THE 'SUPPORTS' DESIGN FOR A BLOCK IN THE ALAMO SQUARE AREA,
SAN FRANCISCO

By

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Signature of the Author

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May 10, 1979

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Abstract

THE 'SUPPORTS' DESIGN FOR A BLOCK IN THE ALAMO SQUARE AREA, SAN FRANCISCO.

Submitted to the Department of Architecture on May 10, 1979, in partial fulfillment of the requirements for the degree of Master of Architecture in Advanced Studies.

This thesis is an attempt to use SAR methodologies as tools to formulate design guidelines for a housing development in the Alamo Square area, San Francisco.

Design guidelines will deal with two levels; one is the block level (or the way in which the new housing will fit within the existing fabric), second is the building or unit level (or the way in which the dwellings will be designed within the buildings). Design rules derived from previous research made for this area regarding the existing character of the environment and its visual quality will provide a basis for the guidelines. These rules are expressed in the form of an urban tissue model at the block level and of support principles at the building level.

An analysis of user profiles within individual households has been carried out and households and house types have been correlated. This analysis leads to the development of behavioral norms and related housing needs which are used to evaluate sector groups in terms of their potential for housing different types of households.

The final stage deals with the application of the units (supports) into the block (tissue model).

Thesis Supervisor: Anne Vernez-Moudon.
Title: Assistant Professor of Architecture.
Acknowledgements

This thesis comes into being with great input from many people. I would like to take this opportunity to thank my advisor; Assistant Professor Anne Vernez-Moudon, who inspired me and helped supervise my thesis. I had a chance to work with her on San Francisco project during Summer of 1978. By then I formed and developed the ideas for my thesis subject and goals.

I would like to thank my thesis readers; Professor N. John Habraken and Associate Professor Sandra C. Howell in helping me for the input that help me achieve my thesis goals. They shared the constructive ideas and supporting ideas in the area of my interest in my thesis.

English writing is rather difficult for foreign student who does not have English as native language. I would like to thank Instructor Abelle Mason, my teacher in English who generously spent her time with me correcting my writing on some parts of my thesis.

All people mentioned above shared the great contribution to me and my thesis.
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BIBLIOGRAPHY
1. PAST HISTORY
1.1 Housing design issues

After World War II, the shortage of houses was the critical problem of housing. Both the private and public housing projects had used the industrialized building system to resolve these issues, constructing as many buildings as possible. The uppermost thing in people's minds was the quantity of housing units.

Nowadays, the emphasis is no longer that of quantity but the quality of housing in terms of form and function becomes the crucial issue. People cannot find the housing that suits their needs because in housing projects built for masses of people it is impossible to design dwellings that fulfil the requirements of all the potential dwellers. The best that architects can do within their limits of time and money is distinguish household types and then group the same types together. Thus what we get is housing for the elderly, housing for young couples, for small families, for large families, etc. By surveying individual needs and lifestyles, the designer can base his plan on the average requirement. However the problem still cannot be solved thoroughly because people are different: they have different tastes, different habits, different lifestyles according to their age, sex, occupation, and background. In the single house design, the architect has to have all of this information about the future occupants so that he is able to design the space to serve their specific requirements. We judge whether that architecture is good
or bad, by evaluating it in terms of functions and how well it can serve the requirements of the people who use it.

Therefore since the specialists - the architects, the developers, the builders, etc. cannot know the individual user requirements they must limit their scopes. That is, they should provide the basic design structure of the dwellings, leave plan sufficiently flexible so that the dwellers can make decisions about space use for themselves. In this way, the dwellers, who will remain long after the planners have left, will have a say in their own living environment.
1.2 SAR methodologies as the tools to resolve the housing problem

Since the sixteen months of being a student in Housing Design and Related Method program in the department of architecture at M.I.T., I have had an opportunity to study SAR philosophy, its methodologies and some of its applications throughout many countries in Europe. The philosophy and approach are based on the principle that the user must participate in the housing design process. Its methods have been developed to introduce the dweller once more into the housing design process; to make participation of the dwellers possible. As I mentioned earlier, in housing process built for masses of people it is impossible to design dwellings that fulfill the requirements of all the potential dwellers. Therefore participation is an efficient way of understanding what people want.

Within this description of the critical housing problem, this thesis is an attempt to develop a design proposal for housing that overcomes this difficulty. It is based on the SAR philosophy and uses the SAR methods as a design evaluation and more generally as a communication tool.
2. PURPOSE
2. Purpose

The intention of this thesis is to propose the design of a support: which is defined as the element of dwelling which lies beyond the control of the dweller and represents the physical framework of professional decision making power, within a chosen tissue tissue for a specific site: block # 822 Alamo square area, San Francisco. (fig. 1)

The proposed support will have the relationship with its immediate environment in terms of the overall form and its means of access. In order to do this, studies about San Francisco Victorian setting have been made including:

- Victorian tissue
- Lot subdivision
- Victorian house
- Public facade type
- How they changed overtime.

The support will be designed to enable the accommodation of different types of dwellings of varying sizes and configurations. Those are:

- Dwellings for young singles.
- Dwellings for young couples.
- Dwellings for couples with young children.
- Dwellings for middle age couples with teenage children.
- Dwellings for middle age couples with grown children.
- Dwellings for elderly couples.
- Dwellings for elderly singles.

The reasons the support should be able to accommodate different types of dwellings are:
1976 Alamo Square
- To make the community lively with different activities of people of different ages and backgrounds.
- To locate each individual household type effectively for example, the best location of the dwellings for the elderly and young couples with young children is the ground floor or the floor that has direct access to the ground, but the dwellings for middle age couples with grown children and young singles or young couples may be located on the upper floors, thus they can be set on top of the units for the elderly or for the young couples with young children.
- To benefit the children and the elderly when they need help from the stronger people in the other age groups, for example in case of fire.
- To allow people within the community to talk and exchange their ideas with the others of different ages.
- To assure benefit the young singles and the young couples who are always away from their units during workdays. That is since some people in other household types remain at home and children always play nearby, it is difficult for thief to operate.
3. THE ALAMO SQUARE AREA, SAN FRANCISCO:
   A CASE STUDY
3. The Alamo Square area, San Francisco: a case study

The Alamo Square area has been a residential neighborhood in the northwestern portion of San Francisco for over 100 years. The vast majority of streets are laid out in a grid ignoring the presence of hills. The basic block situated in this area is 412'-6" by 275'-0", with the long dimension running in the east-west direction. Each block was originally subdivided into six large parcels of 137'-6" by 137'-6" each which were sold for further subdivision into lots whenever the demand for land was sufficient to warrant an increase in density. The most common lot frontage dimensions were 25', 27'-6" and 30'. On the lots, various types of individual houses were built corresponding closely to the size of the lot and in relationship to the adjacent houses. The building foundations on those lots varied according to the slope of the land, but the upper portions of the buildings tended to be standardized in their height and bulk.

These factors and the creative abilities of San Francisco architects and builders over the past century, have led to the patterned beauty we now perceive.

Block # 822, one block in this area has been chosen as a tissue model and support model design case study for these reasons:

1. It is an urban residential area. The buildings in the area are mostly
two to three-storey town houses\textsuperscript{10} which utilize the concept of supports and SAR methodology. In addition, this area has an abundance of town house examples, all of which show a relationship between the building and the open space, i.e. the front facades and the streets.

2. It provides the desired context for a new housing proposal based on the existing building prototype, i.e. attached house, with or without recess, semi-detached house, with or without recess.

In addition, my personal experience of having done for several months the infilled projects for block # 823 (Alamo Square area) provides me the information and data about this area which are needed in order to make design decisions in the level of tissue model and support model. Most of the information and the data on which this thesis is based was done in a national endowment for the arts funded study, "Urban Form And Change, San Francisco", carried out in the department of Architecture at M.I.T. under the direction of Assistant Professor Anne Vernez-Moudon.
4. ANALYSIS
4.1 Analysis of existing surrounding blocks

A general analysis of existing block tissue around the Alamo square was already presented in "Urban Form and Change: San Francisco". In this chapter a more specific analysis of the existing surrounding blocks of block #822 will be made because these surrounding blocks have undergone the least change and retain to-date the original Victorian characteristic of the city fabric. For the most part, the general treatment of the existing block tissue can be used for the new tissue model thus retaining its existing environment. However, some characteristics such as the relationship between buildings, the typologies of public facades, and the heights of the buildings are fragile and need relation-
ship to its immediate environment. Therefore the specific analysis of the surrounding blocks is needed.

This analysis will be presented as follows:

1. Location and shape of built elements in relation to open space.
2. Set back location.
3. Facade patterns in relation to side location of the buildings on the lot.
5. Roof line of the buildings.
1. Location and shape of built elements in relation to open space.

The existing surrounding blocks are mostly occupied by narrow, deep townhouses. These townhouses are developed singly from lot to lot, most of them expanded the whole width of the lot create the morphology of closed building block with private courtyard in the center. Light wells and recesses are located in the center of these buildings and along the sides of the houses. In considering the location of the building with the front lot line most of the buildings are located along the street without front yard, except in some buildings in block # 823.

For detailed study of houses, see appendix B., pp. 157-163.
2. Set back location.

There are three positions of front facade in relation to the front lot line, these are:

1. On the lot line.
2. Maximum 5' set back from the lot line.
3. From 5' to 25' set back from the lot line.

Most of the buildings in the intermediate location have setback of 5' from the lot line (usually depth of the bay windows) except the ones in block # 823 have the setback of 25' from the front lot line. The corner buildings are emphasized by having no setback. The corner building of block # 823 which is the detached house has the setback of 25'.

