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# **HOUSING IN A PLANNED UNIT DEVELOPMENT**

**STILLWATER , OKLAHOMA**

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HOUSING IN A PLANNED UNIT DEVELOPMENT

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## ACKNOWLEDGEMENTS

This study was planned to suggest ideas for better housing which have been adopted in the United States so that they can be applied in Thailand. It is hoped that the findings of this study will be used to raise the standard of housing which provides better environments for the residents.

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## INTRODUCTION

Planned Unit Development (PUD) is a distinct type of land development project which reflects a growing trend in the way in which the development industry converts vacant land to urban uses.

Before World War II the development industry was characterized by a fragmented approach. A land speculator purchased land from a farmer, then sold it to a land subdivider who in turn sold single lots to individual purchasers who hired a home builder to construct a house. The typical home builder probably built one or two dozen houses in a year. Other builders specialized in constructing apartments, commercial buildings or industrial structures.

The public regulatory system was composed of two basic tools: land subdivision regulations and zoning ordinances. In the context of the existing development process they worked reasonably well, since most development and regulation took place on a lot-by-lot basis. And, it should be noted that regulation was "preset". It was possible to draft regulation and proceed to lay out, say, a small subdivision of single-family houses. From the governmental perspective, regulation was the process of checking the subdivision plat for conformance to regulation.

The local governments should or will renounce development controls. As developments grow in size and in the resulting environmental impact, regulation will probably increase. Rather the point illustrates the central dilemma of regulating planned unit development: the PUD ordinance, which allows the greatest amount of flexibility, ideally will have a tendency to allow better design. But as problems in actually administering PUDs as defined by developers, planners, lawyers, and public officials are addressed, ordinances are amended and thus become less flexible, and thereby have a tendency to decrease the chance for better design.

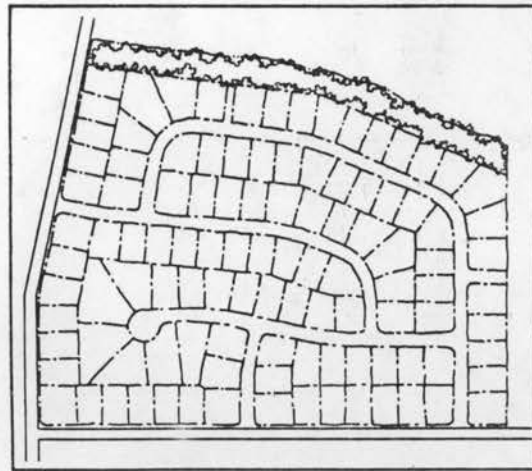
Traditionally, the city, large and small, was a place of mixture. It brought together a wide variety of people and activities in a relatively limited space. People came to the city to be part of this mixture.

The desire to reduce congestion, the need to escape adverse effects of an unplanned and uncontrolled environment and the expansive growth of the urban areas were among the forces that led to a general separation of uses in zoning and otherwise. Segregation seemed to be in order in all respects.

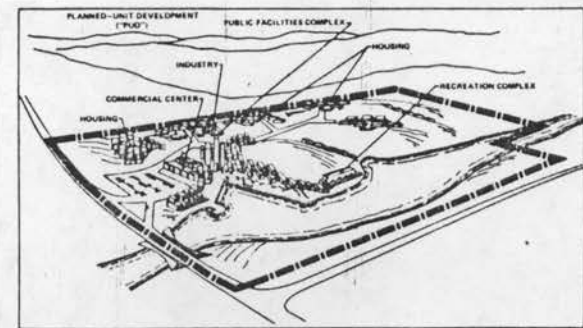
Today there is a search for a freedom to mix and this is reflected to some degree in planning. The uniformity of suburban development has been under attack and there are an increasing number of examples of mixing of types and uses, especially in large scale development, the mixture of single family, town house and high rise apartment houses; the provision of shopping, institutional and other nonresidential uses in residential development. The planned unit development is an attempt to find a flexible means of re-introducing diversity and mixture in newer urban growth.

### Planned-Unit Development

Traditionally, zones have been classified according to type of building. A single-family zone, for example, is based on the premise that all properties within the area should be developed for a single building of a similar type, specifically, the single-family home. In the traditional zoning ordinance, setbacks are required all the way around the house. The front yard setback is generally 20 to 25 feet. The side yard setback varies between 5 feet and 15 feet. The backyard traditionally is 25 to 30 feet. By maintaining these setbacks, a typical pattern of single-family detached dwellings is achieved. Also, a height limit of 30 to 40 feet (excluding chimneys and TV-radio antenna) and a minimum lot size are required. This type of residential zone has many advantages. It ensures that the property will be protected from undue encroachment and exclusion of light and air by the neighboring single-family residential building.



*conventional development*



*Planned Unit Development*

There are some disadvantages to traditional zoning that should be noted. This type of zoning often results in relatively monotonous development. Each street tends to become very much like the neighboring street. Moreover, this type of single-family detached residential zoning may be wasteful of land. Often the side yards are not large enough to be used for anything other than a path permitting someone to take the lawn mower from the front yard to the backyard. Modern planned-unit development zoning encourages variety, full use of all open space, and the addition of residential amenities to insure a long, useful life of the development. It does this by waiving the traditional restrictions, which allow only single-family houses on spacious lots. Under planned-unit development zoning, the density of the area remains constant, but the developer may build an assortment of housing types single-family units, duplexes, row houses, and apartments. This type of development, especially recommended for hilly terrain, has the added advantage of providing common parking facilities and play areas.

For example, in a 5-acre area zoned at a density of four families per acre (approximately 10,000 square feet minimum lot size), the developer can build 20 units. He may choose to construct a row of 8 units plus 2 apartments of 6 units each, for a total of 20 units. This is the same number of units the developer could build under a traditional development of single-family homes. Under planned-unit development, however, the developer may be able to achieve substantial savings in street and utility development. More important, the housing units can be laid out so that a substantial saving in land will be achieved. Many developers add special amenities to their developments, including swimming pools, golf courses, and community centers.

The planned-unit development is usually incorporated into the zoning ordinance, not as a special zone, but as a conditional use in any of the residential zones. Usually it must conform to the density of the zone in which it is located. In some communities, a 10 or 20 percent density bonus is offered as an incentive to encourage developers to use

this method of building residential areas. Usually a 5-acre minimum is required, although in some communities there is an advantage in reducing this minimum to one or two acres to encourage planned-unit development where an entire block in a built-up area is still vacant and under single ownership. The development plan is reviewed by the Board of Adjustment, which may be assisted by outside consultants. Attention should be paid to designing the zoning ordinance so that the review procedure does not discourage developers from taking advantage of the planned-unit development.

The approach is quite simple. Open space is preserved by permitting a subdivider to develop smaller lots than specified in the zoning ordinance, coupled with the requirement that the land saved be reserved for permanent open space. No increase in the number of units is allowed, thus retaining the original density prescribed by the zoning ordinance. For this reason the technique is sometimes referred to as "density zoning" or "density averaging".

A more common term for it is "cluster development", or "cluster zoning". While this is simple and easy to remember, it can be misinterpreted to mean houses tightly packed or clustered together. While this might be appropriate in some places, it is not a necessary feature of successful open space design even though houses will be somewhat closer together than in a conventional development of the same acreage.

Still another term associated with the open space approach is "Planned Unit Development" (PUD). The U.S. Department of Housing and Urban Development uses "PUD" specifically to mean a similar kind of residential development. However, planned-unit development more commonly means a relatively large-scale development that includes commercial and public facilities, and sometimes industrial development, as well as housing, in the overall design. PUD also generally involves densities higher than permitted by existing zoning. PUD may incorporate the open space concept in its design, but its uses are larger in scope.



PUD

Planned Unit Development is a new way of designing residential neighborhoods that can provide a better environment for the people who live there and produce more profits for the developer and builder.

Under this approach, the Planning Board may waive technical requirements, such as yard regulations and height restrictions, to permit dwellings to be built together in clusters leaving substantial land areas in a natural state. In addition, the governing body or planning board can grant bonuses of extra floor area to developers in return for good site plans or the provisions of common open space.

Some of the advantages for people living in a Planned Unit Development are:

- Larger houses for less money
- More choice of house types
- Preservation of natural features like ponds and trees
- Community recreation space
- Safe pedestrian ways and safer streets
- More conveniently located schools and shops

Some of the advantages for the developer and builder are:

- Less land used for streets
- More efficient utility runs
- Better drainage, less grading and site preparation
- More varied house types that can reach a wider market
- More dwelling units and bigger houses
- The ability to include shops and stores

The following outline explains the most significant provisions of the new approach, and shows how these advantages can be obtained.

Regulations that can be modified:

The Planning Board may authorize the following modifications to the zoning regulations, provided that the overall plan is satisfactory to the Board and is not contrary to the Master Plan.

Bulk Regulations

- a. Floor area and dwelling units, rooms, or rooming units may be distributed without regard for zoning lot lines.
- b. Open space may be distributed without regard to zoning lot lines.
- c. Lot sizes may be reduced.
- d. Yard regulations may be waived within a development.
- e. Height regulations may be waived within a development, provided that regulations governing the spacing of buildings are satisfied.

Use Regulations

- a. Convenience shopping, restaurants and certain other types of consumer services may be permitted within residential areas, provided that the Board is satisfied that they represent an amenity, and provided that the total area devoted to such uses is no more than 2-5 percent of the overall floor area permitted in the development.
- b. Outdoor swimming pools may be provided in the common open space, provided that their use is restricted to residents of the development and that the pool is located at a reasonable distance from the development's boundary and is adequately screened from the street.

Regulations that can be modified by special permit:

The Planning Board may grant Special Permits providing for minor variations in the requirements for front or rear yards, and in the regulations governing the height of buildings, along the boundaries of a Planned Unit Development.

Bonuses given by special permit

The Planning Board may grant bonuses of additional floor space to the developer for a good site plan with or without the provision of common open space. The bonus for a good site plan can be granted within the following limits:

1. The required open space may be reduced by 10-20 percent.
2. The required lot area per room, or the lot area required per dwelling unit, may be reduced by 5-10 percent.
3. The allowable floor area may be increased by 5-15 percent.

Larger Houses for Less Money

A large portion of the price paid for a house really goes to pay for land. Land prices in urban areas can be as much as 10 times as high as they would be in a suburb. Since Planned Unit Development permits the builder to offer houses on smaller building lots, a house in a development where this approach has been used could cost substantially less than a comparable house on a larger lot. At the same time, the easing of yard restrictions in Planned Unit Development permits the builder to construct a larger house than is now permitted on a conventional lot; so that a larger house, for less money, is a very real possibility under Planned Unit Development.



### More Choice of House Types

Where conventional development tends to produce street after street of the same type of dwelling, Planned Unit Development encourages town houses, garden apartments, detached houses, and atrium houses, all of varying sizes, to be built in the same development. This means more variety of family size and income level in any given area, and allows families to move from one type and size of house to another without leaving their old neighborhood.

### Preservation of Natural Features

Instead of developing a whole section with paved streets and narrow, fenced-in yards, Planned Unit Development permits as much as 30 percent of the land area to remain in its natural state, while housing the same number of families as conventional development, sometimes even more. This means that natural features, like ponds and rock outcroppings, as well as trees and streams, can be preserved near the places where people live.

At the same time, all houses continue to have their own private open space, which may be larger than conventional backyards. The land saved for open space is land that would ordinarily have been devoted to unusable side yards and unnecessary streets.

### Community Recreation Space

Open space created by Planned Unit Development can be used for recreation areas like playing fields and swimming pools, and there can easily be extra open space for schools and community facilities. The new approach allows such facilities to be designed as an integral part of the residential neighborhood, instead of being in their own separate locations.

### Safe Pedestrian Ways and Safer Streets

The community open space of Planned Unit Development can also be used to create pedestrian greenways connecting houses with schools and larger open areas. Such greenways can be designed so that they cross few or no streets, providing safe routes for children to walk to school, or play space.

The intersection of two conventional "gridiron" streets creates as many as 16 potential places where a collision can take place. The neighborhood loop streets possible in Planned Unit Development can have as few as three potential collision points. In addition, the clear distinction between through-traffic streets and neighborhood streets made possible by Planned Unit Development provides a generally safer traffic pattern, with fewer cars moving more slowly, in the areas where people live.

### More Convenience to Schools and Shops

In conventionally zoned areas, shops can only be placed in sections with commercial zoning. A Planned Unit Development permits small groups of shops and restaurants in the middle of residential areas, giving the kind of convenience often found in the center of cities, but seldom in outlying residential districts.

In addition, by placing a school adjacent to community open space, it is likely to be far more centrally located than would be possible under conventional conditions.

### Fewer and Shorter Streets

Developers in large low-density tracts generally are responsible for building the streets themselves; therefore, the fewer and shorter streets needed for Planned Unit Development mean a substantial saving for the developer. There may be as much as 30

percent less street area under Planned Unit Development, which not only means less development cost, but more valuable land available for housing.

#### More Efficient Utility Runs

The developer in a large tract normally must also build storm drains and the sewers for his development. Because of the more compact street system possible in Planned Unit Development, the developer is likely to realize substantial savings in providing utilities.

#### Better Drainage, Less Site Preparation

Conventional gridiron street systems often work against the natural contours of the land, creating steep streets to which it is hard to relate houses, and low-lying areas susceptible to flooding. Planned Unit Development, by providing streets that are only for local vehicles, allows the builder to develop those parts of his site most suitable for housing, leaving hills and flood plain areas open as part of his community open space. By not having to meet customary requirements for through and connecting streets, the builder frequently can realize a significant saving, as well as ending up with a far more satisfactory development.

#### More Sales Flexibility in House Types

Market conditions often change while an area is being developed. Mortgage money may become easier or harder to come by, local conditions may cause a sudden influx of a new kind of house buyer. Conventional zoning and street maps tend to lock the builder into a single type of house with a very narrow variation in price range. The variety

of house types possible under Planned Unit Development allows the builder to appeal to a wider segment of the potential house market, and to switch from detached houses to garden apartments, for example, as market conditions change.

#### More Dwelling Units and Bigger Houses

The bonus provisions of the Planned Unit Development regulations can give the builder significantly more houses or apartments on a given piece of land, in addition to the extra buildings made possible by saving on the amount of land devoted to streets. The relaxation of yard requirements also permits bigger houses than are possible under conventional zoning, further enlarging the builder's flexibility in responding to the housing market.

#### Ability to Include Shops and Stores

Finally, the developer and builder benefits from the opportunity provided by Planned Unit Development to devote a portion of the floor area he builds to space for shops and restaurants. Such commercial space has a high rental value, and is not usually allowed in a residential development.

#### Streets

Street patterns are the most important element in establishing the character of a residential community. Most existing and mapped streets are based upon only two guiding principles: provision of maximum frontage for traditional lot size and maximum flow of all type of traffic on every street. The first step in dispelling the monotony caused by this system-particularly in low-density residential areas-is the establishment of a

hierarchy of street types based on usage. Aside from expressways and highways, this hierarchy consists of three basic street types: major collector streets, local collector streets and local residential streets. Major collector streets are major arteries and interneighborhood streets; local collector streets pick up traffic from local residential streets in one neighborhood; and local residential streets are solely for the residential area served. Recommendations for specific characteristics of these three street types are:

Major Collector Streets:

Traffic characteristics: all types of vehicles, through traffic.

Pedestrian safety: limitation of pedestrian crossover to a minimum of controlled point.

Length: unlimited

Width: 60' - 100'

Grades: 8 percent maximum, with other technical requirements conforming to the policies of the Department of Highways.

Local Collector Streets:

Traffic characteristics: primarily private cars and service vehicles, through traffic discouraged.

Pedestrian safety: increased through limitation of traffic, but crossover points should be designated.

Length: should be interrupted by intersections with major collector streets; intersections should be T-shaped in order to prevent local traffic from crossing major collector.



Width: 50' - 60'

Grades: 10 percent maximum, with other technical requirements conforming to the policies of the Department of Highways.

Local Residential Streets:

Traffic characteristics: private cars, except that service and emergency vehicles are permitted.

Pedestrian safety: problem minimized through restriction of traffic to residents of specific residential grouping; where possible, a pedestrian should be able to pass beyond his own residential grouping without crossing any street. Furthermore, the pedestrian's path to local shops and elementary schools should cross as few streets as possible.

Length: grid and modified grid system blocks should have a continuous frontage no longer than 800', except that a 1,200' long block is permissible if a pedestrian access no narrower than 10' is provided near the midpoint of the block.

Cul-de-sacs should be no longer than 250' to the neck of the turnaround unless a connection to an adjacent street can be achieved by a 10' wide paved pedestrian walk for emergency vehicle access.

P-loop streets should have a neck no longer than 700' and a loop circumference no longer than 2,800', measured at the center line of the street. P-loop streets must have emergency vehicle access to an adjacent street.

Horseshoe-loop streets may be of varying lengths, depending on the number of dwelling units served.

Width: 40' - 50'

Specifications of street and sidewalk design and construction must conform to the standards of the Department of Highways.

### Sidewalks and Pedestrian Ways

Sidewalks and pedestrian ways supplement and complete street systems in establishing the character of a residential environment. The pedestrian circulation system need not parallel the street system, but the following criteria must be observed:

- a. A sidewalk must be provided on at least one side of a public street except where it can be demonstrated that such a sidewalk is not desirable.
- b. Pedestrian circulation systems must be provided as convenient, safe, and attractive links between residential groupings, open space area, recreational areas, schools, and local shopping areas.
- c. The width of any sidewalk must be at least 4'.
- d. Alternatives to the norms of asphalt or concrete pavement construction should be considered; surface treatment and forming methods can afford an opportunity to enhance the character of a residential environment.

### Utility Placement

The requirements of utility locations generally follow the street pattern; however, easements through common open space augment the flexibility of utility placement. Easement requirements are as follows: 20' unobstructed width for one storm or sanitary line; 30' for two storm or sanitary lines. The feasibility of burying electrical and telephone lines should be studied, as well as the use of existing watercourses for storm drainage.

### Site Characteristics

Pre-existing site conditions have considerable importance in establishing the character of a residential development. Previous policy, again through street mapping

and traditional lot sizes, has generally ignored the preservation of natural site characteristics. The Planned Unit Development amendment not only permits but encourages flexible and positive responses to the natural assets of a site. Specific site assets that should be considered in a Planned Unit Development are:

Trees:

Trees of 6" diameter and larger are to be protected and saved wherever possible, particularly where a grouping of such trees exists; the feasibility of temporary removal and replacement of smaller trees should be considered.

Contours:

Responses to site profiles must be considered in Planned Unit Development; ridges, rock outcroppings, slopes, and hillocks all require that special consideration be given the siting of buildings.

Water:

Existing site water, in the form of watercourses, streams, marshes, and ponds should be considered as possible resources for the establishment of viable ponds, streams, or storm drainage courses.

Orientation:

The siting of a residential development should be assessed in terms of site profiles, views, sun, prevailing wind, and water resources.



### Open Space Development

All of the above considerations should be considered with a view toward developing pleasant and usable open-space patterns throughout the residential community. This open space should be related to any existing parks or park plans.

### Houses and Placement of Houses on Lots

The house is the most important item for each individual homeowner in the residential community. Past practice, dictated by the inflexibilities of street mapping and subdivision, was much too limited a range of choice for homebuyers and developers alike. Typically, such practice resulted in deep, narrow houses on deep, narrow lots. The front yard in this situation is entirely given over to a paving network; sidewalks, driveways, and front walks. The side yard along which the largest dimension of the house must run is seldom much more than 8' wide and is virtually worthless. The rear yard becomes the only usable open space, and even here, since all houses are placed in a row, it is very difficult to establish any real privacy.

Without setting down standards for houses and their placement, it is the intention of the Planned Unit Development regulations to introduce the kind of flexibility that will greatly improve the residential environment. Specifically, the individual house must be designed to relate the open area around each house to what occurs inside the house. The house has entrances for people and an entrance for automobiles; this fact has meaning both in terms of open area, and the portion of the house that serves the entrance function; and a design response to this fact is expected. The house has indoor and outdoor living functions; this requires a design that relates the two, preferably resulting in increased privacy for outdoor living because of the way adjacent buildings are placed.

Similar thought and design response should be shown in the arrangement of bedrooms, internal circulation, and service spaces.

### Definitions

**Planned Unit:** a land area that (1) has both individual building sites and common property such as a park, and (2) is designed and organized to be capable of satisfactory use and operation as a separate entity without necessarily having the participation of other building sites or other common property. The ownership of the common property may be either public or private.

### Planned Unit Development:

A single planned unit as initially designed; or such a unit as expanded by annexation of additional land area; or a group of contiguous planned units, either operating as separate entities or merged into a single consolidated entity.

**Homes association:** an incorporated, nonprofit organization operating under recorded land agreements through which (a) each lot owner in a planned unit or other described land area is automatically a member, and (b) each lot is automatically subject to a charge for a proportionate share of the expenses for the organization's activities, such as maintaining a common property.

### Common Property:

A parcel or parcels of land together with the improvements thereon, the use and enjoyment of which are shared by the owners and occupants of the individual building sites in the planned unit.

The following outline explains the most significant provisions of the new approach and shows how these advantages can be obtained.

Regulations that can be modified:

The Planning Board may authorize modifications to the zoning regulations, provided that the overall plan is satisfactory to the Board and is not contrary to the Master Plan.

Ownership and Maintenance of Open Space

Two matters relating to open-space subdivision that often arouse apprehension on the part of both planning boards and the public are first, concern with the maintenance and control of open space, and second, the fear that the open space may someday be used for development, thus greatly increasing the total density. These are legitimate and sensitive issues. However, planning boards can insure that developers not only prepare an appropriate physical design, but can also provide proper legal safeguards for control and maintenance of the open space.

Two basic approaches are most commonly utilized. The open space can be dedicated to the community for use as a public facility, which would then mean that the municipality would maintain it; or, it could be owned by a homeowners' association comprised of the residents of the subdivision and reserved for their use.

Most county districts are geared to assist developers, local groups, public agencies and community associations in developing appropriate management plans for open space and natural areas.

### Municipal Ownership

A number of communities require public dedication of open space.

Each method has its advantages and problems. With municipal ownership, of course, there is a firmer guarantee that the land will be used and cared for in compliance with the wishes of the larger community. It also can be a relatively inexpensive and painless way to add parks and open space resources for the community. However, should the open spaces be in an area not easily accessible, there is the danger of the municipality maintaining at public cost a facility that is, for all practical purposes, a private park.

In the belief that any open space is better than none, many communities may be tempted to accept whatever land a builder is willing to dedicate to the municipality as open space. Care should be taken, however, that such land is appropriate for open space and compatible with community ownership and responsibility. The possibility of use for formal recreation such as ball fields is not necessarily a criterion. Much open space can serve a valuable function in its undeveloped state as a "wander space" for youngsters, as a visual amenity or as a nature study area. However, in its eagerness to increase its supply of open space, a community may find itself owning land which, through location, topography or general condition, is not only unsuitable for formal recreational use, but difficult to maintain and care for even in its undeveloped state. Or, it may be too inconveniently located for use by any significant number of residents. Such land may turn into a dumping ground for autos and other wastes, and instead of benefiting the community, end up as a hazardous or unsightly area that can only be properly eliminated or supervised at great public expense.

Such land may be offered by developers because it is economically infeasible to build on, or because its slope, soil conditions or other characteristics do not satisfy

the "buildability" criteria. They may often attempt to gain "credit" for such land, thus enabling them to build on the remaining piece to a higher density than would have been realistically possible on the total site.

To cope with this problem, a number of local governments require a builder to submit a conventional subdivision plan for the entire area, showing the lots that could be realistically created in terms of topography and costs under the existing zoning and in compliance with the subdivision regulations. The total number of lots arrived at in compliance with these qualifications establishes the maximum density for the open-space development.

A community can protect itself against the possibility of possessing land that is a liability rather than an asset by asking that developers "finish" the land before dedicating it to the municipality. As a result, the open space received is fully equipped and laid out for baseball and for other specific recreational uses.

#### The Homeowners' Association

Many of the problems associated with municipal ownership may be eliminated through the use of an alternative approach to the preservation of open space - the homeowners' association.

The homeowners' association is a nonprofit corporation made up of the residents to maintain the common open spaces and facilities in an open-space development. It is, in a sense, a small neighborhood government. Such associations may be voluntary or automatic. In voluntary associations, membership is optional and, while this idea may appeal to our democratic instincts, such an approach has many shortcomings. It can lead to administrative difficulties and to inequities among members and nonmembers in the use of land and facilities.



The automatic or mandatory homeowners' association is by far the more effective approach. Such an association should be legally established before sales in a development begin. As each lot is sold, the purchaser must become a member of the association. This requirement "runs with the land" - that is, it is written into the deed of each individual lot in perpetuity.

The association is responsible for the care and maintenance of the open space and any developed facilities, such as ball fields, swimming pools or meeting rooms that may be commonly owned. A monthly or yearly service charge is assessed against each member to cover the costs involved.

The developer retains membership in the association by virtue of his ownership of the unsold lots and in the early stages will have the majority membership and thus control the community facilities and open space.

A number of such associations have been operating for many years. In Radburn, New Jersey, where an association has existed since 1930, the annual fee is based on a prearranged percentage of the real estate tax paid to the Township. In return, the Association not only cares for the recreational facilities and the open space, but also provides a library and a program of recreational and educational activities for all residents. The fee also covers the salary of a full-time manager and a small clerical staff, a necessity in a community as large as Radburn.

The municipality can require that such an association, if established, be set up by the developer according to prescribed standards. It may list a number of conditions for approval of such an association. These include the requirements that membership in the association be automatic for each lot owner and that the Homes Association gain title to all the common property and, once established, retain all responsibility for operation of the open space and common facilities.

The question of whether the open space should be municipally owned and maintained or whether it should become the property of a private homeowners' association is a decision

that must be made by each municipality. Local circumstances, such as the need for public open space and the nature of existing development, will affect the decision.

### Conclusion

Open-space subdivision should become an integral element of a municipality's strategy to achieve recreation and open space objectives. This subdivision technique will not, however, relieve a locality from having to acquire or in other ways obtain and preserve parklands. Though the community can facilitate, guide and encourage its use, in the final analysis Open Space Subdivision lies in the hands of private developers and is subject to the vagaries of the housing market. Yet as we have emphasized, maintaining open areas in new subdivisions is the most farsighted way of ensuring a proper balance between people and nature.

## CLUSTER DEVELOPMENT

A cluster development is one in which a number of dwelling units are grouped, leaving some land undivided for common use. It may mean grouping the same number of units allowed in a given subdivision or zoned area on smaller than usual or minimum lot, with the remainder of land available as a common area - the density remains the same, but some larger pieces of land, hopefully with some interesting natural features such as a creek or wooded hillside, left undivided and uninvaded and open for common use. Cluster development will be found increasingly in use and may become the dominant pattern of residential development.

Common open space is the key element. This may be a recreation core or a park-like natural area.

Development costs are lower since there are fewer for developing and less linear feet of utilities for dwelling. Sewerage is cheaper and there is less runoff with cluster since there is less paving and more ground surface to absorb water. Cluster can also concentrate building where drainage can best be handled, leaving natural water courses and the drainage network in its natural state.

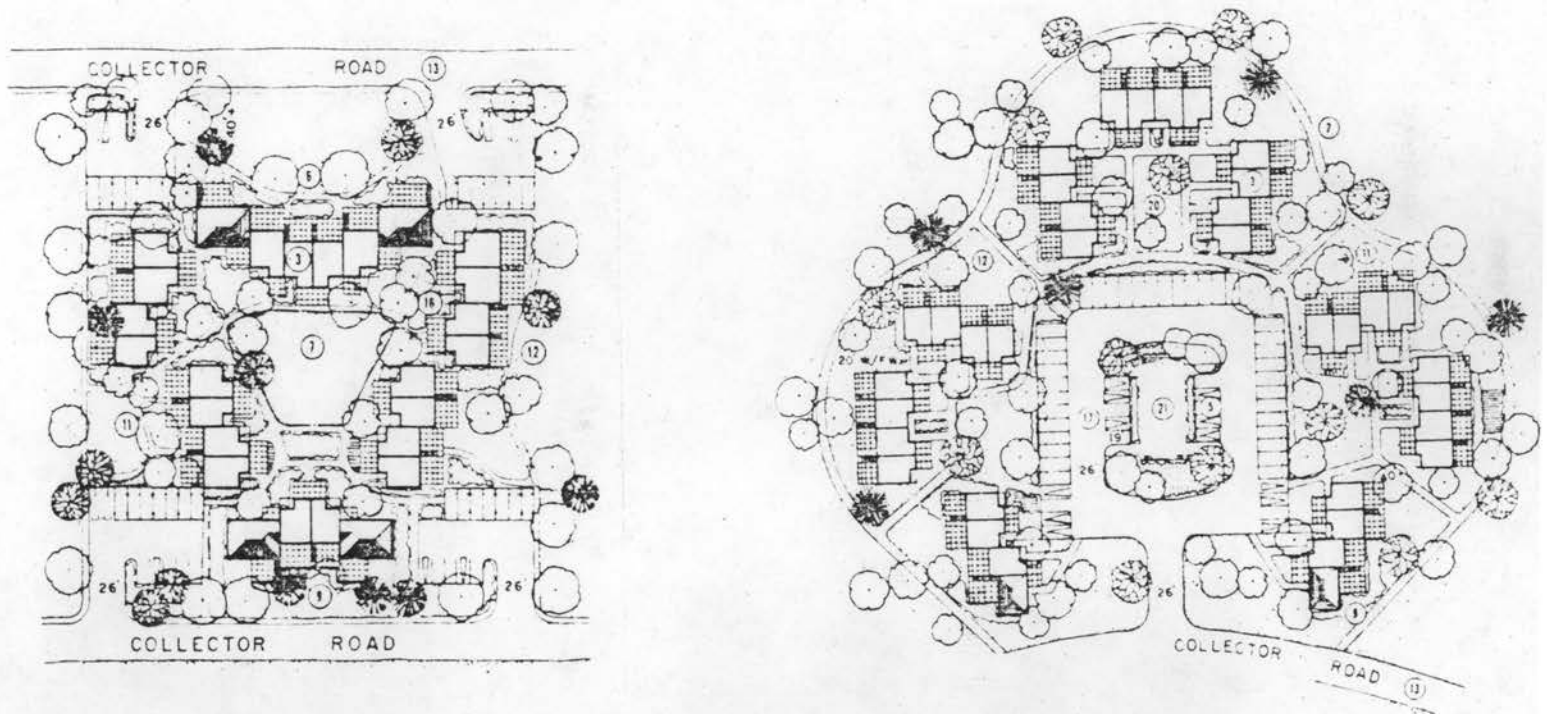
The open space element in cluster development in its best use is part of a general open space system, rather than a series or collection of isolated areas. The open spaces of the cluster pattern are far more effective and should be planned to connect with public open spaces such as parks and schools and with open space arrangements of other developments or subdivisions.

