

**INDOOR ENVIRONMENT ACCEPTABILITY IN THE
CONTINUING CARE RETIREMENT COMMUNITY SETTING**

by

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ABSTRACT



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The focus of this study was to evaluate the perceptions of the building systems that make up the interior environments of the Continuing Care Retirement Community (CCRC). The building systems explored here are related to factors that affect the acceptability of the indoor environment in the CCRC setting: lighting, heating and cooling, sounds, smells, and the physical space. The value of these factors and their related quality was explored for both older residents and staff in skilled health care, assisted living, and independent living options with the CCRC environment. The quality of the environmental systems, as rated by its users, was then compared to the actual physical characteristics of the setting in order to evaluate the characteristics of these systems that were found to be acceptable. The study also measured the relative importance of these systems in order to describe those factors deemed most valuable by the environment's users.

This study was conducted at three continuing care retirement communities in northeast Kansas. A purposive sample of ten staff and ten residents within each living option was targeted at each site. Both residents and staff at each location volunteered to participate in the study. Data collection tools previously developed for assessing the indoor environments of office settings were modified and utilized for CCRC settings. Three types of techniques were employed to collect data: a Satisfaction Rating Scale, a Descriptive Environmental Assessment Checklist, and a Relative Value Rating Scale.

ABSTRACT

The results showed, in almost all settings, the global dimension of heating and cooling was rated as the most important characteristic of the indoor environment. The dimensions of lighting or physical space were either second or third by most groups, and sounds and smells were fourth and fifth respectively in all cases. Within the global dimensions, residents and staff rated some characteristics differently. Residents consistently rated the importance of artificial lighting as the most important feature of the lighting environment, while staff rated sunlight as most important. Under the dimension of sound, residents rated the importance of "having the appropriate noise level in a space" as the most important feature, while staff rated reducing unwanted noises from other areas as most important. Ratings for the characteristics under the dimensions of smells and physical space were more varied, but both residents and staff rated temperature as the most important feature of heating and cooling. The Satisfaction Rating Scale and the Descriptive Environmental Assessment were then compared to reveal possible links between the actual physical characteristics of the settings and resident and staff perceptions of the space. These comparisons, paired with the results of the relative value scale, were then developed into design considerations to assist administrator, facilities managers, and designers in the planning and design of the CCRC environment.

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CHAPTER 1

INTRODUCTION

The long-term care setting refers to environments that provide a range of health and social services for elderly persons, including those who may require assistance with activities of daily living (Oriol, 1985). These settings are often part of Continuing Care Retirement Communities or CCRC's that provide long-term care for elderly residents by offering a planned, centrally administered continuum of shelter and care accommodations within the same facility (Golant, 1992). Thus, in addition to being a place of residence, these long-term care facilities provide health care and require complete staffing encompassing administrative, health care, and housekeeping personnel. This residential types results in a highly diverse group of end users within the facility who may have varying perceptions of the indoor environment as a result of their differing roles and the physiological changes associated with aging. For example, the amount of light an 85 year old resident needs to perform a daily task may be significantly greater than the amount or type of light than is typically specified for an interior space; therefore, the perceptions of the amount of light, the quality of light, or the importance of lighting appropriate for a resident's room or nurse's station may differ greatly between the two users.

The focus of this study was to evaluate the perceptions of the building systems that make up the interior environment in the CCRC settings. The building systems explored

here relate to factors that affect the acceptability of the indoor environment. The factors that contribute to the acceptability of the indoor environment in continuing care retirement communities include: lighting, heating and cooling, sounds, smells, and the physical space. The value of these factors and their related quality was explored for both older residents and staff in skilled health care, assisted living, and independent living options within the CCRC environment. The quality of the environmental systems, as rated by its users, was then compared to the actual physical characteristics of the setting in order to evaluate the characteristics of these systems that were found to be acceptable. The study also measured the relative importance of these systems in order to describe those factors which were deemed most valuable by the environment's users. These ratings and characteristics were combined to yield an assessment of the indoor environment acceptability of the continuing care retirement community settings, which should enhance the understanding of both long-term care managers and designers.

Review of the Literature

The CCRC Setting

The Continuing Care Retirement Community; (CCRC) settings can provide a broad umbrella of housing options and services including independent living, assisted living, and skill health care. These types of housing services are oriented toward persons over 55 years of age and are most typically utilized by persons 65 and older who are

retired (AARP, 1994). Each living option is characterized by the level of care that is provided.

Independent Living. Independent living in a CCRC setting is often apartment living with self-contained areas for living, dining, kitchen, bedroom and bathroom. Some facilities also provide duplexes or small single family homes on the site. This living option most typically requires that the residents be able to fully take care of themselves in the areas of personal care and activities of daily living. Most services, such as meals and housekeeping, are optional and are provided on a limited basis (Hunt, Feldt, Marans, Pastalan, and Vakalo, 1983). Staff at this living option are employed dominantly in administrative, building support, and service-oriented positions. Medical staff is usually not a part of this living option.

Assisted Living. Assisted living is a relatively new concept in housing services for frail elderly, and forms of assisted living can vary from facility to facility (Kane, 1993). Some CCRC's have separate living units for assisted living residents. These units can vary from private rooms to self-contained apartments similar to those in independent living. Other facilities provide assisted living only as a service within their independent living option. Both forms of assisted living provide various support services for functional losses while allowing residents to maintain maximum control over their lives and living environments (Kane, 1993). Staffing for this living option usually requires some form of nursing staff in addition to administrative and building support staff.

Skilled Health Care. Skilled health care combines residential living with medical services and custodial care. Residents in this type of setting require more extensive health care services than are provided in an assisted living setting. In skilled care settings, the personal living space of the resident is often reduced to a single room, sometimes shared with another resident (Koncelik, 1976). Meals and other social activities in skilled care living are centrally planned and located (Lawton, 1986). Nursing staff and nursing support staff dominate this setting. The number of administrative personnel and building support staff are proportionally smaller in overall numbers than other settings in a CCRC.

Each of these living options may be available within a single CCRC. The physical characteristics of each option may vary greatly, and thus the perceptions of the environments may also vary. While these living options have often been studied individually and by different disciplines, very little research apparently exists comparing indoor environment acceptability between the different living options or between different user groups such as residents and staff.

Residents in the CCRC Setting

Elderly persons relocate to continuing care retirement communities for various reasons and enter at various levels of living options. It is important to note that older people show enormous variability in their capacities and competencies (Birren and Schaie 1990). The major problem in residential design for older people is in the fact that aging is a process and most building programs assume an essentially static state for users and

usage and may not account for changes over time (Howell, 1990). Hiatt (1987) notes that sensory impairments are more frequent in aging populations, and of those people relocating to long-term care environment, a high percentage are experiencing one or more sensory losses. These physiological losses associated with aging will affect the perceptions of environmental sensory input. These changes may result in loss of independence that requires relocation to a setting that provides opportunities for control within a structured environment. Independence can be related to satisfaction one has with the environment in which one can function to the best of one's abilities. Elements that contribute to satisfaction with the environment can vary from user group to user group based on their characteristics and needs. It has been noted by some authors that due to the fact that sensory impairments are more frequent in aging populations, older people's perceptions of the environment and its input may be different than younger persons, such as staff who may work in the same environments (Hiatt, 1987, Bell et al., 1990, Grant, 1989, Evans and Cohen, 1990).

Staff in the CCRC Setting

Quality of care involves staff at many levels from administrative to housekeeping. Management of these environments involves and complex structure of training, policy orientation, and administrative time. It is costly to replace and retrain staff, and turnover disrupts the stability of the facility (Regnier and Hamilton, 1991). Satisfaction with the work environment has been shown to have positive effects for staff (Veneklasen and Cornell, 1991). This positive influence can affect one's perceptions of the job, the

organization, and other life satisfactions, and this has direct implications for productivity measures such as tardiness, absenteeism, and turnover (Wineman, 1986). While no equally detailed parallel studies involving long-term care exist, these findings suggest that burnout and high turnover rates endemic among staff in long-term care facilities may be reduced by improving the environmental quality of these settings (Cohen and Weisman, 1991). There also are significant economic factors involved related to the cost-effectiveness of providing services. Staff are involved in the care and support of residents on a full time basis. The speed, accuracy, and convenience with which they work will affect not only those they serve but also the economics of service and health care. Improvements in productivity and longevity may not come from further automation but from work places that are more satisfying from a human standpoint (Deasy and Lasswell, 1985). Staff in the field of long-term care need environments that support their daily activities and provide comfortable surroundings, while also recognizing the needs of other user groups who may share building spaces.

Environmental Assessment in the CCRC Setting

Environmental assessment is a general concept for describing and predicting how attributes of places relate to a wide range of cognitive and affective behavioral responses. Assessment of the indoor environment involves two approaches, the physical measurement of the environmental constituents themselves or the descriptive environmental assessment (Craik and Feimer, 1987) and the evaluation of those constituents by the occupants of the space in question (Rohles, Woods, and Morey, 1989) or the evaluative environmental

assessment (Craik and Feimer, 1987). Past research on shelter care settings for elderly has provided valuable insights into ways in which the organizational structures and the built environment relate, but most research has focused on the holistic environment related to social settings and service preferences rather than on indoor environmental systems.

For example, the Multiphase Environmental Assessment Procedure (MEAP) developed by Moos (1976) is a set of tools for measuring and describing the holistic environments of sheltered care settings including long-term care environments. This approach is comprised of five separate parts, including the Physical and Architectural Features Checklist (PAF), the Policy and Program Information Form (POLIF), and the Resident and Staff Information Form (RESIF). The section of this tool devoted to the physical environment (PAF), is composed of a checklist of questions concerning various aspects of the facility such as social and circulation settings, staff work areas, private residential spaces, and general facilities characteristics. The measurements of the environment come from ratings established by an outside observer and statements made by residents and staff who occupy the space. This approach gives points for various features of the environment and results in an overall score for the setting. While this tool provides a rating for various features and characteristics, there is no actual measurement of the features themselves.

Howell (1980) has also conducted extensive research in group housing for elderly persons. This research again focuses on the holistic environment including the social and community resources that affect the behavioral settings. Within this assessment of the housing environment, the effects and significance of the building systems are discussed.

Building systems are the physical and environmental characteristics that shape the indoor environment. The way in which these systems are shaped are determined by design and construction methods. In multiple housing units construction for this type of user group is often a repetitive building process and is based on the concept of duplicating design features and details. Howell notes that this type of approach to design and construction is often standardized and may not take into account the differences of various housing groups and their special needs or preferences (Howell, 1980).

While Howell notes that construction methods for environments for the elderly may not take into account the special needs and preferences of the diverse user groups within the setting, she provides no tool by which to assess the building systems and compare them to the preferences of the users.

Indoor Environmental Acceptability in CCRC Settings

Indoor environment acceptability can be defined as the perceived quality of those identified environmental elements that are recognized as affecting the interior space positively or negatively. For example, nursing homes are often associated with having an institutional odor. This characteristic may affect the users' satisfaction with the environment in a negative way. The acceptability model seeks to assess descriptive attributes of environmental elements in order to provide evaluative criteria for specific settings (Craik and Feimer, 1987). This concept of indoor environment acceptability consists of three main questions:

1. What is the physical characteristic of the identified element? (actual)
2. How good or bad is the element? (perceptual)
3. How valuable is the element to the users? (perceptual)

The construct of indoor environmental acceptability and the development of a rating scale for measuring these characteristics has been previously utilized to evaluate acceptability of the work place. In the study "Indoor Environment Acceptability: The Development of a Rating Scale," Rohles, Woods, and Morey (1989) identified four major indoor environmental factors critical to the acceptability of the indoor environment in the work place: acoustics, air quality, lighting, and thermal comfort, and developed a rating scale by which to measure the relative perceived value of these factors as they related to the perceived quality of the indoor office environment. The sample for the study included students and secretarial staff. Although age was not measured directly in this study, the results suggested that differences in satisfaction levels and perceived value of the constituents might be linked to age. Other researchers have studied the quality of the work place in relationship to environmental systems. Veneklasen and Cornell (1991) studied the relationship between satisfaction with the work environment and employee productivity. Their results suggest that high satisfaction with the work environment has positive effects such as increased productivity and reduced absenteeism. While acceptability has been studied in the work place, the interrelated expectations about acceptability in continuing care retirement communities, where problems in dimensions

such as acoustics and air quality may differ from those in traditional office environments, warrants study (Cohen and Weisman, 1991).

Five Building Systems of Indoor Environment Acceptability in the CCRC Setting

This study focuses on the environmental factors identified as important by users in CCRC environments: lighting, heating and cooling, sounds, smells, and the physical space. The importance of each of these factors has been explored in settings for older adults, and each has implications for satisfaction with the building environment within specific settings.

Lighting. Due to the high dependence of visual tasks, lighting is one of the most frequently studied characteristics on the indoor environment. Normal age-related changes in vision involve a decreasing visual acuity and a decrease in the ability to focus on objects at different distances. Older people also find it difficult to see well under low light conditions (Regnier, 1988). Design modifications that can decrease the environmental barriers associated with loss of sight in nursing homes include reducing the presence of glare and minimizing changes in lighting levels while increasing the overall amount of lighting in order to perform daily tasks (Grant, 1989). Regnier and Hamilton (1991) note that these types of lighting modifications can also assist residents in an assisted living setting to remain more independent for longer periods of time. Even at levels of independent living and higher functioning, one of the first modifications older residents will make is the addition of lighting in areas of high activity (AARP, 1992). These findings

suggest that lighting may be a critical environmental systems for elderly persons, especially in setting they frequently occupy, such as living spaces. Staff preferences may differ, however, due to physiological differences and differences in task.

Heating and Cooling. Thermal comfort in the home environment is often a critical factor in environmental satisfaction. ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) has studied thermal environmental conditions for human occupancy and developed standards that specify conditions in which 80% or more of the occupants will find the environment thermally acceptable. These ranges of comfort vary slightly according to seasonal conditions (ASHRAE, 1992). Thermal preferences may, however, rise slightly for aging populations; thus, perceptions of comfortable temperature may vary according to age (Rohles and Johnson, 1989). In a planned environment where heating and cooling may be centrally controlled, users may be more susceptible to discomfort associated with temperature. Being able to regulate the temperature in one's own home may add to the perception of a comfortable environment (Rohles, 1989).

Sound. Hearing loss, one of the first changes experienced with aging (Hiatt, 1987), can be a critical sensory issue (Regnier, 1988). Two major changes occur in hearing with age: difficulty in perceiving high-pitched tones and problems in hearing voices against background noise (Hiatt, 1985). Increasing the absorption of unwanted sound in spaces in which conversation take place and minimizing background noise, particularly

low-frequency sound, may increase the persons ability to hear normal conversation. For hearing-impaired persons, groups larger than six to eight may make participatory conversation difficult. One of the greatest differences between home environments and institutional settings is the quality of the acoustical environment. Institutional settings have often been designed with hard, smooth surfaces and non-porous materials (Hiatt, 1985). These finishes create acoustically poor environments. Since a higher proportion of residents in a CCRC setting may have hearing difficulties (Hiatt, 1987), their perceptions and satisfaction with acoustical features may differ from staff.

Smells. Smells can either be good or bad. Bad smells (or odors) can create unpleasant perceptions about the environment, making the setting seem dirty or undesirable. Odors can be a problem in skilled health care facilities where incontinence may occur (Koncelik, 1987). Many times the problems of odors are associated with housekeeping, and nursing procedures in handling such incidents (Aranyi and Goldman, 1980). Pleasant smells can also help to create a more homelike environment. The presence of smells such as food cooking or a vase of fresh cut flowers can add to the overall environment satisfaction one perceives. The acuity of smell, however, decreases as the body ages. By 61 years of age, sensory receptors in the nose may be depleted, leaving a person without the ability to detect smells in their environments. Elderly persons are also less likely to discriminate odors and smells than younger persons (Corso, 1981). This physiological change could result in the preferences that residents and staff have with regard to the olfactory environment.

Physical Space. The physical space can involve various parts of the indoor environment, including the number of people in the space and perceptions of crowding, the amount of furnishings in the space, and the ability to have the desired amount privacy. From the perspective of health care nursing for the elderly, Grant (1989) and Kayser-Jones (1989) studied the affects that the physical environment had on residents' perceptions of the skilled care setting. Kayser-Jones (1989) documented resident dissatisfaction with dining accommodations in their facilities associated with crowding and high noise levels. Smaller size appears to contribute to a higher level of social interaction in nursing homes, whereas for independent older persons, larger facilities tend to be associated with a higher level of social involvement (Lemke and Moos, 1989) Responsiveness to the activities to be performed needs to be incorporated into facility layout, room configuration, and size, and material choices. Buildings designed without adequate information on the daily routine may be more costly to manage and may be over-designed for some users and under-designed for others (Hiatt, 1987). Since living space is traditionally reduced as the level of care increases, perception about the amount of space required for personal items such as furnishings may greatly be affected by different living option. CCRC's are also providing a range of services that require extensive staff, and thus adequate space for these staff to perform their jobs.

Significance

With an aging population that will grow to 1.9 million by 1995, it is expected that \$70 billion will be expended on long-term care for the elderly. This population represents one of the fastest growing segments of the health care industry, and it is predicted that 4.3 million elders will be living in long-term care facilities such as CCRC's by the year 2040 (American College of Health Care Administrators, 1992). These trends have significant implications not only for the aging population, but also for the demand this will create for employment in the long-term care field and the construction and remodeling of long-term care facilities. This growth will create a need to focus more specifically on the development and modification of environments that are supportive and responsive to multiple user needs. Past research in long-term care has emphasized such areas as space needs related to human factors (e.g. Howell, 1980). This research explores the perceptions of indoor environment acceptability and satisfaction as related to the environmental factors and architectural systems. By evaluating the perceptions of these settings by its users, the acceptability of the indoor environment in the long-term care setting may be better understood.

To apply research findings to the built environment, it is necessary to evaluate existing facilities in order to learn from previous building experience (Hiatt, 1987). Regnier (1988) notes that design research in gerontology and other aspects of life-span development has played a fundamental role in the development of design research methodologies and the creation of new knowledge. It is necessary to continue to evaluate the environments that affect so many people. The diversity of individuals reactions to

environmental settings highlights the importance of matching specific groups of persons with appropriate environments (Moos, 1987) Wineman (1986) notes that research needs to move beyond the single setting case study and look at results across settings including organizations, job types, and features. The results of such evaluations may provide new ways of thinking about long-term care and shed light on ways to reduce costs across various levels of planning and service.

With an environment that must support two such diverse user groups, it is valuable to identify those elements and architectural systems that contribute both positively and negatively to the perceptions of quality for both groups of users. The results of this research study are relevant to the fields of architecture and health care as its efforts are directed toward the advancement of practical knowledge for use in establishing policy and design for not only new facilities but also for the retrofit and remodeling of existing facilities. With a field of service that is growing at such an accelerated rate, facilities will become more competitive as consumers and employees have more choices about where to live and work. Understanding the factors that contribute to residential and work satisfaction will enable long-term care facilities to provide environments that are sensitive to the preferences of their users. By linking the perceived value of environmental factors and the specific architectural characteristics of a particular setting, it may be possible to suggest specific design implications, especially regarding environmental systems, that will assist architects and facility managers in enhancing user satisfaction with the indoor environments of continuing care retirement communities. Such links could have

significant impacts on future decision making in the planning of CCRC facilities, new or existing, by helping to establish priorities in the early stages of programming.

Objectives

The purpose of this study was to identify the perceived value of the environmental characteristics critical in the continuing care retirement community environments as they related to different users at varying levels of care. The first objective was to determine the environmental characteristics valued as most important for residents and staff within each of the living options: independent living, assisted living, and skilled health care. The second objective was to determine if there were differences in the relative values of the characteristics between residents and staff within each living option. Third, the study explored whether like groups varied in their responses from setting to setting. The fourth objective explored the links between the perceived quality of the environmental characteristics and the actual features and characteristics of the architectural systems used in the settings. Finally, the study developed design recommendations to assist designers, administrators, and facility managers in enhancing the indoor environment acceptability of continuing care retirement communities for residents and staff.

CHAPTER 2

METHODS AND PROCEDURES

Setting and Sample Population

Setting: Continuing Care Retirement Communities

This study was conducted at three continuing care retirement communities in northeast Kansas. All offered options in independent living, assisted living, and skilled health care. A fourth facility was used as a pretest site, but offered only assisted living and skilled health care. These facilities were selected based upon the living options they provided, their accessible location for data collection, and administration's willingness to participate.

Site 1. The first facility selected was a for-profit CCRC. This continuing care retirement community is located on the western edge of the city limits of a major metropolitan area, approximate population 120,000. The site encompasses a campus of services and separate living options including independent living, assisted living, and skilled health care (see Figures 2.1 and 2.2).

There are two main buildings on the site. The congregate building is the location for apartment living residents and staff who provide services for residents in the 102

independent apartments and 66 cottages and duplex houses. The other major building is for skilled health care services which encompasses assisted living and skilled care living options in two separate wings. Both buildings are completely staffed with administrative and housekeeping personnel; assisted living and skilled care are both staffed with health service personal as well. According to resident profiles at Site 1 in 1993, there were 295 residents on the campus: 205 in independent living (including those in the cottages and duplexes), 30 in assisted living, and 60 in skilled health care. The average age of residents at admission is 83.8 years. Most residents are from the state of Kansas, with only 25 of the current residents coming from out of state. The average economic status of residents is middle to upper-middle income. Many of the residents are retired professionals and white collar workers and most have some college education. Due to the size of Site 1, the number of administrative positions is fairly high. As a result, the number of responses from these positions included in the sample is also fairly high. These employees are college educated in areas such as business, marketing, long-term care administration, accounting, and nutrition. Administrative support staff encompass secretarial and clerical personnel. Health care staff include nurses, nurses aides, physical therapy, and medical aides. Other job levels include housekeeping, maintenance, and cooking services.

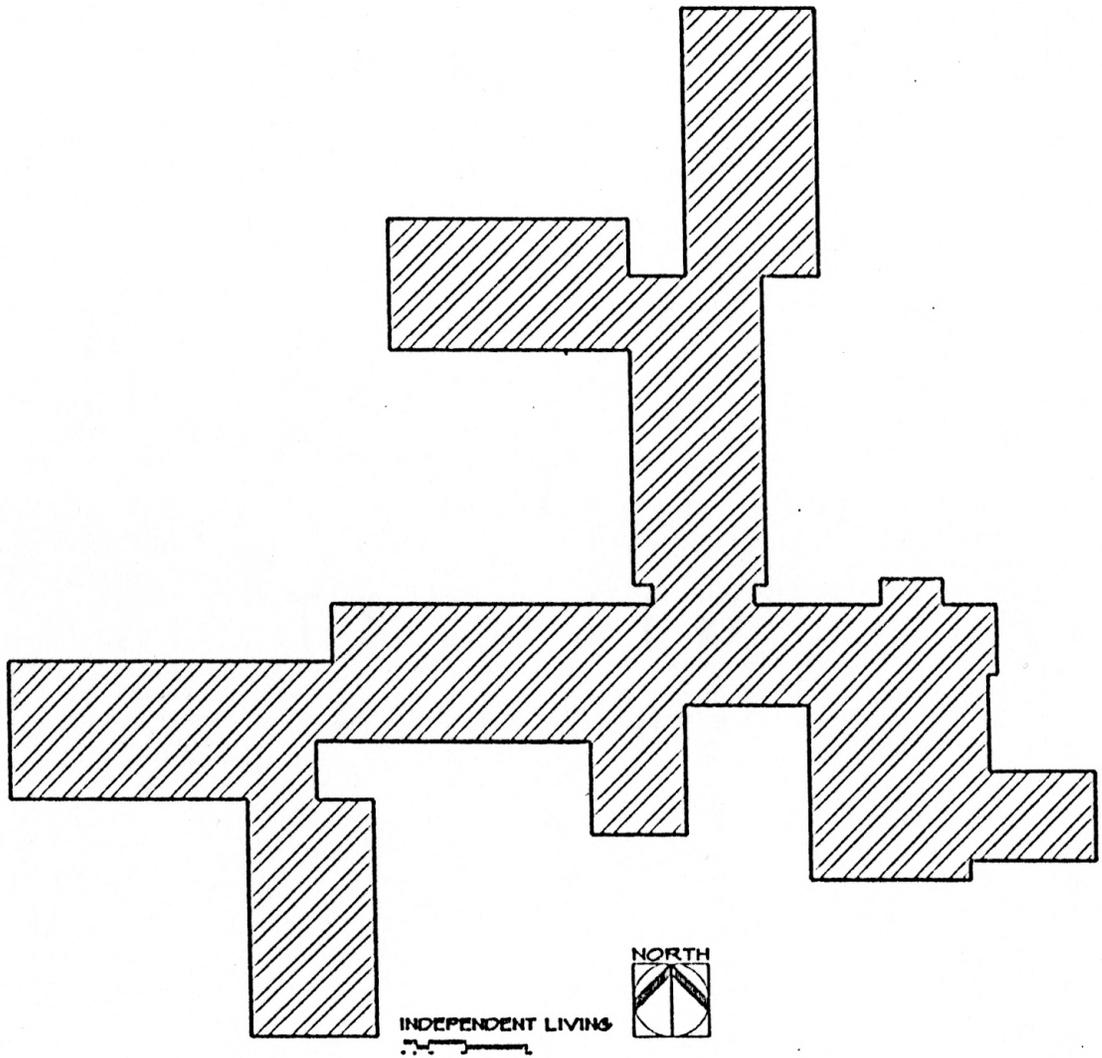


Figure 2.1. Independent Living Building - Site 1.

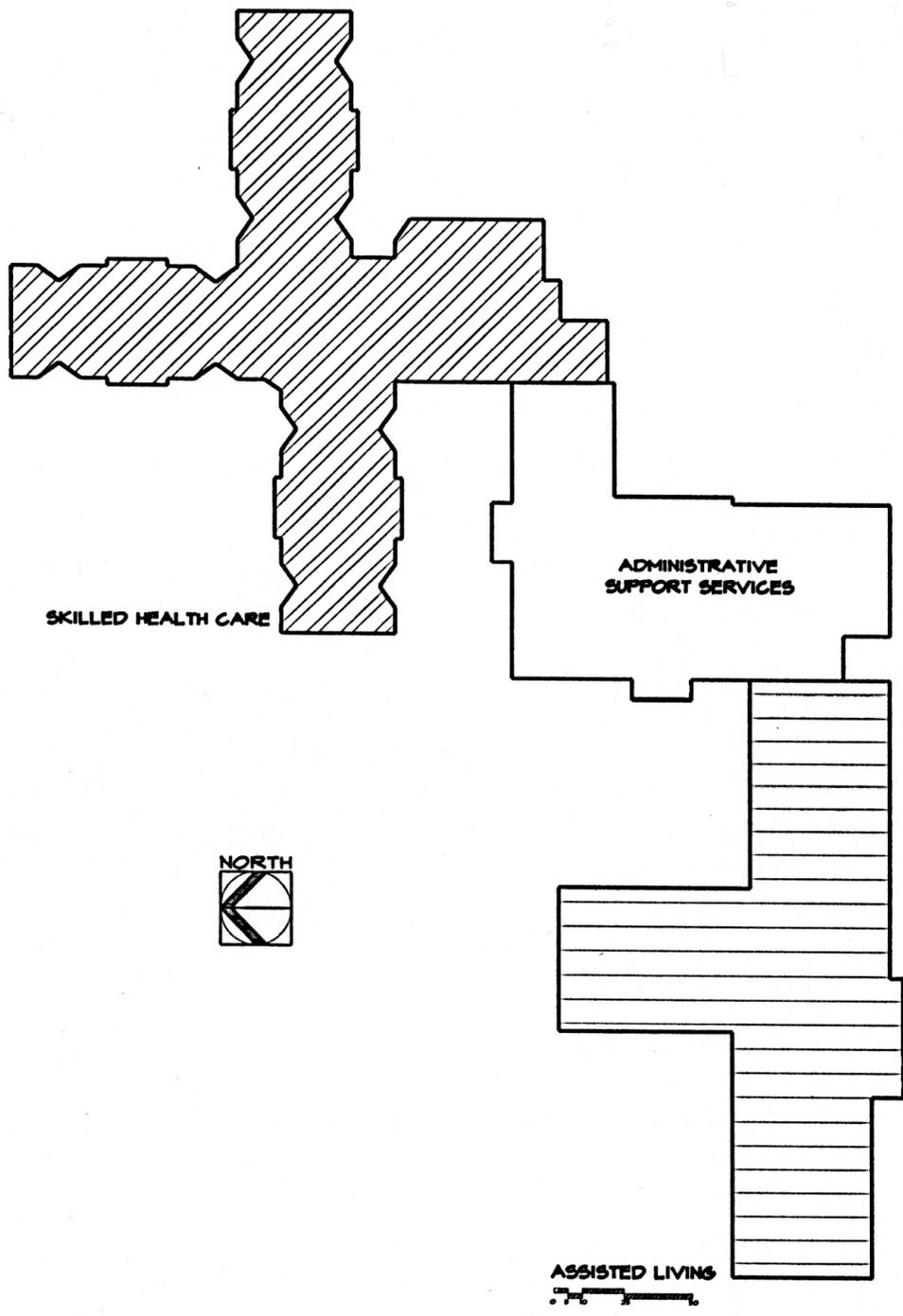


Figure 2.2. Assisted Living and Skilled Care Building - Site 1.

Site 2. Site 2 is located on the western edge of a small city, approximate population 18,000. Site 2 was established as a for-profit nursing home, but expanded in 1984 to provide 28 apartments for independent living. This section of apartments at Site 2 is called the "Estates." This addition is attached to the care facility by a hallway that serves as a staff area for building maintenance and support services such a laundry (see Figures 2.3 and 2.4).

While Site 2 offers only two separate living options; independent apartment living and skilled health care, assisted living is offered on a service basis for those residents in independent apartments who may need extra help. This service is operated by an outside, independent, home health agency, but the main office is located at the facility across from the apartment manager's office. Many residents at Site 2 come from agriculture or military backgrounds. A precise profile of residents was not available from this facility, but the average age of residents sampled was estimated to be in the middle 80's with some residents well over 90 years of age. The average economic status of residents falls between upper- lower and lower-middle income with a high proportion of residents in skilled care relying entirely on Medicaid funding. The majority of staff at Site 2 are employed in the areas of health services with a high proportion being nurses aides. The administrative and administrative support staff is a small proportion of the overall total and is primarily located in the skilled care unit. Due to this distribution, a high proportion of staff who participated in the study were from health services. The apartments are managed by a single apartment manager. Support staff for the apartments include clerical, housekeeping, and cooking personnel.

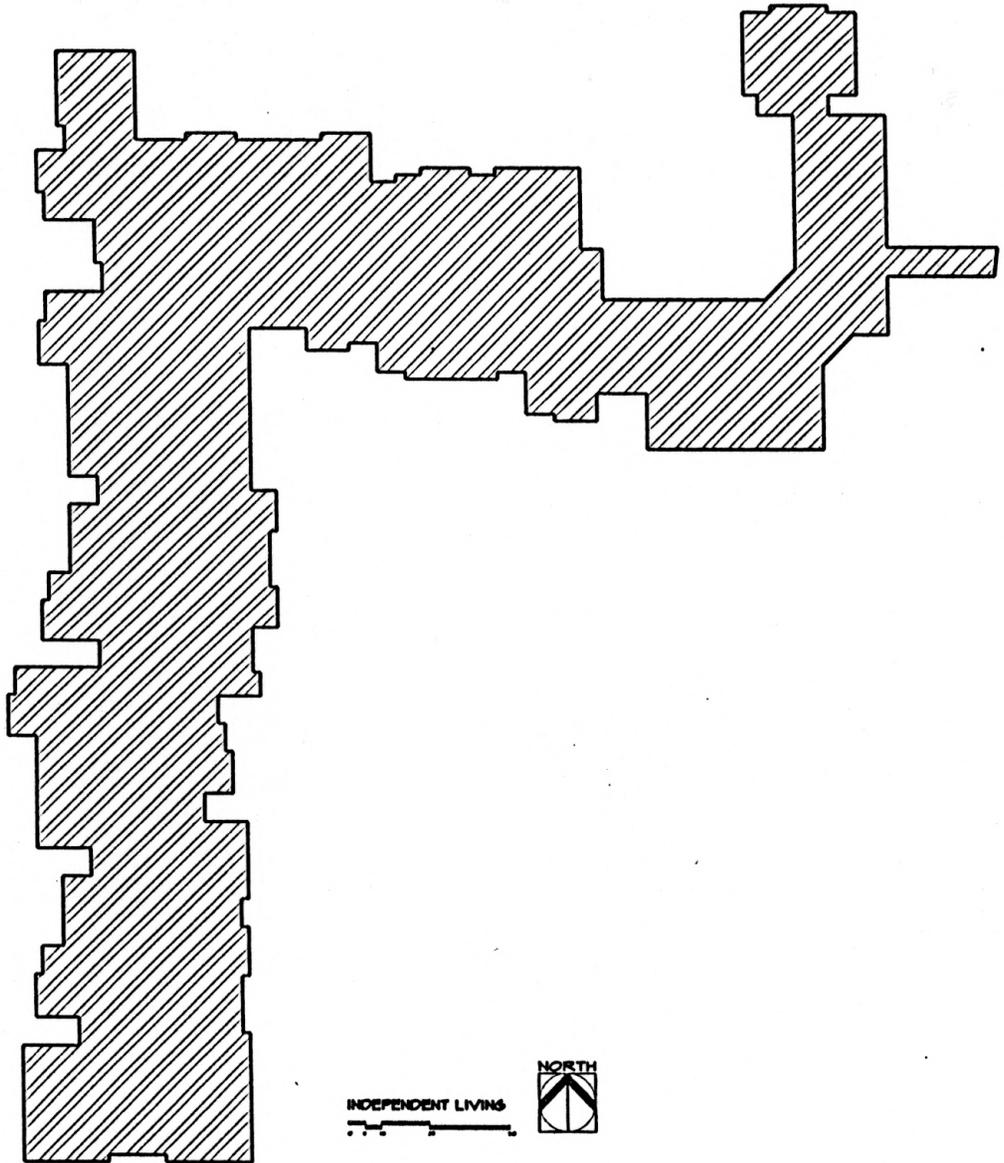


Figure 2.3. Independent Living Building - Site 2.

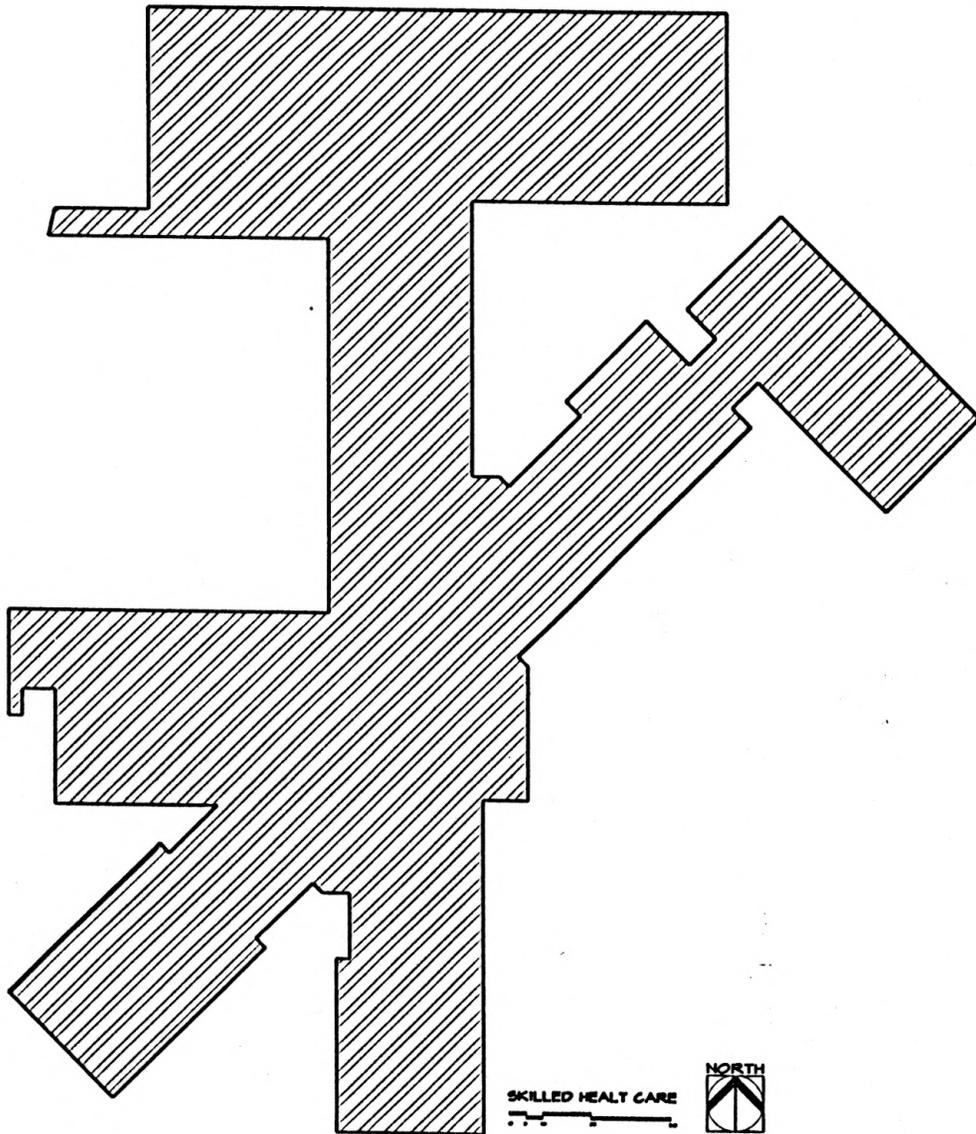


Figure 2.4. Skilled Care Building - Site 2.

Site 3. The final site studied was Site 3, located on the edge of the city limits of a north eastern Kansas town of approximate 38,000 in population. Site 3's campus includes free standing duplexes as well as a main building that houses independent living apartments, skilled care, and support services for the entire campus. Site 3 provides opportunities for three levels of service but only two separate living options within the main building. Assisted living services are provided by an outside, independent, home health agency located within the community. Independent living and assisted living within the main building is comprised of 103 apartment units on 4 floors. Skilled health care has 60 beds and is located on the main level on the north side of the building (see Figure 2.5).

The average age of residents at admission at Site 3 is 77.6 years of age. Residents predominantly come from Kansas, with only 8 of the 159 resident relocating from out of state. Resident are from a variety of backgrounds and lifestyles. Economic status is mostly middle to upper middle class. Many residents are retired educators, retail business owners, and other white collar professional. Staff at Site 3 are fairly evenly balanced between administrative and administrative support, health care, and housekeeping and building support services. There are administrative staff for both areas of independent living and skilled care. Housekeeping and building support services are shared between the areas, and health care staff are predominantly for skilled care living. Staff who participated in the study were fairly evenly balanced between administrative positions and health support services.

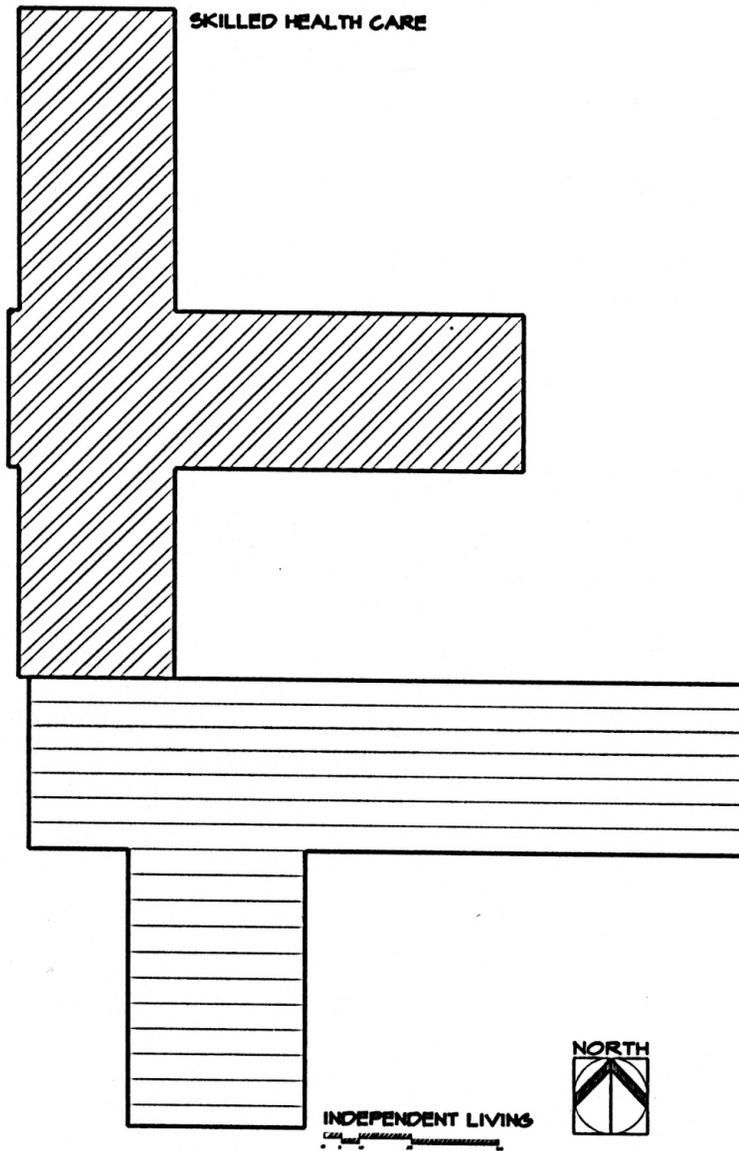


Figure 2.5. Independent Living and Skilled Care Building - Site 3.

Sampling Technique

A purposive sample of ten residents and staff volunteers from each setting was targeted at each site. The total purposive sample size was 120; the sample size that resulted was 110 (See Table 2.1). Prior to all interviews, formal consent to participate was obtained from each person agreeing to be interviewed (see Appendix A for Consent Forms). Only residents cognitively and physically able to participate in the interview were included in the sample. In order to obtain a sample of residents from independent living levels, a presentation of the study was made at one or two social gatherings at each facility where many of the residents were in attendance. Volunteers were requested until the desired sample size was obtained or the list of potential volunteers exhausted. Administration policies required that documentation of formal consent of those in higher levels of care such as assisted living and skilled care be recorded as part of residents' permanent files. For this reason, it was requested by administration that resident participation for assisted living and skilled health care be obtained through staff recommendations and volunteer response. Staff at each of the facilities were helpful in providing the names of those who were most likely and able to participate and residents were approached based on these recommendations. Volunteers were requested until the desired sample size was obtained or the number of potentially willing or able residents was exhausted. Although a limited number of residents living at skilled care levels at Site 1 and Site 3 were able and willing to participate, residents in skilled care at Site 2 were either cognitively unable to participate or unwilling to do so. Since Site 1 was the only

location with separate accommodations for assisted living, only those residents and staff were singled out as a separate group of respondents.

Staff participation was also on a voluntary basis, as requested by administrators. A list based on a cross section of positions was either posted by the administrator or a sign-up sheet was passed among staff to solicit persons willing to participate in the study. Volunteers were requested until the desired sample size was obtained or the number of potential participants was exhausted. This method of obtaining a sample was utilized for each of the levels of care, independent living, assisted living, and skilled care at each of the sites. As noted in Table 2.1, staff response was higher at Site 1 and Site 3; the numbers of staff respondents at Site 2 was substantially lower. Due to the low response rates for this site and the marked differences in populations and settings, it was decided to exclude data obtained from Site 2 from the analysis, and focus on the data from the more similar environments at Site 1 and Site 3.

Table 2.1. Sample Size of Residents and Staff at each Site.

Site / Living Option	Residents	Staff
Site 1:		
Independent Living	10	10
Assisted Living	10	9
Skilled Health Care	6	11
Site 2:		
Independent Living	4	1
Skilled Health Care	0	9
Site 3:		
Independent Living	9	9
Skilled Health Care	3	9
TOTAL SAMPLE	42	58

Data Collection Tools and Techniques

The rating scale established by Rohles and his colleagues (1989) was an attempt to provide a tool by which the user could assess the acceptability of the indoor environment. The original scale focused on environmental criteria relevant to the indoor environment of the work place; light, thermal comfort, air quality, and acoustics, with associated characteristics under each element (See Table 2.2). The tool was structured to have two subjective measurements. One was the relative measure of the importance of the specific indoor environmental features, and the second was a six point satisfaction rating of the environmental features of the space. For the measurement of relative value, the respondents were asked to provide a percentage representing what they considered to be the relative contribution of each element to the total environment. The total percentages for the four global elements were to add up to 100%. The next step in the measurement was to divide the assigned percentage of the element into three parts by assigning a percentage value to each of the contributing features of the global element. The percentages for the features were to add up to the original amount assigned in the first step. For example, if someone gave the element of ACOUSTICS a percentage value of 30%, the respondent divided the 30% between the features of loudness, pitch, and distracting noises. This process was to be completed for each of the features within the respective elements. While the concept of relative measures of importance was valuable, the process involved for the respondent was rather complicated (see Appendix B for Original Scale).

The second part of the scale was a satisfaction rating for each of the features within the existing setting. The scale was based on six points of acceptability from very acceptable to very unacceptable. While this scale gave a range of acceptability for the feature, it gave no indication if there was too much or too little of the characteristic, such as air movement, in the space.

Table 2.2. List of Original Environmental Characteristics for the Indoor Office Environment.

- THE ACOUSTICAL ENVIRONMENT
loudness
pitch
distracting sounds
- THE ENVIRONMENTAL AIR QUALITY
odor
dust
tobacco smoke
- THE LIGHTING ENVIRONMENT
brightness
glare
shadows
- THE THERMAL ENVIRONMENT
temperature
humidity
air movement

To focus the scale toward the CCRC environment, a preliminary list of environmental factors was developed based on the established list by Rohles and his colleagues (1989) and a review of the literature on environments for the aging. This

modified list was then presented to a representative focus group of 12 staff and 12 residents from a CCRC environment. This focus group was asked to suggest additions and possible deletions to the list of critical factors of the indoor environment (see Table 2.3). Based on discussions with the focus group, this list was then further refined to represent indoor environmental factors for environment in settings of CCRC's.

Table 2.3. List of Environmental Elements Presented to Focus Group of Residents and Staff.

- air movement
- amount of dust
- amount of tobacco smoke
- brightness of the light
- cleanliness of the walls and floors
- crowdedness
- drafts
- echoes
- glare - direct and reflected
- humidity
- loudness of the sounds
- number of noisy distractions.
- odor
- pitch of the sounds
- shadows
- temperature.
- window area

In the final list, elements were added to and deleted from the original features of the indoor environment established for the work place in the study by Rohles and his colleagues. The global characteristic of "physical space" was added as an important feature of the indoor environment in the CCRC setting. Items such as "amount of dust" and "cleanliness of the walls and floors" were eliminated in order to focus on specific measures of the indoor environment that related most specifically to physical design. The term "odors" was changed to global dimension of "smell" due to the fact that the word odors was defined only as a negative feature for many residents and staff in the focus group. Some items were also more fully defined in terms of the CCRC environment. For example, terms such as pitch or crowdedness were unclear to both residents and staff. To clarify these terms, they were operationalized specifically for the setting. For example, pitch was combined with loudness of sounds into the term "noise level" of the space. This change was understandable and describable by both user groups. Crowdedness was operationalized as the appropriate amount of people, furniture, or privacy a space contained. This modification also was more understandable for both groups.

The final list resulted in five global dimensions: lighting, heating and cooling, sounds, smells, and the physical space, with three characteristic features for each of these elements (See Table 2.4 for Final List of Environmental Features). This list of elements was then transformed into three tools for data collection: a Satisfaction Rating Scale, a Descriptive Environmental Assessment Checklist, and a Relative Value Rating Scale.

Table 2.4. Final List of Indoor Environmental Features for CCRC's.

Final List of Environmental Systems	
Environmental System	Characteristic of System
LIGHTING	Comfortable Amount of Sunlight
	Comfortable Amount of Artificial Light
	Reducing Glare
HEATING and COOLING	Comfortable Humidity Level
	Comfortable Amount of Air movement
	Comfortable Temperature
SOUNDS	Reducing Noise from Outside the Building
	Reducing Noise from Inside the Building
	Comfortable Sound Level Inside the Room
SMELLS	Reducing Tobacco Smoke
	Reducing Unpleasant Odors
	Having Pleasant Smell Present
PHYSICAL SPACE	Comfortable Amount of People in the Space
	Comfortable Amount of Furniture in the Space
	Comfortable Amount of Privacy

A Satisfaction Rating Scale

In order to determine what environmental systems and characteristics were judged to be satisfactory by users, a questionnaire was developed to establish satisfaction ratings for the features of the environmental systems in three key activity areas within each living option: dining room, hallways, and resident living areas or staff work areas. Based on the modified list of indoor environmental features (see Table 2.4), questions were developed to assess the acceptability of each characteristic. The questionnaire was divided into six short sections, and the same questions were asked for each of the three activity areas independently. The first five sections asked questions associated with a single

environmental category: lighting, heating and cooling, sounds, smells, and the physical space. The last section asked for an overall rating for each area based on the categories, and then asked the respondent to rank the areas in the order of where they spent most of their time (see Appendix C for Questionnaire). Residents and staff were asked to rate various qualities of the indoor environment on a five point scale. Two types of five point scales were utilized. One rated the quantity of the characteristic (see Figure 2.6), and the other rated the frequency of the characteristic (see Figure 2.7). A final overall quality rating was requested at the end of the questionnaire (see Figure 2.8)

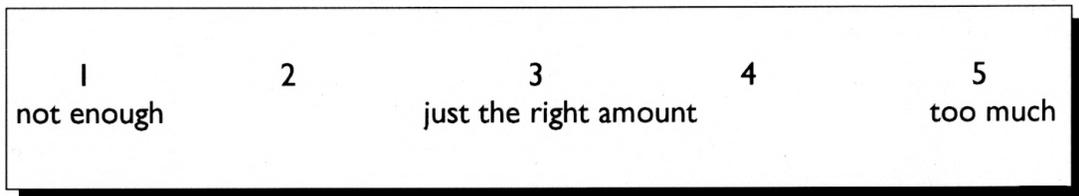


Figure 2.6. Example of 5-Point Scale to Rate Quantity of Environmental Feature.

