

APARTMENT HOUSING FOR THE "FARM" REDEVELOPMENT PROJECT

by

Ronald L. McKay

SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE  
OF MASTER IN ARCHITECTURE

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

25 August 1958

.....  
Signature of Author

.....  
Signature of the Head of the Department of Architecture

## A B S T R A C T

Title: Apartment Housing for the "Farm" Redevelopment Project

Author: Ronald L. McKay

Submitted for the degree of Master in Architecture, in the Department of Architecture, on 25 August 1958.

The "Farm" Redevelopment Project is located in the Brookline Village area of Brookline, Massachusetts. It consists of 13.23 net acres which are to be re-planned for a total of 662 dwelling units in elevator apartments, plus a commercial section of approximately 15,000 square feet. The market indicates that the apartments should be of high quality and that they will be occupied predominately by middle-aged, two person families.

The redevelopment site provides many amenities but is a difficult shape. Several wise, but demanding controls are placed on the project. Land coverage is limited to twenty-five per cent and, at the same time, height is restricted to nine floors. There is a requirement for one and one-tenth (1.1) parking spaces for each dwelling unit.

The design solution provides a relatively "free" site by using four large apartment units, varying between 400 and 500 feet in length and up to sixty-eight feet in width, and by placing the majority of the parking below grade. Bearing wall construction is used for three of the four buildings. Five prototype apartment units are presented. The units feature a certain degree of flexibility through the use of box construction together with movable wall panels and storage units.

9 Sewall Avenue  
Brookline 46, Massachusetts  
25 August 1958

Dean Pietro Belluschi  
School of Architecture and Planning  
Massachusetts Institute of Technology  
Cambridge 39, Massachusetts

Dear Sir:

I respectfully submit the following thesis entitled  
"Apartment Housing for the "Farm" Redevelopment Project"  
in partial fulfillment of the requirements for the Degree  
of Master in Architecture.

Sincerely,

Ronald L. McKay 0

## ACKNOWLEDGEMENTS

I wish to express my sincerest gratitude to the following people and organizations:

Professor Lawrence B. Anderson  
M.I.T. Cambridge, Massachusetts

Professor Horacio Caminos  
North Carolina State College Raleigh, N.C.

Professor Eduardo F. Catalano  
M.I.T. Cambridge, Massachusetts

Mr. Justin Gray  
Brookline Planning Board Brookline, Massachusetts

Professor John T. Howard  
M.I.T. Cambridge, Massachusetts

Mr. Thomas F. McNulty, Architect  
Cambridge, Massachusetts

Professor Robert B. Newman  
M.I.T. Cambridge, Massachusetts

Professor Hideo Sasaki  
Harvard University Cambridge, Massachusetts

Mr. Frederick Taylor  
North Carolina State College Raleigh, N.C.

The Brookline Redevelopment Authority  
Brookline, Massachusetts

# T A B L E   O F   C O N T E N T S

ABSTRACT . . . . .	i
LETTER OF SUBMITTAL . . . . .	ii
ACKNOWLEDGEMENTS . . . . .	iii
TABLE OF CONTENTS . . . . .	iv
INTRODUCTION . . . . .	1
The Town of Brookline, Massachusetts . . . . .	2
Brookline's Apartment Market . . . . .	3
PROBLEM . . . . .	5
The Present "Farm" Section . . . . .	6
The Redevelopment Site . . . . .	8
Land Use and Development Controls . . . . .	10
PROGRAM . . . . .	12
Areas . . . . .	13
The Building Code . . . . .	14
Requirements . . . . .	16
Scope . . . . .	19
SOLUTION . . . . .	20
Building Forms . . . . .	21
Circulation and Orientation . . . . .	22
Parking . . . . .	24
Structure . . . . .	25
Residential Building Layout . . . . .	27
Apartment Types . . . . .	28
Flexibility . . . . .	29
BIBLIOGRAPHY . . . . .	30
APPENDIX OF DRAWINGS	

I N T R O D U C T I O N

## THE TOWN OF BROOKLINE, MASSACHUSETTS

The "Farm" Redevelopment Project is situated on Route 9 at the point where that traffic artery passes through the Brookline Village shopping area. The Village is one of the oldest portions of the Town of Brookline and is nominally divided into the "Farm" and "Marsh" sections, respectively to the south and north of Route 9. These names probably originated in the nineteenth century when the nearby Fens River was not controlled or, perhaps even earlier, when Brookline was called Muddy River.

Although present day Brookline<sup>1</sup> is generally southwest of downtown Boston, it is almost surrounded by the city. The Brighton section of Boston is to the north, the Back Bay to the east and the Roxbury section to the south. To the west, Brookline is bordered by Newton. In the context of the Boston Metropolitan Area, one might call Brookline a transitional town. Moving from east to west - first one finds a continuation of the Back Bay, high-density row housing, then older duplex and single family houses on small lots and finally, near the Newton border, new single family houses on large lots. Thus, Brookline offers a variety of housing; from the urban elevator apartment to the large suburban home. The entire town is essentially residential in character, yet it is near enough to downtown Boston so that no resident can justly call himself a commuter. In this, lies Brookline's main asset.

---

1 1950 population: 57,589.

Socially, economically and ethnically, Brookline is quite diverse. Older sections of town, such as the "Farm", are similar to Cambridgeport - newer portions remind one of Wellesley. There are postmen among the citizens and there are also millionaire textile manufacturers. A large percentage of the population is Irish-Catholic and a practically equal percentage is Jewish. Young people with children live in the Hancock Village development and older couples live in Beacon Street apartments. Yet, amid this diversity, there are certain trends.

#### BROOKLINE'S APARTMENT MARKET

The following facts are those which will affect the construction of apartments in the "Farm" Redevelopment Project.<sup>1</sup>

- 1 There is a demand in Brookline for 1500 apartment units due to obsolescence alone.
- 2 500 of the above could rent for \$150.00 per month and over.
- 3 The remaining 1000 could rent for figures near \$150.00 per month.
- 4 Mostly two person families rent in Brookline.
- 5 The demand is for a high percentage of one bedroom and efficiency apartments.
- 6 The average age of persons in Brookline luxury apartments is fifty-six, most men holding responsible positions.
- 7 There is roughly one child per twenty apartments in Brookline.

---

1 Information from the recent "Economic Study of the Town of Brookline", by Joseph F. Turley of Boston College.



- 8 The tax rate on apartments in Brookline is most favorable: \$48.50/\$1000.00 at 70% valuation. (In Boston it is \$86.00/\$1000.00 at 100% valuation.)

Both Professor Howard of the M.I.T. Planning Department and Mr. Justin Gray of the Brookline Planning Board feel the \$150.00 rent per month figure in items 2 and 3 above to be conservative. Brookline's most recent apartment building (68 units) has a rent per month range from \$170.00 up to \$600.00. Sixteen of the units rent at \$300.00 per month and twenty at \$310.00 per month. Apparently Brookline is a desirable location for older couples whose children have matured, and who wish to return to urban apartments from their suburban homes.

The statement that the Brookline tax rate is most favorable is worth further emphasis. The real significance, as Mr. Turley calculates, is that the same apartment can rent for \$30.00 per room per month less in Brookline than in Boston.

We may safely conclude, then, that Brookline is a most desirable location for apartment development due to its proximity to Boston, present residential character and low tax rate. Further, the market seems to be for high quality apartments to be occupied by small, middle-aged families.