A key question is the ownership and management of the open space areas in cluster development. The common open space is primarily for the people of the development and while it may benefit the community at large, it should not be used as a substitute or



alternative to other public spaces needed for parks, schools, and other civic facilities or improvements.

The cluster common area may be deeded to the public, or (as is considered best by some) owned cooperatively by the homeowner through a Homeowners Association, or maintained through the formation of a special district.



## TYPES OF FAMILY

The principal kinds of occupants of housing with which we have to deal are the following:

1. Parents with one or more children
2. Childless couples, one or both of whom work
3. Single persons
4. Old couples or widowed persons living alone
5. Lodgers and boarders
6. Animal pets

Each kind has its typical needs and has several variants.

Families with one child are a simple problem. Normally they will have two bedrooms; if so, whatever the age of the child, it and the parents can usually have adequate privacy. Due to high rentals, this type of family will sometimes occupy a one bedroom unit. During infancy and until the child is three years old, this may be tolerable, although inconvenient in many ways. Thereafter, as the child develops a certain independence and new interests, it is not acceptable. With more than one child, questions of disparity of age, difference of sex, childhood, adolescence, or maturity have great importance. A boy of fifteen and one of five will not be happy sharing one bedroom, nor will the adolescent girl of dating age abide her moppet sister who is interested in what she does and is probably prying into her affairs. As a usual thing adolescents will want rooms of their own; in the case of brothers or of sisters who are thoroughly congenial a large room is needed: hence the second bedroom in a dwelling plan must be full size, capable of holding twin beds. Architects must not plan on the assumption of the minimum needs of children aged four. In his earliest years, a child's need of space can usually be satisfied in his sleeping quarters. Because of their outside associations

teen agers begin to make heavy demands on living space, and major conflicts arise between parents and children. Here a third bedroom used as a study or a dining space separated from the living room will avoid many conflicts.

The normal unit of childless couples has one bedroom, living room, kitchen and bath. Something will depend on whether one or both of its members are gainfully employed. In the latter case, reduced cooking and eating facilities may be tolerable, since they frequently eat only breakfast at home. Perhaps such a couple can survive in a so-called "efficiency apartment", where they can't get away from each other and where the "strip kitchen" has no place to pour out a couple of plates of soup. This type of dwelling may be acceptable in inlying apartment hotels where restaurants are numerous and perhaps good. Elsewhere, the architect must assume that couples without children will eat at home and plan for this accordingly.

Single persons living alone will frequently be entirely satisfied with one large room, kitchenette and bath. Such a unit demands little housekeeping. On the other hand, the more fastidious will object to their living space being in complete confusion until they have had breakfast and made the bed and will hardly welcome an early caller, be it a friend or the Fuller brush man. Two men or two women living together may be willing to share a single bedroom. Such associations are frequently temporary and casual, and the members are not adjusted to each other's habits, as are married couples. A one-room unit is impossible for them. If they cannot share a bedroom, a single-bedroom apartment will oblige one of them to sleep in the living room. This always creates problems, especially if they each have different friends. Hence they will be happier with a two-bedroom unit.

Elderly couples living alone are just like other folks except for the fact that they are old. They usually enjoy quiet, but this does not mean that they want to be out of contact with younger people and in colonies by themselves. They do not want all

those who live around them to remind them of their own aches and pains. Old folks cannot do heavy household work and do not want to climb stairs. They want to be near those they love, and if they have church or social affiliations in the community, they don't want to move away when they quit the old home, whose maintenance has become too burdensome. Some will prefer elevator apartments, some will want to live at ground level with a small private garden. Most of our suburbs have too few possible homes for those who have aged in their midst, who are cherished members of the community, but who now have no recourse other than to move elsewhere.

Only in single-family homes can pets be cared for adequately. They too need space and have physical needs to satisfy. One feels sorry for dogs who have to live in city apartments, and on cold or rainy days one can feel a measure of compassion for their owners who have to walk them periodically. It would be interesting to know what percentage of cases of pneumonia are caused by people leaving overheated city apartments in inclement weather to allow Fido to tend to his needs.

Planning must care for the living needs of all these types of activities: cooking, eating, sleeping, elimination of bodily waste, sex relations, care of invalids, care and training of children, social life and entertainment of old and young, storage facilities, frequently also laundry work, auto storage and repairs. In some instances this has been done, but frequently many of these functions are ill served, due largely to cramped space, and some analysts find in this condition a hitherto unrecognized victim of our living pattern, namely Dad! Formerly everyone was sorry for Mother, who "stood eight hours over a hot stove". Modern technology has taken much of the drudgery out of women's work. But in diminished quarters, Father has no place to putter around, do odd jobs, keep his accounts, or sulk. In serviced apartments, some of his healthful chores disappear; he doesn't even renew the worn out washers in the kitchen faucets. These analysts maintain that he has become the star boarder, with little or no contact with or influence over the family life. Let us not belittle the handicaps of cramped quarters, but let us

also recognize that if Dad is merely a "star boarder", it is in a large measure his own fault. In any event, as planners we should consider his wants and activities most carefully.

#### PHYSICAL NEEDS

1. List the activities of each member of the family individually. Indicate next to each activity or interest the space, furniture, or equipment needed for that activity. Here is an example of Family A.

##### Husband

Studying	Desk, bookshelves, file, desk supplies
Music	Piano, string instruments, stands, music storage, space for chamber music
Woodwork	Workshop, counter, tool and wood storage
Photography	Darkroom, sink, counters, camera storage

##### Wife

Housekeeping	Desk, telephone, bulletin board, cookbooks, fully equipped kitchen, laundry, mending equipment, wrapping material and counter, garden supplies, cleaning supplies and space to store them
Studying	Desk, telephone, bookshelf, desk supplies and storage space for them, file, typewriter
Sewing	Table, sewing machine, storage for small equipment and for materials, iron, etc.



For Each Member of the Family

Sleeping	Beds
Bathing	Baths, linen closets, etc.
Dressing	Clothes storage, mirrors

2. List the activities which the family does as a group, at home and away from home, which take transportation or equipment which must be provided for.

Example: Family A.

Eating	Kitchen, food and dish storage Dining table indoor and outside Entertaining - space for 12 guests
Recreation	Living area Fireplace Seating for from 4 to 16 people Comfortable chairs, light, etc. for two to read Coffee table, bookshelves, etc Musical instruments, piano, phonograph Slide projection equipment, games, etc. Outside area for sitting and playing
Travel	Cars (2) Storage for suitcases, camping equipment Outdoor cloths Space for maps, pamphlets, collections, etc. General storage of large and miscellaneous things

Children (each)

- Indoor play      Large floor, large table, storage for toys  
 Outdoor play      Play yard and equipment, bikes, wagons, etc.

3. Group the activities or necessary space that would go together and thus should be adjacent.

## Example: Family A.

- A. Living area  
    Dining area  
    Entry  
    Outdoor area
- B. Dining area  
    Outdoor dining area  
    Kitchen
- C. Kitchen  
    Dining  
    Entry  
    Utility area - laundry, ironing, sewing, packaging
- D. Carport  
    Workshop  
    Entry
- E. Sleeping areas  
    Dressing and clothes storage  
    Baths

4. List the activities that will probably not occur simultaneously and so could be done in the same space.

Example: Family A.

Parents	Sleeping	Bedroom, study
	Studying	
	Sewing	Guest and sewing room
Visiting guest		
Children	Bathing (2nd bathroom)	Bathroom
	Photography (dark room)	
	Sleeping	Bedroom, playrooms
Play		
Furniture	Guest dining chairs	Same style chair
	Desk chairs	

Make a design from the previous lists. Group together the activities that go together in one room. Arrange these so that they connect with the activities that should be adjacent, i.e. dining-kitchen.

From such a diagram one can figure out the approximate number of square feet needed for each area. This, plus some extra for halls and such, will indicate the number of square feet of space needed for the entire house. Since building cost can be determined approximately on a square foot basis (the cost per square foot can be obtained from a local contractor), this will furnish some clues as to how much the entire house will cost and how much is being spent on each activity.

#### TYPES OF DWELLING

The principal types of dwelling in common use are:

1. Detached single-family houses



2. Semi-detached houses
3. Group and row houses
4. Two or three story flats
5. Walkup apartments
6. Elevator apartments

By far the largest percentage of dwellings is represented by single family homes. The layout of the house is a comparatively simple problem; not so the treatment of site planning, especially for developments of small homes on narrow lots less than 70 feet wide. Without careful study of the relation of each house to its neighbors and of variety of house plans, set back lines, and the outlook from each room in the dwelling as it will be located on the general plan, there is likely to be extreme monotony of appearance, lack of visual and auditory privacy between adjacent homes, and a view of the neighbors' wash from the living room windows. Since the houses are small units, the problem of achieving a pleasing architectural composition which will give a sense of individuality to groups of dwellings becomes increasingly difficult as the development increases in size. The average commercial developer makes no attempt at variety in planning and contents himself with producing a monotonous string of buttons, differentiated, each from the next, by a change in color of material or of type of entrance door. Utter monotony might be better than the resultant chaos of color and form.

Semi-detached houses have a few distinct advantages. The party wall owned in common is an initial saving, and three exposures make a smaller demand on the coal pile than do four. With similar house and lot width, the space between the exposed walls of adjacent houses is doubled, affording greater possible visual privacy than detached houses in the center of the lot. There are several major disadvantages. One of a pair of houses may have a good exposure and the other not. Unless the lots are wide and the houses shallow, there is likely to be a great deal of wasteful corridor space. Usually semi-

detached houses are narrow and deep. If the owner of one side decides to tear it down, the appearance of the remaining half is ruined for life. Unless both owners can agree upon repainting at the same time, the unpainted half is bound to look seedy and ludicrous if the buildings are of frame construction. This sad result is mitigated in a measure if the exterior walls are of masonry, even then, green shutters and window frames on one half and white on the other are unpleasant. This objection is not present in rental houses under common management.

Group and row houses are frequently in urban communities, chiefly along the Eastern seaboard. If well planned, they are one of the best types of urban dwelling and, in spite of a traditional prejudice, they are finding ready acceptance in urban and suburban centers throughout the country. With only a small front and back yard and two exposures to make demands on the heating plant, they have a strong appeal to the householder who has only a limited amount of time and energy to devote to his grounds after the demands of his normal occupation have been met. A row house two rooms deep is preferable to a detached house on a narrow lot, since it affords far better visual privacy. In the past row house planning has been poor. This is due to two factors: the attempt to reduce the cost per dwelling of sidewalks, streets, and public utilities, and the desire of the developer to create as many salable parcels as possible with a given street frontage. This has had unfortunate results: sliver subdivision with houses three and sometimes four rooms deep on frontages of fifteen or sixteen feet; worst of all, the creation of a pattern of narrow blocks and frequent streets, which virtually prevent any rational grouping of row houses. These frequent streets quickly create a heavy burden of street cleaning and maintenance for the community.

As distinguished from apartments, flat buildings are those having a single dwelling per floor with one family living upstairs, who have a private staircase to reach their quarters. It seems to have an individual heating system for each dwelling. The house

has been sold with the idea that the purchaser could live rent free with the money obtained from the extra flat, even when he, as landlord, pays for repair and water supply and furnishes heat to the tenant. Flats can serve a real purpose in rental housing projects by providing one-bedroom units, which are more difficult to arrange in row houses.

Walk-up apartments are a useful type of dwelling for urban or suburban areas and usually permit better unit planning than elevator buildings. In the latter, the heavy cost of installation, operation, and maintenance prompts the developer to serve as many apartments per floor as possible with one elevator stack. This leads to wasteful corridors and frequently to compromised unit planning. A two or three story walkup can afford more frequent staircases if they help avoid public corridor length on each floor. Walk-ups more than three stories in height are open to question, especially if the rentals on the upper floors must be lower than those below. Rentals decrease with each flight of stairs above the second floor. One result is that in addition to a vertical income stratification between neighborhoods of greater or less prestige, there is a horizontal stratification by floors. It is not unusual to find poor people living in the same building as the wealthy.

Low walk-ups meet with frequent objections in suburban communities because owners of single homes feel that their erection will affect the value of individual homes adversely. This feeling is doubtless due to the idea that apartments of necessity will crowd the lot lines and present a vista of unbroken walls. The many garden apartment groups designed by skillful architects are beginning to make headway against this feeling. If the job is done well, it fits perfectly into, and indeed enhances, the setting of fine trees and garden space of which our suburbs are justly proud. Such garden developments are far more desirable than the usual builder's subdivision of small individual houses on narrow lots.

As a usual thing, elevator apartments are found where land prices are high. Sometimes this is their only plausible justification. In other instances they are erected to exploit a desirable view, be it in the city or the country. They have patent advantages. The upper floors are above the level of heavy street dust and in warm weather are more likely to enjoy any breeze there is. In dense urban areas the aggregate of elevator buildings reduces the average travel distance of the occupants. On the other hand, they give rise to many problems. The reduction of travel distance is counterbalanced by slowness of travel due to crowded streets and transit media. If their use is open to question, it is mainly because they create too great a density of population. Even if entirely desirable and acceptable within the lot lines on the ground on which they are built, their aggregate effect upon the community as an operating urban mechanism may be disastrous. Sixteen story apartments in the open country set in acres of land and with low coverage and population density are entirely justifiable. This is not true in the city when they are crowded together, stealing each other's light and making the streets gloomy canyons flanked by high walls. This problem of adequate light has been avoided in the large scale elevator apartment developments of low coverage built by insurance companies and public authorities. However, they do nothing to relieve urban congestion and overcrowded schools. In fact they aggravate these very conditions.

As a place to live, elevator apartments serve the needs of many families admirably, particularly those in the higher income brackets. Assuming that they have enough rooms and space for comfortable living within their apartment, a high-income family can manage its outside contacts and those of its children successfully.

On the other hand, low-income families with children other than infants are not well housed in elevator buildings. If a mother takes entire charge of the home, supervision of outdoor play of her children is virtually impossible.

It has been contended with some degree of plausibility that, if well planned, elevator apartments cost less to erect and operate than walk-ups. When this contention is based on figures which include land cost, it is meaningless. Even when this is not the case and the cost can be shown to be less, we must ask ourselves what we have produced with the money spent. Of two plans compared, which permits a more satisfactory life? That should be the aim of housing, and it is entirely pertinent to ask why one should expect a better product to cost less than one which is not so good.

"If we believe that the object of architecture is to provide a framework for people's lives, then the rooms in our houses, and the relation between them, must be determined by the way we will live in them and move through them." This statement is only partly valid. Only partly, for even though we research the potential users most carefully, we still do not know the persons who are to live there - as we try to know those for whom we may be designing a single family house. Individual families will live differently, even among the same economic, age, occupation, and ethnic groups. Therefore in an apartment building the spaces themselves must be simple and universal enough to adapt to a variety of life styles. As far as the movement through the apartment is concerned far more specific criteria can be established relying on basic circulation patterns that are valid for most living conditions.

A well-planned apartment provides maximum privacy for various activities and makes movement to any room possible without crossing another.

#### ENTERING THE HOUSE

In inclement weather outer clothing should be taken off at the entrance and put away; umbrellas and boots should be stored to prevent dirtying the floors of other rooms; space should be provided to accommodate packages.



#### ENTERING WITH GROCERIES OR LEAVING WITH GARBAGE

Connection between entrance and kitchen should be as direct as possible; preferably through the entry hall and not the living space. A secondary entrance directly into the kitchen solves this problem ideally.

#### CHILDREN COMING IN FROM PLAY

Children should be able to reach the bathroom or their own rooms without crossing the living space.

#### DELIVERIES

Packages should be taken and paid for without having the delivery man enter the living space.

#### CHILDREN ENTERING WHILE ADULT ACTIVITY IS TAKING PLACE IN THE LIVING SPACE (OR VICE VERSA)

Children should be able to get to their bedrooms without crossing the living space.

#### PASSING FROM BEDROOM TO BATHROOM

It should not be necessary to cross the living space. Ideally, one should not be seen at all.

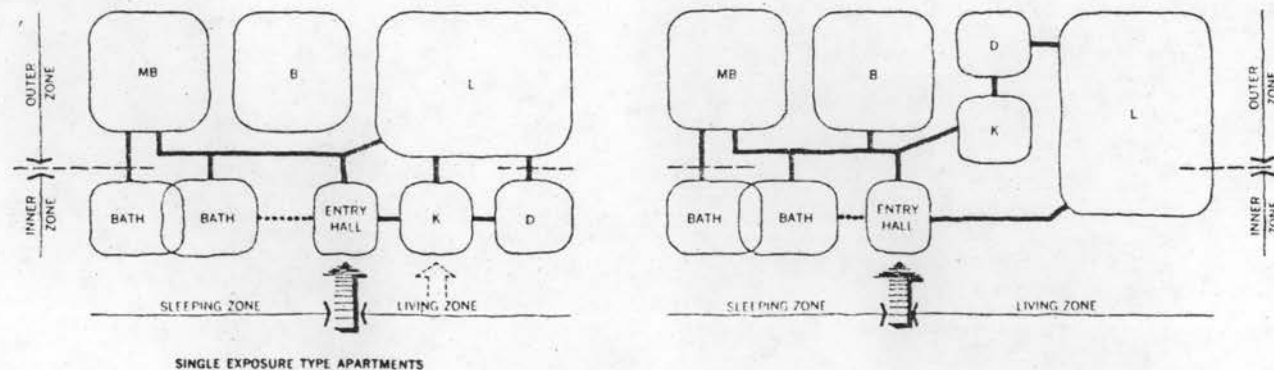


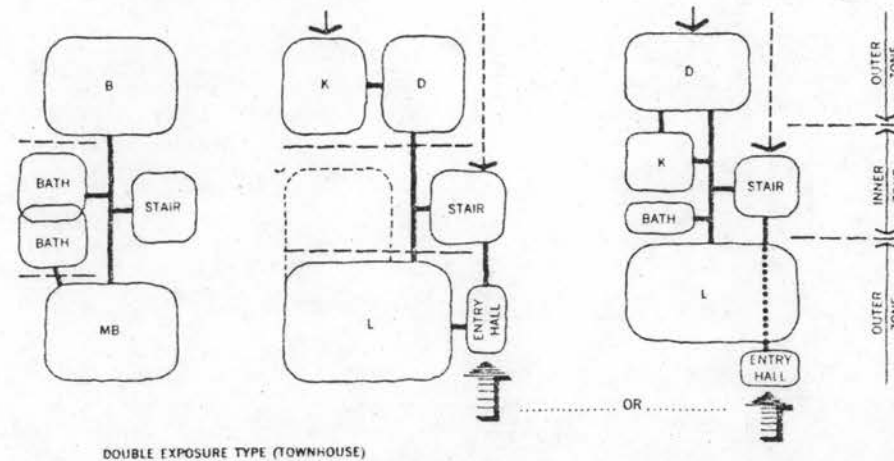
## SERVING FROM KITCHEN TO DINING ROOM

Service should be as direct as possible without crossing any other space (except occasionally the entry hall).

Ideal circulation criteria are achieved by proper planning of the rooms around the core of the house, which consists of the entry hall and the bedroom corridor. In fact a well-planned house can be divided into two zones, living zone and sleeping zone, separated by the entry hall.

Equally important as the relation of each room to the other is the relative position it occupies in relation to daylight and fresh air. Ideally, every room in a house should have exterior exposure to insure light and air. To plan this way, however, would increase the perimeter of the building to an extent that no one could afford to build it. Therefore bathrooms, invariably, kitchens, often, and dining rooms, sometimes, are handled as interior spaces. This is possible because building codes allow bathrooms and kitchens to be mechanically ventilated, because an inside dining alcove is really an extension of the living space, and because the kitchen can be situated to borrow light from the living or dining room. Thus the house plan is divided into outer and inner zones. Naturally, units with double exposure - townhouses, duplex walk-ups, and exterior gallery-type buildings - can have kitchens and dining rooms in the outer zone without difficulty.





The approximate size and proportion of the rooms themselves must be included in the sponsor's program. Extreme care must be taken on public or federally assisted housing jobs because minimum dimensions given as guidelines cannot be accepted without scrutiny.

In the private building sector market conditions and competition are the best gauge of room sizes. Awareness of the local housing market is essential, for market conditions vary considerably not only from city to city but from neighborhood to neighborhood. As an example, the Chicago market demands a separate alcove as a defined dining space; in New York the entry hall is often substituted, thus serving a dual function and increasing the space allotted to the total living area. Considerably larger rooms are called for along Chicago's Lake Shore Drive than in Old Town, just a few blocks away.

The architect's most reliable guide is a thorough analysis of the function, furnishings, and circulation pattern of each space. In this respect HUD guidelines for minimum furniture requirements are quite reliable, assuming naturally that proper circulation space is provided. To ensure comfortable use and adequate dimensions we can safely refer to Time Saver Standards, 4th edition (McGraw-Hill, New York, 1966).

## Minimum Room Sizes

Name of Space	Minimum Area (sf)					Least Dimension
	LU with 0-BR	LU with 1-BR	LU with 2-BR	LU with 3-BR	LU with 4-BR	
<i>A. Minimum Room Sizes for Separate Rooms</i>						
LR	NA	160	160	170	180	11'-0"
DR	NA	100	100	110	120	8'-4"
BR (primary)	NA	120	120	120	120	9'-4"
BR (secondary)	NA	NA	80	80	80	8'-0"
Total area, BR's	NA	120	200	280	380	—
<i>E. Minimum Room Sizes for Combined Spaces</i>						
LR-DA	NA	210	210	230	250	
LR-DA-SL	250	NA	NA	NA	NA	
LR-DA-K	NA	270	270	300	330	
LR-SL	210	NA	NA	NA	NA	
K-DA	100	120	120	140	160	

## Abbreviations:

LU = living unit  
 LR = living room  
 DR = dining room  
 DA = dining area  
 0-BR = LU with no separate bedroom

K = kitchen  
 NA = not applicable  
 BR = bedroom  
 SL = sleeping area

## LIVING ROOM (LIVING-DINING ROOM)

The living room should be conducive to general family life and should allow for group activities as well as individual relaxation: "entertaining, reading, writing, listening to music, watching television, and children's play." HUD Minimum Property Requirements (1973 edition) calls for the following furniture as a minimum to be accommodated:

One couch, 3'-0" x 6'-10"

Two easy chairs, 2'-6" x 3'-0"  
(one for efficiency apartment)

(three for four or more bedroom units)

One desk, 1'-8" x 3'-6"

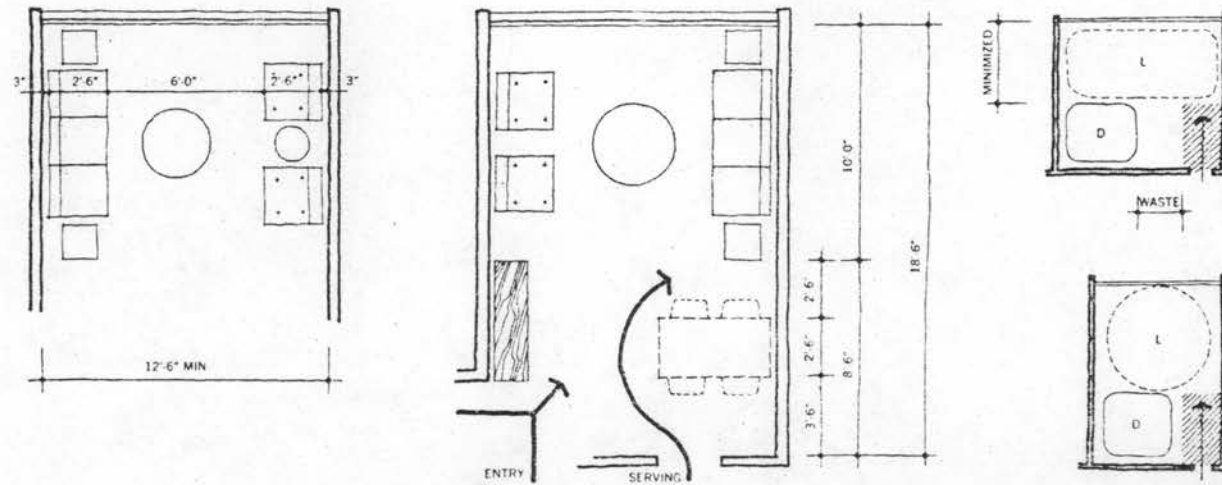
One desk chair, 1'-6" x 1'-6"

One television set, 1'-4" x 2'-8"

One table, 1'-6" x 2'-6"

The living room is the most impressive and largest of all rooms in the house which is why many developers like it to be visible from the entry hall.

To serve as a guide the living room in the average middle income two-bedroom house is about 260 to 300 sf; combined living-dining room is about 400 sf. When the living room is also used for dining, its proportions, with minimum waste, become critical. Typical square (20' x 20') living-dining rooms are far less efficient than the oblong (15' x 26') of the same square footage.



## DINING

A truly separate dining room can be afforded only in townhouses or luxury housing. The most common arrangement takes the form of an alcove off the living room. Although this alcove can occupy an inner zone, a windowed area is preferable even though it creates a larger building perimeter and consequently increases costs. When a large group of diners is to be accommodated, the table must be expanded into the living room and space should be provided for it without having to move heavy furniture.

HUD Minimum Property Standards (1973 edition) calls for the table and chair requirements listed below. They should be considered not only with proper circulation space and pattern of food serving in mind but also in relation to space for storage.

Efficiency or one bedroom, two persons: 2'-6" x 2'-6"

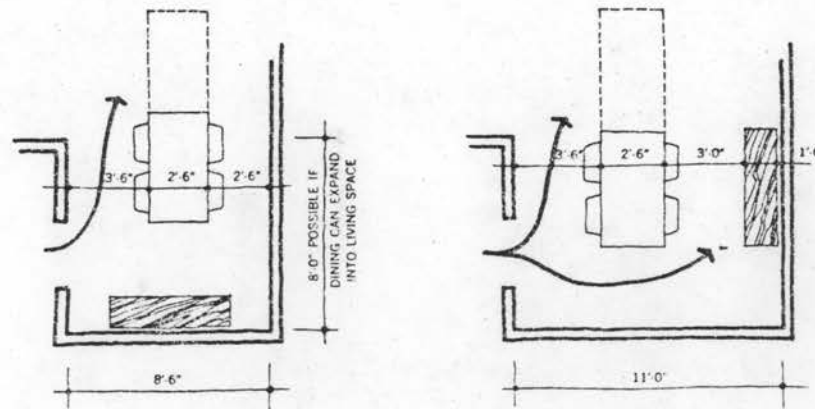
Two bedrooms, four persons: 2'-6" x 3'-2"

Three bedrooms, six persons: 3'-4" x 4'-0" or 4'-0" round

Four or more bedrooms, eight persons: 3'-4" x 6'-0" or 4'-0" x 4'-0"

Dining chairs: 1'-6" x 1'-6"

In middle-income two-bedroom houses an average dining alcove is about 100 sf and a separate dining room is about 140 sf.



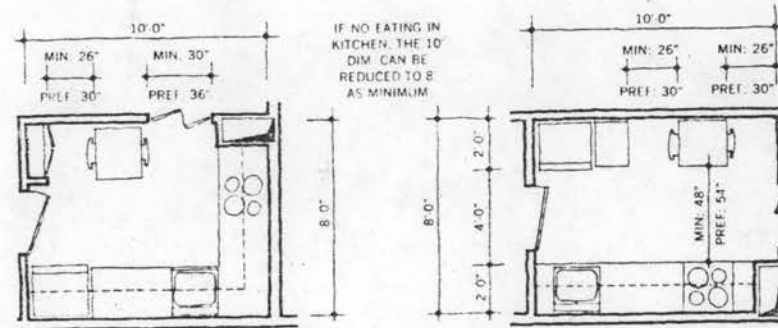
## KITCHEN

To provide for the most efficient food preparation, storage, and service, careful planning is required. Architectural Graphic Standards (6th edition) Ramsey and Sleeper (Wiley, New York, 1970) is an excellent guide and HUD Minimum Property Standards (1973 edition) contains useful information on dimensional requirements for counter tops, fixtures, and storage cabinets. Storage space normally provided in cabinets or utility closets can be expanded by the addition of shallow pantries: floor to ceiling shelving behind hinged doors.