For detailed study of set back location, see appendix B., p. 187.
3. Facade patterns in relation to side location of building on the lot.

Most of the intermediate buildings of the same block have the same setback. That is, the intermediate buildings of block # 827 have the same setback of 5', the same setback happen in block # 803 and block # 821, while the intermediate buildings of block # 823 have the same setback of 25'. This setback character combines with the attached house type without recess mostly found in this existing surrounding block, create the continuity of the facade along the street with a few opening of the recess.

For detailed study of facades, see appendix B., pp.179-186.
4. Height of the buildings.

The two to three-storey townhouses are mostly found in the intermediate location. The corner location are emphasized by higher apartment buildings; i.e. one corner building of block # 803 is six-storey apartment. The others are three-storey buildings. Only one corner building of block # 821 is one storey building and one corner building of block # 823 is two-storey detached house.

For detailed study of heights of the buildings see appendix B., p. 173.
5. **Roof line of the buildings.**

Buildings with different roof shapes and heights create the non-continuity of the roof line. There are many combinations in building heights and roof shapes; these are:

- One-storey building with flat roof.
- Two-storey building with flat roof.
- Two-storey building with gable roof.
- Three-storey building with gable roof.
- Three-storey building with flat roof.
- Six-storey building with flat roof.
4.2 User profiles of individual households

In the support housing, the final floor plan will not be predetermined. Thus it is impossible to evaluate the design of a support by examining the dwelling unit plan. In order to evaluate the layout possibilities of a dwelling, the concept of basic variation has been developed. A basic variation is a notation of the position, in a specific sector group, of a certain group of functions which together form a housing program. Each sector group gives a great many possible basic-variations. The analysis of user profiles of individual household is to be used as a guideline to examine which basic variation of the sector groups matches with which household type. In other words, which household type is possible in that sector group according to this analysis.
Young single

People in this group generally are only moderately concerned with territory. They are away from units during workdays and fairly mobile on weekends. They seek privacy in an environment that enhances social interaction, mostly privacy inside their unit. Identity is generally not a great concern since young single people are fairly mobile moving a lot and are not able to pay for the more unique physical amenities that give a housing environment strong identity. Inconvenience is generally acceptable if the trade-off in the form of lower rent is there; they tend to walk farther and climb more stairs to their units; they have less personal property to pack in and out. They require a full measure of safety from theft during their extended absence.

Young singles best fit into efficiency or one-bedroom units which can either be integrated into interesting location or clusters of larger house types - tops, corners, above garages, etc.
Young couple

If both are working, the description of young single generally applies. However, if one person remains at home, there is an increase in several of human needs. For the person at home the amenities of good orientation, daylighting, sunshine, view, are essential. While peer socialization is still very important, young couples need more time to be by themselves. For the most part young couples get along quite well in one-bedroom units. However if both are working and they can afford it, they may have a two-bedroom unit for the option of having a guest room or a study room.

The one-bedroom unit, which need not be ground oriented one, has the same location adaptability as the young single unit. A unit may also have a full kitchen rather than a kitchenette because of the increasing tendencies of both members to cook together and also providing optional space for laundry equipment.

It may be a small row house, town house, or maisonette.
Couples with young children

With the transition of a two generation family, attention is focused on the development and well being of young children. The children's territory must be able to be limited and well defined with physical barriers such as fences, railings doors, gates, etc., when needed by some family life styles.

Couples with young children should be provided with ground orientation and private outdoor play space. Play spaces in an out of doors should be provided within sight of mother. Not only do the mothers like to keep an eye on what the children are doing, but the children themselves prefer to play in the orbit of their mothers. An extra storage for children toys is needed.

Couples with young children may find their personal privacy and territory severely encroached upon by the children and thus require a minimum amount of "adults only" space, at least during evening hours.

If the site allows a percentage of single level housing, two or three bedroom patio houses would ideally accommodate these families. If not, they can also manage well in medium-sized row houses or town houses, again provided ground oriented amenities are accessible.
Middle age couple, teenage children

One difference between couples with young children and grown children is usually the number of bedrooms needed. A private bedroom for each grown child is desirable and should not be near the parents, allowing privacy for all members of the family, because of frequency of coming or going of teenagers and their friends. Other space requirement increase in proportion to the number and size of members; for example group space like the dining and living rooms must allow for more chairs, bigger tables, etc..

In response to the demand for diversity of spaces for socializing a new space, the play or family room must be added. The living spaces are needed to be kept open for use together or closed off into separate rooms so that the children can entertain their own friends separately. Living spaces with good acoustical insulation are preferable or physically separated and with separate entry. The bathrooms for parents and teenagers need separation and each proximate to bedrooms. Consequently units may require as many as four bedrooms, a separate dining room, a play or family room, a utility room.

The row house, town house and patio house have to be large to accommodate so many spaces.
Middle age couple, grown children

Middle and late middle age is considered by many as the best time of life. Children are gone, housework are less and free time is more plentiful. People are generally still physically active.

Since territory does not have to be shared with children, couples can spread out a bit and have more privacy. Convenience is desirable so that leisure time can be enjoyed. With fewer family members less space is required. Most house types work well. Two bedrooms are about right: one for sleeping and one for bedroom or study. A third bedroom is a nice luxury for over night visitors. Choice of large living room and dining room will be good for the groups tend to entertain more frequently. The town house is the most efficiency choice, but row, maisonette, or terrace would also be appropriate.
Elderly single

People at this age have changes in the structure and functions of their bodies which make them slowly react and lack of mobility. They require as much, or more floor area to carry on their activities as would a young person carrying on the same activities. On the other hand, elderly people do require special design adaptation of spaces to account for possible physical limitations. And because of their limited strength and stamina, convenience is also essential. This means that the elderly require efficiently organized space, less than they had before but enough to hold selected cherished possessions. Since stairs are difficult for the elderly to climb, they must be ground oriented or in elevator buildings.

The elderly require a greater sense of safety since they feel, and generally are, less able to protect themselves from harm. Easy egress in case of fire are necessary.

The elderly make greater use of the bedroom than any other age group except babies. An efficient and commodious bedroom is important for any household but for older people it is absolutely necessary. This is partly because of the need for rest periods but also, as people grow older, many become more susceptible to illness and are bedridden more frequently.
than younger people, and also bedroom furniture is larger and more numerous. Privacy in the bedroom is important. In the dwelling units containing two residents it is essential that one resident be able to carry on normal living activities (including entertaining visitors) without serious loss of privacy to the other person in the bedroom. This means no direct visual accessibility should exist between the sleeping area and the entry or exit, living and dining rooms. The circulation between the bedroom and the bathroom must be direct and close because of frequency of use at night and frequency vision problems at night.

The elderly can cluster with their peers, but their units must be reasonably close to the other household types, they should not be located on physically or socially isolated parcels of land, so that they can enjoy the experience of watching children at play, people passing by or doing simple outdoor activities, etc.
4.3 Correlating household and house type matrix

<table>
<thead>
<tr>
<th>HOUSEHOLD</th>
<th>BEDROOM</th>
<th>HOUSE TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>row</td>
<td>town</td>
</tr>
<tr>
<td>young single</td>
<td>one</td>
<td></td>
</tr>
<tr>
<td>young couple</td>
<td>one</td>
<td></td>
</tr>
<tr>
<td></td>
<td>two</td>
<td></td>
</tr>
</tbody>
</table>
4.4 Correlating of household and location within a building

AS A GUIDELINE TO DETERMINE SECTOR GROUP OR GROUP OF SECTOR GROUP ON WHICH FLOOR IS SUITABLE TO EACH HOUSEHOLD.

TWO STORIES WITH FLAT ROOF OR WITH ATTIC

MAISONETTE (young couple, middle age couple with teenage children, middle age couple with grown children.)

FLAT (couple with young children, elderly couple, elderly single.)

FLAT (young single, young couple.)

FLAT (young single, young couple, middle age couple with grown children.)

FLAT (couple with young children, elderly couple, elderly single.)

FLAT (young single, young couple.)

TOWN HOUSE (couple with young children, middle age couple with teenage children, middle age couple with grown children, elderly couple.)
THREE STORIES WITH FLAT ROOF OR WITH ATTIC

MAISONETTE (young couple,
middle age couple with teenage children,
middle age couple with grown children.)

FLAT (young single,
young couple,
middle age couple with grown children.)

FLAT (couple with young children,
elderly couple,
elderly single.)

MAISONETTE (young couple,
middle age couple with teenage children,
middle age couple with grown children.)

TOWN HOUSE (couple with young children,
middle age couple with teenage children,
middle age couple with grown children,
elderly couple.)

FLAT (young single,
young couple.)

FLAT (young single,
young couple,
middle age couple with grown children.)

FLAT (couple with young children,
elderly couple,
elderly single.)
FLAT (young couple, young single.)

FLAT (young single, young couple, middle age couple with grown children.)

TOWN HOUSE (couple with young children, middle age couple with teenage children, middle age couple with grown children, elderly couple.)

FLAT (young single, young couple.)

MAISONETTE (young couple, middle age couple with teenage children, middle age couple with grown children.)

FLAT (couple with young children, elderly couple, elderly single.)
5. DESIGN PROPOSAL: TISSUE LEVEL
5.1 Tissue model proposal for block # 822

Stages of design decision:
1. Tissue type stage.
2. Function model stage.
3. Tissue model stage.

1. Tissue type stage.

The proposed tissue type for block # 822 is based on the tissue types developed for the Alamo Square area, San Francisco, by Hans Christian Lischewski in his thesis submitted to the department of Architecture at M.I.T. in 1978.

This proposed tissue type is a combination of closed and open building blocks with diagonal alley circulation connecting the two main streets (fig. 2). The reasons for this proposal are as follows:

1. The morphology of the surrounding blocks is a closed building block with
2. While the Victorian buildings have depth up to 60', the modern buildings have less floor plan depth. Thus additional built elements may be located in the inner space of the block.

3. The inner block buildings located parallel to cross streets gain more open space between the inner buildings and the buildings along the cross streets than the open space formed by the inner buildings and the buildings along the cross streets when the inner buildings are located parallel to the main streets. (fig. 4)

4. The alley connects the two main streets use less space than the alley connects the two cross street because of the shorter dimension. (fig. 5)

5. The alley will give access to the parking
6. The closed building block creates the greatest sense of community, location and privacy. It helps define territory and provides surveillance. The interior courtyard also increase social contact between residents within the block. (fig. 6)

7. The benefits of diagonal alley circulation are:

   - A feeling still remaining of one large closed block which is the dominant characteristic of the existing environment while providing access to parking in the courtyard. (fig. 7)
   - A reduction in the use of short cut because the outsider is not sure whether it is a through traffic

lots in the courtyard for the corner locations.
or a cul-de-sac alley, also the distance of the alley is greater than the distance of the cross street.

- A signal to drivers to drive slowly within the block.

2. Function model stage.

An analysis of San Francisco town houses shows that private gardens are situated in the courtyards and parking is located along the street and under the buildings with access from the street.

In the proposed function model for block # 822, the parking for the intermediate location will be provided under the building (fig. 8). This solution is proposed because of the topography of the block; it is hilly with a 6 degree angle of slope on the long side, and a 7 degree angle of slope on the short side. To deal with this slope the build-
ing requires an element to act as the platform so that the main building can be placed upon it independently from the ground. The base would serve as this element. Using the base in this way wouldn't waste any valuable living space since it is very close to the public zone; that is the street and the sidewalk, and privacy would be difficult to achieve here and also it lacks light and ventilation. Therefore by allowing parking facilities we are utilizing otherwise wasted space. An additional benefit is that the parking lot area in the courtyard can be reduced (about 70%).

For the corner location, the parking lot will be provided in the courtyard because the corner location are danger for the car access.

The function model selected for block # 822 will have a public green area
in the courtyard. This space will serve the people in the community. Children can use it as an outside meeting space since there are many units (units on the upper floors) do not have their own private yard.

3. Tissue model stage.

The difference between tissue models based on one function model is caused mainly by the building height. The building height, i.e. the number of storeys on the block strongly influences the density of the tissue model. However, the tissue models do not only vary in building heights, the tissue elements will also have different dimensions in the horizontal plane such as streets, parking area and courtyards.

All design decisions made in this tissue model stage regarding the position and
dimension of thematic building\textsuperscript{14}, non-thematic building\textsuperscript{15}, thematic space\textsuperscript{16}, non-thematic space\textsuperscript{17} and functions will mainly be based on the idea in retaining the characteristic of existing neighborhood. Because this neighborhood has been developed for over 100 years and has its own character, differs from other neighborhoods. It is worthy to be maintained.

The proposed rules for the tissue model will be derived from

1. General characters of existing neighborhood.

The characteristics of existing neighborhood such as the two to three-storey townhouses, setbacks of the buildings, the pattern of 25' to 35' building widths, etc. will be retained.

2. Specific characteristics of existing surrounding block buildings.
Although the general characteristics of the existing neighborhood will be used as the rules for the new tissue model, some specific rules are needed when dealing with the specific site, such as the relationship between buildings, the typologies of the public facades. These characteristics are fragile and can create the strong visual impacts for the streetscape, thus the elements of the surrounding block buildings must be considered.

However preservation is not the sole objective of the design decision. The new tissue model must also fulfill the design criteria such as access of light, ventilation and privacy. Therefore the proposed rules will also regulate the location and the dimension of the open space to fulfill such criteria while protecting the scale of existing neighborhood. These rules are derived from some textbooks.
such as 'Site Planning' by Kevin Lynch, individual and group funded studies, i.e. 'Change Without Loss' under the direction of Daniel Solomon, 'Spatial Structures'. Working paper, Housing and Settlement Series, by Anne Vernez-Moudon.
DOCUMENT 1+2

system of zoning, agreements with respect to

AGREEMENT SHEET 1

the morphology of the thematic elements

section A

section B

section C

section D

M F

1 5
2 8
3 7
4 8

O1

O1

O1

O1

16' 5" 26'
26' 21'
21'

139' 171'

21'

26' 21'

16' 5" 26'

16'

21'

26' 21'

5' 26'

152' 6"

21' 26' 316

72' 21' 26' 21'

136' 6"

21' 26' 316

5 26' 21'

88' 21' 26' 21'

152' 6"

21' 26' 5
The buildings at the corner location will have no setback or maximum setback of 5'. The building at the intermediate location will have minimum setback of 5' and maximum setback of 25' from the property line.

Analysis of existing surrounding blocks shows that most the corner building have no setback, only one corner building of block #823 which is the detached house has setback of 20' from the property line. The buildings in the intermediate location of the same block have the same setback, i.e., the intermediate buildings of block #827 have setback of 5' and the intermediate buildings of block #823 have setback of 25'.

Explanation.
explanation with respect to the morphology of the thematic building (baywindows included)

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<td>7</td>
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</table>

section A

section B

section C

section D

minimum built

maximum built

O1

O2

50
The minimum dimensions of B-zone, an area which always contain building, for the corner location and the intermediate location are 26' and the maximum dimensions are 52'. The minimum dimension of B-zone for the inner block location is 26' and the maximum dimension is 68'.

While the Victorian town houses have a very deep floor plan of up to 60' and provide minimum light for the rooms in the middle of the house by means of light well and recess which are about 8' to 4' respectively, these cannot fulfil the requirement of privacy and optimum light for human's needs. Thus the new dimensions of B-zone have been chosen on the basis of criteria on privacy and light.
The minimum height of building at the corner location is three storeys and the maximum height is four storeys, excluding base and roof storey. The minimum height of building at intermediate location is two storeys and the maximum height is three storeys, excluding base and roof storey. The maximum height of the inner block buildings is two storeys excluding base and roof.

Analysis of the existing situation shows that the buildings in this area are mostly two to three-storey town houses and the corners are emphasized by higher apartment buildings. Thus to maintain the scale and the character of existing environment, the rule for the height of the building is regulated.
Front facades of the buildings in the corner location and the intermediate location must not be shifted. For the inner block buildings, the front facade may or may not be shifted.

Analysis of existing surrounding blocks shows that buildings with the same setback from the property line is the character of existing streetscape. Thus to maintain this character the rule regulates the position of the front facade has been made.
Front facade and back facade of the building may or may not have bay windows. The bay window must remain within the ob-margin which is 5' deep.

Analysis of San Francisco houses shows that bay window is the dominant morphological element of the streetscape. Its functions are not only providing extra light and view for residents but also enlarging the room. Therefore in the new tissue model, the rule for the application of bay window is included.
Explanation: The minimum and the maximum depths of the base are the same as the minimum and the maximum depths of B-zone. The base of the corner building may extend further in the front and in the back. In the front the base may extend to the property line. In the back the base may extend of about 21' from the back facade. The bases of the intermediate and the inner block buildings may extend in the front of about 5' from the front facade and in the back of about 5' from the back facade.

- The maximum height of the base is 7'-6".

To allow parking underneath the increment building, the base height must have enough headroom for cars. An average max. car height is 6'-3". The rule 7'-6" anticipates the structural depth of the above floor.
The roof storey which is the gable roof must not be set back from the front facade. The roof storey which is the flat roof must be set back from the front facade of at least 10'. The roof storey of the corner location must be set back on both sides of at least 10'.

The maximum height of the existing surrounding intermediate buildings is three storeys with gable roof. Therefore if the roof storey with flat roof is needed, it must be set back from the front facade from the visual line of the pedestrian on the opposite sidewalk. In addition to maintain the amount of light to the first floor of the opposite buildings.
Buildings with the gable roofs must have the gable roofs face the street.

Analysis of the existing surrounding block buildings shows that buildings with gable roof have the gable roofs faced the street. Thus to retain this existing streetscape the rule for the gable roof in the new tissue model is regulated.
EXPLANATION SHEET 3
explanation with respect to the morphology
of the thematic building (corner location)
explanation with respect to the morphology of the thematic building (intermediate location)
DOCUMENT 1  EXPLANATION SHEET 5

explanation with respect to the morphology of the thematic building (inner block location)

section A

section B

section C

section D

M F

nto 4 8
ntb 3 7
tb 5 2 6

16' 5' 26'
26' 26' 21'
21' 26' 26'

16' 16' 21'
26' 26' 21'
21' 26' 26'

16' 16' 21'
26' 26' 21'
21' 26' 26'

139' 171'
21' 26' 26'
5 10 26'
EXPLANATION SHEET 1

explanation with respect to the morphology of the thematic space (maximum dimension)

section A

section B

section C

section D

O1

O1

O1
**EXPLANATION SHEET 2**

Explanation with respect to the morphology of the thematic space (minimum dimension).

<table>
<thead>
<tr>
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</tr>
<tr>
<td>4</td>
<td>8</td>
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</tr>
</tbody>
</table>

Diagram with measurements and annotations.
The minimum dimension of courtyard between the intermediate buildings and the inner block buildings is 72'.

"The spacing between buildings has an important effect not only on the ground left over for outdoor use but also on the livability of the interior rooms. Every room should have adequate light and air: a substantial piece of sky should be visible through the windows from normal standing positions in the room to ensure good daylight and prevent claustrophobia. A minimum standard may be that from each window, in principal rooms, the major part of the forward 60-degree cone of vision should be unobstructed by anything that is more than half as high above the sill as its distance from window."
Buildings in corner locations can contain commercial functions such as shops, offices, and social services. Buildings in intermediate and inner block locations must have only residential function.
Explanations:

- The intermediate building and the inner block building must be used only for residential purpose. The corner building may be used for residential, commercial purposes and social services.

- The bases of the corner buildings may be used for both commercial and residential purposes. The bases of the intermediate and the inner block buildings must be used only for residential purpose. A combination of parking and living spaces is possible if the regulations of the San Francisco Municipal Code regarding light and ventilation are fulfilled.

- The roof storey may be used for residential space in every location.23

To achieve good living environment, the intermediate and the inner block buildings have only residential function while allows the commercial to occur in the corners.
DOCUMENT 5 b
AGREEMENT SHEET I
agreements on dimensions with respect to functions
of the thematic building

section A

section B

section C

section D
DOCUMENT 6a
AGREEMENT SHEET I

agreements on position with respect to functions of the thematic space

section A

section B

section C

section D

car circulation
parking
private yard
pedestrian circulation
public green area
The nearest side of the alley to the nearest corner must not be less than 150'.

Street intersections should be a minimum of 150' apart.
if private courtyards occur in location 1, then the ob-margins are unbuilt.
if public green areas occur in location 2, the max. dimensions of public green areas are 28' x 28'
- The alley will have vehicular circulation in one direction. The maximum width of the alley is 20' (12' for driveway and 2 x 4' for the paths). 

Analysis of the existing surrounding block shows the dominance of closed building block character with a few openings for access. Thus to retain this existing streetscape, the opening for an alley in the new tissue model must be narrow.
agreements with respect to the morphology of the non-thematic building
agreements with respect to the morphology of the non-thematic space
Paths are the pedestrian circulation in the courtyard. The width of a path in the courtyard should be between 4' and 8'. If a path provides access to the street, it will have a maximum width of 8'.

Analysis of the existing surrounding block shows the dominance of closed building block character with a few openings for access. Path is an open space in the built area. Therefore to retain the existing streetscape, the opening for a path in the new tissue model must be narrow.
agreements on position with respect to functions of the non-thematic building

functions of non-thematic buildings at location 1: shops, offices, social services.
agreements on position with respect to functions of the non-thematic space

paths provide pedestrian circulations into the block are located between x and y, m and n.
5.3 Calculations of tissue model

AREA BLOCK (NET) 113,437.5 SQ.FT
TOTAL BUILT 237,727.5 SQ.FT
F.A.R 2.1
TOTAL BUILT AT GROUND 50,475 SQ.FT
(50% of ob-margin will be built)

OPEN SPACE:
PRIVATE 35,397 SQ.FT
SEMI PUBLIC 27,565.5 SQ.FT

BUILDING COVERAGE 44.5 %

NUMBER OF DWELLINGS
- @ 650 sq.ft 365
- @ 850 sq.ft 279
- @ 1,100 sq.ft 216
- @ 1,250 sq.ft 190
- @ 1,400 sq.ft 169

AVERAGE SQ.FT PER DWELLING 1,100

NUMBER OF DWELLINGS PER ACRE NET/GROSS 82.9/56.9

NUMBER OF CARS PER DWELLING
<table>
<thead>
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<th>365</th>
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<th>216</th>
<th>190</th>
<th>169</th>
</tr>
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<tr>
<td>.73</td>
<td>.95</td>
<td>1.2</td>
<td>1.4</td>
<td>1.6</td>
</tr>
</tbody>
</table>
AREA BLOCK (NET) 113,437.5 SQ.FT
TOTAL BUILT 192,472.5 SQ FT
F.A.R 1.7
TOTAL BUILT AT GROUND (50% of ob-margin will be built) 50,475 SQ FT
OPEN SPACE:
PRIVATE 35,397 SQ FT
SEMI PUBLIC 27,565 SQ FT
BUILDING COVERAGE 44.5%
NUMBER OF DWELLINGS
@ 650 sq ft @ 850 sq ft @ 1000 sq ft @ 1250 sq ft @ 1400 sq ft
296 226 174 153 137
AVERAGE SQ.FT PER DWELLING 1,100
NUMBER OF DWELLING PER ACRE NET/GROSS 66.8/45.8
NUMBER OF CARS PER DWELLING
296 226 174 153 137 dwellings
.9 1.18 1.5 1.7 1.9

Corner location: 3 storeys + base + roof storey
Intermediate location: 2 storeys + base + roof storey
Inner block location: 2 storeys + base + roof storey
6. DESIGN PROPOSAL: SUPPORT LEVEL
6.1 Support model proposal

In the existing environment, most of the buildings are developed singly from lot to lot, creating buildings of different sizes according to the sizes of the lots. Some lots are combined together creating larger sizes of the buildings. However, the most common lot frontage dimensions are 25', 27'-6" and 30' and the patterns of 25' to 35' building widths are mostly found in this area.

The support design proposal for a block in this area will retain this character. That is, it must provide visual division into narrow segments 25'(min.), 50'(max.) along the street facade by means of stepping, setback, or separate structure, with each division having at least one entrance.

Analysis of existing immediate buildings also shows that the most common house types are the attached type without recess and attached type with recess. Therefore two support systems will be developed. One is the support system for shallow dwellings, the other is the support system for deep dwellings. Each of these two support systems can create buildings without recesses. And by combining these two support systems, dwellings with recesses will be derived.

Bay windows with different shapes and sizes are the dominant morphological element of the streetscape in this area. They do not only provide extra light and view for residents, but also enlarge the room by pushing out from the house. The
maximum depth of bay windows is 5'. In order to respect the essential charm and characteristics of this neighborhood, bay windows with different shapes and sizes are an additional support material added to the support principles.

The structure of these support systems is the wooden structure, which has been used locally since wood is available and lower cost than concrete. However, the timber span available is limited up to 16', beyond this is rare and expensive.

One criteria for the support system is to provide two directional connections which will give more advantages in design flexibility than only one directional connection because the plan can expand in two directions. The local existing Victorian houses also allow two directional connections in the floor plans.
6.2 SUPPORT SYSTEM A

The support system for shallow dwellings. The zone distribution of this support system consists of:

- alpha/gamma margin 5'
- alpha zone 10'
- alpha/alpha margin 6'
- alpha zone 10'
- alpha/delta margin 5'

The alpha/gamma margin and the alpha/delta margin are the spaces for bay windows which can be built or not built from the front facade and the back facade. The dimensions of these two margins are based on the maximum dimension of San Francisco bay windows. Zoning analysis in the next following page will show the relationship between functions and the zone distribution.
Zoning analysis
Sector analysis

[Diagram showing a sector analysis with labeled areas B1, B2, B3, K1, K2, and E.]
Sector analysis
Increments of building

From the support system, many different sizes of buildings can be defined according to sector widths of 10', 15', and 20'. These increments of building from 25' to 50' are based on existing building widths in this area.

In this thesis the increment of building type A1 will be further investigated in its sector groups (dwelling sizes) basic variations and subvariations because it is the most common building width in this area.
SUPPORT SYSTEM A
Increment of building TYPE A1

---

Variations

1

2

3

SCHEMATIC SECTION

---
Sector groups

1. first fl.
2. second fl.
3. third fl.
4. roof storey
Sector groups

1. first fl.
2. second fl.
3. third fl.
4. roof storey
The basic variations of the sector group without bay window (minimum size of dwelling) are shown here. Actually they are the same with the basic variations of the sector group with bay window because the bay window only enlarges the room, no additional room is possible.

These basic variations are the ones of the town house for couple with young children. They are based on these criteria:
- A bathroom on ground floor should be near exit or entry.
- Children's rooms should be placed near parents room.
- Play spaces in and out of doors should be within sight of mother.
6.3 SUPPORT SYSTEM B

The support system for deep dwellings. The zone distribution of this support system consists of:
- alpha/gamma margin 5'
- alpha zone 10'
- alpha/beta margin 6'
- beta zone 10'
- alpha/beta margin 6'
- alpha zone 10'
- alpha/delta margin 5'

The alpha/gamma margin and the alpha/delta margin are the spaces for bay windows which can be built or not built from the front facade and the back facade. The dimensions of these two margins are based on the maximum dimension of San Francisco bay windows.

Zoning analysis in the next following page will show the relationship between a function and a zone distribution.
Zoning analysis

BATHROOMS  STAIRCASES  WALLS
Sector analysis
Sector analysis

---

L/E

---

B1/B1
B2/B1
B3/B1
B3

---

α 10°

---

α 10°

---

α 10°

---

93
Sector analysis

K2
B1/K1
B2/K1
B3/K1

K1
b

α 10°

β 10°
Increments of building

From the support system, many different sizes of buildings can be defined according to sector widths of 10', 15' and 20'. These increments of building from 25' to 50' are based on existing building widths in this area.

In this thesis the increment of building type B1 will be further investigated in its sector groups (dwelling sizes) basic variations and subvariations because it is the most common building width in this area.
SUPPORT SYSTEM B
Increment of building TYPE B1

Roof
3rd/roof
2nd
1st
Base

Variations 1 2 3 4 5 6

SCHEMATIC SECTION
Sector groups

1. first fl.
2. second fl.
3. third fl.
4. roof storey
1. first fl.
2. second fl.
3. third fl.
4. roof storey

Sector groups

---

---

---

---

---

---
1. first fl.
2. second fl.
3. third fl.
4. roof storey

Sector groups

---

α 10'
B 10'
α 10'
α 10'

α 10'
B 10'
α 10'
α 10'

α 10'
B 10'
α 10'
α 10'

α 10'
B 10'
α 10'
α 10'
Basic variations and sub-variations

The basic variations indicate the position of a certain group of functions in a sector group without bay window (minimum size of dwelling) are shown here. Actually they are the same as the basic variations of the sector group with bay window because the bay window only enlarges the room, no additional function is possible.

Since this is the sector group on the first floor, the positions of the functions in relation to each other are based on the criteria of lifestyle of the elderly. These are:

- One or two bedrooms option is possible.
- Direct and close circulation between bedroom and bathroom is possible.
- Position of living room and kitchen with dining area are easily expanded to entertain family.
Basic variations and sub-variations

The basic variations shown on the following page indicate the position of a certain function in the townhouse on the first and second floor. The possibility of the household types in this sector group is middle age couple with teenage children based on these criteria:

- Bedrooms for grown children should not be near the parents' bedroom.
- A play or family room must be added.
- The bathrooms for parents and teenagers need separation and each proximate to bedrooms.
Basic variations and sub-variations
6.4 SUPPORT SYSTEM A+B

6.4.1 TYPE (A+B)1

By combining the support system A (support system for shallow dwelling) and the support system B (support system for deep dwelling), buildings with recesses can be created. The drawing shown here is one possibility. It is the increment of building with 35' width.
SUPPORT SYSTEM  A+B
Increment of building TYPE (A+B)
Sector groups

1. first fl.
2. second fl.
3. third fl.
4. roof storey
Basic variations and sub-variations

The basic variations of the sector group without bay window (minimum size of dwelling) shown on the following page. Actually they are the same as the basic variations of the sector group with bay window because the bay window only enlarges the room, no additional room is possible.

These basic variations indicate the position of a certain function of the flat on the first floor. The possibilities of the household types in this sector are: couple with young children (see page 89), middle age couple with teenage children (see page 101), middle age couple with grown children.
Basic variations and sub-variations
6.4.2 TYPE (A+B)2

By combining the support system A (support system for shallow dwelling) and the support system B (support system for deep dwelling), buildings with recesses can be created. The drawing shown here is one possibility. It is the increment of building with 25' width.
SUPPORT SYSTEM A+B
Increment of building TYPE (A+B)²

SCHEMATIC SECTION
1. first fl.
2. second fl.
3. third fl.
4. roof storey

Sector groups
1. first fl.
2. second fl.
3. third fl.
4. roof storey
Basic variations and sub-variations

The basic variations indicate the position of a certain group of functions in a sector group without bay window (minimum size of dwelling) are shown here. Actually they are the same as the basic variations of the sector group with bay window because the bay window only enlarges the room, no additional function is possible.

These basic variations indicate the position of a certain function in the sector group on the first floor. The possibilities of household type in this sector group are; couple with young children (see page 89), elderly couple and elderly single (see page 100)
The basic variations of the sector group without bay window (minimum size of dwelling) shown on the following page. Actually they are the same as the basic variations of the sector group with bay window because the bay window only enlarges the room, no additional room is possible.

These basic variations indicate the position of a certain function in the group of sector group on the first and second floor. The possibilities of household type in this sector group are: couple with young children (see page 89), middle age couple with teenage children (see page 101).
Basic variations and sub-variations
Sector groups, basic variations and sub-variations at corner

The possibilities of household type in the sector group A are young couples, middle age couples with grown children.

The possibilities of household type in the sector group B are young singles, young couples.
6.5 Comparison

<table>
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<tr>
<th>BASIC VARIATIONS</th>
<th>HOUSEHOLD TYPES</th>
<th>BEDROOMS</th>
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</thead>
</table>
| ![Diagram](image1) | - couples with young children.  
- elderly couples.  
- elderly singles. | 2 |
| ![Diagram](image2) | - couples with young children.  
- couples with teenage children.  
- couples with grown children. | 3 |
| ![Diagram](image3) | - couples with young children.  
- elderly couples.  
- elderly singles. | 2 |

<table>
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<th>HOUSEHOLD TYPES</th>
<th>BEDROOMS</th>
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</thead>
</table>
| ![Diagram](image4) | - couples with young children.  
- couples with teenage children.  
- couples with grown children. | 4 |
| ![Diagram](image5) | - couples with young children.  
- couples with teenage children. | 5 |
7. SUPPORT APPLICATION IN TISSUE MODEL
8. PARTICIPATORY PROCESS: MANAGEMENT, DESIGN DECISION AND CONSTRUCTION PROCEDURES
8. Participatory process: Management, Design decision and Construction Procedures

Step 1 Developer searches for the architects to design the housing. The architects propose support housing and design support model for a given site.

Step 2 Developer searches for future occupants by publication the policy. The advantages of this support housing project including support model drawings and options of types and dwelling sizes (sector group).

Step 3 Developer, architects and future occupants meet and discuss about new tissue model.

Step 4 Architects develop documents and new tissue model.

Step 5 Future occupants obtain documents and new tissue model, lists of sector group, location map, possible types of dwelling and bay window, etc., all informations needed for making decision of their own dwellings.

Step 6 Occupants discuss with their families and make
decision with respect to the common rules they agreed upon and express in the plan of the tissue model. Occupants can discuss with the architects if they need.

Step 7 Occupants inform the architects about their priorities set of requirement. The architects match the dwelling and arrange possible group in each building.

Step 8 Architects meet with developer and future occupants and inform the result by means of architectural drawings which has been modified including engineering drawings if needed.

Step 9 Developer search for the builder and support construction begins with supervision from architects and engineers.

Step 10 During the support construction, occupants discuss with families and lay out their own dwellings. They can meet and discuss with the architect. During this period, occupants can change
the layout of their dwellings.

Step 11  Support construction ends. Detachable units infill begin.

Step 12  Detachable units infill ends. The dwellers move in.

(The above steps listed, consider the fact that engineers work together with architects and provide engineering decisions as input for design. Those are; structure, mechanical, electrical, sanitary engineers.)
9. CONCLUSION
9. Conclusion

This thesis serves as a design case study exercise by using SAR methodologies accompanied with design concepts which apply to the design.

Architecture itself is unique. It has its own characteristics, influenced by the type of building, the users' needs and the environment, no matter what methodology in design is used. SAR methodology has its own uniqueness, resulting from the users' participation in the design concept. However, in participation in the design the users must balance their budget with their needs and aspirations. Otherwise the participation would not achieve their goals because of budget constraints.

However, providing maximum flexibility for users' participation in the design must be accompanied by a framework or rules. The architects provide the framework in order to control the unity of architecture, comply with codes and regulations, and control the scale and proportion, which affect the urban tissue, as one single part should be subordinated to the whole. Besides the framework will provide
control for planning criteria, i.e. site plan.

These framework or rules will define the degree or level of how much users will be able to design for themselves mostly to suit their behavioural patterns. This thesis, however, involves the behavioural study and the proposal then supplements the users to design for themselves.

This design study is an attempt to apply the users' participation in design of SAR philosophy into the real design case study. Mostly it deals with the design issues by provision of rules or frameworks as mentioned earlier in design. Besides it also provides the design proposal in both tissue level and support level with the alternative types and sizes of dwellings to fulfill the requirements of all the potential dwellers. Also procedure in users' participation to correct their plans.

Because of the time constraint, only the increments of buildings 25' and 35' have been investigated. In fact there are many sizes up to 50' which can be used in this area according to the width of the existing buildings.

The matter study in structural details and methodo-
logy which require engineering consultants and make the decisions are not focused in this thesis. However they can be established as another study.
10. APPENDIX A
SAR METHODOLOGY
The SAR Philosophy

As an alternative to mass housing, in 1964, nine Dutch architects and a representative of the Dutch Architects Association formally founded the SAR (Stichting Architecten Research) to investigate better ways to deal with the problems of the design and construction of mass housing.

The hypothesis developed by SAR holds that large scale industrialization of the housing process can only be developed successfully if two distinct "spheres" for decision making, production and use are recognized.

One sphere is represented by the "support structure" which is the building that holds a number of dwellings and constitutes an infrastructure for long term investment, as a result of system building and professional decision making.

The other sphere is represented by the "detachable units" which are the elements for internal layout and servicing of the dwellings in the support structure. These element are industrially made products, durable consumer goods subject to change by decisions of the user. Each "sphere" has its own laws for production and planning. The dwelling is the result of detachable units being placed in the support structure.

Note: All the materials used in this section are from 'Three R' for Housing' by NJ. Habraken, see bibliography.
The philosophy of support housing are:

1. "Living is an act that takes place in both spheres. A home connects the two spheres; A home is the environment of a family and is part of a communal environment; A home has an interior and an exterior; Terminus of a series of communal services; Start of a personal enterprise.

Living cannot take place exclusively in one sphere; Living exclusively in a communal sphere is tantamount to living in a barracks; Living exclusively in an individual sphere is tantamount to exile.

A home must therefore be built in both spheres. It cannot be built in one sphere only. An individual who built his own house completes his home in the sphere of the community. A community that builds houses must allow them to be completed in the individual sphere. The individual must be allowed to complete them."
2. "A home comes into being in two spheres. It cannot be made in one sphere alone. What, then, Should we produce in each sphere? In one sphere everything that is used collectively for housing. In the other, everything that is being used individually for housing.

The product in the communal sphere we call the 'support' or 'framework for living'.

The product in the individual sphere belongs to what we call the 'set of detachable units'.

The 'framework for living' contains by definition everything that is used collectively.

The 'set of detachable units' contains by definition everything which is used by the individual only."
3. "A support is thus not a skeleton. The separation of support and set of detachable units is not made for technical reasons. It is made for reasons of harmonious use. The technical steps taken to separate structure and detached units appear to be the best way of arriving at harmony between technique and use. To achieve harmony between human beings and material.

A framework of living is not a skeleton. A detached unit is not a finishing element. The separation: skeleton - finishing works we know, it is based on a technical possibility and no more. The separation: 'support' - set of detached units is based on the relationship between man and material.

A support contains everything that is needed for communal use. Foundation, roof, outside galleries, staircases, piping systems, etc."
4. "A detached unit is not a finishing element. A support is completed before the detached unit is placed in it. A detached unit is put in position after the support has been built. The detached units serve to make a dwelling. A support is complete in itself. A detached unit is complete in itself. Together they form a home. A detached unit is the means of making a support habitable. A detached unit is a means of living. A means of living is not a technical component (such as a door-frame). A means of living is in itself recognizable and complete, such as a kitchen cupboard. Detached units serve to provide all requirements of the individual sphere. By definition: Also therefore sanitary equipment, division of space, separation from outdoors, heating elements, storage space, etc."
5. "A home is brought into being when support and detached units meet. Therefore we do not make dwellings. We make supports and detachable units. We make completed and recognizable things, each belonging in its own sphere, created in accordance with its own pattern of relationship. We can only make objects, products, things. We cannot make homes. A home is not a thing. A home is an act. The dwelling is part of that act. The dwelling is an act. That is why you cannot make a home for someone else; (you can make 'a villa', or 'a bungalow', or 'a place', or 'a block of flats', but not a home). You can make supports or detachable units. You can provide opportunity for the creation of dwellings; provide the circumstances needed. You can produce the things with which and in which people can live. You can guide technique to produce the things with which people can really live. Because living somewhere is an act. Committing this act is a need (the elementary, essential need). You can make technical things which make the act possible.
You can translate this need into production of clearly recognizable things (such as supports and detachable units).

You cannot make a home for someone else.
You cannot make dwellings for unknown people."

6. "A support is real estate.
A detachable unit is a durable consumer article.
A support is put up on a given place, in a given situation, is built in all kinds of weather, is constructed from the ground up, from a foundation, even when it is completely prefabricated and the prefabricated elements have been made industrially. A detachable unit is not made on the spot where it is to be used. It can be used in every support. It lends itself to mass production in a factory.
It can be complicated and relatively fragile.

Support + set of detachable units = dwelling.
Real estate + consumer article = human function."
7. "Real estate and consumer goods complement each other; they are complementary; they only have meaning when together. Production of cars demands road-building; Road + car = mobility, car driving; support + set of detachable units = dwelling. Individual expenditure requires communal investment. Industrial production requires building production. Building production accommodates industrial products."

8. "Thus there are two means of producing: Production of real estate; Production of consumer goods. Building product. Industrial product. Production in the collective relationship. Production in the individual relationship."
9. "Thus the role of industrial production is twofold. Supply of elements for building production: semi-finished products (parts of the support), and production of means of living for consumer; finished products (detachable units).

This twofold role can only be distinguished in housing if we know the two spheres. Knowledge of the two spheres makes possible good application of our technical ability."

10. "In the production of detachable units a direct relationship occurs with the individual consumer. In the same way as is the case with the production of other consumer goods. With all its inherent advantages. (Individual choice according to price, quality, taste, requirements).

And with all inherent dangers (influencing the consumer for commercial purposes).

Here the second type of individual relationship is at work. The individual is given responsibility. He is able to identify himself with his dwelling. One can recognize him in his dwelling. For good or for bad."
11. "In the production of supports is raised the question of relationship with the community. This relationship may coincide with one of the three collective types of relationship, but this need not be so. The support can be built in the seventh type of relationship, a form in which, as we know, the individual is in no way personally involved. A support is a communal provision. As is a street a canal, a tram line, an electric network. These are infrastructures. A support is an infrastructure."

12. "In every sphere a product has its own time of use and its own wear life. The support bridges a generation and connects generations. A community wants something which has a longer life than that of an individual. Because a community lives longer than an individual and changes gradually. A community takes over what is left behind from previous generations, uses it, changes it, passes it on to the following generations. Then the details have been filled in, the trees are fully grown."
13. "A set of detachable units serves only one generation.
Every generation is distinct from another.
A detachable unit changes for many reasons:
because it is quickly worn out;
because fashion changes;
because technique is further developed;
because we do not want to take over all our parents' things;
because our opinions change;
because we only live once:"

14. "The relationship in one sphere also works with slower machinery than in another.
The communal process of taking a decision is by nature slow.
The individual process of taking a decision is by nature quicker, more impulsive. Especially in a situation where there is a lot of choice, where personal identification is important."
THE SAR METHODOLOGY

A new concept means a new decision making process. The design process is a decision making process. To design support structures and detachable units, a design method is needed that is compatible with the concept in which they belong.

This method has two parts. The first part has to do with the position and dimensions of space. The second part has to do with the position and dimensions of material. Of course, material and space complement each other. For some problems, it is necessary to consider the dimensions, the positions and the properties of space. Some specialists are more occupied with the material side and others more with space. Anyone taking part in the decision making process that results in designs for human environments has to deal with the fact that material and space complement each other.

Part One - Evaluation

With the design of supports, the designer has to make decisions about the position and dimension of material without knowing the floor plans that eventually will be found in the support. This means he cannot make his decision about the material of the support on the basis of a floor plan. He has to work from possibilities of floor plans. To be able to do so, he must be able to make general statements about the possible distribution of spaces in the support.

The concept of "zones" and "margins" has been developed to make general statements about the distribution of spaces in a support visible in a design. A zone is an area in a support to which rules are attached concerning the position and dimension of spaces and functions allowed for in the support. The principle is as follows: First, classes of possible spaces or functions are determined. Secondly, zones are defined that give possible situations for spaces. Finally, rules are formulated about the position of spaces.
in the given zones.

In any given dwelling, three classes of spaces can be found:
1. General living space,

2. Specific living spaces (e.g. bedrooms, kitchens, studies, etc.),

3. Utility spaces (e.g. storage rooms, bathrooms).

These three kinds of spaces give some kind of hierarchy in each floor plan. Generally speaking, it might be said that utility spaces serve specific living spaces and that specific living spaces are distributed in relation to general living spaces.

In supports, four zones can be defined:
1. An alpha zone: Inside space for private use with relation to outside space,
2. A beta zone: Inside space for private
3. A delta zone: Outside space for private use (balcony, garden, loggia),
4. A gamma zone: Space for public use (circulation) either inside or outside.

In any kind of dwelling, in any kind of project, these four zones can be found. In fact any type of dwelling can be defined by its particular arrangement of zones. The relation of an arrangement of zones, therefore, can be seen as the notation of a type of dwelling without giving floor plan.

Between two zones will be a margin. The margin has the properties of the two adjacent zones. It derives its name from these zones, e.g. the margin between the alpha and beta zones is called "alpha beta-margin".

In every zone distribution three primary positions can be distinguished:
Position 1: A place which overlaps the zone and ends in the adjacent margin.
Position 2: A place which overlaps more than one zone and ends in a margin.
Position 3: A place which begins and ends in the same margin.
To make the relationship between a function and a zone distribution explicit, SAR carries out a zoning analysis.

A ZONING ANALYSIS is an indication of how the functions can be located in a zone distribution. The dimensions of the zones must be related to the sizes of the spaces which are to be accommodated.

Because zones are generally long strips they have only one fixed dimension, the width. When the size of the zone is determined, it sets only one dimension of spaces, the depth, but in designing spaces the width must also be taken into account.

Structural components will often cut across zones. In analyzing various layout possibilities, the utility of that part of a zone between structural members has to be evaluated. This portion of a zone is called a sector.

A SECTOR is part of a zone and its adjoining margins that is completely open and can be planned freely.

The sectors in a support are the built spaces given to the dweller for further partitioning or combination into a specific dwelling.
A SECTOR ANALYSIS indicates the relationship between a sector and the functions that it can accommodate. These functions and combinations of functions can be noted using defined code. For clarification one or more typical layouts can be drawn for each of the combinations of functions.

A support in combination with a zone distribution can be considered as a series of sectors. The same sectors can be combined in many different ways, thus different supports can be created from the same set of sectors. It might be said that a dwelling in a support can be seen as a sector group, or a combination of sectors. In principle, each group of adjacent sectors in a support can be a dwelling.

A SECTOR GROUP is a combination of interconnecting sectors.

If a given sector group can be seen as an area for a dwelling, in this area, a great many possible floor plans can be expected. Even if one only considers the floor plans according to the rules on which the support is designed, in most cases, the number of possible variations is very great. To make orienta-
tion on the number of possible variations in a given sector group possible, the concept of the basic variation has been developed.

A BASIC VARIATION indicates the position, in a specific sector group, of a certain group of functions, which together form a housing program.

The different functions attached to the space can be coded. In the sectors, the codes for the space functions are noted. This notation does not give the dimension of the space required. It only states that this kind of space can be located in that place. Such a notation in the area of one dwelling (sector group) gives a basic variant. For any given area in a support to be use for a dwelling, the series of possible basic variants can be written out. They give much information on the different living patterns possible in the given area.

Each basic variant gives a great many possible sub-variants, that is, specific floor plans that all have the same function pattern. An analysis of the basic variants gives valuable information on the properties of a given support design.
A SUB-VARIATION OF A BASIC VARIATION is a completed layout in which the positions of the functions are the same as in the basic variation.

Note: The summary of the SAR methodology in this section is from Variations: The Systematic Design of Supports by NJ. Habraken et al. See bibliography.
The illustrations used in this section are from 'Methodologies'. Techniques & Architecture, number 311. October-November 1976.
11. APPENDIX B:
SAN FRANCISCO HOUSE
One criteria of the design proposal for housing in this thesis is to maintain the characters of the existing environment. In order to do this, studies of existing environment characters have been made. This appendix is the summary of some articles from 'Urban Form and Change' by Anne Vernez-Moudon, sponsored by the National Endowment for the Arts (1976-79) which this thesis has used as a design guideline. They are the summary of house types, space allocation, typologies of public facades, the 'parts of a house' and the 'inserts', and the set back locations.

The summary of house types has been used to determine the morphology and the pattern of the building in the proposed design.

The summary of space allocation has been used as a design guideline of people's lifestyles in this area and served as the space allocation model for the proposed design.

The summary of the 'parts of a house' and the 'inserts' is used as a design guideline for functional uses of each 'parts' and each 'inserts' of the house, i.e. the functions of bay window are not only provide extra light and view for the residents but also enlarge the room.

The summary of typologies of public facades has been used as a classification reference. This classification has been used to determine the facade pattern for the proposed design.

The summary of set back locations has been used to determine the location of the building in relationship to the street.
HOUSE ELEMENTS

The topography of San Francisco is hilly when combines with a rectangular grid, using the wooden victorian construction system it requires substantial modifications to respond to the land configuration.

This led to the need of dividing the building into two elements. The first element, the base, is the element of the building which adapts to the topography and acts as a platform, high enough so that the second element which is the main building could be placed upon it independently from the ground. The second element, the box, is the element of the building which developed in reference to the grid.

These two elements of the house serve two separate features. The base acts functionally and literally as the support structure of the house, containing smaller and less important functions such as garage. The box is the major living and circulation spaces.
VARIATIONS OF THE BOX

Within the narrow width lots, there are many different ways of manipulating the "box". Each responds to the problems of maximizing both the size of the house and the light. There are three basic typical house models for the intermediate lot and one basic typical house model for the corner lot. The depth and width of these "box" models may vary according to the constraints of each site.

The organization of internal spaces is so called the "railroad plan". The rooms are arranged along one side of the hall. Since the house is flanked on both side of the long axis by party walls, access view, daylighting, and natural ventilation almost come from the two narrow ends.
MODEL 1: A SMALL HOUSE WITHOUT AN ADDON

This type of the house is probably one of the purest adaptations of the basic "box". The "box's" width is slightly reduced, creates a side yard or an alley and the light then can reach the middle room of the house. This model does not have rear addon, thus eliminates the need for the hall to penetrate to the rear part of the house. This part of the hall can then be given over as usable living space. Combining with the rear room they can form either a single large room or two regular size rooms.
MODEL 1a : A SMALL HOUSE WITH AN ADDON

This type is very similar to MODEL 1. This box is placed on the site with space left over for a side yard or an alley. The difference is the inclusion of an addon, which itself is set back in order to allow the light into the room at the rear of the "box". This recess prevents the hall from extending into the addon. The importance of this type is the stacking of rooms along the hall maintaining their formality, while the addon becomes less formal because of through circulation.

This model is more common than MODEL 1 because the extra room from the addon makes its use more feasible while the side alley which allows access to the rear, also allows for sufficient access to all parts of the site.
MODEL 2: FULL WIDTH OF SITE

In this model the house fills the entire lot width. For most 25 foot lots, the "box" usually needs to be set back in order to get light into the middle room. By reducing the width of the front room is another way to get the light into the middle room without setting back the whole "box", which occurs in this model.

This model may or may not have the addon. If there is no addon, the end of the hall is given over to the rear room to form either one large room or two small regular rooms. Bay windows or porches were then added on to the rear room or rooms. If an addon was included, it was of course set back and the hall would extend up to it. The plan would then be similar to all the other addon models, with formal rooms in the box and informal "through circulation" rooms in the rear addon.
MODEL 2a: REAR RECESSES IN THE BOX

In this model the house also fills the entire width of the site, but there is a small recess in the rear room rather than the front room of the "box". A four foot notch provides light for the middle room, therefore allowing the front room to maintain its full width. Addon can be extended from the basic "box" and in this case it may or may not be set back. If the addon is not set back, there will be two middle rooms with a small amount of light instead of one. In this case, the railroad plan probably extends to the length of the four rooms. If the addon is set back, this model will have the same characteristics of the other variations of the "box" with addons.
MODEL 3: FULL WIDTH WITH A SHALLOW BOX

Again in this model the house fills the entire width of the lot. This position on the lot creates the need to manipulate the "box" in order to get the light into the middle rooms. In the case shown here, the "box" is shortened to a depth of only two rooms so that the light can get to them from the front and the rear facades respectively.

This type also has an addon which is set back as usual, and the rooms in it become less formal because of the through circulation pattern.

Typically this is a small house and is similar in layout as model la except for the depth of the "box" and the lack of outside access to the rear.
The nature of the site in the model 4 is that it provides exposure to the public zone for the two facades of the house which also receive a great amount of light, the house can be built across the entire lot. The result is no recesses are necessary. What occurs instead are the extensions of the "box" from its side in the form of bay windows. In the interior, the lack of recesses allows the hall or room pattern to extend to the full depth of the house. A special feature of the corner model is that all the rooms have a lot of light an all are accessible from the hall. This allows each room to assume a level of formality. Simultaneously, this creates a potential for great flexibility in their use since their characters are all so similar.
The nature of the railroad plan is that it allows for interchangeable functions between rooms and the expansions of rooms from one to the other. With the further accent of light at both the front and the rear of the house, the potential for importance of these rooms was established. In combining the "non-specificity" of the plan with the importance of different locations within the house and with additional potential for use in "addon", one could easily understand the level of juggling of functions that occurred within the standard house types. But because these factors were basically similar from house to house, some standards can be drawn.
THE FRONT ROOM

The front room was always used as the living room or parlor. This was probably because it was the room with the most light, the most public exposure, and also its location at the front of the house next to the entrance.

THE MIDDLE ROOM

The middle room is the most flexible room in the "box". By using wide opening between rooms, the middle room can thus be associated with the living room as a parlor or with the rear room as the dining area. And since the middle room has its own small source of light, it is not necessary to be connected to another room. By closing itself off, it can also function as a bedroom or a study room.
THE REAR ROOM

The rear room of the "box" has a similar potential for the impotence as the front room has, yet it lacks the formality. Because while it has the same potential for light, it lacks all the elements for specialness in a public sense. It is in the rear of the house, away from both the entrance and public street and because of the addon it does not always have as much light as the front room or as much outdoor space to look out into. Instead this rear room takes on a sort of private importance with access to both light and the back yard which the middle room lacks. This makes it ideal for the uses such as kitchen, dining room, or even a major bedroom. When there is no addon and the hall is given over to form a room with the full width of the house, there is a potential for having a single room that functions as a kitchen and dining area with an abundance of light and a wonderful view of the back yard.
THE ADDON ROOMS

Because of its through circulation as has been discussed earlier, the most common functions placed in the addon are the kitchen and the dining area of which their nature are busy and the center of a household's activity. Another major function which could also be placed here were the bedroom. This could occur only if they were the last room of the house, and access to the yard came before it. Occasionally, smaller functions such as bathroom and closet were tucked into the addon in a variety of ways, and this basically emphasizes their more random nature.
THE "PARTS OF A HOUSE" AND THE "INSERTS"

The final level of decisions in the making of houses, occurs with the "parts of the house" and the "inserts". The "parts of the house" include smaller but important sections of the house, the hall and the addons, which are further divided up into smaller functions. The "inserts" are the things like bathrooms and bay windows which are placed into the "parts" or into the "box" itself.

THE HALL

The hall, as a major "part" of the "box", serves several important functions, as mentioned earlier. The separation of the hall and the rooms allowed the rooms to maintain a formal character, while their relative adjacency created the option of having the rooms open to each other, or to be closed off.

The hall is usually placed on the lot line, sacrificing its own potential for light in order to get more light into the living space.
The hall is an average of 7-8 feet wide for the entire depth of the box. These dimensions are more than adequate for circulation, thus the hall can accommodate several smaller functions within it such as bathroom and closet. Bathrooms can be squeezed in, leaving a hall width of 3 feet, adequate for walking. Usually the bathrooms would be placed in the middle of the house, just behind the stairs. Sometimes they will be inserted into the hall at the end of the "box", just before one would enter the addon. Closets can be placed wherever leftover space occurs and easily leave 4-5 feet of the hall space. The interior stairs are a standard item that are always inserted in the front of the hall near the entrance.
The final use of the hall occurs when it is no longer needed (like the back of the house in MODEL 1). This space which has lots of light, can then be given over to form a single room, or when combined with the other rear room, can either be used to form one large room or two medium ones. Thus the hall which diagrammatically appears to be circulation space, becomes the building's core while allowing the rest of the "box" to remain uncluttered by these functions.
Addons, like the hall, are a major 'part' of the house that will be further subdivided into several smaller functions. What addons do is, by increasing the "box's" square footage, they help it to use the site more efficiently. While their width is controlled by the need for a major setback to allow light into the "box", their potential for depth is unlimited within the site. This is characterized by the inclusion of many functions within its length which tend to both break down its interior while creating the piecemeal exterior form. Addons though rarely extend 20 feet beyond the "box", yet still manage to include a variety of functions such as kitchens, bedrooms, stairs, porches, bathrooms, etc.
THE BAY WINDOW

Bay windows are the dominant morphological element in the San Francisco streetscape. Their functions are not only provide extra light and view for residents but also enlarge the room because of the sizes which are extended four to five feet from the house. Besides that they act as a barrier between the public and the private zones. Eventhough there are certain types of bay window such as Queen Anne style, Italianate style, Stick style, their different sizes, proportions and ornaments which are the elements of personal expression create an expression of individuality from house to house, from period to period which adds up to be the unique character of San Francisco urban fabric.
The most common house type in the Victorian development is the wooden townhouse with one or two main floors. As mentioned earlier that only the "base" has to deal with the topography, the "box" which goes on top of it would only have to respond to the needs of attaining both maximum floor area and light while dealing with the constraints of a 25 foot lot. Thus, in looking closely at the floor plans of the houses, very strong similarities arise between floors of the same house. Since they are independent of the ground, and they too must respond to the problems of a narrow site. The patterns of rooms are very similar between floors, just their uses are different.
The basic "living" function are at the first floor; these include living, dining, kitchen and bathroom. The second floor is devoted to bedrooms and bathroom facilities, but the pattern of a hall with rooms along it is still there. The front room is usually the most special one, followed in importance by the rear and the middle rooms. This is the same as on the first floor where the front and the back rooms are the most formal ones.

Since the townhouse has a lot of bedrooms, the need for a two story addon is eliminated.

The similarities of room layouts on both the first floor and the second floor allow for very easy conversion of a two story house into flats, merely by changing the use of the rooms so where a townhouse may have a master bedroom on the front of the second floor, this space could serve as a living room in a flat. Similarly, the rear room that can be used as the bedroom can also serve as kitchen and dining room by installing kitchen appliances.
The other work is modify the entrance slightly. The work to be done consists of providing two entrance doors and of possibly building a wall in the middle of the hall to provide separate entrance foyers, one with a stair for the second floor, the other a reduced version of the original entrance for the first floor. A variation of this method is to leave only one outside entrance into a foyer which then would have separate doors leading to the two units.

Of course exact duplications between floors cannot be excepted because factors such as access are different. One of the major differences between the layouts is created by the access stairs which, while starting in the front of the house on the first floor, come up the middle of the second floor. Because of this positioning of the stair, additional space in the front of the
house on the second floor is freed up and can be used as an additional room or it can be combined with the front room to create a more formal space. Both of these solutions are very efficient uses of the front facade and its available light. This use of unneeded hall area can occur in the back of the second floor as well as what occurred in the back of the first floor before. The uses of an unneeded hall area for additional living spaces in the front and in the back of the second floor make the second floor a more efficient design in comparison to the first floor, because both facades and their available light are used to their fullest potential.
The final difference come from the fact that the second floor is closer to the source of direct skylight, thus by using notches on the interior of the building, light can be given to the middle room of the "box". The same happens to the hall, the hall is often broken up in this manner in order to get light into it. And when the hall has natural light, the secondary rooms such as dining area then could occur next to these windows in the back of the hall space.
Most of the Victorian houses has an average ceiling height of 11 feet for the main floor, and a base height of 7 feet 6 inches.

Historically, the high ceilings were more of a tradition of the Victorian period that reflected the extravagant attitudes of the times. These high ceiling benefited the townhouses in San Francisco in several ways. Because of the narrow sites, large rooms were not possible, so high ceilings helped to create a feeling of speciousness. More light could also be attained because taller windows were possible. Finally the sense of formality of the rooms was enhanced, especially when combined with the large bay windows.
TYPOLOGIES OF PUBLIC FACADES

Considering the sizes and the locations of the lot, there are many possible ways to locate the houses within the lots. The houses may be attached, semi-detached, or detached, with or without recess. Some houses even have two recesses. These different locations of house created variety of public facade, which were more carefully designed and ornamented than the private ones. The design expression of publicness and private-ness is a strong characteristic of 19th century environments and of environments that have lived through time.

The various types of public facade can be easily identified.

1. Attached type without recess
2. Attached type with recess
3. Semi-detached type
4. Detached type.
1. ATTACHED TYPE WITHOUT RECESS
   : Intermediate lots

   The public facade in this case expands the whole width of the lot, which varies normally between 25 feet and 30 feet.

   When these two attached houses are placed together, many different configurations can occur. First of all they may or may not have bay windows, they may be regularly set back from the street, or they may not. And whenever the bay windows are used, they may be ordered in a repetitive way, with bay windows extending or the same side of each of the houses. Bay windows may be located on the interior lot line, or on the exterior lot line. The houses may even have different kinds of bay windows.

   : Corner lots

   There are, in this case, two public facades mapping around the lots. However the shorter facade is usually emphasized as more public than the other. The entrance located at the shorter facade.
2. ATTACHED TYPE WITH RECESS

: Intermediate lots

The house expands over the whole width of the lot, but has a recess on the right or the left or both the right and the left sides of the lot between 3 feet and five feet. The depth of the recess varies from 8 feet to 30 feet (depth of one or of two rooms).

There are two variations for treatment the recess as a public facade. If the recess is less than 3 feet wide or alternatively extremely deep, only the street facing side of the recess is treated as a public facade. This type is less common as the width of most the recesses is more than 3 feet. If the recess is more than 3 feet wide, the entire street facade of the recess is treated as a public facade.

Whenever part of the public facade is recessed, there are possibilities of grouping the houses. Many different configurations can occur such as recesses with or without bay windows, in a repetitive way. Another is recesses with or without bay windows, reverse
locations of recess on interior lot line. The other is recesses with or without bay windows, reverse locations of recess on exterior lot line.

**Corner lots**

There are very few of such cases because the corner location gives sufficient street orientation to permit the position of light for the rooms in the back of the house.

There are two variations in the treatment of the public facade at the corner lots as well as at the intermediate lots. The principles used to consider the public facade of the recess are the same as the intermediate ones.
3. SEMI-DETACHED TYPE
   : Intermediate lots

In this case the house does not cover the entire lot and is situated on the right or the left hand side of the lot, leaving more than 5 feet strip on one side of the lot. The width of the larger strip can vary according to the width of the lot which varies from 25 feet to 50 feet.

In this semi-detached house type, the street facade and part of the side yard facade are treated as public facades.

There are two variations of the public facade. If the strip is very narrow or less than 5 feet, the public facade treatment will reach only the entrance or to a bay window, on the side yard. If the strip is wider than 5 feet, the entire side yard facade will be treated as public facade.

When these two semi-detached houses are placed together, few different configurations occur when compared to the numbers of different configuration of the attached house types with or without recess. Those are semi-detached houses in a repetitive way, semi-
detached houses in a reverse location of the side yard on the interior lot line and semi-detached houses in a reverse location of the side yard on the exterior lot line.

: Corner lots

There are very few of such cases because the corner location give sufficient street orientation to permit the light for the room in the back of the house.

There are two variations in the treatment of the public facade at the corner lots as well as at the intermediate lots. The principles used to consider the side yard facade as the public facade are the same as the intermediate ones.
4. DETACHED TYPE

: Intermediate lots

In this case the house is situated away from the two side lot lines, at a distance of more than 5 feet on the one side and in most cases less than 5 feet on the other side from the lot line. Detached houses are only located on lots which are wider than 30 feet. The width of the lot can vary from 30 feet up to 75 feet. The width of the house itself is also different.

There are two variations of the public facade. The facade facing the side yard which is less than 5 feet is not treated as the public facade, in this case the house has only two public facades. On the other hand, if the house is located on a very wide lot, leaving the distance of more than 5 feet to both side lot lines, the house may have three or four public facades.
Corner lots

There are very few of such cases because the corner location gives sufficient street orientation to permit the position of light for the rooms in the back of the house.

Detached houses in the corner location also have four public facades.
THE SET BACK

There are three general positions of the front facade relative to the street:

1. On the lot line (flat facade or bay window).
2. Maximum 5 feet set back from the lot line (usually depth of bay window).
3. From 5 feet to 25 feet set back from the lot line.
FOOTNOTES

1. For a summary of the SAR philosophy, see appendix A, pp. 136-146.
2. For a summary of the principles used by the SAR methods, see appendix A, pp. 147-153.
5. Ibid.
6. For summary of house types as developed in "Urban Form and Change" see appendix B, pp. 156-178.
7. For summary of public facade types as developed in "Urban Form and Change" see appendix B, pp. 179-186.
8. Anne Vernez-Moudon, op. cit.
9. Ibid.
10. Ibid.
13. Ibid., p. 43.
15. Ibid., p. 3.7.
16. Ibid., p. 3.5.
17. Ibid., p. 3.7.
18. Ibid., p. 3.5.
19. For summary of recesses as developed in "Urban Form and Change" see appendix B, pp. 181-182.
27. For summary of bay windows as developed in "Urban Form and Change" see appendix B, p. 172.
28. For summary of floor plans as developed in "Urban Form and Change" see appendix B, p. 170, p. 176.
29. For summary of bay windows as developed in "Urban Form and Change" see appendix B, p. 172.
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. Particular The Inside/Outside Zone (Where the public meets the private), part of Urban Form and Change (San Francisco Alamo Square), unpublished report. Sponsored by the National Endowment for the Arts, 1976-79.


Works about Human Behavioural Patterns and Sociology:


