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P E R F O R M A N C E R E Q U I R E M E N T S

RESTON LOW INCOME HOUSING DEMONSTRATION

FOR THE DEPARTMENT OF HOUSING & URBAN DEVELOPMENT

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UNDER THE DIRECTION OF

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This report is the result of an interdisciplinary design team effort to identify and relate present knowledge of basic human function to design implications for low income housing. The team members composed of P. M. Bennett, D. D. King, R. R. Hartmann and C. A. Sands, represent the design fields of Architectural Design, Landscape Design, Industrial Design and Interior Design, respectively. The report has been prepared under the direction of B. C. Bloomfield, Director, Environmental Design Center, University of Wisconsin. The team members are all graduates of the Master of Science program in Environmental Design at the University of Wisconsin.

The recommendations and performance specifications presented in this report are not accompanied by the basic source data being identified, correlated and abstracted for design principles in the University of Wisconsin program and for that reason cannot be taken out of context or used for applications other than the Reston/HUD Low Income Housing Demonstration Project. Interpretations for other design applications must be made by individuals fully conversant with the human function principles underlying each design application cited in this report. The basic design principles, with complete documentation and illustrations, are anticipated to be published by individuals associated with the University of Wisconsin program.

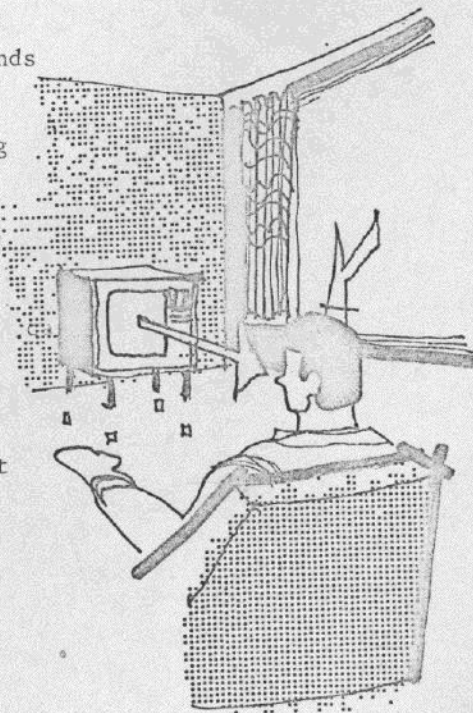
Most of the design principles involving bio-psychological human functions from which these applications to low income housing have been drawn were developed in the University of Wisconsin program under the direction of Dr. D. B. Harmon, visiting research professor from Austin, Texas. Many of the sociological and psychological planning implications have been expanded from topical statements generated through a series of NIMH sponsored interdisciplinary conferences on "Social and Environmental Variables as Determinants of Mental Health" chaired by Dr. Leonard J. Duhl, abstracted for "Considerations of Significance to Designers and Planners" by Byron C. Bloomfield.

Report Basis

This report is intended to reflect fundamental characteristics of humans as they are affected by the physical and social environments in which they live. It will be important to remember that throughout the report statements are made in terms of basic human function which must be satisfied if individuals are not to be affected through violation of the innate characteristics of the human organism.

Influences on Humans

When conflicts in the energy surrounds (light, heat, sound, etc.) affecting basic physiologic organization occur, the cause is seldom perceived directly by the individual. The resulting effect on behavioral patterns can often be described in psychological and sociologic terms. For instance, the phenomenon of claustrophobia is recognized as a psychological term. Yet, this phenomenon can be explained by the lack of light contrast and form recognition accompanied by an absence of acoustic direction typical of small volume spaces. Unless a person has established an adverse conditioned behavioral response through repeated exposure to a series of ill-suited small spaces, such spaces can normally be tolerated by an individual if the visual and acoustic surrounds have been designed to meet the visual and auditory orientation requirements of humans. Another example might be when an individual has been watching television from a location where a high light level source is in his field of vision, such as a window (with the contrast ratio exceeding 7 to 1). He may become disturbed by the subject matter being presented on the TV program or develop an avoidance to TV in general. He would not be aware of the source of the problem even though the contrast ratio of an open window to the background of the wall behind the TV could be as high as 500 to 1. Cultured attitudes can often be the result of energy surround influences. A person may find that he agrees with a number of his acquaintances that trees, flowers, candles or various other types of objects are definitely desirable and should be preserved. He will not be aware of what it is about each of those objects which may have supported or reinforced his basic physiologic structure affected by the energy surrounds impinging on his vision, hearing or thermal receptors.



Common Characteristics

Because of these common characteristics among humans, this report treats society as a collection of people who think, act and react as individual human organisms. Because people are more alike than different physiologically, cultured values tend to result in a surprising similarity of aspirations from one social grouping to another. (This is not meant to ignore the variations in aspirations resulting from association with various ethnic groups.) Since individuals tend to seek out proximity and affiliation with others possessing similar experiential backgrounds, they are motivated by accepted "values" acquired from these cultural influences.

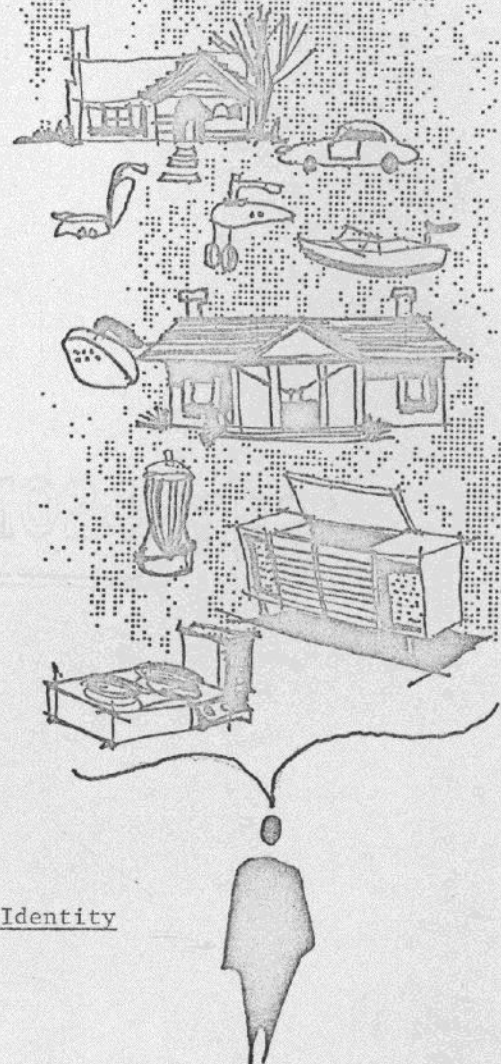
Housing Values

It is important to recognize that individuals from different experiential backgrounds benefit from influence on one another. This concept has been adopted by Reston as the basis for its planning and development. It will indeed be of long-term importance for all occupants of Reston to have the opportunity for intermixing in the shopping, recreation and educational facilities. It would be a serious planning mistake, however, to attempt to achieve such mixes as educational backgrounds, economic levels and experiential backgrounds in single housing clusters, particularly for low income residents during their first exposure to Reston living. An effective planning solution identified in Kaplan-Gans report is to plan the low income housing as a transitory housing facility. This would mean that families purchasing a home (probably their first) or renting in a low income housing cluster would be motivated toward the purchase or rental by promise of fulfillment of their value structure and aspirations developed prior to coming into Reston. Since values can be changed through experience, a period of two, three or more years of living in Reston exposed to the rest of the community and the value structure to which they might then aspire would become a strong influence in motivating the next step in their housing climb. Through living Reston, they would be exposed to middle and high income housing which could be expected to generate a value change toward

cluster type living on a purchase basis. Cluster housing for new low income families could be expected to be satisfactory on a rental basis. A rental-purchase plan could also be effective in stimulating a pride of ownership attitude and generate needed equity for future purchase.

Initial Housing Image

The initial image of housing that new low income families would have would reflect the fact that they really would like to have everything possessed by the typical middle class American family to which they have been exposed through seeing their homes and being subjected to the mass of product promotion aimed at that large segment of the population. A brief review of ads reflecting housing types as published in the popular magazines would be fairly typical of the image of housing that these individuals would want. (Like the candle, these individuals cannot be expected to be aware that light contrast, the silhouette nature of directional light and the color temperature of the illuminant are the reasons for the feeling of intimacy provided by candlelight.) They will consider the visual symptoms of the shutters, the cape cod form, the pillars and the broad expanse of green grass surrounding the typical, single family, detached, middle income class dwelling as the image of what they want. The physical need may be something quite different, but they cannot be expected to be convinced otherwise without experiencing a transitory change in their living environments and seeing first hand the symptoms in evidence from other living patterns. Through skillful handling of this design problem, a fully compatible solution can emerge. The housing spirit of tastemaking can permeate this level of housing just as it has done so commendably throughout Reston to date.

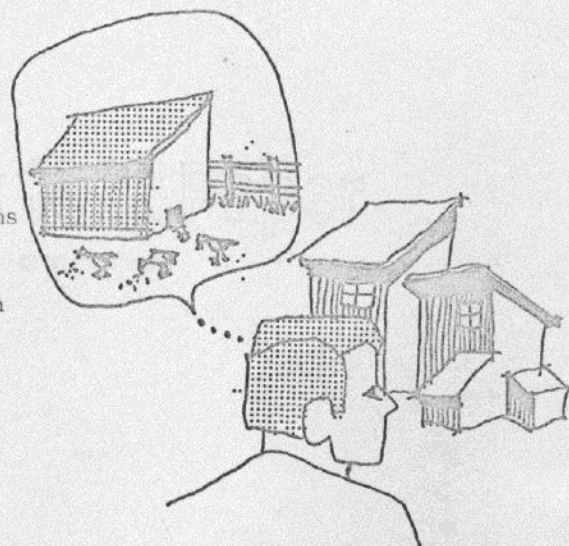


Visual Identity

Visual identity with individual houses will be important to this group of occupants. The forms, materials or colors need not (and should not) differ too radically from unit to unit but something should be special about each one to make it separately identifiable. This could be orientation to a neighboring unit, a conspicuous tree, an entrance in a different location or the like.

Forms and Materials

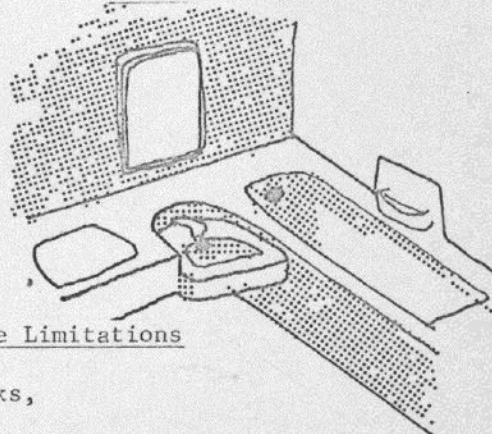
Architectural forms and materials choices will be critical considerations for low income group acceptance. They will not accept variations from existing housing norms simply because it is "cheaper" -- especially if it evidences a new technological advancement in form or materials which appears to have made it cheaper. This group will be ultra-critical of architectural forms identifiable with economic expedients such as chicken houses, hog houses, warehouses, beehives or the like. The type of siding currently used on mobile homes would be completely unacceptable to this group. Exposed concrete or concrete block (unless painted) would be avoided with equal fervor. (These items would be acceptable in "self-help" housing because of the "pioneer effect" but not so if purchasing new, completed property.)



Delicately handled by the designer, it would be possible to use a new form (not identifiable with some present degrading use) or new materials (with conventional forms), but for all intent and purpose, it would be impossible to do both and receive acceptance from this income group.

Interior Equipment and Finishes

Considerably more latitude for departures from traditional materials and forms is permissible in the interior of the units than on the outside. Fixed equipment such as one-piece bathrooms, integral kitchen cabinetry and equipment, etc., can depart widely from conventional solutions. The reason for this is the inclination of families in this group to do their socializing outside the home rather than engage in formal entertaining.

Space Limitations

Those areas of the home not used for sustained tasks, such as the bathroom, need be only large enough to satisfy the physical space required to perform the functions provided interior design considerations such as illumination levels, lighting angles, color and texture have complied with vision requirements. The materials used on such walls and surfaces should be of a permanent type, not subject to whimsical changes of decor by the occupants or interior "decorators." Matt surfaced walls and working surfaces should be used throughout with an absence, if possible, of highly reflective trim.

Hazards and Safety

The designers must use their own sources of information on matters involving health and hazards. Occupants of this housing can be expected to include the aging and infirm with their inherent problems of vision and mobility. Sharp corners and hard surfaced floors are hazardous to all ages of occupants, particularly young children. At this time, insufficient evidence is available to predict whether this income group is ready to accept wall-to-wall carpeting as a substitute for hardwood floors.

Acculturation |

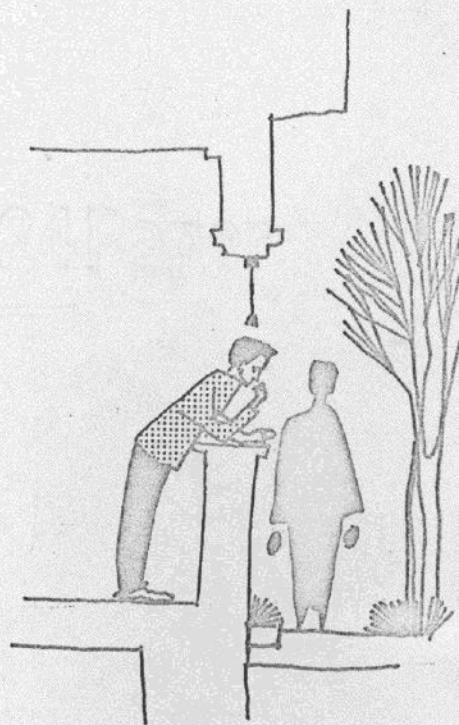
Acculturation of new low income adults will be of equal importance to the education of children among these incoming Reston families. The families will want the independence of their own personal space and visual evidence of their own property. At the same time they will need close proximity to other individuals in their grouping for the purpose of social intercourse. The attitude of adults toward the education of their children can be expected to be substantially different than the attitudes prevailing among middle and high income families. It will be necessary to plan recreational areas and educational units to accommodate a much higher percentage of children-with-children time (in contrast to children-with-parents) than in the present Reston housing. Because of the many hours per day of such activity, it will not be possible to plan all such activity on a supervised basis, particularly if payment for supervision is required.

Housing Objectives and Needs

There is another important difference among the adults of low income families as opposed to the adults in middle and high income families. The adults in these families are not exposed in any comparable degree to the communications stress and tension associated with the work environments of the middle and high income classes. Usually, the work task engaged in by these individuals is more of a service nature or physical work involving big muscle

*Heads
clashes?*

activity. They are not subjected as severely to the stresses of conferences, telephone discussions or other forms of communicative interaction with business contacts. As a result, their housing does not need to reflect the "seclusion from society" characteristic required in successful middle and high income housing. The occupants of low income housing will want to communicate freely with one another as much and as often as possible. Implications for air conditioning and planning of exterior community spaces are self-evident. Air conditioning would prevent or discourage the occupant of a residence from talking through his window to passer-by acquaintances. The temperature change from indoors to outdoors during the summer months would be an inhibiting factor for children as well as adults to move outdoors freely to play or talk with each other. Large, deciduous trees could be one method of achieving an acceptable thermal environment satisfying the communication needs of the occupants. (If individuals in the cluster want to air condition part or all of their units, they would want the air conditioner to be visually evident to passer-by acquaintances.)



Education

The matter of education of the low income group deserves special attention. As mentioned, education involving changes in cultural values of the adults as well as the children is of extreme importance. Additionally, if individuals presently structured in this income level group are to achieve their aspirations of moving into the middle income class or seeing their children successful in so doing, it will be necessary that the formal education process be reflected in the home environment. The children will likely be attending school with children from other parts of the community. Under those conditions, they will have to perform at an equal level, necessitating individual study in the home. Starting about the third grade, an increasing amount of individual home study is involved through the remainder of the formal education period of completion of high school, and, likely within the near future, a minimum of two years of post-high school study. A suitable individual study space can be incorporated into a bedroom area and



serve the dual purpose of providing the child with some physical space for study as well as seclusion away from the rest of the family when needed. It is probably more important than presently recognized for each individual family member to have the opportunity to isolate himself from the rest of the family when he wants or needs relief from social pressures.

Community Action

Community action programs will be important for the low income group. While the typical white collar worker needs to get away from interactions with individuals involved in his work environment, adults in this group need involvement with one another. Some form of community action could be initiated prior to, or upon, joining the community. A way should be found to provide incoming residents with an acceptable approach toward familiarizing them with the new facilities they will be occupying and how to maintain and enjoy those new facilities. Continuing community action programs would be highly beneficial and will require ingenuity on the part of the Reston planners to plant the seeds which will result in such continuing community activities among the low income residents.

Maintenance and Appearance

Maintaining neat and pleasant visual appearance of the low income cluster groupings will be a critical consideration in the planning of these homes since community action programs will not have an opportunity to use the physical facilities as an improvement activity. It will be important to establish the initial structures as complete as possible, permitting as few additions, expansions or modifications to the buildings as possible. Materials will necessarily be of low maintenance and high durability. Solar controls should be an integral part of the design to avoid the tackiness which will result from individual owners trying to solve their individual solar heat gain problems. The designers should look to the palette of materials currently used by typical middle income housing developments for the overall effect which they will attempt to achieve. Such materials will have the greatest "curb appeal" to these potential occupants.

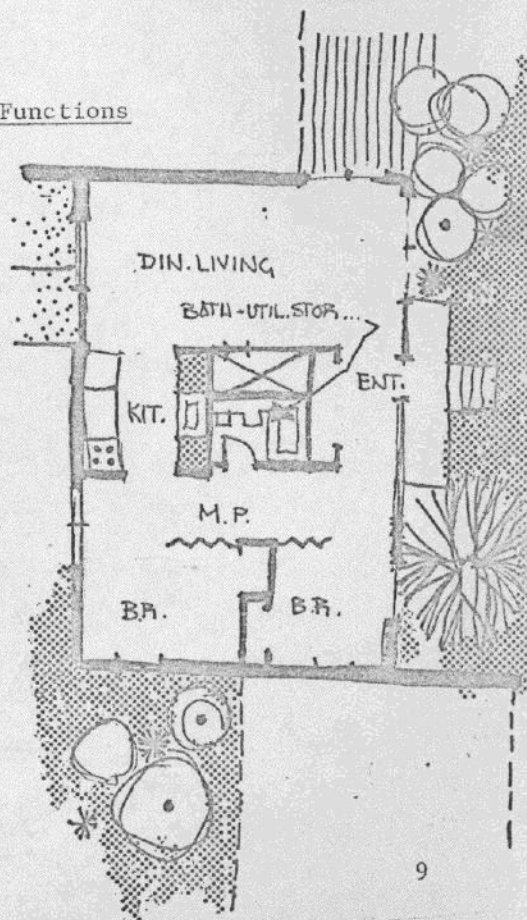
A limited number of options for later purchase and installation could be a desirable means of satisfying the continuing desire of the occupants to upgrade themselves when finances permit. Whatever materials are used should reflect accepted permanence and stability and, by all means, not suggest a transient, trailer or mobile home image.

Types of Housing

Two distinctly different types of low income housing may be needed to satisfy two distinctly different sets of values existing among low income families. Cluster type units will be acceptable to a percentage of existing apartment dwellers who have lived in such units for long periods of time. The cluster units should also appeal to the middle-aged and elderly groups in the low income bracket. Young families will likely have a strong desire to be housed in units of a single family, detached type. Yard space need not be large but should be adjacent to a large commons area for children's play. Such commons should incorporate playschool or other forms of supervised children's activities as well as unsupervised play functions.

Space Functions

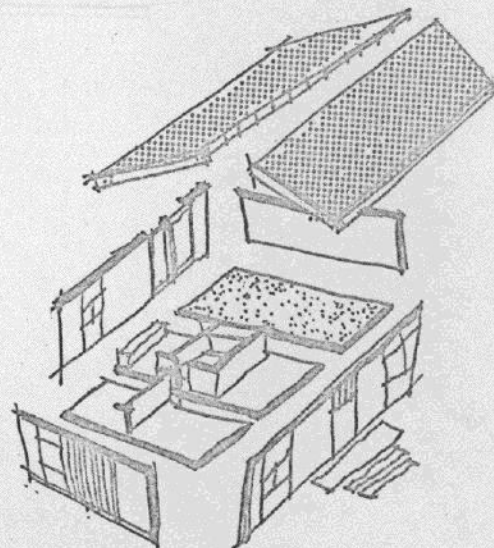
While low income families will want to surround themselves with all of the amenities enjoyed by the middle and upper income classes (such as electric can openers, electric toothbrushes, motor scooters, etc.), their first and most genuinely needed requirement is that of space - just space! Because the low income families are often relatively large, it is important that individual spaces be provided for the separation of functions contained in the house. Bedrooms and studies can be combined. Dining and conversation space (including television) can also be combined for visual openness. Kitchen, bath, storage, circulation and utility spaces should be organized in such a manner as to create as many functionally separated spaces as possible. A multi-purpose space to house family project activities conducted at the same time as children's play will also be needed to make the other spaces serve their intended functions. The multi-purpose space should contain a clothes washer, initially, in every unit with provision made for the addition



of a dryer if not provided in the rental or purchase. This item will start these families on their climb of acculturated values and can be provided less expensively than building additional space for coin-operated machines with resulting supervision problems.

Cost

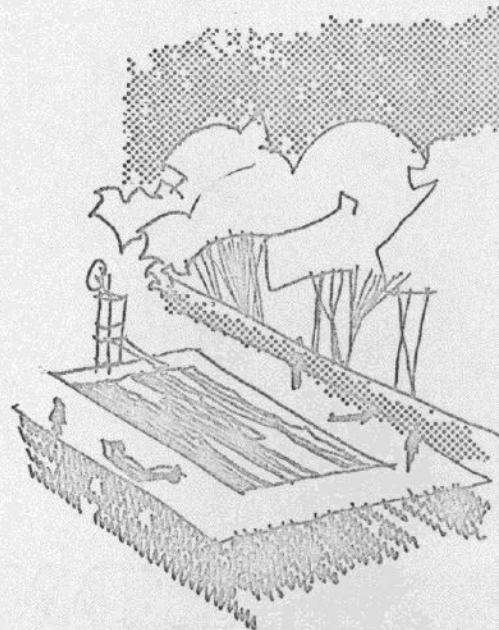
The cost of "space" is often misunderstood during the planning of new facilities. Construction detail intricacies and the equipment included in the space is more of a determinant of cost than the gross square footages involved. In the factory fabrication of components, this axiom is even more of a determinant than in custom built structures. The designer should consider the relatively "fixed" costs of site acquisition, utilities and roads, community facilities and site development costs as well as legal and other fees which must be absorbed in the total selling price of each unit -- prior to launching into a design solution. By so doing, along with organizing the most straightforward construction modules and enclosure components possible with a minimum of custom fabricated joinery details, he will be able to achieve the optimum result for low income housing. Factory fabrication of components will assure the greatest quality of construction details at lowest cost. Purchasers of low income housing will be highly critical of any unplanned roughness or crookedness evidenced into the structure. They will like "finished" surfaces in preference to "rough" textures appealing to the middle and upper income groups.



Recreation

The planning for leisure time activities for low income families, particularly for the adults, must be based on the absence of presently available guidelines. These individuals cannot be expected to participate in most kinds of leisure recreation activities provided for the typical middle and upper income classes because for anyone to participate and enjoy a recreatory activity, he must be predisposed toward that activity. This is a learning process which takes time and exposure. It can be expected that the children

of such families would participate in the swimming pool activities and playground games provided in the area but that adults owning automobiles might tend to enjoy Sunday afternoon drives or simply walking through the Center as well as talking with friends. After a period of being established in Reston, it can be expected that the interests of low income adults in presently available activities will increase. Their continuing problem will be not enough money to participate in the leisure activities of the type currently provided in the Reston area. The cultural activities housed in the Reston Center should become a highly desirable influence on this income group.



Spatial Considerations

The design for a specific task requires a thorough analysis of task demands. These demands establish the basic criteria for the design of a surround which will support the task. The relationship of task and performer must be given careful study before a surround is structured. A surround should be structured to perform the following functions:

1. Support the task.
2. Stimulate the task.
3. Allow task to be performed on surfaces within the surround.

Some of the key factors which determine the degree of support given to a task by the surround are listed as follow:

1. Illuminant on task.
2. Illuminant and color surround near task.
3. Color of the illuminants and surface colors.
4. After-image of colors in the surround.

Where sustained tasks (longer than 15 minutes) are incurred such as reading, writing, food preparation, conversation, eating, ironing, etc., the visual space required will be larger than the minimum space required to accommodate the physical movements involved. The reason for this is the necessity to frequently refix vision at different focal lengths to avoid headaches, visual disabilities or simply an avoidant attitude toward the task, the home or its occupants.

Sound Control

Sound control in the living unit should attempt to provide the most favorable hearing conditions for the production, transmission and perception of wanted sounds and to exclude or reasonably reduce noises (unwanted sounds) and vibrations. Unwanted sound is noise and affects the total performance, attitude and well-being of human beings. Control of noise can be one of the primary factors in the success of either single or multiple family housing.

Sound control in any room will be considerably affected by design considerations such as activity area relationships, room shape, room dimensions and proportions, distribution of exposed structural elements, surface irregularities, furniture and decoration. When designing and planning for sound control, almost every detail within the enclosed space should be considered. Although the designer can employ a masking process whereby the threshold of audibility for one sound is raised by the presence of another sound, this does not solve the overall problem.

A number of sound control problems can be solved by various considerations other than the floor plan of the living space design. These have been considered in the present plan for Reston which recognizes various types of noise produced by community activity; that of transportation, industrial noise and "people" noise with the provision for segregation of these activities. In site planning and landscaping (or in the case of Reston, the utilization of existing topographical features), the buildings requiring a quiet environment can be located away from the various noise producing sources. Landscaping, grading of site, distance from traffic arteries and the vertical distance from the noise source, are all means whereby one can reduce the outside noise factors.

Sound transmission within the living space can be effectively controlled by the location of the various areas, wise selection of building and decorative materials, good structural design and consideration of the quality, placement and installation of mechanical equipment.

In the overall relationship of the various activity areas, consideration should be given to the amount of noise that can be tolerated while involved in each activity. Quiet areas such as the bedrooms, study and living room should be grouped together while the kitchen, bathroom, utility room, staircase and maintenance areas, which are more likely to produce noise, can be located in areas which will not adversely affect one another. Various service areas such as closets, cupboards, corridors, etc., can be used as buffers for effective sound control and serve to separate the quiet and active areas of the house.

In multiple family units, unless open outdoor spaces or structural devices such as fire walls are considered in the placement of the units, the relationship of the quiet area of each unit should be in close proximity to one another to control the transmission of noise between units.

"Open" planning in typical housing and large glass areas provide a psychological feeling of greater space, but it also precipitates difficult sound control problems.

The selection of building materials will be one of the more important factors in controlling sound transmission and developing a good acoustic environment. Structural systems and sound transmission should be considered simultaneously. Prefabrication involves the inherent problem of sound transmission through lightweight building materials and transmission of noise through gaps and open spaces where the jointing of the various prefabricated elements occurs. This is by no means a delimiting problem. The trend toward materials that have plain, non-absorbing surfaces or high sound reflective surfaces makes for difficult control of the sound within a living space. It is possible to provide within the area of a room, various sound absorption materials and treatments on the walls, ceilings and floors that will give the type of sound control required for the activities of that particular living space. The furnishings of a room, as well as the people within that space, will absorb some sound but cannot be relied upon as a complete remedy.

Increasing amounts of mechanical equipment located in homes is causing problems of generated noise within living spaces. The vibration characteristics of some standard household equipment would suggest that their placement in relationship to the various activity areas within the housing structure as well as placement and enclosure in the walls of the structure itself will be important design factors. Mechanical equipment that would have high noise and vibratory qualities may tend to create more problems in terms of the total long-term usage than the possible low cost initial savings it might provide.