Family houses at West Ham : an account of the project with an appraisal.

MINISTRY OF HOUSING AND LOCAL GOVERNMENT

DESIGN BULLETIN

15

Family houses at West Ham

an account of the project with an appraisal

LONDON HER MAJESTY'S STATIONERY OFFICE

PRICE £1 0s. 0d. NET

CI/SfB
812 (A3)

UDC
728.1: 72.011

5fB (98)

MINISTRY OF HOUSING AND LOCAL GOVERNMENT

Family houses at West Ham

an account of the project with an appraisal

LONDON HER MAJESTY'S STATIONERY OFFICE 1969

SBN 11 750002 X

Contents

ABSTRACT

This bulletin contains an illustrated account of the development and appraisal of a housing project which was undertaken to gain practical experience in the application of the recommendations contained in 'Homes for today and tomorrow' (The Parker Morris Report).

The introductory section states the aims of the project; it sets out, in tabular form, itemised summaries of Parker Morris recommendations, findings from the social study, design implications, design decisions, appraisal findings, and outlines the lessons learned.

Part 1 deals with the design and construction. It discusses the implications of the social study, site and density requirements; traces the development of the site layout and house plans, and describes the construction, heating, and costing procedures.

Part 2 gives an account of the appraisal of the project after a year or so in use. It describes tenants' reactions to the higher standards and amenities provided.

13 appendices give detailed information on specific aspects of the project.

THE RESEARCH AND DEVELOPMENT GROUP

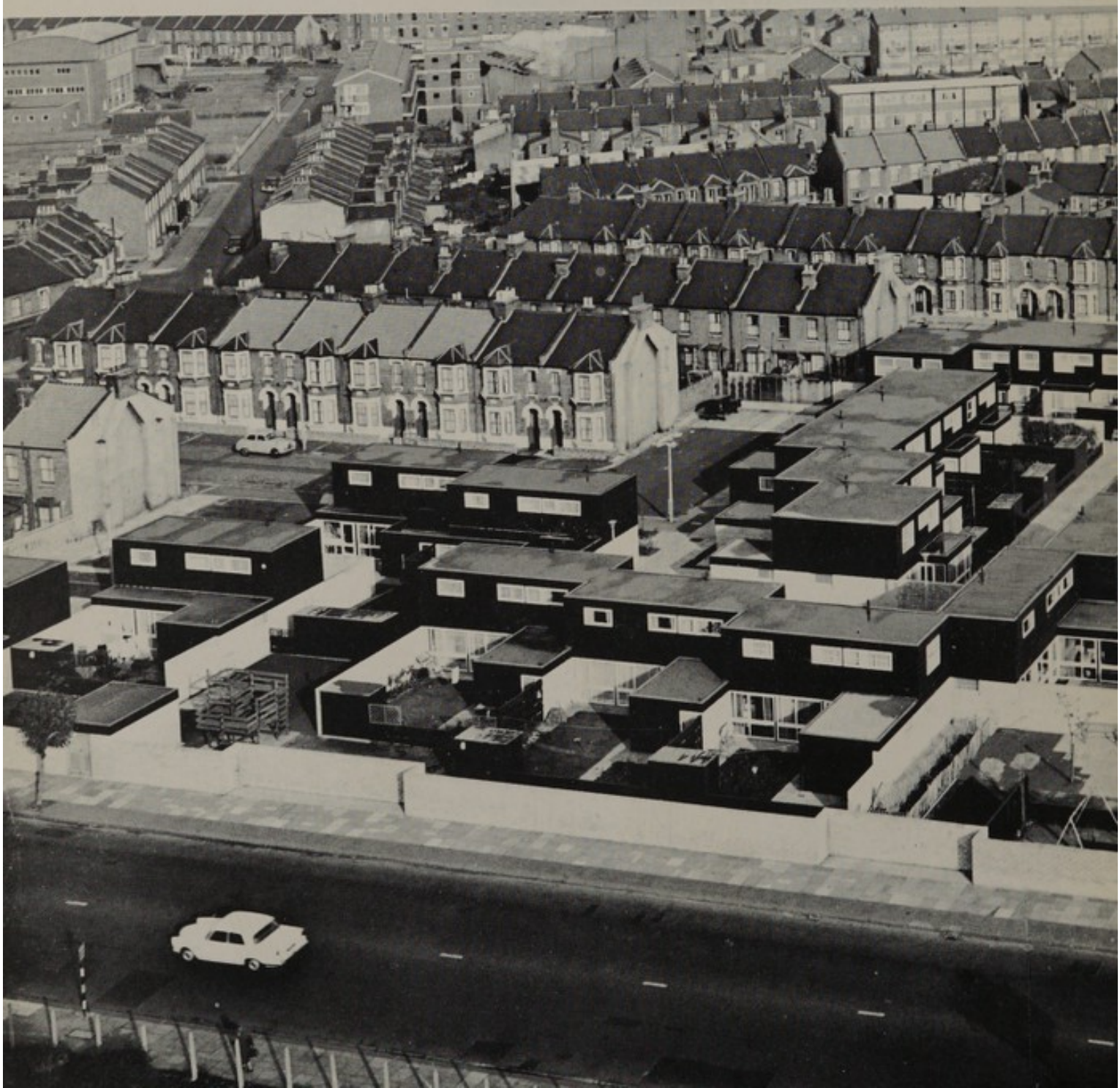
This bulletin is the second of a series dealing with development projects designed by the Ministry's Research and Development Group.

The Group is a team of architects, sociologists, quantity surveyors and administrators, reinforced by other specialists as necessary. One way it operates is by carrying out building projects for local authorities.

The Development Group is commissioned as the authority's architects and paid fees at the normal R.I.B.A. scale. But the Ministry provide funds to enable the Group to investigate user needs, technical problems, and alternative solutions in greater depth than is practicable in the normal contract, so that this knowledge may then be passed on to others.

A project is a continuous process. Each stage reflects the previous ones. Generally the process follows the stages: survey - brief - design - build - appraise. For the West Ham project the process is traced in a single bulletin.

The object of project bulletins is to help local authorities or private developers embarking on similar schemes, by describing the problems they are likely to meet, how the Development Group met these problems, and the lessons that have since been learnt.



Project house types

House type	Description	Number of each house type	Floor area	
			Parker Morris recommendations	Project*
4P	four-person two-storey patio with built-in garage	3	800	833
5P	five-person two-storey patio	13	910	912
** 4Z	four-person two-storey terrace, with built-in garage	8	800	880
5Z	five-person two-storey terrace	3	910	957
6Z	six-person two-storey terrace	8	990	1009
**6Z3	six-person three-storey terrace with built-in garage	4	1050	1202

* Exclusive of average storage space of 58 sq ft against Parker Morris recommendation of 50 sq ft.

** To well above Parker Morris minimum space standards.

Introduction

1. This bulletin describes a project of 39 houses designed for West Ham Borough Council. The architects for the scheme were the Development Group of the Ministry of Housing and Local Government.

2. The general purpose of the West Ham project was to carry out a housing scheme to Parker Morris standards* with a variety of house types, at a high density; to find how the houses worked out in practice; and, within an acceptable cost limit, to explore the greater freedom implicit for designers. As most families live in houses, not flats, the project was limited to family houses.

3. Occupation of the houses was completed early in 1964, and after they had been occupied rather over a year an appraisal survey was carried out.

Aims of the project

4. The major aim was to study the implications of the Parker Morris recommendations as a whole. These recommendations may be very briefly summarised as:

> enough space for all the family's activities, for privacy, quiet, satisfactory circulation, easy housework and storage, to standards based not on room sizes but on minimum overall dwelling size related to the size of the family; adequate heating; more attention to safety, children's playspace, sound insulation and provision of electric sockets; and planning for cars on the basis of one car per dwelling.

5. The Committee recognised that these proposals would cost more money, but believed that enough people were ready to pay more for a better house. It can be said at once that for West Ham the project bears this out.

6. Besides testing the Parker Morris recommendations as a whole, the project had a number of specific aims. Some of these were derived from the report, others were to satisfy user requirements revealed by preliminary social study. They were:

(a) to build some houses with floor space well above the recommended Parker Morris minima;

(b) to plan for flexible distribution of floor space;

(c) to provide two living areas, one adjacent to the kitchen and one that could be cut off from the rest of the house;

(d) to evolve an economical heating system up to Parker Morris standards for the living areas.

7. The important question of the density of the project is discussed separately in paragraphs 83 to 88.

8. At all stages of the design particular attention was paid to the cost implications.

Social study

9. At the start of the design stage a social study was carried out. Its aim was to discover how the kind of families to be accommodated used houses similar in size to those being planned. Leisure activities and the effect of such social changes as television and increasing homework were particularly studied. The findings as they came out were incorporated into the brief.

Summary of the project

10. The table on the following pages sets out in summary form the principal decisions in carrying out the brief, along with:

> the relevant Parker Morris recommendations;
>
> the relevant findings from the social study;
>
> the implications of these findings for the brief;
>
> the relevant appraisal finding.

11. The project house types referred to in the table are shown opposite.

---

* The improved standards for new houses recommended in 'Homes for today and tomorrow', the report of the Parker Morris Committee (HMSO 1961, 4s). This report, prepared by a subcommittee of the Central Housing Advisory Committee under the chairmanship of Sir Parker Morris, was the outcome of some two years' examination of current housing standards, private and public.

	Parker Morris recommendation	Finding from social study
General	Enough space for all family activities, both in houses and flats. Floor areas larger than the recommended minimum will often be called for and should be encouraged.	Not enough space.
Kitchens	Kitchens must be designed for efficient working, with adequate storage space (80 cu ft for family houses).	The most criticised rooms. Over half complained about some design feature or about the lack of space. Kitchens found to be too small averaged 100 sq ft. Complaints were of not enough room for refrigerators and washing machines or (where they were used as dining kitchens) for family meals. Other faults found: back-doors opposite the neighbours'; no direct access from kitchen to dining room or kitchen to garden. Over a quarter complained of too many cupboards - perhaps because they take up space needed for other things.
Living rooms	The living area should provide both for the family to gather together and for its members to carry on their separate pursuits.	Over a quarter of families with two living rooms did not use the dining room regularly because they found it too small or difficult to heat; or did not use the sitting room regularly because they kept it as a parlour. Many small families preferred one living room because it was easier to clean and heat. But most larger families, especially with young children, preferred two living rooms: over half expressed this preference.
Bathrooms	In two- or three-storey houses at or above the minimum floor area for five persons, two w.cs. are required, one of which may be in the bathroom. Where a w.c. compartment is not adjacent to the bathroom, a wash basin should be installed.	One-third only washed in the kitchen. Complaints were, mainly: bathroom too small, handbasin too small, bath discoloured.

Design implication	Design decision	Appraisal finding
This criticism, with the income figures in paragraph 43, suggested that tenants would not take kindly to minimum living spaces. Some might be moving from houses larger than Parker Morris standards.	Of the six house types finally evolved, one had virtually the same floor space as the Parker Morris minimum; three were 2% - 5% larger; the other two 10% and 14% larger.	Tenants were generally pleased with the amount of space though (as appears below) they had reservations about space in some individual rooms.
Tenants were likely to consider a kitchen less than 100 sq ft too small even if well planned and not meant for meals. They would probably already possess the major articles of domestic equipment and would buy additional items by degrees. Kitchens should be attractive for the housewife to enjoy spending her average six hours a day in.	Kitchen space allowed for common household appliances and others that might become common. In the two-storey Z houses the kitchen was 92 sq ft, with 65 cu ft of storage space in the fittings, and 12 ft of shelving for other pieces of equipment; in the three-storey Z houses 89 sq ft and storage space 77 sq ft with 12 ft of shelving. In the 4P houses 66 sq ft; in the 5P houses 89 sq ft; storage space: 69 and 84 cu ft respectively, with 12 ft of shelving.	Nearly all housewives found their kitchen convenient to work in and had space for a refrigerator and washing machine. In all Z houses the kitchen was large enough, but housewives in 4P and 5P houses found it too small for serving some meals. In all house types storage space was insufficient particularly for pots and pans.
A kitchen at the back leading to the garden without going through a living room was likely to be popular although this must be reconciled with the recommendation made in Design Bulletin 13 'Safety in the home' that the working area of the kitchen should preferably be designed as a cul-de-sac. Even in houses with a second living room suitable for eating in, the kitchen would probably be used for some meals and should be planned accordingly.	Kitchens were placed looking out on to the garden. In the P houses access to the garden was through the dining room, the kitchen being a cul-de-sac. In the 23 Z houses access to the garden was through the kitchen. In the two-storey Z houses kitchen and dining room were connected by an open hatch above a counter top on which snacks could be served; and space was provided for a small table for meals.	Access to garden through kitchen preferred.
Smaller families would be satisfied with one living room and a dining kitchen; larger families would want two living rooms. A main living room of about 150 sq ft was reckoned generally satisfactory. With two living rooms, both ought to be capable of being shut off but one must be. Both should preferably be large enough for the whole family at once. In houses without a ground floor bedroom the second living room might occasionally need to be used for someone who was ill or an elderly relative who could not climb stairs. It should be designed with that in mind.	Two-storey houses were planned with two ground floor living rooms, one of them a central dining area. In the three-storey houses the living room was on the first floor.	The smaller dining area in the P houses was 'only just big enough'. The living room was kept mainly for adults and television. Some housewives, mostly in the 5P houses, felt the living room could have been larger. Having the living room on the first floor in the three-storey houses was not disliked but the narrowness and the 'L' shape made it difficult to furnish.
Bathrooms under 48 sq ft might be found too small. A large handbasin and somewhere to hang clothes should be provided.	The P houses had bathrooms 41 sq ft, the Z houses 51 sq ft, the 6Z3 houses 60 sq ft. All except the 4P houses had a second w.c. on the ground floor with a wash basin.	The arrangement of the P house bathroom was criticised as too cramped. The others were satisfactory. The tenants of the 4P houses would have liked a second w.c. in place of the broom cupboard.

	Parker Morris recommendation	Finding from social study
Bedrooms	The minimum bedroom provision for a family of four is two double rooms, but adolescent and adult children should preferably have a room each.	One third complained of lack of space. Larger families wanted additional bedrooms. Bedrooms (average 75 sq ft) also criticised for being too small: several were being used as bedrooms for two children.
Heating	After more floor space the first priority is for better heating. The minimum standard should be an installation capable of heating the kitchen and the area used for circulation to 55°F and the living areas to 65°F, when the outside temperature is 30°F.	Inadequate heating produced about the same amount of complaint as insufficient space. Chief grievance was lack of any heating in dining rooms. The efficiency of the open fires in living rooms and the slow combustion stoves in kitchens was criticised; so were the looks of the stoves.
Decoration	None.	Most houses had been wallpapered throughout by tenants. All living rooms, most stairs and some bedrooms were carpeted. Home decoration was high on the list of tenants' hobbies.

Design implication	Design decision	Appraisal finding
Over half were likely to prefer one double bedroom with the rest single. About a quarter of these families included an adult relative, but most of the need came from grown-up children. Thus single bedrooms for everyone but the married couple seemed desirable even though this was above the Parker Morris minimum.	This was done. Two-storey Z houses had one double and two single bedrooms upstairs with a demountable partition between them. Two-storey P houses had two double bedrooms, one of them partitionable. Main bedrooms were from 116 to 126 sq ft, single bedrooms from 42 to 116 sq ft.	Size and shape of all bedrooms satisfactory except partitioned rooms in 5P houses. The partitioning in general worked well.
In just over half the families (of all sizes) a downstair bedroom would either answer a real need for an elderly person or could be used for another single person over 15. If, however, half the houses were built with a downstair bedroom it was likely that they would not be thought suitable for all stages of the family cycle, particularly when all children were small.	Most houses had a separate or partitionable downstair bedroom.	Downstair bedrooms raised problems of night ventilation. Those with demountable partitions tended to be noisy. Nine housewives disliked the idea of a bedroom on the same level as the living area (see paragraphs 266 to 269).
Where there was to be only one living room at least one of the bedrooms other than the double room should be usable for studies or hobbies.	All bedrooms were designed to take a chair or desk for homework etc.	
Special attention would need to be paid to the design of bedrooms under 75 sq ft if tenants were not to find them too small.	One 42 sq ft cabin bedroom formed by subdividing second double bedroom in the 5P houses.	Considered very cramped.
Heating need was for background heating with the possibility of a rapid warm-up.	As part of the higher standards bedrooms in the 4Z houses were provided with 2KW storage heaters.	Three out of the eight were not used.
Tenants would prefer a more effective heating system to open fire and boiler, and would be able to pay extra for their heating. They would not at present expect this improved standard of heating upstairs. As at least half the housewives were likely to go out to work, a mechanically operated system with a rapid warm-up would be appreciated. Tenants would want constant hot water.	Electric block night storage heaters with controlled output were installed.	Heating efficiency varied between house types. Almost half the tenants were dissatisfied with the heating system. In the Z houses there were complaints about the instantaneous gas water heaters, which were 'too small' and stained the ceiling.
Tenants were likely to undertake a good deal of home decoration and improvement themselves. They would want wallpaper, and not the cheapest, on all walls except perhaps bathroom and kitchen where they would want more protection such as tiles.	Walls were finished with water paint.	Many walls were papered by tenants.
Whatever floors might be laid, they would probably carpet the living rooms and staircase immediately, possibly with fitted carpets.	Downstair floors, which were most likely to be covered by carpet, were laid with black thermoplastic tiles; the living room was laid with a lighter coloured tile. Flooring upstairs was of softwood T & G boarding.	Large areas of flooring, especially in living rooms, covered by carpet or lino. Tenants disliked the dark colour of the floor tiles and the difficulty of keeping them clean.
Thus any expenditure above that required to produce simple, clean internal finishes could not be justified.		On the whole, confirmed that minimum outlay on initial decoration was sensible economy.

	Parker Morris recommendation	Finding from social study
Garden	Any call for large gardens is declining. Where gardens are small, as they may well be when houses are built at densities which in the past have usually called for a proportion of flats, it will be important to plan for children's playspace nearby. In all gardens arrangements are required which will ensure a reasonable degree of privacy.	The study produced little new information. Six back gardens and eight front were uncultivated. All housewives used the garden for drying clothes, 31 said gardening was a hobby, 28 sat out in fine weather, 26 used it for children's play, 16 for pets, 13 tenants grew vegetables. Children over 11 did not play much in the gardens. A few gardens had play equipment such as swings or paddling pools. Several mothers mentioned lack of convenient, safe,parks where children could go without crossing main roads.
Cars	Estates should be planned from the start on the basis of one car per dwelling. The visual effects of this must be carefully considered.	Seven families out of 39 owned a car. All kept them in the street, but six of the seven said they would prefer to rent a garage and some were on the Council's waiting list for garages at 16s. 6d. a week.
Traffic	None.	Besides the social study a short traffic study was carried out into the effect of traffic noise etc.,on families then living on the site.

Design implication	Design decision	Appraisal finding
All tenants would probably want a private garden to cultivate and would prefer one with more privacy than was usually found in West Ham. A garden would be important for children's play in their pre-school years and would sometimes be used by children between five and ten but probably not beyond ten.	Small private gardens (varying from 248 to 520 sq ft) behind the houses, and a small plot in front for planting were provided. The central open space, roughly half an acre, was ringed by the houses and the Beckton Road wall and cut off from outside to ensure exclusive use to the tenants and safe playspace for their children. It was planned, paved and laid out for play, prams and sitting out.	They were used chiefly to dry washing and grow flowers. Many tenants found them rather small for effective gardening and not private enough on the open-space side. Without other open space nearby to attract some of the children, the central open space was too small. There were more older children than expected, so the landscaping was inappropriate; the play area, though safe, was over-used, and play was noisy. There was also a misunderstanding about who should be responsible for maintenance.
Between a quarter and half the families were likely to have cars, and most would want to rent a garage. The carless families would be likely to acquire cars at a quicker rate than the national increase. The amount of parking space would be fixed by the standards adopted, but actual provision of garages would be adjusted to the needs of the moment.	20 garages and 19 hardstandings were provided. Of the garages 15 were built-in and 5 grouped. Of the hardstandings 7 were in front of the houses and 12 grouped.	All car-owners without built-in garages would have preferred them. A 1:1 provision of garages was not required at the time of occupation, but some provision for visitors' parking would have been useful.
For reasonable living conditions tenants would need protection against vibration, noise, dirt and traffic dangers.	A 6ft high brick wall was built along the Beckton Road boundary to minimise traffic noise and dirt. 5P houses had their bedrooms designed to face away from the road.	The 6ft high wall did not reduce noise and dirt much. But it did provide an effective visual barrier, as well as a safeguard for children on the site, and it prevented paper etc., being blown across the site.

Summary of the appraisal findings

12. The tenants generally liked their new homes. They particularly liked the spaciousness; the efficient kitchen and its closeness to the living room(though for some families the kitchen was not large enough for everyone to eat in comfortably); and the general convenience of having two living spaces.

13. The internal dining area was very fully used, even where it had not been practicable to give it direct daylight, and there were, predictably, complaints of its lack of light.

14. The adaptability in room management afforded by demountable partitions gave the tenants a welcome element of choice; but the partitions needed better workmanship for effective sound insulation.

15. General storage space was located outside the houses; tenants would have preferred some of it inside.

16. The second w.c. was appreciated. The tenants of the only house type which did not have it, the 4P, would have liked one.

17. The Z houses were better liked on the whole than the P houses. The 'open planning' of the 5P houses came in for criticism because of the larger amount of floor to cill glazing, the open staircase into the dining room, and the lack of a draught lobby and weather-stripping, all of which contributed to heat loss and draughts.

18. Nearly half the housewives (and especially those in the 5P houses) were dissatisfied with the heating.

19. The provision of an enclosed playspace in the common open space was popular because children could play there safely. But the tenants selected had more teenage children than had been allowed for in the design, and this caused difficulties over play and the use of the open space generally.

20. The fences at the end of the gardens, which had been kept low to give a view out on the open space, were felt by the tenants to be too low for privacy.

21. Building a wall along the main road which flanked the site, though it did not significantly reduce traffic noise, gave seclusion and safety and so contributed considerably to the character of the scheme.

22. Car parking to the ratio of 1:1 was found not to be needed for the present or immediate future, though this may change.

The main lessons

23. A year of occupation is of course a very short time in which to appraise the quality of a housing scheme. Many of the lessons to be learnt are long-term. But the main conclusions are these:

(a) First and foremost, the Parker Morris recommendations were justified as a whole. This is borne out by the enthusiasm of the occupants for their new homes despite paying higher rents. Most had come from quite good postwar council housing.

(b) For flexibility in use the scheme allowed for one bedroom downstairs. This, however, produced a ground floor larger than the first floor, which in turn led to complex shapes. The large ground-floor area was difficult to light at the frontage dictated by the required density. Plumbing was split, which had advantages in internal planning but cost more.

(c) As a result costs had to be pared on a number of things which could have been done better if a simpler building form had been used.

(d) It was difficult within an area close to Parker Morris minima to provide both two living rooms and a kitchen large enough to eat in.

(e) The attempt to provide safe playspace for children by making the central part of the site an enclosed common open space was successful, though some of the gardens became too small to be really useful. In itself, keeping one-fifth of the whole site area as open space at a density of 80 p.p.a. was quite an achievement. But owing to the lack of other possible playspace nearby the open space has been so intensively used that there are difficulties in maintaining it. These might have been fewer if it had been possible to spend more in the first place on landscaping, particularly on paving and protection for plants.

24. These were the main lessons of principle. There are also lessons of detail which are summarised below and which come out more fully in the account of the project and in the appraisal itself.

Some lessons of detail

25. The main points of detail were:

(a) 'Zipping' (sliding the two bays in relation to each other) and the inequality between floors gave many re-entrant angles and a greater amount of external wall. In some places the tenants found this bleak because of the materials used.

(b) Provision for drying and airing washing indoors should have been more carefully considered.

(c) Tenants like rooms which can be furnished in a number of different ways.

(d) Kitchens in the P houses were too small.

(e) A bigger kitchen water heater would have been more satisfactory.

(f) Some mothers with young children disliked open tread stairs.

(g) Downstair bedrooms suffered from noise and lack of privacy, and tenants were reluctant to leave ground floor windows open at night.

(h) It is important to have enough elbow room at washbasins, (see MHLG Design Bulletin 6, figure 26).

(i) Tenants were satisfied with lower temperatures in their bedrooms than downstairs.

(j) Some airing cupboards were not big enough to take bed linen and others had not enough shelves.

(k) A fair proportion of tenants may choose slot meters, and the positioning of meters should have regard to this.

(l) The sandpit, the other play equipment and the seats needed to be of tougher construction.

(m) Mothers were uneasy about a climbing frame for their children's play, but the children liked it.

(n) The Housing Manager must be involved in the design so that account can be taken of the cost of management and resources that will be available, down to such details as arranging for someone to cover a sandpit at night and open it in the morning.

(o) Heaters etc., need actual demonstrations as well as a handbook, which should be absolutely simple and easy to follow in detail.

26. Many of these lessons, both major and minor, were valuable to the Research and Development Group in designing their subsequent projects.

Terms of reference

Team

27. The design team consisted of architects, quantity surveyors, sociologists and a landscape architect, all on the staff of the Ministry of Housing and Local Government. A private firm of quantity surveyors, J. A. Burrell, F.R.I.C.S., was appointed by the client for the preparation of the bills of quantities and the settlement of the final account.

28. In designing the project it was necessary to apply the requirements of the new standards to the particular conditions of the families likely to occupy the houses, and to translate these joint requirements into the brief. To do this, and later to reconcile these requirements with the design possibilities, needed the closest possible collaboration between the architects and sociologists in the team all the way through.

Client

29. The Group approached West Ham County Borough Council because West Ham could provide a difficult urban redevelopment site for infilling, of the type on which so much redevelopment in this country will have to be carried out. The Group's architects had the full collaboration of the Council's Chief Officers, and the assistance, in particular, of the Borough Architect and Planning Officer, the Borough Engineer, and the Housing Manager, was invaluable throughout.

Contractor

30. It was decided to nominate a contractor at the beginning of the design period so that during the design stage he could contribute his knowledge of constructional methods and costs. The contract appointment was subject to agreement of a tender based on priced bills of quantities. The nominated contractor was Messrs. John Laing Construction Ltd.

Programme

31. The team began investigating the problem in November 1960, a year before 'Homes for today and tomorrow' was published. Design of the scheme started in May 1961 and was submitted to West Ham County Borough Council the following December. Working drawings were prepared between January and August 1962. Construction on site began March 1963 and was completed in February 1964.

Method of social study

32. The social study (paragraph 9) was carried out by drawing from the Council's records a random sample of 39 families with at least one child under 16 who had lived in the larger ('Dudley standard')* type of council house for at least two years. The Housing Manager wrote to each housewife, who was then interviewed by a sociologist during May 1961. The use and furnishings of each room were recorded by the accompanying architect on the plan of the house supplied by the Council. There were no refusals, most of the tenants co-operated very willingly, and a considerable amount of useful material was collected.

33. Besides the social study, a short investigation was carried out into the effect of traffic noise etc., on the families then living on the site.

* Built to standards recommended by the Dudley Committee in 1944. The recommended floor area for a three-bedroom house was 900 sq ft plus 50 sq ft storage.

Part 1 Design and construction

The brief

34. The aims of the project have already been described in paragraphs 4 to 8. The standards of space, heating and equipment were generally to be those recommended by 'Homes for today and tomorrow'

35. These recommended Parker Morris standards are minima not maxima. For this reason West Ham agreed to provide some standards well above the minima in certain houses (paragraph 6(a)), besides accepting the higher cost of providing Parker Morris standards as a whole. These extras were to be higher space and heating standards, and more cupboards, electric socket outlets, kitchen fittings and spare bedspaces.

36. In all the houses the scheme aimed at the following:

(a) kitchen space to allow for common household appliances and others that may become common, and to include installed storage space of 80 cu ft;

(b) the recommended 50 sq ft of general storage space to be free of dustbins, fuel stores, access ways, etc.;

(c) garages or hardstandings for cars at the rate of one per dwelling;

(d) provision of an equipped communal playspace for children away from traffic.

Costs

37. The Group worked within the cost disciplines then in force for local authority housing authorities. The basis of cost control was the general level of tendering current in that part of the country.

38. While no actual figure for a cost target was laid down at this stage it was an essential part of the brief that the scheme had to be designed within a cost limit acceptable to the Council, having regard to their current rent policy. The cost target is discussed in paragraphs 169 to 171.

The social study

39. When the aims of the project and the standards had been laid down, the first step in constructing the brief was to consider the social study and its implications for the design. (The families in the study were not the prospective tenants but families living in the sort of houses the tenants would come from.)

40. Besides the sociologist's questionnaire and the architect's record of the use and furnishings of rooms, a diary was compiled of the activities in the home of all members of the family during the previous day.

Families

41. The average size of the 39 families studied was five. All but five of their heads and main wage-earners were manual workers, rather over half of whom were skilled. Two-fifths of them came home for a midday meal. Shift work was prevalent.

42. Those grown-up children who lived at home tended to follow their parents' pattern of life. All the boys were in manual jobs. A few of the girls, however, had gone into offices. This pattern of employment seemed likely to continue in West Ham.

Incomes

43. Rather over half the families in the study had two or more wage-earners, who must have brought in well over £20 a week. This relatively high income level for the time was reflected in their furniture, and in the domestic equipment of which they had more than the average for London.

Houses

44. The houses visited were relatively spacious council houses built in the early 1950's. In fact, on average their floor spaces were above the recommended Parker Morris minima. All but one were two-storey terrace houses with small gardens. The two-bedroom houses had one living room, the four-bedroom houses two, the three-bedroom one or two.

Likes and dislikes

45. Tenants were asked what they liked or disliked about their houses (see the second column of the table on pages 2-7). It is worth noting that about one-third of the housewives interviewed were completely satisfied with their homes.

46. Features they liked were:

having two living rooms;
a garden;
a bathroom;
a second w.c.;
a large kitchen;
straight stairs;
big windows;
solid fuel domestic boilers;
separate wash-houses.

47. Only about a quarter thought their rooms were conveniently arranged, and these were housewives with small families, living at a density of 0.78 persons per room compared with the rest who were at 0.92 p.p.r.

48. Other complaints were of:

one of the two living rooms being a passage;

kitchens without direct access to the garden;

sitting rooms difficult to fit furniture into because they were not square or had off-centre fireplaces or two doors inconveniently placed.

49. It is also worth noting that over half the housewives said they would like to move out of West Ham, and these were in houses among the best in the borough. The only requirement in the house itself to get particular mention was extra space, whether as larger rooms or more of them.

The day in the house

50. The housewives' diaries (paragraph 40) together with the researchers' observations gave the following general picture.

51. Men working in the docks tended to get up from 4.30 a.m. onwards, before the rest of the family, often only having a cup of tea before setting out.

52. Housewives prepared breakfast and got the children ready for school; if they were not working, did housework followed by half an hour's shopping and prepared dinners. In the afternoon they exchanged visits or played with their babies in the garden. (They spent an average of two hours a day out of the house.) If they had morning jobs they had of course to get their housework and shopping in during the afternoon. All housewives had an evening meal to prepare, which was mostly taken between 5 and 6 p.m., and if they had young children they had to be got to bed.

53. The average time spent on housework was five and a half hours a day, ranging from two and a half to nine hours.

54. Most of the older children were out of the house for the greater part of the day. As a rule mothers only took their children out to go shopping or visit relatives.

55. During the day, in summer weather at least, houses did not seem congested. Nor did the houses of the five families interviewed at the weekend; the children were out, and four of the five husbands were working on Saturday or Sunday. Sunday was still the day for the family to visit relatives.

Evening leisure

56. Some of the young went out after the evening meal, but the main evening activity was watching television, though normally, as far as adults were concerned, not very attentively. Other evening activities were entertaining visitors, reading, housework, homework, doing odd jobs, playing, gardening and hobbies. The children of two large families spent a good deal of the evening playing in the garden.

57. Only two of the 16 housewives who had only one living room said television conflicted with other activities. On the evening of the inquiry there were no apparent conflicts between activities in the house.

58. In nearly all the 23 houses with two living rooms, television viewing went on in one room all or part of the evening (except when the television set was being repaired) and entertaining visitors, sewing, writing or tape-recording in the other. Three of the families visited did not use their sitting room during the evening.

Homework

59. Less than half the families had children who had to do homework.

60. These children did their homework in rooms away from the rest of the family and the television. Inevitably a higher proportion of children in dwellings with one living room had to do theirs in the same room as the television. Thus the second living room did allow one member of the family to have a quiet room to himself downstairs.

Hobbies

61. About a quarter of the people in the families visited said they had hobbies. They were nearly all domestic - knitting, sewing, home decorating. Only one housewife was frivolous enough to play records and one husband to indulge in pigeon-racing. Most were hobbies that could be carried on in company.

Use of rooms

62. In the houses with only one living room, space for such activities as dressmaking usually had to be found upstairs. In the houses with two there was more flexibility, especially as the living rooms usually connected. Space was needed more than privacy, and most people managed to find enough space.

63. A third of the families washed only in the bathroom: the rest used the kitchen all or some of the time. It was clear that the lack of constant hot water in the bathroom caused more use to be made of the kitchen (where kettles of water could be boiled).

64. One family did not bath in the bathroom. The most usual thing seemed to be to light the boiler at weekends so that all the members of the family could have their baths, but a few of the families who possessed immersion heaters had baths during the week.

65. In houses with only one living room, the family generally used it for sitting and watching television, and ate in the kitchen to keep the living room free from food and dirty dishes.

66. In the houses with two living rooms only a third of the families actually used one for meals and the other as the family sitting room. There was no predominating pattern of use; in fact these 23 families had devised about 13 different ways of using their living rooms and kitchens.

67. Among these:

six families used their dining rooms for family sitting and television;

nine families with dining rooms ate all their meals in the kitchen (reasons included not only convenience but others such as lack of heating or difficulty of access);

four used both living rooms regularly for sitting in;

over a quarter did not regularly use one or the other (main reasons: dining room too small, inconvenient or difficult to heat; or sitting room kept as parlour).

68. Room size often had some effect on room use; none of the smallest kitchens were used for all meals, but both the two largest kitchens were. The largest dining room (117 sq ft) was regularly used for sitting in: but none of the ten smallest dining rooms (under 93 sq ft) was used daily for sitting in by the whole family.

69. In the West Ham study desire for a parlour or the use of one living room as a parlour was much less prevalent than in previous surveys. Possibly opinion and practice have been changing with an improving standard of living.

70. Housewives spent an average of six hours daily in the kitchen, their total times ranging from one and a quarter to 11 hours. They spent an average of four hours daily in the living room or rooms.

71. The two main factors governing the time a housewife spent in the kitchen were whether she had a job, and which room was used for meals:

Average hours spent in kitchen by housewives with one living room	if at part-time work	if not at work
	4½	8½
Average hours per person spent daily	**in living rooms**	**in kitchens**
	just over 3	just under 3

72. In the home children played mostly in the main living room. The youngest, as might be expected, played more in the kitchen, near their mothers. Children over 11 did not play much in the garden, and during the recorded evening most children played elsewhere than indoors or in the garden.

73. Very little provision for children's play had been made in the houses. In two homes a room had been set aside as a playroom; a few gardens had some play equipment like swings or paddling pools.

The site

74. The next factor in the construction of the brief was the site itself.

75. West Ham is largely a working-class area. Most people who live there also work there, but there is a general shortage of work for women. The most important industry in West Ham is the docks. There is a general lack of social and physical amenities, in particular of open space, of which there are only two and a half acres per thousand of the population.

76. During the war 30% of the houses in the West Ham area were lost by bombing. Most of those left are typical two-storey East End dwellings. Population densities are in some places as high as 200 persons to the acre, and there is still a great deal of 'doubling up' of families within dwellings. The heavily war-damaged areas were being cleared and systematically redeveloped at densities of 100 persons to the acre with four acres of open space per thousand of the population.

77. The site is in an area of Victorian terrace housing and is two and a half acres in extent. It was cleared after war damage and the Council used it for temporary bungalows.

78. To the south it is bounded by Beckton Road, a main traffic route leading eastwards out of London to Southend and into Essex. This road is programmed for widening in the near future. It will therefore always be, as it is now, a main road carrying heavy, noisy and dirty commercial traffic both day and night. Its effect on the site cannot be too strongly emphasised. It carries a great deal of traffic, and the vibration, noise and dirt sully the environment to a considerable depth on either side. It is dangerous too, and most difficult for pedestrians to cross.

79. The effect of Beckton Road and the smallness of the site made it necessary to ask, after an initial site appreciation, whether it was in fact a proper site for redeveloping with housing. The decision to continue was taken for two reasons. First, owing to the shortage of housing land in the borough, the Council would have to redevelop this site for housing in any case, despite its unpromising features. Secondly, it was typical of many current and future sites for urban redevelopment, and the problem of relating major traffic routes and housing in towns was one that the Development Group felt should be tackled.

80. Except to the south the surrounding area is continuously built up with a rectilinear layout of streets with two-storey housing dating from the 1870's. This layout produces high densities, small overlooked gardens and little or no open space. Problems of car parking are acute. Near the north of the site there are schools whose more open layout provides a contrast, but the open space round their buildings is of course not public. The nearest park has a swimming pool in it, but though only a quarter of a mile from the site it is on the other side of Beckton Road.

81. There are a good many small shops close by, but the main shops for the area lie near the intersection of Barking and Beckton Roads, about 250 yards away from the site, where most of the local bus routes also run. The main line of approach to the site is thus from the west.

82. Immediately south of it, on the other side of Beckton Road, there is a primary school whose

catchment area does not cross Beckton Road. Beyond the school is a recent housing development of three 15-storey blocks of flats. This is the beginning of a large sector of post-war reconstruction which started in 1945 in the bombed areas by the docks and has spread northwards through Canning Town. Redevelopment is now concentrated in other parts of the borough and is not likely to move across Beckton Road for many years to come.

Density

83. At the time of planning the project the proportion of dwelling types in West Ham housing schemes was as follows:

2-person	1-bedroom	40%
4-person	2-bedroom	30%
4/5/6-person	3-bedroom	25%
6/7/8-person	4/5-bedroom	5%

84. The gross population density in the development plan is 88 persons to the acre, which results in net residential densities on development of roughly 100 p.p.a. Normally the larger families are provided with houses and the smaller with flats, with a consequent higher residential density for the areas of flats and a lower one for the areas of houses. A project for building houses exclusively was therefore concerned with only one side of the normal housing provision.

85. The possibility of designing a group of houses incorporating the whole range of dwelling sizes was examined, but the Housing Manager was not willing to accept this proposal as it would be likely to produce some small blocks of flats probably needing caretakers who would not be justified in a scheme of this size. It would also reduce the potential economies of gathering numbers of the smaller units into tall blocks. The scheme therefore had to provide dwellings for the larger families of four, five or six persons. In a group of only 39 it was not felt necessary to cater for larger families than six.

86. The proportion of dwelling sizes for the project agreed with the Housing Manager was as follows:

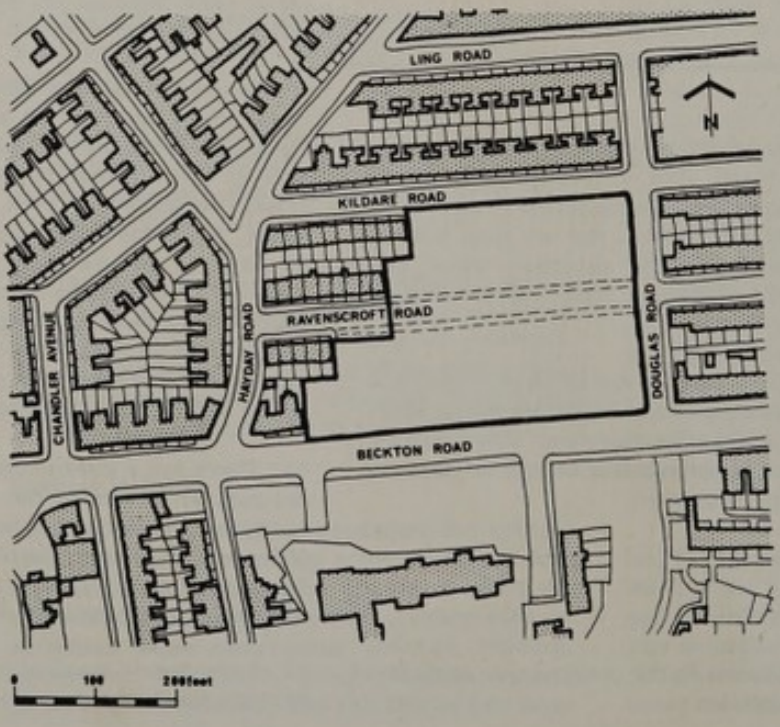
4-person	30%
5-person	40%
6-person	30%

87. This gave an average family size of five. The net residential density agreed with the Borough Council as reasonable from the point of view both of the Council's housing list and the experimental nature of the project was 80 bedspaces per acre. This resulted in 16 dwellings to the acre, a high density for houses, but, because of the large average size of the families, not excessive. Moreover, the project houses would be larger than other houses being built at the time, and car parking would be provided at the rate of one space per house.

88. Relating as closely as possibly the density and the proportion of house sizes required, the development of the site was calculated to need the following scale of houses:

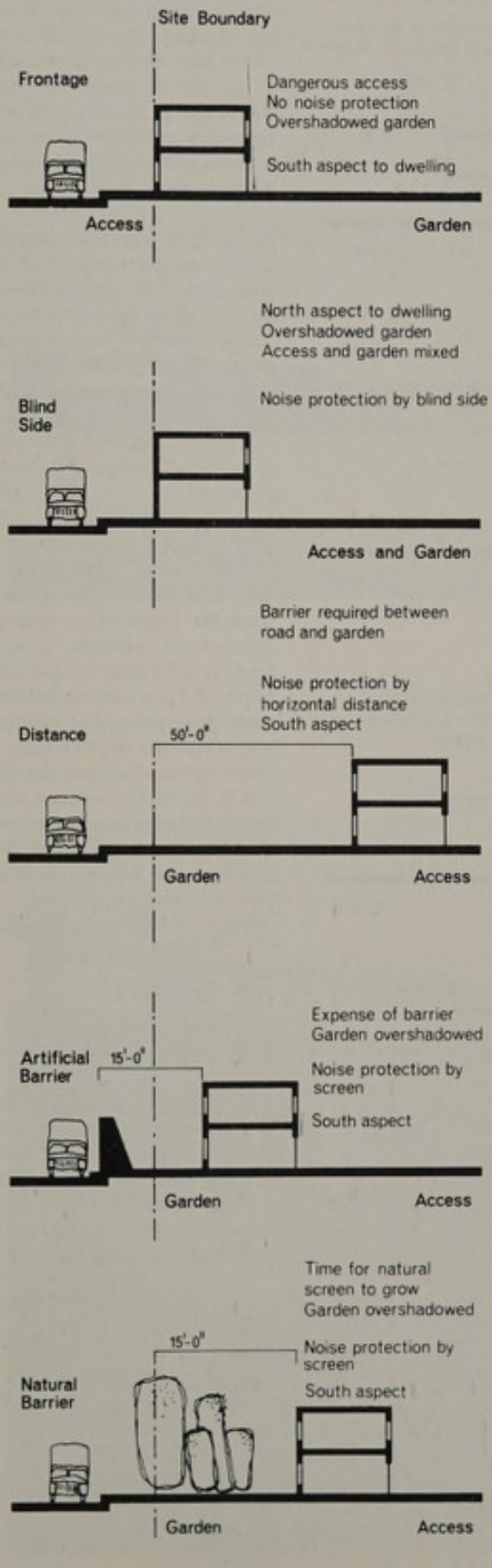
4-person houses	11
5-person houses	16
6-person houses	12

This gives a total of 39 houses.



1 Site plan
Extract from ordnance map showing the site as a gap caused by war damage in the network of Victorian terraces.

2. Beckton Road
Basic problems of layout and house design were analysed in a series of about 30 study sheets dealing with specific design problems prepared while the site was being chosen and the cost limits fixed. The sketches on this and on the following page analyse alternative ways of dealing with the problem of noise from Beckton Road in relation to the form of dwelling.



89. The houses in the surrounding streets were substantial and well kept, by no means slums, and could be assumed to have a further life of 30 years or so. The local authority had put forward no plans for redeveloping the area in the foreseeable future. There was no possibility therefore of relating the development to any large scale proposals. So the site could be considered as an island of new development.

90. It became obvious that a better layout could be produced if the length of Ravenscroft Road which cut the site in two was closed. The closure was undertaken by the local authority.

91. This length of road contained a sewer, a water main and fire hydrant, a gas main, distribution cables of the London Electricity Board, and transmission cables of both the Board and the Central Electricity Generating Board. In closing it arrangements were made with the statutory undertakers concerned for abandoning or diverting all these services except the electricity cables which it was decided should be protected by providing ducts. The cost of the ducting and of the diversion of services was a charge on the finances of the scheme.

92. This disruption of the regular road pattern and the abandonment of the normal street frontages in replanning the site gave a more useful area and were also calculated to create a welcome and interesting visual change from the surrounding rectilinear street pattern.

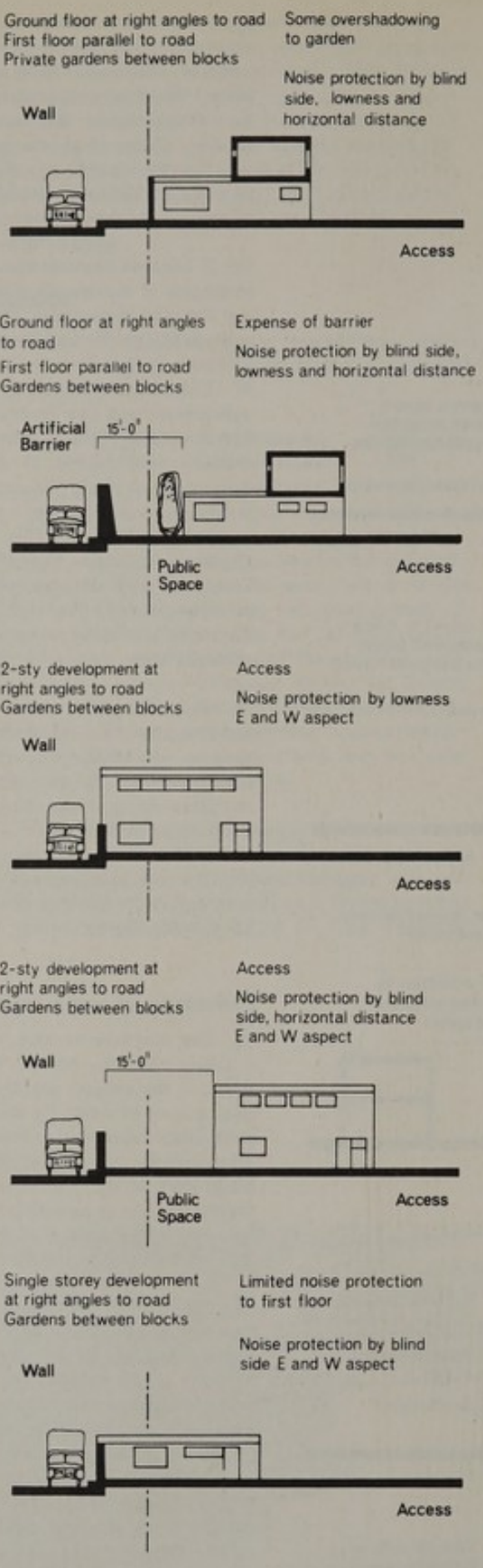
93. The resulting site was generally even and flat, with only a 1ft 0in rise from the north-west to the south-east corner.

