill, Lynn and the North Shore communities of Beverly and Gloucester. Also, it is within 40 miles of the manufacturer in Derry, New Hampshire. The population of Topsfield is approximately 6,000 people.

A recent, as yet unpublished, survey conducted by the Massachusetts Department of Community Affairs (DCA) concluded that the community of Topsfield alone has the need for 201 units of low and moderate income housing and the community is aware of this need and the eventual necessity of providing for it. A member of Topsfield's zoning board indicated that the prevailing sentiment is for the community to take the initiative in providing such housing and thereby avoiding the State's forcing an unsatisfactory solution upon them. At the initiative of the community, zoning variances to allow multi-family dwellings are very probable, if the citizens are in favor of the plan; recently the town accepted a plan for a small development of elderly housing with such variances.

With regard to mobile homes, the town of Topsfield exercises total exclusion through a six-month duration-of-stay limitation. However, it is my belief that if the community can be assured of the quality of the

demonstration project, and if it begins to be seen as permanent housing and not temporary aluminum shelter, zoning exceptions to allow the project are possible. The strategy should be not to revise the zoning altogether, but to make one exception for the benefit of the community and to quell further attempts to establish traditional mobile home parks in the community on the basis that the community already has provided low cost shelter competitive with park homes. The Supreme Court of the State of New Jersey (and other states) has recently ruled that mobile home parks specifically cannot be excluded from communities that do not provide any housing for low income people, and the State of Massachusetts is now empowered with similar anti-snob zoning powers. While such actions have infrequently been employed by the State, the community is well aware of their existence and can possibly be made to understand that one reasonable course of action would be to "beat the State to the punch" by taking the initiative. On these grounds, the demonstration project might seem reasonable.

THE DEMONSTRATION PROJECT DESIGN AND DEVELOPMENT STRATEGY:

Note: A complete set of photo reductions (reduced from 30" x 42" color originals) of the presentation sketches referred to in the following pages appear at the end of this chapter.

Unit Development Criteria

The design for the demonstration project evolved from a set of design criteria established by me (in addition to those developed by the candidate participants and outlined in the preceding chapters) at the outset of the design phase:

1. A range of unit sizes and layouts with rooms of reasonable dimension. The unit designs are to be reasonably constant in various cluster types.

2. A variety of cluster types: to reflect the topography and to provide a choice of social environments to the eventual inhabitants. These cluster types are not necessarily site specific; the intention is that they be applicable in varying degrees to many, if not all, sites.

3. A site concept that respects the topography and the natural conditions of the site. Variety of living situations with respect to types of locational relationships with the open spaces, wooded areas, and community facilities.

4. Reuse of the existing buildings.

5. Potential for planned growth and personalization of living units.

DESIGN DESCRIPTION

Unit Size

To avoid increased transportation costs due to breaking up the individual dwelling units into too many sections--in order to maximize each transportation dollar, a basic unit dimension of 14 x 60 feet (excluding removable trailer hitch) is employed in the units. By the number of bedrooms, the unit size breakdown is as follows:

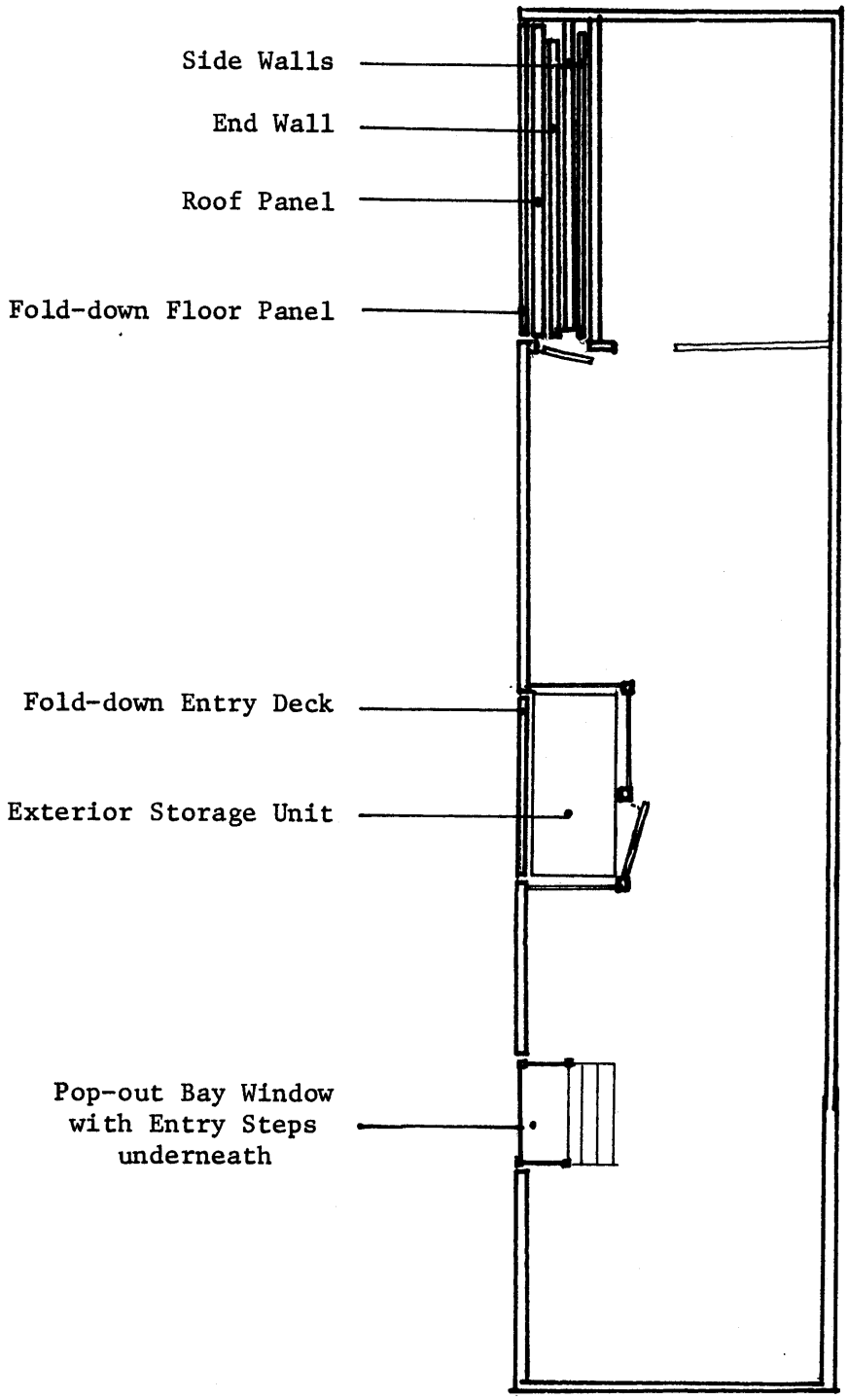
1 bedroom (1 basic unit)	840 sq.ft.
2 bedroom (1 basic unit plus 8x16 ft. foldout)	968 sq.ft.
3 bedroom (2 basic units joined)	1680 sq.ft.
4 bedroom (2 basic units plus 8x16 ft. foldout)	1808 sq.ft.

Fold-out rooms are presently employed by several manufacturers; mobile home technology is sophisticated enough to allow for the walls, floor and roof of the foldout section to be shipped in a three to four foot recess in the unit. (It is not the task herein to specify the engineering details of such a feature: it is sufficient to understand that, technologically, foldout rooms are manageable and easily accomplished.)

Four by eight foot outdoor storage units, finished with the same exterior material as the unit will also be transported inside each unit and at the site will be easily positioned (with supplied overhead horizontal tie braces) on a fold-down deck, that holds the storage unit secure in transit. A diagram illustrating the typical unit in transit position is on the following page.

Room size in the various units is well above FHA standards, and three and four bedroom units include family or playrooms. The preponderance of large windows (in many cases floor to ceiling windows) and sli-

IN-TRANSIT CONFIGURATION

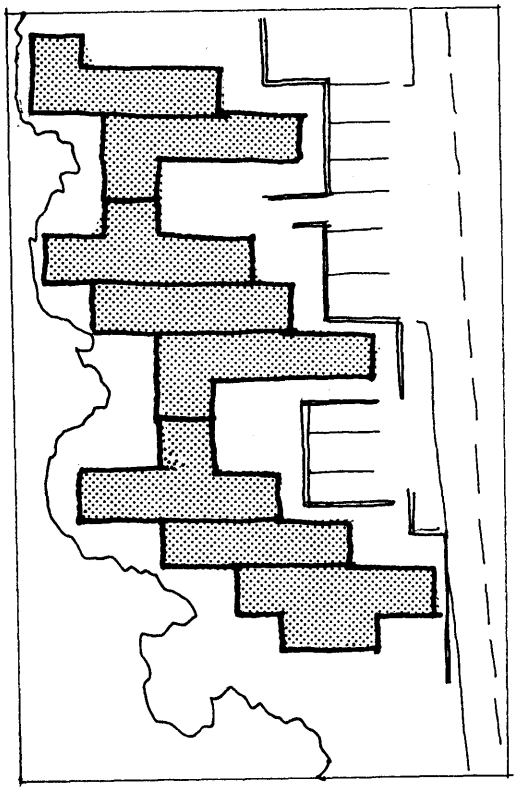


ding glass doors will also increase the sense of spaciousness over a traditional mobile home unit as well as the inhabitants' sense of the ground immediately adjacent to the unit (one interesting problem caused by the traditionally high and small windows used in manufactured homes is the decreased visibility of the area around the home and the increased sense of floating above the land).

Cluster Types

There are five basic cluster types suggested by the site plan, each of which responds to different topographic and social conditions.

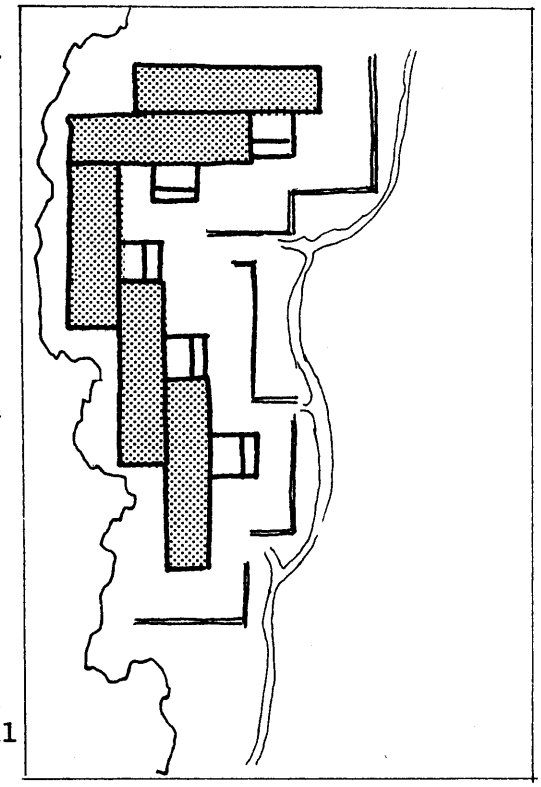
The Row House Cluster: The row house cluster is the densest of the cluster types. The parallel clusters of the units allows up to 18 units per acre including group parking in front of the cluster. Because of the paralell placement of the pitched roofs, this configuration also requires the greatest elevation change per cluster to allow proper drainages; row houses are ideally on the steepest inclines.



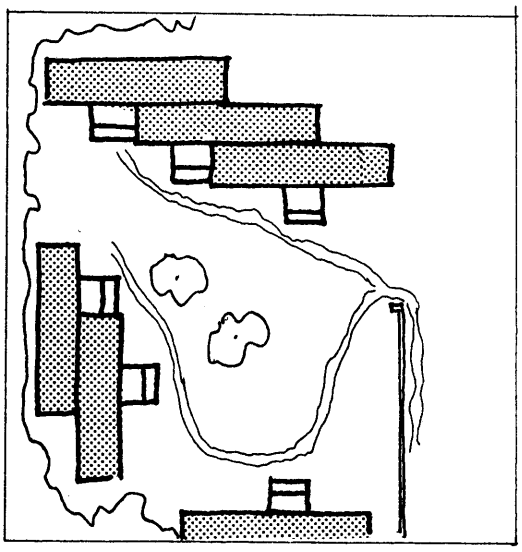
While row houses offer the least opportunity for expansion of the individual units (they are best suited for families that do not intend any extensive future growth), each unit does have a private backyard space and a small walled or fenced in front yard.

