LIVING ENVIRONMENT EVALUATION

FOR LOW INCOME HOUSING

By

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PREFACE

This study is concerned with the improvement of public housing stock for the lower income population in this country. The principal objective is to determine tenant needs as they relate to perceived comfort and satisfaction with the living environment. A tenant survey is used to determine areas of dissatisfaction in two existing housing projects. The findings of the survey are interpretted using social science statistical techniques to suggest basic areas and methods of improvement as perceived to be most important by the public housing tenant.

The author wishes to express his most sincere gratitude and appreciation to his thesis committee, Dr. Lester L. Boyer, Associate Professor of Architecture, George Baumiller, Professor of Architecture, and Dr. Karen K. Stewart, Associate Professor of Housing Design and Consumer Resources, for their guidance and infinite patience. A special note of thanks is extended to Mr. James Netherton, Consulting Engineer, for his help in addressing problems dealing in the technical areas of "comfort". Appreciation is also expressed to Mrs. Betty Shideler and Mrs. Totsy Shore of the Drumright Housing Authority, and to Mr. Earl Vic of the Ponca City Housing Authority for their help in implementing the tenant survey. Dr. William Warde, Statistics Department, and Mrs. Iris McPherson, University Computer Center, are equally appreciated for the time spent in explaining the more mystical aspects

of statistical analysis. Credit must also be given to Professor Christine F. Salmon, FAIA, who planted the original seeds of inspiration for this study in 1974.

Gratitude of the most special kind is extended to Paula Cady Condrey for her forbearance and sacrifice over the last two years, and to Bob and Phyllis Condrey for their special encouragement. Without these three people, the author's wife and parents, this study would not have been possible.

Finally, a deep appreciation is also extended to the Housing Authority residents of Ponca City and Drumright. It is for these people and their counterparts that this study was initiated, and it is to them that it is dedicated.

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CHAPTER I

INTRODUCTION

The Beginning of Public Housing in the U. S.

The first government-sponsored housing program in this nation was born out of the entry into World War I when the Secretary of War, Newton D. Baker, was made to realize the lack of housing facilities could effectively slow down the industrial momentum needed for the war effort. The United States Shipping Board and the United States Housing Corporation were empowered to build homes. After World War I, the government's housing stock was liquidated.[1] Public housing, which Charles Abrams defines as housing built and owned by a public agency for eligible low income families, was introduced on a more permanent basis as part of the Emergency Relief and Construction Act early during FDR's New Deal. It began as a federally sponsored and built operation, before the U. S. Housing Act of 1937 decentralized the program. This made it possible for local housing authorities to qualify for federal loans and subsidies, and, in turn, build and manage the housing projects.[2] The debates on the merits of American public housing, and just what official attitude should be taken toward this institution, have raged ever since.

Psychological Housing Needs of the Lower Class

Traditionally, in dealing with public housing, the "providing"

authority has dealt with the low income brackets whose needs are not met by private industry. It has been the unfortunate experience in this country that these people find their needs still not met by the housing authority. As Lee Rainwater so effectively pointed out in the mid-sixties, the symbolic attitude of "house" differs substantially between the slum-tenement dweller, the traditional working class and the modern working class that is edging its way up the social ladder.[3] Rainwater refers to the slum dweller, or lower class, as the bottom 20% of the population on the social scale. The group is generally unskilled with unstable work histories, as opposed to the more stable blue-collar working class. These differences in attitudes are outlined in Table I.

Rainwater underscores the idea that the very day to day situation with which the lower class must live and deal causes the prime concern that the home be a place of security. The accomplishment of this fete is rare. The working class is not as fearful, but there are still strong overtones of concern with a threatening lower class environment. As described by Rainwater, the attitudes of these people towards their homes are completely different from most middle class situations where to home becomes an expression of self, of relationships, and of realization.[4] The major focal concern of this lower class world-view seems to be "trouble".[5]

The Need for Research to Satisfy Housing Needs

The housing designer and the public agency that will supervise the planning must therefore recognize the fact that they are dealing with the creation of home environments that are, most probably, entirely

TABLE I

VARIATIONS IN HOUSING STANDARDS WITHIN THE LOWER AND WORKING CLASSES

Focus of Housing Standard	Core Consumer Group	Most Pressing Needs In Housing: Inside the House	Most Pressing Needs In Housing: Outside Environs
Shelter	Slum Dwellers	Enough Room; Absence of Noxious or Dangerous Elements	Absence of External Threats
Expressive Elaboration	Traditional Working Class	Creating a Pleasant, Cozy Home With Major Conveniences	Availability of a Satisfying Peer Group Society and a "Respectable Enough" Neighborhood
All-American Affluence	Modern Working Class	Elaboration of the Above Along the Line of a More Comples Material Culture	Construction of the All-American Leisure Style in Terms of "Outdoor Living"; "Good" Community Services

Source: Lee Rainwater, "Fear and the House-As-Haven in the Lower Class," People and Buildings, ed. Robert Gutman (New York, Basic Books, Inc., Publishers, 1972), p. 302.

different than any of their own experiences. In her book, Easter Hill Village, Clare Cooper discussed the fate of this project where three architects, Donald Hardison, Vernon DeMars and Lawrence Halprin, "infused into their efforts an attitude of caring about the needs of low-income residents."[6] In the 1964 study, Cooper found the Easter Hill Village project generally well accepted, which seems to indicate a number of the assumptions made by the architects in their planning acheme were correct. Yet a number of their specific design solutions were obviously wrong and did not meet the resident's needs.[7] What seems to be implicit in the results of this study is that "caring" for the needs of the lower class, even though the care be genuine, simply is not enough to solve the problem. Caring must be backed with some form of research by the planners among the housing users. This need for research was reinforced in 1967 by Louis Sauer, FAIA, in his efforts to change stock project plans in New Haven, Connecticut.[8]

The two cases mentioned above represent 1) a good-will gesture towards improving the plight of project housing, and 2) a feeble, yet noble attempt at research. In 1974, Clare Cooper returned to find Easter Hill Village on the verge of becoming the West Coast's Pruitt-Igoe, and Louis Sauer found the same conditons in one of his New Haven developments. In Cooper's epilogue, which deals with Easter Hill Village after 1974, she makes a strong arguement for social change versus architectural determinism.[9] The housing authority which managed Easter Hill had become a non-profit organization due to Federal action. Tenants had to be accepted regardless of income resulting in a majority of tenants who could not pay enough rent to cover operating expenses. The authority was forced to use a city-wide labor pool for maintenance.

During the late sixties, many of the more stable residents left to be replaced by the very poor. By 1974, 90% of the residents were on welfare, and 75% of the household heads were young women with an average of three children.[10] Herbert Gans, sociologist, in his foreward to Cooper's book tells that this outcome should have come as no surprise; that even a well designed concept "cannot hold people who can afford to live elsewhere, or ameliorate the social and other problems of the very poorest people, or, for that matter, slow down physical deterioration."[11] Louis Sauer echoes the same sentiment and cites management, neighborhood structure, and tenant population as being the non-physical key to public housing success.

John Turner offers one solution to government project housing: abolish it. He maintains in his latest book, Housing By People: Towards Autonomy in Building Environments, that the only method that satisfactorily meets the low-income demand is one which employs the user-builder. While "appearance has little to do with use, . . . the individual's direct participation in providing his own housing not only ensures more useful homes, but tends in time to create better housing. . ."[13] The role of the government agencies is then to make resources available.

Could this nation really depend on Turner's approach of user-builders? How would this affect the female household head with three children? How does this affect the low income blue collar worker who depends on overtime income to help pay the bills? Not surprisingly, a recent AIA report on housing states that it is "no longer only the poor who are unable to afford a moderately designed new home in a growing locality."[14] Where does Turner's user-builder program leave the young

Middle-class head of household, who might be able to take a leave of absence to build his home, but whose manual arts training ended in the eighth grade?

No doubt, our present approach to providing public housing can be improved, but perhaps the corrective action is a bit less radical than Turner's advocacy. Louis Sauer's pleas for greater research should not go unheeded. While he admits there are factors beyond the physical design (ie. management, neighborhood structure, and tenant population), he does not, as Herbert Gans and other sociologists would have us do, completely negate the aspects of limited architectural determinism; that there are definite design implications in the non-physical factors.

> All architects need to validate what they intuitively feel . . . What I did [referring to his interviews with project tenants], . . . as casual as it may appear, was a form of research and we architects should begin to recognize the work we do as such.[15]

Government Research Efforts in Building Performance

Fortunately, Sauer does not stand alone in his beliefs. Federal studies of the housing situation during the 1960's revealed a need for greatly increased production rates to keep up with the population growth and to combat urban slums.[16] Out of these studies, the Department of Housing and Urban Development initiated Project Breakthrough in 1969 to support the development of new housing construction methods. By 1972, various agencies with HUD were able to draw valuable conclusions for the housing industry from their experiences. It was determined that performance measures were needed to encourage innovation

and to evaluate new systems, and that these performance measures had to be defined in terms of user needs and wants.[17] Since this incorporates a wide spectrum from basics to amenities, it is necessary to determine those needs and wants which can be satisfied practically and economically. It was underscored that the present state of knowledge is not sufficient to define all aspects of user requirements, and this implies a need for extensive research. This research not only defines user requirements, but also can establish trade off factors allowing for lower performance in one area in return for higher performances in another that may be more desirable to the user.[18] In 1976, the U. S. Comptroller General published in his report to Congress that this need of technological research was indeed one of the key lessons learned in Operation Breakthrough.[19]

Operation Breakthrough did not try to undermine the sociologist's point of view, and admits that the real test is how the community satisfies the needs of its residents. It does show, however, that building performance cannot be discounted, and that building performance and community performance combine in a complex relationship.[20]

Building Performance and Housing Satisfaction

David Canter makes an excellent arguement for continued research into building performance in the first chapter of his book, Environmental Interaction:

> Given this excited state of man/environment relations it is surprising, but not uncommon, to find academic psychologists who . . . insist that the physical environment has little relevance for behaviour. Some insist that the amount of variation in human response produced by the physical environment is minimal compared with that produced by the social, institutional or cultural environment. One of the

> starting points for this book is the quantity of evidence that is accumulating which suggest that this is not the case. But even if it were the case that the physical environment played only a small part in the total matrix of influences on behaviour, it would still be necessary to examine those influences. This is necessary because of the colossal cost of producing and maintaining our physical surroundings. We must identify even the smallest impact to ensure that resources are effectively utilized.
>
> A very large proportion of the resources of any society is spent upon the creation, development, and maintenance of the environment in which it lives. These resources are spent in order to achieve certain social goals--goals which can best be achieved by providing an appropriate environment for human activities. Until we can develop a scientific understanding of our interactions with the physical environment many of the resources spent on physical surroundings will be wasted. They will be wasted because it is only by the development of a scientific understanding of people's interactions with their surroundings that we may move steadily towards a better environment; instead of the ill--directed meandering which constitutes progress based upon 'experience' and 'rule of thumb'.[21]

There should be no hesitation to believe that improvement of building performance with respect to physical environment can, in some way, improve the quality of life in the American housing project. If there is need to discover a hierarchy of factors which relate to comfort and satisfaction, research in this area should be pursued. It is the investigation of the physical environment and its effects on perceived comfort in low income housing that is to be the direction of this study.

END NOTES

[1]Charles Abrams, The Language of Cities (New York, 1971), p. 147.

[2]Abrams, p. 143.

[3]Lee Rainwater, "Fear and the House-As-Haven in the Lower Class," People and Buildings, ed. Robert Gutman (New York, 1972), p. 299.

[4]Rainwater, p. 301.

[5]Rainwater, p. 305.

[6]A. O. Dean, "Evaluation: A Much-Praised Housing Project Nearly Becomes the 'West Coast's Pruitt-Igoe'," AIA Journal (August 1976), p. 22.

[7]Dean, p. 22.

[8]Louis Sauer, "Differing Fates for Two Nearly Identical Housing Developments," AIA Journal (February, 1977), p. 26.

[9]Dean, p. 25.

[10]Dean, p. 25.

[11]Clare Cooper, Easter Hill Village: Some Social Implications of Design (New York, 1975), p. 198.

[12]Sauer, p. 25.

[13]John Turner, Housing By People: Towards Autonomy in Building Environments (New York, 1976), p. 120.

[14]"New AIA Recommendations on National Housing Policy." AIA Journal (February, 1977), p. 39.

[15]Sauer, p. 48.

[16]Department of Housing and Urban Development, Department of Commerce, Operation Breakthrough: Lessons Learned About Demonstrating New Technology (Washington, D.C., 1976), p. 2.

[17]Harold B. Finger, "The Role of the Performance Concept in Operation Breakthrough," Operation Breakthrough, Department of Housing and Urban Development (Washington, D.C., 1972), p. 821.

[18]Finger, p. 822.

[19]Department of Housing and Urban Development, p. 32.

[20]Finger, p. 824.

[21]David Canter, Environmental Interaction: Psychological Approaches to our Physical Surroundings (New York, 1976), p. 2.

CHAPTER II

PROBLEM STATEMENT

Goals for Study

The general purpose of the study is to search for ways in which low income, multi-family housing projects can be improved and made more viable. Following David Canter's exhortations in his book Environmental Interaction, the primary focus will be to determine the "perceived" comfort (ie. physical) needs of the tenants who will occupy a low-income housing project. A secondary focus of this study will be an attempt to determine satisfaction with the social aspects of the neighborhood and its influence on satisfaction with the physical aspects of the apartment unit.

Defense of Study

The reasons behind this study have, for the most part, been outlined in Chapter I. Simply stated, architects and planning boards must pay closer attention to the needs of the project user, and when these needs are unknown, it is the user who must be consulted. As the cost of housing continues to soar, there will be increasingly greater demand for a quality product. As our society is commited to public housing in some form, time must be taken now to learn from past mistakes so that the future can be handled more skillfully. Another reason for this study is to show that the architect, who by his vary nature is a

problem solver, can take a step beyond his intuitive reasoning and prove his worth in the development of the scientific understanding of interactions with the physical environment.

The underlying motivation behind this study is a personal (but not unique) philosophy that all people deserve the right to a decent home. The existential purpose of architecture is to make a site to become a place. To gain the existential foothold man must be able to orient himself, and he must be able to identify with his environment. "He has to know where he is, and how he is in a certain place."[1] For all of us this process of identification begins at home. As shown in Chapter I, a home with which the lower class can identify is not easily acheived in our society. Although it may be only a small step at a time, it falls squarely on the housing designers, ie. the government agency, the social theorist, and the architect, to help alleviate this problem. The profession of architecture must recognize that its role of making a site become a place extends beyond the grandiose public square to the very domestic environments which touch us all.

Specific Objectives for Study

The specific objectives of this paper are as follows:

1. To determine areas of dissatisfaction with the physical living unit environment as these areas relate to perceived comfort.

2. To determine if there is a hierarchy of physical construction factors which relate to perceived comfort.

3. To determine the relationship between satisfaction with the housing unit and satisfaction with the neighborhood.

4. To propose corrective measures for those areas found to be

unsatisfactory.

5. To incorporate corrective measures in planning a new multi-family housing project.

Areas of Investigation

Areas of physical environment to be investigated are defined by the following batteries of questions:

1. The luminous environment
2. The thermal environment
3. The acoustical environment
4. The spatial environment
5. The quality of construction material and maintenance

A sixth category concerns the social environment of the neighborhood. Limitations of the batteries are evident by studying the questionnaire included in Appendix A, p. 95.

Limitations of Study

To implement this study, a questionnaire was distributed to a sample of residents in two multi-family public housing projects. The questionnaire asked the household head to rate satisfaction with various aspects of his unit and neighborhood, grouped in batteries as outlined above. Aspects which were rated as unsatisfactory on a consistent basis were considered to indicate areas which were in need of further investigation for improvement. The survey was interpreted using Frequency Distributions, T-test of Means, and Multiple Regression analysis as defined by the Statistical Package for the Social Sciences library computer program.

The 93 questions which comprised the main body of the questionnaire were selected as it was felt they dealt more directly with housing problem areas that would cause dissatisfaction with the housing unit. Input for the questionnaire came from Mrs. Betty Shideler of the Drumright Housing Authority, Dr. L.L. Boyer and Dr. Karen K. Stewart of Oklahoma State University, Mr. James Netherton, Visiting Lecturer at Oklahoma State University, and from two other study questionnaires involved with the quality of housing: The Rochester Housing Survey, Department of C.E.P.P., Cornell University, and The Southern Regional Cooperative Research Project, S-95.

While it is realized that a rating scale of one to seven or one to nine is most prefered for statistical analysis dealing with social sciences, a rating scale of one to five was chosen because of the nature of the sample. It was felt, due to the age of the elderly tenants and the expected education of the younger tenants, that a satisfaction scale of one to five would be more easily grasped. The respondent was instructed to circle the number closest to his level of satisfaction. One and five were explicitly defined as extremes, leaving the respondent room to judge between the extremes with a response of two, three and four. With this range it was felt the respondent could readily recognize three as middle ground, and two and four as representing some degree of satisfaction or dissatisfaction, as opposed to a range of one to seven necessitating a more discriminating value judgement and perhaps leading to frustration and a failure to complete the questionnaire. The last question of the first four batteries listed on page 13 are of an open response format. This was to allow the tenant to express any feeling not directly addressed by

the questionnaire.

The locale for this study was limited to housing projects in North Central Oklahoma. While the needs of the country's urban centers are numerous and well known, the major burden of rural housing assistance has fallen to no one. Lower incomes, lack of financial assistance, a reluctance on the part of builders to become involved, and a higher percentage of substandard units make the rural problem, though hidden, of a greater critical consequence than that seen in our cities.[2]

Participating Agencies

The two agencies participating in the survey are the Ponca City Housing Authority, Ponca City, Oklahoma, (the low-rise elderly residence tower excluded), and the Drumright Housing Authority, Drumright, Oklahoma. The site for the proposed new multi-family housing units will also be in Drumright, Oklahoma. This site is currently undergoing development by the City's Housing Authority.

At the Ponca City project, there were 78 multi-family units, and only one vacancy in January of 1978. Sixty-two questionnaires were distributed throughout the project; fifty of these were completed and returned. At the Drumright Project, there were 58 units occupied in February of 1978 with no vacancies. Twenty-eight of these households from across the project were chosen by the Drumright Housing Authority as a sample. All twenty-eight co-operated by allowing an interview and completing the questionnaire. General characteristics of both samples as reflected by the survey are shown in Table II.

Raw data collected from both projects are shown in Appendix B, p. 104. Responses from each resident are recorded on records, or cards,

TABLE II

GENERAL CHARACTERISTICS OF TENANT SAMPLE
BY HOUSING PROJECT SITE

	Ponca City	Drumright
# of Respondents	50	28
Adults		
# of Households with one adult	27	18
# of Households with two adults	21	8
# of Households with three or more adults	2	2
Children		
# of Households with one	9	3
# of Households with two	10	2
# of Households with three	8	
# of Households with four	5	1
# of Households with five		1
# of Households with eight	1	
Previous Home Ownership		
Yes	19	17
No	31	11
Sex of Household Head		
Male	13	10
Female	37	18
Age of Household Head		
20 - 30	13	2
30 - 40	10	2
40 - 60	16	3
60 - 90	11	21
Employment		
Full Time	19	6
Part Time	7	1
Disabled	3	1
Retired	11	20
Unemployed	9	
Student	1	
Race		
Caucasian	39	21
Black	10	6
Asian	1	1

so designated 1 and 2 in the far right hand column. Columns one thru five are respondent identification numbers. A 1 in column five represents the Ponca City sample, while a 2 represents Drumright. A column by column description of all data is given in Appendix A, Survey Description, p. 95.

END NOTES

[1]Christian Norberg-Schulz, "The Phenomenon of Place," Architectural Association Quarterly, Vol. 8, No. 4 (1976), pp. 3-10.

[2]Kay Stewart and Cora McKown, "Determinants of Housing Satisfaction in Rural Low-Income Families," Proceedings of Annual Conference, American Association of Housing Educators (Tucson, Arizona, 1977), p. 2.

CHAPTER III

PROCEDURE

Description of Participating Housing Projects

Both housing projects surveyed are funded and operated under guidelines set by the Department of Housing and Urban Development, and therefore both adhere stringently to HUD specifications as set forth in the Minimum Property Standards for Multifamily Housing, June 1969, FHA #2600. Housing units range from one to four bedrooms, single, duplex, and tri-plex configurations of 2x4, brick veneer construction. Table III shows the breakdown of bedrooms and adjancy configurations by project. Illustrations of typical plans are shown in Figures 1 through 8. Photographs of exterior facades are shown in Figures 9 through 12, while Figures 13 and 14 show a few examples of neighboring indigenous housing.

In Ponca City, the Housing Authority purchased parcels of land at eleven locations in the township. The number of units per location vary from one to twenty. While there is no stated policy, at three of the sites all tenants were black, and at only one site was there a racial mixture--one black and 19 caucasian households. A wide variation of age groups was found at each location. At first observation, all sites seemed to have been well maintained, though there seemed to be a predominate need for screen repair--both window and door. A few units showed that some attention was paid to shrubs and flowers, but by

TABLE III

BEDROOM AND ADJACENCY CONFIGURATIONS
BY HOUSING PROJECT

Adjacency Configurations	# of Bedrooms	# of Units	
		Ponca City	Drumright
Single	1		2
	3		2
	4	9	
Duplex	1	10	20
	2	30	10
	3	24	6
Triplex	1		18

far these were in the minority. With the exception of the larger four bedroom units, the housing sites were located in older blue collar neighborhoods. Questionnaires were distributed and collected at all eleven sites.

At the Drumright project, three construction sites had originally been selected, and as explained by the executive director, the three sites were chosen to separate three different groups of tenants. Though this separation was not strictly adhered to, it was found to be generally true. The largest site contained 46 units, predominately one bedroom with some two bedroom units, principally housing retired caucasian singles and couples. At least one caucasian family was also housed at this site. The smallest site was deemed family housing consisting of four three bedroom units. The population was comprised of two caucasian families, one family of Asian extraction, and one

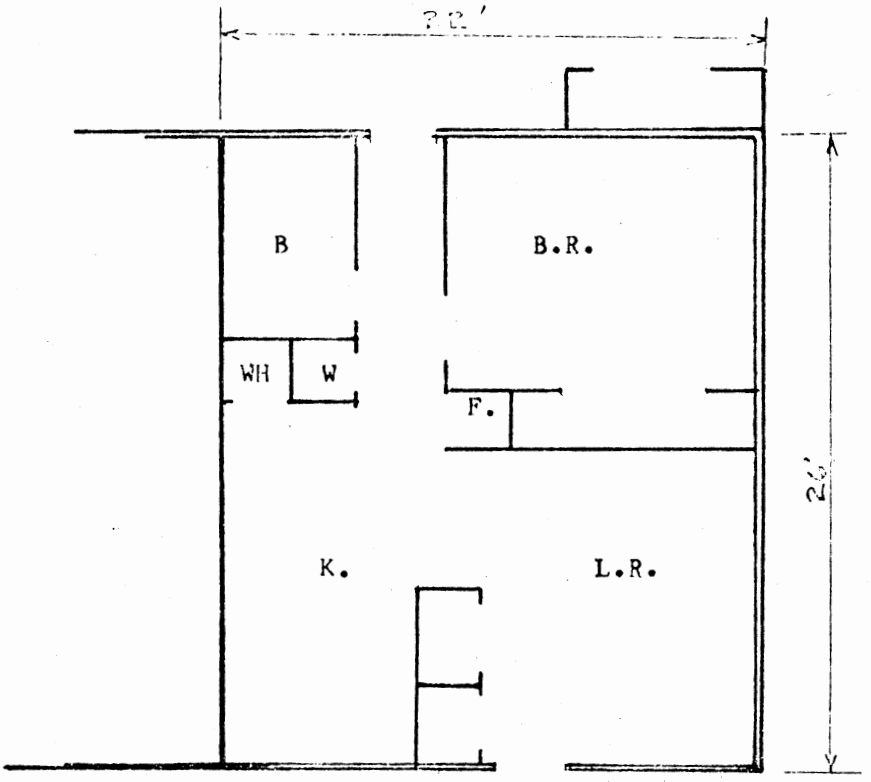


Figure 1. One Bedroom Unit, Ponca City

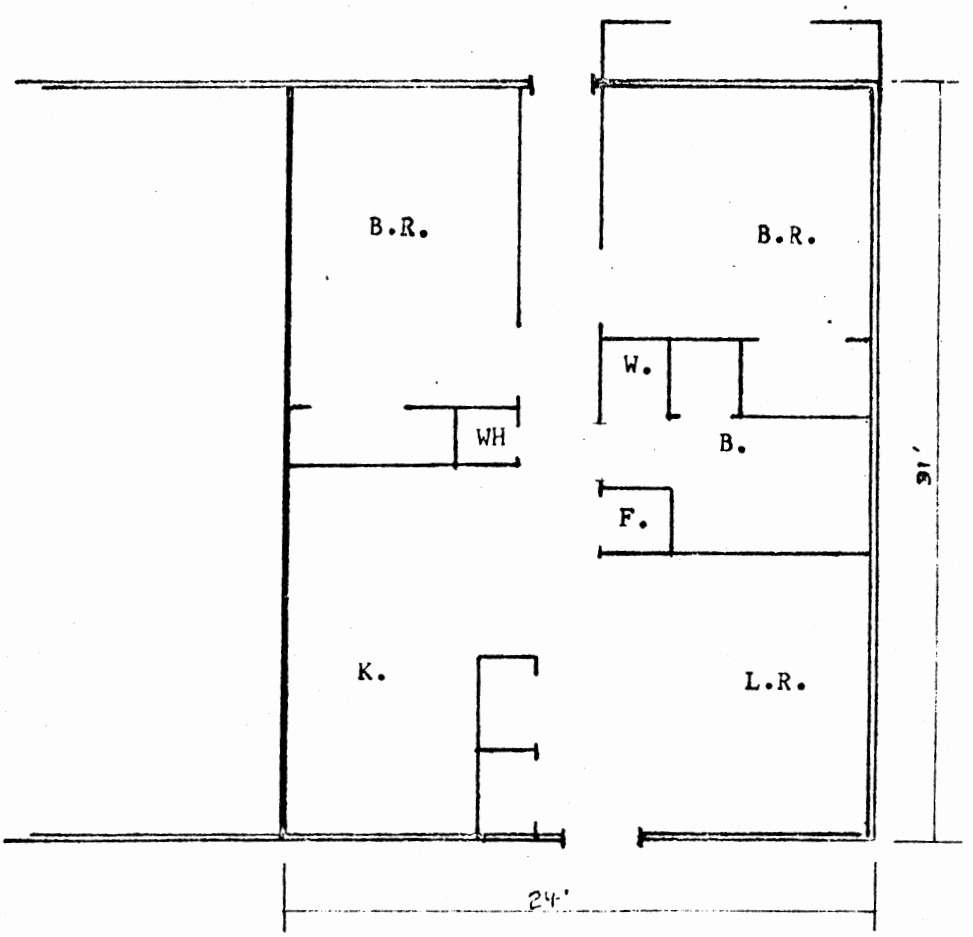


Figure 2. Two bedroom unit, Ponca City

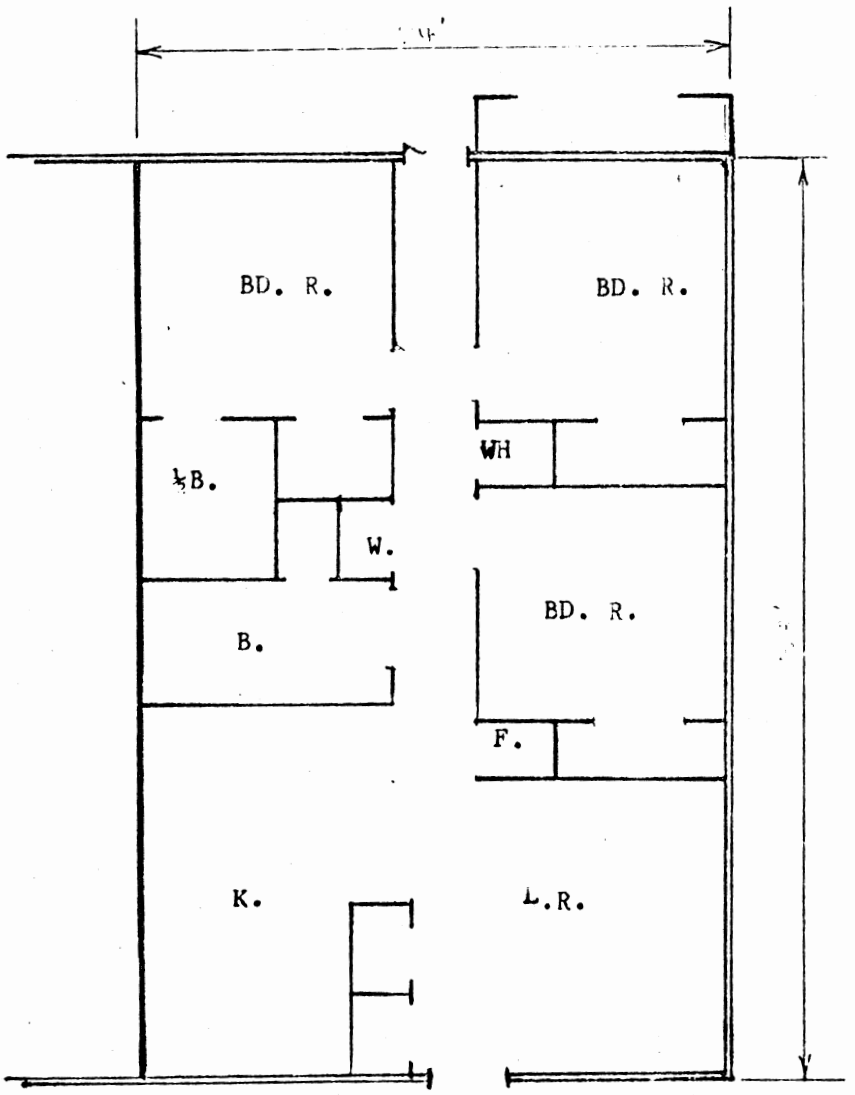


Figure 3. Three Bedroom Unit, Ponca City

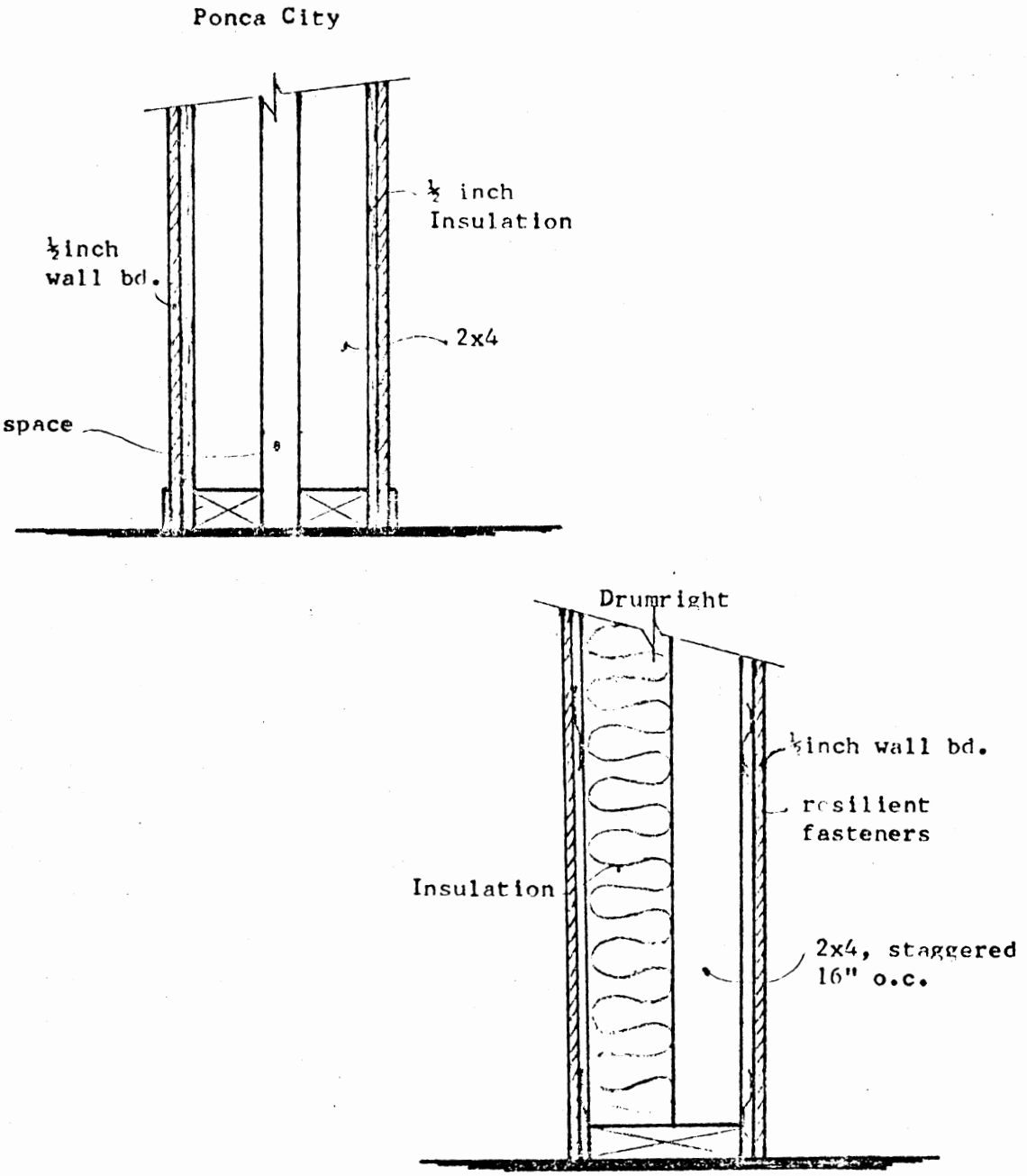


Figure 4. Typical Common Walls Between Units

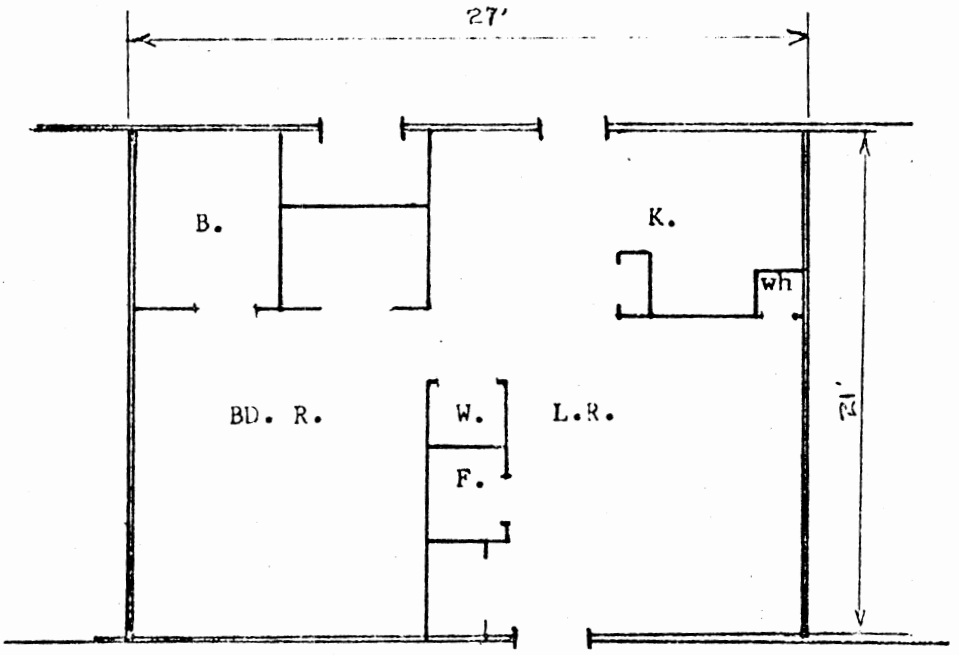


Figure 5. One Bedroom Unit, Drumright

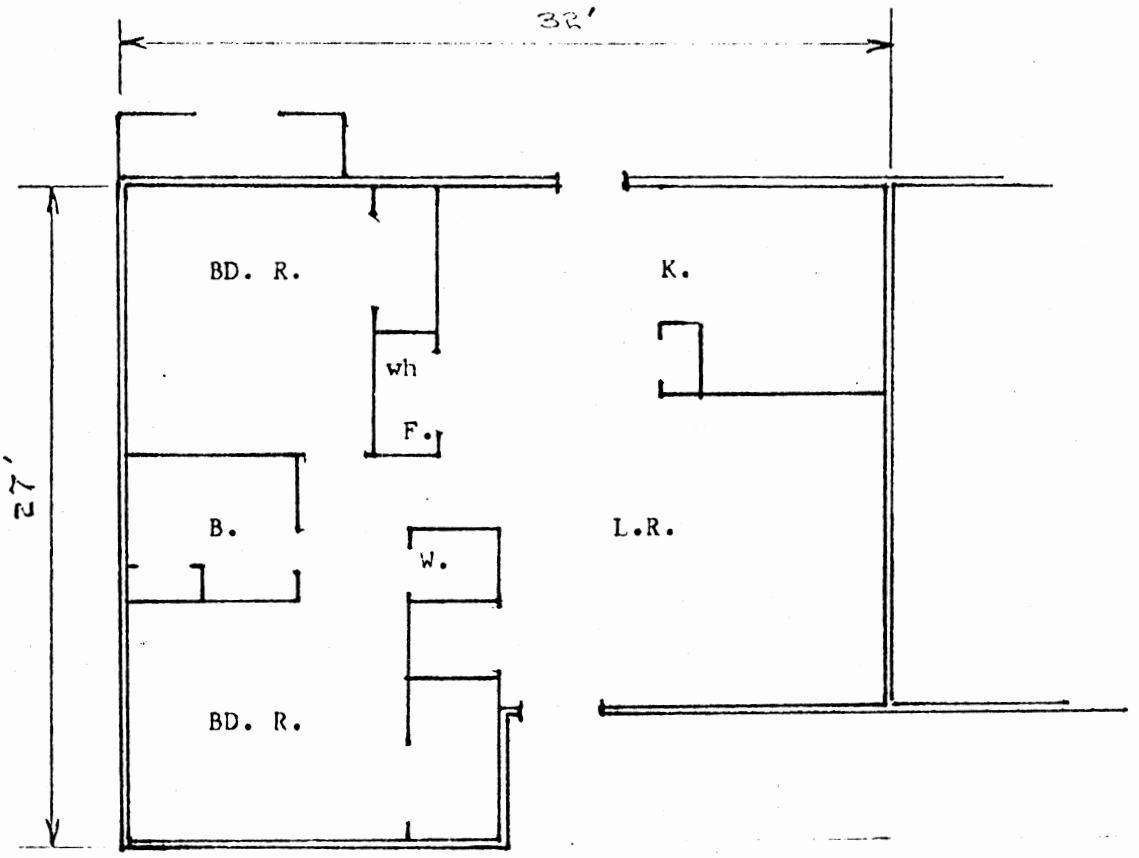


Figure 6. Two Bedroom Unit, Drumright

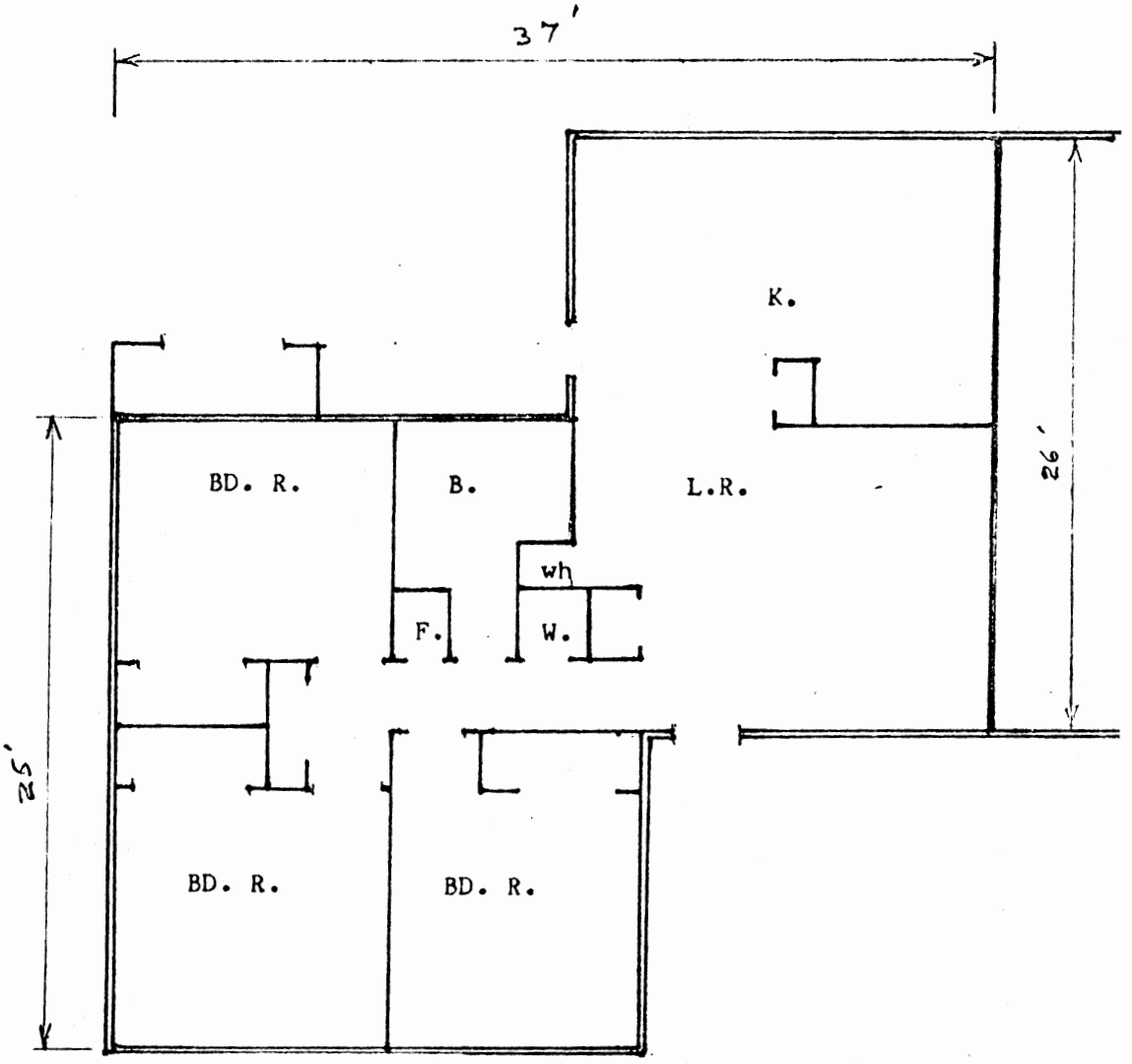


Figure 7. Three Bedroom Unit, Drumright

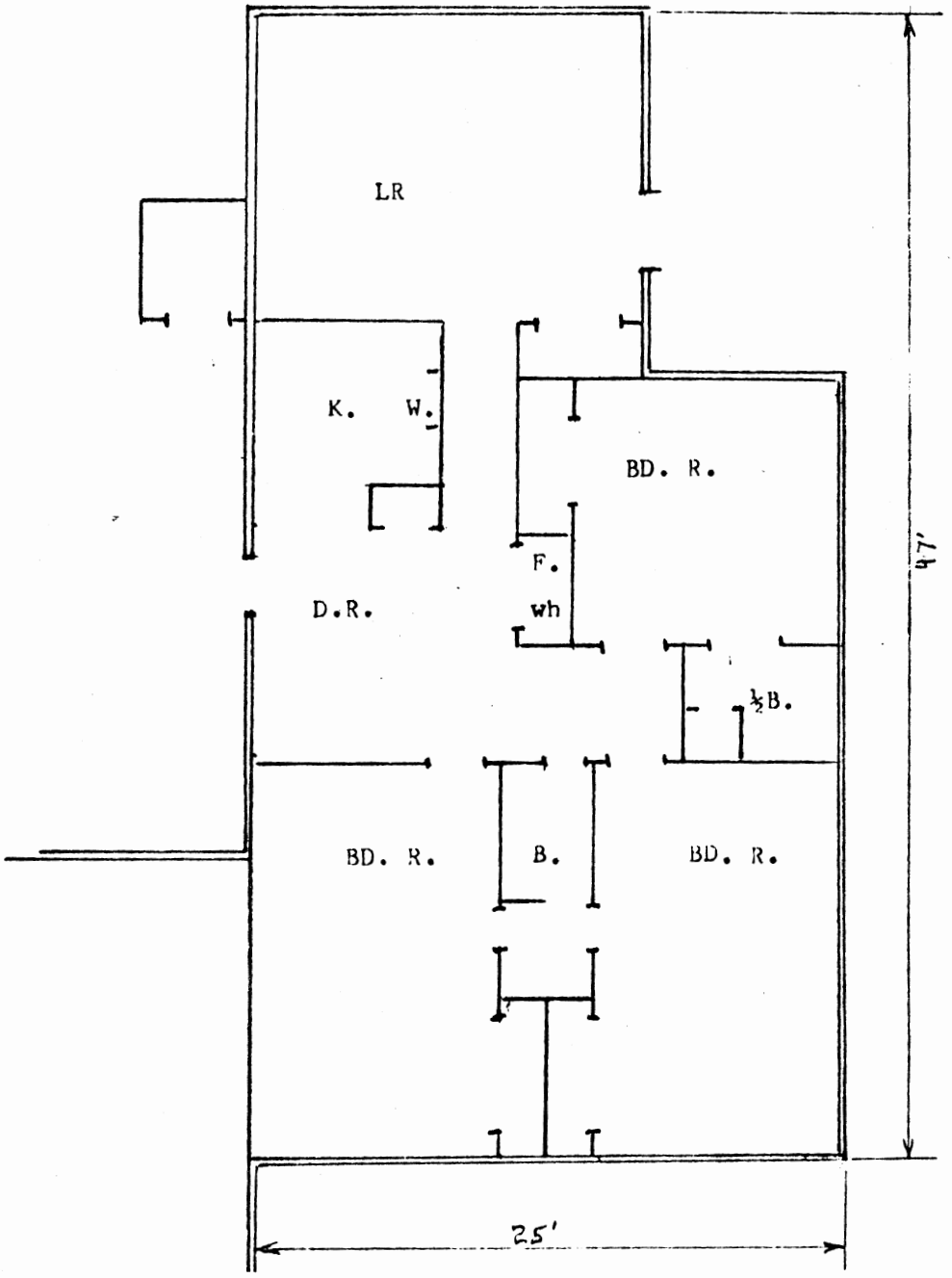


Figure 8. Dormitory Unit, Drumright

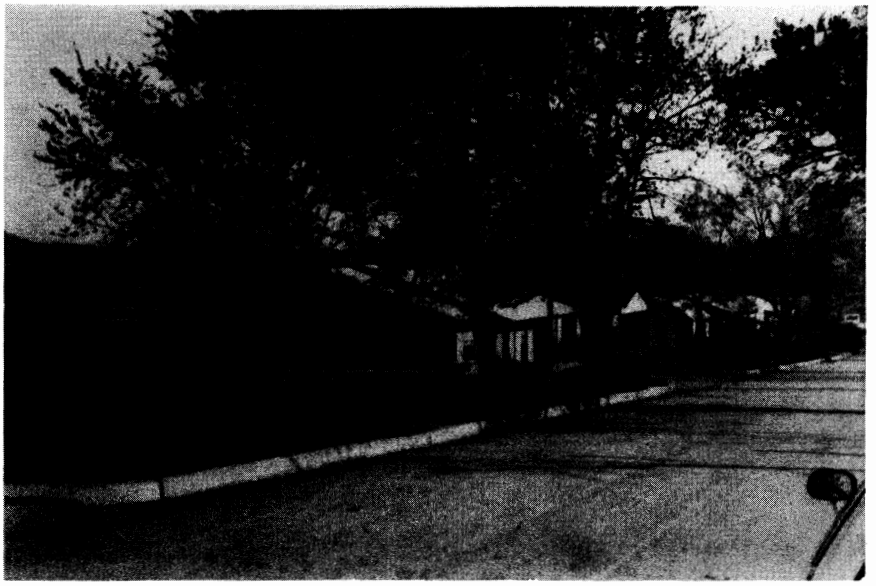


Figure 9. Typical Facades, Ponca City

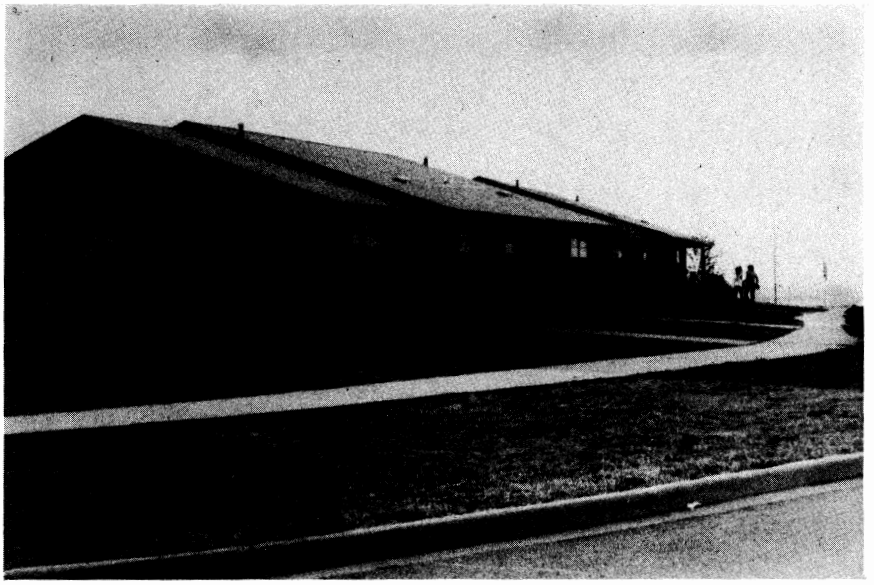


Figure 10. Typical Facades, Ponca City

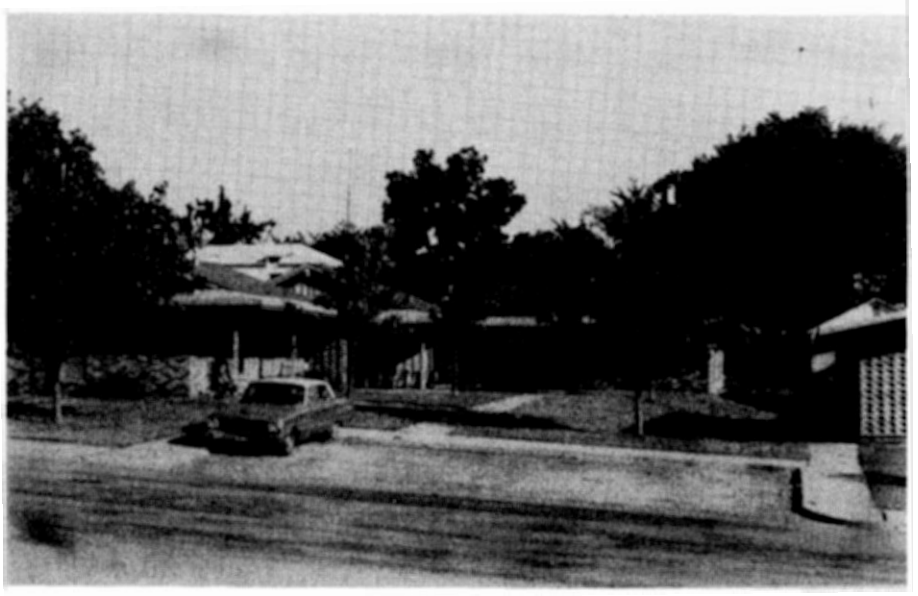


Figure 11. Typical Facades, Drumright

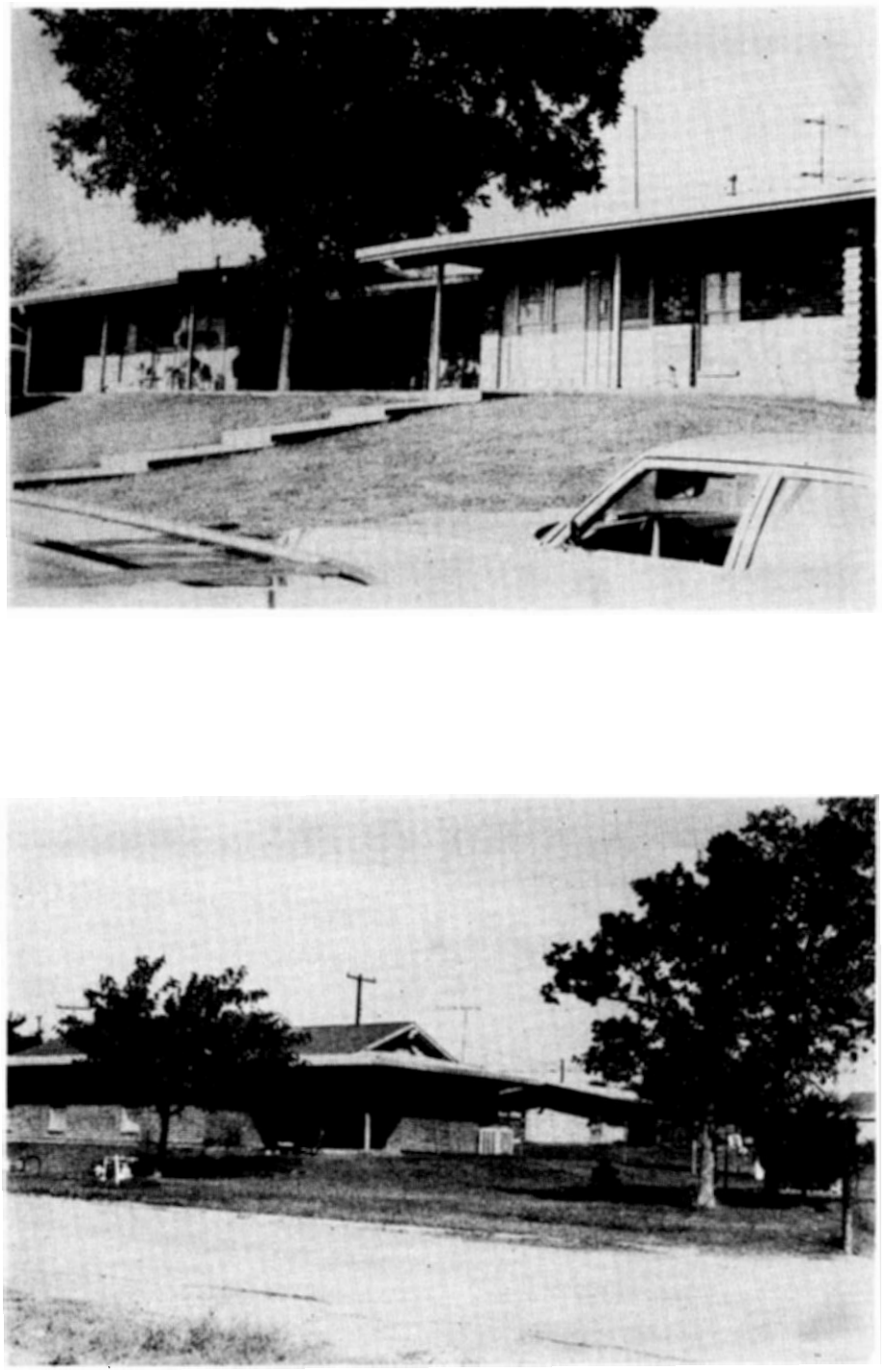
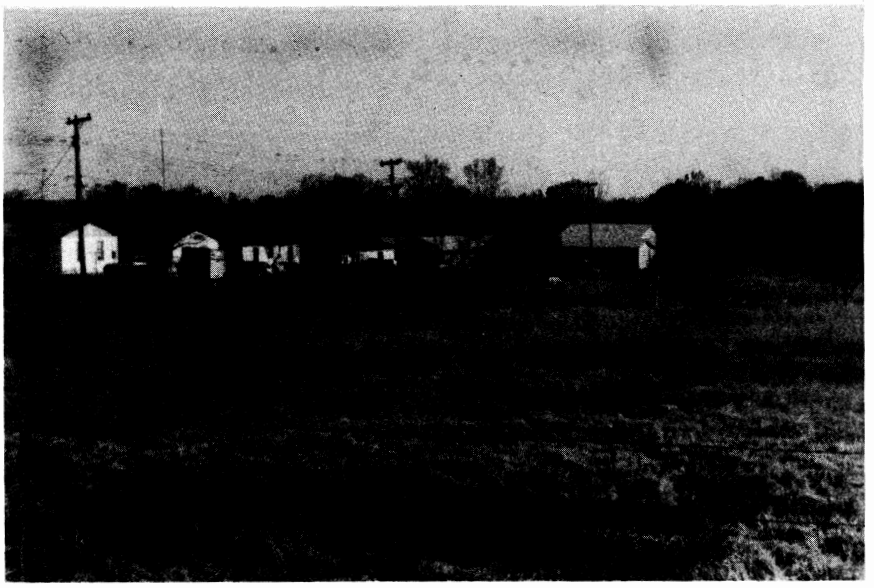


Figure 12. Typical Facades, Drumright

Figure 13. Indigenous Housing Neighboring Drumright Project



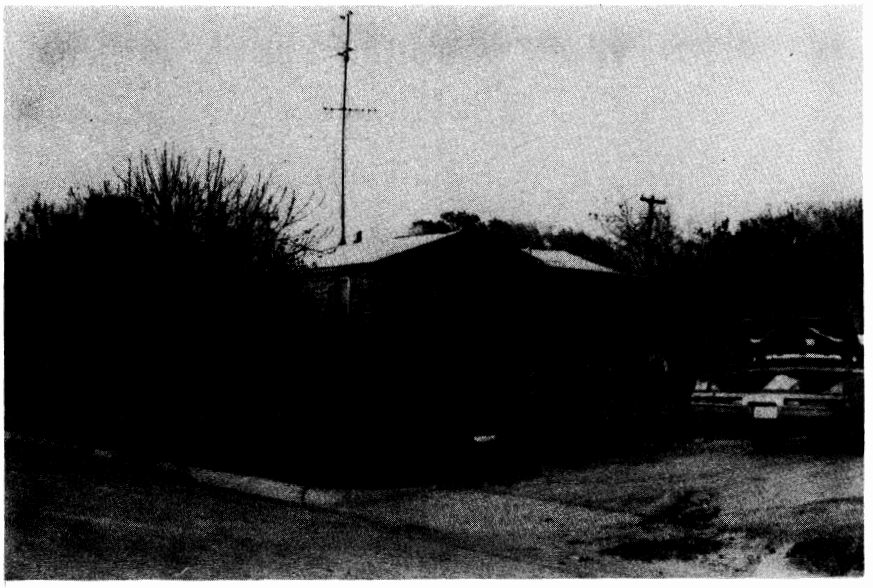


Figure 14. Indigenous Housing Neighboring Ponca City Project

black family. The third site was admittedly located in "colored town" and tenants ranged from elderly to young families. While these families were predominately black, one elderly caucasian lady is also known to live at this site.

As at Ponca City, all units appeared to have been well maintained from the exterior. The "elderly" units and surrounding grounds were striking because of their neatness and obvious upkeep. The other two sites do not show the same degree of tenant (and possibly management) care. The elderly and family sites are, as in Ponca City, located in older, blue collar neighborhoods, while the housing for the black tenants is in a severly depressed area.

At the Ponca City Project, the survey was conducted on a door-to-door basis with the permission of the Ponca Clty Housing Authority's Executive Director, Mr. Earl Vic. Out of the fifty questionnaires completed, 17 were completed in personal interviews at the request of the tenant. The remaining 33 were completed by the tenants and collected approximately four to six days after distribution. In Drumright, at the housing Authority's request, all but two of 28 households selected to participate were personally interviewed. The two exceptions were working couples with young families who completed the questionnaires on their own in Ponca City.

Preliminary Data Analysis Methods With Frequency Distribution and T-test

As a preliminary data analysis, one way frequency distributions on responses were generated, using the SPSS program, for all questions posed by the survey. This in itself began to indicate which factors

caused the greatest amount of dissatisfaction among the tenants. To determine if the two groups sampled demonstrate the same level of satisfaction (i.e., if they "think" alike in both projects), or if there are design differences between the two projects which cause different levels of satisfaction, the T-test of significance was employed to compare this possible difference in satisfaction. The T-test offers an evaluation of differences between effects, rather than the effects themselves, by comparison of population means. In this study, the "effects" to be compared were the summed values for each six batteries of questions, as defined on p. 13 (i.e. responses for questions within each battery were summed to give a general satisfaction level with the battery as a whole).

As in most statistical inferences, the population mean was being estimated by the sample mean. The problem becomes then whether or not a difference between two samples implied a true difference in the parent populations. The null hypothesis for which the t statistic was computed stated that there are no differences between population means. The significance level (i.e. the exact probability that the null hypothesis is rejected when it is true) was set at .05. This value was chosen since a Type II error, accepting the null hypothesis when false, was most likely of greater consequence than a Type I error, rejecting the null hypothesis when true.

The t is a statistic generally applicable to a normally distributed random variable where the mean is an assumed known value, and the population variance is estimated from a sample. It follows the form in equation 3.1:

$$t = (x - \mu)\ s \qquad (3.1)$$

Here, x is a normally distributed random variable, μ is the mean for x, and s^2 is sample variance. The t distribution depends on the degrees of freedom used in computing s, and is usually tabulated from 1 to 30. For degrees of freedom larger than 30, the sample variance is a reliable approximation of the population variance, and the degrees of freedom may be taken as infinity. From the frequency distribution of the t statistic, the probability of drawing two samples that differ more than the pair chosen is computed. If this probability is less than .05, the null hypothesis can be rejected. If greater than .05, the null hypothesis is not rejected. Yet, this is an indication that the true situation is not significantly different from the null hypothesis and not that the null hypothesis is true. Therefore, if the battery of questions dealing with lighting yielded a probability greater than .05 from the T-test, then it could be assumed that there are no differences in satisfaction between the two groups surveyed. As the T-test depends on a statistically random sample and not the volunteer sample that was available for this study, it should not be concluded that <u>all</u> residents of similar housing would respond in a like manner. However, the volunteer sample would suggest valuable trends in satisfaction levels which could be used in improving housing quality.

Data Analysis Methods Using Multiple Regression Techniques

Multiple regression is a general statistical technique whereby one can analyze the relationship between a dependent variable and a set of independent or predictor variables. In this study, the questionnaire by which the data was collected consists of six batteries of questions,

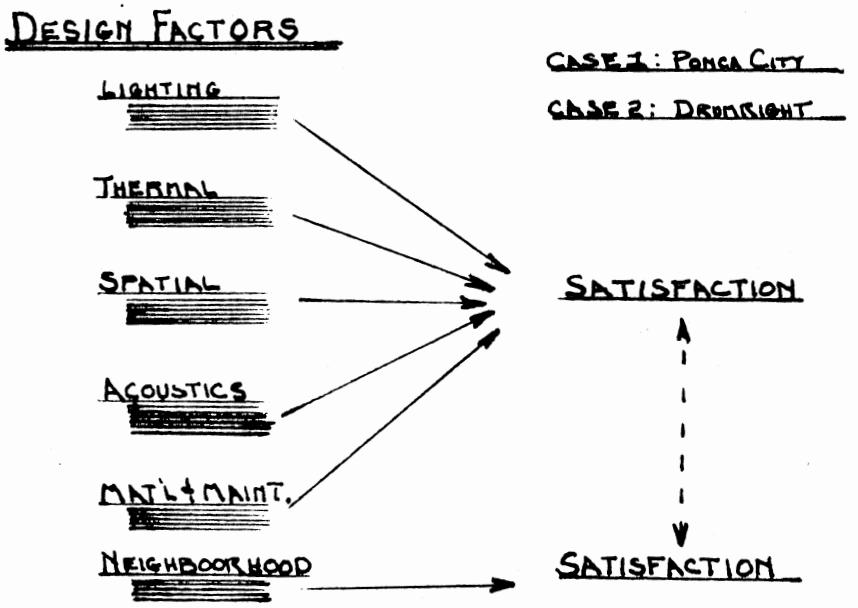
as previously explained. There were two dependent variables: satisfaction with the housing unit and satisfaction with the neighborhood. The six batteries provided the independent or predictor variables. Multiple regression is also viewed as a descriptive tool, or more appropriately in this case, an inferential tool by which relationships in a population are evaluated from the examination of sample data.[1] Again, due to a volunteer rather than a random sample, only trends and not specific relationships could be outlined.

As described in Chapter II, the sample for this study was limited to the low-income population of North Central Oklahoma, and was comprised of present tenants in housing projects at Ponca City and Drumright, Oklahoma. In short, the multiple regression analysis provided a prediction of housing satisfaction from batteries of questions on acoustical, lighting, spatial, thermal, and material quality and maintenance aspects of the housing unit, neighborhood aspects, and the following demographic questions:

1. Number of adults living in the residence
2. Number of children under 18 living in the residence
3. Number of rooms in the residence
4. Sex, age and employment of the household head
5. Record of home ownership.

The application of multiple regression technique here is in conjunction with causal theory, ie. areas of physical dissatisfaction cause dissatisfaction with the housing unit; improvement of these factors causes a greater satisfaction and acceptance of the housing unit. Multiple regression can be used to describe the entire structure of linkages between independent and dependent variables, "and to assist

the logical consequences of a structural model that is posited a priori from some causal theory."[2] The best application of multiple regression for this process is known as path analysis. Path analysis accounts for all variables in the model operating simultaneously. The path coefficient, a standardized beta coefficient, is a measure of the influence of the independent variables on the dependent variable with all variables operating simultaneously.[3]



Null Hypothesis: The volunteer sample consisting of distinct groups, will demonstrate no difference in their evaluation of existing conditions and desired conditions.

Figure 15. Multiple Regression Analysis Model

The basic model for the regression study takes the form shown in Figure 15. For the low income sample, it is expected that the null

hypothesis be rejected, however, it is possible that, out of apprehension, the tenant may rate all factors satisfactory so as not to upset some figure of authority that could put him out of his unit. The results of the analysis should reveal trends indicating:

1. Overall satisfaction with "place" as home
2. Satisfaction with physical and social aspects of place
3. Correlation between physical and social aspects
4. Correlation and ranking by importance of physical aspects as they affect satisfaction with "place" as home.

In simple regression analysis, values of the dependent variable are predicted from a linear function with the form

$$Y' = A + Bx \tag{3.2}$$

where Y' is the estimated value of the dependent variable Y, B and A are the weighting (or regression coefficients) and additive constants respectively, and X is the value of the independent variable. B may be likened to the slope and A to the Y-intercept when predicting a Y value from x on a straight line. The error term, or residual, is equal to Y - Y'. The constants A and B are selected in such a way that the sum of squared residuals (SS_{res}) yields the smallest possible value.

$$\Sigma(Y - Y')^2 = SS_{res} = \text{minimum} \tag{3.3}$$

As B represents slope of the regression line, it indicates the expected change in Y with one unit change in X. The Y' values will fall either side of the regression line as described by the residual representing errors in prediction. As the SS_{res} has been minimized, the regression line may be described as the "line of best fit."[4]

Principles of simple regression analysis dealing with bivariate cases are extended to multivariate uses. The general form of the unstandardized regression is:

$$Y' = A + B_1X_1 + B_2X_2 + ... B_kX_k \quad (3.4)$$

where Y' is the estimated value of Y, A represents the Y-intercept, and B_i are partial regression coefficients. As with Bivariate regression, A and B_i values are selected so that the sum of squared residuals, Equation (3.2), is minimized. This also implies that the correlation between the Y and Y' values is maximized, while the correlation between the indpendent variables and residual values is reduced to zero. It should be noted that for the actual calculation of A and B_i, it becomes necessary to establish a Pearson correlation between the independent variables X_i.[5]

The model for the multiple linear regression is perhaps more easily dealt with using matrix algebra. The form is shown in Figure 16. Y in this model is the actual "value of the dependent variable, B and A are unknowns and E represents the minimized residual $((Y = Y')^2)$ or error. With the use of the Pearson Correlation, the A and B values are generated by the SPSS program.

The partial regression weights B_i will indicate the expected difference on Y between two groups that happen to differ on X_1 by one unit but equal on X_2. The change in Y is known as the path analytic effect coefficient.[7] The total variation in Y (SS_y) can be divided into two components, one explained by the regression (SS_{reg}) and one that is not (SS_{res}).

$$SS_y = SS_{reg} + SS_{res} \quad (3.5)$$

$$\underset{n \times p}{Y} = \underset{n \times m \quad m \times p}{X B} + \underset{n \times 1 \quad 1 \times p}{1 A} + \underset{n \times p}{E}$$

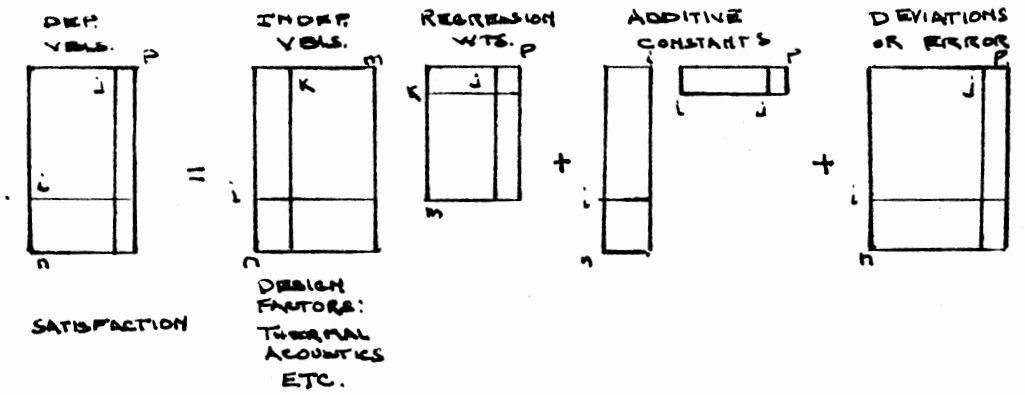


Figure 16. Matrix Model for Multiple Linear Regression

The proportion of variance in Y or its "goodness of fit of the regression equation" can be evaluated by examining the square of the multiple correlation:[8]

$$R^2 = \frac{SS_{reg}}{SS_y}$$

$$= \frac{\text{variation in Y explained by the combined linear influence of the indep. vbl's}}{\text{total variation in Y}} \qquad (3.6)$$

The R^2 term would then indicate what percentage of the variation in housing satisfaction could be explained by the six different batteries of questions asked in the survey. The partial B would indicate in which battery change would produce the greatest effect on satisfaction.

Inferential Procedures Necessary For Testing Hypotheses

Multiple regression procedures may be recognized as descriptive statistics, yet the analysis, as is the case in this study, is often performed on sample data that is to be generalized to a population (ie. testing a statistical hypothesis about the population parameters). Application of statistical inferences procedures for testing these hypotheses is possible because the statistics generated for regression analysis have known sampling distributions.[9] In this study, the two primary hypotheses tests will be the "overall" test for goodness of fit of the regression equation, and the test for a specific regression coefficient. Both require the use of the F test.

The validity of an F test depends on three assumptions. First, it is assumed that the Y-scores are normally distributed at each value of X. Second, the Y-scores have equal variances at each point X. Third, the deviation scores are assumed to be random and normally distributed with equal variances at each point X.[10]

The "overall" test uses inference procedures to indicate whether the (random) sample of observations being analyzed has been drawn from a population in which the multiple correlation is equal to zero (ie. there is no difference between existing and desired conditions), and whether any observed multiple correlation is due to sampling fluctuation or measurement error. The test statistic takes the following form:

$$F = \frac{SS_{reg}/k}{SS_{res}/(N-k-1)} = \frac{R^2/k}{(1-R^2)/(N-k-1)} \qquad (3.7)$$

SS_{reg} is the sum of squares for the entire regression equation, SS_{res} is the unexplained sum of squares, k is the number of independent variables in the equation, and N is the sample size. The F-ratio is distributed approximately as the F-distribution (obtained from a statistical table) with degrees of freedom k and N-k-1.[11] If F is sufficiently large, the null hypothesis would be rejected. Therefore, it can be concluded that the sample was not drawn from a population with a multiple correlation of zero.[12]

If the overall null hypothesis is rejected, then one or more of the regression weights has an absolute value greater than zero. The overall test does not indicate which of the specific weights is not zero, therefore calling for a test on specific regression weights. The F-ratio statistic is again employed, and the test is based on an equivalent of the previous null hypothesis, ie. all weights are equal to zero in the population. Such tests using Stepwise Multiple Regression may be employed in deciding which variables can be deleted from the regression equation, or in deciding how much confidence can be placed in the sign of the sample regression weights.[13]

END NOTES

[1]Norman H. Nie et al., Statistical Package for the Social Sciences (New York, 1975), p. 321.

[2]Nie, p. 322.

[3]Kay Stewart and Cora McKown, "Determinants of Housing Satisfaction in Rural Low-Income Families," Preceeding of Annual Conference, American Association of Housing Educators (Tucson, Arizona, 1977), p. 4.

[4]Nie, p. 323.

[5]Nie, p. 329.

[6]L. L. Boyer, "Principle Concepts of Multiple Regression Analysis" (unpublished study paper in Quantitative Psychology, Department of Architecture, University of California, Berkeley, 1975).

[7]Nie, p. 383.

[8]Nie, p. 330.

[9]Nie, p. 335.

[10]Boyer.

[11]Nie, p. 335.

[12]Boyer.

[13]Boyer.

CHAPTER IV

STATISTICAL ANALYSIS

Procedure

The analysis of the data collected from the two housing projects was conducted in the following order using the SPSS program:

1. Frequency of responses by projects
2. T-test of means between the projects
3. Multiple Regression Analysis
    a. Pearson Correlation
    b. Path Analysis
        (1) Independent Variables - Demographic Data
            Dependent Variables - Summed Question Batteries
        (2) Independent Variables - Design factors (all)
            Dependent Variables - Overall Satisfaction

Analysis of Frequency Distributions

Table IV shows an edited portion of the results of the frequency distribution by housing project, and represents the beginning step in determining areas of dissatisfaction. On the basis of the one to five rating scale, it was felt that a response of three indicated a neutral response. Though this is not aggravated dissatisfaction ti does show that the tenant regards that aspect of his environment as tolerable, but certainly not desireable. Therefore, in compiling data for

TABLE IV

HOUSING ASPECTS EVALUATED AS UNSATISFACTORY

Variable Number Variable Name	Frequency of Response/Cumulative % Code 1 Total Dissatisfaction	Code 2 Moderate Dissatisfaction	Code 3 Neutral
	Ponca City		
Var 008 Sunlight in Home	10/10%	10/20%	18/38%
Var 009 Outdoor Lighting	7/14.3%	5/24.5%	5/34.7%
Var 019 Summer Air Temp.	8/16.3%	16/49%	11/71.4%
Var 020 Fall Air Temp.	8/82%	8/16.3%	18/34.7%
Var 021 Winter Air Temp.	8/16%	3/22%	8/38%
Var 022 Spring Air Temp.	4/8%	4/16%	9/35%
Var 023 Eveness of Temp. in Home	9/18%	9/36%	6/48%
Var 024 Humidity level in Home	9/18%	9/37%	6/49%
Var 025 Amt. of Mech. Ventilation	3/6%	10/26%	6/38%
Var 026 Amt. of Natural Ventilation	4/8%	9/28%	3/34%
Var 029 Size of Rooms	7/14%	5/24%	8/40%
Var 031 Workspace in Kitchen	6/12%	4/20%	9/39%
Var 032 Workspace in Living Room	6/12%	7/26%	6/38%

TABLE IV (Continued)

Variable Number Variable Name	Frequency of Response/Cumulative % Code 1 Total Dissatisfaction	Code 2 Moderate Dissatisfaction	Code 3 Neutral
	Ponca City		
Var 033 Workspace in Bedroom	6/12%	5/22%	5/32%
Var 034 Dining Space	5/10%	6/22%	6/34%
Var 035 Space for Overnight Guests	12/24%	11/47%	9/65%
Var 036 Private Outdoor Areas	12/24%	11/47%	7/61%
Var 037 Security Outdoors	13/26%	6/38%	3/44%
Var 038 Personal Privacy	4/11%	6/29%	5/43%
Var 042 Kitchen Storage	10/20%	4/28%	3/34%
Var 043 Parking Arrangement	14/28%	5/38%	5/48%
Var 049 Living and Bedroom Floors	10/20%	7/34%	7/48%
Var 052 Walls	8/16%	5/27%	7/41%
Var 057 Door Locks	5/10%	5/20%	10/40%
Var 059 Hot Water Supply	18/37%	6/49%	5/59%
Var 060 Construction Materials	8/16%	5/25%	9/45%
Var 061 Maintenance Program	7/14%	4/22%	10/42%

TABLE IV (Continued)

Variable Number Variable Name	Frequency of Response/Cumulative % Code 1 Total Dissatisfaction	Code 2 Moderate Dissatisfaction	Code 3 Neutral
	Ponca City		
Var 062 Laundry Facilities	12/24%	9/43%	6/55%
Var 070 Drafts in Living Room	16/32%	6/44%	7/58%
Var 071 Drafts in Bedroom	12/24%	1/26%	8/42%
Var 073 Floor Drafts in Living Room	13/30%	9/48%	4/56%
Var 074 Floor Drafts in Bedroom	13/26%	5/36%	4/44%
Var 078 Hearing Conversations Next Door	12/24%	5/34%	4/42%
Var 081 Noise in Adjoining Rooms	8/16%	4/24%	4/32%
Var 083 Overall Satisfaction With Unit	10/10%	18/29%	22/51%
Var 084 Friendliness of Neighborhood	7/14%	5/24%	11/46%
Var 085 Trust in Neighbors	8/16%	3/22%	11/46%
Var 086 Mixture of Backgrounds	6/12%	8/28%	15/58%
Var 088 People Make Neighborhood A Decent Place To Live	6/12%	4/20%	13/46%
Var 089 Concern about Neighborhood	4/8%	4/16%	12/41%

TABLE IV (Continued)

Variable Number Variable Name	Frequency of Response/Cumulative % Code 1 Total Dissatisfaction	Code 2 Moderate Dissatisfaction	Code 3 Neutral
	Ponca City		
Var 090 Number of Friends in Neighborhood	16/32%	6/44%	8/60%
Var 091 Responsibility for Repairs	15/31%	4/40%	10/60%
Var 092 Neighbors Maintain Home	9/18%	5/28%	15/58%
Var 093 Neighborhood Attractiveness	7/14%	3/20%	12/44%
Var 094 Neighborhod Noise	3/6%	5/16%	11/38%
Var 095 Management	8/17%	3/23%	7/38%
Var 096 Police Protection	9/18%	5/28%	11/50%
Var 097 Traffic Control	10/20%	5/31%	15/61%
Var 099 Vandalism	2/4%	5/15%	13/43%
Var 100 Overall Satisfaction With Neighborhood	15/30%	1/32%	5/42%
	Drumright		
Var 008 Sunlight in Home		2/7%	9/39%

TABLE IV (Continued)

Variable Number Variable Name	Frequency of Response/Cumulative % Code 1 Total Dissatisfaction	Code 2 Moderate Dissatisfaction	Code 3 Neutral
	Drumright		
Var 009 Outdoor Lighting	3/11%	9/43%	2/53%
Var 011 Overhead Lighting in Living Room	2/7%	11/46%	6/68%
Var 014 Lighting for Housekeeping		3/10%	6/32%
Var 015 Lighting for Kitchen Work	8/7%	2/39%	3/50%
Var 016 Lighting for Reading Activities		4/14.3%	17/75%
Var 017 Lighting for Detail Work	4/14%	1/18%	15/71%
Var 019 Summer Air Temp.	11/39%	11/77%	5/96%
Var 021 Winter Air Temp.	2/35%	7/38%	10/71%
Var 023 Eveness of Temp. in Home	3/11%	3/21%	6/43%
Var 024 Humidity Level in Home	1/4%	13/50%	7/15%
Var 025 Amt. of Mech. Ventilation		3/11%	10/46%
Var 031 Workspace in Kitchen		4/14%	5/32%
Var 035 Space for Overnight Guests	1/4%	4/18%	10/54%
Var 036 Private Outdoor Areas	5/18%	7/44%	5/56%

TABLE IV (Continued)

Variable Number Variable Name	Frequency of Response/Cumulative % Code 1 Total Dissatisfaction	Code 2 Moderate Dissatisfaction	Code 3 Neutral
	Drumright		
Var 037 Security Outdoors		2/7%	9/39%
Var 040 Storage Space for Large Items	2/7%	7/32%	6/54%
Var 043 Parking Arrangement	2/7%	1/11%	6/32%
Var 049 Living and Bedroom Floors	8/29%	11/68%	4/82%
Var 052 Walls		4/14%	7/39%
Var 058 Insulation Around Doors and Windows	8/29%	11/68%	4/82%
Var 062 Laundry Facilities		5/18%	10/54%
Var 066 Smoke and Odors in Kitchen		3/11%	11/50%
Var 069 Drafts in Kitchen/Dining Areas	1/4%	6/25%	7/50%
Var 070 Drafts in Living Rooms	2/7%	8/36%	3/46%
Var 072 Floor Drafts in Kitchen/ Dining Areas	3/11%	11/50%	5/70%
Var 073 Floor Drafts in Living Room	4/14%	11/53%	5/71%
Var 079 Hearing TV Next Door		4/14%	6/36%

TABLE IV (Continued)

Variable Number Variable Name	Frequency of Response/Cumulative % Code 1 Total Dissatisfaction	 Code 2 Moderate Dissatisfaction	 Code 3 Neutral
	Drumright		
Var 083 Overall Satisfaction With Unit		3/11%	5/29%
Var 086 Mixture of Backgrounds		3/11%	17/71%
Var 089 Concern about Neighborhood	1/4%	1/7%	7/32%
Var 090 Number of Friends in Neighborhood	1/4$	5/21%	5/39%
Var 091 Responsibility for Repairs	16/57%	4/71%	4/86%
Var 095 Management	1/4%	3/14%	7/39%
Var 096 Police Protection	2/7%	3/18%	10/53%
Var 099 Vandalism		1/4%	21/78%
Var 100 Overall Satisfaction With Neighborhood	1/4%	5/21%	3/32%

Table IV, responses of three are included as well as responses of two and one. The second factor in this compilation was the percent cumulative frequency. If a variable showed a code three response with a cumulative frequency of greater than 30%, it was included in Table IV.

If 30% of the sample finds an aspect of their environment as being only tolerable or dissatisfactory, then that aspect most surely bears further investigation. As an example, 16.3% of the Ponca City sample exhibits total dissatisfaction with Var 019, while 71.4% exhibit some degree of dissatisfaction with the same variable. For a definition of each variable as listed by its numerical code, the reader should refer to Appendix A, Survey Description, p. 95.

It is interesting to note the differences evident between the two project sites. Though both follow the same HUD guidelines in construction and management, some variance must be expected due to physical design differences and population differences. Variables found unsatisfactory in both locations perhaps indicate areas most in need of research, as neither project offers a suitable solution. The arguement for continuing the statistical analysis of the data collected by the survey is the need to determine which of these variables or group of variables truly represents a universal need within the sample, and which variables will produce the greatest improvement in perceived satisfaction.

Analysis of T-test

The results of the T-test are shown in Table V. As stated in Chapter III, the null hypothesis is that no difference between the sample means will be demonstrated, and the significance level for probability has been set at .05. The SPSS program prints results for pooled variance estimates and separate variance estimates. The two-tailed probability of the F-value is first observed. If this value is greater than .05, then the pooled variance estimate is valid. If the

TABLE V

T-TEST RESULTS COMPARING THE DIFFERENCE OF MEANS BETWEEN
THE DRUMRIGHT AND PONCA CITY TENANT SAMPLES

Variable (Battery)	Mean	F Value	2-Tail Prob.	Pooled Variance Est. T Value	D.F.	2-Tail Prob.	Separate Variance Est. T Value	D.F.	2-Tail Prob.
LIGHTING									
Ponca City	51.71	1.28	0.494	2.91	75	0.005	3.01	62.25	0.004
Drumright	45.96								
THERMAL									
Ponca City	65.95	3.41	.001	0.02	70	0.987	0.02	69.44	0.985
Drumright	65.88								
SPACE									
Ponca City	58.17	3.19	0.002	-0.54	71	0.594	-0.62	70.90	.540
Drumright	59.92								
CONMAT									
Ponca City	76.60	3.58	0.001	-0.50	67	0.618	-0.58	66.08	0.566
Drumright	78.42								
ACOUSTIC									
Ponca City	24.14	4.35	0.000	-1.97	76	0.052	-2.36	74.66	0.021
Drumright	26.57								
NEIGHBORHOOD									
Ponca City	54.68	2.50	0.012	-1.72	76	0.089	-1.95	74.79	0.055
Drumright	60.57								

two-tailed probability is less than .05, then the separate variance estimate is used. The Table shows that for the batteries dealing with thermal, space, construction materials and maintenance (Conmat), and neighborhood aspects, the two-tailed probability for the T-test is greater than .05, and the null hypothesis is not rejected. Therefore, it can be assumed that the true situation is not significantly different from the fact that the two samples display the same characteristics in these batteries. The batteries of questions dealing with acoustics and lighting fail the significance test (ie. the two-tailed probability for the T-test is less than .05) and the null hypothesis is rejected.

Pearson Correlation and Multiple Regression Analysis

The relationship of the first seven demographic questions of the survey to the summed batteries and overall satisfaction questions as dependent variables was the first multiple regression analysis. This analysis was performed using the total sample. The results of the Pearson Correlation matrix have been shown in Appendix D, p. 115. The correlation coefficients are surprisingly low. A condensed figure showing the most significant coefficients for each of the dependent variables is shown in Table VI. An analysis and interpretation of all results found by multiple regression will be offered in Chapter V.

The first regression using variable 83, overall satisfaction with housing unit as a place to live, as the dependent variable shows none of the partial regression weights (BETA) to be of great influence, as all are less than .45 (ie. in this case, an increase of less than .5 will not produce a substantial difference in the dependent variable).

TABLE VI

PEARSON CORRELATION COEFFICIENTS FOR AGE OF HOUSEHOLD HEAD AND NUMBER OF ROOMS WITH SUMMED BATTERIES AND OVERALL SATISFACTION

Dependent Variable	Independent Variable: Number of Rooms (Var 003)	Independent Variable: Age of Household Head (Var 005)
Satisfaction With Housing Unit (Var 083)	.42	
Satisfaction With Neighborhood (Var 100)		.42
Satisfaction With Lighting		.33
Satisfaction With Thermal		.60
Satisfaction With Space		.44
Satisfaction With Construction - Maintenance (Conmat)		.54
Satisfaction With Acoustics		.45
Satisfaction With Neighborhood		.49

Using variable 100, overall satisfaction with the neighborhood, and the summed lighting battery as the dependent variable produces the same results. The thermal battery, however, indicates a significant partial regression weight of .69 with age, variable 5. The F test for this relationship is also significant as it produces an value of 14.8. Two partial regression weights are significant in the space battery; sex and age, variables 4 and 5, with values of -.62 and .67 respectively. The respective F values are 6.6 and 13.3. With construction materials

and maintenance (conmat) as the dependent variable, the same two variables, sex and age, are again significant. Partial regression weights are -.57 (sex) and .76 (age), and F values equal 5.6 and 17.1 respectively. The acoustics battery also reveal significant partial weights for sex and age, however, the F value for sex is only 3.7, while the value for age is 10.3. For the neighborhood battery, the results are shown in Table VII. All results for the regression run are shown in Appendix E, p. 149.

TABLE VII

PARTIAL BETA WEIGHTS FOR SIGNIFICANT VARIABLES ON NEIGHBORHOOD BATTERY

Variable	BETA
# of children (Var 002)	-.47
# of rooms (Var 003)	.59
Age (Var 005)	.61

The second relationship investigated is that of the summed batteries as independent variables against the dependent variable 83 (overall satisfaction with the housing unit). The results of the Pearson Correlation Matrix are shown in Table VIII. An interesting aspect of the Matrix is the comparison of correlation coefficients for the summed batteries upon themselves. The regression analysis shows partial weights for .47 for thermal and .40 for conmat, with F values of 11.3

and 4.0 respectively. Other weights are too small to be of consequence (See Appendix E, p. 149). This indicates that for the total combined sample, the satisfaction model can be revised from Figure 15 to Figure 17. To deal more thoroughly with the two remaining batteries of questions, a multiple regression analysis is necessary using each variable in the battery as an independent, and the overall satisfaction variable as the dependent.

TABLE VIII

PEARSON CORRELATION MATRIX WITH OVERALL SATISFACTION WITH UNIT AND THE SUMMED BATTERIES

	Independent Variables					
Dependent Variables	Lighting	Thermal	Space	Conmat	Acoustics	Neighborhood
Overall Satisfaction With Housing Unit	.44	.68	.49	.64	.44	.47
Lighting	1	.55	.59	.65	-	-
Thermal	.55	1	.65	.71	.48	.54
Space	.59	.65	1	.81	.45	.67
Conmat	.65	.71	.81	1	.53	.65
Acoustics	-	.48	.45	.53	1	.41
Neighborhood	-	.54	.61	.65	-	1

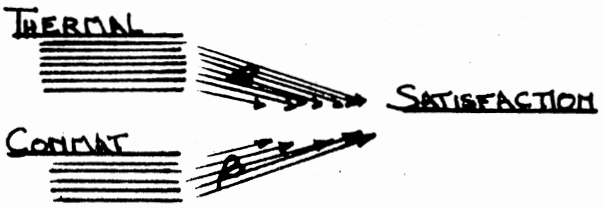


Figure 17. Revised Model for Multiple Regression Analysis

The third relationship investigated, used all question comprising the neighborhood battery as independent variables and overall satisfaction with neighborhood as the dependent. Only privacy (087), number of friends (090), management (095), and traffic (097) yielded an F-value of any significance (ie. greater than one), and all partial regression weights are less than .20. These results are shown in Appendix D, p. 129-132. However, strong correlation results were shown in the Pearson Matrix for this regression. An edited table of results is shown in Table IX.

The fourth relationship examined uses the same dependent and independent variables as did the second and third relationships, but instead of using the combined sample, the multiple regression analysis was done using each project sample individually. Table X shows results found in the regression analysis. Complete results for the analysis and the Pearson correlation matrices are found in Appendix D, p. 131-138.

The remaining analysis is that suggested by the second relationship. The first regression uses all questions in the thermal battery

TABLE IX

PEARSON CORRELATION MATRIX WITH ALL QUESTIONS OF NEIGHBORHOOD BATTERY AND OVERALL SATISFACTION WITH NEIGHBORHOOD

	84	85	86	87	88	89	90	92	93	94	95	96	97	98
Overall Satisfaction With Neighborhood (100)	.56	.58			.56	.57	.53		.61		.60	.55	.57	
Friendliness (084)		.69			.69	.71	.54		.68		.60		.53	.62
Trust (085)	.69				.70	.59			.69	.55	.65	.63	.66	.63
Mixture (086)				.50				.56	.59		.60	.55		.54
Privacy (087)			.50		.58				.51					.50
People (088)	.69	.70		.58		.68	.57	.57	.72	.55	.59	.63	.60	.56
Pride (089)	.71	.59			.68		.54		.61		.59	.55		.55
# of Friends (090)					.51	.54			.51		.50			
Upkeep (92)			.56		.59								.59	
Neighborhood Attractiveness (093)	.68	.69	.59	.51	.72	.69	.51			.56	.70	.66	.50	.59
Noise (094)		.55			.55				.56					.53
Management (095)		.60	.65	.60	.59	.59	.50		.70			.60	.58	.58
Police Protection (096)			.63	.55		.63	.55		.66		.60		.62	.58
Traffic (097)	.53	.66			.60			.59	.50		.58	.62		.59
Safety (098)	.62	.63	.54	.50	.56	.55			.59	.53	.58	.55	.59	

(Var 019 to Var 026, and Var 066 to Var 075) as independent variables and variable 083 (overall satisfaction with housing unit) as the dependent. The second regression used all questions in the conmat battery (Var 045 to Var 063) as independent variables with variable 083 as the dependent, and the third regression used all questions of both batteries as independents with variable 83 as the dependent. The results of these three regressions are found in Table XI, while the correlation matrix for this last analysis is found in Appendix D, p 139 - 142.

Responses to questions 18, 27, 44, 82 and miscellaneous comments are recorded in Appendix C, p. 108.

TABLE X

PARTIAL BETA WEIGHTS FOR SUMMED BATTERIES ON OVERALL HOUSING UNIT SATISFACTION

Variable	Drumright BETA	Ponca City BETA
Lighting	.55	.33
Thermal	.08	.57
Space	-.23	-.22
Conmat	.55	.09
Acoustics	.55	.13

TABLE XI

PARITAL BETA WEIGHTS FOR ALL VARIABLES IN THERMAL AND CONSTRUCTION - MAINTENANCE BATTERIES ON OVERALL HOUSING UNIT SATISFACTION

Independent Variable	BETA Values for Individual Batteries With Dependent Variable	BETA Values for Batteries Combined With Dependent Variables
Thermal Aspects		
Summer Air Temp (Var 019)	-0.08	-0.21
Fall Air Temp (Var 020)	0.13	0.07
Winter Air Temp (Var 021)	-0.30	-0.29
Spring Air Temp (Var 022)	0.04	-0.22
Even Temp. in Apartment (Var 023)	0.29	0.32
Humidity Level (Var 024)	0.02	0.09
Mechanical Ventilation (Var 025)	-0.11	-0.16
Natural Ventilation (Var 026)	0.32	0.29
Smoke, Odors in Kitchen (Var 066)	0.24	0.01
Smoke, Odors in Living Rm. (Var 067)	0.08	0.29
Smoke, Odors in Bedroom (Var 068)	-0.03	-0.02
Drafts While Seated in Kitchen (Var 069)	-0.01	0.25
Drafts While Seated in Living Rm. (Var 070)	0.47	0.55
Drafts While Seated in Bedrooms (Var 071)	0.09	-0.15
Drafts Across Floor in Kitchen (Var 07	0.27	0.13
Drafts Across Floor in Living Rm. (Var 073)	-0.15	0.00
Drafts Across Floor in Bedroom (Var 074)	-0.13	0.17
Drafts Across Floor in Bath (Var 075)	-0.14	-0.03
Construction-Maintenance Aspects		
Working Order of Kitchen Fixtures (Var 045)	0.02	0.10

TABLE XI (Continued)

Independent Variable Construction-Maintenance Aspects	BETA Values for Individual Batteries With Dependent Variable	BETA Values for Batteries Combined With Dependent Variables
Working Order of Stove and Oven (Var 046)	0.08	-0.18
Working Order of Bath Fixtures (Var 047)	0.25	0.61
Working of Doors (Var 048)	0.18	0.05
Condition of Floors (Var 049)	0.02	0.09
Condition of Bath Tile (Var 050)	-0.12	-0.01
Condition of Counter Coverings (Var 051)	-0.01	-0.15
Condition of Walls (Var 052)	0.05	-0.03
Condition of Ceiling (Var 053)	0.26	0.37
Number of Electric Outlets (Var 054)	-0.16	-0.11
Number of Bathrooms (Var 055)	0.43	0.07
Number of Sinks in Bath (Var 056)	-0.46	-0.07
Security from Locked Doors (Var 057)	-0.14	-0.11
Insulation Around Doors and Windows (Var 058)	0.13	-0.29
Hot Water Supply (Var 059)	0.06	-0.01
Construction Material Used (Var 060)	-0.19	-0.48
Management's Maintenance Policy (Var 061)	0.35	0.18
Laundry Facilities (Var 062)	0.06	-0.03
Exterior Appearance of Apt. (Var 063)	0.13	0.08

CHAPTER V

DISCUSSION OF RESULTS

Unaccounted Variance

To begin to understand the significance of all the data provided by the SPSS program, the last steps, the multiple regression results, are to be closely examined. It should be remembered when looking at these results that the R^2 term for each regression represents the percentage of variation of housing satisfaction that can be explained by the questions entered in that regression, and that the partial regression weight (BETA) indicates which categories or questions will produce the greatest effect on satisfaction if changed. An expression viewed to be even more reliable than the R^2 term is:

$$\sqrt{1 - R^2} \tag{5.1}$$

This expression represents the variance which has <u>not</u> been accounted for by the regression equation. In the fledgling art of trying to scientifically predict satisfaction, this latter term is most likely of much greater consequence than the R^2 value.

One last word of warning. When analyzing the Pearson Correlation coefficients, it must be remembered that correlation never proves causation. The problem in interpreting correlations as causatives is that when data are gathered there is little hope of holding all factors constant. The correlation between X and Y may be due in any varying

degree to uncontrollable factors.[1] The correlation does, however, represent a true situation which does exist in a sample, and that with reasonable care, can be extrapolated to a larger population. Keeping in mind that conclusions about causation require the control of outside variables, correlation studies can be used in discovering valuable trends.[2]

Influence of Demographic Data on Satisfaction

As reported in Chapter IV, some significance does begin to surface in the relationship between the demographic questions and the summed batteries and the overall satisfaction questions. For over-all satisfaction with the apartment as a place to live, F-values of 4.7 and 4.5 were achieved by responses to numbers of rooms and age of household head respectively, (Recall that a significant F-value in this study is a value greater than 1.0, and indicates that correlation is due to factors other than error). The BETA values are regretably small, .357 and .344, however, these weights do indicate two characteristics for this sample of project dwellers. As the age of the tenant increases, the more likely he is to be satisfied with his "home." Equally as the number of rooms is increased, the greater the tenant's satisfaction. However, it is erroneous to conclude that an elderly tenant with a seven room unit would be the most satisfied occupant. The R^2 term is .366, yet the unaccounted variance, Equation (4.1), is equal to .796, therefore a great deal of variance has been left unaccounted. Yet, it can be perceived in some small way that age and number of rooms do influence satisfaction with public housing as it exists in North Central Oklahoma.

The trend dealing with age has been noted in other studies, notably those of Dr. Karen K. Stewart, Oklahoma State University. It has been surmised that the elderly claim greater satisfaction with their environments as they recognize their public housing unit as the last resort. There is no place left for them to go and society has told them they must be satisfied with their situation. Therefore a small measure of dissatisfaction recorded for the elderly quite possibly could mask a large dissatisfaction level that has, because of apprehension, been suppressed. This apprehension has been previously noted in this study in Chapter III when discussing the possible acceptance of the null hypothesis (ie. that there is no difference between existing and desired levels of satisfaction) for the regression model.

The same weak observations about age and number of rooms can be made from the results of comparing satisfaction with neighborhood and, to some extent, satisfaction with lighting. To the accomplished social scientist, this indicates a need for further study and questionnaire revision to either prove this weak correlation or to reduce the unaccounted variance. However, with the comparison of the thermal battery against the seven demographic questions, some useful information comes to light. Age of household head yields an F value of 14.8, a BETA of .69, and for the regression statement, Eq. (4.1) is equal to .68. Unaccounted variance is still high, yet the Beta indicates a chnage in age definitely is associated with a change in satisfaction with thermal comfort aspects of the living unit. The same age effect as previously outlined is most likely reoccurring. This same reasoning, i.e., the selection of F and BETA values, was applied to the remaining batteries of questions compared against the demographic questions. The

significant trends of influence on satisfaction are shown in Table XII. For space, conmat, and acoustics, the negative BETA as recorded in Chapter IV for sex indicates (because of notation used for computer analysis) that male household heads tend to be more satisfied with existing conditions than are female household heads. In the neighborhood battery, the negative BETA for children indicates the fewer the children in the household, the greater the satisfaction. This again hints at the "age" findings, as the upper age groups obviously have fewer, or no children, and a trend has already been indicated that, for what ever reason, an increase in age increases satisfaction. It must be remembered that due to a high percentage of unaccounted variance in each instance, any trend suggested by Table XII can be used only as a rude guideline.

TABLE XII

TRENDS OF INFLUENCE ON SATISFACTION

Dependent Variable	Influential Independent Variable
Overall Satisfaction With Unit	None Accounted For
Overall Satisfaction With Neighborhood	None Accounted For
Satisfaction With Lighting	None Accounted For
Satisfaction With Thermal	Age
Satisfaction With Spatial	Sex and Age
Satisfaction With Construction Materials and Maintenance	Sex and Age
Satisfaction With Acoustics	Sex and Age
Satisfaction With Neighborhood	Number of Children Number of Rooms Age

Influence of Physical Factors on Satisfaction With the Housing Unit

As outlined in Chapter IV, the second relationship in the regression analysis compares the summed batteries against satisfaction with housing unit. The unaccounted variance for this regression is again high at 68%, yet, following David Canter's premise that was presented in Chapter I, any factor which increases satisfaction with the physical environment deserves consideration. Therefore regression weights of .47 for thermal and .40 for construction and maintenance were considered to be influential. The results of the regression indicate that improving satisfaction with existing housing does follow some ordered hierarchy as shown in Figure 18. If thermal aspects are changed so that the tenant perceives an improvement, then the greater increase in satisfaction will be realized. An improvement in lighting will effect the least (but not unimportant) change.

That the Beta weights for the thermal and conmat batteries call for a more detailed analysis in those areas, and a modification of the satisfaction model as suggested in Chapter IV, is also supported by results from the T-test. The thermal and conmat batteries produced the highest two-tailed probabilities, and since the probability is greater than .05, it can be reasonably assumed that the two groups of tenants display the same characteristics. Therefore, improvement of these aspects would produce the greatest change in satisfaction across the sample.

In contrast to Figure 18, Figure 19 shows the difference in the hierarchy of the batteries as perceived in the two different projects.

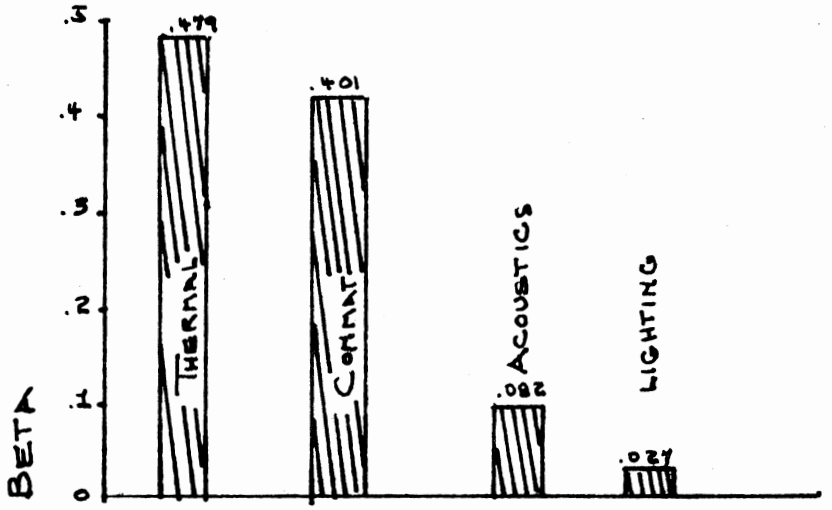


Figure 18. Partial BETA Weights for Significant Variables on Overall Housing Unit Satisfaction (for total sample)

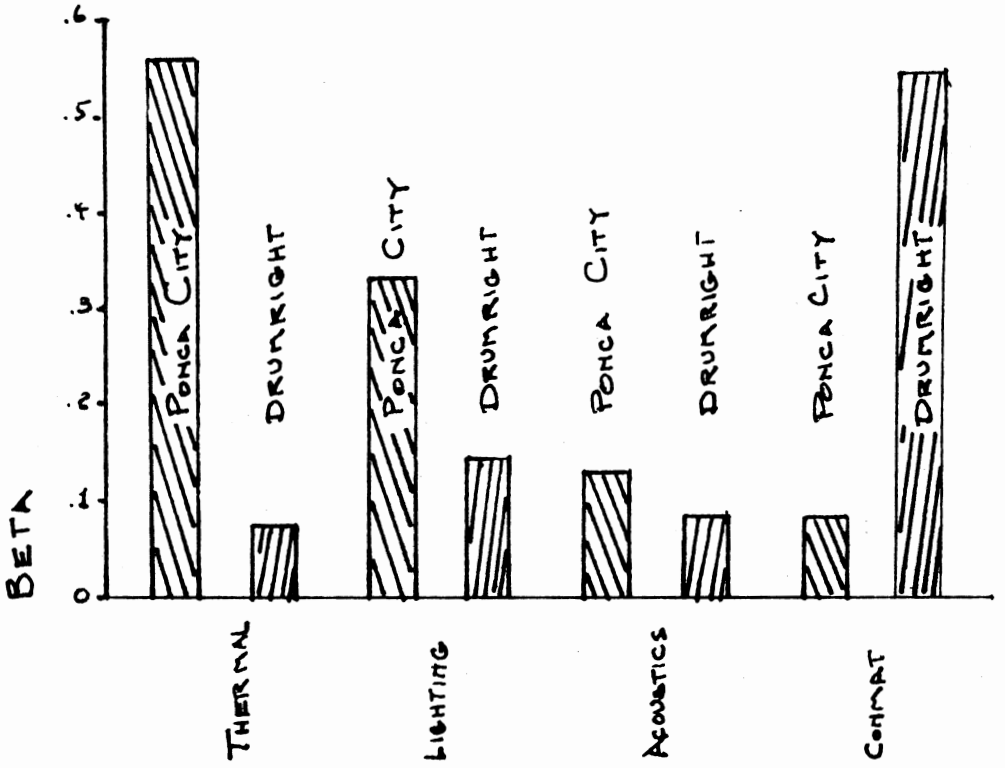


Figure 19. Partial Beta Weights for Significant Variables on Overall Housing Satisfaction

These results indicate that changes (improvements) in thermal and, in some respects, lighting would effect the greatest change in satisfaction in the Ponca City project; a change in construction material and maintenance is called for in Drumright. It must be again noted that because of low F values for the remaining batteries, the regression analysis cannot show that any correlation between these batteries and overall satisfaction is due to the "true" situation as opposed to error. This indicates a need to improve or alter questions used for those remaining batteries, so that more reliable results might be obtained.

Differences between the two projects might be explained by examining the frequency responses. A comparison of common negative responses from each project for each of the two batteries in question is shown in Table XIII. The similarity of these responses further substantiate the need to look more closely at the thermal and construction-maintenance batteries with more detailed regression analysis. However, it could be construed that if Ponca City followed Drumright's solutions for Var 020, 022, 071, and 074, and vice versa for Var 048, the satisfaction level would be improved.

Significant results from the regression analysis using Var 083 as the dependent and all questions from the thermal and conmat batteries are shown in Figure 20. The sample for these results is comprised of both projects. Each of these regressions clearly show areas in which some (positive) change would increase the overall level of satisfaction with the public housing units as a place to live for a sample that quite conceivably could represent a cross-section for any housing project in North Central Oklahoma. The Figure also shows a clear

TABLE XIII

COMPARISON OF THERMAL AND CONSTRUCTION-MAINTENANCE ASPECTS EVALUATED AS DISSATISFACTORY BETWEEN THE PONCA CITY AND DRUMRIGHT PROJECTS

Variable		
Thermal Aspects	Drumright	Ponca City
Summer Air Temperature (Var 019)	X	X
Fall Air Temperature (Var 020)		X
Winter Air Temperature (Var 021)	X	X
Spring Air Temperature (Var 022)		X
Even Temp. In Apartment (Var 023)	X	X
Humidity Level (Var 024)	X	X
Mechanical Ventilation (Var 025	X	X
Natural Ventilation (Var 26)		X
Smoke, Odors in Kitchen (Var 66)	X	
Drafts While Seated in Kitchen (Var 069)	X	
Drafts While Seated in Living Rm. (Var 070)	X	X
Drafts While Seated in Bedroom (Var 071)		X
Drafts Across Floor in Kitchen (Var 072)	X	
Drafts Across Floor in Living Rm. (Var 073)	X	X
Drafts Across Floor in Bedroom (Var 074)		X
Construction-Maintenance Aspects		
Working Order of Doors (Var 048)	X	
Condition of Floors (Var 049)	X	X
Conditions of Walls (Var 052)	X	X
Security From Locked Doors (Var 057)		X
Insulation Around Doors and Windows (Var 058)	X	X
Construction Material Used (Var 060)		X
Management's Maintenance Policy (Var 061)		X
Laundry Facilities (Var 062)	X	X

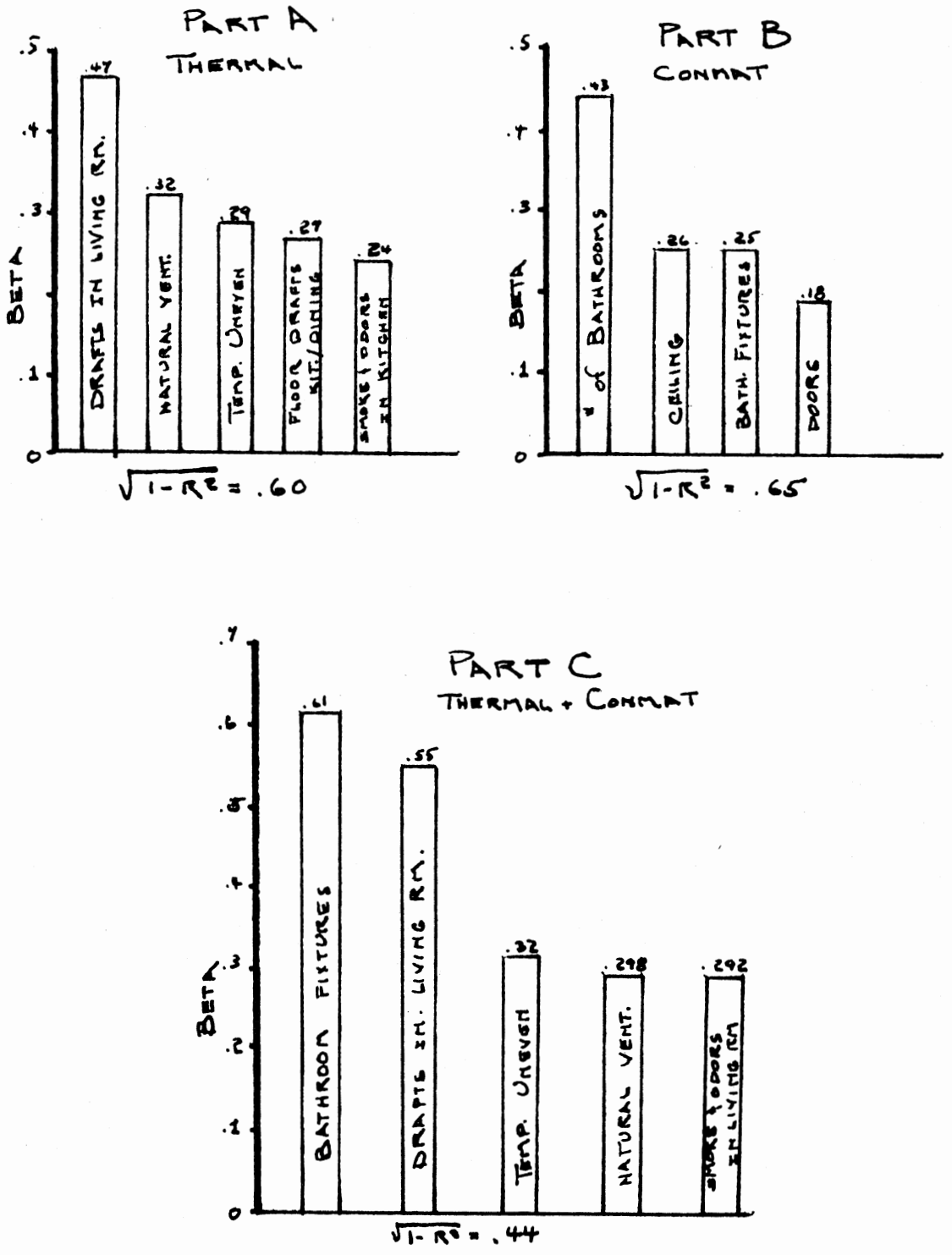


Figure 20. Partial Beta Weights for Significant Variables from Thermal and Conmat Batteries on Overall Housing Satisfaction

hierarchy of influence. Part C of Figure 20, with its value of 44% for unaccounted variance can be accepted with few reservations as representing the most significant changes that need to be effected out of all the various aspects addressed by the questionnaire. This is not, by any means meant to be construed that only these factors need improving, or even that these are unquestionably the most important factors. This can be borne out only through further testing. As a matter of interest, the correlation values for the factors shown in Part C, Figure 20 with Var 083 are shown in Figure 21.

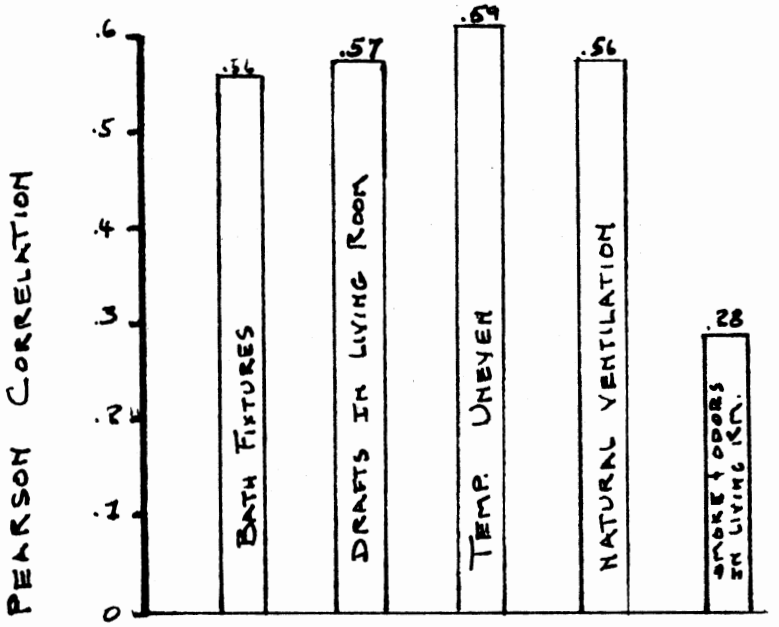


Figure 21. Pearson Correlation of Significant Variables with Overall Housing Unit Satisfaction

Influence of Neighborhood Factors on Overall Neighborhood Satisfaction

Other than those findings reported earlies in this chapter, the relationships between the question in the neighborhood battery and overall satisfaction with neighborhood were exceedingly low. Figure 22 shows the most significant of these results for the various sample compositions. BETA weights and unaccounted variance for the two projects separately begin to approach those values used as significant in earlier parts of the study, as do correlation values. Yet, BETA weights for the total sample, and unaccounted variance of 66%, indicate a need for a far more exhaustive battery of questions to draw conclusive evidence from the sample about how their satisfaction with the neighborhood as a place to live can be affected. These results, however, do hint at some aspects of the neighborhood which will produce some change in satisfaction.

Influence of Physical Batteries on Neighborhood Battery

Again, the correlation values of the other summed batteries against the neighborhood battery is of some interest, and is shown in Figure 23. With respect to the aspects each of these batteries addresses in the questionnaire, the SPSS program is able to produce a positive correlation value in each instance, with values for space and conmat being significant. Once again, however, it should be remembered that this study is a beginning point, and for these values to be conclusive, they should be verified by more exhaustive testing.

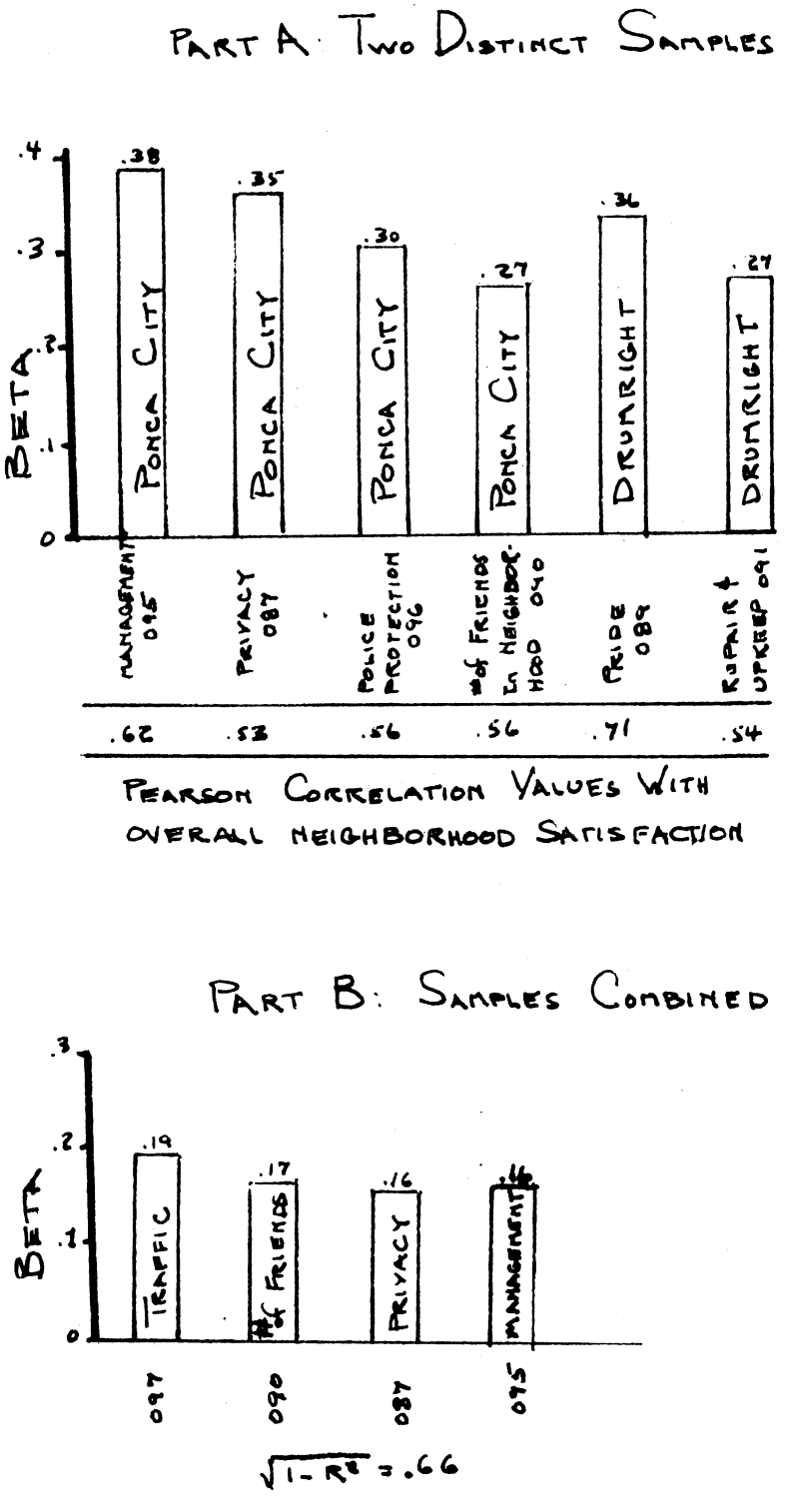


Figure 22. Partial BETA Weights for Significant Variables on Overall Satisfaction With Neighborhood

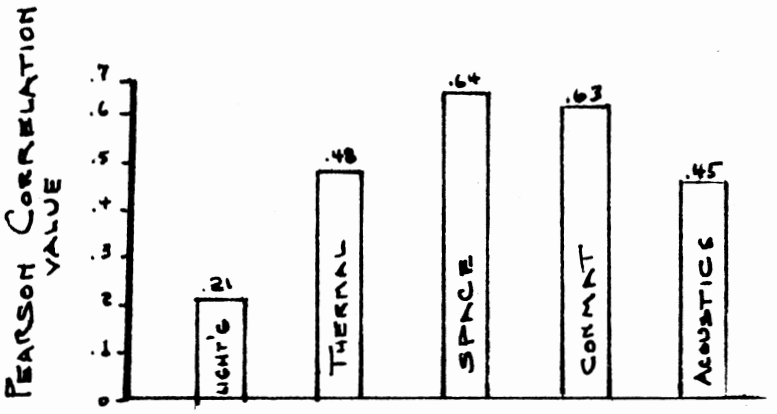


Figure 23. Pearson Correlation Values with the Summed Neighborhood Battery and Summed Batteries Pertaining to Physical Factors of the Housing Unit

END NOTES

[1]Paul Games and George Klare, Elementary Statistics: Data Analysis for the Behavioral Sciences (New York, 1967), p. 375.

[2]Games/Klare, p. 376.

CHAPTER VI

DESIGN IMPLICATIONS

Objectives Re-stated

The purpose of this chapter is to answer the objectives as stated in Chapter II:

1. To determine areas of dissatisfaction with the physical environment as these areas relate to perceived comfort.

2. To determine if there is a hierarchy of physical construction factors which relate to perceived comfort.

3. To determine the relationship between satisfaction with the housing unit and satisfaction with the neighborhood.

4. To propose corrective measures for those areas found to be unsatisfactory.

5. To incorporate corrective measures in planning a new multi-family housing project.

In answer to the first two objectives stated, Figure 20 provides the most reliable data. Out of the 87 questions directed at specific aspects of the apartment and neighborhood, the following questions in the order listed produce the greatest amount of dissatisfaction with the housing unit in the sample.

1. Working order of the Bathroom Fixtures (Var 047)

2. Drafts while seated in Living Room (Var 070)

3. The evenness of the temperature throughout the apartment in the winter (Var 023)
4. The amount of natural ventilation (Var 026)
5. Smoke and odors in the Living Room (Var 068)

These aspects, because of their statistical value, can be judged to be the most reliable results from the survey.

It has been shown that from the T-test and regression analysis that the questions dealing with thermal and construction-maintenance aspects produced the most consistent responses of dissatisfaction across the entire sample. The list in Table XIV, compiled from the frequency distribution, shows aspects of the housing unit which merit some attention. These questions are rated in importance from one to seventeen by virtue of the BETA weights; Pearson Correlation values of less than .40 have been deleted. While these do not have the same statistical values as the five aspects listed above, they do suggest a valuable trend.

Relationships Between Housing and Neighborhood Satisfaction

In answer to the third objective, a trend suggesting the cross influence of satisfaction with the housing unit and satisfaction with the neighborhood is implied by the correlation values that were shown in Figure 23. This seems to indicate that aspects as outlined by batteries of questions dealing with space and construction-maintenance have the greatest influence on satisfaction with the neighborhood than do other aspects as covered by the questionnaire. Thermal and acoustic aspects make a moderate showing here, but in light of the rather

TABLE XIV

TREND OF DISSATISFACTORY PHYSICAL ELEMENTS
ORDERED BY PARTIAL BETA WEIGHTS

Rank	Variable	Pearson Correlation With Overall Satisfaction With Housing Unit
1	Drafts While Seated in Living Rm. (Var 070)	.59
2	Construction Materials Used (Var 060)	.43
3	Amount of Natural Ventilation (Var 026)	.56
4	Evenness of Temperature Thru Apartment (Var 023)	.59
5	Air Temperature in Winter (Var 021)	.49
6	Insulation Around Doors and Windows (Var 058)	.44
7	Air Temperature in Spring (Var 022)	.48
8	Drafts While Seated in Kitchen (Var 069)	.50
9	Management's Maintenance Program (Var 061)	.58
10	Amount of Mechanical Ventilation (Var 025)	.43
11	Drafts While Seated in Bedrooms (Var 071)	.43
12	Drafts Across the Floor in Kitchen (Var 072)	.45
13	Air Temperature in Fall (Var 020)	.54
14	Working Order of Doors (Var 048)	.43
15	Condition of Walls (Var 052)	.43
16	Smoke and Odors in Kitchen (Var 066)	.40
17	Drafts Across Floor in Living Room (Var 073)	.47

general nature of this study, their correlation values are not quite strong enough to be included as influential factors.

Areas of Neighborhood Satisfaction

A second trend dealing solely with neighborhood aspects has been shown in Figure 22, although it is admittedly very weak. This information, repeated here, shows the aspects (ranked in order) covered by the study which most directly influence neighborhood satisfaction.

1. Management of Housing Development (Var 095)
2. Privacy from neighbors when needed (var 087)
3. Police protection in the neighborhood (Var 096)
4. Number of friends who live in the neighborhood (Var 090)

As shown in Table XII, the satisfaction with the summed neighborhood battery seems to have been influenced by such less controllable factors as the number of children in the household, number of rooms in the housing unit, and age of the household head. Age, as reported, shows in every battery except lighting to be a significant influence; ie. the older the tenant, the more satisfied he would be with the existing housing units. However, the cause for this phenomena has been discussed in Chapter V.

Recommendations for Improvement

Suggestions for improving the areas of dissatisfaction as outlined are many and varied, but the following factors, in answer to the fourth objective, are starting points based on correcting existing conditions in the two housing projects surveyed. Where feasible,

these factors are incorporated into the proposal for the addition at the Drumright Project (objective five), Appendix E.

1. Working Order of the Bathroom Fixtures.

The first observation is that the plumbing fixtures used in these projects are all obviously of the economy genre. While this should not directly effect performance, the tenant perceives it as fulfilling only the lowest performance standards. Larger fixtures with a few of the "designer" characteristics with which Better Homes and Gardens and the Sears Catalogue have acquainted us all, would probably help this complaint. A mirrored vanity around the sink with storage below, an electrical outlet at the counter level, and a supplementary light to the one over the mirror would all help to alleviate this institutional appearance of the bathrooms.

As maintenance calls were charged to the tenant in Ponca City, washerless fixtures should be a must. Use of the unitized tub-shower fixtures would solve both a cleaning and a maintenance problem. All tubs should have showers, and it was suggested by one tenant that all tubs should have shower doors. For duplex, or larger, configurations which may share a sewer line, that line should be double checked for adequate sizing.

2. Drafts While Seated in Living Room.

Drafts may be caused directly or indirectly by an assortment of deficiencies, ie. lack of adequate insulation around doors and windows, convection currents set up by cold air falling from interior window surfaces, bad placement of air registers, and inadequate air volumes. Due to increased utility costs, and the fact that tenants in both projects now pay their own gas and electric bills, storm windows and

doors seemed to be a necessary addition at both projects. In both projects, the air registers were located high on interior walls, with a low central return. This arrangement cannot adequately handle cold spots caused by doors and windows. The only solution for existing units would be the addition of a heat source (most likely baseboard electric) beneath large windows in living, dining, and bedrooms. As these units act only as supplements, they need not be large. The return air velocity should also be double checked on the central system to make sure the cold air is being adequately drawn off the floor.

In new units, the air registers should be located beneath windows and at entrance points, with ducts running through the slab. Return air can still be centrally located, but at the ceiling level. Air quantities, velocities, and delivery temperatures should be double checked for adequacy using standard methods, and not left to rule of thumb guidelines. Reduced Norther exposures would also alleviate winter draft problems.

3. The evenness of the temperature throughout the apartment in the Winter.

The same solutions as proposed for the correction of drafts will also be applicable to this problem.

4. The amount of natural ventilation.

Natural ventilation is influenced by site orientation, internal space organization, and size and placement of wall openings. An adequate solution to this problem also necessitates that each unit be considered separately in its own situation. The summer prevailing winds for most of Oklahoma come from the South and Southeast, therefore units should be arranged to use these winds to best advantage.

Internal partitions parallel to initial air flow will split the pattern of flow, yet leave the rate of flow at an adequate speed for cooling. It should be remembered that for the best possible ventilation, openings should be small on the windward and large on the leeward sides. This approaches an ideal situation for Oklahoma as large glass areas oriented to the Southwest should be avoided to alleviate heat problems from the summer afternoon sun. If possible, site designs as suggested by V. Olgyay in Design With Climate should be followed. Attic fans would also be helpful.

5. Smoke and odors in the living room.

Again, adequate ventilation would help to alleviate this problem, however, there are mechanical aids of which advantage could be taken. Neither project had any type of exhaust fan for the bathroom. While the Drumright project had no exhaust hood over the range, the Ponca City project made use of the type which recirculates filtered air back into the kitchen. Installation of a hood which vents directly to the outdoors would probably provide a better solution.

(Headings for the following proposals are taken from Table XIV.)

6. Dissatisfaction with construction materials.

This was a complaint that surfaced chiefly at the Ponca City project. Though there is no significant difference between the construction of the two projects, there is a substantial difference in the make up of the population. This difference points again that finish materials appropriate for elderly, less active tenants is not adequate for younger families. It also points out that a cheap first-cost grows more expensive as repair and maintenance bills mount. Apartment walls should be coated with a good, washable paint. Floors

that are not carpeted should be covered with a good grade of resilient flooring. Walls should be of one-half gypsum board to hold curtain rods, light wall hangings, etc. An even better solution here for window treatments would be the addition of a wooden molding strip. Exterior veneer walls should be vented. In other words, construction materials and practices of minimum performance grades are obvious to all, and will not stand the test of time and hard use. The housing authority must be made to realize this fact.

7. Air temperature in winter.

In addition to earlier suggestions dealing with the topic of thermal comfort, the filters in the central unit should be chekced on a regular basis. This is not a design problem, but one of organizing maintenance time.

8. Insulation around doors and windows.

In this case, the installation and trimming of doors and windows did not differ substantially from common practices found in residential construction (if this can be used as a guide). As suggested earlier, storm doors and windows would probably be the greatest help. It was also noticed that a number of exterior doors had shrunk enough to cause visible cracks between the edge of the door and door frame. Therefore, a higher quality solid-core door should also be called for.

9. Air Temperature in spring, summer and fall.

Improving characteristics of natural ventilation will improve this aspect. Air conditioning is the obvious answer, and many tenants have added window units. It is doubtful, however, if HUD or the American public is ready to stand the cost of providing air conditioning in low income housing. Attic fans, though, would not be beyond the realm of

reason.

10. Management's maintenance program.

This complaint was a voice solely at the Ponca City project. Tenants were dissatisfied with the length of the maintenance men's response time and the lack of attention to the grounds, as well as being charged for repairs. Part of this problem is due to the scattered site policy followed at this project. While this is a management and not a design problem, it definitely affects the acceptance and success of public housing.

11. Amount of mechanical ventilation.

As suggested earlier, improved ventilation for bathrooms and kitchens is needed. Another complaint voiced was that in the winter, there was not enough fresh air introduced into the apartment. This would be corrected in new construction as the addition of fresh air intakes on the furnace are now required.

12. Working order of doors.

Again, as suggested in item eight, a better grade of door, both interior and exterior, that keeps shrinking and swelling to a minimum should be required. A stable dimension would help insure that locks and latches would function properly, as well as to solve infiltration and draft problems. One tenant suggested that dead bolts should be added to exterior doors.

This last list of considerations is comprised of miscellaneous tenant responses suggesting improvements for the housing units that have not yet been addressed.

1. 220 plugs for dryers.

2. Improved overhead lighting in living and dining rooms. At

Ponca City, a standard three bulb fixture was placed in the center of the living room and was claimed to be dissatisfactory because of harshness. In Drumright, no light was placed in the living room; this too drew complaints. Indirect lighting might prove to help this problem. A pull-lamp in the dining area with a three way switch could help provide a satisfactory light for sewing.

3. A definite need was voiced for a range lamp and light in the laundry closet.

4. Increase outdoor lighting.

5. The need for humidification is often noticed, yet because of the rather delicate nature of residential humidifiers that work with central heating, their installation could cause a greater maintenance problem than the problem that now exists, unless a really superior unit could be found.

6. More parking closer to housing units.

7. Dormitory-style bedrooms in larger units, dead corner space in kitchens, and laundry closets with no dryer space are unacceptable.

8. Need for larger outdoor storage rooms.

9. Carpeting for cold floors.

10. Need for improved sound barriers between apartments. This is more critical in family than elderly housing. Physical separation of the units might be the best solution.

11. Through streets do not allow for enough traffic control. The main concern here was for the safety of children at play. Where a through street must be used, orientation away from the street should be effected.

12. Need for a playground area where the children can be noisy

and be safe from traffic.

13. For elderly tenants, a site location close to "town" is desireable.

CHAPTER VII

SUMMARY AND CONCLUSION

Problem Restated

The need for research into building performance was presented in Chapter I from both U. S. government and private sources. As stated in Chapter II, the general purpose for the study was to search for ways in which low-income, multi-family housing projects can be improved and made more viable, while the goals were the determination of perceived "comfort" (i.e. physical) needs of the tenant, and the cross-influence of housing satisfaction and neighborhood satisfaction. It was out of an interest in the quality of housing and a desire to see if tenant research would indeed bear out the building performance premise that this study was initiated.

Questions Raised

The statistical results have been presented; the trends and improvements have been suggested. As was expected, the survey results raised more questions than it answered. Due to the limitations of the survey, a number of areas requiring more detailed study have been noted in Chapters IV and V. Any one of the six areas examined merits as much attention alone as was devoted to this entire study, not to mention such factors as age, family size and cross influence between different

areas of comfort. An interesting follow up would be to return to the housing sites and take actual measurements of such factors causing physical discomfort as drafts, temperature differentials, noise intrusion, etc. Comparison of these readings against established norms would lead to positive improvements which directly address the problems at hand. A second follow up study of some note would be to determine what, if any, impact the questionnaire has had upon the respondents in Drumright and Ponca City, and subsequently upon the housing authorities at those two locations.

Conclusion

This study did not prove the case for architectural determinism either for the success of the building, or for the success of the lives of the building occupants, but this was not its purpose. The role of sociological aspects cannot be undermined, yet the social scientist must also recognize the power of the environment and the need for sympathetic architecture. Even in this novice attempt at scientific social research, the fact begins to emerge that building performance does significantly effect the tenant's perceived comfort and, in turn, his satisfaction and acceptance of the public housing unit as "home."

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APPENDIXES

APPENDIX A

SURVEY DESCRIPTION

As explained in Chapter III, the purpose of this survey was to ask the public housing tenant first hand about his satisfaction with various aspects of his apartment and neighborhood. From a list of nearly 250, the survey was eventually narrowed to 100 questions (or variables). The basic breakdown of the questionnaire is as follows:

BATTERY	VARIABLE NUMBER
(demographic)	(1 thru 7)
Lighting	8 thru 18, 64, 65
Thermal	19 thru 27, 66 thru 75
Space	28 thru 44
Construction Materials and Maintenance (Conmat)	45 thru 63
Acoustics	78 thru 82
Neighborhood	84 thru 99

DEPENDENT VARIABLE	NUMBER
Overall Satisfaction with Apartment as a Place to Live	83
Overall Satisfaction with Neighborhood	100

In the copy of the survey that follows, underlined numbers listed to the left of the questions are the variable numbers. Numbers listed in parenthesis after each variable are column numbers for the data deck (a missing number in sequence indicates a blank). These numbers exist only on the master survey and not on the survey as it was distributed to the sample. Identification and location numbers were added after a completed questionnaire was returned.

Sex of household head was coded 1 for male and 2 for female. Employment of household head was coded 6 through 0; 6 being "full time" and 0 being "other." Home ownership was coded 2 for yes and 1 for no. All other variables were coded by the number listed in the demographic section and by the number circled in the remaining batteries. To code the projects, 1 was used for Ponca City and 2 was used for Drumright.

HOUSING SURVEY

THIS SURVEY IS PART OF A STUDY BEING CONDUCTED ON THE QUALITY OF HOUSING IN CENTRAL OKLAHOMA. YOUR ANSWERS WILL BE USED TO HELP PLANNERS AND BUILDERS DO A BETTER JOB. YOUR HELP IS VITAL AND WILL BE GREATLY APPRECIATED.

ID. (1,2,3,4)
LOCATION. (5)

PLEASE BEGIN WITH THE FOLLOWING QUESTIONS:

1. NUMBER OF ADULTS LIVING IN YOUR HOME _____ (6)
2. NUMBER OF CHILDREN UNDER 18 IN YOUR HOME _____ (7)
3. NUMBER OF ROOMS IN YOUR APARTMENT _____ (8)
4. SEX OF HOUSEHOLD HEAD _____ (9)
5. AGE OF HOUSEHOLD HEAD _____ (10, 11)
6. PLEASE CIRCLE EMPLOYMENT OF HOUSEHOLD HEAD (12)

FULL TIME PART TIME (LESS THAN 35 hours a WEEK) DISABLED RETIRED UNEMPLOYED

STUDENT OTHER _____

7. BEFORE LIVING HERE, DID YOU EVER OWN YOUR OWN HOME? YES NO (13)

(PLEASE CIRCLE ONE)

THERE ARE MANY THINGS PEOPLE LIKE OR DISLIKE ABOUT THE CONSTRUCTION OF THEIR HOMES. WE WANT TO KNOW TO KNOW WHAT YOU LIKE OR DISLIKE ABOUT YOURS. THE FIRST SET OF QUESTIONS ASK ABOUT YOUR SATISFACTION WITH DIFFERNT ASPECTS OF YOUR APARTMENT.

IF YOU ARE EXTREMELY SATISFIED, CIRCLE 5.

IF YOU ARE NOT ALL SATISFIED, CIRLCE 1.

IF YOUR FEELINGS LIE IN BETWEEN, CIRCLE 2,3, OR 4, WHICHEVER IS CLOSEST TO YOUR LEVEL OF SATISFACTION.

8	1 2 3 4 5	THE AMOUNT OF SUNLIGHT THAT COMES INTO YOUR HOME.	(15)
9	1 2 3 4 5	THE AMOUNT AND LOCATION OF OUTDOOR LIGHTING AROUND THIS HOUSING DEVELOPMENT	(16)
		The AMOUNT AND LOCATION OF OVERHEAD LIGHTING IN YOUR:	
10	1 2 3 4 5	a. KITCHEN	(17)
11	1 2 3 4 5	b. LIVING AREA	(18)
12	1 2 3 4 5	c. BEDROOMS	(19)
13	1 2 3 4 5	d. BATHROOM	(20)
		LIGHTING FOR:	
14	1 2 3 4 5	a. HOUSEKEEPING	(21)
15	1 2 3 4 5	b. KITCHEN WORK	(22)
16	1 2 3 4 5	c. READING ACTIVITIES	(23)
17	1 2 3 4 5	d. DETAIL WORK LIKE WRITING, SEWING, HOBBIES, ETC.	(24)
18		HAVE YOU MADE ANY CHANGES TO MAKE LIGHTING BETTER IN YOUR HOME? (PLEASE WRITE IN YOUR ANSWERS, USING THE BACK OF THIS PAGE IF NECESSARY)	

RATE YOUR SATISFACTION WITH THE FOLLOWING:

THE AIR TEMPERATURE IN YOUR HOME DURING:

19 1 2 3 4 5 a. SUMMER (26)
20 1 2 3 4 5 b. FALL (27)
21 1 2 3 4 5 c. WINTER (28)
22 1 2 3 4 5 d. SPRING (29)

23 1 2 3 4 5 THE EVENESS OF THE TEMPERATURE THROUGHOUT YOUR APARTMENT IN THE WINTER. (30)

24 1 2 3 4 5 THE HUMIDITY LEVEL IN YOUR APARTMENT IN THE WINTER. (31)

25 1 2 3 4 5 THE AMOUNT OF MECHANICAL VENTILATION, LIKE BATHROOM AND KITCHEN VENTS, ATTIC FANS, FRESH AIR MIXED WITH THE HEAT SUPPLY. (32)

26 1 2 3 4 5 THE AMOUNT OF NATURAL VENTILATION. (33)

DESCRIBE THE WAYS YOU AND YOUR FAMILY ADAPT TO UNPLEASANT TEMPERATURES THAT YOU CANNOT CONTROL IN YOUR HOME. (PLEASE WRITE IN YOUR ANSWERS, USING THE BACK OF THE PAGE IF NECESSARY)

_____

_____

_____

_____

_____

_____

RATE YOUR SATISFACTION WITH THE FOLLOWING:

28 1 2 3 4 5 ROOM ARRANGEMENTS IN RELATION TO WHAT YOUR FAMILY DOES AT HOME (35)

29 1 2 3 4 5 GENERAL SIZE OF YOUR ROOMS. (36)

30 1 2 3 4 5 THE CEILING HEIGHT IN YOUR APARTMENT. (37)

THE AMOUNT OF WORKSPACE FOR IRONING, SEWING, HOBBIES, ETC, IN YOUR

31 1 2 3 4 5 a. KITCHEN (38)
32 1 2 3 4 5 b. LIVING ROOM (39)
33 1 2 3 4 5 c. BEDROOMS (40)

34 1 2 3 4 5 YOUR DINING SPACE. (41)

35 1 2 3 4 5 SPACE FOR OVERNIGHT GUESTS. (42)

36 1 2 3 4 5 SEMI-PRIVATE OUTDOOR AREAS, LIKE PORCHES, PATIOS, OR SMALL YARDS. (43)

37 1 2 3 4 5 SECURITY IN THE OUTDOOR AREAS AROUND YOUR APARTMENT (44)

38 1 2 3 4 5 PERSONAL PRIVACY IN YOUR APARTMENT WHEN YOUR FAMILY IS HOME. (45)

39 1 2 3 4 5 PRIVACY FOR CHILDREN AND/OR TEENAGERS WHEN YOUR FAMILY IS HOME. (LEAVE BLANK IF NO CHILDREN LIVE IN YOUR HOME) (46)

40 1 2 3 4 5 STORAGE SPACE FOR SELDOM USED ITEMS LIKE ROLL-AWAYS, TRUNKS, LUGGAGE, LAWN FURNITURE, ETC. (47)

41 1 2 3 4 5 STORAGE SPACE FOR EVERYDAY ITEMS LIKE CLOTHES, LINENS, HOUSEHOLD SUPPLIES, ETC. (48)

42 1 2 3 4 5 KITCHEN STORAGE FOR FOOD, UTENSILS, DISHES, ETC. (49)

43 1 2 3 4 5 THE PARKING ARRANGEMENT (50)

44 WHAT HAVE YOU DONE TO SOLVE INCONVENIENT SPACE PROBLEMS (PLEASE WRITE IN YOUR ANSWERS)

_____

_____

_____

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_____

_____

_____

_____

USE BACK OF PAGE IF NEEDED

RATE YOUR SATISFACTION WITH THE WORKING ORDER OF THE FOLLOWING:

45 1 2 3 4 5 KITCHEN FIXTURES (52)

46 1 2 3 4 5 KITCHEN STOVE AND OVEN (53)

47 1 2 3 4 5 BATHROOM FIXTURES (54)

48 1 2 3 4 5 DOORS (55)

RATE YOUR SATISFACTION WITH THE PHYSICAL CONDITION OF THE FOLLOWING:

49 1 2 3 4 5 LIVING AND BEDROOM FLOORS (56)

50 1 2 3 4 5 BATHROOM TILE (57)

51 1 2 3 4 5 COUNTER COVERING (58)

52 1 2 3 4 5 WALLS (59)

53 1 2 3 4 5 CEILING (60)

RATE YOUR SATISFACTION WITH:

54 1 2 3 4 5 THE NUMBER OF ELECTRIC OUTLETS (61)

55 1 2 3 4 5 THE NUMBER OF BATHROOMS (62)

56 1 2 3 4 5 THE NUMBER OF SINKS IN YOUR BATHROOM (63)

RATE YOUR SATISFACTION WITH THE FOLLOWING:

57 1 2 3 4 5 THE SECURITY YOU GET FROM LOCKING THE DOORS OF YOUR APARTMENT (64)

58 1 2 3 4 5 INSULATION AROUND WINDOWS AND DOORS (65)

59 1 2 3 4 5 HOT WATER SUPPLY (66)

60 1 2 3 4 5 CONSTRUCTION MATERIAL USED IN YOUR APARTMENT (67)

61 1 2 3 4 5 MANAGEMENT'S MAINTAINENCE PROGRAM (68)

62 1 2 3 4 5 LAUNDRY FACILITIES (69)

63 1 2 3 4 5 OVERALL EXTERIOR APPEARANCE OF YOUR APARTMENT (70)

HOW ARE YOU BOTHERED BY THE FOLLOWING THINGS IN YOUR APARTMENT.

IF YOU ARE NOT BOTHERED, RESPOND WITH 5.

IF YOU ARE ALWAYS BOTHERED, RESPOND WITH 1.

IF YOU ARE OCCASIONALLY BOTHERED, ANSWER APPROPRIATELY BETWEEN 1 and 5.

HOW OFTEN ARE YOU BOTHERED BY:

64 1 2 3 4 5 GLARE ON THE KITCHEN COUNTER (5)

65 1 2 3 4 5 GLARE FROM THE WINDOWS (6)

SMOKE AND ODORS IN YOUR:

66 1 2 3 4 5 a. KITCHEN (8)
67 1 2 3 4 5 b. BATH (9)
68 1 2 3 4 5 c. LIVING AREAS (10)

DRAFTS WHILE SEATED IN:

69 1 2 3 4 5 A. KITCHEN/DINING AREAS. (11)
70 1 2 3 4 5 B.LIVING ROOMS (12)
71 1 2 3 4 5 C. BEDROOMS (13)

DRAFTS ACROSS THE FLOOR IN:

72 1 2 3 4 5 a. KITCHEN/DINING AREAS. (14)
73 1 2 3 4 5 b. LIVING ROOM (15)
74 1 2 3 4 5 c. BEDROOMS (16)
75 1 2 3 4 5 d. BATH (17)

76 1 2 3 4 5 NOISE FROM WATER PIPES (19)

77 1 2 3 4 5 NOISE FROM OUTDOORS DISTURBING YOUR SLEEP. (20)

RECORD 2

78 1 2 3 4 5 HEARING CONVERSATIONS IN THE NEXT APARTMENT THROUGH THE WALL. (21)

79 1 2 3 4 5 TV AND STEREO NOISE IN THE SURROUNDING APARTMENTS. (22)

80 1 2 3 4 5 NOISE FROM APPLIANCES. (23)

81 1 2 3 4 5 NOISE FROM ACTIVITIES IN ADJOINING ROOMS OF APARTMENT. (24)

82 WHAT HAVE YOU DONE TO CORRECT OR ADJUST TO NOISE PROBLEMS? (PLEASE WRITE IN YOUR ANSWERS)

_____

_____

_____

_____

_____

_____

(USE BACK IF NEEDED)

83	I AM SATISFIED WITH THIS APARTMENT AS A PLACE TO LIVE	1 2 3 4 5	I AM NOT SATISFIED WITH THIS APARTMENT AS A PLACE TO LIVE	(26)

PLEASE CIRCLE THE NUMBER CLOSEST TO THE WAY YOU FEEL BETWEEN THE TWO STATEMENTS ABOVE.

THE NEXT SET OF QUESTIONS DEAL WITH YOUR NEIGHBORHOOD.

IF YOU AGREE WITH THE STATEMENT ON THE LEFT, CIRCLE 1.

IF YOU AGREE WITH THE STATEMENT OF THE RIGHT, CIRCLE 5.

IF YOUR FEELINGS ARE SOMEWHERE IN BETWEEN, PLEASE CIRCLE 2,3, OR 4, WHICH EVER IS CLOSEST TO WHAT YOU FEEL.

84	THE PEOPLE IN THIS DEVELOPMENT ARE NOT AT ALL FRIENDLY.	1 2 3 4 5	THE PEOPLE IN THE DEVELOPMENT ARE VERY FRIENDLY	(29)
85	THE NEIGHBORS CAN RARELY BE TRUSTED.	1 2 3 4 5	THE NEIGHBORS CAN ALWAYS BE TRUSTED	(30)
86	THE MIXTURE OF INTEREST AND BACKGROUNDS IN THE NEIGHBORHOOD CAUSES TROUBLE	1 2 3 4 5	THE NEIGHBORHOOD HAS A GOOD MIXTURE OF INTERESTS AND BACKGROUNDS.	(31)
87	WHEN I NEED IT, I NEVER HAVE PRIVACY FROM MY NEIGHBORS.	1 2 3 4 5	WHEN I NEED IT, I CAN USUALLY HAVE PRIVACY FROM MY NEIGHBORS.	(32)
88	THE PEOPLE IN THIS NEIGHBORHOOD MAKE IT A BAD PLACE TO LIVE .	1 2 3 4 5	THE PEOPLE IN THIS NEIGHBORHOOD MAKE IT A GOOD PLACE TO LIVE.	(33)
89	I AM NOT CONCERNED ABOUT MY NEIGHBORHOOD .	1 2 3 4 5	I TAKE PRIDE IN MY NEIGHBORHOOD .	(34)
90	I HAVE . FEW FRIENDS WHO LIVE IN THIS NEIGHBORHOOD .	1 2 3 4 5	I HAVE MANY FRIENDS WHO LIVE IN THIS NEIGHBORHOOD.	(35)
91	MANAGEMENT SHOULD TAKE CARE OF ALL REPAIRS AND UPEEP.	1 2 3 4 5	I FEEL SOME RESPONSIBILITY FOR REPAIRS AND UPKEEP.	(36)
92	THE NEIGHBORS HERE DO LITTLE TO KEEP THEIR PLACES UP.	1 2 3 4 5	MY NEIGHBORS GENERALLY KEEP THEIR HOMES WELL MAINTAINED.	(37)
93	THIS IS NOT A PRETTY NEIGHBORHOOD.	1 2 3 4 5	THERE IS NOTHING REALLY UGLY ABOUT THIS NEIGHBORHOOD.	(39)

94	THE NEIGHBORHOOD IS TOO NOISY.	1 2 3 4 5	THE NEIGHBORHOOD IS PRETTY QUIET.	
95	THE HOUSING DEVELOPMENT IS MANAGED VERY POORLY.	1 2 3 4 5	THE HOUSING DEVELOPMENT IS WELL MANAGED.	(41)
96	POLICE PROTECTION IN THIS NEIGHBORHOOD IS UNCERTAIN.	1 2 3 4 5	THE POLICE PROTECTION IN THIS NEIGHBORHOOD IS VERY GOOD.	(42)
97	NEIGHBORHOOD TRAFFIC IS NEVER CONTROLLED.	1 2 3 4 5	THE NEIGHBORHOOD TRAFFIC SPEED IS CONTROLLED WELL.	(43)
98	I RARELY FEEL SAFE IN THIS NEIGHBORHOOD.	1 2 3 4 5	I USUALLY FEEL SAFE IN THIS NEIGHBORHOOD.	(44)
99	ONLY POLICE PATROLS CAN STOP INTRUDERS AND VANDALS.	1 2 3 4 5	VANDALISM COULD BE DECREASED IF THE NEIGHBORS WOULD WATCH MORE CLOSELY FOR TROUBLE.	(45)
100	IF I COULD, I WOULD MOVE TO ANOTHER NEIGHBORHOOD.	1 2 3 4 5	I HAVE NO DESIRE TO MOVE TO ANOTHER NEIGHBORHOOD.	(47)

APPENDIX B

SURVEY DATA

80/80 LIST

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                000000000111111111122222222223333333333444444444455555555556666666666777777777
                123456789012345678901234567890123456789012345678901234567890123456789012345678901234567
CARD
0001   001 123513162 4455555555  11111122 21534531555554534 555455555555152145
0002           53 5551151115 355554 3   343553143 5515223 1
0003   002 110326832 5155555555  25552222 5555555522  5512 555255555555352333
0004           55 5355555555 525555 1   54355211 3533155 4
0005   003 122612061 1355555555  15554421 4555255111445452 555555112551153315
0006           51 7554114111 411111 3   211533443 3321135 1
0007   004 111422851 1153343521  13131132 424122411122441 1 554213433244312 1114
0008           55 5551111115 555555 4   133413113 1311133 1
0009   005 122425621 3355555512  22111321 15535544.555555 55533552255515 5425
0010           12 1552115115 555555 4   455443444 5554343 5
0011   006 111522552 5144422211  33131112 33312232112254 11 333322313335211113
0012           33 4444133113 552455 4   332435131 2411345 1
0013   007 111222551 1253555555  25355252 44555552 1314241 444415525455515 5315
0014           55 7335255555 223551 4   455433433 4434353 1
0015   008 113524861 5555555554  55555555 5555555525543555 555525555555553525
0016           55 5555555555 553355 1   111111111 1111111 1
0017   009 113523761 2254555544  2444512  415422432122512 4 555325515355112 2334
0018           55 4555334324 531451 4   443134233 3444345 1
0019   010 120524652 4455555545  54454454 545544432 43-4545 555545444555 4353555
0020           33 5555445535 553255 1   435535553 5554443 5
0021   011 132422321 3555555533  22122122 1151111111111111 352113515511111111
0022           51 1411111115 111111 5   111111111 1311115 1
0023   012 110326832 4555555522  35554 55   351242143  5534 555135544555 5155545
0024           53 5554234235 555555 1   444542113 5553355 5
0025   013 112624251 4444444444  44442444 5555555555555555 555555555555555555
0026           44 5551351355 455552 5   555555555 5555555 5
0027   014 124923861 3355444443  23232343 4352431134452341 453212311454 2151254
0028           52 4534334335 321221 3   334334545 3434245 4
0029   015 110424821 3442343422  25533244 4452334224 4-3542 444323323555 4353234
0030           44 2354334225 334243 4   442344332 3423332 3
0031   016 113523121 3455554544  22222222 3342222222332223 445533333445 3222312
0032           21 2233113111 332232 3   223423132 2232223 1
0033   017 112422861 3144443534  23131121 3254444211223111 555533333444 1153112
0034           55 5551111111 441454 3   322232213 1221125 1
0035   018 113524362 4455555555  1353545  435524521451 4553 55555553555544 53555
0036           55 5555555555 552253 3   533545314 3343443 4
0037   019 110326832 2211111111  22323333 1111111222 4 1112 111121111111111222
0038           53 3551152255 354555 4   111131111 32 3 22 2
0039   020 130515941 2155554444  11111112 1151112111111111 122513411355 5151315
0040           52 1335111112 511155 5   12111  111  11  5155 1
0041   021 124614552 5555555555     4 4454 525332214444454 1 555555555555 5455555
0042           55 5555555555 555555 1   354534334 4453445 5
0043   022 123713661 5555555555  23555455 5554555535555555 555555545555 2155515
0044           55 5551113125 535554 3   4331331 3 3343433 1
0045   023 112622712 4544444444  35544222 5453355221333424 555514455525 2454423,
0046           54 2424214213 551443 4   344473422 3355344 3
0047   024 121426732 4555555554  45544555 5354445314555454 444535555555 5555545
0048           44 4555555555 455554 2   445554334 5355554 3
0049   025 111624341 2555555555  15352545 5555543432433454 443354545555 3233314
0050           55 5455255255 442452 3   443444732 3444433 4
0051   026 121524661 5555555555  55555555 5555555131555551 555555555555 555555
0052           55 7555555555 555555 1   553555153 5555353 5
0053   027 124812761 4555555555  54111155 1455554555555141       111511115551141
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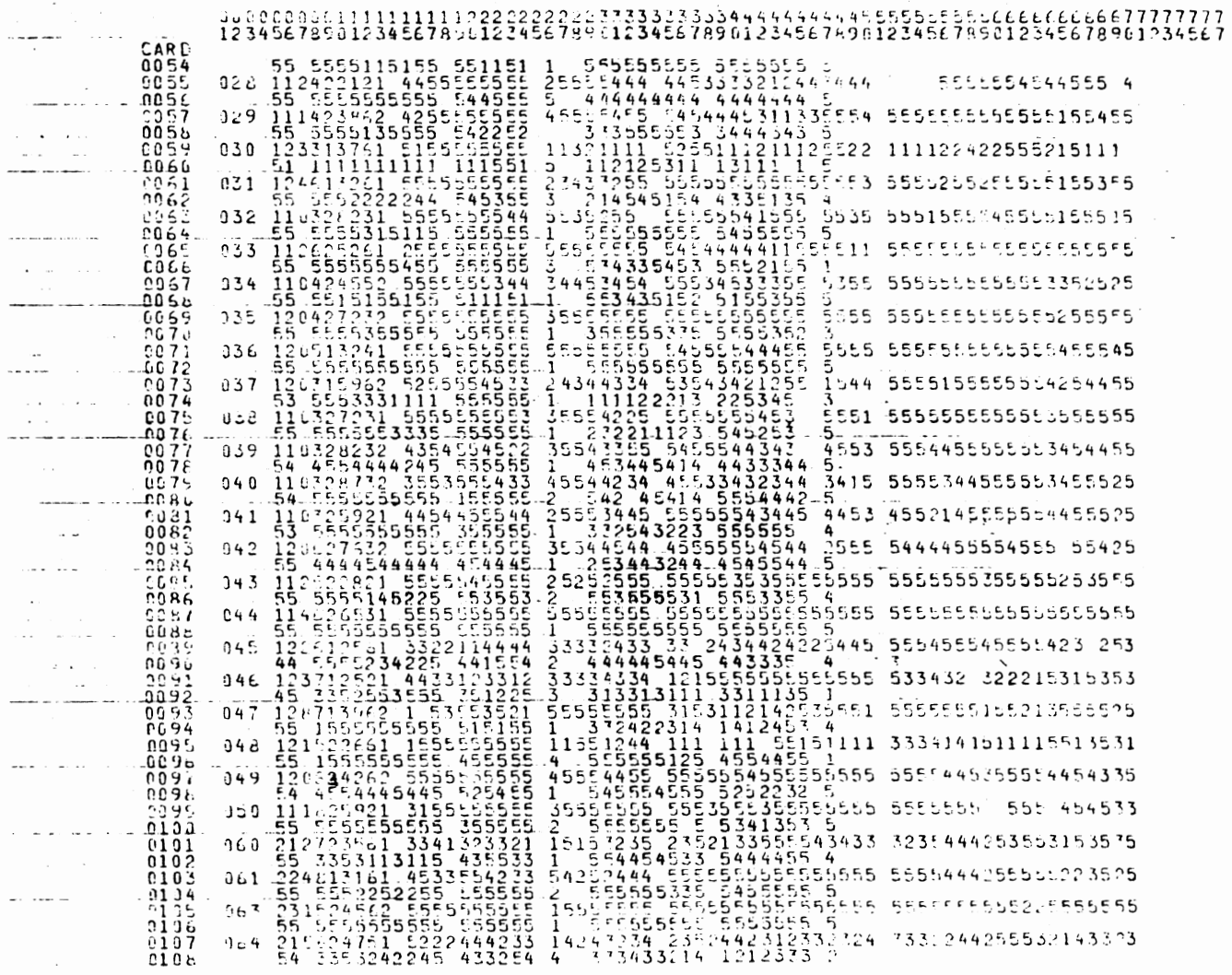

80/80 LIST

```
             00000000011111111112222222222333333333344444444445555555555666666666677777777
             12345678901234567890123456789012345678901234567890123456789012345678901234567890123456
CARD
0109  065  212624461  444244434  24434335  45544442  4444442  45542553444442554 24
0110             55  2344443344  554454  2   543744443  2443333  4
0111  066  221612761  5455555544  24141444  5444444524554553  322233422351151343
0112             55  34411  1114  523232  4   21443111 4  1431445  1
0113  067  220416441  3232454233  14242224  44523545434  1341  334224445555 2153343
0114             55  2243243244  533355  4   23342213  2321132  2
0115  068  210327232  4142553231  15554234  54534441334  2445  4554235555554254434
0116             55  3443342444  543355  2   44243312  2433244  3
0117  069  210326831  4131442323  25554235  55534443144  4543  44442445555 5254435
0118             55  2442252255  534355  3   33243321 2  3532243  2
0119  070  210326332  5422343233  14444425  4454224244   2443  55551255555551555 25
0120             55  3354452245  555555  1   55455541 4  5534353  5
0121  071  210326832  2242544233  14242244  5454543354   2554  3552145355554154535
0122             53  4552241144  454355  2   45334541 4  4553433  4
0123  072  210326731  5153555533  33331374  5554432322   4543  55531 1  3555542545 34
0124             55  5552222222  545555  2   55344544 3  5553433  5
0125  073  210327132  3242354433  24433245  54455554344  4454  4542545445552254544
0126             52  4444443245  254455  2   55455541 5  4453443  4
0127  074  210427432  4254555555  34435245  5555544323   3545  5555234445555155535
0128             55  5554333335  554255  1   55355542 5  5554444  5
0129  075  210316331  5554553444  24545344  55453455445  5455  5545255555555355555
0130             55  5555555445  555455  2   54355544 4  5544453  5
0131  076  210328032  5354555555  24445444  54555555445  4455  5555255555555455545
0132             55  4445555445  555455  1   54554553 4  5553343  5
0133  077  210326532  5435554433  24545355  55543443445  4555  4555355455555455545
0134             54  5445555555  555455  1   54344531 4  4544453  5
0135  078  210326732  5455555544  34243243  5453443214   3355  5555555355     5255524
0136             55  4445555555  454255  1   34244331 4  4555543  3
0137  079  220418131  4243444433  34445444  45534434334  3433  5554255445555455534
0138             54  5555455355  455355  1   35435542 5  5454453  5
0139  080  210327832  2554554233  15545434  54434435234  2551  5555255455554354544
0140             55  3443444455  545455  1   55355551 5  5534443  2
0141  081  210328232  3432232221  23231333  54455433554  5545  5551145555555153555
0142             55  4442221111  544455  3   55334532 5  5554453  5
0143  082  210426732  3455555533  25535244  5455555323   5544  5555115345554553545
0144             55  5554444445  555555  1   55354343 5  5553443  5
0145  083  210328532  3442442221  15544354  33524454245  1324  5554344343554353433
0146             43  3453442233  545544  2   54345541 4  5522443  4
0147  084  220416932  3342453132  24443223  44544443135  3444  5553125555554255534
0148             55  3454452255  544455  2   44334321 4  4524443  4
0149  085  220417332  3253554333  14244254  54555545444  3554  4552145345555254535
0150             54  3552252255  453355  3   45335441 5  4553443  2
0151  086  220417032  4253535433  35554235  45545543234  2445  4553225555554254544
0152             54  4553552355  554455  3   44334541 4  4533343  4
0153  087  231412861  4242553133  24447134  33544442144 52445  5553145455554355544
0154             54  3354352255  544555  3   44344322 4  3334443  3
0155  088  220417832  3553555455  14445345  54454445434  4555  5554355455555355545
0156             54  3445554344  545445  1   45355541 4  4553453  4
0157  $ENDLIST
```

APPENDIX C

TENANT COMMENTS FROM QUESTIONNAIRE

Identification Number and Location (01 = Ponca City; 02 = Drumright)

QUESTION # 18, LIGHTING

0101 "The life of the light bulbs doesn't seem to be as long as they should be."
0501 "I put table light in front room and bedroom for sewing."
0601 "Yes, have added lamps to work by, the overhead light cause too much glare, etc."
0901 "I have a lamp in the living room. The center overhead light is too harsh, the lamp is easier on the eye."
1101 "I have lamps in every room of my home. I also dont like we cant hook our dryers. We have 220 for air conditioners but you didnt put a 220 plug for the dryer as long as we pay lights why cant we have plugins for our dryers it is very unhandy for us in the winter"
1501 "table lamps/swag lamp for sewing"
1701 "Need to have lighting outside. Can't see a thing at night Have complained to management about getting lighting but they haven't done anything about it"
1901 "of course I have a desk lamp that I use at advantageous spots as far as writing, sewing, etc - but there seems to be ample plug-ines. So this is OK!"
2901 "bedside lamps table lamps on living room tables"
3001 "Need lighting in parking lots and alley near rubbish cans."
3701 "Lamps, need more light for sewing"
3801 "Table lamps used"
4001 "would like drop light in living room for reading and sewing."
4101 "Lamps in Living room"

6002 "Table lamps in each room, hanging lamp and table lamp in living room"
6102 "added extra lamps in living room"
6502 "Lamps"
6602 "drop lights in living room"
6702 "flor. light in kitchen over counter, lamps in living rm"
6902 "Light over range, hanging lamps in Living room, light in Laundry closet"
7002 "Lights over sind and range; Chandelier for dining area"
7102 "Swag lamps in Living room and Dining room for sewing"
7202 "Lamps, bought outdoor pole lamp with other tenants"
7302 "Shades drawn for glare; bought outdoor pole light with other tenants."
7502 "light over range"
7702 "Lamps in living room"
7802 "Light in Alley"
7902 "Lamps in Living room"
8002 "added lights for crocheting (table lamps); Need lamp over stove, using night light; part interest in outdoor security lamp (paid by tenants)"
8102 "Venetian blinds not good! Added light over the stove and lamps in living room"
8302 "Lamps in living room, too dim for eyes"

8402 "Drop lights in dining and living rooms"
8602 "Bought special lamps for sewing"
8702 "lamps in living room, light over stove"

QUESTION #27, THERMAL

0101 "Keep shades and curtains closed to keep as much cold air out as possible. Cold air comes in windows. There isn't any insulation in the ceiling at all."
0301 "During summers, windows have to be left open for air which is dangerous because of prowlers. During winters plastic is placed over windows because air seeps in."
0401 "Installed air conditioning for summer use. For winter taped around the windwos. Had to put papers between floor and baseboard gap to prevent extreme drafts on the floor and throughout the apartment."
0501 "The furnish"
0601 "In the winter either wear sweaters etc. or stay covered all the time"
1101 "In the winter time it is too cold their is two many drafes in the summer time the apartment's stay two hot their is not enough insulation. The window's and doors are two chep the door's are paper thine. the window let the wind blow right throug"
1401 "During the summer the rooms of our home gets hoter than it is out side. During the winter the rooms get too cold and the windows ice up."
1501 "Will get water cooler for the summer."
1601 "In summer we have to provide own air conditioning as well as window fan. In winter the temperature is so uneven throughout we keep bedroom doors closed until bed time. In winter I have to put weather stripping around doors and windows."
1701 "During the winter I have to put sheets up to all the doors and windows to keep it half way warm during winter. During summer it is hot! We all have dry skin because of lack of humidity."
1801 "Not satisfied with our air conditing, extremly hot"
1901 "I just wear warmer clothing to keep comfortable. Also use a vaporizer-humidifier to take care of the dry air I breathe/ there is an air-blowing heating system which of course blows dry air in the apartment."
2301 "use one small air conditioner and fans. Natural ventilation is not good in front of unit."
2501 "We place folder newspapers in the cracks along the doors"
3001 "Lower heat and freeze a little bit these homes also need storm windows <u>if the Government gonna spend money then spend it right</u> Put storm doors for winter also and summer we use water cooler and fans but still not that great."
3101 "In winter you weat little more clothing"
3201 "Put duck tape over cracks arround windows to keep out wind"
3701 "use air conditioner"
3801 "the fans"

3901 "A.C. installed"
4001 "Air conditioner"
4301 "I'ved lived only here from Sept. to now, its drafty. The front room is cold wind comes under the windows and door."
4601 "Winter - put on warmer clothing. Summer - cope with weather!"
5001 "use fan or cooler"

6002 "Attempt to seal window in winter. Use heavy draperies and humidifier in bedroom"
6302 "fans"
6402 "Fans (window)"
6502 "Window cooler"
6602 "Stuff rags under the door and put plastic over windows."
6702 "Air condition and fans.. Use kettle on stove for moisture"
6802 "Window fans"
6902 "Water Cooler"
7002 "Air conditioner"
7102 "Use Air conditioner. stuff papers around doors and use water on stove."
7202 "All heat at ceiling, ceiling vents no good."
7302 "Use air condtitiong"
7402 "A. C."
7802 "use air conditioning"
7902 "Window and portable fans"
8002 "Air conditioner, need smoke alarms"
8102 "Use air condtitioning, suffer with heat, temp, uneven."
8303 "use air conditioning"
8402 "Kettle on stove for moisture in winter"
8502 "Air conditioning; Tape window and use rug at door during winter." "Also use vaporizer"
8602 "Fans"
8802 "Use air conditioners"

QUESTION 44, SPACE

0301 "Buy smaller pieces of furnitutr, overload closets"
0401 "No arrangements other than what exists are possible. There is barely enough parking for the residents let alone visitor parking"
0601 "Talked to the management but aren't allowed to build any shelves etc. Not much we can do about the parking lots."
1101 "Their aint much you can do but try to get along. There are no shelf space in the bathrooms fro your towles or wash-clothes No room for your bed linenes. You should have shower doors on the tub for any one with kids need them to keep water off bathroom floor."
1401 "We've try to, but with all the applieances and garden's (yard) tools there just isn't enough room."
1601 "Store some things with relatives. Stack everything as neatly as possible to use all space available."
1801 "Its not the parking area, its the way the house is facing."

1901 "Seems that there are many people who are not accustomed to parking at home properly. I try each time to park in the same parking place each time. The neatness of an area is partially usage of yard and the surroundings."
2301 "Kitchen and living room not big enough."
3001 "There is really not much you can do."
3101 "Nothing you can do."
3701 "Outdoor building, not enough parking."
3801 "Storage room."
4101 "Storage house. Too far to walk to car in bad weather."
4301 "I live on a corner, so parking is no problem."
4601 "There's nothing to be done but find a larger place. These are government Housing Projects."

6002 "Plan no good - wasted corner space in kitchen; living room too small. Would prefer living and dining combination. Dormitory bedrooms no good. Too hard to arrange furniture. Do not like long narrow windows. Dryer in Bedroom. No shower in tub. Walls won't hold nails.
6702 "Store on front porch and park in yard."
6802 "Use front parch for storage."
7002 "Added linen cabinet; keep chairs on front porch. Little room for large items. Would like covered parking space."
7102 "Sold furniture and extras"
7902 "Store on fenced patio"
8002 "Bought portable sewing machine; sold bulky items. Car too far away. Drainage need to be fixed for storm water run off."
8302 "Cram in closets."
"*Rent too high, will dislike having to pay for gas."
8402 "Sold extra furniture, etc."
8702 "Store with parents"

QUESTION #82, ACOUSTICS

0301 "Theres really nothing you can do. You can't make the people next door or outside be quiet. Inside we keep doors shut off to each room. It helps a little."
1101 "Put carpet down to try and keep noise down, and to keep feet WARM in winter thise floors are super cold for kids to be on."
1401 "We tryed to pay no attention."
1501 "Live with them."
1601 "Nothing you can do unless you weat ear plugs."
1701 "You can complain all you want to but they won't do anything."
1801 "Nothing we can say because we probably bug them just as much."
1901 "Have reported noise from water pipes, but nothing has been done"
2001 "Ask the next door people to turn down or talk softer."
2701 "Suffer with them"
3001 "When you complain it doesn't do any good."
3101 "Nothing you can do about noise"
3701 "Carpets
* Phone connection in poor location."
4001 "Noise form hot water tank bothersome."

4101 "Hear clock strike next door."

4301 "I don't hear much and so it doesn't bother me that much. I have kids and they don't so I don't complain because there nice not to complain when my kids get a little out of hand."

7902 "Gotten use to TV noise.

MISCELLANEOUS

0201 "We could have pretty neighborhood if it were not for trash can in front yards and people would be more careful. I cannot say housing development managed poorly, but it could be improved upon. I like my apt. very much except for trash and litter in my front door - covered containers would help. Shrubbery kept neat. Less noisy heating units."

0701 "No dryer vent."

1101 "In the summer time or winter it makes no diffrens cars come speeding throughthise projects and one of this days some little kid is going o be hurt. I think it would be good if the kid's had some kind of a playground to keep them out of the streets and it might help from neibores complaning about your kids. It also would be nice if you all had a utility house for people who cant afford to by a washer or dryer for their homes. It would be very convenient in the winter time. The walls in this apartment's are very hard to keep clean also. They say you can wash them but this is not true if you wash them the point and plaster comes off the walls. The walls are so thin that they wont even hold a curtain rod up half way dissent."

1801 "Walls are weak."

2001 "Satisfied with door locks after they were changed. Moving soon as possible."

2301 "Need place for dryer. Thru street not good."

2401 "Wants to move back to Guthrie."

3001 "You can't have overnight guests. Child is not supposed to play (on porch) and their are no play areas"
Cheaply put together. Walls have no ventilation and need painting. These apartments are supposed to be for low income people but yet when you have to have something repaired you have to pay for it. I think that when this happens the needin of repairs the government should take care of this these are his houses. Incomes should be reported twice each year such as the first 6 months then again 6 mos later instead of everytime you get a raise."

4101 "Vandalism no problem."

4501 "Walls should be a different color."

4801 "The rent is to high. the rent the way it is now is to high. this suppose to be low rent houseing the way ti si now it is not As a renter I think this should be look into. I theres no adjustment in the rent to lower it, there my not be no renter."

7202 "Dryer in closet."

7302 "Need another safety lock on doors. West sun problems. Concerned about bathroom privacy, next to neighbor's kitchen."

7402 "Location good, close to town."

8302 "Would like to see Exec. Director 'loose her job.' Director's son and family in two bedroom unit in elderly housing area."

8502 "Would like to move back into own home."

APPENDIX D

SPSS COMPUTER RESULTS

FILE COMFORT (CREATION DATE = 03/30/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

T-TEST

GROUP 1 - PLACE EQ 1.
GROUP 2 - PLACE EQ 2.

VARIABLE	NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	POOLED VARIANCE ESTIMATE DEGREES OF FREEDOM	POOLED VARIANCE ESTIMATE 2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	SEPARATE VARIANCE ESTIMATE DEGREES OF FREEDOM	SEPARATE VARIANCE ESTIMATE 2-TAIL PROB.
LIGHTING												
GROUP 1	49	51.7143	8.701	1.243	1.28	0.494	2.91	75	0.005	3.01	62.25	0.004
GROUP 2	28	45.9643	7.686	1.452								
THERMAL												
GROUP 1	45	65.9556	19.163	2.857	3.41	0.001	0.02	70	0.987	0.02	69.44	0.983
GROUP 2	27	65.8889	10.371	1.996								
SPACE												
GROUP 1	46	58.1739	15.592	2.299	3.19	0.002	-0.54	71	0.594	-0.62	70.90	0.540
GROUP 2	27	59.9259	8.735	1.681								
COMMAT												
GROUP 1	43	76.6046	17.102	2.608	3.58	0.001	-0.50	67	0.618	-0.58	66.08	0.566
GROUP 2	26	78.4231	9.038	1.773								
ACOUSTIC												
GROUP 1	50	24.1400	6.125	0.866	4.35	0.000	-1.97	76	0.052	-2.36	74.66	0.021
GROUP 2	28	26.5714	2.937	0.555								
NGHERHD												
GROUP 1	50	54.6800	16.331	2.310	2.50	0.012	-1.72	76	0.089	-1.95	74.79	0.055
GROUP 2	28	60.5714	10.319	1.950								

T-Test of Means

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

Pearson Correlation

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	VAR001	VAR002	VAR003	VAR004	VAR005	VAR006	VAR007	VAR083
VAR001	1.00000	0.03948	0.01755	-0.54757	-0.13766	0.18871	0.12540	0.09835
VAR002	0.03948	1.00000	0.43050	-0.38051	0.08338	0.15811	0.14693	0.26516
VAR003	0.01755	0.43050	1.00000	-0.26636	0.11454	0.12168	-0.05809	0.42993
VAR004	-0.54757	-0.38051	-0.26636	1.00000	0.33086	-0.34807	-0.04490	-0.14338
VAR005	-0.13766	0.08338	0.11454	0.33086	1.00000	-0.11084	0.16114	0.36390
VAR006	0.18871	0.15811	0.12168	-0.34807	-0.11084	1.00000	-0.01368	0.21928
VAR007	0.12540	0.14693	-0.05809	-0.04490	0.16114	-0.01368	1.00000	0.19958
VAR083	0.09835	0.26516	0.42993	-0.14338	0.36390	0.21928	0.19958	1.00000

Pearson Correlation: Var 001 - 007, 083

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/12/78 PAGE 6

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR083

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR001
VAR002
VAR003
VAR004
VAR005
VAR006
VAR007

MULTIPLE R	0.60517	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.36623	REGRESSION	7.	22.83785	3.26255	2.55911
ADJUSTED R SQUARE	0.22312	RESIDUAL	31.	39.52113	1.27488	
STANDARD ERROR	1.12910					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	0.1015899	0.05054	0.35935	0.080
VAR002	0.4143810-02	0.00468	0.15473	0.001
VAR003	0.3165441	0.35784	0.14526	4.749
VAR004	-0.1648644	-0.00140	0.57698	0.082
VAR005	0.3701742D-01	0.34491	0.01726	4.567
VAR006	0.1399266	0.18445	0.11565	1.459
VAR007	0.4526739	0.15733	0.46911	1.103
(CONSTANT)	-1.138166			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Var 001 - 007, Var 083

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

Pearson Correlation

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	VAR001	VAR002	VAR003	VAR004	VAR005	VAR006	VAR007	VAR100	LIGHTING	THERMAL	SPACE	CONMAT
VAR001	1.00000	-0.09790	-0.08359	-0.46875	-0.08137	0.13441	0.07133	0.10445	0.14932	-0.04008	0.06248	-0.00816
VAR002	-0.09790	1.00000	0.58966	-0.26586	0.07322	0.05693	-0.36254	-0.02870	0.05877	-0.08100	0.14191	-0.05974
VAR003	-0.08359	0.58966	1.00000	-0.23078	-0.01559	0.27335	-0.26925	0.21292	0.01394	0.14095	0.27823	0.00736
VAR004	-0.46875	-0.26586	-0.23078	1.00000	0.36891	-0.41456	0.08333	0.13750	-0.12356	0.11700	-0.27842	-0.11642
VAR005	-0.08137	0.07322	-0.01559	0.36891	1.00000	-0.12319	0.04845	0.42218	0.33020	0.60546	0.44251	0.54494
VAR006	0.13441	0.05693	0.27335	-0.41456	-0.12319	1.00000	-0.07537	-0.04816	0.00531	0.24902	0.18310	0.14862
VAR007	0.07133	-0.36254	-0.26925	0.08333	0.04845	-0.07537	1.00000	0.02500	0.08044	0.08097	-0.01992	0.07660
VAR100	0.10445	-0.02870	0.21292	0.13750	0.42218	-0.04816	0.02500	1.00000	0.20441	0.46001	0.61335	0.50761
LIGHTING	0.14932	0.05877	0.01394	-0.12356	0.33020	0.00531	0.08044	0.20441	1.00000	0.64448	0.59428	0.68181
THERMAL	-0.04008	-0.08100	0.14095	0.11700	0.60546	0.24902	0.08097	0.46001	0.64448	1.00000	0.69399	0.78334
SPACE	0.06248	0.14191	0.27823	-0.27842	0.44251	0.18310	-0.01992	0.61335	0.59428	0.69399	1.00000	0.85190
CONMAT	-0.00816	-0.05974	0.00736	-0.11642	0.54494	0.14862	0.07660	0.50761	0.68181	0.78334	0.85190	1.00000
ACOUSTIC	-0.09382	-0.12930	-0.13744	-0.06389	0.45032	0.17513	0.13197	0.30898	0.16007	0.43184	0.57512	0.59653
NGHBRHD	0.07014	-0.07080	0.23477	0.02034	0.49593	0.00231	0.18199	0.81867	0.21968	0.48722	0.64602	0.62599

	ACOUSTIC	NGHBRHD
VAR001	-0.09382	0.07014
VAR002	-0.12930	-0.07080
VAR003	-0.13744	0.23477
VAR004	-0.06389	0.02034
VAR005	0.45032	0.49593
VAR006	0.17513	0.00231
VAR007	0.13197	0.18199
VAR100	0.30898	0.81867
LIGHTING	0.16007	0.21968
THERMAL	0.43184	0.48722
SPACE	0.57512	0.64602
CONMAT	0.59653	0.62599
ACOUSTIC	1.00000	0.45670
NGHBRHD	0.45670	1.00000

Pearson Correlation: Var 001 - 007, 100, and Summed Batteries

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/12/78 PAGE 10

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR100

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR001
VAR002
VAR003
VAR004
VAR005
VAR006
VAR007

MULTIPLE R	0.56295	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.31692	REGRESSION	7.	23.40312	3.34330	1.19302
ADJUSTED R SQUARE	0.05127	RESIDUAL	18.	50.44303	2.80239	
STANDARD ERROR	1.67403					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	0.4529481	0.18520	0.57134	0.629
VAR002	-0.4166388	-0.26729	0.39293	1.124
VAR003	0.5835272	0.44248	0.33496	3.035
VAR004	0.1851202	0.04628	1.13714	0.027
VAR005	0.6100175D-01	0.43543	0.03058	3.979
VAR006	-0.1058035	-0.10528	0.22638	0.218
VAR007	-0.2445964D-01	-0.00611	0.64362	0.001
(CONSTANT)	-2.133644			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Var 001 - 007, Var 100

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/12/78 PAGE 12

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. LIGHTING

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR001
VAR002
VAR003
VAR004
VAR005
VAR006
VAR007

MULTIPLE R	0.43778	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.19165	REGRESSION	7.	357.30727	51.04390	0.60967
ADJUSTED R SQUARE	-0.12273	RESIDUAL	18.	1507.03889	83.72438	
STANDARD ERROR	9.15010					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	0.5656066	0.04598	3.12286	0.033
VAR002	-0.1674808	-0.02299	2.14772	0.006
VAR003	0.3764547D-01	0.00568	1.83083	0.000
VAR004	-6.047082	-0.30688	6.21547	0.947
VAR005	0.3002663	0.43509	0.16715	3.357
VAR006	-0.3334158	-0.06702	1.23737	0.075
VAR007	1.292743	0.06930	4.61115	0.091
(CONSTANT)	48.72462			

ALL VARIABLES ARE IN THE EQUATION

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

Multiple Regression: Var 001 - 007, Lighting

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/12/78 PAGE 14

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. THERMAL

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR001
VAR002
VAR003
VAR004
VAR005
VAR006
VAR007

MULTIPLE R	0.73299	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.53727	REGRESSION	7.	4992.84323	713.26332	2.98567
ADJUSTED R SQUARE	0.35732	RESIDUAL	18.	4300.11831	238.89546	
STANDARD ERROR	15.45624					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	-2.073236	-0.07557	5.27509	0.154
VAR002	-5.074571	-0.31194	3.62750	1.957
VAR003	3.635774	0.24975	3.09262	1.382
VAR004	-4.290521	-0.09561	10.49910	0.167
VAR005	1.086366	0.69140	0.28235	14.810
VAR006	2.906611	0.25782	2.09015	1.934
VAR007	1.496124	0.03334	7.78509	0.037
(CONSTANT)	7.925591			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Var 001 - 007, Thermal

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 4

DEPENDENT VARIABLE.. SPACE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR001
VAR002
VAR003
VAR004
VAR005
VAR006
VAR007

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
MULTIPLE R	0.70308					
R SQUARE	0.50223	REGRESSION	7.	3434.15259	490.59323	2.59444
ADJUSTED R SQUARE	0.30865	RESIDUAL	18.	3403.69356	189.09409	
STANDARD ERROR	13.75115					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	-4.044670	-0.17187	4.69316	0.743
VAR002	-3.705028	-0.26551	3.22768	1.318
VAR003	3.729460	0.29389	2.75145	1.837
VAR004	-24.11863	-0.62661	9.34087	6.667
VAR005	0.9163067	0.67571	0.25120	13.306
VAR006	-0.3449456	-0.03567	1.85957	0.034
VAR007	-0.3152459	-0.00819	6.92982	0.002
(CONSTANT)	64.42326			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Var 001 - 007, Space

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/12/78 PAGE 18

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 5

DEPENDENT VARIABLE.. CONMAT

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VARC01
VARC02
VARC03
VARC04
VARC05
VARC06
VARC07

MULTIPLE R	0.71526	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.51159	REGRESSION	7.	3423.76928	489.10990	2.69352
ADJUSTED R SQUARE	0.32166	RESIDUAL	18.	3266.57087	181.58760	
STANDARD ERROR	13.47544					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	-5.756998	-0.24727	4.55506	1.597
VAR002	-4.386908	-0.31777	3.16256	1.924
VAR003	0.537654	0.04284	2.65629	0.040
VAR004	-21.70998	-0.57013	5.15355	5.625
VAR005	1.019693	0.70458	0.24616	17.159
VAR006	0.444998	0.04642	1.82228	0.059
VAR007	3.172475	0.00453	6.75688	0.001
(CONSTANT)	89.10255			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Var 001 - 007, Conmat

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 6

DEPENDENT VARIABLE-- ACOUSTIC

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VARC01
VARC02
VAR003
VARC04
VARC05
VAR006
VARCC7

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
MULTIPLE R	C.66065					
R SQUARE	0.43643	REGRESSION	7.	510.06408	72.86630	1.99152
ADJUSTED R SQUARE	0.21730	RESIDUAL	18.	658.58576	36.58832	
STANDARD ERROR	6.04683					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	-3.269[illegible]E	-0.33569	2.06442	2.503
VAR002	-1.376[illegible]2	-0.23261	1.41578	0.940
VAR003	-0.23143EC	-0.15848	1.21030	0.472
VAR004	-7.909[illegible]67	-0.49709	4.10884	3.706
VAR005	0.3255149	0.63792	0.11050	10.352
VAR006	0.6136[illegible]72	0.15335	0.81758	0.562
VAR007	0.7768[illegible]73	0.04892	3.04827	0.065
(CONSTANT)	33.40973			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Var 001 - 007, Acoustics

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/12/78 PAGE 22

FILE COMFORT (CREATION DATE = 04/12/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 7

DEPENDENT VARIABLE.. NGHBRHD

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR001
VAR002
VAR003
VAR004
VAR005
VAR006
VAR007

MULTIPLE R	0.73137	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.53490	REGRESSION	7.	4099.96001	585.70857	2.95729
ADJUSTED R SQUARE	0.35402	RESIDUAL	18.	3565.00153	198.05564	
STANDARD ERROR	14.07322					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR001	0.1760667	0.00707	4.80308	0.001
VAR002	-7.038879	-0.47643	3.30328	4.541
VAR003	8.025307	0.39732	2.81590	8.123
VAR004	-11.10440	-0.27249	5.55565	1.349
VAR005	0.8823434	0.01820	0.25708	11.780
VAR006	-1.640963	-0.16027	1.90312	0.743
VAR007	0.123750	0.15027	7.05213	0.746
(CONSTANT)	13.37312			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION.

Multiple Regression: Var 001 - 007, Neighborhood

COMFORT ANALYSIS IN LOW INCOME HOUSING 03/31/78 PAGE 5

FILE COMFORTT (CREATION DATE = 03/31/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS PEARSON CORRELATION

A VALUE OF 99...00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	VAR083	LIGHTING	THERMAL	SPACE	CONMAT	ACOUSTIC	NGHBRHD
VAR083	1.00000	0.44261	0.68965	0.49162	0.64062	0.44163	0.47638
LIGHTING	0.44261	1.00000	0.55143	0.59702	0.65155	0.11903	0.32229
THERMAL	0.68965	0.55143	1.00000	0.65004	0.71343	0.48532	0.54233
SPACE	0.49162	0.59702	0.65004	1.00000	0.81696	0.45880	0.67193
CONMAT	0.64062	0.65155	0.71343	0.81696	1.00000	0.53854	0.65852
ACOUSTIC	0.44163	0.11903	0.48532	0.45880	0.53854	1.00000	0.41242
NGHBRHD	0.47638	0.32229	0.54233	0.67193	0.65852	0.41242	1.00000

Pearson Correlation: Var 083, Summed Batteries

COMFORT ANALYSIS IN LOW INCOME HOUSING 03/31/78 PAGE 6

FILE COMFORT (CREATION DATE = 03/31/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR083

VARIABLE(S) ENTERED ON STEP NUMBER 1.. LIGHTING
THERMAL
SPACE
CONMAT
ACOUSTIC

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
MULTIPLE R	0.73282					
R SQUARE	0.53702	REGRESSION	5.	49.18353	9.83671	12.06312
ADJUSTED R SQUARE	0.49250	RESIDUAL	52.	42.40268	0.81544	
STANDARD ERROR	0.90301					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
LIGHTING	0.3876319D-02	0.02750	0.01960	0.039
THERMAL	0.3740792D-01	0.47966	0.01108	11.395
SPACE	-0.1811325D-01	-0.20235	0.01500	1.458
CONMAT	0.3480570D-01	0.40158	0.01734	4.029
ACOUSTIC	0.1932702D-01	0.08214	0.02927	0.436
(CONSTANT)	-1.336103			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Lighting, Thermal, Space, Acoustic, Var 083

FILE COMFORT (CREATION DATE = 03/31/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

Pearson Correlation

A VALUE OF 99.00000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

	VAR084	VAR085	VAR086	VAR087	VAR088	VAR089	VAR090	VAR091	VAR092	VAR093	VAR094	VAR095
VAR084	1.00000	0.69746	0.44593	0.40534	0.69117	0.71139	0.54157	0.25775	0.38035	0.68633	0.47736	0.60108
VAR085	0.69746	1.00000	0.46623	0.38184	0.70390	0.59564	0.48517	0.18348	0.49213	0.69516	0.55252	0.65587
VAR086	0.44593	0.46623	1.00000	0.50285	0.48254	0.46108	0.43226	0.47497	0.56067	0.59402	0.27409	0.60780
VAR087	0.40534	0.38184	0.50285	1.00000	0.58648	0.45663	0.31166	0.33155	0.36782	0.51360	0.32619	0.40924
VAR088	0.69117	0.70390	0.48254	0.58648	1.00000	0.68326	0.51431	0.28761	0.57059	0.72500	0.55648	0.59912
VAR089	0.71139	0.59564	0.46108	0.45663	0.68326	1.00000	0.54714	0.37064	0.42557	0.69536	0.44227	0.59512
VAR090	0.54157	0.48517	0.43226	0.31166	0.51431	0.54714	1.00000	0.34687	0.47273	0.51454	0.39888	0.50744
VAR091	0.25775	0.18348	0.47497	0.33155	0.28761	0.37064	0.34687	1.00000	0.16373	0.45707	0.07232	0.41672
VAR092	0.38035	0.49213	0.56067	0.36782	0.57059	0.42557	0.47273	0.16373	1.00000	0.48460	0.36095	0.47808
VAR093	0.68633	0.69516	0.59402	0.51360	0.72500	0.69536	0.51454	0.45707	0.48460	1.00000	0.56201	0.70552
VAR094	0.47736	0.55252	0.27409	0.32619	0.55648	0.44227	0.39888	0.07232	0.36095	0.56201	1.00000	0.40871
VAR095	0.60108	0.65587	0.60780	0.40924	0.59912	0.59512	0.50744	0.41672	0.47808	0.70552	0.40871	1.00000
VAR096	0.46069	0.63978	0.55388	0.40678	0.63550	0.55237	0.32838	0.49257	0.45894	0.66930	0.38976	0.60570
VAR097	0.53634	0.66961	0.44617	0.38544	0.60793	0.42451	0.43923	0.17407	0.59811	0.50330	0.48388	0.58011
VAR098	0.62455	0.63053	0.54527	0.50560	0.56946	0.55770	0.38777	0.20407	0.42726	0.59070	0.53140	0.58065
VAR099	0.10822	-0.04692	0.22169	0.09866	0.01646	0.08011	-0.01355	0.27507	-0.03521	0.08447	0.04640	0.13809
VAR100	0.56501	0.58752	0.40960	0.45043	0.56578	0.57758	0.53116	0.35456	0.44849	0.61137	0.37770	0.60615

	VAR096	VAR097	VAR098	VAR099	VAR100
VAR084	0.46069	0.53634	0.62455	0.10822	0.56501
VAR085	0.63978	0.66961	0.63053	-0.04692	0.58752
VAR086	0.55388	0.44617	0.54527	0.22169	0.40960
VAR087	0.40678	0.38544	0.50560	0.09866	0.45043
VAR088	0.63550	0.60793	0.56946	0.01646	0.56578
VAR089	0.55237	0.42451	0.55770	0.08011	0.57758
VAR090	0.32838	0.43923	0.38777	-0.01355	0.53116
VAR091	0.49257	0.17407	0.20407	0.27507	0.35456
VAR092	0.45894	0.59811	0.42726	-0.03521	0.44849
VAR093	0.66930	0.50330	0.59070	0.08447	0.61137
VAR094	0.38976	0.48388	0.53140	0.04640	0.37770
VAR095	0.60570	0.58011	0.58065	0.13809	0.60615
VAR096	1.00000	0.62350	0.55140	0.13086	0.55823
VAR097	0.62350	1.00000	0.59031	0.07191	0.57093
VAR098	0.55140	0.59031	1.00000	0.28480	0.45919
VAR099	0.13086	0.07191	0.28480	1.00000	-0.00842
VAR100	0.55823	0.57093	0.45919	-0.00842	1.00000

Pearson Correlation: Var 084 - 100

COMFORT ANALYSIS IN LOW INCOME HOUSING 03/31/78 PAGE 10

FILE COMFORT (CREATION DATE = 03/31/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR100

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR084
VAR085
VAR086
VAR087
VAR088
VAR089
VAR090
VAR091
VAR092
VAR093
VAR094
VAR095
VAR096
VAR097
VAR098
VAR099

MULTIPLE R	0.75448	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.56924	REGRESSION	16.	93.89112	5.86819	4.21221
ADJUSTED R SQUARE	0.43410	RESIDUAL	51.	71.05006	1.39314	
STANDARD ERROR	1.18031					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR084	0.1252694	0.09370	0.23050	~~0.295~~
VAR085	0.51813400-01	0.04070	0.22683	~~0.052~~
VAR086	-0.2706960	-0.18693	0.21402	~~1.630~~
VAR087	0.2526274	0.16582	0.19466	1.684
VAR088	-0.1894335	-0.13636	0.25519	~~0.551~~
VAR089	0.1447362	0.10867	0.20855	~~0.482~~
VAR090	0.1951874	0.17627	0.14351	1.850
VAR091	0.76378020-01	0.07598	0.13470	~~0.321~~
VAR092	0.69282250-01	0.05465	0.17612	~~0.155~~
VAR093	0.1491776	0.12783	0.21975	~~0.461~~
VAR094	-0.95321890-01	-0.06462	0.18785	~~0.257~~
VAR095	0.1866026	0.16897	0.16955	1.226
VAR096	0.1659171	0.13918	0.20350	~~0.505~~
VAR097	0.2442417	0.19178	0.20199	1.462
VAR098	0.61200370-01	0.03900	0.24616	~~0.062~~
VAR099	-0.1311849	-0.08367	0.15908	~~0.643~~
(CONSTANT)	-0.1741172			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Var 084 - 099, Var 100

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

PEARSON CORRELATION; DRUMRIGHT

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	VAR083	LIGHTING	THERMAL	SPACE	CONMAT	ACOUSTIC	NGHBRHD
VAR083	1.00000	0.50391	0.57273	0.24124	0.65395	0.53270	0.74029
LIGHTING	0.50391	1.00000	0.79065	0.55607	0.64831	0.55588	0.51913
THERMAL	0.57273	0.79065	1.00000	0.40975	0.72603	0.63162	0.46238
SPACE	0.24124	0.55607	0.40975	1.00000	0.55624	0.51270	0.64210
CONMAT	0.65395	0.64831	0.72603	0.55624	1.00000	0.76649	0.61251
ACOUSTIC	0.53270	0.55588	0.63162	0.51270	0.76649	1.00000	0.62172
NGHBRHD	0.74029	0.51913	0.46238	0.64210	0.61251	0.62172	1.00000

Pearson Correlation Drumright: Var 083 and Summed Batteries

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/79 PAGE 104

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

PEARSON CORRELATION: PONCA CITY

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	VAR083	LIGHTING	THERMAL	SPACE	CONMAT	ACOUSTIC	NGHBRHD
VAR083	1.00000	0.59065	0.73532	0.55521	0.64717	0.40608	0.35583
LIGHTING	0.59065	1.00000	0.56203	0.72089	0.80482	0.16387	0.45290
THERMAL	0.73532	0.56203	1.00000	0.69576	0.71585	0.47379	0.57300
SPACE	0.55521	0.72089	0.69576	1.00000	0.85648	0.44931	0.68773
CONMAT	0.64717	0.80482	0.71585	0.85648	1.00000	0.50476	0.67094
ACOUSTIC	0.40608	0.16387	0.47379	0.44931	0.50476	1.00000	0.34058
NGHBRHD	0.35583	0.45290	0.57300	0.68773	0.67094	0.34058	1.00000

Pearson Correlation Ponca City: Var 083 and Summed Batteries

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 105

FILE COMFORT (CREATION DATE = 04/05/78) --PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR083 DRUMRIGHT

VARIABLE(S) ENTERED ON STEP NUMBER 1.. LIGHTING
THERMAL
SPACE
CONMAT
ACOUSTIC

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
MULTIPLE R	0.69313					
R SQUARE	0.48043	REGRESSION	5.	11.02995	2.20599	3.32895
ADJUSTED R SQUARE	0.33611	RESIDUAL	18.	11.92839	0.66269	
STANDARD ERROR	0.81436					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
LIGHTING	0.21111920-01	0.15907	0.04053	0.271
THERMAL	0.84100450-02	0.08869	0.03086	0.074
SPACE	-0.26649900-01	-0.23397	0.02556	1.087
CONMAT	0.74923620-01	0.55040	0.04279	3.065
ACOUSTIC	0.36306030-01	0.08634	0.11452	0.101
(CONSTANT)	-2.803003			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Drumright

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 105

FILE COMFORT (CREATION DATE = 04/05/78) -- PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. - VAR083 PONCA CITY

VARIABLE(S) ENTERED ON STEP NUMBER 1.. LIGHTING
THERMAL
SPACE
CONMAT
ACOUSTIC

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
MULTIPLE R	0.78022					
R SQUARE	0.60874	REGRESSION	5.	39.26378	7.85276	8.71276
ADJUSTED R SQUARE	0.53887	RESIDUAL	28.	25.23522	0.90129	
STANDARD ERROR	0.94936					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
LIGHTING	0.5100513D-01	0.33270	0.03501	2.123
THERMAL	0.4132441D-01	0.57463	0.01273	10.539
SPACE	-0.1827209D-01	-0.22272	0.01946	-0.882
CONMAT	0.7089035D-02	0.09162	0.02420	0.086
ACOUSTIC	0.2823312D-01	0.13312	0.03365	0.704
(CONSTANT)	-1.954222			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Ponca City

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 108

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

Pearson Correlation
Drumright

	VAR084	VAR085	VAR086	VAR087	VAR088	VAR089	VAR090	VAR091	VAR092	VAR093	VAR094	VAR095
VAR084	1.00000	0.69473	0.28370	0.35329	0.62427	0.73556	0.69698	0.49144	0.29338	0.69001	0.45853	0.39783
VAR085	0.69473	1.00000	0.18122	0.15803	0.73619	0.75407	0.73764	0.28517	0.43568	0.77435	0.39844	0.60714
VAR086	0.28370	0.18122	1.00000	0.35738	0.42589	0.31364	0.34139	0.44171	0.45220	0.32902	-0.05763	0.29270
VAR087	0.35329	0.15803	0.35738	1.00000	0.32919	0.18806	0.28586	0.24269	0.20818	0.29604	0.08908	0.16591
VAR088	0.62427	0.73619	0.42589	0.32919	1.00000	0.73137	0.71288	0.27101	0.60122	0.77331	0.40370	0.47176
VAR089	0.73556	0.75407	0.31364	0.18806	0.73137	1.00000	0.75437	0.27470	0.39838	0.75522	0.48897	0.48544
VAR090	0.69698	0.73764	0.34139	0.28586	0.71288	0.75437	1.00000	0.43648	0.29420	0.70979	0.47917	0.52096
VAR091	0.49144	0.28517	0.44171	0.24269	0.27101	0.27470	0.43648	1.00000	0.07216	0.34823	0.09507	0.43459
VAR092	0.29338	0.43568	0.45220	0.20818	0.60122	0.39838	0.29420	0.07216	1.00000	0.48972	0.18540	0.41459
VAR093	0.69001	0.77435	0.32902	0.29604	0.77331	0.75522	0.70979	0.34823	0.48972	1.00000	0.66913	0.55866
VAR094	0.45853	0.39844	-0.05763	0.08908	0.40370	0.48897	0.47917	0.09507	0.18540	0.66913	1.00000	0.47534
VAR095	0.39783	0.60714	0.29270	0.16591	0.47176	0.48544	0.52096	0.43459	0.41459	0.55866	0.47534	1.00000
VAR096	0.53497	0.65226	0.23507	0.18010	0.59503	0.51177	0.40916	0.37045	0.42505	0.63385	0.33151	0.48475
VAR097	0.39151	0.41803	0.33207	0.15437	0.61270	0.36753	0.28649	0.30131	0.66524	0.52900	0.33529	0.53474
VAR098	0.32584	0.32822	0.37976	0.30546	0.55904	0.38642	0.24506	0.14670	0.34908	0.53486	0.33093	0.31784
VAR099	0.13636	-0.02924	0.49898	0.24622	0.17546	-0.05382	0.06713	0.35021	0.09135	0.04910	-0.03022	0.19394
VAR100	0.71304	0.64648	0.38184	0.20889	0.52288	0.71754	0.53973	0.54279	0.30893	0.73132	0.42983	0.54279

	VAR096	VAR097	VAR098	VAR099	VAR100
VAR084	0.53497	0.39151	0.32584	0.13636	0.71304
VAR085	0.65226	0.41803	0.32822	-0.02924	0.64648
VAR086	0.23507	0.33207	0.37976	0.49898	0.38184
VAR087	0.18010	0.15437	0.30546	0.24622	0.20889
VAR088	0.59503	0.61270	0.55904	0.17546	0.52288
VAR089	0.51177	0.36753	0.38642	-0.05382	0.71754
VAR090	0.40916	0.28649	0.24506	0.06713	0.53973
VAR091	0.37045	0.30131	0.14679	0.35021	0.54279
VAR092	0.42505	0.66524	0.34908	0.09135	0.30893
VAR093	0.63385	0.52900	0.53486	0.04910	0.73132
VAR094	0.33151	0.33529	0.33093	-0.03022	0.42983
VAR095	0.48475	0.53474	0.31784	0.19394	0.54279
VAR096	1.00000	0.65479	0.58259	0.27733	0.57877
VAR097	0.65479	1.00000	0.42285	0.41827	0.37341
VAR098	0.58259	0.42285	1.00000	0.38854	0.45058
VAR099	0.27733	0.41827	0.38854	1.00000	0.06171
VAR100	0.57877	0.37341	0.45058	0.06171	1.00000

Pearson Correlation: Drumright

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE-Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

Pearson Correlation: Ponca City

A VALUE OF 99.00000 IS PRINTED
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	VAR084	VAR085	VAR086	VAR087	VAR088	VAR089	VAR090	VAR091	VAR092	VAR093	VAR094	VAR095
VAR084	1.00000	0.67358	0.56744	0.44674	0.69066	0.70285	0.45843	0.37922	0.34042	0.68721	0.42868	0.68513
VAR085	0.67358	1.00000	0.61158	0.47017	0.67317	0.52436	0.37448	0.33143	0.45866	0.56732	0.56026	0.67501
VAR086	0.56744	0.61158	1.00000	0.54941	0.55873	0.56108	0.50003	0.48908	0.68337	0.74402	0.43937	0.74665
VAR087	0.44674	0.47017	0.54941	1.00000	0.68453	0.58926	0.32886	0.40477	0.44505	0.62143	0.42396	0.50347
VAR088	0.69066	0.67317	0.55873	0.68453	1.00000	0.68469	0.43306	0.50641	0.51797	0.72957	0.55583	0.64452
VAR089	0.70285	0.52436	0.56108	0.58926	0.68469	1.00000	0.45350	0.56202	0.42921	0.65266	0.41177	0.64952
VAR090	0.45843	0.37448	0.50003	0.32886	0.43306	0.45350	1.00000	0.48831	0.49035	0.42631	0.33160	0.49540
VAR091	0.37922	0.33143	0.44908	0.40477	0.50641	0.56202	0.48831	1.00000	0.43819	0.66178	0.27021	0.53256
VAR092	0.34042	0.45866	0.68337	0.44505	0.51797	0.42921	0.49035	0.43819	1.00000	0.48209	0.33091	0.49872
VAR093	0.68721	0.66732	0.74402	0.62143	0.72957	0.65266	0.42631	0.66178	0.48209	1.00000	0.51733	0.77939
VAR094	0.42868	0.56026	0.43937	0.42396	0.55583	0.41177	0.33160	0.27021	0.33091	0.51733	1.00000	0.37358
VAR095	0.68513	0.67501	0.74665	0.50347	0.64452	0.64952	0.49540	0.53256	0.49872	0.77939	0.37358	1.00000
VAR096	0.46896	0.67382	0.65633	0.48138	0.69125	0.59140	0.31935	0.58455	0.52035	0.70580	0.44945	0.66345
VAR097	0.54277	0.72022	0.54784	0.47946	0.57108	0.43949	0.45015	0.33963	0.52962	0.49063	0.47225	0.59761
VAR098	0.72114	0.71344	0.61456	0.56703	0.56484	0.63479	0.41405	0.32019	0.43547	0.62123	0.58251	0.66775
VAR099	0.23063	0.04889	0.10744	0.05642	0.08615	0.20316	0.04182	0.09991	0.06560	0.16037	0.21078	0.17221
VAR100	0.48774	0.54889	0.45231	0.53973	0.56120	0.50868	0.51027	0.43820	0.46393	0.55416	0.32489	0.62552

	VAR096	VAR097	VAR098	VAR099	VAR100
VAR084	0.46896	0.54277	0.72114	0.23063	0.48774
VAR085	0.67382	0.72022	0.71344	0.04889	0.54889
VAR086	0.65633	0.54784	0.61456	0.10744	0.45231
VAR087	0.48138	0.47946	0.56703	0.05642	0.53973
VAR088	0.69125	0.57108	0.56484	0.08615	0.56120
VAR089	0.59140	0.43949	0.63479	0.20316	0.50868
VAR090	0.31935	0.45015	0.41405	0.04182	0.51027
VAR091	0.58455	0.33963	0.32019	0.09991	0.43820
VAR092	0.52035	0.52962	0.43547	0.06560	0.46393
VAR093	0.70580	0.49063	0.62123	0.16037	0.55416
VAR094	0.44945	0.47225	0.58251	0.21078	0.32489
VAR095	0.66345	0.59761	0.66775	0.17221	0.62552
VAR096	1.00000	0.66169	0.55402	0.07487	0.56942
VAR097	0.66169	1.00000	0.63268	0.09806	0.61638
VAR098	0.55402	0.63258	1.00000	0.32451	0.50491
VAR099	0.07487	0.09806	0.32451	1.00000	0.03817
VAR100	0.56942	0.61638	0.50491	0.03817	1.00000

Pearson Correlation: Ponca City

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 109

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR100 DRUMRIGHT

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR084
VAR085
VAR086
VAR087
VAR088
VAR089
VAR090
VAR091
VAR092
VAR093
VAR094
VAR095
VAR096
VAR097
VAR098
VAR099

MULTIPLE R	0.89640	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.80353	REGRESSION	16.	33.83452	2.11466	2.81183
ADJUSTED R SQUARE	0.51777	RESIDUAL	11.	8.27263	0.75206	
STANDARD ERROR	0.86721					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR084	0.3496956	0.27080	0.35928	0.947
VAR085	0.2017973	0.15144	0.54409	0.138
VAR086	0.2868579	0.18606	0.37331	0.590
VAR087	-0.79253550-01	-0.04988	0.26184	0.092
VAR088	-0.4480295	-0.26963	0.56443	0.630
VAR089	0.3925431	0.36007	0.31231	1.580
VAR090	-0.3697110	-0.31722	0.34864	1.125
VAR091	0.2803324	0.27554	0.22568	1.543
VAR092	-0.98332900-01	-0.06974	0.34123	0.084
VAR093	0.3185526	0.32918	0.37226	0.732
VAR094	-0.13414340-01	-0.00852	0.42124	0.001
VAR095	0.1198800	0.11783	0.25745	0.217
VAR096	0.33579570-01	0.02839	0.31142	0.012
VAR097	-0.32060810-01	-0.02323	0.42941	0.006
VAR098	0.3094634	0.17476	0.41247	0.563
VAR099	-0.2567840	-0.15882	0.36140	0.505
(CONSTANT)	0.2015358			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Drumright

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 109

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR100 PONCA CITY

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR084
VAR085
VAR086
VAR087
VAR088
VAR089
VAR090
VAR091
VAR092
VAR093
VAR094
VAR095
VAR096
VAR097
VAR098
VAR099

MULTIPLE R	0.78303
R SQUARE	0.61314
ADJUSTED R SQUARE	0.34401
STANDARD ERROR	1.41344

ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
REGRESSION	16.	72.82517	4.55157	2.27827
RESIDUAL	23.	45.94983	1.99782	

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR084	0.1760771	0.12629	0.43164	0.166
VAR085	0.65506700-01	0.05114	0.33933	0.037
VAR086	-0.7050275	-0.50099	0.39271	3.223
VAR087	0.5289571	0.35790	0.35244	2.252
VAR088	-0.3252411	-0.24019	0.43000	0.572
VAR089	-0.25744310-01	-0.01774	0.35039	0.005
VAR090	0.2980337	0.27206	0.20042	2.211
VAR091	-0.76988150-01	-0.06864	0.24063	0.102
VAR092	0.2305362	0.17887	0.26798	0.740
VAR093	0.1303655	0.10344	0.42046	0.096
VAR094	-0.30534500-01	-0.02028	0.29076	0.011
VAR095	0.4300968	0.38135	0.30259	2.020
VAR096	0.3591317	0.30519	0.34145	1.126
VAR097	0.2142385	0.16704	0.31540	0.463
VAR098	-0.1656654	-0.11043	0.41916	0.156
VAR099	-0.50109210-01	-0.03316	0.22477	0.050
(CONSTANT)	-0.2941334			

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression: Ponca City

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

CORRELATION COEFFICIENTS

PEARSON CORRELATION

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

	VAR083	VAR019	VAR020	VAR021	VAR022	VAR023	VAR024	VAR025	VAR026	VAR066	VAR067	VAR068
VAR083	1.00000	0.28806	0.54922	0.49721	0.48348	0.59540	0.45680	0.43233	0.56838	0.40447	0.26062	0.28568
VAR019	0.28806	1.00000	0.32643	0.35328	0.33165	0.33447	0.49965	0.40998	0.29386	0.26162	0.41960	0.12845
VAR020	0.54922	0.32643	1.00000	0.61705	0.73430	0.62804	0.46561	0.42311	0.52240	0.26848	0.07551	0.24713
VAR021	0.49721	0.35328	0.61705	1.00000	0.58401	0.72084	0.45994	0.46479	0.55095	0.19110	0.23147	0.22721
VAR022	0.48348	0.33165	0.73430	0.58401	1.00000	0.50199	0.54082	0.50544	0.55108	0.28661	0.19667	0.24501
VAR023	0.59540	0.33447	0.62804	0.72084	0.50199	1.00000	0.49585	0.53290	0.56240	0.20287	0.18271	0.13914
VAR024	0.49680	0.49965	0.46561	0.45994	0.54082	0.49585	1.00000	0.63238	0.51644	0.32660	0.38515	0.24710
VAR025	0.43233	0.40998	0.42311	0.46479	0.50544	0.53290	0.63238	1.00000	0.64621	0.33619	0.45446	0.22816
VAR026	0.56838	0.29386	0.52240	0.55095	0.55108	0.56240	0.51644	0.64621	1.00000	0.21155	0.18550	0.33508
VAR066	0.40447	0.26162	0.26848	0.19110	0.28661	0.20287	0.32660	0.33619	0.21155	1.00000	0.14402	0.38301
VAR067	0.26062	0.41960	0.07551	0.23147	0.19667	0.18271	0.38515	0.45446	0.18550	0.54402	1.00000	0.33973
VAR068	0.28568	0.12845	0.24713	0.22721	0.24501	0.13914	0.24710	0.22816	0.33508	0.38301	0.33973	1.00000
VAR069	0.50753	0.30754	0.45946	0.51669	0.45163	0.45915	0.43532	0.31735	0.36619	0.07862	-0.02254	0.01010
VAR070	0.59607	0.39957	0.48770	0.74331	0.44592	0.59185	0.40885	0.40458	0.56745	0.14394	0.19487	0.32345
VAR071	0.43212	0.29280	0.40581	0.49050	0.47736	0.41020	0.39500	0.43020	0.55110	0.25596	0.17698	0.29051
VAR072	0.45621	0.39437	0.44229	0.52610	0.46101	0.47490	0.61146	0.50137	0.29830	0.14712	0.18804	0.06424
VAR073	0.47912	0.47395	0.47186	0.66482	0.51137	0.59199	0.48942	0.52240	0.43713	0.18021	0.22398	0.23103
VAR074	0.37368	0.31581	0.45451	0.58824	0.53897	0.48476	0.43179	0.53189	0.59035	0.18117	0.15628	0.23112
VAR075	0.21796	0.23592	0.25813	0.29362	0.28575	0.29564	0.24488	0.43917	0.49152	0.10649	0.21693	0.19126
VAR045	0.51295	0.36896	0.43923	0.42308	0.33925	0.37844	0.40709	0.34604	0.18767	0.39959	0.38017	0.26355
VAR046	0.43556	0.26153	0.34099	0.35331	0.23002	0.31769	0.26580	0.30915	0.15304	0.31101	0.40024	0.06777
VAR047	0.55707	0.28074	0.44156	0.42366	0.34629	0.38464	0.30626	0.29116	0.24014	0.29667	0.24205	0.27502
VAR048	0.43234	0.38892	0.28012	0.40497	0.31845	0.49160	0.41339	0.29624	0.28591	0.20671	0.22676	0.12822
VAR049	0.31993	0.40057	0.29081	0.24749	0.36432	0.16104	0.52977	0.33002	0.26388	0.37862	0.27302	0.22920
VAR050	0.32189	0.25519	0.26920	0.28508	0.38692	0.31235	0.48433	0.43856	0.26905	0.16555	0.18388	0.10969
VAR051	0.42547	0.13355	0.46652	0.24846	0.27114	0.40538	0.34014	0.25215	0.30404	0.22068	0.11933	0.04828
VAR052	0.43938	0.20257	0.32919	0.53465	0.41387	0.31662	0.27930	0.20232	0.41781	0.31291	0.17503	0.17635
VAR053	0.44944	0.25636	0.55799	0.30070	0.47917	0.41138	0.26084	0.31926	0.53373	0.22681	-0.01781	0.06002
VAR054	0.38780	0.31046	0.42352	0.24801	0.20352	0.34416	0.26976	0.25931	0.40265	0.14533	0.04764	-0.00115
VAR055	0.32985	0.05154	0.35933	0.09349	0.17191	0.17260	0.13372	0.17419	0.24406	0.33736	-0.04515	0.27436
VAR056	0.29011	0.07367	0.36765	0.15260	0.14256	0.18095	0.08627	0.08580	0.14356	0.29905	-0.07948	0.12679
VAR057	0.31912	0.21856	0.19042	0.28394	0.21841	0.33572	0.37091	0.45340	0.43974	0.03113	0.13912	0.27035
VAR058	0.44332	0.55562	0.45766	0.69046	0.44780	0.48530	0.51115	0.47772	0.45168	0.14930	0.34192	0.18442
VAR059	0.44455	0.08390	0.50692	0.38561	0.24726	0.45490	0.24104	0.27192	0.31577	0.15238	0.06288	0.18549
VAR060	0.43998	0.27168	0.48124	0.57895	0.40966	0.44646	0.40273	0.41027	0.54949	0.09808	0.18484	0.36608
VAR061	0.58026	0.30936	0.45547	0.54310	0.53677	0.56116	0.51146	0.47596	0.65050	0.13093	0.22243	0.24855
VAR062	0.39388	0.22198	0.27019	0.33406	0.21046	0.28156	0.29255	0.40589	0.48665	0.30053	0.28563	0.28229
VAR063	0.48060	0.28313	0.42183	0.25192	0.28507	0.42885	0.44229	0.43117	0.43758	0.37756	0.34253	0.30140

Pearson Correlation: Var 019 - 26, 66 - 75, 45 - 63, 83

FILE COMFORT (CREATION DATE = 04/05/78) PREDICTION OF ONE Y FROM SEVERAL X'S

	VAR069	VAR070	VAR071	VAR072	VAR073	VAR074	VAR075	VAR045	VAR046	VAR047	VAR048	VAR049
VAR083	0.50753	0.59607	0.43212	0.45621	0.47912	0.37368	0.21796	0.51295	0.43556	0.55707	0.43234	0.31993
VAR019	0.30754	0.34957	0.29280	0.39437	0.47395	0.31581	0.23592	0.36896	0.26153	0.28074	0.38892	0.40057
VAR020	0.45946	0.48770	0.40581	0.44229	0.47186	0.45451	0.25813	0.43923	0.34099	0.44156	0.28012	0.29081
VAR021	0.51669	0.74331	0.49050	0.52610	0.66482	0.58824	0.29362	0.42308	0.35331	0.42366	0.40497	0.24749
VAR022	0.45163	0.44592	0.47736	0.46101	0.51137	0.53897	0.28975	0.33925	0.23002	0.34629	0.31845	0.36432
VAR023	0.45915	0.59185	0.41020	0.47490	0.59199	0.48476	0.29564	0.37844	0.31769	0.38464	0.49160	0.16104
VAR024	0.43532	0.40885	0.39500	0.61146	0.48942	0.43179	0.24488	0.40709	0.26580	0.30626	0.41339	0.52977
VAR025	0.31735	0.40458	0.43020	0.50137	0.52240	0.53189	0.43917	0.34604	0.30915	0.29116	0.28624	0.33002
VAR026	0.36619	0.56745	0.55110	0.29830	0.43713	0.59035	0.49152	0.18767	0.15304	0.24014	0.28591	0.26388
VAR066	0.07862	0.14394	0.25596	0.14712	0.18021	0.18117	0.10649	0.39959	0.31101	0.29667	0.20671	0.37862
VAR067	-0.02254	0.19487	0.17698	0.18804	0.22398	0.15628	0.21693	0.38017	0.40024	0.24205	0.22676	0.27302
VAR068	0.01010	0.32345	0.29051	0.06424	0.23103	0.23112	0.19126	0.26356	0.06777	0.27602	0.12822	0.22920
VAR069	1.00000	0.63382	0.45746	0.77862	0.64434	0.40024	0.20864	0.17920	0.08906	0.15073	0.36732	0.20261
VAR070	0.63382	1.00000	0.64997	0.51487	0.80534	0.63015	0.37295	0.36511	0.36080	0.36393	0.25132	0.12081
VAR071	0.45746	0.64997	1.00000	0.36288	0.62118	0.85568	0.57342	0.16619	0.14260	0.19986	0.06709	0.18912
VAR072	0.77862	0.51487	0.36288	1.00000	0.69277	0.40666	0.39367	0.30779	0.14861	0.19454	0.35190	0.38123
VAR073	0.64434	0.80534	0.62118	0.69277	1.00000	0.67388	0.46077	0.25675	0.21004	0.23548	0.31248	0.18745
VAR074	0.40024	0.63015	0.85568	0.40666	0.67388	1.00000	0.60708	0.11117	0.11964	0.16785	0.06088	0.12928
VAR075	0.20864	0.37295	0.57342	0.39367	0.46077	0.60708	1.00000	0.09159	0.08540	-0.04380	-0.04816	0.18185
VAR045	0.17920	0.36511	0.16619	0.30779	0.25675	0.11117	0.09159	1.00000	0.83121	0.82254	0.46504	0.35518
VAR046	0.08906	0.36080	0.14260	0.14861	0.21004	0.11964	0.08540	0.83121	1.00000	0.80318	0.22511	0.18433
VAR047	0.15073	0.36393	0.19986	0.19454	0.23548	0.16785	-0.04380	0.82254	0.80318	1.00000	0.44656	0.26756
VAR048	0.36732	0.25132	0.06709	0.35190	0.31248	0.06088	-0.04816	0.46504	0.22511	0.44656	1.00000	0.39888
VAR049	0.20261	0.12081	0.18912	0.38123	0.18745	0.12928	0.18185	0.35518	0.18433	0.26756	0.39888	1.00000
VAR050	0.29364	0.29666	0.20552	0.43122	0.30849	0.17929	0.10340	0.46375	0.35925	0.44779	0.39824	0.52235
VAR051	0.19281	0.26638	0.20386	0.13859	0.15679	0.19423	0.16840	0.34576	0.55295	0.58414	0.20335	0.26137
VAR052	0.28508	0.54957	0.49054	0.21690	0.39402	0.38973	0.19169	0.49275	0.40979	0.51935	0.25532	0.17870
VAR053	0.12015	0.33090	0.41308	0.09051	0.25976	0.36552	0.31455	0.46047	0.43411	0.48747	0.20100	0.22307
VAR054	0.16335	0.31385	0.30226	0.16759	0.21390	0.27340	0.27483	0.51206	0.59973	0.56015	0.16086	0.18018
VAR055	0.13811	0.11147	0.15291	0.04311	0.00641	0.11498	0.04767	0.36952	0.32154	0.46127	0.19339	0.14507
VAR056	0.13621	0.06207	0.02977	0.06220	-0.04264	-0.00015	-0.07899	0.42850	0.36841	0.55264	0.29436	0.10512
VAR057	0.34634	0.43977	0.43157	0.25049	0.43977	0.40622	0.24517	0.30006	0.24614	0.38758	0.36459	-0.05382
VAR058	0.56010	0.70568	0.51645	0.59127	0.70713	0.50563	0.31859	0.38453	0.27476	0.34194	0.44072	0.31506
VAR059	0.28514	0.33754	0.16866	0.20048	0.23392	0.16510	0.04918	0.46824	0.45132	0.50223	0.34051	0.17729
VAR060	0.32181	0.56879	0.40241	0.33546	0.46569	0.48016	0.27414	0.50963	0.45459	0.60178	0.41613	0.16316
VAR061	0.43890	0.56909	0.46500	0.36490	0.44518	0.52654	0.29408	0.36292	0.31687	0.50111	0.38993	0.17415
VAR062	0.22410	0.48665	0.39894	0.16594	0.35310	0.27606	0.21915	0.35486	0.30249	0.32551	0.17068	0.22349
VAR063	0.27166	0.23160	0.25532	0.23698	0.21753	0.19452	0.21901	0.44669	0.37522	0.49326	0.43460	0.28625

Pearson Correlation (Continued)

FILE COMPORT (CREATION DATE = 04/05/79) = PREDICTION OF ONE Y FROM SEVERAL X'S

	VAR050	VAR051	VAR052	VAR053	VAR054	VAR055	VAR056	VAR057	VAR058	VAR059	VAR060	VAR061
VAR048	0.32189	0.42547	0.43934	0.44944	0.38780	0.32985	0.29011	0.31912	0.44332	0.44455	0.43933	0.58026
VAR049	0.25919	0.13355	0.20257	0.25636	0.31046	0.05154	0.07367	0.21956	0.35562	0.08390	0.27168	0.30435
VAR050	0.25923	0.46952	0.52719	0.55795	0.42352	0.35933	0.36765	0.19042	0.45769	0.50692	0.48124	0.45547
VAR051	0.23508	0.24346	0.51465	0.39073	0.24901	0.09349	0.15260	0.28304	0.69046	0.38561	0.57895	0.54810
VAR052	0.38692	0.27114	0.41387	0.47017	0.20352	0.17191	0.14256	0.21841	0.44780	0.24726	0.40966	0.53677
VAR053	0.31235	0.20538	0.31662	0.41138	0.34414	0.17263	0.18095	0.33572	0.48530	0.43470	0.64646	0.56116
VAR054	0.48433	0.34014	0.27930	0.26084	0.26076	0.13372	0.08627	0.37091	0.51115	0.24104	0.40273	0.51146
VAR055	0.43656	0.25213	0.20232	0.31926	0.25931	0.17419	0.08580	0.45360	0.47772	0.27192	0.41027	0.47596
VAR056	0.26935	0.30434	0.41781	0.53373	0.42265	0.24406	0.14356	0.43474	0.45163	0.31577	0.54949	0.65050
VAR057	0.19553	0.22068	0.31291	0.22681	0.14533	0.33736	0.29905	0.03113	0.14930	0.15238	0.09808	0.13093
VAR058	0.13338	0.11934	0.17503	-0.01781	0.34764	-0.34515	-0.37944	0.13912	0.34192	0.06298	0.18484	0.22243
VAR059	0.10869	0.04828	0.17635	0.06002	-0.00115	0.27436	0.12671	0.27035	0.18442	0.18649	0.36503	0.24865
VAR060	0.27364	0.19231	0.28508	0.12015	0.16335	0.13811	0.13521	0.34534	0.36010	0.29514	0.32181	0.43890
VAR061	0.29946	0.26034	0.54057	0.33040	0.31345	0.11147	0.16707	0.43077	0.76558	0.33754	0.56879	0.56909
VAR062	0.20552	0.20336	0.39054	0.41308	0.33225	0.15291	0.09377	0.43157	0.51045	0.16866	0.40241	0.46500
VAR063	0.42122	0.13359	0.21693	0.09051	0.16759	0.04311	0.15220	0.25044	0.27127	0.20054	0.33545	0.36490
VAR064	0.33849	0.15679	0.39402	0.25976	0.21390	0.00541	-0.04754	0.43977	0.72713	0.23332	0.44569	0.44518
VAR065	0.17929	0.19923	0.43873	0.36532	0.37340	0.11495	-0.00015	0.45022	0.50363	0.16513	0.48016	0.52554
VAR066	0.16340	0.16360	0.41154	0.31455	0.27433	0.24767	-0.07309	0.24317	0.31457	0.04914	0.27414	0.29438
VAR067	0.18175	0.15978	0.42275	0.46047	0.31206	0.26552	0.17853	0.30005	0.44453	0.25324	0.33353	0.35292
VAR068	0.36426	0.05245	0.33979	0.43411	0.59973	0.32134	0.36841	0.24614	0.27476	0.45132	0.45469	0.31687
VAR069	0.44779	0.28814	0.41335	0.48747	0.56315	0.46127	0.35254	0.38758	0.34194	0.43223	0.53178	0.50111
VAR070	0.39824	0.20389	0.29512	0.20130	0.16086	0.19339	0.20435	0.36459	0.43072	0.33051	0.41513	0.38993
VAR071	0.52235	0.29137	0.17870	0.27307	0.13114	0.14537	0.12512	-0.05312	0.31506	0.17729	0.16316	0.17415
VAR072	1.00000	0.50356	0.34026	0.41255	0.31830	0.25393	0.25043	0.33624	0.36427	0.41254	0.44286	0.36965
VAR073	0.50336	1.00000	0.45013	0.67715	0.70063	0.52132	0.49725	0.33820	0.17765	0.61428	0.53150	0.41299
VAR074	0.34026	0.45013	1.00000	0.55203	0.44746	0.26934	0.19183	0.39725	0.13333	0.37436	0.49336	0.53863
VAR075	0.41255	0.67715	0.55203	1.00000	0.75569	0.31402	0.33455	0.29324	0.27599	0.38583	0.51745	0.43013
VAR076	0.31830	0.70063	0.44746	0.75569	1.00000	0.45551	0.45911	0.31605	0.24273	0.56647	0.51994	0.39991
VAR077	0.25393	0.52132	0.26934	0.31402	0.45551	1.00000	0.43935	0.35953	-0.37054	0.54633	0.30263	0.29449
VAR078	0.25043	0.49725	0.19183	0.33455	0.45911	0.43935	1.00000	0.33404	-0.31009	0.52464	0.32102	0.31352
VAR079	0.33624	0.33820	0.39725	0.29324	0.31605	0.35953	0.33404	1.00000	0.36648	0.33052	0.53661	0.59408
VAR080	0.36427	0.17765	0.13333	0.27599	0.24273	-0.37054	-0.31009	0.36648	1.00000	0.20117	0.42184	0.51057
VAR081	0.41254	0.61428	0.37436	0.38583	0.56647	0.54633	0.52464	0.33052	0.20117	1.00000	0.57319	0.45596
VAR082	0.44286	0.53150	0.49336	0.51745	0.51994	0.30263	0.32102	0.53661	0.42184	0.57319	1.00000	0.68799
VAR083	0.36965	0.41299	0.53863	0.43013	0.39991	0.29449	0.31352	0.59408	0.51057	0.45596	0.68799	1.00000
VAR084	0.32300	0.29044	0.47237	0.33001	0.32172	0.29295	0.23663	0.43391	0.38954	0.44074	0.37204	0.43901
VAR085	0.43279	0.34116	0.35299	0.38260	0.45958	0.63478	0.56932	0.34543	0.20412	0.55782	0.51631	0.51891

Pearson Correlation (Continued)

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

	VAR062	VAR063
VAR083	0.39088	0.48060
VAR019	0.22198	0.28313
VAR020	0.27019	0.42183
VAR021	0.33406	0.25192
VAR022	0.21046	0.28507
VAR023	0.28156	0.42885
VAR024	0.29255	0.44229
VAR025	0.40589	0.43117
VAR026	0.48665	0.43758
VAR066	0.30053	0.37756
VAR067	0.28563	0.34253
VAR068	0.28229	0.30140
VAR069	0.22410	0.27166
VAR070	0.48665	0.23160
VAR071	0.39894	0.25532
VAR072	0.16594	0.23698
VAR073	0.35310	0.21753
VAR074	0.27606	0.19452
VAR075	0.21915	0.21931
VAR045	0.35486	0.44659
VAR046	0.30249	0.37522
VAR047	0.32551	0.49326
VAR048	0.17068	0.43460
VAR049	0.22349	0.28625
VAR050	0.32300	0.43279
VAR051	0.28063	0.64116
VAR052	0.47237	0.25299
VAR053	0.33001	0.38260
VAR054	0.39172	0.45958
VAR055	0.29295	0.63478
VAR056	0.24668	0.56932
VAR057	0.43391	0.54543
VAR058	0.38954	0.20412
VAR059	0.44074	0.65782
VAR060	0.37004	0.51631
VAR061	0.43901	0.51891
VAR062	1.00000	0.37973
VAR063	0.37973	1.00000

Pearson Correlation (Continued)

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * *

VARIABLE LIST 1
REGRESSION LIST 1

DEPENDENT VARIABLE.. VAR083

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR019
VAR020
VAR021
VAR022
VAR023
VAR024
VAR025
VAR026
VAR066
VAR067
VAR068
VAR069
VAR070
VAR071
VAR072
VAR073
VAR074
VAR075

MULTIPLE R	0.80074
R SQUARE	0.64119
ADJUSTED R SQUARE	0.49099
STANDARD ERROR	0.90971

ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
REGRESSION	18.	63.59169	3.53287	4.26894
RESIDUAL	43.	35.58573	0.82758	

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR019	-0.87454170-01	-0.08986	0.11542	0.574
VAR020	0.1533152	0.13574	0.18218	0.708
VAR021	-0.2624836	-0.30598	0.15660	2.810
VAR022	0.53789700-01	0.04677	0.18220	0.087
VAR023	0.2737509	0.29976	0.14120	3.759
VAR024	0.21138910-01	0.02175	0.15480	0.019
VAR025	-0.1236328	-0.11808	0.17313	0.510
VAR026	0.3366950	0.32533	0.18997	3.141
VAR066	0.2309383	0.24142	0.11590	3.970
VAR067	0.1265818	0.08499	0.20917	0.366
VAR068	-0.45144600-01	-0.03315	0.15685	0.083
VAR069	-0.11802650-01	-0.01294	0.19027	0.004
VAR070	0.3890504	0.47681	0.18413	4.464
VAR071	0.79148700-01	0.09207	0.18145	0.190
VAR072	0.2332595	0.27822	0.19922	1.371
VAR073	-0.1302814	-0.15610	0.18203	0.512
VAR074	-0.1068304	-0.13246	0.17880	0.357
VAR075	-0.1540869	-0.14453	0.16095	0.916

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

Multiple Regression: Var 019 - 26, 66 - 75, 83

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 109

(CONSTANT) 0.96842080-01

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression (Continued)

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 111

FILE - COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 2

DEPENDENT VARIABLE.. - VAR083

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR063
VAR045
VAR046
VAR047
VAR048
VAR049
VAR050
VAR051
VAR052
VAR053
VAR054
VAR055
VAR056
VAR057
VAR058
VAR059
VAR060
VAR061
VAR062

MULTIPLE R	0.75792	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
R SQUARE	0.57445	REGRESSION	19.	56.97222	2.99854	2.98396
ADJUSTED R SQUARE	0.38194	RESIDUAL	42.	42.20520	1.00489	
STANDARD ERROR	1.00244					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F
VAR063	0.1676341	0.13869	0.23057	0.529
VAR045	0.2738192D-01	0.02006	0.33544	0.007
VAR046	0.1298095	0.08908	0.40730	0.102
VAR047	0.3580205	0.25795	0.34910	1.052
VAR048	0.1814066	0.18486	0.15057	1.452
VAR049	0.1851246D-01	0.02290	0.12249	0.023
VAR050	-0.1406552	-0.12266	0.16925	0.691
VAR051	-0.2546962D-01	-0.01799	0.32789	0.006
VAR052	0.4844165D-01	0.05390	0.15005	0.104
VAR053	0.2765941	0.20332	0.22173	1.556
VAR054	-0.2174044	-0.16803	0.26046	0.697
VAR055	0.5128989	0.43470	0.31683	2.621
VAR056	-0.5354823	-0.46017	0.31146	2.956
VAR057	-0.1451009	-0.14501	0.17074	0.722
VAR058	0.1165797	0.13775	0.12667	0.855
VAR059	0.6911724D-01	0.06336	0.21727	0.101
VAR060	-0.1848653	-0.19235	0.16848	1.204

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

Multiple Regression: Var 045 - 63, 83

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 112

VAR061	0.3457061	0.35162	0.16696	4.288
VAR062	0.5937828D-01	0.06596	0.12652	0.220
(CONSTANT)	-0.7093970			

---ALL VARIABLES ARE IN THE EQUATION

Multiple Regression (Continued)

COMFORT ANALYSIS IN LOW INCOME HOUSING 04/05/78 PAGE 114

FILE COMFORT (CREATION DATE = 04/05/78) - PREDICTION OF ONE Y FROM SEVERAL X'S

* MULTIPLE REGRESSION * * * * * * * * * * * * * VARIABLE LIST 1
REGRESSION LIST 3

DEPENDENT VARIABLE.. VAR083

VARIABLE(S) ENTERED ON STEP NUMBER 1.. VAR063
VAR019
VAR020
VAR021
VAR022
VAR023
VAR024
VAR025
VAR026
VAR066
VAR067
VAR068
VAR069
VAR070
VAR071
VAR072
VAR073
VAR074
VAR075
VAR045
VAR046
VAR047
VAR048
VAR049
VAR050
VAR051
VAR052
VAR053
VAR054
VAR055
VAR056
VAR057
VAR058
VAR059
VAR060
VAR061
VAR062

		ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F
MULTIPLE R	0.89754					
R SQUARE	0.80557	REGRESSION	37.	79.89475	2.15932	2.68757
ADJUSTED R SQUARE	0.50583	RESIDUAL	24.	19.28267	0.80344	
STANDARD ERROR	0.89635					

VARIABLES IN THE EQUATION

VARIABLE	B	BETA	STD ERROR B	F

VARIABLES NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	TOLERANCE	F

Multiple Regression: Var 019 - 26, 66 - 75, 45 - 63, 83

VAR063	0.97968850-01	0.08105	0.28386	0.119
VAR019	-0.2058560	-0.21152	0.16589	1.468
VAR020	0.89285310-01	0.07905	0.30943	0.083
VAR021	-0.2516118	-0.29331	0.19519	1.662
VAR022	-0.2535583	-0.22047	0.25212	1.011
VAR023	0.2946825	0.32268	0.21573	1.866
VAR024	0.87538650-01	0.09006	0.21299	0.169
VAR025	-0.1728811	-0.16512	0.27338	0.400
VAR026	0.3089236	0.29850	0.28582	1.168
VAR066	0.12405050-01	0.01297	0.17738	0.005
VAR067	0.4361551	0.29284	0.34885	1.563
VAR068	-0.32800980-01	-0.02409	0.28805	0.013
VAR069	0.2338330	0.25633	0.29274	0.638
VAR070	0.4533157	0.55557	0.32137	1.990
VAR071	-0.1350429	-0.15709	0.25628	0.278
VAR072	0.1142726	0.13633	0.30964	0.136
VAR073	-0.25248940-03	-0.00030	0.23845	0.000
VAR074	0.1376568	0.17068	0.25865	0.283
VAR075	-0.34205220-01	-0.03208	0.22304	0.024
VAR045	0.1495046	0.10954	0.44686	0.112
VAR046	-0.2664306	-0.18284	0.73810	0.130
VAR047	0.8506533	0.61289	0.48489	3.078
VAR048	0.53523320-01	0.05434	0.21675	0.061
VAR049	0.74149470-01	0.09170	0.14490	0.262
VAR050	-0.11524500-01	-0.01005	0.19817	0.003
VAR051	-0.2202120	-0.15555	0.47740	0.213
VAR052	-0.34418590-01	-0.03829	0.20991	0.027
VAR053	0.3892744	0.37059	0.44830	0.754
VAR054	-0.1453999	-0.11238	0.37474	0.151
VAR055	0.86432840-01	0.07326	0.41851	0.043
VAR056	-0.82989590-01	-0.07132	0.42357	0.038
VAR057	-0.1149946	-0.11492	0.21721	0.280
VAR058	-0.2501381	-0.29556	0.23038	1.179
VAR059	-0.21767780-01	-0.01996	0.26499	0.007
VAR060	-0.4684109	-0.48738	0.20403	5.271
VAR061	0.1799614	0.18304	0.19099	0.888
VAR062	-0.27087780-01	-0.03309	0.13821	0.038
(CONSTANT)	-2.079400			

ALL VARIABLES ARE IN THE EQUATION

Multiple Regression (Continued)

APPENDIX E

HOUSING PROPOSAL

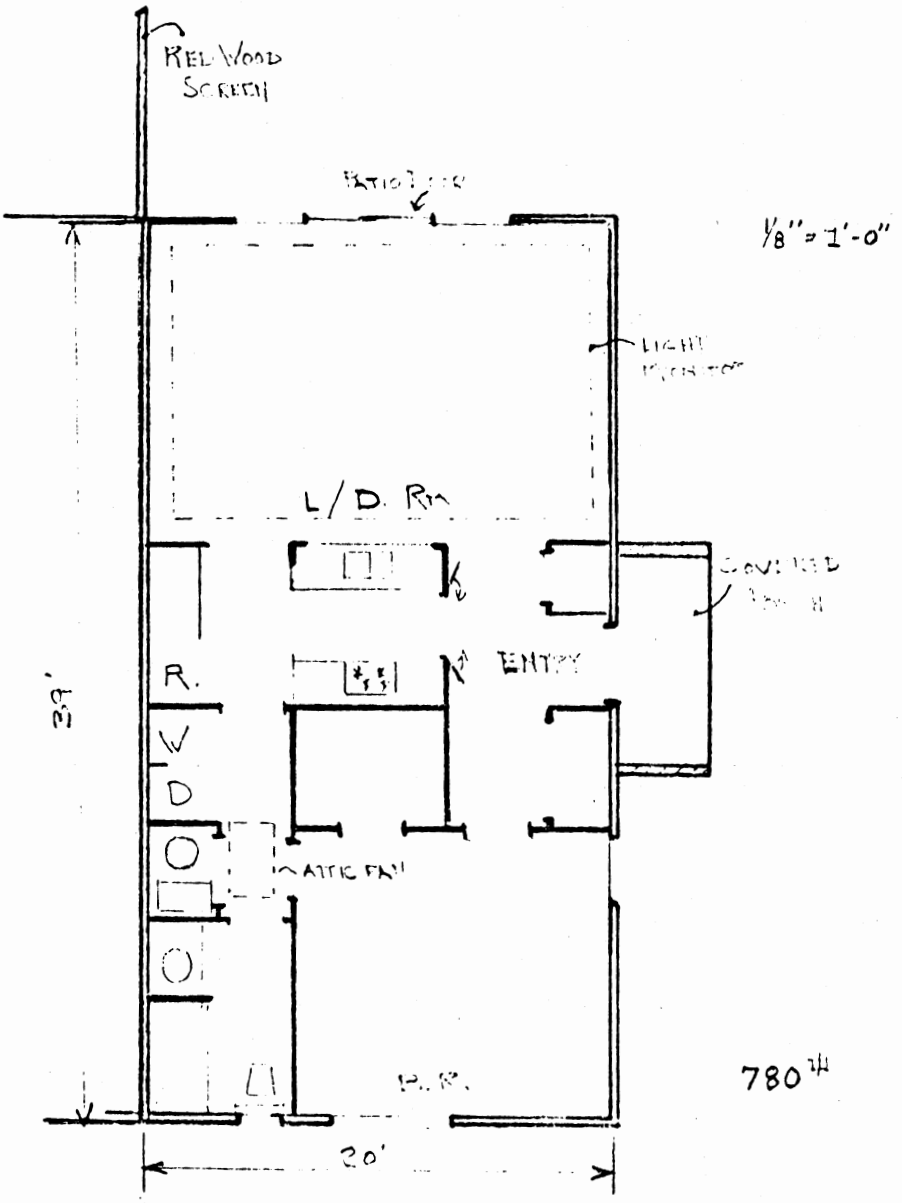

Figure 24. Proposed One Bedroom Unit

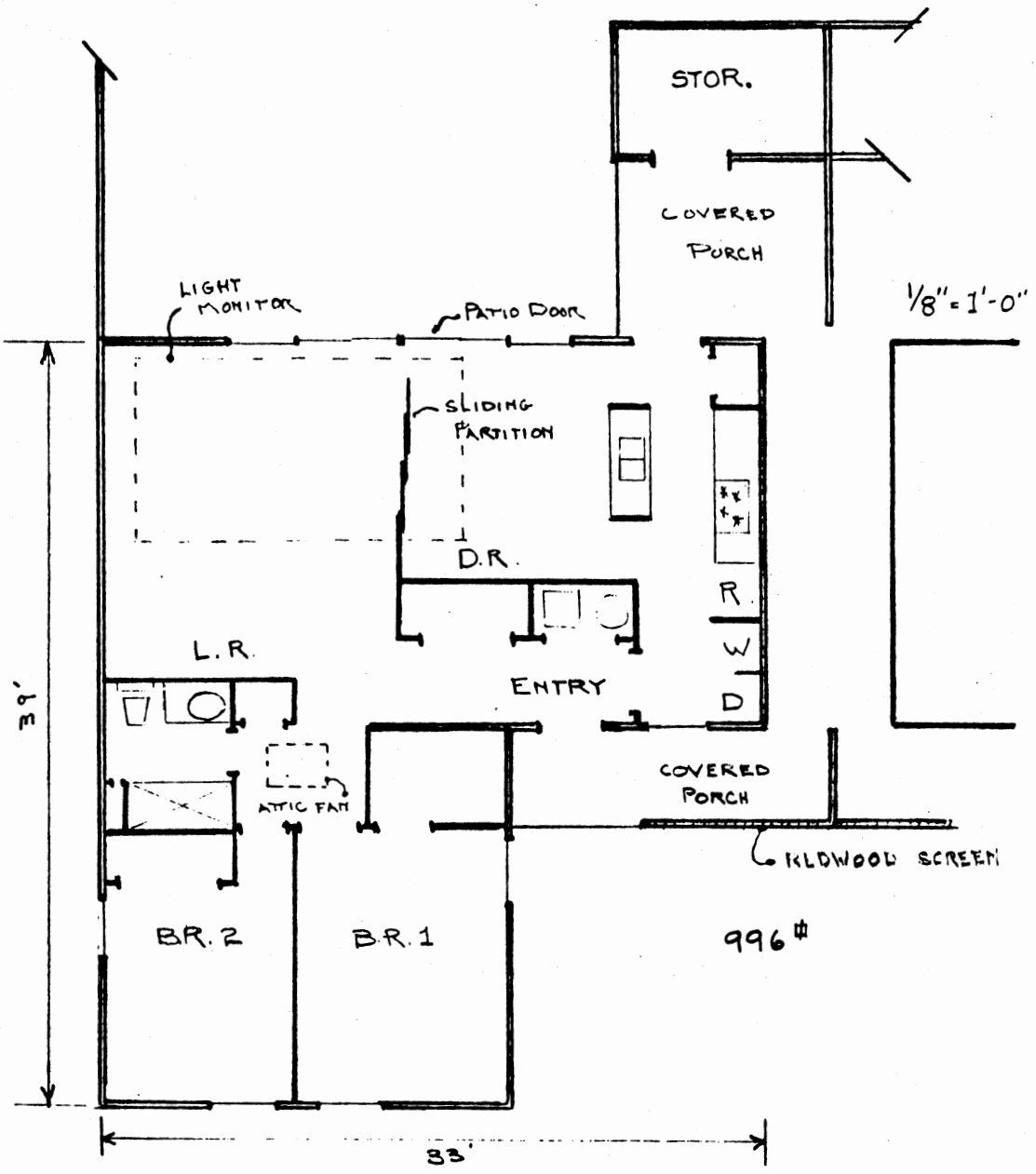

Figure 25. Proposed Two Bedroom Unit

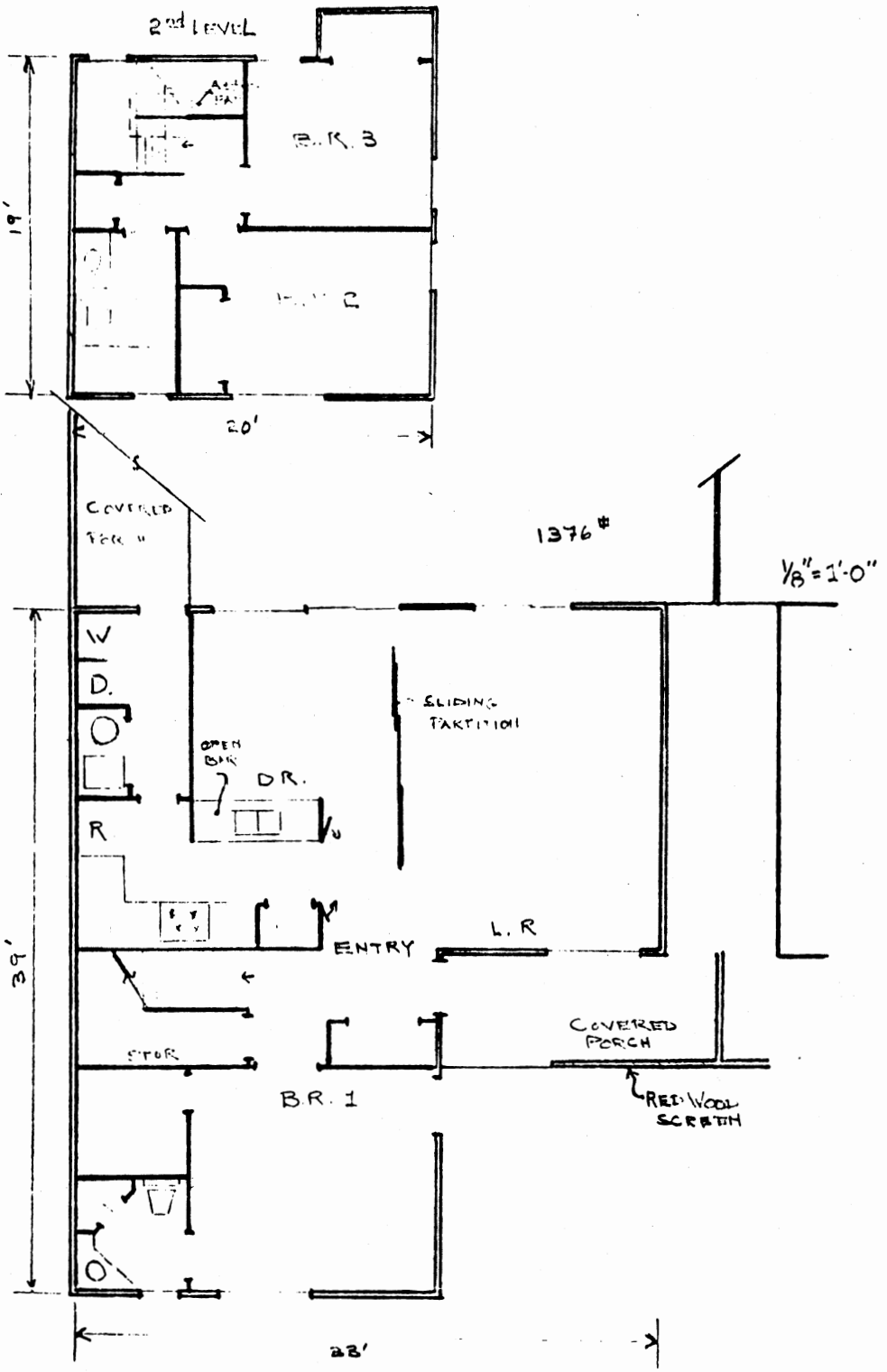

Figure 26. Proposed Three Bedroom Unit (two levels)

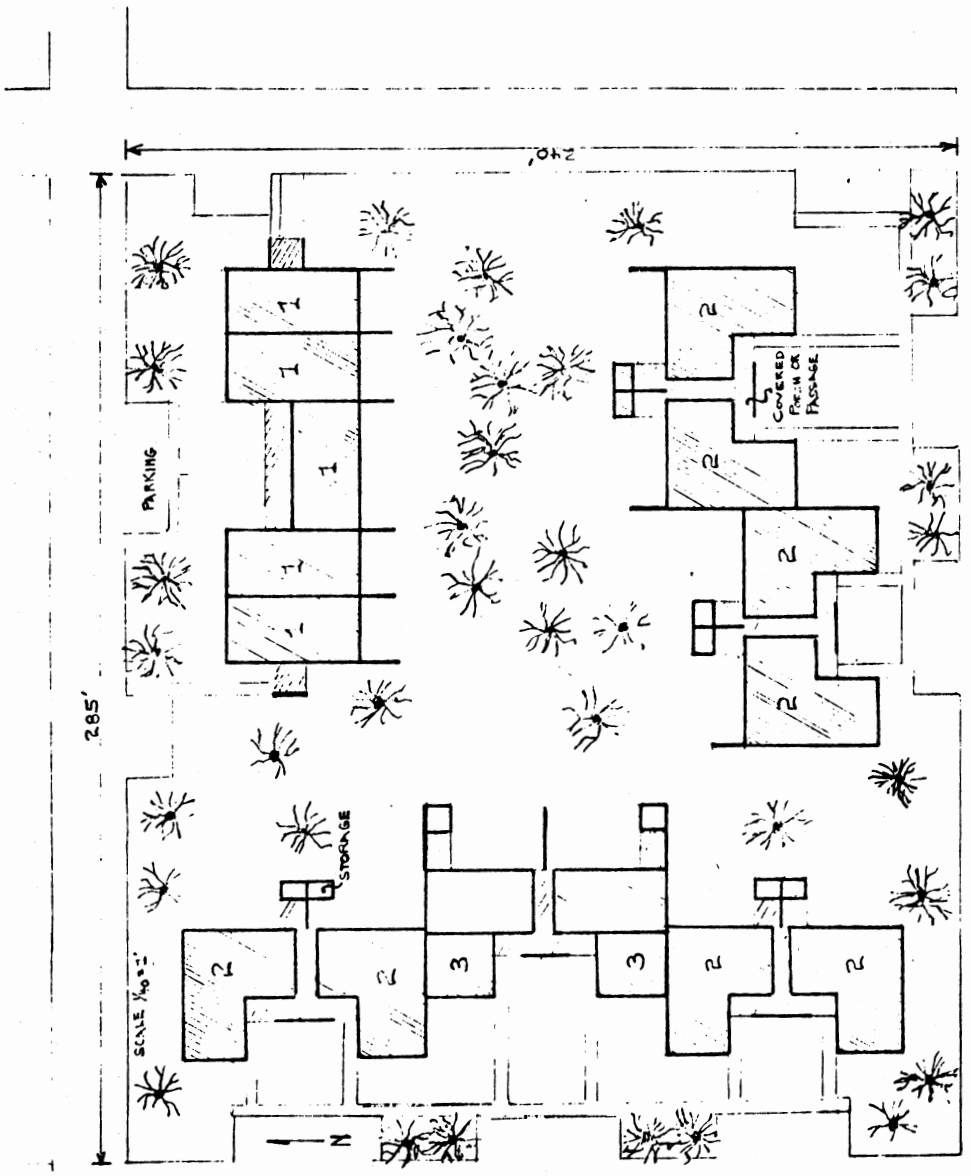

Figure 27. Proposed Site Plan 15 Units

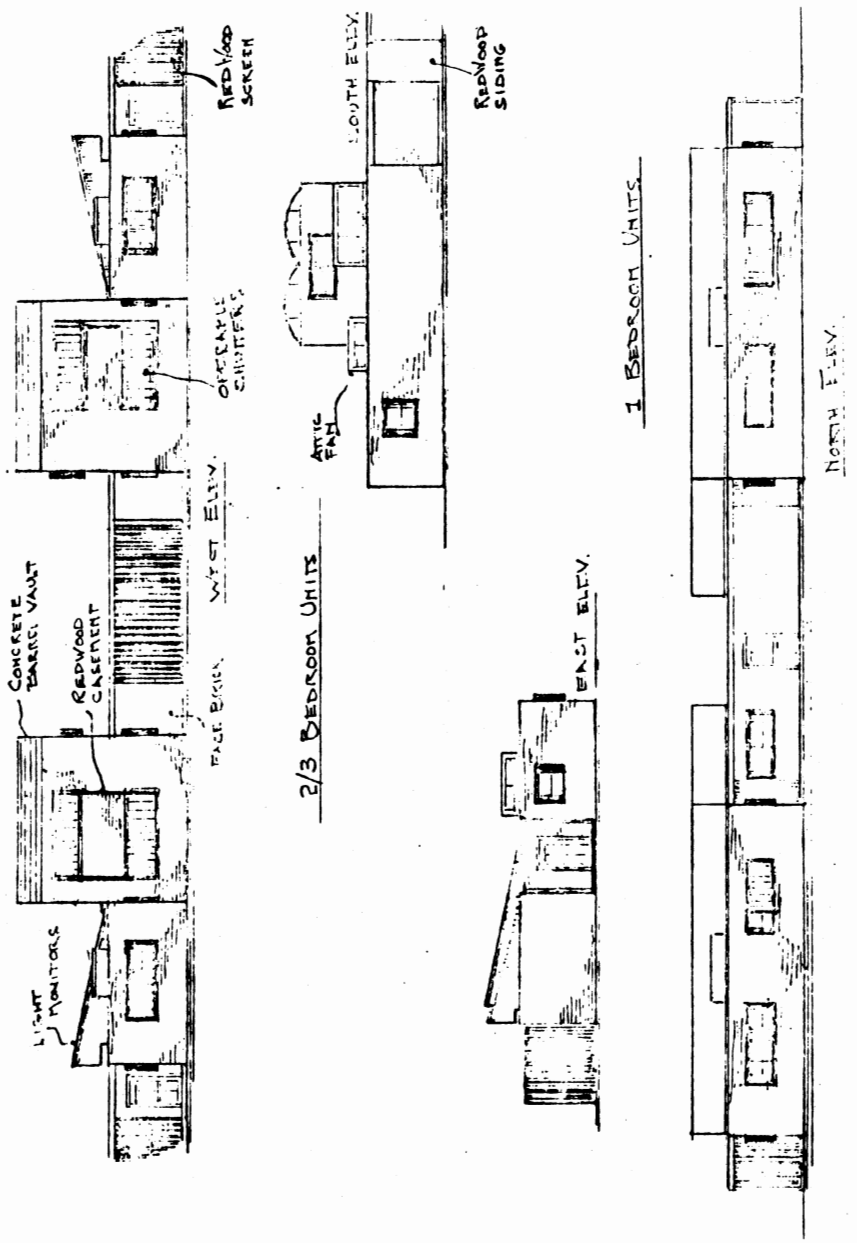

Figure 28. Proposed Elevations

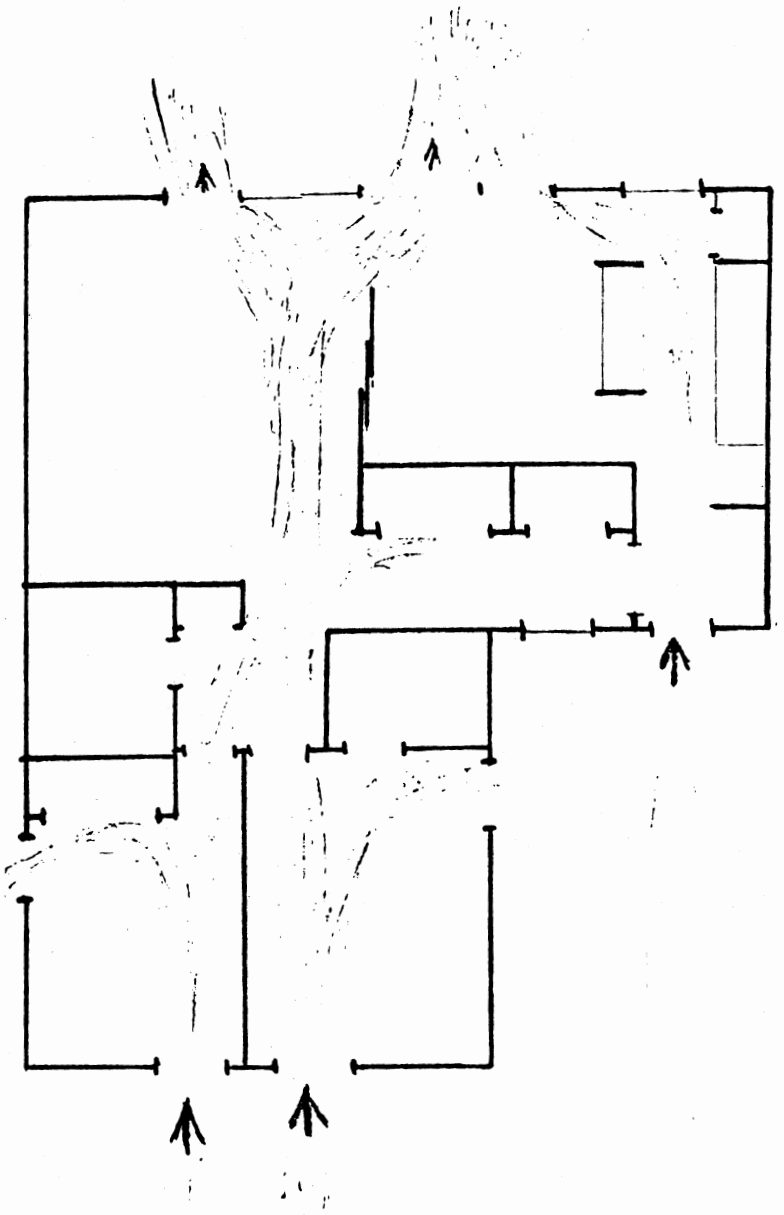

Figure 29. Wind Diagram for Wind Perpendicular To Street Facade; Two Bedroom Unit

PROJECT DESCRIPTION

One of the major considerations in designing the new units for Drumright was an efficient utilization of space, both in unit plan and in site plan. The existing site is approximately 285 feet by 240 feet, and is located on a hill top in southeast Drumright. The units, two 3-bedroom, eight 2-bedroom, and five 1-bedroom, were grouped around the perimeter of the lot using minimum set backs from the residential street. This allows for off-street parking that is close to the unit, yet not requiring drives or "turn-around" paved surfaces. The small front yard provides some transition area from the public street to the semi-private front porch areas.

The most important feature of the perimeter grouping is that it allows the common ground in the center of the lot to work to fullest advantage. All living areas are oriented to this center and, by virtue of wing walls extending from the units, each residence has a semi-private "backyard" opening into the commons. By use of berms and landscaping, a natural "visual screen" can be erected offering privacy to the rear living areas. However, a natural screen, such as trees and shrubs, would not be so dense as to completely block the view of the opposite units, thereby offering the neighbors some degree of "security viewing" in case of trouble.

On the exterior, all windows facing the street have been surrounded with heavy redwood casing that encloses operable redwood shutters.

These shutters provide both sun and wind control. They can also provide privacy from the public street. All physical recommendations from Chapter VI (i.e. solid core doors, etc.) are to be incorporated. Porches are screened with redwood slats to allow air movement and visual privacy. Suggested facade and paving material would be brick.

Within each unit, space has been provided for a washer and dryer, as well as full-sized kitchen appliances. In the two and three bedroom units, the wall between the living and dining areas slides in sections to provide one open room, two distinct rooms, or a partially divided room. In the one and two bedroom units, the living areas have windows on only one exposure. Therefore, a sloping ceiling with a clerestory has been included to allow more light. The second story of the larger units has been roofed with barrel vaults. This is also to allow more light with clerestories in the end of the vaults, and to create a greater illusion of space in the small rooms. All units have been provided with attic fans, and walls have been arranged to take advantage of the summer winds (Figure 29). Northern exposures have been kept to a minimum, or are to be protected by planted wind breaks. An entry separate from the living room is provided in each unit. This offers a measure of both privacy and thermal control.

VITA

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