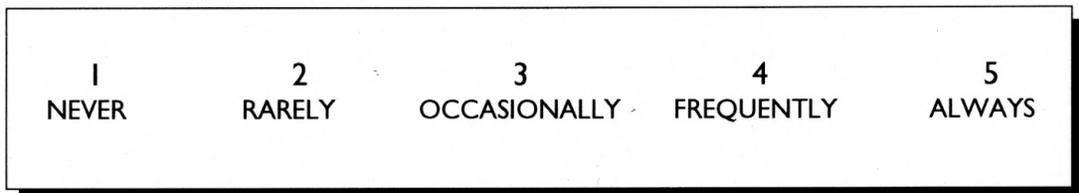


Figure 2.7. Example of 5-Point Scale to Rate Frequency of Environmental Feature.

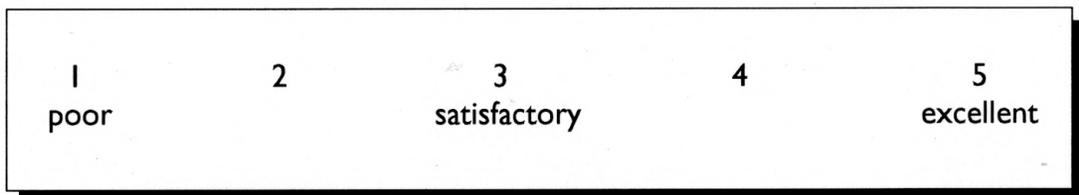


Figure 2.8. Example of 5-Point Scale to Rate Overall Quality of Spaces.

This approach differed from the six point scale utilized by Rohles and his colleagues. Although it reduced the number of measurement points on the scale, it gave a clearer indication about the direction of acceptability. The five point scale was also utilized to keep the questionnaire simple and easy to complete.

Descriptive Environmental Assessment Checklist

The physical characteristics of the environment were also recorded in order to compare their actual characteristics with the satisfaction ratings. A check list of environmental features to be noted was developed. The features recorded were based on the list of indoor environmental features for the CCRC environments, such as the number of light fixtures, amount of exterior window space, temperature, and the amount of furniture in the space. This list was used to generate floor plans of each of the settings and to describe some of the physical characteristics of the immediate environment. Photo documentation was used to supplement information obtained from field notes and sketches. For each of the primary living and work areas, the physical dimensions of the room were recorded as well as distinguishing characteristics such as colors, textures, and finishes. Notes were also made in reference to environmental systems, such as locations of thermostats and heating and cooling registers, number and type of light fixtures, and square footage of exterior window space, (see Appendix D for the Descriptive Environmental Assessment Checklist).

The Relative Value Rating Scale

The next step involved developing a short relative value rating scale. The purpose of this scale was to establish how important various characteristics of the indoor environment were to the respondent. In order to provide a simple means of obtaining values, three-dimensional hand held charts were developed to allow the respondent to physically manipulate the characteristics and visually explain the importance of a factor (See Figure 2.9). For each of the five independent categories, three associated characteristics were identified. The last chart represented the total environment divided up by the five environmental systems. (See Table 2.5).

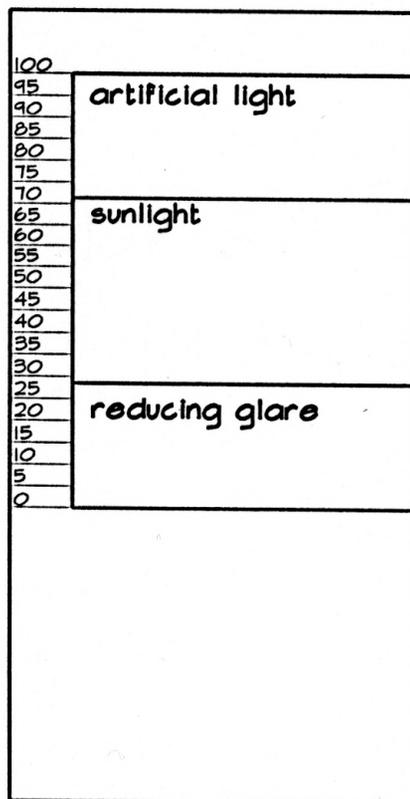


Figure 2.9. Example of Design for Hand-held Bar Chart for Relative Value Rating Scale.

Table 2.5. Outline of Environmental Systems and Characteristics Targeted.

Rating Scale of Relative Values - Environmental Systems	
Environmental System	Characteristic of System
LIGHTING	Comfortable Amount of Sunlight
	Comfortable Amount of Artificial Light
	Reducing Glare
HEATING and COOLING	Comfortable Humidity Level
	Comfortable Amount of Air movement
	Comfortable Temperature
SOUNDS	Reducing Noise from Outside the Building
	Reducing Noise from Inside the Building
	Comfortable Sound Level Inside the Room
SMELLS	Reducing Tobacco Smoke
	Reducing Unpleasant Odors
	Having Pleasant Smell Present
PHYSICAL SPACE	Comfortable Amount of People in the Space
	Comfortable Amount of Furniture in the Space
	Comfortable Amount of Privacy

Pretest

In order to assure the clarity of the data collection tools, a pretest was conducted at another independent CCRC. Five staff and six residents agreed to participate in the pretest. The respondents completed the questionnaire and the rating scale and then provided feedback on questions that were unclear or presented difficulties in responses. Upon completion of the pretest, slight modifications in the wording of some questions were made, and the hand held charts were completely revised. The concept was changed from a bar type chart to a *pie* design (see Figure 2.10). The discs were made up of individual interlocking wedges, each wedge representing a single feature of the associated global element, i.e. lighting (sunlight, artificial lighting, reducing glare). These pieces

could easily be positioned to divide the pie into pieces that represented the proportion of importance. Five pies represented 100% or the global indoor environment dimensions, and the last pie represented the total environment divided into the five dimensions. These wheels were easier to conceptualize and manipulate for both residents and staff.

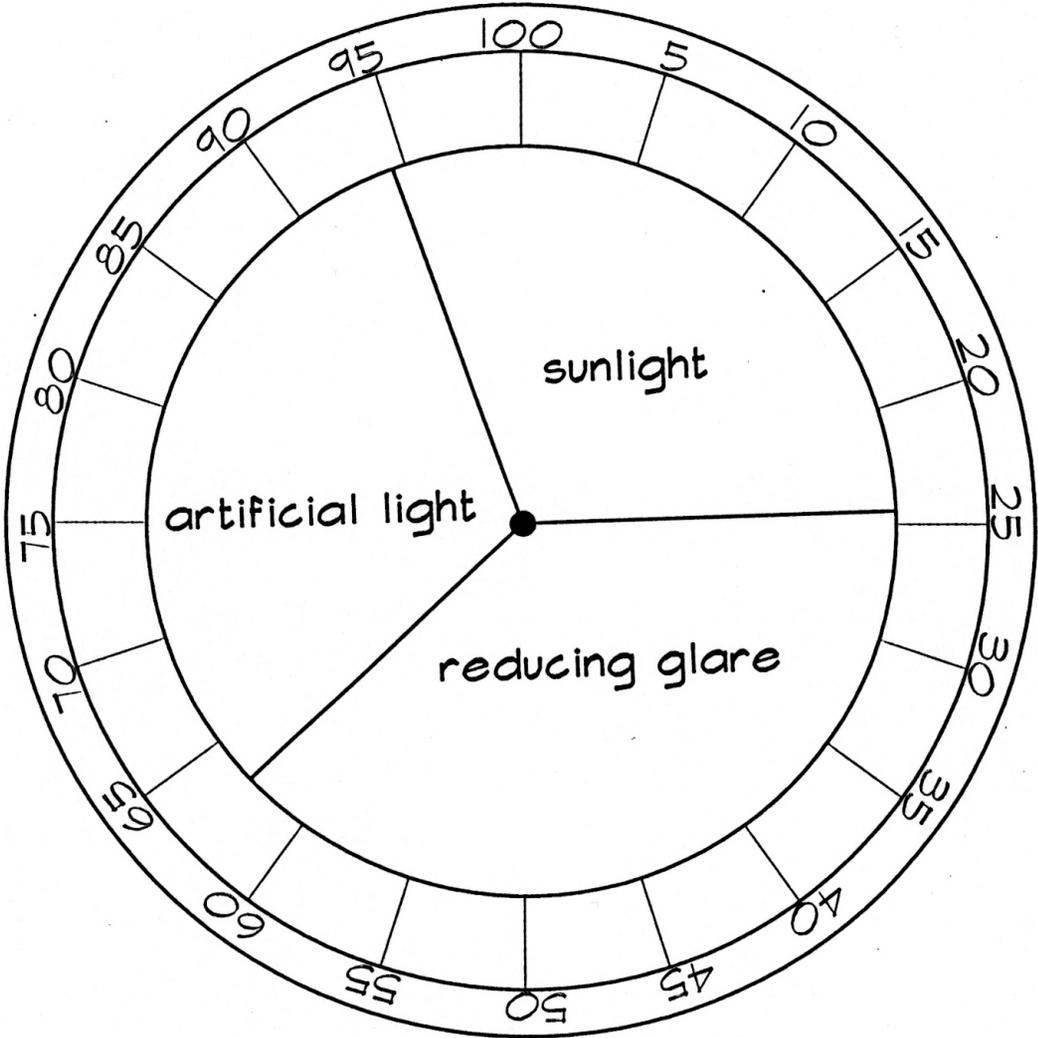


Figure 2.10. Example of Design for Hand-Held Pie Chart for Relative Value Rating Scale.

Since each of the values given by the respondents were based on a division 100% importance, the values were calculated as a percentage given to the environmental characteristic in the total environment. For example, if two respondents gave the following values to the characteristics, their weight was calculated as shown in Figure 2.11.

<u>LIGHT</u>	<u>Respondent 1</u>	<u>Respondent 2</u>
Comfortable Amount of Sunlight	37	37
Comfortable Amount of Artificial Light	45	45
Reducing Glare	18	18
	100	100
<u>TOTAL ENVIRONMENT</u>		
<u>LIGHT</u>	20	35
HEATING and COOLING	40	30
SOUNDS	5	7
SMELLS	18	18
PHYSICAL SPACE	17	10
	100	100
<u>LIGHTING CHARACTERISTICS</u>	<u>Respondent 1</u>	<u>Respondent 2</u>
Comfortable Amount of Sunlight	37% of 20 = 7.4	37% of 35 = 12.95
Comfortable Amount of Artificial Light	45% of 20 = 9	45% of 35 = 15.75
Reducing Glare	18% of 20 = 3.6	18% of 35 = 6.3

Figure 2.11. Example of Weighted Value Calculation.

Respondents 1 and 2 may rate the characteristic features of LIGHT the same, but if they give LIGHT different values in the TOTAL ENVIRONMENT, the value calculated in the overall average rating is different.

Procedure

The study was conducted in two phases. First, a satisfaction rating questionnaire and relative value rating scale based on the parameters established by Rohles and his colleagues (1989) were developed for use in CCRC settings and pre-tested. Next, data collection was completed at the three CCRC sites.

Data collection was conducted over a period of four months. The pretest and refinement of the data collection tools was completed during July of 1993. Information at each of the individual CCRC's was collected over a one month period. Data were collected at Site 1 during the month of August, Site 2 during the month of September, and Site 3 during the month of October. Interviews of staff and residents were done on an appointment basis and were scheduled to be convenient for the respondents' personal and work schedule. Data collection took place between the hours of 8:00 a.m. and 6:00 p.m., Monday through Saturday. All of the data collection was completed by the researcher.

Analysis

The data collected in this study were analyzed separately for each data collection tool. First, the data from the Relative Value Rating Scale were organized by user groups and ranked in order to conduct non-parametric analyses for small sample groups. These data were statistically compared in three ways: mean percentages ratings for each user group were compared, differences between the percentage scores between users groups within settings were computed, and an analysis of variance between like user groups across settings was conducted. Second, the data from the Satisfaction Rating Scale were

sorted by indoor dimension and by user groups and the responses tabulated to determine frequency and range of responses for individual user groups within each setting. Finally, the Descriptive Environmental Assessment Checklists for each setting were described and discussed based on the measurements taken on each of the identified areas.

CHAPTER 3

Relative Value Rating Scale

The first three objectives of this study were to identify the perceived value of the indoor environmental dimensions: lighting, heating and cooling, sounds, smells, and the physical space, for different users at varying living options within the CCRC setting, and identify possible differences attributable to user groups or settings. In order to make these determinations, the data obtained through the Relative Value Rating Scale were analyzed in three ways. The first objective was to determine what environmental characteristics were rated as most important for residents and staff within each living option. This was done by comparing the mean values of the Relative Value Rating percentages of residents and staff within each living option to describe the importance of the indoor environmental characteristics for each user group in different living options. The second objective was to determine if residents and staff in each living option placed relatively the same amount of importance on the same characteristics. To determine if residents and staff rated characteristic of the environment differently, the percentage values of the Relative Value Rating Scale were statistically compared to determine if significant differences existed between user groups in their preferences for certain indoor environmental characteristics. The third objective was to determine if like user groups varied in their preferences from

setting to setting. To determine like groups differed, the value ratings of residents and staff were statistically compared across the CCRC setting.

Data obtained from Site 1 and Site 3 are described and compared here. Due to the low response rate and the significant differences in population characteristics of Site 2, it was not possible to establish a representative sample of users from this location. Data from this site, therefore, is not, included in this discussion.

Ratings of Indoor Environmental Qualities

The first objective was to determine what environmental characteristics were rated as most important for residents and staff within each living option. Ratings of relative importance obtained from respondents at Site 1 and Site 3 were combined to result in a mean score for each of the environmental characteristics.

Independent Living. For residents and staff in independent living, the dimension with the highest overall value was heating and cooling. Residents rated the importance of physical space second and lighting third, while staff rated the importance of lighting second and physical space third. Sounds and smells were rated fourth and fifth respectively for both groups (see Table 3.1). Within the global dimensions of lighting, residents and staff differed on ratings for the importance of sunlight and artificial lighting. Staff rated the value of sunlight as the most valuable feature, while residents rated artificial light as most valuable. This finding could be due to the necessity of greater illumination levels for visual task for older person and an indirect response to problems associated with

direct glare from sunlight. Within the element of heating and cooling, both residents and staff rated the features consistently the same: temperature first, humidity second, and air movement third. Although the value of sound in general was rated similarly by residents and staff, residents gave the feature of noise level considerably more weight than the features of reducing unwanted noises from outside the building or from other rooms. They also rated noise level higher than did staff, who rated reducing unwanted noises from other rooms as the most important feature. This finding may be due to problems associated with hearing loss in later stages of life and background noise created in spaces that are acoustically poor (Hiatt, 1987). Smells were rated lowest by both groups. The different features of smells were rated equally by staff, but residents put most of the importance of reducing tobacco smoke. Since the ability to detect subtle smells diminishes with age, residents may be more aware of and sensitive to stronger smells such as tobacco smoke. Staff also rated features comprising physical space consistently equal, while residents placed a greater amount of weight on the features of privacy and have the appropriate amount of space for furniture. Since the CCRC is a place of residence, privacy, a feature that is associated with home, would be expected to have importance for residents. Residents who relocate to CCRC are usually moving from larger home settings, and there may not always be enough room for their possessions in smaller apartments. Space for furniture may, therefore, be an important feature as well.

Table 3.1. Mean Percentage Ratings for Residents and Staff in Independent Living.

INDEPENDENT LIVING	RESIDENTS		STAFF	
	n = 18		n = 18	
	MEAN	S.D.	MEAN	S.D.
LIGHT	20.6	56.3	21.4	73.7
Sunlight	6.4	6.5	8.6	38.5
Artificial Light	9.5	45.4	6.2	19.5
Reducing Glare	4.8	9.9	6.6	12.1
HEATING & COOLING	27.4	70.4	25.8	32.4
Humidity	7.5	14.9	7.5	10.8
Air Movement	7.2	10.8	7.3	14.7
Temperature	12.7	26	11.1	16.6
SOUNDS	15.2	41.6	16.8	56
Outside Noise	2.6	2.5	3.9	6.7
Inside Noise	4	13.4	6.7	20.1
Noise Level	8.6	17.4	6.3	10.3
SMELLS	12.2	114.1	15.8	37.2
Smoke	5.4	100.3	5.3	28.7
Odor	2.6	2.9	5.5	29.9
Pleasant Smells	4.2	14	5	23.3
PHYSICAL SPACE	24.7	78.4	20.2	102.9
People	5	10.5	6.7	15.4
Furniture	8.6	20.2	6.6	15.5
Privacy	11.1	27.1	6.9	16.9

Assisted Living. Residents in assisted living also rated the global dimension of heating and cooling as the most important feature of the indoor environment. Staff rated physical space only slightly higher than but near the same relative value as heating and cooling. Residents rated lighting as the second most important feature of the indoor environment and physical space third. Staff rated lighting and sounds approximately equal as the third most important dimension. Both residents and staff rated the dimension of smells lowest (see Table 3.2). Within the global characteristic of lighting, residents rated the importance of sunlight and artificial light very closely. Sunlight was rated only slightly higher. Staff rated sunlight as the most important feature and rated artificial light the least important. Again, the importance of artificial lighting could be due to the physiological changes in visual acuity during later years that requires more light for visual tasks.

Residents and staff both rated the feature of temperature as the most important characteristic under heating and cooling. Humidity and air movement were rated closely as second and third. Noise level was rated the most important feature under sounds by both residents and staff. This was followed closely by reducing unwanted noises from other rooms. Pleasant smells was the feature identified as most important by both residents and staff under the dimension of smells. Residents rated reducing the amount of tobacco smoke second, while staff rated reducing odors second. Privacy, again, was the highest rated feature under the dimension of physical space, and having the appropriate amount of furniture in the space was second for residents. Staff rated privacy and having the appropriate amount of people in the space relatively the same and rated furniture lowest. Again, the issues associated with the concepts of home and having privacy most

likely play a role in the perception residents have about the physical features of their home environments. Assisted living in this setting was a single private room. Many residents had brought several pieces of their furniture with them to create a more homelike environment.

Table 3.2. Mean Percentage Ratings for Residents and Staff in Assisted Living.

ASSISTED LIVING	RESIDENTS		STAFF	
	n = 8		n = 9	
	MEAN	S.D.	MEAN	S.D.
LIGHT	24.7	87.4	21	30.8
Sunlight	10.2	37.6	9.3	18.3
Artificial Light	8.6	19.4	5.1	8
Reducing Glare	6	19.5	6.5	26
HEATING & COOLING	26.4	33.1	21.9	51.9
Humidity	7.6	14.1	7.1	10
Air Movement	8	12	5.3	2.4
Temperature	10.8	9.2	9.4	34.7
SOUNDS	15.6	41.4	20.6	47.3
Outside Noise	2.8	2.9	5.8	12.8
Inside Noise	5.8	22.1	7.3	19.6
Noise Level	7.1	9.4	7.5	10.7
SMELLS	12.5	68.3	14.2	45.2
Smoke	4.2	19.1	3.3	3.7
Odor	2.9	5.3	4.8	16.1
Pleasant Smells	5.4	37.5	6.1	24.6
PHYSICAL SPACE	20.8	17.4	22.3	165.8
People	5	5.4	8	21.4
Furniture	7.3	11	6.5	12.6
Privacy	8.5	10.4	7.9	38.8

Skilled Health Care. Residents and staff in skilled health care rated the dimension of heating and cooling as the most important characteristic of the indoor environment. Residents rated lighting and physical space relatively the same as next important. Staff rated physical space second and lighting third. Residents and staff rated sounds and smells fourth and fifth respectively (see Table 3.3). Under the global characteristic of lighting, residents rated the value of artificial lighting to be the most important features. Again, staff rated sunlight as the most important feature and rated artificial light as least important. The importance of artificial lighting may be more critical for residents in skilled care who have reduced visual acuity. Temperature was the feature identified as most important within the dimension of heating and cooling by both residents and staff. It was rated as almost twice as important as humidity and air movement by residents. Lower activity levels in skilled health care settings may make residents more susceptible to variations temperature (Rohles, 1989), thus its importance may increase for residents within this living option. Noise level was identified as the most important feature under the category of sound by residents. Staff rated noise level and reducing noises from other rooms relatively equal as the most important features. Residents and staff rated "having pleasant smells present" as the most important feature of smells in the skilled care environment. Reducing tobacco smoke was rated lowest. Since these skilled care environments are smoke-free, tobacco smoke may not be an issue for residents or staff. Having the appropriate amount of furniture in the space was rated the most important feature of physical space by residents, and privacy was rated second. Staff rated privacy as the most important feature, almost twice as important as furniture or having the

appropriate amount of people in the space. In the skilled care setting, a resident's living space is reduced to a single room, often shared with another resident. Space for personal possessions is often limited and residents may desire to have more space to accommodate belongings. Sensitivity to regulations regarding residents' rights to privacy may be a factor in staff ratings for these features in this type of setting.

Table 3.3. Mean Percentage Ratings for Residents and Staff in Skilled Health Care.

SKILLED CARE	RESIDENTS		STAFF	
	n = 8		n = 30	
	MEAN	S.D.	MEAN	S.D.
LIGHT	21	34.57	20.24	44.89
Sunlight	5.93	7.85	8.16	22.48
Artificial Light	10.25	14.5	5.18	6.95
Reducing Glare	4.83	16.62	6.9	10.64
HEATING & COOLING	31.25	119.64	26.57	101.86
Humidity	7.2	6.44	7.89	17.46
Air Movement	6.81	2.3	7.18	12.57
Temperature	17.24	81.12	11.51	28.59
SOUNDS	13.88	20.98	15.95	43.95
Outside Noise	2.16	4.06	3.68	4.84
Inside Noise	5.1	6.18	5.9	15.29
Noise Level	6.59	10.14	6.37	11.43
SMELLS	13.75	35.07	14.52	37.76
Smoke	2.78	24.67	3.71	7.97
Odor	5.04	8.09	5.3	16.78
Pleasant Smells	5.93	14.59	5.51	14.86
PHYSICAL SPACE	21.25	31.93	22.81	111.96
People	4.26	1.44	6.26	6.29
Furniture	8.66	12.19	5.98	10.27
Privacy	8.34	19.73	10.58	71.49

Summary of Ratings for Residents and Staff Across the CCRC Setting

In almost every setting, the global characteristic of heating and cooling was identified as the most important factor (out of the five identified) in the indoor environment. These findings are consistent with the findings from the study of office environments (Rohles, Woods, and Morey, 1987). Thermal comfort was the most important feature in office environment for both clerical workers and students. Staff in assisted living were the only group to rank physical space as important as heating and cooling. This finding may be due to staff dissatisfaction with current work areas, and lack of physical space to perform daily duties and tasks. Lighting and physical space were rated either second or third by residents and staff at all other levels. The importance of sounds and smells were rated fourth and fifth, respectively, by each group within each of the settings. In the study of office environments where the focus was four dimensions of the indoor environment, clerical workers rated the relative importance of lighting second to thermal comfort, followed closely by air quality. Students gave air quality the second highest rating and lighting third. Both groups rated acoustics as the least important factor in the indoor office environment.

Within each of the global dimensions, some of the associated characteristics of the dimensions were rated consistently as the most important feature of that dimension. Staff consistently rated the importance of sunlight first when breaking down the value of lighting characteristics. Residents almost always rated artificial light as the most valuable characteristic. Residents in assisted living rated sunlight slightly higher by gave artificial light a significant amount of the overall total. Within the global dimension of heating and

cooling, staff and residents rated the characteristic of temperature as the most important factor in this category. The characteristic of "comfortable noise level in the room" was rated the most important feature of sound by residents and staff in almost all situations. Ratings of the features of smells were more varied. In assisted living and skilled care living options, residents and staff consistently identified the importance of "having pleasant smells present" as the most important feature of smells. In independent living options, residents rated the importance of "reducing tobacco smoke" as the most important feature, while staff rated "keeping unpleasant odors to a minimum" highest. Variations in ratings associated with smells could be due to factors associated with the ability to smell and policy decisions that result in smoke-free environments. There was little consistency in rating the features of physical space between residents and staff with each living option. Residents and staff in independent living and assisted living options rated privacy as the most important feature. Staff in skilled care living options also identified privacy as the most important characteristic, while residents perceived space for furniture as most important.

Differences in Ratings Between Residents and Staff

The second objective was to determine if significant differences existed between the relative importance of characteristics for residents and staff within each living option, based on the percentage scores established by residents and staff in the Relative Value Rating Scale. Wilcoxin Rank Sum non-parametric t-test were conducted to determine if significant differences between the relative importance of indoor environmental features

existed between residents and staff in each living option (independent living residents vs. independent living staff). This non-parametric test ranks the scores and statistically compares the means of the ranks for the two groups. A separate test was completed for each environmental characteristic, resulting in twenty comparisons for each living option. Given the number of t-tests, a non-significant difference in one characteristic would be expected by chance to be identified as statistically significant within each living option.

Independent Living. Within independent living, significant differences in relative values were obtained for three characteristics (see Table 3.4). Within the category of sounds, staff rated the importance of "reducing unwanted noises from other rooms in the building," significantly greater than did residents ($.05 > p < .02$). This difference may be due to changes in hearing acuity in later years. Residents may be less sensitive to external noises whereas these sources may interfere with staff's ability to concentrate in the work setting. Staff also rated the global characteristic of smells significantly higher than residents ($.05 > p < .02$). The ability to detect smells also declines with age (Corso, 1981). Staff are likely more aware of smells, and thus smells become more important in the total environment. Residents, however, rated the importance of privacy significantly higher than did staff ($p > .01$). The CCRC environment is "home" for residents. Privacy is a feature of the home environment, and thus, its importance may be more critical for residents in this setting than for staff.

Table 3.4. T-test of Mean Ranks of Percentage Values for Independent Living.

INDEPENDENT LIVING	RESIDENTS		STAFF		t-ratio of ranks
	n = 18		n = 18		
	RANK MEAN	RANK S.D.	RANK MEAN	RANK S.D.	
LIGHT	18.28	99.27	18.72	126.5	0.125
Sunlight	17.17	95.56	19.38	127.4	0.628
Artificial Light	21.03	127.5	15.97	87.07	1.466
Reducing Glare	15.83	113.8	21.17	98.76	1.554
HEATING & COOLING	19.14	129.4	17.86	94.49	0.363
Humidity	18.11	141.4	18.89	86.4	0.219
Air Movement	18	99.29	19	128.2	0.281
Temperature	19.94	128	17.06	95.82	0.819
SOUNDS	17.72	113.9	19.28	109.2	0.443
Outside Noise	15.89	97.55	21.11	116.1	1.515
Inside Noise	14.94	112.3	22.06	89.35	2.029**
Noise Level	21.03	116.6	15.97	98.07	1.465
SMELLS	14.92	106	22.06	93.6	2.15**
Smoke	17.14	106	19.86	118.3	0.771
Odor	16.06	84.5	20.94	131.1	1.41
Pleasant Smells	17.64	111.4	19.36	115.2	0.485
PHYSICAL SPACE	20.72	96.71	16.28	119.8	1.28
People	16.06	109	20.94	106.8	1.409
Furniture	20.53	120.8	16.47	98.87	1.162
Privacy	22.86	98.14	14.14	90.05	2.697**

** $p > .05$

Assisted Living. In the assisted living setting, two significant differences were identified between residents and staff (see Table 3.5), residents rated the importance of artificial lighting higher than staff ($p = .05$). Physiological changes associated with aging eyes may result in residents perceiving greater importance for more artificial lighting in a space to assist with visual acuity. While lighting may be similarly important to staff and residents, dependability from artificial light sources may be more significant for residents. Reducing unwanted noises from outside the building was rated significantly more important by staff than by residents ($p < .05$). Residents in higher levels of care may also be affected by hearing losses and may not be as sensitive to sounds outside the building. As noted in independent living, unwanted sounds may be more noticeable by staff, and these sounds may be an unwanted disturbance.

When comparing the overall mean percentage values between residents and staff in objective 1, although residents in assisted living gave a high proportion of importance to artificial lighting, they were the only group of residents to rate the value of sunlight slightly higher than artificial lighting. The t-test reveals, however, that residents in assisted living still rate artificial lighting to be significantly more important in the total lighting environment than staff within the same setting. Overall, residents and staff in assisted living did not differ significantly on characteristics of the environment. It is interesting to note that perceptions of the characteristics of the physical space did not differ as they did with "privacy" in independent living.

Table 3.5. T-test of Mean Ranks of Percentage Values for Assisted Living.

ASSISTED LIVING	RESIDENTS		STAFF		t-ratio of ranks
	n = 8		n = 9		
	RANK MEAN	RANK S.D.	RANK MEAN	RANK S.D.	
LIGHT	9.38	32.48	8.67	21.38	0.283
Sunlight	9.38	29.34	8.67	25	0.28
Artificial Light	11.5	20.86	6.78	20.94	2.126 **
Reducing Glare	8.88	31.27	9.11	23.61	0.093
HEATING & COOLING	10.38	19.98	7.39	27.74	1.253
Humidity	9.25	30.14	8.78	24.44	0.187
Air Movement	11.38	33.41	6.89	11.11	1.992
Temperature	10.06	14.46	8.06	36.15	0.808
SOUNDS	7.06	20.6	10.72	25.07	1.57
Outside Noise	6.38	17.41	11.33	22.75	2.266 **
Inside Noise	8.13	33.84	9.78	19.94	0.662
Noise Level	9.19	32	8.83	22.88	0.14
SMELLS	8.31	33.64	9.61	19.86	0.521
Smoke	8.88	40.41	9.11	15.61	0.093
Odor	7.63	19.41	10.22	30.44	1.062
Pleasant Smells	8.13	34.41	20.89	12.61	1.001
PHYSICAL SPACE	9.38	14.48	8.67	36.94	0.283
People	7.31	18.41	10.5	29.63	1.332
Furniture	9.81	27.85	8.28	25.32	0.614
Privacy	10.38	19.91	7.78	29.94	1.066

** $p > .05$

Skilled Care. Two significant differences were identified between residents and staff in skilled care living options (See Table 3.6). First, residents rated the importance of artificial lighting higher than staff ($p > .01$). As discussed in previous comparisons, the importance of artificial lighting may be more critical to residents who may require almost twice the level of lighting of a younger person. The second significant difference was in the comparison of ratings for "having a comfortable amount of people in the space." Staff rated this characteristic as more important than did residents ($.02 < p < .01$). As sensory receptors become weaker with age, the amount of stimulation required to receive the same message may be greater. This may result in residents desiring closer contact with other residents and staff in order to hear and see them. Staff, however, may have larger personal space boundaries resulting in potential differences in the perceptions of crowding for residents and staff (Pastalan and Carson, 1970).

Summary and Discussion of T-test Result Across the CCRC Setting

Overall, the majority of features were rated similarly between residents and staff and no significant differences were identified between the groups for most features of the indoor environment. Comparing the t-test result across the CCRC settings, some similarities can be found in the differences between residents and staff. Given the number of comparisons and the likelihood of Type II error, differences that are identified across multiple settings may be less likely to have resulted from chance. In both the independent living and assisted living settings, staff rated features of the acoustical environment

Table 3.6 T-test of Mean Ranks of Percentage Values for Skilled Care.

SKILLED CARE	RESIDENTS		STAFF		t-ratio of ranks
	n = 8		n = 21		
	RANK MEAN	RANK S.D.	RANK MEAN	RANK S.D.	
LIGHT	15.69	81.07	14.74	70.32	0.267
Sunlight	12.91	71.85	16.07	71.86	1.102
Artificial Light	22.94	30.1	11.98	56.01	3.757 **
Reducing Glare	11.13	95.91	16.48	59.21	1.553
HEATING & COOLING	17.31	77.85	14.12	101.86	0.785
Humidity	14.94	53.75	15.02	82.44	0.022
Air Movement	14.5	36.93	15.19	88.29	0.192
Temperature	18.88	63.27	13.52	70.94	1.554
SOUNDS	13.19	54.78	15.69	78.49	0.707
Outside Noise	10.44	66.96	16.74	66.39	1.859
Inside Noise	14.19	94.35	15.31	68.04	0.312
Noise Level	16.06	89.82	14.6	69.37	0.407
SMELLS	14.25	69.14	15.29	74.79	0.291
Smoke	13.31	72.28	16.79	63.96	1.03
Odor	15.06	61.03	14.98	80.09	0.022
Pleasant Smells	16.25	102.4	14.52	64.64	0.483
PHYSICAL SPACE	14.69	42	15.12	85.6	0.12
People	9.063	22.46	17.26	74.04	2.533 **
Furniture	19.69	67.21	13.21	65.74	1.918
Privacy	14.94	75.53	15.02	74.94	0.022

** $p > .05$

associated with unwanted sounds from other areas to be significantly more important than did residents. While residents noted they enjoyed acoustically private home environments, this feature may not be a critical to residents as it is to staff. These differences may be attributed to losses associated with hearing acuity. Hiatt (1987) notes that a higher proportion of persons relocating to a CCRC or long-term care setting may experience or be experiencing hearing loss. In assisted living and skilled care settings residents rated the importance of artificial lighting significantly more important than staff. Regnier (1988) notes that older persons find it difficult to see well under low light conditions. For people who depend on sight to provide information about the environment, the ability to see the environment is critical for negotiation through it. Therefore, lighting would be more crucial to persons with reduced visual acuity.

Analysis of Variance Between Residents and Staff Ratings

To determine if like user groups varied in their responses on the Relative Value Rating Scale from setting to setting, an analysis of variance was conducted using the ratings of residents and staff. The Kruskal-Wallis One-Way Analysis of Variance by Ranks was used to rank all of the values for an individual feature (i.e. sunlight) for like users across the CCRC settings. These analyses were conducted for each of the dimensions and their associated characteristics. This non-parametric analysis reveals if a significant difference exists between ratings of the like users in the three settings (i.e. residents in independent, assisted, and skilled care living options).

When the ranks of the like users were compared, there were no significant variations in the rankings of importance of the indoor environmental features between residents in independent living, assisted living, or skilled health care services (see Table 3.7). These findings suggest that members of the same groups do not differ across the CCRC settings in their perceptions of the dimensions and features of the indoor environment.

Table 3.7 Analysis of Variance of Residents and of Staff.

ANALYSIS OF VARIANCE	RESIDENTS	STAFF
	n = 34	n = 47
	H =	H =
LIGHT	1.382	4.915
Sunlight	0.246	5.362
Artificial Light	1.699	3.372
Reducing Glare	2.561	3.546
HEATING & COOLING	3.746	3.286
Humidity	2.955	3.557
Air Movement	1.549	4.65
Temperature	0.103	3.806
SOUNDS	2.146	1.623
Outside Noise	1.918	8.574
Inside Noise	1.222	5.324
Noise Level	1.647	5.628
SMELLS	1.733	3.351
Smoke	1.804	3.594
Odor	1.443	3.733
Pleasant Smells	1.445	4.704
PHYSICAL SPACE	0.365	3.864
People	1.968	5.701
Furniture	2.096	4.096
Privacy	0.272	4.885

CHAPTER 4

Satisfaction Ratings and Descriptive Environmental Assessment Checklist

The fourth objective of the study was to explore if links could be proposed between physical characteristics of the indoor environment and the perceived quality of the indoor environment. Data from the Descriptive Environmental Assessment Checklist and the Satisfaction Rating Scale for the same locations were compared. The Descriptive Environmental Assessment Checklist was completed for each area by the researcher, while the Satisfaction Rating Scale was completed for each area by the respondents (residents and staff). Three types of areas were evaluated: dining, hallways, and resident rooms or staff work areas. Each area is described separately for Sites 1 and 3. Residents and staff were asked to rate various qualities of the indoor environment on a five point scale. Two five point scales were utilized: one rated the quantity of the characteristic, and the other rated the frequency of the characteristic. A final overall quality rating was requested at the end of the questionnaire. In this chapter, information about the individual spaces as obtained through the Descriptive Environmental Assessment Checklist are described, and the corresponding satisfaction ratings established by residents and staff are described and discussed.

Descriptive Environmental Assessment and Satisfaction Ratings of Dining Areas.

The first areas assessed and rated by respondents were the dining spaces where the main meals for the individual living groups were served. Residents and staff both occupied these spaces to some degree depending on their job description and the policies of the dining room with regard to serving both resident and staff. The general characteristics and design features are described for each of the spaces within a living option for each site and unique or problematic areas identified and discussed.

Descriptive Environmental Assessment of Independent Living Dining Areas - Site 1

The dining room for independent living apartments at Site 1 was a large room encompassing approximately 2,240 square feet of floor space sub-divided into three dining spaces. Ceiling heights in this space slope from 20'-0" to 8'-0" creating an interior volume of approximately 31,360 cubic feet (see Figure 4.1 and 4.2). The dining area was furnished with 30 tables of various shapes and sizes accompanied by 127 chairs. A brick fireplace was located in the center of the middle dining area (see Figure 4.3). Interior finishes include a blue-green loop carpet with a multi-colored fleck, teal acoustical wall covering, and a floral vinyl wall covering. The ceiling was white and was a textured finish. There was approximately 1,104 square feet of exterior window space, dominantly facing north and east. These windows were finished with a mini-blind window treatment (see Figure 4.4). Artificial lighting was provided by 44 can lights and three chandeliers.

Heating and cooling registers were located around the periphery of the exterior wall and there were two thermostats, one located at each division of space. There was an exterior deck on the north side of the space and the kitchen was located in the adjacent room to the south.

Summary of Satisfaction Ratings for Independent Living Dining - Site 1

Described below are ratings established for the dining room by residents and staff in independent living. Dining services were run "restaurant" style and both residents and staff use the dining room as a place to eat meals. For a complete detailed summary of the ratings, see Table 4.1. The summary of satisfaction ratings is described and discussed in reference to the Descriptive Environmental Assessment of the dining space.

Lighting Features. Some of the residents felt that there was too much sunlight in the dining room (mean rating 3.8), while in general, staff felt there was just the right amount of sunlight in the dining room (mean rating 3.3) Residents had varying opinions about the amount of brightness that came from the sun through the windows in the dining room. Staff who worked in the dining room noted that some residents were very sensitive to the bright sunlight from the window, and they would request to be seated with their backs to the windows or in a location where the sunlight did not bother them. Although the amount of sunlight was rated as satisfactory by staff, staff also varied on their ratings on the amount of brightness. Some staff felt the amount of brightness was slightly too

much, while some rated it as just the right amount. The element of sunlight may be desirable, but the unwanted side effects may be a natural result.

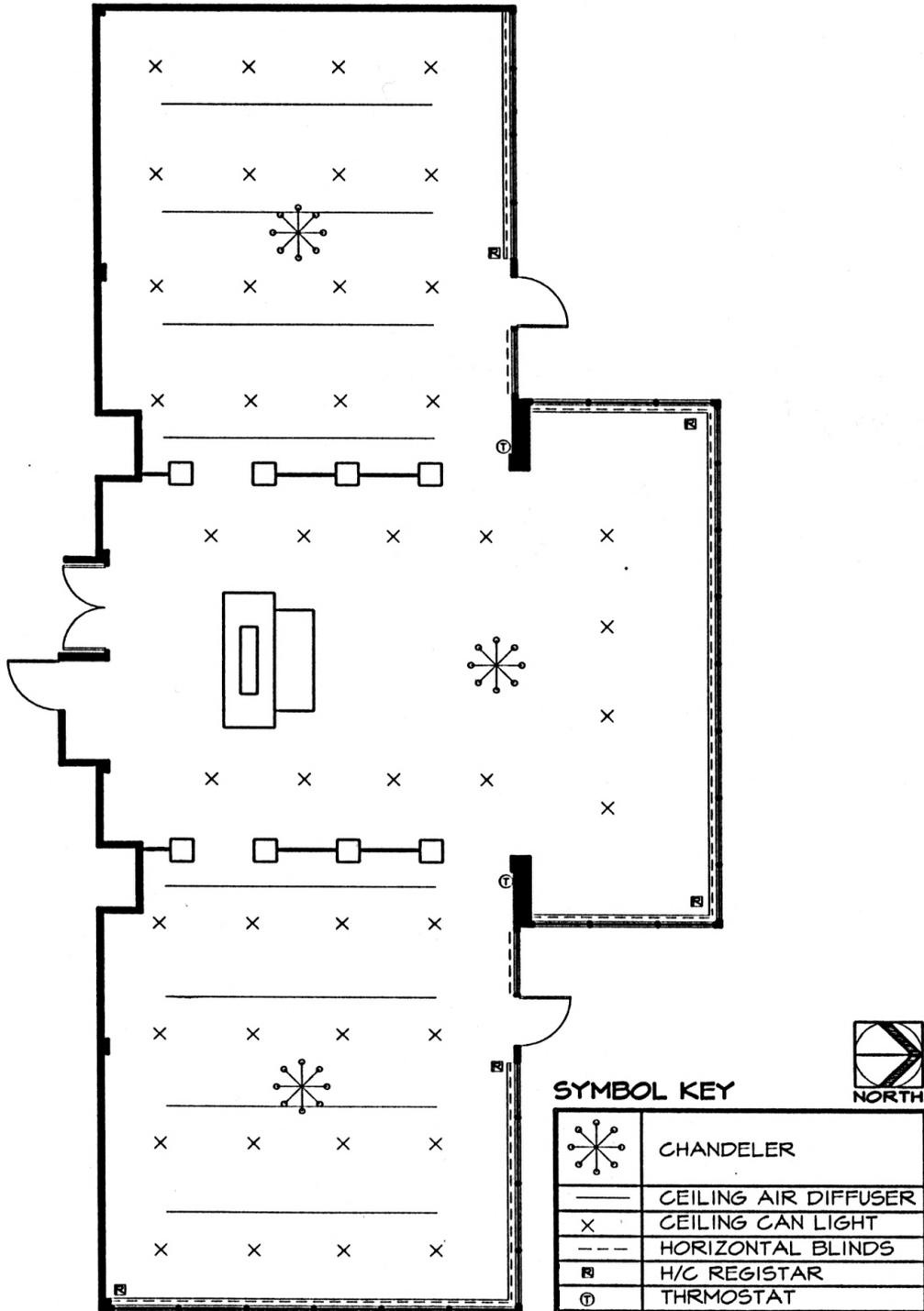


Figure 4.1. Plan of Independent Living Dining - Site 1.

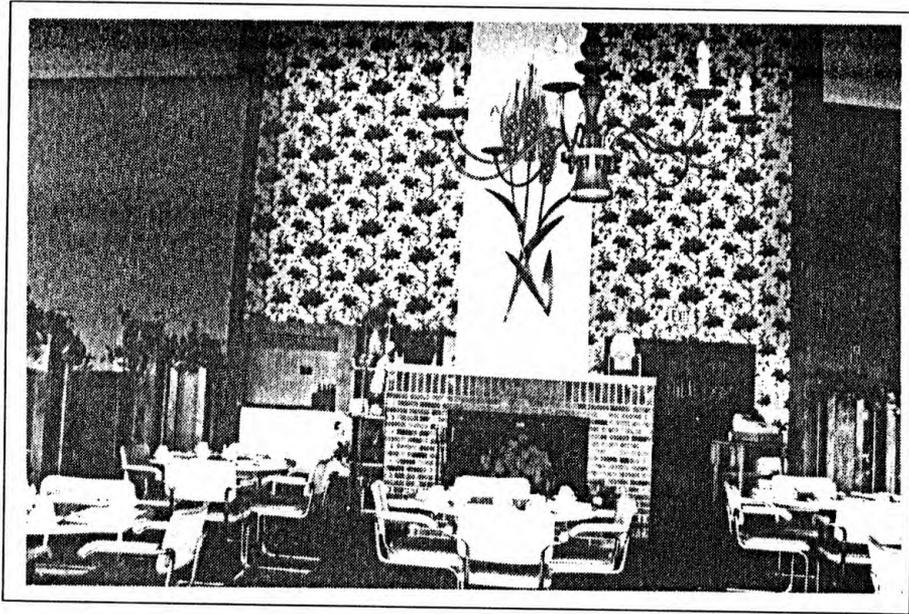


Figure 4.2. Independent Living Dining - Site 1.

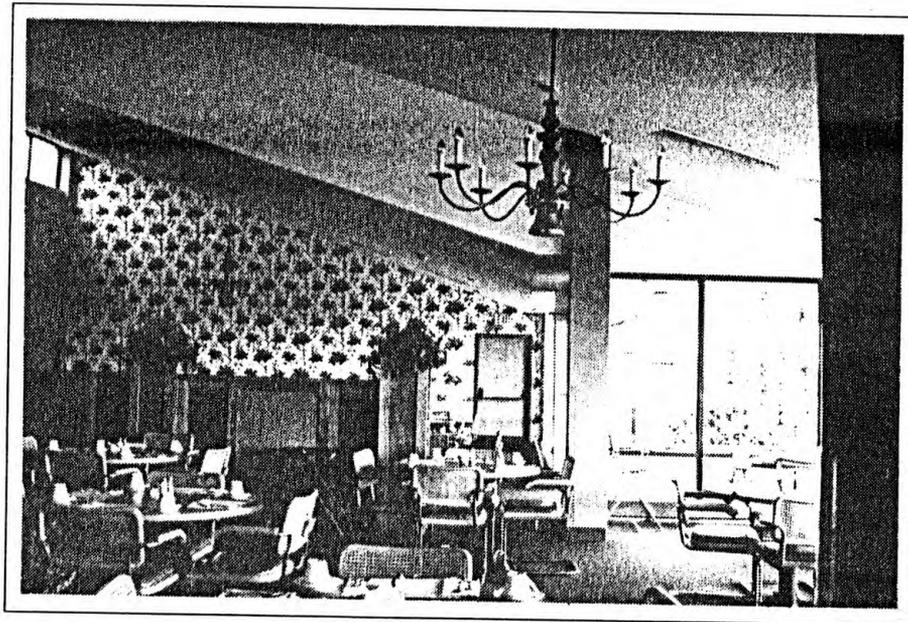


Figure 4.3. Independent Living Dining - Site 1.

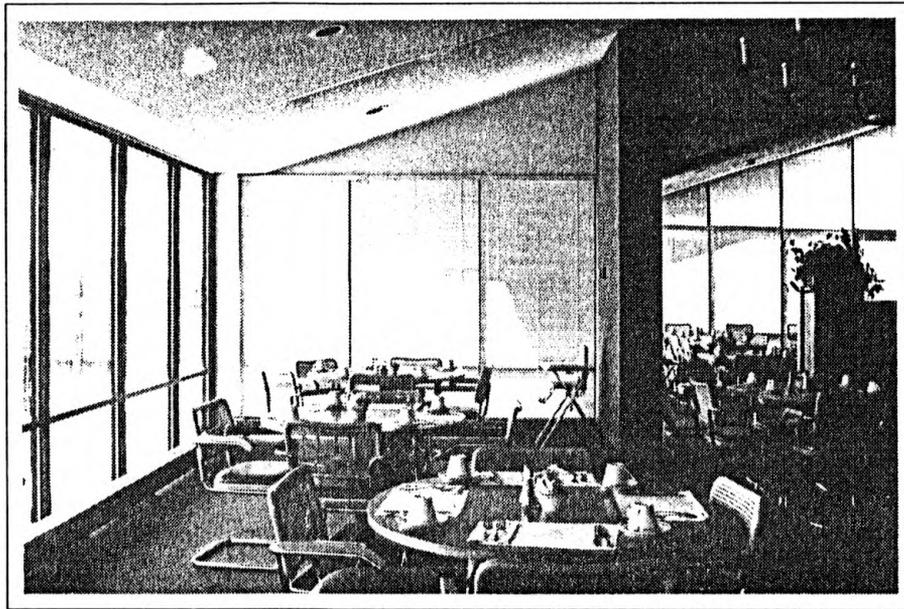


Figure 4.4. Plan of Independent Living Dining - Site 1.

Resident and staff varied on their ratings about whether this brightness was distracting, or interfered with activities in the dining room. Differences in ratings could be due to differences in visual acuity, and the time of day the dining room was frequented most often. Most all residents and staff rated the amount of artificial lighting to be just the right amount. Due to the carpeting on the floor, residents and staff felt that there was no reflection of light off of the floor that was distracting or interfered with activities.