Provision of open space

94. The shortage of open space in the area made it likely that any small, easily accessible open space in the project would get hard treatment; and this was confirmed by the wear and tear on the open space near recent housing schemes. It therefore became an aim of the layout to allocate a large part of the site to one sizeable open space for the people to be housed there, all the more so because of the density of the surrounding housing and the absence of any open space nearby.

95. There were two main ways of providing it. One was to create the space as part of the access to the dwellings on the public side of each house. But this would bring it too close to the roads and the vehicular access to the houses, and make it too easily accessible from outside. The other was to create it on the garden side of the dwellings, the private side of each house, which would make it less generally accessible, adjacent to the private back gardens, and thus more easily used by children for play and adults for strolling and leisure. The second way seemed the better and the sequence became 'access, house, garden, central open space' for every house on the site.

96. This central open space was to be large enough for trees, planted areas and playspaces. To provide a central area of this size, however, houses would probably need to be concentrated on the perimeter of the site and the gardens would have to be kept small.



3

An early sketch showing buildings set well back from Beckton Road closely resembling the final scheme.

97. The site itself had not only Beckton Road to the south but road frontages as its northern and eastern boundaries and road access halfway along its western boundary. It was therefore both economical and common sense to make every effort to use existing roads to the utmost before making any new ones.

98. However, planning requirements would not allow access from the noisy, traffic-clogged Beckton Road. This ruled out creating a complete ring of houses round the open space. And it was necessary to do something more positive on the Beckton Road side than just not use its frontage for housing. The effect of the traffic had to be minimised and the enclosure of the open space had to be carried across this side too. It was decided therefore to build a high brick wall along this boundary and to keep the houses as far back from it as possible to isolate them from the effects of Beckton Road.

99. In this way the central area could be completely ringed round by terraces of houses and the boundary wall along Beckton Road. Access would only be given through a house and its garden. There needed to be one gate to it under the control of the Housing Manager, to let in maintenance staff and allow for special deliveries to the houses. Apart from this gate the central area could be completely cut off from outside. It would be an open space reserved to the families in the houses round it.

Gardens

100. In accordance with the design implications from the social study (paragraph 11 table), it was decided to provide a small private garden, perhaps 20ft deep behind each house. Even if the tenant did not want to cultivate it, it was there for putting the pram and washing out, for toddlers to play in under supervision, for chores such as mending bicycles and for sitting in. The gardens had to be small because the central open space had to be large to make it worth while and because anyhow tenants did not seem to want large gardens. All houses were also to have a small plot in front for planting which in many cases could help to screen ground floor bedrooms.

Car parking

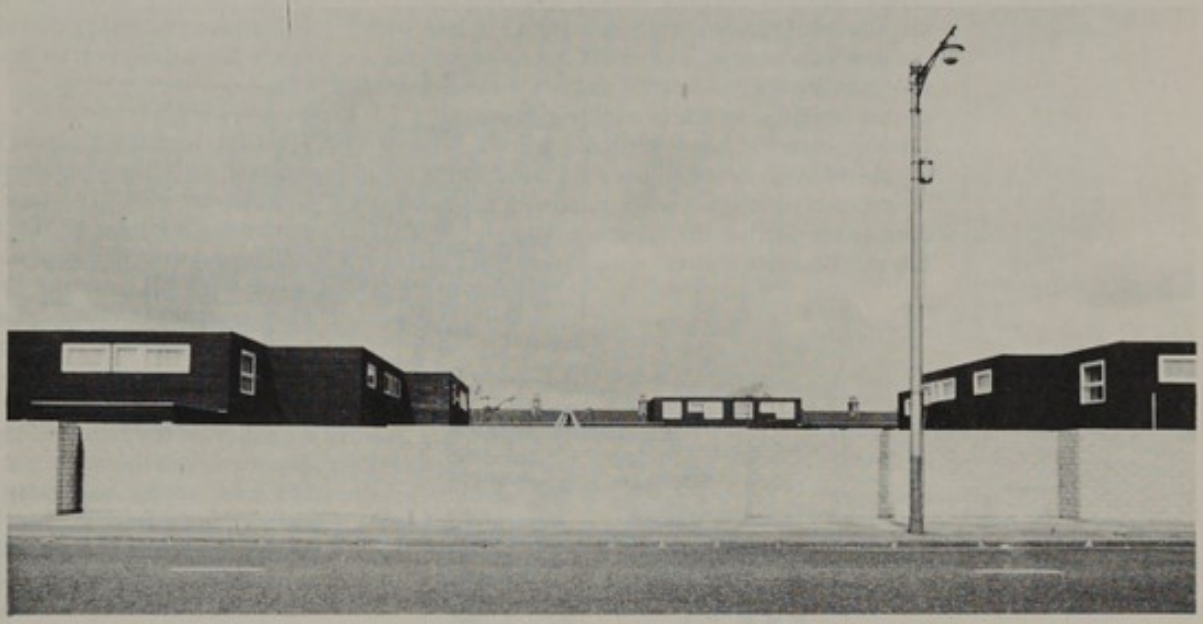
101. In accordance with the brief (paragraph 36(c)) one parking place was provided per dwelling.

102. If most dwellings were to have road frontage it seemed sensible to allow for a garage or parking space at each house. Against this it was argued that grouped parking is a more flexible and less wasteful way of providing car space because it does not oblige people with a car to rent a garage whether they want to or not.

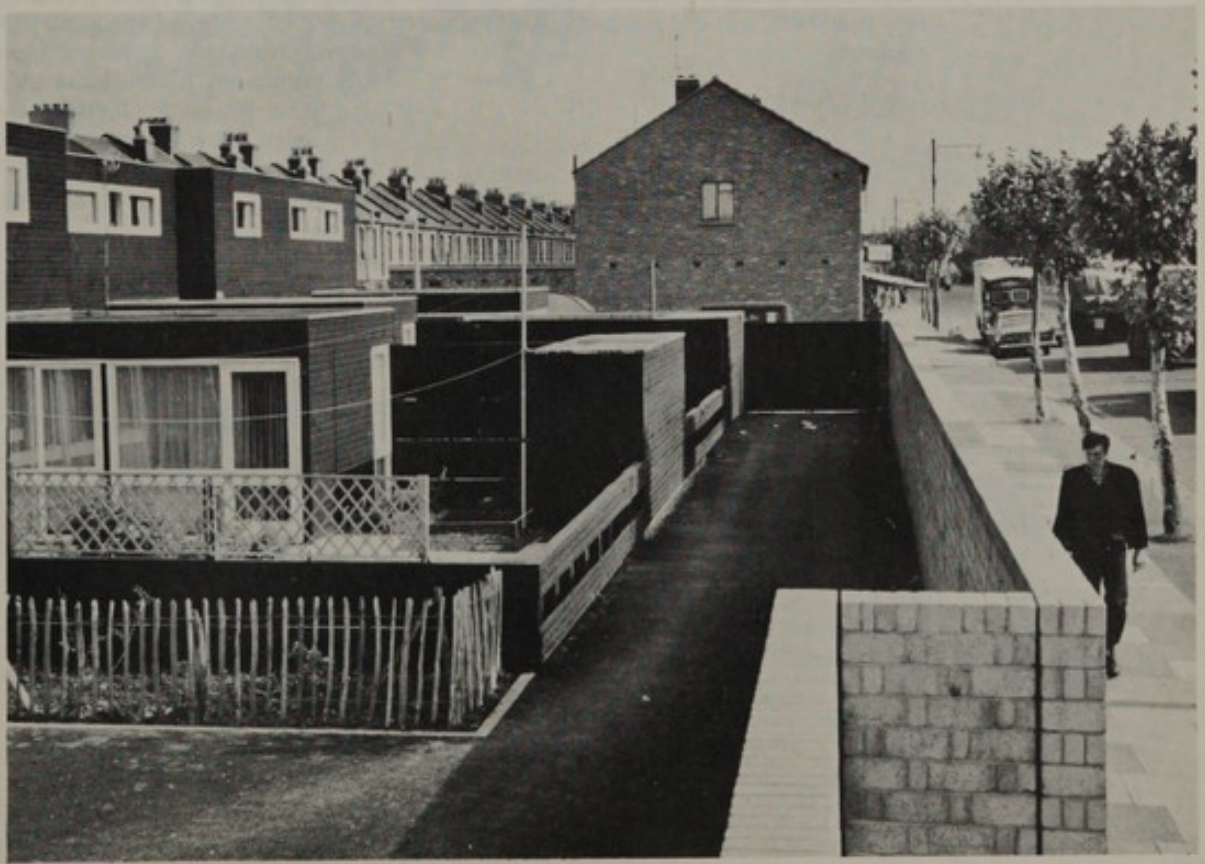
103. A compromise was arrived at and parking was provided as follows:

15 built-in garages 5 grouped garages	20 garages
7 hardstandings in front of the house 12 grouped hard-standings	19 hardstandings

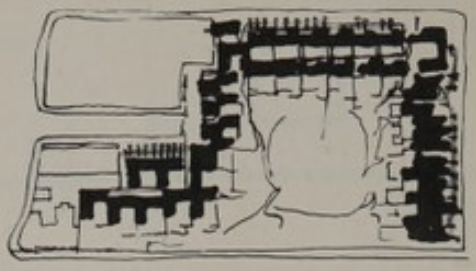
4
The scheme looking across Beckton Road wall.



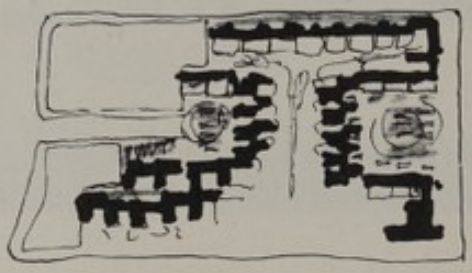
5
Patio houses in the eastern pedestrian cul-de-sac seen from Beckton Road wall.



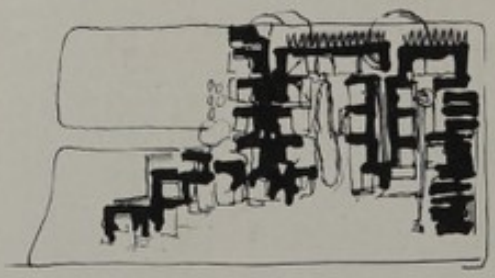
Development of the layout



6
This series of plans shows development of the layout. Houses running north, west and east of the site would have produced a layout in line with the general concept, but could not have got the required number of houses on to it without some double banking, which is explored here.
Obvious disadvantages: difficult access for the double-banked houses; overshadowing and orientation problems; no contact with the central open space for the 'front' houses.
Advantage: main central open space intact.



7
The next stage envisaged forming two courts to increase the possible length of frontage to allow a larger number of medium-frontage dwellings. Some double banking was necessary even here.
Main disadvantages: breaking up of open space; new road building; and not particularly attractive squares.



8
A further development was to have two pedestrian paths leading into the site from the north, and place several houses each side of these. Central space too much broken up.

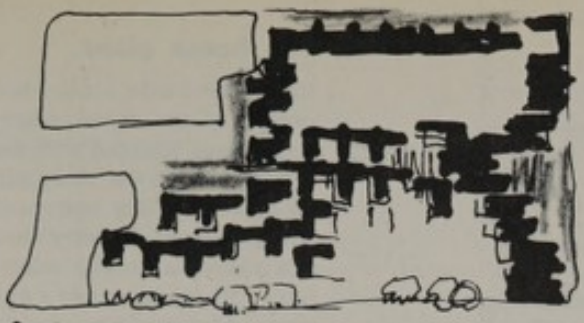
104. The built-in garages needed to be rented to the tenants at an inclusive rental. It would, however, be open to the tenant to sub-let the garage in his own right. This would free him of the burden of paying for a garage if he did not need it and yet give him control of the sub-letting, for example if there were undue noise or any abuse of the tenancy.

105. Theoretically, space for parking of visitors' cars was available at the kerbside of the roads round the site. This might in time be encroached on as the neighbourhood was short of garages. Still it seemed likely that there would always be space for a dozen or so visitors' cars near the site.

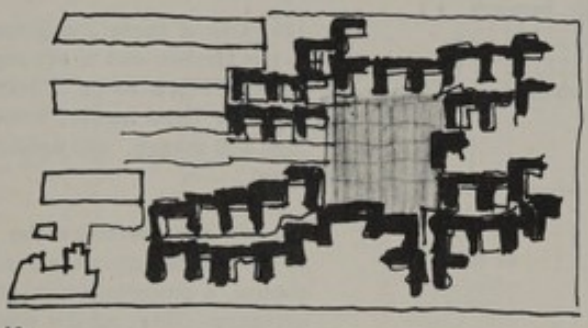
106. The idea for a layout that had now emerged entailed building 39 houses, neglecting entirely the Beckton Road frontage and creating as few roads as possible on the site. A central open space was to be created, and the sequence 'access, house, garden, central space' followed in the planning of each house. A number of layouts had to be considered to find the best way of doing this.

107. Meanwhile work was progressing on the evolution of the house plans. These two aspects of the work went hand in hand. No detailed layout could be produced without the house types that fitted it. By now it was clear that the layout requirements excluded wide-frontage houses, while narrow-frontage houses were rejected because they were too deep or would have to be three-storey and because they raised problems of internal circulation.

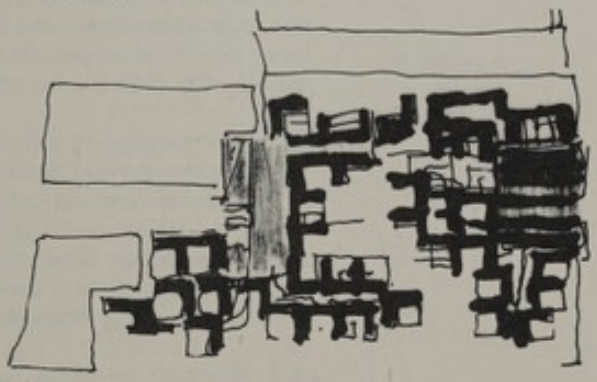
108. From an early stage therefore layouts were based on medium-frontage houses. And the problem of getting the required 39 houses on to the site while keeping the central open space intact was solved, after trying several arrangements of frontages and space all of which had crucial disadvantages, by accepting some form of double banking. A number of the rejected arrangements are shown in figures 6 to 11. The layout eventually accepted is in figure 39.



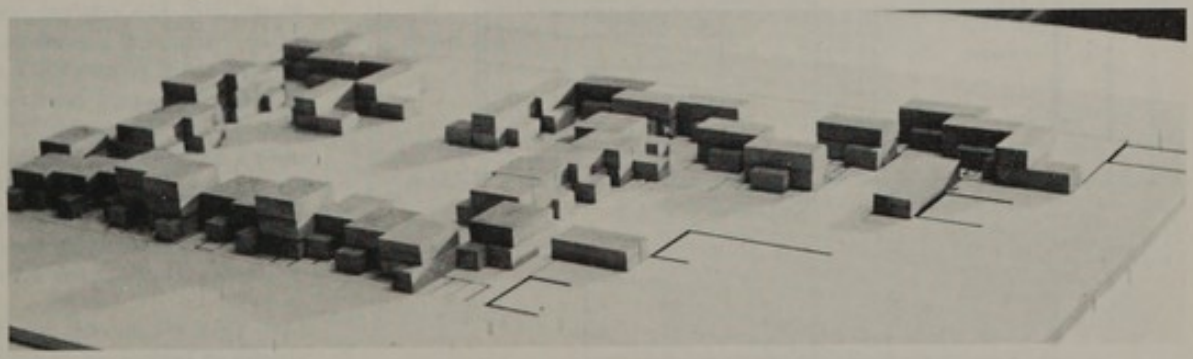
9
The same basic idea as figure 8 but with the paths from east and west. This arrangement avoids some of the previous disadvantages but still breaks up the open space.



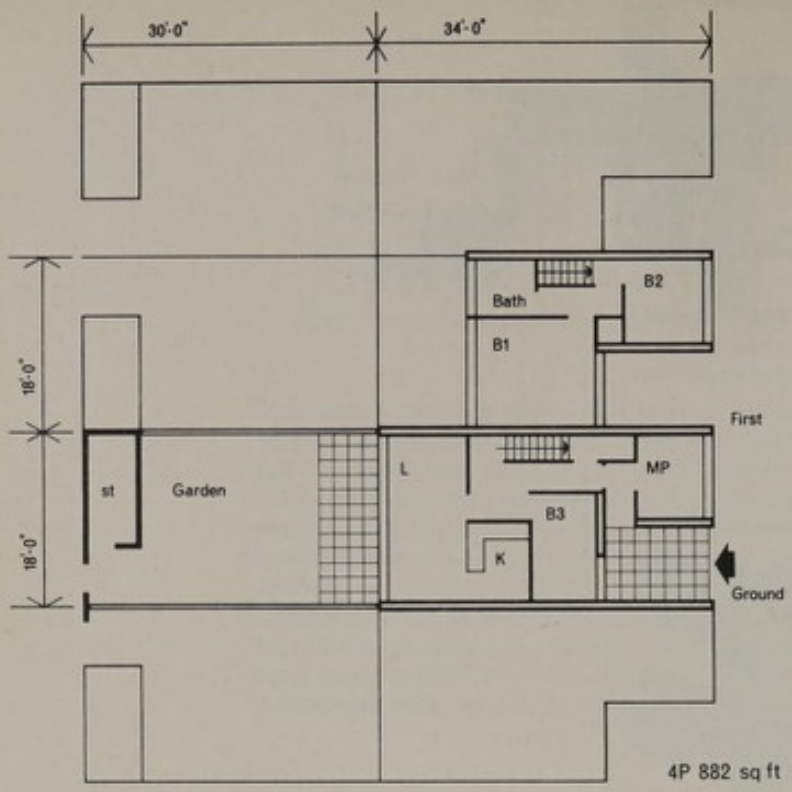
10
Turns the previous idea inside out, allowing access to all houses from a central square with vehicular access, but required road building and boundary walls on three sides. It concentrates the traffic but makes the open space fragmented and difficult to use.



11
It was agreed that the final solution would probably be on the lines of some perimeter development with pedestrian culs-de-sac leading into the site but arranged so as to obtain a large central open space. The above sketch goes some way towards realising this.



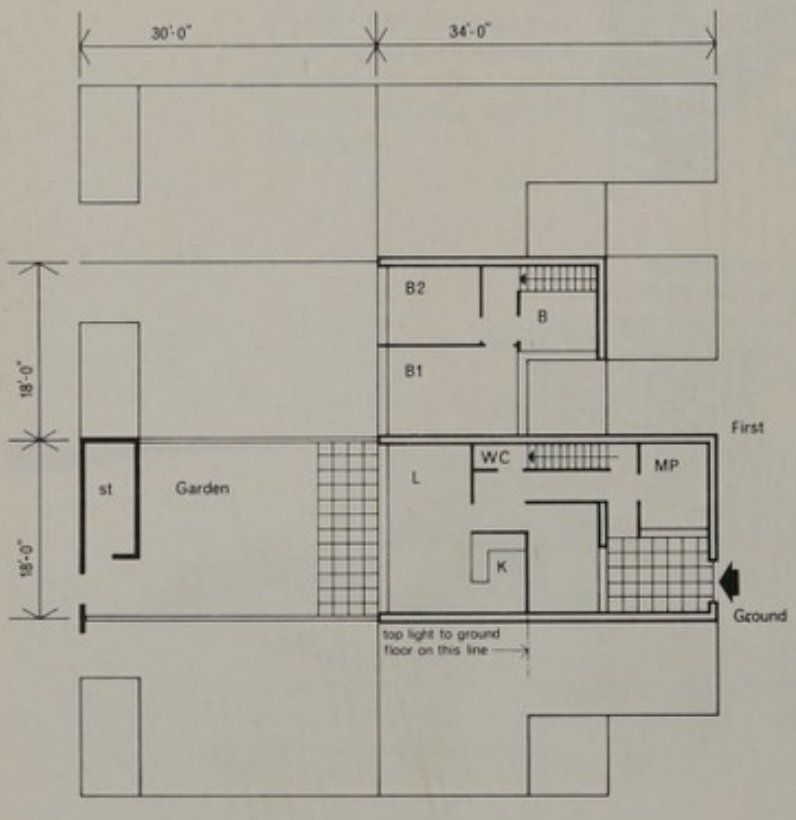
12
Rough models were made with wooden blocks when studying the detailed position of the various house types in the final layout.



13

Two study sheets showing an early exploration of type planning. Both deal with medium-frontage terrace houses and have been selected because they bear some resemblance to the final scheme. Note the attempt to provide privacy in gardens from other people's first floor windows by projecting the living room at the back, the use of both ground floor bedroom and the ground floor multi-purpose room with a family room providing the living space. Kitchens are internal.

14



The house plans

109. Some house plans were produced before the results of the social study were available, and many ideas changed with the fuller understanding of needs which the study supplied. For example, 'Homes for today and tomorrow' suggests two living spaces. Initially the architects assumed this would mean one main living space, apart from the kitchen, and a small secondary living room which could be used for studying or hobbies. Such rooms appeared on the earlier plans as the 'multi-purpose room', but the study showed that tenants were unlikely to use them. The need therefore seemed to be for two living spaces both large enough to take the whole family. They were likely to be used one at a time rather than shared between the family.

110. One of these living spaces needed to be close to the kitchen and to act partly as a dining room, and the other to be a room that could be kept separate from meals, homework and family comings and goings, and used as a sitting and leisure room.

111. So far therefore the ground floor of these houses needed to contain a kitchen, the two living rooms, a downstair w.c.,storage space and an entrance. This, as the study sheets showed, was more than half the area allowed for the whole dwelling. The study had also shown the need to provide as many single bedrooms as possible, but extra bedrooms meant a larger area for the houses than the minimum recommended in 'Homes for today and tomorrow'. To keep close to the Parker Morris minimum the total space for the bedrooms had to be kept small, and as the single bedrooms were thought of as possible 'study-bedrooms', the main bedroom had to be small too.

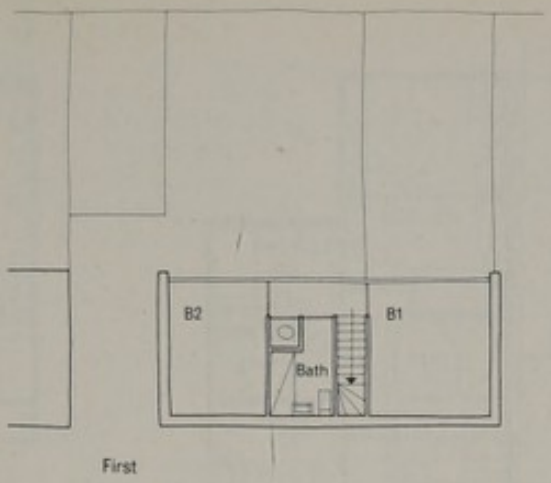
112. For teenagers, elderly relatives, etc. one of the bedrooms was placed on the ground floor. It was also thought possible in some of the houses, within the likely cost limits, to make one of the single bedrooms large enough to take two beds, so the tenants could if they wished use the ground floor bedroom for other purposes.

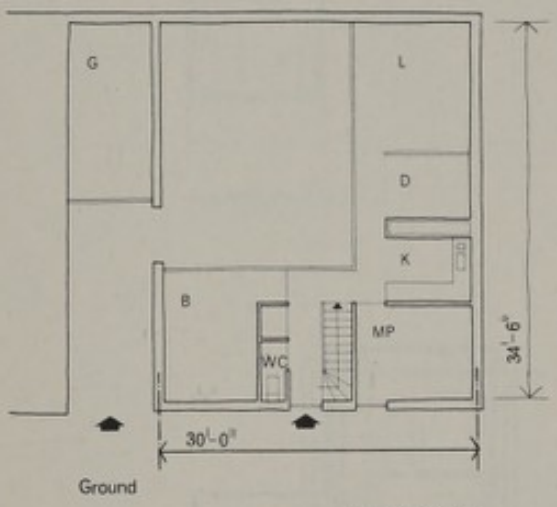
113. However,to offset part of the extra space required by the two living rooms and the extra bedrooms, the living area containing the dining space could be used for circulation as well without detracting much from its main use.

114. As the houses were to have a road or footpath on one side, and the small garden on the other, with the central open space beyond, the living room was placed on the garden side. The kitchen could go on either side of the house, but as the social study confirmed that women spent a good deal of time in their kitchens during the day, and as the pleasantest outlook and the best place for children's play were obviously on the garden side, it was also placed looking out on the garden. This involved bringing the downstair bedroom to the front, where some houses also had a garage.

115. This meant the upper floor would consist simply of bedrooms and the bathroom. Though the inquiry did not suggest that at present bedrooms were much used for homework and study, it was felt that with the improvement in heating standards and the increase in opportunities for education

15
An early exploration of the patio house idea. This was not taken any further at this stage because it implied a wide frontage. Results of the social study were not yet available, and the 'multi-purpose room' was still included.

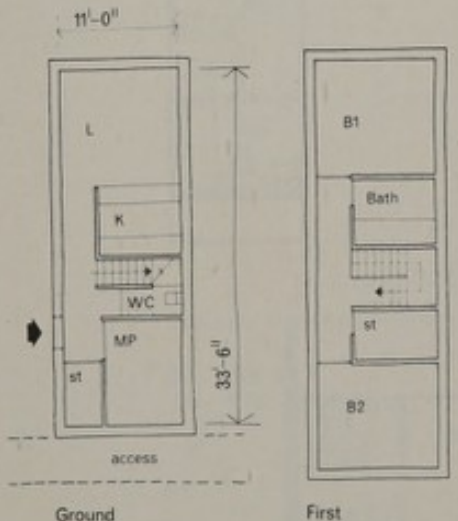




5P 948 sq ft

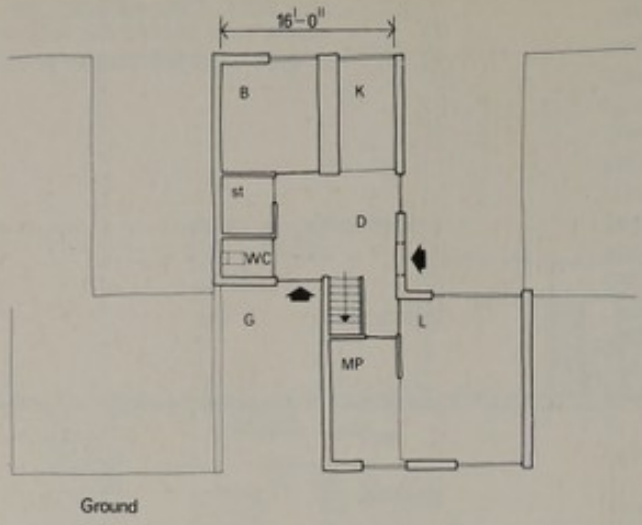
every bedroom should be designed to take a table or a desk. This affected the design of the windows which were placed not only to give a table or desk a good light but also to provide a view.

16
A study of a narrow-frontage plan.



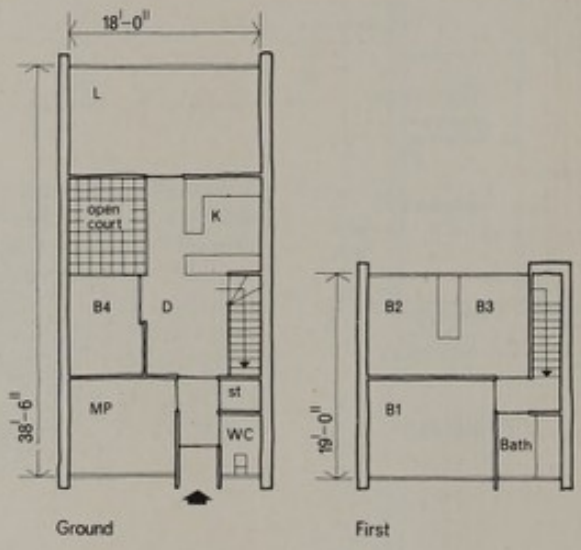
4P 790 sq ft

17
A wide-frontage plan showing the use of a dining hall, with plenty of flexibility in ground floor planning. Frontages at this stage were still too wide for the layout envisaged.



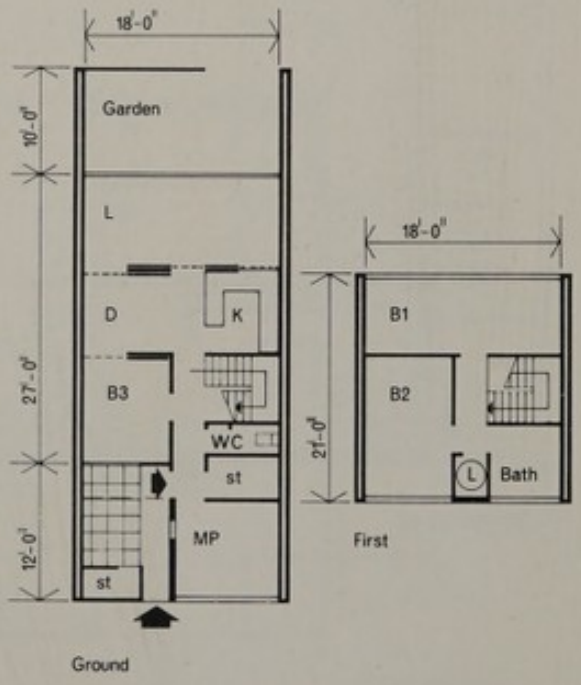
5P 932 sq ft

18
As the work on the layout proceeded planning became tighter and frontages smaller. This plan contains a small open court on the ground floor, but the view from the kitchen is poor and the dining space awkward.

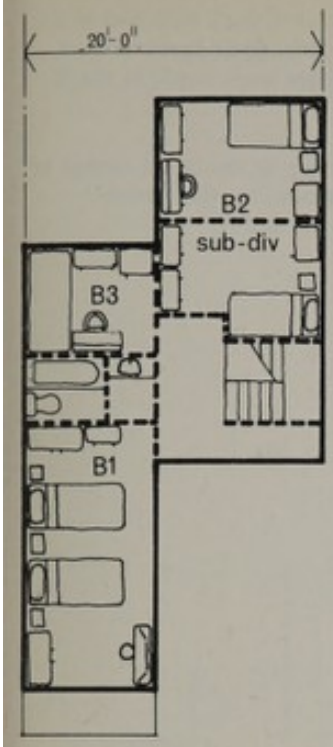


5P 953 sq ft

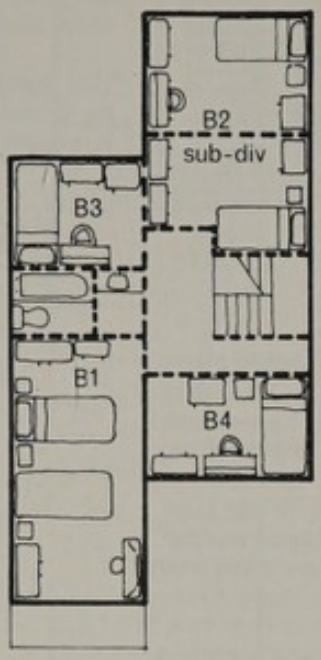
19
Another version of the above without the courtyard. Areas more realistic. The ground floor looks better than on the previous plan, but lighting is doubtful and the first floor layout inflexible. It can be seen from this and the above plan that the team was working towards a two-bay approach of about 20ft total frontage.



5P 980 sq ft

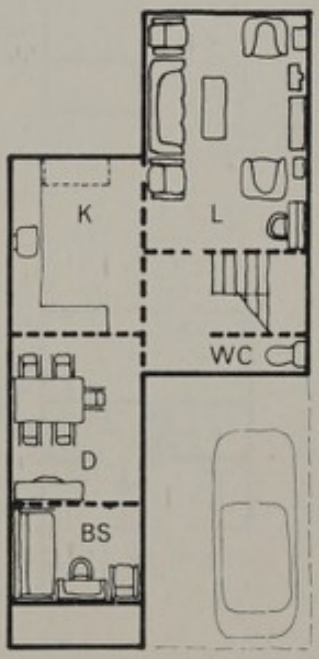


First



First (alternative)

20
This is the first expression of the Z house idea and is particularly important in the development of the scheme as it is the first time that a layout was produced directly related to plan types.



Ground

6P 1026 sq ft
7P +70 (alternative)

The Z house

116. Though experiments had been made with frontages as wide as 38ft 0in, it became clear that a frontage allowing two bays of accommodation across it gave a house of acceptable depth and was likely to allow for flexible internal planning. A 20ft 0in frontage allows two rooms of an average width of 8ft 6in and access space of say 3ft 0in to be arranged within its width, or one room of 11ft 6in and one of 8ft 6in at one end of the house. Even within this frontage the house was likely to be comparatively deep. This raised the problem of adequately lighting the inner space on the ground floor.

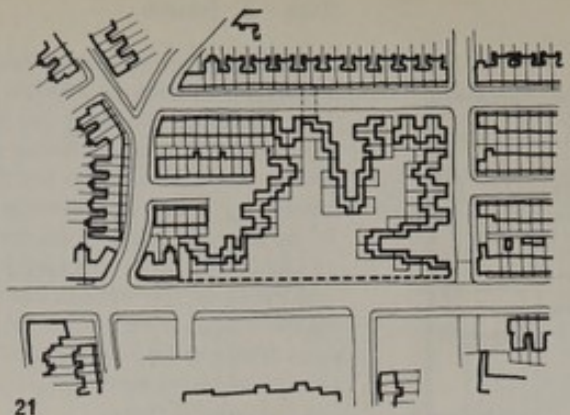
117. A solution was sought by sliding or 'zipping' the two bays in relation to each other. 'Zipping' (a term coined by the Group, which led to it being known as a 'Zip' or 'Z' house) had the effect of reducing the distance of any point from a source of light and enabling windows to be placed in the flank walls thus created where before none were possible (figure 20). It also produced a very small point of contact between the two bays through which all circulation had to pass. The problem therefore became one of adjusting and balancing the space and circulation requirements against the amount of sliding of the bays.

118. If the first floor could have been much smaller than the ground floor, top light could have been let in to the central area, but it was not possible to make the difference in floor areas large enough. Eventually the narrowest house capable of giving satisfactory accommodation was used for the perimeter of the site on the east, west and north.

119. The following were the external conditions for the design of the Z house. It would have all access, pedestrian, vehicular and service, on the road side. It would need to contain parking space, either as a built-in garage or as a hardstanding directly in front. On the other side would be its private garden, and beyond that the central open space.

120. As can be seen from the illustrations, lighting of the central dining space was a problem. The architects in the design team thought that in the few houses that could not be given an external window the lack of direct daylighting would be accepted because the dining area was expected to be used for a limited period only during the day. The sociologists in the team feared the lack of daylighting might lead to the space being underused. Eventually it was found possible, by staggering, to place the eight 6Z houses in positions in the layout where they could all have a window either high up in the side of the dining area or in the half-landing of the staircase. This left only the three 5Z houses without any natural light in the dining area.

121. During detailed planning it emerged that the 4Z house was well suited to be one of the higher standard houses called for in the brief as it could have attached garage, extra large dining area with windows arranged so that it could be curtained off from the circulation space, and the downstair cloakroom: this last would be over the standards of a basic four-person house.



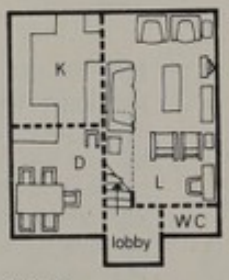
21

The layout produced with the first Z house plans. Houses have to be handed in pairs to limit the excessive amount of external wall. This means that privacy is reduced by windows in side walls looking across at each other unless the houses are scattered excessively as they were in the first layout. There were orientation problems and the placing of houses in the layout was not sufficiently flexible. Generally very expensive. These first plans allowed good lighting and good flexibility internally except that it was difficult to sub-divide bedrooms.

122. Though a lot of detailed work still had to be done, especially on the first floor layout, from this point no major changes were made in the Z house plans.

123. The stages in arriving at the basic design of the Z houses are best shown in illustrated summary form (figures 20 to 29).

First

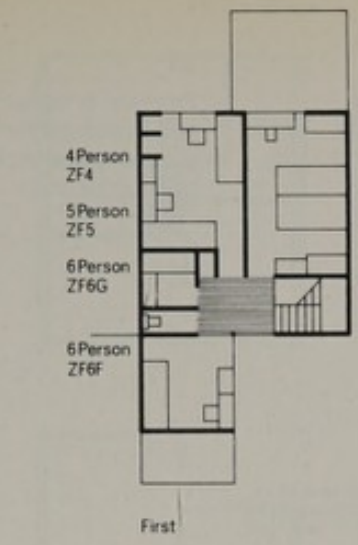


Ground

4P 837 sq ft

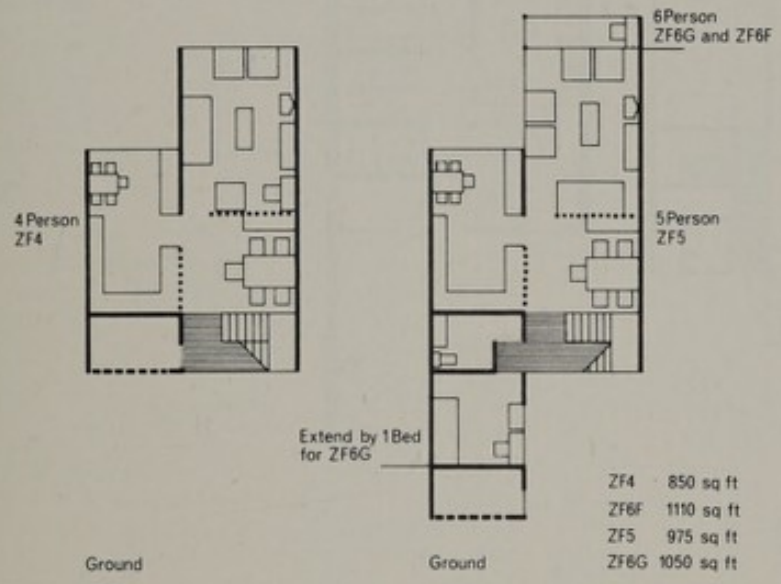
22

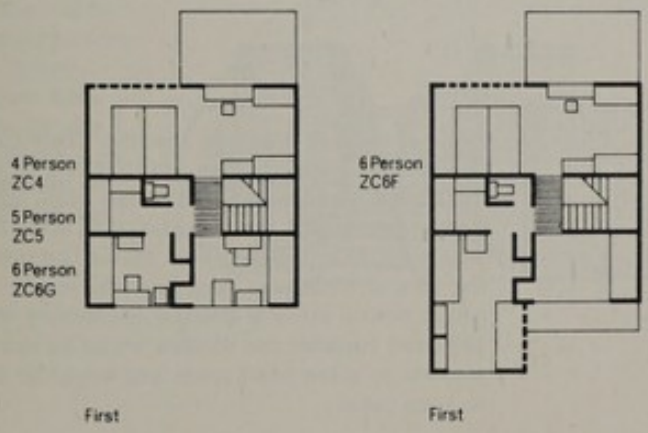
The general idea of the Z house was accepted for at least some of the houses in the scheme but disadvantages would have to be offset by more compact planning. This drawing illustrates one idea which was explored and abandoned of putting a straight flight of stairs in the middle of the plan parallel to the party wall. Although this made a more compact plan the disadvantages were poor lighting and an awkward shaped living room. A wider frontage than could be afforded would be necessary to make this work well.



23

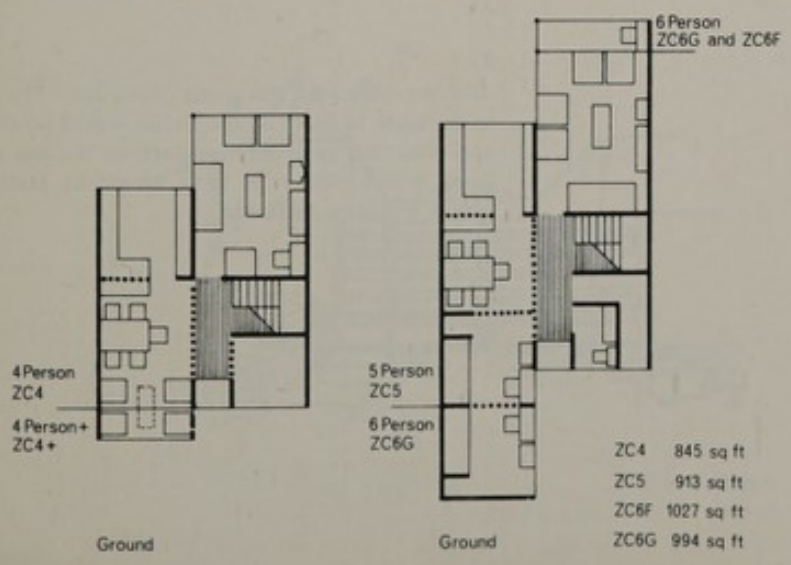
This shows the staircase placed at the front of the house. This plan is more compact than the first idea and had good access to living space from circulation space but the flexibility was poor on the ground floor in five-person and larger houses and the lighting to the dining room would be poor in all cases. As drawn, these plans were also well over area.

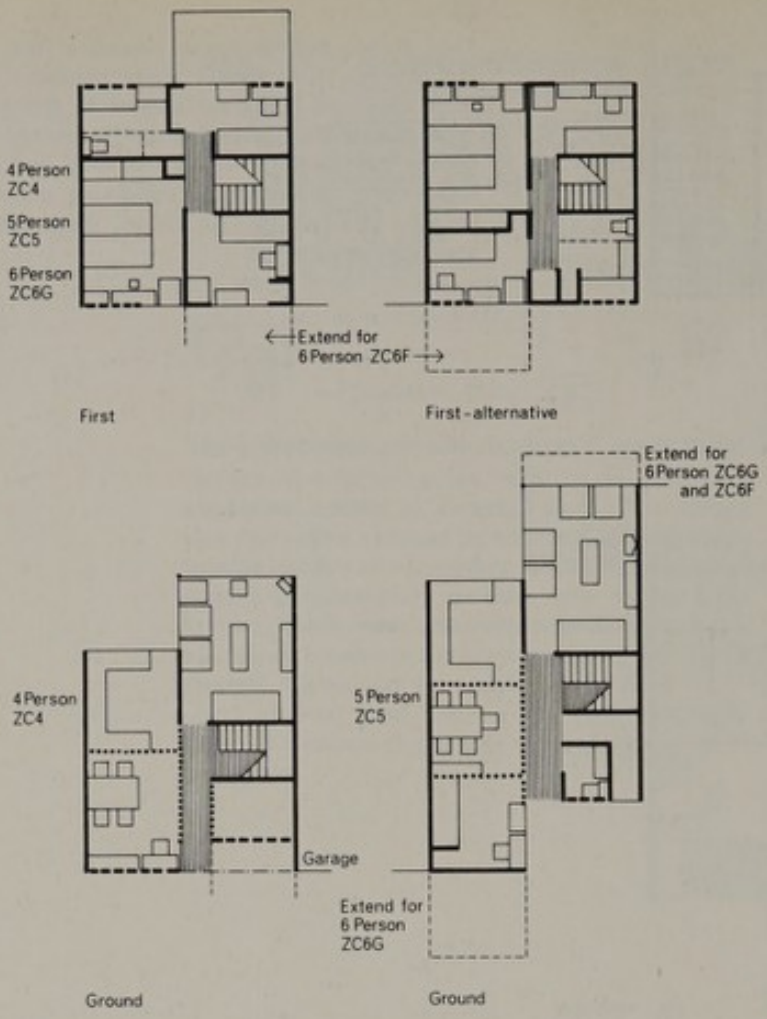




24

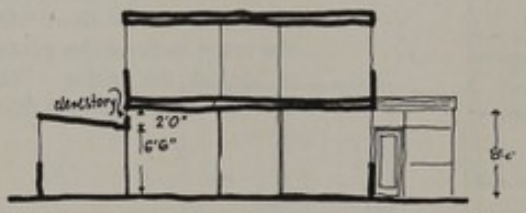
One of the chief objects was to get a satisfactory first floor layout within the compact shape considered essential for economy and clarity of structure. This development has very few projections to the first floor which is now directly above the main body of the ground floor. The staircase is back in the centre. This plan is more compact and has better ground floor disposition and space.





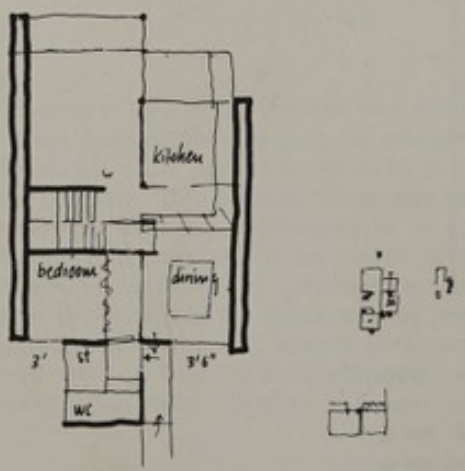
25

Further revision showing better access to kitchen and improved first floor plan with better disposition of space between bedrooms and better potential flexibility.



26

When it became apparent that the likely final plan would have a dining room which would be internal in at least some variations on the plan, alternative treatments were explored to avoid this whilst retaining other advantages. This illustration shows the idea of tilting the roof over the single storey projection to allow a shallow clerestory window. Rejected because the window would be very shallow to allow head room and would be difficult to keep clean.

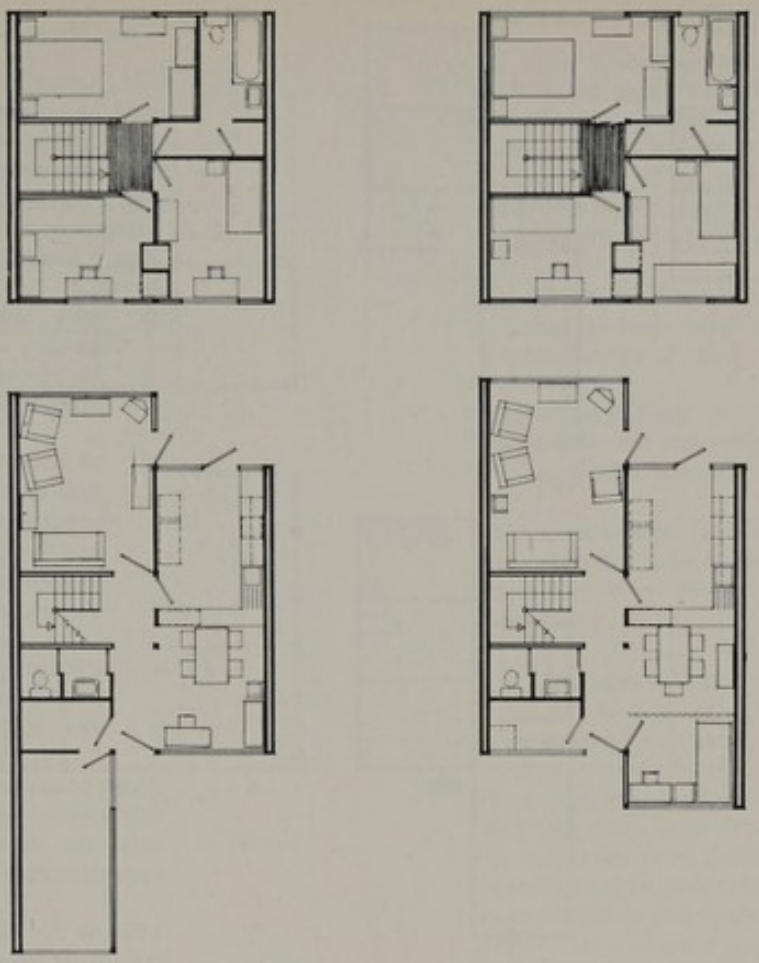


27

Another idea with the same objective. The placing of garages in front of the house would be difficult and also the bedroom so formed on the ground floor would either be very small or circulation space would be difficult.

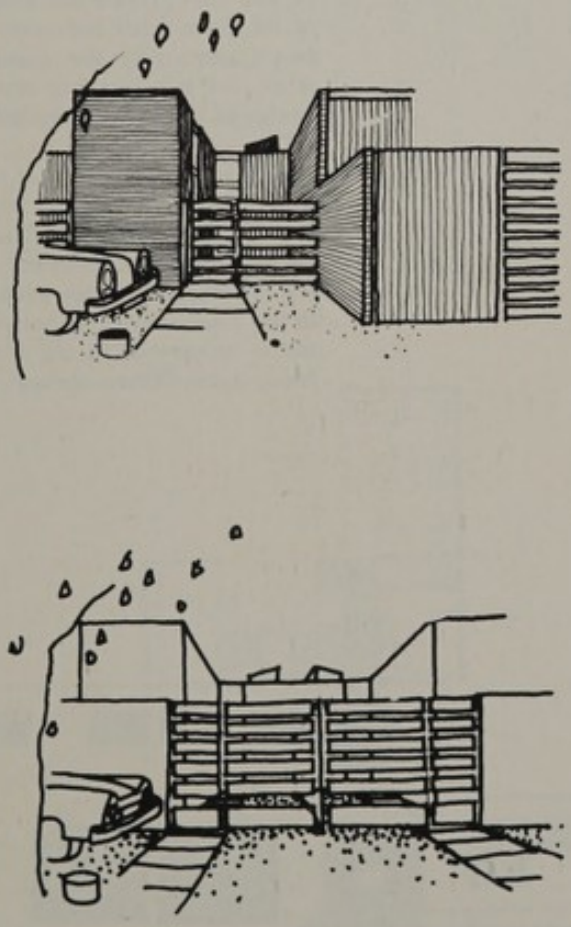
28

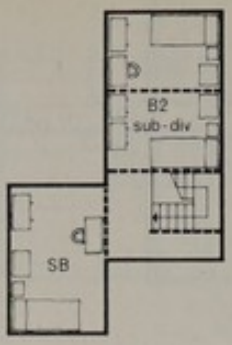
Detailed planning within the Z houses. Allocation of space between different bedrooms is improved. On the ground floor a column is necessary for structure support to give the preferred circulation arrangement. Another disadvantage is that the cloakroom is internal. These snags were eliminated on the final plan.



29

Two sketches showing the environment of the Z house. These show the enclosure of the entrance forecourts and the results of handing the houses.





Second

First

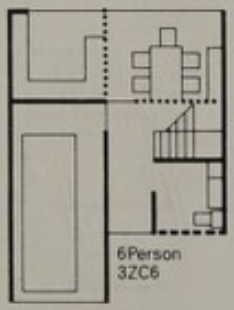
30
An attempt to develop the Z idea for a three-storey house. This was not taken any further until it became apparent that a three-storey house would be necessary for layout reasons.

Ground 5P 1330 sq ft

31
A more detailed three-storey house produced in parallel with the revised two-storey house shown in figure 24. Main disadvantage unequal disposition of space between bedrooms.

Second

First



Ground 1006 sq ft

The three-storey Z house

124. Using Z houses, it proved possible to get only 36 houses on the site. Moreover the central open space was still too broken up (figure 21). If the number of houses was to be kept at 39 or 40, and a worthwhile central space provided, it was necessary to introduce a certain number of three-storey houses for these reasons:

(a) they saved in ground floor area and depth as they could contain built-in garages, thus increasing the area available for the central open space;

(b) at least one other higher standards house type besides the one in paragraph 121 was needed to fulfil the requirements of the brief, and the Group was interested in seeing how these requirements could be applied to three-storey houses;

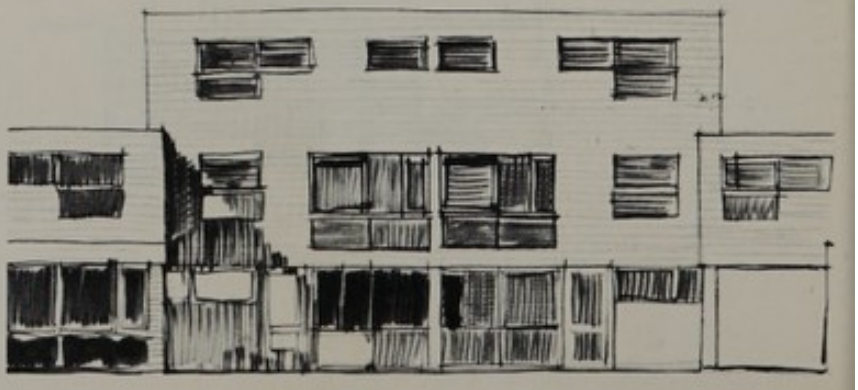
(c) they provided a dominant element in the lay-out contrasting in shape and volume with the rest of the housing.

Their planning followed the same principle as the two-storey houses in the internal space relationship, but there were not so many alternative arrangements.

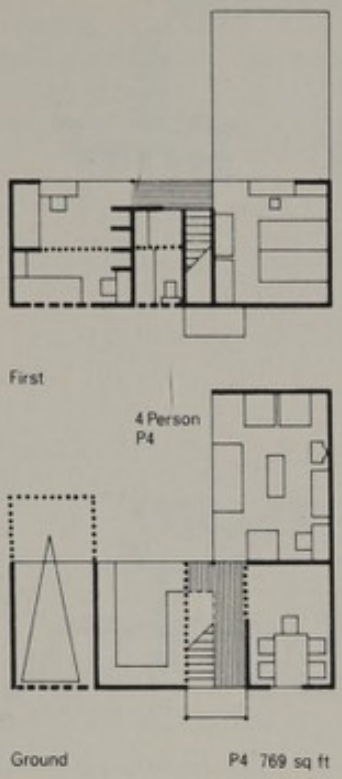
125. As the houses were to have built-in garages for layout reasons, it became impractical to have kitchen, dining and living rooms on the ground floor and it was decided to have only the kitchen and dining room there, facing the garden. The living area was on the first floor and could be cut off and kept private and could be expanded by use of the first floor bedrooms. The top floor could be all bedrooms. The standard provision of two w.cs. for a house this size is essential in the design of a three-storey house (figure 31).

126. The disadvantages at this stage were mainly in the second floor plan, which is the same as the first floor in figure 24. The sizes and shapes of the bedrooms are awkward and the plumbing lay-out is complex. These problems were overcome in the final scheme (figure 55) but the staircase had to be moved into the wider bay, so making the living room rather narrow.

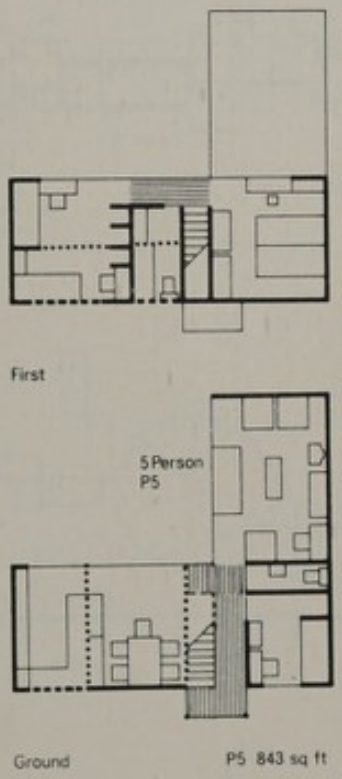
32
Sketch elevation for the three-storey house.



33
The first four-person patio house plan. There are planning problems in the relationship between dining room and kitchen and in the depth of the two-storey portion.



34
The first five-person patio house plan. Fairly near to final version except that the position of the downstair w.c. is awkward.



The two-storey P house

127. The Z and three-storey houses were now suitable for three sides of the site; but there was still the special problem of finding a satisfactory house type to place along the noisy and dirty Beckton Road if the full 39 houses were to be provided. For this a form of patio ('P') house was evolved, which had the following characteristics:

(a) the ground floor living room was projected so that the main windows were at right angles to the source of noise;

(b) the first floor was only one room deep, so that all the bedrooms could be lit and ventilated from the side away from Beckton Road.

This arrangement meant a wide frontage, and to get sufficient area on the ground floor the living room had to be projected at right angles to the main block.

128. The internal requirements were similar to those of the Z houses. The boundary wall along Beckton Road was designed to screen the ground floor effectively from noise, though not the upper floor: this was dealt with by making the first floor only one room deep. The main windows were on the side away from Beckton Road so that the rooms could be properly lit and ventilated, while on the Beckton Road side only small windows were placed, to minimise noise and dirt. Economical circulation on the first floor was obtained by running the stairs across the narrow dimension in the middle of the house. As in the Z house, the ground floor bedroom is adjacent to the central dining area.

129. Plans for four- and five-person versions were developed (figures 33, 34 and 35).

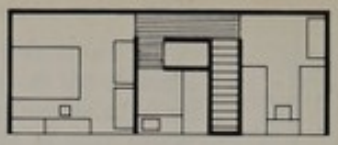
130. The five-person version (figure 34) seemed to meet all the planning requirements as well as the conditions imposed by its position on the site. Its disadvantages were a complex plumbing layout and an arrangement of bedrooms upstairs that made it more difficult to form single than double bedrooms.

131. The same first floor plan was applicable to the four-person house (figure 33) but the ground floor bedroom was replaced by a garage.

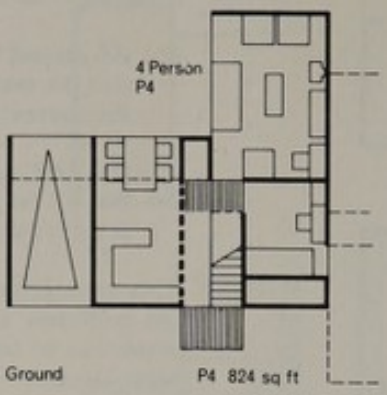
132. A six-person house (figure 36) was also designed but was abandoned because it proved too costly owing to the amount of external and party wall it contained, and because it needed a party floor where one dwelling was above another.

35

Revised four-person patio house plan with the dining room placed next to the garden and a full projection to the two-storey portion. This was accepted as a basis for the final plan although some modifications would still be necessary.



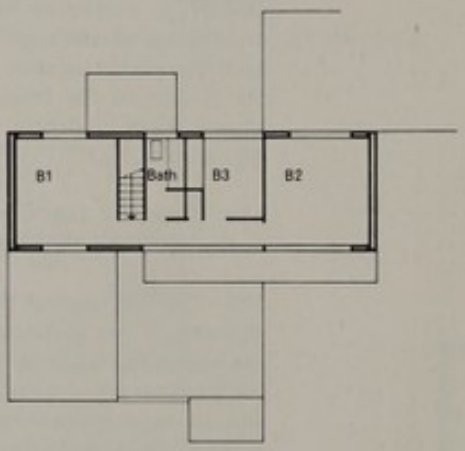
First



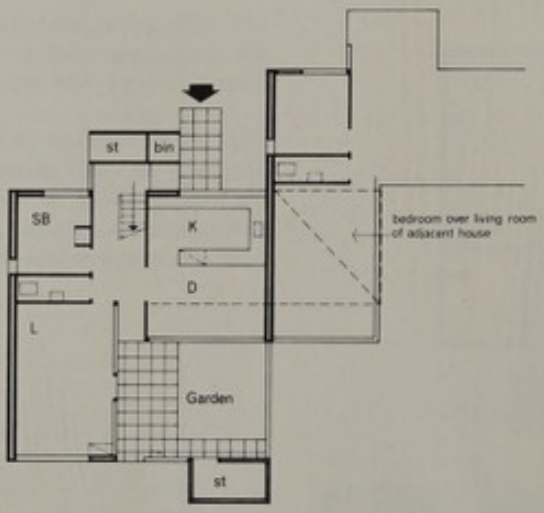
Ground P4 824 sq ft

36

A study for a six-person patio house. There was some difficulty in getting this size of patio house within a reasonable frontage, and it would have been necessary to project the additional bedroom over the living room of the adjoining house. This type was dropped for this reason and because there were already two six-person house types in the scheme.

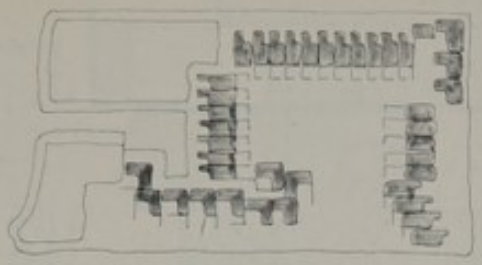


First

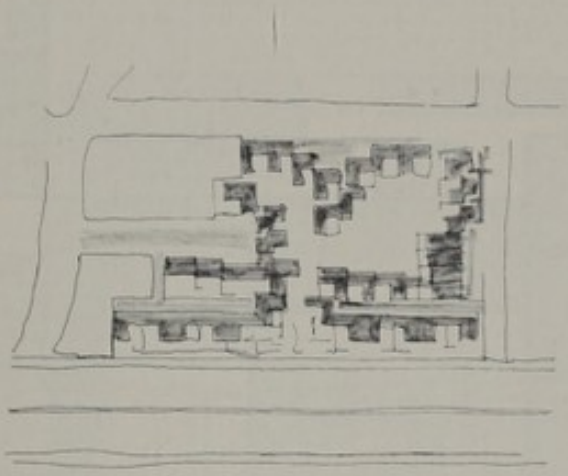


Ground 6P 1120 sq ft

37
A further development of the layout showing pedestrian culs-de-sac in their final position.



38
A development from figure 37 showing the maximum number of dwellings placed on the perimeter of the site in straight terraces. An attempt to manage with only one pedestrian cul-de-sac. The final basis was a compromise between these two studies.



Final stage of the layout

133. The ideas evolved in paragraphs 89 to 132 were developed further till they emerged into a complete layout (figure 39) incorporating all the agreed features:

(a) medium-frontage Z houses on three sides of the perimeter, Ravenscroft Close, Kildare Road and Douglas Road;

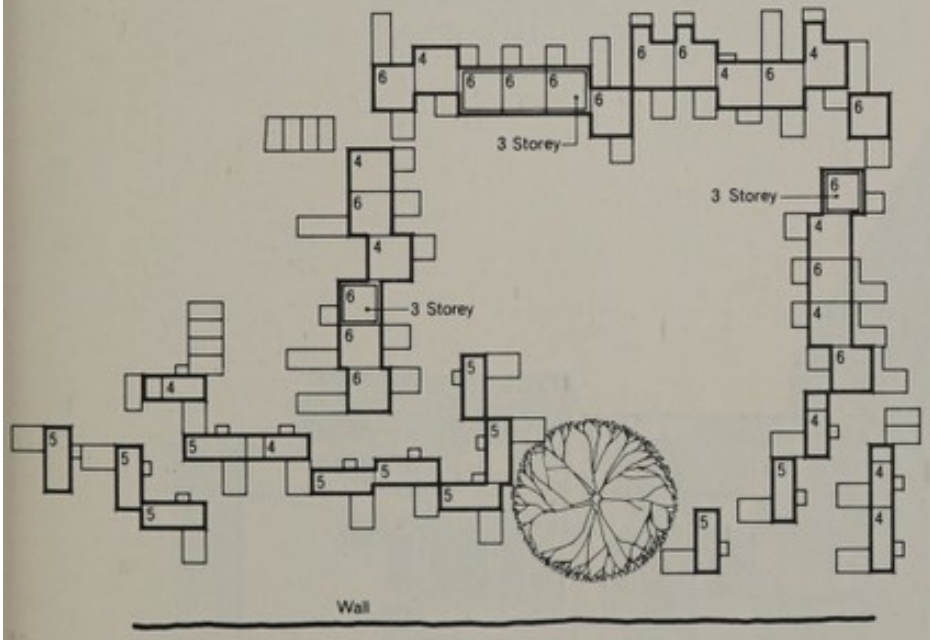
(b) wide-frontage P houses on the south side behind the Beckton Road wall, grouped round two pedestrian culs-de-sac; a few P houses faced the old road frontage of Ravenscroft Close and a road hammerhead on its south side; the furthest house was 150ft from the carriageway and all the dustbin stores would be accessible to collection from the house fronts;

(c) direct vehicle access to Z houses; garage or hardstanding to all houses; pedestrian courts to the 5P houses;

(d) corner terrace houses set forward so as not to break up the 'single building' character*;

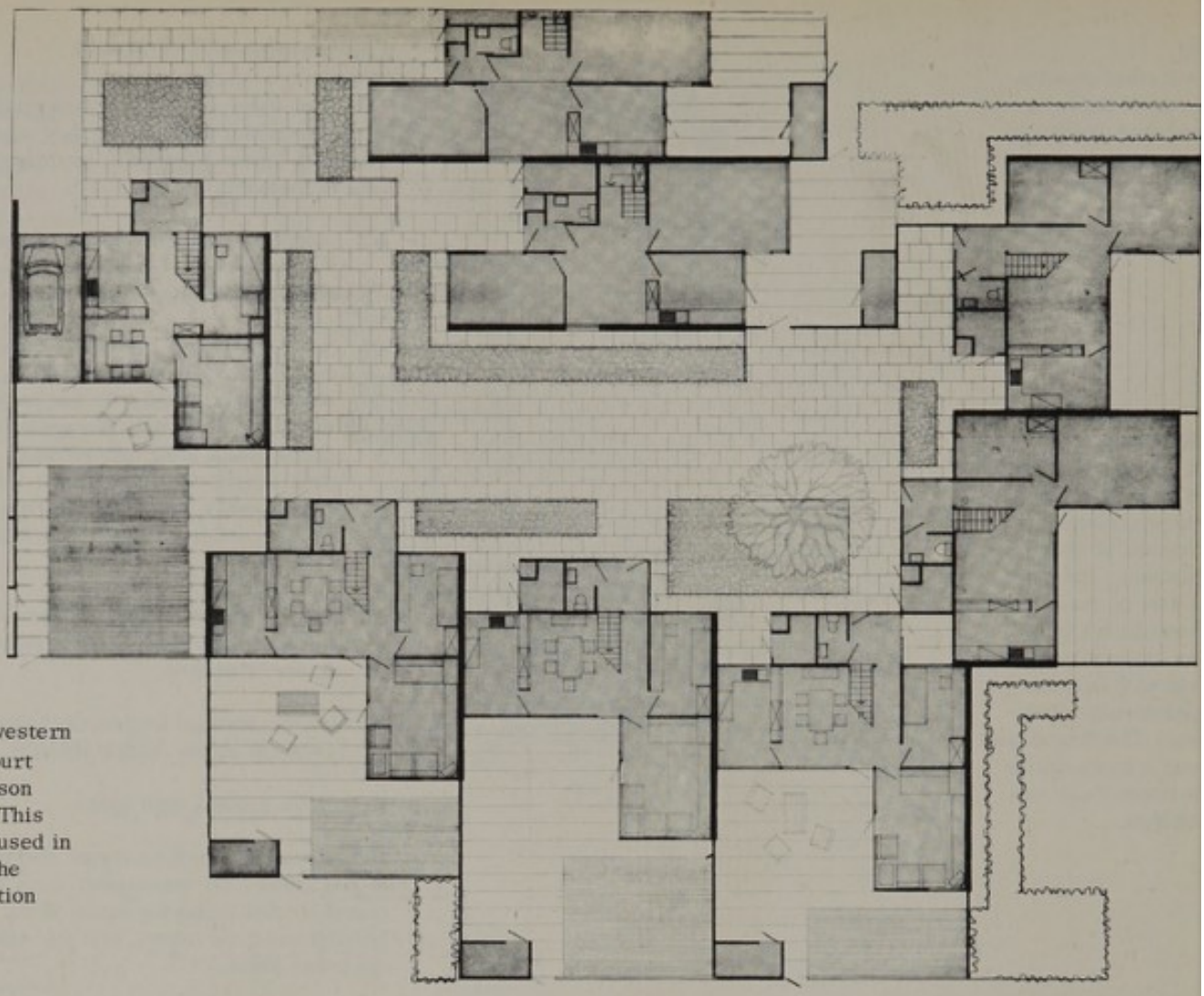
(e) large central open space.

134. From this point no major change was made in the layout: all subsequent work was concentrated on developing the detail of the terraces and co-ordinating the layout with the development of the house plans.

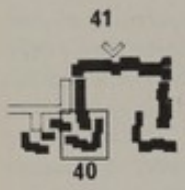


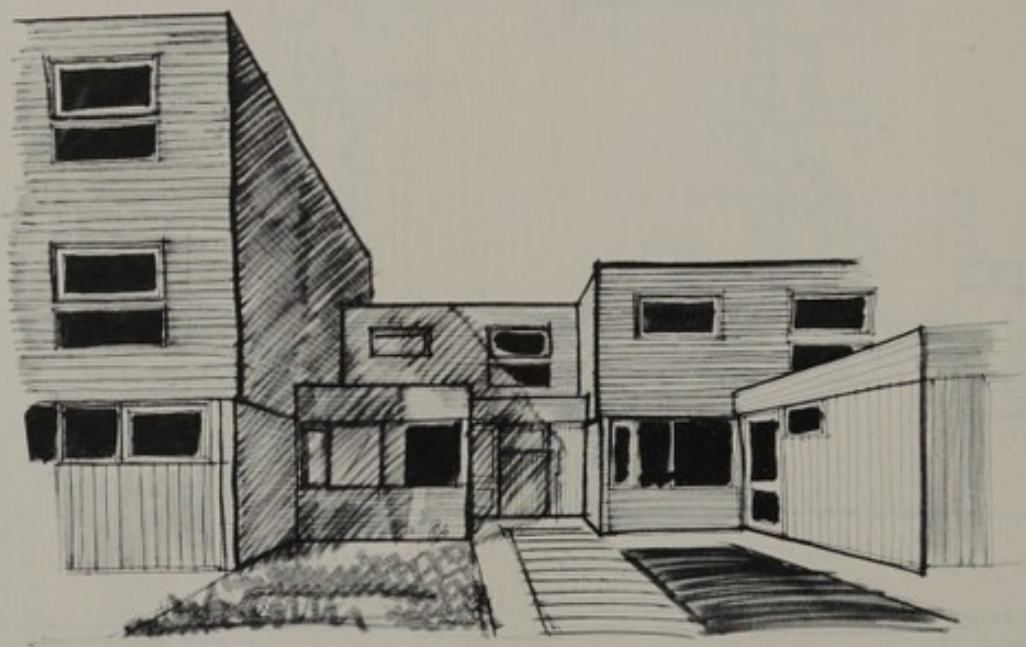
39
The first version of the final layout. The placing of the various house types has yet to be rationalised and made more economical in external walling.

* At first these corner houses were thought to be sited unpleasantly close to the flanks of the terraces on the return, but careful examination established that they had enough daylight and garden space although their outlook was more limited than that of the other houses in the scheme. They had of course access to the central open space. The alternatives were to omit them and accept a drop in density or set them back and let them lose the connection with the centre. It was decided to retain them as they were.



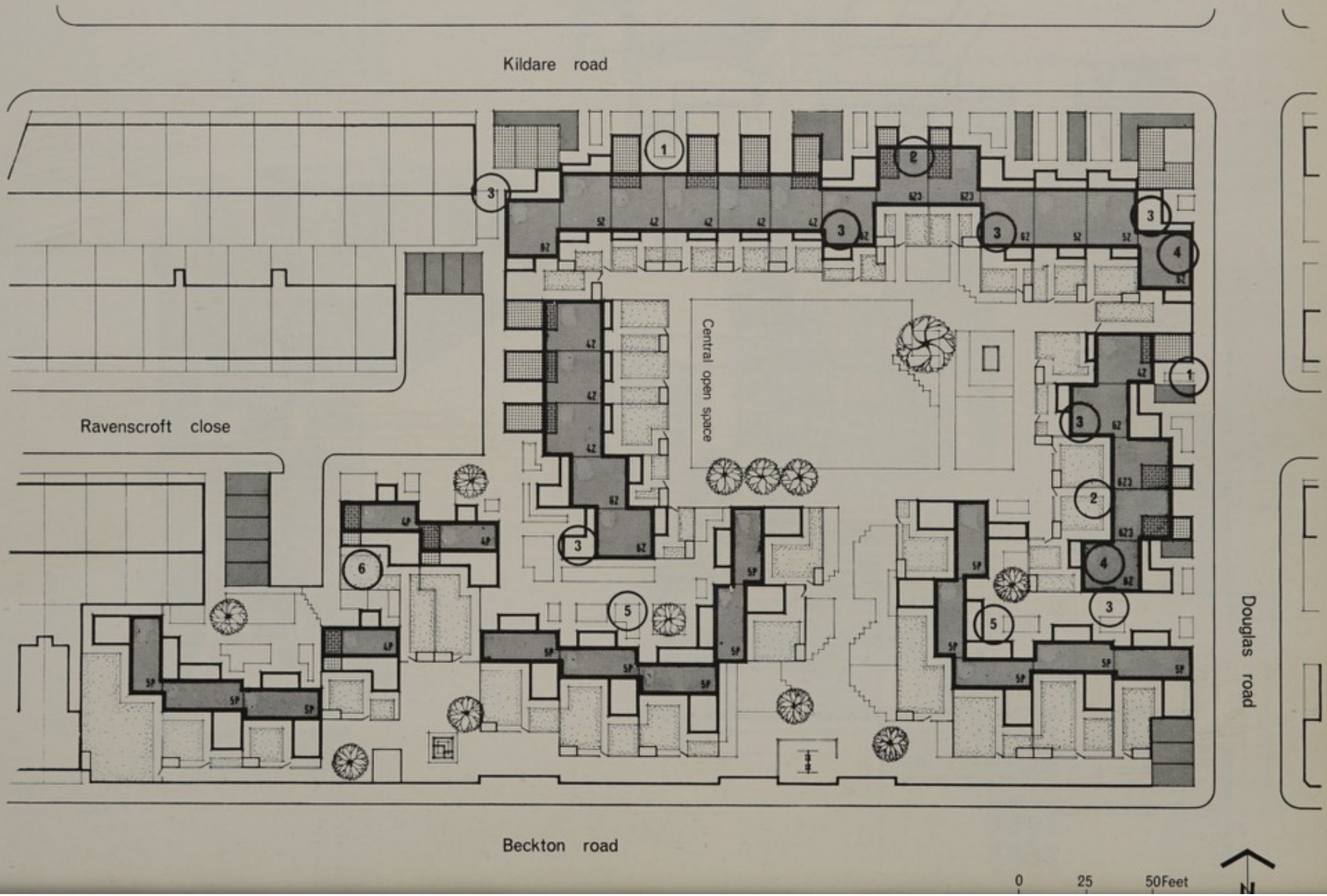
40
Study of the western pedestrian court with five-person patio house. This drawing was used in working out the complex junction details.





41
Besides the block models, detailed studies were made of particular areas. Sketch shows a 6Z house between a three-storey house and a 4Z house. This arrangement occurs along the Douglas Road frontage.

42
Sketch of Douglas Road from Ravenscroft Close.


Kildare road
Ravenscroft close
Central open space
Douglas road
Beckton road
0
25
50Feet
N

The detailing

135. It was realised early on that one of the main problems was to create a satisfactory design for houses of differing types with a ground floor bigger than the first floor. This meant that the massing of the scheme was complex and without careful planning might become chaotic. It was also felt that this very complexity could be made to produce an interesting environment with equal justice to the character of the individual houses and to the unity of the scheme as a whole. The scheme was therefore treated visually as a single continuous building. Figure 43 shows the principles governing the positions of the various house types.

136. Where because of the layout a party wall was partly exposed, the whole wall had to be a cavity construction. It was thought that glazing to the floor would improve the lighting, particularly in the living room where it would make it easier both to look in and to look out. However, on the access side a blank fill-in material was needed to ground floor rooms. Smaller windows were required upstairs, and they left larger areas of wall blank. This contrast between ground floor and first floor requirements made part of the design.

137. The need seemed to be for a continuous 'skin' on all surfaces above ground floor window head, with surfaces below that either in glass, or brick, or 'skin' covering the solid in-fill surfaces. This would give visual unity and would be sensible construction as heavy materials, such as brick, would be confined to extensions of party walls and 'skin' would be on light framing in in-fill areas.

138. Timber boarding was the only material available within the price limits which was flexible enough for all conditions and good in appearance and tough enough for the few places where boards were used down to the ground in exposed conditions and which could be fixed over light framing, over the ends of party walls or over blockwork where party walls are extended to become external walls.

43
Notes refer to the final layout opposite showing the basis on which the various house types were arranged in relation to one another.

Notes

1 Z houses with integral garages in straight terraces with the front of garage 5ft back from back of pavement at Kildare Road and with the front of garages at back of pavement elsewhere.

2 Three-storey houses in pairs with similar relationship to pavement as two-storey Z houses. Pairs placed for visual effect.

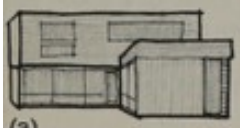
3 6Z houses set back to allow a window to be placed in dining room. Distance of set-back minimised by either being adjacent to 6Z3 houses or at ends of terraces.

4 Corner houses set back to give adequate lighting and contact with central open spaces.

5 5P houses in terraces staggered round pedestrian courts.

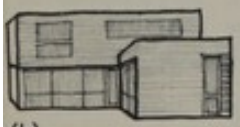
6 4P houses with integral garages on road access.

44
Sketches showing alternative ways of handling timber boarding.

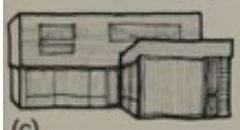

(a)

(a) Scheme as first drawn with vertical board infill on same plane as horizontal boards - no division between or frame around.

Difficulties with no drip at head or cill of vertical boards.

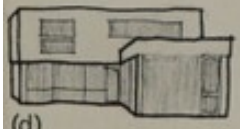

(b)

(b) With all horizontal boards carried down as uninterrupted skin.


(c)

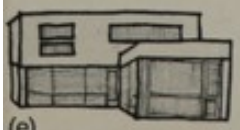
(c) As for **(a)** but with vertical board frames and/or painted or stained different colour.

Objections to same cladding material framed and unframed on same building.


(d)

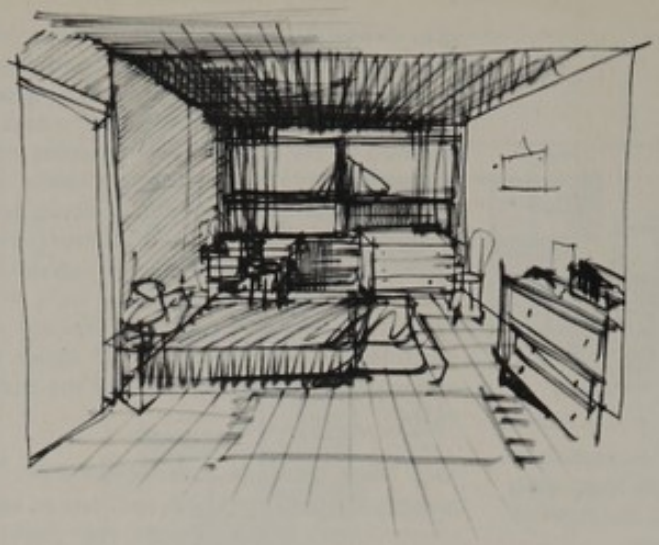
(d) As for **(a)** but with change of colour on same plane.

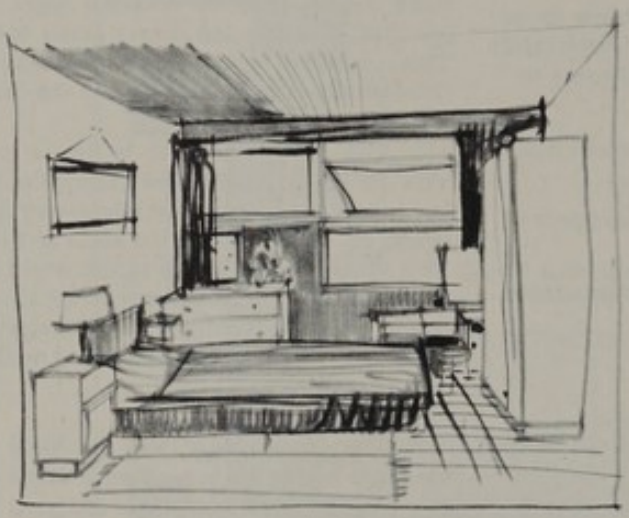
Arbitrary change of colour should be confined to 'isolated' areas of boarding.

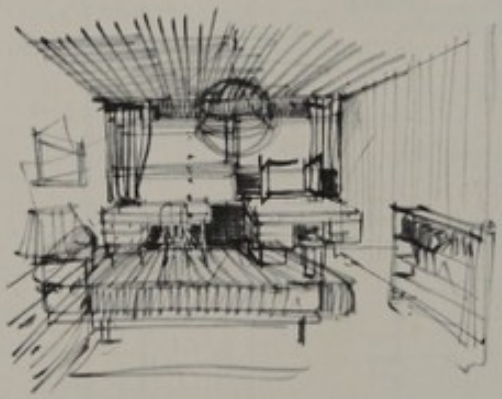

(e)

(e) Blind panels of painted ply or glass with back-up.

Expensive - why have two materials to do the same job in different places?







45
Studies showing how the window forms which were being considered would affect furniture arrangement, curtaining, etc. in the bedrooms.

Windows

139. The size and position of the windows had of course to be taken into account, and especially their effect on the arrangement of the furniture and the various possible uses of the room, e.g. as a study as well as a bedroom, and on looking out, leaning out and the avoidance of overlooking. So it had the advantages of lighting from two sides and its effect on such factors as the sufficiency of wall space and on privacy.

140. The windows had to provide an opening area for daytime ventilation, and adequate night ventilation without draughts. They had to be easy to clean and, on the first floor, accessible for cleaning from inside. Curtains had to be easy to fix and operate.

141. On the ground floor side-hung windows in glazing frames were used, with some controllable ventilation at head height. On the first floor the window unit evolved was a horizontal pivot unit about 4ft 9in x 2ft with an occasional sub-light. This was considered suitable, with minor exceptions, for all the requirements as it allows both cleaning from inside, including the sub-light, and good ventilation, and the height at which it is used here keeps draught away from bedhead level. Moreover,it could be used for virtually every kind of window planned including high level ground floor windows. To simplify curtaining of horizontally pivoting windows, fixing battens were provided and wherever possible windows were kept away from the corners of rooms. Wherever practicable the windows of ground floor living and dining rooms were extended to the floor as it was felt that this would improve the lighting and feeling of spaciousness in comparatively deep rooms and increase the visual contact between inside and outside spaces.

142. There was some disagreement in the team whether so much glazing was necessary. The advantage of windows on two sides of a room was appreciated, but there was fear of their effect on privacy and that they might reduce wall space to the point where it was insufficient for furniture and decoration.

143. As has been seen in the footnote to paragraph 133(d) alternative solutions to the problem of lighting and outlook for the corner houses had to be found.

Demountable partitions

144. It became obvious that some of the houses could be used more flexibly if partitions were introduced that could be erected or taken down at the tenant's wish. An instance was the two-storey Z house where removing the wall between the central dining area and the ground floor bedroom would greatly enlarge the total living area and improve the lighting. In the three-storey house the first floor living room could be enlarged by taking away the wall to one of the bedrooms. The 5P house could have four bedrooms with a partition and three without.

145. The decision whether to have the partition up or not would have to be left to the tenant because the nominal size of the house did not inevitably dictate the number of inhabitants and in any case families differ in habits. The choice, within the required price level, was between a light, easily movable screen with little or no sound insulation and a heavy, less mobile one with a higher insulation value.

146. The latter was chosen. It takes an hour or two's work to put up or dismantle, and is not intended to be moved every week or month, but only as the composition of the family alters and the family living pattern with it; for example, by a son or daughter leaving home.

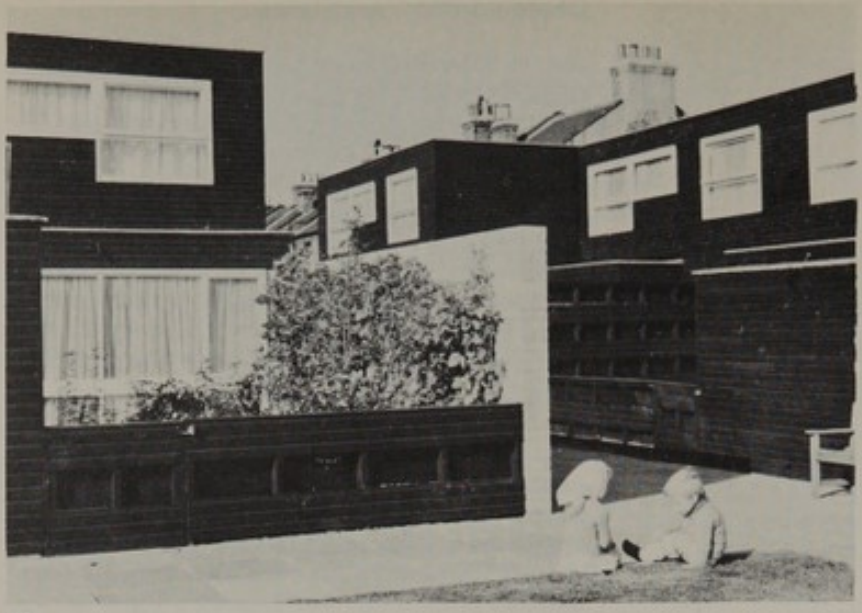
147. One of the problems in dismantling a partition is storing the panels. In West Ham the Housing Manager agreed to take them down and remove them from the home to a central store if the tenant wishes.

16
Sketch of a Z house living room.

Cupboards

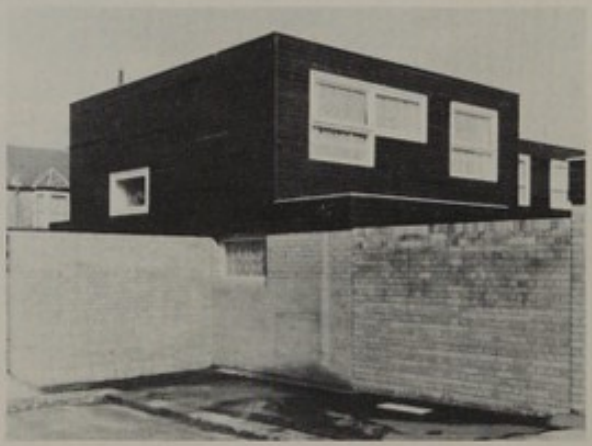
148. At the same time it was decided to provide cupboards for every bedroom after the first.

149. Usually bedroom cupboards are built into the room, but with demountable partitions this causes complications. Moreover, while some people like cupboards, others find them a waste of space and a bar to arranging the furniture as they would like. The solution chosen was to provide free-standing cupboards in all bedrooms except the first, which the Housing Manager will remove along with the partition if the tenant does not need them.



47
The NE corner of the central open space.

48
The NE corner of the central open space with two 3-storey houses on left.



49
6Z house, NW corner of site.

The central open space

150. The central open space (see plan on page 34) is roughly half an acre in size. The grassed area in the middle is 200 sq yds; the precast concrete paving running round it is 8ft 0in wide. The level of the paving is raised 6in above the level of the grass and the edges are protected by a concrete curb. This wide path is to allow children to speed round on scooters and bicycles, to provide space for seats and prams, and to link one part of the site with another. At one side of the grassed space a 35ft lime tree has been planted. 12 teak seats have been provided.

151. The planted areas on either side of the narrower paved path leading southwards form a screen between the central open space and the adjacent gardens. A balance was attempted in deciding the height and type of fencing, between the desire for privacy and for an outlook. Tall fences were provided between gardens for privacy, and low fences at the ends of gardens on to the common open space to give an outlook.

152. The access path to the maintenance gate into Douglas Road is 10ft 0in wide.

153. The climbing frame is placed close to the wall so that children can see the traffic in Beckton Road. The other play equipment is scattered to prevent too much play and noise in any one spot and give children the chance to run from one place to another.

154. The paths to the south of the site ensure that every house has access to the central space.

155. The central area was considered more as a garden containing some play equipment (the actual area of playspace is 627 sq yds) than as a children's playground. It was not planned to cater for the play of children over 10.

156. In contrast to the large grassed area, the rest is broken into smaller spaces, some sheltered by walls, some adjacent to planting. Both large and small spaces were provided to cater for different needs.

157. The cost of the communal walkways was £3,250; of the grassed and planted areas £1,400; of the play equipment £250; and of the fences £1,300.

Transformer chambers

158. In accordance with the Council's policy of assisting the London Electricity Board in providing transformer chambers in the area, the Board were given facilities for two chambers on this site as they had requested. It was agreed that these chambers, each 10ft 0in by 12ft 0in internally, should be designed as part of the scheme. One is situated on the north-east corner of the site with some garages. The other is on the southern boundary, incorporated with the boundary wall and opening into Beckton Road.

The house types in their final form

The two-storey Z house

159. The 5Z and 6Z houses are the same internally except that the 5Z has a single and the 6Z a double ground floor bedroom. The 4Z is to a higher standard; it has no downstair bedroom but has an integral garage and a large dining hall.

The main points are:

Frontage
Two bays, 10ft 6in and 8ft 6in.

Kitchen 92 sq ft
Outer door opens on to garden.

Fittings in sequence: worktop - cooker - worktop - sink - worktop. Space for a small table for meals: snacks can also be served on the counter top under the hatch. Also 25 cu ft of space for refrigerator, washing machine, etc.

In the Z houses the sink was some distance from the hot water cylinder, so an instantaneous gas water heater was provided. A small one was chosen to avoid the need for a flue.

Dining area
Serves also as a living space and playspace, in conjunction with kitchen or bedroom.

Kitchen and dining areas are connected by an open hatch above a counter top and by a door with glazed upper panel. The hatch can be closed by a holland blind. Above it are wall cupboards; above them, at ceiling-height, a 10in deep continuous strip of glazing the width of the kitchen to give borrowed light to the dining area.

In the 5Z house this central space gets its light from the windows in the front and back outer walls: in the deeper 6Z house it gets side light from a flank wall.

Living room
Not part of the circulation; it can be kept tidy and quiet for grown-ups. Gives alternative access to kitchen.

Downstair bedroom
Can also be used as daytime playroom or for hobbies or study. Suitable for an elderly or sick person, being near w.c.

Windows kept back as far as possible from the path outside with provision for a planted area outside to screen them from passers-by.

If it is not needed as a bedroom, the partition can be taken down to make more space.

Upstair bedrooms
Main double bedroom 116 sq ft. Two single bedrooms of 116 and 66 sq ft.

The first single bedroom can be used as a double, so providing an extra bedspace in all three types, allowing the downstair single bedroom in the 5Z to be used as an extra living space, or the downstair double bedroom in the 6Z to be used as a single when the house is fully occupied. The partition between these two upstair bedrooms can be taken down to make one large room.

Downstair w.c. and basin
Saves children washing in the kitchen; and shiftworkers or anyone in the downstair bedroom can wash without disturbing others.

The three-storey Z house

160. The living room and two single bedrooms are on the first floor. A demountable partition enables the living room to be either across the back or from front to rear. Taking it down makes a larger living room by sacrificing a bedroom.

The two-storey P house

161. There are two versions, five-person (5P) and four-person (4P).

5P

Frontage 30ft 0in

Entrance
In a single-storey projection containing the store, and the bin store which is accessible from outside.

Dining area 120 sq ft
Connected with kitchen by stable door whose lower half can be kept shut to keep children from running in and out of the kitchen.

Living room 156 sq ft
At back, looking on to garden. Where possible, another window in end wall gives light from two directions.

Kitchen 89 sq ft
Same equipment as two-storey Z houses. In the 5P house the door to the garden is placed in the dining area because wall space in the

kitchen was needed for a table or other equipment. It then formed a direct access from the front of the house to the garden.

Downstair bedroom 88 sq ft

Upstair bedrooms

Main double bedroom 120 sq ft. Second double bedroom (127 sq ft) can be partitioned into two singles, one being 85 sq ft and the other cabin-size, 42 sq ft. The cabin bedroom takes a bed, a chair and some shelving or a wall cupboard. Intended for younger children.

The main two-storey part of the house stretches the full width of the frontage and is 12ft 0in deep, giving the upstair bedrooms external walls and windows on both sides, but on the Beckton Road side windows are small to minimise noise and dirt. Having windows on both sides also allows the second bedroom to be subdivided.

4P

Built-in garage

Reduces frontage of downstair living accommodation to about 20 ft and necessitates an increase in ground floor depth.

Entrance

Lobby but no downstair w.c.

Dining room area	85 sq ft
Kitchen	66 sq ft
Living room	133 sq ft
Downstair bedroom	88 sq ft
Upstair bedrooms	
Main double	126 sq ft
Single	88 sq ft

Storage

162. In all the houses storage space has been split between front and back. This is because there is no outside connection between back and front and because storage space is needed at each entrance. About 28 sq ft is provided by the front door and about 30 sq ft in a garden shed at the back - a total of 58 sq ft against the Parker Morris recommendation of 50 sq ft.

Space standards of the house plans

163. The 'net floor area' space standards of each house type in the scheme compared with those recommended in 'Homes for today and tomorrow' are:

Parker Morris minimum	Scheme		Percent. excess of scheme over minimum
800 sq ft	4P	833 sq ft	4%
910	5P	912	-
800	4Z	880	10%
910	5Z	957	5%
990	6Z	1009	2%
1050	6Z3	1202	14%

Higher standard houses

164. As can be seen from the table the 4Z and 6Z3 houses were designed to higher standards than the recommended minima, with a corresponding increase in their cost limit. There are eight 4Z houses and four 6Z3 houses, which means 12 higher standard houses out of 39, or roughly one-third.

165. Higher standards in the 4Z houses are:

(a) a second w.c. which the minimum standard does not require for a four-person house;

(b) net floor area 880 sq ft against minimum standard 800 sq ft;

(c) two bedrooms heated (the minimum standard does not provide for heating of bedrooms);

(d) a built-in garage; though no specific minimum standard is recommended for garaging as distinct from parking, a built-in garage is considered a higher standard than a hard-standing or a garage away from the house.

166. Higher standards in the 6Z3 houses are:

(a) net floor area 1202 sq ft against minimum standard 1050 sq ft;

(b) one bedroom heated;

(c) a built-in garage, as 165(d) above;

(d) this house has five possible bedrooms, which for a six-person house is above normal standard and higher than that of the other six-person house in the scheme, the 6Z.

167. Many of the other houses have floor areas somewhat above the recommended minima, but without any increase in the cost limit.

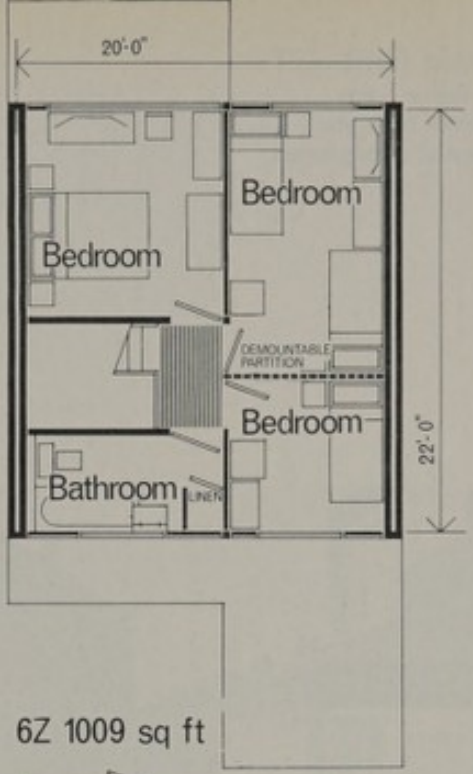
The final plans

0
louse type Z
-person house (4Z).

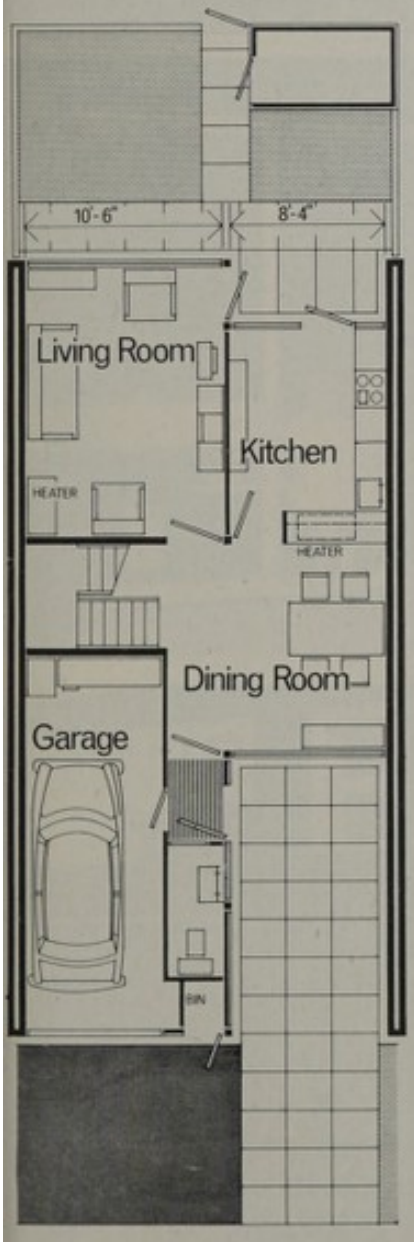
louse type Z
-person house (5Z).

ouse type Z
-person house (6Z).

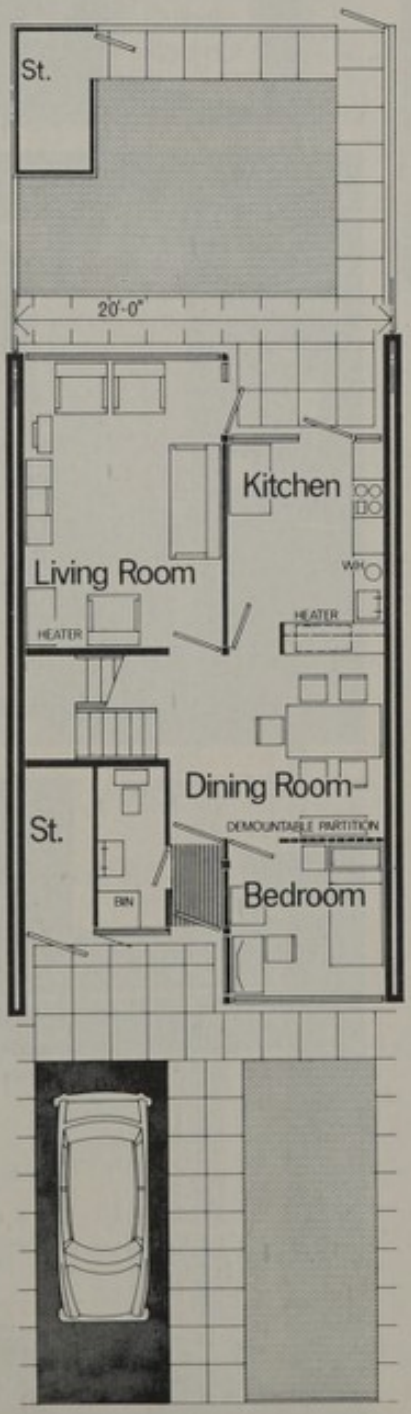
Upper floor of 4Z,5Z and 6Z house types



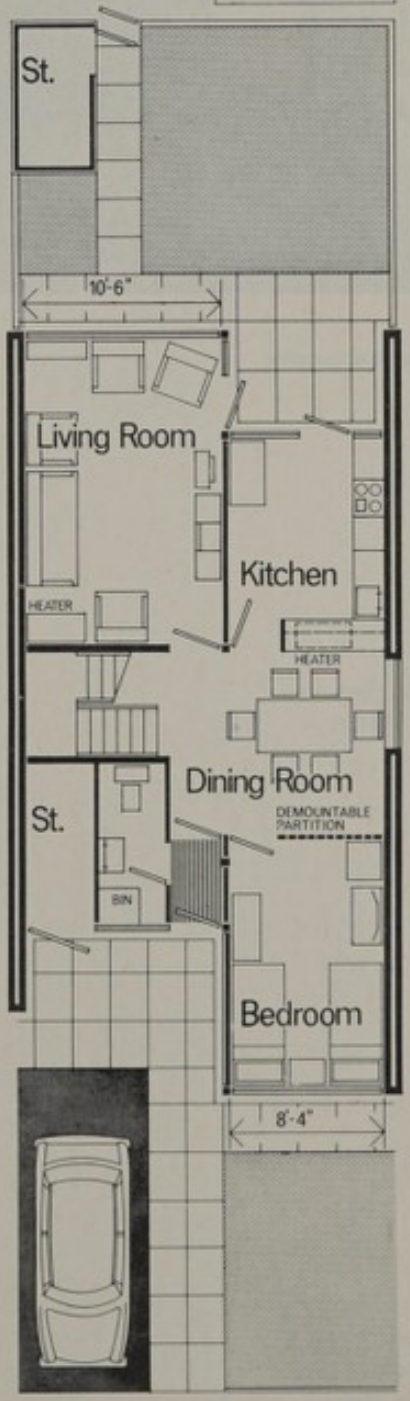
4Z 880 sq ft



5Z 957 sq ft



6Z 1009 sq ft



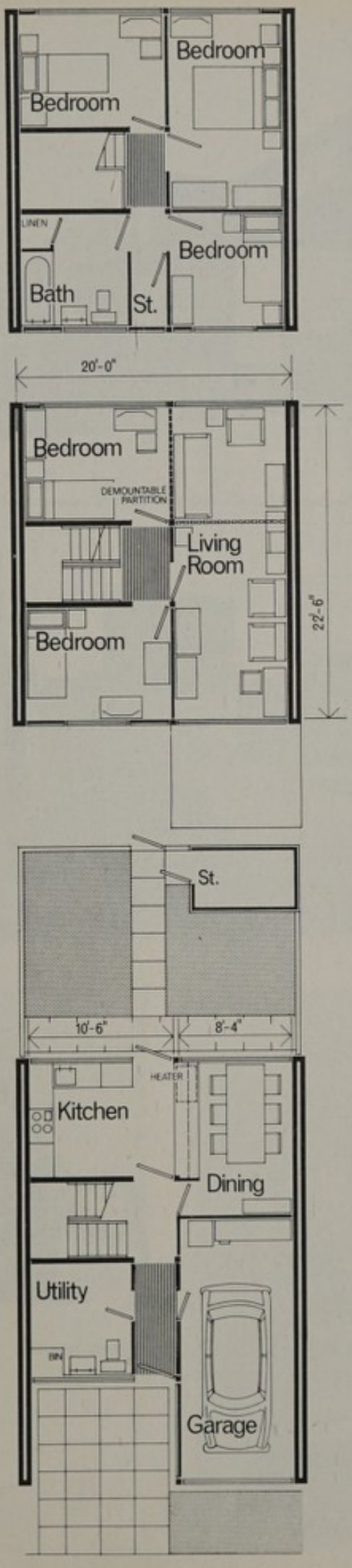
51
6Z house - the kitchen from the internal dining area.

52
6Z house NW corner of site.

53
On the kitchen step of a two-storey Z house.

54
Rear view of the Z house looking into the living room.

55
House type Z
6-person house (6Z3)
(3 floors).

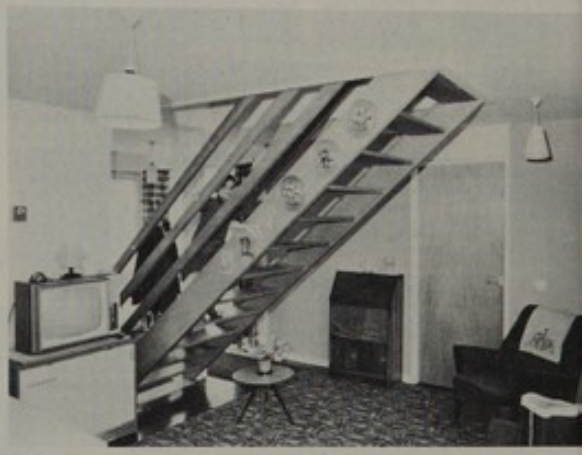


6Z3 1202 sq ft

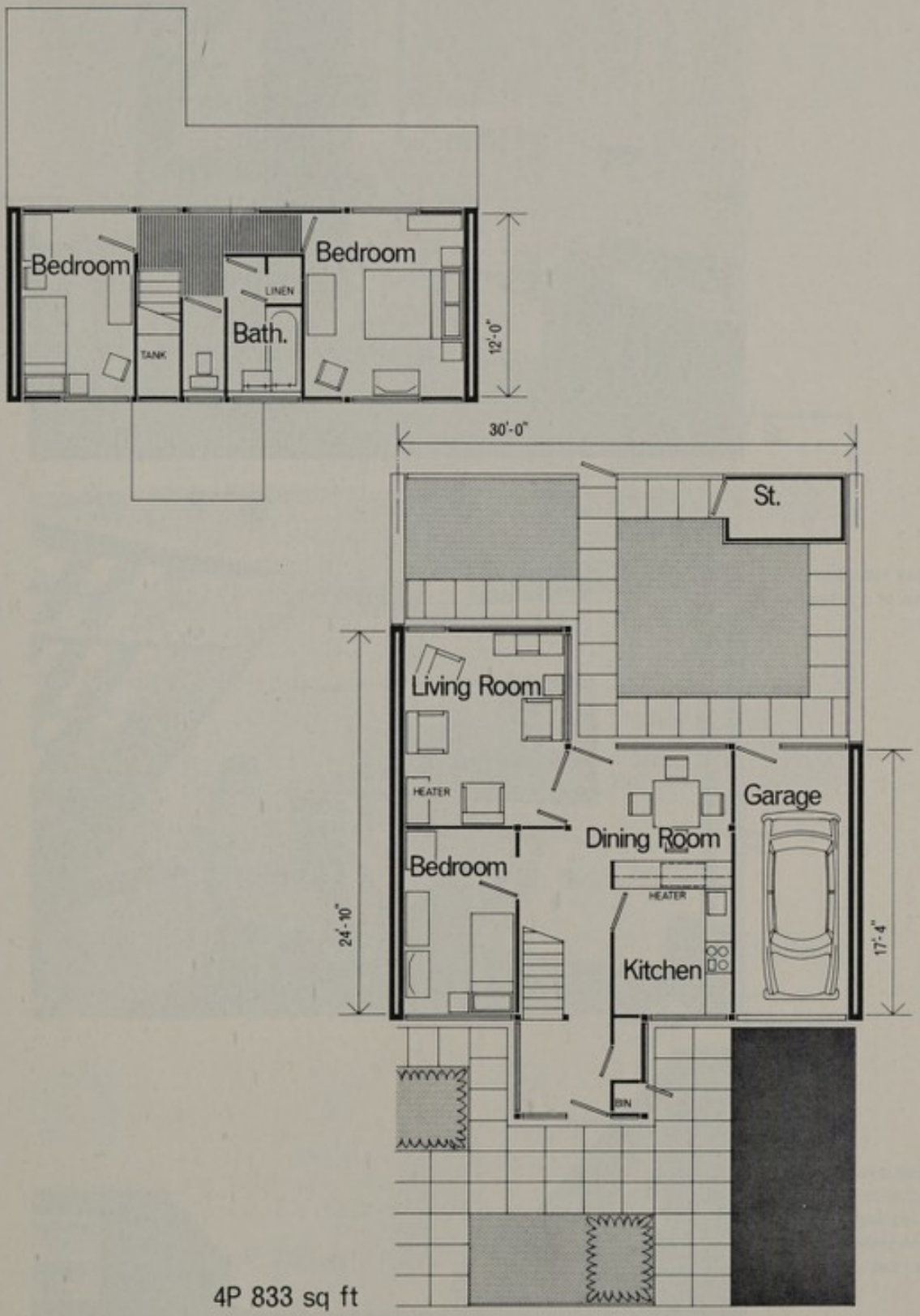
56
4P patio houses in Ravenscroft Close.

57
Ravenscroft Close looking towards 4P patio house.

58
At the door of a 5P patio house.

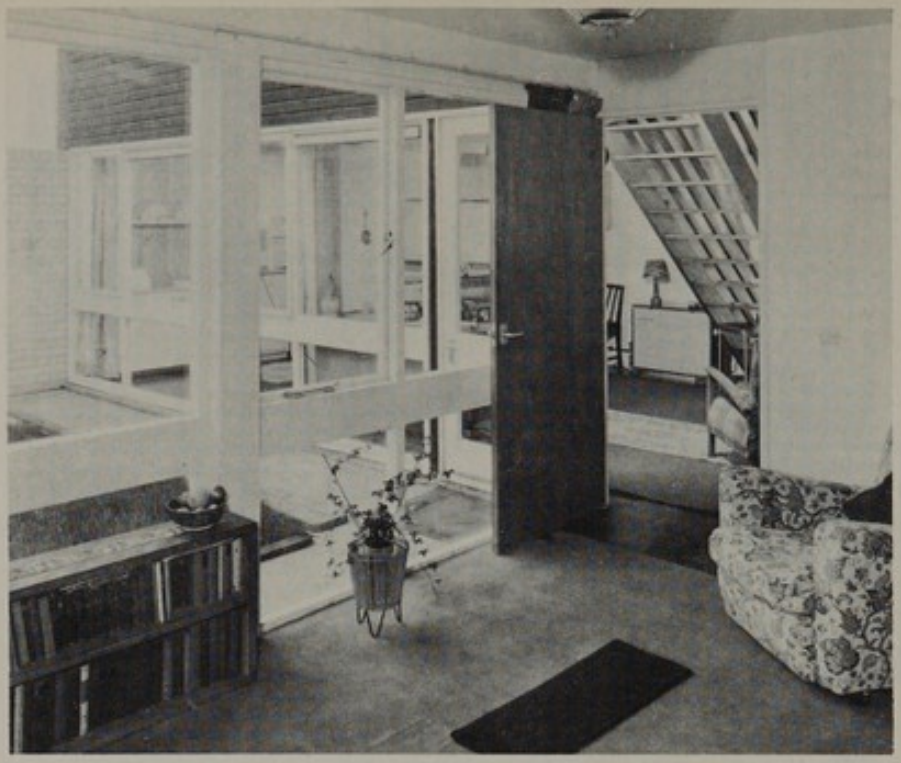


59
5P patio house.


Bedroom
Bedroom
LINEN
Bath.
TANK
12'-0"
30'-0"
St.
Living Room
HEATER
Garage
Dining Room
Bedroom
HEATER
24'-10"
17'-4"
Kitchen
BIN

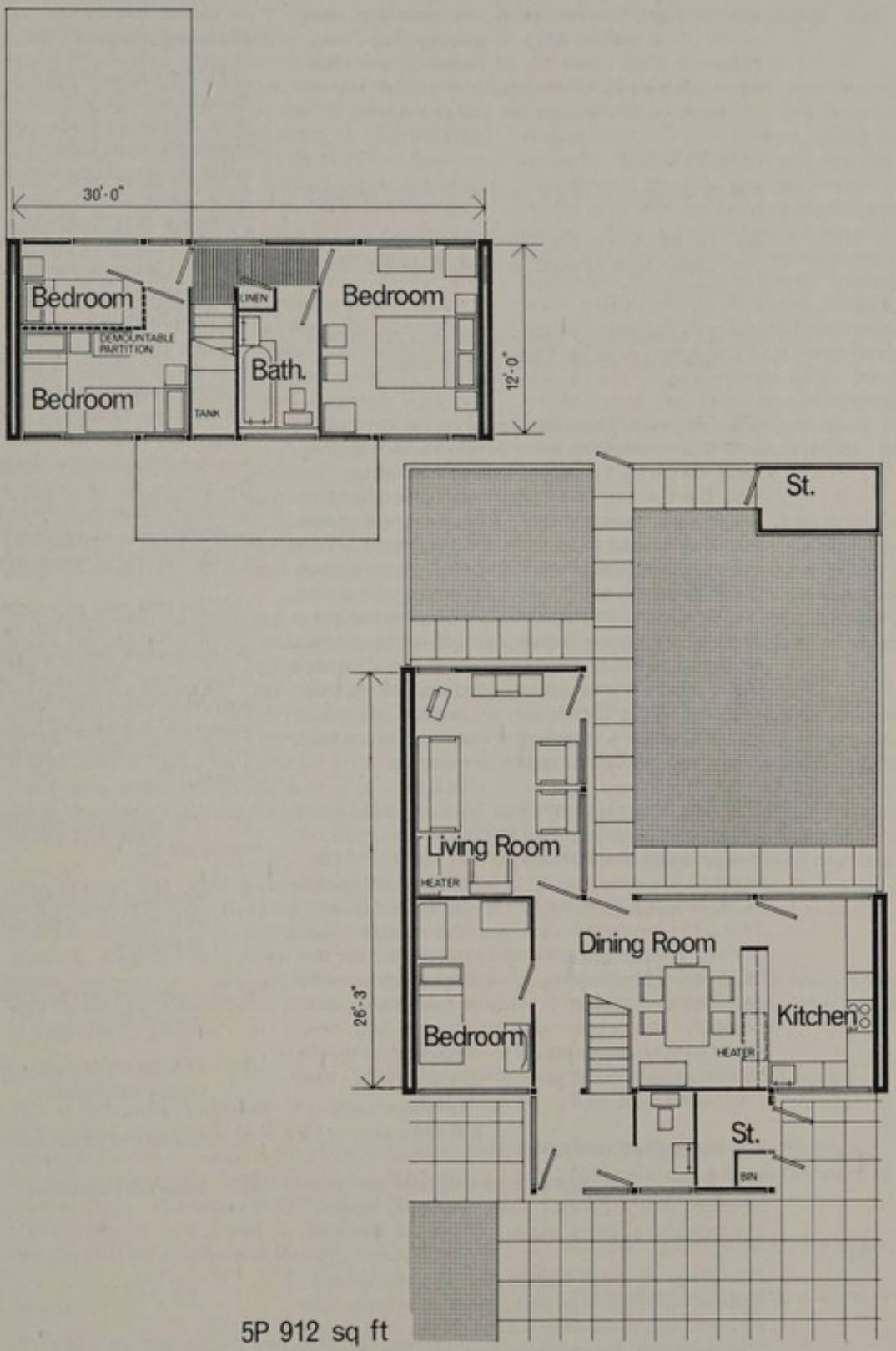
4P 833 sq ft

61
View from living room looking into the dining room and kitchen of the 5P patio house.



62
Looking into the kitchen of a 5P patio house.

63
Looking down the 5P entrance side of patio houses in the eastern pedestrian cul-de-sac.


30'-0"
Bedroom
DEMOUNTABLE PARTITION
Bedroom
LINEN
Bath.
TANK
Bedroom
12'-0"
St.
Living Room
HEATER
Dining Room
Kitchen
HEATER
26'-3"
Bedroom
St.
BIN

5P 912 sq ft

Costs

168. Three main costing operations were carried out during the design stage of the project. First, a cost target was set before any drawings were made; then preliminary cost estimates were prepared from a number of sketch plans; these were followed by more detailed cost estimates of the various elements as the design evolved.*

The cost target

169. The purpose of the cost target was twofold:

(a) to provide a cost limit acceptable to the client with special reference to the rents obtainable;

(b) to establish a framework of cost within which the design team should work.

170. The cost target was based on the estimated cost of a conventional site development with the local authority's existing types of dwelling but with floor areas and specification increased to Parker Morris standards. Allowance was made for all dwellings to be raised to the Parker Morris recommended minima and for some to have standards above them. The sum allowed in the target for foundations and site works was based on the costs of previous schemes carried out by the local authority on similar redevelopment sites. In view of the bigger living areas and more car spaces required by the Parker Morris Report, allowance was made within the required density for a small number of dwellings being three-storey.

171. The original target was later amended by a deduction for certain site works to be carried out in a separate contract under the control of the Borough Engineer and by an addition to bring it to an anticipated 'firm price rate' basis at January 1963, the proposed date for the tender. The revised cost target amounted to £123,200 for the 39 houses, 20 garages, 19 parking spaces, curtilage site works, site development (including landscaping, play areas and equipment) and two electricity substations. The amount for the 39 houses and 20 garages (buildings only) was £100,270.

The preliminary cost estimates

172. A brief specification was agreed and preliminary cost estimates were prepared, by way of comparison, for a number of outline schemes.

173. When the final scheme was decided on and while it was still in outline, the preliminary cost estimate was found to be exceeding the cost target. The individual house plans had been designed to test certain sociological hypotheses, and it was felt that they could not be altered. But it was thought possible to make savings by substituting some cheaper materials and by economies in structural design. For example, the house plans which had evolved had larger external wall and roof areas than more conventional schemes, and to enable the cost of the scheme to come within the cost limit, a cheaper way of constructing external walls had to be devised.

Elemental costs

174. The scheme was a departure from the general pattern of local authority housing at that time. Its house plans were less orthodox, and its standards were higher. The pattern of elemental costs for a typical conventional house would not be a satisfactory basis for calculating the elemental target cost of a scheme of such houses. Apportionment of the cost target between the various elements was therefore based broadly on the pattern of the preliminary cost estimate for the final scheme.

175. As the design of the final scheme developed, detailed cost estimates were prepared for each of the various elements. To keep within the cost target and offset the more expensive plan types it was essential for the design of the structure and the choice of materials to be as economical as possible. This entailed detailed studies of comparative costs of various forms of construction in a wide variety of materials.

176. As this was an experimental scheme it was thought best to have the contractor's co-operation at the design and cost planning stages, so the tender was negotiated; the contractor's co-operation was useful both in discussing practical aspects of design and in negotiating comparative prices of alternative methods of construction and finish.

177. The following details of costs are shown in the appendices:

A Breakdown of tender price for the project, assessed to show effect of Parker Morris standards.

B Assessed extra costs of Parker Morris standards.

C Elemental prices: comparison between cost target and tender.

D Elemental price analysis of tender.

E Financial statement.

* This was before publication of the advice to local authorities on assessing costs of housing schemes contained in MHLG Design Bulletin 7, but the procedure followed the principles laid down in that bulletin.

Construction

178. The project was intended to concentrate on user requirements rather than technical innovation. Brick and timber were the main materials used, but as the house plans had produced smaller upper floors than ground floors the conventional methods of carrying up brick external walls could not easily be used and some timber framing was needed. A composite construction of load-bearing brick or block party walls, with in-filling between them of softwood framing, formed and assembled on site, seemed the most economical. Columns were necessary because a good deal of open planning was desirable. Thus, in the Z houses, on a line between the two bays, there is a row of timber posts carrying solid timber beams which in turn support the joists spanning from beam to party wall. In the P houses there are timber posts in the external walls carrying beams which in turn support joists spanning from external wall to external wall.

179. This method of construction makes it possible quite simply to position external walls on each floor according to the planning requirements of each floor instead of having to follow up the external wall from its ground floor location.

180. In between this framing or in between party walls, whichever it might be, timber stud walls were formed, faced externally with stained softwood weather boarding. This type of wall, and its external finish, are relatively cheap and simple to take round the complex forms of these houses. It does however need maintenance treatment every five years, which brings its 'cost in use' slightly above that for a maintenance-free material such as tile hanging.

181. Against this slight disadvantage in cost must be set the difficulties of taking tiles satisfactorily round numerous returns and the fact that timber is more adaptable than tiles and more suitable where, as here, a single material was desirable both on the upper and ground floors to give unity to a complex building.

Byelaws

182. In designing the project it became apparent that certain requirements in the byelaws were not logical for such a scheme. The Council applied for relaxation of the byelaws and the Minister granted them. The features requiring relaxation of the byelaws are listed in Appendix F. All comply with the subsequent Building Regulations.*

Details

183. Construction details are given in Appendix G.

Heating

184. The social study gave clear indications of the sort of heating installation that would be most acceptable. It suggested that many houses would be unoccupied for a good part of the day when families were out at work and at school, so the installation should be one needing little attention. This also meant that when the house was occupied in the evening a rapid build-up to full heating standards was needed. The heating needed to be flexible, economical and labour-saving as well.

185. A corollary of this was that some background heat should be provided continuously to reduce the amount of build-up required, and to avoid condensation.

186. Fan-assisted electric block storage heaters with controlled output seemed to meet all these requirements. These heaters, which were then at an early stage of development, are charged during the off-peak periods, and the heat is stored in a series of blocks set inside a highly insulated metal casing. Heat is discharged as warm air when a fan is switched on and blows air along channels in the heated blocks and delivers it through a low-level grille. No air is blown through until the heater is switched on by hand, and once switched on the fan is controlled by a room thermostat. The blocks are highly insulated to minimise heat losses when the fans are not working. The residual losses, amounting to about 10% of the total charge over 24 hours, provide background heating.

187. As well as heaters delivering warm air frontally, there are block storage heaters that deliver it either to front and side, or front and back. These can heat a second room by means of ducting, but it only proved practicable to heat bedrooms that way in four houses where the ducting required was short.

188. The minimum heating standards recommended in 'Homes for today and tomorrow' are that in living areas a temperature of 65°F, and in working and circulation areas a temperature of 55°F, should be maintained when the outside temperature is 30°F. The heating standards for the West Ham scheme were based on these.

189. The heating system was required to give:

In living rooms
a temperature of 65°F when the outside temperature is 30°F: for 16 hours a day.

In dining rooms
65°F when outside temperature is 30°F: for 3 hours a day.

In kitchen and ground-floor bedrooms
55°F when outside temperature is 30°F: for 3 hours a day.

In first-floor bedrooms (only for higher standard houses)
65°F when outside temperature is 30°F: for 3 hours a day.

190. To produce heating to these standards, the heater units shown in the table overleaf were provided:

*See page 119

House type	Unit	Location
4P	2 KW	Housed in kitchen units, discharging to kitchen and dining areas
	4.5 KW	Living room, discharging to living room and bedroom 3
5P	2 KW	Housed in kitchen units, discharging to kitchen and dining areas
	2 KW	Freestanding, in dining area
	4.5 KW	Living room, discharging to living room and bedroom 3
4Z	2 KW	Housed in kitchen units, discharging to kitchen and dining areas
	3 KW	Living room, discharging to living room and hallway
	2 KW	Bedroom 1, discharging to bedroom 1 and bedroom 2
5Z and 6Z	2 KW	Housed in kitchen units, discharging to kitchen and dining areas
	3 KW	Living room, discharging to living room and hallway
6Z3	2 KW	Housed in kitchen units, discharging to kitchen and dining areas
	3 KW	Freestanding, in living room
	3 KW	In living room, discharging to living room and bedroom 4

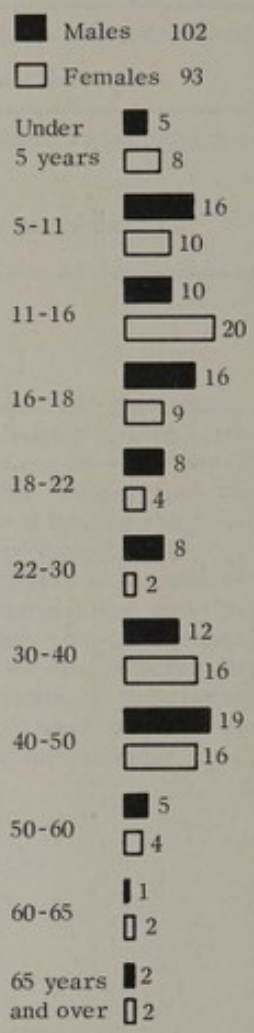
191. Estimates were made for each house type of the probable annual consumption of electricity units necessary to supply the given standards of space heating and their cost. They assumed the use of the off-peak tariff, which at the time the houses were designed was obtainable at .95d. per unit between 6 p.m. and 7a.m. with a three-hour midday boost. To this had to be added the charge of 10s. a quarter for rent of the off-peak time switch and clock, and a further 40s. a year to allow for replacement of the various parts of the unit needing renewal within 60 years, and for general maintenance. The estimated space heating cost of the scheme as a whole, expressed as a weekly charge averaged over the whole year, was 8s. 6d. per house.

192. There were also changes in the off-peak tariffs, but at an early stage the precaution was taken of designing the system to function adequately on the 10 p.m. to 7 a.m. period with a three-hour midday boost supply at the lower rate even though the estimated costs were calculated on the longer supply period of 6 p.m. to 7 a.m. This meant that if more current were needed it could be obtained by changing to a longer supply period even if at an increased tariff rate per unit. The installations were in fact connected up using the shorter supply period, and the running costs should therefore have been a little under the estimated cost for the design standards despite the increase in the tariff.

193. Water heating was provided by immersion heaters in insulated cylinders. In addition, some houses had instantaneous gas water heaters to the sink. Average weekly consumption was estimated at 200 gallons of hot water at 140°F. Assuming the normal on-peak tariff of 1.25d. a unit, the average weekly cost of water heating for the scheme was estimated at 4s. 8d. But between the date when the heating system was designed and the date when it was installed the on-peak electricity tariff was increased to 1.65d. a unit, bringing the estimated cost of water heating to 6s. 4d. a week.

194. Thus the estimated total off-peak space heating and on-peak water heating running costs were 14s. 10d. a week. As can be seen from the table in Appendix M, fourth column, when the appraisal was done the cost of heating was found to be underestimated by something like 25%. It is not possible to check the cost of water heating separately as this charge is metered along with lighting, cooking (if electric), plug-in additional heating, etc. The indications are, however, that 6s. 4d. is about the proportion of the metered average charge of 15s. 0d. a week for all on-peak current which was spent on water heating.

65
Age distribution of total population on project site



66
Occupancy

	Number	Reason	House type
Houses occupied by the number of people intended	29		
Occupied by one or two more than intended	5	Additional children	Two 5P, one each in 4Z, 6Z, 6Z3
Occupied by one or two fewer than intended	5	Left home	One each in 5P and 4Z and three 6Z houses
Total	39		

Part 2 Evaluation

The appraisal

195. When the houses had been occupied for rather over a year, the Group carried out a survey of the tenants' reactions backed up by observation and measurement. Each of the 39 tenants (all but one of them first tenants) was interviewed by a sociologist with a prepared questionnaire, and an architect who examined the whole house for defects in design or construction and also drew plans of the furniture arrangement for each room. This was similar to the method employed in making the preliminary social survey for the scheme.

196. In all instances it was the housewife who was interviewed, sometimes with the husband present. The children were also asked what they liked about the houses and what use they made of the open space.

197. The questionnaire (Appendix I) asked for opinions on various innovations in the house and for information about the use of the house, garden and open space.

198. Twenty-two housewives were asked to keep diaries (Appendix J) for one weekday and one day of the weekend, showing what they did in the house. The purpose was to give more details of how people used their rooms and how use differed between a weekday and a weekend day. 16 housewives returned the diaries; most were only vague outlines of how they and the rest of the household spent the day in the home, but some were mines of information. These, with the information from the questionnaire, gave a fairly full picture of activities in the home.

199. The Building Research Station provided thermograph recording devices which were used in 12 houses (two in each house type) to keep records of room temperatures (Appendix M).

200. At the Group's request the Building Research Station also carried out sound and daylighting tests both indoors and in the open space.

201. One of the tenants kept outside temperature recordings and a record of activities on the open space.

202. A time-lapse film was taken on a day in the school holidays to show the pattern of use of the open space and its play equipment.

The people

203. Most of the tenants had come from other West Ham council dwellings. Some had asked specially to be moved to this particular site. Only one was taken from the waiting list. Seven came from the clearance area across Beckton Road.

204. The demand for the project houses was apparent when a report in the local paper, stating incorrectly that the rent was £6 a week, resulted in 300 applications from people who were mostly council tenants. In fact five of the project tenants had asked for a transfer to the scheme after merely reading about it in the press. Most of the tenants were therefore chosen at their own request.

Households and families

205. There were 39 houses but 40 households. In the top half of one 5P house a widowed mother lived quite separately while her son with his wife and children lived in the lower half. For simplicity, however, they are treated as one household for the purposes of this appraisal.

206. There were 195 people on the site, 67 of them 15 years or under, giving a net actual residential density of 78 persons per acre – slightly less than the designed density of 80 bedspaces per acre (paragraph 87).

207. The table of Age Distribution (figure 65) shows that these were not particularly young families. Only four housewives were under 35, and more than half the rest were over 40. But although 15 households contained mainly adult or teenage children, there were some with children under 11.

208. When asked if they considered moving, 35 tenants said they hoped to stay on indefinitely. The other four said they would consider moving when their children grew up and left home or rents reached a level they could not afford.

Occupancy

209. Houses were not always occupied by the number of people intended, see table 66 opposite.

Occupations and income

210. Number of wage earners by household

Wage earners	Households
½*	1
1	9
1½	5
2	4
2½	1
3	11
3½	5
4	2
4½	1
Total	39

* A part-time worker - who works between 10 and 30 hours a week - is counted as half a wage earner.

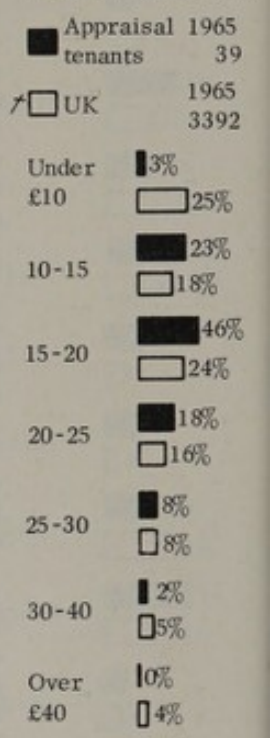
211. All but six of the chief wage earners were manual workers. Most of the men worked in West Ham or neighbouring boroughs (as they were then); ten worked in the docks. Some of the manual workers were on shift work and the use they made of the home reflected their requirements. Those on night shift had to sleep during the day; for them peace and quiet were essential; many of the manual workers came home in their working clothes and needed a place near the door where they could leave them. Five out of the six in non-manual jobs were clerical or supervisory and one was a lecturer in a technical college.

212. Over half the housewives went out to work. Only two of these had children under five, and both were in part-time jobs. This pattern - the whole family being out of the house most of the day - influenced, for example, the heating, which was turned on when they came home, and was appreciated for its rapid warm-up.

213. The children tended to stay on longer at school and, when they left, to go into different jobs from their fathers'; most of the boys who worked were industrial apprentices.

214. Incomes were higher than those of two sample surveys of local authority tenants, one national and one for London (figures 67 and 68). As one would expect, the families with fewer dependent children and with more wage earners spent more on furnishing their homes.

67
Distribution of gross weekly incomes of heads of households



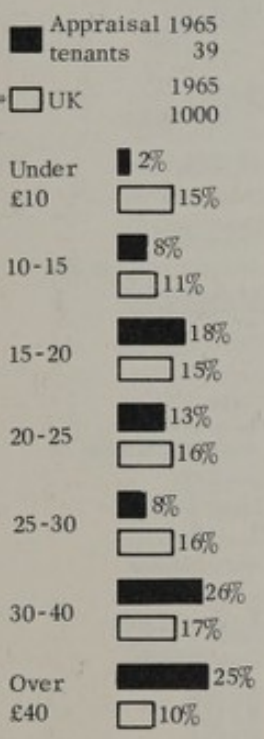
† Income of heads of households in all types of tenure (Family Expenditure Survey 1965). The data for local authority dwellings was not available.

Rents

215. Gross weekly rents i.e. including rates, were:

House Type	Net Rent	Rates	Water rate per week	Gross Rents	Additional weekly rent for garage:	
	£ s. d.	£ s. d.	s. d.	£ s. d.		s. d.
4P	2 13 3	1 1 1	1 1	3 15 4	Integral	10 2
5P	2 3 2	1 1 3	1 1	3 4 5	Detached	13 2
4Z	2 15 1	1 2 1	1 1	3 17 2	Hardstanding	5 0
5Z	2 10 3	1 2 1	1 1	3 12 4		
6Z	2 7 8	1 2 1	1 3	3 9 9		
6Z3	3 6 11	1 8 2	1 6	4 15 1		

68
Distribution of gross weekly income of total household



Mean values for the gross weekly income of households in local authority dwellings are as follows:

Appraisal tenants	£30
Greater London area	£28
England & Wales	£25

* Incomes of households in local authority dwellings (Family Expenditure Survey 1965)

216. Net rent as a percentage of gross income of head of household ranged from 8.4% to 25.1%. The average of 15.4% was similar to that for local authority households in the Greater London Conurbation. Net rent as a percentage of gross income of the total household ranged from 4.2% to 24.0%: the mean of 9.8% was less than that for local authority tenants in London (11.5%).

217. Half the tenants considered the gross rent reasonable, but the other half felt that the total outgoings for gross rent, water rates, and heating were too high.

Previous dwellings

218. Number of households

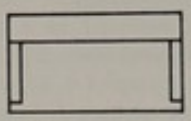
Houses	16
Maisonettes	15
Flats	8
Total	39

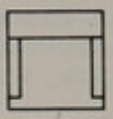
219. Most tenants had lived in their previous dwellings for over five years. Apart from seven who came from the slum clearance area, and one off the waiting list, they had been living in local authority housing; nine had been under-occupying their previous homes.

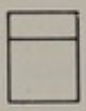
220. Twenty-five households had been able to have two living spaces: the others had a dining kitchen and a living room. There was therefore no great difference in standards of living space. What they had been dissatisfied with was the neighbourhood ('low class', 'noisy and rowdy') and the dwelling in general - small rooms, damp, not enough storage, no safe playspace, etc. But for some the feeling of 'belonging', of being near relatives or among friends, had made up for these disadvantages.

221. The move did not involve a great uprooting as all the families had lived within a mile of the site, and 31 had lived most of their lives in the area. They knew the immediate neighbourhood therefore, and the pattern of social relationships was not radically altered by the move.

69
Key to furniture and equipment shown on the room plans for 'Spaces within the home'.


Settee


Armchair

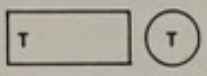

Easy chair


Chair

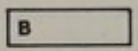

Rocking chair

Seat or stool

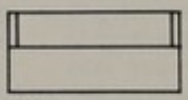
Pouffe

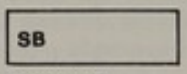


Tables



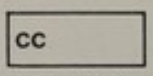
Bookshelves or bookcase


Piano



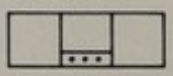
Sideboard

Glass cabinet



Cocktail cabinet

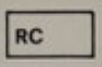

Cocktail bar


Radiogram


Television


Record player

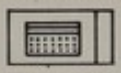

Radio

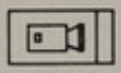


Record cabinet

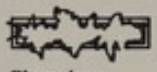

Tape recorder

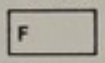

Loudspeaker


Typewriter on sewing machine

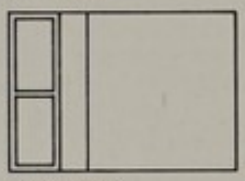

Sewing machine

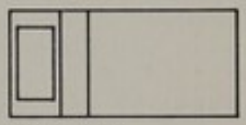
Needlework box

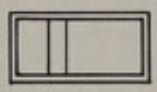

Plant box

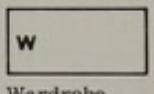


Fish tank

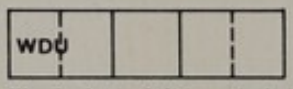

Double bed


Single bed

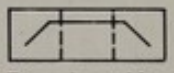

Cot

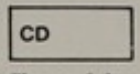


Wardrobe



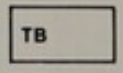
Wardrobe and drawer unit


Dressing table

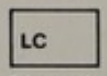


Chest of drawers

Cupboard or cabinet

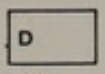


Tallboy



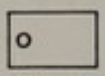
Linen chest

Linen basket

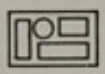


Desk


Child's desk



Oddments

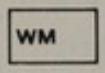

Toys


Cheval-glass


Suitcase


Billiard table on end


Rocking horse



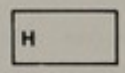
Washing machine

Refrigerator


Spin drier


Cooker

Gas boiler



Heater

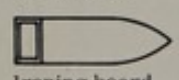
Paraffin heater


Electric fire


Vacuum cleaner

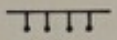
Vegetable rack

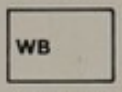

Rubbish bin


Ironing board


Ironing board on end

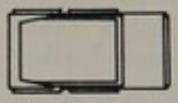

Clothes horse

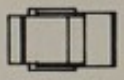

Coat rack

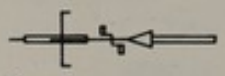


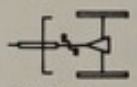
Workbench


Toolbox

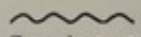

Pram


Pushchair

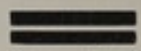

Bicycle


Tricycle

Birdcage


Curtain or screen

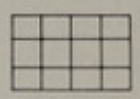
Demountable partition

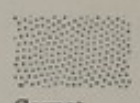

External wall

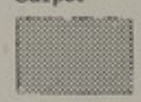
Socket outlet

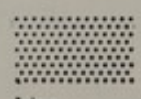

Ceiling light


Light switch


Lino tiles

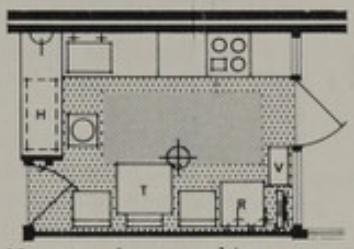

Carpet


Rug or mat

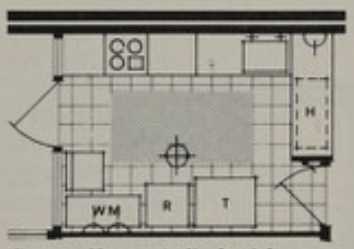

Lino

Spaces within the home – a selection of plans

4Z

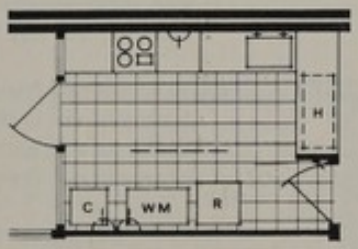


No room for a washing machine, and the gas boiler across the doorway is inconvenient.

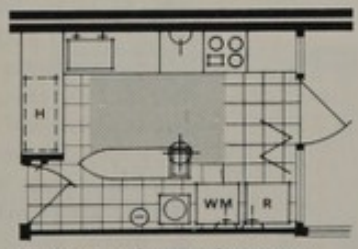


Generally satisfied with kitchen.
Not enough storage space, and the vents are unsatisfactory.

5Z



The size and shape are liked, but not enough cupboards.
Don't like the gas water heater.



There is plenty of storage space, but can't reach the shelf over the cooker.

The kitchen

222. 'Homes for today and tomorrow' did not specify minimum room sizes for kitchens. But it recommended a sequence for efficient working (paragraph 80 of the Report):

> 'work surface/cooker/work surface/sink/work surface (or the same in reverse order) unbroken by a door and arranged either in a straight line or an L or a U'

It also recommended that kitchen size should be related to present or likely future ownership of domestic appliances and should allow for some meals to be taken there as well as for storage of kitchen utensils and implements.

223. The 4P kitchen was 66 sq ft; the 5P 89 sq ft; the kitchen in the two-storey Z houses 92 sq ft; in the three-storey Z houses 89 sq ft. All had the recommended work sequence.

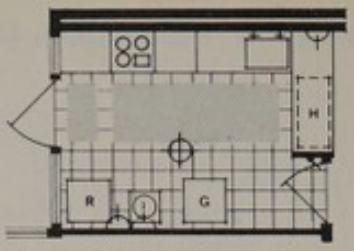
224. During the week housewives who did not have jobs spent on average six hours a day preparing meals and doing other things in the kitchen. (This is two and a half hours less than the housewives in the preliminary social study, paragraph 71.) Housewives with part time jobs spent on average four and a half hours (the same as in the social study), housewives with full time jobs three hours. In many families some meals, especially breakfast, were taken in relays in the kitchen.

225. Although the social study suggested a kitchen of 100 sq ft or less would be too small (table under paragraph 11), all housewives in Z houses were satisfied with the size. The 6Z3 houses had a utility room, so though the kitchens were the same size as in the 5P houses, housewives did not have to keep their washing machines in them.

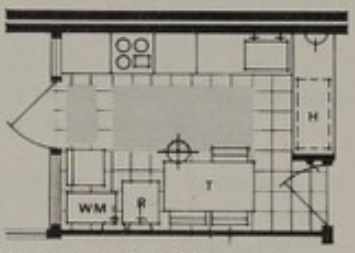
226. Housewives in the 4P and 5P houses found their kitchens too small for eating meals in. As the dining area had been placed immediately adjacent to the kitchen with a large communicating hatch, it was thought at the design stage that this would enable families to have all their meals in the dining area. It appeared, however, that in spite of this convenient arrangement many families still preferred to eat their lighter meals in the kitchen. Most main meals were eaten in the dining area.

227. Thirty-six of the 39 housewives found their kitchen easy to work in; eight because it was compact, 17 because of the work sequence. Three found it inconvenient because of insufficient working space. One housewife with a large family of

6Z

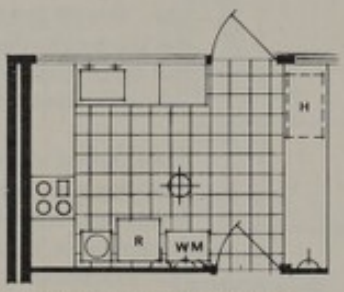


Plenty of space, but needs a broom cupboard. Getting rid of cooking smells is a problem.
Water heater doesn't run quickly enough.

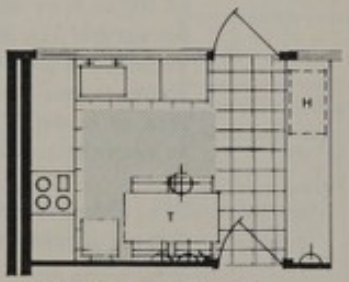


Kitchen is liked because it overlooks garden and a watch can be kept on the children.
Difficulty in getting rid of cooking smells.

6Z3



Kitchen is convenient and compact with enough working space.
Do not use the water heater because it stained the ceiling and burnt a curtain.
The vent is inadequate.



Kitchen is used for all meals, for sitting in, and children's play.
Not really big enough for family meals.
Vents cause draughts.
Can't clean window.

grown-up boys found the standard stainless steel sink too small to hold large pans containing potatoes for the whole family. The splash-back round the sink which was one tile high, was found inadequate.

228. In all Z houses water to the sink was heated by an instantaneous gas water heater. (In the P houses the sink was supplied by the bathroom cylinder.) About half the housewives with the water heater over the sink were dissatisfied with it, mainly because 'water never gets really hot and is slow running'. This was probably because a small heater had to be provided as a large one would have required an external flue. Some housewives did a lot of clothes washing in the sink even though the council provided a gas-heated boiler in the houses.

229. Another cause of dissatisfaction was that the water heater had not been supplied with a shield over it and so stained the ceiling. However, many tenants had fixed a shield themselves to disperse the hot exhaust air and to prevent staining. One housewife in a 6Z3 house complained about the water heater being by the window and had stopped using it because her curtains caught fire from the flame.

230. All found the outlook from the kitchen satisfactory. The kitchen got enough daylight and sun.

231. Adequate kitchen ventilation was a problem and many complained of condensation. Some tenants had installed their own extractor fans to reduce condensation and to get rid of cooking smells.

232. The social study (table under paragraph 11) suggested access to the garden would be preferred from the kitchen. The 23 Z houses had this, and everyone liked it as they could take washing straight outside from the kitchen to dry. In the 16 P houses access to the garden was from the dining area, (see design decision, paragraph 161) which was inconvenient as children in muddy boots came straight into the living space.

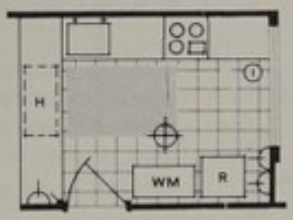
233. Access from the kitchen to the dustbin was inconvenient in 4Z, 5Z, 6Z and 5P houses because the housewife had to take rubbish through the dining area and out through the front door.

234. 'Homes for today and tomorrow' recommended (paragraph 87 of the Report) that all four, five, and six-person dwellings should have 80 cu ft of storage space in or adjacent to the kitchen. (This means built-in cupboard space, not open shelving.) Only the 5P houses (84 cu ft) were above this minimum: the remainder were below (4, 5 and 6Z, 65 cu ft; 4P, 69 cu ft; 6Z3, 77 cu ft)*. All kitchens had a 12ft run of 9in wide open shelving. Many criticisms were made in all house types of the lack of enough storage space for specific items of kitchen paraphernalia, but it is not possible to judge whether the overall storage space was inadequate too. Housewives found some cupboards too small and too inconveniently placed to be much use. Many had difficulty storing saucepans. There were 'too many small cupboards, not enough big ones'. Some tenants would have liked a broom cupboard in the kitchen, which seemed the most convenient place for it.

*See paragraph 308

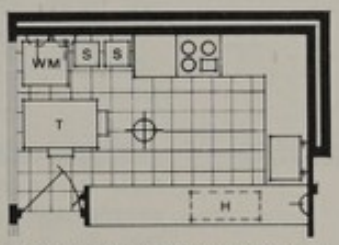
4P

Housewife takes her meals in kitchen when she is alone. The size is convenient for her.

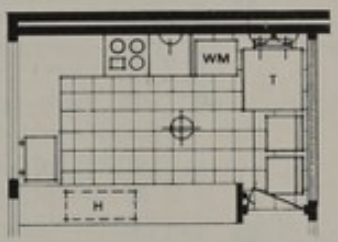


Likes the working surfaces but dislikes the size and shape - would prefer one long kitchen-dining room. Not enough space for equipment.

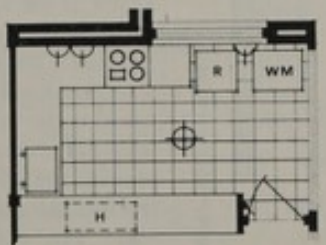
5P



Family take all meals here. Heating and ventilation are inadequate.
Not enough room for vacuum cleaner in broom cupboard. Would like direct access to garden.



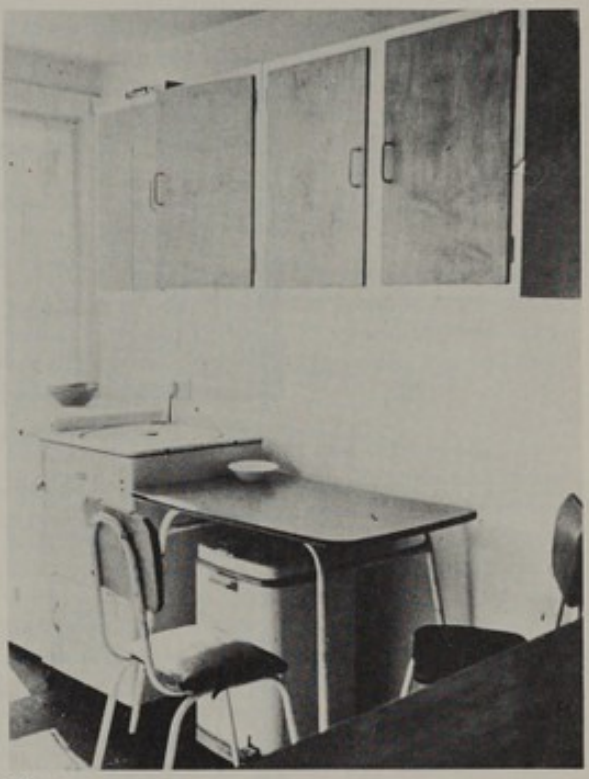
All meals taken here - but not enough room for five people to sit down together. Would like door to garden.



Not enough room for vacuum cleaner and ironing board. Heating and ventilation are sometimes insufficient.

235. These complaints came equally from all the houses and suggests that designers should pay as much attention to storage of specific kitchen items as to overall provision of storage space.

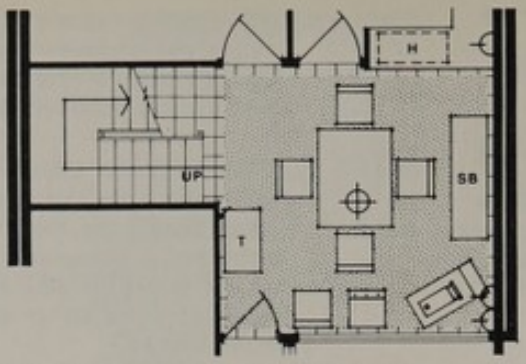
236. Thirty-five tenants had refrigerators and 31 had washing machines. Most of them felt there was enough space for these two major items. As is mentioned in paragraph 225 however, most of the housewives in the 6Z3 houses kept their washing machines in the utility room, thus releasing space in the kitchen.



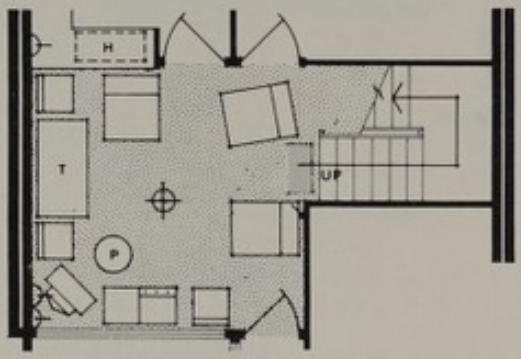
70
A kitchen (Z type) showing typical domestic equipment.

71
A 6Z kitchen looking into the internal dining room.

4Z

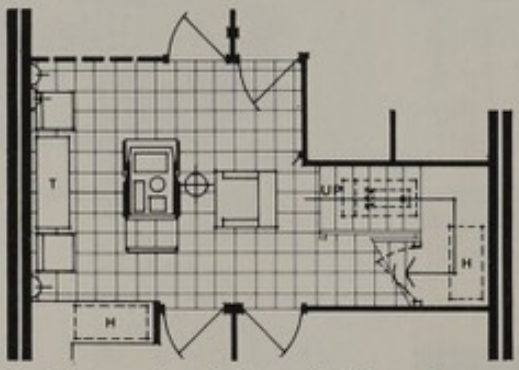


Used for meals, sitting in, visitors, and dress making.
No complaints.

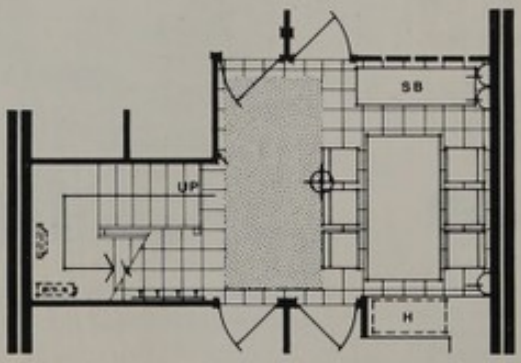


Used for meals, sitting in, and for visitors.
Heater kept on all time when it is cold, and electric fire is also used.

5Z



Used for meals, visitors, hobbies and children's play.
Not enough natural light - electric light kept on most of the time.
Partition is up.



Used for meals, sitting in, visitors and homework.
Household goods stored under stairs.
Door kept open (when not cold) to give extra light.
Partition is down.

The dining area

237. 'Homes for today and tomorrow' suggested (paragraph 31 of the Report) that there should be a second living space in family houses. In the project this second living space was the dining area. Evidence from the interviews and diaries suggested that on the whole the dining area was used as intended. Most households had their family meals in it, and used it during the day to sit in, for children's play, and for homework or hobbies. Four households, however, used it as their main living area and kept the living room as a 'best room' for special occasions and visitors.

238. An analysis of where homework was done and where children played indoors showed that this second living space was used a good deal more for this purpose than those provided in some of the tenants' previous homes.

239. Most households had no babies and so no prams. Four had prams in daily use and found the intended space for them under the stairs large enough to keep them in.

In the Z houses

240. The dining area in the three 5Z houses had no direct natural lighting when the partition was up. Of the 6Z houses, all but one were sited, through staggering or by being placed at the end of terraces, to allow side light into the dining area.

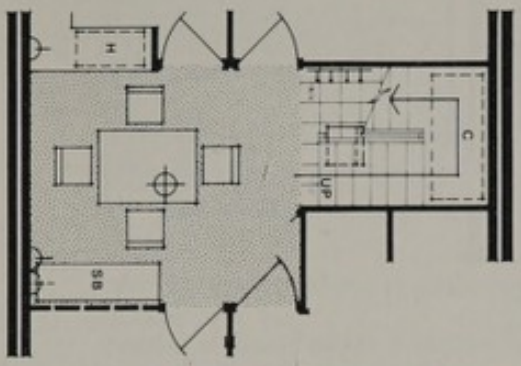
241. The Building Research Station carried out tests in one of the 5Z houses that had no direct natural lighting in the dining area. This showed that the daylighting, as was envisaged at the design stage, was far below the recommended minimum standard of 1%. The only light reaching it was 'borrowed' from the surrounding rooms via open doors and through the kitchen hatch. With doors and the hatch blind closed, the daylight factor was 0.07%: with all doors open it was 0.2%. However, the housewife in this particular house was quite happy about it and considered the extra accommodation given by the downstair bedroom outweighed the loss of daylight.

242. Tests under the same conditions were also carried out in two 6Z houses which admitted natural light into the dining area. When daylighting was through a half-landing window the daylight factor was 0.28% in one and 0.3% in the other; when it was through a side light in the dining area the daylight factor was above the recommended minimum; 1.10% and 1.45%.

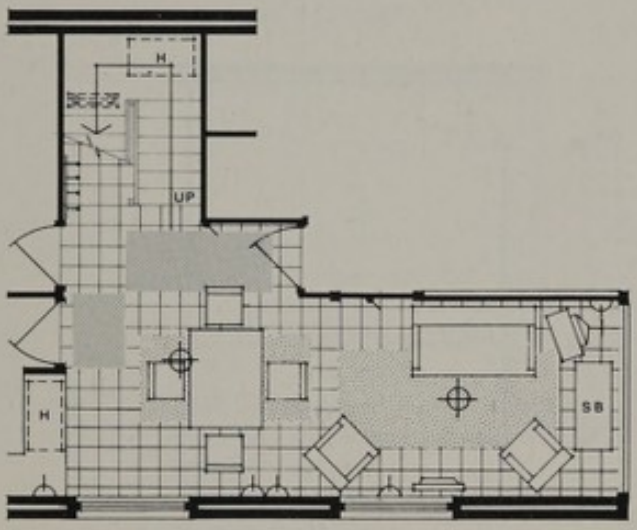
243. The tenants' opinions confirmed the tests. Seven of the nine 5Z and 6Z house tenants who had no direct daylight and had the partition up thought the room 'extremely dull' or 'dark and gloomy'. One housewife said she had to have the light on most of the day. Another said having all the doors into the dining area closed made it dark, but leaving them open lost heat. The dark floor covering had the effect of markedly reducing reflected light, thus accentuating the lack of daylight.

244. It would seem therefore that indirect daylighting, whether through half-landing windows or through open doors, is not satisfactory, but that

6Z

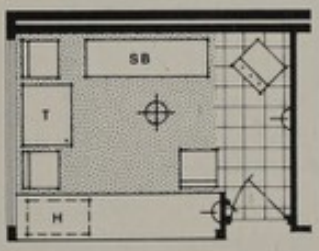


Used for meals and for visitors.
Not enough light in this room.
Partition is up.

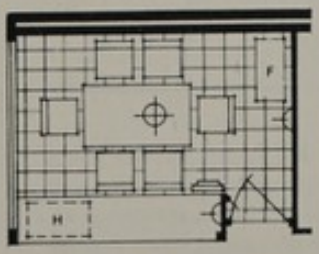


Used for sitting in, watching T.V., children's play and hobbies.
Heater is kept on all the time.
Partition is down.

6Z3



Used for sitting in during the day; also children's play, homework, and for playing music.
Heater is supplemented by an oil fire in cold weather.
Prefer dining room and kitchen to be separate.



Used for all meals and for children's play.

direct daylighting,even through a small window, is.

245. How far was the use of the dining area affected by the lack of direct light? All the families took their meals in it; some sat there during the day, some in the evening. Children played in it and used it for homework and hobbies. Comparison with the houses which had natural light in the dining area suggested that other factors such as the stage in the family cycle, the number of children and what they did, influenced its uses more than the lack of direct light, even though there were complaints about this.

246. All housewives in Z houses were satisfied with the size and shape of the dining area though the capacity of the storage heaters was inadequate for the amount of space to be heated (see paragraphs 307 and 308).

In the P houses

247. The dining area in the 4P houses was the smallest: all the households found it 'only just big enough'. In all of them it was furnished very simply, usually with a dining table, four or five chairs and a sideboard.

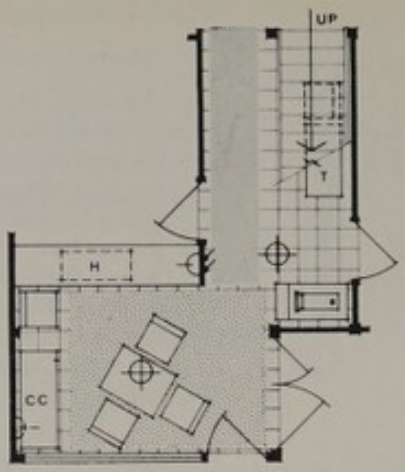
248. In the 5P houses it was big enough, but unsatisfactory in other ways. Most tenants thought it had too much glazing, resulting in excessive heat loss, especially as the 5P had no draught lobby. Some families in 5P houses had covered the lower part of the glazing with sheet material partly to reduce heat loss and partly to make it safer for children. Although no instances were known of children having accidents, many mothers thought this unwired glass (it was in fact toughened, but this was not obvious) was unsafe to very young children. There was also heat loss through ill-fitting doors and windows and up the staircase.

249. The heating performance in the dining area of the P houses was measurably lower than in those of the Z houses; almost all the 5P households complained that the heaters did not give enough heat. Three 5P tenants had put up additional screening on the ground floor to reduce heat loss.

250. Most housewives thought the staircase in the P houses was in an awkward position and the space around it wasted. But in many houses the television or radiogram was placed in the space under the open stair.

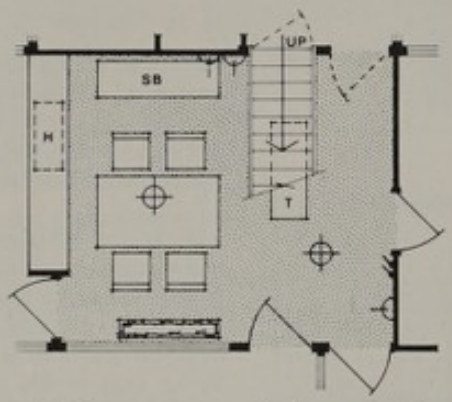
251. Mothers with young children felt the open tread of the stairs was unsafe. Other tenants said the position of the staircase in the dining area caused people to knock their heads on it.

4P

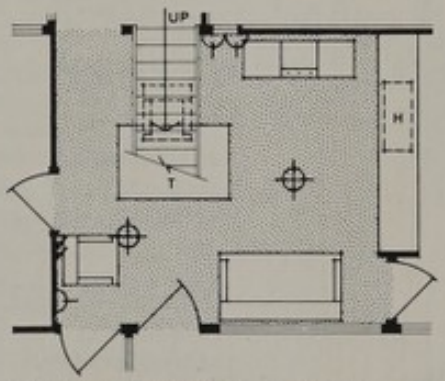


Used for all meals and for entertaining.
Heater is inadequate; can hear neighbours through wall.

5P

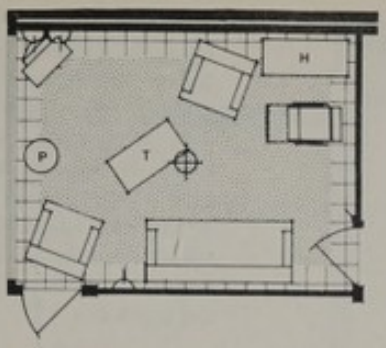


Used for supper, weekend meals (other meals in kitchen), homework and hobbies.
Have installed extra doors because of heat loss.
Want larger heater.

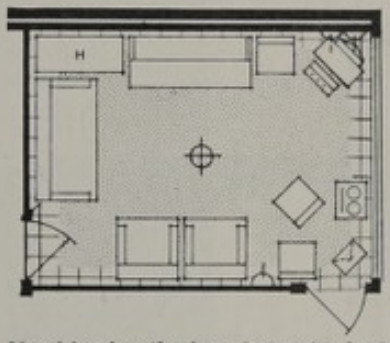


Used for sitting in at all times.
Meals in kitchen.
Would prefer Z type stairs with the heater underneath instead of present arrangement.

4Z

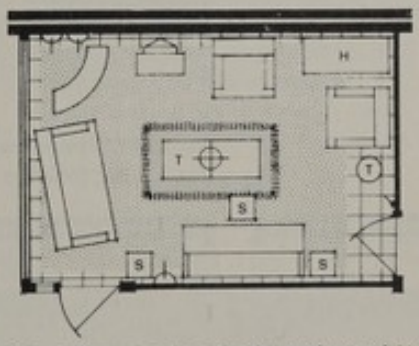


Used throughout the day by adults and children.
Position of heater makes furniture arrangement difficult in this room.
Only place to keep pram.
Noise through party wall can be heard.
Windows too large and difficult to clean - expensive to curtain.

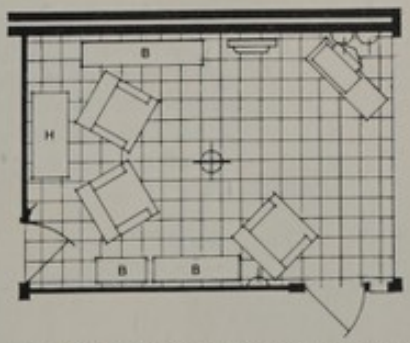


Used by family for sitting in during evenings, and occasionally as a bedroom for visitors.
Windows a bit high for cleaning.

5Z



Used for evening meals and watching T.V., for entertaining visitors and occasionally for homework.



Used for afternoon and evening meals, for sitting in during the evening, and as a playspace for 13 year old child.
Have moved heater from under stairs to this room.
Storage heater is too big.
Not enough lighting.

The living room

252. In all the house types the living room was cut off from the general circulation area and could be used for leisure and quiet. In all but a few households it was in daily use. The four households who kept it as a 'best room' for visitors liked having two living spaces as this enabled them to have the arrangement they wanted.

253. It was found that although before moving into the project houses 61% of the children under 15 played in the living room, only 24% played there after moving in. This was mainly because of the second living space, generally used for daytime activities, and of a safe playspace outside. Though most children did their homework in their own bedroom or in the dining area, four children used the living room for homework, usually while television was on. This was from choice rather than having nowhere else.* So the living room allowed for by the higher space standards was kept mainly for adults and television.

254. Most tenants found the living room size just right, but seven housewives, mostly in 5P houses, thought it could have been bigger or wider. The evidence suggested that when the room was small more importance was attached to its shape, and many housewives felt that a square shape was most convenient for arranging furniture. Another factor influencing comments on size and shape was the position and size of the heater which took up $5\frac{1}{4}$ sq ft. This was particularly important in the 133 sq ft 4P living room.

255. The 6Z3 house has the living room on the first floor. In three out of the four the partition was down, making an L-shaped room, which was found a difficult shape to furnish satisfactorily as the smaller area in the 'toe' of the L was divorced visually from the main part of the room and because the room was only 8ft 3in wide. The entrance divided the main space into two virtually equal areas, neither of which had any focus or feeling of intimacy. In all three rooms furniture was arranged along the long (23ft) wall facing the door.

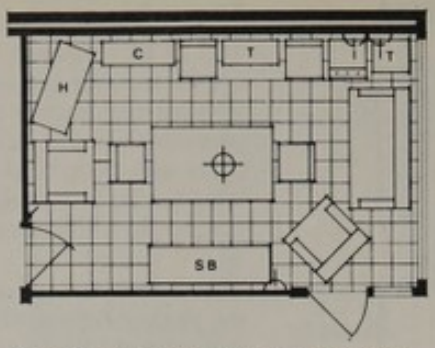
256. All these four housewives had got used to having the living room on the first floor, though one or two neighbours had remarked that they could hear them going up and down stairs more often than in an ordinary two-storey house.

257. All the houses had one wall of glazing to floor level in the living room and, except in the 6Z3 houses, a glazed door in the return. This amount of glazing was liked, but with some reservation. 30 tenants appreciated it because it let through plenty of sunlight; nine, though liking it, found the number of panes a lot to clean, especially as water from the roof dripped down windows. Much of the glazing was obscured by furniture.

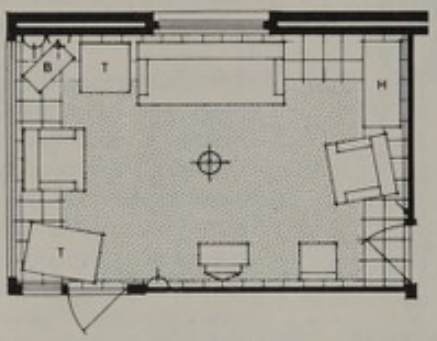
258. The view from the living room was of course dictated by its position on the site. When it looked on to the open space and the green the housewives liked it; dissatisfaction came mainly from the 4P and 5P houses facing Beckton Road, with no view

* A similar finding was reported in 'Television and the child', H. T. Himmelweit and others (see page 125).

6Z

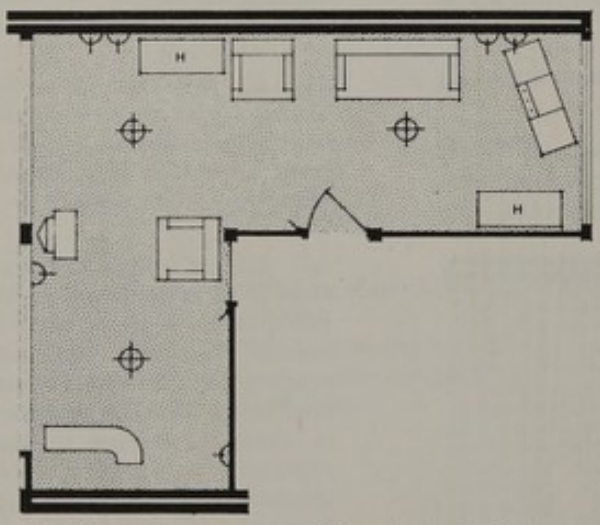


This room is occasionally used for entertaining visitors, but not for family activities.
The bottom part of the window is obstructed by furniture and is difficult to clean, but no other complaints.



Used for sitting in at all times and for entertaining.
This room is greatly appreciated, but the wall outside makes it difficult to clean windows and spoils the view.

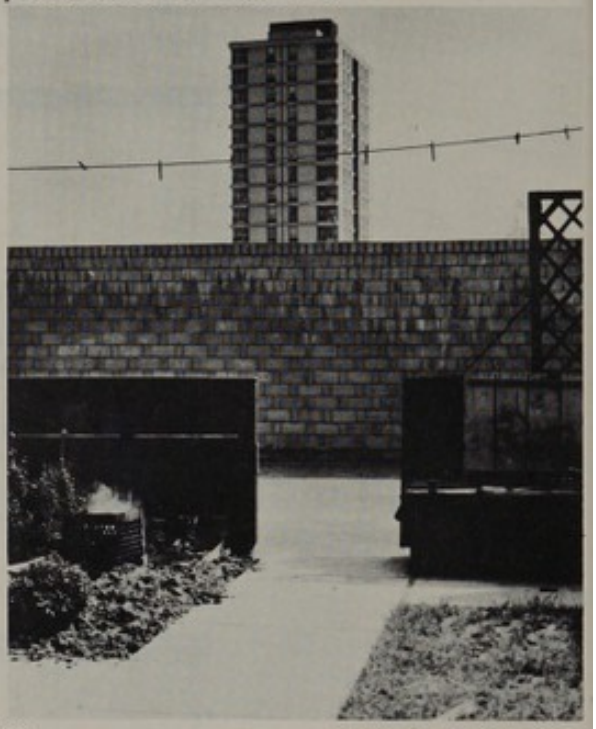
6Z3



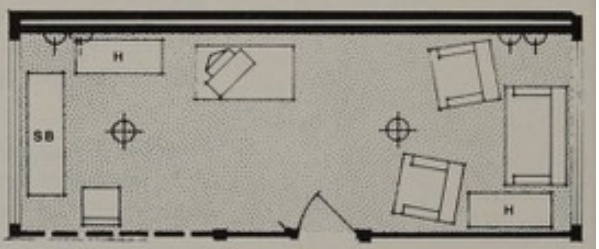
Used for taking supper and for sitting in during evenings.
Have enough heat - but two heaters take up too much space.
Window cleaning is either difficult or expensive.

at all. Examples cited were 'climbing frame an eyesore, disturbs privacy', 'don't like black wood, lighter wood would be better to look at', 'blank wall of opposite house - we have put trellis up' Two housewives in 5P houses remarked of the block of flats on the other side of the road 'not nice', 'big brother effect'. All houses except the 4P and 6Z3 had a glazed door in the living room, but nine never used it, 19 said they only used it in summer and only four used it regularly to get to the garden.

259. Most housewives thought the living room adequately heated by the night storage heater with capacity to heat the room to 65°F for 16 hours a day with the outside temperature at 30°F. But the heater fans were mainly used in the evenings for periods of four to six hours.

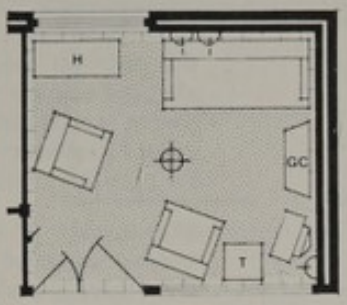


72
Tenants' comments, 'no outlook except on to a blank wall'. 'Big brother looks down from those flats'.

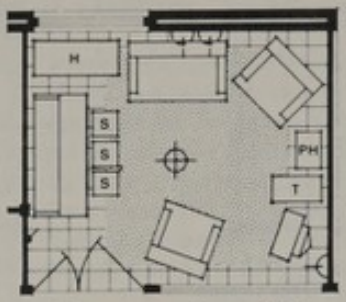


Used for sitting in during evenings.
Is too long and narrow for proper furniture arrangement.
Windows are difficult to clean.
Don't like having two heaters.
Prefer living room on ground floor.

4P

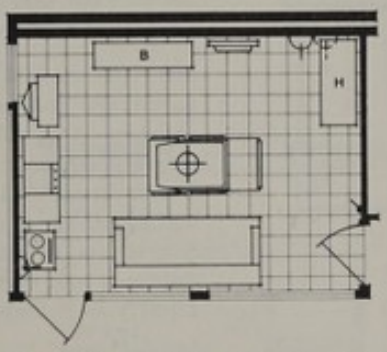


Used for supper and for sitting in.
Insufficient heat in cold weather; position and size of heater limits furniture arrangement.
Uneven plastering had to be covered with thick wallpaper.

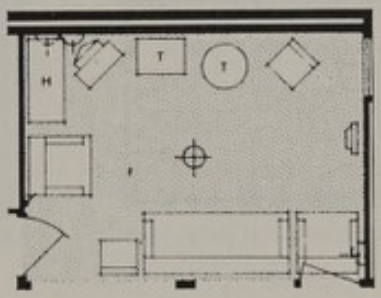


Used for sitting in at all times.
Disturbed by noise from upstairs and from next door garden.
Position of heater unsatisfactory, and too much heat given out in relation to the size of the room.
Window clashes with kitchen door so we use the little window.

5P



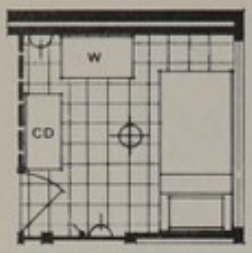
Used for sitting in during evenings, and for gramophone playing by two children.
Size and shape is satisfactory, but would prefer smaller heater.
Windows are a lot to clean - have to climb over a fence to get at one of them.



This room is especially liked. It is used for T.V., children's play, and for visitors.
The heater is not used because of the expense.

73
The toe of a 6Z3 living room showing a popular piece of furniture, the cocktail cabinet.

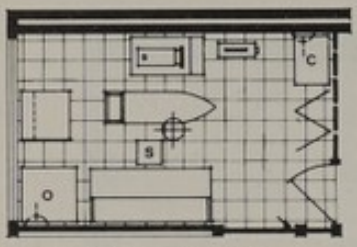
5Z



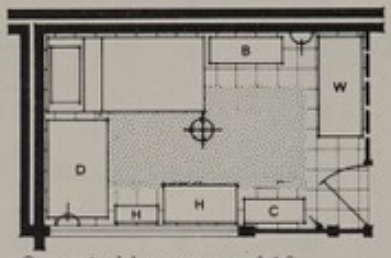
Occupied by boy aged 13 and used as a bedsitter and for homework. Complained of lack of privacy from street, and people could be heard returning home late next door.

Not occupied by members of family - kept as a spare room.

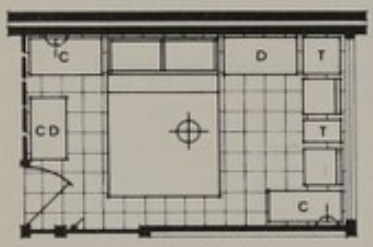
6Z



Used as storeroom only.

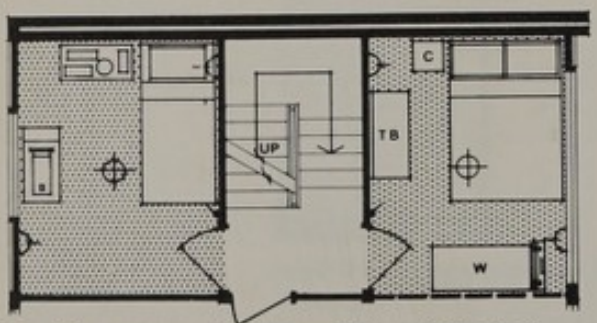


Occupied by son aged 18.



Occupied by invalid wife aged 60. Complained about noise through internal partition.

6Z3 (First floor)



Used by parents. Find it small for double bed.

Downstair bedrooms

260. All houses except the 4Z had a bedroom adjacent to the living space. The 15 5Z, 6Z and 6Z3 houses had a demountable partition between this bedroom and the living space. As these houses also had a spare bed space, the households had the choice of this room or more living space. Five of these 15 households chose more space by having the partition removed: the other ten kept theirs up.

261. In four of these ten houses the room so formed was used as an additional bedroom, usually for a teenage child. The other six kept the partitions up to conserve heat in the dining area ('too cold to have it open') and to provide extra storage space.

262. Besides these ten houses the 16 4P and 5P houses had a permanently partitioned downstair bedroom. So 26 of the 39 houses had an additional room on the same floor as the main living space. Six were used wholly for sleeping in, 14 as bedsitters and for homework, entertaining friends and play; six solely as study/playrooms or stores. In one house the parents used the extra room, in another the wife when she was ill: elsewhere it was given to teenage or grown-up children.

263. The tenants were divided in their use of the partitions: it depended on the age and sex of the children. Other factors were shortage of storage space elsewhere and the problem of heating the larger area, as it was not heated by a block storage heater. Poor sound insulation also discouraged use of the separate room as noise from the entrance hall and living area was heard almost as clearly as if there had been no partition.

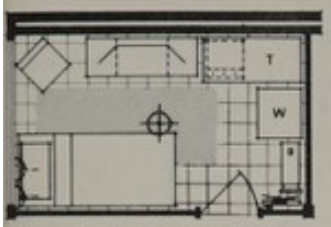
264. The airborne sound insulation value of the partitions, allowing for all joints, was initially estimated to be 35 dB. But the tests carried out at the time of the appraisal showed that it was in fact only 15 dB. Sound leakage seemed to be aggravated by gaps round the doors and poor sealing of the partition to the structure.

265. The diaries showed that children in downstair bedrooms tended to go to bed later than other children of similar ages, probably because of noise from the living room.

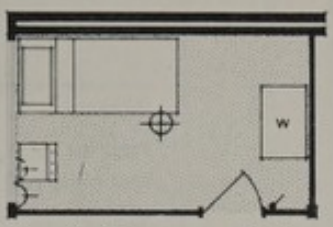
266. In the 5P houses, which did not have demountable partitions on the ground floor, almost half the housewives complained that the occupant of the bedroom was disturbed by television and noise from the living room and was often unable to go to bed early. This ordinary fixed internal partition was not tested for sound insulation. But the Building Research Station estimated that plasterboard - faced panel partitions would give a sound reduction of about 28 dB. Where the partitions had communicating doors the net insulation would be reduced to 20-23 dB. There is no statutory standard for internal partitions, but the Building Research Station considers a sound reduction of less than 35 dB to be inadequate.

267. All housewives seemed to find the size and shape of the downstair bedrooms convenient, though seven would have preferred the room bigger so that it could have been fully used as a bed-sitter. Nine did not like the idea of a downstair bedroom at all, their reasons varying from a feeling that the proper place for bedrooms was

4P

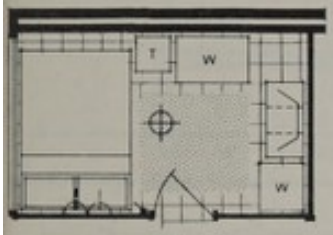


Occupied by son aged 17.

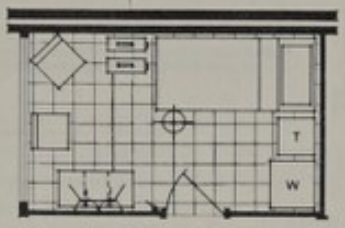


Occupied by son aged 15.

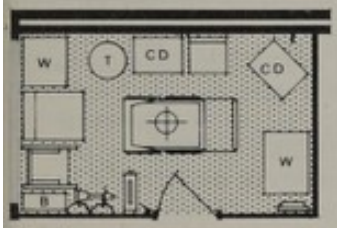
5P



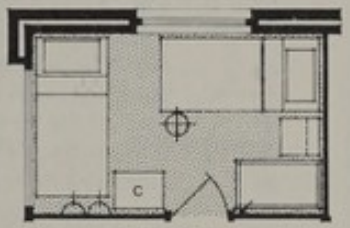
Occupied by husband and wife.



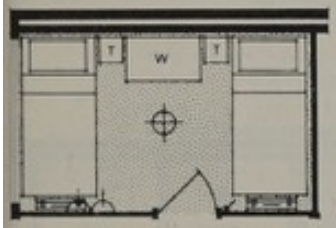
Occupied by girl aged 13 and used for entertaining friends.



Used as a storeroom as not sufficient privacy - window too big.



Occupied by girls aged 5 and $2\frac{1}{2}$ and used as a playroom.
Disturbed by noise in the Close outside.



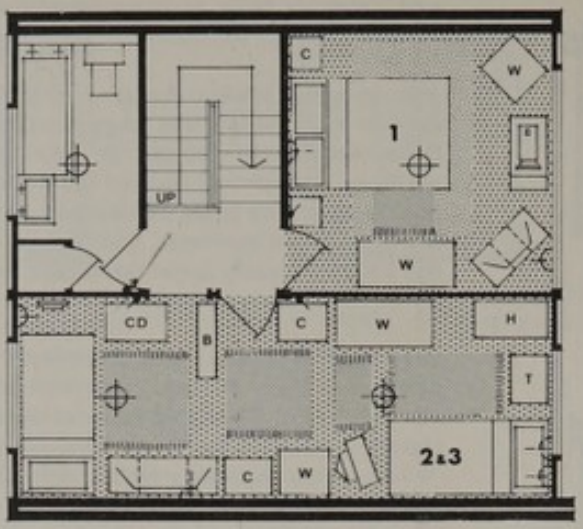
Occupied by girls aged 15 and 12 and used as a study-bedroom.
Complained about noise through internal partition.

upstairs to 'not hygienic' (this last from a housewife whose 16-year-old daughter was using it as a bed-sitter). Most of these households did not use the room as a bedroom.

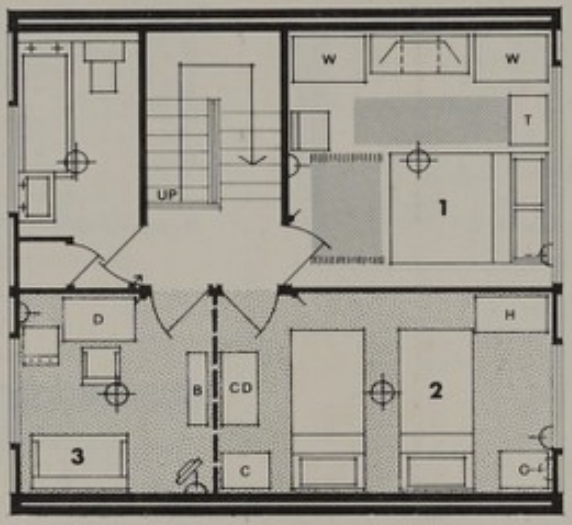
268. In some houses the area of glazing of the outside wall, which was large in relation to the floor area, was thought to give insufficient privacy. Tenants had planted shrubs as a screen from passers-by in the flowerbeds provided, but few shrubs had survived. One housewife said her son could not study in the downstair bedroom as he was constantly distracted by things outside.

269. Night ventilation of this bedroom was also a problem in many houses. High level vents were provided in the 5Z and 6Z houses, but did not give enough ventilation by themselves. In the 4P and 5P houses the downstair bedroom had no vents, and housewives disliked having to leave a window open through fear of being burgled: 'the windows are too near the ground and anyone could walk in'. Another housewife suggested a small window that could be left open at night, especially in summer.

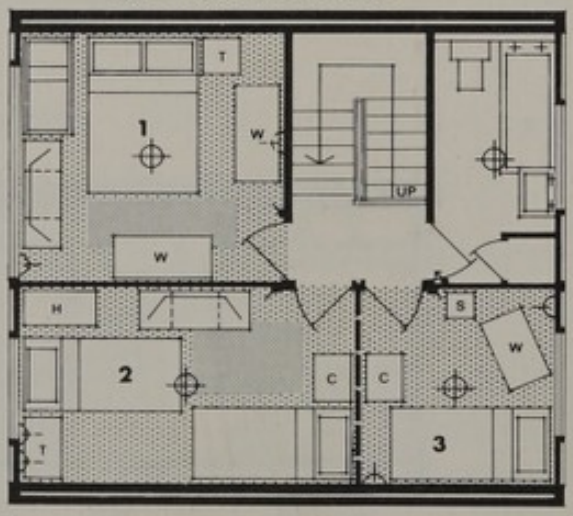
4Z



Occupied by 4 persons
Bed. 1 - Used by husband and wife. Could be larger.
Bed. 2 & 3 - Used by girls aged 18 and 15. Heater limits furniture arrangement. Partition down because rooms were very cold with it up.



Occupied by 4 persons
Bed. 1 - Used by husband and wife - not quite big enough for two. Windows are difficult to open and clean.
Bed. 2 - Used by boys aged 16 and 12. Would like large bedroom with bigger windows.
Bed. 3 - Used as a study, and for visitors. Not quite big enough. Partition up.



Occupied by 5 persons
Bed. 1 - Used by husband and wife and baby. No vent for heater.
Bed. 2 - Used by boy aged 7. Heater is a nuisance, can't arrange the room. Windows difficult to clean.
Bed. 3 - Used by girl aged 15. Partition up.

Upstair bedrooms

270. Bedrooms were allocated as follows:

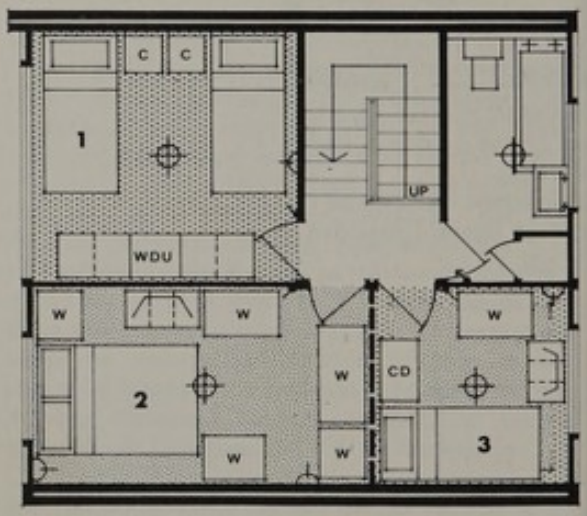
	Main	Second	Third	Fourth (6Z3 1st floor)
Parents	28	2	2	-
Parents and one child	3	1	-	-
Parent and two children	1	-	-	-
One child	1	17	16	3
Two or more children	5	16	3	-
Relative	1	1	1	-
Unused spare	-	2	2	1
Study	-	-	2	-
Totals	39	39	26	4

271. On the whole the size and shape of main bedrooms were satisfactory though some tenants would have preferred them bigger to accommodate their large bedroom suites.

