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MAINSTREAMING OUTDOOR RECREATION

THE UNIVERSITY OF ARIZONA

M.L.ARCH. 1982

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MAINSTREAMING OUTDOOR  
RECREATION

by

Daniel Wayne Gilbert

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A Thesis Submitted to the Faculty of the  
SCHOOL OF RENEWABLE NATURAL RESOURCES  
In Partial Fulfillment of the Requirements  
For the Degree of  
MASTER OF LANDSCAPE ARCHITECTURE  
In the Graduate College  
THE UNIVERSITY OF ARIZONA

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## ABSTRACT

The role of disabled people recreating in the outdoor environment is studied. Accessibility standards and concepts are explored, as well as site components designed to facilitate the disabled.

The subject of mainstreaming, to blend into the flow of society, without special segregated facilities is discussed.

The conclusion reached is that there is a place for the disabled population recreating in our outdoor environment, as well as society as a whole. Special consideration and thought need to be applied to planning and designing the outdoor environment so as to open up a new world for all of the citizens of the United States.

## CHAPTER 1

### INTRODUCTION

In the past, the attitude of society was to ignore and hide away disabled persons because they did not conform to the "norm." However, attitudes are changing. Today there is an emphasis on the rehabilitation and reintegration of disabled persons into the mainstream of life. Disabled persons are encouraged to lead productive lives and to explore the many opportunities and services provided by the community. This hidden population is now becoming an emerging population.

Access to the outdoor environment is frequently denied to many people in our society because of the manner in which the outdoor environment is designed and constructed. Almost every person can expect to be physically handicapped either temporarily or permanently at some time during their lifetime. A mother pushing a baby carriage, a pregnant woman, a child with a bicycle, or an elderly person may find themselves unable to cope with a flight of stairs, a curb, or a door because of the design of these objects.

These people may expect to be relieved of their handicaps within a fairly short time, unfortunately, there are those who, through a permanent handicap, will always be inhibited in their movements.

For the handicapped person, architectural barriers are everywhere. The environment hampers and frustrates the everyday functioning of the disabled person, whereas the able-bodied person is unaware of the problem.

Barrier-free design is becoming a reality through federal, state, and local codes and legislation, although access to the outdoor environment has not progressed as well as that of public buildings. Standards, details and other design criteria that have been used in the past are inconsistent and vary in their appropriateness. Designers and planners who want to do the right thing are often confused. They are confronted with fragmented or conflicting information and varying standards.

Outdoor recreation standards which offer a wide range of accessible activities allow each individual to choose his preferred activity. Accessible and usable facilities require designs that consider the variations within our population. Insensitive designs create architectural barriers which people cannot always overcome,

keeping them dependant on others. Those with handicaps and the elderly are sensitive to restrictive design. It is for these people who we must design and plan for, because one day we ourselves will join their ranks.

#### Purpose of Study

The purpose of this research is to provide information to administrators, designers, planners, and the general public in planning the outdoor environment for the disabled population. It is not intended for this thesis to be a "Bible" of standards and guidelines in planning for the handicapped, but to serve as an information source and introduce ideas in thought and design in accommodating the handicapped into the outdoor recreation spectrum.

#### Research of the Study

This study will introduce the problem of accessibility as it occurs in the environment, and list ways that such a situation can be remedied drawing from personal experience in helping with the planning and design of two county parks in the state of Virginia. Also, information obtained by conferences on design accessibility in which ideas were supplied by the disabled themselves provided a great base for data gathering.

### Definition of Disabilities

In order to provide the reader with a basic understanding of the types and limitations of various impairments the following terminology is used, and generally accepted in various literature, to help define particular handicaps. By using the term "disabled," this study is referring to one who has suffered a condition in which the normal physical capabilities have been weakened, an incapacity to a degree.

1. TEMPORARY IMPAIRMENTS: Temporary impairment is a term used to describe a situation in which people become temporarily restricted in their movements, that requires time to heal or correct. Example: a pregnant woman, a man with a broken leg, or a child with his arm in a sling, these are all temporary impairments. They are restricted in their movements but the situation will be corrected in a fairly short time.
2. PERMANENT IMPAIRMENTS: A situation in which a person has a disability so severe that they will be restricted in their movements for the duration of their life. Example: an amputated limb, a para-palegic, or blindness are all examples of impairments that will exist throughout their lifetime.
3. ACTIVITY IMPAIRMENTS: Activity impairment refers to a condition in which there is a limitation that restricts

activities of a person. Activities most commonly grouped into this category may be strenuous games such as football, basketball, running and hiking. The most common impairments are heart disease, arthritis, lungs, high blood pressure, and even knee damage.

4. MOBILITY IMPAIRMENTS: Mobility impairment is a term referring to restriction of movement. Disease, paralysis, deformities all fall under this category.

5. HEARING IMPAIRMENTS:

-Partial audial impairments refers to people who have limited hearing ability but are able to hear major sounds.

-Total audial impairment means being unable to detect any sounds at all. Birth defects and hearing deterioration resulting in deafness with old age are the most common causes of total impairment.

6. MANUAL IMPAIRMENTS:

-Partial manual impairments describes a degree of disability of both hands or arms, or total disability in one hand.

-Total manual impairments refers to total disability in both hands and arms.

7. VISUAL IMPAIRMENTS:

-Partial impairment of vision is usually defined as loss of one eye, cataracts, glaucoma,

detached retina or color blindness.

-Total visual impairment refers to total blindness.

#### 8. CATAGORIES OF IMPAIRMENTS:

-Congenital impairment refers to a disability existing from birth.

-Acute impairment refers to a disability that may arise during the course of a persons lifetime.

#### 9. MOBILITY AIDS:

-Wheelchair. A chair mounted on wheels that can be propelled manually or by a motorized system.

-Crutch. A staff used to help support a persons weight enabling ease in walking. Support of the crutch comes from under the shoulder or forearm, and then again at the hand.

-Cane. A short staff providing support at hand level.

-Walker. A support device standing on four legs usually moved by lifting and advancing in the desired direction.

-Artificial Limb. A device used to replace a missing arm, hand, leg, or foot. This device may or may not be movable.

-Orthopedic shoes. Footwear designed to aid people for ease in walking by adjusting a defect in either the leg or foot.

## CHAPTER 2

### METHODOLOGY

The methodology for this thesis was to collect information drawn from past experience, journals, texts, and personal interviews with professional educators, and interviews with the disabled persons themselves. Much information was obtained by attending conferences and lectures of Recreation and Parks conventions at both the state and federal levels. Also, certain professions were sought out to help provide specific information in compiling this data. These professions included: physical therapists, recreational therapists, designers, planners, and public recreation agencies.

The basic guidelines used within this thesis are those criteria established by the American National Standards Institute (ANSI), which are the most complete standards used for making facilities accesible to the handicapped.

#### Content of the Thesis

The information presented in this thesis relates to the following areas:

1. The status of Federal legislation in making the outdoor environment more accessible to all people.

2. The relationships of costs in providing barrier-free access for both existing and proposed facilities.
3. Information regarding the amounts, types and characteristics of handicapped people within our society and the means for gathering statistical data.
4. Details of the site elements such as ramps, walkways, and surfaces in relation to picnic areas, camping, hiking, swimming, and playgrounds. Guidelines and planning considerations along with inter-relationships between site elements will be included.
5. Finally, suggestions as to where to look for additional information; names of organizations, agencies, publications, and projects that would be of additional value.

#### The Importance of Observation and Analyzation

While serving as a volunteer for the Crippled Childrens Hospital in Richmond, Virginia, the opportunity arose to present several projects on outdoor recreation for the disabled. These projects; camping, hiking, and swimming, provided a wealth of information that can be applied to the practical side of making outdoor recreation facilities usable by everyone. Being able to observe someone who lacks the mobility that most people have, in an environment that historically eliminated them from such is quite an education in itself. While seeing the disabled in such an environment is beneficial, from a planning

standpoint, to take note of difficulties that existed in hampering the recreational experience. These observations have helped to formulate the basis of this study.

#### Drawing From Firsthand Experience

While serving as an intern for the Virginia Commission of Outdoor Recreation, the opportunity arose to evaluate master plans for various county and state parks. This evaluation consisted of on-site inspection and analyzation of the site and its components. By accompanying professionals, trained in landscape architecture and therapeutic recreation, who performed these inspections, provided additional design criteria relevant to barrier-free design.

## CHAPTER 3

### LEGISLATION

In almost every nation, the number of handicapped individuals is increasing rapidly. In the United States, statistics show that over 10 percent of our population fall into a certain category of being handicapped.

For many years, institutions were considered the best and most economical means of doing something for, and with the handicapped. These people were confined and forgotten by the rest of society--as the saying goes, "Out of sight-out of mind."

Due to a growing public awareness of the problems faced by a handicapped person, and through the work of many people and government organizations, the national attitude has changed for the better. Institutions are still needed, but they are not the only place for the handicapped. The main areas of mainstreaming began with access to housing, public and private facilities, recreation, and transportation. This assimilation began in the late 1950's and the early 1960's.

#### Housing Act of 1964

In the mid 1960's, the Federal government enacted several pieces of major legislation which specifically

addressed the problem of architectural barriers. The first legislation was the Housing Act of 1964. This act provided a wide range of federally assisted programs to help meet the needs of the disabled person. This act was administered by the Department of Housing and Urban Development and required that ten percent of the housing units provided by H.U.D. be accessible to persons with physical disabilities.<sup>1</sup>

#### Architectural Barriers Act of 1968

One of the most significant pieces of Federal legislation was the Architectural Barriers Act, an act to ensure that certain buildings, financed with Federal funds, are designed and constructed so that the facility is accessible to the handicapped. This legislation required any building constructed in whole or in part with Federal funds to be made accessible. This law does not apply to buildings on military installations designed for able-bodied military personnel.<sup>2</sup>

#### Rehabilitation Act of 1973

This legislation directly affects architectural barriers. Section 304 of Title V marks the first federal

<sup>1</sup> Elizabeth Aino, Access For All-An Illustrated Handbook of Barrier-free Design, (Special Press, Columbus, Ohio, 1977).

<sup>2</sup> Ibid.

recognition of the importance of recreation for individuals with handicaps. Mandating accessible recreation facilities and programs are vital to the process of mainstreaming.

Section 504, states that "no otherwise handicapped individual...shall, solely by reason of his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal assistance." In addition, recipients of Federal financial assistance must eliminate physical obstacles so that the program or activity is readily accessible to all persons.<sup>3</sup>

#### Federal Aid Highway Act of 1973

This act authorizes the Secretary of Transportation to make grants and loans to private non-profit corporations to assist "in providing transportation services meeting the special needs of the elderly and handicapped." Section 228 of this law also requires that states provide "adequate and reasonable access for safe and convenient movement to the physically handicapped

<sup>3</sup> Ibid.

person, including those in wheelchairs, across curbs constructed or replaced at all pedestrian crosswalks, after July 1, 1976.<sup>4</sup>

#### Tax Reform Act of 1976

Tax incentives for barrier-free design have taken the form of legislation to give private business an income tax credit for removing architectural barriers. Such incentives are especially important for buildings which are not subject to barrier-free laws.

Section 2122 of the act contains a special clause which grants a tax relief to businesses that remove barriers. The maximum deduction is \$25,000 per taxpayer for any taxable year.<sup>5</sup>

#### Specifications for Making Buildings and Facilities Accessible

In 1961, the President's Committee on Employment of the Handicapped and the National Easter Seal Society for Crippled Children and Adults developed these specifications to accommodate the disabled into the mainstream of society. These specifications were adopted by the American National Standards Institute, Inc., (ANSI). Today, these standards are the most utilized for eliminating barriers in the environment.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

## CHAPTER 4

### COST-BENEFIT ANALYSIS

Most of the investments in outdoor recreation are made in the public sector, therefore, the economic objective should be to maximize human welfare--the greatest good for the greatest number of people. In order to provide for the greatest number of people, barrier-free design is a must.

#### Principles

Cost-benefit analysis is based on the following principles:<sup>6</sup>

1. The goods and services produced from a given project have the value only to the extent that there is or will be a demand for them.

2. The best alternative for supplying the desired goods and services must also be the most economical one.

Thus, the cost of developing the best alternative establishes the upper limit of value as measured by what the public is willing to forego to develop this alternative.

<sup>6</sup> John Meekins, Cost-Benefit Analysis, Harper Press, N.Y., N.Y. 1968.

3. The best alternative relative to decision making should be that project which fulfills the desired objectives and exhibits the largest benefit-to-cost ratio.

4. In order to determine the best economic point of development of the selected project, it is necessary to maximize its economic worth by increasing the amount of the investment to the point that the benefit-cost ratio is just marginal relative to the benefit-cost ratio of the next best alternative.

5. All "negative" benefits must be accounted for in the cost-benefit analysis. These values are primary costs in that they reflect recreational opportunities that are destroyed in the process of creating new opportunities.

In building and designing, the anticipation of extreme costs has hindered incorporating considerations for the handicapped. Greater anxiety exists in the costs of correcting facilities that are already built. This is due to lack of research in the cost-benefit aspects of barrier-free construction. Recent studies have shown that earlier assumptions of cost were exaggerated.

#### Case Studies

In a study financed by a Government grant in 1977, undertaken by the architectural firm of Perkins and Will,

on the costs of barrier-free construction, revealed two important points. First, that the cost to eliminate architectural barriers would not have been an important consideration to cities and counties that have undertaken projects that have proved to be restrictive to the disabled. Second, that less than 10% of the architects surveyed, felt that a building constructed to be fully accessible to the disabled would be prohibitively costly. In support of this is a study conducted by the Department of Urban Studies, National League of Cities, Washington, D.C. (1977), in which several buildings, both existing and hypothetical, were studied as to the specific costs involved in making them barrier-free. Elements considered in the estimate were basic to accessibility, and conformed to the ANSI specifications for making buildings and facilities accessible to, and usable by, the physically handicapped.

Of the 3 new existing structures studied, it has been estimated that each building could have been constructed in such a way as to provide total access for less than 1/10 of 1% of the total construction costs. Likewise, 6 of the 7 hypothetical buildings studied could have been constructed barrier-free for less than 1/2 of 1% of the original construction costs.

It is evident that barrier-free design does increase the cost of construction. However, analysis indicates that

the additional money necessary for such construction is relatively small. In another study by McGaughan and Johnson, Architects, the additional cost proved to be less than 1%.

The same analysis to original construction costs is difficult to make on existing projects which require renovations to allow access to handicapped groups. Since a project may have been constructed many decades ago, a direct comparison of current corrective costs will bear little relationship to costs incurred during its original construction.

The concept remains that our environment must be made accessible to our whole population. On projects not yet built, appropriate considerations should be incorporated to meet this responsibility. In addition, we must evaluate our existing environment and eliminate those barriers that exist.

Under the Housing and Community Development Act of 1974, it is possible to receive aid in the form of a loan or grant and supervisory assistance that is directed to the removal of material and architectural barriers which restrict the mobility and accessibility of elderly and handicapped persons.<sup>7</sup>

<sup>7</sup> U.S. Government, Department of Housing and Urban Development, (Government Press, N.Y.) 1979.

### Private Sector

Within the private sector, the costs involved in making existing structures accessible must be weighed against the benefits of complete accessibility. The number of people will be increased at a site which is accessible, therefore the potential for additional economic revenue is increased. It is also important to meet a moral responsibility to provide total access in public places. This is only just when you consider that the money spent for construction of public places comes in part from the families of physically restrictive people and the handicapped themselves.<sup>8</sup>

<sup>8</sup> Ibid.

## CHAPTER 5

### POPULATION

As the recreation movement itself has grown to include participants of all ages and backgrounds and to meet a wide variety of special needs, it now must embrace those who have the greatest need of all. These are the ill and the handicapped who live among us.

One of the most serious barriers that prevents millions of handicapped and aged Americans from participating freely in recreational programs is found in simple architectural features that do not permit them to enter or use them conveniently. The needs and basic rights of the handicapped have been ignored in the past by those who have designed all types of facilities.

One of the best tools to be considered in accessible design is data on the number of people with impairments in a given geographical area. This will establish, to a certain extent, the priority for designing facilities to provide disabled persons with full access to site activities and facilities.

For designers and administrators concerned with the problem, statistics provide the best assistance in answering the following types of questions:

- \*Where disabled people are located in a given region.
- \*How many disabled people there are in this region.
- \*What types of disabilities they have.
- \*The extent of the impairment the disability covers.
- \*What age groups are represented.
- \*What difficulties these handicapped people have with using the site.
- \*What considerations should be made in the design of facilities for people with this handicap in terms of design, location, alteration, and cost.
- \*What attitudes towards the disabled exist in the community.

With answers to these questions, a more realistic and competent decision can be made as to the extent the handicap should be considered in the design. Many statistics have been developed to include only the permanently disabled, and frequently disregard the group of the population which is temporarily handicapped. Each year, many persons must temporarily limit their movements to a wheelchair or crutches due to mishaps. Their activity is

restricted for only a few weeks or months, but nonetheless they are just as restricted for that period of time as are those whose handicaps are permanent.

Using the 1980 U.S. Census, an estimated adult population of 129,000,000 persons between the ages of 16 and 64 existed. This figure does not include those persons institutionalized or in the military service. This information showed also that 14,800,000 persons with disabilities which existed for six months or longer which means that one in every eleven Americans has a disability. The disability rate increases with age:

4.5%	16-24 Years
5%	25-34 Years
8%	35-44 Years
13%	45-54 Years
21%	55-64 Years <sup>9</sup>

#### Mechanical Aids

The National for Health Statistics has compiled statistics relating to mechanical aids. These figures are as follows:

	<u>1973</u>	<u>1982</u> (estimated)
*Wheelchairs	409,000	461,000
*Crutches	443,000	482,000

<sup>9</sup> Ibid.

	<u>1973</u>	<u>1982 (estimated)</u>
*Canes	2,156,000	3,100,000
*Walkers	404,000	455,000
*Braces	1,102,000	1,197,000
*Artificial Limbs	172,000	210,000
*Special Shoes	2,337,000	2,800,000

When compared to our national population of over 200 million, it is shocking to think that physical barriers in the environment are limiting the activities of more than one out of every four Americans.

#### Awareness of the Disabled Population

To be successful, the design and construction of site elements should be structured in such a way as to make all people using them feel normal and inconspicuous. Site elements should never bring unnecessary attention to a disabled person. The American Foundation for the Prevention of Blindness totally disapproves of special trails to facilitate the blind person. They do not want to be singled out and segregated but prefer to blend into the mainstream of the population.

## CHAPTER 6

### DESIGN

It should be note that some kinds of disabilities require conflicting modifications. For instance, the person confined to a wheelchair can operate with better mobility in open spaces, whereas the blind person can maneuver better in smaller spaces so that they may make use of their ability to touch. Both of these disabilities can function better in a space with hard surface floors.<sup>10</sup>

A person confined to a wheelchair may be able to operate much as a fully ambulatory person, within the limitations of the chair. Others, because of the nature of their handicap may be able to utilize facilities only from a certain direction or process.

Where facilities have allowed access for wheelchairs, persons using walkers, stairs with open risers should be avoided.

It must be stressed that even if a person does not suffer a disabling injury, they cannot escape the

<sup>10</sup> Ibid.

aging process. As a person gets older the muscles become weaker, the bones softer, and the agility that they were once blessed with has now departed. Design criteria for the disabled must also encompass needs for the elderly. In doing so, the design facilitates current needs but also additional needs for the future since the population of America is experiencing larger numbers of elderly persons than ever before.

### Accessibility

The accessibility of any outdoor area depends upon the relationship of space and site elements. Unless there is a relationship of accessibility between forms of transportation, site elements, and building entrances, the value of making any one of these components more accessible is lost.<sup>11</sup>

For instance, in a historic area or natural recreation area where shuttle buses are used to eliminate automobile traffic, the buses not only have to be designed to carry disabled passengers, but the information center, interpretive trails, restrooms and snackbar areas must also be designed to allow full access.

<sup>11</sup> Keith Ready, Virginia Commonwealth University, (From a lecture on "Site Planning and Design). April 1980.

## CHAPTER 7

### ACTIVITIES AND FACILITIES

In order to allow the disabled to fully experience his outdoor environment, certain design criteria must be met. Specifics on new facilities or modifications on already existing facilities must be identified as how to make them accessible. This chapter will attempt to do that very thing, allowing for maximum use by the greatest number of people.

The method for determining the activities and facilities mentioned in this chapter is based upon the Arizona Outdoor Recreation Coordinating Commission "Statewide Comprehensive Outdoor Recreation Plan" (1978). Statewide recreation needs were established and preference was given to funding the forthcoming activities and facilities.

#### Picnicking

Picnicking is one of the most popular recreational activities in the outdoor environment. It brings together families and friends for relaxation and enjoyment.

A properly designed picnic area, one that is fully accessible, incorporates a variety of design criteria. Items such as wind direction, slope, and avoiding conflicts with other activities are important.

Specifics include a firm ealkway leading from the parking area to the picnic area. Once in the picnic area, the picnic table must be designed in such a way as to allow a person in a wheelchair to pull up to the table, independently serving himself, without special treatment or fuss. (Figures 1 and 2).

When designing picnic areas in the Southwest, it is important to remember that shade is a valuable tool in creating a pleasant atmosphere. Good design will feature trees, shrubs, and ramadas to help reduce heat and for general aesthetics. A grove of mesquite or cottonwood trees provides ample shade and allows for some privacy between groups of picnickers. These trees can be placed in such a way as to promote slight breezes to help lift and carry smoke away from grills.

### Camping

Camping offers a variety of experiences in the outdoor environment. This camping can come in modern camping trailers with electric hookups, in a

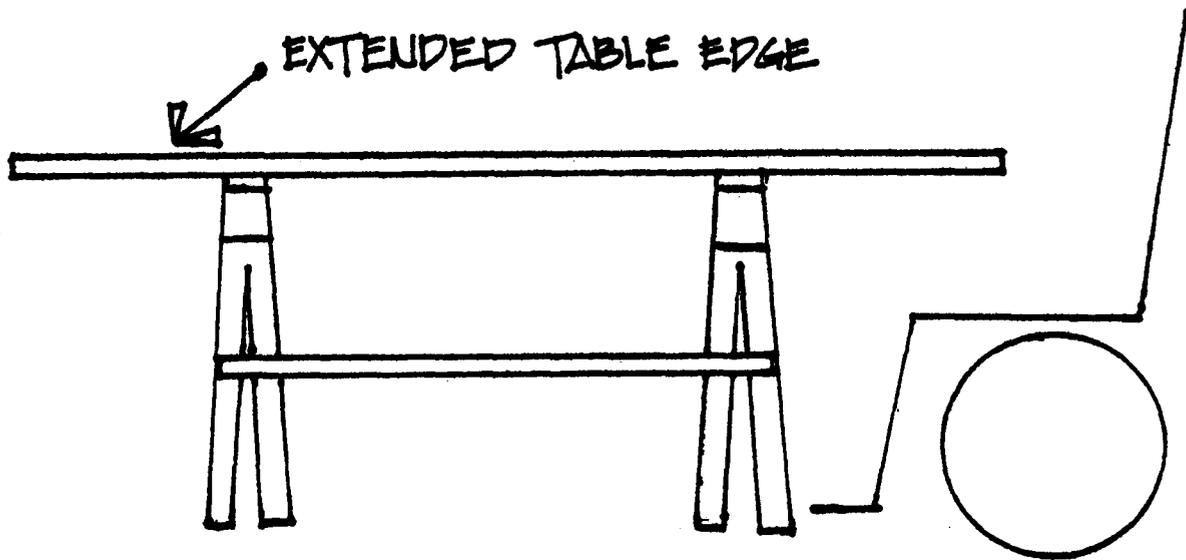
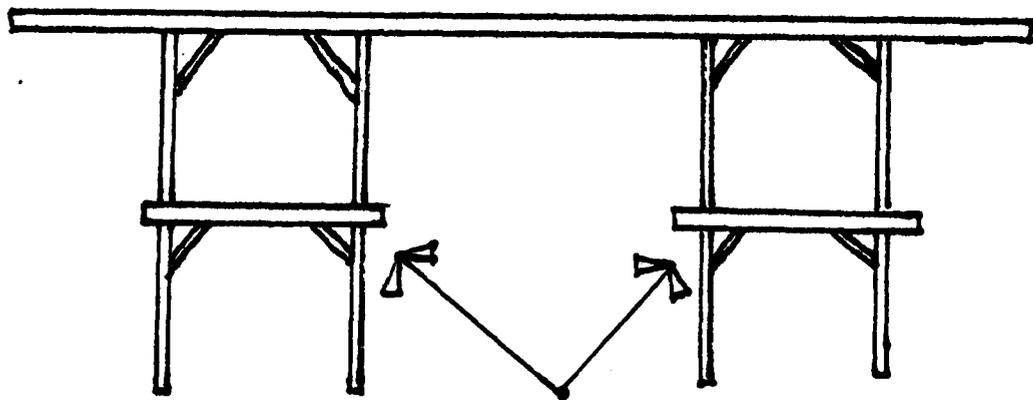


Figure 1. Extended end of picnic table allowing access.



SPLIT SEATING TO  
ACCOMODATE A WHEELCHAIR

Figure 2. Split seat accessible picnic table.

developed campground, or in a primitive area. The choice is up to the participant. That is why the diversity for camping experiences is important in providing the needs to a variety of camping styles.

For a camping facility to provide a good range of experiences for nearly everyone, it should generally include the following items:

- \*Level terrain around high-use areas such as shelters, restrooms, swimming pools or beaches, food and snackbar areas.

- \*Adequate acreage to promote the "camping experience" and buffer zones to instill a sense of remoteness.

- \*Good recreation potential with prime consideration given to water-based activities. This is due to the shortage of water-based facilities in the state of Arizona, and the Southwest in general.

- \*Ease of access with good signage.

- \*Good medical facilities. If in a primitive area, a good first-aid kit and personnel trained in basic first-aid.

Developed camping areas are the easiest to make accessible. These areas are characterized by having central restrooms and showers, on-site parking,

electrical hookups, and a considerable amount of vegetation removed to allow for more camp sites and activity areas.

Primitive camping tends to be more difficult to those who have mobility limitations. Camping of this nature reflects the ability to maneuver in the environment with just a minimum of modifications and facilities. Although primitive camping can be enjoyed by a disabled person, care should be taken as to not tax one's ability and create a situation of hardship, such as a wheelchair bound person attempting to camp in an area only accessible by a narrow, uneven path leading to a mountain top.

Camping in primitive areas can be made accessible by modifying the surrounding terrain to accommodate the use of a wheelchair. Vault toilets with a door wide enough to allow clearance with a wheelchair and the elimination of lips along the base of the doorway are important in allowing access of limited facilities.

### Playgrounds

Design segregation of play facilities in regard to varying physical characteristics of children is not desirable. Playgrounds that are constructed to serve diverse segments of society enhance the opportunity of a child's meeting and interacting with a variety of

people having different physical and social characteristics. These are people with whom he will have to deal with most of his life.

Generally, play can be grouped into two categories; (1) defined play, and (2) creative play. Defined play is the channeling of play activities into a set of directions. For instance, swings and sliding boards define the kind of activity the child may participate in. On the other hand, creative play arises from the child's imagination. For instance, a child in a sand box can make sand castles, roads, mountains, rivers and other fantasies from his mind. Likewise, free-form play structures allow the child to extend and exercise his imagination.

Just as designers have been designing the environment for the "normal" man, so have playgrounds been designed for the "normal" child. Unfortunately for the handicapped child, he does not see the world as a normal child would.

By participating in challenging play activities, children develop muscles and coordination, self-esteem, and the ability to work with others. Therefore, the designer should strive to create a playground that will provide a rich and wide experience of both defined and creative play.

When designing a playground the following criteria should be taken into consideration to enhance the use of play facilities both from a standpoint of serving more people and also by making the facility a safer place to recreate.

\*Access in the playground should include a system of hard surface paths.

\*The play area should be organized so that a child who has vision impairments can find his way easily throughout the playground.

\*Facilities able to accommodate a greater diversity of children does not need to be altered drastically. But, they should be modified in such a way as to make them more safe and accessible. Sharp edges, splinters, and pieces that stick out should be eliminated.

\*Playgrounds that are accessible to the handicapped child require a certain amount of adult supervision. Of course the amount of supervision depends on the type of disability.

\*A series of small signs can be placed at each play structure illustrating the uses that the handicapped child can participate in and make the best use of.

### Nature Trails

Nature trails are a very successful form of allowing a handicapped person out into the environment to experience nature at its finest. These trails should be designed to allow for the greatest diversity of people to use them. Interpretive trails should be well organized and detailed to allow an individual to learn as much about the area as possible. The main purpose of the trail is to please and inform the user.

Design and construction materials of the trails should be simple and durable in nature. Avoid having sharp turns, a large number of switchbacks, and sudden changes in gradient. A smooth, firm, easy flowing trail lends itself to the environment and provides a measure of access to all family members.

Trail heads should be equipped with signs bearing raised letters (since a majority of blind people do not read braille) providing information of the name and length of the trail, and items of special interest along the way.

Determining the sides of the trails is vital to people with visual impairments. Trail edges can be defined by curbing, a rope or railing system, or textural changes (asphalt to gravel).

Attention should be brought to the fact that blind people do not want special trails designed for their use only. Instead, elements of these trails for the blind, such as fragrance gardens and texture gardens, can be incorporated into trails used by the whole population. This system allows families with a blind member to recreate together, without being segregated into separate facilities. Also, another advantage of this kind of trail is to make the "normal" person more attuned to his environment, by not only using his sense of sight but his sense of smell and touch as well.

### Swimming

Over the years swimming has become a very popular sport as well as being recognized for its therapeutic value to the handicapped. If swimming is going to be properly utilized by the disabled a pool is preferred over a lake or ocean. This is due to such elements as water depth, temperature, currents, supervision and sanitation.

Considerations of the planning and design of swimming facilities include the following:

(1) Accessibility to swimming pools designed to accommodate a diversity of people can be accomplished in two ways:

(a) At various locations, the pool side surface can be raised to allow people who have difficulty crouching, or people who are wheelchair bound, to sit first and then swing their legs over the side into the water.<sup>12</sup>

(b) The walking surface can be sloped just slightly to allow drain off from any water splashed from the pool.

(2) Along with both of the above types of pool surfaces, there should be a ramp with handrails, and a set of stairs with handrails, both located at the shallow end.

(3) Pools having more shallow area than usual are preferred by many people who enjoy the security of knowing that they can touch bottom at any time.

Disadvantages arise over beach swimming compared to pool swimming. These disadvantages come in the form of fluctuating water level and temperature, changes in the contour of the bottom, no warning over changes in water depth, debris that is either submerged or floating, and the lack of supervision.

All of these factors affect the quality of the facility and swimming experience. When developing or

<sup>12</sup> Observed at the "Hallenschwimmbad" in Friedberg, West Germany, June 1976.

modifying a beach area to accomodate the disabled care must be taken to alleviate such problems and to inform all personnel, lifeguards, concessionaires, etc., as to the difficulties that may arise.

A properly planned facility along with specially trained personnel make a highly desirable combination. The designer should consider the following items when attempting to make a beach swimming area accessible to the disabled:

- (1) The grade of the beach should be no more then 10%.
- (2) An access walk leading to and along the water is necessary.<sup>13</sup>
- (3) A ramp with handrails along at least one side extending into the water should be provided.<sup>14</sup>
- (4) The entire swimming area should be marked with floating bouys attached by ropes.
- (5) With difficulties in regulating a beach swimming facility the designer should consider conflicting activities (boating, fishing, and skiing) and specify areas where these activities may take place.

<sup>13</sup> United States Department of the Interior, Heritage Conservation and Recreation Service, Guide to Designing Accessible Outdoor Recreation Facilities U.S. Government Printing Office, 1979.

<sup>14</sup> Ibid.

### Boating and Fishing

Boating can be enjoyed by a variety of physically handicapped people as long as a few adaptations are made to accomodate them. Primarily, the problems are; (1) access to the boat, and (2) supportive devices within the boat itself.

Proper design can be incorporatated by:

1. Providing access to the docks over hard surfaces.
2. Docks should have handrails.
3. An extended rail support, over the dock edge, is helpful for balance and stabilization when entering and leaving the boat.<sup>15</sup>
4. Provide life-rings and ladders in case of emergencies.

Fishing is a very popular recreational activity among all types of people, and is fairly easy to accomodate since all that is basically needed is access to the water. When designing fishing facilities one should consider the following:

1. Hard surfaces to and along access ways.
2. Fishing piers built with benches and railings so as to promote a means for resting and for safety.

<sup>15</sup> Ibid.

## CHAPTER 8

### ACCESSORIES

In order to make the outdoor environment accessible to all people elements of design come into play. There is little use in having a fully accessible visitor center at a park or scenic area unless walkways, curbcuts, ramps, or parking are designed in such a way as to allow the disabled to get to the visitor center.

This is where specifications developed by the American National Standards Institute (ANSI) should be adhered to. These standards, if followed by each state in America, would provide consistency in design criteria for the disabled. Ideally, facilities incorporating these standards provide access to recreate in whatever means capable.

Some ways to make site components accessible are as follows:

#### Walks

Walks should be designed to allow the greatest diversity of people to move safely and independently through the environment.

The surface of walkways should be firm and smooth allowing for drainage of water. Surfaces come in a variety of characteristics suitable for every situation.

Lighting is a very important tool used in the safety and well-being of a facility and its visitors. Lighting is used to reduce hazards and to provide personal safety. Overhead lighting is more functional than side or foot lighting, and is also more vandal proof.<sup>15</sup>

Along walkways where highly developed areas exist it is wise to provide rest areas every 200'-0". These rest areas should be placed out of the main flow of traffic so as not to interrupt and cause obstacles to negotiate.

Curbcuts are necessary to allow access from street to sidewalk to building entrances for people with physical handicaps. These curbcuts should be designed in such a way as to allow water to drain freely from the area itself.

These walks must be maintained in order to provide safe access. Routine inspection includes checking for breaks and buckling and the removal of any debris that inhibits access.

<sup>15</sup> Keith Ready, Virginia Commonwealth Univ. op. cit.

### Parking

For the majority of sites, the main access for the disabled person is through the automobile. This is why parking lots should be related to the building they serve. Parking spaces specially designed to facilitate the disabled will be required. These spaces are ideally 4'-0" wider than the average parking space so as not to hinder movement by a person confined to a wheelchair.<sup>16</sup>

Parking spaces specifically designed for restricted individuals should be properly identified by proper signage, the international sign of access, which is a white wheelchair on blue background. This sign is used only when all facilities are accessible and a disabled person will be able to move freely throughout the area.

<sup>16</sup> Albert Rutledge, Anatomy of a Park, (McGraw-Hill, N.Y., N.Y. 1971).

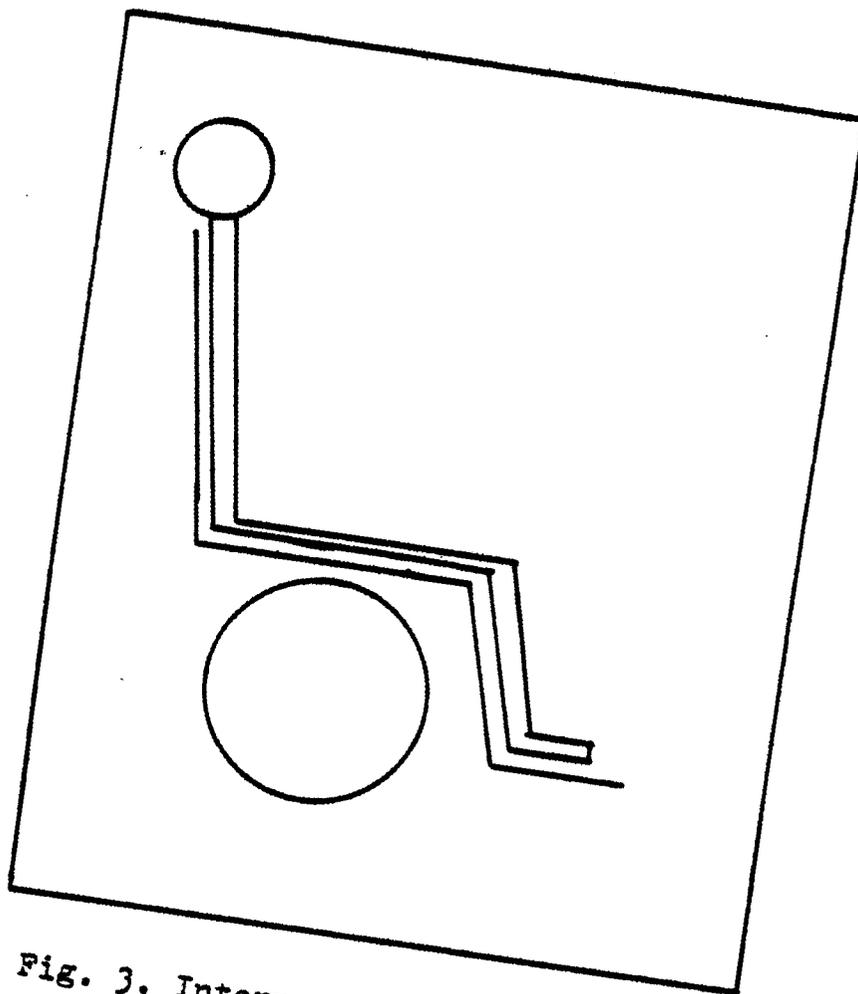


Fig. 3. International Sign of Access.

### Restrooms

At almost any public recreation area certain comfort facilities are necessary. These facilities must be accessible to facilitate all patrons of the site.

The following guidelines, using ANSI criteria, illustrate some of the ways design can be implemented to make restrooms accessible:

- \*The toilet stall should have a grab rail which is about 36" long.
- \*The dimensions of the stall should be 5 feet by 5 feet.
- \*The door to the stall should preferably be 36 inches.
- \*The toilet seat should be 18-20 inches high off of the floor.
- \*The flush lever should be hand operated and be push type.
- \*Sink height is 30 inches and all pipes are insulated and recessed under the sink in order to allow a wheelchair to pull up to the basin.

### Signs

Adequate signage must be provided for pedestrian and vehicular information. Site signage should be illum-

inated after dark, and all signs should be placed so that they are in view and easily read.

Signs should be located so that they are not a hazard or obstacle. Overhead signs should be located high enough to avoid conflict with pedestrians or autos. Ground signs should be placed out of the way of pedestrian traffic. But all signs should be located next to the areas that they are serving.

Signs that everyone can read are vital for a recreational area that is usable by all. They should also be readable by other senses than vision alone. Raised letters or symbols easily provide information to all persons reading them--either with their hands or eyes. Sound systems such as those utilized by the Arizona Historical Society provide information to those with visual impairments. These sound systems can either be carried or placed permanently at the specific site and the information can be obtained by the press of a button.

All of these elements of site design are important to a functional , well-organized accessible facility. By providing a wide range of activities and making them usable by all of the patrons, access is a must.

### Elements of Design

1. **BUILDING ENTRANCE:** Should be clearly defined; ramps provided where necessary; wide walkways and doors.
2. **DROP-OFF ZONES:** Located as close to building entrances as possible.
3. **PARKING:** Related directly to buildings they serve; parking spaces to facilitate the handicapped no more than 100'-0" from the building entrance.
4. **REST AREAS:** Should be provided where people must walk long distances and off of the throughfare.
5. **SIGNAGE:** Provided to direct people to various destinations within the site.
6. **SITE ENTRANCE:** Well identified and easy access; proper signage to promote smooth traffic flow.
7. **WAITING AREA:** Within 200'-0" of the facility entrance; sheltered area provided for protection from the elements.
8. **WALKWAYS:** Clear, direct routes throughout the recreation area; surfaces should be firm and smooth; curb cuts and ramps provided where necessary.

## CHAPTER 9

### LANDSCAPING

In contemporary thinking, appropriate design is that which meets objectives considered particularly relevant for the individual park site under study. Design of each and every park is different in the aspect that characteristics of the sites natural order must come into play. Therefore, what may be appropriate in one situation may not suffice in another.

Since we are always in environment of some kind, we cannot help but react to it. Behaviorists maintain that surroundings consciously or subconsciously shape our attitudes, breeding tranquility or tension, pleasure or dissatisfaction. Therefore, design of the environment must be pleasant and appeal to ones inner satisfaction.

Design is for the people and in order to include all people into design the use of barrier-free design is vital. Aspects of the controlled environment come into play by taking what the area has to offer and capitalizing on it. The vegetation, land-form, breezes, and water are all important elements in any recreational area.

### Vegetation

The art of implementing vegetation on a site is not to be taken lightly. Proper plant materials are necessary for design components such as visual blockage, buffer zones and general aesthetics. The use of vegetation is also important when speaking of accessibility of a recreation site. Some considerations of vegetation are:

- (1) Potentially dangerous plants such as those having large thorns or those with poisonous fruit should not be placed next to a playground or on heavily used walks.
- (2) Proper maintenance of plant materials is necessary to assure that dangerous situations do not arise. Seed pods, berries and fruit that may produce a slippery surface or rough surface should be removed.
- (3) Plant materials can be used as barriers in controlling the movements of people through public spaces or in keeping them away from hazardous areas.
- (4) Plant materials are useful in providing shelter from the sun and wind.
- (5) Vegetation offers a pleasing environment.
- (6) Plant materials must be suited to the environment that is being created.

Plant Materials Presenting  
Potential Problems of Design

POISONOUS: examples: oleander (*nerium oleander*), chinaberry (*melia azedarach*), soapberry (*sapindus saponaria*).

THORNS: examples: catclaw acacia (*acacia greggii*), saguaro (*Carnegiea gigantea*), soaptree yucca (*yucca elata*), desert holly (*atriplex hymenelytra*), barrel cactus (*echinocactus* sp.), prickley pear (*opuntia* sp.).

SHALLOW ROOTS: examples: fremont cottonwood (*populus - fremontii*), california pepper tree (*schinus molle*), australian willow (*geijera - parviflora*).

ODOR: examples: arizona grape ivy (*cissus trifoliata*), carob (*ceratonia siliqua*).

DEBRIS: A) Fruit and Nuts: examples: arizona walnut (*juglans major*), olive (*olea europaea*), date palm (*phoenix dactylifera*).

B) Cones and Seed Pods: examples: arizona sycamore (*platanus wrightii*), desert broom (*baccharis - sarthroides*).

C) Branch Breakage: examples: california pepper tree (*schinus molle*), australian willow (*geijera - paraiflora*), modesto ash (*fraxinus velutina*).

DROOPING BRANCHES: examples: australian willow (*geijera - paraiflora*), arizona sycamore (*platanus - wrightii*), eucalyptus (*eucalyptus - cineria*), california pepper tree (*schinus - molle*).

\*Sources: Plant Sciences, Landscape Architecture, and Arid Studies Departments at the University of Arizona.

### Creating an Environment

Man is a unique creature in being able to create an environment to suit his wants and needs. For centuries man has created a "space", and area developed through artificial means, such as a strolling garden, a backyard, or even a room in his house, to achieve a certain "look" as well as provide a function.

By building structures, combined with impacts of the natural environment, man has ineffect created a "microclimate." Sidewalks, parking lots and buildings react with the forces of nature in creating a microclimate by making alterations in the immediate localized area. These alterations can be either positive or negative.

Large, unprotected parking lots can cause hot spots and unwanted glare in the immediate surroundings. Wind may be channeled into the recreation site causing potential vegetation breakage and uprooting. These conditions can be counteracted by proper landscaping. Vegetation surrounding the parking lot helps to reduce heat, pollution and noise. A shade tree properly placed will reduce the temperature by as much as 40°F on a surface that receives direct sunlight. An earth mound or evergreens strategically placed direct damaging winds and cold, brisk winter winds out of the

direct path of the recreation center, picnic area and playground.

The location of vegetation, landforms, and structures help to create the microclimate that is most desirable. By proper design, an area can be made warmer, cooler, windy or less breezier, drier or more humid. By responsible design, the effects of extreme environmental conditions can be reduced. In effect, a comfort zone is being created to maximize full potential of a site.

Dust storms in the Southwest are a fairly common phenomena. This is why proper design helps to reduce the wind that carries dust, therefore, creating an atmosphere more conducive to recreation and enjoyment. Also, the use of windbreaks helps to reduce the amount of debris cast about on the parking lots and walkways possibly hindering the movements of a disabled person.

#### Use of Vegetation

Vegetation provides various functions in landscapes. Erosion, noise, glare, wind, and pollution can all be reduced by proper design and placement of plant materials. Also, plants can be used to create visual harmony by use of screening, affording privacy, creating a space, or by channeling your view to a particular object or setting.

In the arid Southwest, consideration must be given to plant materials and their ability for drought-

tolerance. Due primarily to the rising cost of water, the use of native vegetation is a wise choice . This beneficial factor of saving water is enhanced by using desert vegetation in its natural character and helping to maintain the desert environment.

The importance of creating the proper environment in the recreational setting is vital to a well-rounded experience. Of course it is impossible to pave the Gila Wilderness, but it is possible to create an alternate, but equal experience through proper planning and design.

This can be accomplished in a variety of ways. In order to create access to a wilderness environment grading and construction can be limited to the trail itself, leaving the surrounding area intact. Access over a firm level path affords visitation by a disabled person and allows for experiencing nature in its on element. Secondly, an artificial situation can be created that resembles a wild environment but in fact is totally protected and safe in all aspects. A good example of this can be seen at the Arizona-Sonora Desert Museum.

#### Vegetation Maintenance

The designer of a recreation facility must be aware of the special features of vegetation as opposed to inanimate objects, such as walls and fences. Also,

seasonal changes provide great variety to the plants as well as creating a new atmosphere.

Soil(acid or alkaline), exposure (sun or wind), moisture (heavy or light), and hardiness (extreme - temperatures) are all vital to the well-being of the plants. This is why native vegetation is stressed because of its adaptability to the Southwest environment.

Desert vegetation is easy to maintain and care for. Irrigation is minimal and pruning can be kept to a schedule of seldom or never. This ease of maintenance is highly desirable in times of reduced budgets and a reduction of staff employees.

When used in proper context with the recreation setting, a pleasing effect can be created. An example of this can be seen in using ocotillo as a "living fence". The effect of this is accentuated when in bloom instilling an intrinsic value only known through the role of nature.

## CHAPTER 10

### SUMMARY AND RECOMENDATIONS

Attitudes toward the recreational needs of the handicapped are important, as each individual should have the opportunity to fully develop his potential. As outdoor recreation managers, designers, planners, and participators, our attitudes and actions are critical to the attainment of that potential. "Special" parks stigmatize the users and separate them from the rest of society. When an effort is made to create recreational activities within existing parks which offer a wide range of accessibility, "special" facilities will not be needed.

Handicapped people, for the most part, do not wish to be excluded from the rest of society. They do not want separate areas designed exclusively for them. They prefer to enjoy the same areas and facilities as other people. Disabled people work at being accepted by the rest of the population, by separating them into different areas does not help with their acceptance. Provisions which will allow them to participate along with everyone else are most important and should be included wherever feasible.

When designing a facility, the planner should think in terms of access for all people. The cost for barrier-free design, when incorporated in the original plans is minimal. Designers and planners must be aware of the needs of the handicapped individual and make use of these needs when designing a facility.

Outdoor recreation facilities designed for our population of able-bodied and handicapped people alike offer many advantages to recreation consumers and providers by:

- (1) Encouraging otherwise restricted persons to become part of the mainstream of society, thereby increasing the participation rate of a facility.
- (2) Increasing physical and mental health by enabling to recreate where they choose and to the best of their ability.
- (3) Helping to break down attitudinal barriers and stigmas often attached to the aged or handicapped, thereby increasing human resources as a whole.
- (4) Increasing general safety and ease of maintenance, thereby reducing operating costs.

By the simple act of mainstreaming the disabled into today's society everyone is bound to benefit and grow, and learn more about each other, thereby making the world a nicer place to live.

Federal, state, and local legislation mandates access for all people. Compling to this legislation may bring tax breaks of up to \$25,000 per tax year, as well as affording access and increased participation rate.

Outdoor activities can be enjoyed by everyone by simple design techniques and modifications. Picnic tables can have an extended end allowing access by a wheelchair, picnic shelters can include ramps and easy clearance between tables to make moving about less demanding.

Camp sites utilizing accessible standards allow for a full range of activities from hiking to swimming. Firm paths and surfaces, ramps, and in swimming, supervision, take the inaccessible out of the environment.

Playgrounds provide creative, relaxing, and challenging activities. Mainstreaming the playground allows for social interaction between different backgrounds and ability levels-a situation that exists throughout a person's life.

Boating and fishing can be enjoyed by an individual or large groups. Once in the boat or on the fishing pier everyone is participating on an equal basis. The problem arises in providing access to the waters edge. This can easily be eliminated by firm, level surfaces allowing simple entrance into the boat or pier.

As case studies have shown, the costs of implementing accessible design into the original construction plans are minimal, less than 4%. Designers and planners should be made aware of the facts on costs and numbers of disabled people being served by an area or facility. If this information can be easily obtained, design plans and deadlines could be met with ease.

The whole idea of accessibility for the handicapped has been brought about by public concern, enraged disabled persons themselves, and the professional designer. Now, it is common knowledge that it is necessary for all people to have access to a facility or program. This is why it is important to provide meaningful opportunities to the handicapped person and allow him the same services that are offered to the majority of the population. It is within their Bill of Rights. This "hidden" population is now becoming an "emerging" population.

## APPENDIX A

### POPULATION DATA

#### Numbers of People with Physical Disorders:

MUSCULO-SKELETAL DISORDERS .....	5,492,000
arthritis or rheumatism .....	2,201,000
spinal impairment .....	1,952,000
impairment of limbs .....	874,000
other conditions .....	465,000
CARDIO-VASCULAR DISORDERS .....	4,408,000
heart trouble .....	2,018,000
high blood pressure .....	966,000
other conditions .....	813,000
RESPIRATORY DISORDERS .....	1,968,000
asthma .....	677,000
chronic bronchitis .....	489,000
emphysema .....	220,000
tuberculosis .....	168,000
other conditions .....	283,000
SENSE ORGANS DISORDERS .....	620,000
visual impairments .....	433,000
deafness .....	187,000

Numbers of People with Physical Limitations:

<u>Population Groups</u>	<u>Numbers</u>
Total Population	199,843,000
Activity Limitations	23,630,000
Major Activity Limitations	17,747,000

Numbers of People with Mobility Limitations:

<u>Capacity Limitations</u>	<u>Number</u>
Limitations .....	1,850,000
Needs help for transportation ..	854,000
Needs help outside home .....	571,000
Confined to bed .....	137,000
Confined to home .....	288,000
Unknown .....	257,000

\*Source: National Center for Health Statistics (1977),  
U.S. Census Data (1970 and 1980).

## APPENDIX B

### ORGANIZATIONS CONTACTED

- AMERICAN ASSOCIATION FOR REHABILITATION THERAPY, INC.,  
P.O. Box 93, North Little Rock, Ark. 72116.
- AMERICAN FOUNDATION FOR THE BLIND INC., 15 W. 16th Street,  
N.Y.,N.Y. 10011.
- AMERICAN HEARING SOCIETY, 919 18th Street N.W., Washington,  
D.C.
- AMERICAN HEART ASSOCIATION INC., Rehabilitation Dept.,  
44 E. 23rd Street, N.Y.,N.Y. 10010.
- AMERICAN NATIONAL RED CROSS, 17th and D Streets, N.W.,  
Washington, D.C.
- AMERICAN PHYSICAL THERAPY ASSOCIATION, 6000 Executive Blvd.  
Rockville, Md. 20852.
- AMERICAN PUBLIC HEALTH ASSOCIATION, 1015 18th Street NW,  
Washington, D.C.
- ARTHRITIS AND RHEUMATISM FOUNDATION, 10 Columbus Circle,  
N.Y., N.Y. 10011.
- ASSOCIATION OF SWIMMING THERAPY, 15th Street NW,  
Washington, D.C. 20005.
- BUREAU OF EDUCATION FOR THE HANDICAPPED, U.S. Office of  
Education, 7th and D Streets SW, Washington, D.C.
- FEDERATION OF THE HANDICAPPED INC., 211 West 24th Street,  
N.Y.,N.Y. 10010.
- FEDERATION OF THE GERONTOLOGICAL SOCIETY, One DuPont Cir.,  
Suite 520, Washington, D.C. 20036.
- MUSCULAR DYSTROPHY ASSOCIATION OF AMERICA INC.,  
1790 Broadway, N.Y.,N.Y. 10019.

- NATIONAL ASSOCIATION OF THE DEAF, 1575 Redwood Ave.,  
Akron, Ohio 44301.
- NATIONAL ASSOCIATION OF THE PHYSICALLY HANDICAPPED INC.,  
124 W. Boundary, Perrysburg, Ohio 43551.
- NATIONAL CONGRESS OF ORGANIZATIONS OF THE PHYSICALLY  
HANDICAPPED, 2753 Farragut Ave., Chicago,  
Illinois 60625.
- NATIONAL EASTER SEAL SOCIETY FOR CRIPPLED CHILDREN AND  
ADULTS, 2023 W. Ogden Ave., Chicago, Ill. 60612.
- NATIONAL PARAPLEGIA FOUNDATION, 333 North Michigan Ave.,  
Chicago, Ill. 60601.
- NATIONAL RECREATION AND PARK ASSOCIATION, 1601 N. Kent  
Street, Arlington, Va.
- NATIONAL TUBERCULOSIS AND RESPIRATORY DISEASE ASSOCIATION,  
1740 Broadway, N.Y., N.Y. 10019.
- PRESIDENT'S COMMITTEE ON EMPLOYMENT OF THE HANDICAPPED,  
Committee on Barrier-free design, Washington,  
D.C. 20210.

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