

HOUSING FINANCING AS AN INSEPARABLE ELEMENT OF THE BUILDING PROCESS
The Mexicali Project

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This paper will deal with the specific characteristics of housing financing, and especially with construction financing of individual houses built together as a group.

The predominant feature of the building procedure in general, and consequently in housing, is fragmentation. The architect designs what is going to be built -at best, he has a sense of construction and a consulting meeting with the future users of the houses, if known; the contractor builds it -it very rarely happens that he knows exactly what he is building, how the house ^{he builds} is going to look like; he merely follows instructions and the drawing specifications; a family will be interested in buying it; and the bank will finance both the construction and the purchase of the houses according to its own rules, with the minimum risk involved.

The relationships among these participants in the building procedure are very weak, if non existent; each one of these is operating for its own shake and its own advancement, and there is nothing that brings them together for the accomplishment of a common task, -the building of some nice houses.

Here, I am not going to analyze the causes and the consequences of the fragmented building procedure, and how the role of each one of the participants is structured within it. Mainly, I will concentrate on the role of the financial institution, and on the repercussions of the fragmentation of the building process as manifested in its policies.

The way housing is financed today determines their form, their quality, and the process followed for their construction. The control, exercised by the institutions which finance housing on their form and quality, emanates basically from the institution's concern for risk elimination, ~~and~~ reduction of the administrative cost involved, and maximization of their profits. Although all these seem reasonable concerns for an enterprise, they are so predominant and overemphasized, that there is no room left for any integration between building and its financing.

A building process, where building and its financing are integrated and unified, has two basic characteristics: (a) Both, building and its financing, beyond pursuing their own specific goals, share the accomplishment of a common goal, that has to do with the form and the quality of the houses under construction, and (b) The way each one of these gets organized and operates, is shaped by the specific needs and required accommodations of the other.

I am not going to deal further on a general level with the issue of an integrated building process, where financing facilitates and serves the accomplishment of the goals of the building process rather than determining these. Instead, I will use an example to illustrate the structure of such a housing financing procedure. It is a housing project which was undertaken by the Center for Environmental Structure (Berkeley) in Baja California, Mexico, in 1976.

THE PROJECT

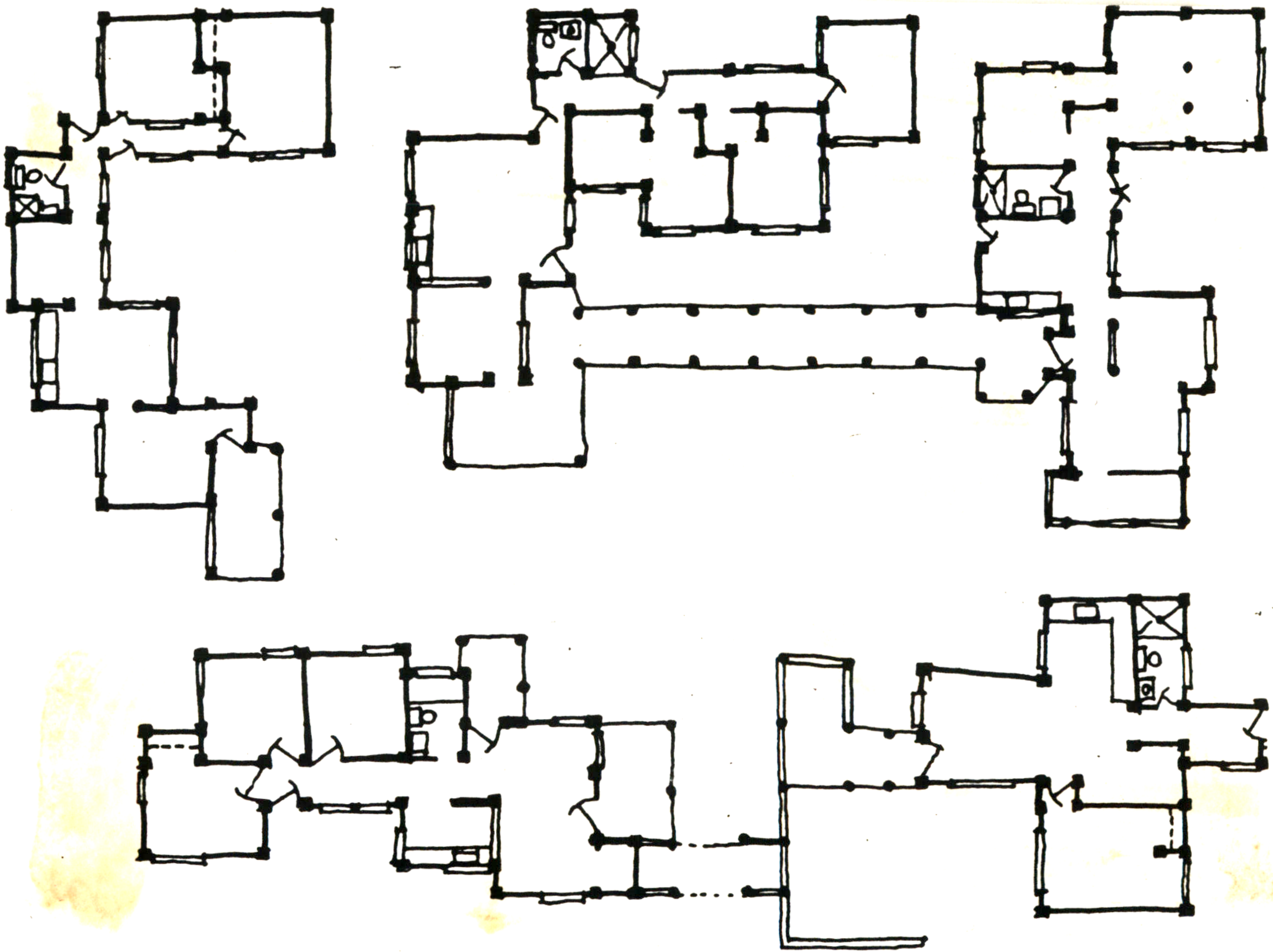
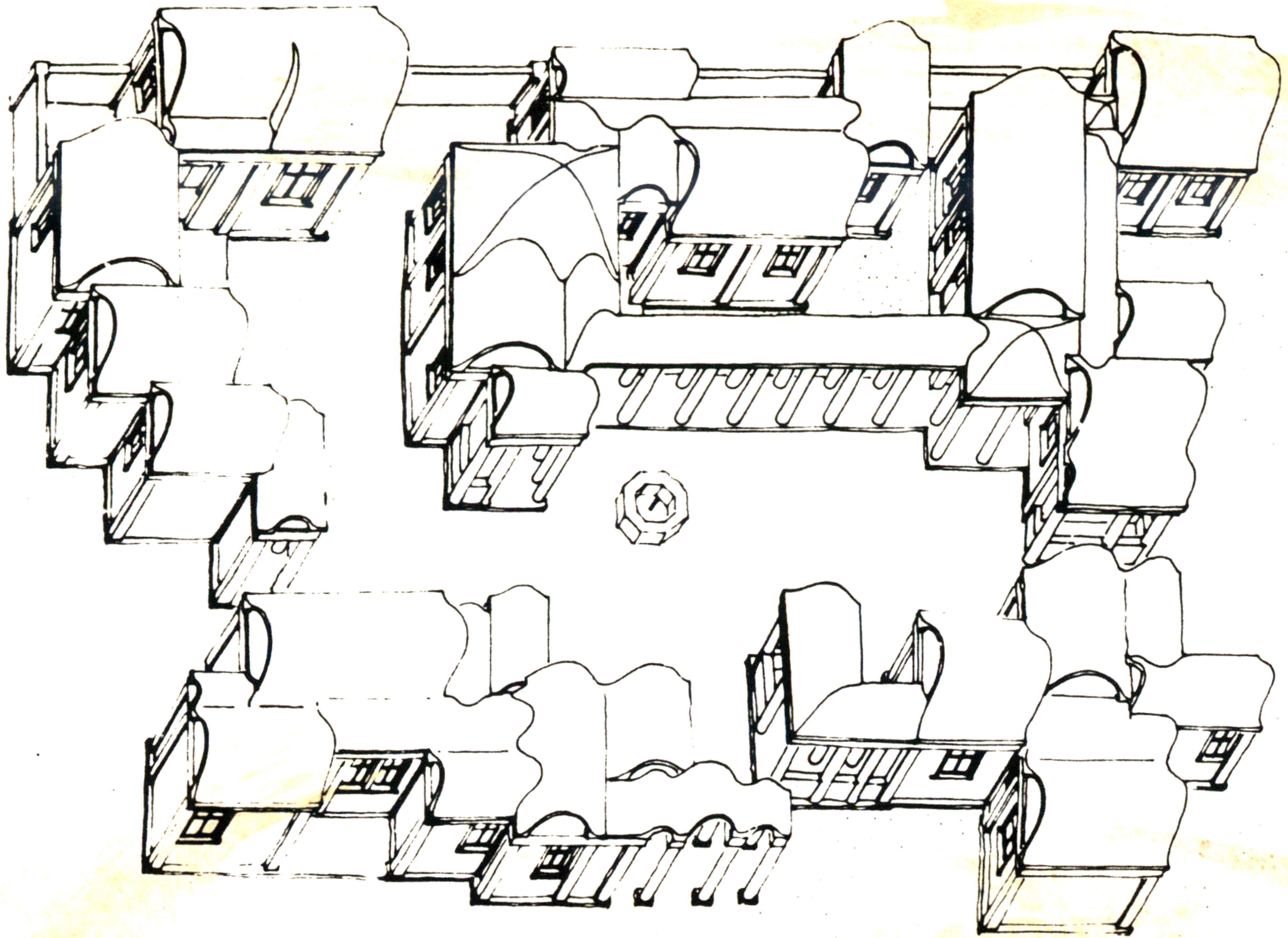
The project was to build 30 houses in Mexicali, Baja California.