Shadows did not seem to be a problem for residents in the dining room. Staff were divided on their ratings on unwanted shadows. Half stated they were rarely present, while the other half felt they were occasionally present. Overall, lighting characteristics of this space were judged to be satisfactory. The room had an abundant source of natural illumination, and while this may cause occasional problems with direct glare from bright sunlight,

residents and staff can control their exposure to this by their location and by controlling the window treatments.

Thermal Comfort Features. Overall residents rated the temperature of the dining room to be too cool (mean rating 2.1). Staff varied on their ratings of temperature from too cool to slightly too warm (mean rating 2.6). Both residents and staff felt the humidity level in the dining room during the summer was just about right. Residents' mean rating was 2.9 with only one resident rating the space slightly too dry. Staff rated the space similarly (mean rating 3.0) with one staff rating it slightly too dry and one rating it slightly too moist. All but one resident rated humidity during the winter months to be just right, one rating it to be slightly too dry. Humidity during the winter dropped slightly for staff (mean rating of 2.8). Two staff felt the space was too dry or slightly too dry during the winter month, one felt it was slightly too moist, while the rest rated the humidity during the winter as "just right." The majority of residents and staff felt the amount of air movement in the dining room was satisfactory. Residents felt the frequency of unwanted drafts was minimal in this space (mean rating 1.4) Only one resident felt there were occasional drafts, and two residents said drafts were rarely present. Staff felt the presence of drafts was more frequent (mean rating 2.6). Since neither residents or staff control the temperature in this space, both groups experienced dissatisfaction with some thermal comfort feature.

Acoustical Features. All resident felt that unwanted noises from outside the building were never or rarely present (mean rating 1.2). Staff also felt that unwanted noise from outside the building were never or rarely present, with only one staff rating these types of noises as occasionally present (mean rating 1.89). Unwanted noises from other rooms were also rated low by residents (mean rating 1.6) Some staff rated unwanted inside noises as occasionally present, while the rest rated it as rarely or never present (mean rating 2.3). Unwanted sounds from other rooms that could be heard in the dining area were mostly sounds from the adjacent kitchen. Overall, residents felt that the sound level in the dining room was too loud (mean rating 3.9). Three residents who responded noted that the large dining space filled with people increased the hearing difficulty they normally encountered in trying to have conversation at the table. One resident felt that the background noise added to his feeling of overall crowding in the space. Staff varied on their ratings of sound level but the average resulted in a mean score of 3.0, with ranges from 1 to 5. Variations in ratings could be a result of individual differences or staff taking into account the difficulties they recognized with residents' hearing ability. Due to the large volume of space, some residents felt that sounds echoed in the dining area. Half of the staff felt sounds echoed in the dining room, while the other half said sounds never or rarely echoed. Even though acoustical wall covering had been installed, the acoustical environment in the dining room was slightly below satisfactory, overall. Problems in sound quality may be due to the high volume of space.

Olfactory Features. Questions on smells focused on the frequency of smells and odors. Of the ten residents who responded, three residents had no sense of smell, and thus, did not answer questions related to olfactory features. Overall, the olfactory environment in the dining room was satisfactory to both residents and staff. The seven residents who responded felt that unpleasant odors were never present in the dining room (mean rating 1.0). Staff, however, were mixed on their opinions about the presence of unpleasant odors. Odors noted by staff usually focused on cooking smells from the kitchen. Residents felt that pleasant smells were occasionally to always present in the dining room (mean rating 3.7). Staff rated the presence of pleasant smells slightly lower than residents (mean rating 3.1). Most of the staff felt that pleasant smells were occasionally to always present, while three staff rated the presence of pleasant smells as rarely present. Smells identified as pleasant were cooking and food smells from the adjacent kitchen. Since the public areas of the congregate building were non-smoking, tobacco smoke was not an issue for most residents or staff. Differences in rating for smells could be due to differences in the abilities to smell between residents and staff. The ability to smell reduces with age, and as noted, three of the ten residents who responded had no sense of smell.

Physical Space Features. Residents felt there was an appropriate amount of privacy in the dining (mean rating 2.8). Only one resident felt there was not enough privacy and only one felt there was slightly too much privacy. Ratings on privacy were received from seven of the nine staff respondents. Overall the ratings of privacy for the

dining room were slightly lower than the rating given by residents (mean rating 2.1). Both residents and staff felt that the amount of furniture in the dining space was just the right amount (mean rating 3.0 and 3.3 respectively). Ratings of the perceptions of crowding varied slightly for both residents and staff. Overall, residents felt the dining room was never or rarely crowded (mean rating 1.9). Three of the residents, however, felt the dining room was occasionally or frequently crowded with people. Staff rated the frequency of crowding slightly higher (mean rating 2.2). Most of the staff felt that the dining space was rarely crowded. Overall, the physical space characteristics of the dining room were satisfactory for both residents and staff. The room was furnished with tables and chairs that were distributed evenly throughout the space, and most residents and staff were comfortable with the amount of privacy afforded by the divisions in the room.

Overall Satisfaction. Residents rated the dining room as a highly satisfactory space (mean rating 3.8). Only two residents rated the dining room below satisfactory. Staff ratings of the dining room were slightly lower (mean rating 3.0). The majority of ratings were a "3" or satisfactory with only two ratings above satisfactory and one rating below. Out of the three spaces evaluated, seven of the residents rated the dining room as the place where they spent the least amount of time (mean rating 2.7). Similarly, most of the staff also spent the least amount of time in the dining area, although two of the staff reported this was their primary work area.

Table 4.1. Summary of Satisfaction Ratings for Independent Living Dining - Site 1.

INDEPENDENT LIVING DINING ROOM SITE 1	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	3.8	4	2-5	8	3.3	3	3-4
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	10	3.6	4/5	1-5	9	3.2	3	2-4
How often in the amount of sunlight that comes from the windows in this room distracting?	10	2.4	1	1-4	9	2.8	3	2-4
How often does bright sunlight from the windows interfere with activities?	10	1.7	1	1-3	9	2.7	3	1-4
How much artificial lighting from light fixtures is present in this room?	10	2.8	3	2-3	9	2.8	3	1-3
How often are shadows present in this room?	10	1.2	1	1-2	9	2.4	2	2-3
How often is the light that reflects off of the floor in this room distracting?	10	1	1	1	9	1.2	1	1-3
How often does the light that reflects off of the floor interfere with activities?	10	1	1	1	9	1.2	1	1-3
Can you control the temperature in this room	10							
How comfortable is the temperature in this room to you?	10	2.1	3	1-3	9	2.6	3	1-4
During warmer months, how would you describe the amount of humidity in this room?	10	2.9	3	2-3	9	3	3	2-4
During cooler months, how would you describe the amount of humidity in this room?	10	2.9	3	2-3	9	2.8	3	1-4
How would you describe the amount of air movement in this room?	10	3.1	3	3-4	9	3.3	3	3-5
How often are there unwanted drafts in this room?	10	1.4	1	1-3	9	2.6	3	1-4
How often can unwanted sounds from outside the building be heard in this room?	10	1.2	1	1-2	9	1.9	2	1-3
How often can unwanted sounds from other rooms be heard in this room?	10	1.6	1	1-3	9	2.3	2.5	1-3
How would you describe the sound level in this room?	10	3.9	3	3-5	8	3	3	1-5
How often does sound echo in this room?	10	1.9	1	1-5	8	2.6	4	1-4
How often are odors present in this room?	10	1	1	1	9	3.2	3	2-5
How often are pleasant smells present in this room?	7	3.7	3/4	3-5	9	3.1	2/3	2-5
How often is tobacco smoke present in this room?	7	1	1	1	9	1.1	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	0	0	0	0	1	2	2	2
How would you describe the amount of privacy in this room?	10	2.8	3	1-4	7	2.1	3	1-3
How would you describe the amount of furniture in this room?	10	3	3	3	9	3.3	3	3-4
How often does this room seem crowded with people to you?	10	1.9	1	1-4	9	2.2	2	1-3
How would you rate the overall quality of this room?	10	3.8	4	1-5	8	3	3	1-4
Rank the rooms in the order where you spend the most time?	10	2.7	3	2-3	9	2.4	3	1-3

Descriptive Environmental Assessment of Independent Living Dining Areas - Site 3

The dining room for independent living apartments at Site 3 was a medium-sized room encompassing approximately 1,304 square feet of floor space (see Figure 4.5). The ceiling height in this space was 8'-10", creating an interior volume of approximately 11,519 cubic feet (See Figure 4.6). The dining room was furnished with 16 tables in two basic shapes and sizes, 42" square and 60" diameter, accompanied by 71 chairs. Interior finishes include a low, level loop carpet with a base color of teal green and a multi-color yarn tufted throughout, beige colored walls with a dark green wainscot and a floral wallpaper border. The ceiling was white 2'-0" x 4'-0" acoustical ceiling panels with 15 flush-mounted fluorescent light fixtures that provide artificial lighting to the space. There was a wall of exterior windows that faces to the south. Total exterior window space was approximately 106 square feet (see figure 4.7). Windows were finished with cream colored sheers and headers with swags and jabots. Heating and cooling registers and air exchange was located in the ceiling grid layout. One thermostat, located near the entrance of the room regulates the temperature in this space. The dining room was located on the main floor of the building off of the main corridor between the parlor and the kitchen.

Summary of Satisfaction Ratings for Independent Living Dining - Site 3

Described below are ratings established by residents and staff for the dining area in independent living at Site 3. Meals were part of the "package" that can be purchased by residents as one of the services Site 3 provides. Staff utilize the room when participating in planned activities, but there was a separate break-room where staff eat meals. Rating

and described and discussed in reference to the Descriptive Environmental Assessment of the dining space. For a complete detailed summary of the ratings, see Table 4.2.

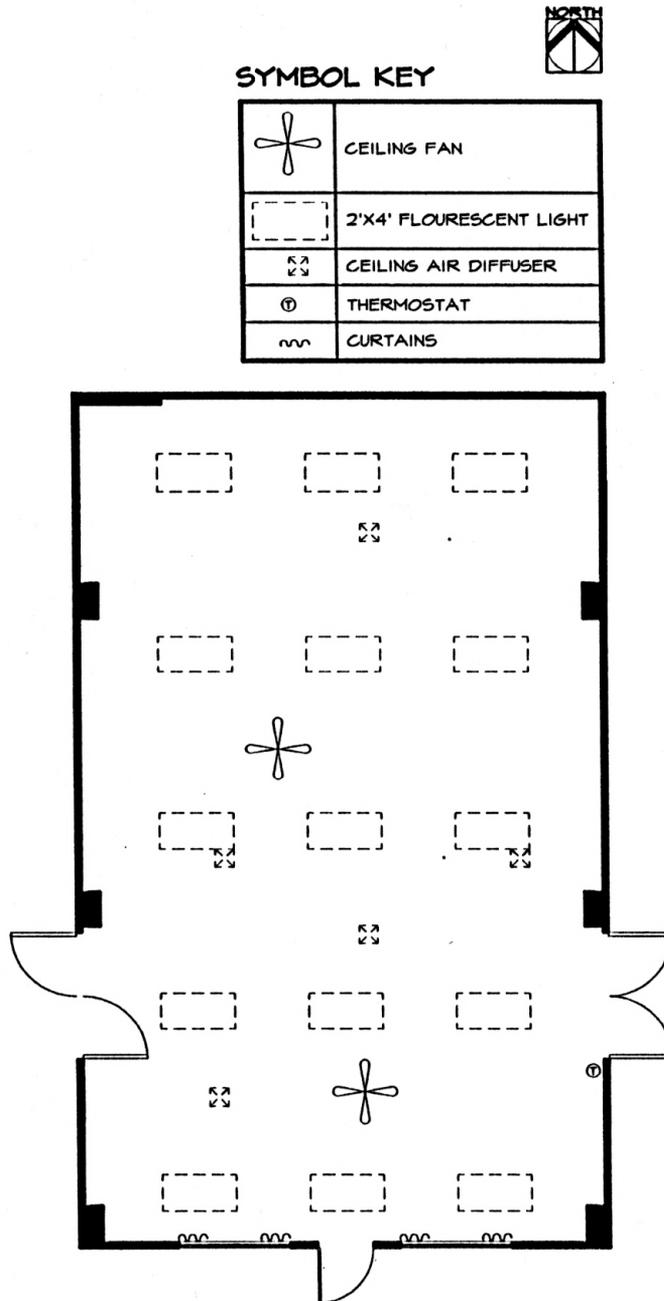


Figure 4.5. Plan of Independent Living Dining - Site 3.

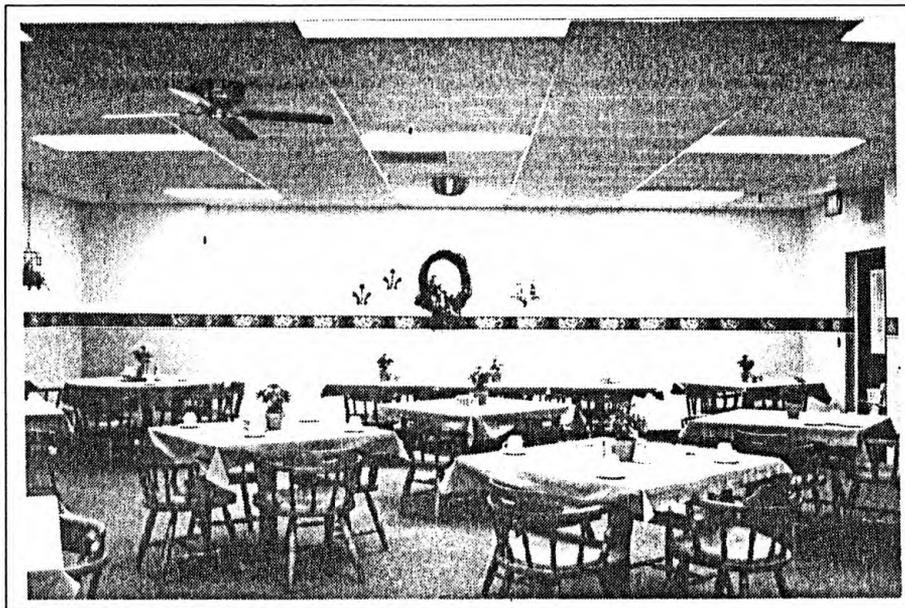


Figure 4.6. Independent Living Dining - Site 3.

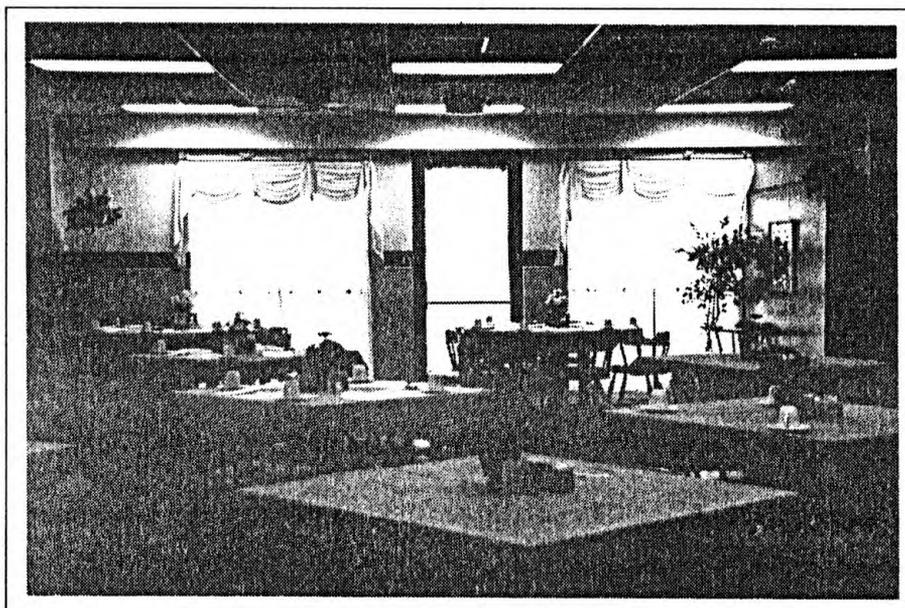


Figure 4.7. Independent Living Dining - Site 3.

Lighting Features. Lighting features were rated as being fairly satisfactory in the independent living dining room at Site 3. Most of the residents and staff were fairly satisfied with the amount of sunlight and artificial lighting in the dining room. Residents noted that since there were options for sitting either close or far away from the windows, they could personally control the amount of sunlight their eyes encountered. Likewise, problems associated with excessive brightness from the sun was never or rarely a problem for residents or staff. Artificial lighting was rated as just the right amount by all residents and staff who responded. Shadows were never or rarely an issue with either residents or staff in the independent living dining room. Since the floor was carpeted, light reflecting off of the floor was not an issue with residents or staff.

Thermal Comfort Features. Overall, the thermal environment of this space was judged to be satisfactory by residents and staff. Residents and staff found the temperature in the dining room to be comfortable. Some individual differences in staff satisfaction were noted with regards to temperature, but were not dramatically different. Humidity levels in the summer and winter months were also rated as satisfactory by both residents and staff. Some differences were noted in the area of air movement. Most of the residents felt that that amount of air movement was just the right amount. More of the staff, however, rated the amount of air movement as not quite enough. Unwanted drafts were rated as rarely present by most residents and staff.

Acoustical Features. The acoustical environment in the dining room was slightly below satisfactory. Residents felt that unwanted sounds from outside the building and from other rooms were never or rarely present in the dining room, while staff noted that unwanted sounds from outside the building and from other rooms in the building were occasionally present. Noises that staff could identify included lawn mowers or traffic. Residents did, however, feel that the sound level in the dining room was slightly too loud (mean rating 3.8). Staff also rated the sound level slightly above "just the right amount" (mean rating 3.3), with three of the eight staff who responded rating the sound level a "4." Residents did not feel that sounds echoed in the dining room, but staff rated the presence of echoes slightly higher.

Olfactory Features. Of the nine residents who responded, two residents had limited abilities to detect the presence of smells. Overall, the olfactory environment of this space was judged to be satisfactory. The presence of odors in the dining room was never or rarely noticed by residents in independent living. Staff, however, rated the presence of odors slightly higher, with the majority of staff stating that odors were frequently present. Residents as well as staff did rate the presence of pleasant smell as more frequent. Smells identified by residents and staff were aromas associated with food cooking in the adjacent kitchen. The public areas of the building at Site 3 were non-smoking, thus, tobacco smoke was never or rarely detected in the dining room, and residents and staff were never (or rarely) bothered by its presence.

Physical Space Features. Most of the residents who responded, felt that the amount of privacy in the dining room was just the right amount for that type of space. However, staff felt the amount of privacy could be slightly higher. Both residents and staff felt the amount of furniture in the space was just the right amount. A majority of the residents and staff felt that the dining room was crowded with people only on occasions. They noted that Sundays dinners and holiday meals were often popular, and that crowding only tended to occur when these additional people showed up or people brought guests for dinner.

Overall Satisfaction. Overall, residents rated the quality of the dining room to be high (mean rating 3.63). Only one resident felt that the dining room rated below a satisfactory rating and this may be attributed to her dissatisfaction with the menu selections that were often served. Staff typically rated the dining space as satisfactory or slightly above satisfactory. Most residents and staff noted that out of the three spaces identified in the study, they spent the least amount of time in the dining room.

Table 4.2. Summary of Satisfaction Ratings for Independent Living Dining - Site 3.

INDEPENDENT LIVING DINING ROOM SITE 3	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	8	3.3	2	2-5	9	2.5	3	1-3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	9	3.1	3	2-5	8	2.9	3	1-4
How often in the amount of sunlight that comes from the windows in this room distracting?	7	1.6	1	1-4	8	2.5	2	1-4
How often does bright sunlight from the windows interfere with activities?	7	1.4	1	1-4	8	2.4	2	1-4
How much artificial lighting from light fixtures is present in this room?	8	3	3	3	9	3	3	3
How often are shadows present in this room?	8	1	1	1	9	2	2	1-3
How often is the light that reflects off of the floor in this room distracting?	6	1	1	1	9	1.4	1	1-3
How often does the light that reflects off of the floor interfere with activities?	6	1	1	1	9	1.4	1	1-3
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	9	3	3	3	9	3.1	3	2-4
During warmer months, how would you describe the amount of humidity in this room?	9	3	3	3	9	3	3	2-4
During cooler months, how would you describe the amount of humidity in this room?	9	3	3	3	9	2.6	3	2-3
How would you describe the amount of air movement in this room?	9	3.1	3	2-5	9	2.5	3	1-3
How often are there unwanted drafts in this room?	8	2	1.5	1-4	8	2.5	2/3	1-4
How often can unwanted sounds from outside the building be heard in this room?	8	1.3	1	1-2	8	2.6	3	1-4
How often can unwanted sounds from other rooms be heard in this room?	8	1.4	1	1-3	8	2.8	3	1-4
How would you describe the sound level in this room?	9	4.1	5	3-5	8	3.3	3	3-4
How often does sound echo in this room?	9	1	1	1	9	2.2	2	1-4
How often are odors present in this room?	7	1.4	1	1-2	9	3.3	4	2-5
How often are pleasant smells present in this room?	8	3.4	4	1-4	9	3.7	4	2-5
How often is tobacco smoke present in this room?	7	1	1	1	9	1.1	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	0	0	0	0	1	2	2	2
How would you describe the amount of privacy in this room?	8	2.8	3	2-3	9	2.1	2	1-3
How would you describe the amount of furniture in this room?	9	3.1	3	3-4	8	3.1	3	3-4
How often does this room seem crowded with people to you?	9	2.6	3	1-4	7	2.6	3	1-4
How would you rate the overall quality of this room?	8	3.6	4	2-5	8	3.1	3	2-4
Rank the 3 rooms in the order where you spend the most time?	9	2.8	3	2-3	9	2.7	3	2-3

Descriptive Environmental Assessment of Assisted Living Dining Room - Site 1

The dining room for assisted living at Site 1 was a medium sized room encompassing approximated 1,380 square feet of floor space (See Figure 4.8). The ceiling height in this room was 9'-0" creating an approximate volume of 12,420 cubic feet (See Figure 4.9). The dining room was furnished with 11 - 48" diameter tables accompanied by 42 chairs. Interior finishes include light blue vinyl composition tile on the floor, light colored walls with soft blue floral and soft blue striped wall paper. The room had approximately 319 square feet of exterior window space. The window treatments include dark blue curtains with dark blue balloon valences and mini-blinds. The ceiling was 1'-0" x 1'-0" concealed spline acoustical tiles with 16 - 1'-0" x 4'-0" surface mounted fluorescent light fixtures (See Figure 4.10). Air diffusers were located in the ceiling and there were three ceiling fans that provide additional air movement in the dining room. Heating and cooling registers were also located along the south wall below the windows. There was no thermostat in this room, the temperature was centrally regulated and controlled by maintenance. The dining room was centrally located between the three residential hallways. The nurses station was directly adjacent and visible from the dining room. There was small kitchen area located on the west side of the room where dishes were cleaned and stored for meals. The entrance to assisted living was to the west of the dining room.

Summary of Satisfaction Ratings for Assisted Living Dining Area - Site 1

Described below are the satisfaction ratings established for the dining area by residents and staff in assisted living at Site 1. The ratings are discussed and evaluated in reference to the Descriptive Environmental Assessment of this space. The dining area in assisted living was also an activity room for programs, planned events, and special occasions, therefore both residents and staff utilize the space. For a complete, detailed summary of the ratings, see Table 4.3.

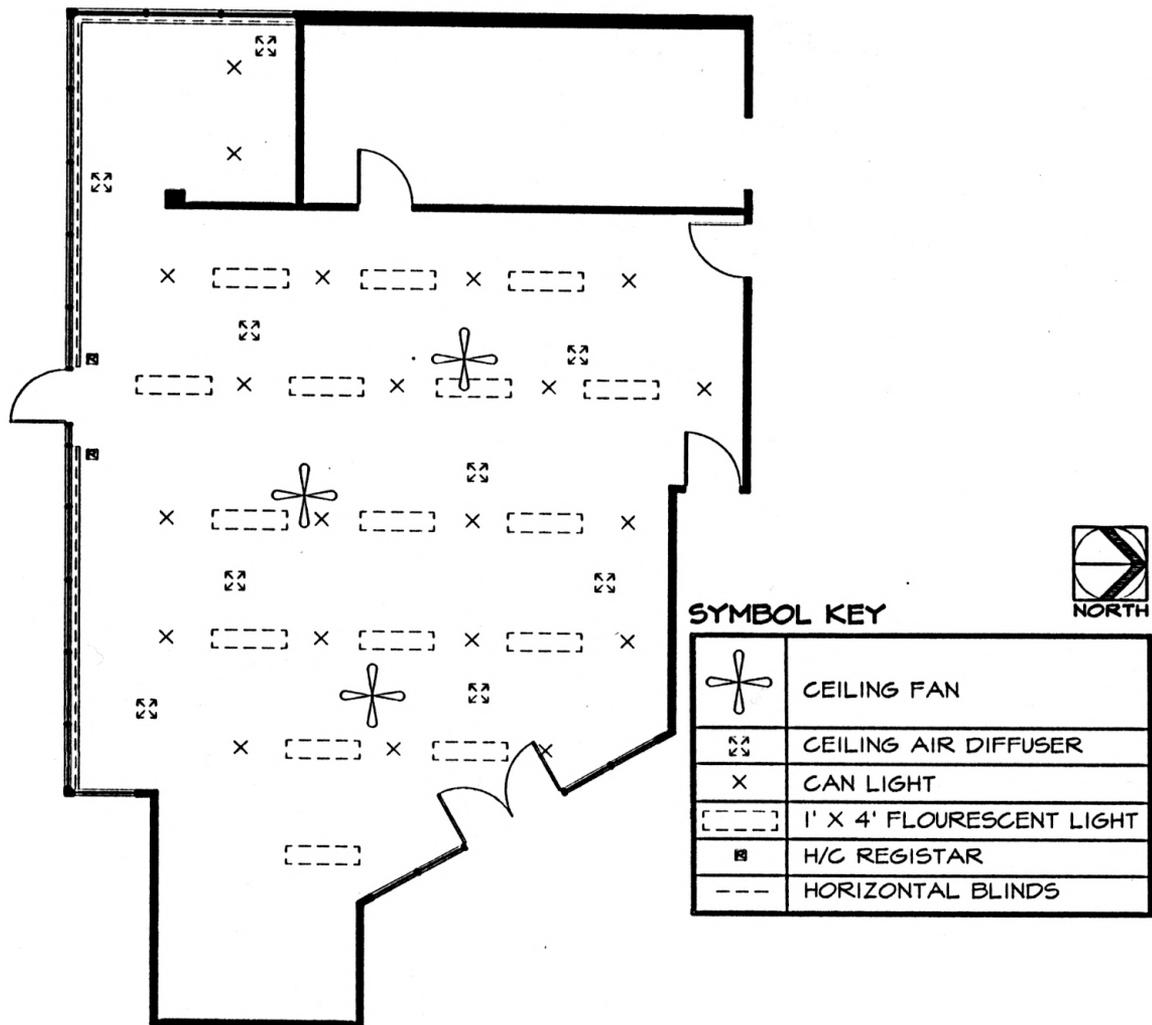


Figure 4.8. Plan of Assisted Living Dining Room - Site 1.



Figure 4.9. Assisted Living Dining Room - Site 1.



Figure 4.10. Assisted Living Dining Room - Site 1.

Lighting Features. The lighting features of this space pose a problematic situation. While residents feel the amount of natural lighting in the room was "just right", the amount of brightness created from the sun created visual problems for some residents. The amount of direct glare was an undesirable side effect of the desired natural lighting. Staff note that this source of glare was occasionally a distraction or interferes with activities. The majority of residents, however, did not feel that brightness from the sun interfered with activities in the dining room. Likewise, residents did not feel that light reflecting off of the vinyl floor was distracting or that it interfered with any activities, while some staff felt that light reflecting off of the floor was distraction or that it occasionally interfered with activities. Most all residents and staff rated the amount of artificial lighting to be just the right amount, and shadows did not seem to be a problem feature of this space.

Thermal Comfort Features. Residents and staff differ on their perceptions of temperature in this space. When residents and staff in assisted living rated the feature of temperature, residents felt it was just the right temperature to slightly too cool in the dining room, while staff felt it was usually too warm. Humidity during the summer and winter months was rated as satisfactory with residents, but staff noticed that season changes affected the humidity levels, especially in the summer time. The amount of air movement in the dining room was rated fairly similar by both residents and staff with the majority of respondents rating the amount of air movement as "just the right amount." The presence of unwanted drafts was noted by two of the residents who responded. They

felt that unwanted drafts created by the ceiling fans were frequent. The majority of residents and staff felt drafts were never or rarely present.

Acoustical Features. The acoustical features of this space were fairly satisfactory. Unwanted noises from areas outside the dining room were not frequent, and if present, only noticed occasionally by staff. Noises identified included lawn mowers and outside traffic. Noises from other rooms were again not noticed by residents, and were noticed less frequently than outside noises by staff. The sound level was slightly higher than was desirable for almost half of the residents. Some residents noted that table conversation at meal times was sometimes a problem due to background conversation noise. Some staff also rated the sound level to be slightly too loud in the dining room. This could be due to the number of hard surfaces in the room. The presence of echoes was rated infrequent, overall, by both groups.

Olfactory Features. One resident, out of the ten who responded, had limited ability to detect smells. Residents felt odors were rarely or never present in the dining room. They did, however feel the presence of pleasant smells was more frequent. Staff rated the presence of odors slightly higher than did residents but also felt that the presence of pleasant smells was more frequent than odors. Pleasant smells that were identified were associated with meals. This portion of the building was non-smoking, so the presence of tobacco smoke was not an issue for most all residents and staff. One resident and one staff did detect the presence of smoke that drifted in from an adjacent smokers space in

the foyer at the entrance of the assisted living facility. This rarely bothered the staff person, while the resident was never bothered by the smoke.

Physical Space Features:

Overall, the physical space features of the dining room were rated to be satisfactory by most residents and staff. Some residents desired a bit more privacy for table conversation, but did not feel the dining room was crowded with people. Most of the residents felt there was enough privacy in the dining room. Staff, also rated the overall privacy of the dining room to be adequate. The amount of furniture in dining room was rated to be "just the right amount" by both residents and staff. Crowding in the dining room was not an issue for residents, they felt the dining room was never or rarely crowded. Three of the staff felt the dining room was occasionally crowded, but the rest of the respondents felt it was never or rarely crowded with people.

Overall Satisfaction. Most all residents who responded rated the overall quality to be satisfactory or slightly above (mean rating 3.6). Staff rated the quality of the dining room to be slightly lower (mean rating 2.9). Out of the three areas studied, residents rooms (or staff work area), dining room, and the hallways, most residents rated the dining room as the second place they spent most of their time (mean rating 2.3). This could be due to the fact that the dining room also serves as an activity space for meetings, programs, and planned social occasions. Staff rated the dining room to be the third place they spent most of their time (mean rating 2.6).

Table 4.3 Satisfaction Ratings for Assisted Living Dining - Site 1.

ASSISTED LIVING DINING ROOM SITE 1	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	3.2	3	3-5	9	3.4	3	3-5
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	10	3.9	4	3-5	9	3.9	4	3-5
How often in the amount of sunlight that comes from the windows in this room distracting?	10	2.2	1	1-5	9	3.2	3	2-4
How often does bright sunlight from the windows interfere with activities?	10	1.6	1	1-4	9	3.1	3	2-5
How much artificial lighting from light fixtures is present in this room?	10	3.1	3	3-4	9	3	3	3
How often are shadows present in this room?	10	1	1	1	9	2	2	1-3
How often is the light that reflects off of the floor in this room distracting?	10	1	1	1	9	2.1	1.5	1-4
How often does the light that reflects off of the floor interfere with activities?	10	1	1	1	9	1.8	1	1-4
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	10	2.8	3	2-4	9	3.8	3	3-5
During warmer months, how would you describe the amount of humidity in this room?	10	3	3	3	9	3.4	4	1-5
During cooler months, how would you describe the amount of humidity in this room?	10	2.9	3	2-3	9	2.6	3	1-3
How would you describe the amount of air movement in this room?	10	3.2	3	2-4	9	2.8	3	2-4
How often are there unwanted drafts in this room?	10	1	1	1-4	9	2	2	1-3
How often can unwanted sounds from outside the building be heard in this room?	10	1.6	1	1-4	9	2	2	1-3
How often can unwanted sounds from other rooms be heard in this room?	10	1.3	1	1-4	9	1.78	1	1-3
How would you describe the sound level in this room?	10	3.5	3	3-5	9	3.2	3	3-4
How often does sound echo in this room?	10	1.4	1	1-3	9	1.6	1	1-3
How often are odors present in this room?	9	1.7	1.5	1-3	9	2.3	2	1-4
How often are pleasant smells present in this room?	10	3.6	4	3-4	9	3	3	2-4
How often is tobacco smoke present in this room?	9	1.1	1	1-2	9	1.1	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	1	1	1	1	1	2	2	2
How would you describe the amount of privacy in this room?	10	2.7	3	2-3	9	2.9	3	2-4
How would you describe the amount of furniture in this room?	10	3	3	3	9	3	3	2-5
How often does this room seem crowded with people to you?	10	1.1	1	1-2	9	2	2.5	1-3
How would you rate the overall quality of this room?	10	3.6	5	1-5	9	2.9	3	2-4
Rank the 3 rooms in the order where you spend the most time?	10	2.3	2	2-3	8	2.6	3	2-3

Descriptive Environmental Assessment of Skilled Dining Area - Site 1

The dining room for skilled care facility at Site 1 encompasses 2,548 square feet of floor space (See Figure 4.11). The ceiling height was 8'-0" resulting in an interior volume of approximately 20,384 cubic feet. Interior finishes include vinyl composition tile flooring in three colors, white, dark orange, and tan. The walls were also a dark vibrant orange paint with small areas of orange and tan wallpaper and peach paint. The ceiling was a white 2'-0" x 4'-0" acoustical panel. The dining space was lighted by 48 - 1'-0" x 4'-0" fluorescent light fixtures. Air diffusers were located in the ceiling and were evenly distributed across the room. Two ceiling fans were also located at either ends of the room. There was not thermostat located in this room, the temperature was centrally regulated and controlled by maintenance. Exterior window space of approximately 207 square feet faces to the east and to the south and provides natural illumination to the space (see Figures 4.12 and 4.13). The windows were finished with dark orange mini-blinds. The room was furnished with 23 tables of various shapes and sizes accompanied by 42 chairs. In the northwest corner of the room was a small kitchenette. The television for the unit and a piano were also located in this room. The dining room was located along a double loaded corridor, across from the bathing rooms and adjacent to the nurses station. There were three entrances into the dining room off of the hallway. There was also an exit to a small secured courtyard from this space on the east side of the room.

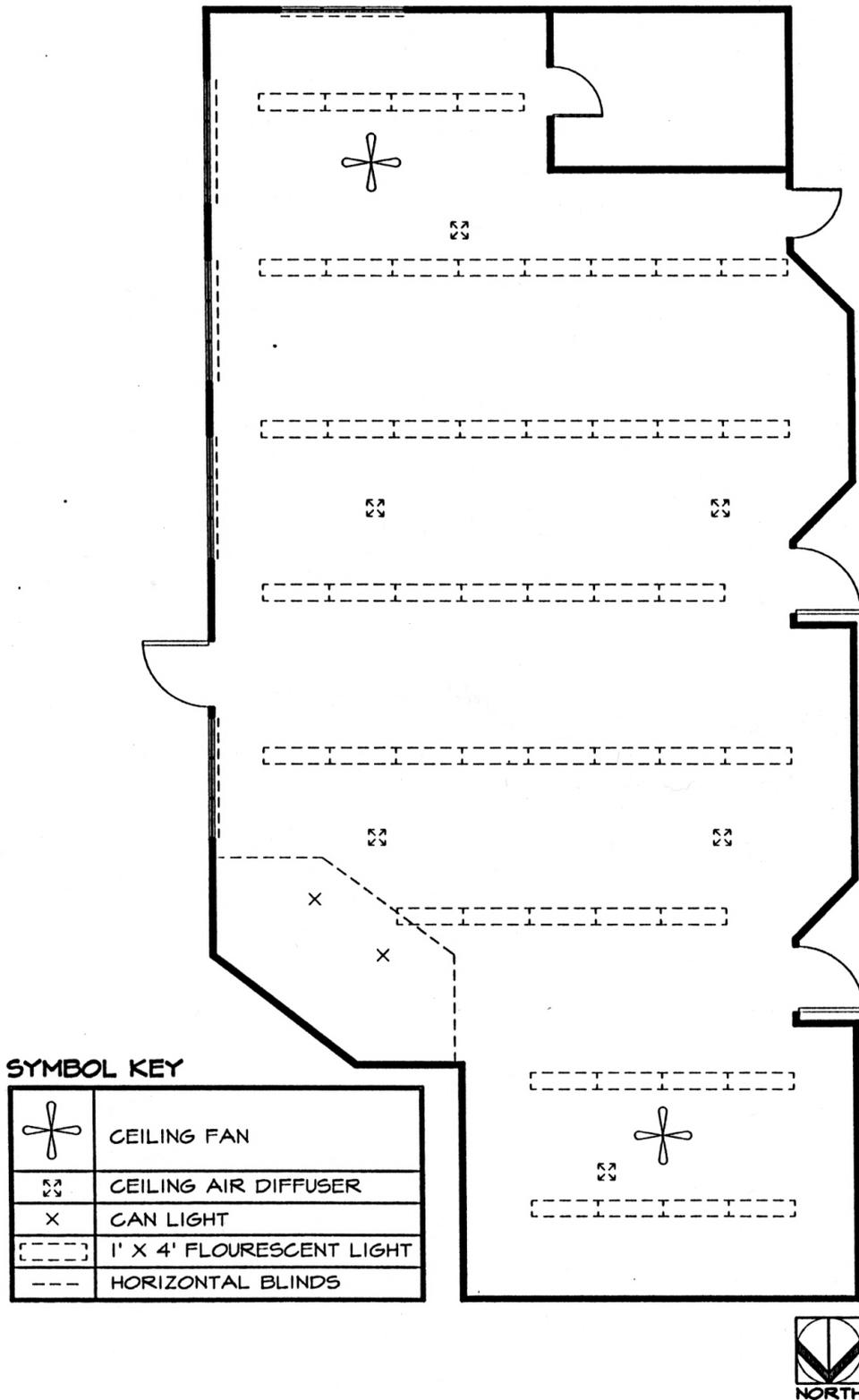


Figure 4.11. Plan of Skilled Care Dining - Site 1.

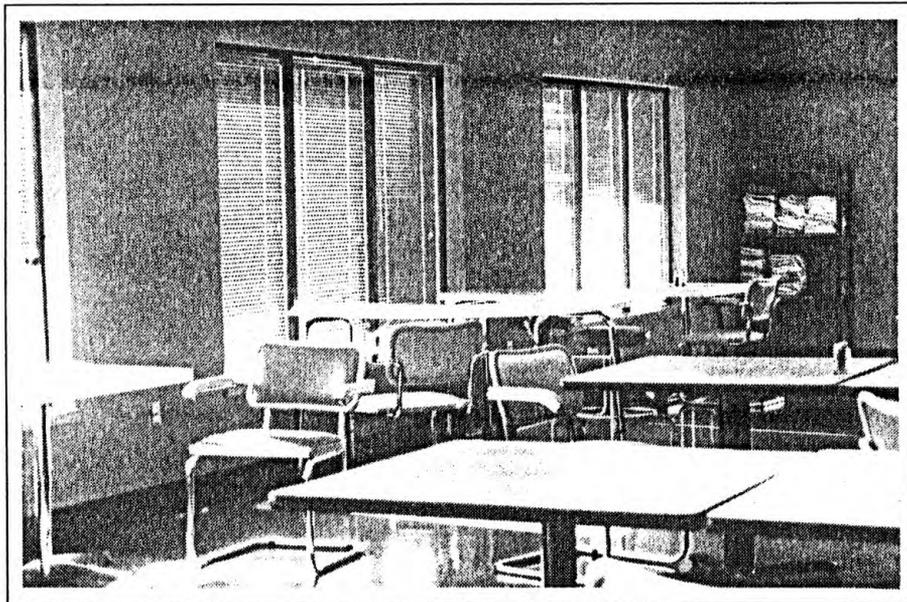


Figure 4.12. Skilled Care Dining Room - Site 1.

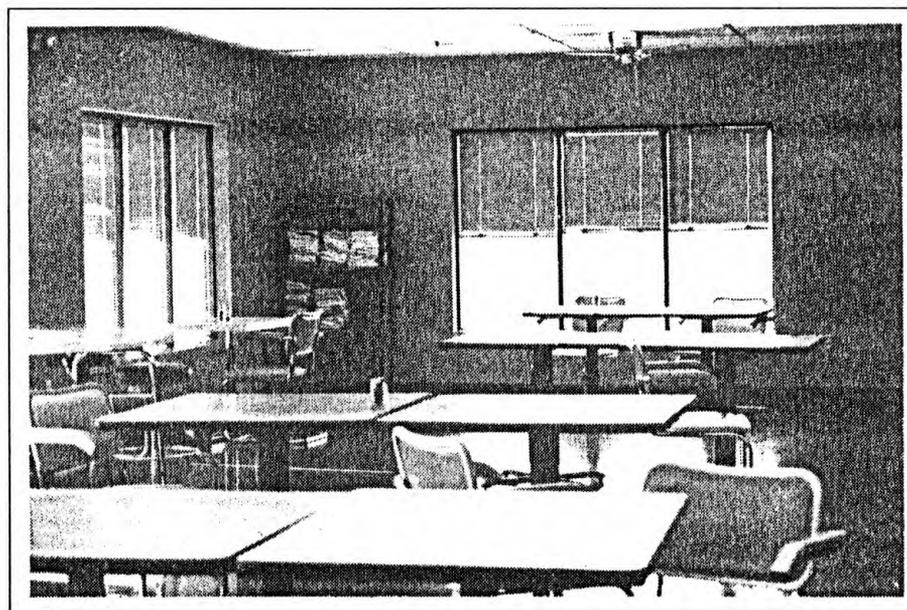


Figure 4.13. Skilled Care Dining Room - Site 1.

Summary of Satisfaction Ratings for Skilled Care Living Dining Area - Site 1

Described below are a summary of the satisfaction ratings for the skilled care dining room at Site 1 as established by residents and staff. The dining room also serves as an activity room for meetings, programs, and special events, thus, residents and staff both utilize this space. Ratings are discussed and evaluated in reference to the Descriptive Environmental Assessment of this space. For a complete, detailed summary of the ratings, see Table 4.4.

Lighting Features. The natural lighting features of this space were a bit problematic. The amount of sunlight that comes through the windows to the east creates direct glare that more residents and staff find undesirable. While residents do not acknowledge this source of glare as an interference, staff note glare sometimes hinders activities. Likewise with the light reflecting off of the smooth vinyl flooring, only staff identified this reflection to be a problems. Residents and staff both seemed satisfied with the amount of artificial lighting that was present in the dining room, and both residents and staff felt shadows were never or rarely a problem.

Thermal Comfort Features. Thermal comfort features of the dining room vary for residents and staff. Most residents rated the temperature to be just right. The second most frequent rating by residents was slightly too cool. Over half of the staff rated the temperature in the dining room to be too warm. Humidity levels in the dining room during the warmer month were rated to be just the right amount by most residents, but over half

of the staff rated the humidity level in the dining room to be slightly too moist. Ratings for humidity during cooler months centered closely around "just the right amount" for both residents and staff with the mean rating for both groups being slightly below just the right amount. Most of the residents felt air movement was just the right in the dining room. Almost half of the staff, however, felt there was not enough air movement. Residents were split on the frequency of drafts in the dining room. Half of the residents felt drafts were never present, half felt they were occasionally present. Most staff felt drafts were never or rarely present in the dining room. Individual differences and the differences in activity levels most likely account for differences in satisfaction with these features.

Acoustical Features. Residents and staff rated the presence of unwanted sounds from the outside as never or rarely present. The frequency of unwanted sounds from other room was rated slightly higher. Residents and staff both identified noises associated with "loud residents" as occasionally present. These noises were usually from residents who had some form of dementia. Both residents and staff rated the sound level in the dining room to be just the right amount. Some residents noted sometimes during meals it was louder, but overall, was satisfactory. Both residents and staff said that sound never or rarely echoed in the dining room. Overall, the acoustical features of this space were satisfactory.

Olfactory Features. Olfactory features of this space were satisfactory to most all residents and staff. Only a few staff identified odors as being a problem in the dining

room, but residents did not acknowledge this to be a problem. Odors that were identified included the smells of food after meals or bodily odors. Most residents and staff felt pleasant smells were occasionally present in this space. They most frequently identified meals as the source of pleasant smells. The skilled health care facility was entirely non-smoking, so, neither residents or staff detected the presence of tobacco smoke in the dining room or were bothered by smoke in this room.

Physical Space Features. Overall, the physical space features of the dining room were satisfactory to residents and staff. Residents and staff noted few problems associated with lack of privacy or too much or too little furniture. Other ratings varied slightly. Most residents felt the dining room was never or rarely crowded with people. Staff were divided. Half felt the dining room was rarely crowded, half felt it was occasionally crowded with people.

Overall Satisfaction. Overall, the residents rated the dining room to be "satisfactory." Staff varied on their rating, but most staff rated the dining room to be satisfactory, also. Residents were divided on the location where they spent most of their time. The dining room was also an activity area so residents who participated in activities spent more time in the dining room than residents who were was skilled care for rehabilitation. Out of the three area evaluated, staff spent the least amount of time in the dining room.

Table 4.4. Summary of Satisfaction Rating for Skilled Care Dining - Site 1.

SKILLED CARE LIVING DINING ROOM SITE 1	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	6	4	4	3-5	11	3.2	3	3-5
When you look at the windows in this room, how would you describe the amount of b. The rightness from the sun.	6	3.8	4	3-5	11	3.6	3	3-5
How often in the amount of sunlight that comes from the windows in this room distracting?	6	1.8	1	1-4	11	3	3	2-4
How often does bright sunlight from the windows interfere with activities?	6	1	1	1	11	2.5	3	1-5
How much artificial lighting from light fixtures is present in this room?	6	3	3	3	11	3.2	3	3-4
How often are shadows present in this room?	6	1.2	1	1-2	11	2.2	2	1-3
How often is the light that reflects off of the floor in this room distracting?	6	1	1	1	11	2.3	2	1-3
How often does the light that reflects off of the floor interfere with activities?	6	1	1	1	11	1.8	2	1-3
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	6	2.7	3	1-4	11	4	4	3-5
During warmer months, how would you describe the amount of humidity in this room?	6	3.7	3	3-5	11	3.9	3.5	3-5
During cooler months, how would you describe the amount of humidity in this room?	6	2.8	3	2-3	11	2.9	3	2-4
How would you describe the amount of air movement in this room?	6	3.2	3	3-4	11	2.2	3	1-3
How often are there unwanted drafts in this room?	6	2	2	1-3	11	1.8	2	1-3
How often can unwanted sounds from outside the building be heard in this room?	6	1.7	1	1-2	11	1.8	2	1-3
How often can unwanted sounds from other rooms be heard in this room?	6	1.5	1	1-3	11	2.8	3	1-4
How would you describe the sound level in this room?	6	3.3	3	3-4	11	3.3	3	2-5
How often does sound echo in this room?	6	1	1	1	11	2.2	2	1-4
How often are odors present in this room?	6	1	1	1	11	2.3	2	1-4
How often are pleasant smells present in this room?	6	2.8	3	1-4	11	3.4	4	1-4
How often is tobacco smoke present in this room?	1	1	1	1	11	1	1	1
If present, how often are you bothered by tobacco smoke in this room?	0	0	0	0	0	0	0	0
How would you describe the amount of privacy in this room?	6	2.6	3	1-3	11	2.6	3	1-3
How would you describe the amount of furniture in this room?	6	3	3	3	11	2.8	3	1-4
How often does this room seem crowded with people to you?	6	1.2	1	1-2	11	2.6	2.5	1-4
How would you rate the overall quality of this room?	6	3	3	2-4	11	2.8	3	1-4
Rank the 3 rooms in the order where you spend the most time?	6	2.5	2.5	2-3	11	2.9	3	2-3

Descriptive Environmental Assessment of Skilled Care Dining - Site 3

The dining room at Site 3 was also part of the multipurpose room, but there was a clear definition between the lounge areas and the eating area (see Figure 4.13). The dining space take up 945 square feet of floor space (see Figure 4.14). The ceiling height was 8'-0" creating an interior volume of approximately 7,560 cubic feet when the folding partition was closed. Interior finishes include a terrazzo type vinyl composition tile in shades of brown and tan. The walls were wainscoted with a teal colored acoustical wall covering topped with a floral wall paper border. The rest of the wall was painted a cream color up to the ceiling. The ceiling was a white 2'-0" x 4'-0" acoustical panel with 15 - 2'-0" x 4'-0" fluorescent light fixtures. There was 77 square feet of exterior window space. The three exterior windows in the dining area face south. These windows were finished with vertical blinds and balloon valences (see Figure 4.15). The dining area was furnished with 11 - 38" x 50" tables accompanied by 26 chairs. A small kitchenette was located in the east corner of the room, along with a commercial ice maker. Air diffusers were located in the ceiling, but there was no thermostat located in this room. Temperature was centrally controlled. The dining room was located off of a double loaded corridor on the hallway that connects that skilled care to the independent living portions of the building. The nurses station was directly adjacent to the space to the east. Across the hallway were two resident rooms, the physical therapy room, and some clean linen storage.