Unless space is extremely tight, kitchens should be equipped with a small eating space to augment the regular dining room or alcove. When the kitchen is part of a combined kitchen-dining or kitchen-family room, the food preparation-cooking space should be screened from the dining or family area. When planning kitchens, the basic sequence of refrigerator-sink-stove, starting from the door and progressing toward the serving and eating areas, should be observed. The method of connecting with the dining room or alcove, pass-through or door, needs special attention. Well-planned kitchens in an inner zone should borrow daylight from the living or dining space to make working conditions in the kitchen pleasanter.

In a middle-income two-bedroom house an average kitchen with minimum eating space is about 100 sf.



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 COUNTERTOPS AND FIXTURES
 

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Work Center	Number of Bedrooms				
	0	1	2	3	4
	Minimum Frontages (lin in.)				
Sink	18	24	24	32 <sup>a</sup>	32 <sup>a</sup>
Countertop, each side	15	18	21	24	30
Range or cooktop space	21	21	24	30	30
Countertop, one side	15	18	21	24	30
Refrigerator space	30	30	36	36	36
Countertop, one side	15	15	15	15	18
Mixing countertop	21	30	36	36	42

<sup>a</sup> When a dishwasher is provided, a 24-in. sink is acceptable.

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 STORAGE AREA<sup>b</sup>


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Square Feet	Number of Bedrooms				
	0	1	2	3	4
Minimum shelf area	24	30	38	44	50
Minimum drawer area	4	6	8	10	12

<sup>b</sup> Wall cabinets over refrigerators and shelves above 74 in. shall not be counted as required storage area.

## BEDROOM

Each bedroom should have enough space for double occupancy unless the client specifically agrees to its single use. HUD Minimum Property Standards (1973 edition) calls for the following basic furniture:

Two twin beds, 3'-3" x 6'-10"  
One dresser, 1'-6" x 4'-4"  
One chair, 1'-6" x 1'-6"  
One crib, 2'-6" x 4'-6"

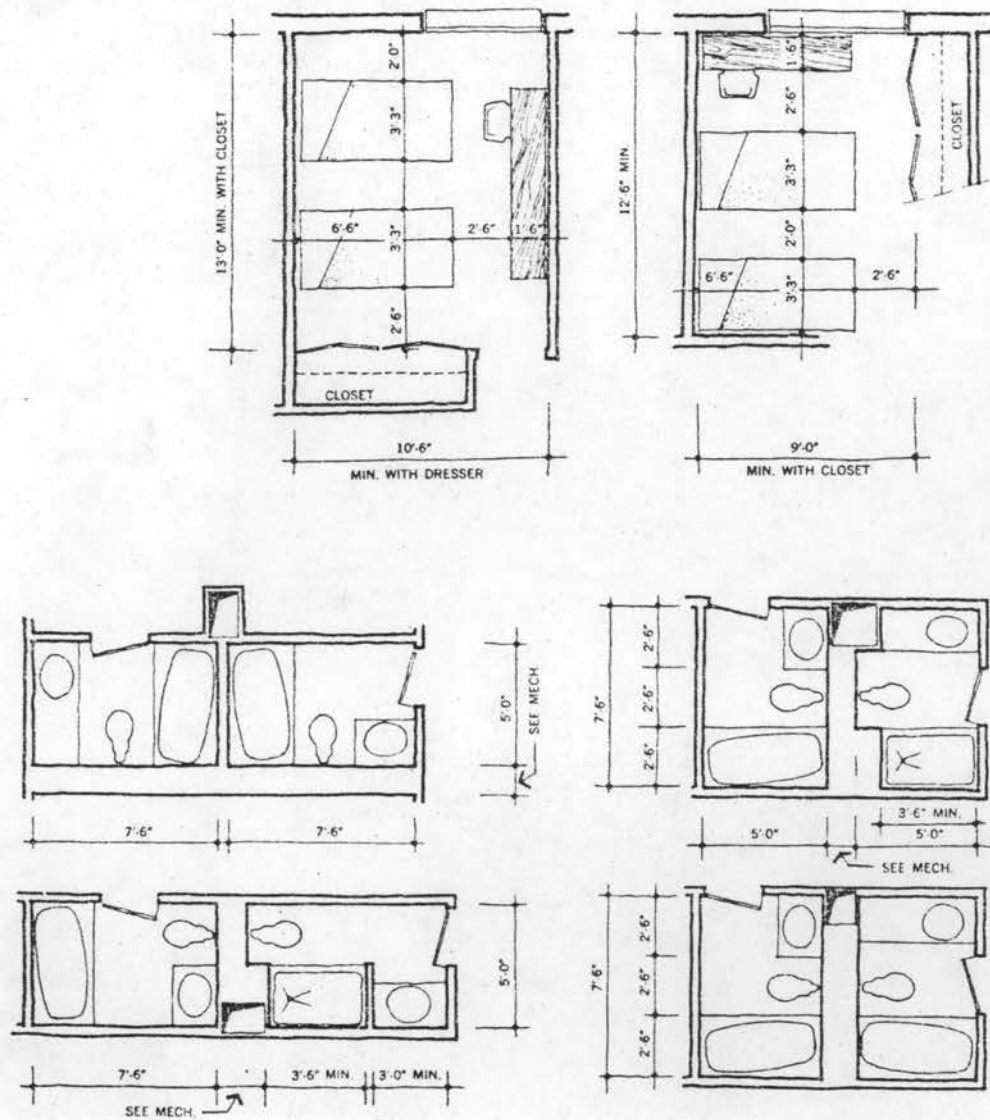
It should be kept in mind that night tables must also be accommodated. Because the bedroom often serves as an extra work area, space for a sewing machine or writing desk is not a luxury.

In middle-income two-bedroom houses average bedroom sizes (exclusive of closets) are 150 sf for secondary bedroom and 180 sf for master bedrooms.

## BATHROOMS

For the sake of economy a back-to-back arrangement of bathrooms is preferred either in the same apartment or with one that is adjacent. When there is only one bathroom, a tub and shower combination is standard equipment; when there are two, the second usually contains a stall shower. When an apartment has two or more bathrooms, one is customarily attached to the master bedroom; the others serve the remaining bedrooms. A powder room or lavatory is sometimes substituted for the second bathroom, although the savings are nominal compared with the convenience of having two baths. In luxury housing compartmentalization

is an advantage that allows simultaneous multiple use. Architectural Graphic Standards (6th edition) Ramsey and Sleeper (Wiley, New York, 1970) is a useful planning guide; for innovative ideas Alexander Kira's The Bathroom (Grosset and Dunlap, New York, 1967) is unsurpassed.

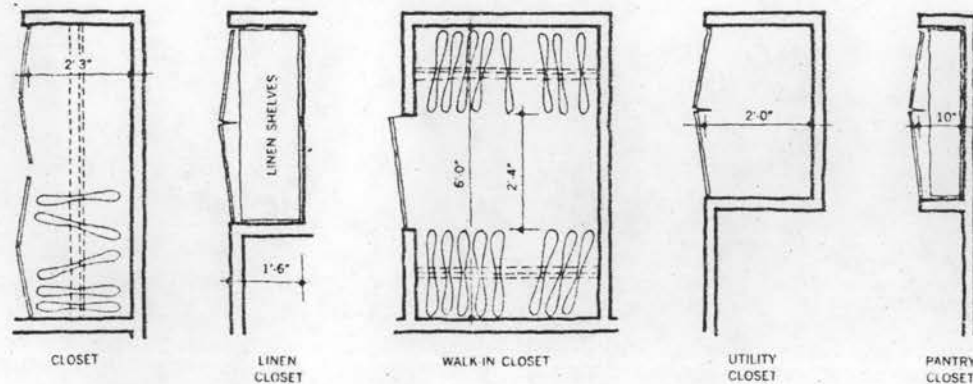


## CLOSETS

Although overall apartment size is stated in a client's program, few clients pay attention in the early design stages to the amount and kind of closet space that is provided. It is generally accepted however, that it is never enough for the tenant or buyer. The tabulation that follows is a guide to closet sizes at various rental levels.<sup>1</sup>

	Depth	Length (linear feet) <sup>a</sup>			
		Low Rental	Middle	Luxury	HUD minimum
Guest closet (in or near entry hall)	2'3"	3'	4'	5'	2'
Utility closet (in or near kitchen)	2'0"	2'	2'	2'	2'
Pantry (in kitchen)	8 to 10"	—	—	4'	—
Linen closet (in bedroom hall)	1'6"	2'	2 to 3'	3 to 4'	1'6"
Master bedroom closet (in bedroom)	2'3"	8'	10'	12'	5'
Second bedroom closet (in bedroom)	2'3"	6'	8'	9'	3'
General storage closet (in entry or bedroom hall)	2'0"	—	—	4'	—

<sup>a</sup> Or equivalent linear feet in a walk-in closet.



COMMUNITY FACILITIES

Such facilities are of two kinds: those which provide for needs which should normally be met within the private area of each family but which by default must be provided in common on the premises, and those which afford the wider social and recreational opportunities not usual in individual homes. In the former category are common laundries, drying rooms or yards, storage rooms for surplus household goods, bicycles and perambulators, provision for waste removal, parking space and garages, play areas for young children, and small workshops. The latter category includes nursery schools, play fields, picnic areas, stadia, meeting rooms, auditoria, dance halls, and theaters. It is to be noted that the first group consists of items which are the responsibility of the developer. Provision of the second group is properly a community function. Where communities have been unable or unwilling to furnish these facilities, many projects, especially in public housing projects, the use of such facilities cannot properly be restricted to residents. This distinction of category should be recognized in computing the cost of a housing project, and the amount spent on the normal requirements should be segregated from that which is paid to make up for a community deficiency.



## STILLWATER

Stillwater, the county seat and approximate geographical center of Payne County, is located in North Central Oklahoma. The Oklahoma Lands, in which Stillwater is situated, were first opened for settlement on April 22, 1889. The initial Stillwater settlement covered 240 acres.

### Physical Factors Affecting Development

The area covered by the city of Stillwater consists of a series of north-south ridges and valleys with a slope not exceeding 20%. The termination point of these ridges is at the Stillwater Creek to the south of the city.

### Characteristics of the Natural Environment

#### Topography

Topography - The layout of the land exerts itself as a force on the urban environment through its influence on drainage characteristics of the urban area, and the design of physical improvement such as sewers, streets, etc. Actually, both of these influences are of the same type since both are related to physical improvements, but drainage characteristics often cause such dramatic urban impact that separate treatment is justified.

The basic topographic pattern of the Stillwater urban area consists of a series of north-south ridges and valleys which drain into the Stillwater Creek channel. With the exceptions of a few small isolated areas, the maximum slope of land does not exceed 20%, which is generally accepted as the upper limit for economical residential development.

The framework of tributaries that make up the watershed system, coupled with the contour, climate, and soil type of the area, determines the nature of two major factors of urban

importance. Of first and most vital concern is the availability of water for human use. This subject will be treated in a later section. Second, these characteristics determine the extent of periodic regional and local flooding that occurs in the area.

Before World War II, urban flooding did not pose an extremely serious problem to Stillwater. However, during the drought of the mid-1950's, considerable residential development occurred along minor tributaries within the urban area. In 1957 and 1959, heavy rains caused extensive flood damages. The property losses during the 1959 flood (estimated by the U.S. Corp of Engineers) were set at \$824,800. To alleviate future damages, a flood control plan was conceived by citizens in the Stillwater Creek Watershed and the U.S. Soil Conservation Service. This plan is well into the implementation stages.

Topography's influence on the urban environment is often vastly underrated. Its effect on certain types of physical improvements, such as sewerage systems, is obvious. Additionally, through wise use of existing topography, the community can minimize street costs, provide for effective surface drainage, enhance natural appearance, etc.; thus maximizing value and utility of urban land.

The factors of topography and drainage cast the mold for urban development. Sound physical planning seeks to insure that these nature environmental factors are harnessed by man to provide maximum efficiency in the development of our surroundings.

### Climate

Climatological factors affect the development of the city in a number of ways. For example, the 213 day growing season places Stillwater near the northern limit of many types of crop production. Small grain, alfalfa and hay production make necessary the provision of space within the urban area for the open display of equipment necessary for these operations.

To plan for certain land use areas, it is important to remember that wind directions and velocity are factors. The wind velocity in Stillwater averages 11.4 miles per hour and this indicates that air pollutants could be blown to any area of the city. To diminish adverse influences on surrounding land uses and avoid the prevailing northwesterly-southeasterly wind corridor any commercial or industrial land uses producing air pollutants should be located in the northeast quadrant of the city. Residential land uses should be located away from the air pollution plumes down wind from adverse air pollution producers.

Total snowfall during a year in Stillwater is relatively insignificant, averaging 4.65 inches per year. This factor, however, is reflected in roof pitches of buildings and street grades.

Rainfall contributes to determine two elements of vital importance. With an average of 33 inches per year, large rainfalls can contribute to the drainage complexities of the city. To accommodate large amounts of runoff, the circulation of water becomes a primary planning concern. Only through competent engineering and planning drainage policy will Stillwater provide a solution. In drought years where demand exceeds supply, the use of water for community domestic and commercial needs must be limited. A limited water supply eventually limits the growth of a community.

### Soils

The orderly development of land cannot proceed without an understanding of soil characteristics. Because Stillwater is growing, land is being consumed for urban purposes at a fast pace. In 1968, the Soil Conservation Service completed the Payne County Soil Survey with concentrated analysis in and around Stillwater. In addition to the 1968 study, city planning staff asked the S.C.S. in 1976 for prime agricultural lands in the Stillwater area. A list of prime agricultural soils has been added to the initial survey.

The Stillwater area soil characteristics abound with a reddish-brown loam with subsoil clay. The soil tells us where flooding occurred and is likely to reoccur. The high clay content presents several construction obstacles in some areas and they are: high ground water levels, rock outcroppings, high shrink-swell potential, unstable barring pressure, poor percolation, etc.

Agricultural land is, of course, popular for development. The land is already cleared for surveying. Cropland usually has good drainage and few steep slopes. These factors make agricultural land a target for urban expansion even at the loss of a non-renewable resource. The Stillwater fringe areas have a great amount of spotted urbanized land that has been developed piecemeal in prime agricultural tracts.

### Natural Resources

The natural resources that are of primary significance to the Stillwater urban area are agricultural soil and minerals.

### Characteristics of the Human Environment

#### Population

The study of population is undoubtedly the most important single element in community planning.

When a community reaches a population of approximately 25,000, it is faced with the necessity of providing virtually every service and solving every problem that confront any large urban area in the United States today, with the possible exception of providing mass transit system.

Population growth in the city of Stillwater has exhibited a steady growth since 1920.

## POPULATION OF STILLWATER

Year	Oklahoma State University	Stillwater
1920	-	4,701
1930	-	7,016
1940	5,539	10,097
1950	8,517	20,238
1960	10,854	23,965
1970	17,500	31,126
1975 Est.	21,000	35,200

We project Stillwater's population to be 66,144 in the year 2000. The Oklahoma Employment Security Commission projects a slightly lower figure of 63,600.

Since the population projections included in this report are based on historical data, they do not indicate the impact that the recent boom in regional economic base growth may have on Stillwater. The potential effect of the Arkansas River Navigation Project and the Tulsa-I-35 Turnpike cannot be measured at this time. Other proposed projects that will affect Stillwater growth are the Oklahoma City Navigation Project and a supersonic transport airport, which may be located between Oklahoma City and Tulsa.

#### Density

Two major centers of human activity in Stillwater, the Central Business District and Oklahoma State University, are hubs in the community's population distribution patterns.

Two-thirds of Stillwater's 34,000 citizens live within one-quarter mile of these hubs. The heaviest concentrations of people are in the areas immediately south and east of the OSU campus, and in the dormitories west of the campus academic area.

Increased medium density development can be expected in the northeast and southeast quadrants of Stillwater, areas which are now under development but served by utilities. Low density development can be expected in the northwest and southwest portions of the community.

#### Age Distribution

Of every ten people in Stillwater, four are between the age of 15 and 25. The continued influence of Oklahoma State University over the next few years will cause an even greater increase in this age group. By 1975, the 15-25 age group will make up over 60 percent of Stillwater's total population. By 1989, the percentage is expected to have dropped back to about its present level.

A large proportion of young people in a community produces significant affects upon land use and development. In Stillwater these effects are intensified by the temporary nature and economic status of the student group. For example, this segment of the population generally desires higher density rental housing located close to the campus. An unusually high demand for recreation and leisure facilities is another demonstration of the student impact.



## AGE DISTRIBUTION PROJECTIONS FROM 1970 - 2000

<u>Age</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>Year</u>
60-over	2,831	3,329	3,976	5,227	
50-59	1,669	1,894	2,841	4,700	
40-49	1,890	2,070	3,899	7,304	
30-39	2,308	3,474	6,452	7,036	
20-29	11,044	16,499	16,879	23,649	
10-19	7,539	8,201	7,960	11,616	
0-9	3,845	4,356	5,575	6,616	

Economic Profile

The Stillwater per capita income in 1970 was \$2,485 with earnings dispersed relatively evenly from \$1,000 to \$50,000. By 1975, the per capita income had grown to \$3,600 and a new emphasis for commercial land uses had been a direct result.

Labor Force

The Stillwater labor force is estimated to be 60% of the Payne County labor force of 23,000 or 13,800 workers in Stillwater. The unemployment rate fluctuates from 3.5 to 6.5 percent. From Payne County employment statistics, the largest employer is the government with 8,290 persons followed by wholesale and retail trade with 3,330.

The largest single governmental employer is Oklahoma State University with 3,340 full-time employees and 2,900 part-time employees.

### Land Use

There are five basic types of land use: residential, commercial, industrial, quasi-public, and public. The first four types are usually privately owned and operated.

Much can be learned from classifying and studying the existing land use of a community. From past land use studies in many communities, planners have learned that growth of land use type is directly dependent on the economic base of the community. As base employment is established several by-products are produced. Land is needed for:

1. The work site and possible expansion,
2. Housing for workers and commercial to serve workers and their families with the goods and services.

In Stillwater, the historic, base employer has been the university and land development has been directly proportional and the growth has become a greater and greater portion of the economic base of the community

The community land use profile is unique because of the tremendous amount of land owned by Oklahoma State University and the City of Stillwater. However, the private land use profile is similar to that of other communities. In 1975, 5.1 square miles or 36 percent of the urbanized land area was residential. Commercial land uses normally are based on the population served and the proportion of income that can be expended for goods and services. Stillwater commercial land use covers .7 square miles and is 5 percent of our urbanized land area. The industrial land use category has increased substantially in the last fifteen years and it now has grown to cover .5 percent of urbanized land area.

### Future Land Use

The urban area of Stillwater will absorb more than 30,000 people by the year 2000 and this will require the conversion of 7 square miles from rural land to urban land. In 1960 the population of Stillwater was 23,900 persons and the urbanized property was 7.5 square miles. The 1975 population is estimated to be 35,200 with 14 square miles developed. The ratio of increased population to land use has increased disproportionately in the last fifteen years. This can be contributed to the increased use of the automobile, the city providing more off campus housing for students, and the affluent moving into larger lot developments.

The profile of future land use illustrated as follows and it reflects an increase in privately owned properties developing while the publically owned land decreases as a proportion of the urbanized land. Residential land between now and the year 2000 will overtake public and quasi-public land. Of the 7 square miles of urbanization, 4.8 square miles of it will be in the residential category. Industrial land use will continue to assert itself as it has in the last fifteen years by jumping 1.1 square miles. Of course much of the industrial growth will depend on national economics and the supply of water and labor. Commercial land growth and development requires the conversion of 200 acres to supply the goods and services of the increased population and the buying power of that population.<sup>2</sup>

## PLANNING AND ZONING

Sec. 16-24B. PUD Planned Unit Development

(a) Purpose. The purpose of planned unit development district is to allow flexibility in the development of land in order to improve site design, manipulation of human activities, more efficient and economical use of utilities and vehicular movement, and the conservation of existing natural features which will continue to enhance the scenic qualities of the area. This district should be used to develop compatible uses in accordance with a development plan in harmony with surrounding neighborhoods and activities.

(b) Qualifications.

1. If the project is to be built in phases, there must be comprehensive phase development plans for the entire project. Each phase shall be interrelated, coordinated and self-supportive.

2. Each phase shall have a minimum land area of three (3) acres with the exception of mobile home parks which requires ten (1) acres.

(c) Permitted uses. Any land use or combination of land uses may be requested; however, these uses are subject to the approval of the city commission after considering the recommendations of the City Planning Commission and the city staff.

(d) General requirements.

1. Phase development

(A) If the proposed preliminary development plan is not to be implemented in one continuous construction period, delineation of phase development areas shall be required.

(B) Whenever a preliminary development plan provides for multiple land uses, each phase shall include more than one land use.

(C) No following phase shall be allowed to begin until seventy five (75%) of the building structures in the preceding phase are completed.

(D) Future phases shall be compatible in use and activity of the already approved phase or phases.

(2) Density. Density shall not exceed the maximum allowable in the R-4 District.

(3) Intensity. Intensity of land use shall not exceed the maximum allowable in the R-4, C-4 and I-3 as used respectively to that type.

(4) Open space. The final development plan should normally contain and encourage the provision of open space. A buffer zone circumventing the entire site should usually be provided.

(e) Approval procedure.

(1) The developer(s) shall meet with the planning director for project and procedure orientation.

(2) The developer(s) shall submit application for PUD zoning; this application consists of (1) a zoning application for a planned unit development; (2) preliminary drawings, which shall be filed with the planning department by the owner and/or developer(s) of the land; and (3) a certified list of the property owners, including street addresses, within three hundred (300) feet of the proposed PUD.

(3) The planning director shall notify: (1) all property owners within three hundred (300) feet of the land proposed for a PUD; (2) CPC members; and (3) city commissioners that a PUD proposal has been submitted and that preliminary information is available for review in the planning department.

(4) The developer(s) shall meet with the subdivision review committee for technical assistance on the suitability of the proposed PUD for its intended use.



(5) The developer(s) shall, after taking into consideration the recommendations of the subdivision review committee, prepare a preliminary plan for review by the CPC. The CPC shall either recommend denial, approval or approval subject to enumerated conditions of the preliminary plan and the request for zoning to PUD. The developer(s) shall not be allowed to lay out streets until a final plan has been approved by the city commission.

(6) The city commission shall hold an official public hearing for review of the PUD zoning application and the preliminary plan. The city commission shall either deny, approve or approve subject to enumerated conditions to the preliminary plan and zoning request.

(7) The developer(s) shall prepare and submit to the CPC a final plan. The CPC shall either recommend denial, approval or approval subject to enumerated conditions of the final plan.

(8) The city commission shall hold an official public hearing for review of the final plan and shall either deny, approve or approve subject to enumerated conditions of the final plan. (Ord. 1423, 1.)

(f) Statement of intent and development plan preparation.

(1) Statement of intent. The statement of intent shall contain the following information to be provided for both preliminary and final development plans:

(A) An explanation of the objectives to be achieved by the planned unit.

(B) A development schedule indicating the approximate date when implementation of the preliminary development plan will begin and be completed by phases shall be provided.

(C) Copies of any special agreements, conveyances, restrictions or covenants which will govern the use, maintenance and continued protection of the planned unit and any of its common open area.



(D) Other information which the planning department may request because of special topographic, circulation, traffic, design, sitting or other problems of the proposed plan.

(2) Preliminary development plan preparation

(A) The preliminary development plan shall be in accordance with sections 16-79 and 16-80 of the subdivision regulations.

(B) In addition, the following shall be required:

(i) Existing and proposed land use in the planned unit.

(ii) Existing land uses on land adjoining the planned unit.

(iii) The number and type of family units and acreage devoted to residential use

(iv) A general landscape plan, including but not limited to screening and decoration areas.

(v) When requested by the planning department, preliminary elevations, working models, and/or conceptual layouts of proposed building, structures and improvements.

(vi) The allocation of parking areas and the number of spaces.

(vii) A rough grading plan of the land.

(3) Final development plan preparation

(A) The final development plan shall have a final plat prepared in accordance with section 16-81 of the subdivision regulations.

(B) In addition to the preliminary development plan and the final plat, the following shall be required:

(i) Proposed grades for all buildings.

(ii) The location, height and size of proposed signs, lighting and advertising devices.

(g) Status of the plan

(1) Legal position. The land within the district shall be developed only in accordance with the preliminary and final plans as approved by the city commission.

(2) Preliminary and final plan amendment procedure.

(A) Preliminary plan changes. Any substantial deviation from the preliminary development shall be submitted for review following the same procedure required in the original adoption of the preliminary development. The planning director shall determine what constitutes a "substantial" deviation or change in the preliminary development plan.

(B) Changes in final plan. Any deviation from the final plan shall be submitted for review following the same procedure required in the original adoption of the final plan.

(3) Changes during construction. Except as follows, no changes may be made in the approved final development plan during its construction:

Minor changes in the location, siting, height or character of buildings and structures may be authorized by the planning director if required by engineering or other circumstances not foreseen at the time the final development plan was approved. No change authorized by the planning director under this section may increase the size of any building or structure by more than ten percent (10%), nor change the location of any building or structure by more than ten (10) feet in any direction.

(4) Change in ownership. If a change in property ownership occurs, the approved final development plan shall be honored and maintained.

(h) Time limit. The planned unit development district designation shall automatically revert to the zoning classification in effect immediately prior to such PUD designation unless substantial construction has occurred within two (2) years of the original PUD

designation. Provided, however, the city commission may grant an extension before said automatic reversion occurs. (Ord. 1406, 2, as amended by Ord. 1423, 1.)

R-PUD

Designation and Intent

Planned Unit Development. Ordinance No. 1683 Sect. 16-24B to permit innovative land development while maintaining appropriate limitations on the character and intensity of land use.

Permitted Principal Uses and Structures

Any residential land use or combination of uses permitted in an R-Zone may be requested and use subject to approval of the city commission.

Permitted Uses on Review

These commercial areas may be permitted on review and are limited by the zoning district.

R-1, R-2

Self-Service Laundry  
Vending Machines

Offices

R-3, R-4

Ath. Club  
Bakery, Retail Only  
Cafeteria  
Coffee Shop  
Delicatessen  
Florist Shop  
Gift Store  
Hobby Shop  
Laundry (Self Service  
Retail only)  
Pharmacy  
Private Club  
Restaurant, Indoors  
Tailor Shop  
Vending Machines

Barber Shop  
Beauty Shop  
Candy Store  
Dairy Shop  
Dry Cleaning Pick Up  
Food Specialty Store  
Grocery  
Ice Cream Shop  
Liquor Store  
Offices (Performing Residential  
Area)  
Pro Shop  
Shoe Repair  
Tobacco Shop

#### Minimum Lot Regulations

1000 sq. ft. shall apply to lots utilized for dwelling purposes. All commercial establishments, except restaurants, cafeterias and private clubs are limited to 2,000 sq. ft. The density permitted is equal to the following:

R-1, 7.26/units/acre

R-2, 14.56/units/acre

R-3, 18./units/acre

R-4, 39/units/acre

The above density is the same as the zone it supplements (-) public R/W ratio.

#### Minimum Yard Set Back

Minimum of 25' from periphery of zone.

No commercial structure shall be located within 200' of the perimeter of the R-PUD district.

#### Floor Area Ratio

The aggregate floor area of the commercial facilities shall not exceed an average of 50 sq. ft. per dwelling.

#### Maximum Height

When in conflict with the airport approach zone the planning commission may require lower building heights. The height allowed is equal to the zone it supplements.

#### Sign Limits

Allowed on review, limited to one name plate of not more than 8 sq. ft.

Ground Sign shall not exceed 4' in height located no closer than 100' from any residential area.

Off-Street Parking Requirements

All require previously mentioned apply. Common parking areas should not exceed 10 spaces.

R-1. ONE FAMILY DISTRICTSDesignation and Intent

Most restrictive district intended for single family dwellings.

Permitted Principal Uses and Structures

1. Detached one-family dwelling
2. Church
3. Public school
4. Public park or playground
5. Public library
6. General purpose farm or garden; Not including livestock.

Permitted Accessory Uses and Structures

1. Accessory building
2. Private garage

Permitted Uses on Review

1. Municipal use
2. Plant nursery; with no building
3. Golf club
4. Private club NOT conducted for profit.

Minimum Lot Regulations

6000 sq. ft.

There shall be a minimum lot width of 50' at the front building line and 35' at the street line.

Maximum of 7.2 D.U. per acre.

Minimum Yard Set Back

Front Yards. Minimum depth of 25'. If existing building set back greater than 25' then no building shall be erected closer to the street line than the minimum set back so established by existing building (not to exceed 40'). Yards with double frontage must meet front yard requirements for both yards.

Side Yards. One story 5' plus an additional 3' for each additional story up to 25' accessory buildings 5'.

Corner Lots. Require set back from intersecting streets of NOT less than 15' when back to back with another corner lot, all other corner lots 20'. Buildings other than dwellings shall set back from all interior and exterior lot lines NOT less than 35'.

Rear Yards. 20' or 20% of depth of lot whichever is smaller.

Floor Area Ratio

Main and accessory buildings shall not cover more than 30% of the lot area on interior lots and 35% of the lot area on corner lots.

Maximum Height

2½ stories or 35'

Sign Limits

Not permitted.



Off-Street Parking Regulations

1½ spaces for each separate dwelling unit.

Church - 1 space for each 5 seats

Club - 1 space for each 100 sq. ft. of floor area.

Size - 8' x 21'

R-2 TWO FAMILY DISTRICTDesignation and Intent

Residential district intended to provide for a slightly higher population density, but with basic restrictions similar to the R-1 district.

Permitted Principal Uses and Structures

1. Accessory building
2. Private garage

Permitted Uses on Review

1. Any use permitted on review in R-1 district.
2. Day Care (No limitations)

Minimum Lot Regulations

6000 sq. ft.

Minimum lot width of 50' at building line, 35' at street line.

Maximum of 14.52 D.U. per acre.

Minimum Yard Set Back

Front Yard - Side Yard - Rear Yard. All same as R-1 district.

Floor Area Ratio

Main and accessory buildings shall not cover more than 35% of the lot area, accessory building shall not cover more than 20% of the rear yard.

Maximum Height

2½ stories or 35'

Sign Limits

Not permitted

Off-Street Parking Regulation

Same as R-1 district<sup>3</sup>

## GOAL

1. To promote flexibility in design and permit planned diversification in the location of structures;
2. To promote the efficient use of land to facilitate a more economic arrangement of buildings, circulation system, land use and utilities;
3. To preserve to the greatest extent possible the existing landscape features and amenities and to utilize such features in a harmonious fashion;
4. To provide for more usable and suitable located recreation facilities and other public and common facilities than would otherwise be provided under conventional land development procedures;
5. To combine and coordinate architectural styles, building forms and building relationships within the planned unit development; and
6. To insure a quality of construction commensurate with other development within the city.

## A PLANNED UNIT DEVELOPMENT

### Site Location

The site is located in the northeast part of Stillwater. It is about 46.7 acres. The north part of the site the developer wishes to have zoned as "commercial" in order to serve the neighborhood in the future.

#### Facts about the site:

North - McElroy Ave.

Across McElroy Ave. is a zone for commercial purposes.

East - Jardot St.

Across Jardot St. is R1 residential.

South - Virginia Ave.

Across Virginia Ave. is R1 residential.

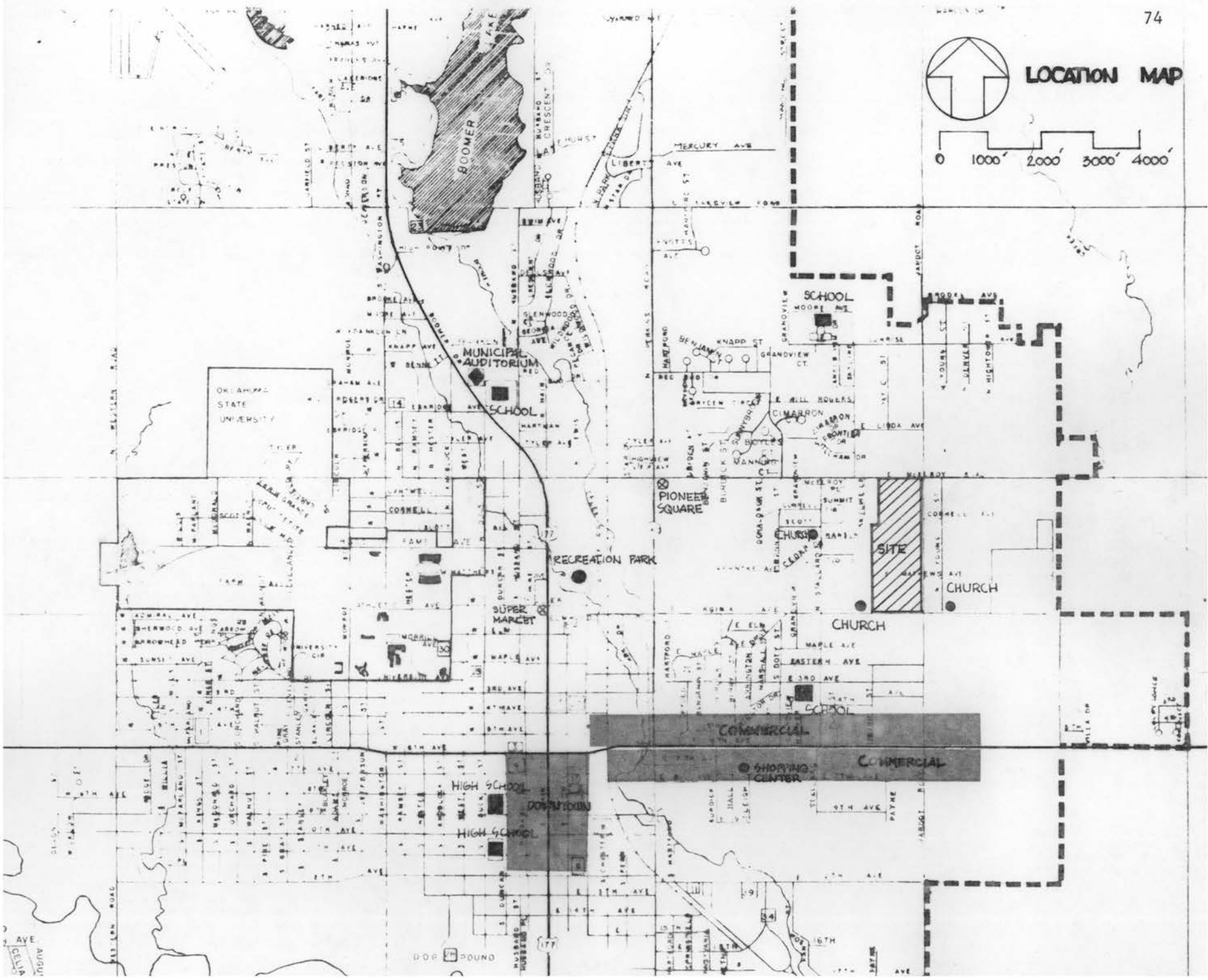
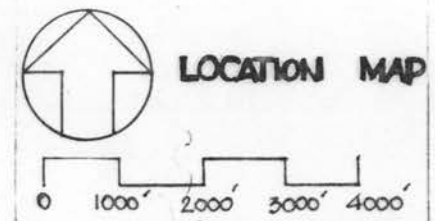
West - Existing single-family detached houses and a church.

The site of this project is in the residential zone, and it is an attractive neighborhood. This site is out of the flood plain. It has two areas of low lands which are located on the northwest and south on the site. These areas may be used as open spaces for this proposed housing project.

### Site Design

Design Quality - The site plan layout and arrangement shall provide an environmentally beneficial development which is economical in construction and maintenance.

Residential Needs - The site design for outdoor areas and facilities shall respond to the social and physical needs of the residents. Anticipated occupant characteristics





JARDOT ST.

CLUSTER OF TREES IN  
THE SITE





McELROY AVE.  
NORTHERN PART OF THE



McELROY AVE.  
NORTHERN PART OF THE



VIRGINIA AVE.  
SOUTHERN PART OF THE



CLUSTERS OF TREES IN  
THE SOUTHERN PART OF

such as income levels, age levels, family composition and local customs shall be accommodated in the site plan.

The Proposed Site - The site design shall be arranged to utilize and preserve the favorable features and characteristics of the site and to avoid or minimize the potential harmful effect of unfavorable features.

Topography - In the design of a site the effect of topographic conditions on the cost of development and operation shall be considered; when land uses combined with site conditions in manners which prevents a functional, economically maintained development or in a manner which prevents correction of a potential hazard. All elements of the site plan shall be designed to fit the natural contour.

Vegetation - Existing healthy trees, shrubs and natural cover of good quality which will contribute to the living environment and can save within the site design, shall be preserved.

Ground Water - Building, structure, streets, paved areas and utilities shall be located on the site in areas of the least potential ground water hazard.

Climate - The site design shall utilize or moderate temperature, sunlight, wind and other climatic factors to create maximum possible comfort for residents by the introduction and orientation of structures and planting.

Common Use Facilities - Improved openspace for both active and passive recreation shall be provided as appropriate where permanent maintenance can be assured. The improvement shall be consistent with the size of the development, age levels, and the needs of intended occupants, and shall consider the operation and maintenance costs.<sup>4</sup>

### Site Considerations

The site slopes gently down from the north-west to the south-east. There are two areas of low land where there are clusters of trees and a pond. Because low land is the collector of water and the grower of trees, the development of the site follows the PUD concept of keeping the natural characteristic of the site for a better - useable and enjoyable - environment. With concern in mind, the large area of low land located on the north-west of the site is to be used as a central park as there are many clusters of trees and a pond in this area. The small one which is located on the south of the site is to be used as open space for the house clusters. It will be an open space which has the strip clusters of trees and a recreation area for the residents who live remotely from the central park. Because of the shape of the site the central park cannot serve all the residents, consequently the small open space which is located to the south will be useful for the residents who live in the southern part of the site.

As the slope of the site is not excessive, development and grading problems will not be serious. The development of the site is assumed to be classified as R2 PUD (with some commercial areas to the north).

According to the program, there are two types of housing in this PUD project. They are single-family detached houses and duplex houses. The number of each type is 100 units. The developer intends to allocate for commercial use the north-east corner of the site at McElroy Ave. and Jardot St. There is, however, a piece of land left for the housing project next to this commercial project site. This will serve as a buffer between the residential zone and the commercial zone. It will also provide access from McElroy Ave. at this point and the street will be used as the buffer between the two contrasting zones. This street will be the collector street and will connect with Virginia Ave. Jardot St. is the main street and another access road should come from it. It should connect with the collector street. The site is divided by the collector street from west to east. Consequently,



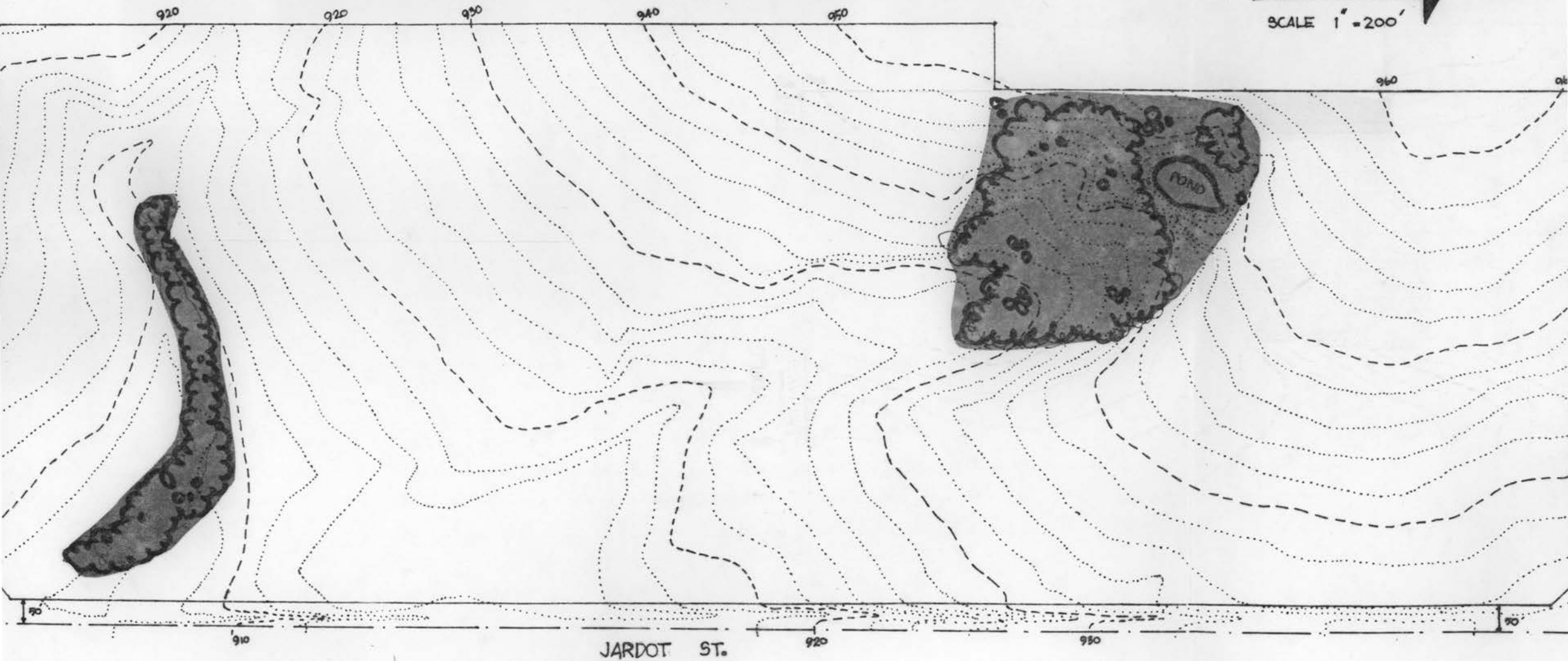
PRESTON HILLS  
STILLWATER, OKLA.

THE NATURAL SITE CHARACTERISTICS

THE EXISTING SITE CHARACTERISTICS  
WHICH HAVE TO KEEP

NORTH

SCALE 1" = 200'



VIRGINIA AVE.

Mc ELROY AVE.

COOPER

EXISTING SINGLE - FAMILY DETACHED HOUSE

SINGLE - FAMILY DETACHED HOUSES

SINGLE - FAMILY DETACHED HOUSES

OPEN SPACE (CENTRAL PARK)

DUPLEX HOUSES

DUPLEX HOUSES

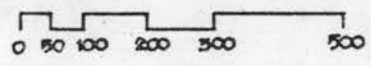
GITE FOR COMMERCIAL PROJECT

OPEN SPACE

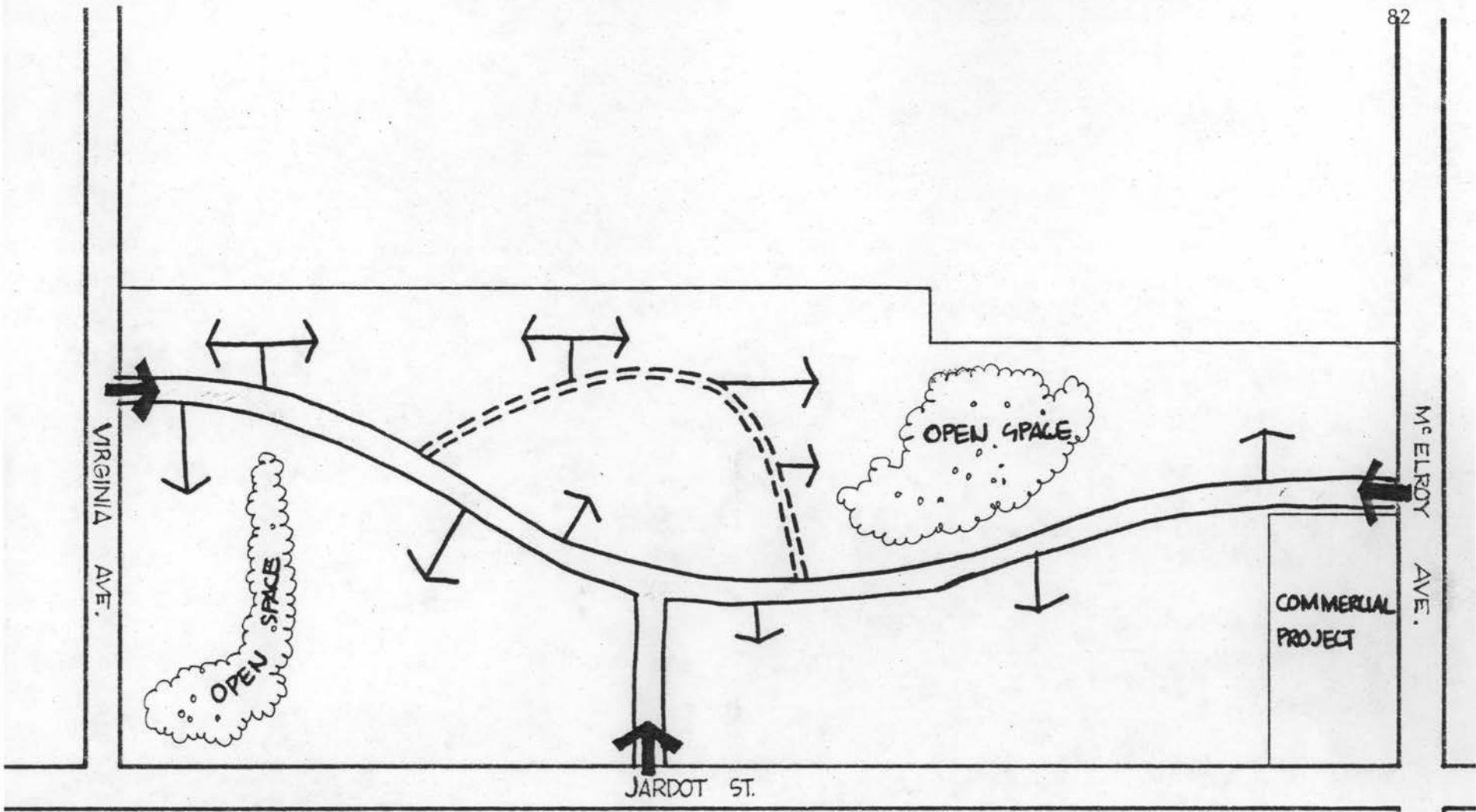
JARDOT ST.



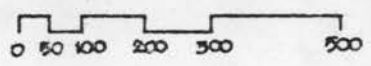
LAND USE










TRAFFIC ANALYSIS



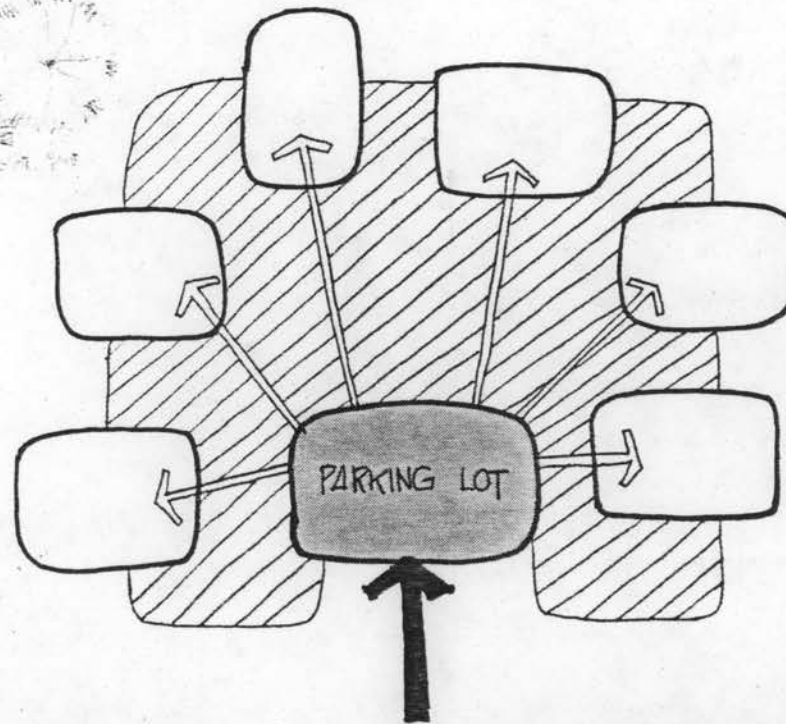
-  COLLECTOR STREET
-  MINOR STREET
-  HOUSE CLUSTER ACCESS

west of the site are existing single-family detached houses. The west part of the site is planned with single-family detached houses. The residents who live near this area hope to have neighbors of equal or better quality. The east part of the site, near Jardot St., will be the location for duplex houses. "The planned unit development is slightly different from cluster planning although the basic principle is similar. Both seek a more flexible approach to permit development of large areas as a whole. Cluster design usually is limited to residential development, permitting a higher density if the resulting open space is legally permanently open. The advantages of cluster are also characteristic of planned unit development. A further advantage comes from a design freedom which is not possible under single lot-single building consideration.

Planned unit development is a broader concept than cluster. It may apply to commercial and industrial as well as residential development areas. In some cases, a mixture of uses one or more residential types of residence plus commercial is allowed. A major difference between planned unit development and cluster is that the specific condition under which the development will be allowed are general in nature for planned unit development, and frequently not applied until actual plans are proposed. In this case, much is left to the discretion of the administrator, the review board, or other controlling authority."<sup>5</sup>

## HOUSE CLUSTER

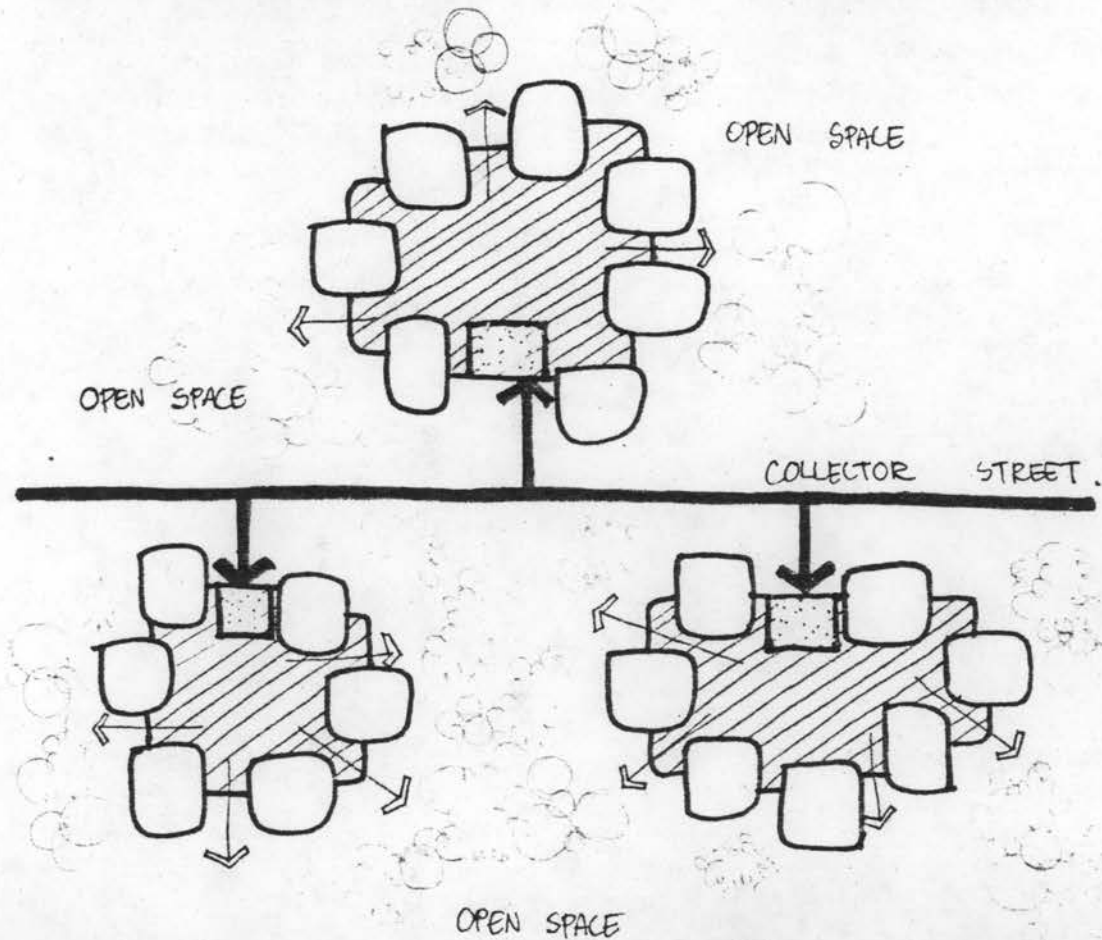
A CLUSTER DEVELOPMENT IS ONE IN WHICH A NUMBER OF HOUSES ARE GROUPED TOGETHER, LEAVING SOME LAND UNDIVIDED FOR COMMON USE. COMMON OPEN SPACE IS A RECREATION CORE AND SHOULD BE PLANNED TO CONNECT WITH PUBLIC OPEN SPACES.



- - HOUSE
- ▨ - COMMON AREA.

PARKING LOT IS OUT OF COMMON AREA FOR THE SAFE PEDERTRIAN WAYS AND THE BETTER ENVIRONMENT IN THE HOUSE CLUSTER.

HOUSE CLUSTERS CONNECT WITH COLLECTOR STREET.



COMMON AREA OF THE HOUSE CLUSTER  
SHOULD BE PLANNED TO CONNECT WITH  
PUBLIC OPEN SPACE.

- - HOUSE
- ▨ - COMMON AREA.
- ◻ - PARKING LOT.

Types of Dwelling Units in this PUD Project

Total 200 Units Divide Into:

1. Single-Family Detached House - 100 Units.
2. Duplex House - 100 Units.

Single-Family Detached Houses, which Divide Into:

1. One Story, 2 Bedroom 15%
2. One Story, 3 Bedroom 40%
3. Two Stories, 3 Bedroom 40%
4. Two Stories, 4 Bedroom 5%

Duplex Houses, which Divide Into:

1. One Story, 2 Bedroom 15%
2. One Story, 3 Bedroom 40%
3. Two Stories, 3 Bedroom 40%
4. Two Stories, 4 Bedroom 5%

Area Requirements

## Single-Family Detached House

## 2 Bedroom - 1 Story

	<u>Sq. Ft.</u>
Master Bedroom	144
Bedroom	144
Living and Dining	288
Kitchen	108
Bath	30
Bath	39
Closets	63
Storages	66
<u>Mechanical Closet</u>	<u>18</u>
Total Area (Rooms Area Plus Circulation)	1085

## 3 Bedroom - 1 Story

	<u>Sq. Ft.</u>
Master Bedroom	144
Bedroom	117
Bedroom	90
Living and Dining	291
Kitchen	108
Bath	30
Bath	39
Closets	78
Storages	69
<u>Mechanical Closet</u>	<u>18</u>
Total Area (Rooms Area Plus Circulation)	1211



## Single-Family Detached House

## 3 Bedroom - 2 Stories

	<u>Sq. Ft.</u>
Master Bedroom	180
Bedroom	135
Bedroom	99
Living and Dining	333
Kitchen	99
Bath	48
Bath	48
Closets	69
Storages	45
<u>Mechanical Closet</u>	<u>36</u>
Total Area (Rooms Area Plus Circulation)	1557

## 4 Bedroom - 2 Stories

	<u>Sq. Ft.</u>
Master Bedroom	144
Bedroom	132
Bedroom	144
Bedroom	132
Living and Dining	324
Kitchen	108
Bath	30
Bath	39
Bath	48

	<u>Sq. Ft.</u>
Closets	132
Storages	63
Mechanical Closet	18
<u>Balcony</u>	<u>48</u>
Total Area (Rooms Area Plus Circulation)	1839

## Duplex House

## 2 Bedroom - 1 Story

	<u>Sq. Ft.</u>
Master Bedroom	144
Bedroom	108
Living and Dining	226
Kitchen	108
Bath	30
Bath	36
Closets	63
Storages	27
<u>Mechanical Closet</u>	<u>18</u>
Total Area (Rooms Area Plus Circulation)	892

## 3 Bedroom - 1 Story

	<u>Sq. Ft.</u>
Master Bedroom	144
Bedroom	135
Bedroom	120

	<u>Sq. Ft.</u>
Living and Dining	276
Kitchen	90
Bath	30
Bath	36
Closets	81
Storages	27
<u>Mechanical Closet</u>	<u>18</u>
Total Area (Rooms Area Plus Circulation)	1098

## 3 Bedroom - 2 Stories

	<u>Sq. Ft.</u>
Master Bedroom	192
Bedroom	160
Bedroom	144
Living and Dining	336
Kitchen	108
Bath	48
Bath	48
Closets	72
Storages	54
<u>Mechanical Closet</u>	<u>18</u>
Total Area (Rooms Area Plus Circulation)	1515

## Duplex House

## 4 Bedroom - 2 Stories

	<u>Sq. Ft.</u>
Master Bedroom	144
Bedroom	108
Bedroom	144
Bedroom	108
Living and Dining	360
Kitchen	120
Bath	30
Bath	48
Bath	48
Closets	132
Storages	96
Mechanical Closet	18
<hr/>	
Total Area (Rooms Area Plus Circulation)	1728

## House Design

### Design Concept

The philosophy for designing this kind of project is space organization. The design begins with the study of furniture arrangement and the minimum size of room areas and volumes from H.U.D. Minimum Properties Standards. When room sizes are determined, the next step is to relate these spaces to conform to the circulation chart.

In the concept presented, the house was divided into two zones. They are the sleeping zone and the living zone. The sleeping zone are bedroom(s), bathroom(s) which need more privacy. The living zone include living, dining, and kitchen, which should be conducive to general family life and should allow for relaxation.

The PUD concept provides open space for common use and the house provides a solution for a better environment. Parking areas are not attached to the houses but are covered for the use of residents who live in the adjoining cluster. In this situation, the first area to be reached ought to be the kitchen. In carrying groceries, for example, from the parking lot it is not desirable to pass through the living area. For this reason the house should not have two doors in the front as might be the case in a conventional residential subdivision. The dining area is next to the kitchen and is combined with the living area. The living area is at the back of the house, because it will give more privacy in relaxation than in the front of the house. The backyard is wider than the front yard and has an outdoor terrace next to the living area for outdoor relaxation. In the sleeping zone, for privacy, the bedrooms are separate from the living zone and has its own circulation.

The dining area and kitchen are designed as a combined area. Between the kitchen and dining area there is a counter separating the spaces and used as a serving counter. The mechanical equipment room is located so the ducts will have the shortest distance to every room. In the bedroom the sleeping space (the space for the bed and circulation around the bed)

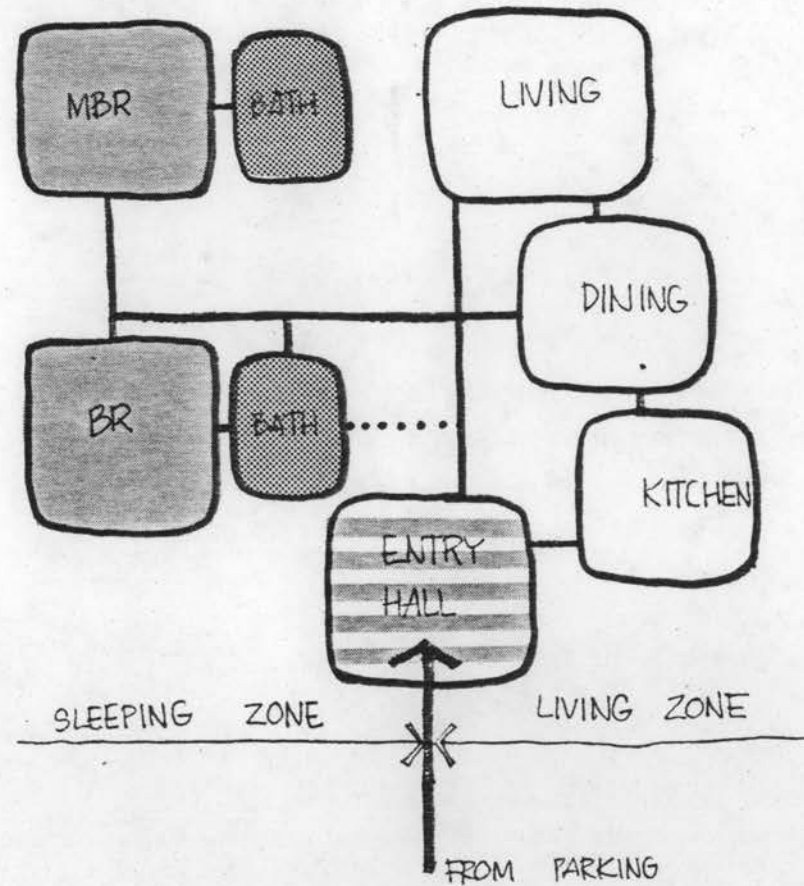
should be 10' x 10' and the best position to sleep is against the wall not the window. There is a walk-in closet for the master bedroom. Another room will provide the required area for a second bedroom. This room will serve one person or two persons by using bunk beds to save space.

The "half-bath" bathroom for the master bedroom is directly connected. This will reduce the cost of building. A full-bath bathroom serves the secondary bedroom(s) and guests. This bathroom should be located so that privacy is maintained.

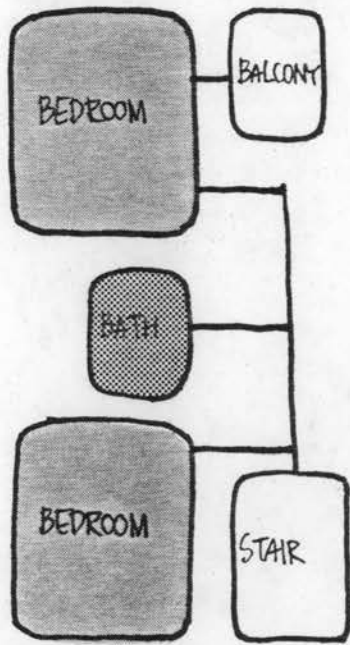


## ONE STORY HOUSE

THE HOUSE SHOULD BE DEVIDED INTO TWO ZONES, SLEEPING ZONE A LIVING ZONE. THE SLEEPING ZONE NEEDS MORE PRIVACY THAN LIVING ZONE. THE LIVING ZONE SHOULD BE CONDUCIVE TO GENERAL FAMILY LIFE AND SHOULD ALLOW FOR RELAXATION.

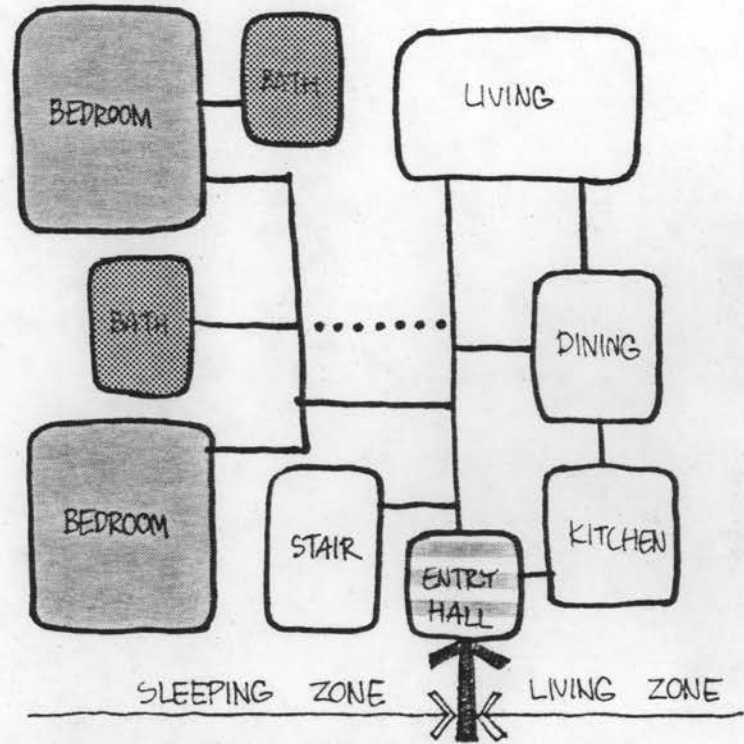


TWO STORIES HOUSE



SLEEPING ZONE →

SECOND FLOOR



SLEEPING ZONE      LIVING ZONE

FIRST FLOOR

Materials Used

1. Flooring: 4" thick concrete slab on 4" sand cushion and 4 mil visqueen vapor barrier for ground floor; and use wood flooring for upper floor in case of two story house.
2. Finish Flooring: Carpet on ground floor and upper floor; mosaic in the bathroom, 4" x 4" ceramic tile for balcony.
3. Side Wall: Two 4" brick with 2" gap for insulation.
4. End Wall: Exterior wall wood ending or insulation board on 2" x 4" study 16" O.C. fully insulated, interior-finish gypsum board paneled.
5. Interior Partition: 2" x 4" study 16" O.C., 1/4" prefinished wood paneling or gypsum board.
6. Bathroom Wall: Finished with 4" x 4" glazed tiles at 5' level except a bathtub will use 7' level.
7. Roof Framing: 2" x 6" at 16" O.C. with bailup plywood trusses at 12" beam. 6" insulation.
8. Roofing: 235 lb. asphalt composition shingles on 2 plys of 15 lb. felt on 3/8" plywood roof sheathing.
9. Ceiling: 1/2" gypsum board spray painted finish.
10. Door: Exterior: 1-3/4" S.C. Mahogany with screen aluminum frame door outside, or sliding glass doors with aluminum frame. Interior: 1-3/8" H.C. Mahogany.
11. Window: Casement window, glass and aluminum framing with screen window.

The type of commercial facilities to be allowed in this PUD project are as follows:

According to the ordinance R-2 PUD, the commercial facility which are permissible:

Self-service laundry

Vending machine

Offices

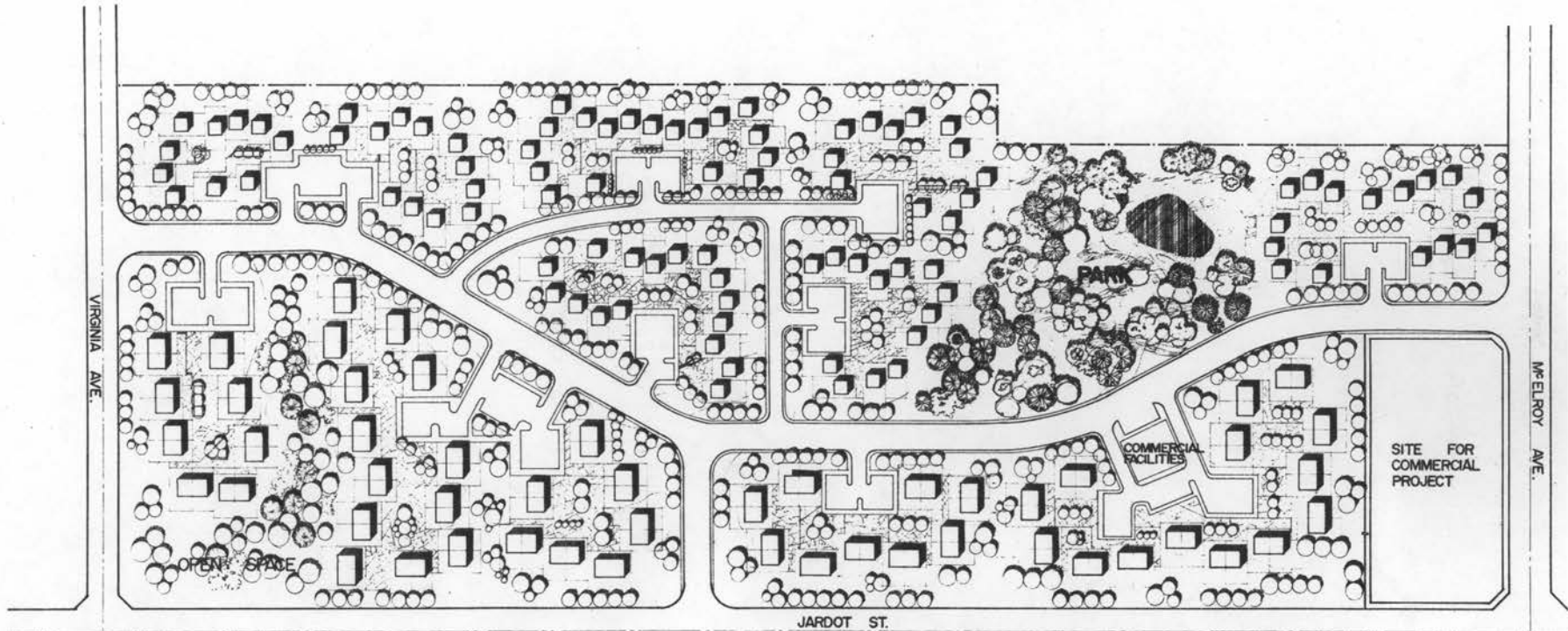
These facilities are to serve the development only and must be located at least 200' from property boundaries.

Self-service laundry and vending machines are to mainly serve the duplex housing.

Offices are for the use of the Homeowners' Association. The Association is responsible for the care and maintenance of the open space and any developed facilities.

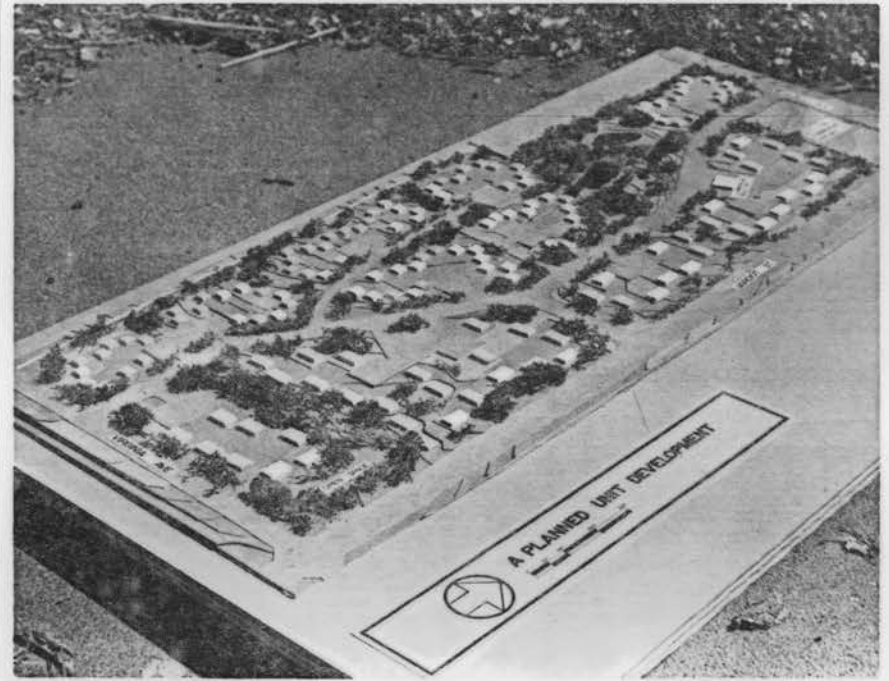
Area Requirements

	<u>Sq. Ft.</u>
Self-Service Laundry (Including vending machine)	800
Office	400
Storage	200
Toilets	120

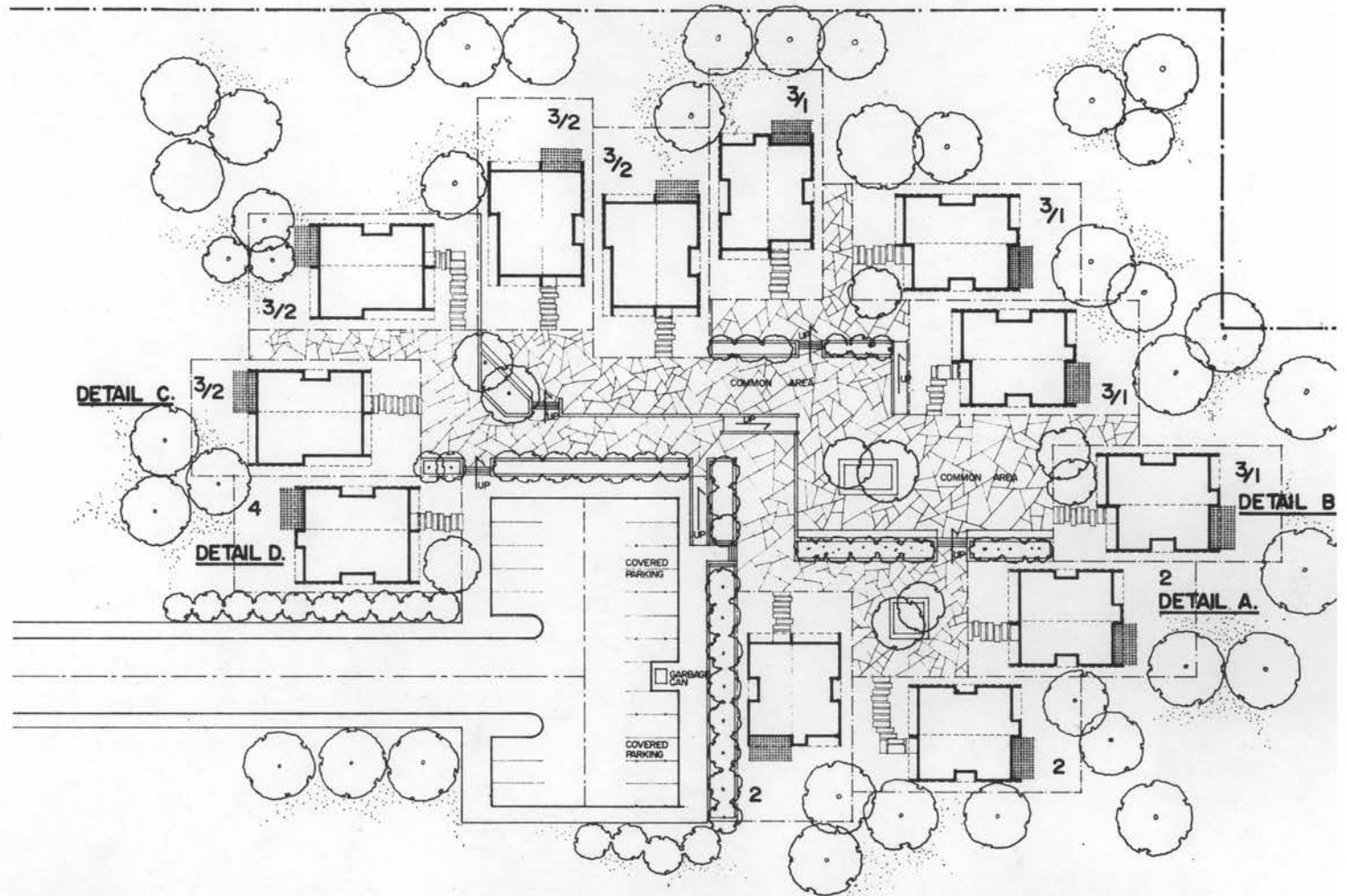


**SITE PLAN**





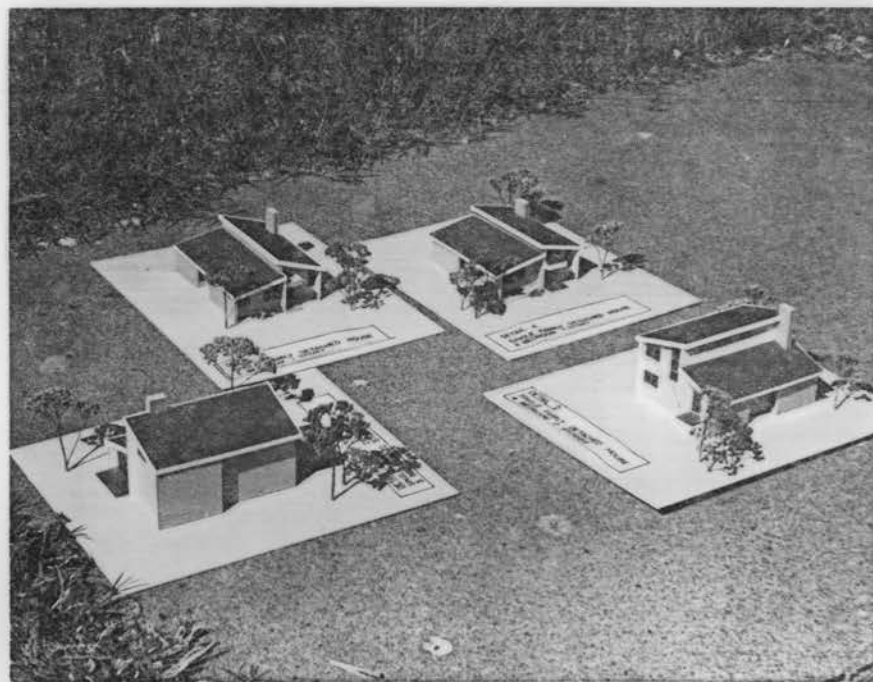




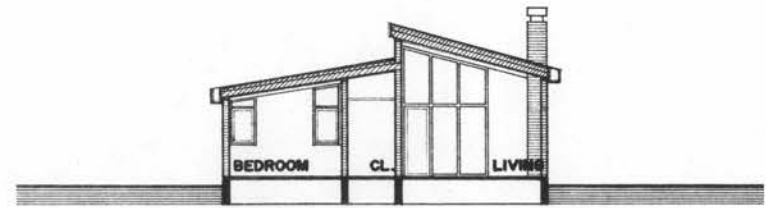
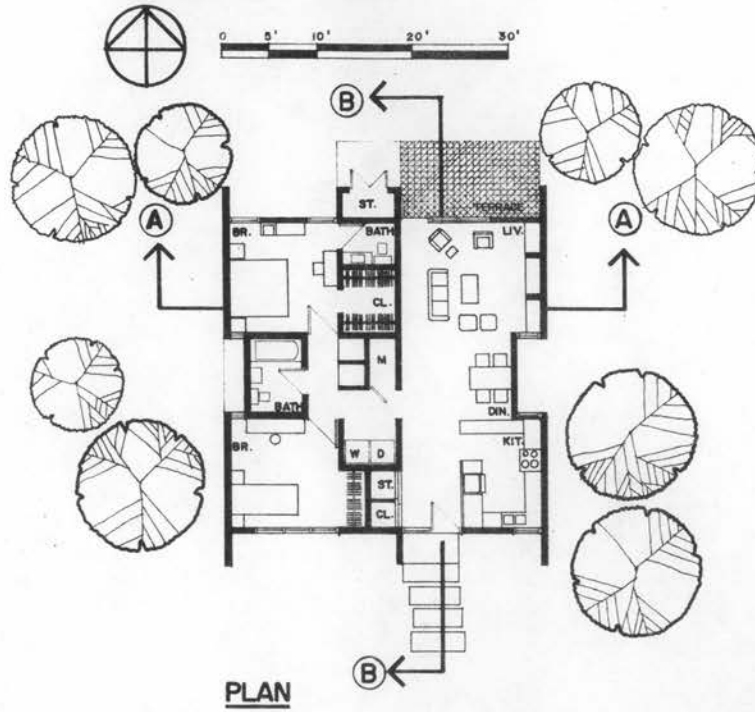
**SINGLE FAMILY DETACHED HOUSE CLUSTER**



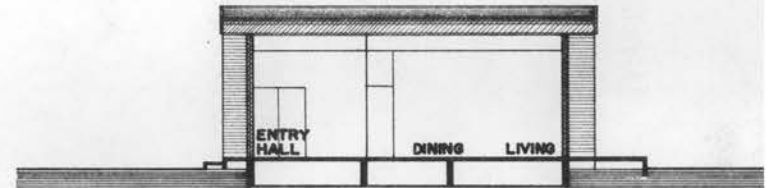
2.	2-BEDROOM	1 STORY
3/1	3-BEDROOM	1 STORY
3/2	3-BEDROOM	2 STORIES
4	4-BEDROOM	2 STORIES



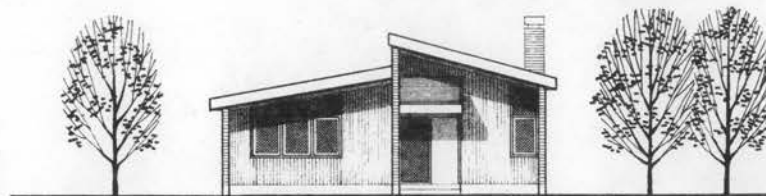
DETAIL A  
SINGLE FAMILY DETACHED HOUSE  
2 BEDROOM 1 STORY



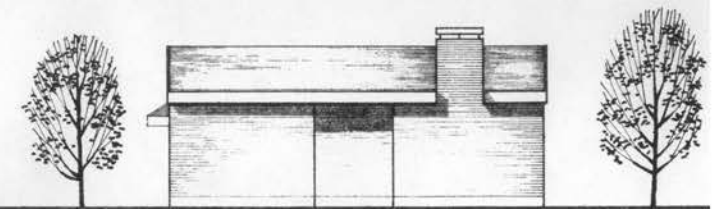
SECTION A - A



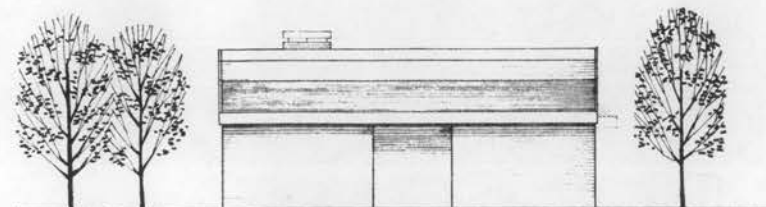
SECTION B - B



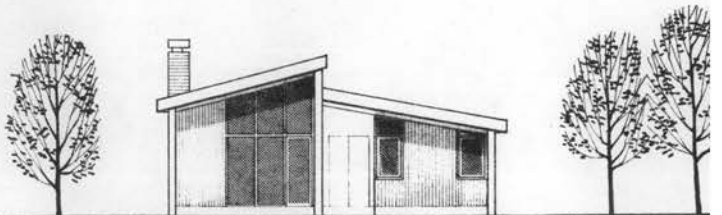
FRONT ELEVATION



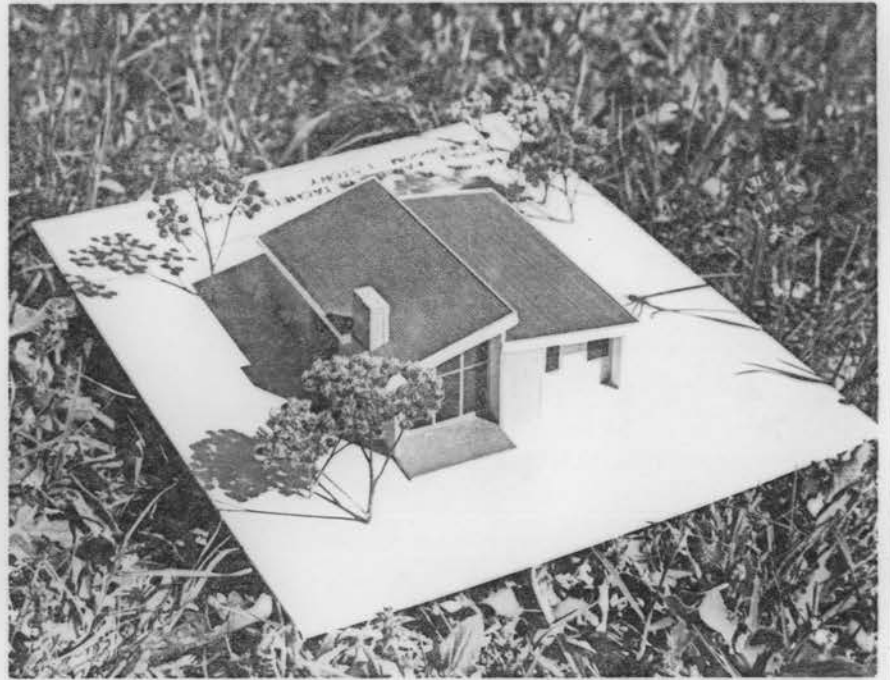
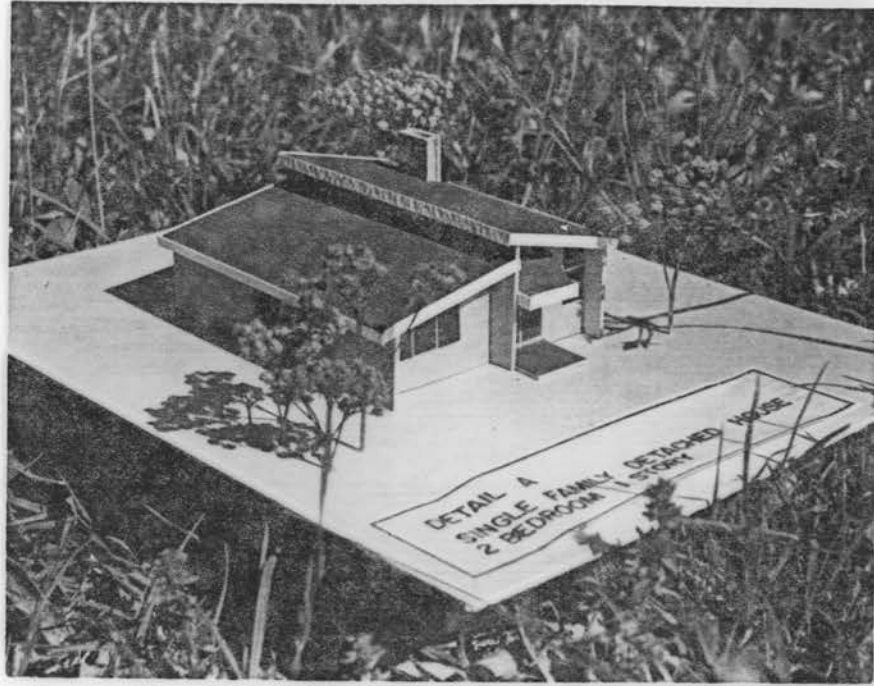
SIDE ELEVATION



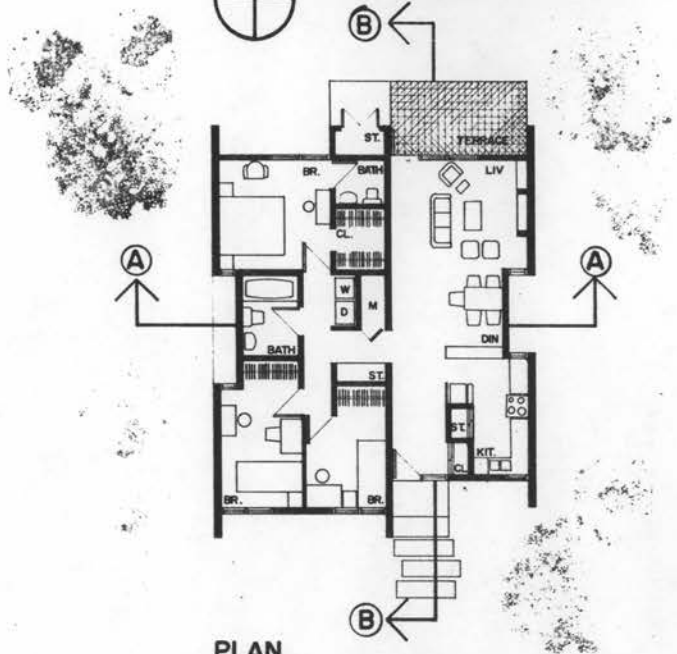
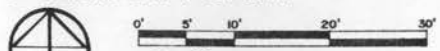
SIDE ELEVATION