In the P houses

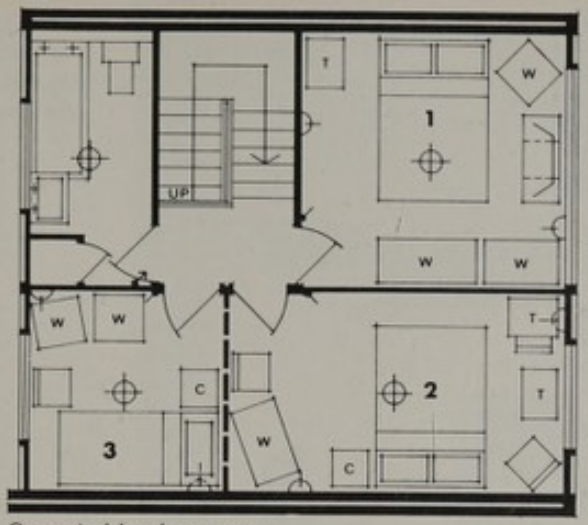
272. As mentioned in paragraph 161 the 13 5P houses had a second bedroom of 127 sq ft which could be subdivided to create a smaller second bedroom of 85 sq ft and a third one of 42 sq ft. Nine of the 13 households did not have the partition up as the 42 sq ft cabin bedroom was considered extremely cramped. Of the four who had the partition up, one used the smaller room as a study; the remaining three used it for young children to sleep in - the housewives in these three houses found the room big enough for only a small single bed.

5Z

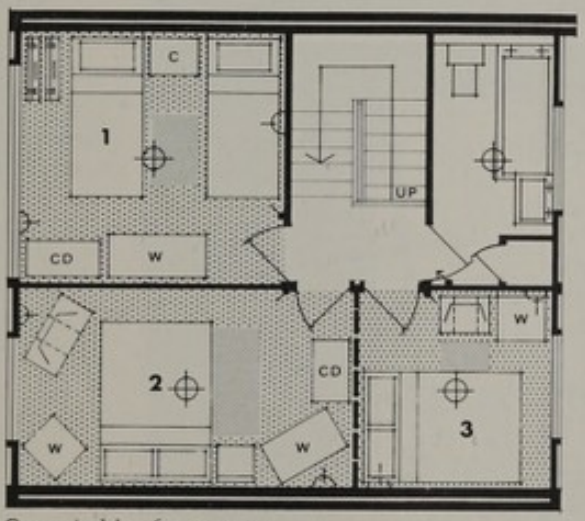


Occupied by 5 persons
Bed. 1 - Used by sons aged 20 and 16.
Bed. 2 - Used by husband and wife.
Bed. 3 - Used by girl aged 18. Partition up. No complaints about any of the bedrooms.
D.B. - Not used, kept as spare room.

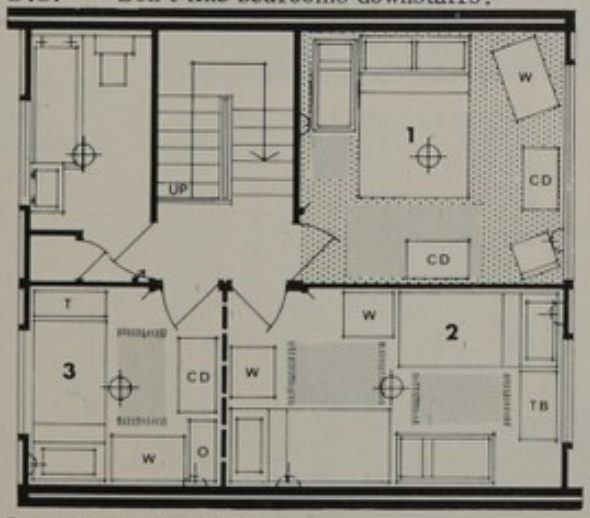
6Z



Occupied by 4 persons
Bed. 1 - Used by husband. Window is a bad fit.
Bed. 2 - Used by girl aged 14. Homework is done here.
Bed. 3 - Used by wife's cousin. Would prefer this bedroom larger and the second bedroom smaller.
D.B. - Invalid wife.

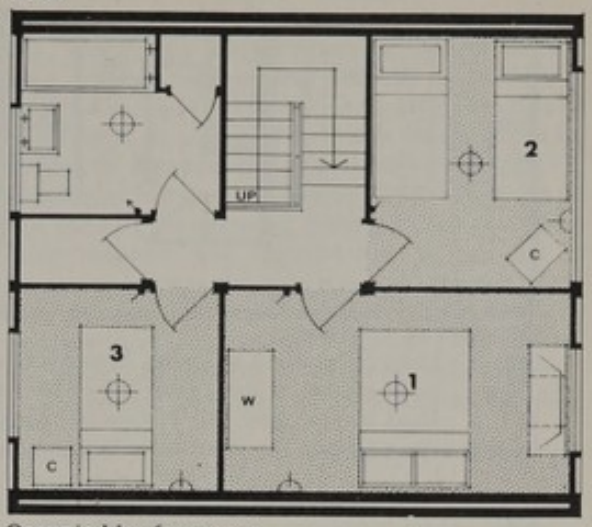


Occupied by 6 persons
Bed. 1 - Used by sons aged 28 and 11. Window is an odd shape for curtaining.
Bed. 2 - Used by daughters aged 20 and 8.
Bed. 3 - Used by husband and wife. Could be bigger. Partition up. Downstair partition is down.
D.B. - 'Don't like bedrooms downstairs.'



Occupied by 8 persons
Bed. 1 - Used by husband and wife and baby.
Bed. 2 - Used by boys aged 11, 7 and 4.
Bed. 3 - Used by girls aged 9 and 2. Not big enough. Windows difficult to clean in all three bedrooms. Partition up.
D.B. - Not used as it is too damp.

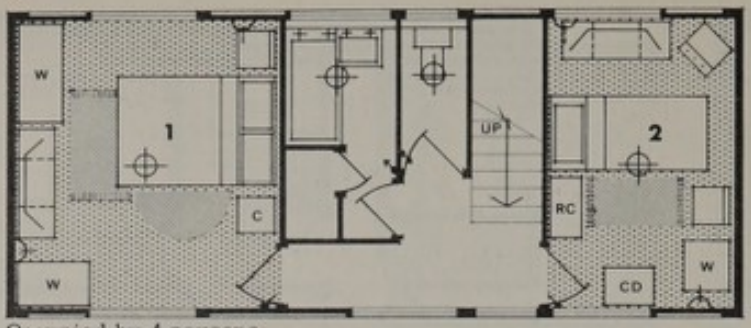
6Z3



Occupied by 6 persons
Bed. 1 - Used for husband and wife.
Bed. 2 - Used by boys aged 19 and 12.
Bed. 3 - Used by girl aged 7.
No complaints about any of the bedrooms.
D.B. - Used by boy 19 'right size'
1st floor D.P. down making 'L' shaped living room.

74
More than one use for the upstair demountable partition in a 6Z house

4P



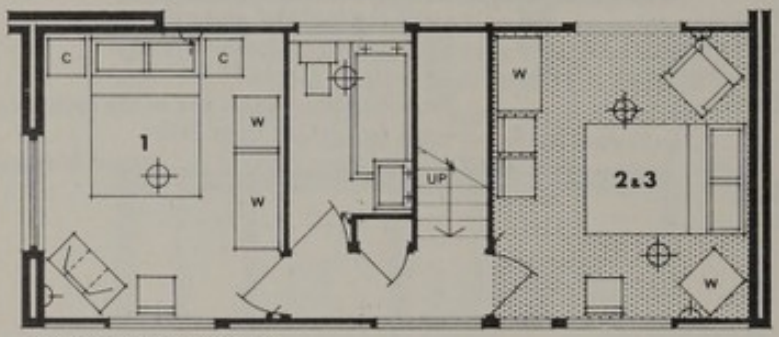
Occupied by 4 persons

Bed. 1 - Used by husband and wife. Would like position of windows to be reversed to give better view. Not enough heat upstairs.

Bed. 2 - Used by son aged 17. Window interferes with opening of door.

D.B. - Used by boy 16. Ventilation is a problem.

5P

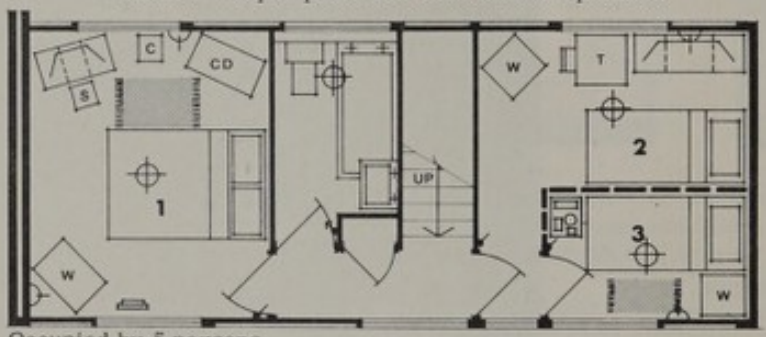


Occupied by 5 persons

Bed. 1 - Used by husband and wife. Can't change furniture around because of windows.

Bed. 2 - Used by boy aged 7 and girl aged 4. Partition taken down because rooms were too small with it up.

D.B. - Used by girl 13 for sleeping, homework, entertaining friends. 'Proper place for bedrooms is upstairs.'



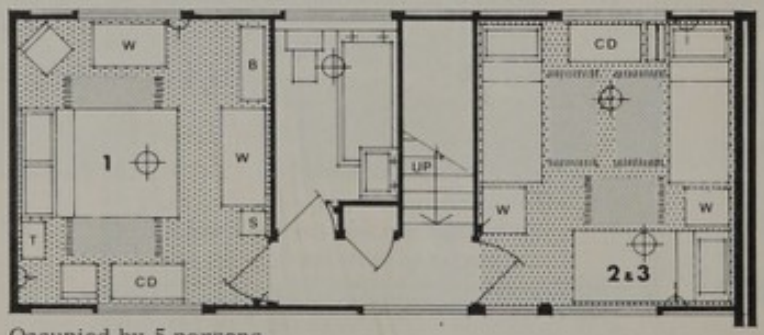
Occupied by 5 persons

Bed. 1 - Used by husband and wife. Not large enough. Don't like position of electric points.

Bed. 2 - Used by girl aged 12.

Bed. 3 - Used by boy aged 7. Partition up - but this room is too small. Can't clean non-revolving window.

D.B. - Used by boy 16. T.V. in living room disturbs him. 'Don't like bedroom downstairs.'



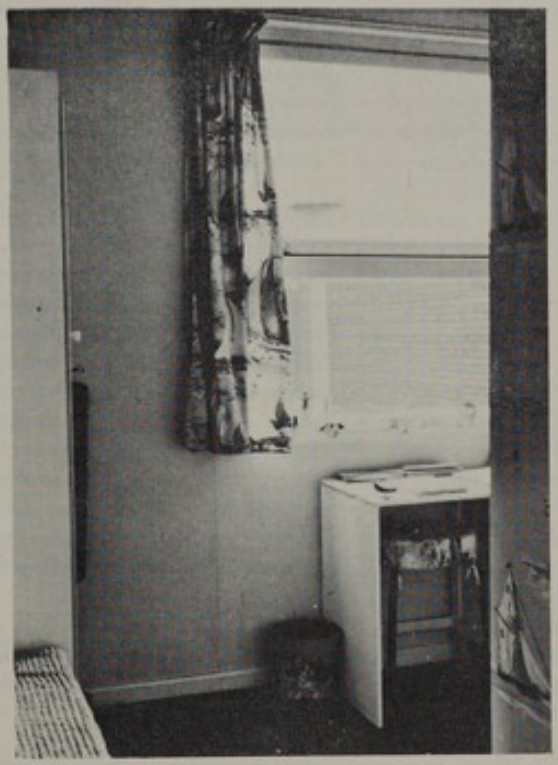
Occupied by 5 persons

Bed. 1 - Used by husband and wife. Not big enough.

Bed. 2 - Used by sons aged 20, 17 and 10. The non-revolving window is difficult to clean. Partition down.

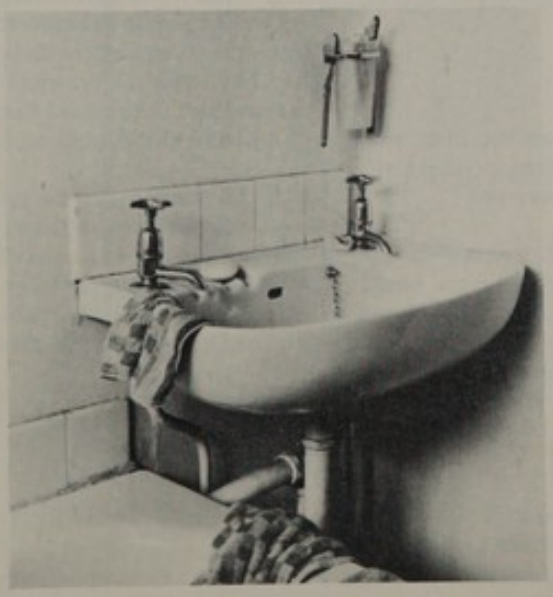
D.B. - Used as playroom only.

75
Small bedroom/ study in 5P house made when demountable partitions are up.



76
Remainder of partitioned bedroom in 5P house.

77
Detail of a 5P bathroom showing cramped position of washbasin.



Two-storey Z house

273. The 19 two-storey Z houses, on the other hand, had two bedrooms in addition to the main one, the second (116 sq ft - nominally a single but could serve as a double) and third (66 sq ft) being divided by a demountable partition. 18 of the 19 households had the partition up. The only tenant who had had the partition removed said that the third bedroom was too cold and so her two daughters slept in the long room of 186 sq ft. As with the downstair bedroom, age and sex of the children were factors which influenced the tenants' use of the demountable partition in these houses. Use of bedrooms in the 18 houses was as follows:

Two-storey Z houses	Number of households
2 girls in 116 sq ft bedroom. 66 sq ft bedroom - study	1
Separate bedrooms for members of opposite sex	14
Separate bedrooms for members of different ages	2
116 sq ft bedroom used by son 66 sq ft bedroom vacant	1
Total with partition up	18
Partition down	1
Total houses	19

In half the instances the second bedroom was used by two children sharing. Size and shape were satisfactory as this bedroom could be used as a double bedroom. The third bedroom of 66 sq ft was less satisfactory: 12 out of the 18 households considered that this room was small or would have preferred it to be bigger.

274. The 23 households who had the upstair bedroom partition up were equally divided between those who thought it let more noise through than an ordinary wall and those who thought it made no difference. Most of the former seemed not unduly disturbed by it.

275. Bedroom windows posed problems of opening and cleaning. Some did not swivel enough, and some housewives were unable to reach part of the window to clean it. In many houses this was because furniture was in the way.

276. Putting windows on opposite sides of the bedrooms in the P houses was appreciated for the light it gave. Doing so enabled the occupants of the houses facing Beckton Road to reduce the traffic noise in their bedrooms by closing one window and getting air from the other. But one housewife would have preferred 'a better view over the main road and a French window on the landing to give access to the flat roof'.

277. 'Homes for today and tomorrow' suggested (paragraph 103 of the Report) that built-in wardrobes should be provided in all bedrooms except

perhaps the main one as a married couple would probably have a wardrobe already. '... cupboards should be provided at the rate of 2ft of rail per occupier, not less than 21ins deep internally to allow for clothes on hangers.' Instead of built-in cupboards, free-standing ones were provided, which was not only more flexible but cheaper. One third of the housewives placed these cupboards in other rooms or asked the Housing Manager to take them away to make room for their own wardrobe.

278. Thirty-one households had partly covered the bedroom floors with linoleum and/or carpets, and others said they intended to cover them in due course.

279. The evidence suggested that teenage children of the same sex preferred to share a bedroom and that children under one usually slept in the same room as their parents. It looked as though at future stages of the family cycle different partitioning arrangements would be made. A frequent comment was: 'We'll have it changed (i.e. the partition taken down) when one of the children gets married. Then my husband and I will have one big room'. Another: 'We'll rearrange it when the children are older'.

Overnight visitors

280. Twenty-four households had had overnight visitors. In three 4Z houses they were put in a spare bedroom upstairs. In seven households they slept in the living room. In 14 they shared a bedroom with a member of the family. One housewife was particularly appreciative of the spare bedspace as 'visitors do not now have to drink and drive home'.

Utility room

281. Only the four 6Z3 houses had the utility room, of 60 sq ft and opening off the entrance corridor, on the ground floor. It was really an enlarged cloakroom containing a wash basin and the second w.c. It was used by the tenants to store washing machines and other household appliances. Housewives liked it because it allowed more space in the kitchen. However, two things were criticised. It had no socket outlets, so housewives had either to wheel the washing machine into the kitchen or let a long flex trail from there. And the lightweight partition dividing it from the dustbin enclosure did not fit properly and let in smells.

Bathroom and w c

282. In four of the six house types the size and shape of the bathroom were found generally satisfactory, but many details were not.

283. The 4P and 5P houses had bathrooms of 41 sq ft which were criticised for being too small, though it seems more likely that it was the placing of the basin rather than the actual size of the room that was the reason. In the 5P houses the basin was placed between the bath and the back of the linen cupboard, allowing next to no elbow room one side.

284. The Z houses had bathrooms of 51 sq ft (60 sq ft in the 6Z3). These bathrooms were liked because the fittings were conveniently placed. The 6Z3 houses had a large linen cupboard and an extra store next to the bathroom, both of which were appreciated.

285. Most housewives found the placing of the bathroom window inconvenient for opening and shutting. Some in 4P and 4Z houses objected to having to stand in the bath to clean it. Bathroom windows in these houses were generally awkward to clean, but especially on the outsides.

286. Initially no ventilators were provided, apart from the pivoting windows. Some tenants, however, had fitted their own in the form of plastic 'hit-and-miss' grilles. The remainder had to open the window to let the moisture out, which they did not much like. Housewives, especially with young children, found the one tile high splash-back round the bath inadequate.

287. Some found not having an overflow in the bath a novelty, but most of them thought they would get used to it. The plug had no chain and got lost, especially in families with young children, and some tenants had persuaded the Council to provide a plug on a chain.

288. The airing cupboards were not big enough to store bed linen as well as air clothes. In the 5P houses, where the airing cupboards were smallest, there were complaints. One solution suggested was extra shelving in the airing cupboards.

289. All housewives, except seven in 4P and 5P houses, were satisfied with the arrangements for water heating. The arrangement in these houses was that the hot water bathroom cylinder supplied both the downstair washbasin and the kitchen sink; consequently the draw-off distance for the downstair fittings, and the waiting time for hot water, were rather long. Also the cylinders in these houses were the same size as those in houses where only the bathroom was being supplied with hot water; moreover, at the time of the appraisal, many cylinders were unlagged. All these things made the cost of hot water higher in the 4P and 5P houses.

290. Tenants mostly switched on the water heater when needed for baths during the week. 14 kept it on all weekend.

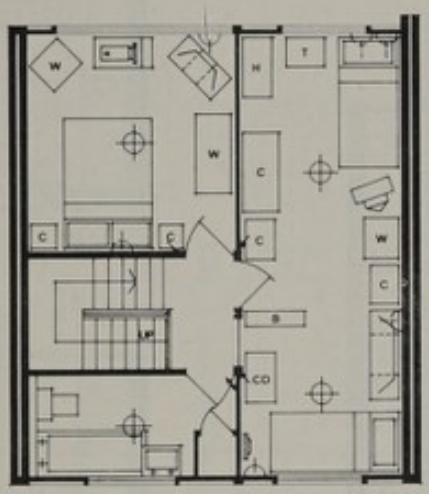
291. Most housewives liked their new water heating on the whole because many of them had had immersion heaters in their old houses and were familiar with them and considered the cost reasonable. A few said having the heater switch at the back of the linen cupboard was inconvenient.

292. All house types except the 4P had a second w.c. on the ground floor; in most houses the downstair w.c. was used during the day in preference to the one upstairs. The occupants of the 4P houses would have liked a downstair w.c. even if it had meant doing without a broom cupboard.

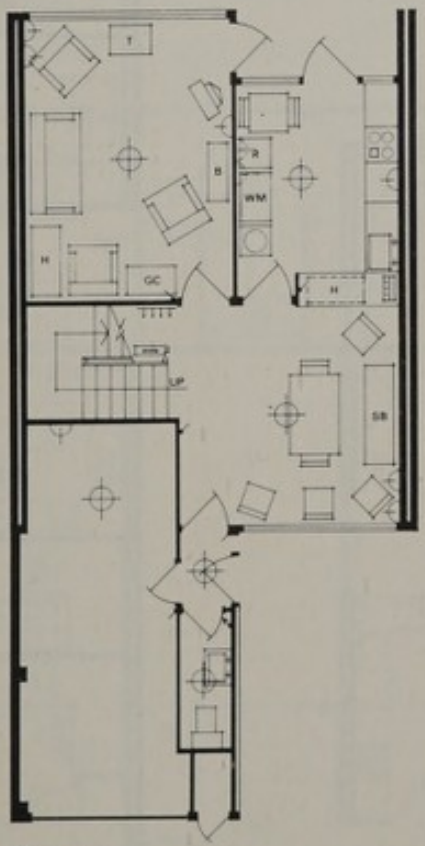
Selected furniture arrangements

78 The house types Examples of tenants' furniture arrangements.

4Z

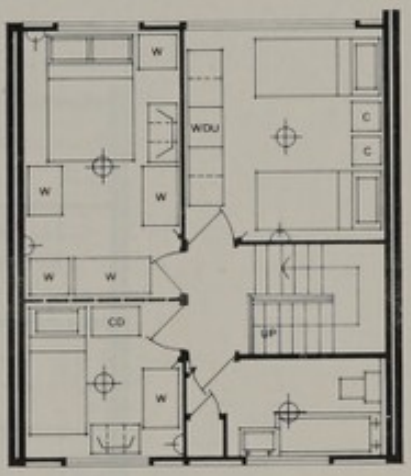


First

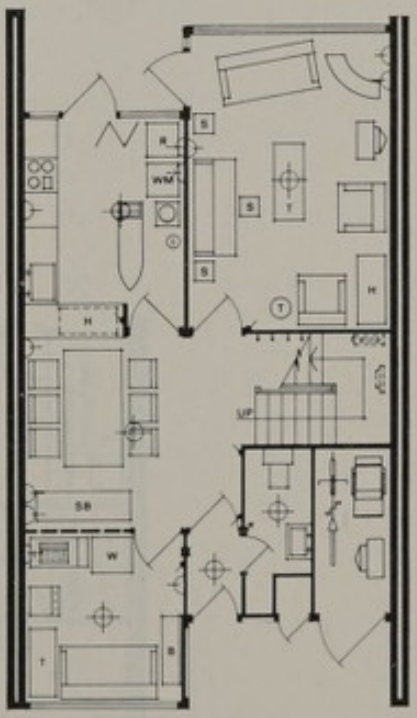


Ground

5Z



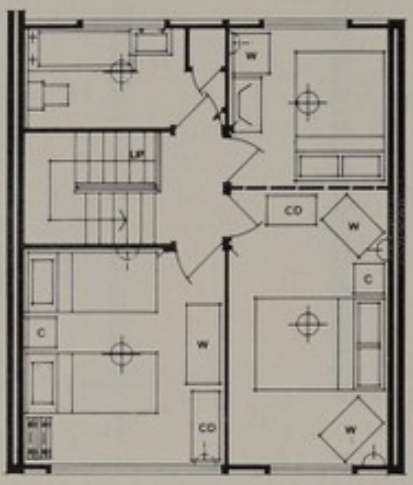
First



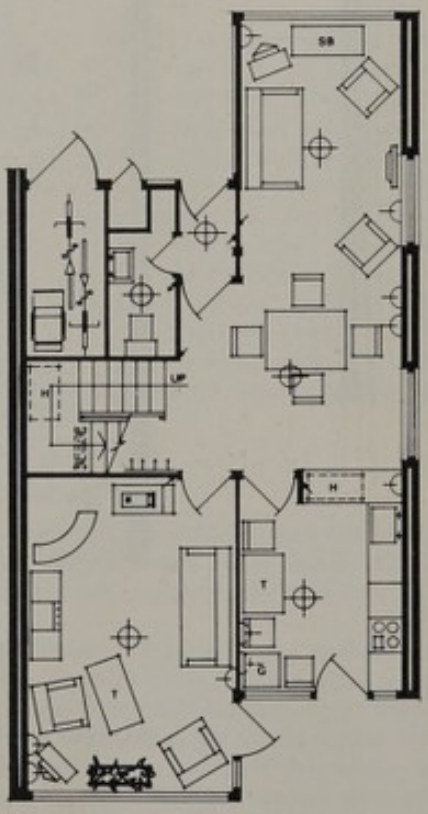
Ground

Selected furniture arrangements

6Z

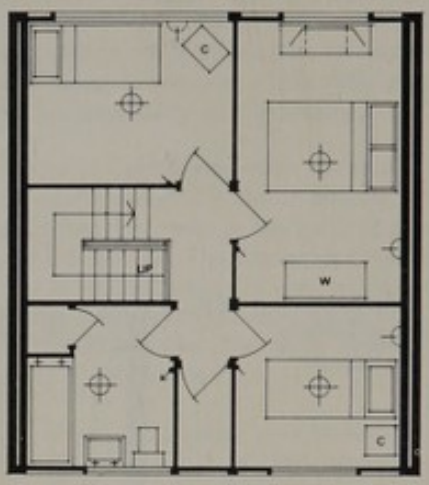


First

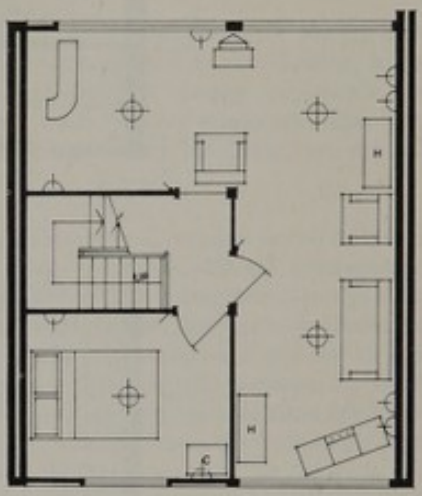


Ground

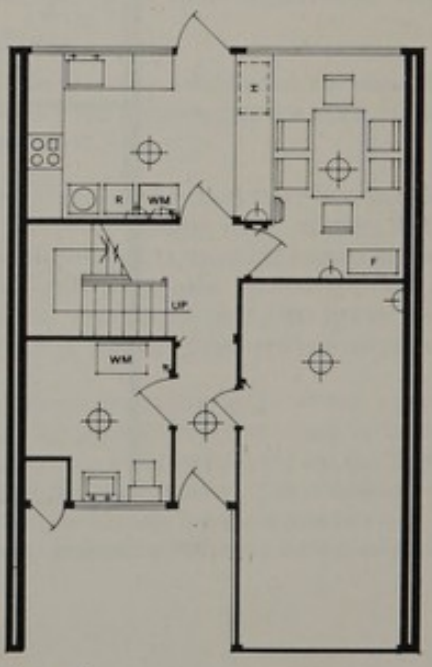
6Z3



Second



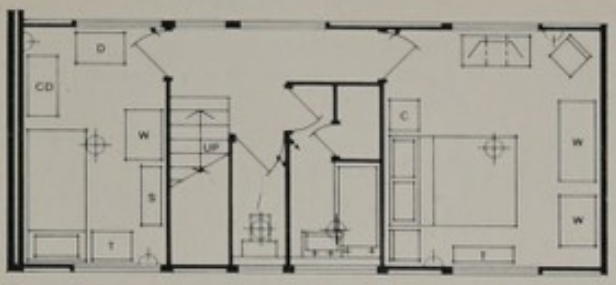
First



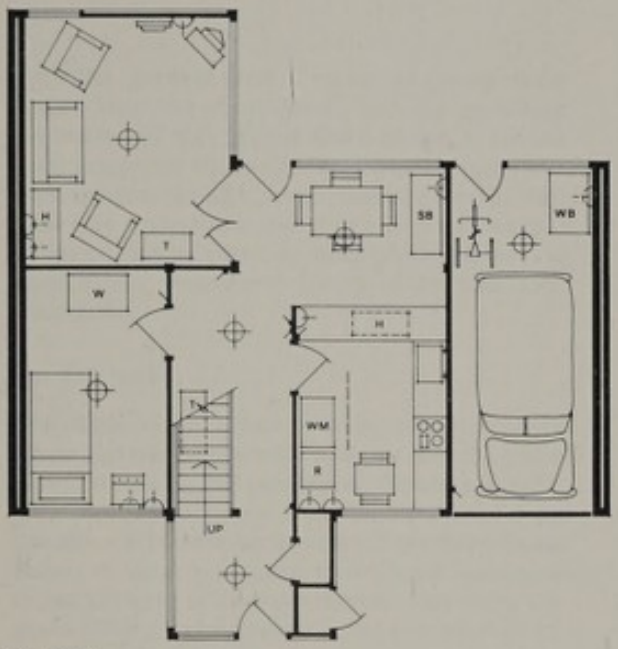
Ground

Selected furniture arrangements

4P

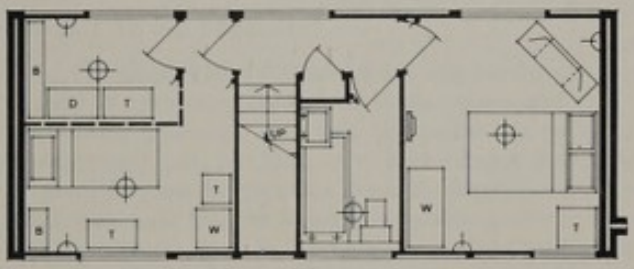


First

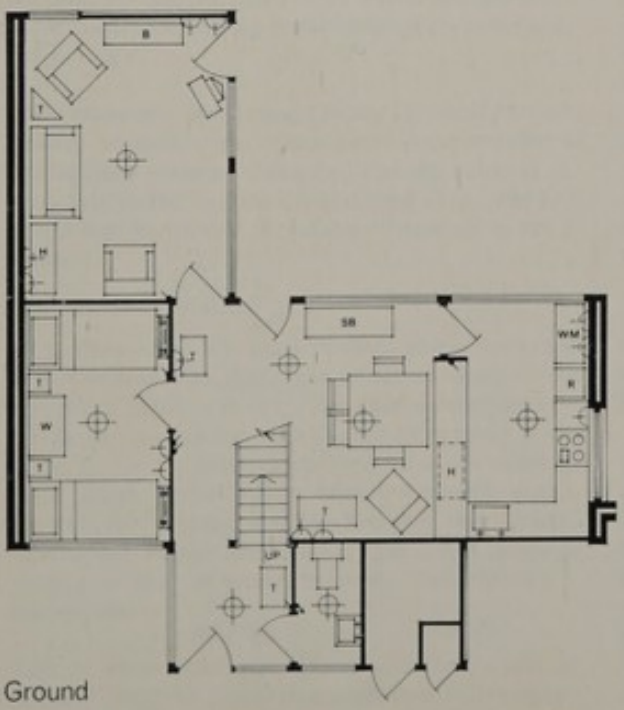


Ground

5P



First



Ground

The houses in use

293. The general need to make the ground floor larger than the first floor, and the resulting projection of the ground floor in the Z houses (paragraph 116 ff), meant re-entrant angles and a comparatively high proportion of external walls. This was more expensive than a straight terrace, so less could be spent on other elements such as floor tiles, weather-stripping, partitions and ventilation.

The 6Z3 house

294. This is in effect a three-storey terrace house and not comparable with the 4Z, 5Z and 6Z types, except in the position of the stair across the centre of the house. It is less successful than the other Z houses because the first floor living room, though the largest, is the least satisfactory in use because of its narrowness. However, the ground floor arrangement, the relationship of kitchen to dining area, the provision of a utility room, and the relation of the stair to these rooms and the entrance, were well liked.

The 4Z, 5Z and 6Z houses

295. The zipping of the house plans was partly a means of improving daylight in some rooms and increasing privacy. This was successful on the living room side, but less so on the entrance side; in the 4Z house the entrance became deeply set back and most tenants found the resulting court (roughly 8ft 6in wide by 14ft 6in deep) bleak and unusable. In the 5Z and 6Z houses tenants felt the zipping on the entrance side made the ground floor bedroom unduly prominent, thus reducing its privacy.

296. However, the draught lobby provided in these houses increased the effectiveness and comfort of the heating system. Tenants liked the relation of the stair to the entrance and dining area, and felt there was no wasted circulation space as in the P houses.

The 4P and 5P houses

297. These are not patio houses in the strictest sense because the two areas of the building do not enclose a patio or court. The chief advantage of the patio house is the high degree of privacy it can give. But in the gardens opening on to the central open space there was a choice between high fencing for privacy and low fencing for a view. The Group chose low fencing, but most tenants, feeling a lack of privacy, made their fences higher.

298. In some 5P houses tenants also felt a lack of privacy because there was a narrow full-height window, easy for passers-by to look through, in the wall of the living room and only a few feet from a path. It was provided to give additional sunlight earlier in the day.

299. 'L'-shaped or patio houses usually have some open planning in the living/dining area to allow access from the entrance to the rooms in the opposite wing. The P houses have this openness accentuated by having no hall or draught lobby, and stairs without risers. The extreme openness of the 5P, involving circulation and furniture around and under the stair, made it less popular than the 4P.

300. Tenants of the P houses with living rooms that faced south and west liked the orientation but the tenants of the two 5P houses whose living rooms faced south and east were less satisfied.

301. The tenants themselves preferred the Z type to the P type, for although the internal dining area in the Z houses was dark, the P houses suffered more from heat loss owing to their open plan and the larger area of glazing. And tenants preferred the position of the stairs in the Z houses to that in the 5P house.

302. Almost all the housewives were fairly happy with their particular arrangement of ground floor rooms. In particular, they liked the way the serving hatch connected the kitchen with the dining area. They also praised the brightness of the rooms. But their general satisfaction with the open plan arrangement was qualified by some comments on the detailing: inadequate insulation, and badly fitting doors and letterboxes which caused draughts and increased heat loss.

303. One housewife in a 5P house said: 'For more privacy and fewer draughts we need doors to the stairs and the dining area'. This was echoed in other P houses. These tenants preferred separation of the hall from the dining area, not only to reduce heat loss but also to save them having to receive casual callers like the milkman and postman in the dining area, and to provide somewhere to keep coats and hats. The 4Z, 5Z and 6Z houses had such a hall.

304. This bore out the opinion of 'Homes for today and tomorrow' (paragraph 29 of the Report) that 'The general preference is for a hall, as providing a neutral space in which to deal with visitors whom one wishes neither to leave on the step nor to invite to meet the family, and as a place to store outdoor clothes and a pram'.

Heating

305. Details of the space heating installations are given in paragraph 190.

306. There was no weather-stripping of external doors, although it is recommended in paragraph 74 of 'Homes for today and tomorrow' as a means of saving a large quantity of heat at low cost: but a groove was incorporated in the window section so that weather-stripping could be added.

307. Almost half the housewives said without being asked that they were dissatisfied with the heating system, especially the position and efficiency of the heaters. In the 4Z, 5Z and 6Z houses many of the larger heaters (3KW and 4.5KW) had been moved at a late stage in the construction from their place under the staircase half-landing where they were to be enclosed in a cupboard. It was thought that this would lead to overheating, and in addition there were technical difficulties in ducting warm air through partitions.

308. This had three unfortunate results: the output of some heaters was not so well suited to the cubic capacity of the space to be heated - the heater between the dining room and kitchen produced too little heat whereas the heaters in the living room produced too much; the affected living rooms became harder to furnish satisfactorily because the re-sited heater had to be accommodated; and the storage space in the kitchen was seriously reduced because a heater had to be incorporated in the fitting between kitchen and dining room. As an illustration of the last two points the 3KW model measured 42in long x 26in high x 18in deep, not counting clearance round the grilles.

309. Other factors made heating data hard to interpret. Some heaters were out of service for long periods. Some tenants used their heaters more than others. Many tenants had not understood how to operate or control this rather complex device, so its performance did not come up to their expectation. Analysis of 12 thermograph recordings and the tenants' heating records (Appendix M) suggests that living rooms were appreciably better heated than dining/kitchen/circulation areas, though their heater fans were used for shorter periods.

310. The essential difference in heating performance was between the 4P and 5P houses, which had no hall or draught lobby, and the 4Z, 5Z and 6Z, which had an effective draught lobby. The 6Z3 house was different again because though it had no draught lobby the kitchen/dining area could be shut off from the circulation space and staircase. The heating standard reached in the central area of the 4P and 5P houses was measurably lower; it produced more complaints and provided less comfort than the Z houses.

311. The heater fans were mostly quiet and quick to respond to hand and automatic controls; temperature increases of 10^{o}F to 12^{o}F were obtained in 20 to 30 minutes.

312. Enclosing the staircase, as three 5P householders did, probably reduced heating costs and made the central area more comfortable, but at the expense of heating the upstairs.

313. Most households had additional heating appliances. Tenants with paraffin heaters complained of condensation.

314. Eight 4Z houses, which were one of the types designed to higher standards, were given a 2KW heater in the second bedroom (ducting air to the main bedroom); three of them were not used. In the bedrooms where they were used in the evenings, spot temperatures were recorded in the 63^{o}F - 72^{o}F range, with the heater on at low to medium. Lack of complaints about bedroom heating suggests that tenants preferred low temperatures (upper 40^{o}s and lower 50^{o}s) in bedrooms, and that portable heaters (which do not complicate the arrangement of the furniture) met their needs. However, there were some complaints about chilly bedrooms downstairs.

Noise

315. Sound insulation also came in for plenty of comment. Three-quarters of the housewives said the sound of the plumbing system and of the cistern refilling were irritating*. A quarter mentioned noise through both fixed and demountable partitions and between floors, but this did not appear to worry them.

316. Noise through party walls was not particularly disturbing, though the tests showed that their airborne sound insulation was 42 dB/5 - seven decibels below House Party Wall Grade. One-third of the housewives said they could hear the radio, piano, children playing, water hammer in pipes and cisterns refilling, in adjoining houses.

Demountable partitions

317. Providing demountable partitions was a good idea, but they proved disappointing, partly because of indifferent workmanship, partly because there was not the money to spend on the requisite detailing. To be effective, the junctions between panels, and between panels and structure, needed better workmanship than can usually be applied to housing work. Because the airborne sound insulation performance of the partitions was so low it affected the usefulness of the extra rooms that could be made with them.

Storage

318. 'Homes for today and tomorrow' (paragraph 97 of the Report) recommended 50 sq ft of general storage space in a house for four or more persons exclusive of fuel bins, dustbins and access ways, with slightly less for smaller families, though no view is expressed on how much should be inside and how much outside the house. Overall main storage space in the project houses was 58 sq ft split between a 28 sq ft store outside the front door and a 30 sq ft store in the garden. In the 4Z and 6Z3 houses the built-in garage gave additional storage space accessible from the house. The 6Z3 also had storage in the ground floor utility room.

319. Two-thirds of the housewives said they did not have enough indoor storage space, and indeed four out of the six project house types put almost

*44% of a sample in 'A survey of noise in British homes' (Building Research Station Technical Papers No. 2) were conscious of cisterns refilling.

all of the 58 sq ft outside. The problem was not so much not enough space overall as the lack of conveniently placed storage space for specific needs, as was also the case with the kitchens (paragraph 234).

320. With the increase in aids and time-saving household gadgets there will need to be more storage space of the right kind for them.

321. There was much criticism of the lack of space near the front door to hang outdoor and work clothes.

322. When it was fine, housewives preferred to use the garden for drying their washing. No special provision had been made for indoor drying (as distinct from airing), but the need for it was strongly felt. Most housewives had used the heaters for drying clothes indoors, which reduced their effectiveness. Some also used the airing cupboard for drying, and perhaps a larger airing cupboard or more shelves in the existing ones would have met the need without going to the expense of a special drying cabinet.

Floorings and decoration

323. The ground floor was covered with the cheaper grades of thermoplastic tiles. Black marbled grade B in kitchen, dining room, hall and stairwell, and plain black grade A in the living room. Bedroom flooring was of softwood T and G boarding.

324 Most tenants disliked the dark colour of the tiles and the difficulty of keeping them clean. But in most houses except those of the poorer families large areas of flooring, especially in living rooms, were covered by carpet and/or linoleum.

325. This had been assumed at the design stage but it was not clear how far the tenants' decision to cover floors was taken from preference and how far it was a reaction to the difficulty of keeping the dark tiles clean but it does at least seem certain that in areas - such as the kitchen - where floors will normally be left uncovered, lighter - coloured tiles should be used.

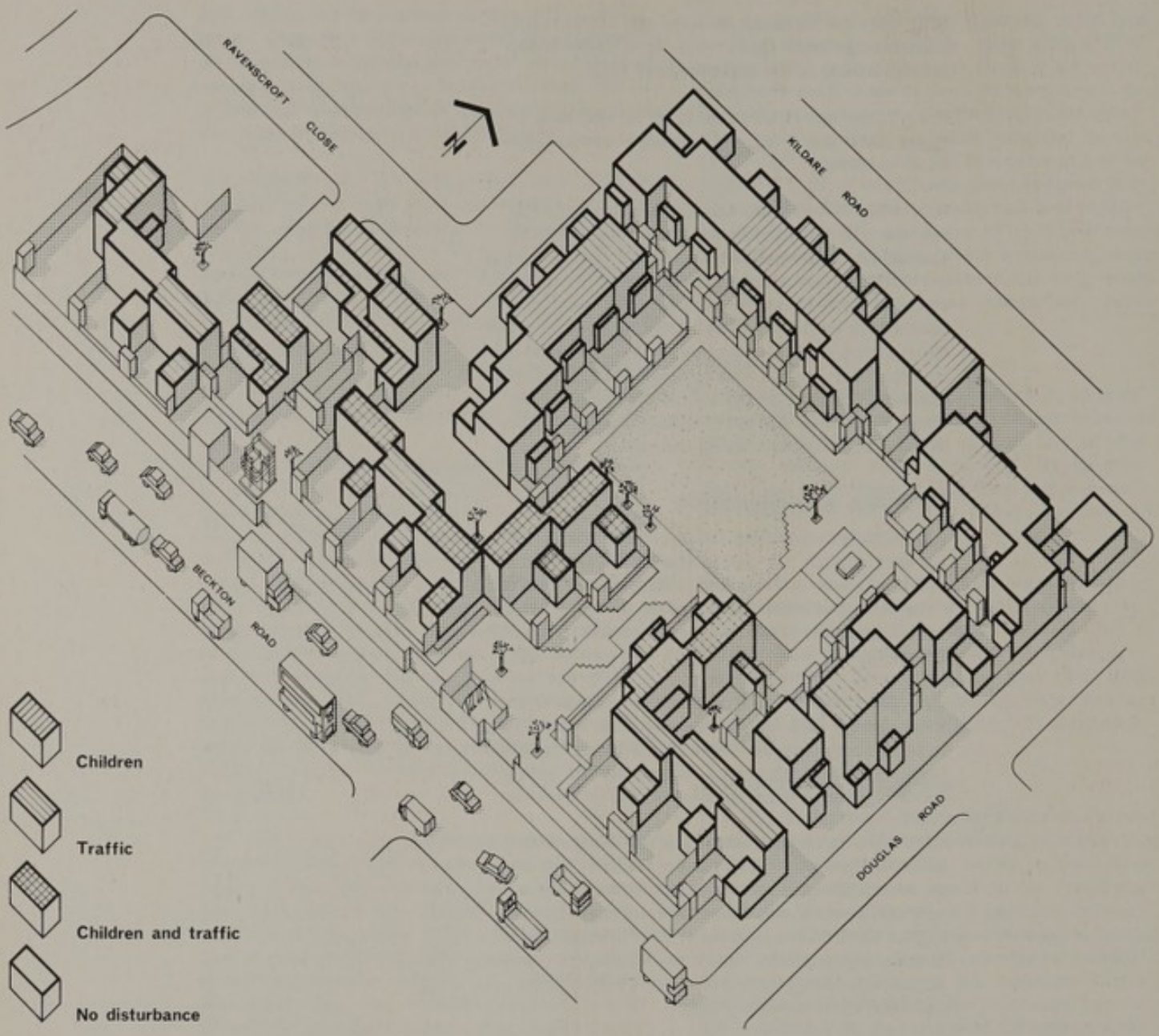
326. As expected (paragraph 11, table), many tenants had redecorated with wallpaper, so that spending as little as possible on initial decoration proved a sensible economy.

Furniture and its arrangement

327. Most tenants had a lot of furniture and possessions, so rooms tended to look overfull. The varied ways in which similar rooms were furnished emphasised that rooms should be designed where possible to be suitable for a number of different furniture arrangements (figure 78).

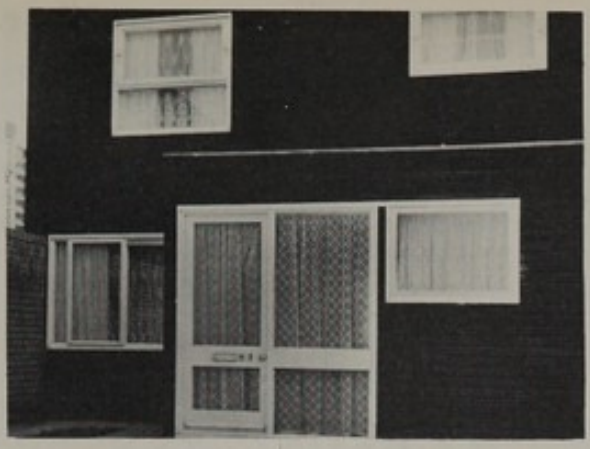
Light switches and socket outlets

328. 'Homes for today and tomorrow' (paragraphs 113 to 115 of the Report) recommended that at least 15 electric points should be provided, but that 20 were desirable. Their location was important too. On average 15 socket outlets were provided in the project houses, and tenants were satisfied with this except for the lack of points in the hallway and corridors presumably for the vacuum cleaner. Housewives in the 6Z3 houses commented on the lack of a point in the utility room.

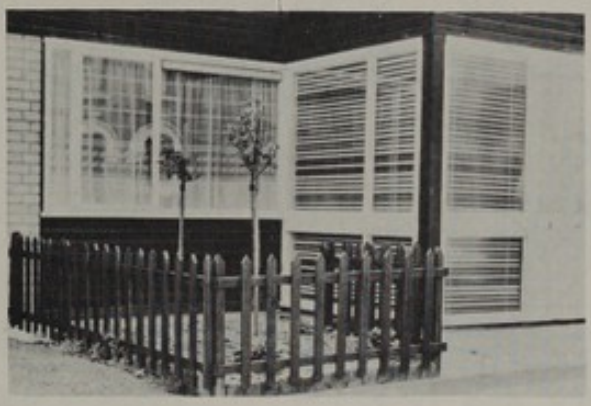


79
Sources of noise which disturbed the tenants (see paragraphs 332-333 opposite). Despite the wall built along Beckton Road traffic noise was disturbing, but the wall formed a good visual barrier and enabled children to play on the site in complete safety.

80
Lace curtaining to increase privacy.



81
Venetian blinds were also used to increase privacy. Fencing was erected by the tenant.



82
Some small inadequately protected trees have not survived.

83
Heavy traffic on Beckton Road.

Out of doors

329. It was not possible to fit 39 houses, each with a small garden and 1:1 parking, and a central open space on to a two and a half acre site of this shape without compromises. For example, the play equipment was too close to some houses for the comfort of their occupants; some houses had little outlook beyond their gardens except a blank wall. Most houses, however, had a reasonably pleasant view from their living rooms and were not overlooked.

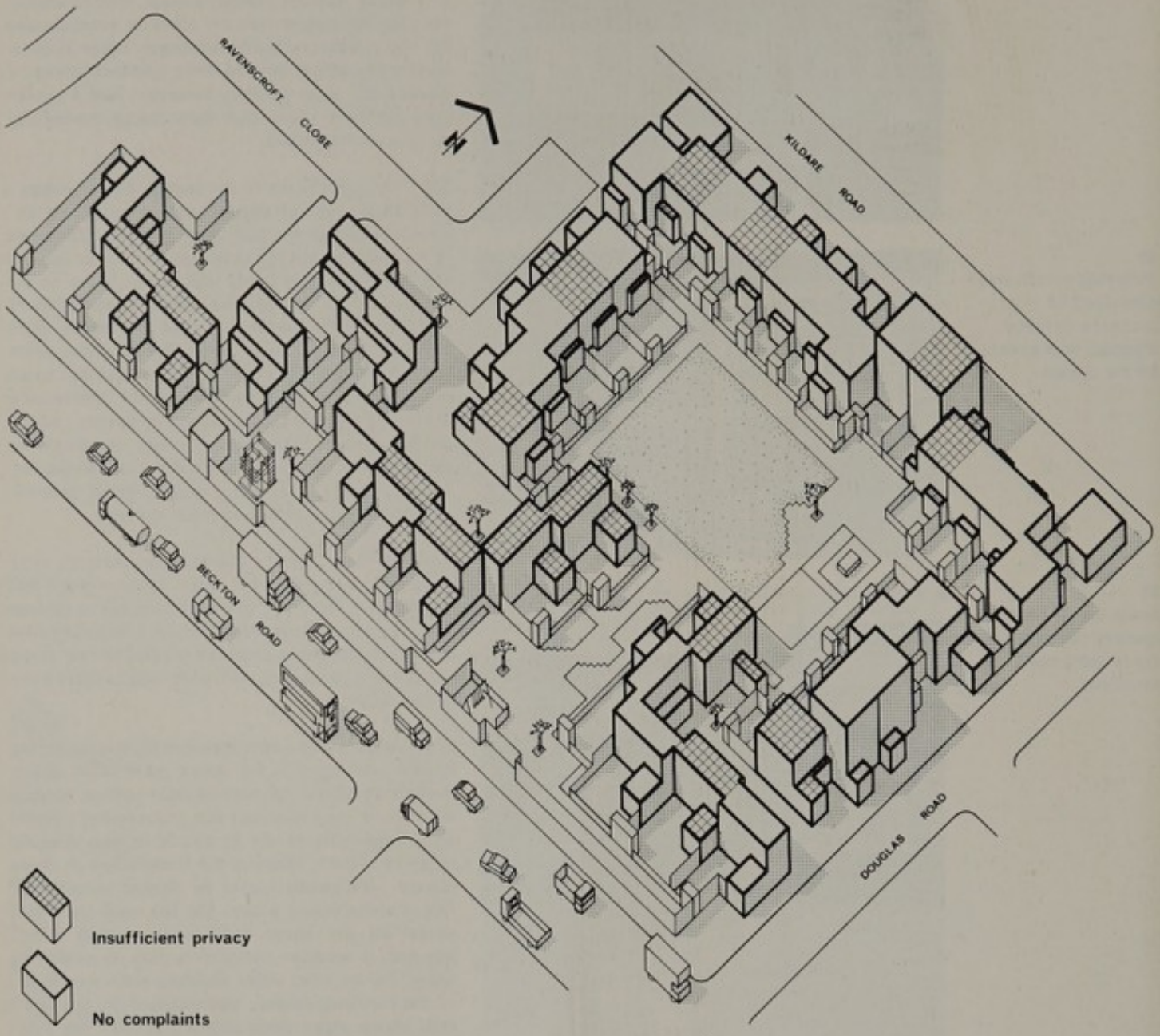
330. The open parts of the layout needed either a very high level of upkeep and management or special care on the part of all tenants. The plots in front of the houses intended for flower beds or shrubbery had not fared very well. Many of the unfenced plots had become untidy humps of earth collecting dirt and rubbish, and trodden by children and dogs. A few tenants thought these plots were wasted and would have preferred that much more added to their gardens. Some had tried to protect the planting by putting up fences, which did not always add to the tidiness. As might be expected, it was in the secluded culs-de-sac of Ravenscroft Close and Douglas Road that the unfenced flower beds had most success.

331. Of the 12 trees planted unprotected, only seven had survived, and three of these were badly mutilated. The other areas of planting in the open space were still protected by the temporary fencing which the Parks Department had put up (these were later removed), but were now largely overgrown with weeds.

332. Tests using a comparative noise-measuring device showed that the brick wall built along Beckton Road did not significantly reduce noise on the site or keep dust and dirt from being a problem, especially in the 4P and 5P houses directly behind the wall. Many of the housewives in these houses said rooms had to be dusted sometimes two or three times a day. But the wall was very useful all the same: it formed a good visual barrier; it enabled children to play in complete safety on the site, older children even sat on it, or the climbing frame, and watched the traffic; it kept waste paper from blowing across the site; and it has proved a considerable asset to the scheme as a whole.

333. Eight of the nine families in houses immediately behind the wall found traffic noise a real problem, as it interfered with sleep, listening to radio, and television. The other family was not disturbed by it because they had always lived on a main road.

334. Many housewives commented on the external appearance of the houses. The black creosote was not liked: one housewife called the scheme 'Dodge City'.



84
Plan prepared from tenants' comments: privacy was a problem, especially on the Beckton Road site which was overlooked by high flats. And the gardens lacked privacy too. 'Like sun bathing on a public highway', as one housewife put it. See particularly paragraphs 349 ff.

Garages

335. 'Homes for today and tomorrow' recommended (paragraphs 198, 206-7 of the Report) that in new housing projects car space should ultimately be provided on the scale of one car per dwelling, and that special care should be taken, especially in high density projects (paragraph 203 of the Report), to merge accommodation for cars with the landscape.

336. Twenty garages and 19 hardstandings were provided in the scheme (see figure 85 overleaf). All but two of the hardstandings were conveniently sited.

337. Ownership of cars was as follows:

Number of cars	Number of households
2	3
1	12
None	24

Only two of the non-owners expected to be getting a car.

Built-in garages

338. Fifteen households had built-in garages. Nine of them owned at least one car. Of the six without, one let the garage; the other five did not because it was 'not private enough, slot meters in the garage', 'used as store room'. Of the nine car owners, six said the garage came up to requirements. The other three were dissatisfied for reasons such as 'step too high', 'big gap between house level and garage', 'vermin and cats get in, also draughts'.

339. Whether the tenant was a car owner or not, the garage was used for storing tricycles, toys, tools etc., and as a workshop. The garages had in fact been designed with space at the back to allow for a work bench.

340. The built-in garages were used as an extension of the house, e.g. for drying clothes, play (in bad weather when the car was out) or as the husband's workroom.

341. The services were designed with the meters in the garage, on the assumption that they would be quarterly ones. In the event seven of these 15 households chose slot meters. Four tenants without cars said that having the slot meter in the garage prevented them from letting their garage. The position was particularly inconvenient for the tenants in the 4P houses as there was no direct access from the house to the garage.

Detached garages and hardstandings

342. All car-owners without built-in garages would have preferred to have them as parking was difficult. One family with two cars kept one on the kerb at the time of the interview, thus obstructing an adjoining garage. One or two tenants had asked the Council for permission to cover their hardstanding with a canopy.

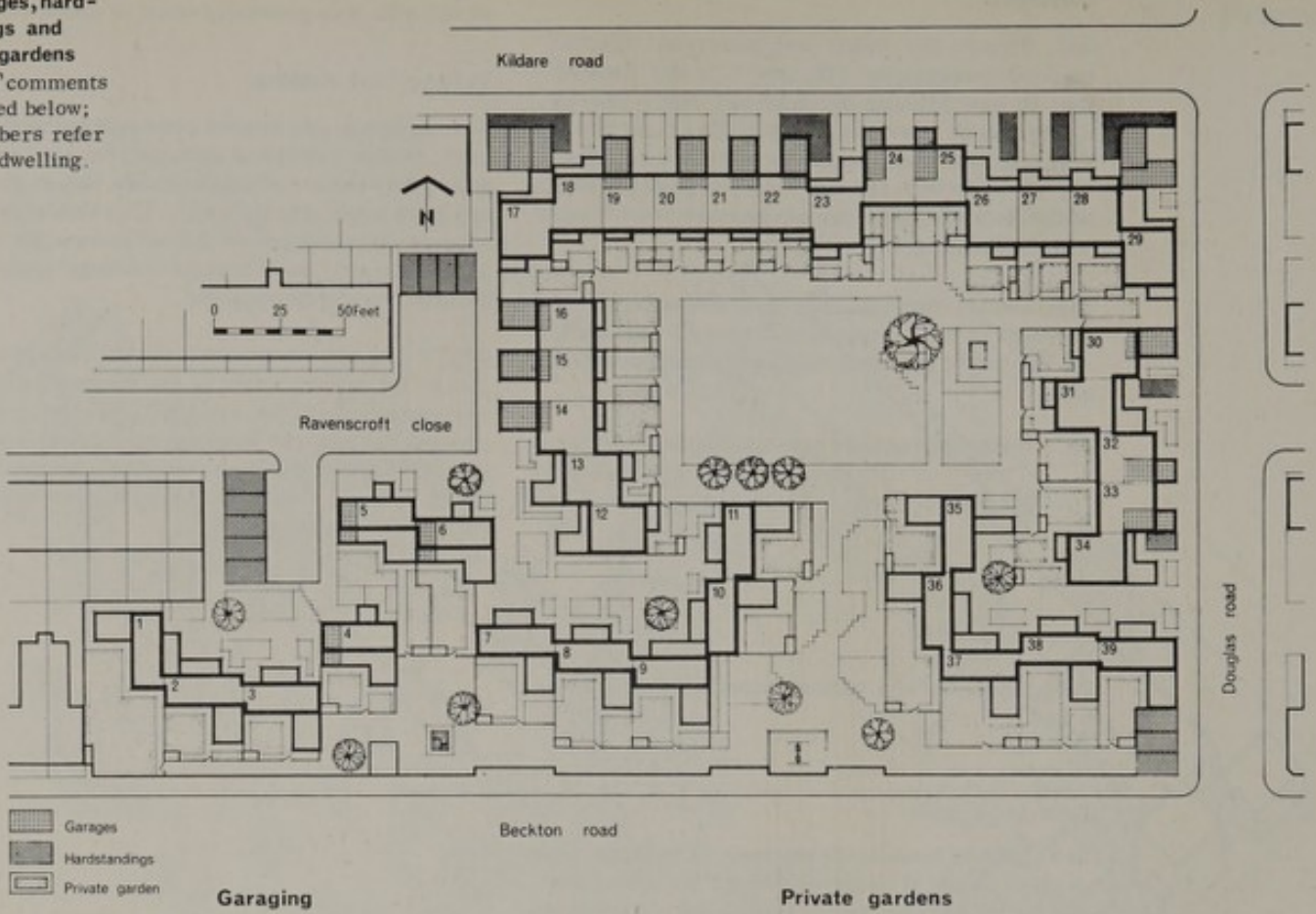
343. Three of the five detached garages were not being used by tenants, and the Council let them to outside people. They had no difficulty in doing so as the area was generally short of space for cars.

Visitors' car parking

344. Although car spaces outnumbered residents' cars, visitors still had difficulty parking near the house they were visiting and often had to go to a car park a few streets away. This underlines the suggestion in paragraph 208 of 'Homes for today and tomorrow' that special parking space for visitors should be provided.

345. From the evidence it seemed that, prosperous as the tenants were, a 1:1 provision of parking space was not yet essential, but was justified here by the general shortage of parking facilities in the neighbourhood and by the intensive use which both car-owners and non-owners made of their built-in garages.

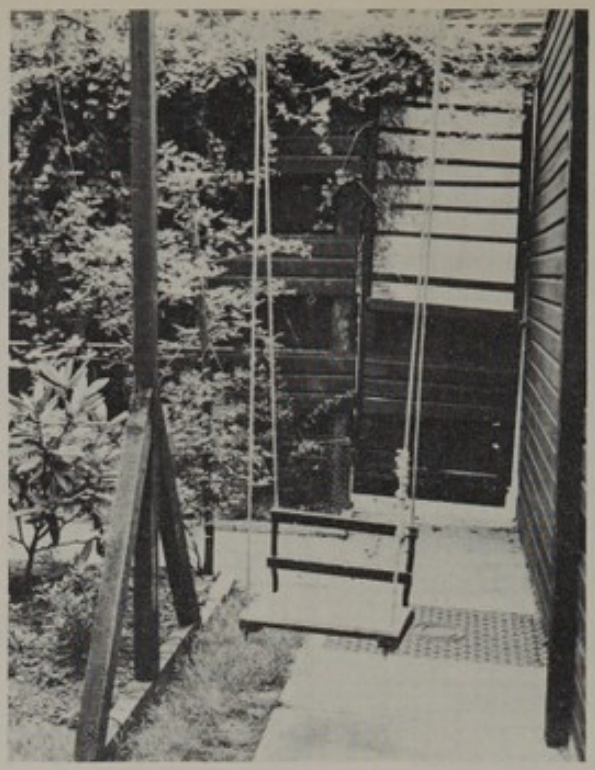
85 Garages, hard-standings and private gardens
Tenants' comments are listed below; the numbers refer to each dwelling.



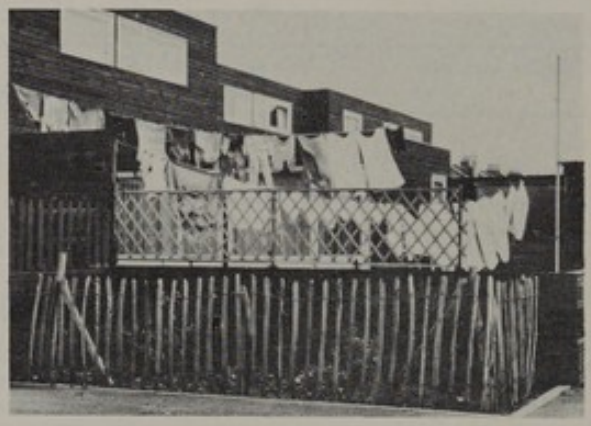
	Garaging	Private gardens
1	Car kept on hardstanding - not convenient, would prefer garage Visitors' parking convenient	Wall is too low, rubbish comes over fence
2	No car Son hopes to get one soon	Will sit out more when we have a lawn
3	Would prefer garage for car, asked for one, but didn't get it Visitors' parking convenient	Baby not out often, garden too small Cannot grow flowers etc., need more top soil Boys throw bottles over wall Dogs come in under fence
4	Car kept in garage - difficult to get to meters since there is no direct access from house Visitors' parking awkward	Would like to grow vegetables and sit out more Have added to paving and increased height of fence to keep children out
5	Car kept in garage Satisfactory Visitors either park in car park or at the front of the house Washing basket, brooms etc., stored in garage	Satisfied with garden
6	No car - son may get one Garage is loaned to someone, but no charge made - wants to retain garage	Added another path
7	Car kept on hardstanding Do not want garage Visitors go to car park	Would like a bigger shed and a higher fence for more privacy Do not like broad passageway
8	No car	Would prefer more paving, and a higher fence to keep dogs out and children in
9	No car	Have put in more paving Would prefer higher fences to keep children in
10	No car Visitors' parking convenient	Too small for drying clothes Not enough privacy to have tea Not enough sunlight Would prefer less paving, and have increased height of fence
11	No car Visitors' parking satisfactory	Cannot sit out because of children
12	No car	Not enough sunlight Extra path to shed put in Trellis put up to keep children out
13	No car	Have put in some extra paving

14	No car Garage is let to brother-in-law Satisfactory	Would prefer higher fences
15	No car Motor cycle kept in garage Do not like garage attached to the house - smell comes in	Garden not big enough for sitting in Would prefer higher fences to keep balls out
16	Car kept in garage The step is too high - vermin can get in Brooms etc. stored in garage Visitors' parking satisfactory	Clothes drying space inadequate Would like room for greenhouse
17	No car	Not enough sunlight Would prefer less paving
18	No car	Satisfied with garden
19	No car - garage used as store for toys and for visitors' cars	Fence satisfactory, but trellis added to keep balls out
20	No car Garage used as store Visitors' parking satisfactory so far	Would prefer more paving
21	Son's car kept in garage - satisfactory Visitors use car park	Awkward for clothes drying - too cramped Have increased fence to 7ft
22	No car - garage used as store and children's playroom Other cars parked in front - visitors park further down road Not prepared to let garage - lack of privacy	Would prefer more paving Trellis added to keep balls out
23	Car kept on hardstanding - would prefer attached garage	Too small for clothes drying Would like to grow more flowers
24	One van, one car (son's) Van not always kept in garage Market produce stored in garage Arrangement is convenient	Satisfied with garden
25	Car kept in garage - satisfactory	Not enough room to sit out in deck chairs Have to walk on garden to put clothes out
26	No car Doctor has difficulty in parking when he visits	Awkward to put washing line up Higher fence preferred, to give shade to kitchen
27	No car - but visitors unable to park conveniently because of other cars	Would like daughters to be able to sunbathe Have increased height of fence
28	Car kept on hardstanding or in rented garage next to house - satisfactory Neighbours park in front, but there is co-operation	Not enough space for sitting out Height of back gate increased to improve privacy Would like less paving
29	No car Visitors' parking convenient	Would like bigger garden
30	Two cars One kept in garage, one on parking space Satisfied - but hose point would be welcome Visitors' parking satisfactory	More paving wanted in front of door Have increased height of fence Would like to put clothes up without walking on the lawn
31	No car Visitors can use hardstanding	Satisfied with garden
32	One car Bottom of garage door blocked to keep draughts out of dining room and to keep cats out Visitors' parking satisfactory	Paving is sinking Garden was dug up by workmen to lay cables
33	Car kept in garage - satisfactory Sometimes obstructed by other people's cars	Garden not big enough Muddy in winter
34	Have two cars - would prefer garage or at least a roof over the hardstanding Visitors' parking is awkward	Put in extra paving outside kitchen door Higher fence preferred
35	No car	Satisfied with garden
36	No car Visitors' parking satisfactory	Would like a little more paving for pram Prefer higher fence to keep children out
37	No car Visitors' parking convenient	No room to grow vegetables Would like bigger garden
38	No car	Satisfied with garden
39	No car Visitors' parking satisfactory	Garden not big enough for adults - too small to sunbathe

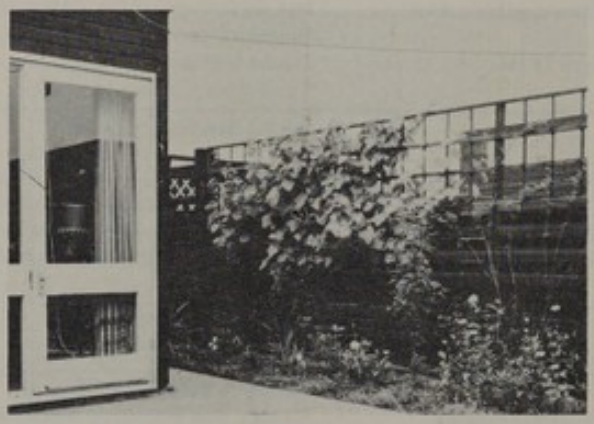
86
A swing in a private garden. Note home-made screen over the gate.



87
Temporary chestnut paling to protect plants in foreground; tenant's fencing is behind; washing obscures private garden.



88
View of private garden. Tenant has made the fencing higher to increase privacy.



89
Trellises put up by tenants to protect gardens from balls and to increase privacy.

Gardens

346. 'Homes for today and tomorrow' suggested (paragraph 169 of the Report) that now gardens were no longer necessary for growing food it would be a temptation to make them too small for such use as children's play, and that where gardens are small it would be important to plan for playspace nearby.

347. Each house had its own garden, the size varying from 248 sq ft to 520 sq ft. Larger gardens were more popular than smaller ones. The evidence suggested that the size of garden required was not related to the size of the family but was related to what the family wanted to do in it. Gardens were used, among other things, for drying clothes; sitting out; young children playing under their mother's eye; putting prams out; and pets. Seven out of 10 households thought their 248 sq ft garden was too small for some, let alone all, of these uses. The other three, who either had no young children or did not garden, were satisfied.

348. Most housewives mentioned spontaneously only two uses of their gardens - drying washing and growing flowers. But with prompting specific uses were mentioned as follows:

Use	Percentage of housewives
drying washing	100
growing flowers	92
sitting out	79
children's play	50
making and mending	10

349. 'Homes for today and tomorrow' (paragraph 170 of the Report) stressed the need for a reasonable amount of privacy in gardens. There was some conflict between being able to look out and preventing other people looking in. As most gardens gave directly on to the central open space most housewives felt they were not private enough. 'Like sun bathing on a public highway', as one put it. This made 34 out of the 39 tenants increase the height of the 3ft horizontally boarded fence at the end of the garden.

350. Another reason for doing this was to keep children and dogs from climbing in and out. As most tenants had done the extra fencing themselves, the general effect was of an uneven pattern round the open space. Households immediately behind the Beckton Road wall also felt their privacy was intruded on by people looking in from the tops of buses, and also by the flats opposite although these were about 100 yards away.

351. Among those who had had gardens before, comparison showed that neither in their previous homes nor here were the gardens private enough for families to sit outside in comfort, or large enough for drying washing and doing other things at the same time.

352. Over half the households were satisfied with the amount of paving in their gardens, but 11 housewives in 4P and 5P houses with larger gardens would have preferred more paving leading to

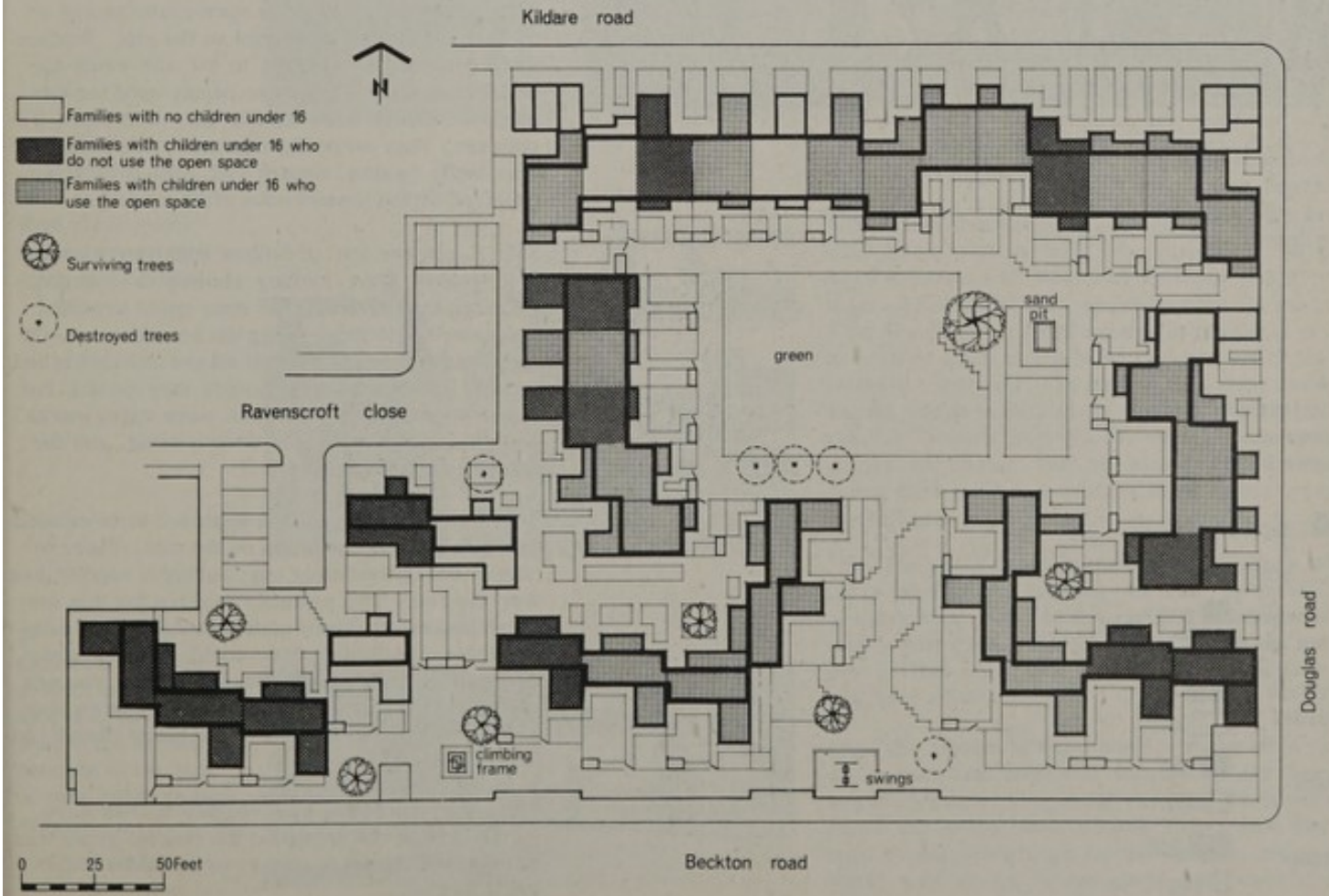
90
A typical garden store.

the clothes line and the shed.

353. All households were satisfied with the storage places provided in the garden and by the front door; these were adequate for such things as bicycles, pushchairs and tools. A few husbands had put a work bench into the garden shed. 11 of the 18 households who paid for electricity by slot meter had the meter in the front store. This was inconvenient, and some tenants had had to fix an electric light in the store to enable them to use the meter at night. The locks on the front stores had to be changed because of burglars.

354. Tenants liked their gardens but, apart from the question of privacy, those with small ones would have preferred them bigger.

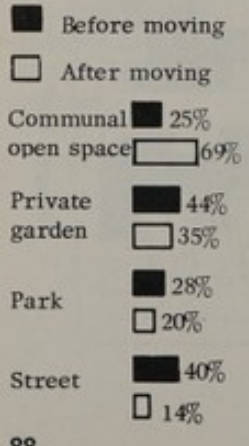
91 Open space
Plan showing use of open space by children under 16; play equipment and surviving trees.



92
The climbing frame, a popular platform from which to watch traffic.

93
Wood screen to swings, now broken and used as play equipment.

94
Play outside the home of children under 16 years.



The central open space and children's play

355. The play equipment on the open space was designed primarily for the younger children. But as it turned out two-thirds of the active children living on the site at the time of the appraisal survey were over ten; and so were about half the children who actually used the open space:

Children living on the site

Age Group	Number	Percentage
Up to 5	13	14
5-10	26	29
11-14	28	31
15 up to 18	23	26
Total children under 18	90	100

356. With nearly all the housewives over the age of 35 it seems unlikely there will be many more children under five while the present residents remain. So in a few years time, as the older children find leisure interests away from the site, pressure on the open space should be reduced unless a turnover of tenants keeps the number of teenagers up.

357. Toddlers and other children under five used the open space mainly during the day, when the others were at school. Most of the children from five to ten used it after 4 p.m., at weekends, and during holiday periods. Observation also showed that a number of children between 11 and 14, and a few youths over 15, used it as well, mainly in the evenings, to play football with their brothers, sisters and friends.

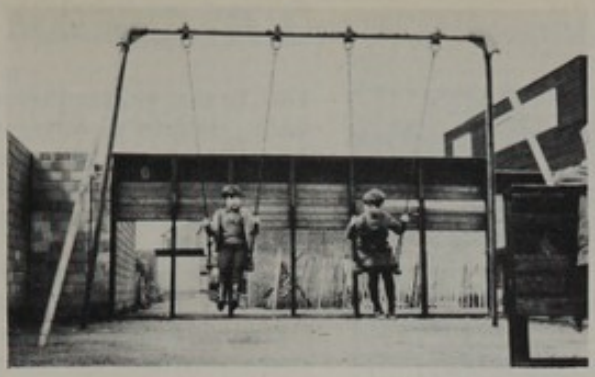
358. Adults never used the open space except as a short cut to friends' homes on the site. Benches were provided for parents to sit and watch the children at play. They were rarely used for this purpose, though occasionally they were used by children. They were lightly made, and two had been badly broken. Others had been broken but repaired by the tenants soon after moving in.

359. A comparison of where children played before and after moving showed a marked increase in those using the open space provided and a decline in those using the nearest park, the street or their gardens. Not all the households had the use of an open space before they moved, but figure 94 shows that children were using parks and their own garden less after moving, and the street much less.

360. Use of the open space appeared to be related to the household's position on the site. Those in houses not immediately overlooking it used it less than the rest. Two probable reasons for this are: these houses contained mainly teenage and adult children; and housewives could not see their children at play and so did not let the younger ones use it. Some of them let their children play in the culs-de-sac in front of the house though one had vehicle access.

361. The open space was roughly half an acre. At the time of the appraisal the central green was rarely used except to cross, or for older children's football.

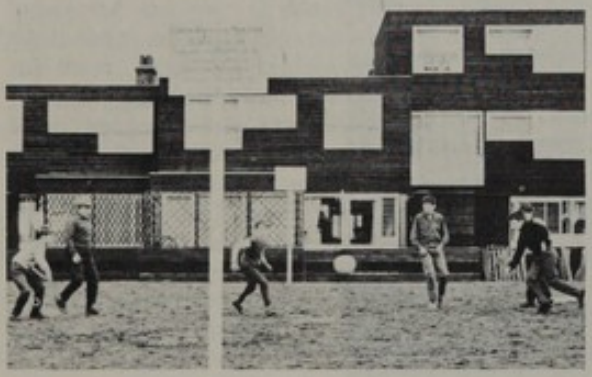
95
The swings - suitable for the older children.



96
The sandpit in use.

97
Paved areas are popular for playing but overlooking windows may get broken.

98
Boys playing football on the green in spite of the notice.



99
Children from the project site and the adjoining houses play in the street because of the lack of open space in the area.

362. The open space as a whole was intensively used, and all the more so because there were so few other playspaces nearby. The nearest park was 20 minutes away and across a busy main road. So the older children inevitably played in the enclosed space on the site and brought their friends too.

363. If the enclosed space was safe for children it was also safe for the eight dogs on the site - another problem. Many mothers of young children would not let them use it because tenants' dogs regularly fouled it and sometimes destroyed things. In addition, the wilder ones terrorised the younger children and restricted the use of the open space. Many mothers would have liked dogs prohibited from it. Dog owners said there were few open spaces nearby where they could exercise their dogs.

364. The play equipment (figures 92-93, 95-96) consisted of two swings, one climbing frame and one sandpit with lockable sliding covers, which was lightly made and had been gradually wrecked. It had been empty of sand for a large part of the year and was used by children to clamber over (figure 100). No one seemed concerned that it was unusable: all the children spoken to, and some of the mothers, said they would rather see a slide in its place.

365. All parents with children between five and ten thought the climbing frame dangerous. It had a raised concrete base, so a few minor accidents had resulted from children falling from it. But despite their parents' uneasiness, the children were not deterred from using it or sitting on the top to watch the Beckton Road traffic.

366. The two swings, which were open bench type for older children, were extremely popular and used by all the children throughout the day. There was a demand for the more protected type of swing for younger children to be placed where they could be supervised. A few families with children under five had put up this type of swing in their gardens.

367. Housewives were asked whether they would have liked more or less play equipment. Many were satisfied with what was provided. Six did not want a climbing frame, six did not want a sandpit. Five housewives, and a number of children, would have liked a pen in which the children could play football. As it was, children were playing everywhere, which led to broken windows and destruction of flowers and plants, mainly from ball games. But in fact, both the site and the central space were too small to allow for a special space for ball games.

368. The paved areas in the open space were far more popular for playing on than the green. Tenants themselves commented on this and said they would have welcomed more paving and less grass. This would have involved less maintenance but more noise.

369. The amount of vigorous play going on in the open space one afternoon was as follows: boys, and two girls, cycling at top speed on the paved rib round the green: boys playing five-a-side football on the paved area by the sandpit, using a house wall as one of the goals: girls under five

100
The sandpit broken and now unused except as a platform.

playing on and around the swings; boys and girls on the climbing frame.

370. To sum up, families were not anxious about their children's safety and were satisfied generally with the play equipment provided. But there were conflicts and difficulties in the use of the central space for reasons beyond the designers' control, such as the lack of other open space nearby, the fact that the families were at different stages of the family cycle, and the freedom allowed to some of the tenants' dogs. More supervision by parents and collective control generally would have improved matters.

101
A tenant's device to keep neighbouring children from climbing the wall into her garden to reach the communal space.

102
One of the surviving trees in a cul-de-sac.

Management

371. The history of the scheme since it was occupied shows the need for a clear arrangement from the start on how responsibility for upkeep and management, particularly of the external works, is to be divided between the tenants and the local authority. The intention at West Ham was that the management of the scheme in general should be the joint responsibility of the Council's Parks and Housing Departments. In particular, the Parks Department were to be responsible for the green and planted areas of the central open space, and the Housing Department for the care and upkeep of the equipment. The tenants had no specific responsibility for the open space, but were expected to look after their own gardens and the plots in front of their dwellings.

372. As it happened, the Parks Department were able to attend to the green and planted areas only once a year on average, and the Housing Department frequently had to repair broken benches and the sandpit. (Eventually they had to remove the sandpit as it had lain broken and unused for some months.)

373. In practice, therefore, this arrangement did not prove completely satisfactory as a layout of this type really calls for some form of corporate supervision and communal upkeep on the part of the tenants. Originally the designers had hoped that a tenants' association would be formed to supervise the use of the open space and its equipment. Although this seemed a possibility at the start, when the tenants took part in a site party to celebrate West Ham winning the Cup, it later became clear that this was unlikely to happen. The 39 households came from different social backgrounds and were at different stages of the family cycle. The houses were built close together, which meant inevitably that there were problems of noise and privacy. Possibly also the group of tenants was too small for such an organisation to be feasible.

374. The area to suffer most from this lack of corporate supervision was the open space, which was a favourite play area for the older children and therefore used more intensively than had been expected.

375. Much of this is a question of management, but some of the responsibility must be regarded as the designer's. He must not only calculate the running costs of the layout, but consider how the equipment he provides is likely to be used. Only by previous investigation can he design so as to minimise possible conflicts of use.

376. Some of these conflicts, which are inseparable from town life, might have been foreseen; for example, the noise likely to result where it is necessary to build houses close together for large families. And it was known that there was not much other local open space. But what was not foreseeable at the design stage was the effect of having a large number of older children on the site. On balance it seems that these disadvantages did not outweigh the great advantage of a safe play area.

377. However, no designer can forecast with any degree of accuracy how intense different uses of a space will be and how much upkeep and renewal may be necessary on different parts of a site. In the West Ham scheme it gradually became clear that if plants on through roads were to survive they would need protecting by fencing. Tenants had successfully cared for the plots of land in the culs-de-sac, but the only plants to have survived in Kildare Road - the through road - were those which tenants had fenced in. Experience also suggested that the plots in front of dwellings in through ways should be kept back as far as possible from where people walk, and that trees and shrubs could have been further protected by being planted in raised beds.

378. Because some of these things were difficult to foresee it seems that landscape work ought to be a continuous process, and should not end when the contractor leaves the site. Designers should have the opportunity of returning after a year or so to look at the site in its current stage, and to advise further, as suggested in the Ministry's Design Bulletin 5, 'Landscaping for flats'*. Flexibility, in fact, is the only answer. The designer and the housing manager together must devise solutions to problems that have revealed themselves. As Design Bulletin 5 says (page 25), '... the flexible approach has a further advantage. As time passes, the uses to which various parts of the estate are put may be changed. As age structure changes, so will the tenants' needs. For example, more provision might be required for older children, and less for toddlers'.

379. To sum up. Experience at West Ham suggests that the successful management of a scheme of this type depends on the tenants, the local authority and the designer each assuming responsibility for different aspects of the site's upkeep and renewal.

---

*See page 119

380. In public housing it is extremely difficult to insist that tenants take part of the responsibility. It might be possible through the selection of tenants to ensure that only households who were prepared to take responsibility, i.e. join an association, were chosen for a particular scheme. But this would be scarcely practicable generally as families are housed according to need. Also, insistence on tenants being members of a tenants' association would give the local authority more work in enforcing continuing membership and adherence to rules.

381. A tenants' association is more likely to flourish where corporate action spontaneously springs from the tenants themselves, with encouragement from the local authority. High density urban life requires a carefully designed environment as well as a home, and this involves local authority management and maintenance.

382. Management should be willing to consider alterations from time to time, particularly in the external works, to meet changing needs, and this may enable the designer to be actively associated with the scheme for some time after its completion, and to benefit from the feedback.

Maintenance

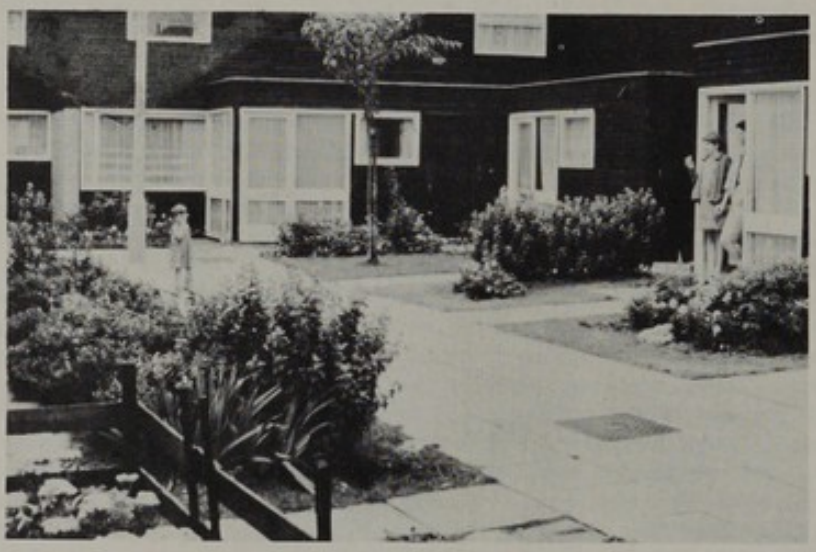
383. The Council was responsible for maintenance and the tenants did the internal decorations and minor repairs.

384. So far, naturally, the Council has not had to undertake any large scale maintenance. To assess the maintenance implications for a scheme of this type, built to higher standards than earlier local authority projects, it would be necessary to carry out appraisals at intervals during its life.

Tenants' handbook

385. On occupation, tenants were given a handbook prepared by the Group as a guide to the use and maintenance of their houses and the equipment in them. During appraisal, however, it became apparent that the tenants had not understood or had not followed specific instructions, probably because the handbook was not illustrated and was written in too technical a style.

386. One result of this failure of communication was that tenants were not getting the best out of the space and water heating systems. Such handbooks are clearly very useful, particularly for experimental housing schemes, but they must be written in non-technical language and illustrated with diagrams wherever possible. Individual demonstrations of unfamiliar equipment, such as new heating appliances, might also help and might need to be repeated more than once. Another possibility is to instruct rent collectors on aspects of maintenance which tenants may find difficult, so that they can give information and advice if required.



103
Planting in culs-de-sac has been more successful.

104
Protective fencing around planting has now been removed.

Appendices

Appendix A

Analysis of tender price

39 houses, 20 garages and site works

External works and site abnormals	£ 22,564
11 two-storey houses, 4 persons 16 " " " 5 " 8 " " " 6 " 4 three- " " 6 "	
39 houses and 20 garages at 'pre-Parker Morris' standards (but including additional and moveable partitioning to provide a greater proportion of single bedrooms)	£ 84,331
Extra for recommended standards as in Appendices 1 and 2 in the Parker Morris Report 'Homes for today and tomorrow' including some standards higher than the recommended minima (as detailed in Appendix B)	£ 14,885
Amount of Firm Price Tender at February 1963	£121,780

Notes

1. Analysis of tender price for the project, assessed to show effect of Parker Morris standards.

2. The prices for houses in West Ham are influenced by the high price level of the London area and are therefore higher than the average prices for houses in provincial urban areas.

Appendix B

Assessed extra costs of Parker Morris standards*

Increased standards	Average per house: Minimum standard	Average per house: In excess of minimum standard	Average per house: Total	Total extra cost for all houses
	£	£	£	£
4-PERSON HOUSES				
Floor space	105	122	227	
Extra w.c. and washbasin with all services, to 8 houses £30 x 8 ÷ 11	-	22	22	
Heating	70	42	112	
Kitchen fittings	40	-	40	
Electric socket outlets	20	-	20	
Bedroom cupboards	10	-	10	
11 houses at	245	186	431	4,741
5-PERSON HOUSES				
Floor space	90	33	123	
Extra w.c. and washbasin with all services	30	-	30	
Heating	94	25	119	
Kitchen fittings	40	-	40	
Electric socket outlets	20	-	20	
Bedroom cupboards	20	-	20	
16 houses at	294	58	352	5,632
6-PERSON HOUSES				
Floor space	60	122	182	
Extra w.c. and washbasin with all services	30	-	30	
Heating	63	8	71	
Kitchen fittings	40	-	40	
Electric socket outlets	20	-	20	
Bedroom cupboards	33	-	33	
12 houses at	246	130	376	4,512
Assessment of extra cost of 39 houses				£14,885

The above assessment does not include the extra costs of additional single bedrooms and moveable partitions (implied in paragraphs 28 and 35 of 'Homes for today and tomorrow') nor any cost effects in keeping a high density with more floorspace per dwelling.

* See Appendices 1 and 2 of 'Homes for today and tomorrow'

Appendix C

Elemental prices

Comparison between cost target and tender		Target	Tender
		£	£
Average per house 39 houses and 20 garages (buildings only)			
Substructure		164	169
Structural frame		97	81
Roof		340	339
Upper floor		120	100
Staircase		60	68
External walls		391	336
Windows, external doors, garage doors		310	356
Party walls		82	87
Partitions and doors, ducts and cupboards		335	305
Ground floor finishings		65	50
Kitchen joinery fittings		76	92
Sundry joinery		5	3
Rainwater piping		15	17
Soil, vent and waste pipes and traps		60	62
Sanitary fittings		75	88
Water services		78	71
Space and water heating		200	204
Electric lighting and power		67	88
Gas installation		12	9
Washboilers		9	9
Contingencies		10	10
		2,571	2,544
Multiply by 39		x 39	x 39
Total for 39 houses and 20 garages (buildings only)		100,269	99,216
Site works and substations		22,931	22,564
	Totals	£123,200	£121,780

Appendix D

Elemental price analysis

Site: Ravenscroft Close
No. of dwellings in contract: 39
Basic price date: February 1963. Firm price

Type of dwelling Z and P: 4, 5, and 6-person
No. of storeys: 2 and 3
No. of persons: Average 5

Element	Average per house: Price per house	Price per person	Price per sq ft of total floor area	%
	£	£	s. d.	
Group A. Substructure				
Substructure	169	34	3 2½	7
Group B. Superstructure shell				
1 Posts	81	16	1 6½	3
2 Roof, with ceiling under	339	68	6 5	13
3 Upper floor, with ceiling under	100	20	1 10¾	4
4 Staircase	68	14	1 3½	2¾
5 External walls, with finishings	336	67	6 4½	13
6 Windows, external doors, garage doors	356	71	6 9	14
7 Party walls, with finishings	87	17	1 7¾	3½
Group C. Partitions, fittings, ground floor finishings				
1 Partitions and doors, ducts and cupboards	305	61	5 9½	12
2 Ground floor finishings	50	10	11½	2
3 Kitchen joinery fittings	92	18	1 9	3½
4 Sundry joinery	3	1	0¾	¼
Group D. Services				
1 Rainwater piping	17	3	4	¾
2 Soil, vent and waste pipes and traps	62	12	1 2	2½
3 Sanitary fittings	88	18	1 8	3½
4 Water services	71	14	1 4	2¾
5 Space and water heating	204	41	3 10½	8
6 Electric lighting and power	88	18	1 8	3½
7 Gas installation	9	2	2	½
8 Equipment: washboilers	9	2	2	½
Totals	2534	507	48 0¾	100

Local Authority: WEST HAM COUNTY BOROUGH

Areas and costs based on 39 houses and 20 garages

Average floor area 1054 sq ft

Area of element	Price per sq ft of element	Ratio of element area to total floor area	Brief Specification Preliminaries allocated between the various elements Decorations included with the relevant items Contingencies excluded	
sq ft	s. d.			
614	5 6	.5825	4in reinforced concrete raft on 4in hardcore bed	
-	-	-	Timber posts and beams	1
614*	11 1	.5825	Mastic asphalt on strawboard slabs Timber joists. Plasterboard ceiling	2
440*	4 7	.4175	Timber joists and boarding. Plasterboard ceiling	3
-	-	-	Open riser stair in parana pine	4
907	7 5	.8605	End walls: cavity brick and block plastered internally In-fill walls: timber studding with shiplap boarding externally and plasterboarding internally	5
451	15 9	.4279	Purpose-made timber units. Metal 'up-and-over' garage doors	6
210	8 3	.1992	Cavity block walls, plastered	7
890	6 10	.8444	Mainly patent hollow plasterboard, part demountable Timber cupboards	1
614*	1 7	.5825	Thermoplastic tiles on screed	2
			E.J.M.A. type fittings	3
			-	4
			Cast iron	1
			Cast iron soil, copper wastes and traps	2
			To Parker Morris Report standards	3
			Copper piping and cylinder: 74 gallon storage tank	4
			Electric block storage heaters, immersion heaters, gas instantaneous sink water heaters	5
			Average 12 lighting points and 17 power points	6
			-	7
			-	8

* Area measured inside faces of external and party walls.

Appendix E

Financial statement*

Outgoings	£	£
Builder's work in 39 houses, 20 garages, 2 substations and external works (as cost target)	123,200	
Less substation (costs reimbursable by Electricity Board)	- 750	= 122,450
Additional site works to be carried out under the direction of the Borough Engineer		7,500
Site purchase and compensation payments		11,000
Fees, salaries and miscellaneous expenses		7,300
Total capital outlay		148,250
Annual debt charge at 6% interest, repayment over 60 years (£6 3s. 6½d. p.a. per £100) from above		9,158
Annual management costs		176
Annual repairs allowance		508
Annual maintenance of communal areas		58
A. Total annual outgoings		9,900
Incomings		
Annual rents 39 houses @ average £123		4,797
20 garages @ £30		600
19 hardstandings @ £13		247
Annual subsidies (60 years)		
Dwellings, 39 @ £24		936
Expensive site, 2½ acres @ £230		575
B. Total annual incomings		7,155
C. Annual rate contribution (A minus B)		2,745
Annual rate contribution, average per house (C ÷ 39)		70†

* Based on estimates for January 1963.

† An annual rate contribution of £70 per dwelling was less than the Council's average contribution. The cost target of £123,200 for builder's work was therefore acceptable to the client.

Appendix F

List of byelaws relaxed with reasons for relaxation

(a) Byelaw requiring party walls in terraces with combustible external panels to project 9in beyond external face.

The proposal was to carry external weather-boarding across the face of the party walls with the back face of the boards bedded solidly against the end of the party wall. It was agreed that this gave an adequate firestop between houses. In the complex layout it also simplified and cheapened the detailing of the external wall.

(b) Byelaw requiring party walls in terraces with combustible external panels to be carried up 15in above roof.

The proposal, similar to (a), was to carry the flat roof over the party walls. By carrying up the party wall to the underside of the roof covering, similar resistance to spread of flame is ensured and as before the detailing of the roof is cheapened and simplified.

(c) Byelaw stating various provisions for the fire resistance of walls and floors applicable to the three-storey dwellings in the scheme, which, since they are three-storey, cannot, as the bye-law stands, be regarded as 'small houses'.

The proposal was that in this scheme the three-storey houses should be considered as 'small houses' for the purposes of the byelaws.
The reasons for the proposal were:

(i) it was illogical to have two standards of fire resistance within one terrace;

(ii) the houses were of the same construction as the two-storey houses and would have the same sort of use;

(iii) they were within the limits of floor area for 'small houses' as defined by the byelaws.

(d) Byelaw requiring open space in the front of dwelling across the whole frontage of the dwelling for depth of 24ft 0in.

The proposed alternative, which applied to 15 houses in the scheme, allowed adequate light and ventilation to the front rooms of all of them. Several houses had a single-storey projection at the front with windows arranged in its side. Thus adequate open space was provided but not in the position or of the dimensions required under the byelaw. The reason for the proposal was to achieve a high density of large two-storey houses.

(e) Byelaw requiring open space at the rear of a dwelling across the whole width of the dwelling for a depth of 15ft 0in if the building is 25ft 0in high, measured from the rearmost wall of the building and to be not less than 300 sq ft.

The proposal applied to 27 houses in the scheme. Every house had a garden behind never less than 200 sq ft in area. 90% of these gardens were over 300 sq ft, but owing to the form of the houses were not in a position required under the byelaw. In addition to its garden every house had access to the central open space of roughly half an acre which was private to the houses around. All houses had thus enough open space around for ventilation, lighting and amenity. The reason for the proposal was to provide the inhabitants with more open space than strict compliance with the byelaws allowed.

Appendix G

Construction details

Foundations and ground slab: The site was stripped to a depth of 8in, hardcore laid and compressed with vibrating rollers. On this base a 4in reinforced concrete slab was laid with extra reinforcement and depth at the party walls, the slab toes and the post bases. A separate apron of concrete paving was laid extending 2ft 6in beyond the toe as protection to the foundation from frost and water.

Party walls: Two skins of 4in lightweight concrete block with 3in cavity and 3/8in plaster to both sides giving House Party Wall Grade airborne sound insulation.

External flank walls: These walls run in line with the party walls and are an extension of them. They are formed of an inner skin of 4in lightweight concrete block, plastered; running in line with one leaf or other of the party walls and an outer skin of 4½in flint lime brickwork lining with the other leaf of the party wall, giving a 2½in nominal cavity. Thus on one line the party wall changes to an external wall facing one way or the other as the relationship of the house to its neighbour dictates. The 'U' value of this external wall is 0.17.

External walls: The external walls elsewhere, apart from the fully glazed panels to the ground floor, are of 4in x 1½in studs at 16in c/s with, externally, medium quality building paper and 5/8in shiplap boarding fixed with aluminium nails and creosoted; and, internally, 3/8in aluminium foil-backed plasterboard. The 'U' value of this wall is 0.21.

Timber frame: 4in x 4in sawn timber columns with sawn timber beams of various gradings and sizes according to spans. Connections by pairs of timber connectors.

Floors: 7in x 2in or 7in x 1½in joists, dependent on spans, at 16in c/s connected by joist hangers to timber beams or housed into party walls, 7in x 1in bridging. 7/8in T and G softwood boarding, 3/8in plasterboard ceilings.

Roofs: 7in x 2in or 7in x 1½in joists, dependent on spans, at 16in c/s connected by joist hangers to timber beams or housed in the party walls. 7in x 1in solid bridging. 2in compressed straw boards, sheathing felt, ¾in mastic asphalt and chippings, 3/8in plasterboard ceiling. The 'U' value of this roof is 0.17.

Windows: On the ground floor, casement windows integral with the storey-height glazed joinery frames. Ventilation on the ground-floor level is provided by proprietary adjustable aluminium vents set in the glazed panels of the external doors in living rooms and in the casement windows of bedrooms. In most kitchens ventilation is provided by two banks of adjustable glass louvres. On the upper floors the opening lights are horizontally pivoted windows. These windows normally have a limited opening but can, by the release of a stay, be turned to a horizontal position for cleaning from inside. They are fitted with two cockspur fasteners and keeps with double slots which allow the window to be retained in a slightly open position to achieve night ventilation. The level of the sill of these windows is kept at 4ft 0in to prevent draughts at bed level. To allow a view from the room when in bed, sitting or working at a desk, most of these rooms are provided with a fixed light below the horizontally pivoted light with a sill level of 2ft 9in. This shallow-depth lower fixed light can be cleaned from the upper opening light. When there are two opening lights to a bedroom only one lower fixed light has been provided. This produces an L-shaped window. A curtain batten has been provided for the full width of the windows.

Partitions: Internal partitions are of a proprietary type, of 2in overall thickness consisting of 3/8in plasterboard each side on a cellular core. These were intended to give 30 dB airborne sound insulation, but in rooms adjacent to w.cs. an extra layer of plasterboard in the panel increased the value to 35 dB.

Demountable partitions: These partitions are formed from the same proprietary partitions as are used for the normal internal partitions. A timber frame all round each panel enables a tongued joint to be obtained between panel and panel. Both sides were faced with ¼in Japanese luan plywood to give a more sturdy surface for handling purposes. At the perimeter a joint to a splayed batten mounted on the wall was developed using bronze weather strips to ensure a tight fit. At the floor the partition rests on a rubber pad and the panels are secured together by a skirting running across them and screwed to each panel. The airborne sound insulation value allowing for all joints was estimated to be 35 dB (but see paragraph 317). Each panel in the partition weighs 200lbs and is room width. To avoid complications the door in this partition has been carried from floor to ceiling.

Doors: Internal doors generally are Japanese luan ply-faced hollow core doors with parana pine stile to leading edge.

Staircase: Open riser stair in parana pine with ex 1¼in treads lipped with hardwood and ex 1¾in string.

Kitchen units: Standard timber units with doors clear-finished and frames and sides painted. Worktops of parana pine clear-finished.

Wardrobes: Standard whitewood hanging cupboards with doors clear-finished and frame and sides painted.

Ironmongery: Satin aluminium finish throughout. Lever handle latch sets to all internal doors. Bathroom and w.c. doors with outside release mechanism.
Rear external doors with mortice lock.
Front door with cylinder mortice night latch, postal plate and clockwork bell.

Sanitary fittings:
Bath: 5ft 6in pressed steel bath.
Basin: 22in x 16in vitreous china basin to Ministry of Housing and Local Government design.
W.c: Vitreous china pan with low-level plastic cistern.
Sink: 3ft 6in x 1ft 9in stainless steel sink and single drainer.

Waste disposal: A single stack system in cast iron with copper wastes and traps.

Rain-water disposal: Rain-water pipes and outlets in cast iron.
Some housewives complained that through lack of effective and conveniently placed outlets, rain-water stayed on the lower roofs, over the living room and downstair bedroom projections. These lower roofs were intended (after consultation with the Building Research Station) to be flat and without outlets or spouts, though spouts were added later, but generally too short and in awkward places.

In some cases the standing water had penetrated the roof and had damaged decoration inside. The chief cause of complaint was that in high or blustery winds standing water was blown off the roof down the face of windows or over passers-by. This also happened from the main house roofs, especially those in the 6Z3 houses.

The main causes were:

a) rain-water outlets were placed away from points of maximum deflection of the roof structure, so that a good deal of water had to collect before the outlets were reached;

b) the upstand curb was roughly 1¼in high instead of the recommended 2¾in.

Cold-water service: Light gauge copper pipe. Cold-water storage is provided in a 100-gallon (nominal) tank in bulkhead above stairs.

Hot-water service: Light gauge copper pipe. 25-gallon copper cylinder, lagged, and immersion heater provided in linen cupboard. Where this is situated more than 30ft 0in from the kitchen a gas water-heater is provided at the sink.

Washboiler: Gas or electric washboiler provided at each house.

Gas installation: The standard minimum gas carcassing of the local gas board, providing five outlets per house as follows:

Kitchen: four outlets for cooker, washboiler, water-heater, and refrigerator.

Living room: One outlet for space-heater.

Electrical installations: The electrical installation is carried out in PVC-sheathed cable run in suspended timber floors and roof, hung loose in partitions and in conduit in plastered walls. Single ceiling control unit is made in each kitchen. Socket outlets were provided as follows:

Living room	3
Dining area	1
Kitchen	4
Main bedroom	2
Double bedroom	2
Single bedroom	1
Hall	1

This results in the following number of outlets per house:

four-person house	14 outlets
five-person house	15 outlets
six-person house	16 outlets

Finishes: Three coats of paint; primer, undercoat, topcoat.

Ceilings: Plastic compound texture finish applied to plasterboard with joints and angles caulked and primed.

Walls: On plasterboard surfaces joints filled with plastic compound and two coats water paint.
On plaster surfaces two coats water paint.

Joinery: Gloss paint.

Hardwood surfaces: Clear seal finish.
The social study showed that nearly all families spent a lot of money and energy on home decoration. It was likely therefore that whatever finish the walls of these houses were given, the occupants' own decoration (which in this part of London was likely to be principally wallpaper) would be substituted. So while a clean finish was required, it would have been unreasonable to spend more than the essential minimum of money to produce it, especially if it had to be at the expense of the size of the house. The walls were finished with water paint, and a limited range of bold colours were used on certain walls, with the rest white.

Ground-floor finishes: Thermoplastic tiles grades A and B.
On the same principle as the wall finish the cheapest grade of tile was used in the parts of the house where it was most likely to be covered up with carpet, and especially in the living room. Elsewhere a more expensive flecked tile was used.

Appendix G

Garages: The garages have no internal finishes except where they are integral with the dwelling; in such cases a plasterboard ceiling has been incorporated. Vertical fire stops of plasterboard between the joists are provided at the perimeter of the garage to complete the fire separation between garage and dwelling. A raised timber threshold is provided to the door between house and garage.

Garage doors: Painted steel up-and-over doors. Originally timber doors were designed, which would also contain windows to allow the garage to be used easily for other purposes. Those would have given a uniformity of material throughout the scheme, as had been intended. But the expense of such doors and of the heavier gear to carry them caused them to be abandoned in favour of proprietary doors with a painted finish.

Appendix H

Landscaping

As shown in paragraphs 371-379, there was some miscalculation in the design of the landscaping, as it was difficult to foresee the amount of use the area would receive. The landscape advice initially suggested a large area of paving and small protected planted areas which would allow for normal local authority housing requirements. Raised beds, knee rails and tree guards were thought essential.

The choice of plants was reasonable. Two choisiyas, perhaps the least likely to survive, are thriving. Also a few of the bolder bergenia have survived. But most of the berberis and roses, chosen for their spines, have disappeared. (The spines are probably not a protection unless the plant is fairly large.) Small ground cover plants, planted at paving level, did not live long and have entirely gone. Although the initial planting was well done and the imported top soil of good quality, a contributory cause of failure was the lack of frequent and regular maintenance. The need, at a later stage, for a paved base around buildings had in many cases provided an additional hazard to planting, fragmenting the beds and separating them from the protection of adjoining buildings.

If trees and plants are to survive, they must be fairly large to start with and capable of robust growth; they must be planted in a sheltered spot, away from centres of children's play; and survival may be helped by their being evergreen, as this identifies them as plants in winter.

Although the extent to which children would use the open space was underestimated, if steps had been taken early enough to replace damaged plants and make minor adjustments to the design, there would have been no need to remodel the landscaping, which now seems unavoidable. Frequent and regular maintenance is essential.

Appendix I

The appraisal questionnaire

Name and address

Date of interview

House type

Date of movement to project house

Relationship to housewife	Age	Marital status			Paid job			Occupation	Industry	Place of work	Net income
		S	M	W/D	F.T.	P.T.	Not				
1 Housewife											
2											
3											
4											
5											
6											
7											
8											
9											
10											

1. Is there anything you like especially about this house? (After answer, prompt: Anything else? or Anything in particular?)

2. Which of these is most important to you? (Mark with cross)
3. Is there anything you dislike about this house? (After answer, prompt: Anything else? or Anything in particular?)

4. Which of these is most important to you? (Mark with cross)
5. Compared with your previous place, which do you prefer. Why?

6. Do you intend to stay here permanently? Yes No
7. If no. Why do you intend to move?

We would like to know how you use the rooms in your house.

	Kitchen	Dining Room	Living Room	Other (Specify)
Where do you all usually have your meals? (If some people in one room, some people in another, mark both.)				
8. Breakfast				
9. Midday dinner				
10. Tea				
11. Supper				
12. Where do you and others at home sit in the day-time?				

13. Where do the members of your family sit in the evenings? (Prompt each member)
Weekdays?

Weekends?

14. Does anyone in the family have homework to do or study at home?
Who? (Mark where)

15. Does anyone have a hobby taking up space in the home? (Prompt: dressmaking, carpentry, anything else.)

Person Hobby (Mark where)

16. We would like to know where your children play, or where leisure activities are carried out, in the house and outside.

CHILDREN AGE	IN THE HOUSE					OUTSIDE				
	Everywhere in house	Kitchen	Dining room	Living room	Bedroom	Garden	Common garden at back	Street outside house	Park or recreation ground	Other (specify)

17. Have you any problems concerning children's play? YES NO

If yes:
What?

Heating

We should like to ask you about your heating arrangements (Only for those not already surveyed)

18. Do you use the storage heaters, the fan as well as the background heating?

19. If not fully used, why not?

20. In the winter when do you usually switch your heaters on and off?

	weekdays	weekends
Living room heater		
Heater		
Fan		
Kitchen-dining room heater/s		
Heater		
Fan		
Bedroom heater (if any)		

21. Do you use any other form of heating upstairs or downstairs? Yes No
If yes, what is it, where is it, when do you use it?

Other appliances Where When used

TO ALL (whether previously surveyed or not)

22. Do you get as much heat as you want from your heaters -
Living room heater?
Kitchen/dining heater/s?
Bedroom heater? (if any)

23. Do you like the heating here more or not as much as the heating you had before? (record type of heating previously)

24. Compared with when you first came here, do you like the heating more or not as much?

25. If you had the opportunity, would you choose to have a different form of heating? If so, what?

26. Considering the service provided, do you think the heating is worth what it costs you?

27. What is your opinion of the position of the light switches and sockets?

Hot water installations

28. Do you consider the arrangements for heating hot water satisfactory?

    (i) Immersion heater
    (ii) Gas water heater over sink

29. When do you usually switch your immersion heater on and off?

    on weekdays?

    at weekends?

30. Can you get as much hot water as you want from it?

31. Can you get as much hot water from the sink hot water heater as you want?

32. Do you like the hot water installations here more or not as much as what you had before? (record type of hot water heating previously)

33. Considering the service provided, do you think the hot water is worth what it costs you?

Privacy

34. Do you feel you have enough privacy here?

    If not

35. What interferes with your privacy?

Noise

36. Are you or anyone else in the family at all disturbed by noise when you are inside the house? Yes No

    If yes

37. (i) Noise from inside the house? Yes No

    If yes

38. What the noise is | Where it is heard | Degree of disturbance
    Disturbs sleeping?
    Disturbs listening to T.V. or radio?
    Disturbs reading, etc?
    Interferes with anything else?

39. (ii) Noise from outside the house?
    If yes

40. What the noise is | Where it is heard | Degree of disturbance
    Disturbs sleeping?
    Disturbs listening to T.V. or radio?
    Disturbs reading, etc?
    Interferes with anything else?

41. (iii) Are you disturbed by noise from neighbours? Yes No

    If yes

42. What the noise is | Where it is heard | Degree of disturbance
    Disturbs sleeping?
    Disturbs listening to T.V. or radio?
    Disturbs reading, etc?
    Interferes with anything else?

43. Have you done anything about it?

Storage etc

    Indoor

44. Have you enough convenient storage space for your ironing board, vacuum cleaner, brushes and brooms, buckets, household repair and decorating material and other similar things?

45. If a pram owned

    Have you a convenient place to keep your pram?

46. Does your husband want a work-bench?

    Outdoor

47. Have you enough room in the outside store for the things you want to keep there?

Furniture

48. Did you buy any new furniture, curtains, floor coverings, heaters or anything else for the house when you moved?
49. How much did it all cost?

50. Do you like having bedroom cupboards provided?
    (a) main bedroom
    (b) second "
    (c) third "

51. What is your opinion of the flooring downstairs?
52. What is your opinion of the flooring upstairs?

53. Are you buying anything on hire purchase? Yes No

    If yes

54. What are you buying | Weekly charge | When payment finishes

Cars

Car owners with integral garages

55. Do you keep your car in the garage?
56. Is there anything you like or dislike or find inconvenient about the garage?

Car owners with detached garages or only parking spaces

57. Do you keep your car in the garage parking space?
58. Would you prefer a garage attached to the house?

Car owners without garage for one or more cars in the family

59. Would you prefer to pay for a garage for your car (or cars)?
60. Are the arrangements for keeping your car convenient?

TO ALL

61. If you have visitors arriving by car, are they able to park conveniently?

Non car owners with garage

62. Do you let your garage?
63. If yes: do you find this arrangement satisfactory?
64. If no: what are your reasons?

Visiting

I would like to ask you about visiting.

65. On the whole do you think moving here meant that
    you have more people to talk to?
    less people to talk to?
    no difference?
66. Do you like it better this way or did you prefer .....?

Room arrangements (Show plans for comparison of two basic types)

67. What do you think of the arrangement of your rooms downstairs?
68. Have you been into any of the other new houses here which are different from yours?

    If yes, which?

    (a) 'P' Type of house (Show plan for identification)

        Which arrangement of rooms downstairs do you prefer? (Ask reasons)

    (b) 'Z' Type of house (Show plan for identification)

    Which arrangement of rooms downstairs do you prefer?

    We would like to know what you think of each of your rooms.

Kitchen

69. What do you think of the size of this room?
70. What do you think of its shape?
71. Is there room for your washing machine (if any) refrigerator (if any)?
72. Is there enough room in the cupboards for your food stores, crockery and cooking utensils etc.?
73. Do you get enough light in here?
74. How about sunlight?
75. Is there anything you particularly like or dislike about the outlook from this room?
76. Do you find it a convenient kitchen to work in? (Ask reason for answer)
77. Do you use the ventilators? Are they satisfactory?
78. Do you have any problems getting rid of cooking smells?
79. Do you find the way to the garden through the kitchen satisfactory?

Dining area

80. What do you think of the size of this room?
81. What do you think of its shape?
82. Is there anything you particularly like or dislike about this room?
83. Do you get enough light in here?

Use of downstair w.c. (if any)

84. Where do the children and people coming in from work wash their hands?

Downstair partition

85. Why did you decide to have the partition up or not have the partition up?
86. Did you start with it like this?

    If no: Why did you have it changed?
87. Are you satisfied with the arrangement you now have or would you like it changed? (Give reasons)
88. If satisfied with arrangement now:

    Do you think you might like it changed in the future?

    If partition up:
89. Do you get more noise through the partition than through an ordinary wall?
90. Is anyone disturbed by noise through the partition?

Downstair bedroom (if any)

91. What do you think of the size of this room?
92. Is the shape convenient?
93. Has it the right amount and positioning of window area?
94. Is the window easy or difficult to open and shut?
95. Is the window difficult to clean?
96. Do you use the ventilators? Are they satisfactory?
97. Do you like or dislike having the bedroom downstairs? (Ask for reasons)
98. Is there anything else you like or dislike or find inconvenient about this room?
99. Is this room used for any other purposes than sleeping?
100. Does the person who uses this room have enough privacy here?
101. Is he/she disturbed by noise from within the house or from outside?

Living room

102. What do you think of the size of this room?

103. What do you think of its shape?

104. Does it have the right amount of window area?

105. Is the window easy or difficult to open and shut?

106. Is the window easy or difficult to clean?

107. Do you get enough light in the room?

108. How about sunlight?

109. Is there anything you particularly like or dislike about the outlook from this room?

110. Do you use the french window to get outside?

111. Is there anything else you like or dislike or find inconvenient about this room?

Ask 6Z3 type occupiers only

112. What do you think of the living room being upstairs?

113. What is your opinion of having the rooms on three storeys?

Private garden

114. Would you prefer a larger garden and less public space in the middle or a smaller garden with more public space in the middle or is this garden the right size?

115. What do you use your garden for?

116. Prompt if not mentioned:

For drying clothes?
For growing flowers, etc?
For growing vegetables?
For sitting out?
For pets?
For storage? (what)?
For making and mending?
If baby - for putting the baby out in the pram?
If children - for children playing?
Anything else?

117. Is there anything you'd like to do outside which you can't do in your garden?

118. Is there enough sunlight in the garden?

119. Would you prefer more or less paving?

120. Would you have preferred a higher fence?

Common open space

121. Who in your family uses the common open space at the back? How often?

122. Do you think that there should be more or less play equipment for children on the common open space?

123. If more: What would you/the children like?

124. Have you any other suggestion about the design or management of the common open space?

Washing

125. Where indoors do you dry your washing?

126. Is this satisfactory?

Bathroom

127. What do you think of the size of the bathroom?

128. Is the shape convenient?

129. Has it the right amount and position of window area?

130. Do you use the ventilators? Are they satisfactory?

131. Is there anything you like or dislike or find inconvenient about the bathroom?

Bedrooms

What is the arrangement regarding sleeping?

132. Who sleeps in the downstair bedroom (if any)?

133. Main double bedroom?

134. Other bedrooms in order of size?

I

II

III

IV

135. If arrangement unusual: Why?

136. Have you had visitors to stay overnight? Yes No

137. If yes: where do they sleep?

Upstair partition (none in 4P)

138. Why did you decide to have the partition up or not to have the partition up?

139. Did you start with it like this? If no: why did you have it changed?

140. Are you satisfied with the arrangement you now have or would you like it changed? (Ask reasons)

141. If satisfied with arrangement now. Do you think you might like it changed in the future?

If partition up

142. Do you get more noise through the partition than through an ordinary wall?

143. Is anyone disturbed by noise through the partition?

Main double bedroom

144. What do you think of the size of this room?

145. Is the shape convenient?

146. Has it the right amount and position of window area?

147. Is the window easy or difficult to open and shut?

148. Is the window easy or difficult to clean?

149. Do you use the ventilators? Are they satisfactory?

150. Is there anything else you like or dislike or find inconvenient about this room?

Questions 144 to 150 were repeated for each bedroom in the house.

Mrs Matheson

TOTAL No. IN HOUSEHOLD 5

HOUSEWIFE				Husband				Mary (12)				John (7)				David (5)							
ACTIVITY	TIME FROM	TO	ROOM	ACTIVITY	TIME FROM	TO	ROOM	ACTIVITY	TIME FROM	TO	ROOM	ACTIVITY	TIME FROM	TO	ROOM	ACTIVITY	TIME FROM	TO	ROOM	ACTIVITY	TIME FROM	TO	ROOM
Washing	6.45	6.55	B	Washing Shaving	6.30	6.45	B	Reading	8.0	8.30	B.R.2.	Playing	7.45	8.15	B.R.3.	Playing	7.45	8.15	B.R.3.				
Cooking and Eating	7.0	7.30	K	Dressing	6.45	7.0		Washing	8.30	8.40	B	Washing	8.15	8.30	B	Washing	8.15	8.30	B				
				Eating	7.0	7.20		Eating	8.40	9.20	K	Eating	8.40	9.20	K	Eating	8.40	9.20	K				
Washing up	7.30	7.40	K	Out of	7.30			Reading	9.30	11.0	B.R.2. L.R.	Playing with trains	9.30	12.0	D.R.	Playing with Trains	9.30	12.0	D.R.				
Housework	7.40	8.0	B.R.1.	House				Looking after Children	11.0	12.0	D.R.	In Garden	12.0	12.30	—	Lying on Bed	12.0	12.30	B.R.3				
Cooking	8.0	8.30	K																				
Getting the Children up	8.30	8.40	B.R.2. B.R.3.					Peeling potatoes	12.0	12.20	K												
Listen to Radio	8.40	9.20	L.R.					Eating	12.30	1.0	D.R.	Eating	12.30	1.0	D.R.	Eating	12.30	1.0	D.R.				
Housework	9.30	10.0	L.R.					Out with Mother & the children	1.15		—	Out at the Park with Mother	1.15	4.30	—	Out at the Park with Mother	1.15	4.30	—				
"	10.0	10.30	B.R.2 B.R.3							4.30	—												
"	10.30	11.0	K																				
Out Shopping	11.0	12.0	—					Visiting Friends	4.30	5.30	—	Playing	4.30	6.30	D.R.	Playing	4.30	6.30	D.R.				
Preparing Lunch	12.0	12.30	K					Eating	5.30	6.30	D.R.	Eating	5.70	6.30	D.R.	Eating	5.30	6.30	D.R.				
Eating	12.30	1.0	D.R.					Reading and Sewing	6.30	8.0	D.R.	T.V.	7.0	8.0	L.R.	Playing	6.30	7.30	L.R.				
Out with Children	1.15	4.30	—	Washing	5.20	5.30	B					Washing	8.0	8.30	B	Washing	7.30	8.0	B				
Cooking & Eating	4.30 5.30	5.30 6.30	K D.R.	Eating Mending Cup'd	5.30	6.30	D.R	T.V.	8.15	10.15	L.R.	Bed	8.45		B.R.3.	Bed	8.0		B.R.3				
T.V. and Knitting	7.0	10.30	L.R.	T.V.	6.30 8.30	8.0 10.30	B L.R.	Washing	10.15	10.30	B												
Bed	10.30		B.R.1.	Bed	10.30		B.R.1.	Bed	10.20		B.R.2.												

Key

D.R. Dining Room
L.R. Living Room
K. Kitchen
B. Bathroom
B.R.1. B.R.2. B.R.3. } Bedrooms

Check list

HOUSE NO:

OCCUPANT:

1. Tenants' possessions and amendments to the fabric of the building

Indicate on Plan 1

(a) Position of windows where at variance with plan.
(b) Position of heaters where at variance with plan.
(c) Furniture to scale. In particular note relationship to windows, door swings, and sockets. Measure major items, plan and height.
(d) Partitions up or down.
(e) Cooker, electric/gas.
(f) Actual position of light fittings, electrical equipment; especially note relationship of power points to these.
(g) Use of adapters in lights/sockets and why needed.
(h) Type of flooring, and redecoration which has been carried out to date.
(i) As near as possible, contents of storage fitments and, specifically, those of the cupboards supplied by the Council, also items not stored - steps, toys, bicycles etc.
(j) Use of external stores and garages (contents, equipment).
(k) Garden arrangement and quality of layout achieved, clothes line.

2. Assessment of the structural and material condition of the houses

Indicate on Plan 2

(a) Points where excessive condensation has occurred.
(b) Points of noticeable cracking, especially partitions at ceiling.
(c) Points of staining above sink water-heaters, and block-storage-heaters.
(d) Location of obvious structural or material defects.
(e) Failure of window, door and fitting design and hardware.
(f) Timber movement/shrinkage, e.g. front door, stairs.

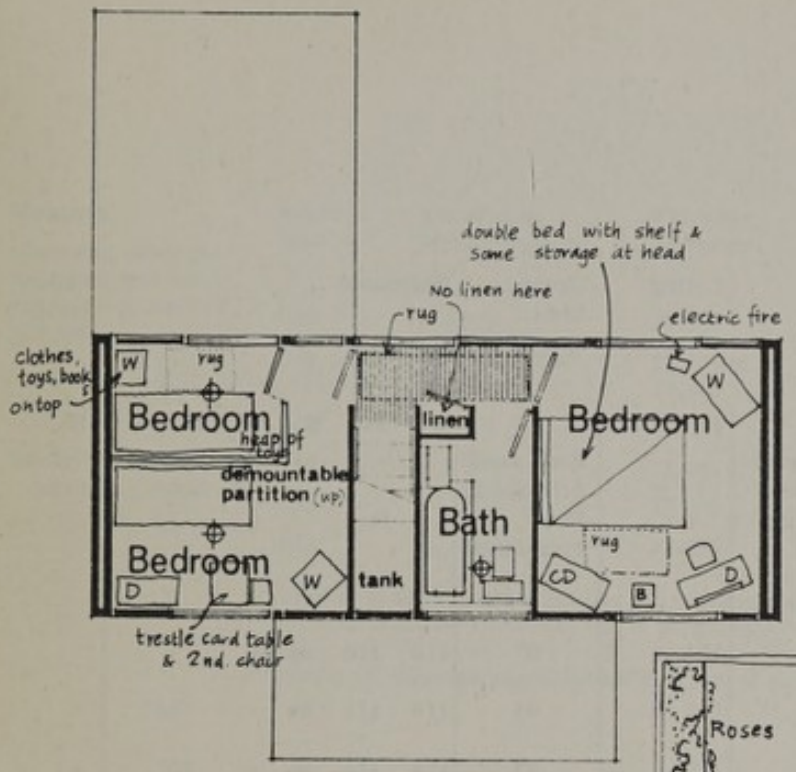
3. Location related to site amenities

Indicate on Site Plan

(a) Position of interviewee's house.
(b) Where car(s) actually kept.
(c) Points of intrusion on privacy (noted from comments).

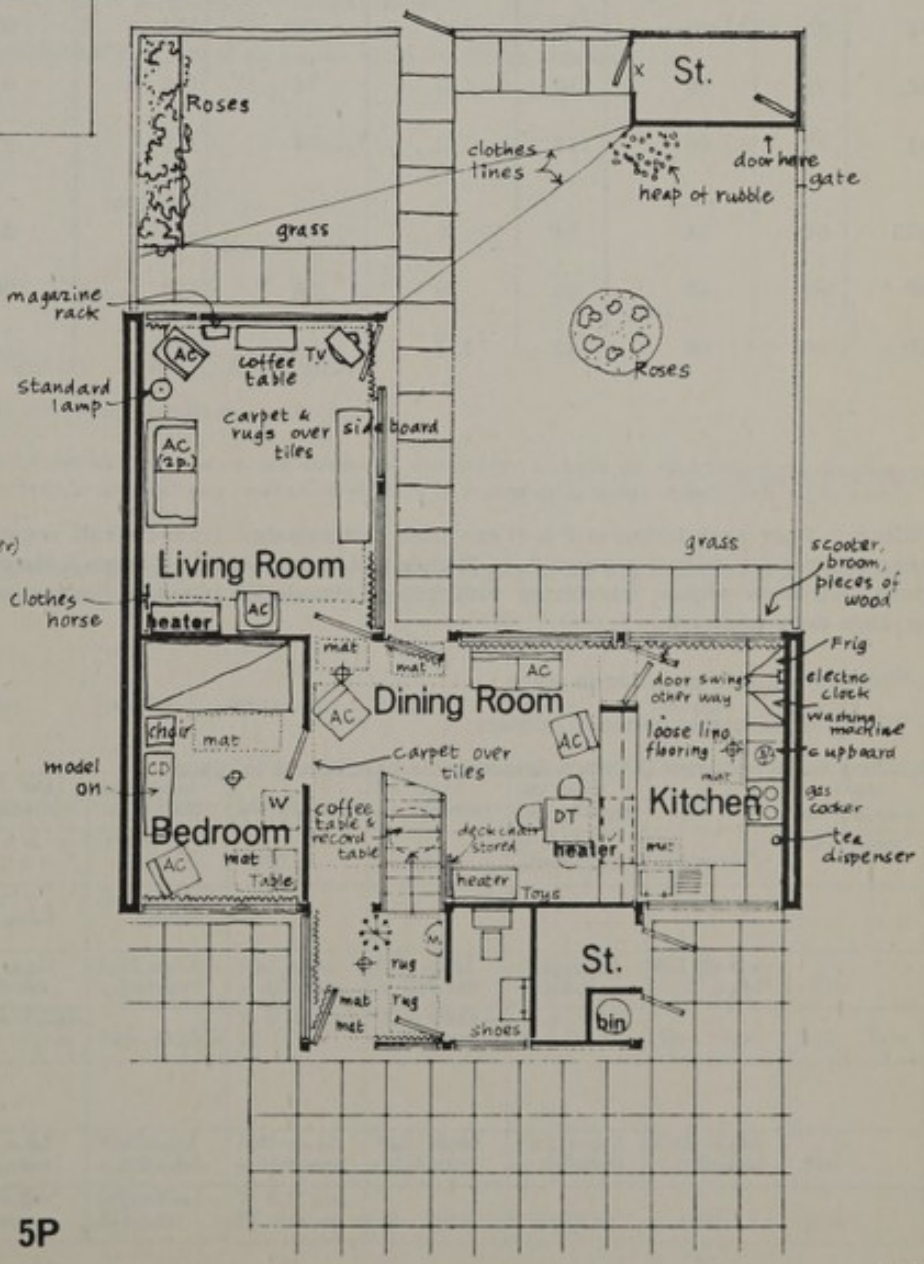
Appendix K

Architect's survey plan and check list



Notes

External door of living room never used.
Very strong draught when front door & external D.R. door are both open.
Stairs pock-marked by stiletto heels (attributed to visitors when this was a show house)
Garden not yet established but obviously carefully done. Grass is fenced in by lengths of cable tied to sticks.
Decorations appear to be as original.



KEY (all items drawn to scale)

W : wardrobe
D : dressing table with drawers
CD : chest of drawers
B : bedside table (shelf + cupboard under)
mmm net curtains + heavy curtains
AC : armchair
DT : dining table & 3 chairs
(3/-) : height in feet
: pendant light fitting
: coat stand.
M : mirror, & cosmetics table.

5P

Appendix L

Room sizes in each house type

House type	Kitchen		Dining area			Living room	Ground-floor circulation	Bedrooms					Utility room
	1 Room area	2 Floor area (excluding fittings)	3 Room area	4 Floor area (excluding fittings)	5 Floor area for dining (excluding fittings and circulation)	6	7 Area used principally for circulation	8	9	10	11	12 Ground floor	13 Ground floor
4Z	92	69	126	126	82	151	97	116	116	66	-	-	-
5Z	92	69	112	112	74	161	95	116	116	66	-	66	-
6Z	92	69	112	112	74	172	95	116	116	66	-	107	-
						1st floor		2nd floor			1st floor		
6Z3	64	64	94	81	81	278[2]	83	117	87	69	87	90[3]	60
4P	66	48	85	79	58	133	100	126	88	-	-	88	-
5P	89	54	142	133	63	149	114	120	85[1]	42	-	88	-

Sizes are in sq ft.

Effective floor area (columns 2 & 4) has been distinguished from overall room area (columns 1 & 3) in those rooms which normally contain built-in storage (i.e. kitchen and dining areas). Column 5 shows the floor area which could be furnished for dining purposes without interfering with through circulation. Column 7 is measured from the way in which tenants actually arrange their furniture.

1 With demountable partition in place

2 Without demountable partition in place

3 Living room becomes 188 when demountable partition is in place

Appendix M

Heating

The table shows the running costs for the 1964-65 heating seasons

House type	KW of night storage heaters	BTU's/hr. equivalent	*Average weekly cost of heating (spread over year) (off-peak rate 0.87d/unit) s. d.	**Average weekly cost of electricity for all other purposes (domestic tariff 1.65d/unit) s. d.
4P	6.5 KW	22,178	11 9	14 2
5P	6.5 to 8.5 KW (variable)	22,178 to 29,002	8 0 8 10	12 11
4Z	7 KW	23,884	8 10	9 9
5Z	5 KW	17,060	8 0	17 9
6Z	5 KW	17,060	11 9	12 3
6Z3	8 KW	27,296	11 2	14 6

* Tenants had the choice of heating their water by gas or electricity. Five of them chose electricity, and their immersion heater costs have had to be included in these averages.

** Similarly, these averages include the costs of six houses which had electric cookers.

Heating record

5P House 8th-15th March

Thank you for agreeing to help us in our survey on the heating installed in your house.

May I point out that this is to study the efficiency of the heating system for everyday use and not a check on your use of the heaters so please do not feel obliged to alter your heating methods in any way e.g. switch on heaters in rooms or at times when it has not formerly been your practice to do so.

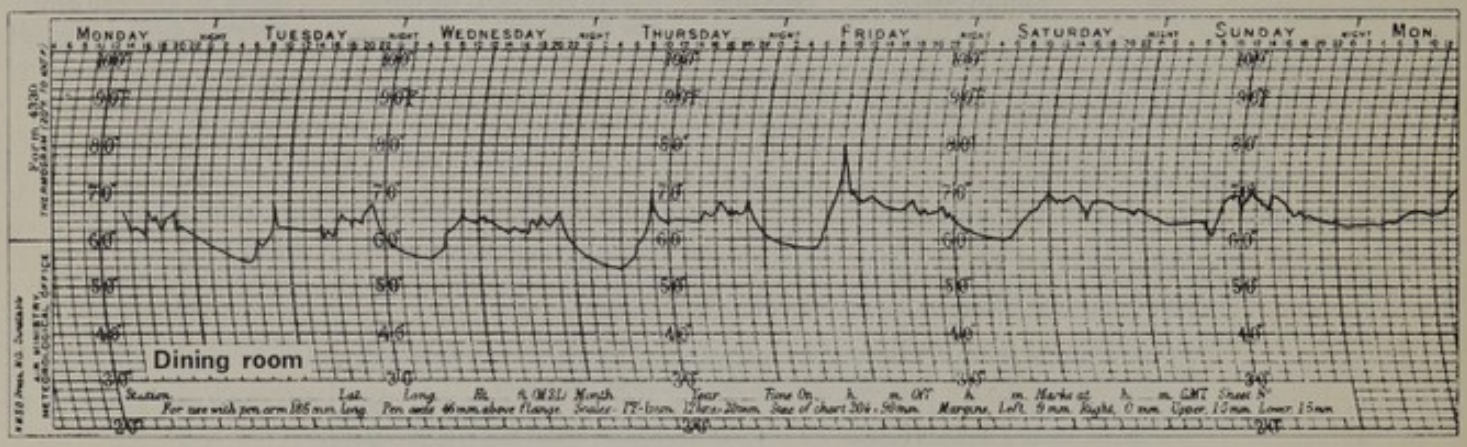
1. As part of the survey, perhaps you would be good enough to complete the table below by filling in the times between which the heater and the fan have been switched on for each day of the forthcoming week.

BLOCK STORAGE HEATERS		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
(A) In living room	Heater	½ all night ½ afternoon	Low night ½ afternoon	Low afternoon	Low night Low afternoon	Low night Low afternoon	Nil	Low night Low afternoon
	Fan	6.30 A.M. to 10.30 P.M.	4 P.M. to 7 P.M.	Nil	Nil	6-10.30 Thermostat	Thermostat	Intermittent P.M.
		As per thermostat	Thermostat control					
(B) Between kitchen and dining room	Heater	Full night & afternoon	Full night & afternoon	Full night & afternoon	Full night & afternoon	Full night & afternoon	Nil afternoon Full night	Nil
	Fan	7a.m.-8.30a.m. 4p.m.-7p.m.	4pm-10.30pm	7a.m.-8.30a.m. 12-1, 6-7	7a.m.-8.45a.m. 7 - 9p.m.	7a.m.-8.45 6 - 9p.m.	5pm.-7pm.	5.30 - 7p.m.
(C) Additional one in dining room if installed	Heater	Full night & afternoon	Full night & afternoon	Full night & afternoon	Full night & afternoon	Full night & afternoon	Full night & afternoon	Nil
	Fan	Intermittent afternoon	Intermittent Afternoon	7-8.30 a.m. all evening	7-9 p.m.	6-9p.m.	Nil	Nil

2. Perhaps you would also be good enough to complete the columns below with the appropriate times of use if you also use any other form of heating in addition to the block storage heaters.

SUPPLEMENTARY HEATERS		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
ROOM	TYPE							
(bedroom 4) Study	¾ K.W. Electric fire		7-9 30 p m					

Thermograph



Works referred to in the text

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH
Building Research
National Building Studies: Technical Paper No. 2
A survey of noise in British homes by Dennis Chapman
HMSO 1948 (out of print)

HIMMELWEIT (Hilde Therese) and others
Television and the child by H. T. Himmelweit, A. N. Oppenheim and Pamela Vince
OUP 1959 42s. 0d.

MINISTRY OF HEALTH
Central Housing Advisory Committee
Design of dwellings (The Dudley Report)
HMSO 1944 (out of print)

MINISTRY OF HOUSING AND LOCAL GOVERNMENT

Central Housing Advisory Committee
Homes for today and tomorrow (The Parker Morris Report)
HMSO 1961 4s. 0d.

Design Bulletin 5
Landscaping for flats the treatment of ground space on high density housing estates
HMSO 1963 8s. 6d.
(a second edition was published in 1967)

Design Bulletin 6
Space in the home
HMSO 1963 5s. 0d.
(a revised edition in metric terms was published in 1968)

Design Bulletin 7
Housing cost yardstick for schemes at medium and high densities
HMSO 1963 2s. 6d.
(the background information in the bulletin still holds good but cost tables are now given in MHLG Circulars)

Design Bulletin 13
Safety in the home
HMSO 1967 4s. 6d.

STATUTORY INSTRUMENTS
1965 No. 1373
The building regulations 1965
HMSO 1965 11s. 0d.

Acknowledgements

Special thanks are due to:

The officers of West Ham County Borough (as it then was) for all their assistance.

The tenants for their willing co-operation in the appraisal survey.

The Building Research Station for assistance in making field tests and measurements.

Thanks for permission to reproduce photographs are due to the following:

The Architects' Journal (Fig 56)

John Laing and Son Ltd. (Figs 71 and 51)

Printed for Her Majesty's Stationery Office
by St. Clements Fosh & Cross Ltd.
Dd 142304 K56 6/69

Plans of the project house types

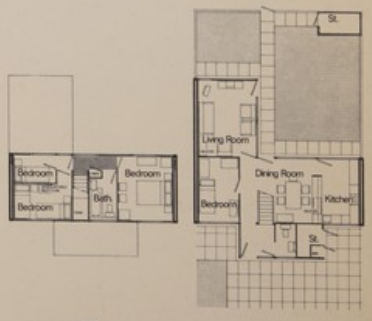
4Z
880 sq ft

5Z
957 sq ft

6Z
1009 sq ft

6Z3
1202 sq ft

4P
833 sq ft



5P
912 sq ft

THE ROYAL SOCIETY

FOR THE PROMOTION

OF HEALTH

90, BUCKINGHAM PALACE ROAD, LONDON, S.W.1

Borrowers must comply with the following by-laws governing the Library, made by the Council of the Society.

Books, periodicals and pamphlets may be borrowed by Honorary Fellows, Fellows, Members, Licentiate Members, Associate Members and Affiliates personally or by a messenger producing a written order. The person to whom such publications are delivered shall sign a receipt for them in a book provided for that purpose.

Publications may be borrowed through the post, or by other means of carriage, upon a written order. The postage, or carriage of publications returned to the Society shall be defrayed by the borrower.

A borrower may not have more than three publications in his possession at one time.

A borrower will be considered liable for the value of any publication lost or damaged while on loan to him, and, if it be a single volume or part of a set, for the value of the whole work thereby rendered imperfect. Marking or writing in the publications is not permitted, and borrowers are requested to call attention to damage of this character.

Books and pamphlets may be retained for twenty-eight days. Periodicals may be retained for fourteen days. Applications for extension of the loan period must be made in writing before its expiry. No publication may be kept longer than three months.

Books and pamphlets added to the library will not be lent until after the expiry of one month from the date received. The current number of a periodical may not be borrowed.

Borrowers retaining publications longer than the time specified, and neglecting to return them when demanded, forfeit the right to borrow until they be returned, and for such further time as may be ordered by the Council.

Any borrower failing to comply with a request for the return of a publication shall be considered liable for the cost of replacing it, and the Council may, after giving due notice to him, order it to be replaced at his expense.

No publication may be reissued to the same borrower until at least seven days have elapsed after its return, neither may it be transferred by one borrower to another.

Publications may not be taken or sent out of the United Kingdom.

Publications returned through the post must be securely packed and adequately protected.

The library may be used for reference by members during the office hours of the Society.

Publications borrowed through the post must be acknowledged on the form provided, immediately upon receipt, and returned when due to the Librarian at the above address.

January, 1968.

O.B., Truro.

Published by
HER MAJESTY'S STATIONERY OFFICE
To be purchased from
49 High Holborn, London W.C.1
13A Castle Street, Edinburgh 2
109 St. Mary Street, Cardiff CF1 1JW
Brazennose Street, Manchester M60 8AS
50 Fairfax Street, Bristol BS1 3DE
258 Broad Street, Birmingham 1
7 Linenhall Street, Belfast BT2 8AY
or through any bookseller

SBN 11 750002 X