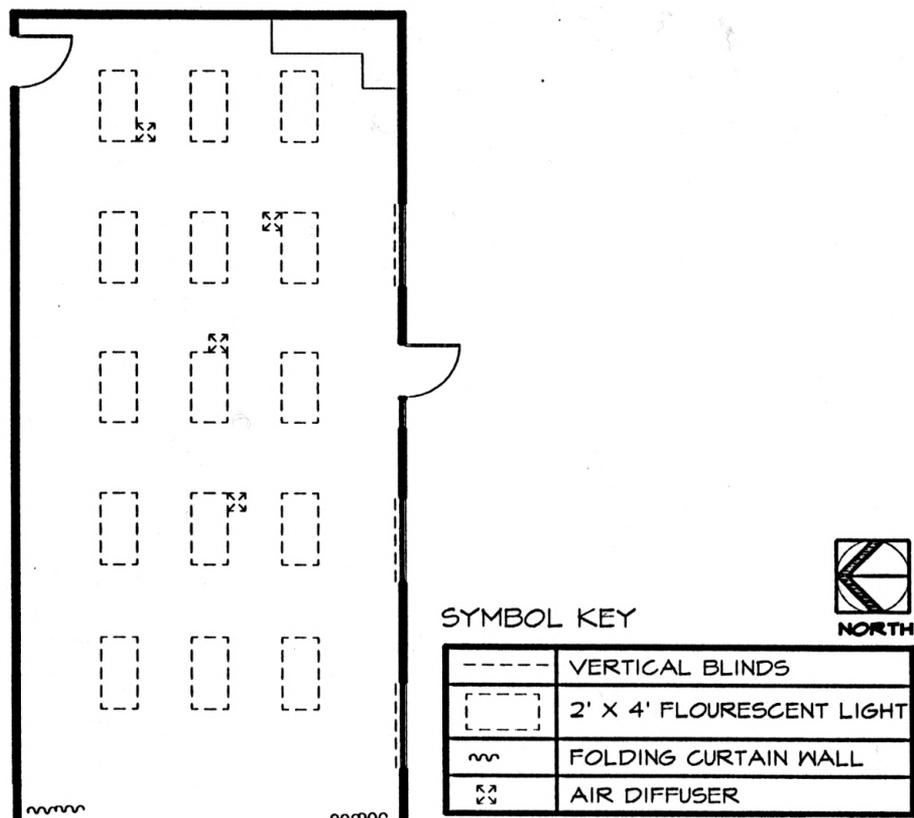


Figure 4.14. Plan of Skilled Care Dining - Site 3.



Figure 4.14. Skilled Care Dining - Site 3.

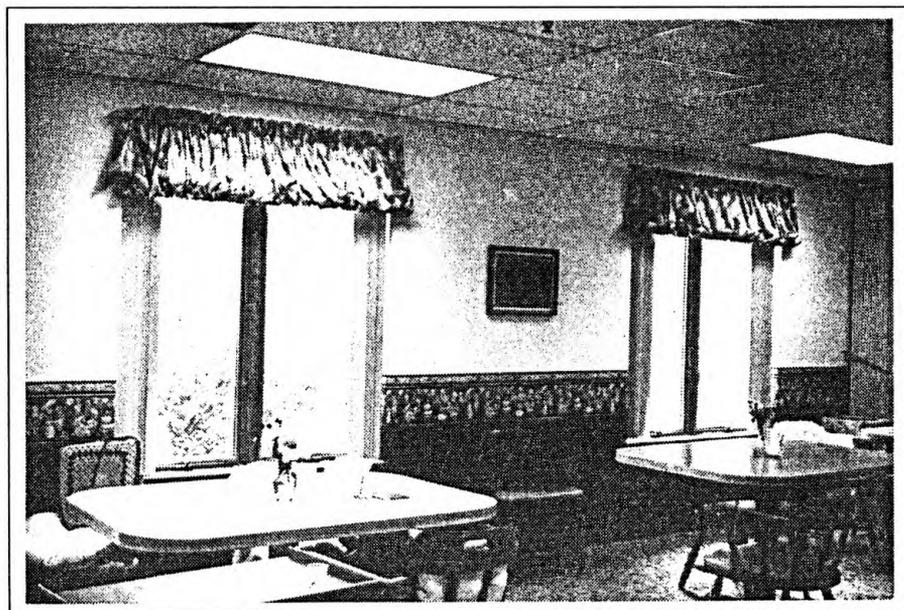


Figure 4.15. Skilled Care Dining - Site 3.

Summary of Satisfaction Ratings for Skilled Care Dining - Site 3

Described below are a summary of satisfaction ratings for the dining room in skilled care as established by residents and staff at Site 3. Since there was another activity space attached to the dining room, this space was mainly for meals. The dining area was used, however for large activities when more space was required. Ratings and discussed and evaluated in reference to the Descriptive Environmental Assessment of the space. For a complete, detailed summary of the ratings, see Table 4.5.

Lighting Features. Satisfaction with the lighting characteristics of this space were varied. Most residents and staff felt the amount of sunlight to be just the right amount. Overall, the amount of brightness from the sun was rated as just the right amount, also. Because the brightness was not rated as excessive in the dining room by residents, they did not associate brightness with creating distraction or causing interference with activities. Staff ratings were varied. Six of the nine staff rate the occurrence of distraction as occasional or frequent. Seven of the nine staff rated the occurrence of interference as occasional or frequent. No explanation was given for the differences in rating between the amount of sunlight and the amount of brightness to the presence of distraction and the higher presence of interference from the sunlight in the dining room by staff. Staff may have felt the amount of sunlight was just right for them, but noted the interference of the brightness for the residents in their care. Most residents and staff felt there was just the right amount of artificial lighting in the dining room. Both residents and staff felt shadows

were never or rarely present in the dining room, and that reflection of light from the floor was never or rarely a problem.

Thermal Comfort Features. Thermal comfort features of this space were satisfactory, overall. Residents rated the temperature in the dining room to be just the right temperature. Staff were varied in their ratings. Half of the staff who responded felt the temperature was just right, while the other half felt the temperature was too cool. Only one staff felt the temperature in the dining room was slightly too warm. Ratings for the humidity level in the dining room were just the right amount or slightly too dry for both warmer and cooler seasons for both residents and staff. Overall, the amount of air movement in the dining room was rated as just the right amount by both residents and staff. Some residents and staff did note drafts were occasionally present.

Acoustical Features. Acoustical qualities of this space were rated slightly below satisfactory, overall. Unwanted sounds from outside the building were not noticed by residents. Almost half of the staff who responded felt that unwanted noises from outside the building were occasionally present. Noises identified included lawn mowers and traffic. The presence of unwanted noises from other rooms was noticed more frequently by residents and staff. Noises that were identified were usually cart traffic or noises from other residents down the hall. Two of the three residents who responded felt the sound level in the dining room was too loud. Almost half of the staff surveyed also felt the sound level was too loud in the dining room. Possible reasons for this characteristic could

be the number of hard surfaces and the open design of the room. The presence of an echo was not notice by most residents and staff.

Olfactory Features. Two of the residents surveyed had not sense of smell and did not respond to questions about odors or pleasant smells. The one resident who did respond felt odors were occasionally present, but did not respond to the question about pleasant smells. Staff varied on their ratings associated with odors. Half of the staff surveyed felt odors were rarely present in the dining room, half felt they were occasionally to frequently present. Odors identified included food smells as well as odors from incontinent residents. The presence of pleasant smell was rated as more frequent by staff. Pleasant smells were identified as food smells, perfumes, and air -fresheners. One staff noted there was a fine line between when food was a meal and when food was garbage. When food comes into the dining room it smells good, but when the meal was over and plates were sitting on the cart waiting to go back to the kitchen, it smells bad. The presence of tobacco smoke was never detected by those residents who responded. Only three staff noted the presence of smoke in the dining room. This was usually from guests were visiting. Of those who detected smoke only two were rarely bothered by its presence.

Physical Space Features. The physical space characteristics of the dining room were slightly below satisfactory. Residents and staff varied on their ratings on the amount of privacy. Respondents in both groups rated privacy between "just the right amount" to

"not quite enough." The amount of furniture in the dining room was rated as just the right amount by residents. Over half of the staff surveyed felt there was slightly too much or too much furniture in this space. Two of the three residents felt the dining room was frequently crowded with people. One resident felt it was rarely crowded. Most of the staff also felt the dining space was occasionally to frequently crowded with people. The rectilinear design of this room and the lack of division of space in the dining area could contribute to these perceptions.

Overall Satisfaction. Residents rated the dining space to be satisfactory to slightly above satisfactory. Out of the three spaces evaluated, the dining room was the space where they spent the least amount of time. Since there was also a separate area for activities, the dining room was usually only for meals. Staff rated the dining space slightly lower. Most staff rated the dining space to be satisfactory to slightly below satisfactory. Most staff also spent the least amount of time in the dining room.

Table 4.5. Summary of Satisfaction Ratings for Skilled Care Dining - Site 3.

SKILLED CARE LIVING DINING ROOM SITE 3	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	3	3	3	3	9	2.8	3	2-4
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	1	3	3	3	9	2.7	3	1-4
How often in the amount of sunlight that comes from the windows in this room distracting?	2	1	1	1	9	2.9	3/4	1-4
How often does bright sunlight from the windows interfere with activities?	2	1	1	1	9	2.7	3	1-4
How much artificial lighting from light fixtures is present in this room?	2	3	3	3	8	3.1	3	2-4
How often are shadows present in this room?	1	1	1	1	9	1.8	1	1-3
How often is the light that reflects off of the floor in this room distracting?	2	1	1	1	9	2.1	2	1-4
How often does the light that reflects off of the floor interfere with activities?	2	1	1	1	9	2.1	2	1-4
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	2	3	3	3	9	2.6	3	1-4
During warmer month, how would you describe the amount of humidity in this room?	2	2.5	2/3	2-3	9	2.8	3	1-4
During cooler month, how would you describe the amount of humidity in this room?	2	2.5	2/3	2-3	9	2.3	3	1-4
How would you describe the amount of air movement in this room?	2	3	3	3	9	3	3	2-4
How often are there unwanted drafts in this room?	3	1.7	1	1-3	9	2.4	3	1-3
How often can unwanted sounds from outside the building be heard in this room?	1	1	1	1	9	2.3	2/3	1-3
How often can unwanted sounds from other rooms be heard in this room?	3	2.7	----	1-4	9	2.9	3	1-4
How would you describe the sound level in this room?	3	3.7	5	1-5	9	3.4	3	3-4
How often does sound echo in this room?	3	1.7	1	1-3	9	1.8	1	1-3
How often are odors present in this room?	1	3	3	3	9	2.8	2	2-4
How often are pleasant smells present in this room?	0	0	0	0	9	3.4	4	2-4
How often is tobacco smoke present in this room?	2	1	1	1	9	1.3	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	0	0	0	0	2	2	2	2
How would you describe the amount of privacy in this room?	2	2.5	2/3	2-3	9	2.2	3	1-3
How would you describe the amount of furniture in this room?	3	3	3	3	9	3.7	3.5	2-5
How often does this room seem crowded with people to you?	3	3.3	4	2-4	9	3.3	4	1-4
How would you rate the overall quality of this room?	3	3.3	3	3-4	9	2.9	3	2-4
Rank the 3 rooms in the order where you spend the most time?	2	3	3	3	9	2.4	3	1-3

Descriptive Environmental Assessment and Satisfaction Ratings of Hallways

The next areas of the CCRC environment to be assessed and rated were hallways. While there may have been multiple hallways within a building, the general characteristics and design features are described and unique or problematic areas identified and discussed. The hallways within each living option are described and discussed by site.

Descriptive Environmental Assessment of Independent Living Hallways - Site 1.

There were two floors of apartments along six separate wings resulting in twelve residential hallways for independent living at Site 1 (see Figure 4.17). Each hallway was designed the same with the same basic configuration. Three hallways joint together to open up on a sitting area where elevators and laundry rooms were located. Hallways were approximately 116'-0" long and 6'-0" wide (see Figure 4.18). They were double-loaded with four apartments on each side of the corridor. Entrances into individual apartments were slightly recessed off of the main hallway and were directly across from the apartment on the opposite side. The ceiling was 8'-0" high creating an interior volume of approximately 5,568 cubic feet per hallway. The floor covering was a multi-colored low, level loop carpet with a dark teal green background and multi-colored yarn throughout. The walls were gypsum board and were painted a light cream color. The ceiling was white, 2'-0" x 4'-0" acoustical panel in ten of the twelve hallways. Two hallways on the second level on each wing were gypsum board with a textured ceiling finish. Each hallway had 10 - 1'-0" x 4'-0" surface mounted fluorescent light fixtures spaced 12'-0" apart,

on-center. There were no windows in the hallways, but windows were present in the sitting area where three hallways junction. Thermostats were not located in the hallways. The temperature was centrally regulated and controlled by maintenance. Air was diffused through the ceiling.

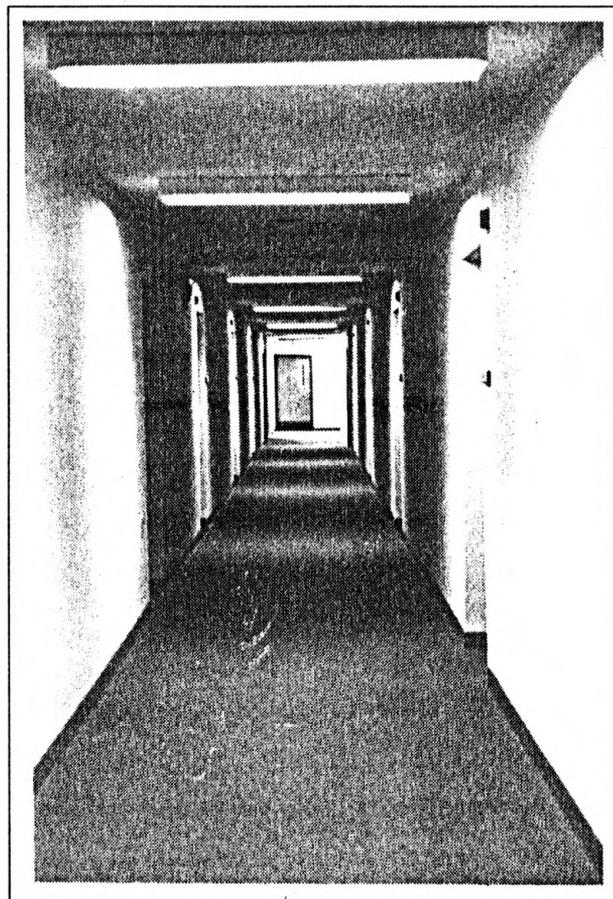


Figure 4.17. Independent Living Hallway - Site 1.

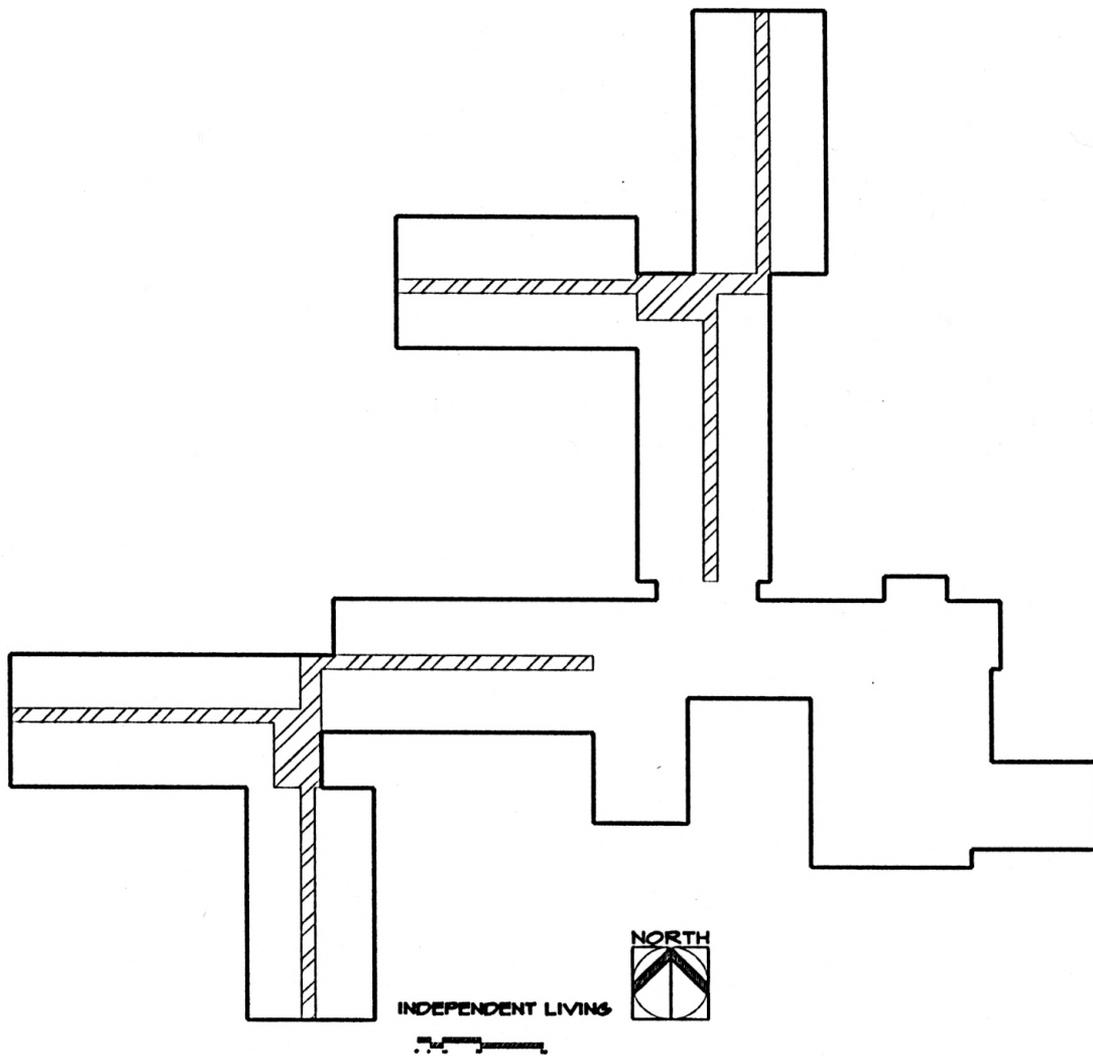


Figure 4.18. Plan of Independent Living Hallways - Site 1.

Summary of Satisfaction Ratings for Independent Living Hallways - Site 1

Described below are a summary of ratings for the hallways in independent living by residents and staff at Site 1. Hallways serve as links between resident apartments and resident services, thus, both residents and staff utilize various hallways to get to and from locations. Ratings are described and discussed based on the Descriptive Environmental Assessment of these areas. For a complete, detailed summary of the ratings, see Table 4.6.

Lighting Features. Overall the lighting characteristics of the hallway were good. Residents and staff rated the amount of sunlight between not enough and just the right amount. As noted earlier, there were no windows facing directly into the hallways, but there were windows at the intersections of the hallways. When asked about the amount of brightness from the sun, residents felt, overall, it was just the right amount, but residents who felt it was too bright, consistently identified the sitting areas where the hallways come together. The windows located here were often a source of glare for some residents, especially during morning "resident meetings" when the sun comes through the windows. This source of light was felt to be too bright but did not seem to be a significant distraction or interfere with activities. Most staff felt the amount of brightness from the sun was just the right amount to not quite enough. This was most likely due to the fact that staff did not frequent the sitting areas in the hallways. The amount of artificial light was rated almost consistently as just the right amount by both residents and staff. Residents felt there were never any unwanted shadows in the hallways. Staff rated the

presence of shadows higher. Over half of the staff who responded felt unwanted shadows were occasionally to frequently present. Due to the carpeting in the hallway, neither residents or staff felt reflection of light off of the floor was a problem.

Thermal Comfort Features. Both residents and staff noted temperatures were too warm in the hallways. Humidity levels in the warmer and cooler months was judged to be just the right amount by most residents. Staff rated the humidity levels to be slightly too moist in the warmer months and slightly too dry to just the right amount during cooler months. About half of the residents and staff who responded felt the amount of air movement was not quite enough. Most residents felt drafts were never to rarely a problem. Staff felt drafts were rarely to occasionally a problem in the hallways.

Acoustical Features. Residents and staff were satisfied, overall, with the acoustical quality of the hallway spaces. Residents felt the presence of unwanted noises from outside the building were never present. Staff felt these noises were rarely present. Unwanted noises from other rooms was as occasionally to never present by residents and staff. Noises that were identified were usually sounds from apartments such as loud televisions or radios. Some residents noted it was sometimes pleasant to hear some sounds from the apartments, it made the space seem lived in. The sound level in the hallway was judged to be just the right amount by almost all residents and staff. Residents and staff also rated the presence of echoes in the hallways as never to rarely present.

Olfactory Feature. Three of the ten residents who responded had limited to no abilities to detect smells and did not answer questions associated with smells. Most residents felt that odors were never to rarely present in the hallways. Staff varied on their ratings, some staff felt odors were rarely present, some frequently. Odors that were identified included burnt food and other cooking smells. Residents felt pleasant smells were more frequent than odors, while staff rated the presence of pleasant smells about a frequent as odors. Smells that were identified as pleasant were fresh cut flowers, food, and air-fresheners. The presence of tobacco smoke was occasionally detected by some residents and staff. Those who did detect smoke had varying opinions on tobacco smoke.

Physical Space Features. Most all residents and staff felt the amount of privacy in the hallways was just the right amount. All residents and most staff felt the amount of furniture in the hallway areas was also just the right amount. Residents rated the hallways as never to rarely crowded with people. Almost half the of the staff rated the hallways as occasionally crowded with people. Staff ratings may reflect perception for areas closer to "service oriented" spaces at the entrance of each of the hallways.

Overall Satisfaction. Residents rating of the hallways ranged from satisfactory to excellent. Out of the three areas evaluated, residents spent more time traveling through the hallways than they did in the dining room, but spent less time in the hallways compared to their living spaces. Most staff rated the hallways as satisfactory. Staff also rated the hallways second in terms of amount of time spent.

Table 4.6. Summary of Ratings for Independent Living Hallways - Site 1.

INDEPENDENT LIVING HALLWAYS SITE 1	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	2.2	3	1-3	9	2.7	3	2-4
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	10	3.2	3	2-5	9	2.5	3	1-4
How often in the amount of sunlight that comes from the windows in this room distracting?	10	1.6	1	1-4	9	2.3	2	1-4
How often does bright sunlight from the windows interfere with activities?	10	1.1	1	1-2	9	1.9	2	1-3
How much artificial lighting from light fixtures is present in this room?	10	2.9	3	1-4	9	2.5	3	1-3
How often are shadows present in this room?	10	1	1	1	9	2.6	2	2-4
How often is the light that reflects off of the floor in this room distracting?	10	1	1	1	9	1.1	1	1-2
How often does the light that reflects off of the floor interfere with activities?	10	1	1	1	9	1.2	1	1-2
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	10	3.7	5	1-5	9	3.9	4	1-5
During warmer months, how would you describe the amount of humidity in this room?	10	2.8	3	1-4	9	3.8	4	1-5
During cooler months, how would you describe the amount of humidity in this room?	10	2.9	3	2-3	8	2.8	3	2-4
How would you describe the amount of air movement in this room?	10	2.7	3	1-5	9	2.2	3	1-3
How often are there unwanted drafts in this room?	10	1.6	1	1-4	9	2.5	2.5	1-4
How often can unwanted sounds from outside the building be heard in this room?	10	1.1	1	1-2	9	2.1	2	1-3
How often can unwanted sounds from other rooms be heard in this room?	10	2	2	1-3	9	2.4	3	1-3
How would you describe the sound level in this room?	10	3	3	3	8	2.8	3	1-3
How often does sound echo in this room?	10	1.1	1	1-2	8	1.8	1	1-3
How often are odors present in this room?	7	3	3	3	9	2	2	1-4
How often are pleasant smells present in this room?	8	2.8	3	1-3	9	3	3	2-4
How often is tobacco smoke present in this room?	8	2	2	1-3	9	1.7	1	1-3
If present, how often are you bothered by tobacco smoke in this room?	6	2.2	2	1-4	7	2.3	2	1-4
How would you describe the amount of privacy in this room?	10	3	3	2-4	7	3	3	3
How would you describe the amount of furniture in this room?	10	3	3	3	9	2.7	3	1-4
How often does this room seem crowded with people to you?	10	1.5	2	1-2	9	2.1	3	1-3
How would you rate the overall quality of this room?	10	3.9	3	3-5	9	3	3	2-4
Rank the 3 rooms in the order where you spend the most time?	10	2.3	2	2-3	8	2.2	2	2-3

Descriptive Environmental Assessment for Independent Living Hallways - Site 3

There were four floors of independent living apartments at Site 3. The main floor accommodates residential services and social gathering spaces. The second, third and fourth floor have one long corridor with a shorter corridor located near the elevators and stairs (see Figure 4.19). The fifth floor had only one long corridor. Each residential floor was decorated differently. The second floor was yellow, the third floor was green, the fourth floor was orange, and the fifth floor was tan. Each hallway had a low, level loop carpet in the respective colors. All walls were gypsum board and were painted a cream color. The ceiling was white, 2'-0" x 4'-0" acoustical panel. The hallways were double-loaded with apartments on either side (see Figure 4.20). The longest corridor on each floor was approximately 176'-0" long and 6'-0" wide. Fourteen apartments open directly onto this hallway. The shorter hallway was approximately 86'-0" long and 6'-0" wide. Six apartments were located on this hallway. Entrances were not recessed off of the hallway, but the doors were staggered. The ceiling height was 8'-0" creating an interior volume of approximately 12,576 cubic feet per floor. The longest hallways have 12 - 1'-0" x 4'-0" surface mounted fluorescent light fixtures spaced 10'-0" to 18'-0" apart, on-center. The shorter hallways have 6 - 1'-0" x 4'-0" fluorescent fixtures spaced 12'-0" to 16'-0" apart, on-center. There was no thermostat in the hallways, the temperature was centrally regulated and controlled by maintenance. Air was diffused through vents in the ceiling grid. There were no window to the outside of the building located any where inside the hallways of independent living at Site 3.

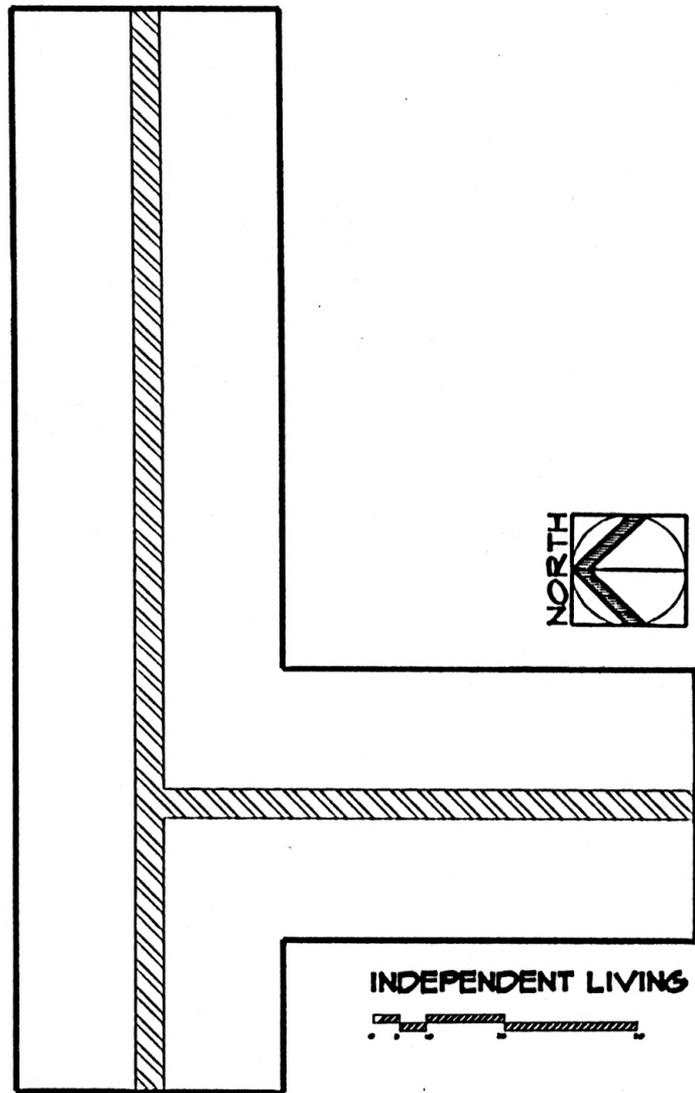


Figure 4.19. Plan of Independent Living Hallways - Site 3.



Figure 4.20. Independent Living Hallway - Site 3.

Summary of Satisfaction Ratings for Independent Living Hallways - Site 3

Described below are a summary of satisfaction ratings for hallways as established by residents and staff in independent living at Site 3. The ratings are described and discussed in reference to the descriptive environmental Assessment of these spaces. For a complete, detailed summary of ratings, see Table 4.7.

Lighting Features. Overall, the lighting characteristics of the hallways were very acceptable for residents. Even though there were not windows in the hallways, residents rated the amount of sunlight in the hallways as just the right amount. Residents did not seem to desire windows in this space. Staff, however rated the amount of sunlight in the hallways as not enough, expressing a desire to have a stronger connection to the outside. Since there were not windows in the hallways for independent living, issues such

as amount of brightness from the sun, and glare were not applicable. Residents and staff both felt the amount of artificial lighting in the hallways was just the right amount. The presence of unwanted shadows in the hallway was an issue for only one of the residents who responded. Most of the staff also felt shadows were never or rarely a problem. Due to the fact that the floor was covered with carpeting and there were not windows in the space, reflection of lighting off of the floor was not an issue in these spaces for residents or staff.

Thermal Comfort Features. Half of the residents who responded felt the temperature in the hallways was too warm. Staff ratings on temperature varied slightly. Most staff, however, felt the temperature was just right. Residents did not seem to notice a change in the humidity levels in the hallways during the warmer and cooler seasons. Some staff noted the humidity level as too moist, while some thought it too dry during warmer months. During the cooler months, more staff were inclined to find the humidity level to be slightly too dry in the hallways. The amount of air movement in the hallways was judged to be just the right amount by most residents. Half of the staff also felt the amount of air movement was appropriate, but the other half who responded felt there should be more air movement in the hallways. Drafts were never or rarely a problems for most resident and staff.

Acoustical Features. Residents felt that unwanted sounds from outside the building were never present in the hallways. Some staff rated sounds as occasionally

present. Sounds identified were usually associated with construction or airplane traffic. Unwanted sounds from other rooms were rated more frequent than noises from outside the building by both residents and staff. Sounds that were identified were televisions with the volumes turned up too loud, or sometimes conversations. The sound level was judged to be just the right amount by both residents and staff. Most all residents and staff felt that echoes were never present.

Olfactory Features. One of the residents who responded could no longer detect smells, and therefore, did not respond to questions associated with olfactory features. The presence of odors was occasionally detected by three of the residents who responded. Staff felt odors were occasionally to frequently present in the hallways. Odors identified included cooking smells and cleaning smells. The presence of pleasant smells was rated higher by residents and lower by staff. All residents who responded felt pleasant smells were occasionally present in the hallways. They identified smells such as food, perfume, and air-fresheners. Staff varied on their ratings. Half of the staff who responded felt pleasant smells were never or rarely present, while the other half felt they were occasionally to frequently present. Several of the residents who responded detected the presence of tobacco smoke in the hallways. Residents were divided, however, whether they were bothered by tobacco smoke. Staff were less like to detect smoke in the hallways. Staff were also less likely to be bothered by its presence.

Physical Space Features.

Most residents felt the amount of privacy in the hallways was just the right amount. Staff rated the amount of privacy slightly lower. Half of the staff who responded felt there could be more privacy in the hallways. The amount of furniture in the hallways was rated overall as just the right amount. Two residents noted that would be desirable to add a chair or two halfway down the hallway for an occasional rest since the hallways were so long. Staff also rated the amount of furniture in the hallways as just the right amount overall. Both residents and staff felt the hallways in independent living were never or rarely crowded with people.

Overall Satisfaction.

Most of the residents rated the hallways as satisfactory. Two of the nine residents who responded rated the hallways as excellent. Staff rated the hallways as satisfactory or slightly above satisfactory. Out of the three areas evaluated, both residents and staff rated the hallway as the second place they spent the majority of their time.

Table 4.7 Summary of Satisfaction Ratings for Independent Living Hallways - Site 3

SKILLED CARE LIVING DINING ROOM SITE 3	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	9	3	3	3	8	2	2	1--3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.								
How often in the amount of sunlight that comes from the windows in this room distracting?								
How often does bright sunlight from the windows interfere with activities?								
How much artificial lighting from light fixtures is present in this room?	9	3	3	3	9	3	3	2-4
How often are shadows present in this room?	9	1.6	3	1-5	9	2	2	1-4
How often is the light that reflects off of the floor in this room distracting?								
How often does the light that reflects off of the floor interfere with activities?								
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	9	4	4	3--5	9	3.1	3	2-4
During warmer months, how would you describe the amount of humidity in this room?	8	3	3	3	9	3	3	2-4
During cooler months, how would you describe the amount of humidity in this room?	8	3	3	3	9	2.7	2	2-4
How would you describe the amount of air movement in this room?	8	2.6	3	1--3	9	2.7	2.5	2-4
How often are there unwanted drafts in this room?	8	1.3	1	1-2	9	2.8	3	1-4
How often can unwanted sounds from outside the building be heard in this room?	8	1	1	1	9	2.6	3	1-4
How often can unwanted sounds from other rooms be heard in this room?	8	2	2	1-3	9	3.3	3	3-4
How would you describe the sound level in this room?	9	3.1	3	3-4	9	3.2	3	3-4
How often does sound echo in this room?	8	1	1	1	9	2.3	2	1-4
How often are odors present in this room?	7	1.9	1	1--3	9	3.7	4	3-4
How often are pleasant smells present in this room?	7	3	3	3	9	2.7	2.5	1-4
How often is tobacco smoke present in this room?	8	2.3	2	1-4	9	1.3	1	1-3
If present, how often are you bothered by tobacco smoke in this room?	6	2.7	2.67	1--5	6	1.3	1	1--2
How would you describe the amount of privacy in this room?	8	2.9	3	2-3	9	2.3	2.5	1-3
How would you describe the amount of furniture in this room?	8	2.6	3	2-3	8	3	3	2-4
How often does this room seem crowded with people to you?	8	1.3	1	1-2	8	2	2	1-3
How would you rate the overall quality of this room?	9	3.4	3	3-5	9	3.3	3	3-4
Rank the 3 rooms in the order where you spend the most time?	9	2.2	2	2-3	9	2.3	2	2-3

Descriptive Environmental Assessment of Assisted Living Hallways - Site 1

There were three residential hallways in assisted living at Site 1. Each hallway was approximately 90'-0" long and 8'-0" wide (see Figure 4.21). The ceiling heights were 8'-0". Halfway down each hallway was a sitting area where the hallways open up to 16'-0" wide and the ceilings slope up to 10'-0" to allow clerestory windows to shine in natural illumination (see Figures 4.22 and 4.23). In these sitting areas, called parlors, there were two love seats, four upholstered side chairs, four side tables, and four planters. Two of the hallways have exits to outside sitting area, these doors have one glass panel and two side lights (see Figure 4.24). The third hallway leads to the administrative support area between assisted living and skilled health care. The hallways were carpeted with a dense, low, level loop carpeting in a dark teal green color. The walls were painted dark orange on one side and white on the other. The parlor areas have a floral wallpaper with reds, oranges, blues, and greens on white background. The ceiling was white, 2'-0" x 4'-0" acoustical panel. There were seven, 1'-0" x 4'-0" surface mounted, fluorescent light fixtures spaced approximately 8'-0" apart, one-center, in the corridors, and two, 2'-0" x 4'-0" fluorescent troffers in the sitting areas across the 8'-0" ceiling. In the parlors, where the ceiling slopes up to 10'-0", there were six, 1'-0" x 4'-0" recessed fluorescent troffers on each side of the sloped ceiling opposite the clerestory windows. The hallways were double loaded with resident rooms opening up to the corridor on each side (see Figure 2.25).

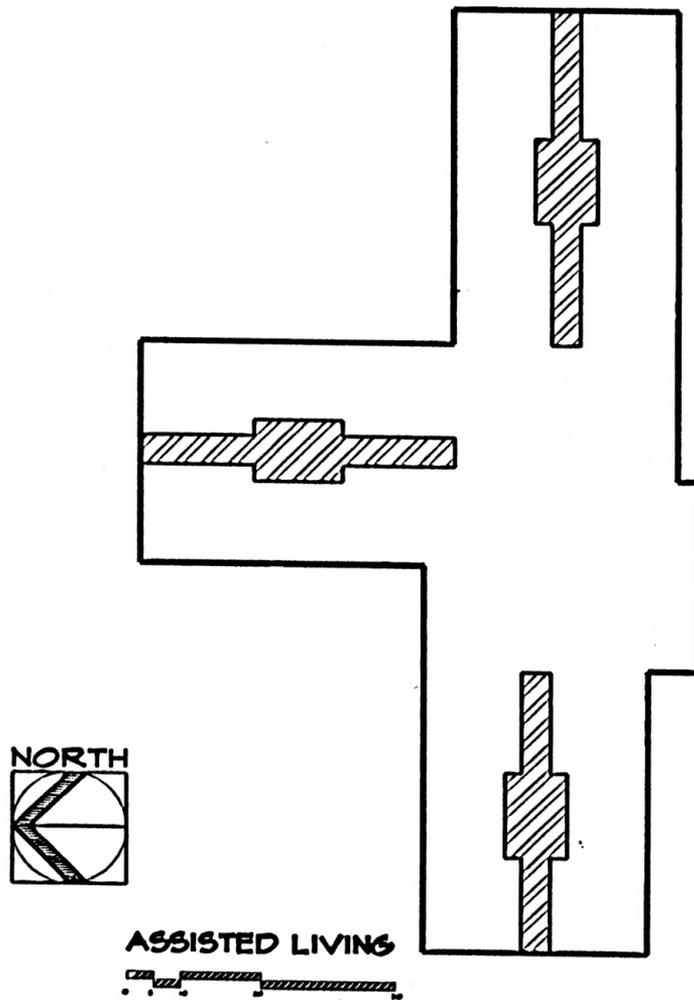


Figure 4.21. Plan of Assisted Living Hallways - Site 1.

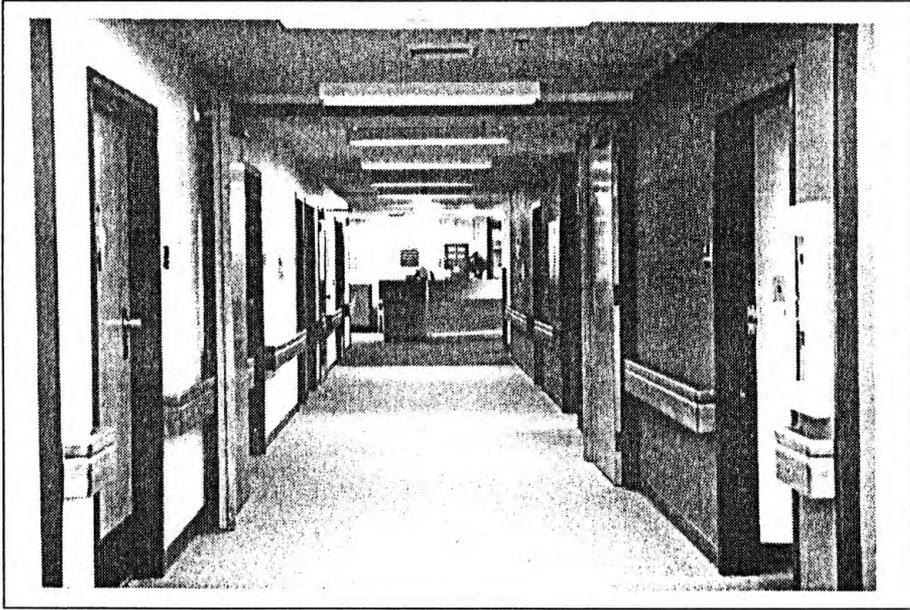


Figure 4.22. Assisted Living Hallway - Site 1

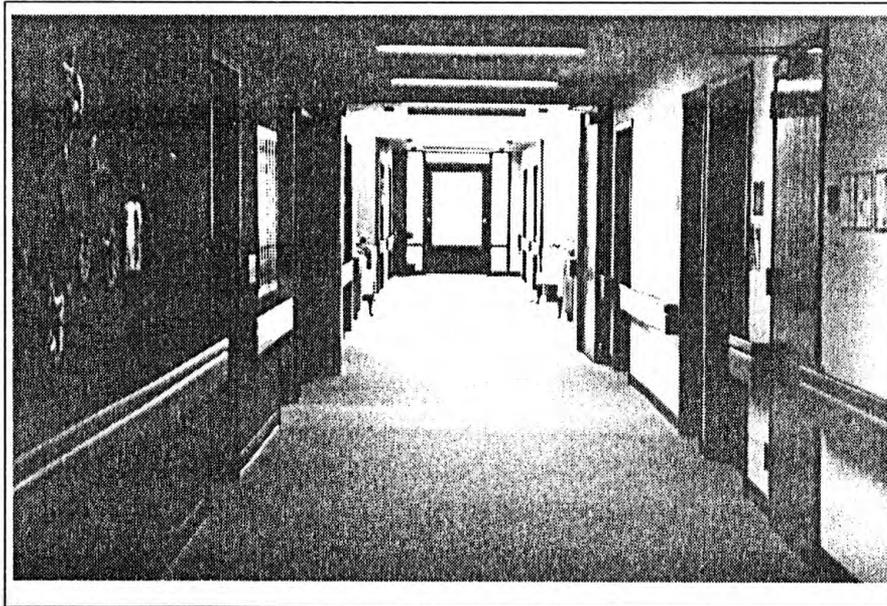


Figure 4.23. Assisted Living Hallway - Site 1.

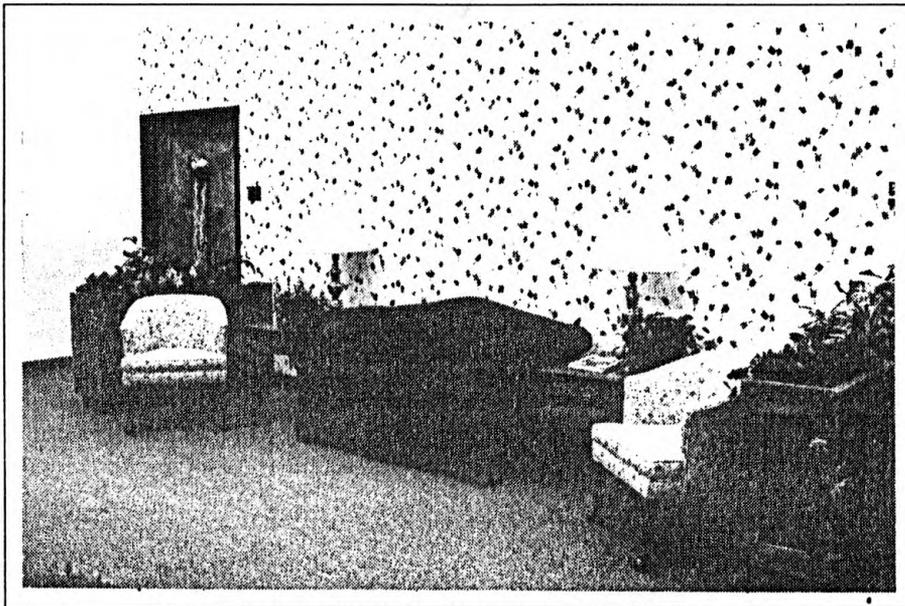


Figure 4.24. Assisted Living Hallway - Site 1.

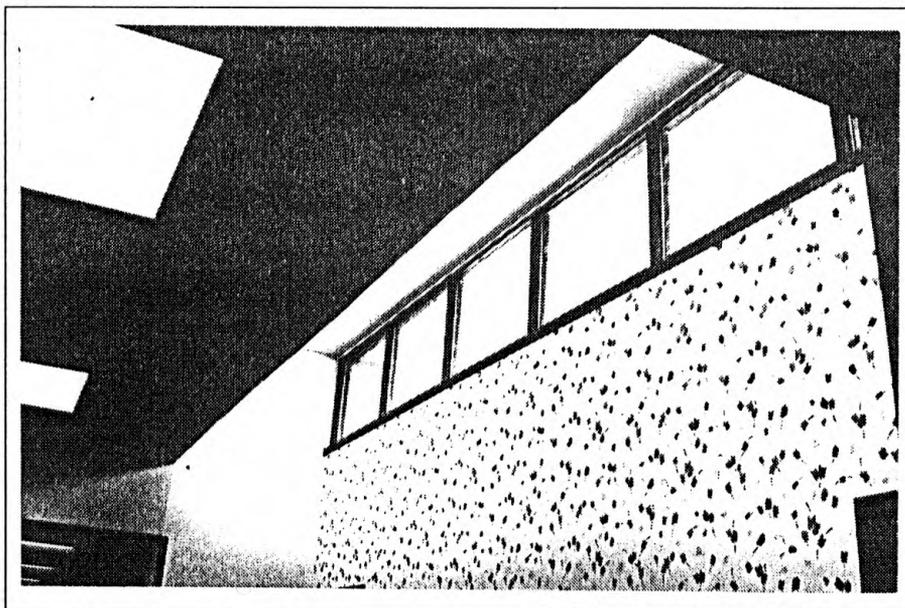


Figure 4.25. Assisted Living Hallway - Site 1.

Summary of Satisfaction Ratings for Assisted Living Hallways - Site 1

Described below were a summary of satisfaction ratings for hallways in assisted living as Site 1 as established by residents and staff. Ratings were described and evaluated in reference to the Descriptive Environmental Assessment of these spaces. For a complete, detailed summary of ratings, see Table 4.8.

Lighting Features. Overall, residents felt the amount of sunlight in the hallways and the brightness from the sun was just the right amount. Only two of the ten residents who responded felt there was too much sunlight in the hallways and that the brightness was also too much. Staff were split on their ratings of sunlight. Half of the staff felt there was not quite enough sunlight in the hallways, while the other half of staff rated it as just the right amount. Most of the staff also felt the amount of brightness from the sun could be slightly more. Both residents and staff felt the brightness from the sun never or rarely was a distraction or interfered with activities. All residents who responded felt the amount of artificial lighting in the hallways was just the right amount. The majority of staff also rated the amount of artificial light as just right. Most residents and staff felt that shadows were never a problem in the hallways. Due to the carpeted floor surface, they also felt that light reflecting off of the floor was also never a problem.

Thermal Comfort Features. Most residents and staff thought the temperature in the hallways was just right. Staff also rated the temperature to be just right with only three staff rating the temperature as too warm. Residents did not notice any variations in

the humidity levels in the hallways during warmer or cooler seasons. Most staff also rated the humidity level to be comfortable. Three staff felt it was slightly too moist in the warmer months, and only two staff thought it was slightly too dry during the cooler months. Overall, both residents and staff rated the amount of air movement to be just right. Unwanted drafts were occasionally noticed by only two residents, but almost half of the staff who responded said they were occasionally to frequently present. This finding could be due to the fact the nurses station, located at the entrance to each of the hallways where many staff work from, was located directly across from the entrance to the facility.

Acoustical Features. Residents felt unwanted noises from outside the building were never present in the hallways. Half of the staff who responded rated the presence of unwanted outside noise as more frequently present. Noises that were identified included lawn mowers and outside vehicular traffic. Unwanted noises from other room was rated slightly higher by some residents, but staff rated the occurrence of unwanted noise from inside less frequent than noise from outside. Noises identified included televisions turned up loudly or sometimes conversations. The sound level in the hallway was judged to be just right by almost all residents and staff, and neither residents or staff felt echoes were a problem in the hallways.

Olfactory Features. Two of the residents who responded to the questionnaire, were unable to detect smells. Overall, residents felt odors were never or rarely present in the hallways. One-third of the staff felt odors were occasionally present in the hallways,

while the rest of the staff who responded felt odors were never or rarely present. Both residents and staff rated the presence of pleasant smells as slightly more frequent than odors. Smells that were identified included smells associated with food from the dining room air-fresheners, flowers, and perfumes. Most of the residents and who responded said tobacco smoke was never or rarely present. The facility was non-smoking, but there were two outside porch areas where smokers can go. These areas were directly off of the hallways.