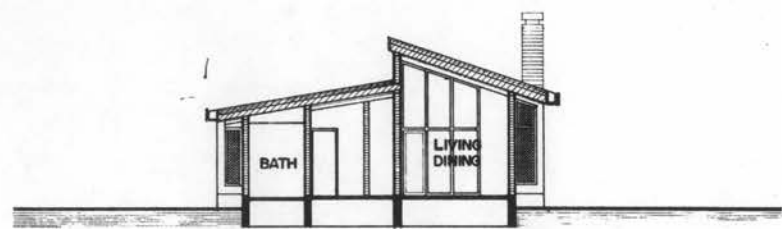
REAR ELEVATION



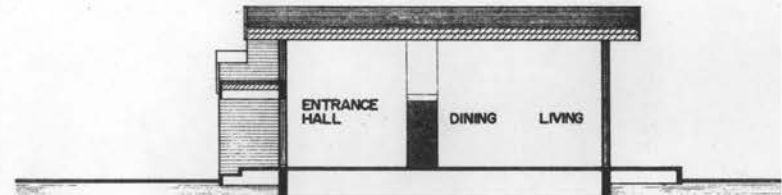
**DETAIL B**  
**SINGLE FAMILY DETACHED HOUSE**  
**3 BEDROOM 1 STORY**



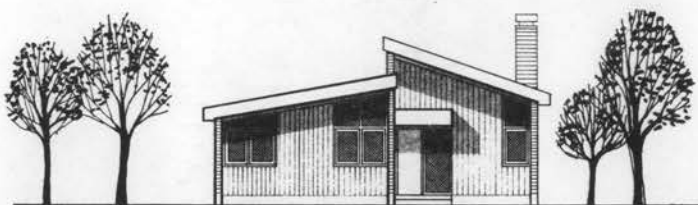
**PLAN**



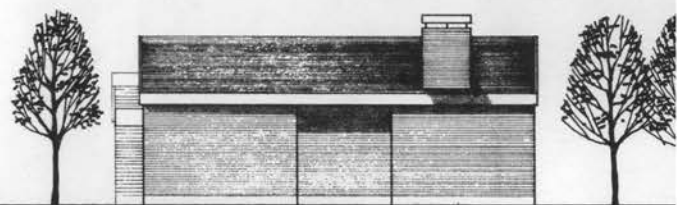
**SECTION A-A**



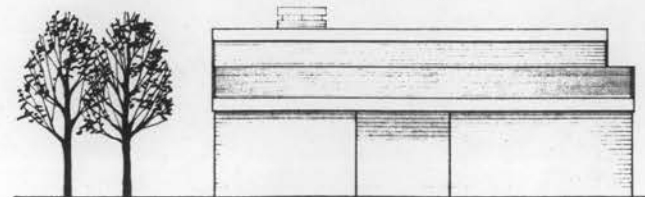
**SECTION B-B**



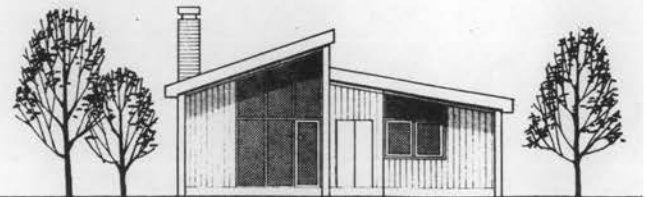
**FRONT ELEVATION**



**SIDE ELEVATION**

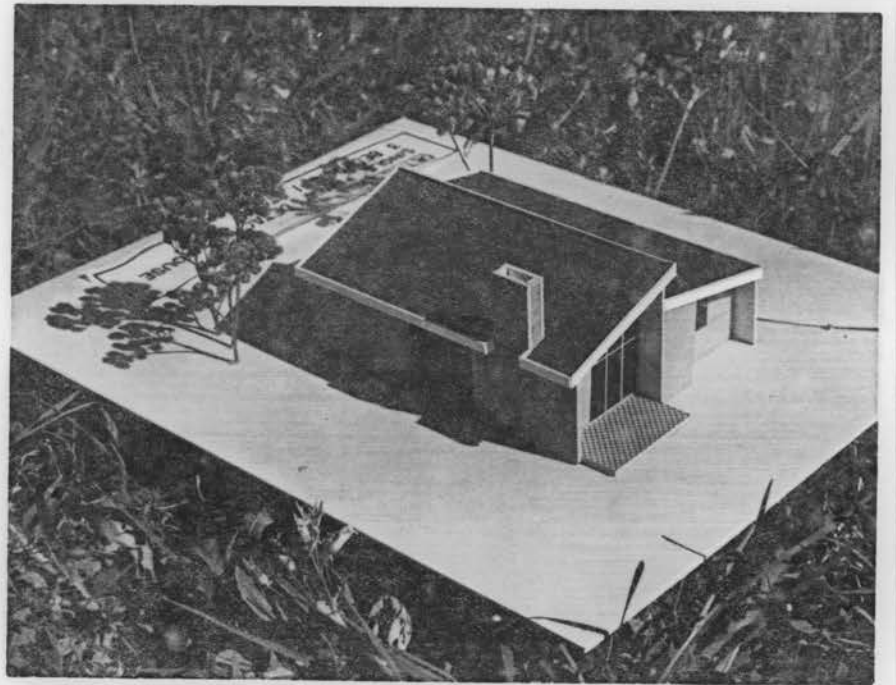
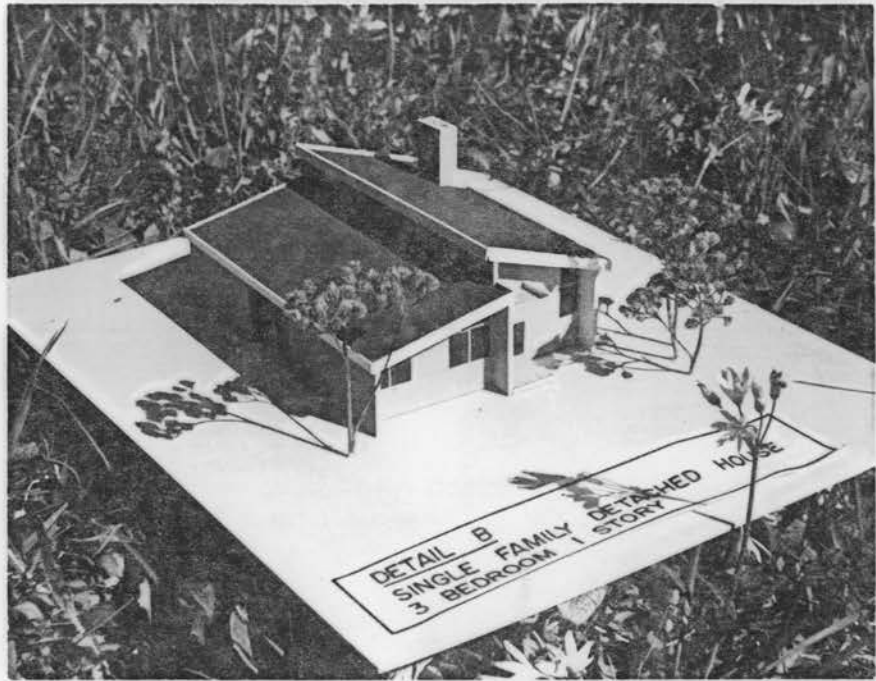


**SIDE ELEVATION**



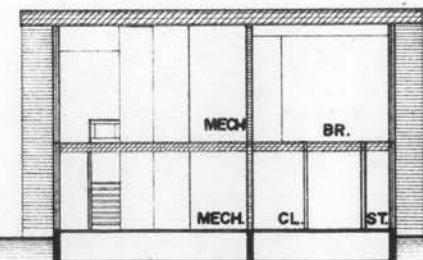
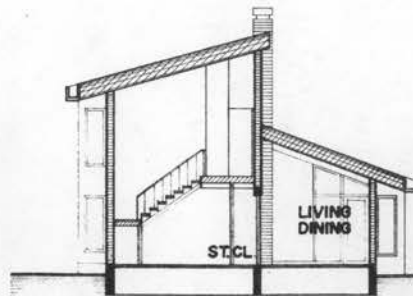
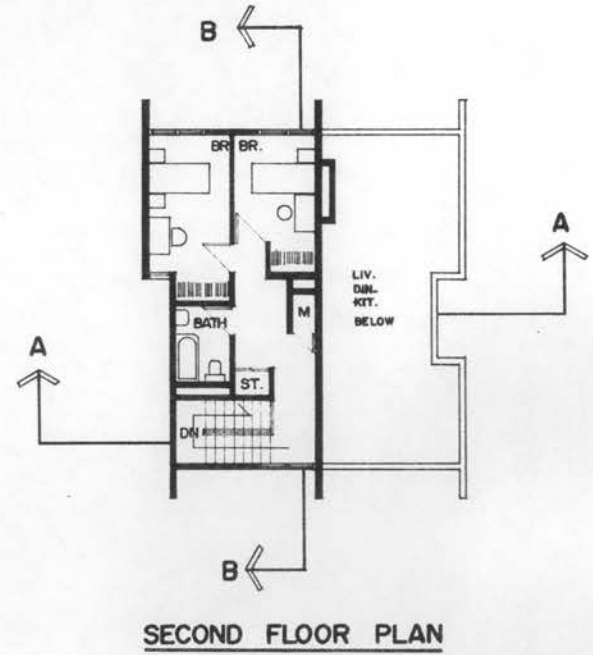
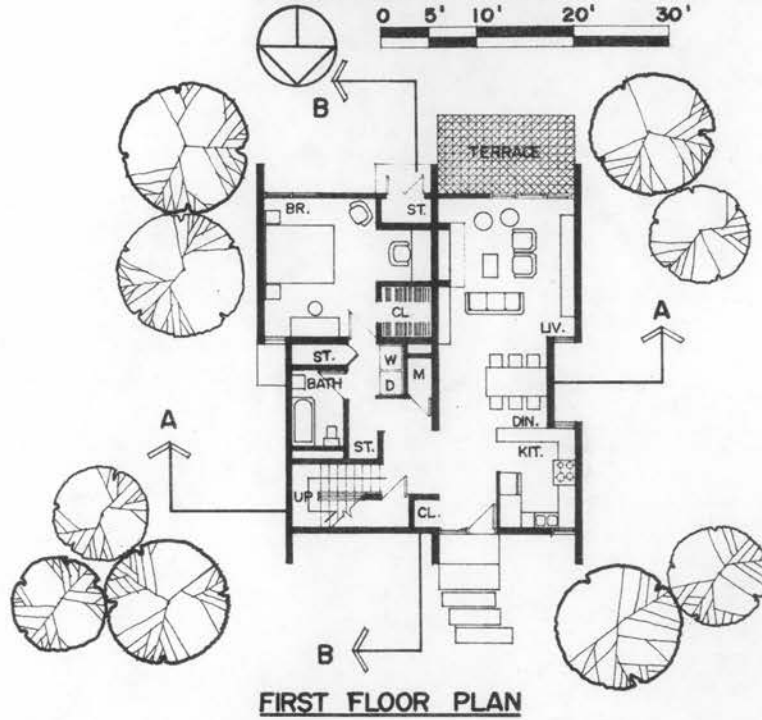
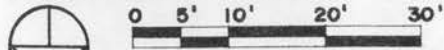
**REAR ELEVATION**





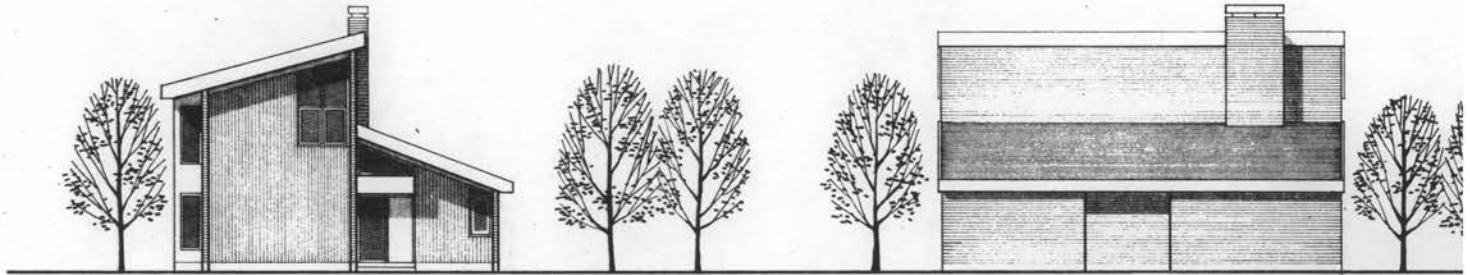


DETAIL C  
SINGLE FAMILY DETACHED HOUSE  
3 BEDROOM 2 STORIES



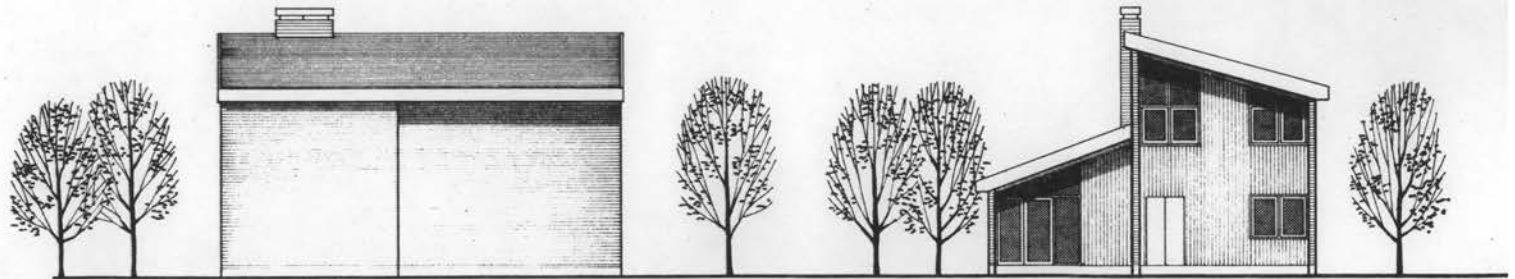
DETAIL C  
SINGLE FAMILY DETACHED HOUSE  
3 BEDROOM 2 STORIES

0 5' 10' 20' 30'



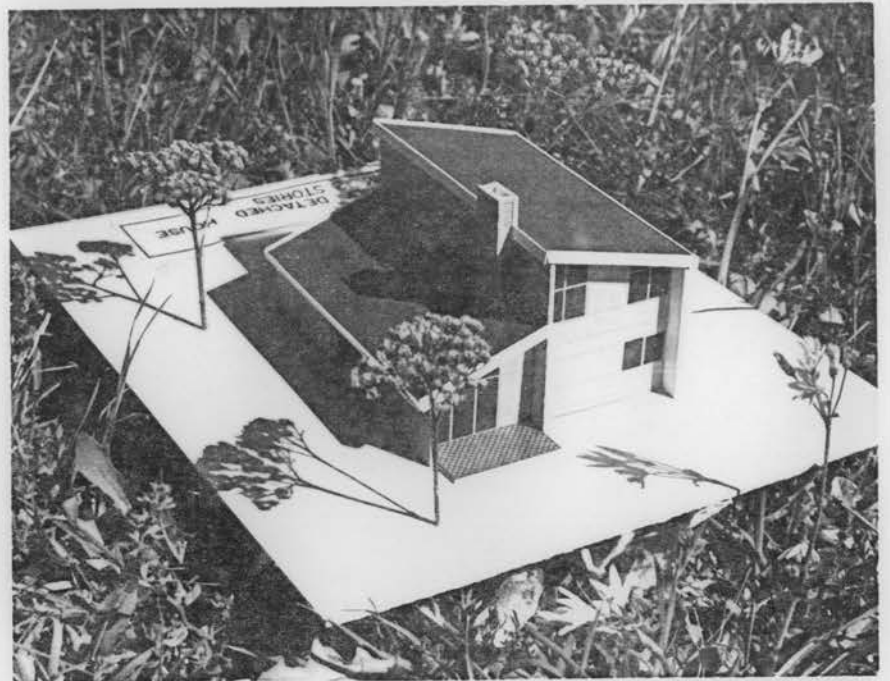
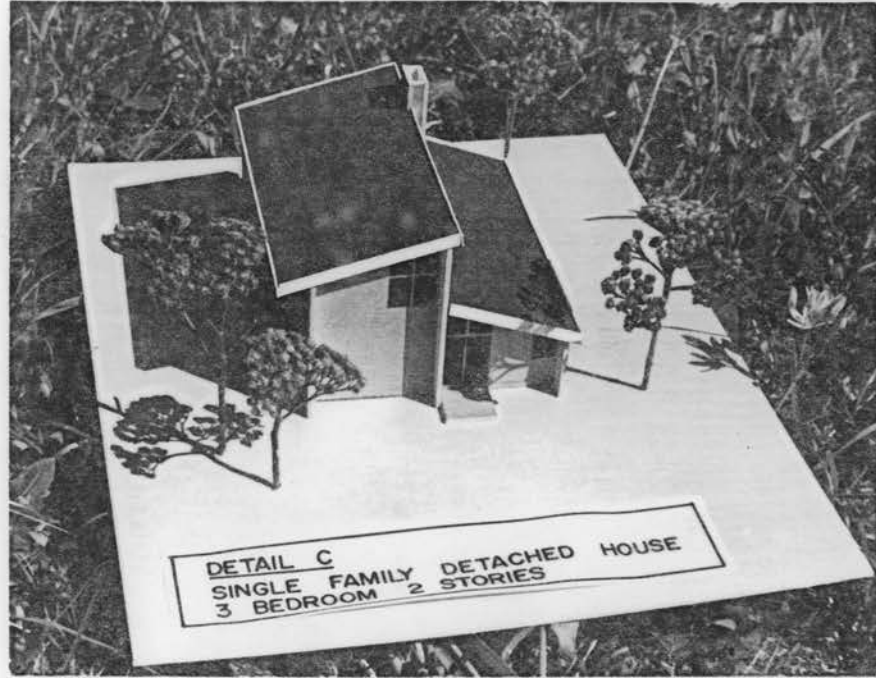
FRONT ELEVATION

SIDE ELEVATION

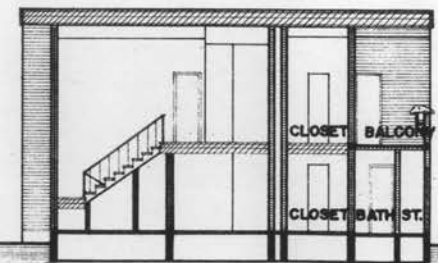
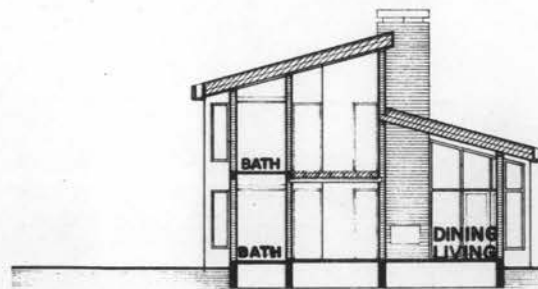
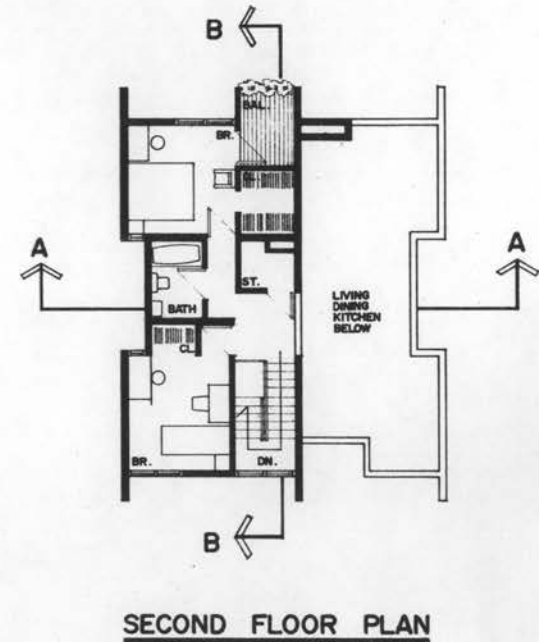
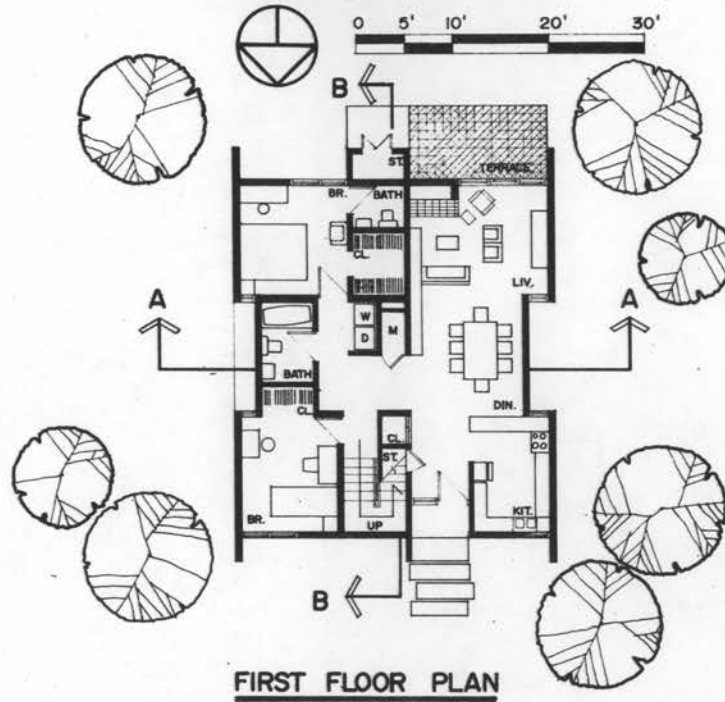


SIDE ELEVATION

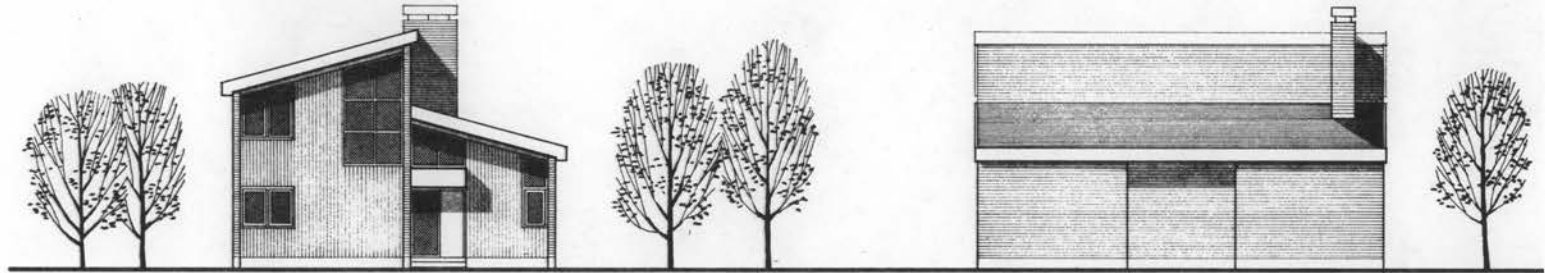
REAR ELEVATION



**DETAIL D**  
**SINGLE FAMILY DETACHED HOUSE**  
**4 BEDROOM 2 STORIES**

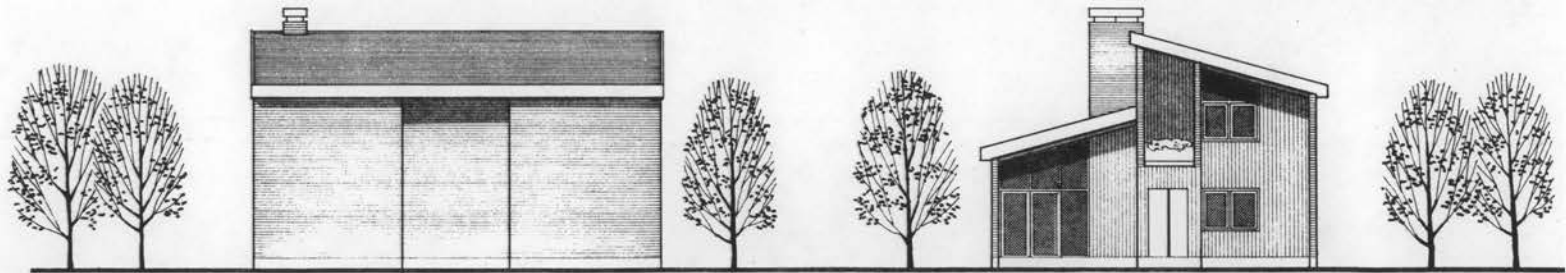


DETAIL D  
SINGLE FAMILY DETACHED HOUSE  
4 BEDROOM 2 STORIES



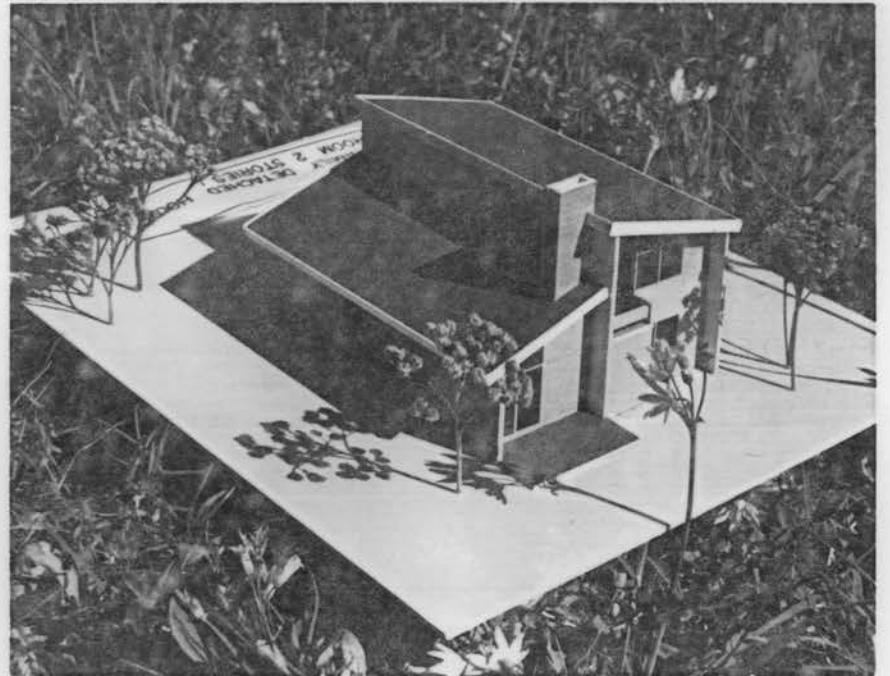
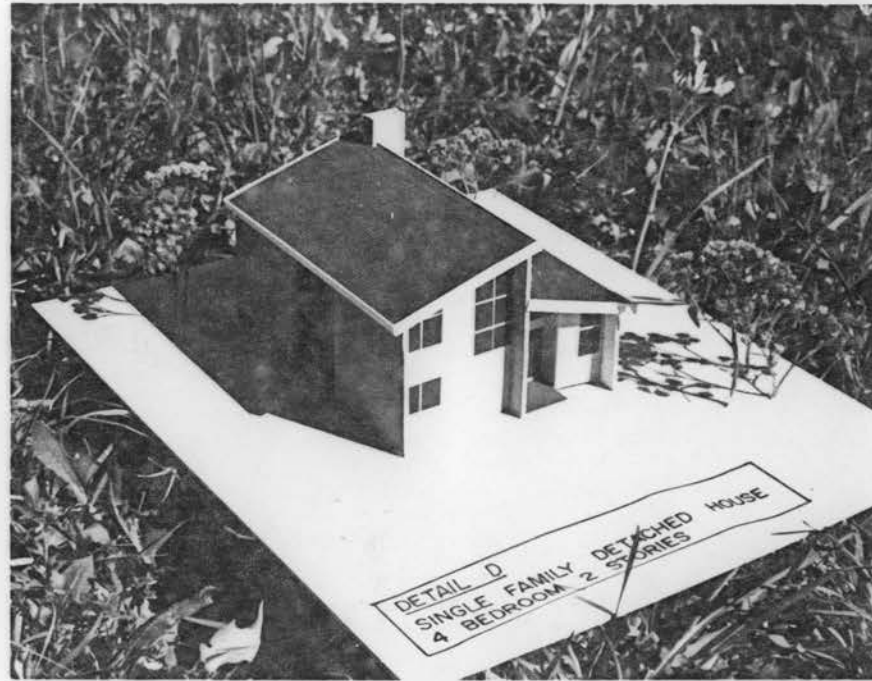
FRONT ELEVATION