The objectives of the project were:

- (a) to let the future users of the houses design and build their own houses, fact that implied a considerable reduction of the labor cost involved.
- (b) to lay-out the houses on the site together with the users, instead of designing them, fact that helped the users to visualize their houses more easily, and therefore made their participation on the design really essential.
- (c) to develop a construction system on the basis of local materials and local techniques, ~~and~~ to make it simple enough, and structure it on the basis of a clear sequence of building operations, so that it could be used easily by the families to build their houses.

The first five houses that were actually built, together with the builder's yard where the new construction system was implemented for the first time, and which was going to be used as a communal space by the families after the completion of the project, were designed and built together by the architect-contractor (The Center for Environmental Structure) and by the families.

The five houses were clustered around a piece of common land, shared by all 5 families. All the houses were designed and built according to the same principles and rules, fact that gave order and coherence in the project; however, each one of the houses was different from the others, since specific needs of each family had to be accomodated. (1)



The cluster of the five first houses

THE PARTICIPANTS IN THE MEXICALI PROJECT

1. ISSSTECALI (Instituto de Seguridad y Servicios Sociales de los Trabajadores del Gobierno y Municipios del Estado de Baja California)

ISSSTE is one of the oldest government agencies in Mexico working in the field of housing. Its programs were initiated under the office of Civil and Retirement Pensions in 1925.⁽²⁾

ISSSTECALI is the branch of ISSSTE in Baja California. All employees of public services are joined under this public union.

ISSSTECALI was the financing agency for the project, by offering a convenient loan to its members.

2. BIENES RAICES

This is a public land holding agency in the State of Baja California. This program allows the state to subdivide public land, prepare it for development, and offer it to Mexican settlers at a low price.

Bienes Raices offered 7,463 sq.mt. of land for 30 houses in Mexicali. The land was distributed as follows:

30 lots of 150 sq.mt. each; that is 4,500 sq.mt. (privately owned)
 1500 sq.mt. of common land (communally owned; every 5 houses own communally 250 sq.mt. of outdoor space)
 and 1000 sq.mt. were leased ^{for 10 years} to the Center for the development of the construction system in an experimental building, with the option to buy the land afterwards; otherwise, the land with the building will be given to the community.

Besides the land, Bienes Raices offered the Center a grant of 150,000 pesos to buy equipment and the materials necessary for the development

of the construction system and its first application on the construction of an experimental building.⁽³⁾

Bienes Raices offered the land to the families on the price of 94.48 pesos per square meter, with the restrictions that the settler could not sell the land at a profit, neither could he use it for any other purpose than housing together with small family business.

Beyond these, Bienes Raices undertook the whole development of the land; it provided for running water, sewer, electricity, and built the roads.

Both, the financial contribution of Bienes Raices for the development of the construction system, and the provision of the infrastructure at its own expenses, made possible the advancement of the project and reduced its cost at a considerable amount of money.

3. CENTER FOR ENVIRONMENTAL STRUCTURE

It was both the architect and the contractor, responsible for the design and the construction of the first five houses.

The Center organized the whole project, developed the construction system, designed and built the houses together with the families, and it was responsible for the management of the loans, issued by ISSSTECALI to the families.

4. FAMILIES

Eligibility for participation in this housing program was restricted to families whose at least one member, husband or wife, were employed by a public communal service agency.

The first five families were the following: ^(3^a)

Name	Size of Family	Monthly Income	Current Rent
Julio Rodriguez Regla	2+4	3825 pesos	0 pesos
Lilia Durant Hernandez	2+1	3467+900	500
Emma Cosio Cobert	1+10	5518	500
Jose Tapia Betancourt	2+3	3753	500
Makaria Reyes Lopez	2+2	4048+3800	0

THE STRUCTURE OF THE FINANCING PROCEDURE

As it was mentioned, ISSSTECALI, a public institution, financed the project, through the issuance of loans to each individual family. The amount of each loan was going to be approximately 40,000 pesos (\$ 3,200 in 1975 U.S dollars). That was a rather small sum of money for a house, compared with the house prices in Mexico in 1974-75, ranging from 70,000 to 120,000. ⁽⁴⁾

However, that sum of money was enough to provide for the material and some contracted labor. But, most of the labor necessary for the completion of the house had to be provided by the able-bodied members of the family; this agreement was part of the contract between the family and ISSSTECALI.

The interest on the loan was 9%, and the term was 10 years, with a down-payment close to 6%. Compared with policies on loans, common at that time in Mexico, the main advantage of the loan issued by ISSSTECALI was the considerably low down-payment compared with

20% as the usual figure. Otherwise, the interest on the loan was compatible with the prevailing figures at that time, 9%-10%, and the ^{term of the} loan could be considered as rather short, since loans were given for not less than ten years and not more than twenty (5) years.

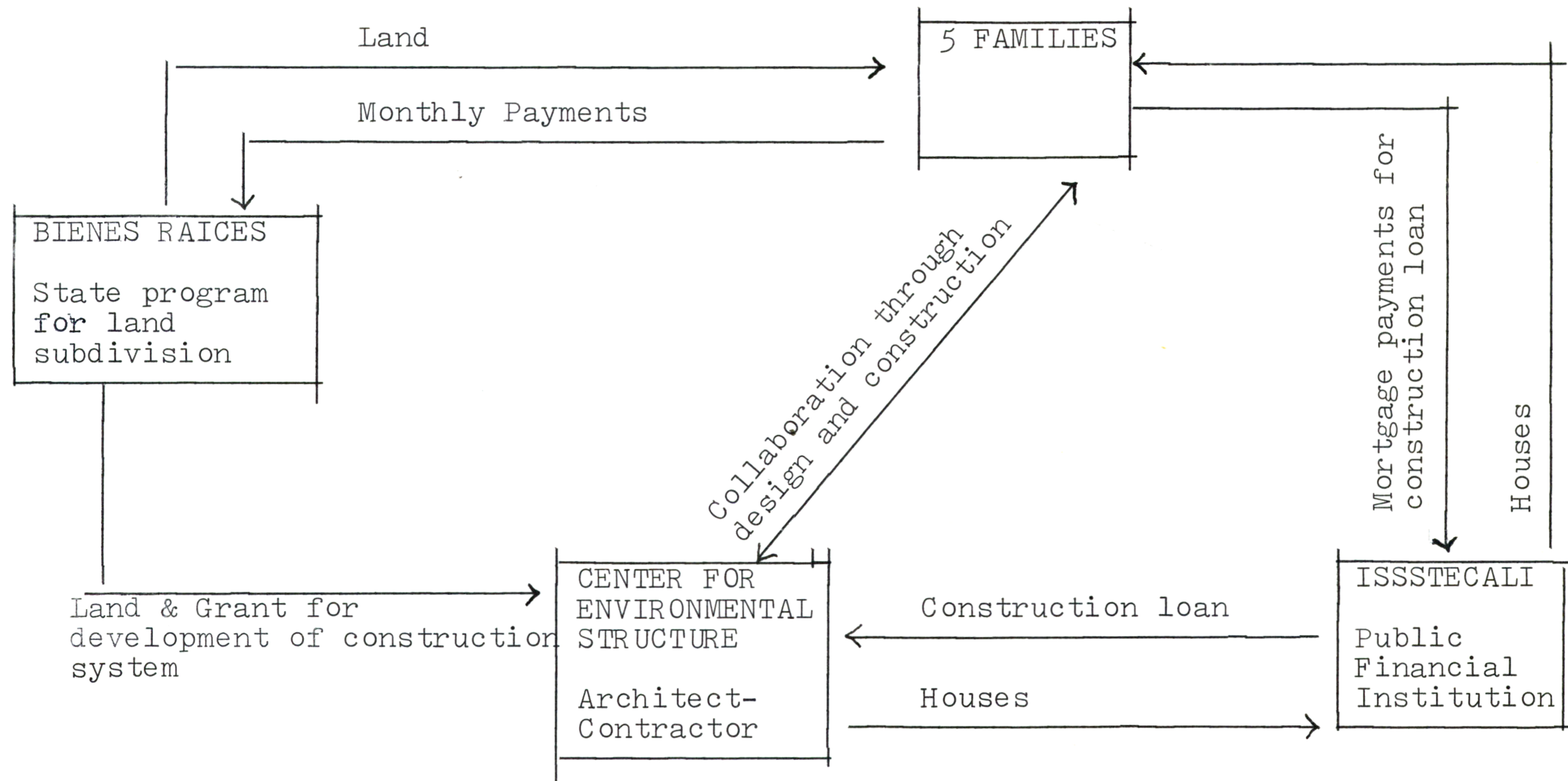
What is important is that this loan, issued at the name of the family, was managed by the contractor, and was considered for him as a construction loan for the ^{completion of a} particular house. The money were not given to the family, but to the contractor on three draws, to be used for the construction of the house.

Therefore, here there is a particular case, where there is only one loan issued for both the construction and the purchase of the house. It does not have exactly the characteristics of a usual construction loan, since it is not ^a short-term loan, ~~and~~ since it does not demand the issuance of a long-term permanent loan for its pay off; and since there is no interest accrued during the construction period however, it is used for the construction of the houses. Also, it does not have exactly the features of a long-term loan, since it is going to be given in draws to the contractor for the construction of the building.

The administration of this loan was made possible through separate agreements among the participants in the building process.

First, there was the contract between ISSSTECALI and each particular family; included that that the management of the loan issued on its name was to be managed by the contractor, ~~and~~ that they had to provide for the monthly payments, necessary for the pay-off of the loan according to the agreed upon terms, and that they had to provided for --- hours of labor weekly for the construction of their house.

THE PARTICIPANTS IN THE MEXICALI PROJECT AND THE ESTABLISHED RELATIONSHIPS AMONG THEM



Second, there was the contract between ISSSTECALI and the Center, that it had to complete the building of the houses within 10 months, it being responsible for the management of the loan and its allocation on the different materials, necessary for the completion of the houses.

And of course, there was an unwritten agreement between the families and the Center, that the families should participate on the design of the houses and should collaborate with the Center, and that the Center should meet their specific needs and requirements for their individual houses.

THE STRUCTURE OF THE FINANCING PROCEDURE IN RELATIONSHIP TO THE BUILDING PROCEDURE.

The next important thing on the structuring of the financing procedure was its adjustment to the needs of the building procedure, that was to be followed for the construction of the houses.

It was known generally that each house was going to have a floor area of something between 60 and 70 square meters, but it was also clear that each house was going to be different in size from the other, fact that would determine the amount of the loan given for each house.

Also, it was clear that there was going to be no design for each one house, that could specify its floor area beforehand, but that the houses were going to be laid out on the ground together by the architects and the families, and that only after this building activity had taken place, the floor area of each house would be specified.

Also, a need for a margin regarding the total cost of the building was expressed by the families. It was impossible for them to know in advance, in all details, what exactly the needs for their ~~house~~ house was going to be. Any additional element in the house, that was not part of the calculation in the beginning, but which would be felt to be important, would have been impossible, if a flexibility for loan adjustment was not conceded.

And besides these issues, the construction system to be used for the building of the houses was still under development.

To respond to these problems and deal specifically with them, the loan was structured on the following way.

It was issued on three steps:

1st step: ISSSTECALI makes agreement with the Center that the houses will be built.

This first step, a commitment by ISSSTECALI to issue the loans, took place after the construction system was fully developed and accepted by ISSSTECALI.

At this point, the obligation of the families, who had been chosen as the first families to participate in the project, was to pay 2,500 pesos as good faith money. Withdrawal from the project would imply loss of these money. These 2,500 was also considered as a down-payment (6.5%) for the loan to be issued.

After this agreement was made, the layout of the individual houses started on the actual site.

2nd step: ISSSTECALI issues the individual loans to each family

After the layout of the individual houses was completed, and therefore the floor area of each house was established definitely,

ISSSTECALI issued the loans, a different amount of money for each household. The amount of the loan was calculated on the basis of 585 pesos, as the cost per square meter of house.*

Consequently, the first five loans were:

	<u>M²</u>	<u>Cost of house</u> <u>585 p./M²</u>	<u>Cost of</u> <u>Porch</u>	<u>Total</u> <u>Loan</u>
Julio Rodriguez	75.2 M ²	43,992	1,346	45,338
Lilia Duran	65.5 M ²	38,318	-	38,318
Emma Cosio	84.6 M ²	49,491	1,931	51,422
Jose Tapia	73.7 M ²	43,114	-	43,114
Makaria Reyes	76.0 M ²	44,460	1,462	45,922

3rd step: Adjustment of the loan after construction was finished

The Center was responsible for the management of these loans, and therefore a detailed account of the construction material spent for each house was kept, to make sure that no excess in cost would occur for any house, beyond what was agreed upon.

However, if any family had decided to add something more in their house, in excess of what had been agreement upon, that was feasible.

ISSSTECALI provided for a possibility in adjusting the amount of the individual loans after construction had been completed, in order to allow for the needed flexibility during construction.

MORTGAGE PAYMENTS BY THE FAMILIES

Payments by the families for the amortization of the loan started after the construction of the houses was completed, and they were deducted by their paychecks every 15 days.

* It will be discussed later how this figure was established

The liabilities of each family were the following:

1) Each family was indebted to Bienes Raices for 14, 104 pesos.

This is the cost of the land; 150 square meters of land were given to each family at the price of 94.48 pesos per square meter.

The terms for the pay off of this debt were that a down payment of 1,410 pesos (10%) was required, that there was no interest involved, and that the full payment had to be accomplished within three years.

Therefore, each family had to pay 352.59 pesos monthly to Bienes Raices for three years.

2) Each family also has to accomplish the required monthly payments for the amortization of the loan issued by ISSSTECALI, for ten years. As it was mentioned before, the monthly mortgage payment is deduced by the family's paycheck in two draws, twice a month.

The economic situation of the families, at the time the project was completed was the following:

	Monthly Income (pesos)	Monthly payment in the first 3 years, to both ISSSTECALI & Bienes Raices (pesos)	Monthly payments in the following 7 years to ISSSTECALI
Julio Rodriguez	3,825	895.24 (23%) of monthly income)	542.65 (14%) of monthly income)
Lilia Durant	4,367	806.31 (18%)	453.72 (10%)
Emma Cosio	5,518	969.30 (17%)	616.71 (11%)
Jose Tapia	3,753	867.06 (23%)	514.47 (13%)
Makaria Reyes	7,848	902.64 (11%)	550.05 (7%)

It is clear that the families are worse off in the first three years than in the following seven years; however, even during the first years, although their due payments are considerably higher than the rent they used to pay (500 pesos monthly), in

no case do they exceed 25% of their monthly income. After the first three years the financial situation of the families improved remarkably, since their due payments were not higher than 14% of their income, in any of the cases.

According to financial obligations that each family has to bear, initial down payments (2,500 to ISSSTECALI and 1,410 to Bienes Raices), and monthly payments, it becomes clear that this project was not addressed to very low income families, but to families who had some savings to meet the down payments, and a steady, even low yielding job, to meet the requirements for the monthly payments.

The equity that the families have on the house in the beginning is very low, only 7.2%, because of the low down-payments required. However, ^{this} ~~it~~ is ~~only~~ the case, if the equity is estimated ^{only} on the basis of money put in and still owned by the families. But, there is one more, very important, factor to be estimated as part of the equity of the family, and this is the labor that the family has contributed for the entire construction of the house.

It was estimated by the Center that the price of labor per square meter of the house was 478 pesos, and this was not part of the loan that covered ^{only} ~~the~~ cost of the materials of the house. This labor was mainly family labor, and has to be considered as part of the real equity of the family on the house.

Therefore, if the value of each house is estimated as the total of the cost of materials (loan) and ~~of~~ the cost of labor (unpaid, provided by the families), and then estimate the equity of the family on its house, as the sum of the down-payments and the cost

of labor , the results are as following:

	Cost of Materials= (pesos) Loan	Cost of Labor (sq.mt.of houseX478)	Initial Value of the house	Initial Equity of Equity of the family	Equity of the family as % of house value
Julio Rodriguez	45,338	35,899	81,237	39,809	49%
Lilia Duran	38,318	31,269	69,587	35,179	50.5%
Emma Cosio	51,422	40,387	91,809	44,297	48.2%
Jose Tapia	43,114	35,183	78,297	39,093	49.9%
Makaria Reyes	45,922	36,281	82,203	40,191	48.9%

Consequently, the ^{real}equity of the families on their houses, at the time the houses were completed , was really high. Therefore, any assumption that the ^{initial}low equity, where only down payments are considered as such, could induce default by the families has no real basis. The real equity of the families, as it was felt by them and not according to the established rules of a financial institution, was really high, and it was built up by their labor. And there was no reason for defaulting because of a "low" equity.

ADMINISTRATION OF LOANS BY ISSSTECALI-RISKS

ISSSTECALI, in order to avoid any possibility of defaulting, adopted the policy of deducting the due amount from the borrower's paychecks.

As far as the contract with the Center concerns, ISSSTECALI, in order to avoid any risks, issued the loans after the construction system was fully developed, and gave the loans to the Center in three draws, after specified building operations had been completed. The first draw, 39% of all the loans issued for the families, 87,405 p. was given in the beginning for the completion of the operations from excavation to walls erection. The second draw, 37% of all

loans, that is 82,922 pesos, was given when slabs were already poured, for the completion of all building operations until roofing. The third and last draw, 24% of all loans, that is 53,787 pesos, was given at the time the structure of the roof was already built, for the completion of the rest of the building operations.

Compared with any usual loan, these loans assumed more administrative cost, since for one project five different loans had to be issued, and since they had to be taken care in three different steps. However, this excess in administrative cost was compensated by the better quality houses that were built.

The major risk that ISSSTECALI took was due to the fact that any delay in the completion of the construction was going to have negative repercussions only for itself.

Was the agreement that the contractor had to pay off the construction loan with a permanent loan, then any delay in the construction would imply increase of the due amount by the contractor, because of the piled up interest during construction period, and consequently increase of the cost of the houses. However, in this case there was no interest accrued during the construction period to be paid back, since the 9% interest on the loan to be paid off by the families started to be counted only after the completion of the buildings. Therefore, any delay in the construction would not affect negatively either the contractor or the families, but only the lender, since there was no interest to be accrued on the borrowed money during the construction period. The effect of any delay on the construction would mean decrease of the value of

the loan, in proportion to the rate of inflation, and therefore a loss for ISSSTECALI. However, the rate of inflation was very low at that time in Mexico, and consequently, the risk for any devaluation of the loan because of construction delay was minimum.

Although, theoretically and practically in times of high inflation, this is a major risk for any lender, it is a problem that can be dealt with legally, as part of the contract between the financial institution and the contractor.

The financing program by ISSSTECALI can be viewed as a subsidy program, not because of a low interest rate, since that was not the case, but partly because of the low down payment, and partly because of lending the money for the construction period without interest.

MANAGEMENT OF THE LOANS BY THE CONTRACTOR (CENTER FOR ENVIRONMENTAL STRUCTURE)

The management of the loans by the contractor was structured on the basis that every house was different, that there were no precise plans before construction started, and that the buildings were going to evolve and change during the process of construction. The point was that a cost control system had to be adopted that could keep the costs below certain limits, and that could permit at the same time changes, modifications and evolution to take place during construction.

The system of cost control adopted made sure that both materials and labor were paid for in a way that was exactly parallel with the system of operations that constituted the building process, and was controlled essentially by its relation to the steps of

the process, step by step. (7)

The basis of the cost control system was the precise estimation of the quantities and prices per square meter of each operation, and the close connection between the operations and the cost accounts.

This is how the system of cost control was organized.

First, each operation was counted in some specific system of units. For example, slabs were measured in m^2 , foundations in m^1 , doors by the number, windows in m^2 .

Second, by rough statistical analysis it was established the maximum of ~~the~~ each one of the operations per square meter of the house. Through this number the necessary quantities for each operation were controlled; for example, given that the statistical maximum for walls allowed per square meter of the house was estimated to be $0.97m^1$, in any house there should be more walls than $0.97 \times$ square meters of the house.

Third, the material price per unit of operation was figured out from the local construction market, and on the basis of this, the cost of each operation per square meter of the house.

On the basis of these, a list of operations to be followed during the construction process was made, with the statistical maximum of unit of each operation allowed per square meter of the house, and with the price of each operation per square meter of the house; and as a result the total price per square meter of the house was estimated to 585 pesos per square meter.

The following is the chart that was used by the contractor for cost accounts and management of the loans.

TABLE OF OPERATIONS (8)

Price and maximum allowed quantities in 1976 pesos

OPERATION	UNIT	MATERIAL	STATISTICAL	PRICE/	PERCENTAGE
		PRICE/ UNIT A	MAXIMUM OF UNIT ALLOWED PER M ² of HOUSE B	M ² OF HOUSE C=A×B	
1. Layout and tools	1	2 800		42	7
2. Excavation	M ²	8.3/M ²	1.00	8	1
3. Corner stones	#	26.6@	0.53	14	2
4. Wall fountation	M ¹	19.2/M	1.05	20	3
5. Slab preparation	M ²	9/M ²	0.77	7	1
6. Underslab Plumbing	1	600		9	2
7. Slab	M ²	18/M ²	0.77	14	2
8. Columns	#	41 @	0.53	22	4
9. Walls	M ¹	93/M	0.97	90	15
10. Door Frames	#	120 @	0.08	10	2
11. Perimeter Beams	M ¹	30/M	1.10	33	6
12. Roof Basket	M ²	38/M ²	1.00	38	6
13. Gable ends	#	112 @	0.08	9	2
14. Electrical Circuits	rooms	110/room	0.10	11	2
15. Roof first coat	M ²	66/M ²	1.00	66	11
16. Roof top coat	M ²	44/M ²	1.00	44	8
17. Window frames	M ²	121/M ²	0.18	22	4
18. Windows	M ²	windows 148/M ²	0.18	27	5
19. Doors	#	250 @	0.08	20	3
20. Plumbing fixtures	1	3 300		50	9
21. Electrical fixtures	rooms	85/room	0.10	8	1
22. Painting	M ²	10/M ²	1.94	19	3
23. Paving	M ²	20/M ²	0.30	6	1
				585 pesos/M ²	

Through this system of cost control, ^{the need for} a separate estimation of the cost of each house was overcome, fact that would lead to a great complexity because of the variety among the houses.

This same set of figures, in slightly more elaborated form, were used as the basis for the cost control system.

Each building operation was controlled very carefully before it happened through a careful system of material distribution and through a detailed accounting system.

As concerning the allocation of materials, two days before the start of a particular operation materials order sheets for that operation were distributed to each group of builders. These order sheets included a list of the total materials required, along with the limits of those materials based on the statistical maximum of unit of operation allowed per sq. mt. of the house. The amount of materials actually needed was calculated from the building itself. If this calculation exceeded the statistical maximum for that operation, then the family had one of the following two choices; either it had to reduce the amount of that particular operation, or request excess, and pay for it additional to the loan.

The materials were purchased in bulk, and distributed to the families according to the requisition sheets.

As far as the cost accounting concerns, each operation for each house was recorded in detail in separate accounting sheets.

The following is an example of cost analysis for wall operation.

(9)

COST ANALYSIS FOR WALL OPERATIONUnit of measure M¹Typical house requires 0.97 M of wall per M² of roof

COST ESTIMATE/ALLOCATION

Materials/M of wallLabor/M of wall

<u>Materials</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Price(pesos)</u>	Unskilled 2.1 hrs/M of wall @ 20 pesos/hr
Blocks	27/meter	2.8 p/block	76.9/M	Skilled — @ 35 pesos/hr
Fill	.076m ² /M of wall	140p/M ²	10.7/M	
Rebar	17/M of wall	1/3p/M of wall	<u>5.7/M</u>	

TOTAL = 93.3p/M of wall

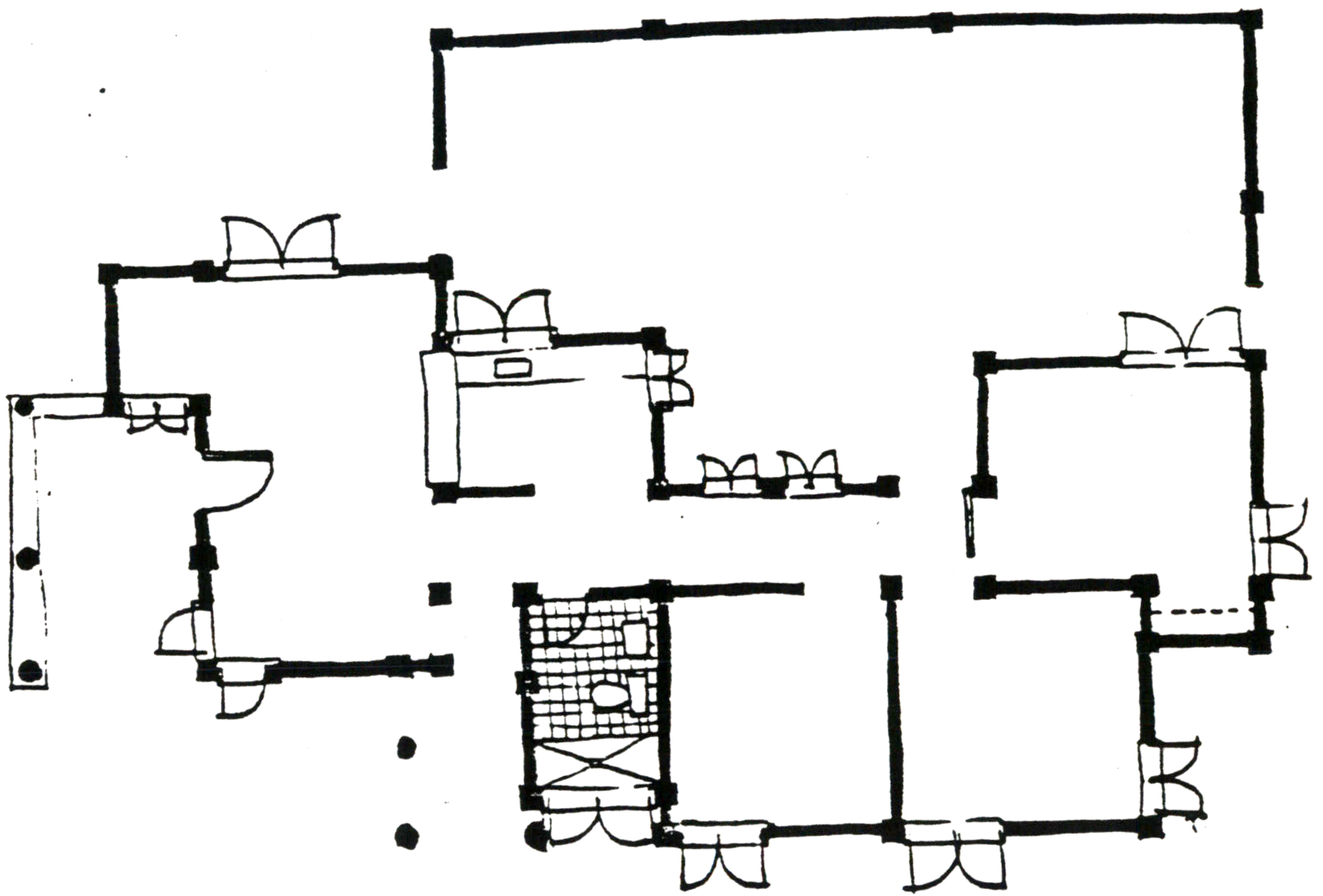
TOTAL = 42 pesos/M of wall

TOTAL MATERIALS AND LABOR = 135.3 pesos/M of wall

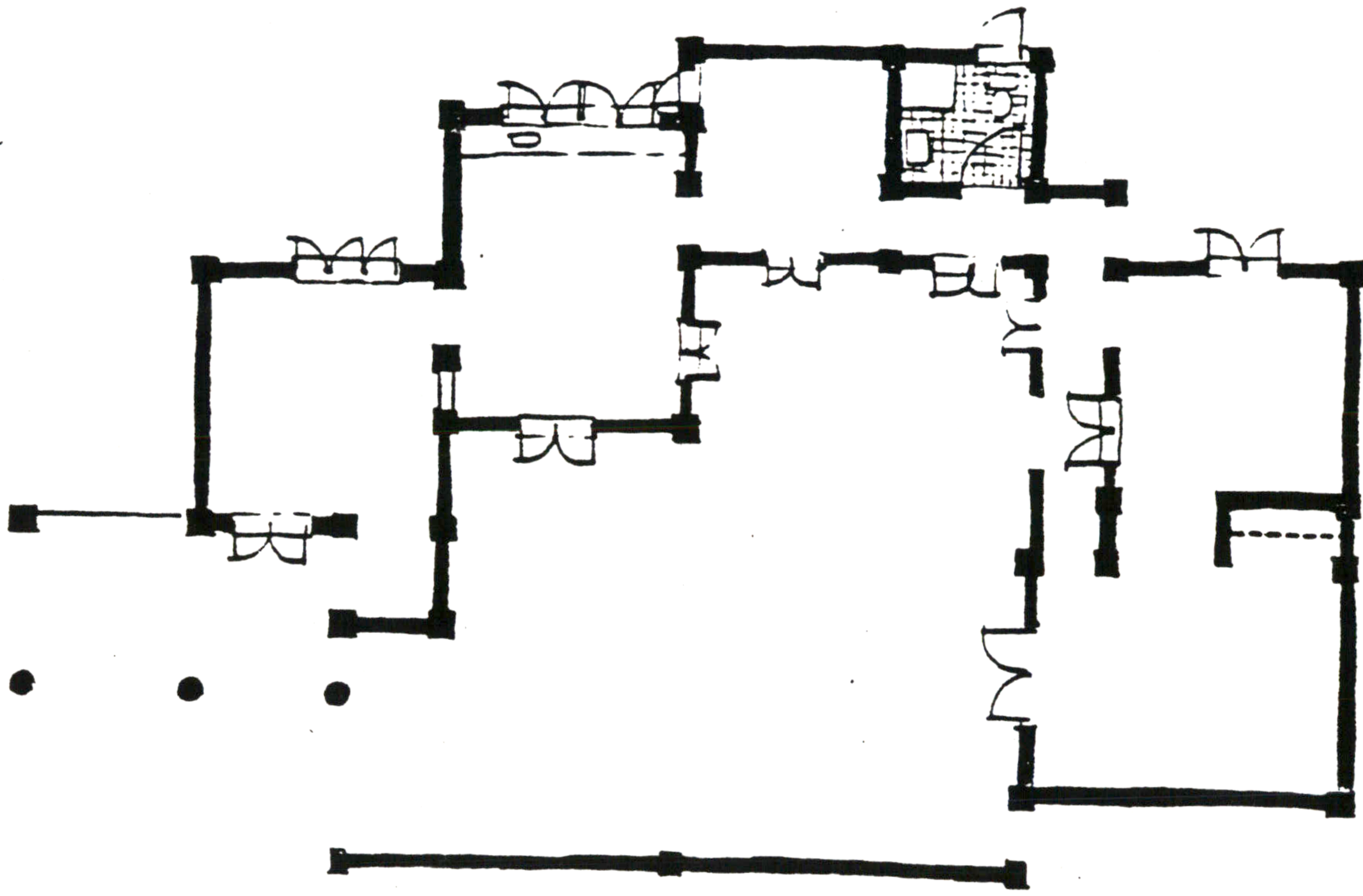
	Max. Allowed Length of walls (M)	Extra Walls	Funds Allocated for Materials	Funds Spent	Skilled Labor Required	Unskilled Labor Required	Actual Labor Used
House 1 (73.7M ²)	71.5		6,671 pesos			3,003 pesos	
House 2 (84.6M ²)	82.1		7,660			3,448	
House 3 (76.6M ²)	73.7		6,876			3,095	
House 4 (65.5 M ²)	63.6		5,934			2,671	
House 5 (75.2 M ²)	72.9		6,802			3,062	

The way ISSSTECALI financed the project in Mexicali is a clear example of how financing and the building process can be structured so that they collaborate closely for the achievement of a common goal. ISSSTECALI adapted the policies concerning the issuance of the loans to the requirements of the building process, that asked for variety among the individual buildings, layout of houses instead of advanced detailed design, ~~and~~ development of a new construction system, and flexibility for modifications and changes in the houses during construction. And the architect-contractor, had to assist ISSSTECALI on its attempt to make this bulding process really work, by developing a simple system of cost control and,at the same time, a secure system of loan management.

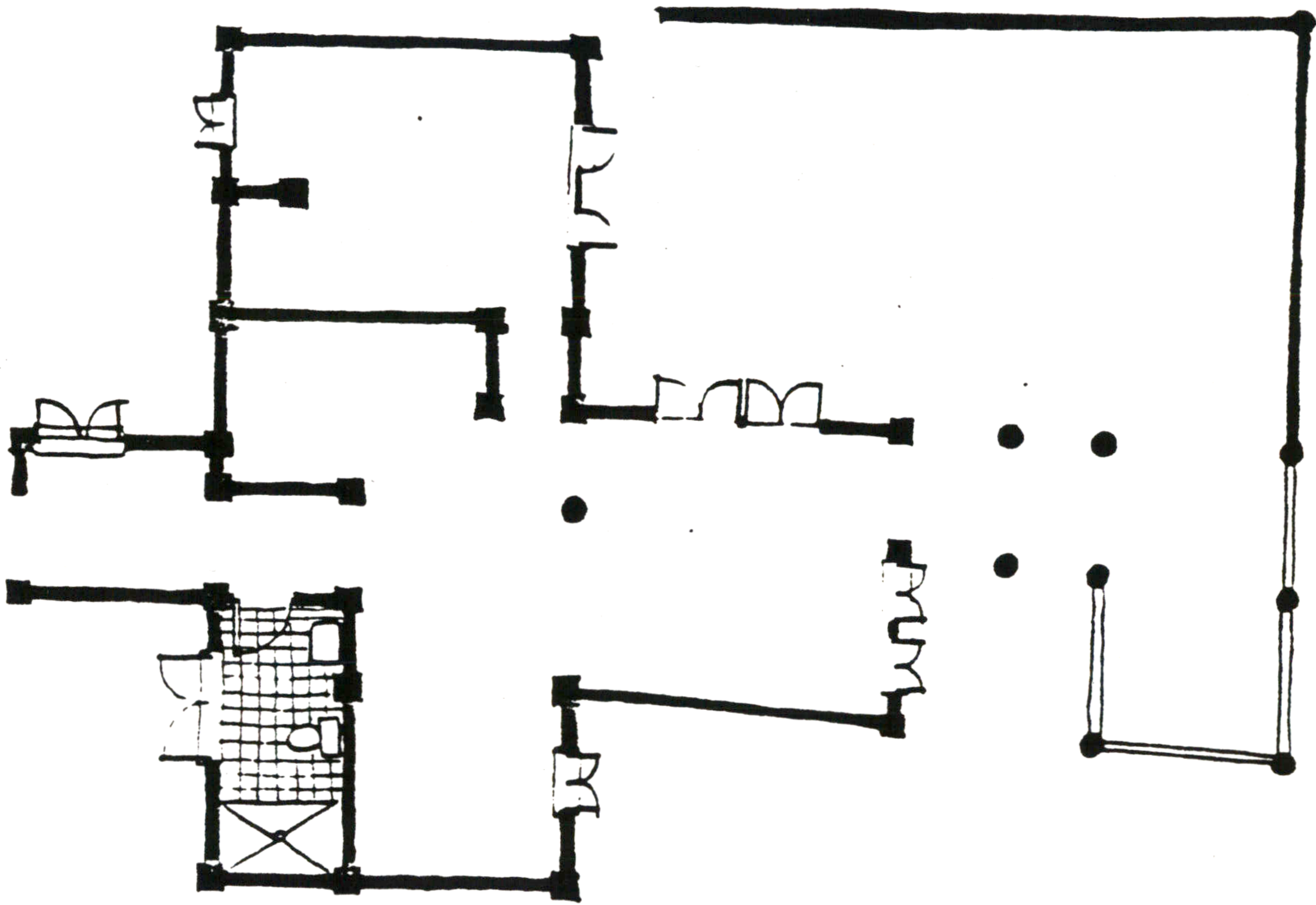
Of course, the attempt to unify the financing and the building process is not a goal by itself, but a means for the improvement of the environment and for the creation of human and healthy housing areas.



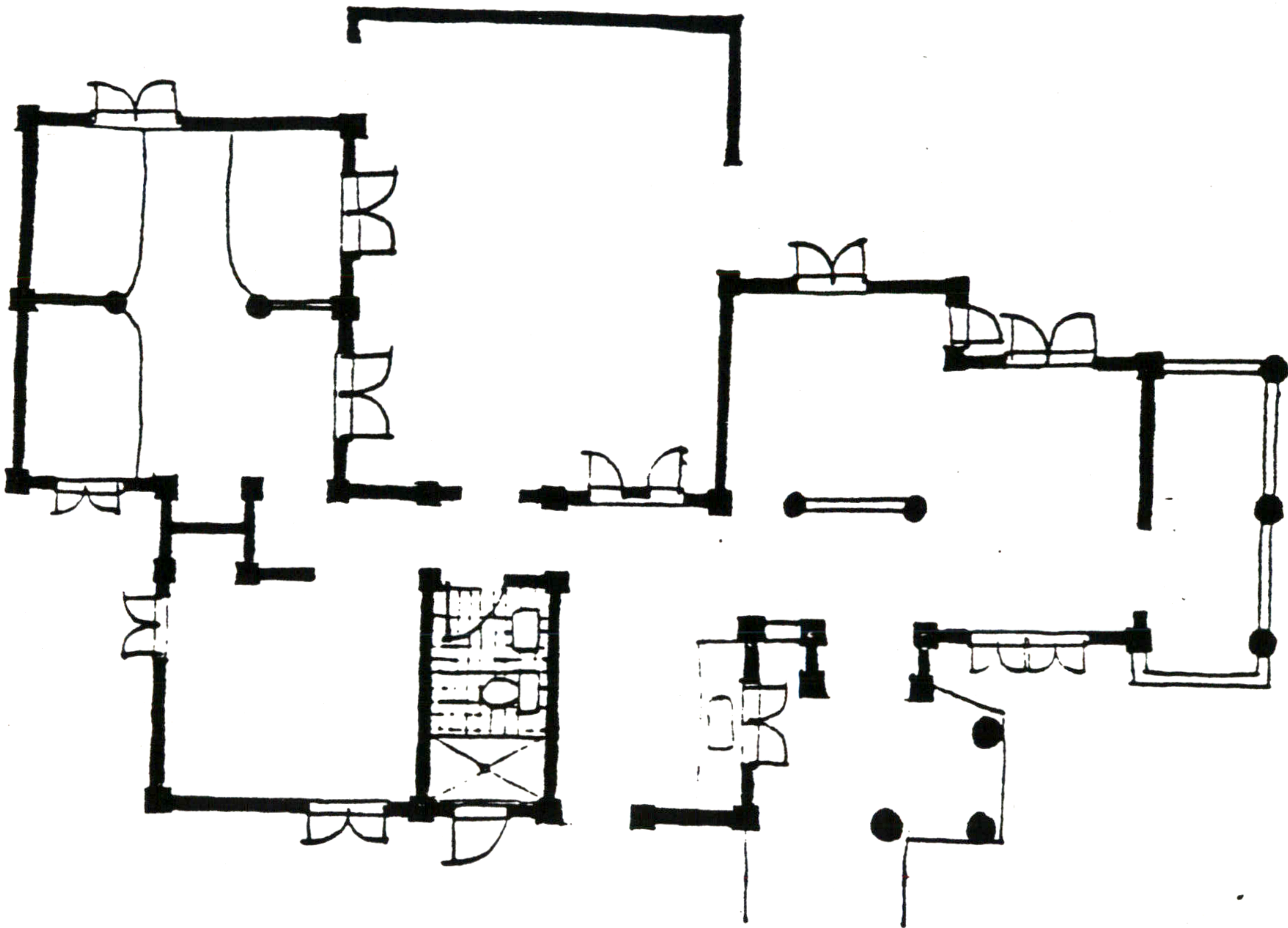
House of Makaria



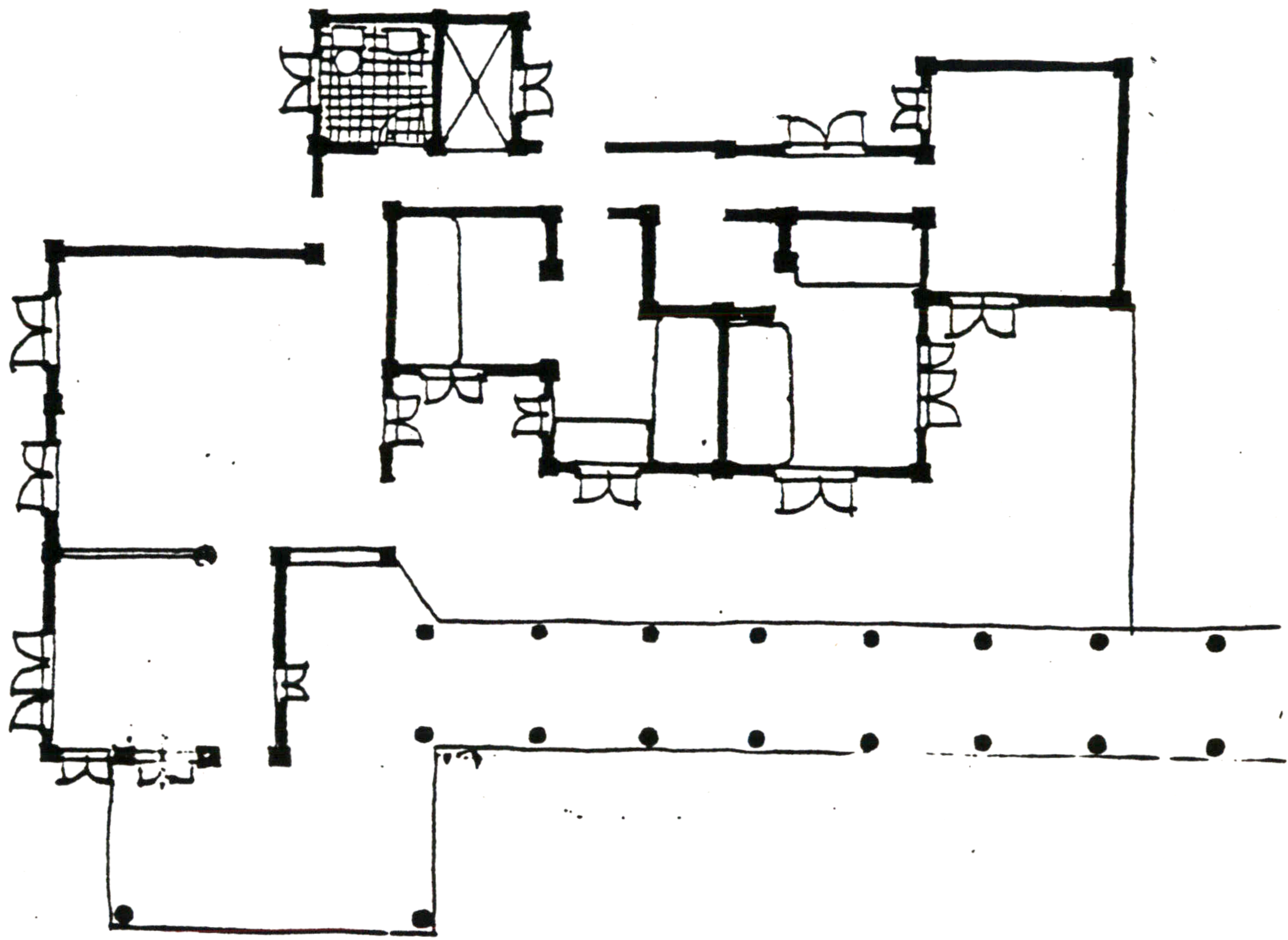
House of Jose



House of Lilia



House of Julio



House of Emma

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- (9) ibid.