Physical Space Features. Most residents and staff felt the amount of privacy in the hallways was just the right amount. The tables and chairs in the parlor areas in the hallways were also rated to be just the right amount of furniture by most residents and staff. Residents felt the spaces in the hallways were never or rarely crowded with people. The majority of staff also felt they were never or rarely crowded. Those staff who noted occasional crowding identified meal times when people would start to congregate at the entrances to the hallways.

Overall Quality. Overall, residents and staff rated the hallways to be satisfactory to above satisfactory. Three residents even rated the hallways to be excellent. Residents rated the hallway to be the place they spent the least amount of time out of the three areas evaluated. Staff ratings of the hallways varied from poor to excellent with most ratings falling at the satisfactory level. Out of the three areas identified, staff spent the second most amount of time in the hallways.

Table 4.8. Summary of Satisfaction Ratings for Assisted Living Hallways - Site 1.

ASSISTED LIVING HALLWAYS SITE 1	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	3.2	3	1-5	9	2.6	3	2-3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	10	3.3	3	3-5	9	2	2	1-3
How often in the amount of sunlight that comes from the windows in this room distracting?	9	1.2	1	1-3	9	1.3	1	1-2
How often does bright sunlight from the windows interfere with activities?	9	1	1	1	9	1.3	1	1-2
How much artificial lighting from light fixtures is present in this room?	10	3	3	3	9	2.9	3	2-4
How often are shadows present in this room?	10	1.2	1	1-3	9	2.4	2	1-4
How often is the light that reflects off of the floor in this room distracting?	9	1	1	1	9	1.1	1	1-2
How often does the light that reflects off of the floor interfere with activities?	9	1	1	1	9	1.1	1	1-2
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	10	3	3	1-4	9	3.3	3	3-4
During warmer months, how would you describe the amount of humidity in this room?	10	3	3	3	9	3.1	3	1-4
During cooler months, how would you describe the amount of humidity in this room?	10	3	3	3	8	2.6	3	1-3
How would you describe the amount of air movement in this room?	10	2.9	3	2-3	9	2.6	3	1-3
How often are there unwanted drafts in this room?	10	1.4	1	1-3	9	2.2	2	1-4
How often can unwanted sounds from outside the building be heard in this room?	10	1	1	1	9	2	1	1-4
How often can unwanted sounds from other rooms be heard in this room?	10	1.4	1	1-3	9	1.8	2	1-3
How would you describe the sound level in this room?	10	2.8	3	1-3	9	3.1	3	3-4
How often does sound echo in this room?	10	1.2	1	1-3	9	1.1	1	1-2
How often are odors present in this room?	8	1.3	1	1-2	9	2	2	1-3
How often are pleasant smells present in this room?	9	2	1	1-4	9	2.6	2	1-4
How often is tobacco smoke present in this room?	9	1.4	1	1-4	9	1.2	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	2	2.5	-	1-4	2	2	2	2
How would you describe the amount of privacy in this room?	10	2.9	3	2-3	9	2.7	3	2-3
How would you describe the amount of furniture in this room?	10	3	3	3	9	3.2	3	3-5
How often does this room seem crowded with people to you?	10	1.1	1	1-2	9	1.7	1	1-3
How would you rate the overall quality of this room?	10	3.9	3	3-5	8	3	3	1-5
Rank the 3 rooms in the order where you spend the most time?	10	2.7	3	2-3	8	2.3	2	2-3

Descriptive Environmental Assessment of Skilled Care Hallways - Site 1

There were three residential hallways in skilled care at Site 1. Each hallway was approximately 90'-0" long and 8'-0" wide. Halfway down each hallway was a sitting area that expands the hallway to 16'-0" wide (see Figure 4.26). The ceiling height was 8'-9" except in the sitting areas where the ceiling rises to 10'-0" on either side of the main corridor. Indirect fluorescent light fixtures illuminate the sitting areas when the ceiling extends to 10'-0" (see Figure 4.27). The corridor ceiling was 2'-0" x 2'-0", white acoustical panel. Nine, 1'-0" x 4'-0" fluorescent ceiling troffers illuminate the main corridor. At the end of each of the residential hallways was a glass door with a side light where natural illumination penetrates the space (see Figures 4.28 and 4.29). The carpeting throughout the skilled care unit was a low, level loop in a solid orange color. Each of the wings was identified by a different color of wallpaper: the north wing was orange, the east wing was yellow, and the west wing was tan. In each of the sitting areas, there was a ribbed, acoustical wall covering from floor to ceiling. Furniture in the sitting areas was an assortment of small chairs and tables, game tables, and planters (see Figure 4.30). The temperature was centrally regulated and controlled by maintenance, so there was no thermostat located in the corridor. Air was diffused through the ceiling. Each of the hallways was double loaded with resident rooms opening up on to the hallway from each side.

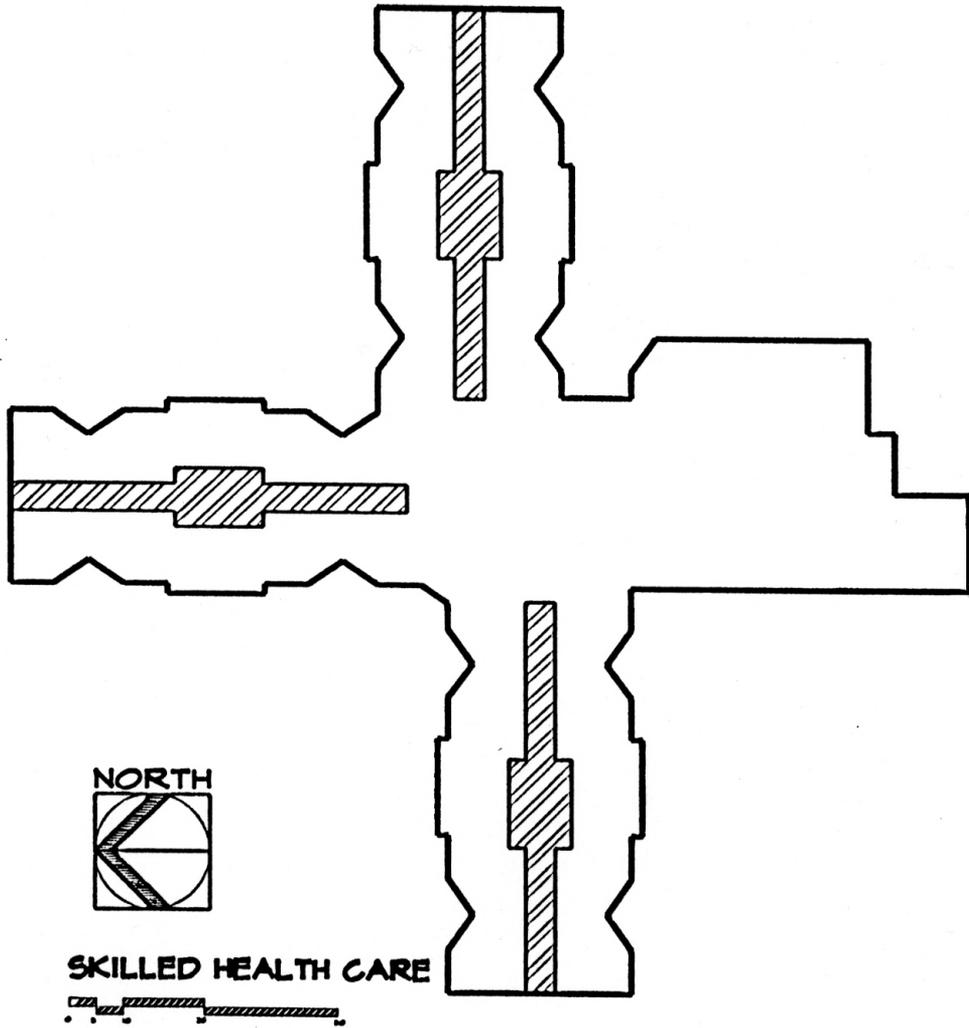


Figure 4.26. Plan of Skilled Care Hallways - Site 1.

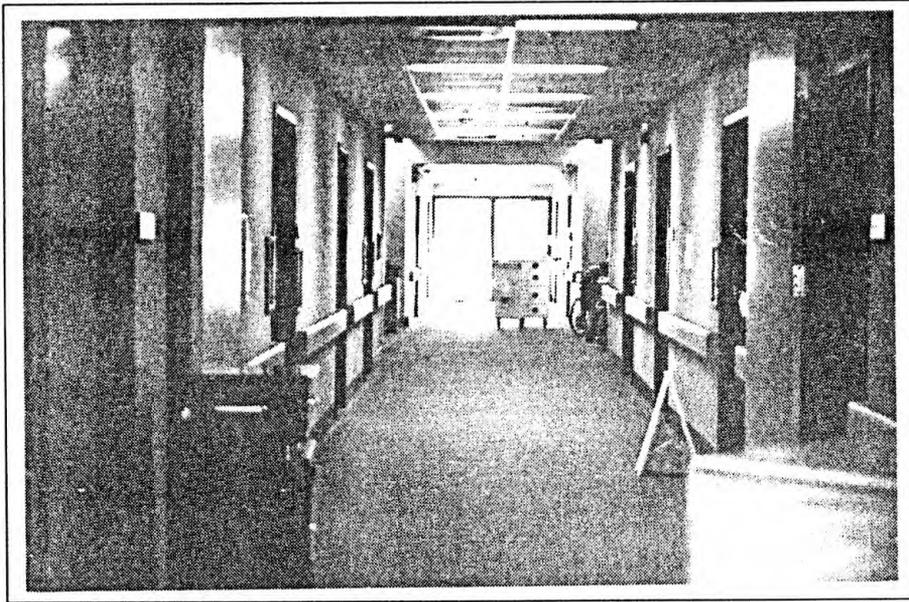


Figure 4.27. Skilled Care Hallways - Site 1.

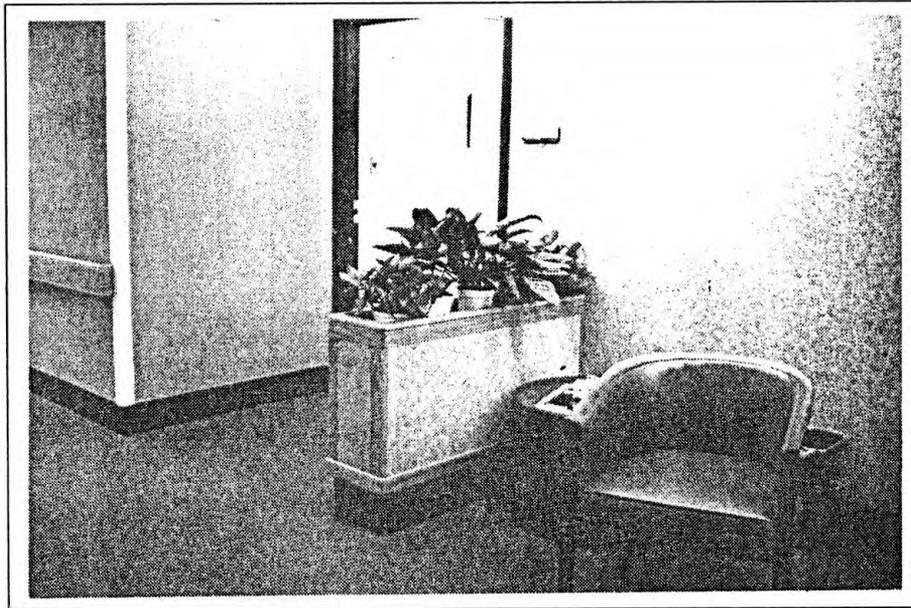


Figure 4.28. Skilled Care Hallways - Site 1

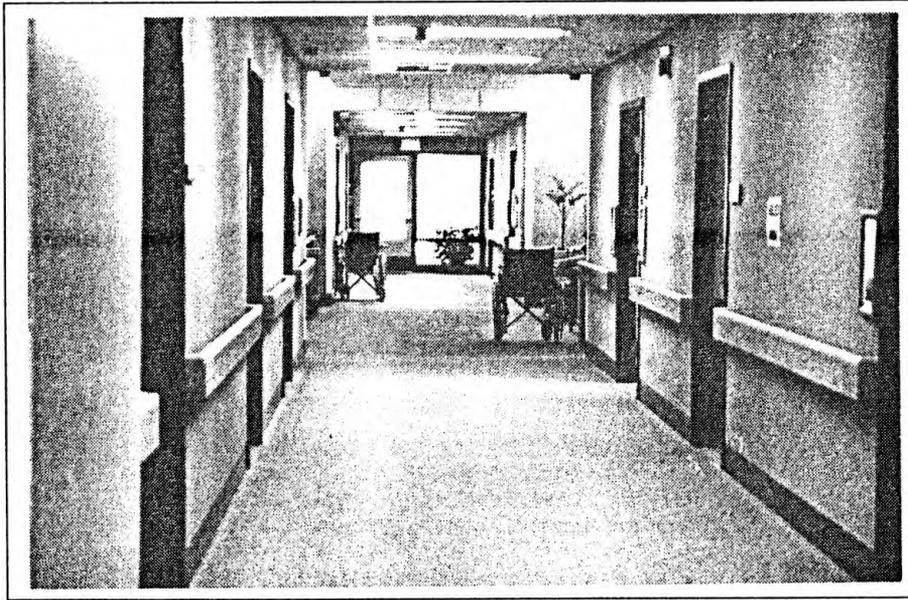


Figure 4.29. Skilled Care Hallways - Site 1.

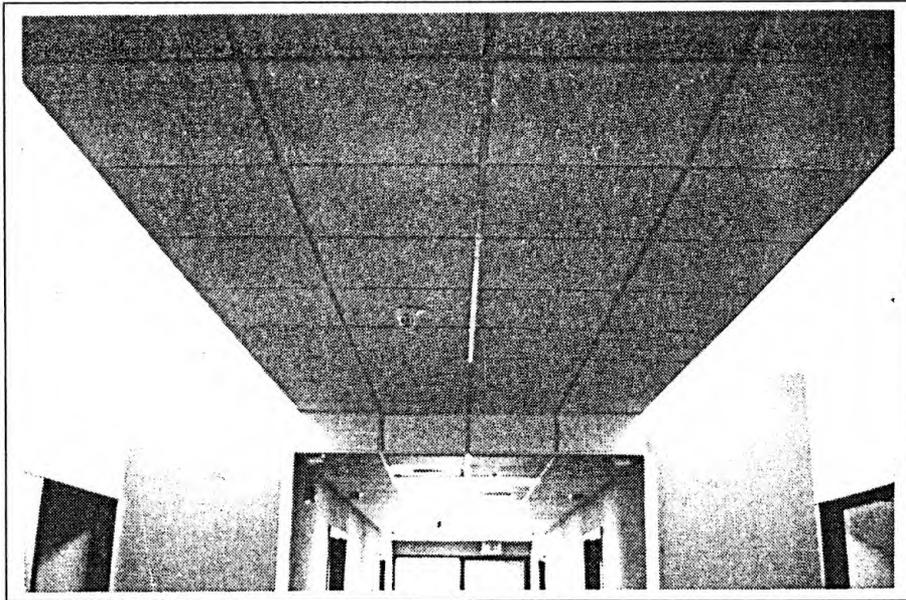


Figure 4.30. Skilled Care Hallways - Site 1.

Summary of Satisfaction Ratings for Skilled Care Hallway - Site 1

Described below are a summary of satisfaction ratings for hallways in skilled care as established by residents and staff at Site 1. Ratings are described and discussed in reference to the Descriptive Environmental Assessment of these spaces. For a complete, detailed summary of ratings, see Table 4.9.

Lighting Features. Most residents who responded felt the amount of sunlight in the hallways was just the right amount, while over half of the staff felt there was not quite enough. Residents varied on their ratings about the amount of brightness from the sun in the hallways. Some felt it was just the right amount, but some desired more brightness. Staff also varied on their rating, but none of the staff surveyed felt the amount of brightness was too much. Most residents and staff rated the amount of artificial light in the hallways to be just the right amount. Residents felt that shadows were never a problem, but staff rated their presence more as more frequent. Due to the carpeting on the floor, reflection of light off of the floor was not a problem.

Thermal Comfort Features. Residents were divided on their satisfaction with the temperature in the hallways. Half of the residents who responded felt the temperature was just right, half felt it was too cool. Most staff consistently rated the temperature as too warm. Differences in activity levels and physiological differences were most likely the reason for the differences in perception of temperature. Half of the residents surveyed noticed a distinct change in the humidity level during the warmer months and rated it as

too moist. Staff also rated the humidity level during the warmer season as too high.

During the cooler months, the satisfaction with the humidity level as closer to just the right amount for both residents and staff. Residents felt the amount of air movement in the hallways was just the right amount. Over half of the staff felt the amount of air movement was not enough in the hallways. Half of the residents and staff felt drafts were occasionally to frequently present in the hallways, half felt they were never or rarely present. Differences in ratings could have been a result of location. Residents and staff who were located closer to exterior doors may have experienced more drafts, those closer to the core of the building, fewer.

Acoustical Features. Residents and rated the presence of unwanted noises from outside the building as never or rarely present. Half of the residents who responded said unwanted noises from other rooms were occasionally present in the hallway, while half felt they were never or rarely present. Staff rated the presence of unwanted noises from other room slightly more frequent than did residents. Noises identified were associated with resident noise or mechanical systems. Most residents rated the sound level in the hallway to be just right. Staff ranged on their ratings from slightly too soft to slightly too loud with the majority of ratings being in the middle. Most residents and staff felt that echoes were never or rarely present in the hallways.

Olfactory Features. Residents felt odors were never or rarely present in the hallways. Half of the staff surveyed, however, felt odors were frequently present. Odors

identified by staff were associated with incontinent residents and musty smells that the HVAC system generated in the building. Residents rated the presence of pleasant smells higher than odors, while staff rated them lower. Pleasant smells that were identified were food from the dining room or perfume on the nurses. The building was a non-smoking facility, so neither residents or staff detected tobacco smoke in the hallways.

Physical Space Features. Most residents felt the amount of privacy was satisfactory in the hallways. Some of the staff who responded felt there should be more privacy in this space, but most felt it was satisfactory. Both residents and staff felt the amount of furniture in the sitting areas in the hallways was satisfactory. Crowding of people in the hallways was noted by only some residents and staff. Times at which crowding seemed to take place revolved around meal times when residents would start to congregate at the opening of each hallway.

Overall Satisfaction. Residents ratings of the hallway varied from below satisfactory to slightly above. Residents were also divided on whether they spent more time in the hallways or in the dining room. As note earlier, some residents only went to the dining room for meals and not activities, and thus spent more time going and coming in the hallways than in the dining space. Staff ratings of the hallways also varied from poor to excellent. All staff rated the hallways as the second more frequented space out of the three area evaluated.

Table 4.9. Summary of Satisfaction Ratings for Skilled Care Hallways - Site 1.

SKILL CARE LIVING HALLWAYS SITE 1	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	6	3.2	3	2-3	11	2.3	2	1-3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	5	3	2/3	2-5	11	2.2	2	1-3
How often in the amount of sunlight that comes from the windows in this room distracting?	5	1	1	1	11	1.4	1	1-3
How often does bright sunlight from the windows interfere with activities?	5	1.6	1	1-4	11	1.4	1	1-3
How much artificial lighting from light fixtures is present in this room?	6	2.8	3	2-3	11	2.8	3	2-4
How often are shadows present in this room?	6	1	1	1	11	2.3	3	1-4
How often is the light that reflects off of the floor in this room distracting?	5	1	1	1	11	1.1	1	1-2
How often does the light that reflects off of the floor interfere with activities?	5	1	1	1	11	1	1	1
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	6	2	2/3	1-3	11	4.2	5	3-5
During warmer months, how would you describe the amount of humidity in this room?	6	4	4/5	3-5	11	4.1	4/5	3-5
During cooler months, how would you describe the amount of humidity in this room?	6	3.2	3	2-5	11	2.8	3	2-4
How would you describe the amount of air movement in this room?	6	3	3	3	11	1.8	1	1-3
How often are there unwanted drafts in this room?	6	2.3	2/3	1-4	11	2.3	1	1-5
How often can unwanted sounds from outside the building be heard in this room?	6	1.7	1	1-2	11	1.6	2	1-2
How often can unwanted sounds from other rooms be heard in this room?	6	2.2	3	1-3	11	3.1	2	2-5
How would you describe the sound level in this room?	6	2.8	3	2-3	11	3.4	3/4	2-4
How often does sound echo in this room?	6	1.7	1	1-3	11	1.8	2	1-3
How often are odors present in this room?	6	1.7	2	1-2	11	3	4	1-4
How often are pleasant smells present in this room?	6	2.5	2/3	1-4	11	2.6	2/3	1-4
How often is tobacco smoke present in this room?	6	1.3	1	1-2	11	1.1	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	2	1	1	1	1	1	1	1
How would you describe the amount of privacy in this room?	6	2.7	3	2-3	10	2.6	3	1-3
How would you describe the amount of furniture in this room?	6	3	3	3	9	2.9	3	2-3
How often does this room seem crowded with people to you?	6	1.8	1	1-4	11	2.1	2	1-3
How would you rate the overall quality of this room?	6	3	3	2-4	11	3.1	3	1-5
Rank the 3 rooms in the order where you spend the most time?	6	2.5	2/3	2-3	11	2	2	2

Descriptive Environmental Assessment of Skilled Care Hallways - Site 3

There were two residential hallways for skilled care living at Site 3. The hallways were double loaded with rooms opening up on the corridor from each side. The shortest hallway had six rooms on one side and nine rooms on the other. The third hallway was for specialized care for persons with dementia, and that hallway was not discussed (see Figure 4.31). The longest hallway was approximately 90'-0" long and 8'-0" wide. The ceiling height was approximately 8'-0", creating an interior volume of 5,760 cubic feet. The shorter hallway was approximately 60'-0" long and 8'-0" wide with a ceiling height of 8'-0", creating an interior volume of approximately 3,840 cubic feet. The floor covering throughout the health care unit was a terrazzo patterned vinyl composition tile in shades of brown, beige, and tan. The wall coverings in the shorter hallway were an acoustical treatment up to a wainscot and paint to the ceiling. The ceiling was white, 2'-0" x 4'-0" acoustical panel throughout with surface mounted fluorescent light fixtures (see Figure 4.32). There were no windows in the hallways except for a small window in the door at the end of the long hallway (see Figure 4.33). Any other natural illumination comes indirectly through windows in residents rooms. The temperature in the hallways was centrally controlled and regulated, so no thermostat was located in the corridors.

Summary of Satisfaction Ratings for Skilled Care Hallways - Site 3

Described below were a summary of ratings for the hallways in skilled care at Site 3 as established by residents and staff. Ratings were described and discussed in reference

to the Descriptive Environmental Assessment Checklist of the area. For a complete, detailed summary of ratings, see Table 4.10.

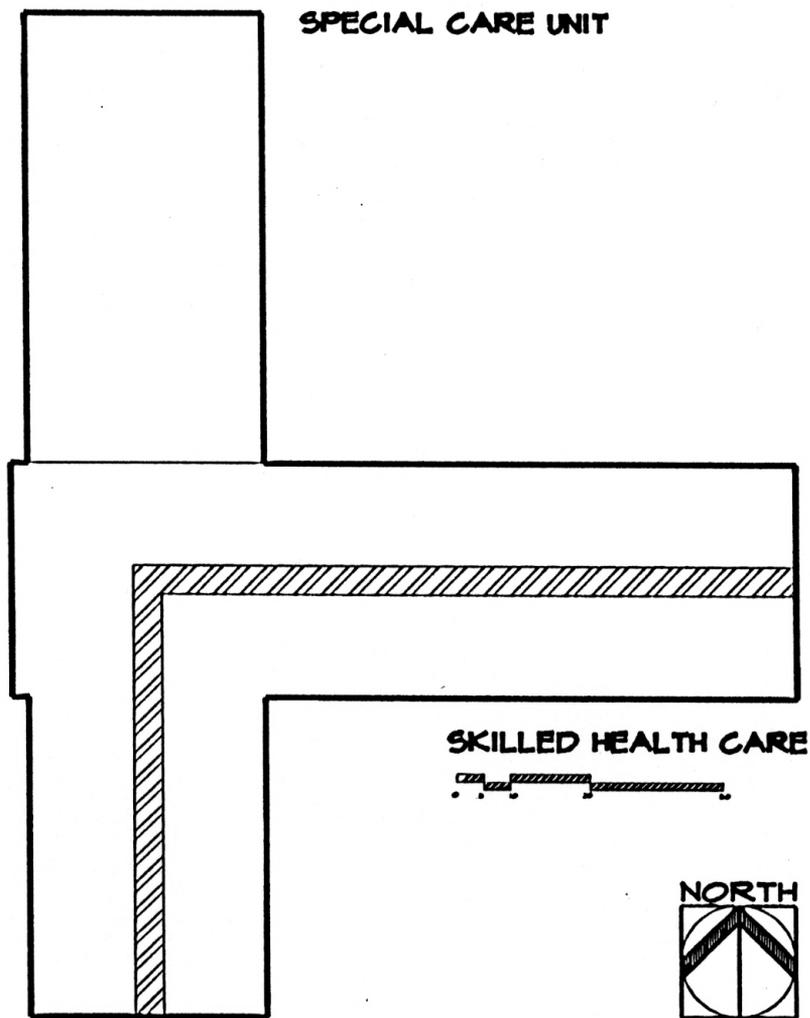


Figure 4.31. Plan of Skilled Care Hallways - Site 3.

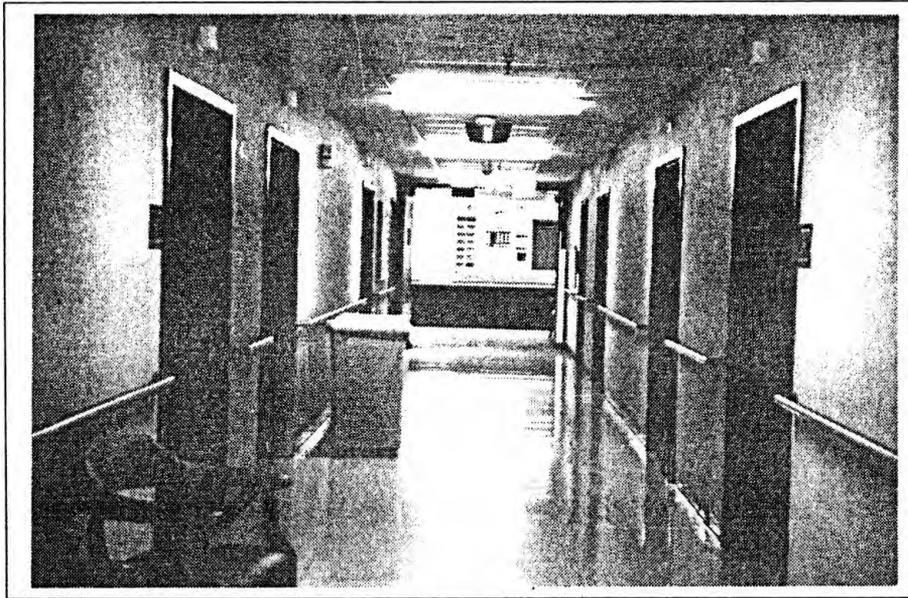


Figure 4.32. Skilled Care Hallways - Site 3.

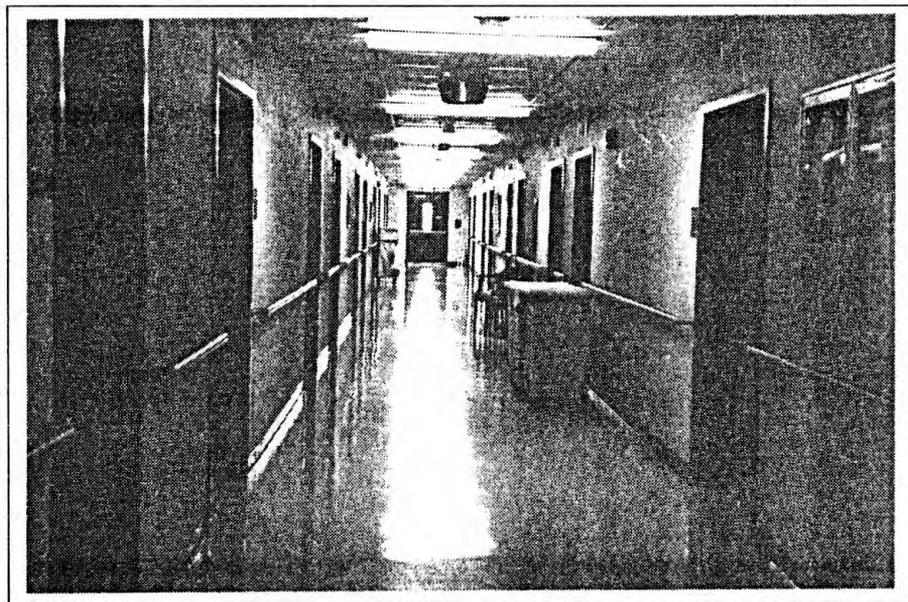


Figure 4.33. Skilled Care Hallways - Site 3.

Lighting Features. Residents rated the amount of sunlight in the hallways as just the right amount, while most staff, however, felt there should be more sunlight in the hallways. The amount of brightness from the sun was rated by a majority of residents and staff to be not enough, thus, problems associated with brightness from the sun were not relevant. Most residents and staff rated the amount of artificial lighting to be just the right amount and did not feel light reflecting off of the floor or shadows were a problem.

Thermal Comfort Features. Most residents and staff were satisfied with the temperature in the hallways. Some staff felt it was slightly too cool, but no one rated it as too warm. Humidity levels were rated as slightly too dry for both residents and staff during warmer and cooler seasons of the year. Residents and staff rated the amount of air movement to be satisfactory in the hallways, but over half of the staff who responded felt drafts were occasionally to frequently present.

Acoustical Features. Residents felt unwanted noises from outside the building were never present in the hallways. Staff varied on their rating, but most felt unwanted noises from outside the building were occasionally present. Unwanted noises from other rooms were noticed more frequently than noises from outside by both residents and staff. Noises identified included resident noises and televisions. Residents felt the sound level in the hallways was just right, while almost half of the staff rated the sound level as too loud. Likewise, residents did not detect echoes in the hallways, while almost half of the staff felt

they were occasionally to frequently present. The perception of sound levels and echoes could be due to the number of hard surfaces in the hallways.

Olfactory Features. Two of the residents who responded could no longer detect smells. Both resident and staff ratings reflected the occasion to frequent presence of odors in the hallway. Odors identified were associated with incontinent residents, or food carts in the hallways after meals. There was no response to the question about pleasant smells in the hallways from residents, they did not feel the question applied to this space. Staff rated the presence of pleasant smells more frequent than odors. The skilled health care facility was smoke-free, so residents and staff never or rarely detected tobacco smoke.

Physical Space Features. The amount of privacy in the hallways was rated as just the right amount by the resident who responded. Staff rated the amount of privacy as not quite enough to just the right amount. The amount of furniture also was rated as not quite enough to just the right amount by staff, and as just the right amount by residents. Ratings about the amount of crowding in the hallways indicate the hallways were never or rarely crowded with people.

Overall Satisfaction. Overall, residents rated the hallways as satisfactory to slightly above satisfactory. Staff rated the hallways as mostly satisfactory. Most residents and staff rated the hallway was the second most frequented space of the three areas identified.

Table 4.10. Summary of Satisfaction Ratings for Skilled Care Hallways - Site 3.

ASSISTED LIVING HALLWAYS SITE 1	RESIDENTS				STAFF			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	3.2	3	1-5	9	2.6	3	2-3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	10	3.3	3	3-5	9	2	2	1-3
How often in the amount of sunlight that comes from the windows in this room distracting?	9	1.2	1	1-3	9	1.3	1	1-2
How often does bright sunlight from the windows interfere with activities?	9	1	1	1	9	1.3	1	1-2
How much artificial lighting from light fixtures is present in this room?	10	3	3	3	9	2.9	3	2-4
How often are shadows present in this room?	10	1.2	1	1-3	9	2.4	2	1-4
How often is the light that reflects off of the floor in this room distracting?	9	1	1	1	9	1.1	1	1-2
How often does the light that reflects off of the floor interfere with activities?	9	1	1	1	9	1.1	1	1-2
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	10	3	3	1-4	9	3.3	3	3-4
During warmer months how would you describe the amount of humidity in this room?	10	3	3	3	9	3.1	3	1-4
During cooler months how would you describe the amount of humidity in this room?	10	3	3	3	8	2.6	3	1-3
How would you describe the amount of air movement in this room?	10	2.9	3	2-3	9	2.6	3	1-3
How often are there unwanted drafts in this room?	10	1.4	1	1-3	9	2.2	2	1-4
How often can unwanted sounds from outside the building be heard in this room?	10	1	1	1	9	2	1	1-4
How often can unwanted sounds from other rooms be heard in this room?	10	1.4	1	1-3	9	1.8	2	1-3
How would you describe the sound level in this room?	10	2.8	3	1-3	9	3.1	3	3-4
How often does sound echo in this room?	10	1.2	1	1-3	9	1.1	1	1-2
How often are odors present in this room?	8	1.3	1	1-2	9	2	2	1-3
How often are pleasant smells present in this room?	9	2	1	1-4	9	2.6	2	1-4
How often is tobacco smoke present in this room?	9	1.44	1	1-4	9	1.2	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	2	2.5	-	1-4	2	2	2	2
How would you describe the amount of privacy in this room?	10	2.9	3	2-3	9	2.7	3	2-3
How would you describe the amount of furniture in this room?	10	3	3	3	9	3.2	3	3-5
How often does this room seem crowded with people to you?	10	1.1	1	1-2	9	1.7	1	1-3
How would you rate the overall quality of this room?	10	3.9	3	3-5	8	3	3	1-5
Rank the 3 rooms in the order where you spend the most time?	10	2.7	3	2-3	8	2.3	2	2-3

Descriptive Environmental Assessment and Satisfaction Ratings of Resident Living Areas

The third area assessed and rated by respondents were areas where they primarily lived or worked. Residents rated their living spaces, apartment living areas or rooms. To explore the characteristics rated most satisfactory by like user groups, residents at each living option were compared between sites. The general characteristics of the living spaces are described and the satisfaction ratings between sites are discussed.

Descriptive Environmental Assessment of Independent Living Apartments

Described below are the Descriptive Environmental Assessments for the Independent Living apartments at Site 1 and Site 3. Although each apartment may have had individual characteristics, the general design and composition of the spaces was described and discussed.

Site 1. All independent living apartments at Site 1 were self contained units with bedroom, bathing, kitchen, and living spaces. The living space was the focus of the assessment. Most apartment assessed at Site 1 had an interior living space of 14'-0" x 17'-0" with a ceiling height of 8'-0", creating an interior volume of approximately 1,904 cubic feet (see Figure 4.34). The walls and ceilings were gypsum board construction. The wall had a smooth surface for a painted finish and the ceilings were textured. All but one apartment assessed had a cream color paint on the walls. The other resident had painted

the wall a deep yellow. The exterior window space was a sliding glass door that had 54 square feet of exterior window exposure. Most of the sliding doors also were treated with curtains or sheers. Carpeting varied in most of the apartments from loop to cut pile, but most were a neutral beige or off-white color. The number of light fixtures and lamps in the apartments ranged from 7 to 13. The number of furniture pieces ranged in size and numbered from 15 to 30. Residents control the air-conditioning temperature in the summer and the heating temperature in the winter in their individual apartments. Temperatures in the apartments (measured during the month of August) ranged from 73 degrees Fahrenheit to 78 degrees Fahrenheit.

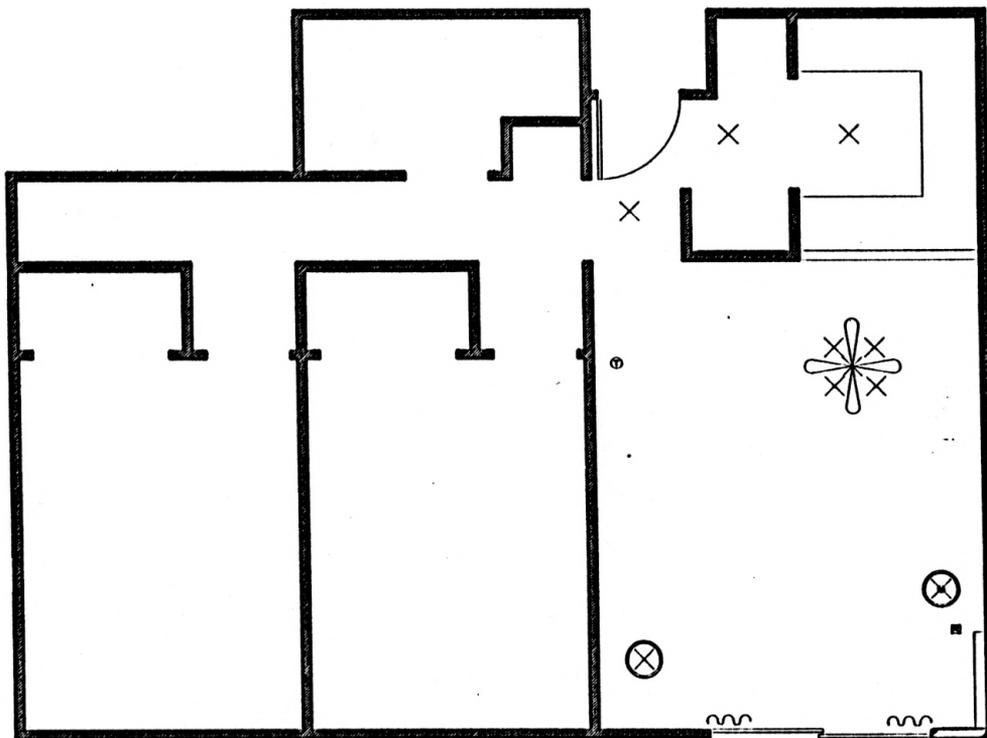


Figure 4.34. Plan of Independent Living Apartment - Site 1.

Site 3. Independent living apartments at Site 3 also were self contained units with bedroom, bathing, kitchen, and living space. The living spaces at Site 3 were slightly larger than at Site 1. Almost all units assessed had an interior living space of 19'-0" x 13'-6" with a ceiling height of 8'-0", creating an interior volume of approximately 2,036 cubic feet (see Figure 4.35). The construction of the walls varied between gypsum board and concrete block. All wall had a flat surface. The gypsum board had been painted and the concrete block was covered with a vinyl wall covering. In several of the apartments, the wall covering had been painted over. The ceilings were gypsum board construction with a textured finish. All wall and ceiling colors were a neutral, off-white. The carpeting varied from loop to cut pile construction, but almost every apartment had a neutral color floor. One residents had installed a blue carpeting to coordinate with her furniture. The amount of exterior window space varied. Some apartments had walk-out balconies and the exterior window was a sliding glass door that had 41 square feet of exterior exposure. for of the nine apartments assessed, had these sliding glass doors. Apartments without balconies had a window that provided 27 square feet of exterior exposure in the living area. Windows and sliding doors were treated with curtains and sheers. The number of light fixtures and lamps in the apartments ranged from 4 to 8. The amount of furniture pieces ranged in size and numbered from 14 to 20. Residents had control over the heating and cooling in their apartments throughout the year. Temperatures in the apartments assessed (measured during the month of October) ranged from 74 degrees Fahrenheit to 78 degrees Fahrenheit.

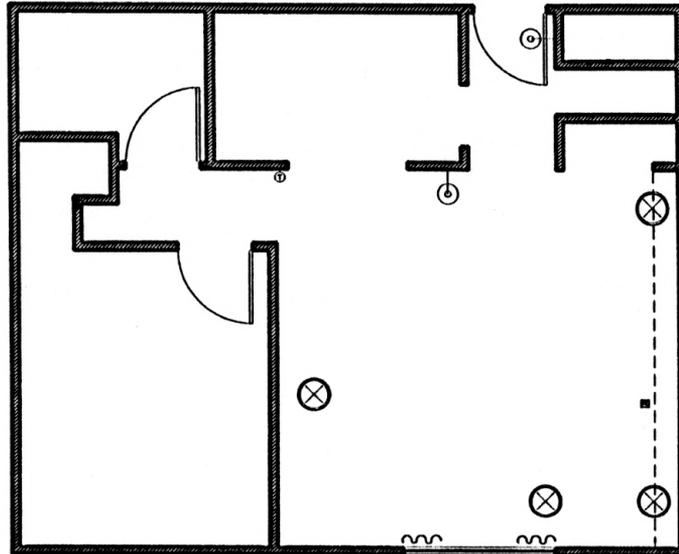


Figure 4.35. Plan of Independent Living Apartment - Site 3.

Summary Satisfaction Rating for Independent Living Apartments- Sites 1 & 3

Described below are a summary of ratings for independent living apartments as established by residents and Site 1 and Site 3. The ratings are discussed in reference to the Descriptive Environmental Assessment of the spaces. For a complete, detail summary of ratings, see Table 4.11.

Lighting Features. Almost all residents at Site 1 and Site 3 felt the amount of sunlight in the living spaces of their apartments was just the right amount. Ratings did not vary between resident who had sliding glass doors and windows. Residents whose apartments faced east of west were more likely to note occasional problems with brightness and glare. They noted, however, that the ability to control the sunlight in their living space was the key to being satisfied with the amount of natural day lighting in the room. Residents at Site 1 were satisfied with the amount of artificial lighting in their living spaces where the number of light fixtures ranged from 7 to 13. The majority of light fixtures and lamps were incandescent (see Figures 4.36 and 4.37). Residents at Site 3, however, where the number of fixtures ranged from 4 to 8, rated the amount of artificial lighting as not being quite enough. Several residents felt lighting had not been given enough attention in the design of the apartments (see Figures 4.38 and 4.39). Residents at both sites did not feel shadows in the living space were a problems, and due to the carpeting on the floor, reflection of light from this surface was not an issue.

Thermal Comfort Features. Residents at both locations were able to control the temperature in their apartments. Site 1 utilized a central control systems that regulated when the heating and cooling system was in operation, but allowed residents to control the temperature of their individual apartments. During transition periods of spring and fall, temperatures were harder to regulate. When the system was switched from heating to air-conditioning in the spring, residents complained the temperature often was too cool in their apartments on cooler days because they no longer had access to the heating

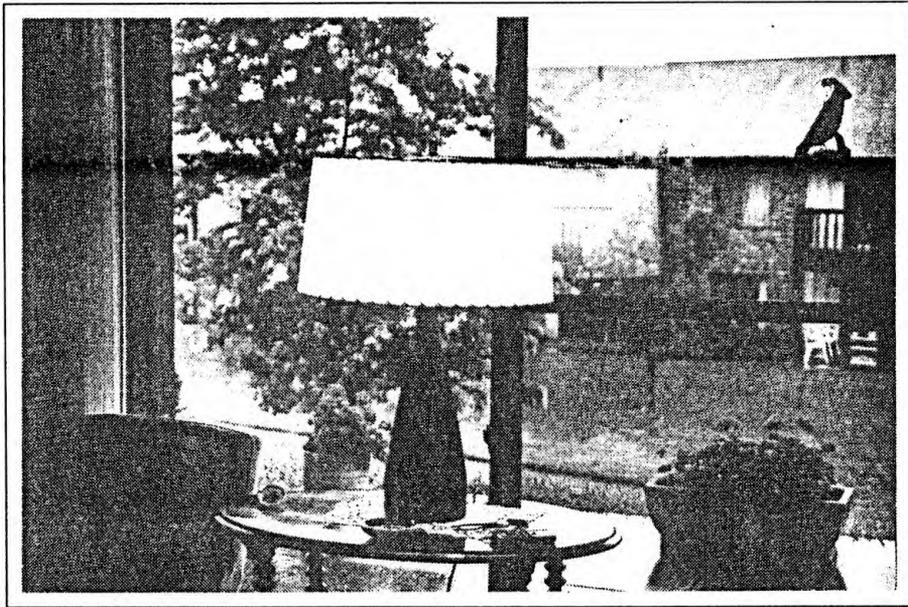


Figure 4.36. Independent Living Apartment - Site 1.



Figure 4.37. Independent Living Apartment - Site 1.

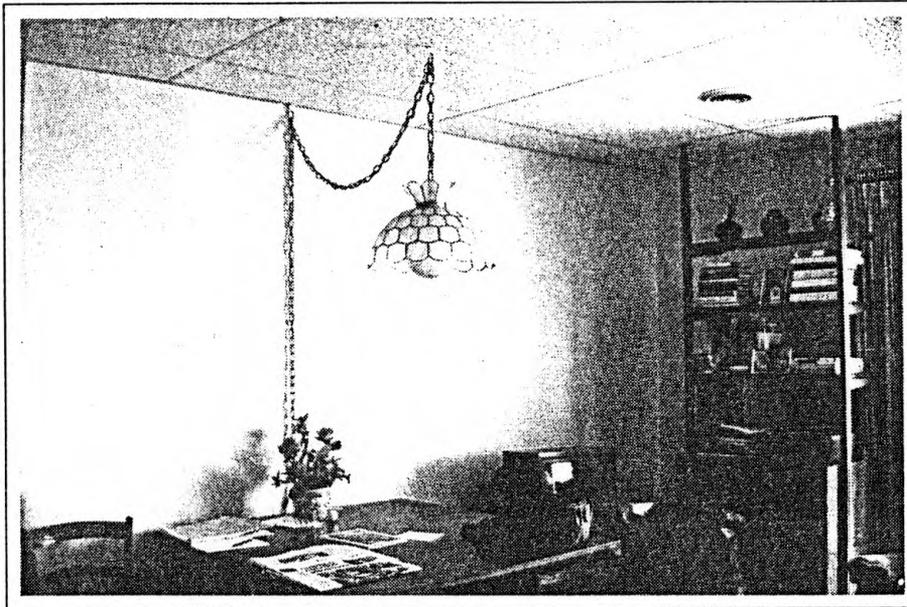


Figure 4.38. Independent Living Apartment - Site 3.

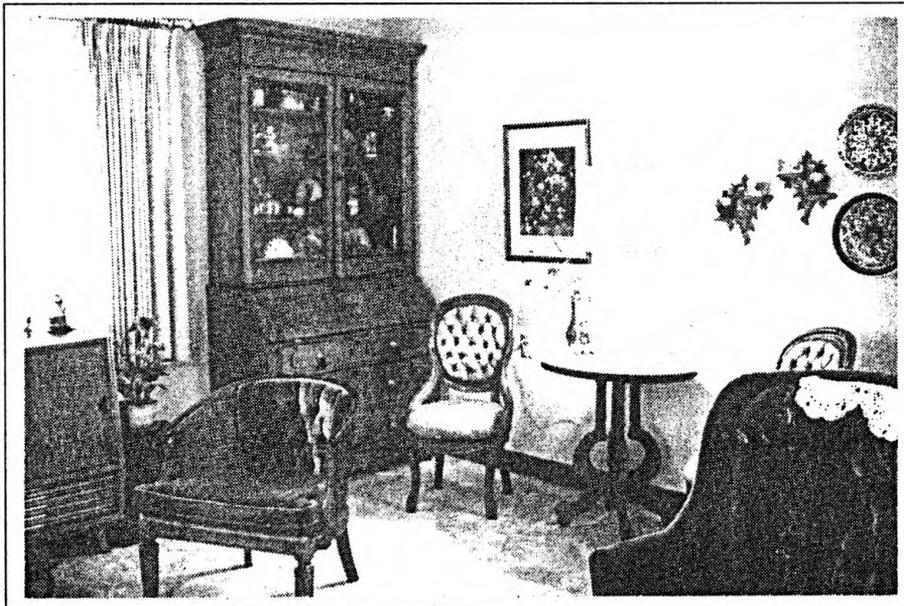


Figure 4.39. Independent Living Apartment - Site 3.

system. During the fall, the reverse situation would occur. When the system and the season were matched, residents seemed satisfied with the temperatures in their apartment, however. At Site 3, residents could also control the temperature in their apartment but had access to heating and cooling all year around. Residents at both sites were satisfied overall with the humidity levels during the warmer months. Assessment were taken at Site 1 during the month of August and the humidity levels ranged from 59 - 75 degrees Relative Humidity. Assessment were taken at Site 3 during the month of October and the humidity levels ranged from 31 - 59 degrees Relative Humidity. The amount of air movement in the apartments was judged to be just the right amount by most residents at Site 1 and Site 3. Some residents had floor fans to assist in circulating the air. Drafts were never or rarely a problem for most residents at either site. Several residents had added a device to direct the air that came from the heating and cooling unit in the living room. Some residents noted that drafts had been a problem in certain locations in the room before the directional devices were added. (see Figures 4.40 and 4.41). Four of the nine residents at Site 3 said drafts were occasionally present around windows and doors.