SIDE ELEVATION

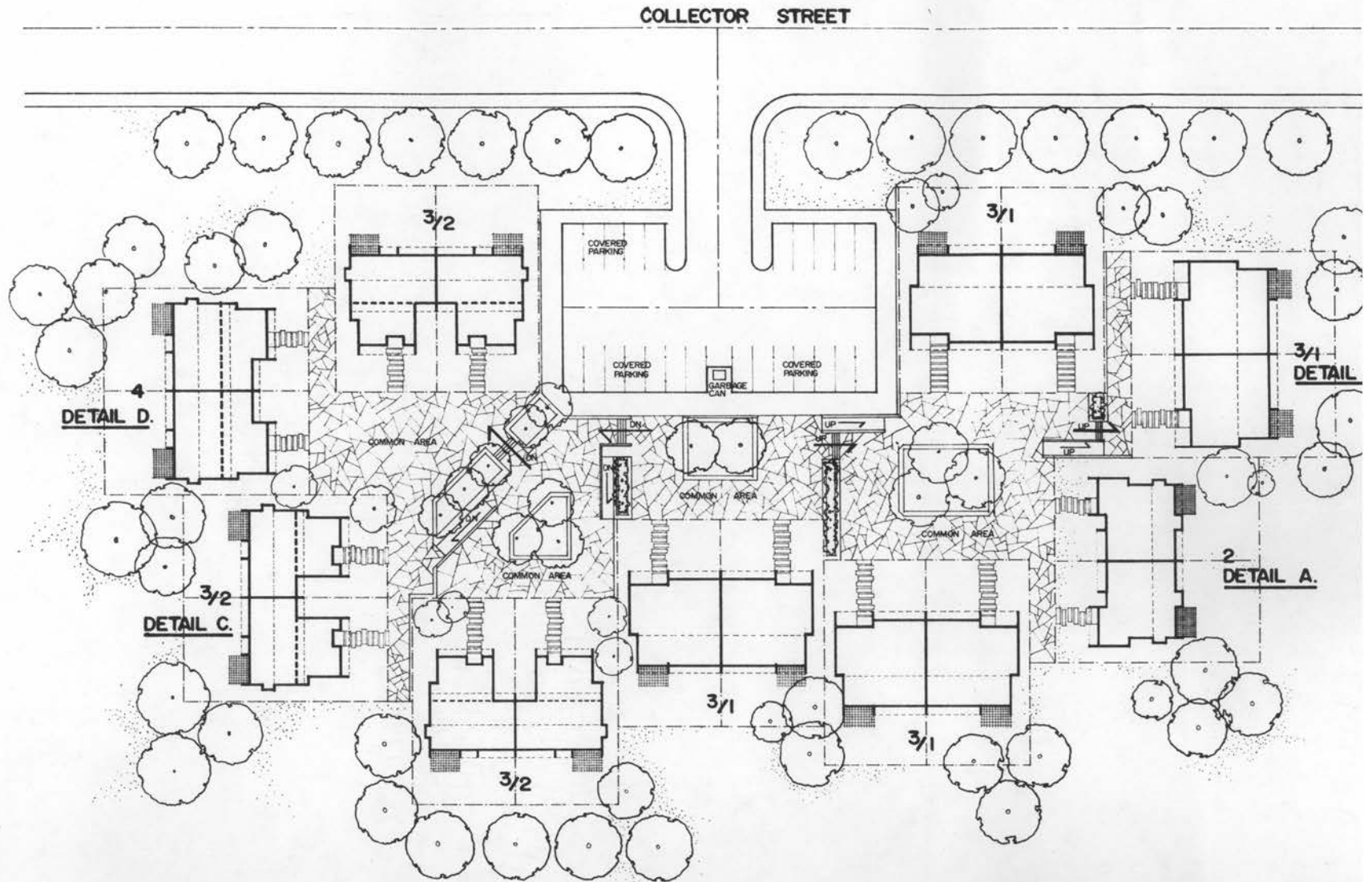


SIDE ELEVATION

REAR ELEVATION







**DETAIL D.**

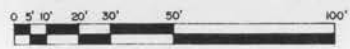
**DETAIL C.**

**3/1  
DETAIL**

**2  
DETAIL A.**



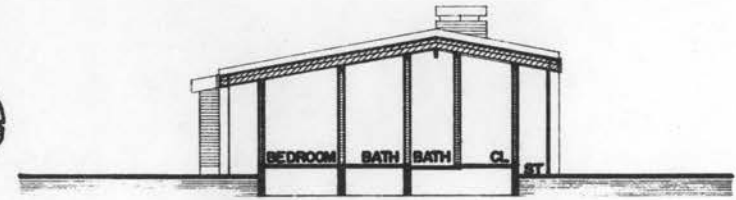
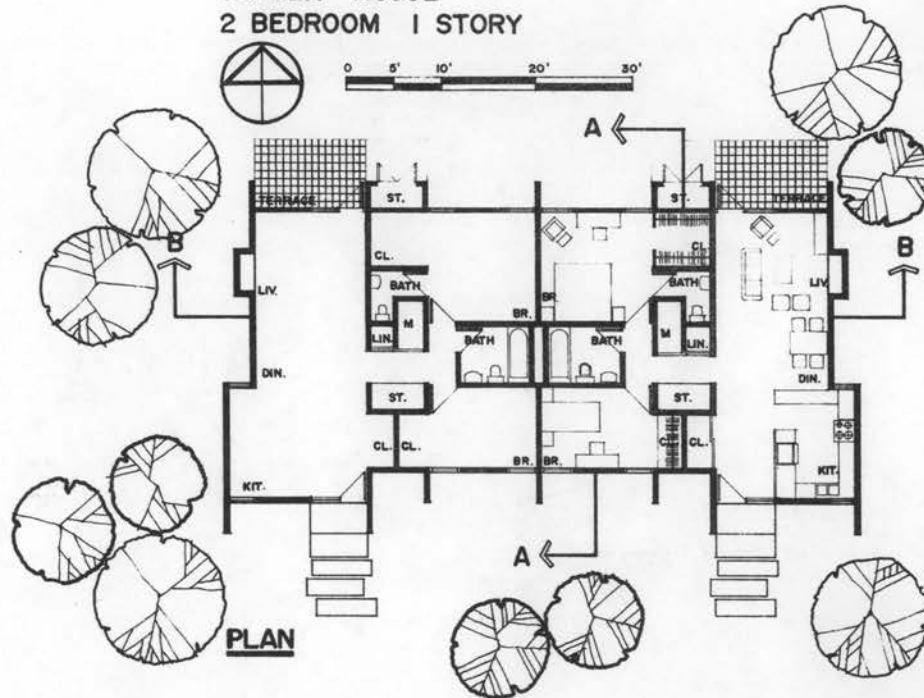
**DUPLEX HOUSE CLUSTER**



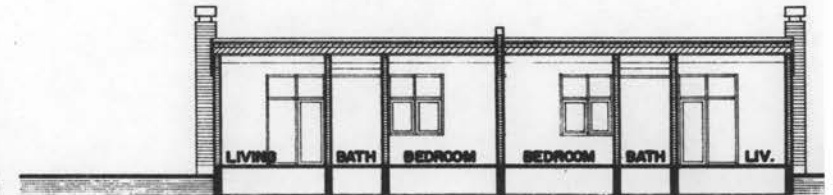
2	2- BEDROOM	1 STORY
3/1	3- BEDROOM	1 STORY
3/2	3- BEDROOM	2 STORIES
4	4- BEDROOM	2 STORIES



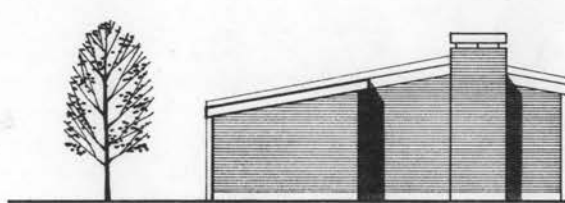
**DETAIL A**  
**DUPLEX HOUSE**  
**2 BEDROOM 1 STORY**



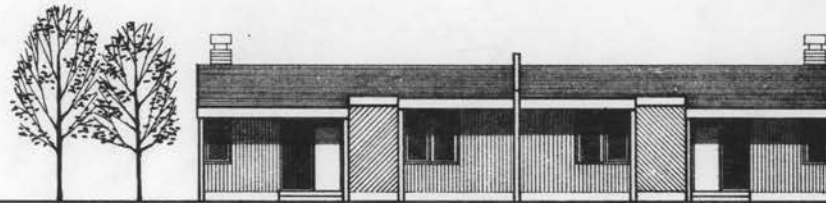
**SECTION A - A**



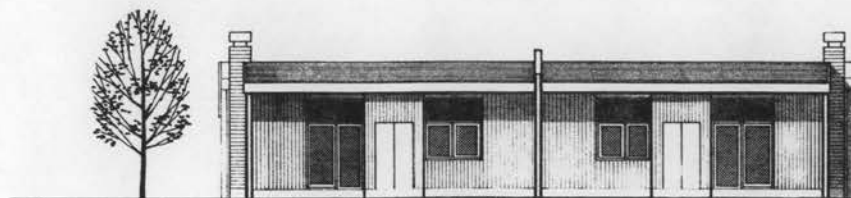
**SECTION B - B**



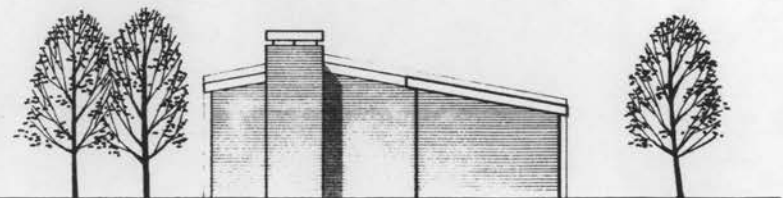
**SIDE ELEVATION**



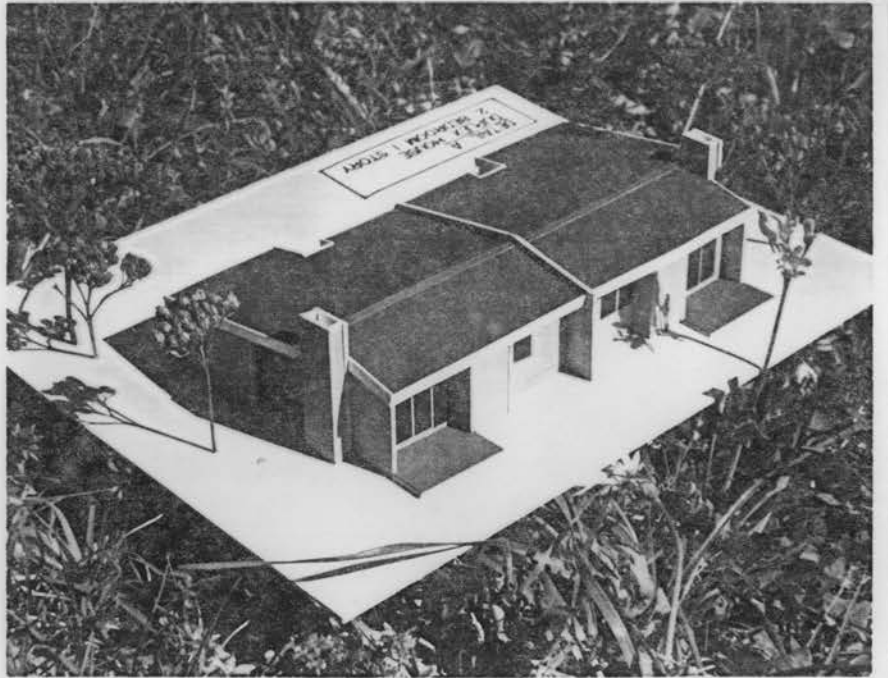
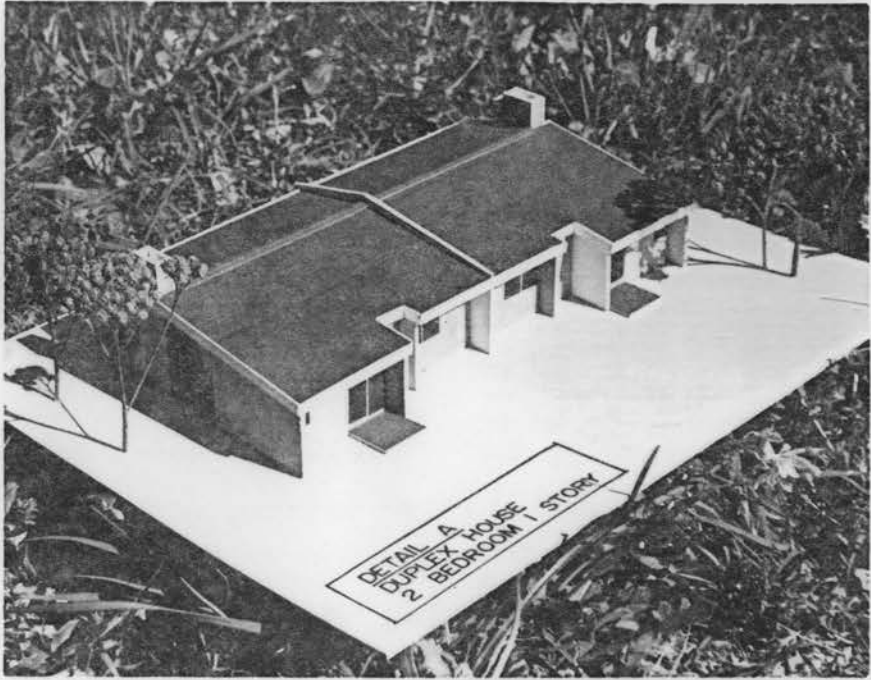
**FRONT ELEVATION**



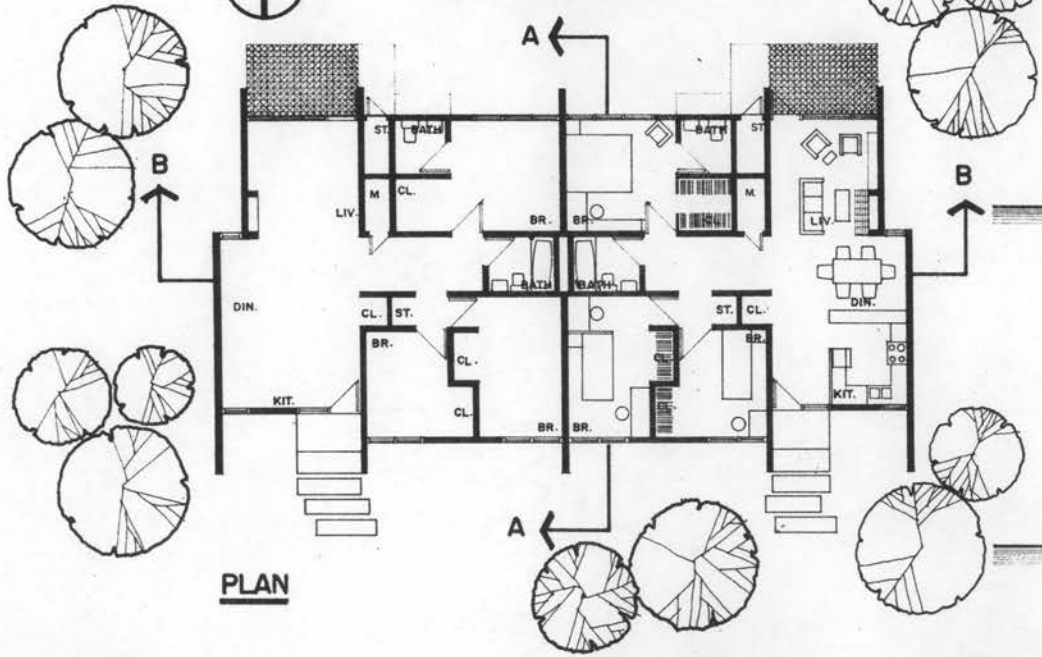
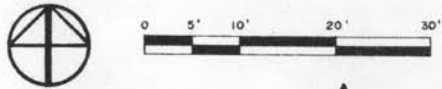
**REAR ELEVATION**



**SIDE ELEVATION**



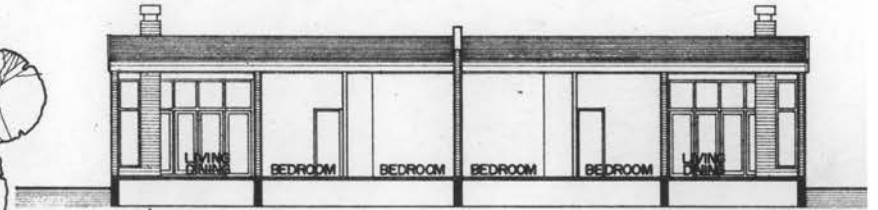
**DETAIL B**  
**DUPLEX HOUSE**  
**3 BEDROOM 1 STORY**



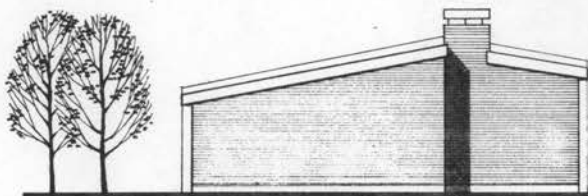
**PLAN**



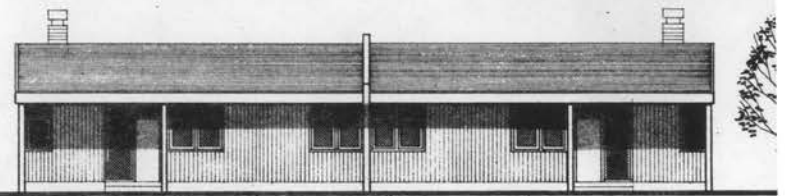
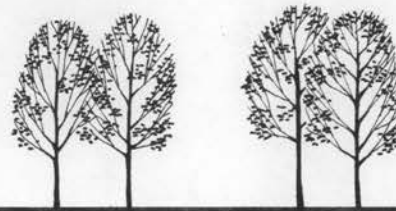
**SECTION A - A**



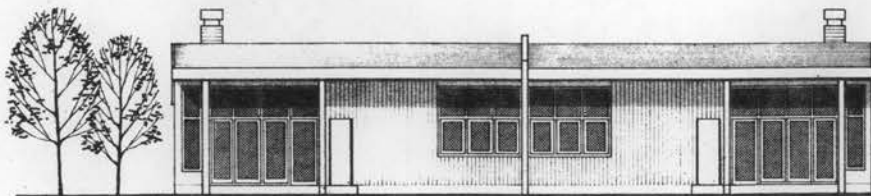
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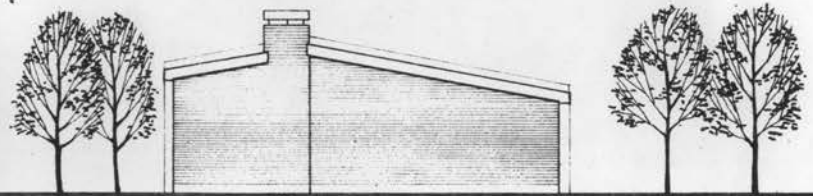
**SIDE ELEVATION**



**FRONT ELEVATION**

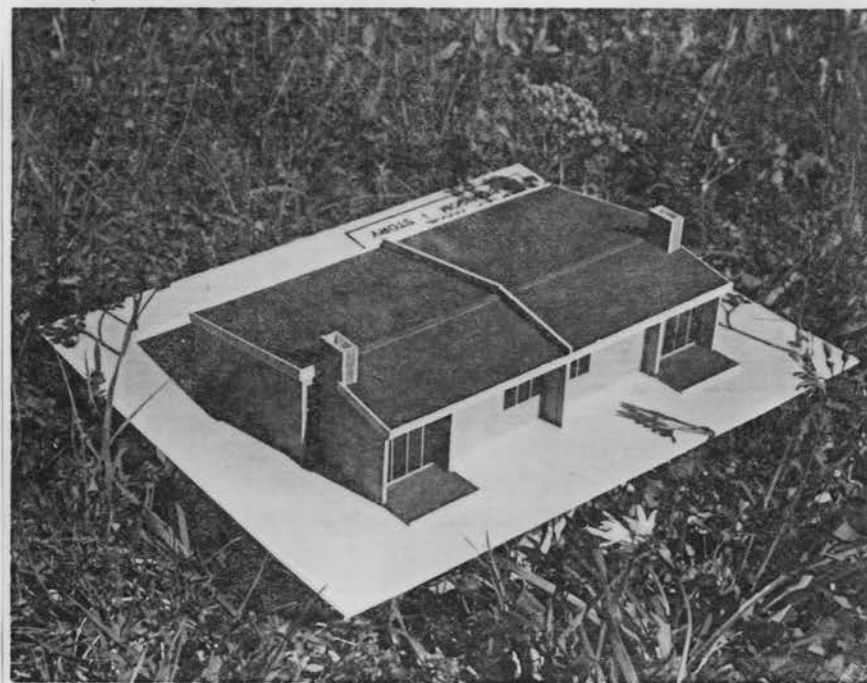


**REAR ELEVATION**



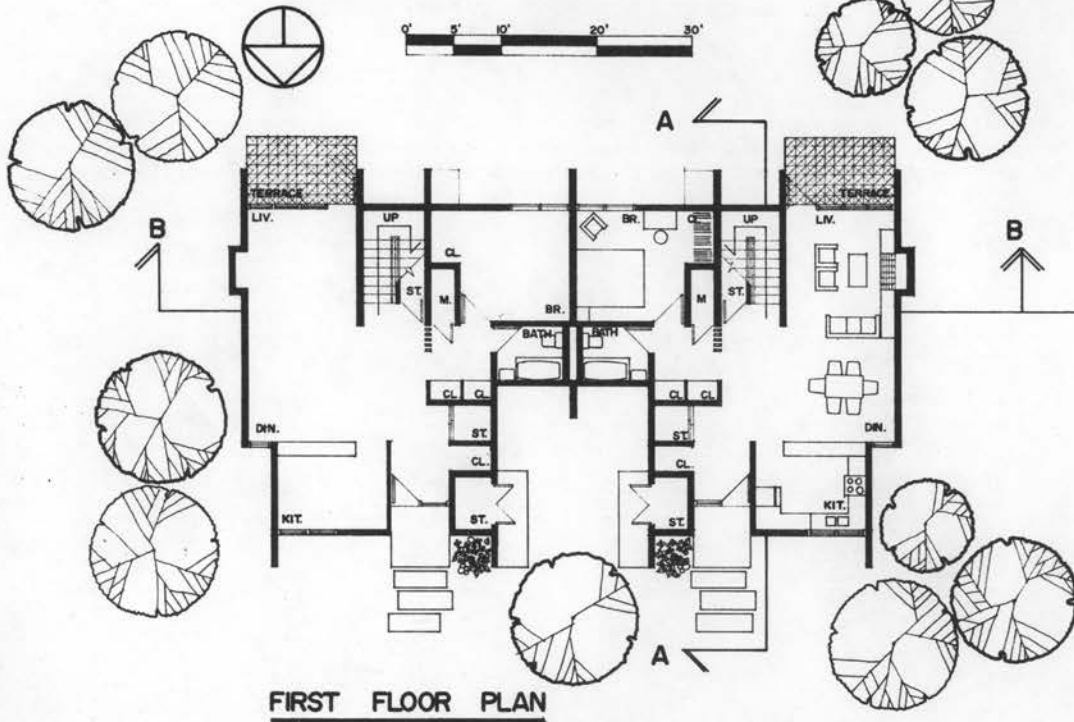
**SIDE ELEVATION**



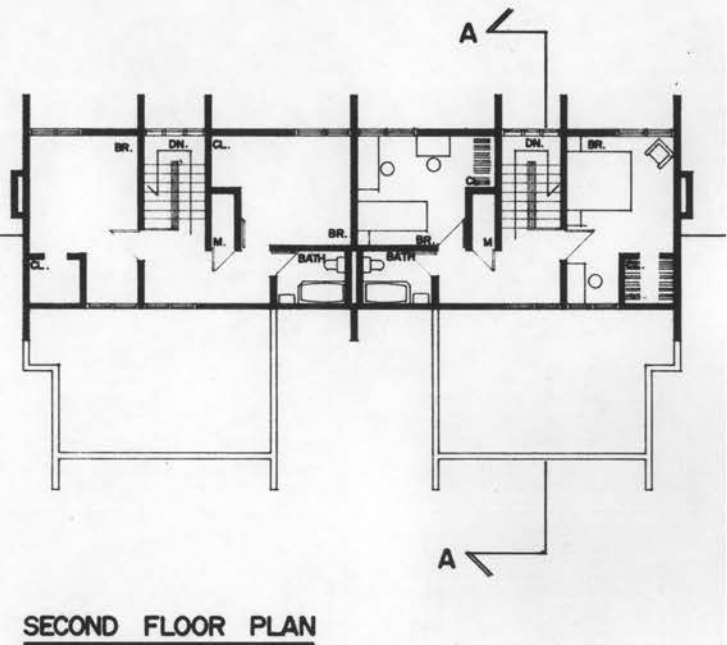




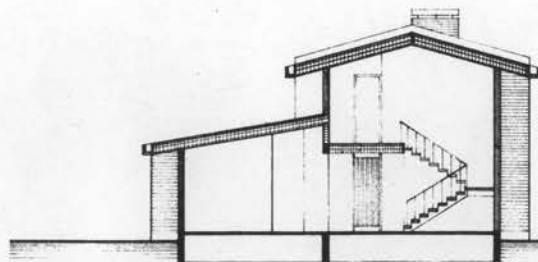
**DETAIL C**  
**DUPLEX HOUSE**  
**3 BEDROOM 2 STORIES**



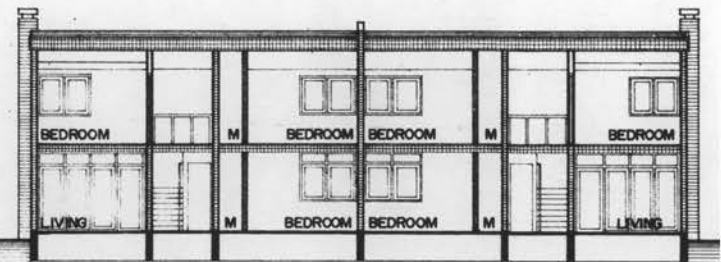
**FIRST FLOOR PLAN**



**SECOND FLOOR PLAN**

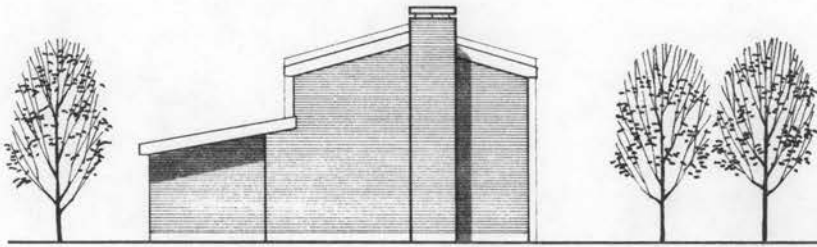


**SECTION A - A**

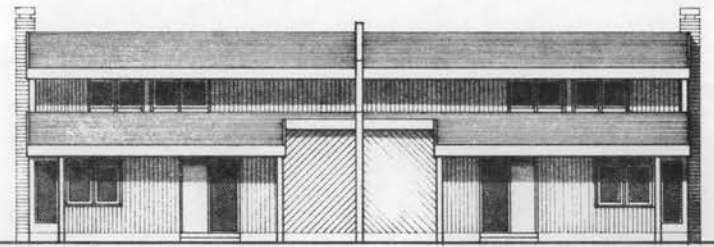


**SECTION B - B**

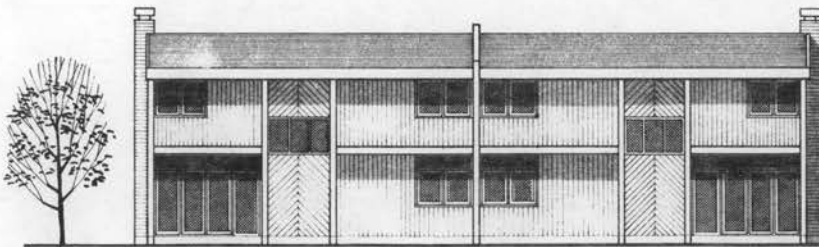
DETAIL C  
DUPLEX HOUSE  
3 BEDROOM 2 STORIES



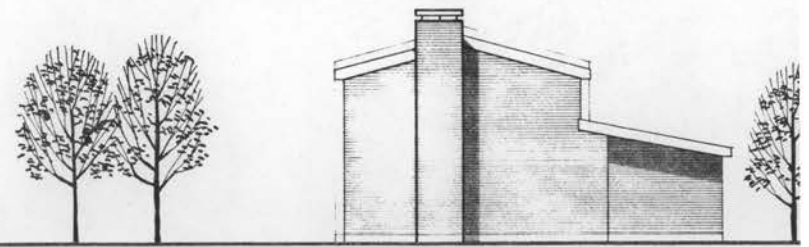
SIDE ELEVATION



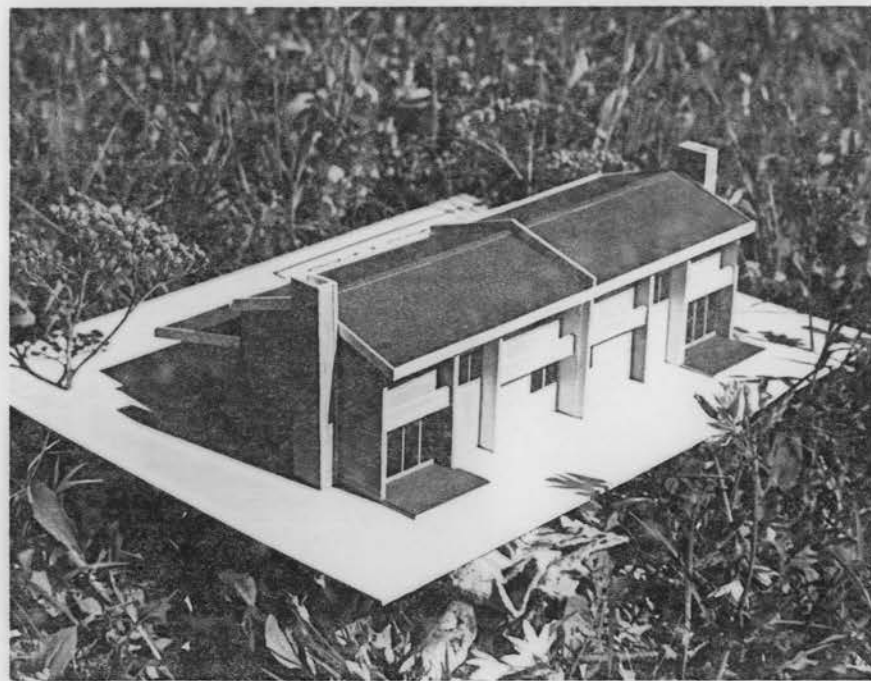
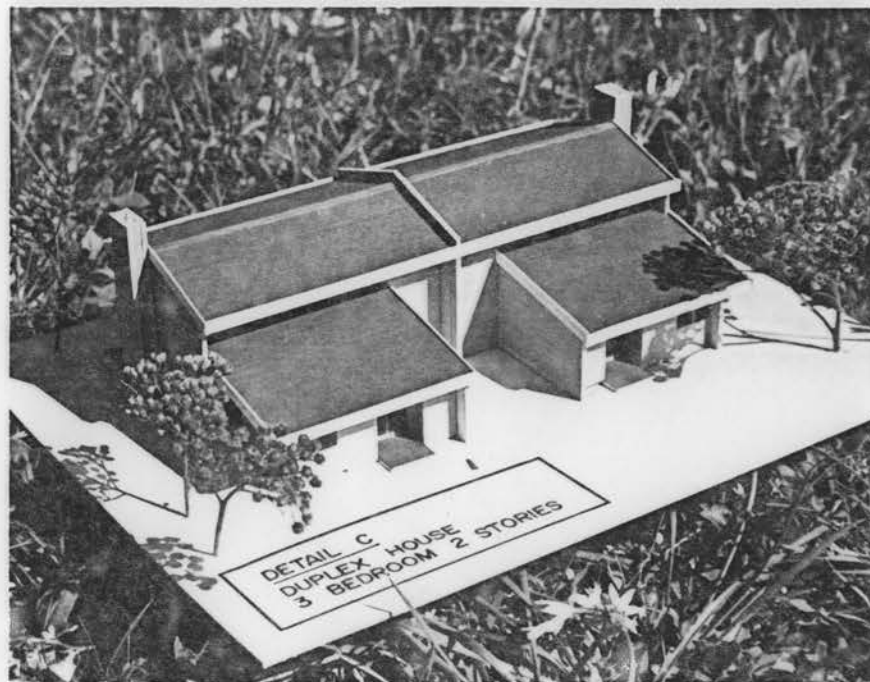
FRONT ELEVATION



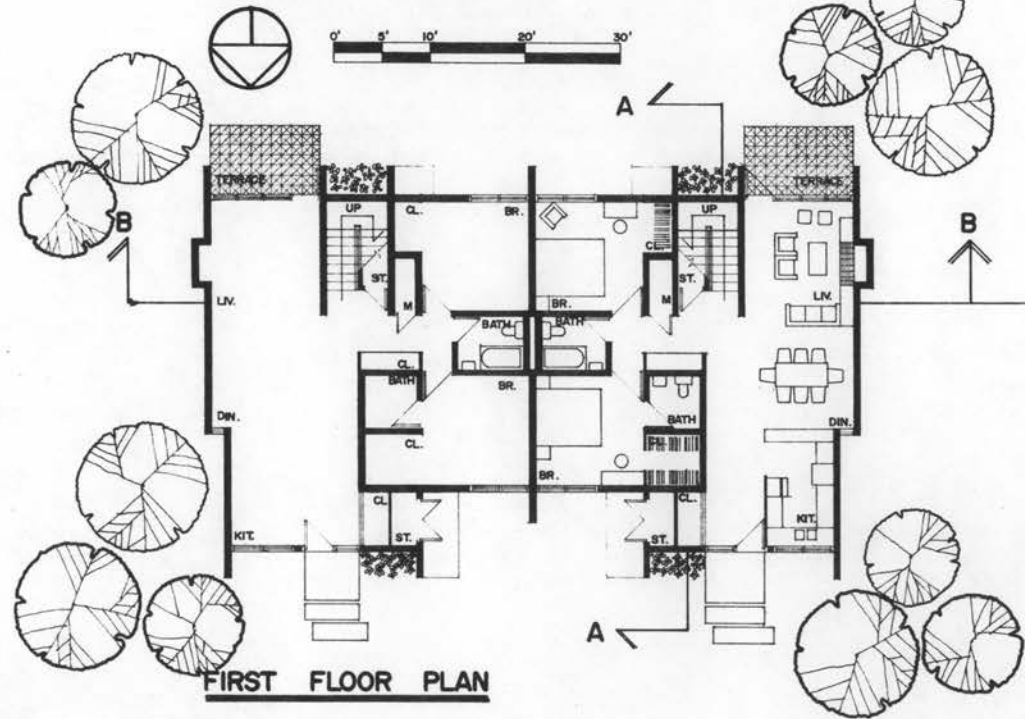
REAR ELEVATION



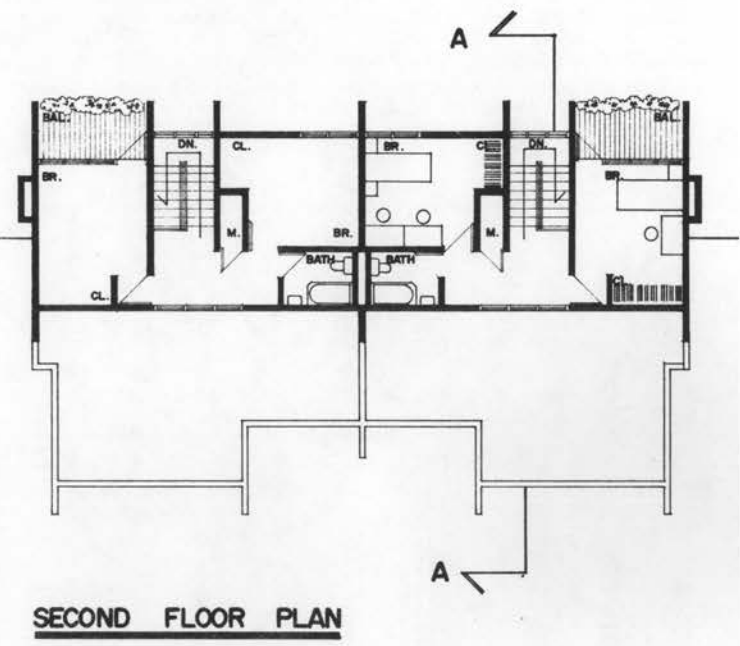
SIDE ELEVATION



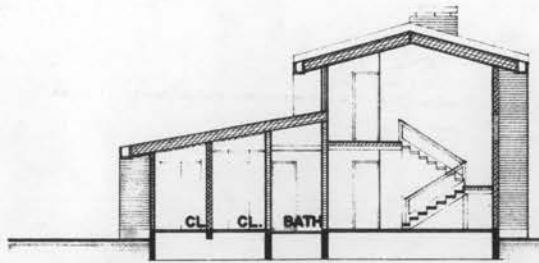
**DETAIL D**  
**DUPLEX HOUSE**  
**4 BEDROOM 2 STORIES**



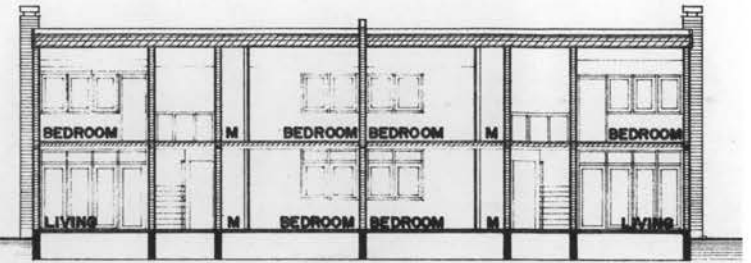
**FIRST FLOOR PLAN**



**SECOND FLOOR PLAN**

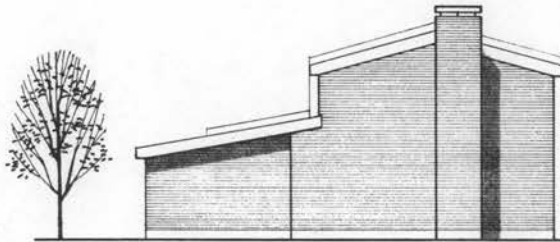


**SECTION A - A**

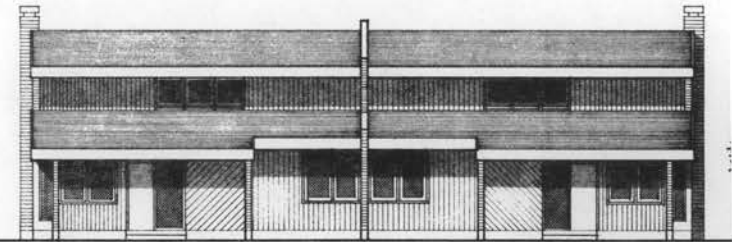
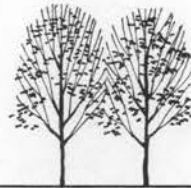


**SECTION B - B**

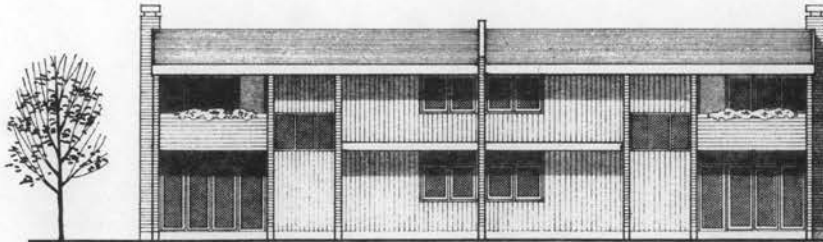
**DETAIL D**  
**DUPLEX HOUSE**  
**4 BEDROOM 2 STORIES**



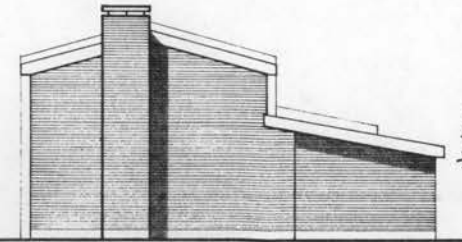
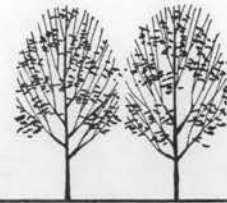
SIDE ELEVATION



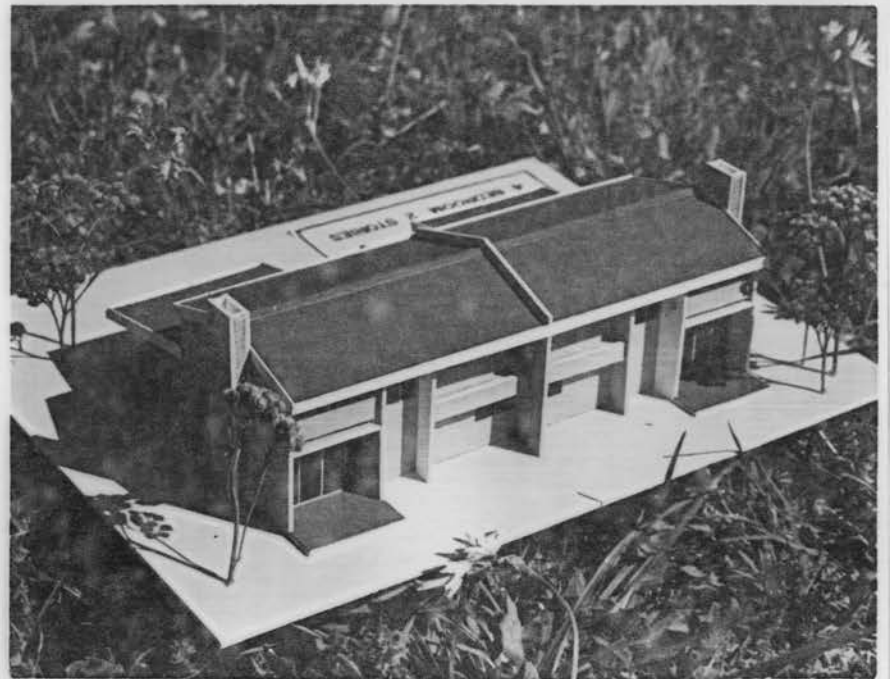
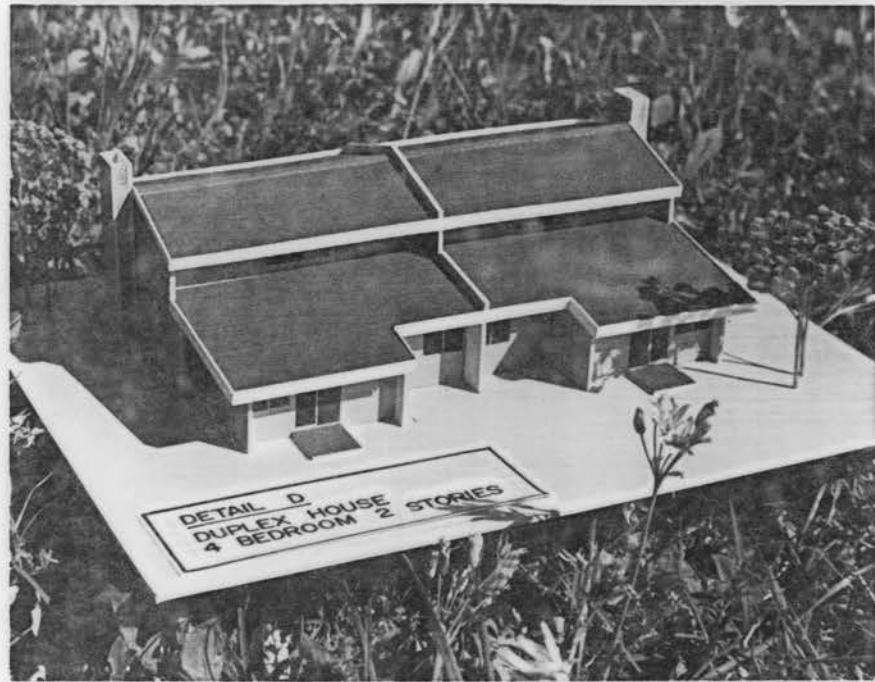
FRONT ELEVATION



REAR ELEVATION



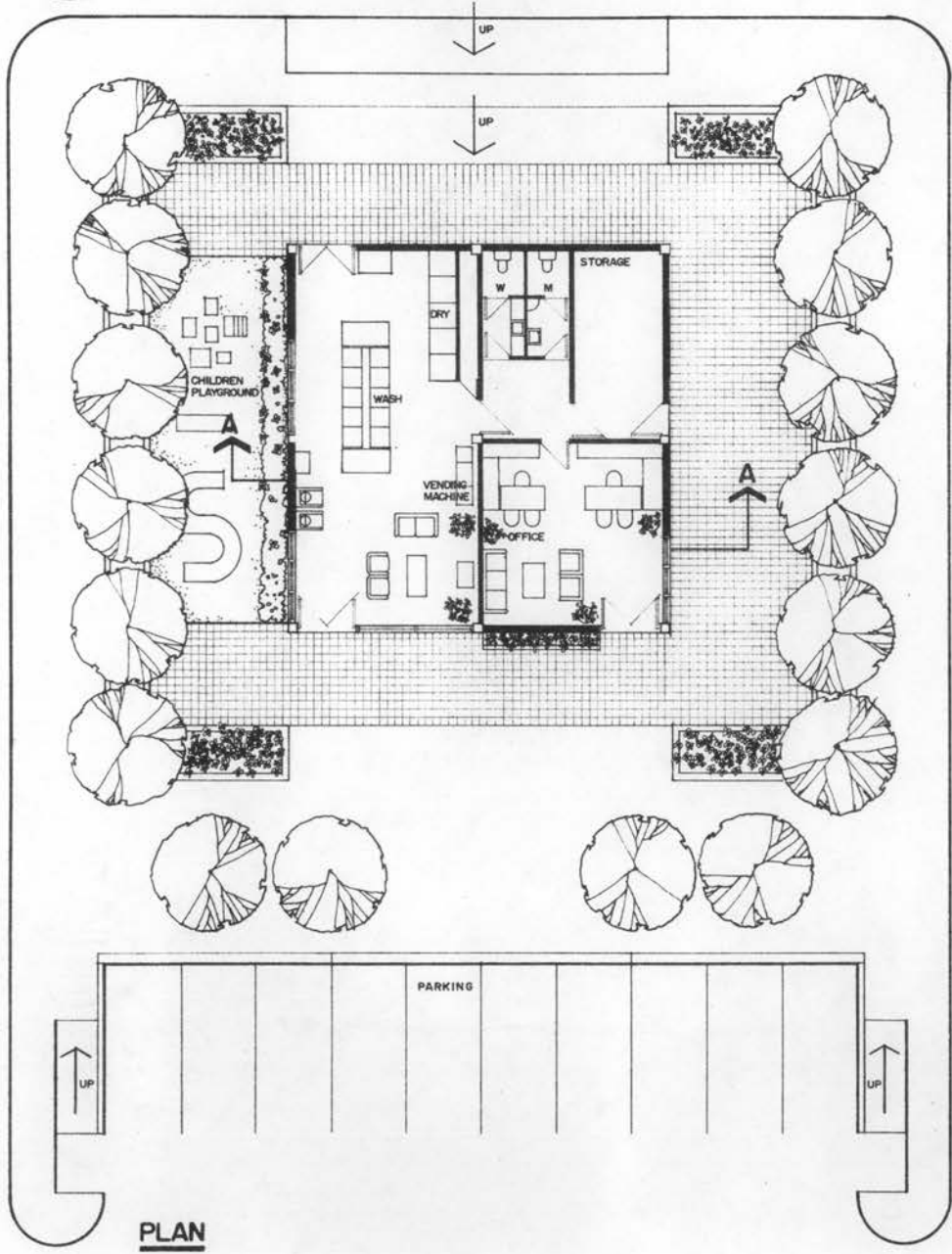
SIDE ELEVATION



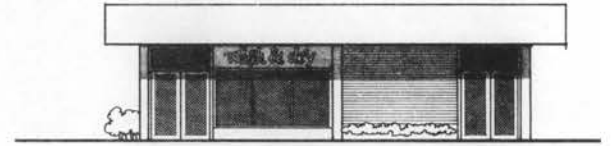




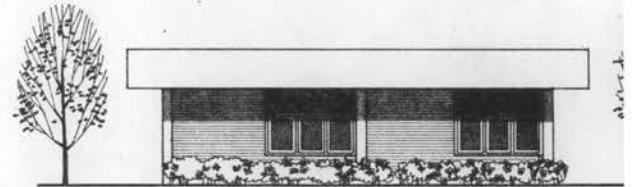
**COMMERCIAL FACILITIES**



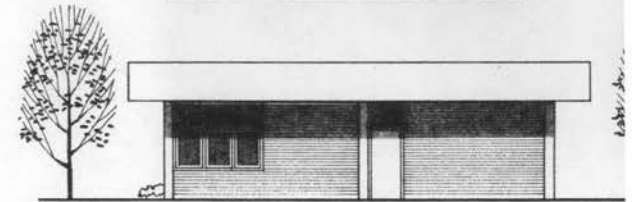
**PLAN**



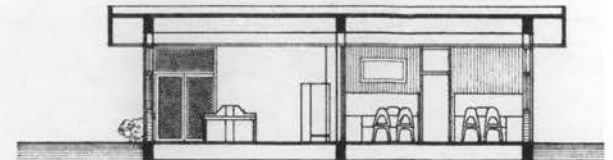
**SOUTH WEST ELEVATION**



**NORTH WEST ELEVATION**

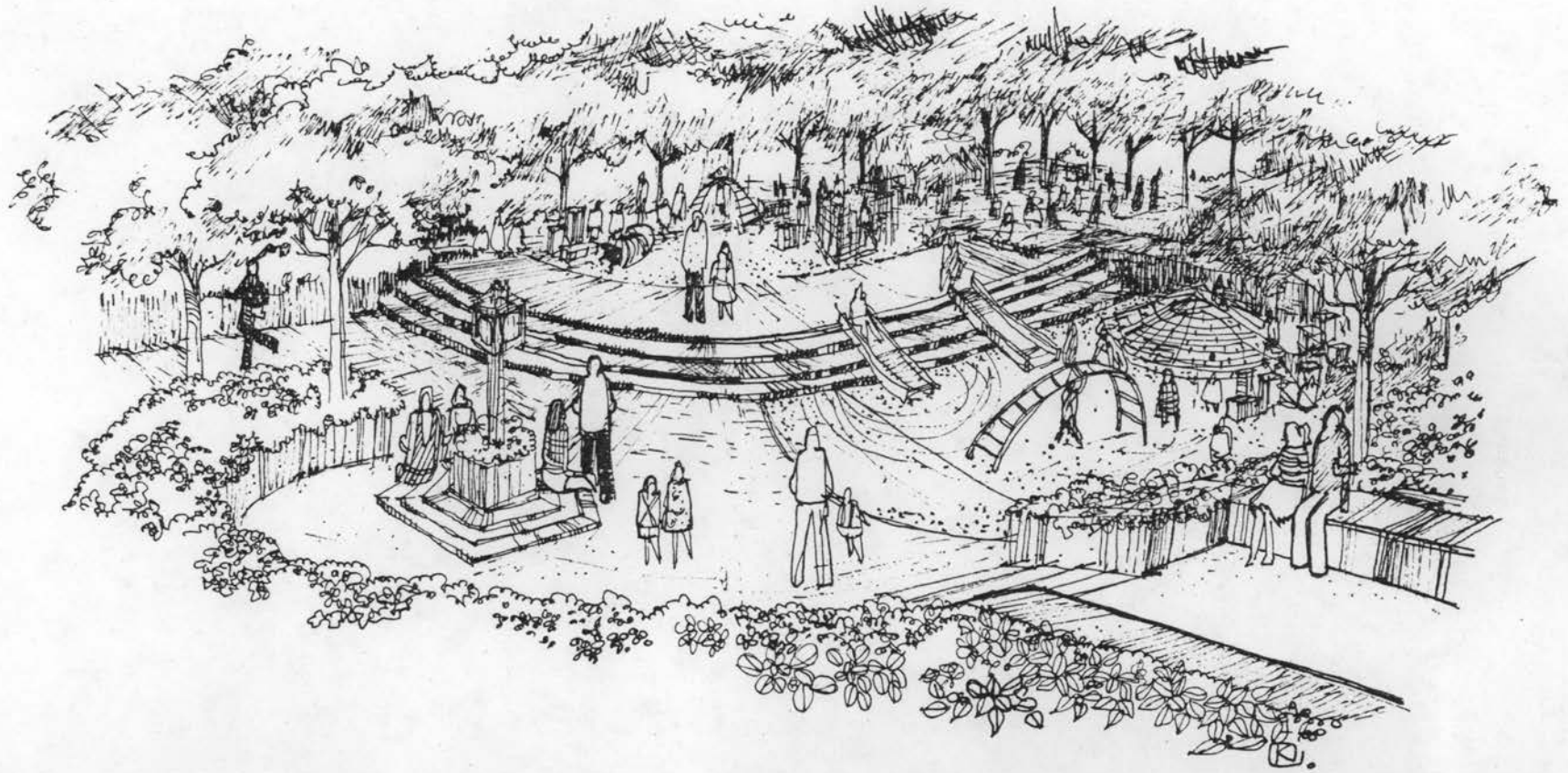


**SOUTH EAST ELEVATION**

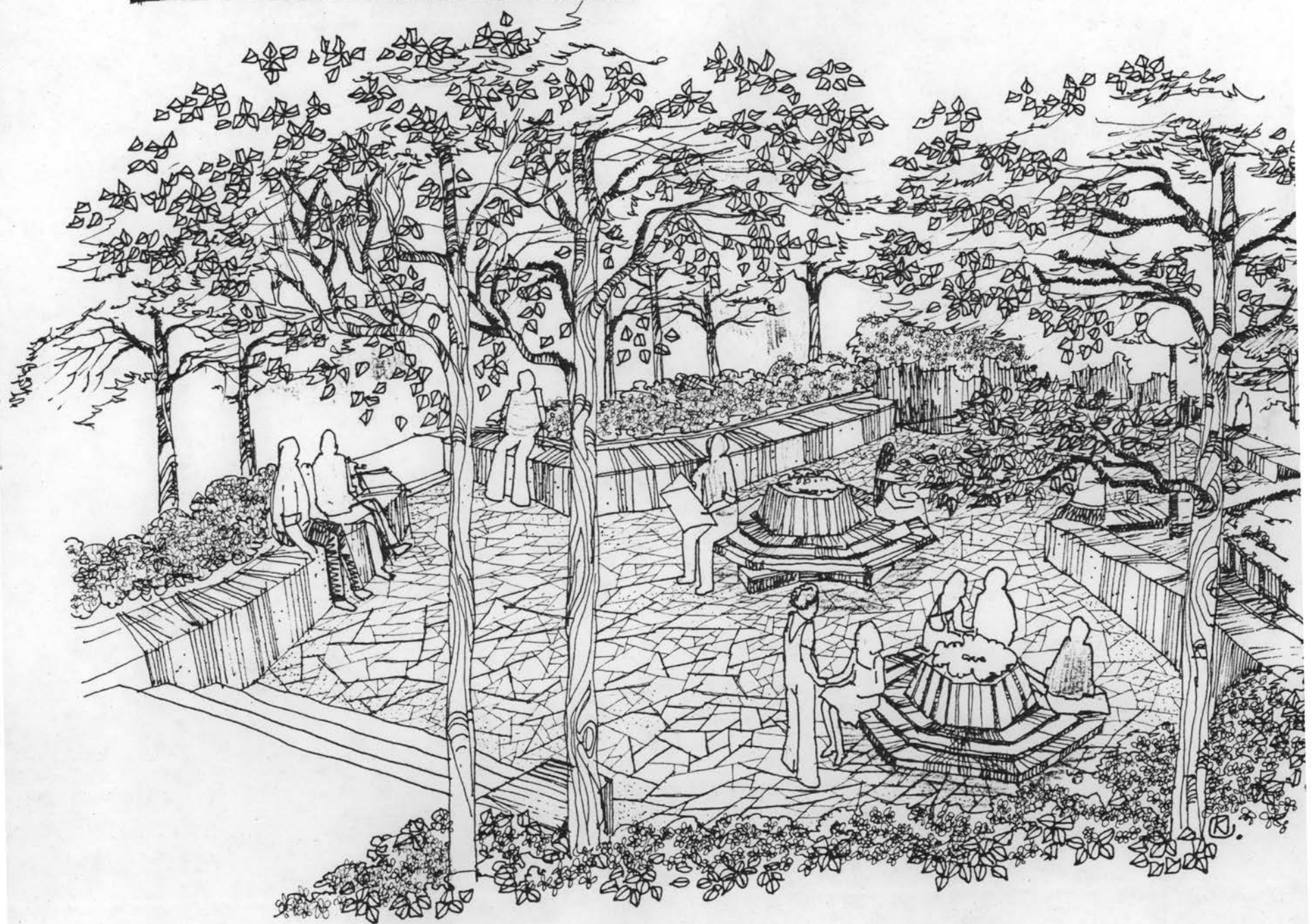


**SECTION A - A**

## OPEN SPACE , RECREATION AREA



OPEN SPACE , RECREATION AREA



## NOTES

1. John Maesai, Housing, Copyright 1976 by A. Weley-Interscience Publishing. John Wiley and Sons, Inc., N.Y., U.S.A.
2. Stillwater Comprehensive Plan Data Base, September 30, 1977.
3. Stillwater Zoning Ordinance.
4. H.U.D. Minimum Property Standards, 1973 Edition.
5. Joseph DeChiara and Lee Koppelman, Urban Planning and Design Criteria. Copyright 1975, by Litton Educational Publishing, Inc.



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- DeChiara, Joseph and Lee Koppelman. Manual of Housing Planning and Design Criteria. Copyright 1975, by Prentice-Hall, Inc. Englewood Cliffs, N.J.
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- Stillwater Zoning Ordinance
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