P R O B L E M

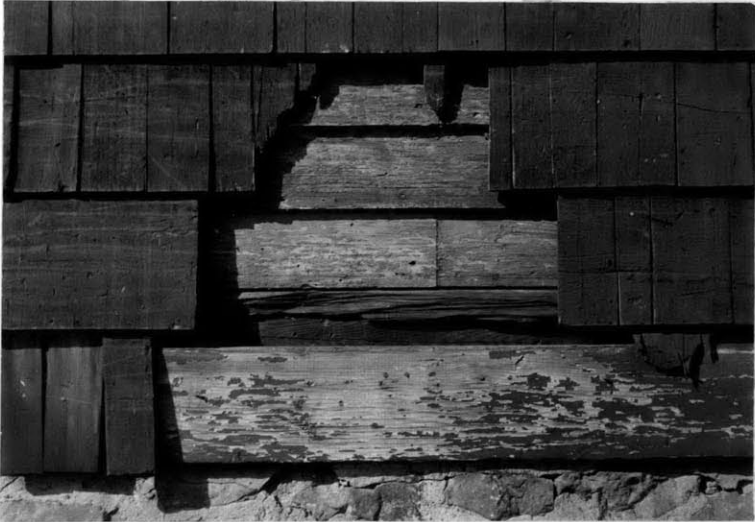
## THE PRESENT "FARM" SECTION

Brookline's urban renewal program is relatively young. It began in March, 1957 with the establishment of the Brookline Redevelopment Authority. Since that date, the Authority has chosen the "Farm" section of Brookline Village as its first redevelopment project. It has drafted a program for the relocation of the families and businesses within the area, the razing of the existing structures and the sale of the land to a private developer for restricted new uses. The Brookline Board of Selectmen approved the program in March of this year and the Federal Urban Renewal Administration agreed to a grant-in-aid this July. The federal grant is for \$1,878,000 and the town will contribute \$888,000 for a total of \$2,766,000.

The present "Farm" section is characterized by relatively narrow streets and inadequate parking facilities. Although it is predominantly residential in nature, there is a heavy scattering of commercial and light industrial uses throughout the area. There exists an overcrowding of the land by structures and building maintenance is quite poor. The housing is not at all indicative of the normal standard throughout Brookline.

Although the "Farm" is badly in need of redevelopment, the project has met with considerable resistance within the town. The present residents are of the lower income group and are mostly Irish-Catholics. They have organized in expressing dislike for their eventual displacement and this

The Present "Farm" Section



has not fallen on deaf ears at the Town Hall and in other quarters. One can certainly sympathize with another's reticence to leave his home and the fact that \$100 is inadequate to move a household, or \$2,500 a business. There are 230 families and seventy-five individuals now living in the area. Seventy-five of the families will be relocated in public housing to be built at Kent Square, Brookline and some in housing for the elderly already under construction. The others will move to various locations throughout the town.

Within the agreement signed by the Brookline Redevelopment Authority and the Federal Urban Renewal Administration, there is the following loosely worded paragraph: "A number of units [within the new development] not to exceed 150 for families and 25 for individuals shall be provided at reasonable rentals for families of moderate income, and made available initially to persons now resident in the project area." It is obvious what this paragraph intends and it is equally obvious that it is phrased so that evasion would not be difficult. The market in Brookline is for quality apartments and the restrictions placed on the new development of the "Farm" are in consonance with such a demand. A developer will not be able to rent such apartments at the "reasonable" level meant by the preceding paragraph. At the same time, it would be a poor solution to build low income housing and luxury apartments on the same site. This problem will best be resolved through social and political means, for, in my opinion, there is no good architectural resolution. Therefore,

for the purposes of this thesis, I shall not consider the preceeding paragraph and hope that an answer, both practical and equitable, can be reached before actual project execution.

#### THE REDEVELOPMENT SITE

The site of the "Farm" Redevelopment Project is, as already stated, to the south of Route 9 in Brookline Village. The gross site area is 18.30 acres, but after the widening of several streets and a 100 foot setback requirement along Washington Street (Route 9), only 13.23 net acres remain for construction.

To the east of the site is lightly traveled Pond Avenue, Leverett Pond and Olmstead Park. Beyond the pond and park is the Jamaicaway (Route 1). At the southeast corner of the site is the very small Allerton Hospital. The southern boundary consists mostly of steep hillside and a retaining wall varying from two to fifteen feet in height. The land above and beyond the wall is well treed and occupied by single family houses. To the west is High Street, and beyond it a residential area of good quality. At the northwest corner is a fire house, in good repair, and in no way a detriment to the site.

Route 9, on the north, is the main artery leading from Boston to the western suburbs and the Massachusetts Turnpike. Presently, more than 46,000 vehicles pass through the Village on this route each day and there is an average of over one accident a week. The existing traffic situation is considered

Right: Pond Avenue

Center: Leaverett Pond

Bottom: Allerton Hospital



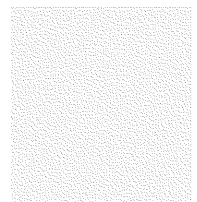
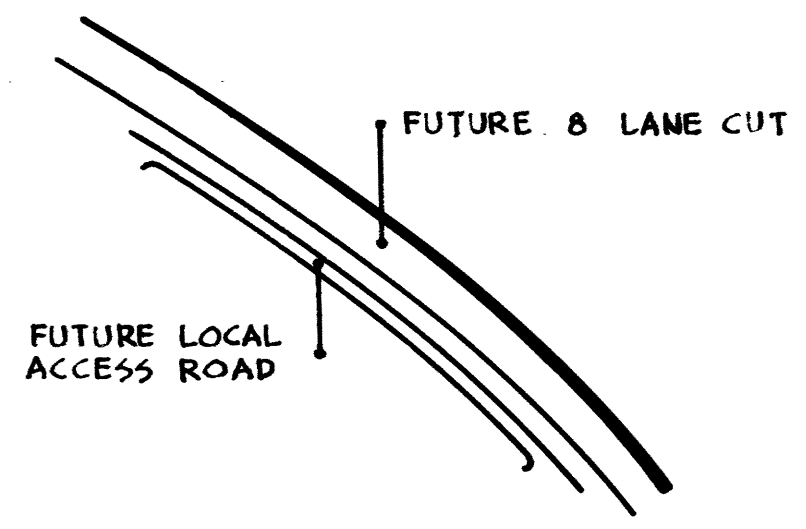
Right: The Firehouse

Center: Residences on High  
Street

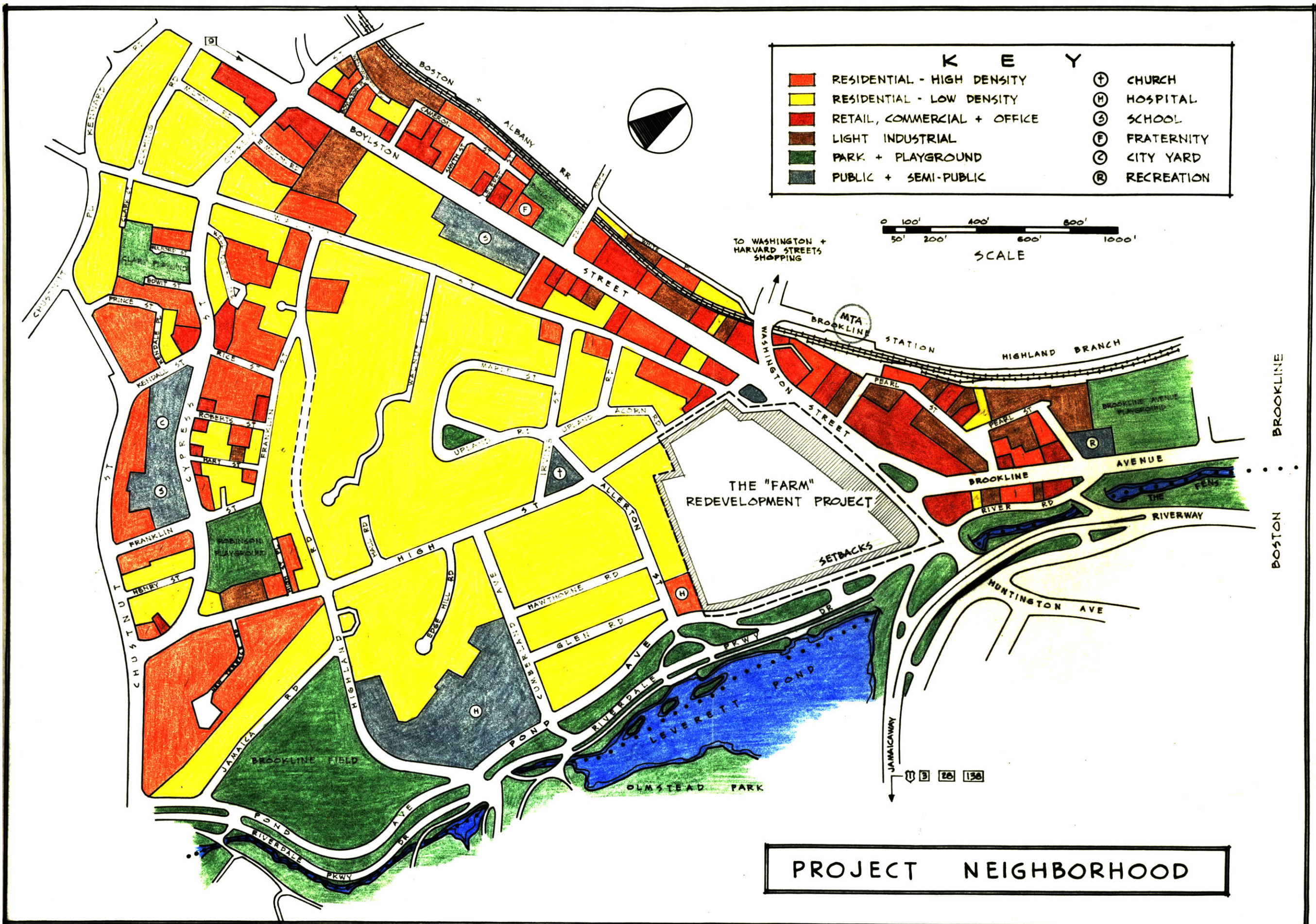
Bottom: Washington Street  
(Route 9)