Acoustical Features. Almost all residents at both sites felt unwanted noises from outside the building were never or rarely present in their living spaces. Residents who did feel noises were present identified sounds such as lawn mowers and vehicular traffic. Noises from other room also was rated as never or rarely present by most residents. While some residents commented on the "sound proof" quality of their apartments, other residents expressed concern about the ability to hear fire or tornado alarms. The indicated

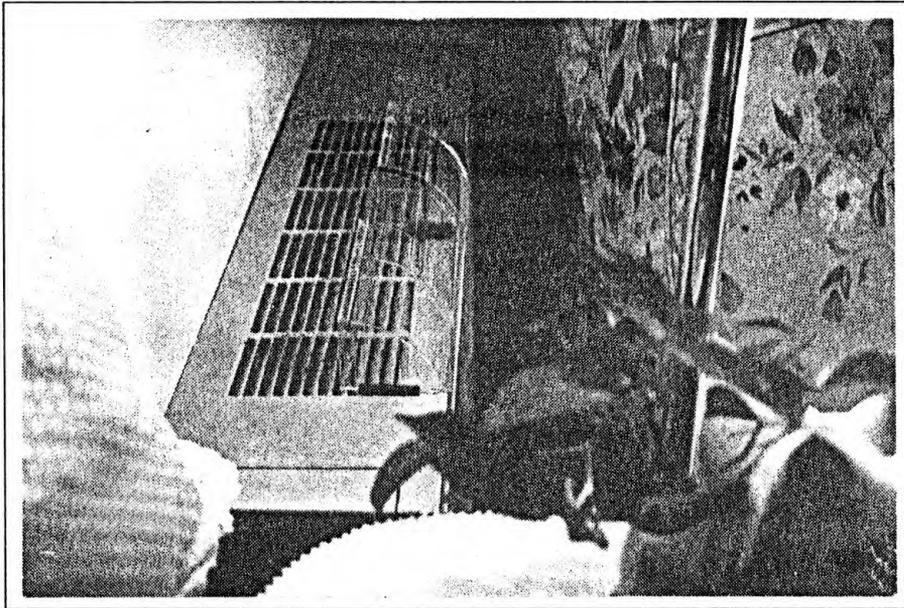


Figure 4.40. Independent Living Apartment - Site 1.

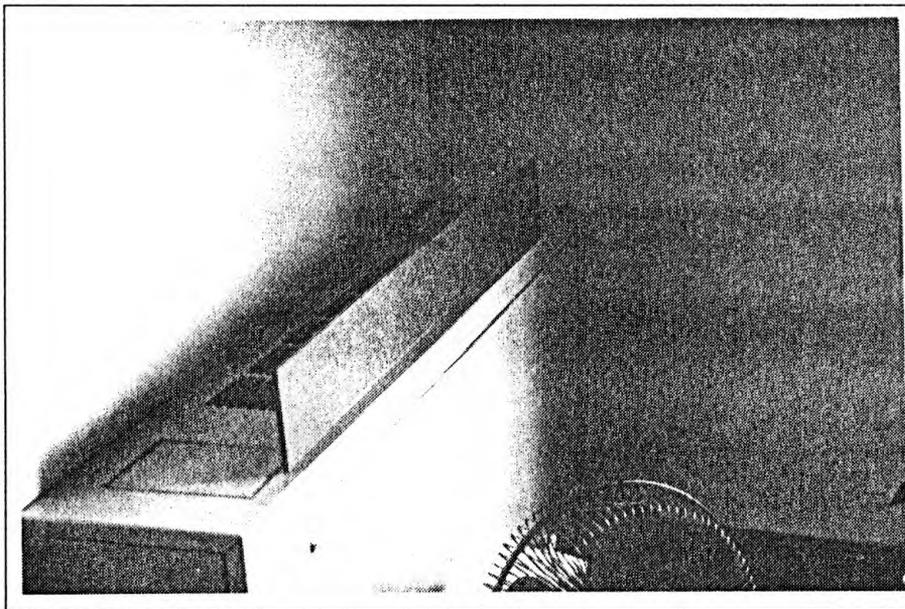


Figure 4.41. Independent Living Apartment - Site 1.

in the past, these signals had gone off but they were unaware of any potential hazard due to the inability to hear the alarms in the hallways from their apartments. While the acoustical environment provide auditory privacy, the trade off was the inability to alert those with hearing losses to potential danger. Residents who could identify unwanted noises from other room usually targeted the bathroom. They noted that water running or toilets flushing in the adjacent apartment could sometimes be detected. The sound level in the apartments at Site 1 and Site 3 was rated by all residents to just right, and no one felt there was a presence of echoes in their apartment.

Olfactory Features. Residents said odors were never or rarely present in their apartments. Odors that were sometimes presents were identified as the smells of burnt food. There were large exhaust fan in the apartments at Site 1, but some of the residents did not feel they were very effective in removing odors, but rather were a source of odors from other areas of the building (see figure 4.42). Pleasant smells were rated higher than odors and were also associated with food and cooking smells. The presence of tobacco smoke was never or rarely present in most of the apartments. Only one resident in independent living was a smoker, the rest did not smoke. Residents who did detect smoke, attributed the source to adjacent apartments or visitors. When it was present, tobacco smoke from adjacent apartments was often a source of aggravation for some residents. One resident had install an air-freshener affixed to the wall (see Figure 4.43).

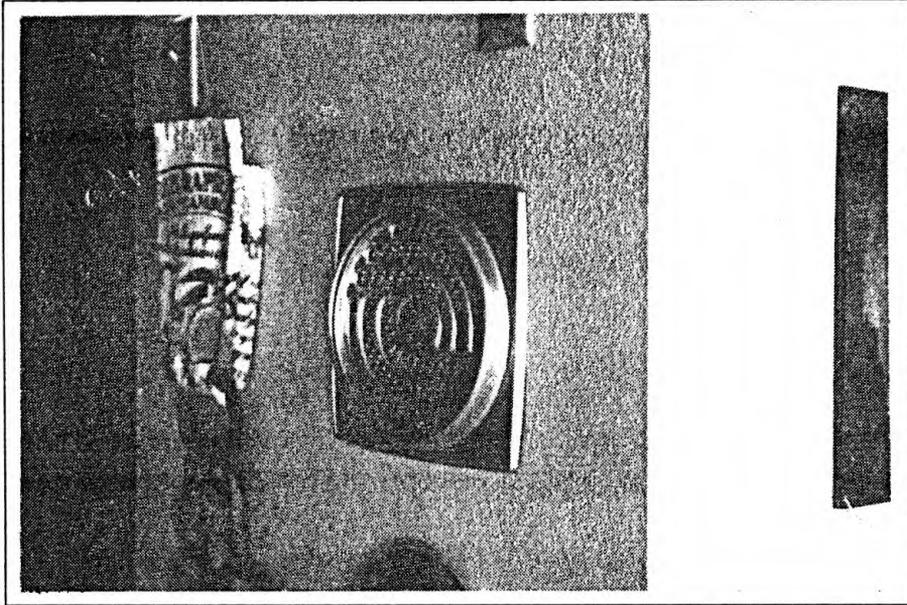


Figure 4.42. Independent Living Apartment - Site 1.

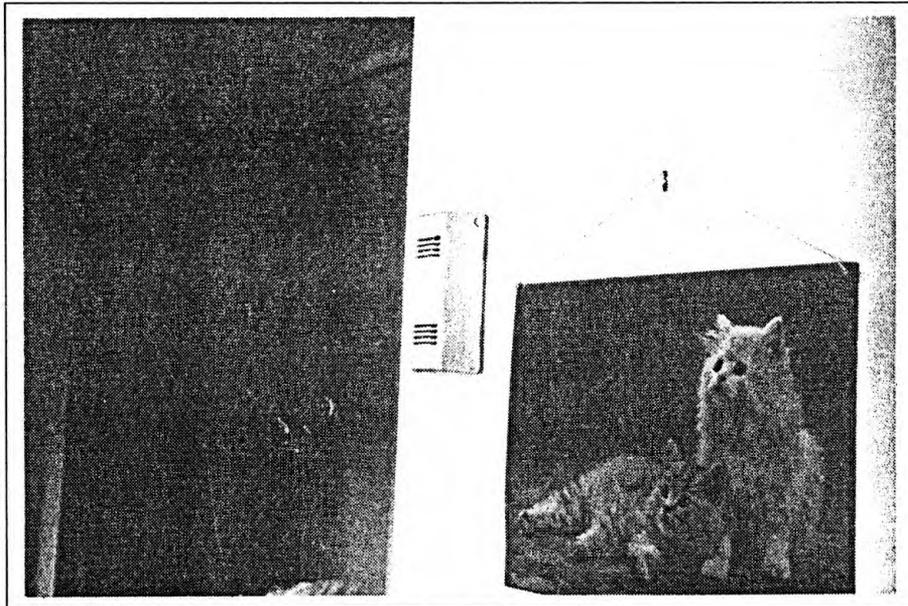


Figure 4.43. Independent Living Apartment - Site 1.

Physical Space Features.

Most residents at Site 1 and Site 3 felt the amount of privacy in their apartment living spaces was just right. One resident at Site 1 felt there was not quite enough and one resident at Site 3 felt there was a little bit too much. Three residents at each site felt the amount of furniture in the living space was too much. These residents tended to have larger pieces of furniture, but not necessarily more pieces than other residents (see Figures 4.44, 4.45, 4.46, and 4.47). They expressed the desire for more living space or better storage option on the site. Residents felt their apartments were never or rarely crowded with people, which may be attributed to the ability to control access to the living space. Residents at both sites noted they utilized social spaces located in the building for family or large groups. Residents who occasionally perceived crowding usually had others over to play bridge.



Figure 4.44. Independent Living Apartment - Site 1.

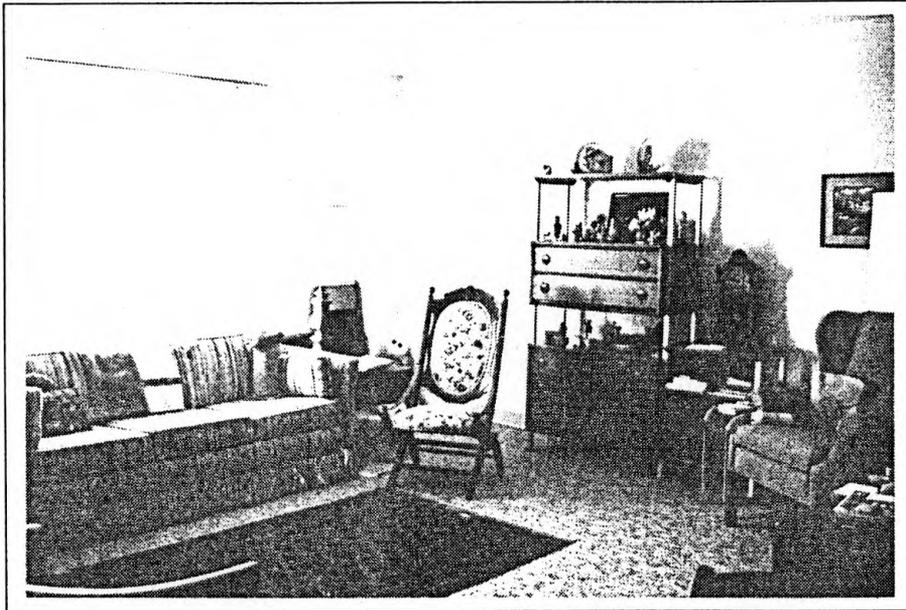


Figure 4.45. Independent Living Apartment - Site 3.



Figure 4.46. Independent Living Apartment - Site 3.

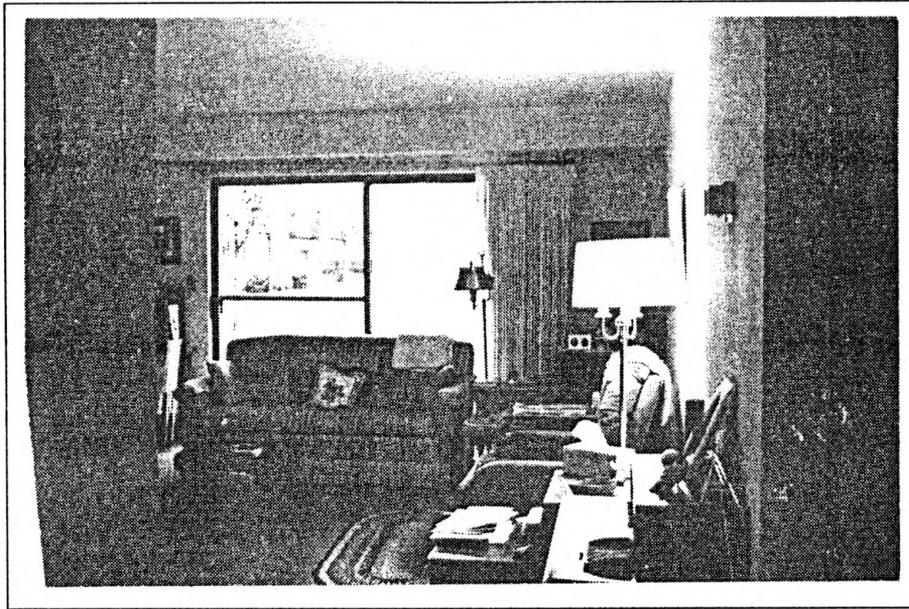


Figure 4.47. Independent Living Apartment - Site 1.

Overall Satisfaction. Overall, residents at both sites rated their apartment living spaces to be above satisfactory. No one rated their living space below satisfactory.

Residents spent most of their day in their apartments compared to the dining and hallway spaces.

Table 4.11. Summary of Satisfaction Ratings for Independent Living Apartments.

INDEPENDENT LIVING APARTMENTS SITE 1 and SITE 3	RESIDENTS - SITE 1				RESIDENTS - SITE 3			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	3	3	3	9	3.1	3	3--4
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	10	3.5	3	3-5	8	3.5	3	2--5
How often in the amount of sunlight that comes from the windows in this room distracting?	10	2	2	1-3	8	2.4	3	1-4
How often does bright sunlight from the windows interfere with activities?	10	1.4	1	1--3	8	2.1	1	1-4
How much artificial lighting from light fixtures is present in this room?	10	3	3	3	9	2.3	2/3	1--3
How often are shadows present in this room?	10	1.4	1	1-3	9	1.2	1	1-2
How often is the light that reflects off of the floor in this room distracting?	10	1	1	1	8	1	1	1
How often does the light that reflects off of the floor interfere with activities?	10	1	1	1	8	1	1	1
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	10	3.1	3	2--5	9	3.2	3	3-5
During warmer months how would you describe the amount of humidity in this room?	10	3	3	2--4	9	3.3	3	2--5
During cooler months how would you describe the amount of humidity in this room?	10	2.7	3	1--3	9	2.4	3	1-5
How would you describe the amount of air movement in this room?	10	2.6	3	1-3	9	2.8	3	1-5
How often are there unwanted drafts in this room?	10	1.6	1	1-3	9	2	2	1-3
How often can unwanted sounds from outside the building be heard in this room?	10	1.8	1/2	1--3	9	2	2	1-4
How often can unwanted sounds from other rooms be heard in this room?	10	2	1	1-4	9	1.9	1	1-3
How would you describe the sound level in this room?	10	3	3	3	9	3.2	3	3-5
How often does sound echo in this room?	10	1	1	1	9	1	1	1
How often are odors present in this room?	8	1.6	1	1-3	8	1.6	2	1-2
How often are pleasant smells present in this room?	8	3.1	3	2--5	7	3.1	3	3--4
How often is tobacco smoke present in this room?	8	1.8	1	1-4	8	1.4	1	1-3
If present, how often are you bothered by tobacco smoke in this room?	7	2.3	2	1-5	5	3.2	3	1--5
How would you describe the amount of privacy in this room?	10	2.9	3	2-3	9	3.1	3	3--4
How would you describe the amount of furniture in this room?	10	3.5	3	3--5	9	3.6	3	3-5
How often does this room seem crowded with people to you?	10	1.4	1	1-2	9	1.8	1	1-3
How would you rate the overall quality of this room?	10	4.2	4	3-5	9	4.2	4/5	3-5
Rank the 3 rooms in the order where you spend the most time?	10	1	1	1	9	1	1	1

Descriptive Environmental Assessment of Assisted Living Resident Rooms

Described below are the Descriptive Environmental Assessments for the Assisted Living rooms at Site 1. Since Site 1 was the only location assessed with separate living arrangements for residents at this level of care, the individual characteristics of the resident rooms and the general design and composition of the spaces is described and discussed but not compared to other living options.

Site 1. All rooms assessed in assisted living were single occupancy. The assisted living unit had been converted from a skilled care unit, so the rooms were designed to accommodate two hospital size beds. The floor area of most of the rooms was 19'-0" x 12'-0" (228 square feet) (see Figure 4.48). The ceiling heights were 8'-0", creating an interior volume of approximately 2,088 cubic feet. The walls were gypsum board construction. Three of the interior walls were a painted finish in a neutral white, the fourth wall had a wallpaper finish. Wallpaper colors varied from room to room, but all were a pastel value of pink, blue, or beige. The floors were loop construction carpeted. Carpet colors also varied from light rose to tan. There was 32 square feet of exterior window space in each room. All rooms had curtains to control day lighting. The number of light fixtures and lamps in the rooms varied from 3 to 7, but most residents had approximately 6 sources of artificial illumination in their room. Each room had its own heating and air-conditioning unit and residents controlled the temperature in their individual spaces. Temperatures in the rooms (measured during the month of August) ranged from 70 - 82 degrees Fahrenheit. Residents provided their own furnishing for their

rooms. Many also used a residential bed instead of the typical hospital style bed. There were various sizes of furniture, and the number of pieces of furniture in the rooms ranged from 9 to 15. Each room also had a television set.

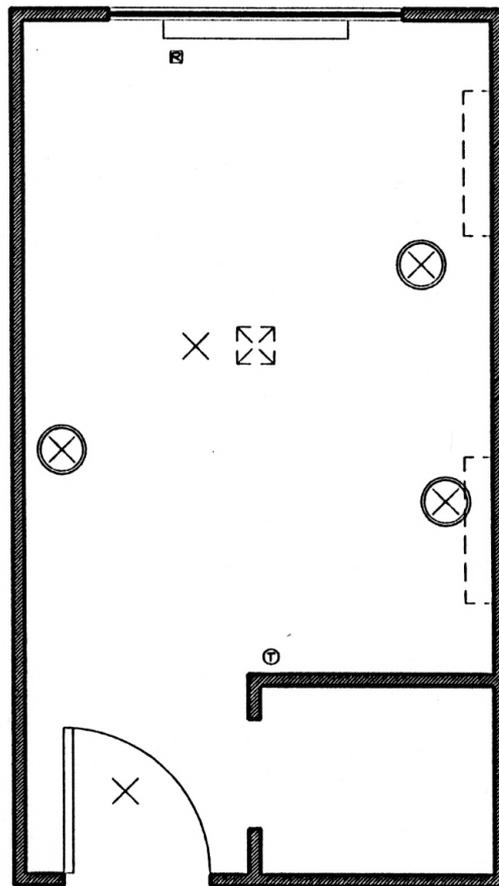


Figure 4.48. Plan of Assisted Living Room - Site 1.

Summary of Satisfaction Ratings for Assisted Living - Resident Rooms - Site 1

Described below are a summary of satisfaction ratings for resident rooms in assisted living as established by residents at Site 1. Ratings are described and discussed as they relate to the Descriptive Environmental Assessment of these spaces. For a complete, detailed summary of ratings, see Table 4.12.

Lighting Features. Almost all residents were satisfied with the amount of sunlight in their rooms, and most felt the amount of sunlight that came through the windows was just right. Residents who noted problems with glare, commented that the ability to control the brightness by closing the drapes eliminated this problem. Curtains however, provide an all or nothing option. When the curtains were pulled, very little useful sunlight came through (see Figure 4.49). While most of the residents felt the amount of artificial lighting in their rooms was just the right amount, some of the residents noted a desire for more lighting options (see Figure 4.50). Shadows were not a problem for residents in assisted living, and due to the carpeting on the floor in their room, reflection of light off of this surface was not an issue, either.

Thermal Comfort Features. All residents surveyed felt the temperature in their rooms was just right. In addition, few changes in humidity levels were noticed during warmer and cooler seasons. The amount of air movement in the rooms was rated as just right by most residents and residents noted few problems associated with drafts.

Satisfaction with thermal comfort issues was most likely due to the control that residents

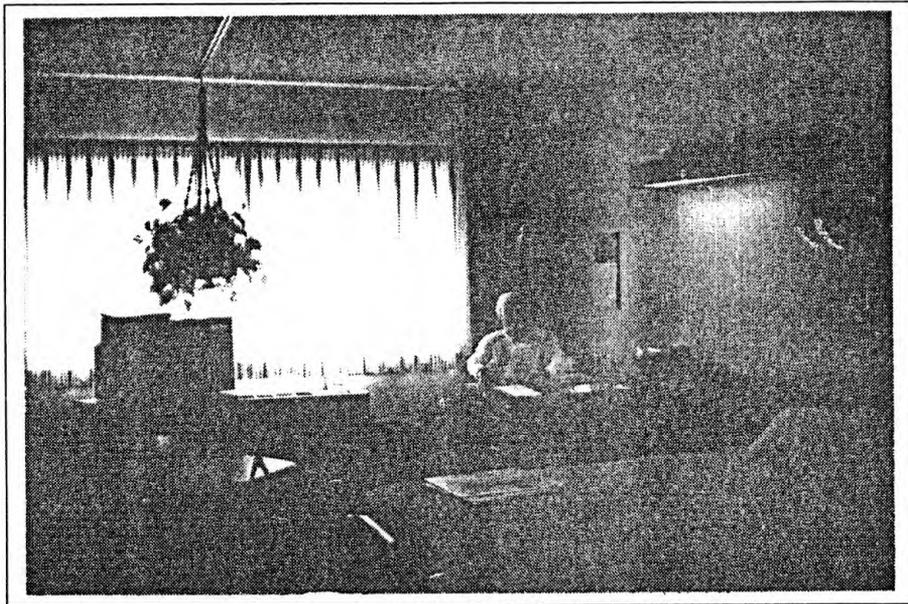


Figure 4.49. Assisted Living Apartment - Site 1.

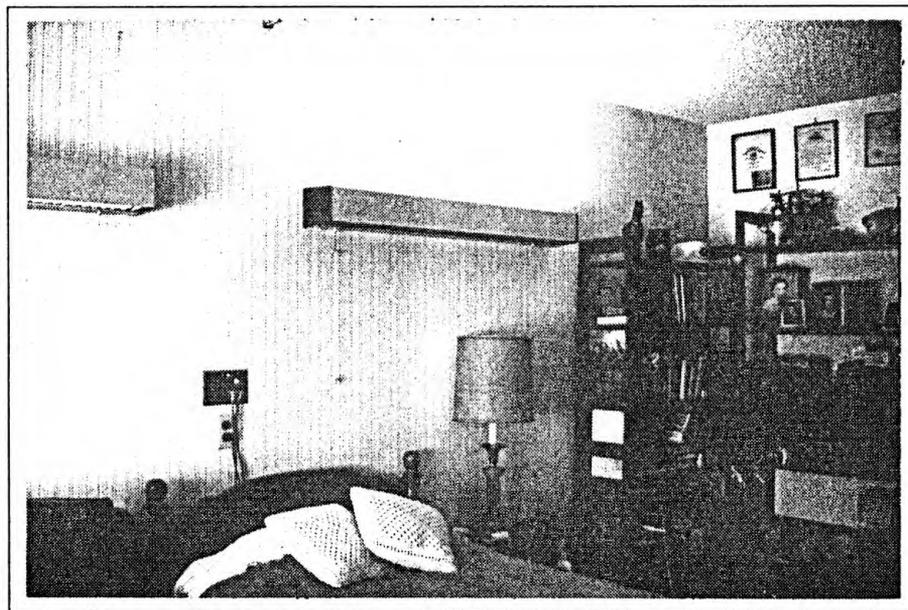


Figure 4.50. Assisted Living Apartment - Site 1.

have over their individual environments. Some residents added ceiling fans or floor fans to accommodate their personal preferences, also (see Figure 4.51).



Figure 4.51. Assisted Living Apartment - Site 1.

Acoustical Features. The acoustical environment on the individual rooms was rated as satisfactory by most all residents. External noises from outside the building or from other rooms was only occasionally noticed by a few residents. Some problems did occur, however, if televisions from adjacent rooms were placed against a shared wall and turned up too loudly. Sound levels in the rooms were judged to be just right, and no problems with echoes were reported by residents in assisted living.

Olfactory Features. Unwanted odors were rated as never or rarely present in individual rooms by most residents. Pleasant smells were rated more frequent. Pleasant smells that were identified included flowers, air-fresheners, and perfumes. The assisted living unit was entirely non-smoking, and while residents who do smoke may go to designated area, they cannot smoke in their rooms. Tobacco smoke, therefore, was not detected in any of the rooms.

Physical Space Features. Most residents were satisfied with the amount of privacy they were afforded by their private room. Only one resident felt there was not enough privacy in this space. The amount of furniture in the space was rated as satisfactory by most, but some residents noted there was not enough space in their rooms for personal belongings (see Figures 4.52 and 4.53). This was especially true for residents with hobbies such as painting or wood carving (see Figures 4.54 and 4.55). Resident were in control of people coming and going from their space, so they felt their rooms were never to rarely crowded with people.

Overall Satisfaction. Residents rated their rooms satisfactory to above satisfactory (mean rating 3.9). Residents spent most of their time in their rooms and this served as their primary living area.

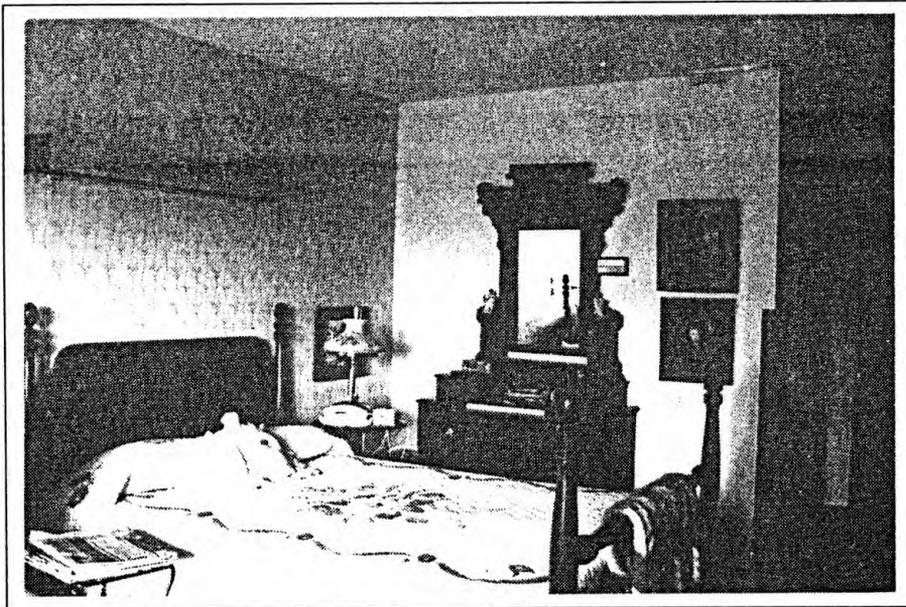


Figure 4.52. Assisted Living Apartment - Site 1.

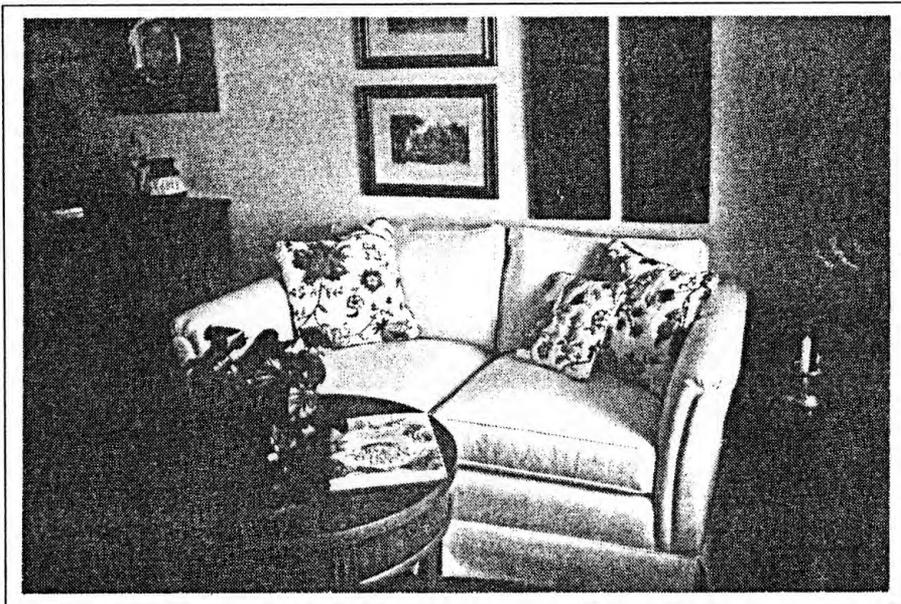


Figure 4.53. Assisted Living Apartment - Site 1.

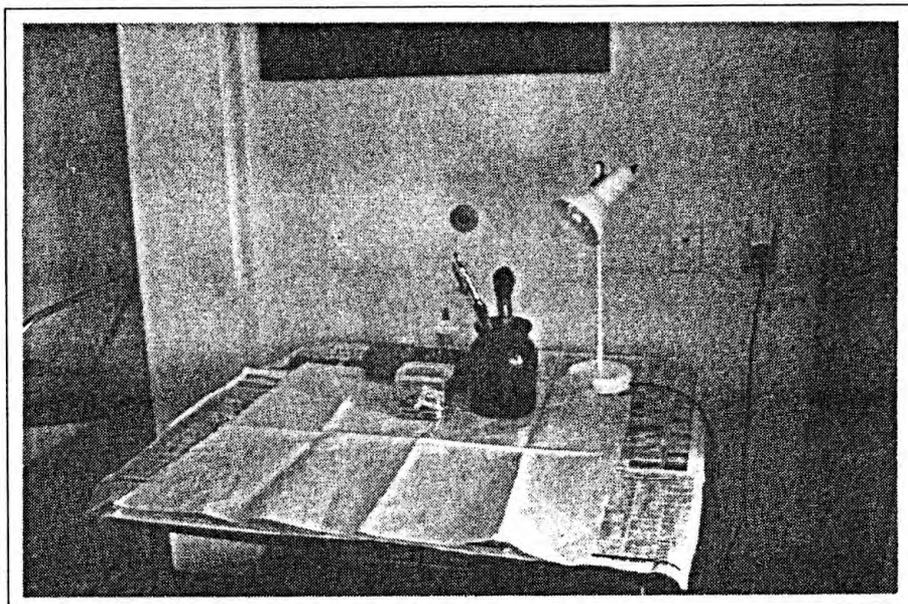


Figure 4.54. Assisted Living Apartment - Site 1.

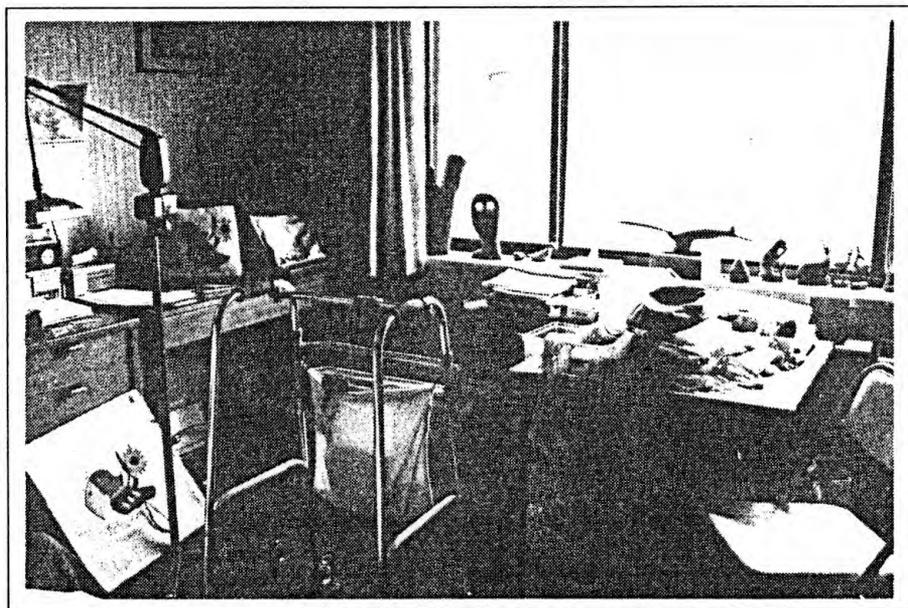


Figure 4.55. Assisted Living Apartment - Site 1.

Table 4.12 Summary of Satisfaction Ratings for Assisted Living Rooms.

ASSISTED LIVING RESIDENT ROOMS SITE I	RESIDENTS - SITE I			
	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	2.8	3	1-5
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	10	3.4	3	3--5
How often in the amount of sunlight that comes from the windows in this room distracting?	10	2.2	1/3	1--4
How often does bright sunlight from the windows interfere with activities?	10	1.6	1	1--4
How much artificial lighting from light fixtures is present in this room?	10	2.6	3	1--3
How often are shadows present in this room?	10	1.4	1	1--5
How often is the light that reflects off of the floor in this room distracting?	10	1.2	1	1--3
How often does the light that reflects off of the floor interfere with activities?	10	1.2	1	1--3
Can you control the temperature in this room				
How comfortable is the temperature in this room to you?	10	3	3	3
During warmer months how would you describe the amount of humidity in this room?	10	3.1	3	3--4
During cooler months how would you describe the amount of humidity in this room?	8	2.6	3	1--3
How would you describe the amount of air movement in this room?	10	3.3	3	3--5
How often are there unwanted drafts in this room?	10	1.4	1	1--3
How often can unwanted sounds from outside the building be heard in this room?	10	1.8	1	1--4
How often can unwanted sounds from other rooms be heard in this room?	10	1.7	1	1--3
How would you describe the sound level in this room?	10	3	3	3
How often does sound echo in this room?	10	1.1	1	1--2
How often are odors present in this room?	9	1.2	1	1--3
How often are pleasant smells present in this room?	9	2.6	3	1--4
How often is tobacco smoke present in this room?	9	1	1	1
If present, how often are you bothered by tobacco smoke in this room?	9	1	1	1
How would you describe the amount of privacy in this room?	10	2.8	3	1--3
How would you describe the amount of furniture in this room?	10	3.2	3	1--5
How often does this room seem crowded with people to you?	10	1.1	1	1--2
How would you rate the overall quality of this room?	10	3.9	--	3--5
Rank the 3 rooms in the order where you spend the most time?	10	1	1	1

Descriptive Environment Assessment of Skilled Care Living - Resident Rooms

Site 1. Most rooms assessed in skilled care at Site 1 were shared. Rooms were designed in a modified L-shape (see Figure 4.56). Total square footage of the room was approximately 235 square feet, but individual resident space was approximately 120 square feet. The ceiling height in the rooms were 8'-0", creating an interior volume of approximately 1,876 cubic feet. The private rooms that were assessed had 135 square feet of space with an approximate volume of 1,088 cubic feet. The walls and ceilings in the rooms were gypsum board construction with a white painted finish. The walls had a smooth finish, but the ceiling was textured. The floors were vinyl composition tile, also in white. There was 32 square feet of exterior window space in each of the shared rooms. The private rooms had 21 square feet of exterior exposure. Windows were all treated with curtains. The number of light fixtures and lamps in resident rooms varied from 4 to 6. Most of the lighting was from overhead fixtures, but most residents had a personal lamp. Each room had one heating and cooling register that supplied warm and cool air to the space. Residents could control the temperature in their rooms, but one register served two residents. Temperatures in the rooms assessed ranged from 71 to 76 degrees Fahrenheit. The rooms were pre-furnished with a hospital bed, a wardrobe closet, and a desk. Most residents also had a personal chair and other small pieces of furniture, and some had a television. Number of total pieces including furniture supplied by the facility was 5 to 9 pieces.

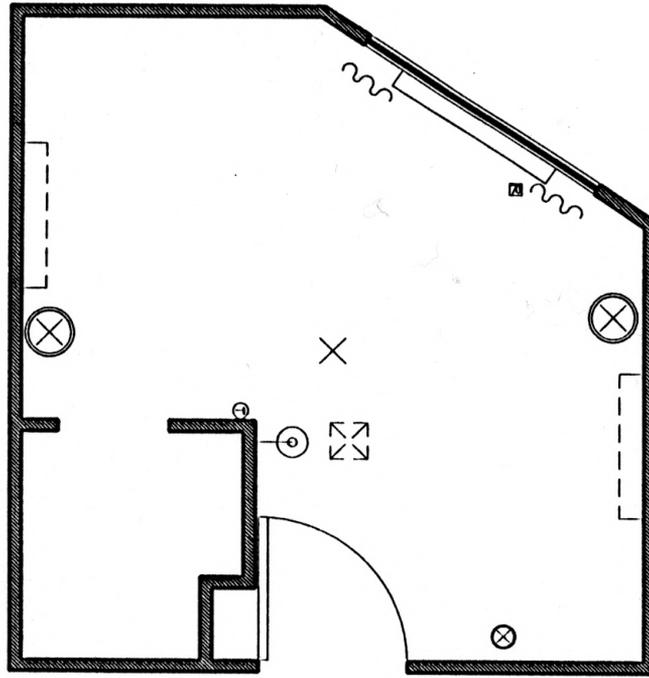


Figure 4.56. Plan of Skilled Care Residents' Room - Site 1.

Site 3. Resident rooms in skilled care at Site 3 were also shared, but were slightly larger than rooms at Site 1. Total floor area for a shared room was approximately 267 square feet. The ceiling heights were 8'-0", creating an interior volume of approximately 2,133 cubic feet. Although there was slightly more floor space, the rectilinear design of the room only allowed one resident access to the window and the heating and cooling register located under the window (see Figure 4.57). Walls in the rooms were gypsum board construction. Finishes in the rooms include painted walls in neutrals and accent wall with various colors of wallpapers. Floors in all of the rooms were light colored vinyl composition tile. Each room assessed had 20 square feet of exterior window space. Each of the windows was finished with curtains in a neutral color. The number of light fixtures in the room ranged from 3 to 5. Most lights in the room were overhead lights but

residents surveyed also had a personal lamp. The rooms were pre-furnished by the facility with a hospital style bed and a desk. There was also a built-in closet that was shared by both residents. Each of the residents surveyed had additional pieces of furniture in their space. Except for chairs and dressers, most pieces were relatively small. Number of pieces ranged from 6 to 11. Residents can control the temperature in their rooms with the register that was located by the window. As previously noted, however, this was clearly on one person's side of the room. Temperatures in residents' rooms (measured during the month of October) ranged from 73 - 75 degrees Fahrenheit.

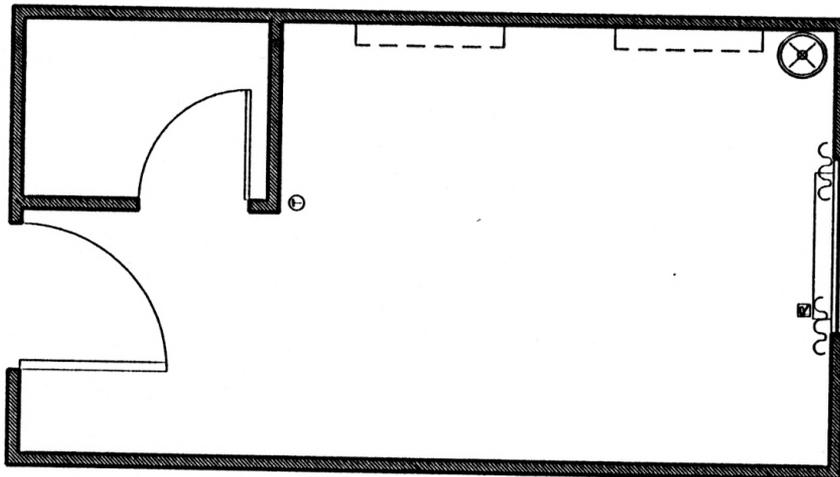


Figure 4.57. Plan of Skilled Care Residents' Room - Site 3.

Summary of Satisfaction Ratings for Skilled Care Living - Resident Rooms

Described below are a summary of ratings for resident rooms in skilled care as established by residents at Site 1 and Site 3. Ratings are described and discussed in reference to the Descriptive Environmental Assessment of these spaces. For a complete, detailed summary of ratings, see Table 4.13.

Lighting Features. Residents rated the amount of sunlight in their rooms as just right, overall, but some residents at Site 1 noted problems with the amount of brightness that came from the sun during specific times of the day. This brightness was sometimes distracting, but residents did not feel it interfered with activities. The amount of artificial lighting in residents rooms was rated as just right by residents at Site 1, but at Site 3, where the number of fixtures was lower overall, residents noted a desire for more lighting in the room (see Figure 4.58). Shadows were not a problem for residents at either site. Even though the floor was a smooth tile surface, residents did not mention problems associated with light reflecting off of this surface.

Thermal Comfort Features. Satisfaction with thermal comfort features varied between the two sites. Resident at Site 1 could control the temperature, but reported being too warm. Residents at Site 3 could also control the temperature and rated the

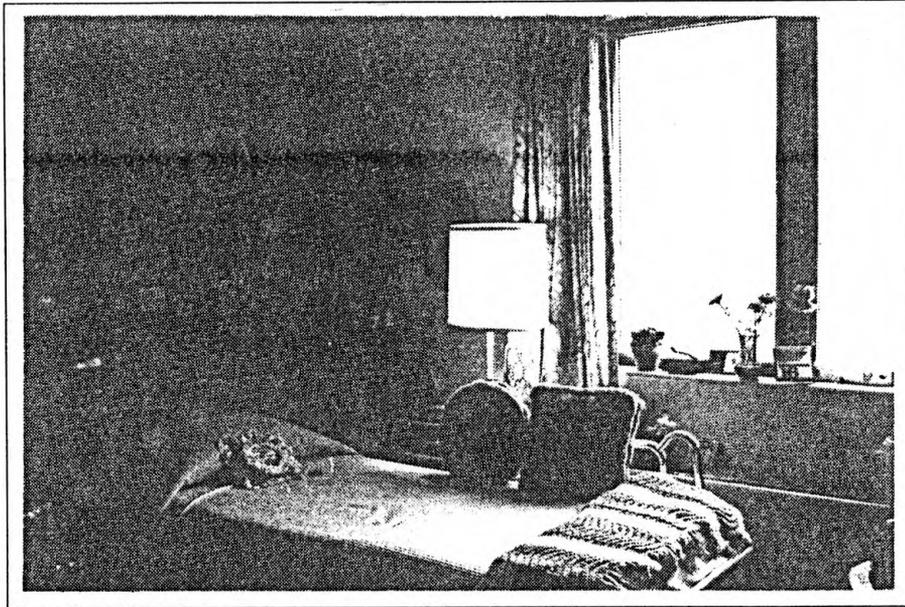


Figure 4.58. Skilled Care Resident's Room - Site 3.

temperature to be closer to just right. Differences in ratings may be due to differences in activity levels between the two groups of residents. Residents surveyed at Site 1 seemed healthier and more active, thus, potentially increasing their overall body temperature. Residents surveyed at Site 1 were more frail and less active overall, thus potentially reducing the amount of warmth their own bodies would generate. Differences could also be due to seasonal occurrences. Residents in skilled care were sensitive to humidity levels during the winter and summer months in their rooms. Residents at Site 1 report the humidity level to be too moist during warmer months and too dry during cooler ones. Residents at Site 3 reported being slightly too dry during both seasons. Differences may be attributed to HVAC systems used in the buildings. The amount of air movement was

judged to be just right by both groups and neither group identified problems with unwanted drafts in their rooms.

Acoustical Features. Sounds from outside the building were not identified for either group of residents in skilled care. Sounds from other rooms, however, were rated as more frequent. Sounds identified by residents were noises from other "sick" residents, televisions from other rooms, and sometimes cart traffic. The sound level in the rooms was judged by most to be just right, and few problems were identified with echoes in these spaces.

Olfactory Features. Odors and pleasant smells were both rated as never to rarely present in resident rooms by most residents. Pleasant smells that were occasionally identified were perfume or smells from the dining room. Since smoking was not allowed in either facility, tobacco smoke was not detected either.

Physical Space Features. Privacy was rated between just the right amount and not quite enough by residents at both facilities. Each of the shared rooms were divided only by a privacy curtain (see Figure 4.59). No one felt they had too much privacy. Several of the residents noted problems with lack of space for furniture, or crowded conditions with respect to furniture. As Site 1, residents in wheelchairs can not get to the heating and cooling register in the private rooms because the bed occupied so much of the existing space (see Figure 4.60). In shared rooms at Site 1, residents in wheelchairs

cannot access their wardrobe closets due to lack of space between the bed and the closet (see Figure 4.61). Similar problems exist at Site 3, but most resident expressed the desire to have more space for personal belongings (see Figure 4.62 and 4.63). Residents at both facilities, however did not feel that there rooms were ever crowded with people.

Overall Satisfaction. Residents at both facilities felt overall their rooms were satisfactory to above satisfactory. No one rated their room below satisfactory. Residents did spend most of their time in their rooms out of the three areas identified.

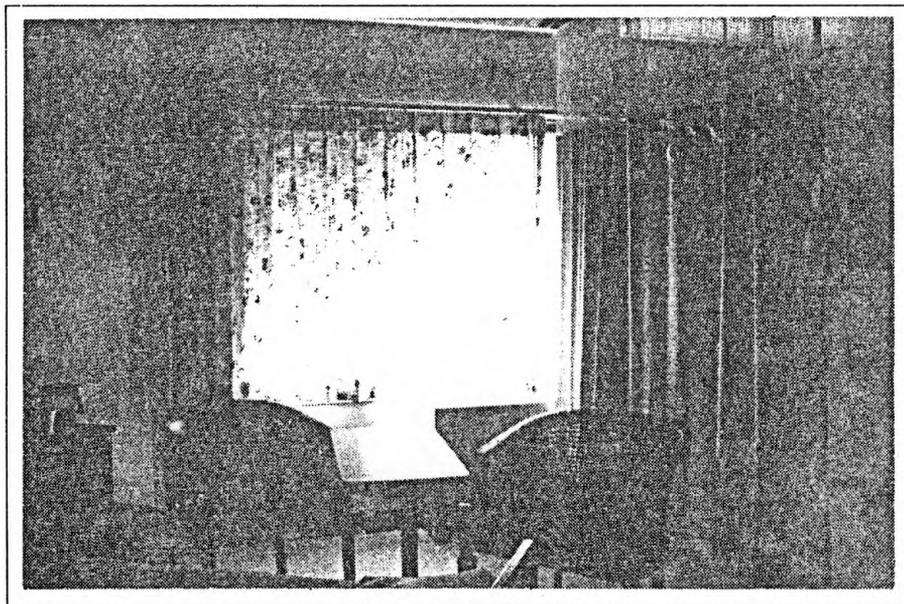


Figure 4.59. Skilled Care Resident's Room - Site 1.



Figure 4.60. Skilled Care Resident's Room - Site 1.

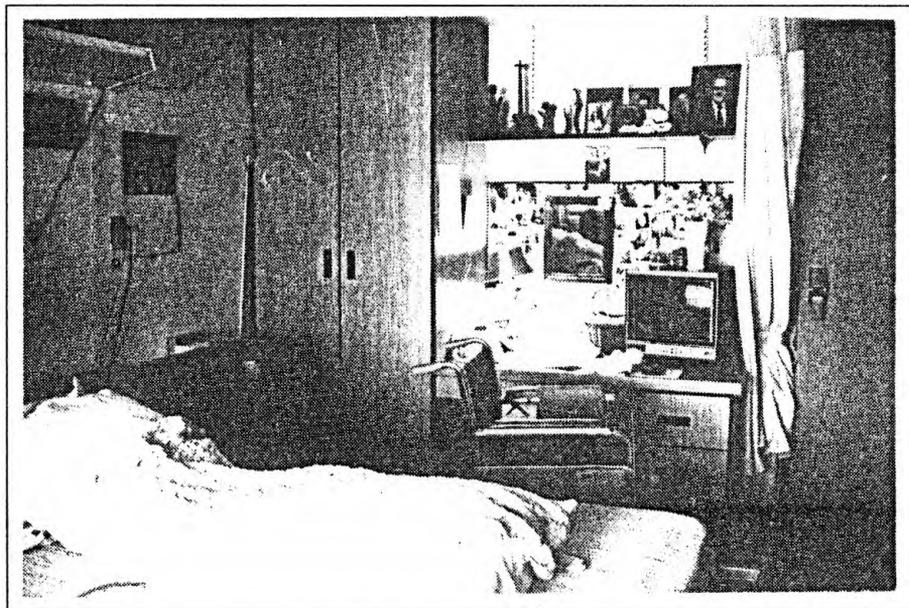


Figure 4.61. Skilled Care Resident's Room - Site 1.

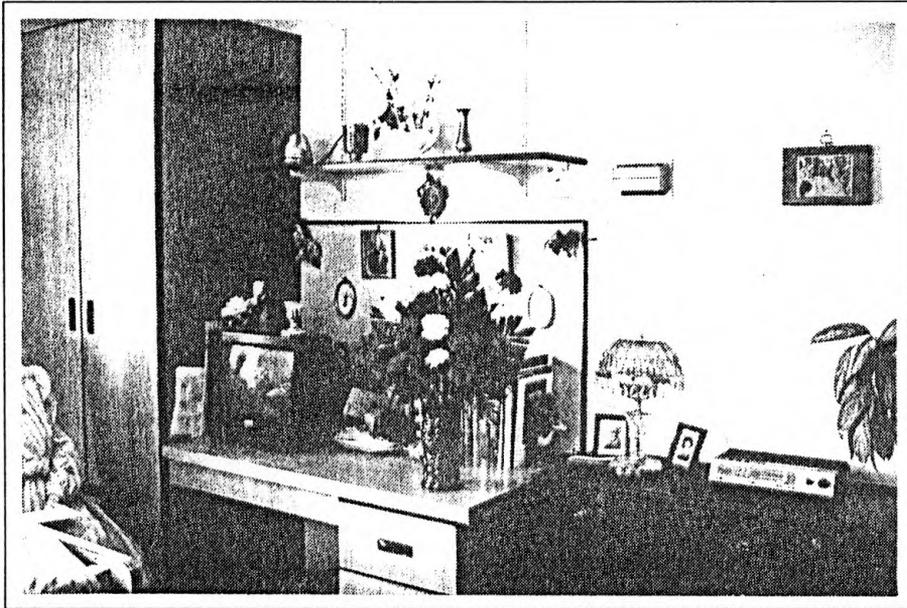


Figure 4.62. Skilled Care Resident's Room - Site 3.



Figure 4.63. Skilled Care Resident's Room - Site 1.

Table 4.13 Summary of Satisfaction Rating for Skilled Care Rooms.

SKILLED CARE LIVING RESIDENT ROOMS SITE 1 and SITE 3	RESIDENTS - SITE 1				RESIDENTS - SITE 3			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	6	3.3	3	2--5	3	3	3	3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	6	4	3/5	3--5	1	3	3	3
How often in the amount of sunlight that comes from the windows in this room distracting?	6	2.3	1	1--5	1	1	1	1
How often does bright sunlight from the windows interfere with activities?	6	1.7	1	1--2	1	1	1	1
How much artificial lighting from light fixtures is present in this room?	6	3	3	3	1	2.2	2	2--3
How often are shadows present in this room?	6	1.8	1	1--3	3	1	11	1
How often is the light that reflects off of the floor in this room distracting?	6	1.3	1	1--3	1	1	1	1
How often does the light that reflects off of the floor interfere with activities?	6	1	1	1	1	1	1	1
Can you control the temperature in this room					1			
How comfortable is the temperature in this room to you?	6	3.7	3	3--5		3.3	3	3--4
During warmer months how would you describe the amount of humidity in this room?	6	3.8	3	3--4	3	2	2	2
During cooler months how would you describe the amount of humidity in this room?	6	2.3	3	1--3	2	2	2	2
How would you describe the amount of air movement in this room?	6	2.7	3	2--3	2	3	3	3
How often are there unwanted drafts in this room?	6	1.8	1	1--4	3	1	1	1
How often can unwanted sounds from outside the building be heard in this room?	6	1.3	1	1--2	3	1	1	1
How often can unwanted sounds from other rooms be heard in this room?	6	3.2	4	1--3	2	2.7	--	1--4
How would you describe the sound level in this room?	6	3	3	3	3	3.7	3	3--5
How often does sound echo in this room?	6	1.5	1	1--4	3	1	1	1
How often are odors present in this room?	6	1.2	1	1--2	2	2	2	2
How often are pleasant smells present in this room?	6	2.2	1	1--4	1	2	2	2
How often is tobacco smoke present in this room?	6	1.3	1	1--2	1	1	1	1
If present, how often are you bothered by tobacco smoke in this room?	5	1	1	1	2	1	1	1
How would you describe the amount of privacy in this room?	6	2.7	3	2--3	1	2.7	3	2--3
How would you describe the amount of furniture in this room?	5	2.6	1/4	1--4	3	4	4	4
How often does this room seem crowded with people to you?	6	1.8	1	1--4	3	1.7	1	1--3
How would you rate the overall quality of this room?	6	4	4	3--5	3	3.1	1	3--4
Rank the 3 rooms in the order where you spend the most time?	6	1	1	1	3	1	1	1

Descriptive Environmental Assessment and Satisfaction Ratings of Staff Work Areas

The third area assessed and rated by staff were locations in the building where they primarily worked. Staff rated spaces where they spent a majority of their day or a space where their personal desk and belongings were located and where they performed tasks significant to the job. Due to the wide variety of job descriptions, differences in perceptions of the environment as a result of job requirements are noted as they occur. Staff in similar settings of the CCRC environment are compared between Site 1 and Site 3. Each of the settings was described individually, and then the ratings of the spaces are compared between sites.

Descriptive Environmental Assessment of Independent Living Work Areas

Described below are the descriptive environmental assessment for staff work areas in the independent living setting at each of the sites. Although primary work areas may differ, the general characteristics of each of the work spaces are described and discussed as part of the total work environment at each location.

Site 1. Staff work areas in independent living at Site 1 varied in size from 160 square feet of floor space to 365 square feet of floor space (see Figures 4.64 and 4.65). Types of work areas varied slightly, but most areas were associated with the administrative services of the building. Of the areas assessed, four had no access to day

lighting in their primary work environment (see Figure 4.66). Those who did have access to day lighting varied in the amount of exterior window space from 25 to 77 square feet of exposure to the outside. These windows were treated with horizontal mini-blinds (see Figure 4.67). The number of light fixtures in work areas ranged from 2 to 6. Most spaces were gypsum board construction with a painted finish. Ceilings were either gypsum board with a textured finish or white, 2'-0" x 4'-0" acoustical panel. All but one work space assessed had carpeting on the floor (see Figure 4.68). All carpeting in the administrative areas was a low, level loop in a teal-green color with a multicolor yarn throughout. Spaces were furnished with 8 to 14 pieces of furniture or equipment. Only one staff surveyed could control the temperature in their primary work space. Temperatures in the spaces (measured during the month of August) ranged from 70 -80 degrees Fahrenheit.

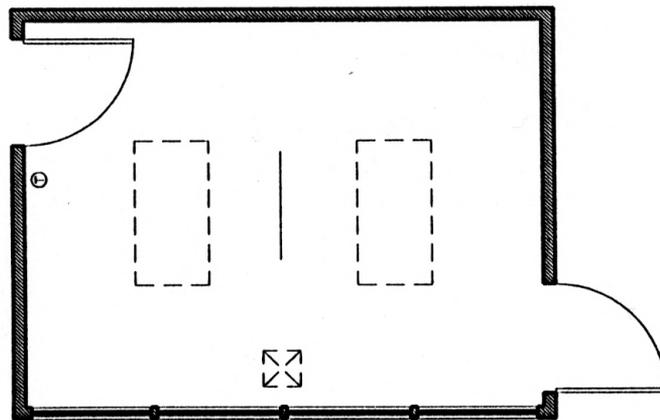


Figure 4.64. Plan of Independent Living Work Area - Site 1.

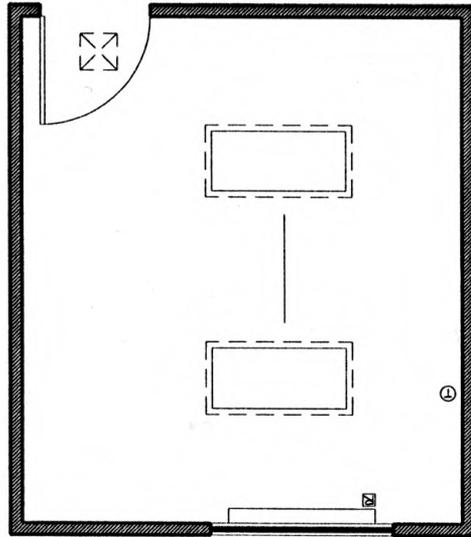


Figure 4.65. Plan of Independent Living Work Area - Site 1.

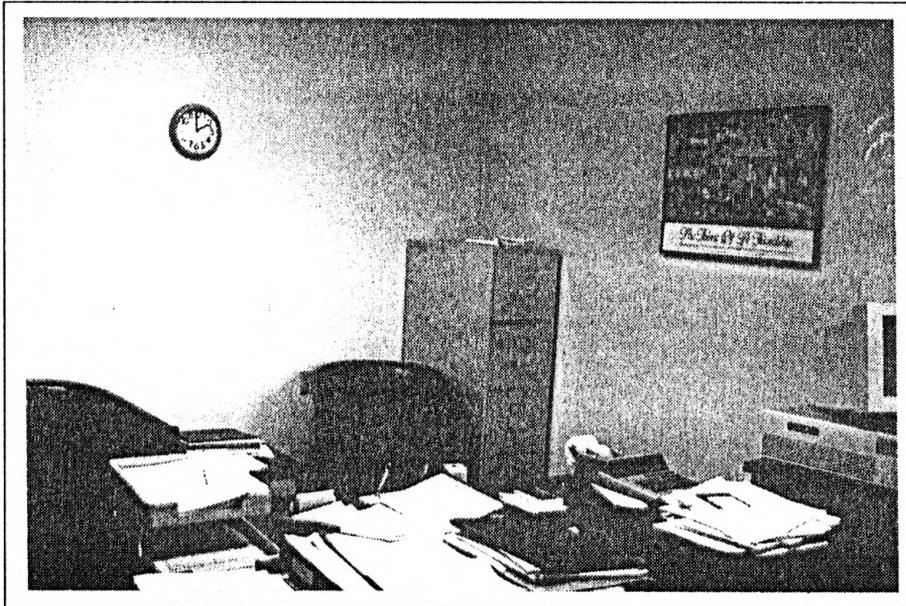


Figure 4.66. Independent Living Work Area - Site 1.

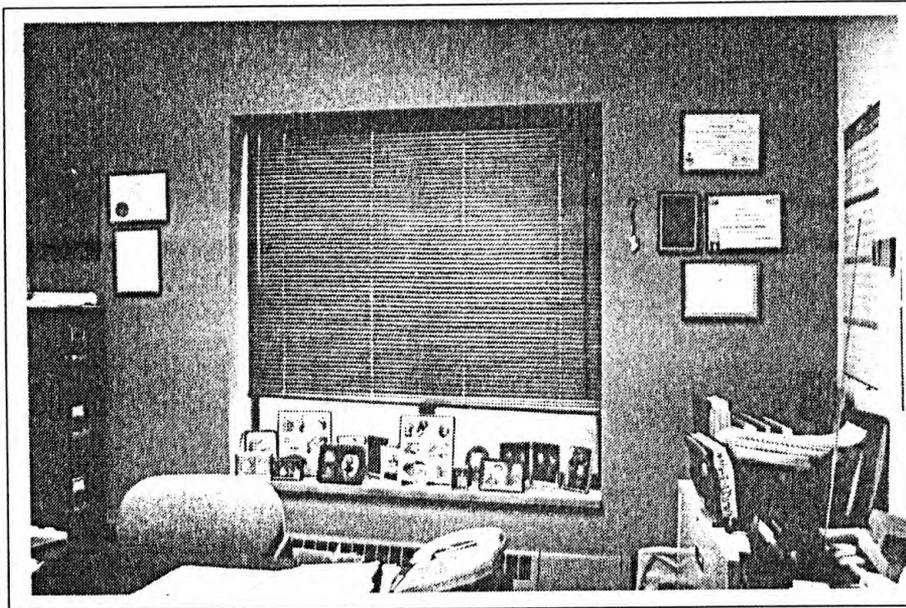


Figure 4.67. Independent Living Work Area - Site 1.

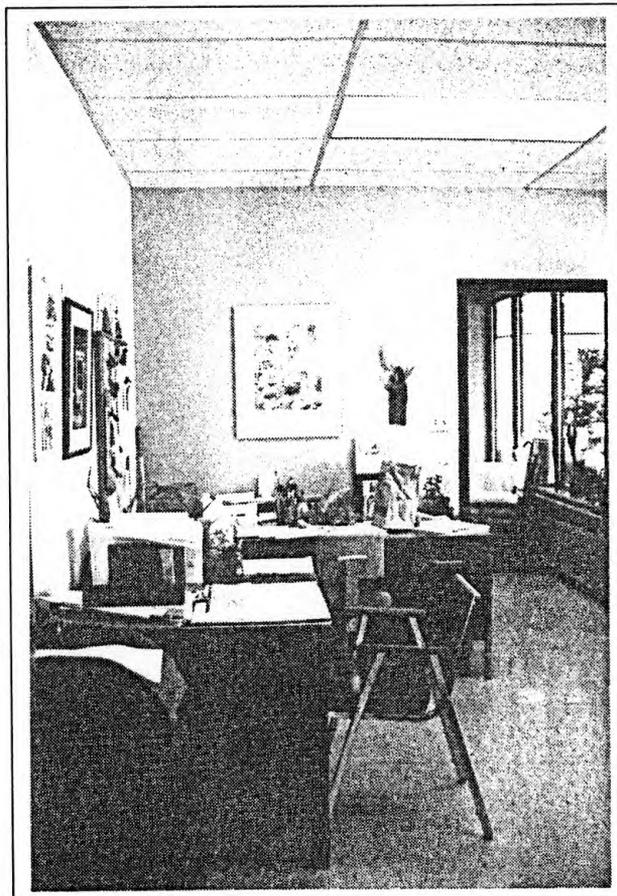


Figure 4.68. Independent Living Work Area - Site 1.

Site 3: Staff work areas in independent living ranged in size from 110 to 340 square feet of floor space (see Figures 4.69 and 4.70). Areas assessed included administrative areas and the kitchen area. Only one area assessed in independent living had no access to day lighting. Other spaces had approximately 32 square feet of exterior exposure to the outdoors. Some of these windows were treated with blinds or shades, but the windows in the kitchen area were not covered with any type of window treatment. The number of light fixtures varied from space to space, but in general, office areas had between 4 to 8 fixtures, and the kitchen was lighted by 25 fluorescent light fixtures (see Figures 4.71 and 4.72). Wall construction in the administrative areas was gypsum board with a smooth painted finish. The kitchen area was painted concrete block. Floor covering in the administrative areas was a low, level loop carpet in a teal color. Floors in the kitchen were a poured material with a slight texture to reduce the risk of falls due to slick surfaces. Spaces were furnished with 9 to 18 pieces of furniture and equipment (see Figures 4.73 and 4.74). The kitchen had several pieces of large equipment necessary for large meal preparation and clean up. Over half of the staff who were surveyed said they could control the temperature in their work area. Temperatures (measured during the month of October) ranged from 67 to 77 degrees Fahrenheit.

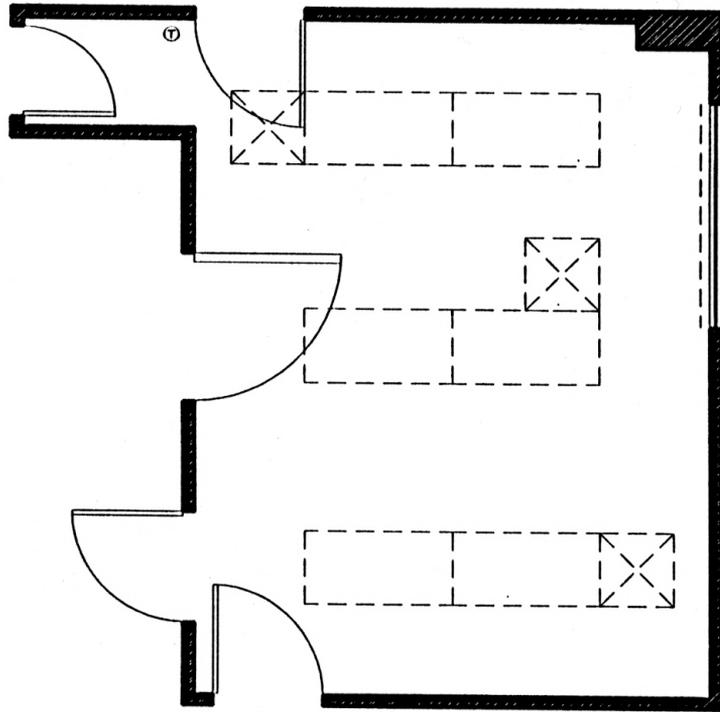


Figure 4.69. Plan of Independent Living Work Area - Site 3.

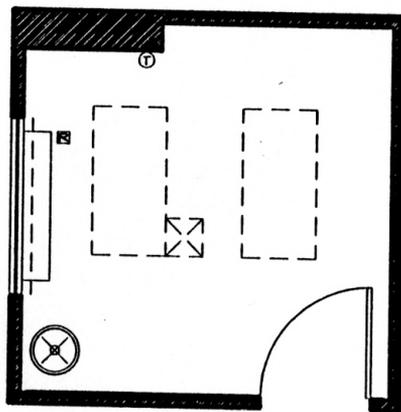


Figure 4.70. Plan of Independent Living Work Area - Site 3.

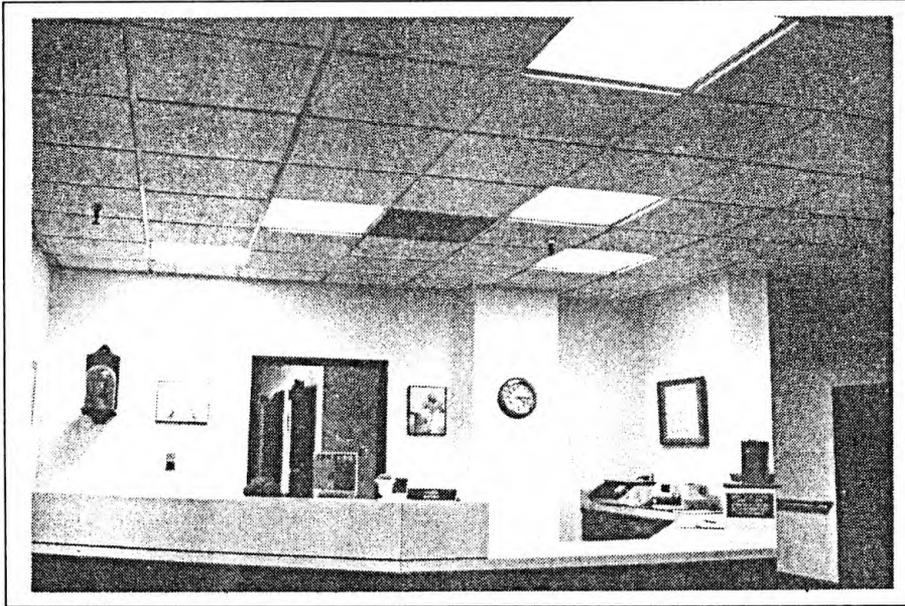


Figure 4.71. Independent Living Work Area - Site 3.

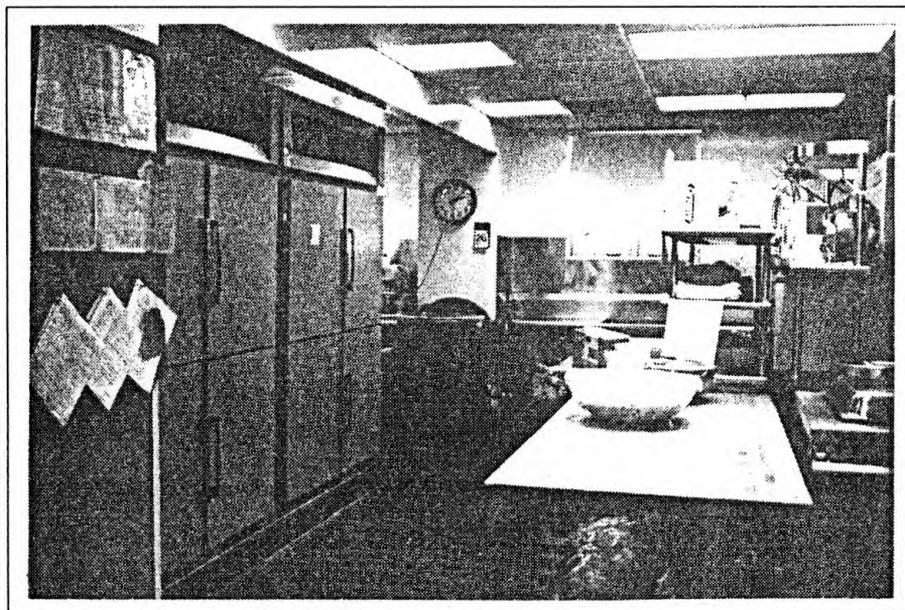


Figure 4.72. Independent Living Work Area - Site 3.



Figure 4.73. Independent Living Work Area - Site 3.

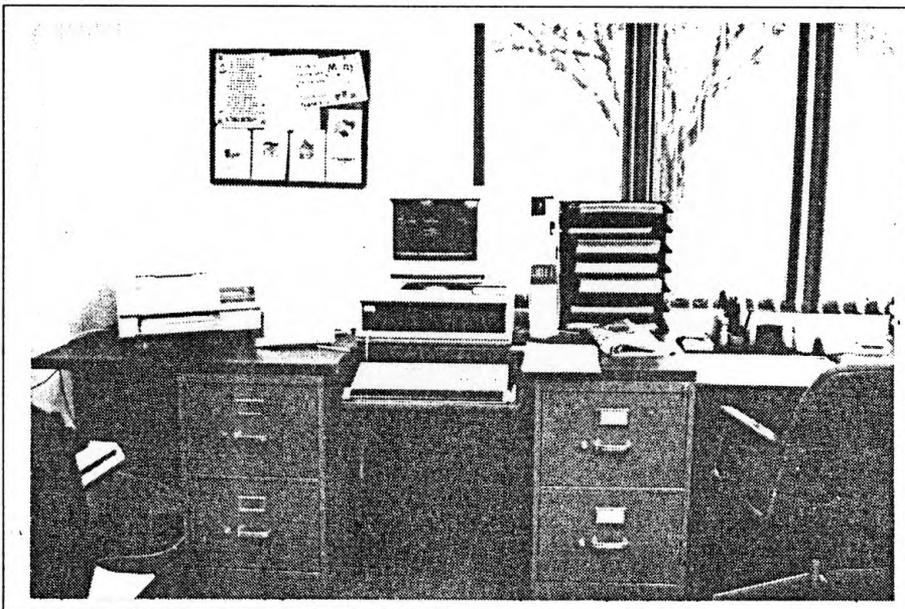


Figure 4.74. Independent Living Work Area - Site 3.

Summary of Satisfaction Ratings for Independent Living - Work Areas

Described below are a summary of independent living work areas as rated by staff at Sites 1 and 3. Ratings are described and discussed in reference to the Descriptive Environmental Assessments of these spaces. Although staff work area vary in characteristics, ratings are discussed based on characteristics that were similar between staff work areas. For a complete, detailed summary of rating, see Table 4.14.

Lighting Features. Most staff who had access to day lighting in their primary work space were satisfied with the amount of sunlight the windows provided. Staff without access to sunlight found this feature to be most undesirable. Some problems with brightness from sunlight did occur, however, in spaces without window treatments to control the amount of sunlight coming through the windows. Some staff who frequently worked with computer monitors noted problems associated with glare on their video screens. The brightness from the sun, when not control, was sometimes a distraction or interfered with staff duties. Almost all staff surveyed felt they had plenty of artificial light in their work space. Shadows were not noted as a problematic features, and since most floors were carpeted, light reflecting off of the floor was rarely a problem. Even the textured finish on the floor in the kitchen area at Site 1 eliminated the problems of reflection on this surface.

Thermal Comfort Features. Staff who could control the temperature in their work space were more likely to be satisfied with the temperature. Staff were satisfied overall with humidity levels during both warmer and cooler months, but more staff did note the humidity level was slightly too dry during cooler seasons. Over half of the staff at each facility rated the amount of air movement in their work space as not quite enough. Drafts were not a problem for most staff, but location of work area may have resulted in some staff rating the presence of unwanted drafts higher.

Acoustical Features. Unwanted sounds from outside the building were rated as rarely to occasionally present by staff at Site 1 and as occasionally present by staff at Site 3. Unwanted sounds from other rooms was rated more frequent than sounds from outside the building at both locations. Most staff felt unwanted sounds from other rooms were occasionally to frequently present in their primary work areas. The sound level in most areas was rated to be just right, and most staff felt echoes were never or rarely present in their space.

Olfactory Features. Staff at the two locations varied on their perceptions of odors. Staff at Site 1 rated odors as rarely present, staff at Site 3 rated odors as frequently present. Odors identified by staff at Site 3 included food smells, exhaust from the fans through the air exchange, and smells from the beauty shop down the hallway. Staff in the kitchen also noted smells from the garbage disposal and waste food. The occurrence of pleasant smells was rated higher than odors at both locations. Smells, staff identified in

their work spaces were usually associated with food smells from the kitchen area or smells from fresh flowers or air-fresheners. Smoking was not allowed in most spaces, so the presence of tobacco smoke was rarely detected or bothersome.

Physical Space Features. Several staff at both sites noted a lack of privacy in their primary work areas. Dissatisfaction with the amount of privacy could be due to the open configuration of the work space or the location of the space in the building layout. The amount of furniture in the work space was rated as too much by many staff also. This would indicate the amount of space staff have to work in may not be adequately spacious to accommodate the amount of furniture and equipment that must also occupy the space. Crowding in the work space was rated as occasional by most staff. This, again, may be an indication of requirements for more square footage per employee.

Overall Satisfaction. Staff at both sites rated their work spaces slightly below satisfactory, overall. Out of the three spaces evaluated, most staff spent the greatest amount of their work day in this space. Only one staff at Site three spent more time elsewhere. This respondent's job, however, was maintenance, and more time was spent in the hallways of independent living.

Table 4.14. Summary of Satisfaction Ratings for Independent Living Work Areas.

INDEPENDENT LIVING WORK AREAS SITE 1 and SITE 3	STAFF - SITE 1				STAFF - SITE 3			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	10	2.6	3	1-5	9	2.4	3	1-5
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	7	3.4	4	1-5	9	2.4	1/3	1-4
How often in the amount of sunlight that comes from the windows in this room distracting?	7	2.4	3	1-4	9	2.4	1	1-4
How often does bright sunlight from the windows interfere with activities?	7	2.3	3	1-4	9	2.3	1	1-5
How much artificial lighting from light fixtures is present in this room?	10	3.1	3	2-5	9	2.9	3	1-4
How often are shadows present in this room?	10	1.9	2	1-3	9	2	2	1-3
How often is the light that reflects off of the floor in this room distracting?	10	1.3	1	1-2	9	1.2	1	1-2
How often does the light that reflects off of the floor interfere with activities?	10	1.2	1	1-2	9	1.3	1	1-4
Can you control the temperature in this room					9			
How comfortable is the temperature in this room to you?	10	3.1	4	1-5	9	3	3	1-5
During warmer months how would you describe the amount of humidity in this room?	10	3.3	3	1-5	9	3.6	3	3-5
During cooler months how would you describe the amount of humidity in this room?	10	2.4	3	1-4	9	2.6	3	1-4
How would you describe the amount of air movement in this room?	10	2.3	3	1-4	9	2.2	3	1-3
How often are there unwanted drafts in this room?	10	2.3	1/2	1-4	9	2.6	2/4	1-4
How often can unwanted sounds from outside the building be heard in this room?	10	2.2	2/3	1-3	9	2.6	3	1-4
How often can unwanted sounds from other rooms be heard in this room?	10	3.4	3	3-5	9	2.9	3/4	1-4
How would you describe the sound level in this room?	9	3.2	3	3-4	9	3.4	3	3-4
How often does sound echo in this room?	9	2.1	2	1-4		2	2	1-4
How often are odors present in this room?	10	2.3	2	1-4	9	3.1	4	1-5
How often are pleasant smells present in this room?	9	2.7	3	1-4	9	3.7	3/4	3-5
How often is tobacco smoke present in this room?	10	1.5	1	1-4	9	1.4	1	1-3
If present, how often are you bothered by tobacco smoke in this room?	6	1.5	1	1-4	6	1.5	1/2	1-2
How would you describe the amount of privacy in this room?	8	2	1/3	1-3	9	1.9	2	1-3
How would you describe the amount of furniture in this room?	10	3.6	3	3-4	7	2.9	3	1-4
How often does this room seem crowded with people to you?	10	3.3	3	2-5	8	2.5	2/3	1-4
How would you rate the overall quality of this room?	10	2.7	2/3	2-4	9	2.8	3	2-3
Rank the 3 rooms in the order where you spend the most time?	10	1.2	1	1-3	9	1	1	1

Descriptive Environmental Assessment of Assisted Living Work Areas

Site 1. Most spaces assessed in assisted living at Site 1 were office area or spaces for nurses and nurses aides. These spaces ranged in area from 65 square feet to 243 square feet (see Figures 4.75 and 4.76). Some larger spaces were also assessed such as kitchen areas and the laundry room. These spaces had in excess of 500 square feet of floor area. Four of the work areas assessed had no access to sunlight (see Figures 4.77). Other spaces with access to day lighting varied from 77 to 144 square feet of exterior exposure or had indirect access to day lighting through open public spaces. Most exterior windows were finished with horizontal mini-blinds to control day lighting (see Figure 4.78). Interior walls were predominantly gypsum board construction with a painted finish. Service areas such as kitchen and laundry spaces had concrete block walls. Other finishes included 2'-0" x 4'-0" acoustical panel ceilings and carpeted floors in offices and nursing areas (see Figure 4.79). Service areas have vinyl floors or some other type of smooth surface. The number of light fixtures in work spaces varied from 1 to 18. Lighting was typically 2'-0" x 4'-0" fluorescent fixtures recessed into the ceiling grid. Heating and cooling was typically dispersed from the ceiling. Most staff reported they were unable to control the temperature in their work space. Temperatures (measured during the month of August) ranged from 74 - 80 degrees Fahrenheit. The number of pieces of furniture in the spaces ranged from 8 to 21.

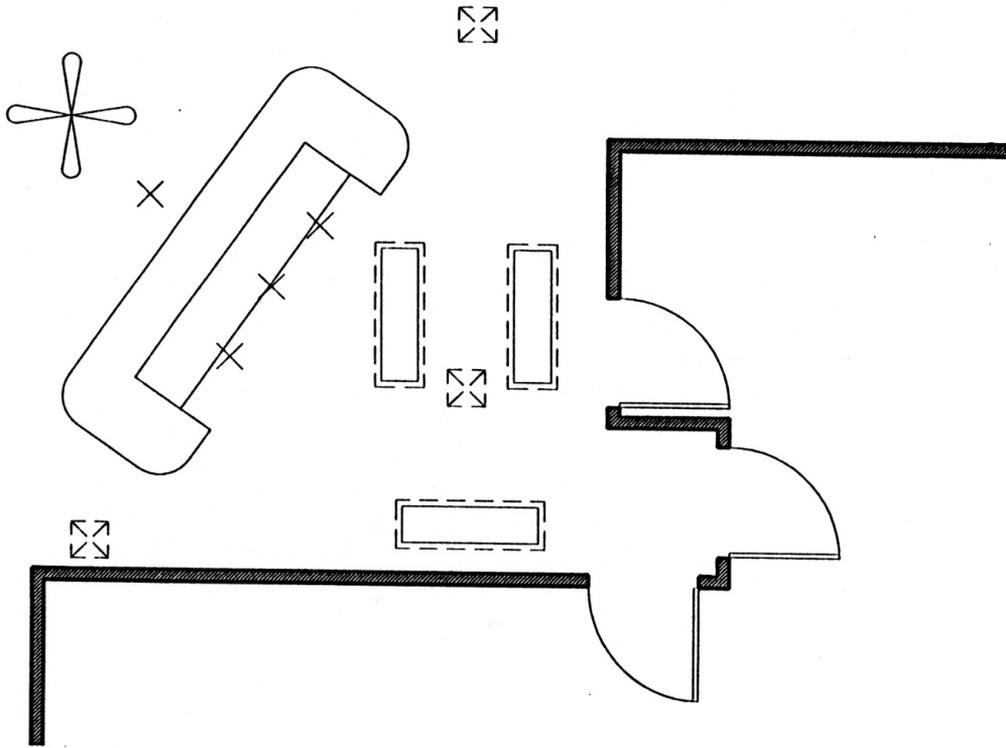


Figure 4.75. Plan of Assisted Living Work Area - Site 1.

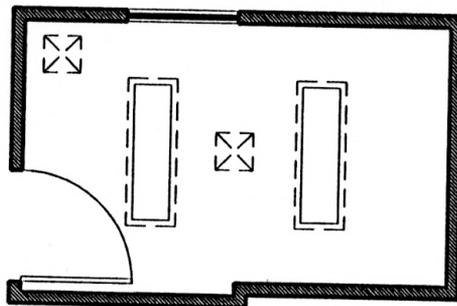


Figure 4.76. Plan of Assisted Living Work Area - Site 1.

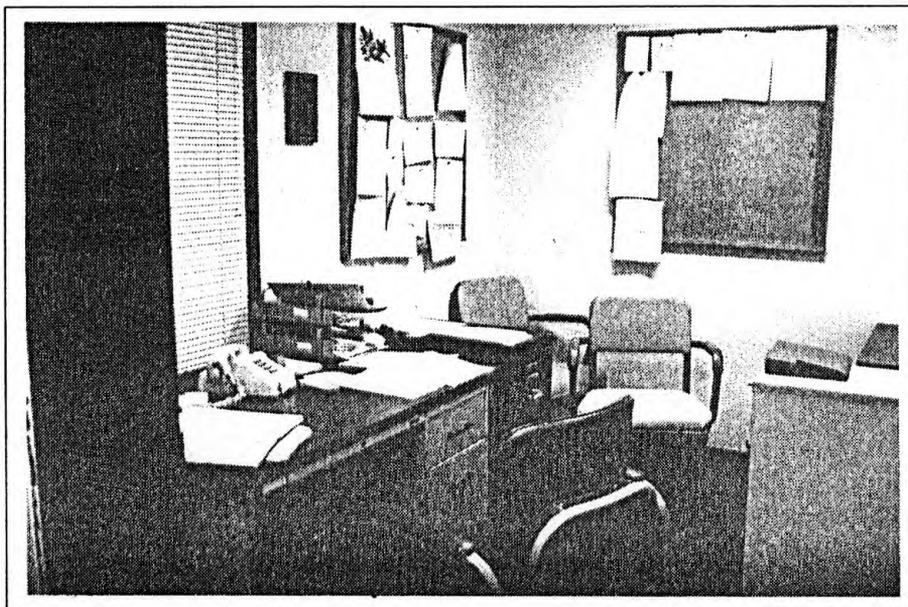


Figure 4.77. Assisted Living Work Area - Site 1.

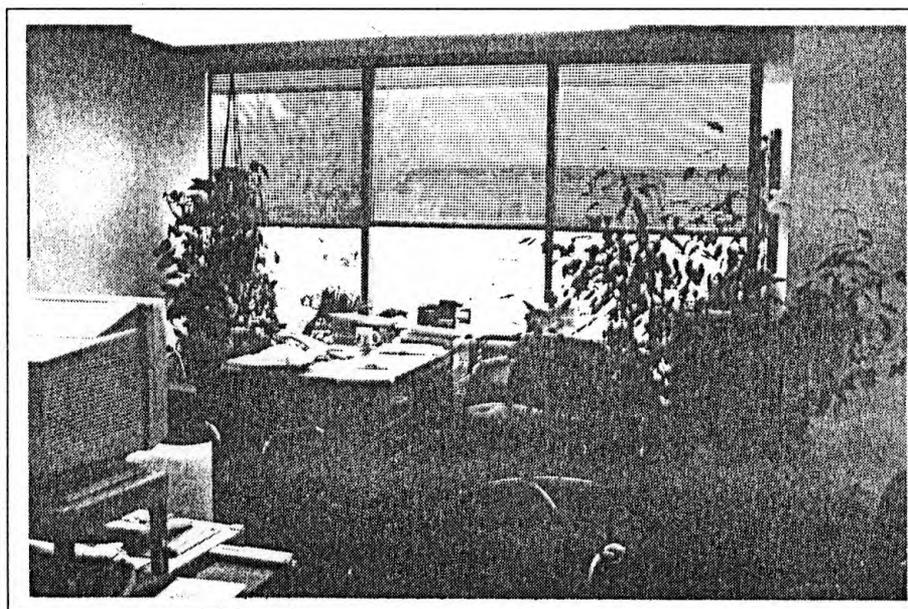


Figure 4.78. Assisted Living Work Area - Site 1.

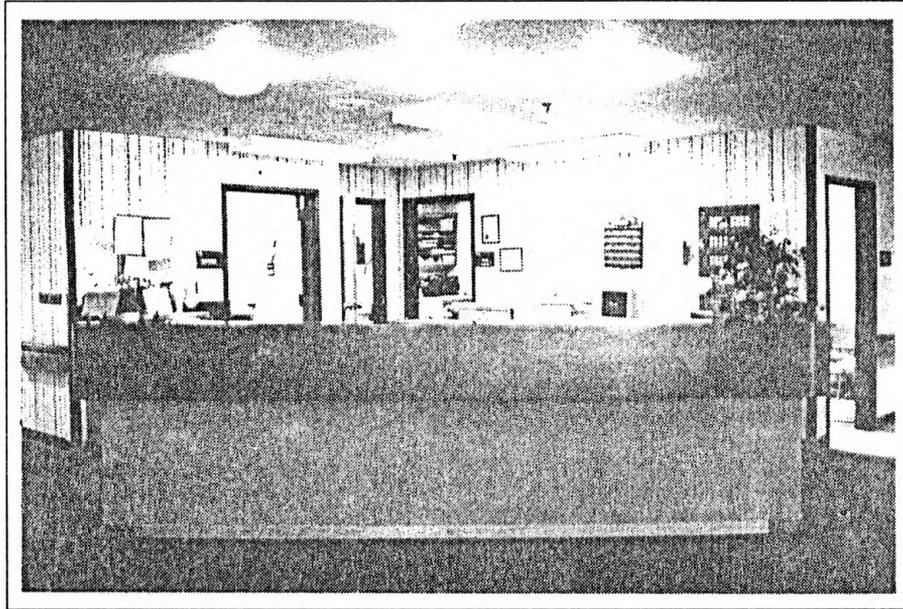


Figure 4.79. Assisted Living Work Area - Site 1.

Summary of Satisfaction Rating for Assisted Living Work Areas

Described below are a summary of satisfaction rating for work areas in assisted living at Site 1 as established by staff at that location. Ratings are described and discussed in reference to the Descriptive Environmental Assessment of these spaces. Even though spaces vary in their characteristics, ratings and features that show similarities in perceptions are discussed. For a complete, detail summary of ratings, see Table 4.15.

Lighting Features. Staff would did not have access to sunlight rated this as an undesirable feature of their work space. Staff who had access to day lighting, were, in general, satisfied with the amount of sunlight. Windows that did not have window treatments to control sun lighting, however, were noted to create problems with glare.

This occasionally interfered with activities in the work space. The amount of artificial lighting in the space was rated to be just the right amount in most spaces. Shadows were rarely a problem for staff, and due the large amount of spaces with carpeting, reflection of light off of the floors was also rarely an issue for staff.

Thermal Comfort Feature. Staff who could not control the temperature in their work environment were more likely to rate the temperature as unsatisfactory. Most staff consistently rated their work spaces to be too warm. Humidity levels were rated by most to be slightly too moist during warmer months, but were rated closer to just the right amount during cooler seasons. The amount of air movement in the work spaces was rated as not quite enough by most staff, but problems associated with drafts were rarely present.

Acoustical Features. Unwanted sounds from outside the building or from other rooms were never or rarely present in staff work areas of assisted living. The sound level was also rated to be just right by most and echoes were never or rarely a problem.

Olfactory Features. Odors were rated as never or rarely present by staff, while the presence of pleasant smells was rated as more frequent. Smell identified were usually smells from the dining room, flowers, or air-fresheners. The facility was non-smoking so tobacco smoke was rarely detected or bothersome to staff.

Physical Space Features. Most staff felt their work space had a satisfactory amount of privacy, some, however, rated privacy as too low. Lack of privacy may be due to open configuration of work space or location of work space in the building layout. The amount of furniture in the work space was rated as too much furniture for the space by half of the residents who responded. Staff also noted their work spaces were occasionally crowded with people. These ratings suggest there may be a need to plan for more space to accommodate staff work requirements.

Overall Satisfaction. Staff rated their work space to be satisfactory, overall. Of the three spaces evaluated, staff spent the majority of their time in their primary work areas.

Table 4.15. Summary of Satisfaction Ratings for Assisted Living Work Areas.

ASSISTED LIVING WORK AREAS SITE I	STAFF - SITE I			
	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	9	2	1/3	1-3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	9	2	1	1-4
How often in the amount of sunlight that comes from the windows in this room distracting?	9	1.3	1	1-3
How often does bright sunlight from the windows interfere with activities?	9	1.2	1	1-3
How much artificial lighting from light fixtures is present in this room?	9	3	3	1-4
How often are shadows present in this room?	9	1.7	1	1-4
How often is the light that reflects off of the floor in this room distracting?	9	1.2	1	1-3
How often does the light that reflects off of the floor interfere with activities?	9	1.2	1	1-3
Can you control the temperature in this room				
How comfortable is the temperature in this room to you?	9	4.1	4	3-5
During warmer months how would you describe the amount of humidity in this room?	9	3.3	4	1-4
During cooler months how would you describe the amount of humidity in this room?	9	2.6	3	1-5
How would you describe the amount of air movement in this room?	9	2.1	1	1-4
How often are there unwanted drafts in this room?		1.8	1	1-3
How often can unwanted sounds from outside the building be heard in this room?	9	1.8	1	1-3
How often can unwanted sounds from other rooms be heard in this room?	9	1.8	1	1-3
How would you describe the sound level in this room?	9	3.1	3	3-4
How often does sound echo in this room?	9	1.2	1	1-2
How often are odors present in this room?	9	2.1	1/2	1-4
How often are pleasant smells present in this room?	9	2.3	2/3	1-4
How often is tobacco smoke present in this room?	9	1.6	1	1-4
If present, how often are you bothered by tobacco smoke in this room?	7	1.4	1	1-2
How would you describe the amount of privacy in this room?	9	2.6	3	1-4
How would you describe the amount of furniture in this room?	9	3.4	3	2-5
How often does this room seem crowded with people to you?	9	2.6	3	1-5
How would you rate the overall quality of this room?	9	3.2	3	2-5
Rank the 3 rooms in the order where you spend the most time?	9	1	1	1

Descriptive Environmental Assessment of Skilled Care Work Areas

Site 1. Staff in skilled care at Site 1 work predominantly in administrative or health care services. Spaces assessed were typically office spaces or nursing areas including physical therapy (see Figures 4.80, 4.81, and 4.82). The square footage of work areas in skilled care ranged from 75 to 300 square feet of work space (see Figures 4.83 and 4.84). Larger spaces were usually shared by more than one staff person (see Figure 4.85). Four of the areas assessed had no access to sunlight. Work spaced with natural day lighting ranged in window area from 32 to 80 square feet of exterior exposure (see Figure 4.86). These windows were typically finished with horizontal mini-blinds to control day lighting. Most walls were gypsum board construction with a painted finish. Other wall construction included concrete block that was also painted. Floors in work area varied from a low, level loop carpet to vinyl composition tile. Ceilings were usually 2'-0" x 4'-0" acoustical panel with fluorescent lighting. The number of light fixtures in work spaces ranged from 1 to 7. Heating and cooling was either distributed through the ceiling or through registers located below windows in the private offices. Most staff reported they were unable to control the temperature in their work spaces. Temperatures (measured during the month of August) ranged from 71 to 79 degrees Fahrenheit.

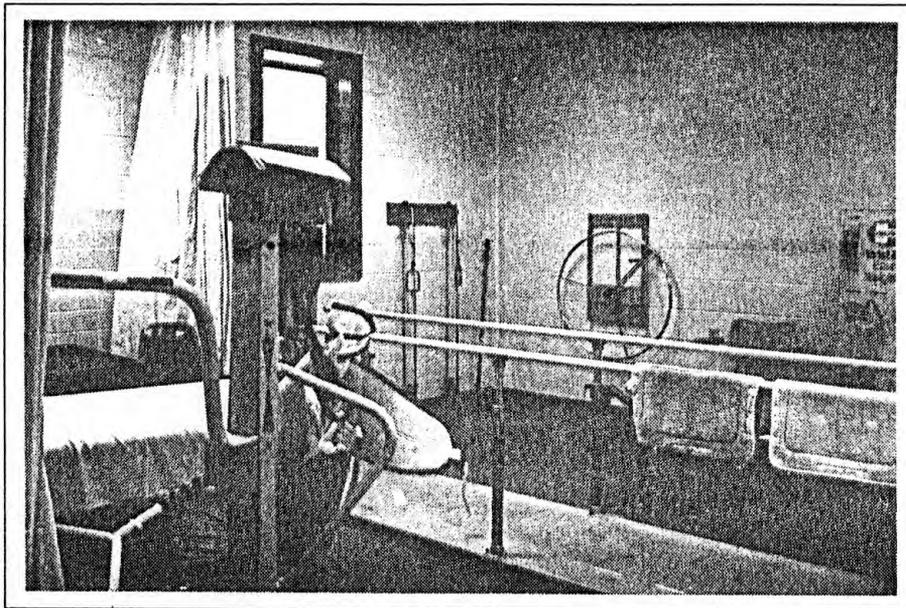


Figure 4.80. Skilled Care Work Area - Site 1.

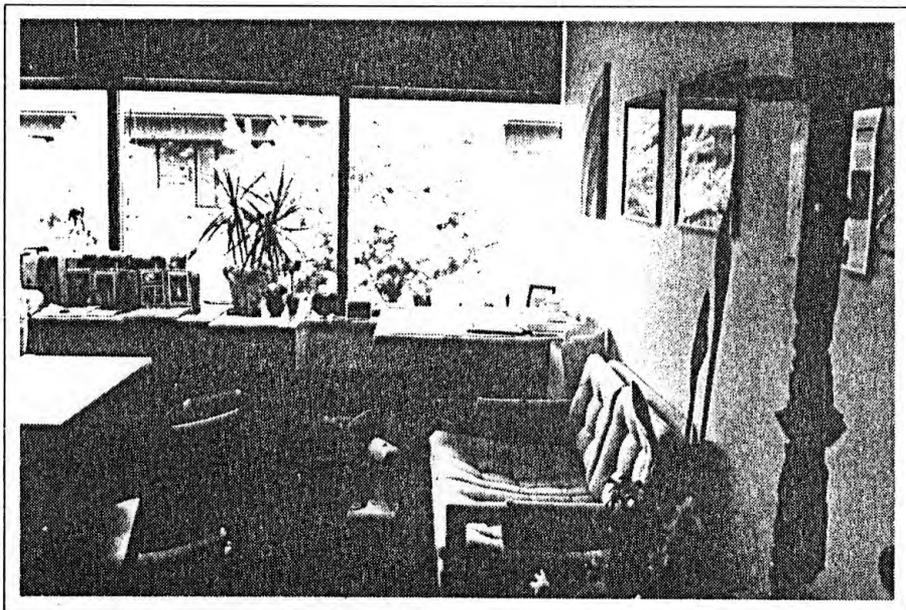


Figure 4.81. Skilled Care Work Area - Site 1.

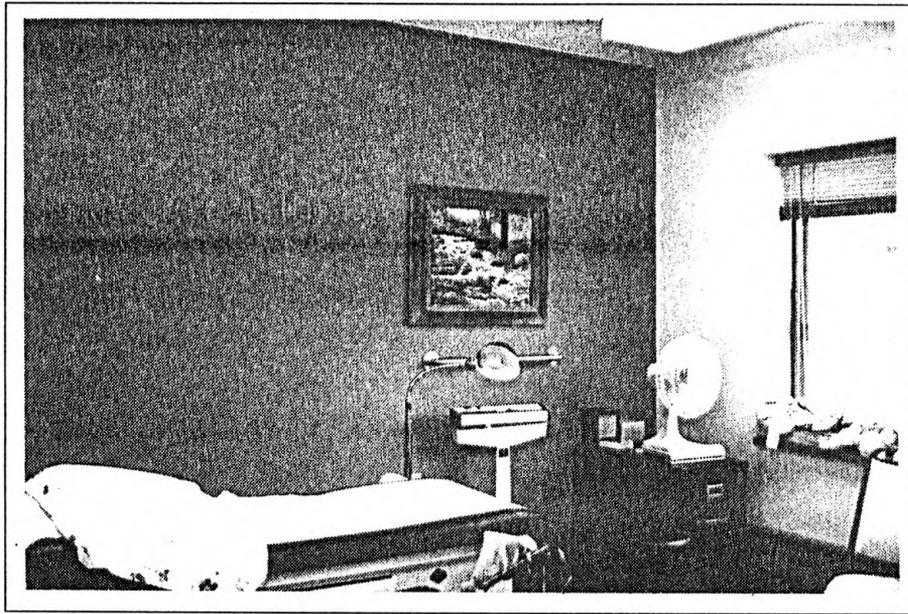


Figure 4.82. Skilled Care Work Area - Site 1.