In the row house cluster, as in the other clusters, the fire walls separating the units might also act as retaining walls, if they were to be site-applied as opposed to factory-installed.

The Terrace Homes: The terrace home clusters employ both parallel and perpendicular arrangements of the units: they therefore require less change of elevation per cluster. Their density ranges from 12-16 units/acre. Units within these clusters have a varying degree of expansion potential that is generally greater than in the row homes. While they indicate the use of private back yards, terrace clusters also imply large enclosed front terraces with pedestrian walks for the cluster immediately adjacent. Terrace homes ideally overlook developed open space and their elevation above that space affords privacy and separation from, while at the same time a close proximity to, that open community space. Overlooking open space, as opposed to the street as in the row house cluster, the parking for terrace homes would be group parking in a small lot within 200 feet of the cluster.

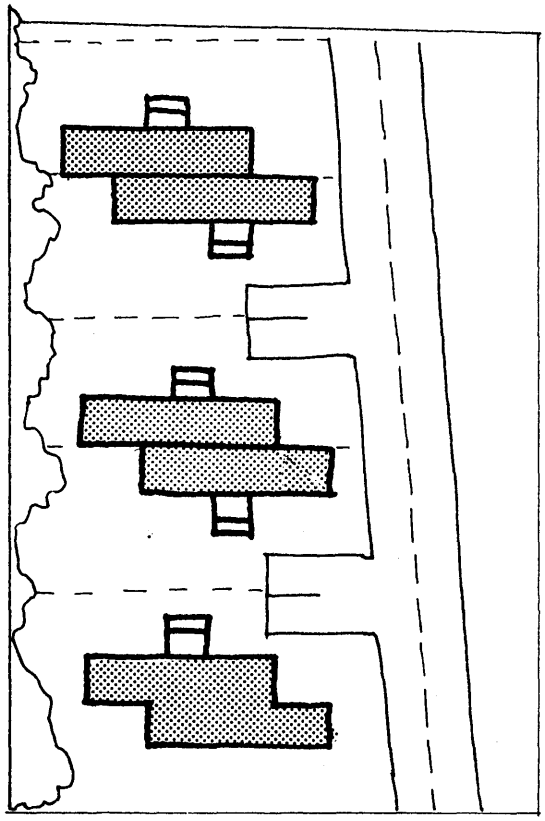


Homes on the Green: This cluster type is actually a pair of smaller clusters that form a common open front space. Each unit would have private backyard space. The topography for this cluster type need not be too steep: 6 feet over 120 feet of run is sufficient. Homes on the green have considerable potential for expansion and are therefore ideal for growing families. It is conceivable that these units could grow from an initial one-bedroom to four bedrooms in size. Parking for this configuration would be group parking within 200 feet of the cluster. The cluster density can be up to 10 units per acre.

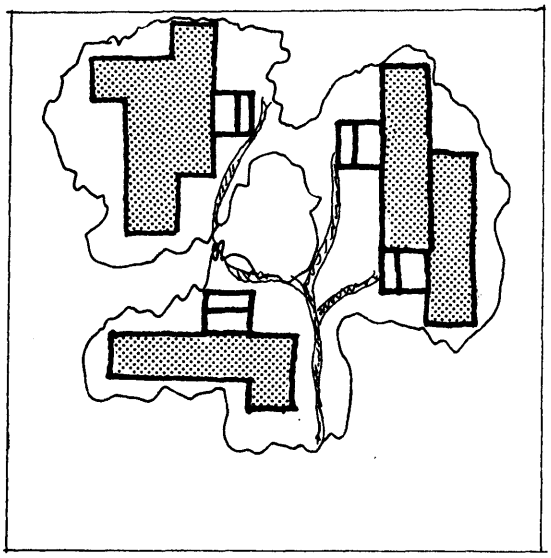


Street Homes: Street home clusters are basically two units back to back with a possible elevation change between the units to afford clerestory windows on the upper unit of the two. Topography can be variable, from flat to quite steep. Each street home would be sited on a 35-foot wide lot that would provide for maximum expandibility and yard space. Parking for each unit would be provided with driveways directly off the street at the head of each cluster.

Street homes would be ideal for growing families and people who like the sense of proximity to a street. They most closely approximate the single family traditional American home. Because of the considerable land devoted to each unit, street home clusters will only achieve a density of 8-10 units per acre.



Homes in the Woods: This cluster type simply refers to the least dense configuration, a few of which would be provided in a densely wooded section of the site. These homes would be in clusters of two or three, the clusters themselves generously spaced. Homes in the woods would have limited expandibility due to their setting, but could possibly be sizeable to begin with. These clusters would be approached on a path in the woods from group parking adjacent to the street, and would, quite obviously, be the most rural and secluded of the cluster types. Their density would be quite low.



These five cluster types could be employed on any site, but are most ideal for tracts of land with varying topography. They represent a considerable departure from one's social and physical image of traditional mobile home parks. In fact, they afford as great, if not greater, degree of variability, privacy, and expandability as most cluster housing of any construction type or cost, while repeating basically standard units at a higher density than is normally associated with those qualities.

Unit Expandability

Implicit in the unit and cluster designs is the idea of expandability. The intention is quite simply to allow for a variation of unit growth at a rate commensurate with family growth. Not only would this increase the attractiveness of the units to potential dwellers, but it would also lessen the turnover rate so often associated with attached homes that do not allow for such expansion. The latter would almost certainly appear as a positive point also to most communities concerned with transient residents.

Technologically, expansion is not a problem if the design readily allows for it. Panels and mechanical equipment could possibly be available from the manufacturer or from a panelized housing producer: a resident could stick build the additions (there would have to be strict qualitative standards imposed, especially in this case). Access to the additions would be provided by the removal (or re-use elsewhere) of floor to ceiling windows and the insertion of doors in these open-

ings as well as by the simply removal of sliding glass door units to provide large access space to more public room additions (e.g., dining rooms). A variety of (1) panelized add-on rooms, (2) greenhouse-like additions, (3) decks, and (4) bay windows should be available to allow for a range of choice in growth patterns. Also, owner-built additions should be allowed for.

Not only would expandability allow family growth, but it would also encourage a high degree of unit personalization over time.

The Site Development Description

The Topsfield site was developed as a prototype illustrating how the cluster types described above could be employed: the site plan is presented as only an illustrative first attempt at developing a more comprehensive responsive plan.

The plan implies rehabilitation and re-use of the existing buildings as a community center to be used primarily by the residents of the development, but also possibly by the entire community of Topsfield. A wise plan would emphasize the former as a move to gain community support. The classroom building could easily be developed as a much needed pre-school child care center for the entire town, one that could utilize the gymnasium during the day and allow for its use in the evenings by members of the development. The large administration buildng is quite suitable for not only game rooms and a community

function space with kitchen and dining facilities but also for doctors' suites or other professional offices on the upper floor. As mentioned above, the Guest House is an appropriate size for a management and maintenance office and the garage below could house snow removal equipment and the like. The three story dormitory building could easily be converted into 20 to 30 one and two bedroom units, providing yet another housing type for those who wish to be most centrally located and desire the security of a low-rise building. A swimming pool could be constructed in the open area to the south of the community buildings.

Emphasis on the site plan is given to developing the large open field to the west and down the hill from the Community Center as an open space large enough for a variety of activities including large group sports activities. The existing grotto would serve as a good observation point and an ideal communal cookout facility adjacent to this area.

The site plan shows 121 dwelling units clustered on the 11 acres of site (a density of 12 units per acre) with 25 more in the dormitory (for a gross density of 7.5 units per acre). Many units are clustered around the community field, or Village Green. Efforts to maintain the existing stone walls and the healthy trees is also emphasized. The clusters, as described above, are sited to afford a choice not only in location and physical surroundings but also in social environments from the densest and most communal to the most private and secluded.

The site plan does represent the kind of community quality that can be achieved, while still using manufactured housing--a commodity not traditionally associated with such environments. It is hoped that such a development, providing not only reasonably priced, expandable housing, but also service facilities for the community at large, will attract enough community interest and support to induce closer examination, negotiation, and cooperation, with the stigma usually attached to manufactured housing at least partially removed. The development should be perceived as a resource to the community, not a burden.

Production Issues

The technological innovations implied by the unit and cluster designs are the fold-out rooms, fold-down entry decks that would protect the larger expanses of glass in transit, pop-out bay windows installed at the site, and a kit of parts that would encourage expansion. Of these, the only one that should be totally unfamiliar to a manufacturer is the expansion kit; all of the others are already a part of the mobile home manufacturer's vocabulary, even if they are not frequently employed.

One other technological area that bears explanation is that of the fire resistant party walls. It is possible, perhaps, to apply exterior finish materials, on the exterior surfaces common to two units, in the factory, that will provide for an adequate fire barrier. The industry's performance-oriented building code should make it

easier to utilize such a process. It is, however, questionable as to whether the manufacturer has such fire-retardant materials at his disposal through normal supply channels. If such a plant-applied fire wall is possible it would eliminate a great deal of site work and would facilitate the set-up process considerably.

From a materials and production standpoint, the only architectural innovations that may pose problems are the finish materials. It is essential that wooden exteriors be used as it is that interior finish materials be of varied textural and color quality. The efficiency of the manufacturing process is greatly enhanced by the use of prefinished materials, both interior and exterior, and it is essential that the manufacturer have a readily available source of supply for such finish innovations. The industry's trade journals have recently included suppliers' advertisements for new interior (and exterior) finishes that are supplied pre-finished in "decorator" colors and patterns that would allow for considerable variety: the issue here is the availablity of such materials and their cost to the manufacturer.

The other architectural innovations are primarily in the area of layout, room size and window size and orientation, all of which, production-wise, present no real problems, it would seem. Also, the elimination of all built-in bedroom furniture and all moveable, standard in all mobile homes, intended to allow the user an opportunity for personalization and varied furniture arrangement within the units, represent no problems whatsoever.

Site Work Issues

In order to cut down construction time and to reduce the financing costs that long construction periods require, it is essential that the site work be performed concurrently with the factory production of the dwelling units. This could conceivably cut the construction time from a familiar two-year period to one of six months. Not only would this reduce finance costs, it would also allow for the earliest occupancy date (and therefore the earliest date at which revenues would begin to be received from the occupants).

The site work specified by the design is far more extensive than in mobile home parks. It includes not only the usual road, sewerage, and utility connection construction but also foundations for each unit and terraces in some cluster types. The character of the site work would be quite similar in nature, extent and cost (higher) to that commonly associated with standard "stick" construction. It is hoped, however, that the higher (than mobile home parks) density of the units per linear foot of road and utilities will offset much of this added cost.

It is apparent from the dual nature of the site work that a developer familiar with mobile home park site work and conventional site work is an absolute prerequisite to efficiency and quality. Also the rehabilitation of the existing buildings on the site would also require the expertise of a stick builder.

Mode of Operation Issues

In order for growth and personalization of the units to become a part of the life of the environment, I feel that some type of ownership by the occupants is essential. Condominium or cooperative ownership are perhaps the most feasible, since the development would be more easily managed if the land, common space and the built common facilities were to be jointly owned and controlled by all the residents. Such an arrangement would also seem more attractive to a community fearing a large transient population.

The desire for consumer ownership poses a problem if the intent is to obtain MHFA financing and subsidies, commodities the agency is chartered to provide only to rental developments. The possibility of cooperative ownership is an issue that must be explored with the MHFA, if they express an interest in the project.

Labor Issues

One objection commonly raised by communities considering the use of manufactured housing, especially in these times of widespread unemployment, is the perceived lack of local labor force input into the project. However, it is intentionally the case in this project that extensive use of local labor in the rehabilitation of the existing buildings, the site preparation, the foundation work, and the unit set-up (all of the non-factory processes) would be necessary. In fact, the project represents an opportunity to the community's labor force that might otherwise be non-existant with higher cost modes of con-

struction, particularly in the present economic depression facing housing financers. This aspect of the demonstration project must be emphasized to the community.

Regulatory Issues

The zoning, taxation and building code issues raised by the demonstration project design can most effectively be addressed if the community supports the project: otherwise, success in overcoming regulatory stumbling blocks will be impossible.

The design necessitates the employment of cluster zoning. The community already recognizes that a variance in the 20,000 sq.ft. minimum lot size requirement will be necessary in order to provide any economically feasible housing for low and middle income citizens. The design, however, does not imply that the community allow the use of mobile homes as they are clearly thought of in zoning terms--the demonstration project homes are <u>not</u> mobile homes; they are quality attached homes that happen to originate in a factory. Approval of the project in no way signals the onslaught of a multitude of aluminum boxes. It is essential that the zoning board understand this.

The issue of taxation is a more troublesome one. But here, too, it would seem the demonstration project could prove to be a boon to the town's economy. First of all, the regional schools are by no means filled to capacity; no new schools would be needed because of the project. Secondly, in a community like Topsfield, in which nearly all of the commercial establishments--grocery stores, barber

shops, dry goods stores, gasoline stations, fuel dealers, drug stores, etc.--are owned by residents of th e community, the arrival of 140 new families would mean considerable revenue. This fact is not related specifically to taxation but it presents a great input of capital into the local market. If business people in the community realize this, considerable support for the project can be mustered. If the units are taxed as real property, the net flow of income into the community would be substantial. The excise tax on 140 or more automobiles alone would be a tremendous input, and would more than compensate for non-education related services (police and fire protection, etc.) provided by the community.

While the state-wide mobile home performance building code, ANSI A119.1, will clarify the standards which the units must meet allow for no locally administered additions, deletions, or modifications, for the community to accept these clustered dwellings (that are no longer really mobile homes) under the mobile home code implies considerable support for the project. Without such support, it is possible for the community to lobby against the project by insisting that it comply with the stick built (non-performance) BOCA code; such an imposition would raise numerous production difficulties and could severely reduce much of the cost benefits of mobile home construction achieved through the use of non-traditional materials.

Cost

Until the coalition candidates examine the design, it is difficult to the specific about the cost of construction of the project. If one is to apply the strictest of all approaches to estimating the cost by assuming that the cost of the land and site work would be identical to a conventionally constructed development of the same design and the only savings to be accrued would be in the areas of unit production costs and construction financing, it is easy to see that the savings could be substantial. If, on the other hand, the cost of the demonstration project is competitive to a low-rise development of 140 units (this unfair comparison is analogous to comparing apples and oranges), the provision of extensive private outdoor space and the potential for growth, as well as the neighborhood-like social characteristics of the clusters, would seem to make the project preferable. This comparison, as unfair as it may be, cannot be considered until the manufacturer and the developer estimate the cost of their work.

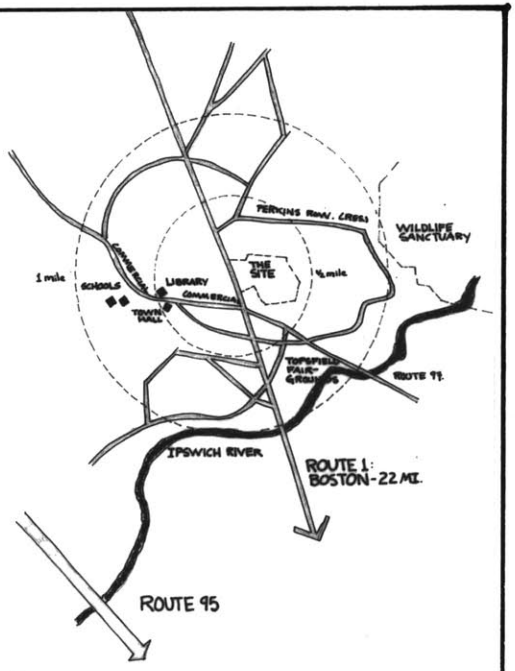
The Coalition

If anything, the design for the demonstration project indicates very strongly that, particularly in a project of this sort dealing with innovative processes, a strong coalition of all the involved parties is tantamount to success. The complex issues it raises are as much issues of process as they are issues of product, and they can only be addressed by a group of people working together to solve the problems in the most equitable fashion. Solutions can only be arrived

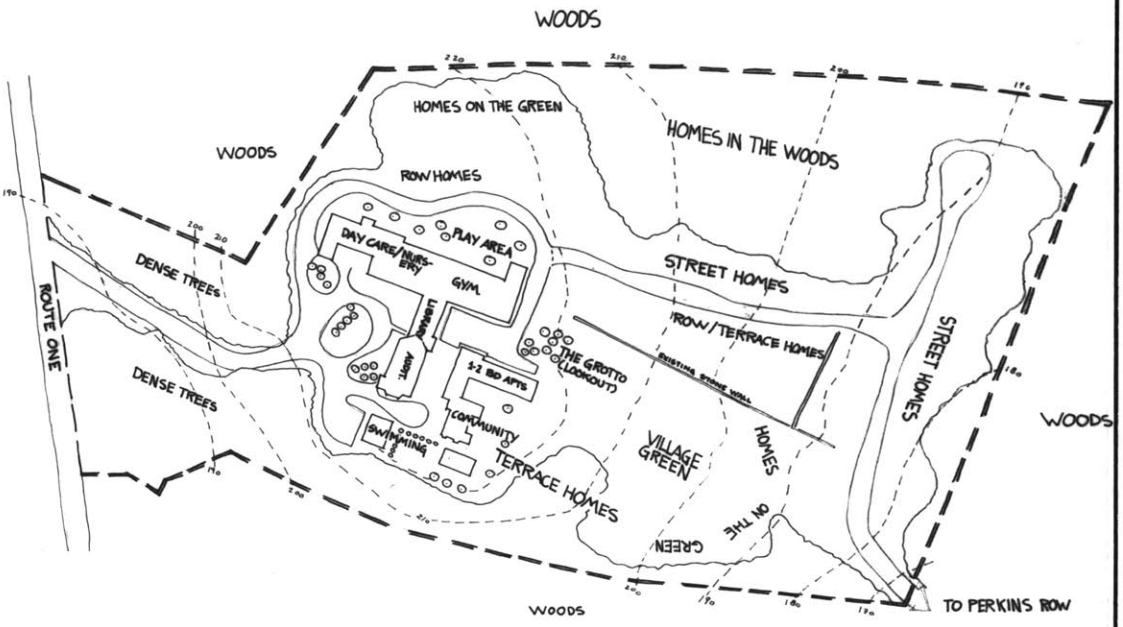
at by a responsive consideration of each party's capabilities and desires. The willingness of the community, the manufacturer, the developer, and the financers to amicably negotiate a process that will yield a satisfactory environment is essential. The approach will be highly complex and demanding--if not totally enervating.

Presenting the design and the various coalition make-up possibilities: The task at hand is to present the design, the site development issues outlined above, and a variety of coalition compositions to the potential coalition members, in order to try to ascertain the feasibility of the project. On the following pages are reductions of the presentation panels that will be presented along with the coalition member combinations as outlined in the chart on pages 92 and 93 . It is hoped that after the presentations are made it will be possible to come to a fuller understanding of the most likely coalition makeup for the project.

Location within Topsfield

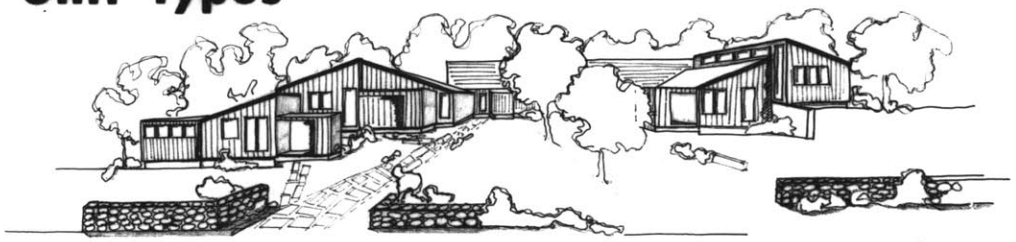


Site Development Concept

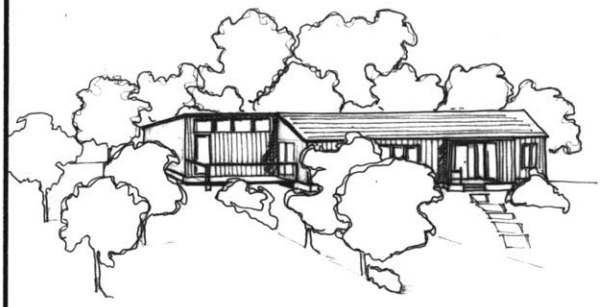


- ONE STORY CLUSTERS
- EXPANDABLE UNITS
- VARIETY THROUGH SITE + CLUSTER PLANS
- MEDIUM DENSITY
- "LOW" COST
- PRIVACY
- SENSE OF COMMUNITY
- SERVICES FOR LARGER COMMUNITY - TOPSFIELD
- REUSE OF EXISTING BUILDINGS AS:
  - APARTMENTS
  - PRESCHOOL CHILD CARE
  - GYMNASIUM
  - COMMUNITY SERVICE CENTER
  - LIBRARY
  - AUDITORIUM/THEATRE
- PRESERVATION OF HEALTHY, MATURE TREES

Unit Types

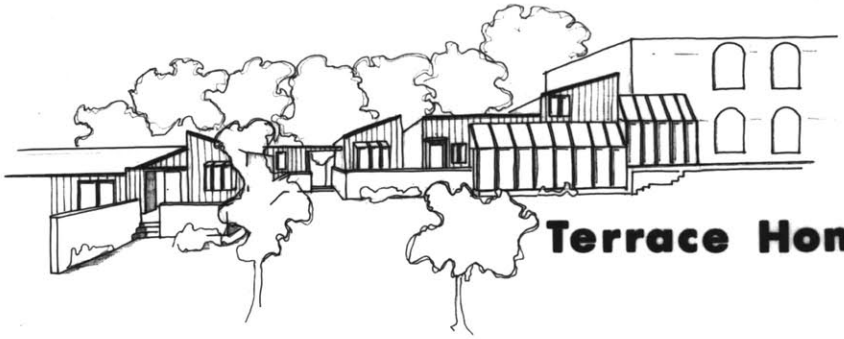


Village Green Homes



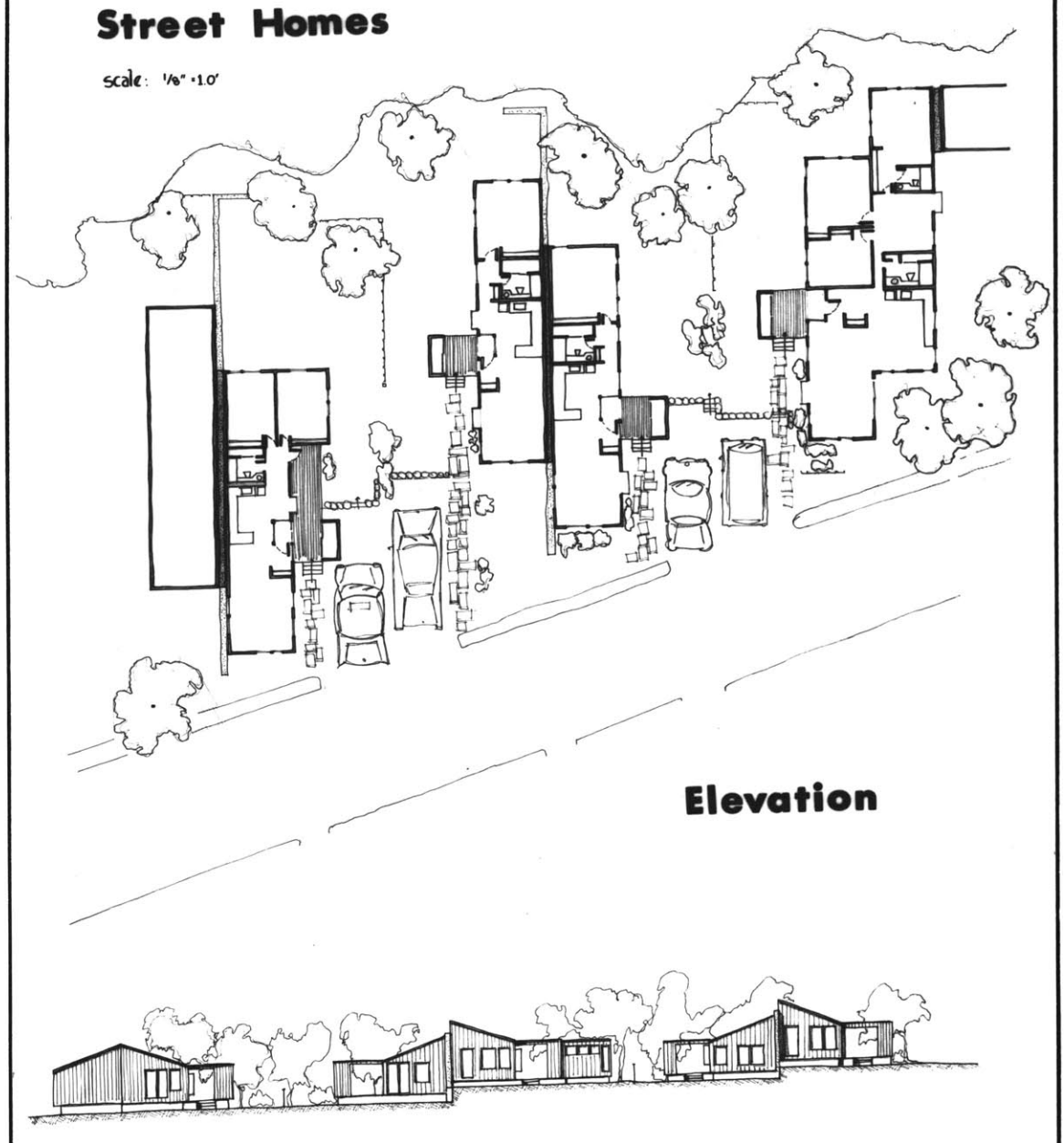
Homes in the Woods

Street Homes



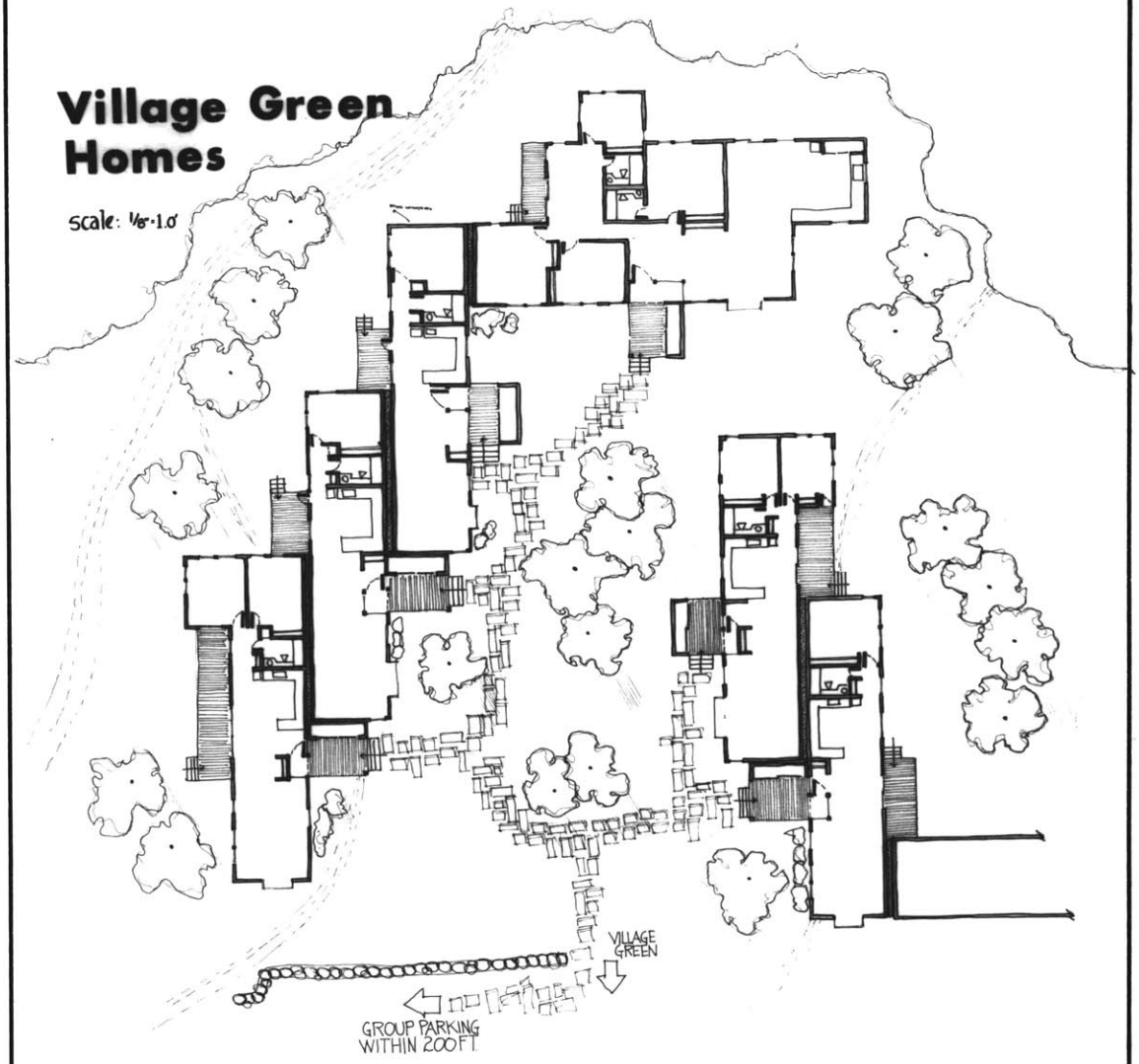
Terrace Homes

Row Homes

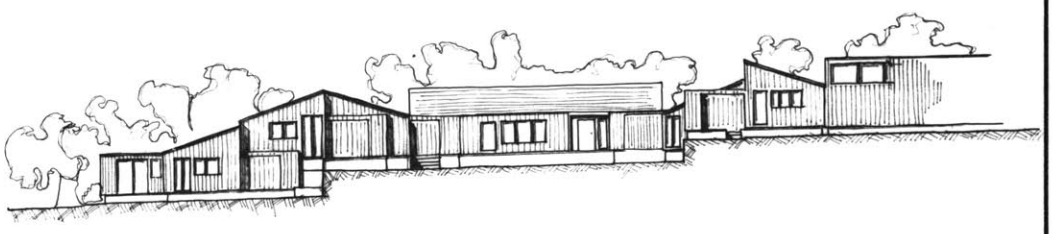

Street Homes
scale: 1/8" =1.0'
Elevation

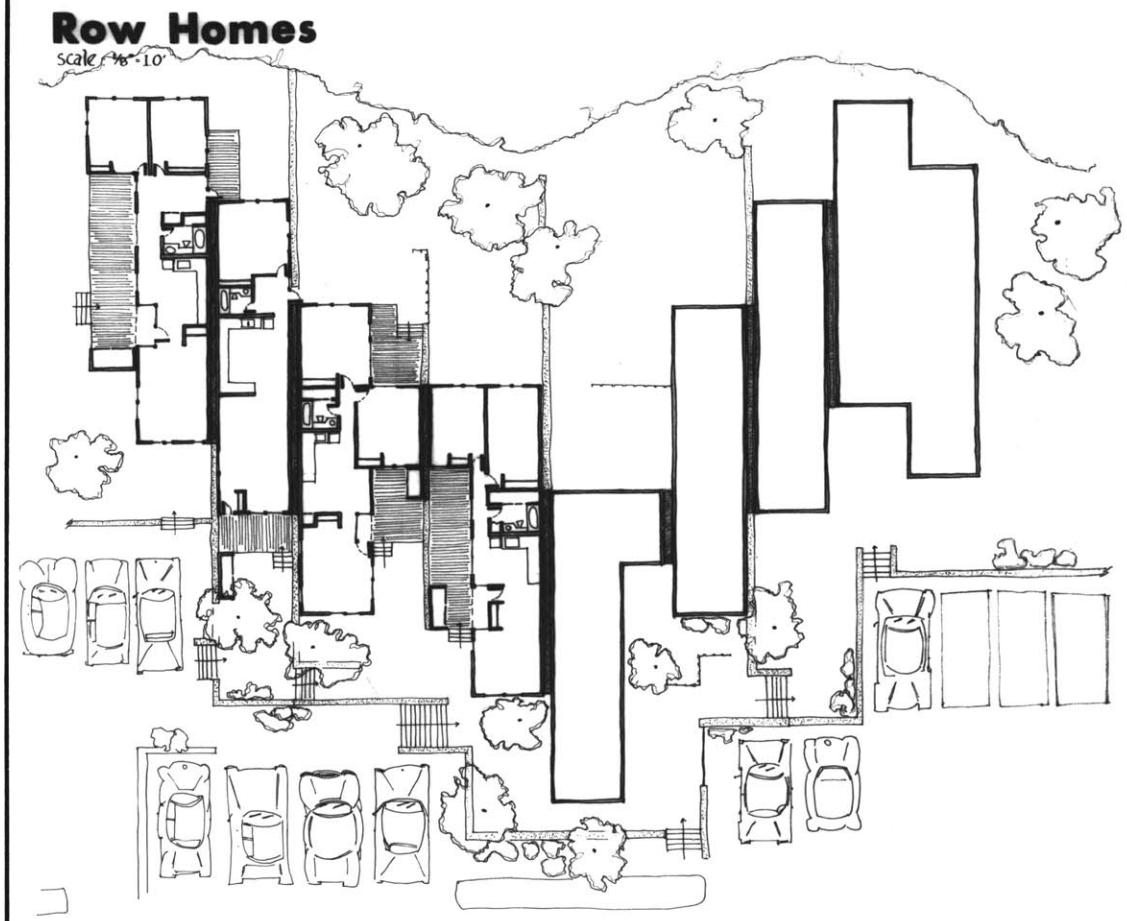
Village Green Homes

scale: 1/8"-1.0'

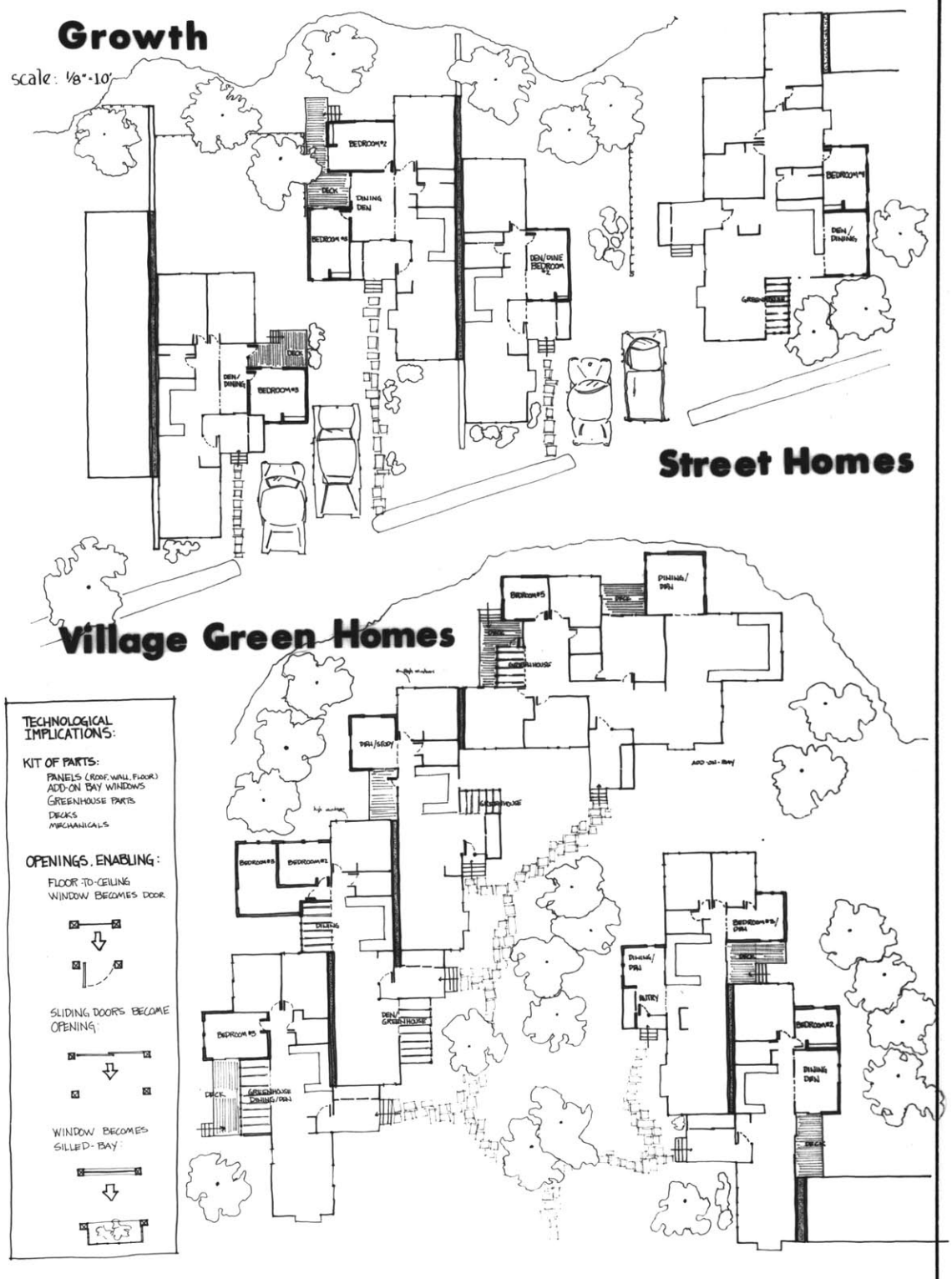


Elevation

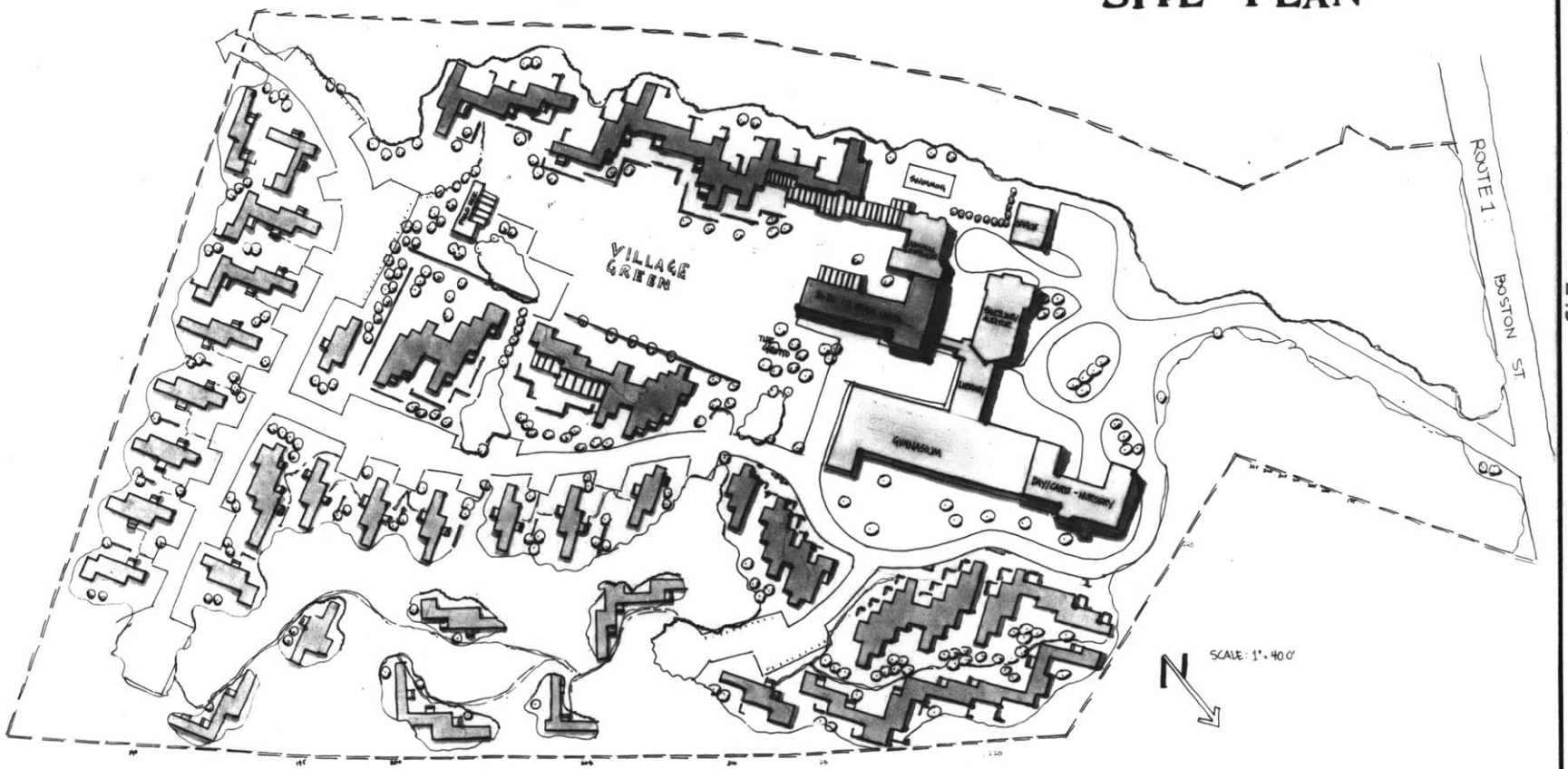




Elevation


Growth
scale: 1/8"=10'
Street Homes
Village Green Homes
TECHNOLOGICAL IMPLICATIONS:
KIT OF PARTS:
PANELS (ROOF, WALL, FLOOR)
ADD-ON BAY WINDOWS
GREENHOUSE PARTS
DECKS
MECHANICALS
OPENINGS, ENABLING:
FLOOR-TO-CEILING WINDOW BECOMES DOOR
SLIDING DOORS BECOME OPENING
WINDOW BECOMES SILLED-BAY

SITE PLAN


VILLAGE GREEN
ROUTE 1
BOSTON ST.
GYMNASIUM
DAYCARE - NURSERY
N
SCALE: 1" = 40.0'

PART 6:

PROCESS: Participant Reaction to the Design

Evaluation: The most feasible coalition and the next steps in carrying out the demonstration project

SUMMARY

Contained in this section are notes on the meetings with the potential coalition participants and their reactions to the demonstration project design.

The design concept was well received by all parties I met with. It seems the design has, at least partially, transcended the problems of people's images of manufactured housing and that the real problems lay not in the use of such housing but in the site itself. The redundance of the existing buildings and their probably assessments might elevate the cost of the project to the point of rendering it unfeasible. However, one must not lose site of the implications of every party's interest in the design concept; it was deemed by all to be worthy of further perusal, quite a change from the initial response on most people's parts. If anything, the process oriented coalition approach has yielded a product that may not only be feasible, but just as important, may not suffer from the stigma of the "trailer camp" image.

Also in this section is an outline of what would seem to be the coalition most likely to succeed, and next steps this coalition should undertake in order to carry out the demonstration project.

PRESENTATION OF THE DEMONSTRATION PROJECT TO POTENTIAL COALITION MEMBERS

The Mobile Home Manufacturer
Don Bean: Moduline Industries

Presentation Emphasis

The emphasis of the presentation to Bean was twofold: production issues raised by the design and the desirability of the coalition. In fact, it was not my role to fully address either issue, but rather to solicit participant evaluation of the design concept and the design on these bases.

Production Issues

Bean's overall response to the design was extremely encouraging. This was to be expected, however, in view of his high initial interest in the project. In the course of the presentation, he found great problems now in the area of factory production. The only real questions dealt with the engineering details of the fold-out rooms, those details not having been specified. It was clear to him, however, that since fold-outs were an existing operational part of mobile home technology, they would only be problematic from the standpoint of design time. It would be impossible to begin production immediately, as engineering details would have to be worked out at Moduline, which has never employed fold-outs. The storage units and the fold-down protector decks, on the other hand, pose absolutely no problems, according to Bean.

In the area of finish materials Bean could see no problems as long as the units could receive prefinished materials that needed no special finishing (i.e., staining, painting, wallpapering) in the factory. All of the materials I suggested are available to Moduline by its suppliers and, in fact, they have recently been exploring the possibility of using interior finish materials other than the standard wood panelling. The number of dwelling units specified by the design (121) would justify their purchasing such materials at volume prices.

Bean emphasized that one of the advantages of our employing factory production of the units was the time that could be saved; he estimated that their facility could produce two units a day after about a two-week tooling up and familiarizing period. He could, therefore, guarantee delivery of the entire package of units within three months of the order date.

In regards to the cost of the dwelling units, Bean offered a rough estimate that he termed "safely high", an estimate that he would have little trouble meeting. Excluding site preparation, but including engineering and retooling costs and transportation costs, the set up of the units on the prepared sites, the final connection of the utilities, and the ma-ufacturer's profit, he calculated the costs to the developer to be $11,000 for the one bedroom units and under $20,000 for the four bedroom units, if the units were to be constructed as the design specified and with the finish materials we had discussed. There is little chance of these production times and costs being duplicated with total on-site fabrication of the units.

The issue of expandability was one that Bean found extremely attractive and also quite possible. He saw no problem in engineering the units to allow growth and he felt Moduline could produce the expansion kits as they were ordered.

All of the above will only be feasible, Bean emphasized, if the number of units is greater than 100 and if the development is not constructed in phases, but all at once. To produce a third of the units initially with only the possibility of producing the rest at some later date would not permit any of the economies of scale required and wuld pose considerable tooling up and retooling problems in the factory. While he is extremely anxious to carry out the demonstration project, he would not do so unless he had a guaranteed order for the entire number of dwellings. A piecemeal approach would be impossible and unacceptable.

The Coalition

Bean feels the only way the demonstration project will be feasible is if the coalition is very strong and if the community is included in each step of the plannning. He expressed the attitude that the next step of the process would logically be to assemble the coalition and to begin negotiating the specifics of the project. He is more than willing to commit himself to such negotiations and to work within the community to build support for the project. He voiced no hesitation about involving himself in local politics.

In regard to the MHFA's involvement, Bean expressed the feeling that such involvement on their part would be extremely valuable and would only lend to the project's high quality image. He feels there is a point to be made about manufactured housing with the demonstration project and that the MHFA would provide organizational expertise and credibility to the endeavor. He also expressed the same feeling in terms of HUD's involvement, although not as emphatically.

Bean has no misgivings about dealing directly with a developer, but he feels the relationship would be far more fruitful if the developer has had experience with both mobile homes and, in the case of the demonstration project, conventional building techniques as well.

The Developer
Lawrence Henrich

Presentation Emphasis

It was my intention to gain response from Henrich on the site development aspects of the demonstration project as well as to gain some insight into the political implications of the project, in light of the fact that he has had considerable first-hand experience in both of these areas.

Henrich reacted to the design with a considerable degree of excitement. In general, he felt that not only was it a very feasible plan but it did not suffer from the traditional manufactured-housing image. He was extremely enthusiastic both about the notion of rehabilitating the existing facilities on the site and about the concept of clustering and siting identical units in a multitude of ways in order to eliminate much of the monotony that usually results with manufactured housing. He felt that there was, in fact, no need to even think about the dwellings as mobile homes, most of the negative aspects of mobile home design and siting having been extensively reworked and only the positive benefits of using manufactured housing remain.

Site Work and Site Work Costs

The only area of real concern that Henrich expressed about the site plan was the distance from the road of the Homes in the Woods

clusters and some of the Terrace Homes. While it should be the intention of the design to minimize road construction, he felt more would be necessary than the site plan implied. In the end, additional roads would only facilitate setting up the units, even if a crane would have to be employed to set the units on foundations.

While it was impossible for Henrich to estimate the site work costs of the project, being basically unfamiliar with the site, he felt that the increased density of the units per foot of road and utilities service lines (in comparison with a mobile home park) would offset the added expense of foundations and terraces. He estimated that it would cost roughly $5,000 per unit (this too is intentionally high, he said) to prepare the site for the units. This figure could be broken down roughly as follows (the figures below are adjusted figures calculated from the actual site work costs of his park):

Road construction, utility installment, sewerage	$1000/site
Engineering costs	100/site
Street lighting	60/site
Actual site work	2500/site
Unit set-up costs	1400/site
Total	$5060/site

A great deal of this would be dependent on the adequacy of the existing sewerage treatment infrastructure (he feels a great deal would have to be added to the existing system) and on the condition of the soil. The topographic conditions of the site seemed to be no deterrent to his enthusiasm; in fact, he agreed they would only add interest to the finished environment.

When asked whether or not he felt he could conventionally build the project (recall that Henrich is an experienced stick-builder) at a competitive cost, he answered "no way." He estimated that it would cost at least $30,000-40,000 to build the same units conventionally and added that construction financing costs would be almost quadrupled in light of all the additional time that would be needed. He agreed that occupancy of the units could be achieved within one season using manufactured dwellings, and that would be totally impossible otherwise.

To the issue of ownership, Henrich responded by saying that his experience has been that ownership of the units and cooperative ownership of the land would be the only approach that would permit personalization of the units and unit growth. The notion of rental units was extremely unattractive to him; he suggested that if the development were to be organized as a cooperative it would be the most successful and easily managed and maintained.

The Coalition

Previously viewing involvement of the MHFA and HUD as an unnecessary involvement yielding only a lot of headaches, Henrich reversed his stand and, for much the same reason as Bean, agreed that their involvement would be a real boon to ironing out the political and regulatory issues the design raises. Henrich, too, feels community support for the project is absolutely essential. It is possible, he insisted, to show the community that the project will yield a con-

siderable amount of tax and other revenues and that it would stimulate the local economy. Not only would the construction phase provide employment for a large local labor force, but the completed development will bring in a fantastic amount of revenue to the very local commercial marketplace. And, he reiterated, the municipal government will serve only to gain from it all (Henrich has recently, be request of the town of Halifax, completed a study showing that his park, in which the units only pay $72.00 each per annum in lieu of taxes, netted the municipality over $60,000 in municipal revenues last year).

The zoning and code problems (as a result of clustering) will be significant enough to require the community's support. The town of Topsfield is a particularly appropriate community for the project, Henrich feels, because the political bureaucracy of the town is small enough to make local leaders accessible and available for negotiations.

When pressed as to whether he personally would act as the developer of this "fantastic set-up" (his words, not mine), Henrich declined on the basis of having too many responsibilities already, but the manner of his response led me to believe that if the project were to become a reality he would reverse his decision willingly. Otherwise, someone with similar expertise would have to be found, preferably someone more local to the community in which the project will eventually be constructed.

The State Housing Agency
The Massachusetts Housing Finance Agency
Lois Stern, Design Review Board

Presentation Emphasis

My discussion with Stern focused on the site design and development concepts as well as on the specific design of the clusters and units.

In general, it would be safe to say that she received the entire project quite favorably in light of her previous feelings about the inappropriateness of using manufactured housing in MHFA projects (pp.). Although Ms. Stern is not in a position at the MHFA that would allow her to make final decisions concerning the acceptability of proposals, she did leave me with the distinct feeling that the project, with modifications, would be worth pursuing with the MHFA by actually applying for funding; to me this signals a shift from viewing the project concept as totally unacceptable to that of possibly negotiable, given that the development financing package, as well as the design, is acceptably worked out.

The Site Concept and Design

The notion of cluster variety and re-use of existing buildings struck Ms. Stern as being quite attractive. She did caution me, however, that entirely too much of the existing structures were given over to community space. The MHFA has never, and will not in the forseeable future, enter into a partnership with the community in the

aspect of developing community facilities. Therefore, if such great emphasis would be placed on such facilities, it would become the community's responsibility to purchase and develop them separately. However, Ms. Stern indicated that the economics of the project would probably demand that more of the existing structures be redeveloped as housing and that perhaps only the gymnasium and one other facility would feasibly be redeveloped as community space. This would make the balance more reasonable from the MHFA's standpoint and would increase the total number of units from 145 to the range of 160-170. The notion of making available some of the remaining (a significantly smaller amount) community space available to groups within the community (i.e., doctors, lawyers, day care center entrepreneurs) would then be quite feasible; in some more urban projects the construction of ground floor commercial space has been financed by the agency, but this space never is a large percentage of the total project space.

In regard to the variety of cluster types, Ms. Stern felt it was a "very nice concept," but that several of the clusters on the site plan suffered greatly by being so far from the street and from available parking. For example, the Homes in the Woods would have to be serviced by a road that would not only allow closer parking to the units, but also necessary servicing by garbage removal, ambulance, and fire protection vehicles. All units should have a close relationship to some street, although parking need not be at each unit's doorstep. In fact, she advised that in some cluster along the street pocket parking behind the units would be advisable. The dwelling

density of the project and the variety of open spaces appealed to Stern and would seem to pose no problems to the agency, provided that the financial analysis of the project would allow for it.

Cluster and Unit Designs

While the cluster-type variety appealed to Ms. Stern, she did feel that considerable reworking of some of the units within the clusters would be necessary. This was most evident, she felt, in the Row Home clusters, where the kitchens of the central units had no windows. She also criticized some of the layouts as having too open a relationship between the kitchens and living room areas and for having dining areas without windows. She offered numerous suggestions as to how these problems might be reasonably handled within the unit dimensions employed. The room and unit sizes, however, did appear to her to be quite generous. Her main concern was centered on ventilation and light problems that resulted from too much insistance on parallel units.

The limitation of one-story units was not at all bothersome to Stern, as it has been conceptually in the past; the notion of direct access to the outside from each unit appealed to her. Her feeling was that as long as the units were well constructed and more efficiently laid out, it would be quite possible to market the units. Cost never became an issue with her; quality was the major consideration.

Matthew Hobbs
Administrative Assistant to the Director

Presentation Emphasis

My discussion with Hobbs primarily centered about the administrative aspects of the design and the site, what he terms "the front end" issues of the demonstration project. He did, however, offer several comments to the issue of design that were quite interesting. Many of his comments indicated a new (but guarded) enthusiasm toward the project I did not expect to see.

The Site

Hobbs was extremely enthusiastic about the site for the project. He indicated that the MHFA was quite anxious to construct a project in that area, and that this specific site offered, as far as he could tell, a great opportunity. His main concerns were the condition of the soil, and the available sewerage treatment capacity, these specifics only determinable by closer site inspection by the agency. If no problems in these areas were evidenced, he seemed to feel the site was ideal.

Although Hobbs felt the community of Topsfield was an appropriate choice, he cautioned that the issues of zoning and taxation would require significant negotiation and would not be easy.

The Design

Hobbs indicated that the existence of buildings on the site was a real asset not only in terms of function but also in terms of image; the development image is aided by the existence of non-manufactured elements. He did see some of the clusters as being too manufactured in aesthetic, particularly the Row Home clusters, but he did add that the notion of the on-site addition of decks, patio fences and other built parts (evidenced in the perspective of the Terrace Homes) did a great deal to alter that aesthetic. It was his attitude that if, in fact, the manufactured units acted as only the framework for the development, the resulting environment could be quite rich and interesting. He encouraged the further use of that attitude in future design work on the project; he agreed that the design did not suffer from the traditional sameness he had begun to expect from manufactured housing and that this was in great part due to siting variety and the use of non-manufactured elements.

The density of the development, he felt was very appropriate for the site, but suggested that the cost of the land might dictate that more units be added. He did feel, however, that such considerations would probably be negotiable and manageable; the MHFA has financed many projects with an overall density of 7-8 units per acre.

Ownership

The MHFA has recently undertaken two projects (in Beverly and Lincoln) that are to be maintained as cooperatives: rental subsidies

will be transferred to mortgage payments by the agency. In the case of this design, with so much open space and with each unit having direct access to both common and private open space, he feels a cooperative would be the best arrangement. Also, if the units were to be rented, the expansion of units would be unmanageable. In a cooperative arrangement, the MHFA prefers the developer to be the initial cooperative manager whose tenure is decided upon by the residents. The agency presently does have considerable subsidy resources and is looking for new projects to finance; we are therefore speaking of real possibilities and not pipe dreams.

The Coalition

Hobbs feels that the standard MHFA development process implies a very strong coalition of the architect, the developer and the agency and feels that in this case such a coalition would be even more important. Involvement with the community he sees as desirable, but not necessary. Cooperation in terms of tax agreements is quite vital, he admits, but zoning problems have been, and will continue to be, solved through the use of the State's anti-snob zoning powers, which the agency has used on numerous occasions. In a town the size of Topsfield, community support does make the process a lot smoother and more manageable, but still he feels it is not absolutely necessary, or for that matter absolutely possible unless the community actively supports the construction of mixed income housing per se (a real rarity). Without the backing of the MHFA, however, it would

seem that community support would be absolutely essential, as the agency acts as a very strong (but subtle) force in negotiating the political pitfalls of such projects.

Next Steps

The demonstration project design concept seemed appealing and feasible enough to Hobbs to enable him to actively suggest continuation. He feels it is time for the developer, the manufacturer and an architect to join forces and apply for MHFA financing. The first step would then be for the coalition to gain control (or option for control, from the State in this case) of the site and for the MHFA to inspect the site to determine its appropriateness. This inspection, however, cannot be undertaken until the coalition is assembled and the members' credentials are approved and an application fee of $150.00 is provided. If the site is approved, then a reworking of the design and a financial package for the development will have to be completed for secondary approval. While Hobbs admitted both that he was in no position to make any guarantees about MHFA approval at this point and that it would require some (possibly unfruitful) work on the manufacturer's and developer's behalf, the project is well worth pursuing and can go no farther until application procedures are initiated.

The Department of Housing and Urban Development
David Myers, Architect, and associates

Presentation Emphasis

The presentation was structured so as to raise the issues of HUD participation in the financing, the appropriateness of the design and the site concept from a HUD point of view, and the staff's reservations regarding the project that may have resulted from previous experiences with manufactured housing.

While there were many implications of the plan they felt would pose real problems, Myers and his associates were quite enthusiastic about the project. There seems to be nothing standing in the way of HUD's participation, although such participation would be quite limited.

Financial Support

HUD presently administers no programs directly that would provide consumer subsidies for the project. While the Massachusetts area offices have received considerable (over $30 million) Section 8 rental subsidy funds, most of this has been allocated to the MHFA and to local housing authorities for their use. The MHFA is the main recipient of the funds and the agency most likely to become involved in a project of such size.

However, other mortgage insurance programs are administered through HUD that Myers felt could quite easily be applied to this

project, provided the financial development package was in proper order and within the low and moderate income price range. First, however, it must be determined whether the project would be managed on an ownership or rental basis. If the project is to be a rental development, only 221D3 mortgage insurance (for the developer) is presently available; Section 8 money would have to be received from the MHFA. If, on the other hand, the development would be managed on some sort of ownership basis, mortgage insurance programs are available to the individual purchasers of the dwellings that would effectively reduce their down payments and therfore make the burden of ownership easier to manage. Also, HUD mortgage insurance would help lower the risk in a private lender's eyes. In any case, the feeling was that these hopes could be financed as traditional homes and not mobile homes; traditional mortgages could be obtained due to the non-mobile nature of the dwellings and the image they project. Depreciation would be far less of a problem than with traditional mobile homes. There seems to be nothing standing in the way of the use of such insurance programs.

The Cluster Designs and the Site Concept

The cluster designs represented to Myers a very "no-nonsense" approach to the use of mobile homes; he felt that the on-site construction problems would be kept at a minimum with one story clusters while still moving a considerable way from the traditional mobile home image. This and the variety of cluster types he felt would be

a strong point in my favor in any community's mind.

The site concept, while it was appealing, did pose several problems, he felt. First, as it has been pointed out by others, many of the units were too far removed from the street. But more importantly he thought the existing buildings posed more problems than they did benefits. It was his feeling that the cost of the land, while still undetermined, would never allow for so much community space and that rehabilitation of the existing buildings would be too costly to perform for housing. In essence, he feels that there is not enough potential income-producing space in these buildings, which will only add to the cost of the site and then be a major headache. His suggestion, especially if the community is not interested, was to search out another site with no existing structures that would impose financial burdens, and then to employ the same cluster types of that site. While the notion of using this piece of available state-owned property was attractive, he felt that the project might be more feasible if other land were to be obtained on the open market.

The Community

In addition to the above problems raised by the existing buildings, Myers and his associates predicted three other "strikes" against the plan in the eyes of the community.

1. The mere discussion of non-elderly mixed income housing will be a deterrent. For this reason he felt simply providing housing for the general market that was within the price range of low and moderate

income families was more advisable.

2. Suburban communities like Topsfield have shown incredible resistance to multi-family housing through zoning. On the other hand, if it can be shown that multi-family housing will have to be provided in the community, this is a far better alternative than low-rise construction. Perhaps finding a site in a community more amenable to multi-family housing would yield fewer political problems.

3. The use of manufactured housing will certainly strike fear in the hearts of the community. They intimated that the cost savings incurred through the use of such housing might not be worth the risks.

For the above reasons, Myers felt community support and involvement in this project would be absolutely necessary for success. To go the anti-snob ruling route would only delay and add to the cost of the project.

The Value of the Approach

Myers expressed the summarizing attitude (one which I share) that the housing needs of low income people will not be met through government subsidy programs but through the development of market housing that is within the reach of such people. The main attraction of the demonstration project to the HUD staff was this implicit attitude; it will be possible, somewhere, someday, to carry through such a project that will be able to stand basically on its own. For that reason, HUD would be very interested in closely examining the possibility of

providing the mortgage insurance (there are no limits to income in these programs) that would lessen the project's risk in lenders' minds and would help insure its implementation.

The Community
Mr. Clayton Rock
Topsfield Zoning Board

Presentation Emphasis

The thrust of my presentation to Mr. Rock, a thirty-year resident of Topsfield, was aimed at uncovering what he felt the community's response to the demonstration project would be. Also, the regulatory issues of the project were discussed.

As noted previously, Mr. Rock is a gentleman of considerable foresight, who realizes that every community in the Commonwealth has the obligation to provide housing for lower income groups and elderly people. This attitude is partially based on the fear that if the community does not take an active role in any such housing program the State will force some developer's scheme, in which the town had no say, down the community's throat. It is therefore the community's responsibility to cooperate and initiate appropriate measures that will provide decent housing in decent environments.

Of primary concern to Rock was the suitability of the site for housing. There has been considerable controversy in the community about the sewerage treatment facilities for the existing buildings and

it is now quite obvious that extensive work would have to be done to upgrade the system before housing could be built.

Cluster Designs and Site Concept

The cluster types were quite appealing to Rock and seemed to him to be a good alternative to any low-rise development. He also noted that the cluster type variety helped eliminate the sameness of the necessarily repetitive use of identical units. He went so far as to say that the idea was more appealing than identical detached subdivision homes.

The ratio of unit sizes (50% one bedroom units, 25% two bedroom units, and 25% three and four bedroom units) established by the MHFA was most acceptable, he felt, in that it did not allow for only large size families with many children, but also younger and elderly families.

While Mr. Rock could appreciate the emphasis on open space and community facilities, he raised two problems that would certainly arise if the project were to be brought before the community at large. In respect to the amount of open space, he felt that there was not enough. The town of Topsfield, in 1971, instituted cluster zoning, but the zoning law states that the gross density of the development cannot exceed the density that would be achieved if the site were utilized for single family homes. In the case of this site, that would allow only for approximately fifty dwellings. Realizing that the land costs would certainly, in such a case, raise the cost of the units to the point of being too costly for all but the rich, he acknowledged

that if the community were to feel the project worthy (which he indicated they might in this case), some arrangements might be worked out to allow for higher densities. However, he did feel that there were too many units on the site and not enough open space.

Closely related to this was the overwhelmingly disproportionate amount of existing buildings on the site. Mr. Rock seemed to feel that there was absolutely no great need in the town for more community facilities (e.g., the new regional high school has a large gymnasium, there are several small private nursery schools, and all the community's doctors work out of their own homes). Therefore, a proposal for community space would not only be unnecessary and unattractive (I'm still not sure about that), but that the buildings would pose an unnecessary financial burden on the developer that would effectively raise the cost of each dwelling. Like the people of HUD, Rock felt a site without such buildings would be financially a better proposition. It is, unfortunately, impossible to obtain information on the price which the State will expect to receive for the land and buildings. (Six years ago the package was purchased for almost a million dollars, but since then it has been realized by the state that they were in fact swindled, and that the parcel is worth far less, considering its location and the condition and usefulness of the existing structures. If more precise land cost information were obtainable at this time, specific land costs per unit could be calculated to determine the appropriateness of the site.) While the site is in a good location, Rock felt that other parcels were available in the community that would be just as approp-

riate and would lend themselves well to the units and clusters which he felt had "great merit" as a solution, one that was well worth pursuing in the coalition fashion I have described.

On the other hand, Rock cautioned me that the local Planning Board is on a "no build" rampage currently and that any requests to build have been hampered by them. He noted with disgust how the Board had just taken by emminent domain a parcel of land that was to be developed as a subdivision, and that the owner is taking them to court over the issue. At the same time, Rock made reference to the more frequent use of anti-snob zoning in the state (sixteen communities recently lost zoning appeals in the courts on this basis), and that the community could be made to realize the merits of participatory action in the area of housing. If the MHFA were to be involved, the project would have an air of respectability, and teh agency's high management standards would be quite appealing to the town and would assure against a "fly-by-night" development image, Rock felt.

Manufactured Dwellings

Rock did not seem threatened at all by the use of manufactured housing. There are several modular homes in the community and he felt that manufactured housing was a good approach to keeping costs down. As long as they have no resemblance to the mobile homes we are accustomed to seeing, and as long as these homes would be well constructed and legally regarded (taxed, etc.) in the same manner as any other homes, Rock felt the use of manufactured homes would be acceptable and

perhaps wise.

While it is unwise to draw too broad a set of inferences from speaking with only a few local people, I was given the distinct impression that the plan itself would at least be considered fairly and that if it would fail, it would fail not on the basis of its design or its use of manufactured units, but on either the basis of community sentiment against low-income housing or the inappropriateness of the iste. The former problem can be circumvented, the latter bears far closer investigation.

EVALUATION

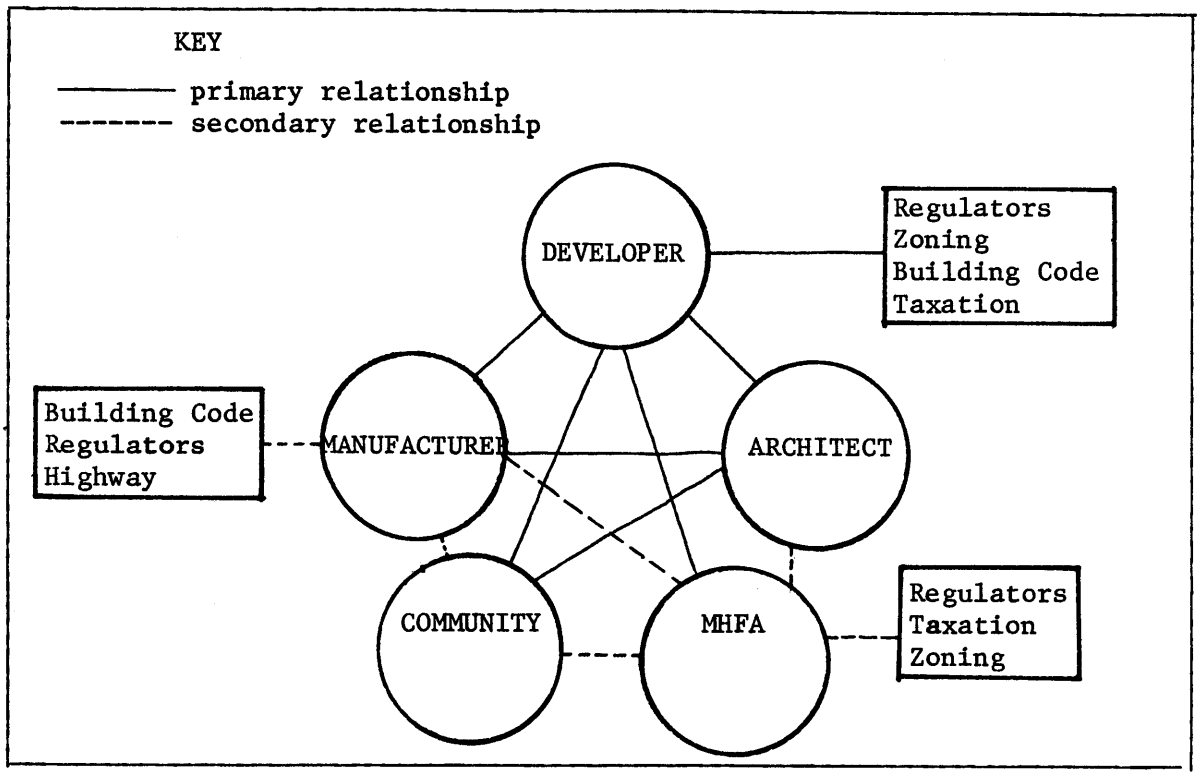
The presentation of the demonstration project design to the potential coalition members served very strongly to indicate that the project is well within the realm of reality and feasibility. Admittedly, many issues still exist that will have to be resolved with far more detailed planning and negotiations; however, it is clear that the concept of the project has been received as being quite meritorious and worthy of pursual.

The Coalition

It is now possible to specify the membership of a coalition that is most likely to succeed in carrying out the demonstration project. The objectives assemble a coalition that is the least complex (in terms of process) while being the most powerful (in terms of capabilities), as suggested in previous sections, in light of the preceeding responses to the project concept. That participant mix is as follows:

1. The Developer
2. The Manufacturer
3. The Massachusetts Housing Finance Agency
4. The Community
5. The Architect
6. (And secondarily) The Regulatory Agents

Diagrammatically, the primary and secondary relationships within the coalition, simplified from the original concept (which was not specific to this project) developed in Part 2 of the thesis (p. 34) can be shown as follows:



The Developer: The developer ultimately must assume the position of greatest responsibility in the project; he must deal directly with all the other coalition members. It is his role to:

1. Work with the COMMUNITY to develop the particulars of the project that will be acceptable to the community.

2. Establish with the MHFA the suitability of the site, establish the credentials of the development team, arrange the financing particulars, and establish post-construction management procedures.

3. Arrange with the MANUFACTURER the production and delivery process and schedule for the dwellings.

4. Work with the ARCHITECT to develop specific site, cluster and unit designs.

5. Assume the primary responsibility of dealing with REGULATORY agencies (zoning, taxation, and building code) to establish acceptable practices.

6. To schedule and carry out the physical on-site construction and to arrange for any necessary subcontractors.

The Manufacturer: The manufacturer is responsible primarily for:

1. Working with the DEVELOPER to arrange the production and delivery process and schedule of the units.

2. Establishing with the ARCHITECT the specific unit designs and specifications for those designs.

3. To produce and deliver the dwellings.

Secondarily, the manufacturer may (but not necessarily) be called upon to:

1. Meet with the MHFA to clear his credentials and his product. In a project that is as innovative as this, the MHFA will be particularly interested in these matters, which the manufacturer will be most capable of addressing.

2. Establish with the COMMUNITY the quality of his product. Once again, the nature of the project is such that the community will want strong assurances about the quality of the product itself; this implies some relationship with the manufacturer.

3. Establish with highway and building code REGULATORS the legality specific to the nature of the dwellings.

The Massachusetts Housing Finance Agency: It is clear that involvement of the MHFA is quite desirable in that it would not only lend a great deal of political credibility to the project in the world at large, but would also insure to the community a degree of construction, management and maintenance quality that would be necessary to gain community support. The responsibilities of the MHFA would include primarily:

1. Establishment of the site appropriateness, examination of the developer's and manufacturer's credentials.

2. Financing the project and overseeing the management and maintenance of the completed development. Also, evaluating its success.

3. Working closely with the DEVELOPER on the above and perhaps (if it was necessary) to use its anti-snob zoning powers.

It may perhaps be necessary for the MHFA to deal directly and continually in a secondary way with the MANUFACTURER and the ARCHITECT, in order to work out the specifics of this innovative project. Also, relationships with the COMMUNITY and the REGULATORS may be advisable to insure cooperation. While the agency does not see these relationships as necessary, and feels these are the developer's responsibility, formally, I feel it might be highly desirable.

The Community: (Namely the zoning board, the Planning Board, the Board of Selectmen, and secondarily business people, the school board, and other interested parties) While several parties, particularly the MHFA, feel less strongly than I about the necessity for community involvement, it is my contention that the community owes it to its people to demand certain specifics in the development. Their involvement must be viewed positively by the other coalition members, and not as a stumbling block. The community's prime relationship would be through the DEVELOPER. Secondary relationships with the ARCHITECT, MANUFACTURER, and MHFA may become necessary if the community demands them to gain assurance about the project's specific nature.

The Architect: After the process gets to the point with the groundwork for the process and the project is completed, the architect's responsibilities become somewhat more traditional and less extensive. The architect's primary relationships in completing a final design for the project are with:

1. The DEVELOPER
2. The MANUFACTURER
3. The COMMUNITY

Secondary involvements with the MHFA, as described above, may be necessary. While it is the architect's role to translate the criteria of the other participants into form, he/she must be particularly responsive to these other groups. One should not lose sight, moreover, of the fact that it can be (and was) the architect who acts as a catalyst in the initial development processes and lays the groundwork for some feasible plan of action that is herewith being described. It is by now safe to say that without the participation of such a catalytic party, the process might yet be at step one and the project might be yet nothing more than an idea.

The involvement of the other potential coalition members, as outlined in Part 2, does not seem to be necessary to the advancement of the process in this particular project. While, for example, the involvement of HUD seems at this point to be unnecessary (lending only complexity to the process while facilitating development only minimally) the necessity of future involvement cannot be discounted, especially if the MHFA decides not to finance the project.

THE NEXT STEPS IN THE DEVELOPMENT PROCESS

It is also possible at this point to suggest one possible scenario for the next steps that should occur in the process particular to this demonstration project. As suggested above, the developer must assume most of this responsibility.

1. DEVELOPER ascertains appropriateness of the site; negotiations with State regarding the cost and availability of the site and the existing buildings must be undertaken. This will be highly dependent on the cost of the site: if, for example, the site can be purchased at a very low cost less income will be necessary from the existing buildings (it may perhaps even be possible to leave some of them as they are and allocate them for future use only).

2. DECISION: The DEVELOPER decides to use this site or to search for another. If the site seems appropriate, developer gains control or option to control land from the State.

3. IF GO: The DEVELOPER meets with COMMUNITY representatives to ascertain whether enough support for the demonstration project on this site can be mustered.

4. IF GO: The DEVELOPER and MANUFACTURER meet and prepare necessary applications for site approval by the MHFA.

5. The DEVELOPER applies to the MHFA for site approval. If the site is approved, GO. If the site is not approved, the DEVELOPER returns to step one.

6. IF GO: The DEVELOPER, ARCHITECT, MANUFACTURER and COMMUNITY convene to clarify design change parameters.

7. DEVELOPER concurrently develops financing package for the MHFA application.

8. DEVELOPER applies to the MHFA for preliminary design and financing approval. The entire coalition convenes to negotiate details. If preliminary approval is not obtained from the MHFA, DEVELOPER either terminates process or returns to step six.

9. If approval is obtained, the DEVELOPER (and possibly ARCHITECT and MANUFACTURER) meet with local and state REGULATORY authorities to proceed with zoning, taxation, building code approval of the project.

10. If approval from REGULATORY agencies is not obtained (unlikely with MHFA approval) or is not negotiable, coalition begins court procedures. The MHFA is called upon to testify as to the merits of the project. If approval is still not obtained, process will most likely have to be rethought or terminated.

11. If approval is obtained, actual construction, production procedures begin.

The above is a rather simplistic outline of the next steps in the development; it does, however, serve to indicate both the great responsibility (as spearhead of the coalition) the developer must assume as well as the degree and timing of the involvement of the other coalition

members. While it would seem at a glance that the process has only just begun, it cannot be emphasized enough that without the presence of a catalytic force in the development process, particulary in the case of an innovative project such as this, the project would not likely have progressed to the point of actual negotiation.

PART 7:

CONCLUSIONS: Have the Objectives of the Thesis and the Goal been Achieved?

APPROACHING THE GOAL

In concluding, it would seem appropriate to examine how far toward achieving the initially stated goals this approach has carried the housing process. Briefly, the goal addressed strides toward low-cost, high density housing of appreciable environmental and architectural quality with minimal use of government intervention--financially and organizationally.

Low Cost?

Estimates from the developer and the manufacturer show that the smaller units in the demonstration project could be constructed (exclusive of land costs) for $16,000, while the larger units could be delivered for $25,000. While these figures do not include land costs, one would be hard pressed to find a new 1800 square foot, eight room home (similar in nature to any private detached homes), with private yard, for $25,000 plus land costs, which have been reduced by increasing unit density. Construction financing cost would also be cut to a bare minimum, the duration of the construction being no more than three to four months. Monthly operating costs would also be less than the lowest mobile home operating costs, assuming that traditional (longer term, lower interest) mortgages would finance the units and that the units would appreciate since they are permanent (and well constructed) dwellings no different from any other conventionally built home. By utilizing the well developed cost saving production techniques of the

mobile home industry with the cost saving (compared to the mobile home industry), financing and assessing techniques we have seen that it is possible to reduce costs considerably. Traditionally (stick) built units of the same design have been estimated to cost 20-30% more. While this may not meet the most stringent definition of low cost, it would provide a better alternative to the non-equity producing housing presently accessible to large families with incomes of $10,000 and small families with incomes of $8000. It would also provide a viable alternative to middle income families who cannot or do not wish to devote a considerable portion of their income to housing. Admittedly, however, this housing would remain inaccessible to the lowest income groups without the use of government housing subsidy funds.

High Density?

Here, too, it must be admitted that truly high densities have not been suggested by this approach. While the clusters employed could achieve densities up to 16 units per acre, the demonstration project density of eight units per acre is considered to be quite high in most suburban areas. This increase of density (from the traditional two to five units per acre) considerably decreases the per unit costs of the land without having to resort to low-rise construction. In more urban areas higher density uses of the same clusters would be quite acceptable. In the most urban areas, other multi-story configurations would be necessary; but those, too, would be within the realm of future possibility through the process employed if existing technologies were to

be expanded. In any case, the approach forestalls the necessity of apartment block environments by decreasing costs in all areas.

Architectural and Environmental Quality?

It is quite safe to say that the environment suggested by the demonstration project design is architecturally superior to the traditional mobile home park. On a more subjective level, it also seems clear that the project would be at least comparable to any multi-family environments. The variety of cluster types and siting conditions, the inclusion of considerable open space and wooded areas, the possibilities for dwelling expansion, the inclusion of private back and front yards accessible to each unit, and the units themselves suggest the quality that consumers should demand from their housing.

Government Non-Involvement?

Again, the degree of progress toward this goal that the demonstration project suggests is significant, but not total. It is obvious that such a project does not require any revolutionary full-blown housing program similar to Operation Breakthrough; such a process is feasible without any considerable degree of political hoopla and can be undertaken quite regardless of changes in the Executive, Congressional or other makeup of the American political system.

However, for the project to be immediately feasible, use of existing government subsidy funds for the lowest income levels would be necessary. Large families with incomes below $10,000 would need assis-

tance. The effectiveness of such subsidy monies would be increased, though; less capital per unit would be required to subsidize individual consumer's mortgage payments.

It is not the intention of the thesis to claim that this process and projects similar to this demonstration projects represent a panacea to the housing crisis in this country. It is, however, reasonable to suggest that they represent a partial solution that is feasible in the present political and economic climate. Such solutions do not, in fact, evolve from large government public housing programs, but from the rationalization and utilization of already existing production and financial systems and technologies. The risk involved in such a project, as perceived by the potential coalition members, is not appreciably more or different from the risks involved in any multi-family housing development. At the same time, the results may be far more rewarding.

Achieving the Objectives: The Value of the Approach

The objectives of the thesis, as initially stated, are:

1. To develop a plan and a developmental strategy for a demonstration project, indicating how close toward this goal it is possible to move in the immediate future in one state (Massachusetts).

2. To develop a plan for a blend (a coalition) of the vested interests who would affect and be affected by this approach, one that is practical today, in order to carry out such a demonstration project.

3. To evaluate the experience of this process and the coalition members' response to the demonstration project plans in order to suggest future steps in achieving the goal.

At the outset of the work, the range of possible physical design solutions and development strategies for the demonstration project, as for any development, was extremely broad. Finally, we have come to a point at which the range has been considerably narrowed but also at which the feasibility of the product seems considerably high. It was only through the emphasis on process and not product that this resulted. Also, it was only, and can only be, through a responsive look at each step of the process and the capabilities of the actors who might perform these phases that the resulting product concept is feasible. If, for example, a mobile home manufacturer alone were to outline a development process for a particular demonstration project it is highly unlikely that the process would be very sensitive to the phases of development in which the manufacturer has little expertise. While this may seem obvious, experience has shown many large national corporations and government housing programs fail because of a lack of knowledge of the entire housing process; we have seen many products become too costly, or impractical, when one party alone assumes control without modifying the product in response to the criteria of others. This was most pointedly experienced in Operation Breakthrough in which, for example, architects designed housing utilizing manufactured housing systems that they knew little about and that were developed with little

input from the architects. Many Breakthrough projects, as a result, were highly impractical, too costly, and this necessitated conventional building techniques in lieu of the manufactured systems proposed. Such an experience is particularly common when developers and architects deal with innovative processes and products; the tendency has commonly been to go wild and to disregard the constraints imposed on a product by reality--the reality of building systems, financing, zoning, and community opposition.

In an innovation-bent process such as this, a coalition of actors seems therefore to be the most valuable organizational tool possible. By encouraging a process of constant product redefinition based on each participant's specific capabilities, it is quite possible to make progress toward whatever goal(s) the process is aimed. My experience with this thesis has only too strongly indicated that. Granted, the product evolving from such a process will not be startlingly revolutionary; on the other hand, it may be startlingly feasible. New technologies may not be necessary to solving the housing crisis; rather, new understandings of existing technologies are necessary--understandings based on a responsive process.

Perhaps the most revealing aspect of the experience was the discovery of the role architects can assume in such a process. It is safe to say that neither a mobile home manufacturer, a developr, a state housing agency, nor a community would have initiated this process. And if one party had, they would likely have been received as bias-bent proponents of a single idea (perhaps justifiably so). An architect, on

the other hand, occupies a unique position in the housing process--a position (ideally) of procedural impartiality and responsiveness. Within such a position, an architect is the likeliest initiator of an innovative process and product. His/her neutrality allows great possibility for synthesis, evaluation, and even manipulation of the housing process, while actually occupying a position of little power. In the past, various government agencies have attempted to act in such a role; however, experience has shown that such agencies have had little understanding of the existing building industry's capabilities and less understanding of localized political conditions, and as a result, have relied on the implementation of revolutionary and (unlikely) technology-based solutions. It is possible for an architect, more familiar with local conditions and building traditions, to act as a catalytic initiator of the process--as a more powerful force in the existing housing marketplace.

Architects have not traditionally been trained to view themselves in such an active role in the housing process. It is perhaps an appropriate time for the profession to re-examine its ivory tower stance and to assert itself in a position of higher value and responsibility. Not only would such an altered role benefit the profession, but it would allow for considerably more responsive architectural additions to the environment we all share.

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