KEY			
[Red Box]	RESIDENTIAL - HIGH DENSITY	[Church Symbol]	CHURCH
[Yellow Box]	RESIDENTIAL - LOW DENSITY	[Hospital Symbol]	HOSPITAL
[Brown Box]	RETAIL, COMMERCIAL + OFFICE	[School Symbol]	SCHOOL
[Dark Brown Box]	LIGHT INDUSTRIAL	[Fraternity Symbol]	FRATERNITY
[Green Box]	PARK + PLAYGROUND	[City Yard Symbol]	CITY YARD
[Grey Box]	PUBLIC + SEMI-PUBLIC	[Recreation Symbol]	RECREATION



PROJECT NEIGHBORHOOD



to be nearly intolerable. It is planned that within a few years Route 9 will be put into an eight lane cut through the Village area, with a small local access road running between the cut and the "Farm" site. The 100 foot setback on this side of the project will then become a normal 30 feet. The Brookline Planning Board visualizes that with the construction of the "Farm" Project and the placing of Route 9 in a cut, the old Village shopping area, to the north, will be converted to general services and light industry.

Briefly then, the site's surroundings are: a pleasant pond and park to the east, a treed hillside and wall to the south, a narrow residential boundary to the west and a "traffic canyon" on the north.

Within the site area the land slopes very gently from the northeast corner to the southwest, rising 20 feet in 1000 feet. At the southwest corner a steep hillside begins and would be difficult for construction. The land is well drained and there should be no subsoil problems. A 20 foot easement, under which there is a 9 foot by 10 foot storm sewer, passes from west to east across the northern portion of the site. Buildings may be placed over the easement with permission from the Redevelopment Authority.

There is bus service adjacent to the project on Boylston and Washington Streets and Brookline and Huntington Avenues. To the north of Route 9, within a very short walk, is Brookline Station on the old Highland Branch of the Boston and Albany railroad. The MTA has recently taken over this

line and will provide fast commuter service (12.5 minutes) to downtown Park Street. Trains will run at three and one-half minute intervals, and it is predicted that with the new service 9,077 inbound passengers will use Brookline Station each day.

#### LAND USE AND DEVELOPMENT CONTROLS

Once the land within the "Farm" Project area has been cleared, it will be sold in a single parcel to a developer. The following are the controls placed on any redevelopment.<sup>1</sup>

- 1 Zoning The project is zoned as 4(A), Multi-Family Residential. Other permitted uses are play areas, parking areas or garages and service drives.
- 2 Density Density shall not exceed 50 dwelling units per net acre (a total of 662 for the project).
- 3 Coverage Land coverage by structures shall not exceed 25% of the net acreage.
- 4 Building Bulk The gross floor area within residential structures shall not exceed two (2) times the net site area.
- 5 Setbacks Setbacks shall be 30 feet from all right-of-way lines and property lines at all boundaries except Washington Street, where the setback shall be 100 feet.
- 6 Height No residential building shall be higher than 85 feet (9 stories).
- 7 Parking One and one-tenth (1.1) parking spaces shall be provided for each dwelling unit. Such spaces may be within or without of structures and shall be no less than 180 square feet in size.

---

1 The controls are as stated in the "Final Plan Report, The Farm Redevelopment Project", Brookline Redevelopment Authority, December 1957.

8 Retail, Commercial and Service Uses

- a Such uses may be permitted within the project area provided they are operated in harmony with the residences and do not create an adverse environment.
- b Such uses shall be restricted to stores and shops such as drug stores, delicatessens, beauty parlors, etc. that will be of service to the project area and immediate neighborhood.
- c All commercial uses shall not utilize more than 10% of all ground floor area of all buildings in the project. No single shop or store shall cover more than 5,000 square feet.
- d All commercial and service uses shall be located in close proximity of each other in an integrated and unified manner.
- e Parking (including driveways) shall be provided at a ratio of at least one (1) square foot for each two (2) square feet of commercial floor area. No parking space shall be less than 180 square feet in size.
- f At least one loading space, 12 feet by 30 feet, shall be provided for each 8,000 square feet of commercial floor area.

The following excerpts are also taken from the Redevelopment Authority's Final Plan Report.

"The controls are set so as to allow elevator apartments . . . ; there is now adequate evidence of a market for this type of development."

"A strong market for new apartment housing in Brookline is indicated by the numerous luxury type apartments built in and near Brookline since World War II. Available information indicates complete or nearly complete occupancy of these apartment buildings, and there is a general demand for this type of accomodation in the Greater Boston Area."

P R O G R A M

## AREAS

The following chart indicates the areas which may be apportioned to various sections of the "Farm" Redevelopment Project, under the controls set forth in the preceding part of this thesis.

<u>Item</u>	<u>Area</u>	<u>Acres</u>	<u>Square feet</u>
1	Gross Project Area <sup>1</sup>	18.30	797,148
2	Area Lost to Rights-of-Way <sup>1</sup>	2.66	115,870
3	Area Lost to Setbacks	3.36	146,605
4	Area Remainin for Building Use	12.28	534,673
5	Stated Net Site Area <sup>1</sup> (Includes area lost to 30' setbacks)	13.23	576,299
6	Maximum Allowable Gross Residential Floor Area (2 times item 5)	26.46	1,152,598
7	Average Allowable Gross Area per Apartment (at 662 apartments)		1,741
8	Maximum Allowable Land Coverage (at 25% of item 5)	3.31	144,075
9	Maximum Allowable Commercial Area (at 10% of item 8)	0.33	14,408
10	Residential Parking Area <sup>2</sup> (at 1.1 spaces for each of 662 units and 300 square feet of space)	4.70	218,400 728 spaces
11	Commercial Parking Area <sup>2</sup> (at 50% of item 9)	0.16	7,204 24 spaces
12	Commercial Loading Area (at 360 square feet per 8,000 square feet in item 9)		648 2 spaces

1 Areas taken from "Final Plan Report" of the Brookline Redevelopment Authority.

2 Areas are minimum requirements and include driveways.

Several points should be made concerning the area figures just presented.

- 1 The average allowable gross area per apartment of 1,741 square feet is extremely liberal.
- 2 Although the officially stated net site area for building use is 13.23 acres, a significant portion of this is unusable. Land area is lost to the 30 foot setbacks at the eastern, southern and western boundaries and to the steep hillside at the southwest corner. In addition, it is necessary to avoid, as far as possible, the 20 foot easement across the northern portion of the site. An estimated 11.70 acres remain.
3. If all of the required residential parking is placed on grade, over one-third of the net site area must be allocated to this usage.
- 4 It is pertinent to note that if one subtracts the maximum allowable commercial area from the total allowable land coverage figure to get the maximum allowable residential land coverage, and then divides this figure into the maximum allowable residential floor area, the result is almost exactly nine stories. After a few years the "Farm" Development will have access to no other nearby shopping facilities than those indigenous to the project itself. It will therefore be necessary to provide the maximum commercial space. This means, that in order to provide the maximum residential building area, all such structures must be nine stories in height, which is all that is allowed by zoning regulations.

#### THE BUILDING CODE

The following regulations in the "Zoning By-Law and Amendments" (May 1956) and the "Building Code" (August 1956) of the Town of Brookline, will affect this project.

- 1 Construction must be "Type 1, Fire-resistive".



- 2 Height may not exceed eighty-five feet  
(nine stories)
- 3 Stairs and exits
  - a A minimum of two exits must lead from all ground floors.
  - b A minimum of two interior stairways or one stairway and one fire tower must lead from all floors above grade.
  - c Access to all basement floors from the outside is required.
  - d At least one stairway must lead to the roof in buildings over two stories in height.
  - e All stairways must lead directly to an exit.
  - f All interior stairways must have windows.
  - g Exits on each floor must be remote from each other.
  - h No apartment door may be more than 125 feet from an exit.
  - i The minimum width of a stairway is forty-four inches.
  - j The number of occupants is to be calculated by dividing apartment floor areas by 100.
  - k There must be one foot of exit width for every fifty occupants, or fraction thereof, above any given level.
  - l The width per exit from any given floor must be determined by dividing the total required width by the total number of exits less one.
- 4 Design Loadings
  - a Garage floors - 150 pounds per square foot (live)
  - b Corridor floors - 100 pounds per square foot (live)
  - c Apartment and porch floors - 40 pounds per square foot (live)
  - d Flat roofs - 40 pounds per square foot (snow)

Two things should be noted concerning the above requirements. Firstly, there is no stipulation that any single apartment must have dual egress. Secondly, to calculate the number of occupants of an apartment of the type to be built in the "Farm" Project, by dividing the floor area by 100, will be overly safe. Most apartments will be large and at the same time be occupied by only a few persons.

Such a method of calculation will probably result in unnecessarily wide stairways.

#### REQUIREMENTS

Since the land within the "Farm" Redevelopment Project has not yet been cleared or sold to a developer, there is no set of specific requirements such as a client might normally prepare. There are only those imposed by the existing apartment market, the land use and development controls, the zoning law and building code and the designer's personal wishes. All requirements but those of the designer have already been presented.

The site for the "Farm" Project offers both amenities and difficulties. The long view to the east, across Leverett Pond and Olmstead Park, is most pleasant. The hillside on the south and residential neighborhood to the west are also pleasing, so that outlooks in either of these three directions are worth exploiting. The site tends to open up towards the principal eastern view and this shape, together with the southern hillside, provide the project land with an agreeable plastic quality. Any design should take these views into account and leave the land as free as possible. Difficulties, however, arise from these same qualities. The narrow western neck of the site, the hillside and the sloping northern boundary all seem to defy order. If it is strictly respected, the easement cuts off the entire north-eastern corner.

Apartment developments which consist of a number of buildings are too often arranged in neat rows. It would be better if they were disposed so as to work with the terrain and so as to define certain definite but varied spaces. Such a solution, together with careful attention to landscaping, should just as well add rentable value to a development as a more materialistic addition of marble to the lobby areas.

Outdoor lots should be avoided as far as possible when providing parking spaces in the Boston region. It is impossible to plough such an area without burying the automobiles under several feet of snow. Experience would show that any car parked in an outdoor lot will be snowed-in for at least three weeks each winter. This fact, together with the large number of required spaces and the desired high quality of accommodations, make underground parking a necessity for the "Farm" Project.

The Brookline apartment market indicates that a large percentage of residents of the "Farm" Project will be middle-aged, two person families. There will be few children and many of the people will have lived in suburban homes. Their desire will be for housing with the privacy and quality of a single family home but without quite as much space and responsibility. There should be two-bedroom apartments for families which still have a teen-age member, and there should also be one-bedroom and efficiency units. Most units should, however, provide an extra room which might be used as a study

and place of quiet retreat, a sewing room or a space for a visiting grandchild. All apartments should have storage space adequate for years worth of accumulated "refuse".

Porches are important in order to add a bit of outdoor living to a seventh floor apartment. They should, however, if they are to be used, be both large and private. By setting a porch back into the façade of a building, one may achieve this privacy together with a protected space which is usable later in the New England fall and earlier in the spring. In addition, space should be provided somewhere on the site where small private plots may be laid out and rented for gardening, barbecues and similar activities.

Lastly, an apartment should offer a certain degree of flexibility to a tenant. If movable partitions are applicable to office buildings, they can also be useful in the home. Granted, such partitions provide a low degree of sound isolation, but this is desirable between apartments, not within them. A unit could be designed with two or three basic arrangements. Then, a new tenant could choose the arrangement which best fitted his personal needs and, by paying a small "installation fee", have the apartment divided according to his choice. Such a feature should be most desirable and could be accomplished without much added expense.

## SCOPE

The "Farm" Redevelopment Project, with 662 dwelling units, parking for some 760 automobiles and a commercial section covering approximately 15,000 square feet, presents a problem of some magnitude. As with all residential work, attention to a large number of details is demanded. It is not within the scope of this thesis to produce a complete design including all such details. Therefore, an area must be defined in which to work.

This thesis proposes to do the following:

- 1 Provide a site plan indicating landscaping and the size, shape and location of all buildings, both residential and commercial;
- 2 Develop separate paths of vehicular and pedestrian circulation within the site and provide for all necessary parking spaces;
- 3 Suggest a structural system for each of the buildings on the site;
- 4 Provide a basic layout for each residential building - indicating the location of horizontal and vertical circulation, the method of introduction of mechanical and electrical services and the disposition of various apartment types;
- 5 Design several prototype apartment units;
- 6 Devise a general façade treatment for all residential buildings.

The above proposals will be carried out within the requirements and restrictions set forth in preceding sections of this work.

S O L U T I O N

## BUILDING FORMS

Two basic types of residential buildings and one basic commercial unit have been designed for the "Farm" Project. Two buildings of each apartment type and a total of seven commercial units have been placed on the site. Both apartment types are rectangular in form, one fifty-six feet wide and the second sixty-eight feet wide. The commercial buildings are circular; approximately fifty feet in diameter.

Since the Development Area has an eighty-five foot height limit, it would be impossible to design true tower, or "point" type, apartment buildings. They would have nearly equal width and height. Further, in order to achieve the desired amount of building volume, and still not exceed twenty-five per cent land coverage, all apartments must rise to the maximum allowable limit. Hence, with a constant height a necessity, a series of small square or rectangular buildings might prove quite monotonous. In addition, such a series of buildings would define many small, perhaps unuseful, spaces.

The four apartment buildings actually used are, though basically rectangular, quite long. Their lengths vary between four and five hundred feet and each is a full eighty-five feet in height. The resultant site is rather "free", and but four primary spaces are defined. Though these spaces contrast with each other in shape and actual size, they are all relatively large, open and "horizontal" in nature. Three of the buildings are strict rectangles. The

fourth rectangle is curved into somewhat of an "S" shape. The curving of this latter building accomplishes five ends: it echos the plastic qualities of the southwestern hillside, it provides visual contrast and relief from the geometric pattern and long rectangular forms of the other three buildings, it provides for a better distribution of space on the site, it does away with the joint difficulties which would result from a "Z" shape, and it allows for better orientation to the existing views.

The commercial buildings are grouped on a plaza which lies so that it will be approached by pedestrians from several directions. The units will be small and require a minimum amount of service, since only such businesses as drug stores, delicatessens and beauty parlors are allowed. Each building, therefore, consists of a core, extending to loading areas below the plaza level, and is circular in form, so that there is neither a front nor back side and approach and entrance may be from any direction on the plaza. The following area comparisons may be made.

<u>Item</u>	<u>Allowable</u>	<u>Actual</u>
Land Coverage	144,075 sq. ft.	136,530 sq. ft.
Gross Residential Floor Area	1,152,598 sq. ft.	1,037,920 sq. ft.

#### CIRCULATION AND ORIENTATION

A neck is formed at the western end of the Development site between the hillside and firehouse. The area is just



adequate for the commercial buildings and, at the same time, is the best location for this grouping. The neck is situated so that it lies on the main pedestrian path between the apartment buildings, the bus stops and Brookline MTA Station. In addition, it is at the foot of High Street, which is the best vehicular connection with the immediate neighborhood. By cutting the hillside back somewhat, and then filling outwards, a raised commercial plaza has been formed. Adequate parking space has been provided on the firehouse side at the street level, so that the upper level remains only for pedestrians.

All apartment buildings have been oriented so as to enjoy views across the pond to the east, over the residential neighborhoods to the south and west or into the large 250 foot by 300 foot central space on the site. In all cases, the northern view towards present day Brookline Village and the site where Route 9 will be placed in a cut, has been avoided. A 100 foot setback and an interior ring-road will act presently as a buffer between the apartments and Route 9. Eventually, fill will be borrowed from the highway cut and used to form a long, gently rolling hillside, which will be planted with trees and used as an additional buffer.

It would be desirable if all apartments could enjoy the long eastern view across Leverett Pond, but it would be impossible to accomplish this and, at the same time, avoid bad solar orientations plus the unpleasant northern outlook.

Rather than this, the main interior site spaces have been opened so as to allow circulation towards the pond besides a degree of visual connection.

The apartments in the thicker, sixty-eight foot buildings will have only one orientation while most of those in the thinner, fifty-six foot buildings will have two. Therefore, the former buildings have been positioned with outlooks to the east and west and the latter ones, north and south. This way, all apartments will receive sunlight for at least half of each day.

All apartment buildings, except one, include the maximum allowable nine stories of residential space. The westernmost building is located on the same raised plaza as the commercial units. It contains only seven stories, since it is raised some fifteen feet above the plaza level by setting it on large concrete bents. This allows free circulation to and from the plaza and prevents the interruption of the slope of the southwestern hillside.

Vehicular circulation within the site is via a single, two lane ring-road. All apartment entrances are off this road. Pedestrian circulation is separate and along three principal axes running generally from the commercial plaza on the west towards the pond on the east.

#### PARKING

For the reasons stated in the Program, the majority of the required residential parking spaces have been placed

below grade. A total of 728 spaces are required: 553 are in garages and the remaining 175 in small lots distributed along the ring-road. The basement levels of the three eastern apartments and the portion of the plaza below the western building have been utilized as garages. It is felt that it would be cheaper to place the parking beneath the buildings, rather than elsewhere, since excavation must necessarily take place in these areas anyway. In addition, an underground garage, beneath any other portion of the site, would limit the landscaping possibilities. The earth removed from the garage areas will be used to form a large, low platform for the three eastern buildings. These apartments may then rest on the level, rather than a slope, and access to the underground areas is made easier. It will be possible for service and delivery vehicles to enter all underground spaces and to park in certain convenient locations.

#### STRUCTURE

Reinforced concrete structure will be used throughout the "Farm" Project. This seems to be the normally accepted mode of multi-story construction throughout the Boston area, is fire-resistive and adopts itself readily to mass production of repetitive units.

The roof structure of the commercial units will be of thin shell construction, using a shallow domical form. All seven units will be similar so that the same formwork may

be used for each shell. The shells will be poured on the ground, allowed to set and then lifted into place with a crane.

Bearing wall construction (supplemented in a few special instances by columns) will be used in all apartment buildings but the one set on bents. A ribbed slab will span thirty feet across apartments, between the walls. The walls will be hollow so as to be able to easily carry utilities, to provide more strength by raising their moment of inertia and to afford a higher degree of acoustic isolation between apartments. In addition, they have been designed in standard panel sizes so that they may be mass produced on the ground and lifted into place. This type of construction will effectively form a series of boxes into which each apartment may be fitted. Utilities will run horizontally, between the ribs of the floor slab and a furred plaster ceiling below. Thus, a high degree of planning freedom may be realized within each apartment "box".

Since the fourth apartment building rests on bents, it is not logical to repeat the bearing wall form of construction. A more standard system of column, beam and slab construction is used in this case. The bays of this building are only fifteen feet in width so that the beams and columns may be small in size. With proper furring, a simple box like interior may also be formed for each of these apartments. In addition, the fifteen foot spacing works well with the varying apartment widths of thirty and forty-five

feet and a thirty foot distance between bents. The bents consist of two legs plus a horizontal member which varies in depth according to the distribution of bending moments and in width with the shearing forces.

#### RESIDENTIAL BUILDING LAYOUT

Two circulation systems are used within the apartments of the "Farm" Project. The thinner, fifty-six foot buildings, use a skip-floor arrangement with elevator stops and central corridors every third story. The thicker, sixty-eight foot buildings, have a standard double loaded corridor on each floor. By using these two systems, a variety of apartments is achieved. Some occupy an entire floor, some half a floor and some one and one-half floors. The skip-floor system is conservative of non-rentable space, but the double loaded corridor system provides for tenants who do not care to use stairways. In the former system, only ten per cent of the building area is given over to lobbies and hallways, while in the latter system, twenty per cent is required.

All buildings have stairways at each end and next to the elevator lobbies. These stairways have necessarily been made quite wide in order to satisfy the code requirements for egress. The requirements demand as much as fifty feet of total stairway width in some cases. The code also specifies that stairways have windows: hence their exterior locations.

In all but the shortest building, two elevator lobbies have been provided; each at the approximate third points of the structure's long dimension. This significantly reduces the length of corridor which a resident must traverse in order to reach his apartment.

#### APARTMENT TYPES

Three basic apartment types have been designed for the skip-floor buildings and two for the buildings with double loaded corridors. There is some variation in the end units of each building and eight fan shaped apartments occur on each floor of the curved structure. The development controls restrict the project to 662 dwelling units and exactly 662 have been provided. The smallest apartment has 720 square feet of gross floor area and the largest, a full 2,000. There is a considerable variety of choice within the development.

There are 69 two-bedroom apartments, 441 one-bedroom apartments and 152 large efficiency apartments in all. The average gross floor area for all apartments (includes walls but not lobbies and corridors), is approximately 1,300 square feet. Every larger apartment has a study and some have one and one-half baths. Each unit is provided with considerable storage space and a large, deep porch which will be quite private and should act as a "sun trap" in the fall and spring when the solar altitude is low. This latter fact will provide for longer seasonal use. All ground floor

units will have private patios. As already stated, the apartments are varied as to the number of floors which they include and as to whether they have one or two exposures.

#### FLEXIBILITY

All larger apartments within the Development have been planned to allow a certain degree of flexibility. In each case, a core of immovable rooms, such as the kitchen and bath, has been established. Rooms and doorways in the core have been arranged so that they zone the apartment into living, sleeping and eating areas. Beyond this, the tenant has a choice of two or three ways in which to sub-divide the remainder of his apartment. This is accomplished by putting everything within the flexible portion of the apartment on a two and one-half foot module. Windows, doors, wall panels and storage units all adhere to this dimension. The latter two elements may quite simply be moved to create the different basic arrangements. The bearing wall and rib slab construction methods make it easy to provide electrical outlets for the several plan possibilities.

## B I B L I O G R A P H Y

### APARTMENT HOUSES

Joseph H. Abel and Fred N. Severud  
New York, 1947.

### BROOKLINE BUILDING CODE

Brookline, Massachusetts, August 1956.

### ECONOMIC STUDY OF THE TOWN OF BROOKLINE

Joseph F. Turley, Director  
Bureau of Business Research, Boston College.

### FINAL PLAN REPORT, THE FARM REDEVELOPMENT PROJECT

Brookline Redevelopment Authority  
Brookline, Massachusetts, December 1957.

### HOUSING IN DENMARK SINCE 1930

Esbjørn Hiort  
London and Copenhagen, 1952.

### LE CORBUSIER, OEUVRE COMPLETE, 1952-1957

Le Corbusier  
Zürich, 1957.

### LIFE AND HUMAN HABITAT, MENSCH UND WOHNEN

Richard Neutra  
Stuttgart, 1956.

### THE NATURE OF CITIES

L. Hilberseimer  
Chicago, 1955.

### OFFICIAL SUMMARY OF THE FARM REDEVELOPMENT PROJECT

Brookline Redevelopment Authority  
Brookline, Massachusetts, February 1958.

### SWEDEN BUILDS

G.E. Kidder Smith  
New York, 1950.

### URBAN LIVING ENVIRONMENT, by Demiene

M.I.T. Master in Architecture Thesis, 1957.

### ZONING BY-LAWS AND AMENDMENTS

Town of Brookline, Massachusetts  
Brookline, Massachusetts, June 24, 1922; Amended May 3, 1956.



A P P E N D I X   O F   D R A W I N G S

APARTMENT HOUSING

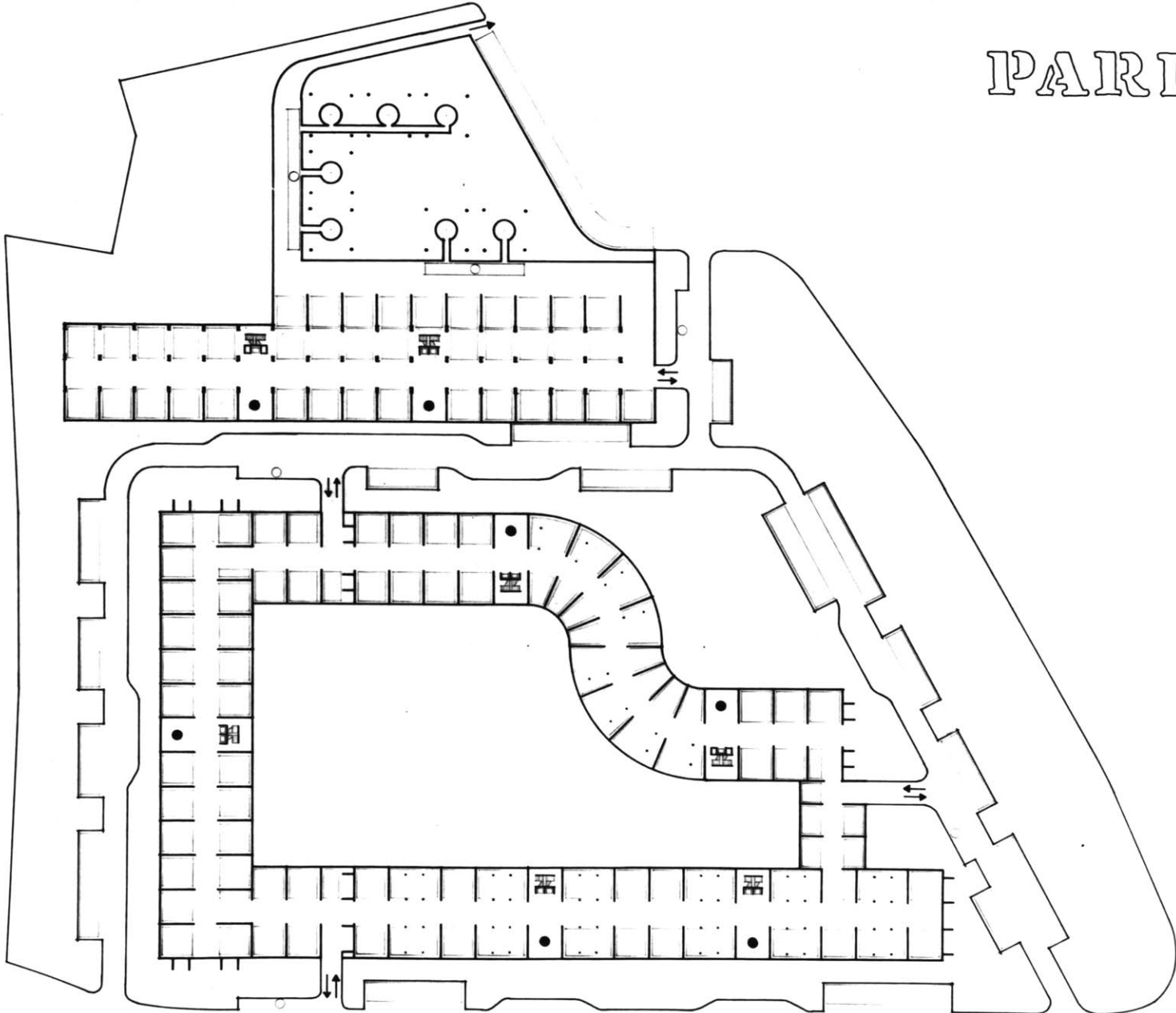
FOR THE

'FARM' REDEVELOPMENT PROJECT



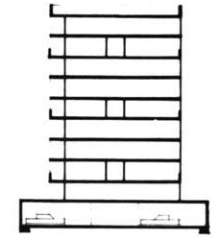
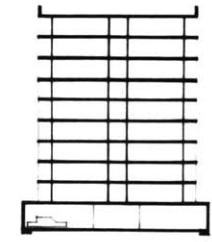
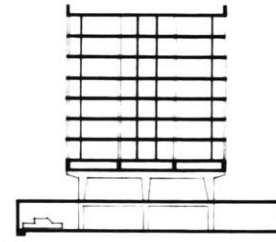
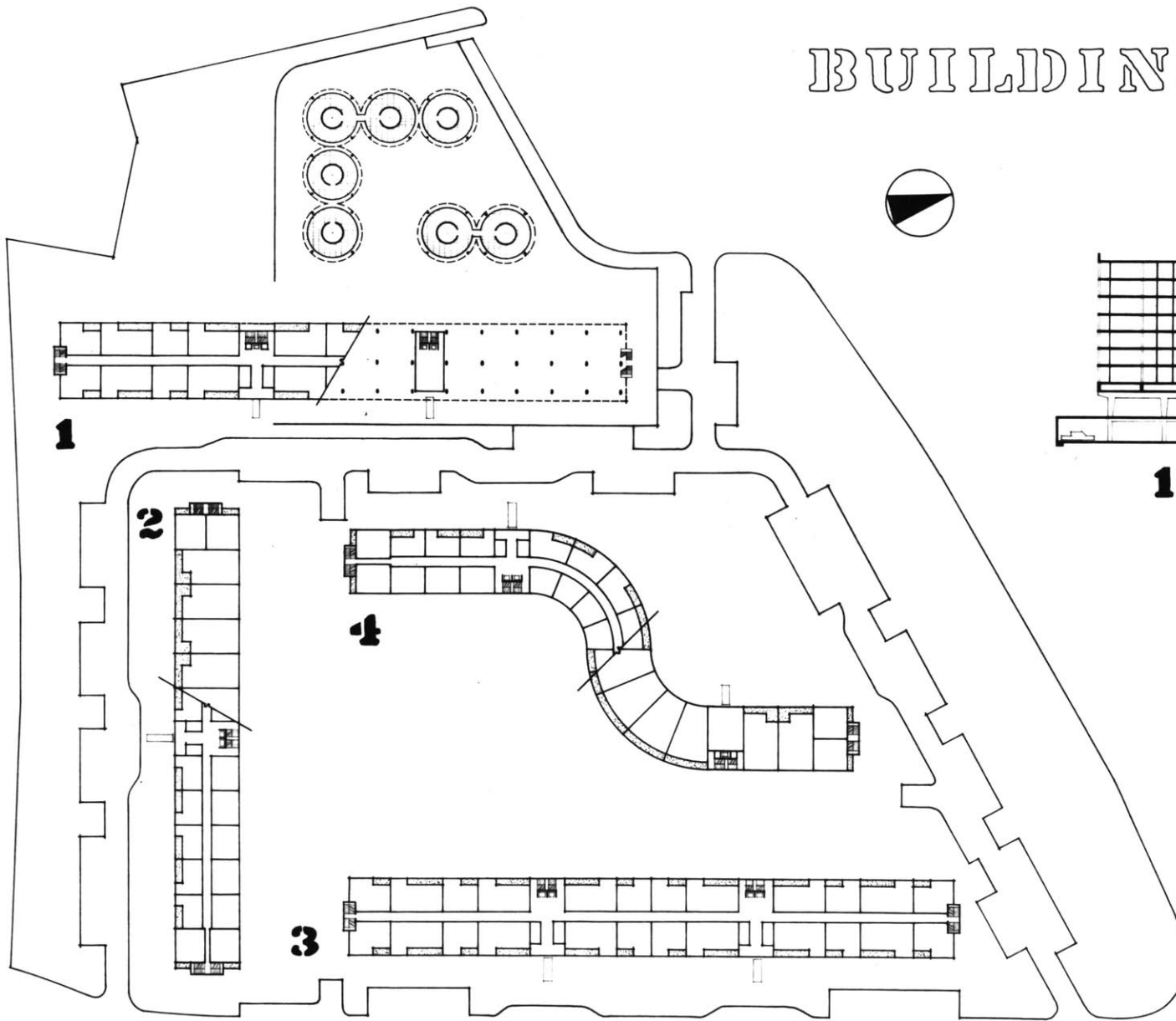
RONALD L. MCKAY  
M.ARCH. THESIS MIT  
25 AUG. 1958

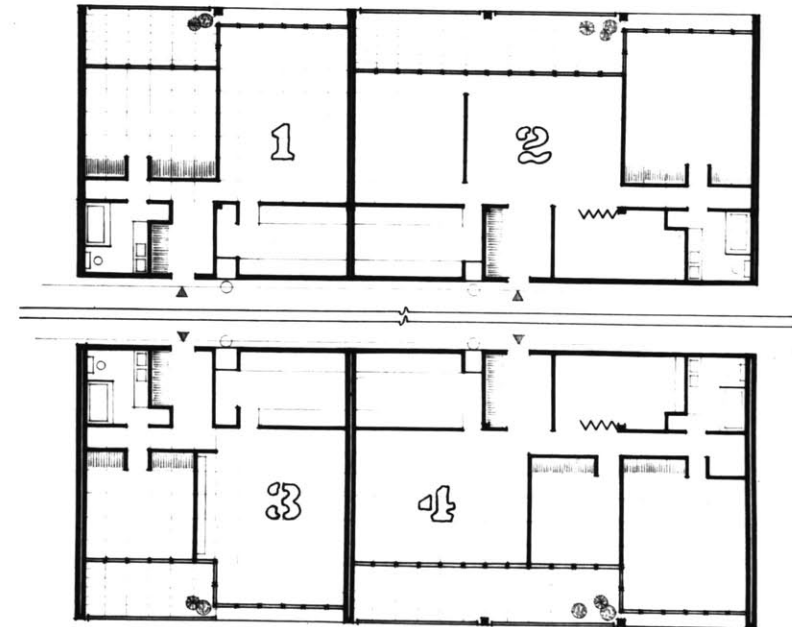
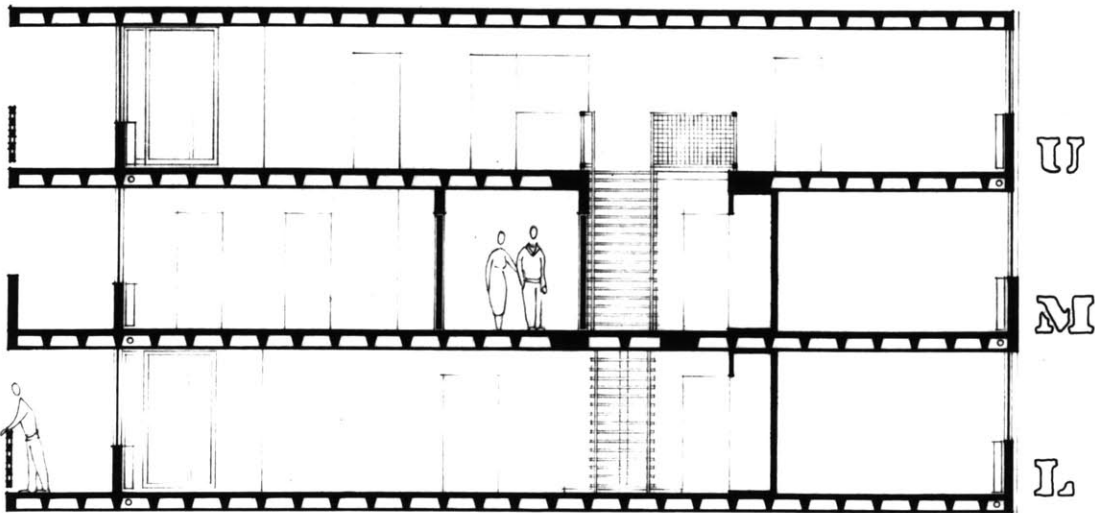
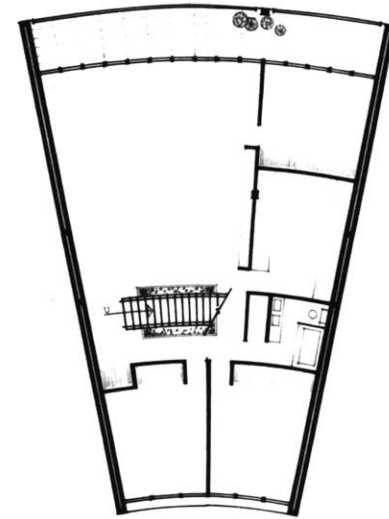
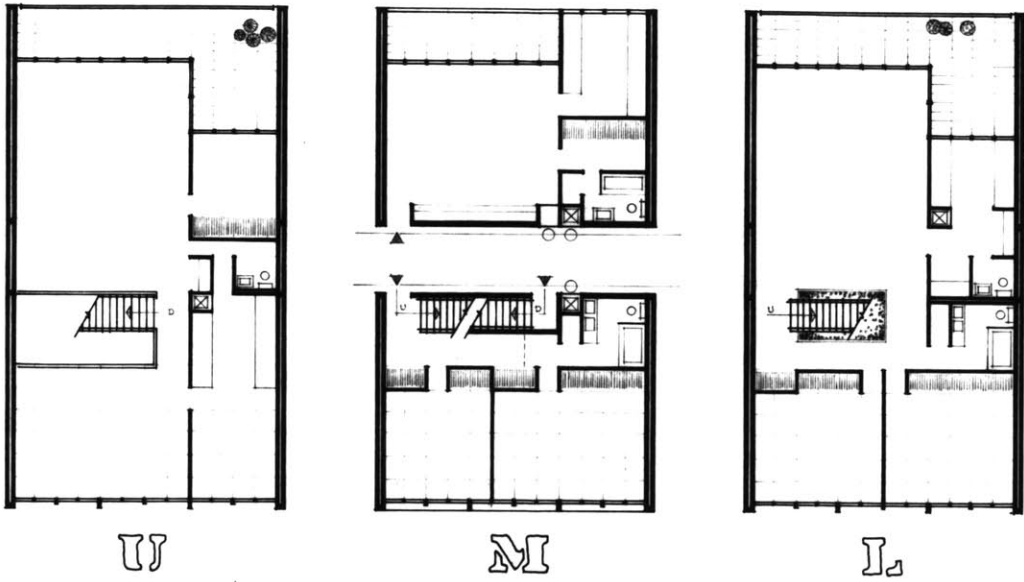
# PARKING



F·R·P 1

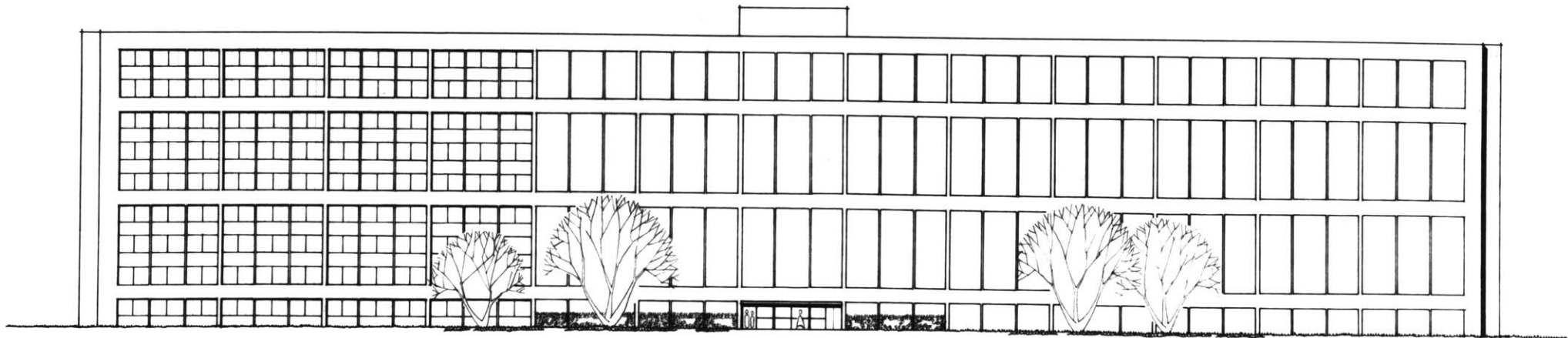
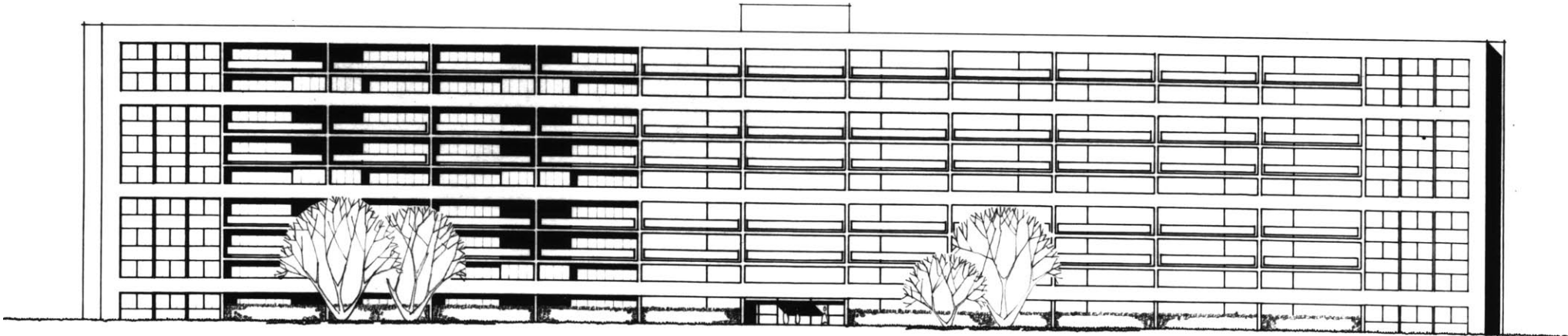
# BUILDING TYPES





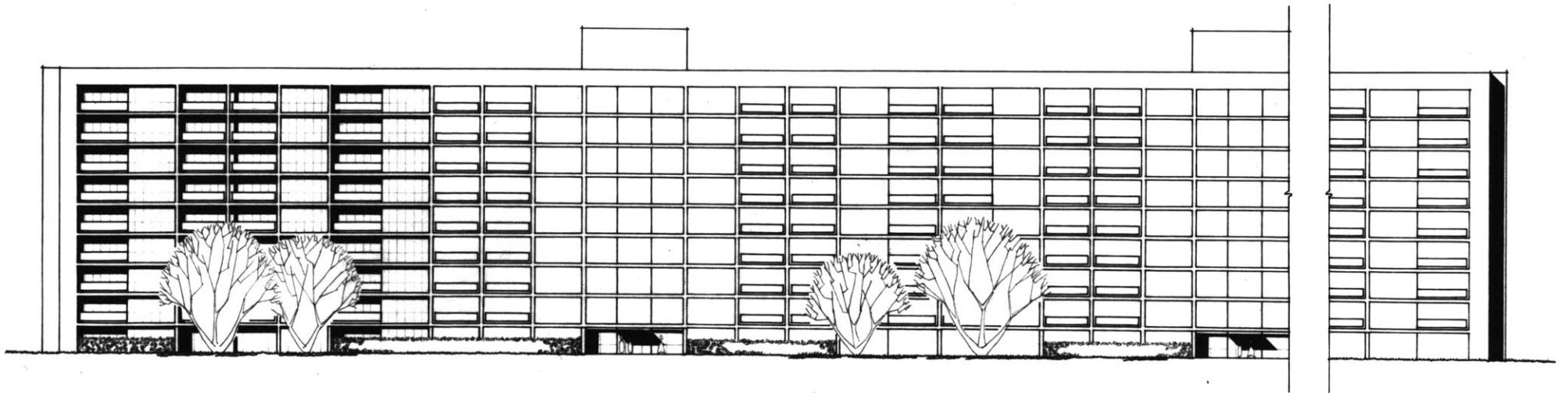
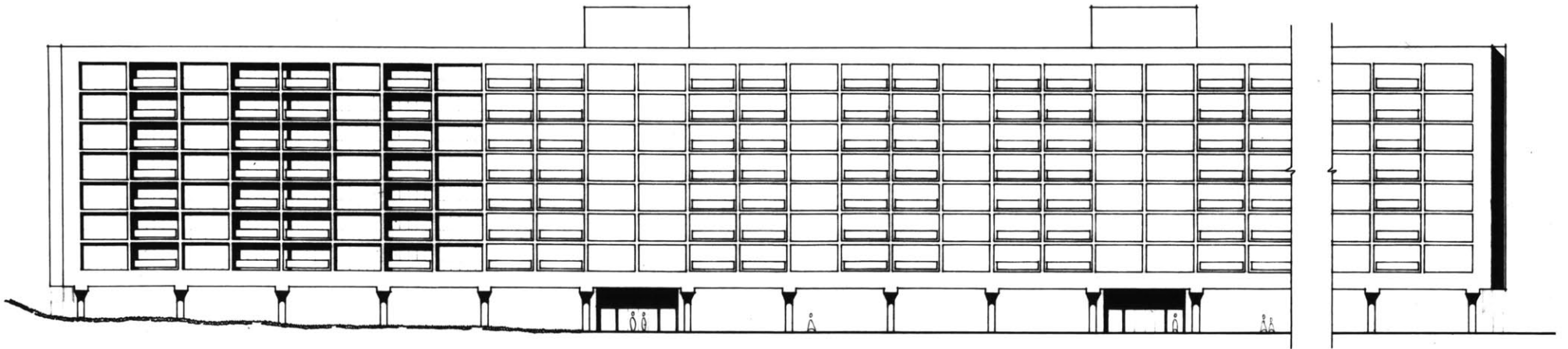
APARTMENT UNITS

F·R·P 3



ELEVATIONS

F·R·P 4



ELEVATIONS

F·R·P 5