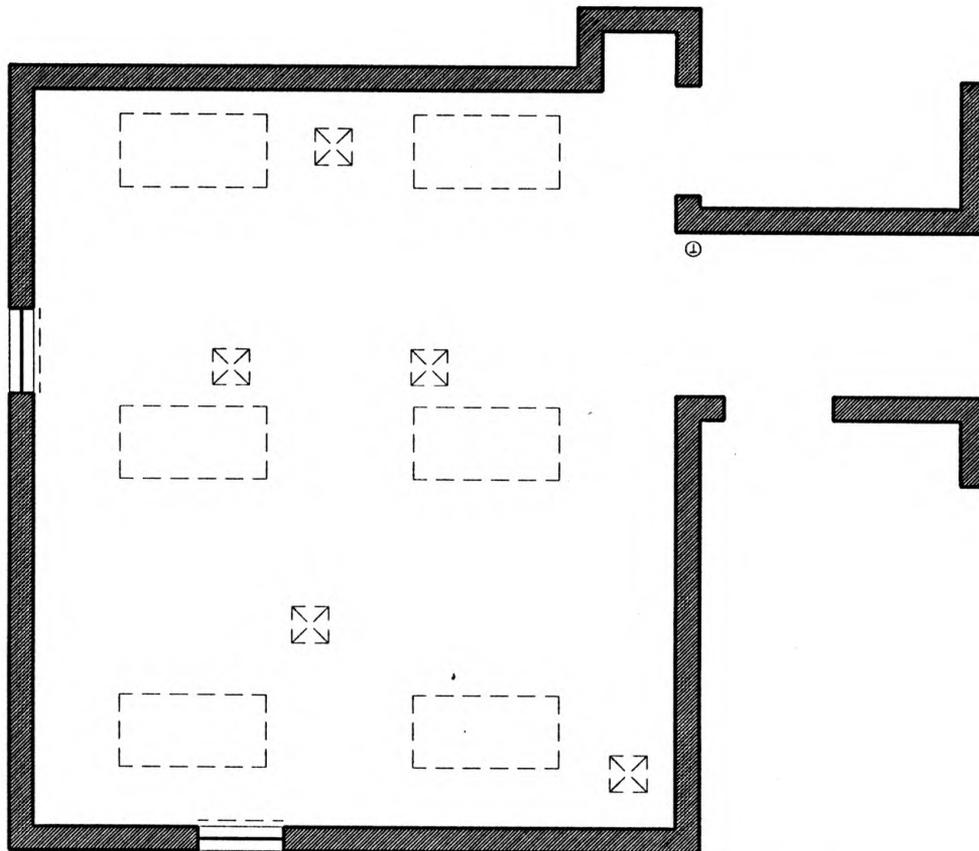


Figure 4.83. Plan of Skilled Care Work Area - Site 1.

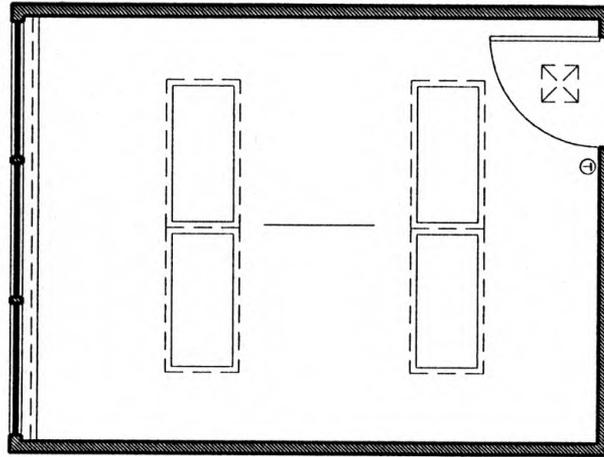


Figure 4.84. Plan of Skilled Care Work Area - Site 1.

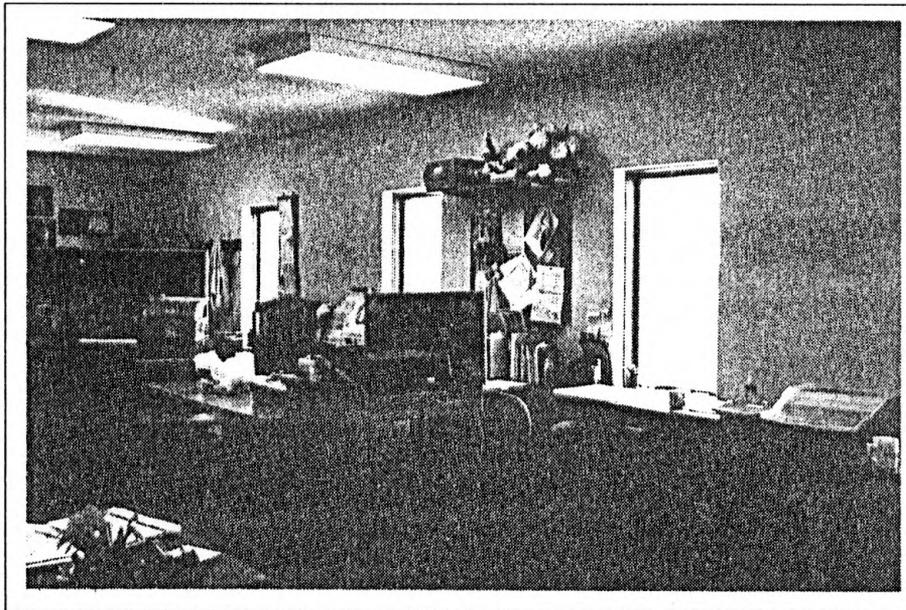


Figure 4.85. Skilled Care Work Area - Site 1.

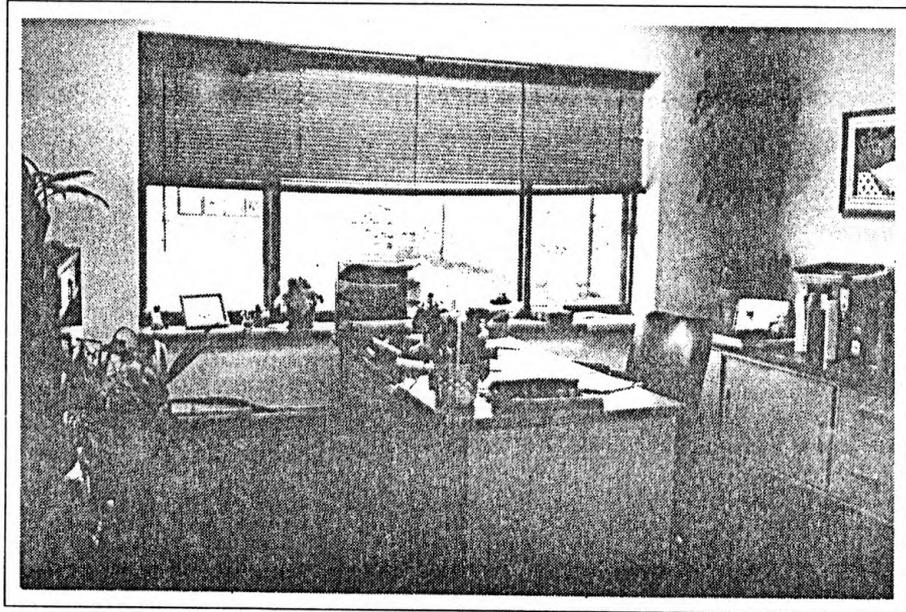


Figure 4.86. Skilled Care Work Area - Site 1.

Site 3. Staff in skilled care at Site 3 also were predominantly administrative staff or nursing staff. In addition to the nurses station, areas assessed were typically office spaces (see Figures 4.87, 4.88, 4.89). Most offices were small and approximate square footage of most work spaces ranged from 105 to 126 square feet (see Figures 4.90, 4.91). Five of the office spaces assessed had no access to sunlight (see Figure 4.92). Office spaces with a window to the outside had approximately 21 square feet of exposure to day lighting (see Figure 4.93). These windows were finished with either horizontal mini-blinds or vertical blinds. The number of artificial light fixtures in a space ranged from 2 to 33 (see Figure 4.94). Lighting in the offices was usually provided by 2'-0" x 4'-0" fluorescent fixtures recessed into the ceiling grid. Ceilings were, thus, typically 2'-0" x 4'-0" acoustical

panel. Other finishes included walls constructed of gypsum board with a smooth painted finish. Floors in most offices were a low, level loop carpet in a teal green with a multi-color yarn throughout. Heating and cooling was distributed either through the ceiling or through registers under the windows in some offices. Most staff reported being able to control the temperature in their work space. The temperature in skilled health care spaces (measured during the month of October) ranged from 68 to 76 degrees Fahrenheit. The number of pieces of furniture varied from 5 to 14.

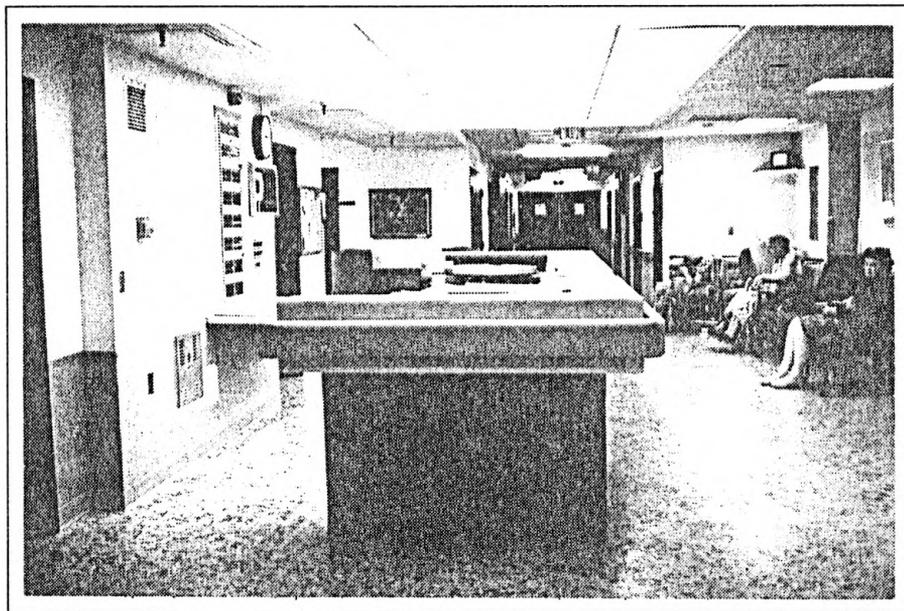


Figure 4.87. Skilled Care Work Area - Site 3.



Figure 4. 88. Skilled Care Work Area - Site 3.

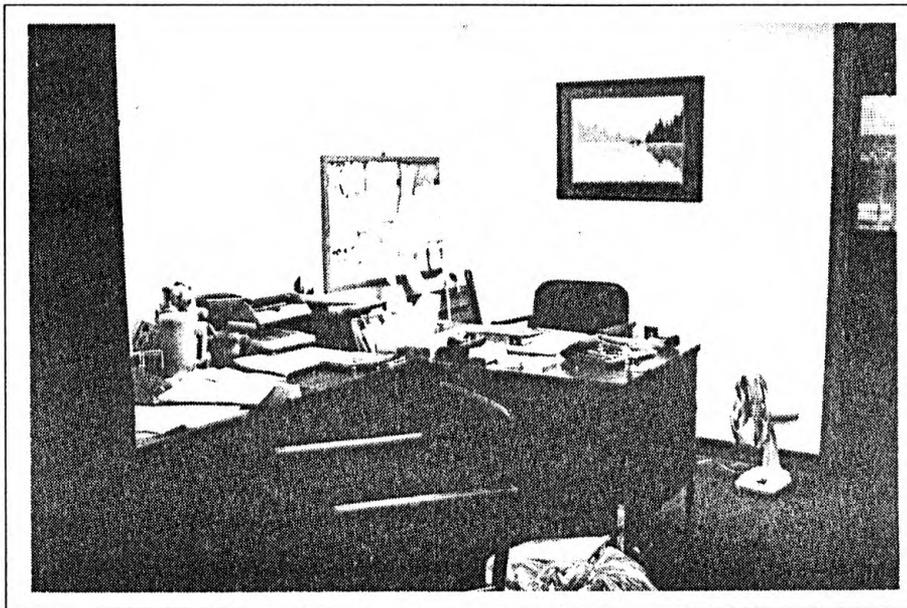


Figure 4.89. Skilled Care Work Area - Site 3.

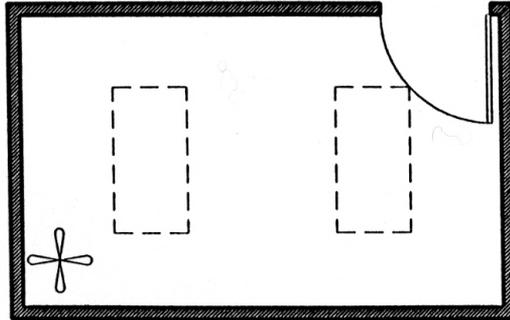


Figure 4.90. Plan of Skilled Care Work Area - Site 3.

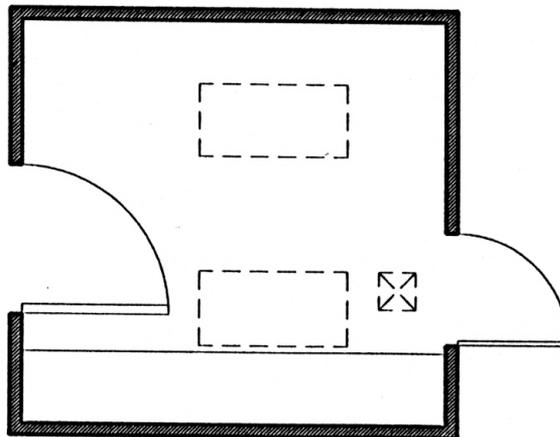


Figure 4.91. Plan of Skilled Care Work Area - Site 3.

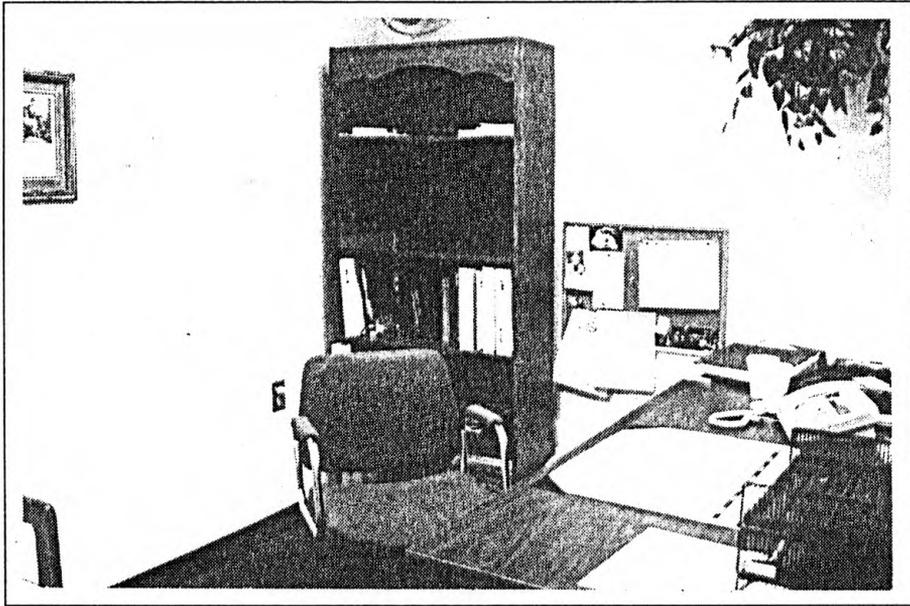


Figure 4.92. Skilled Care Work Area - Site 3.



Figure 4.93. Skilled Care Work Area - Site 3.

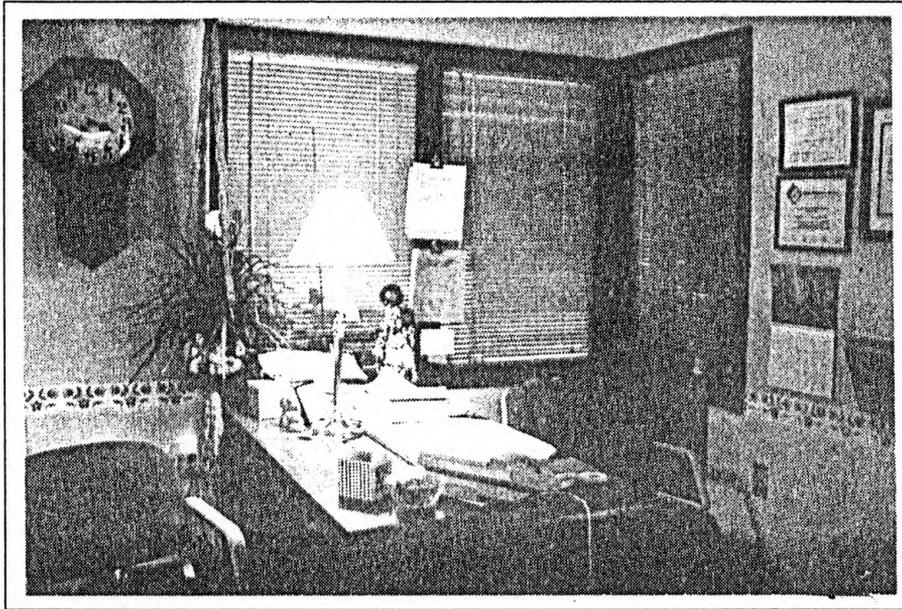


Figure 4.94. Skilled Care Work Area - Site 3.

Summary of Satisfaction Ratings for Skilled Care Work Areas

Described below are a summary of satisfaction ratings for skilled care work areas as established by staff at Site 1 and Site 3. Although individual work areas may vary, ratings are discussed in reference to space the similar features and characteristics as described in the Descriptive Environmental Assessment of these spaces. For a complete, detailed summary of ratings, see Table 4.16.

Lighting Features. Staff whose work area had no access to day lighting, rated the amount of sun lighting in their space to be unsatisfactory. Offices with windows and

window treatments were able to control the amount of brightness from the sun in their work spaces, so this was rarely a problem for most staff. The amount of artificial lighting was rated by most all staff to be satisfactory. Shadows were never or rarely a problem, and due to the frequency of carpeting in offices, light reflecting off of the floor was not an issue for most. Areas with vinyl tile floors, typically had very little day lighting, and the amount of artificial lighting was not enough to be a problem with reflective glare.

Thermal Comfort Features. Staff who could control the heating and cooling in their work environments were more likely to be satisfied with the temperatures. Staff at Site 1 noted high humidity levels in their work space during warmer months and low levels during cooler seasons. Staff at Site 3 felt the humidity was slightly too low during both warmer and cooler months. The amount of air movement was rated as not enough by most staff at both locations. Draft, however, were never or rarely a problem.

Acoustical Features. Unwanted sounds from outside the building were never or rarely present in staff work areas at both sites. Unwanted sounds from other rooms, however, were rated as frequently present. Sounds typically identified were associated with resident noises or mechanical systems. Some staff at Site 3 noted poor wall construction and problems with acoustical privacy in their offices. The sound level in most spaces was rated to be just about right and echoes were never or rarely a problem for most staff.

Olfactory Features. Odors were rated as rarely present by staff at Site 1, while staff at Site 3 felt they were occasionally present. Staff at Site 3 identified smells associated with incontinent residents or food carts in the hallways after meals. The presence of pleasant smells was rated as more frequent than odors by staff at both locations. Smells identified as pleasant were either food at meal times, flowers, or air-fresheners. Both facilities were non-smoking so staff never or rarely detect the presence of tobacco in their work spaces.

Physical Space Feature. Staff rated the amount of privacy in their work spaced to be not quite enough. Problems with acoustical privacy have already been identified, but other causes could be associated with space location or configuration of the space. Staff in skilled care also rated the amount of furniture in their work space to be too much and noted their spaces were occasionally crowded with people. These ratings again suggest that space for staff work areas may not be adequately planned.

Overall Satisfaction. Staff at both sites rated their spaces to be satisfactory overall, and spent the majority of their work day in these locations. One respondent at Site 3, however, disliked the space so much that she spent the least amount of time in this room and took paper work home. This office space had no windows, no air exchange for heating and cooling, and thus no thermostat.

Table 4.16 Summary of Satisfaction Ratings for Skilled Care Work Areas.

SKILLED CARE LIVING WORK AREAS SITE 1 and SITE 3	STAFF - SITE 1				STAFF - SITE 3			
	N	MEAN	MODE	RANGE	N	MEAN	MODE	RANGE
How much sunlight is present in this room?	11	2.6	3	1-3	9	1.8	1	1-3
When you look at the windows in this room, how would you describe the amount of brightness from the sun.	11	2.7	3	1-4	9	1.7	1	1-3
How often in the amount of sunlight that comes from the windows in this room distracting?	10	1.8	1/2	1-3	9	2.1	1	1-5
How often does bright sunlight from the windows interfere with activities?	10	1.4	1	1-2	9	1.3	1	1-3
How much artificial lighting from light fixtures is present in this room?	11	3.1	3	2-5	9	3	3	2-4
How often are shadows present in this room?	11	1.7	2	1-3	9	1.8	1/2	1-4
How often is the light that reflects off of the floor in this room distracting?	10	1.2	1	1-2	9	1	1	1
How often does the light that reflects off of the floor interfere with activities?	10	1.1	1	1-2	9	1	1	1
Can you control the temperature in this room								
How comfortable is the temperature in this room to you?	11	4.2	5	2-5	9	3.1	3	2-5
During warmer months how would you describe the amount of humidity in this room?	11	4.1	4/5	3-5	9	2.3	3	1-3
During cooler months how would you describe the amount of humidity in this room?	11	2.7	2/3	1-5	9	2.3	3	1-3
How would you describe the amount of air movement in this room?	11	1.4	1	1-3	9	2.1	1	1-4
How often are there unwanted drafts in this room?	11	1.6	1	1-3	9	2	2	1-4
How often can unwanted sounds from outside the building be heard in this room?	11	1.7	1	1-3	9	2.3	2	1-4
How often can unwanted sounds from other rooms be heard in this room?	11	3.6	4	1-5	9	3.4	4	1-4
How would you describe the sound level in this room?	11	3.6	3	2-5	9	3.3	3/4	2-4
How often does sound echo in this room?	11	2.3	1	1-5	9	1.8	1	1-4
How often are odors present in this room?	11	2	2	1-4	9	2.4	3	1-3
How often are pleasant smells present in this room?	11	2.8	3	1-5	9	2.9	3/4	1-4
How often is tobacco smoke present in this room?	11	1.1	1	1-2	9	1.2	1	1-2
If present, how often are you bothered by tobacco smoke in this room?	10	1.4	1	1-5	8	1.1	1	1-2
How would you describe the amount of privacy in this room?	11	2	1/3	1-3	9	1.9	2	1-3
How would you describe the amount of furniture in this room?	11	3.9	3	3-5	9	3.9	3	3-5
How often does this room seem crowded with people to you?	11	2.7	3	1-5	9	2.9	3	1-5
How would you rate the overall quality of this room?	11	3.2	3	1-5	9	2.7	3	1-5
Rank the 3 rooms in the order where you spend the most time?	11	1	1	1	9	1.2	1	1-3

CHAPTER 5

PLANNING AND DESIGN CONSIDERATIONS

The final objective of this study was to propose links between satisfaction and relative value ratings established by residents and staff and the physical environment of the CCRC setting. Since the data obtained from Site 1 and Site 3 are case studies, results may not be generalized as representative of CCRC settings; however, many of the links proposed are consistent with past research in similar areas such as planned environments for elderly and office work settings. The proposed links between the physical environment and the perceived relative value and satisfaction with features as rated by residents and staff at these facilities are summarized into design considerations for the CCRC environment. These design considerations may provide assistance to designers, administrators, and facility managers, in the planning, programming, and design of CCRC's. Design considerations are based on the features and characteristics of the five indoor environmental dimensions targeted in this study; lighting, heating and cooling, sounds, smells, and the physical space. The dimensions are discussed in the order of importance as rated by residents and staff within each living option at Site 1 and Site 3, beginning with the dimension rated as most valuable to the indoor environment, thermal comfort.

Thermal Comfort Considerations

Both residents and staff within each living option at Site 1 and Site 3 identified heating and cooling as the dimension that was most important in the indoor environment in the CCRC setting, thus, planning and design issues associated with thermal comfort may be an important consideration in the overall satisfaction residents and staff experience in all living options within the CCRC environment.

Design Consideration #1. *Plan heating and cooling systems that provide the maximum amount of control in the residential environment.* Maximum control seems to result in maximum satisfaction for residents, and being able to regulate the temperatures in one's own home may add to the perceptions of a comfortable environment (Rohles, 1989). Residents at Site 1 and Site 3 who could not maintain the desired temperatures in their living spaces were more likely to note dissatisfaction with the thermal comfort. Some residents also noted problems associated with not being able to read the small numbers on the thermostat, therefore, efforts should be made to provide controls that can be easily seen and manipulated.

The need to be able to control the temperature in one's environment does not diminish when a higher level of care is required. Thermal preferences may rise to slightly higher levels for frail older persons. In a planned environments where heating and cooling may be centrally controlled, users may be more susceptible to discomfort associated with temperature. The ability to control the thermal comfort may be even more important for

older residents with a greater sensitivity to temperature, such as some residents in assisted living or skilled care settings.

Design Consideration #2. *Staff should be able to control the temperature in their individual office spaces whenever possible.* Staff who had individual offices or work spaces at Site 1 and Site 3 and could not control the temperature expressed higher dissatisfaction with the thermal environment than staff who could regulate the temperature in their primary work environment. Staff temperature preferences often were different than those of residents within the same setting. Higher levels of activity and different temperature preferences create different perceptions of thermal comfort. If staff can control the temperature in the location where they primarily work, their satisfaction with the work environment may be higher.

Design Consideration # 3. *Air movement in the space should be even and controllable.* Air that is distributed from only one source often creates unwanted drafts. As noted in design consideration 1, older residents may be more susceptible to changes in temperature. Drafts created by uneven air movement can be a source of discomfort for residents who may not be as able to relocate themselves easily. For example, some residents in independent living at Site 1 noted problems with arthritis and said that drafts from registers was sometimes a source of discomfort to their joints. Staff in work settings may desire more air movement. This may result in differing preferences in common spaces. It may, therefore be beneficial to provide opportunities for residents and staff to

regulate the source and the amount of air movement their primary living or work space receives.

Lighting Considerations

Lighting was rated as either second or third in importance to the indoor environment by both residents and staff. Some differences were noted, however, between the features of lighting that residents and staff found most desirable. These differences may be attributable to physiological changes associated with aging and reduced visual acuity. It is also important to note that residents' ratings of lighting features were consistent across the CCRC setting, and design considerations important for one living option should not be disregarded in the others. Likewise for staff, ratings on the features of lighting were shared across settings, and the design considerations should be taken into account at all levels.

Design Consideration #4. *Create options for maximum control of sunlight whenever possible in residential settings.* Residents and staff both rated the dimensions of sunlight as important in the interior environment, but problems associated with glare often were a source of discomfort for residents who were more susceptible to changes in lighting levels. Window treatments that allowed residents to gauge how much sunlight came into the space created a higher level of satisfaction with the lighting environment. At both Site 1 and Site 3, residents enjoyed spaces with natural illumination, but many residents noted that controlling sunlight was a key to satisfaction with the space. Thus,

the amount of exterior window space may not need to be reduced or minimized, but window treatments that provide opportunities for maximizing the amount of control users have of daylighting should be planned for and installed wherever possible.

Design Consideration #5. *Provide access to natural illumination in office spaces and work areas to accommodate the types of visual tasks an employee will be doing.* Staff in the CCRC settings rated sunlight as the most important feature of the dimension of lighting, unlike residents who rated artificial lighting as the most important feature. Staff at both Site 1 and Site 3 who worked in spaces without windows, such as offices that had been converted from storage rooms or janitors closets, were less satisfied with the lighting characteristics of their work environments than staff who had at least some access to day lighting in their work space, even if it was indirect. Similar to findings in traditional office environments, these rating and perceptions suggest that access to sunlight in the workplace is an important indoor environmental feature for staff in the CCRC setting .

Design Consideration #6. *Reduce the amount of reflected glare in an area by using surfaces and finishes that have a matte or textured finish.* Light reflecting off of hard, smooth vinyl tile can create distractions or interference with activities or mobility for residents in the CCRC setting. Residents did not report problems with reflective glare in interior spaces at Site 1 and Site 3 with carpeting on the floor. Residents and staff at both sites were more likely to note problems with reflective glare in large spaces such as dining

rooms and hallways where hard smooth surfaces like vinyl composition tile or terrazzo had been installed. Although there are often concerns in health care settings about cleaning and housekeeping, other types of non-glare materials are becoming available for use in such facilities. In addition to reducing glare, soft surfaces can also minimize other problems such as reducing injury due to falls and improving the acoustical properties of a space. Given the recent developments of alternative flooring materials, it is important that designers explore other types of flooring materials available that are easy to clean but do not have a shiny finish for areas where spills or incontinence may be a problem.

Design Consideration #7. *Provide multiple sources or opportunities for artificial lighting in the residential environment of the CCRC settings.* Residents in all level of the CCRC settings rated artificial lighting as the most important feature of the lighting environment. Many residents noted, however, that they desired more lighting than was currently available in their living spaces. Most residents at Site 1 rated artificial lighting in their apartments to be satisfactory, but residents at Site 3 felt there could be more artificial lighting. Opportunities for lighting and the number of lighting fixtures were greater at Site 1. Residents at Site 3 felt lighting had been ignored in the original design of their apartments. By providing multiple outlets for lamps and multiple sources of overhead lighting, residents can control the amount of lighting in the space to suit their individual needs.

Lighting consideration should also be addressed in higher levels of care. Residents in assisted living and skilled care may have increased needs for additional artificial lighting

in their environments. The total number of light fixtures in these settings at Site 1 and Site 3, however, was considerably less than for settings in independent living. When planning lighting for these living options, spaces should maximize the opportunities to add additional lighting for residents who may desire more illumination in their living spaces. Non-breakable lamps are available as alternatives for skilled care and contribute to a residential character as well as enhancing lighting levels and choices.

Design Consideration # 8. *Provide appropriate lighting in work settings to accommodate the types of visual tasks an employee will doing.* Like the traditional office environment, lighting in the CCRC settings should be designed for the specifics of the tasks that are performed. Staff who worked with computer monitors noted frequent problems with glare from standard fluorescent overhead lights. Lighting options or control should be carefully explored for these types of settings as needed.

Physical Space Considerations

The dimension of physical space was also rated second or third by both residents and staff across the CCRC setting. Physical space can involve various parts of the indoor environment including the number of people in the space and perceptions of crowding, the amount of furnishings in the space, and the ability to have the desired amount of privacy. The physical space in the CCRC setting provides two distinctive roles. One is the role of the home environment, the other is a work place. Characteristics and perceptions of space were different , therefore, between residents and staff at each site.

Design Consideration # 9. *Provide maximum amount of wall space possible in independent living apartments for residents who may have traditionally large pieces of furniture.* Residents who move to CCRCs often are moving from larger home environments and have large pieces of furniture. Many residents at Site 1 and Site 3 had traditional pieces of furniture such as china cabinets and buffets in their apartments. The overall amount of living space was slightly larger at Site 3 than at Site 1, and more residents at Site 1 noted a desire to have more space for furniture. Some residents also noted that storage accommodations were minimal, and more space for storing items was desirable. While it is recognized that all personal belongings from a single family home will not fit into an apartment, spaces that provide substantial wall space will be easier to arrange in planning what to bring to one's new home.

Design Consideration #10. *Provide adequate floor space in resident rooms for residents in higher levels of care to bring in personal furniture.* Typically, as the level of care increases, the amount of personal living space decreases. Some residents in assisted living and skilled care settings reside in CCRCs for extended periods of time and would desire to have some personal items in their "home" environments. The rooms for residents in higher levels of care often are based on the typical "hospital room" design, however, and do not accommodate the residential mission of the CCRC. Some residents in skilled health care at Site 1 and Site 3 noted dissatisfaction with the amount of personal living space available to them in their room for their own furniture. Rooms that are

planned and designed to allow a resident to bring in personal items without overly crowding the space will probably be more home like and increase resident satisfaction.

Design Consideration #11. *Provide enough space in residential areas for residents using wheelchairs to access storage and temperature controls.* Many residents in different settings of the CCRC use wheelchairs, yet are quite mobile. Spaces that restrict access to clothing or temperature controls may reduce the control and satisfaction residents have with the physical environment. At Site 1, closets for clothes storage and a desk had been added to each room. This unit was placed adjacent to the bed with enough room for one person to walk between them. The doors to the closet could not be opened, however, if a person in a wheelchair wanted to access the closet. Similar problems occurred in accessing temperature controls located in the register, if the register was located next to a bed. If clothing storage is to be built-in in skilled care and assisted living residential rooms, enough space should be allowed for a resident in a wheelchair to get between the bed and the closet to access clothing and into other spaces where access is normally desirable.

Design Consideration #12. *Plan appropriate spaces in higher levels of care, such as assisted living, where residents who have hobbies can go and enjoy their favorite past-times.* Many residents in assisted living and some in skilled care are very capable of independent creative activity. Several residents in assisted living at Site 1 were very active and continued to engage in past hobbies such as wood carving, cross stitch,

and painting. Their single rooms were very crowded, however, and did not provide enough space to complete projects with supplies necessary to create their crafts. Many residents at Site 1 expressed the desire to have a craft room (like the one in independent living) where they could go, spread out their things, and not worry about getting the nice floor messy. Although assisted living provides a higher level of care than independent living options, the goal is to maintain as much independence as possible. Spaces should be planned to support these types of independent activities and programs whenever possible.

Acoustical Considerations

The characteristic that was rated fourth in importance in the interior environment was the dimension of sound. All residents and staff within each living option consistently placed the relative value of sounds below the dimensions of heating and cooling, lighting, and physical space, but above the dimension of smells. Similarly to the dimension of lighting, however, residents and staff focused on different features of sounds and rated characteristics of this dimension differently. Like the dimension and features of lighting, these differences may be attributable to physiological changes associated with aging such as loss of hearing.

Design Consideration #13. *Large public spaces should be limited or planned to reduce the noise level that will occur in that space when occupied.* Residents rated having the appropriate noise level in a space the most important feature of the acoustical environment. Large spaces such as dining rooms, however, often are locations

where background noise is a problem. One of the major changes that occurs with age is the problem of hearing noises, especially conversation, against background noise, and one of the greatest differences between home environments and institutional settings is the quality of the acoustical environment. Institutional settings are often designed with hard, smooth surfaces and non-porous materials (Hiatt, 1985), which create an acoustically poor environment. Spaces for large group activities should be planned with finishes that absorb sounds and keep noise levels lower. Reducing the overall interior volume of the spaces or dividing one large space into several smaller ones, may also be helpful in creating an acoustically successful environment for residents with hearing difficulties.

Design Consideration #14. *Provide multiple cues for warning devices in residential locations.* While residents in independent living noted satisfaction with the acoustical privacy of their apartments, several residents noted problems in hearing the warning alarms for fire or tornado. The sound or pitch level of some warning devices may be inaudible to residents with hearing impairments. Unlike skilled care settings where staff are primarily responsible for evacuating a building or assisting residents to safety, residents in independent living are required to rely on themselves to seek safety in case of an emergency situation. Building alarms could be supplemented by placing alarms in individual apartments to increase a residents ability to hear the signals. These types of signals may need to be paired with visual cueing for residents who may have difficulty with hearing auditory signals.

Design Consideration #15. *Provide acoustical privacy in staff work areas where personal or confidential types of information may be exchanged.* Staff in administrative or counseling rolls may need to have conversations with residents, residents' family, or other staff that are sensitive or personal in nature. These types of work spaces should be acoustically private and not filter sounds out to other areas. Some offices at Site 3, while enclosed with gypsum board walls, provided no acoustical privacy due to thinly constructed materials. Staff in these work settings noted problems with acoustical privacy between adjacent rooms. Wall construction and finishes that absorb sounds or do not let sounds pass through them were identified as most appropriate for office settings.

Olfactory Considerations

Residents and staff in all living options at Site 1 and Site 3 consistently rated the global dimension of smells as the indoor feature that was least important out of the five dimensions identified. The ability to detect smells diminishes with age, and while smells can enhance or detract from the homelike qualities of a setting, they may not be as critical in activities of daily living or negotiating one's environment. While the subtle features of smells may not be perceived as most critical in the planning of CCRC environments, these design considerations may be the added touch of a truly homelike setting within a planned environment for older persons.

Design Consideration #16. *Provide ventilation systems in residential settings*

to allow an exchange of fresh air in the environment. The residential environment in the CCRC setting should not have an institutional odor. Buildings that are tightly sealed can keep in smells, including those that are institutional in nature. This tendency can be most critical in living options with higher levels of care. While good housekeeping programs are essential, skilled care and assisted living settings that are planned to have a frequent exchange of air may reduce the lingering odors that may commonly occur due to incontinence or use of harsh cleaning chemical. In independent apartments, air exchanges that are connected with other apartments may result in odors drifting in from other spaces. Some residents in independent living at Site 1 noted occasional odors coming through exhaust fans in between living areas and adjacent kitchens. This situation was sometimes a source of dissatisfaction for residents who were sensitive to odors such as tobacco smoke.

Design Consideration #17. *Reduce the amount of food odor from meal carts*
in higher levels of care by planning dining spaces adjacent to kitchen spaces.

Residents and staff at Site 3 noted that food sitting on carts in the hallways after meals was a source of unpleasant odors in skilled care living. One staff pointed out that there was a fine line between the time that food was "food" and when the food was "garbage." By planning a kitchen space next the dining space, the amount of time that food sits in a hallway or dining space after a meal could be reduced. Kitchen spaces could be a complete kitchen or a small "prep" kitchen where dish washing after meals is done. A small prep kitchen was located adjacent to dining spaces in skilled care and assisted living

settings at Site 3, and odors associated with "food garbage" was not identified as a problem at either of these living options.

Design Consideration #18. *Provide opportunities for pleasant residential smells to be experienced in the CCRC environment.* Most residents and staff at both Site 1 and Site 3 noted that pleasant smells in the indoor environment were often associated with food cooking or food being served. Spaces where food is prepared are located where residents and staff can smell food cooking, the olfactory environment of the CCRC may be more homelike. Trade-offs may occur, however, with regard to noises that may be heard when meals are being prepared, cooking odors that are not deemed pleasant by some residents or staff, or noised when cleaning up after meals takes place. Planning of these spaces may need to be carefully laid out and designed so that the benefits of one feature does not diminish the quality of others. Provisions for activity related cooking such as crockpots and microwaves may also enhance pleasant smells in skilled care settings.

Conclusions

The continuing care retirement community includes many different settings with a diversity of users. This study focused primarily on two CCRC's in northeast Kansas whose residents were similar in demographic characteristics. Although residents and staff at Site 1 and Site 3 shared similar perceptions overall of the interior global dimensions, they often placed emphasis on different characteristics of the dimensions that make up the

indoor environment, perhaps due to differences in the design of the settings. While these findings may not be generally applicable to all CCRC settings, many of the ratings and preferences reported by residents and staff at these two sites are consistent with findings in other, similar settings. These similarities suggest some validity for some of the conclusions. By thoughtful planning and design, these settings may be able to successfully address the different preferences of user groups across the CCRC environment, while still maintaining a continuity in programming and design. Both residents and staff shared similar needs with regard to the indoor environment across the different living options, and careful planning can provide spaces within each setting to maximize the overall user satisfaction. These differences identified between residents and staff may also be addressed by relating simple design consideration.

Additional research in various CCRCs, systematically selecting settings with regard to dimensions such as demographics and regional differences, may be beneficial to increase the validity of these findings. Future work may also wish to focus on understanding the regional or economic differences that may affect perceptions and satisfaction with the indoor environment. Additional user groups whose satisfaction should be considered may also need to be explored. Satisfaction with the total environment can be related to many factors beyond design. Social organization and types of services offered within the settings may play a dominant role in resident and staff perceptions and satisfaction with the environment. Further understanding of the interrelated relationships between these two roles of the environment may provide valuable insight into providing supportive and therapeutic environment in settings such as CCRCs.

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APPENDIX

APPENDIX A CONSENT LETTER AND FORM

■ Hello,

My name is Migette Kaup. I am a graduate student in the College of Architecture at Kansas State University studying continuing care retirement communities in conjunction with the American Institute of Architects and the American Hospital Association. The results of this study will be used to suggest design recommendations for new future retirement facilities and the remodeling of existing facilities.

With the permission of the administration of _____, I am conducting a survey of residents and staff to discover in what ways the indoor environment is well designed and in what ways it could be made better .

My survey involves a short questionnaire that asks approximately 30 questions about various parts of the indoor environment, such as lighting and temperature, in different settings like hallways or dining rooms. There is also a scale that will ask you to rate the value of elements in the indoor environment. I will go through the questionnaire and the scale with you, and it will not take much of your time.

I will be taking physical measurements and a few photos of the spaces that you describe, so if you agree to complete the questionnaire, I will need to take a few quick measurements of your primary work area. I will be measuring the light level, the temperature and relative humidity, and the dimensions of the room. The measurements will probably take about 15 minutes, you can be in the room at all times, and I will be glad to do this at your convenience.

All your responses to the questionnaire will be held in strict confidentiality. I will be combining your responses with responses from a total of four other retirement communities in order to draw some general conclusions. You will not be identified in any way, and any response you may make will not be disclosed to anyone else in the facility.

Your participation in this survey is entirely voluntary and if at any time you wish to withdraw or not answer a question, you may do so. If you have any questions about this study at any time, please do not hesitate to ask me. You may also contact the director of _____, or you may contact my advisor at Kansas State, Lyn Norris-Baker at 532-5945.

If you are willing to participate in this study, please sign the attached form stating that you agree to participate and you understand the guidelines and your rights as they have been described above.

Thank you for your time and consideration.

■ Migette Kaup,
■ Graduate Student

APPENDIX A
CONSENT LETTER AND FORM

■ I, _____ agree to participate in the study of "Indoor Environment Acceptability" conducted by Migette Kaup by responding to a questionnaire and allowing the recording of the physical dimensions of the immediate area as described by the study.

I understand that my participation is entirely voluntary and that I have the right to not answer any question I choose or to withdraw my participation at any time.

■ Signed _____
■ Date _____

APPENDIX B ORIGINAL SCALE

THE INDOOR ENVIRONMENT

The Kansas State University Institute for Environmental Research is conducting a survey to determine how you rank the various constituents of the indoor environment. The survey is in TWO PARTS. Read all of the directions BEFORE making any responses. THEN make the appropriate responses in the spaces provided. A pencil is suggested so you can erase and change any of the values until you are satisfied.

PART I

It is generally agreed that the main constituents of the indoor environment are the acoustics, the quality of the air, the lighting and the thermal aspects. In the space opposites each of these factors listed below, enter in the form of a percentage what you consider to be their relative contribution to the total indoor environment. Be sure the total equals 100%.

- (A) _____ ACOUSTICS (loudness, pitch, distraction)
 - (B) _____ AIR QUALITY (odor, dust, tobacco smoke)
 - (C) _____ LIGHTING (brightness, glare, shadows)
 - (D) _____ THERMAL (temperature, humidity, air movement)
- 100% TOTAL INDOOR ENVIRONMENT

**Now copy the percentages you have written in spaces A, B, C, and D above to spaces A, B, C, and D on the next page; Then READ THE INSTRUCTIONS AT THE TOP OF THE PAGE UNDER PART II AND CONTINUE.

PART II

Below are listed three feature for each of the environmental constituents. In the space provided, enter the percentage that each feature contributes to each individual constituent. Make sure the percentages total the percentage that you have entered for that constituent from the former page. FEEL FREE TO MAKE CHANGES BUT MAKE SURE THAT THE TOTALS ARE CORRECT.

THE ACOUSTICAL ENVIRONMENT

- _____ loudness
- _____ pitch
- _____ distracting sounds

(A) _____ TOTAL Acoustical Environment (from Part I)

THE ENVIRONMENTAL AIR QUALITY

- _____ odor
- _____ dust
- _____ tobacco smoke

(B) _____ TOTAL Environmental Air Quality (from Part I)

THE LIGHTING ENVIRONMENT

- _____ brightness
- _____ glare
- _____ shadows

(C) _____ TOTAL Lighting Environment (from Part I)

THE THERMAL ENVIRONMENT

- _____ temperature
- _____ humidity
- _____ air movement

(D) _____ TOTAL Thermal Environment (from Part I)

MAKE CERTAIN THE VALUES ADD UP TO THE CORRECT TOTAL

APPENDIX B ORIGINAL SCALE

ENVIRONMENTAL ACCEPTABILITY OF THE WORKPLACE

Listed below alphabetically are 12 items related to the environment of the area in which you work. In front of each item, enter a number from the following acceptability scale that best describes the acceptability of your work area at this time. THEN rate the overall quality of your work area in the space provided.

IMPORTANT: Look the scale over before making any ratings

- 6 = very acceptable
- 5 = acceptable
- 4 = somewhat acceptable
- 3 = somewhat unacceptable
- 2 = unacceptable
- 1 = very unacceptable

- _____ air movement
- _____ amount of dust
- _____ amount of tobacco smoke
- _____ brightness of the light
- _____ glare
- _____ humidity
- _____ loudness of the sounds
- _____ number of noisy distractions
- _____ odor
- _____ pitch of the sounds
- _____ shadows
- _____ temperature

- _____ OVERALL QUALITY

APPENDIX C QUESTIONNAIRE

INDOOR ENVIRONMENT ASSESSMENT SURVEY

This survey asks a series of questions about three different areas in the building where you live. Please listen to the question then respond with the most appropriate answer for each of the areas. Answer the question for each room individually. If a question does not apply to an area, simply say so. **** If you have any questions do not hesitate to ask.**

SAMPLE QUESTION WITH SAMPLE RESPONSES

Resident's Apartment	Dining Room	Hallways	SAMPLE QUESTION
2	4	1	How many plants are present in the room? 1 2 3 4 5 not enough just the right amount too many

QUESTIONNAIRE

Resident's Apartment	Dining Area	Hallways	
			LIGHTING
			How much sun light is present in this room? 1 2 3 4 5 not enough just the right amount too much
			How much artificial lighting from light fixtures is present in this room? 1 2 3 4 5 not enough just the right amount too much
			How often are unwanted shadows present in this room? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS
			When you look at the windows in this room, how would you describe the amount of brightness from the sun? 1 2 3 4 5 not enough just the right amount too much
			How often is the amount of sun light that comes from the windows in this room distracting? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS
			How often does bright sunlight from the windows interfere with activities? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS
			How often is the light that reflects off of the floor in this room distracting? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS
			How often does the light that reflects off of the floor interfere with activities? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS

TIME:
DATE:

APPENDIX C QUESTIONNAIRE

INDOOR ENVIRONMENT ASSESSMENT SURVEY

Resident's Apartment	Dining Room	Hallway	
			HEATING AND COOLING
			Can you control the temperature in this room? YES NO
			How comfortable is the temperature in the room to you? 1 2 3 4 5 too cold just right too warm
			During warmer months, how would you describe the level of humidity in this room? 1 2 3 4 5 too low (dry) just right too high (moist)
			During cooler months, how would you describe the level of humidity in this room? 1 2 3 4 5 too low (dry) just right too high (moist)
			How would you describe the amount of air movement in this room? 1 2 3 4 5 not enough just the right amount too much
			How often are there unwanted drafts in this room? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS
			SOUNDS
			How often can unwanted sounds from outside of the building be heard in this room? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS
			If present, can you identify any particular unwanted sound from outside the building from this room?
			How often can unwanted sounds from other rooms be heard in this room? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS
			If present, can you identify any particular unwanted sound from other areas in this room?
			How would you describe the sounds or the sound level inside this room? 1 2 3 4 5 too soft just right too loud
			How often does sound echo in this room? 1 2 3 4 5 NEVER RARELY OCCASIONALLY FREQUENTLY ALWAYS

**APPENDIX D
DESCRIPTIVE ENVIRONMENTAL ASSESSMENT CHECKLIST**

LIGHTING

TIME: DATE:

- Foot-candle Reading:
- Location (on plan) where measured:
- Height where measured:
- Weather conditions outside:
- TYPE OF ARTIFICIAL LIGHTING (Location on Plan and Reflected Ceiling Plan)

	Incandescent			Fluorescent	
	Direct	Indirect		Direct	Indirect
Ceiling	_____	_____		1 x 4	_____
Table	_____	_____		2 x 2	_____
Other	_____	_____		2 x 4	_____
- WINDOW LOCATION:
N NE NW E S SE SW W
- TOTAL S.F. OF WINDOWS _____

THERMAL COMFORT

- Relative Humidity Wet Bulb: Dry Bulb:
- Temperature:
- Location of registrars (on Plan):
- Location of Returns (on Plan):
- Placement of Thermostats (on Plan):
- Number of Fans _____ Type:

ACOUSTICS

- Decibel Level: (Sound Meter Reading)
- Number of Openings and Size: Doors: _____ Windows: _____

_____	_____
_____	_____

**APPENDIX D
DESCRIPTIVE ENVIRONMENTAL ASSESSMENT CHECKLIST**

WINDOWS:

TYPE OF TREATMENTS:

BLINDS SHADES CURTAINS VALANCES OTHER

PHYSICAL SPACE

- Room Dimensions (on Plan)
Ceiling Heights(s) _____

	MATERIAL	COLOR	TEXTURE	OTHER
WALLS				
FLOOR (S)				
CEILING				
FURNITURE				NO. OF TOTAL PIECES: _____

NOTES: