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Swimming Pool Accessibility

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Swimming Pool Accessibility Project

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National Center on Accessibility
Swimming Pool Accessibility Project

Executive Summary

This project was conducted for the U.S. Architecture and Transportation Barriers Compliance Board to identify and evaluate methods and standards related to enabling access to swimming pools by people with disabilities. It focused on the appropriateness, independent use, degree of consistency with existing building standards, level of safety, and impact on pool design.

With the assistance of a national advisory panel, four principal activities were undertaken: a comprehensive review of literature; a national telephone survey of people with disabilities; a national telephone survey of swimming pool operators, managers, aquatic directors, and adaptive aquatic instructors; and actual pool testing of identified designs and devices by people with disabilities.

A comprehensive review of the literature was organized into four areas. The first area was a review of the published literature of the past 35 years. Seven means of pool access were identified: ramps, lifts, stairs, transfer steps, lifts, zero depth entry, movable floors, and transfer walls. The second area reviewed was the state building codes related to swimming pools. Relevant standards from each state code were presented in table format. The third area examined was the existing standards for public swimming pools and spas, ANSI/NSPI-1 1991 and ANSI/NSPI-2 1992. Finally, the fourth area analyzed the report of the Recreation Access Advisory Committee (1994). The recommendations of each of the sub-committee reports that dealt with swimming pools, sports facilities, places of amusement, and developed outdoor recreation areas, were analyzed separately. Though minor differences in technical specifications were found, there was general agreement among the various sources.

A national telephone survey of 300 people with disabilities was conducted to determine their needs and preferences relative to the effective access to swimming pools. Telephone interviews were completed with 205 subjects, 69% of the sample. Data were collected regarding subject characteristics; pool behavior including frequency, purpose and type of pool used; preferences and problems associated with various means used to access swimming pools. The findings indicated that people with disabilities do use swimming pools with some regularity. There was nearly unanimous agreement that at least one accessible means of entry and exit should be provided at all pools, and most believed that more than one accessible means should be provided. Subjects also clearly indicated that the ability to use a design or device independently was important to them. Although no one means of access was preferred by a majority of

subjects, the means of access most often preferred were lifts, ramps stairs, and zero depth entry. Stairs however were only preferred by those who were ambulatory. Similarly, ramps, zero depth entry, movable floors and lifts were the means of access most subjects would be willing to use at a pool. Yet, most of those who had previously used a movable floor would not be willing to use one again.

A national telephone survey of 150 professionals involved with swimming pool operation was conducted. The sample included swimming pool operators, pool managers, aquatic directors, adaptive aquatics instructors, and aquatic therapists. The purpose of this study was to determine the current practices of pool operations related to entering and exiting swimming pools by people with disabilities. Specifically, the study was designed to examine the prevalence of designs and devices used to provide pool access, related policies and procedures, as well as safety and maintenance concerns of aquatic professionals. The results supported the finding of the earlier survey that people with disabilities do frequent pools. People with disabilities account for 14% of pool users at those pools that collect data on pool users with disabilities. Seventy-three percent of the respondents indicated that each of the pools operated by their agencies had a least one accessible means of entry for people with disabilities and 48% reported more than one. Stairs, lifts, ramps, and zero depth entry were the means of access most frequently found at pools. Respondents reported on the safety and maintenance concerns for each of the devices or designs.

On-site testing of the identified means of pool access was conducted to examine the appropriateness, independent use, and safety of the identified means of pool access by people with diverse disabilities. This was accomplished by observing 84 people with disabilities using the identified means of providing access to swimming pools. Subjects' buoyancy points ($\bar{x}$=34.6 in.) and their perceptions of design/device strengths and weaknesses were presented. Entering was perceived as easier than exiting swimming pools using each of the identified means of water access. There were significant differences between ambulatory and non-ambulatory subjects in the perceived difficulty of the designs and devices. Most of the designs and devices were significantly easier to use by ambulatory subjects than they were for non-ambulatory subjects. Only lifts and transfer steps were easier for non-ambulatory subjects, although non-ambulatory subjects who required assistance in transfers were unable to use the transfer steps. Specific problems with each of the designs and devices were reported.

Recommendations

Based on the findings of the review of literature and three research studies, the following recommendations were presented:

General

1.1. At least one accessible means of water entry/exit shall be provided for each swimming pool and shall be located on an accessible route.
1.2. Swimming pools with more than 300 linear feet of pool wall shall provide at least two accessible means of water entry/exit located on accessible routes.
1.3. When only one accessible means of water entry is provided, it shall be a swimming pool lift, wet ramp, or zero depth entry.
1.4. When a second accessible means of water entry/exit is provided, it shall be a transfer wall, transfer steps, movable floor, stairs, swimming pool lift, wet ramp, or zero depth entry. Lifts, wet ramps, and zero depth entry may not be used as a second accessible means of water entry/exit if the same means is used as the first accessible means of water entry/exit.
1.5. When a second accessible means of water entry/exit is provided, it must be located so that in combination with the first accessible means of water entry/exit to serve both ends and sides of the pool.

Ramps

When pool ramps are provide, they should meet the following specifications:
2.1. Surface: The surface of pool ramps must be firm, stable, and slip resistant.
2.2. Slope: The least possible slope should be used for a pool ramp. The maximum slope of a pool ramp shall be 1:12.
2.3. The maximum rise for any run shall be 30 inches.
2.4. The minimum clear width of a pool ramp shall be 36 inches.
2.5. Landings: Level landings must be located at the bottom and top of each ramp and each ramp run. At least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must:

- 2.5.1. be at least as wide as the ramp run leading to it;
- 2.5.2. have a minimum length of 60 inches clear;
- 2.5.3. have a minimum of size of 60 inches by 60 inches if the ramp changes direction.

2.6. Handrails: Handrails should be required on all ramps. Ramp handrails should include the following:

- 2.6.1. Two handrails shall be provided and located 32 to 36 inches apart.
- 2.6.2. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches above the ramp surface, a second handrail should be mounted between 16 inches and 26 inches.
- 2.6.3. Handrails should not be required to extend beyond the base of stairs or the base of a ramp where such would protrude into a lane or otherwise programmable area.
- 2.6.4. Handrails must be affixed so as to not allow movement in any direction.
- 2.6.5. Handrail diameter should be 1.25 inches to 1.5 inches.
- 2.6.6. If handrails are mounted adjacent to the pool wall, the space

between the wall and the handrail shall be 1.5 inches.

2.7. Aquatic chairs: Facilities that provide ramps must also provide an aquatic chair that meets recommendations 12.1 to 12.5.

Pool Lifts

When provided, pool lifts should meet the following specifications:

3.1. Pool lifts shall facilitate unassisted operation.

3.2. Clear space: A minimum clear deck space of at least 60 x 56 inches to one side and to the front of the lift seat must be provided. The space under the lift seat could be included as part of the clear space as long as the area is unobstructed.

3.3. Seat location: In the raised position the lift seat edge used for transfers must be located over the pool deck at least 12 inches inside the deck edge.

3.4. Seat height: Lift seats should be located 17 inches from the deck to the top of the seat surface.

3.5. Seat width: The lift seat width should be a minimum of 19 inches wide.

3.6. Footrest: A footrest should be attached to the lift seat.

3.7. Armrests should be located on both sides of the lift seat. The armrest located next to the clear deck space should be capable of moving away from the transfer area.

3.8. Controls and operating mechanisms: Controls and operating mechanisms at both the deck level and water level positions should be operable from the front edge of the lift seat and unobstructed by any other component of the lift. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).

3.9. Lifts shall be operable from both the deck level and water level.

3.10. Vertical travel: The vertical travel of the lift should allow the lift seat to be submerged 18 inches to 20 inches below the water level.

3.11. Minimum lifting capacity: A minimum weight of 300 lbs. is required for all single person lifts. The lift should also be capable of sustaining a static load of at least three times the rated load.

Zero Depth Entry (Beach Entry)

When zero depth entry is provided it should meet the following specifications:

4.1. Surface: The surface shall be firm, stable and slip resistant.

4.2. Slope: Zero depth entry pools are typically designed with very slight slopes. The maximum slope of a zero depth entry should not exceed 1:12 continuing to a minimum depth of 30 inches. For pools less than 30 inches deep, the slope should continue to the depth of the pool. Whenever the slope exceeds 1:20, it shall be considered a ramp and all recommendations for a ramp would apply.

4.3. Vertical rise: Whenever a zero depth entry slope exceeds 1:20, a maximum rise for any run should be 30 inches.

4.4. Landings: For zero depth entry slopes that exceed 1:20, at least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must have a minimum length of 60 inches and a minimum width of 36 inches
4.5. Handrails: Whenever the slope of a zero depth entry exceeds 1:20, two handrails should be required 36 inches apart.
4.6. Whenever the slope of a zero depth entry exceeds 1:20, handrails shall have a top handrail gripping surface mounted at 34 inches to 38 inches and a second handrail mounted between 16 inches and 26 inches.
4.7. Handrails must be affixed so as to not allow movement in any direction.
4.8. Aquatic chairs: Facilities that provide zero depth entry must provide an aquatic chair that meets recommendations 12.1 to 12.5.

Transfer Wall

When a transfer wall is provided, it should meet the following specifications:
5.1. Clear deck space: Clear deck space of 60 inches by 60 inches should be required at the transfer wall.
5.2. Wall height: The wall height should be 17 inches above the pool deck.
5.3. Wall depth: The transfer wall should be 12 inches to 15 inches deep.
5.4. Wall surface: The transfer wall surface must be non-abrasive and without any sharp edges.
5.5. Handrails: A minimum of one handrail should be located perpendicular to the pool wall, 4 to 6 inches above the transfer wall and with a minimum of 22 inches clearance on either side of the handrail.
5.6. Dry ramp: If a dry ramp is used to achieve the transfer wall, all of the requirements of ADAAG 4.8.5 will apply to the ramp.

Movable Floors

When a movable floor is provided, it should meet the following specifications:
6.1. Pool coping: Changes in level in the pool coping should be no greater than one-half inch and be beveled with a slope no greater than 1:2.
6.2. Aquatic chairs: Facilities that provide a movable floor as an accessible means of water entry/exit shall provide an aquatic chair that meets recommendations 12.1 to 12.5.

Transfer Steps

When provided, transfer steps should meet the following specifications:
7.1. Clear deck space: Clear deck space of 60 by 60 inches should be required adjacent to the surface of the transfer steps.
7.2. Transfer surface: The transfer surface of the highest step should be 17 inches above the pool deck.
7.3. Surface: The surfaces should be firm, have no sharp edges, and should not be abrasive in texture.

7.4. Step risers: The risers of transfer steps should be 5 to 7 inches in height. The last step in the water should be at least 18 inches below the water surface.
7.5. Step surface: Transfer steps should have a minimum of 12 inches of tread depth and a minimum of 22 inches tread width.
7.6. Handrails: One handrail should be provided at the side of the transfer step opposite the clear deck space. The handrail should be between 4 inches and 6 inches above the step surface.
7.7. Handrail diameter should be 1.25 inches to 1.5 inches.

Stairs

If stairs are provided as an accessible means of water entry/exit, they should meet the following specifications:
8.1. Surface: The surface of pool stairs must be firm, stable, and slip resistant.
8.2. The minimum clear width of pool stairs shall be 36 inches.
8.3. All steps shall have uniform riser heights and uniform tread widths. Stair treads shall be no less than 11 inches wide.
8.4. Two handrails shall be provided and located 32 to 36 inches apart.
8.5. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches above the ramp surface, a second handrail should be mounted between 16 inches and 26 inches.
8.6. Handrails should not be required to extend beyond the base of stairs or the base of a ramp where such would protrude into a lane or otherwise programmable area.
8.7. Handrails must be affixed so as to not allow movement in any direction.
8.8. Handrail diameter should be 1.25 inches to 1.5 inches.
8.9. If handrails are mounted adjacent to the pool wall, the space between the wall and the handrail shall be 1.5 inches.

Wading Pools

9.1. A minimum of one accessible means of water entry/exit shall be provided for each wading pool and shall be located on an accessible route.
9.2. An accessible means of water entry to wading pools shall be one of the following: transfer wall, transfer steps, pool lift, a wet ramp, or a zero depth entry, provided the means of entry/exit meets each of the recommendations for that means of entry/exit.

Spas

10.1. A minimum of one accessible means of water entry/exit shall be provided for each spa and shall be located on an accessible route.
10.2. An accessible means of water entry to spas shall be one of the following: transfer wall, transfer steps, or lift, provided the means of entry/exit meets all recommendations that apply to the selected means of entry/exit.
10.3 An accessible spa that is unattended shall have a means of emergency

notification that is adjacent to the accessible means of egress, within reach of someone seated in the spa, and operable at all times.
10.4. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).

Removable Designs & Devices

11.1. A removable device must remain in place until all users of the device have exited the pool tank.
11.2. Removable devices shall be on-site, readily available, maintained and operable at all times. Whenever possible, removable devices should be in place.
11.3. Signage: Whenever devices are removable and not in place at all times, signs must be posted to instruct users as to how the designs/devices can be requested.

Aquatic Chairs

12.1. Whenever a ramp, zero depth entry, or movable floor is used as an accessible means of water entry/exit, an aquatic chair with push rims must be provided.
12.2. At least one aquatic chair with a top surface of the seat at 17 inches above the deck shall be provided.
12.3. Seat width: The aquatic chair seat width should be a minimum of 19 inches wide.
12.4. Footrest: Footrests should be provided on the aquatic chair.
12.5. Armrests should be located on both sides of the aquatic chair seat. At least one armrest should be capable of moving away from the side of the chair.

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Swimming Pool Accessibility Project

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On September 29, 1995, the U.S. Architectural and Transportation Barriers Compliance Board awarded a research contract to the National Center on Accessibility. The purpose of the project was to identify and evaluate methods and standards related to enabling access to swimming pools by people with disabilities. It focused on the appropriateness, independent use, degree of consistency with existing building standards, level of safety, and impact on pool design. The following goals were pursued during the project:

- to comprehensively review the existing literature, both published and unpublished, to determine the problems, issues and available solutions to providing swimming pool access to people with disabilities;
- to determine the needs and preferences of people with disabilities regarding access to swimming pools;
- to determine the issues and concerns of pool/equipment designers and manufacturers, pool operators, and adaptive aquatic instructors regarding providing swimming pool access to people with disabilities; and
- to identify and evaluate available solutions to providing the highest degree of independent access possible for people with disabilities.

With the assistance of a national advisory panel, four principal activities were undertaken: a comprehensive review of literature; a national telephone survey of people with disabilities; a national telephone survey of swimming pool operators, managers, aquatic directors, and adaptive aquatic instructors; and on-site testing by people with disabilities of identified designs and devices used for entering and exiting swimming pools by people with disabilities. This report is organized according to the four principal activities, comprehensive project recommendations, and extensive appendices.

The comprehensive review of the literature presented in the first chapter is organized into four sections. A review of the published pool-related literature of the past 35 years is presented in the first section. A review of the state building codes related to swimming pools comprises the second section. The third section examines the existing standards for public swimming pools and spas, ANSI/NSPI-1 1991 and ANSI/NSPI-2 1992. An analysis of the Recreation Access Advisory Committee recommendations is presented in the fourth section of the first chapter (1994). The recommendations of each of the sub-committee reports that dealt with swimming pools, sports facilities, places of amusement, and developed outdoor recreation areas, were analyzed separately. Though minor differences in technical specifications were found, there was general agreement among the various sources.

Results of the survey of people with disabilities, the survey of aquatic professionals, and the on-site testing of designs and devices by people with disabilities are presented in chapters two, three, and four. The study sample, procedures, results, and summary are provided. Results are presented for pool behavior, pool policies, and experiences with the seven identified means of access: lifts, ramps, zero depth entry, stairs, transfer steps, transfer walls, and movable floors.

Comprehensive recommendations are presented in Chapter Five. A rationale based on the project findings is provided for each recommendation. Finally, extensive resource information as well as project documents are presented in the Appendices.

Study Limitations

Findings of this project should be considered in light of the following limitations:

- Although subjects in the survey of people with disabilities were randomly drawn from the sample pool, the sample pool was developed from volunteers who had agreed to participate in the study.
- Subjects in the on-site testing volunteered for the study and were paid for their participation.
- No attempt was made to determine statistically the validity and reliability of the survey instruments.
- The on-site testing was limited by the availability of designs and devices, thus wet ramp slopes between 8.3% and 5% could not be tested and transfer walls could only be tested by a small number of subjects.

Advisory Panel

A national advisory panel was formed to provide assistance in the literature review, study design, survey development, and critique of project findings and recommendations. Representing people with disabilities, architects, pool builders, equipment manufacturers, the hotel and motel industry, and national aquatic organizations, the advisory panel rendered invaluable information to the project. On two separate occasions the panel met for two days to review the project design, critique study procedures and survey instruments, identify related resources, and discuss access issues revealed in the study findings. The advisory panel also reviewed all of the project documents, including drafts of the literature review and project report.

Near the end of the project, a two-phase Modified Delphi Technique was conducted with the advisory panel. Once the study findings had been analyzed, a draft project report with recommendations was mailed to the panel. Based on a review of the draft report, panel members were asked to a rate the degree to which they agreed or disagreed with each recommendation using a 10-point

Likert-type scale (1 Strongly Disagree - 10 Strongly Agree). The results of the panel ratings were calculated to determine the amount of consensus among panel members. The revised recommendations and rationales were then sent to the advisory panel a second time. The results of the Delphi process (Appendix A) revealed significant consensus among panel members. Each of the 76 recommendations received a mean rating greater than 7.0, indicating strong agreement. In contrast, there were nine recommendations in the first round that received mean ratings of less than 7.0. Given the diversity of the advisory panel, the strength of the consensus was significant.

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Literature Review

Swimming is one of the most popular leisure and fitness activities in the United States. It is estimated that nearly 100,000 new swimming pools are constructed each year (Mittelstaedt, 1992). Swimming pools offer opportunities for recreation, exercise, therapy, and competition in water sports. Activities such as swimming, diving, water polo, and aqua aerobics can facilitate socialization and shared experiences, improve strength and fitness, as well as increase independence and self-esteem (Osinski, 1993).

Yet, people with disabilities have often been frustrated in their attempts to participate in swimming and other leisure activities. A 1994 national survey of individuals with disabilities in the United States found that they had limited social and recreational outlets (Leitman, Cooner, & Risher, 1994). They typically socialized less with friends and family and were less involved in community activities than were people without disabilities. The majority said their disability prevented them from socializing outside their homes and from attending cultural and sporting events to the extent that they would have liked. The figure rose to 67% for somewhat severely disabled persons and 97% among very severely disabled persons.

Kickes-Hughes and Langendorfer (1986) surveyed aquatic programs nationwide to learn the rate of participation by children with disabilities. Though 82% of the programs reported serving children with disabilities, only 0.4% of all children enrolled had diagnosed impairments. A total of 5.8% of all children in the U.S. have a disability (McNeil, 1993). Osinski (1993) noted that both discrimination in aquatic programming and poor facility design persists. It is widely recognized that architectural barriers, specifically pool ingress and egress, have significantly contributed to that discrimination (Grosse, 1985; Gunning, 1991; Langendorfer, 1989; Mace, 1993; Osinski, 1993; Popke, 1994; YMCA, 1987). Mace (1993, p. 34) proclaimed that "nothing is more frustrating and dangerous for a swimmer with a disability than a pool he or she cannot get into and out of." In a study of 100 Pennsylvania colleges and universities, Gunning (1991) found that none of the 39 schools with aquatic facilities met or exceeded the 11 minimum requirements for accessible pools suggested by the American Red Cross.

Access into swimming pools, especially for persons with mobility impairments, presents a myriad of challenging issues because of the diverse needs of users. Of course, getting people with disabilities into and out of pools is an oversimplification of the problem. The real dilemma is how to provide access to

pools in a manner that protects each individual's dignity, assures as much personal independence as possible, and is feasible for the facility. Carrying people with disabilities "piggy back into the pool" or "improvising sling seats with towels, canvas, and other materials" (Gabrielson, 1975) successfully achieves access, but at what cost to human dignity and independence? A ramp can be used to provide access, yet how feasible is a ramp in a small spa? Solutions have ranged from fixed elements, such as stairs and ramps, to movable equipment, such as transfer steps and lifts. Yet, guidance as to which, if any, solution is most effective and appropriate for people with disabilities has been lacking. Consequently, pool designers, builders, and operators desiring to make their pools more usable by all swimmers must proceed without the information needed to make good decisions. As McGovern has noted, "the catch-22 is that there are no specific design requirements for entry into a pool today" (Popke, 1994, p. 39).

In an initial step toward that end, this document presents an analysis of the current literature related to swimming pool ingress and egress by people with disabilities. Literature searches were conducted using Sport Discus, Medline, Dissertation Abstracts, Health and Wellness Database, ERIC, and Periodical Abstracts Plustext. Purdue University's Technical Information Services was used to search engineering and architecture literature. Online searches were made of the National Rehabilitation Information Center's Rehabdata and Abledata. The project advisory panel (see Appendix B) contributed resources from their personal libraries. Walter Johnson of the National Recreation and Park Association provided state building codes related to swimming pools for 48 of the 50 states.

The document is organized into four sections. The first section presents a review of the published literature of the past 35 years. It is subdivided according to the methods of pool access identified in the literature. The second section reviews the state building codes related to swimming pools. The third section examines the existing standards for public swimming pools and spas, ANSI/NSPI-1 1991 and ANSI/NSPI-2 1992. Finally, the fourth section analyzes the report of the Recreation Access Advisory Committee (1994). The recommendations of each of the sub-committee reports that dealt with swimming pools, sports facilities, places of amusement, and developed outdoor recreation areas, are analyzed separately.

Published Literature

The published swimming pool literature over the past 35 years was reviewed to determine the methods that have been employed to provide access to swimming pools by people with disabilities. Seven primary methods were identified: ramps, transfer wall/dry ramps, stairs, transfer steps, pool lifts, movable pool floors, and

zero depth entry. Each method is described, specific recommendations from the literature identified, and the method's advantages and disadvantages discussed.

Ramps

Ramps into swimming pools have long been recognized as viable alternatives to enable people with disabilities to enter and exit swimming pools. Franklin Delano Roosevelt, upon purchase of a Warm Springs, Georgia, retreat in 1926, had a ramp built into the pool (Treanor, 1993). Schoenbohm (1962) described various swimming pools of the late 50s and early 60s that used ramps as a primary means of access for people with disabilities. Today, ramps may be constructed as part of the pool or be added as removable equipment. They may be located in the pool tank or in a separate swimout.

There is widespread agreement that pool ramps should have a slip-resistant surface and be a minimum of 36 inches wide (Mace, 1993; Osinski, 1993; Parks Canada, 1994; Priest, 1991; U.S. Air Force, 1984). A maximum ramp running slope of 1:12 is most commonly found in the literature (Mace, 1993; Parks Canada, 1994; Priest, 1991; U.S. Air Force, 1984), though slopes as great as 1:6 have been used (Schoenbohm, 1962). The 1:12 maximum slope is consistent with that for ramps in constructed facilities (ADAAG 4.8.2). The appropriateness of the 1:12 slope is questionable, however, based on the added resistance created by water. Maximum ramp cross slope and the need for a level surface landing at the top and bottom of ramps are rarely mentioned in the literature.

Nearly all writers recognize the value of handrails on both sides of ramps. Recommendations for the height of handrails have varied from 24 to 36 inches. Mace (1993) recommended handrails be placed at 20 to 24 inches and again at 24 to 36 inches, extending horizontally at both ends. The ADAAG standard (4.8.5) for constructed facilities requires handrails on both sides of ramps with a rise greater than 6 inches or a horizontal projection greater than 72 inches. The top of handrail gripping surfaces are to be 34 to 38 inches above the ramp surface.

There are numerous advantages to using ramps for pool access. Ramps can be used by a wide range of individuals, including those with and without disabilities (Mace, 1993). The Recreation Access Advisory Committee (1994) noted that beginning swimming classes, children, and older people who are ambulatory are among the many broad range of people who use swimming pool ramps. Several authors have noted the ease (Priest, 1991; Schoenbohm, 1962), "independence and dignity that a ramp can give" (Kennedy, 1980, p.35). Yet, ramps are not the most effective nor the most appropriate means of access in all situations.

It is widely believed that the primary use of pool ramps is to allow someone using a wheelchair to roll into and out of the pool, but ramps may not be effective for many people who use wheelchairs. There are significant problems with using wheelchairs in all but the most shallow of waters. Standard wheelchairs are not designed for underwater use and are too expensive to allow repeated, prolonged submersion. The use of standard wheelchairs in pools may cause sanitation problems as dirt, oil, and grease wash from a wheelchair (Mace, 1993). Water resistance and swimmer buoyancy also create difficulties for patrons using wheelchairs on ramps. The additional space and related costs required for a ramp may not be feasible in smaller pools.

Transfer Wall

Two similar pool designs have been used to assist people with mobility impairments in entering and exiting pools by creating a transfer surface at the pool's edge: the transfer wall (Mace, 1993) and the dry ramp (Blakey, 1992; Osinski, 1993). In the first design the coping or edge of the pool is raised above the level of the deck, forming a small wall around the perimeter of the pool. The water is also raised to a height just below the wall edge. In the second, a ramp is depressed into the pool deck to run along the outside of a pool. The pool deck is essentially lowered to a level transfer point at wheelchair height.

Both the transfer wall and the dry ramp are designed to form a transfer point above the pool deck and even with the water level. Mace (1993) recommended a height of 17 to 20 inches above the deck, Hunsaker (1989) recommended a height of 18 inches, and Osinski (1993) a height of 19 inches. By comparison, ADAAG requires a maximum height range of 17 to 19 inches for two different transfer surfaces: shower bench seats (4.21.3) and water closets (4.16.3). Mace (1993) also suggested the top of the wall be made wide enough (approximately 18 inches) to function as a seat or bench, "allowing some wheelchair users to transfer from the chair to the bench-like wall, and from there into the water. The water level should be as close to the top of the wall as possible to provide aid in getting out of the water" (Mace, 1993, p. 36). Mace and Blakey (1992) also recommended grab bars be placed on the transfer wall to facilitate transfers. Osinski (1993) suggested dry ramps descend at a maximum slope of 1:12 to a point 19 inches below the transfer wall. This would create the same effect as the transfer wall but for only a small segment of the pool.

The advantage of the transfer wall and dry ramp is that they enable those who use wheelchairs and those unable to use pool ladders to transfer more easily into and out of the water. The most difficult transfer for someone using a wheelchair is from ground level to the chair seat. Rising from ground level to chair height is also difficult for someone with arthritis or weakness in their lower limbs. Dry ramps have the added advantage of requiring much less space, and

therefore less cost, than a ramp into the pool (Osinski, 1993). As the ramp only extends to a point 19 inches below the deck, a much shorter ramp is required.

As with other access methods, transfer walls and dry ramps will not be effective for all users. Some users with disabilities will not be able to easily transfer to and from the transfer point. For existing pools, the transfer wall and dry ramps may not be feasible. Also, the 19-inch height of the transfer wall may be too high for children (Center for Accessible Housing, 1992).

Stairs

Though not usable by as wide a range of people as some other alternatives, stairs provide greater access for many. Ambulatory swimmers with arthritis, joint replacements, or muscle weakness will find stairs much easier to use than ladders, which require greater leg strength and place more stress on the lower joints. Non-ambulatory swimmers capable of independent transfers may find stairs helpful, especially when exiting pools. Children and new swimmers may use the stairs to ease their acclimation to the water. All swimmers may use the stairs as rest areas where they can sit and chat for a while. With so many effective uses for stairs, it should not be surprising that Blakey (1992) reported that the use of stairs in pool designs is increasing.

There are several features of stairs that are particularly important for providing access to people with disabilities: surface, width, riser height, tread depth, nosing, and handrails. There is universal agreement that stair surfaces should be non-slip, yet non-abrasive. Recommended riser heights range from 4 to 6 inches, and recommended tread widths range from 12 to 18 inches (Illinois Department of Conservation, 1978; Indiana Department of Natural Resources, 1981; Mace, 1993; Ries, 1973). Riser heights are not specified in ADAAG (4.9.2) though uniform riser heights are required. Uniform tread widths of no less than 11 inches wide are also required (ADAAG 4.9.2). As with ramps, recommendations for the height of stair handrails have varied from 24 to 36 inches. Mace (1993) recommended handrails be placed at 20 to 24 inches and again at 24 to 36 inches. The ADAAG standard (4.9.4) for constructed facilities requires handrails on both sides of stairs with a rise greater than 6 inches or a horizontal projection greater than 72 inches. The top of the handrail gripping surfaces are to be 34 to 38 inches above the stair nosing.

Transfer Steps

Transfer steps are used in conjunction with pool stairs, extending the stair configuration to a transfer surface above the pool deck. The transfer step design enables a person to transfer from a wheelchair and move to and from the water, one tread at a time. Transfer steps require upper body strength to complete the multiple transfers. They can be either permanent or movable; in

neither case should transfer steps obstruct access to the stairs for ambulatory persons.

As transfer steps are a continuation of the configuration of the pool stairs, the specifications of stairs discussed previously would apply to transfer steps as well. Transfer steps would continue to rise to a platform from which someone could easily transfer to a wheelchair. The recommended height of the platform has varied between 14 and 19 inches (Illinois Department of Conservation, 1978; Indiana Department of Natural Resources, 1981; Mace; 1993; Osinski, 1993; Popke, 1994). Mace (1993) has recommended the transfer platform be a minimum of 24 inches square, to provide ample space for side transfers. Popke (1994) has recommended a platform 24 inches wide and 14 inches deep.

Osinski (1993) recommended that handrails be placed to allow either left or right handed access. Parks Canada (1994) recommended that one continuous railing be placed along the back of the platform and along the side opposite the transfer space. The recommended heights of handrails for transfer steps have been consistent with those for stairs.

Pool Lifts

Pool lifts are mechanical devices that move a person into or out of the water. A variety of lifts are currently available; some are permanently installed others are portable, placed in a deck mounting or rolled into place when needed. Lifts may require a transfer from a wheelchair to the lift seat or may have a sling seat that moves the person directly from a wheelchair to the water. Some lifts are power operated and others are operated manually; some can be operated independently by the user, while others require assistance.

There are very few specifications for pool lifts mentioned in the literature. Osinski (1993) suggested a seat height of 19 inches above the deck to facilitate transfers to and from wheelchairs. She recommended that lifts be placed such that they lower users into "shallow or standing depth water." Osinski also recommended lifts be constructed with corrosion-resistant materials to protect them from water and pool chemicals, that they be sturdy and lightweight, and that they be securely anchored and bolted into the deck.

Lifts are both useful for "people with severe disabilities who cannot use other methods to enter the pool and for those with minor mobility impairments who may find lifts easier to use" (Mace, 1993, p. 36). For some large individuals with severe disabilities, lifts may provide the only viable means of access. In pool facilities where space limitations prohibit the use of ramps or steps, lifts provide an effective and relatively inexpensive alternative.

Though lifts provide pool access regardless of the user's physical limitations, lifts have not received universal acceptance. Without explanation, Parks Canada (1994, p. 57) referred to lifts as the "least desirable form of pool entry." Lifts, often do require an available power source, but the most frequently used power source, water, is usually readily available at pools. As with any mechanical device, lifts must be kept in good working order to ensure that a pool facility is always accessible. In some situations, trained personnel will be needed to operate the lift (Mace, 1993).

The issue of independent operation of lifts is a controversial one. Osinski stated that, "The best lifts are those that can be operated by the individual with little or no assistance" (Osinski, 1993, p. 18). Conversely, Popke (1994, p.40) reported that manual lifts, which require assistance, ensure that "someone other than a user will be nearby while a person is in the water. You never want to place a disabled individual into a pool unchaperoned." Though few would argue that anyone, including someone with a disability, should swim alone, disability should not be the discriminating factor to determine who can participate independently.

Moving Pool Floors

Moving pool floors allow the entire pool floor, or just a section of the floor, to be raised or lowered to any depth or to a desired slope (Kacius, 1990). Hydraulic pistons are used to move the reinforced concrete or fiberglass sub-floor. If the floor is not perforated or slotted, a PVC grill around the perimeter of the floor allows water to circulate both above and below the floor. When the floor is raised to deck level, participants can either walk or roll their wheelchairs onto the pool floor and be lowered to the desired water depth "at a rate of approximately one foot per minute" (Osinski, 1993, p. 18). In 1994, the average cost of movable floors was reported to be $300,000 (Nianiatus, 1994).

The movable floor concept has been called "one of the greatest swimming pool innovations" (Priest, 1991, p. 9). An advantage of the movable floor is that it provides easy access to nearly anyone, while adding great flexibility to a facility. Competitive pools must be a uniform 6 to 9 feet deep (Kacius, 1990), much too deep for novice swimmers, young children, water aerobic programs, and some people with disabilities. The movable floor can be raised to any depth to accommodate these varied needs (American School & University, 1977). Raising the floor to deck level also provides a large multi-purpose space (Mace, 1993). In addition, multiple swimmers with disabilities can be moved into and out of the pool at one time. The disadvantages of the movable floor are 1) the relatively high initial cost for equipment and installation, 2) the time it takes to move into and out of the pool, 3) the general disruption of pool activities when the floor is moved, 4) the dependency on others for a person with a disability to move into and out of the water.

Zero Depth Entry

The growth in wave pools, leisure pools, and family aquatic centers has spawned the development of zero depth entry designs. This design creates an end of the pool where the tank bottom begins at the deck level, similar to a beach, and often gradually slopes to a depth of 60 inches (Fuerst & Reiner, 1991).

One of the significant advantages of the zero depth entry pool is that people with disabilities and people without disabilities participate in the aquatic activities together. As Fuerst and Reiner (1991, p. 6) noted, "This participation happens naturally at no additional cost to the sponsoring agency." This design enables people with disabilities greater independence by providing access that is always available and is integrated into the setting. It allows people with disabilities to freely interact with their families, friends, and others. Zero depth pools also have much greater appeal to children and older adults, therefore will probably result in an increase in water activity use by older individuals (Kacius, 1990).

Zero depth pools are not feasible in all situations. The gentle sloping of the vessel bottom will require significant space. With pools used for competition and existing multi-purpose pools, zero depth entry may not be possible. As with ramps, the zero depth pools require a person using a wheelchair to transfer to an aquatic chair or use a personal chair to enter the pool.

Building Codes

Swimming pool building codes for 48 of the 50 states were reviewed for requirements related to access by people with disabilities. Though only 13 of the codes specifically address pool entry and exit by people with disabilities, nearly all of the codes contain requirements that could affect pool access. Standards for deck surface, pool ingress and egress, ramps, stairs, lifts, handrails, underwater benches, water depth, and pool bottom slope were reviewed. Summary tables of the state codes may be found in Appendix B.

Only Oklahoma specifically requires a means of access be provided for people with disabilities in public swimming pools, though several states require accessible ingress/egress in "special use" pools designed for use by people with disabilities. Oklahoma requires all public pools provide either a ramp or lift for use by people with disabilities. The state of Washington's code encourages "designs permitting entry/exit for impaired or handicapped persons" but does not require it or specify acceptable designs. Similarly, the Florida code permits "permanent or portable steps, ramps, handrails, lifts or other devices designed to accommodate" people with disabilities and advises pool design engineers and owners that the "Americans with Disabilities Act of 1990 may relate to public

pools and should be reviewed." Several codes contain standards for ramps, lifts, and raised pool coping when they are provided, but the codes do not require they be provided. New York requires pool access by people with disabilities, when provided, be located in the pool's shallow end and consist of an 18 inch high "block of steps followed by a normal set of pool steps," referred to in this manuscript as a transfer step. The New York code does allow the use of hoists or ramps as alternatives to the transfer step.

Although the design of pool decks is not the primary focus of this review, the minimum clear space may affect various pool ingress/egress designs and devices. Most states (35) require a minimum deck width ranging from 48 inches to 96 inches, though four of those states have reduced or no requirements for health clubs, treatment, and therapy pools. A 48-inch minimum width is stipulated by the largest number of states (12), with 60 inch and 96 inch minimum widths each specified by eight state codes. Three states vary the requirements for pool deck width based on the size of the pool, using 1500 and 1600 square feet as thresholds. The minimum space around pool equipment (e.g., diving boards, slides, lifts, etc.) varies between 24 inches and 60 inches. Only the 24 inch minimum deck clearance required by two states would fail to meet the minimum space requirements of 36 inches (ADAAG 4.3.3) for an accessible route, though the 48 inch minimum deck width required by many states does not provide the requisite 60 inch passing space (ADAAG 4.3.4).

State codes are in general agreement on several aspects of pool ingress and egress. Codes universally require a minimum of two means of ingress and egress for each pool, one at each end. A minimum of four ingress/egress points (two on each end, one on both sides) is required if the pool is greater than 30 feet wide (20 feet in Arizona). Also, most state codes require points of ingress/egress at least every 75 feet of pool perimeter, although Michigan requires a means of ingress/egress no more than 50 feet from any point in the pool. At least one ingress/egress point must be provided in the pool's shallow end if the vertical water depth is 24 inches or greater. A depth of less than 24 inches is considered a "natural entry." Ladders, stairs, recessed treads, ramps, and swim-outs are generally considered means of ingress and egress, though some state codes only consider ladders, stairs, and recessed treads when calculating minimum ingress/egress points.

Ramps are specifically addressed in only seven of the state codes. Ramp slopes are stipulated in only two of the state codes: the Wisconsin code requires that ramp slopes not exceed 1:10, and the Ohio code requires that pool ramps comply with the Americans with Disabilities Act, which would imply a maximum slope of 1:12. Other codes address the ramp surface (non-slip), location in the pool's shallow end, handrails, and width. The Wisconsin code specifies a

minimum width of 36 inches, a five foot level clearance at the bottom of ramps, a slip-resistant surface, and handrails on both sides 30 to 34 inches above the ramp surface with a second rail mid-height between the ramp surface and the top rail. The Michigan code requires that ramps terminate at a depth of 3.5 feet or less, a slip-resistant surface, and "sturdy" handrails along both sides. The Idaho code also requires handrails on both sides of the ramp, while the Iowa and North Carolina codes require a handrail on only one side.

Pool lifts are mentioned in only two of the state codes: Delaware and Florida. Both states require that lifts, when provided, be mounted into the pool deck and have a minimum deck width of four feet behind the lift mount.

Stairs are discussed in 29 of the state codes, with general agreement that stairs should have a slip-resistant surface and uniform riser height (except for the top and bottom steps that may vary up to two inches). The maximum riser height allowed by state codes varies between 10 and 12 inches, with 10 inches required by 17 of the 27 state codes stipulating a maximum riser height. Only four state codes specify a minimum riser height: three require a 10-inch minimum riser height and one state code requires a 7-inch minimum height. A minimum tread width of 12 inches is required by 12 state codes, and a minimum width of 24 inches is required by three states. A minimum tread depth of 12 inches is required by four states and 10 inches is required by three states. At least one handrail is required on stairs by seven state codes, with Wisconsin the only state that requires handrails on both sides of stairs.

Pool water depth may affect access by people with disabilities, especially children. Using a wheelchair on pool ramps may create a hazard if the ramp ends at a depth too deep for a person seated. Required minimum pool depths in the shallow end range from 2 to 3.5 feet, with 3 feet the most frequently occurring minimum depth. The maximum depth of the shallow end ranges between 3.5 and 5 feet, any of which would be problematic for children seated in a wheelchair. It might not pose a problem when entering a pool using a wheelchair, as an individual could float or begin to swim once in the water. Exiting the pool, however, a person would need to re-enter the wheelchair on the level landing at the base of the ramp, which probably would be too deep.

Handrail diameters are specified by only four state codes. Louisiana, North Carolina, and West Virginia stipulate that handrails have diameters between 1 and 1.9 inches, which is at variance with the ADAAG 4.26.2 requirement of 1¼ inches to 1½ inches. The Ohio state code requires that the ADA, and therefore ADAAG, be followed.

Existing Standards

Neither the Standard for Public Swimming Pools (ANSI/NSPI-1 1991) nor the Standard for Public Spas (ANSI/NSPI-2 1992) directly addresses access to pools by people with disabilities. Each, however, contains criteria that may affect the development of standards for swimming pool accessibility.

Standards 3.5 of both ANSI/NSPI-1 1991 and ANSI/NSPI-2 1992 require surfaces within pools and spas to be slip-resistant without the texture causing discomfort or injury. This is compatible with the needs of users who have mobility impairments, and with surface requirements of accessible routes in ADAAG 4.5.1. The slip-resistant surface provides a safe, stable footing for those who can ambulate. Yet, some slip-resistant surfaces can be abrasive and uncomfortable, especially for someone transferring to and from the surface.

Standard 4.8 of ANSI/NSPI-1 1991 addresses underwater seat benches, which can also be used to facilitate exiting pools by people with mobility impairments. The standard stipulates that underwater seat benches, when provided, must have a maximum bench top depth of 20 inches below the waterline. Transferring up 20 inches might be difficult, though body buoyancy in water would reduce the difficulty of such a transfer.

Standard 5.2 of ANSI/NSPI-1 1991 requires at least two means of entry into and exit from pools, with a minimum of one for every 75 linear feet of pool wall. The standard stipulates that only ladders, stairs, and recessed treads may be used for the minimum entry/exit points. Though this standard does not preclude the use of ramps, lifts, or transfer points, assumably they may not be considered in calculating minimum entry/exit points.

Standard 5.3 of ANSI/NSPI-1 1991 deals with the design of pool stairs. Stair treads must be a minimum of 10 inches deep and have a minimum unobstructed surface area of 240 square inches. Risers must have a maximum uniform height of 12 inches. The standard also requires a minimum of one handrail for each set of stairs. Standard 5.3.3.3 dictates that outside diameters of handrails be between 1 inch and 1.9 inches. This differs from the requirement of ADAAG 4.26.2, wherein the diameter of handrails is to be 1¼ inches to 1½ inches.

Recreation Access Advisory Committee

In July of 1993 the Access Board convened the Recreation Access Advisory Committee, a group of experts representing people with disabilities, manufacturers of leisure products, operators of leisure facilities, public agencies, designers, and others interested in accessibility. The committee was appointed to "provide advice and information to the Access Board on accessible design" of "programs, entities, and structures that are made available to the public for

recreation" (Recreation Access Advisory Committee, 1994, p.iii). Due to the diversity of recreation and leisure environments, the committee was divided into six sub-committees that allowed members to concentrate their expertise on recreation environments with which they had the most knowledge. Three of the sub-committees, sports facilities, places of amusement, and outdoor developed recreation areas, directly addressed issues related to entering and exiting pools. As the full committee did not attempt to resolve differences among the three sub-committees, each sub-committee's recommendations are discussed below. This section concludes with a discussion of the public comments on the Advisory Committee's report.

Sports Facilities

The Sports Facilities Sub-committee acknowledged three underlying tenets of providing access to these environments: 1) pools are "highly developed spaces" for which accessible design is more easily achieved and, by inference, expected, 2) the overriding objective "is to allow persons with disabilities to use the facilities independently and in a dignified manner" (Recreation Access Advisory Committee, 1994, p. 16), and 3) diversity of user needs precludes a single solution but requires a range of alternatives. Ramps, lifts, transfer steps[1], and movable floors were the alternatives listed and discussed in the sub-committee's final report.

The sub-committee recommended that a minimum of one accessible means of getting into and out of pools be required. For larger pools, the sub-committee recommended that two different means of access be required. The size of larger pools, whether measured by water surface area or user capacity, was not defined. Ramps, lifts, and a combination stairs/transfer steps were stipulated as the accessible means of pool entry/exit. The sub-committee recommended specific changes in ADAAG to accommodate each means of access.

The Sports Facilities Sub-committee recommended that ramps comply with ADAAG 4.8 with only two modifications. As most state codes require multipurpose pool tank depths be a minimum of 42 inches, the sub-committee recommended that pool ramps not be limited to the 30 inch maximum vertical rise specified in ADAAG 4.8. The sub-committee also recommended that handrails not be required to extend beyond the base of a ramp where the handrails would protrude into a swimming lane or "otherwise programmable area," as handrails can present underwater safety hazards.

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[1]The Sports Facility Sub-committee used the term "transfer tier." a registered product of Triad. As other companies offer similar products, the more generic term transfer step is used in this manuscript.

There were several recommended changes in ADAAG related to stairs and transfer steps. Citing pool construction practices that preclude the use of stair nosing, the sub-committee recommended that risers be permitted to be vertical and without angled nosing. The sub-committee also recommended that transfer steps extending the stair tread/riser configuration to a level 17 to 19 inches above the pool deck be provided. This is the seat height range for standard adult wheelchairs, which would facilitate a person's transfer to and from the wheelchair. Extrapolating from ADAAG 4.35.4 requirements for benches, the sub-committee recommended that the transfer steps provide treads and a top transfer surface with a 36 inch minimum depth and a 24 inch minimum width.

The other stair/transfer step recommendations related to handrails. As with ramps, the sub-committee recommended that handrails not be required to extend beyond the base of the stairs if the handrail would extend into a swimming lane or otherwise programmable area. To accommodate a person sitting on the stair treads to transfer into and out of the pool, the sub-committee recommended that a handrail be required at a height of 17 to 19 inches in addition to the handrail at 34 to 38 inches required in ADAAG 4.9.4(5). The Sports Facility Sub-committee recommended only one handrail be permitted on either side of the stairs or within the stairs where a minimum 22 inch stair tread width is maintained. The sub-committee argued that requiring two handrails (with extensions) would obstruct movement to the transfer surface by a wheelchair user, that many pool stairs do not have "sides" on which to install handrails, and that "support is not as critical due to buoyancy." This final argument is questionable, as the relationship between support and buoyancy is only relevant once a person's point of buoyancy is reached. Prior to that the need for support would seem as great or greater than in non-pool environments.

Places of Amusement

The Places of Amusement Sub-committee also addressed pool access issues. It identified stairs, ramps, transfer steps, lifts, ladders, zero depth entry, and raised pool walls as means of entering and exiting pools. Unlike the Sports Facilities Sub-Committee, which limited accessible entry to one of three methods, the Places of Amusement Sub-committee provided the identified methods as examples but did not limit accessible alternatives to those identified.

The sub-committee stipulated that handrails be required on only one side, or in the center of stairs greater than 60 inches wide. This differed from the 22 inches clearance recommended by the Sports Facilities Sub-Committee.

For aquatic ramps, the Places of Amusement Sub-committee specified minimum slope (1:12) and width (36 inches) but did not provide a rationale for either criterion. The sub-committee also recommended a level landing (minimum 60 by

60 inches) be required 24 to 30 inches below the stationary water level; landings not be in the path of swimming lanes or water currents; landing edges and ramp edges not attached to a wall have rounded curbs 1½ inches high; and handrails be provided only on one side of a ramp, away from the body of water, and not extend beyond the end of the landing.

The sub-committee recommended that zero depth entry have a slope of 1:16 and lead to a level landing. Also, handrails would not be required at sides of zero depth entry paths where the ramping begins within 60 inches of the water's stationary level. No rationale was provided for the slope or the lack of handrails.

The Places of Amusement Sub-committee, as did the Sports Facilities Sub-committee, recommended that transfer steps have a highest transfer level 17 to 19 inches above the deck. Transfer steps would have risers 5 to 7 inches in height and treads with minimum measurements of 14 inches deep and 14 inches wide. The sub-committee recommended that transfer steps extend to a point 12 to 24 inches below stationary water level, though they indicated that research is needed to determine the depth at which a seated person becomes buoyant. A "wheelchair landing", 60 inches by 60 inches, would be required adjacent to the pool edge and the transfer steps, and one handrail would be required at the side of the transfer step opposite the landing.

The sub-committee indicated that lifts, manual or mechanical, could be used for access. The sub-committee also recommended that when lifts are used there should be continuous attendant observation. Finally, the sub-committee recommended that transfer wall heights extend no more than 19 inches above the deck and be at least 60 inches in length.

Developed Outdoor Recreation Facilities

The Developed Outdoor Recreation Facilities Sub-committee was the third group to address swimming pool access. This sub-committee identified ramps and stairs as the forms of water entry and provided recommendations for each. For ramps, the sub-committee recommended the slope not exceed 1:12, a maximum rise of 30 inches, and a minimum clear width of 36 inches. Landings would be required at the top and bottom of each ramp segment and each point at which the ramp turns. The sub-committee left it to the site designers and managers to determine whether handrails are needed. When a handrail is provided, it would meet ADAAG 4.8.5 requirements, except the top rail at the bottom (water end) of the ramp would end at water level.

The sub-committee recommended that stairs be required when access by ramp is not feasible or desired. Stairs would be a minimum of 36 inches wide, uniform riser heights and tread widths, treads at least 18 inches deep, and risers 4 to 6

inches high. Rationale was not provided for any of the criteria. As with ramps, the need for handrails would be determined by site designers and managers.

A comparison of the three sub-committees' recommendations is provided in Table 1.1. Regarding ramps, the three sub-committees agreed on the maximum slope (1:12), the minimum width (36"), and the need for level landings at the top and bottom of the ramp. There was disagreement on the maximum vertical rise and on handrails. Only two of the sub-committees discussed maximum vertical rise. The Developed Outdoor Recreation Sub-committee recommended a maximum rise of 30 inches , which is the requirement of ADAAG 4.8. The Sports Facilities Sub-committee recommended the maximum rise not be limited to the existing ADAAG requirement, as "most state codes require multipurpose pool tank depths to be a minimum 42 inches" (Recreation Access Advisory Committee, 1994, p. 19). Limiting the maximum rise to 30 inches would require another level landing in the ramp, extending the length and increasing costs. All three sub-committees agreed that handrails, when provided, should not extend beyond the end of the ramp landing. Only the Developed Outdoor Recreation Sub-committee, however, recommended that the need for handrails at ramps be determined by the site designer and manager.

On the issue of stairs, there was less agreement among the three sub-committees. Two of the sub-committees specified that one handrail be required on pool stairs. Those two differed on the minimum clear width needed for a handrail to be placed in the center of the stair, 22 inches versus 30 inches. The third sub-committee left it to the site designer and manager to determine whether any handrails are needed. The suggestion of one group to require rails at both the 34 to 38 inch height, required in ADAAG, and at 17 to 19 inches would provide a rail within the comfortable reach of anyone using the stairs to transfer into and out of the water. Two of the groups disagreed on where handrails should end. One recommended that handrails not extend beyond the base of stairs, and the other suggested that the top rail end at water level and extend 12 inches parallel to the water surface. Though the two recommendations could result in handrails ending at the same height, only one would require it to extend beyond the base of the stairs. The two groups also disagreed on the depth of stair treads: 11 inches versus 18 inches. There was no disagreement that risers should be uniform, but only one group specified riser heights be between four and six inches.

Table 1.1. Comparison of Swimming Pool Accessibility Recommendations.

	Sports Facilities	Places of Amusement	Developed Outdoor Recreation Facilities
Ramps			
Surface	not specified	•slip resistant •rounded 1½ curb on any edge not attached to wall	not specified
Slope	1:12 max.	1:12 max.	1:12 max.
Vertical rise	not limited to 30" max. of ADAAG 4.8--refers to 42" min. pool depth of state building codes	not specified	30" max.
Width	36" min.	36" min.	36" min.
Landings	60" X 60" at top and bottom	•60 X 60" located 24-30" below stationary water level •not in path of swimming lanes or water current •rounded 1½" curb	•top and bottom of ramp •60" X width of ramp •60" X 60" at direction change
Handrails	not required to extend beyond base when it would protrude into lane or programmable areas	•only on one side, away from body of water •not beyond end of landing nor intersect swimming lanes •34-38" high •diameter 1¼-1½"	•need determined by site •at bottom (water end) of stairs, top handrail must end at water level, extending 12" parallel to water surface
Stairs			
Width	22" min.	not specified	36" min.
Tread	11" min. (ADAAG 4.9.2)	not specified	18" min.
Risers	uniform heights	not specified	4-6"
Handrails	•one handrail required •handrails at 17-19" as well as 34-38" •not required to extend beyond base of stairs	only on one side or in center of stairs greater than 60" wide	•need determined by site •at bottom (water end) of stairs, top handrail must end at water level, extending 12" parallel to water surface

Table 1.1. Comparison of Swimming Pool Accessibility Recommendations.

	Sports Facilities	Places of Amusement	Developed Outdoor Recreation Facilities
Transfer Steps			
Width	extends stair configuration	14" min.	
Tread	extends stair configuration	14" min. depth	
Risers	extends stair configuration	5-7" height	
Surface height	17-19" above deck	17-19" above deck	
Surface dimensions	not specified	60 X 60"	
Handrails	•on one side of transfer surface •handrails at 17-19" as well as 34-38" •not required to extend beyond base of stairs		
Lifts			
Specifications	technical specifications reserved	•technical specifications not discussed •continuous observation	
Zero Depth Entry			
Surface			
Slope		1:16 max.	
Handrails		not required at sides where ramping begins within 60" of water's stationary edge	
Movable Floor			
Specifications	technical specifications not discussed		
Raised Pool Wall			
Specifications		•19" max. height •60" min. length	
Ladder			
Specifications		must not intersect with stationary water level	

All three of the sub-committees recognized transfer steps as a viable alternative for pool entry and exit. The groups generally extended the stair configuration to transfer steps. Two of the groups stipulated the transfer steps rise to a point 17 to 19 inches above the pool deck. Only one of the sub-committees specified dimensions (60" by 60") for the top transfer surface. Only one sub-committee commented on each of the other features of transfer steps and on the remaining methods of pool access.

Public Comments

The U.S. Access Board received approximately 600 public comments on the Recreation Access Advisory Committee's report (1994), though only 58 of the comments addressed swimming pools. A breakdown of the comment sources is presented in Table 1.2.

Table 1.2 Public Comments on Recreation Access Advisory Committee's Report

Source	N	%
Individual	11	19
State Agency	8	14
Federal Agency	1	2
Municipal Agency	5	9
University Faculty	1	2
University Student	16	28
Rehabilitation Facility	1	2
Disability-related Group	10	17
Pool or Related Industry Association	3	5
Park & Recreation Professional Organization	2	3

The majority of those who commented (71%) agreed that a minimum of one means of accessible entry to the water be required and that a second, alternative means be required for larger pools (53%). There were few specific criteria suggested for distinguishing large pools, though several individuals suggested pools "Olympic size" or larger. Pool capacity, extent of use, type of use, and size of the facility housing the pool were also suggested as factors that should be considered. Most comments indicated it should be the facility operator's choice as to which method of pool ingress/egress is used.

There were individuals who questioned the need for technical specifications for the "means of access" into the water. Approximately one-half of the comments

indicated that technical specifications would be necessary to ensure compliance or reduce confusion. Others cautioned against mandating particular technologies or methods of access, preferring to leave open the "opportunity to explore additional means of access more freely."

Most of the comments agreed that none of the proposed solutions provided fully independent access to the water. Several comments noted the benefits of zero depth entry pools to many users. Other comments suggested a method not discussed in the report: a transfer wall around the pool edge, with the pool water height actually above the deck level[2]. Two comments proposed a maximum ramp slope of 1:20 for ramps into and under water, to counteract the buoyancy of individuals in water. They noted the difficulty of pushing a wheelchair underwater and the tendency of chairs to tip over backwards when going up a ramp under water.

Design/Device Costs

Through searches of Abledata, disability and aquatic journals, and vendor literature; discussions with vendors at the National Recreation and Park Association National Congress; contacts with product manufacturers; and referrals by the project advisory panel, a comprehensive list of existing products and their costs were compiled (Appendix B). Construction estimates for designs of a dry ramp/transfer wall and a wet ramp (Appendix B) were developed by Mr. Tom Begley, Bradford Woods Facility Engineer. The following discussion is based on the findings of those efforts.

The majority of the removable or portable means of pool access were comparable in price, generally ranging from $2,000 to $6,000. Of all of the identified means of pool access, lifts provided the largest number of options from which to choose and the widest range in cost. There were 18 power operated lifts identified, ranging in price from $1,980 to $25,000 (Product Table, Appendix B) with a mean cost of $5,576. The least expensive model was water-powered, but it could not be operated independently by the user. Four removable ramps were identified, with prices ranging from $4,600 to $6,331. The most expensive of the ramps was 15-feet long, made of stainless steel and custom designed for each pool's gutter or perimeter profile. The least expensive ramp, nearly $2,000 cheaper, was also 15-feet long and made of stainless steel. There were also four types of portable stairs available. Prices for the stairs ranged from $972 for a four-step stainless steel model to $3,000 for a five-step stainless steel model. Only two transfer steps could be identified--one at $864 and the other at $2,450. The less expensive transfer steps provided a transfer point 18 to 20 inches above the deck

[2]Several comments referred to this as an "Australian pool," but the American National Red Cross' 1977 book Adapted Aquatics refers to this as a "New Zealand type pool."

and two lower surfaces that stopped at the pool deck. The more expensive unit began at 18 inches above the deck and continued to a point 24 inches below the water line. There were nine aquatic chairs available, seven of which had push rims. Aquatic chairs ranged in price from $662 to $2,200.

Construction costs were estimated for a wet ramp and for a dry ramp/transfer wall. The estimated cost for a wet ramp 36 inches wide and 41 feet long was $8,282. The estimate for a dry ramp 36 inches wide and 19 feet long, leading to a 5-foot square platform adjacent to a transfer wall 17 inches high was $6,180 (see Appendix B). Construction estimates for a zero depth entry and movable floor were not developed, as neither would typically be constructed solely for the purpose of access.

Summary

A comprehensive review of the literature was conducted to identify existing methods of providing swimming pool access, recommended or required technical specifications for each, and perceived advantages and disadvantages of each method. The pool-related literature of the past 35 years, state and regional building codes, existing ANSI/NSPI standards for public swimming pools, and the recommendations of the Recreation Access Advisory Committee and the public comments on those recommendations were reviewed. A search of existing products also was conducted to determine the products' specifications and costs. Finally, an analysis of costs for removable and constructed devices and designs was conducted.

The review of the literature revealed seven means of pool access by people with disabilities: ramps, stairs, transfer steps, lifts, zero depth entry, movable floors, and transfer walls. Though a significant body of information related to pool access was found, no reports of empirical research were found in the literature review. A content analysis of the literature was organized around each of the identified designs and devices. Though minor differences in technical specifications were found, there was general agreement among the various sources.

Swimming pool building codes for 48 of the 50 states were reviewed for requirements related to access by people with disabilities. Though only 13 of the codes specifically address pool entry and exit by people with disabilities, nearly all of the codes contain requirements that could affect pool access. Standards for deck surface, pool ingress and egress, ramps, stairs, lifts, handrails, underwater benches, water depth, and pool bottom slope were reviewed and presented in summary tables.

A review of the Standard for Public Swimming Pools (ANSI/NSPI-1 1991) and the Standard for Public Spas (ANSI/NSPI-2 1992) found that neither directly

addresses access to pools by people with disabilities. Each, however, contained criteria that may affect the development of standards for swimming pool accessibility. Of the seven means of access for people with disabilities identified in the literature, only stairs are directly addressed in the ANSI/NSPI standards.

An analysis was done of the report of Recreation Access Committee to the U.S. Access Board (1994). The committee had divided into six sub-committees to deal with different recreation areas. Three of the sub-committees, sports facilities, places of amusement, and outdoor developed recreation areas, directly addressed issues related to entering and exiting pools. As the full committee did not attempt to resolve differences among the three sub-committees, each sub-committee's recommendations were compared. The reports agreed in areas, though there were significant differences on specific recommendations and the scope of the recommendations. An analysis of public comments in reaction to the committee's recommendations was also presented.

Finally, a cost analysis of the identified designs and devices was completed. There was considerable variability in the costs for each device. Generally however, the additional costs for those designs and devices used to provide greater access to people with disabilities ranged between $2,000 and $8,000.

National Center on Accessibility
Swimming Pool Accessibility

Telephone Survey of Swimmers with Disabilities

Purpose

The purpose of this study was to to determine the needs and preferences of people with diverse disabilities and functioning levels, representing all regions of the U.S. and a wide range of ages regarding effective access to swimming pools. Data were collected regarding subject characteristics; pool behavior including frequency, purpose and type of pool used; preferences and problems associated with various means used to access swimming pools.

Procedures

The survey instrument (Appendix C) was developed by project staff in cooperation with the project advisory panel and the Indiana University Center for Survey Research. The survey was pretested April 10 - 14, 1996 using 25 people with disabilities identified in the original sample pool. After revision of the survey instrument, data collection was conducted from April 25, 1996 - July 16, 1996. The survey was administered by the Indiana University Center for Survey Research in Bloomington. The average interview length was 29.5 minutes. Data were collected by telephone using the University of California Computer Assisted Survey Methods software (CASES). Interviews were conducted from: 9:00 AM - 9:30 PM, Monday - Friday; 11:00 AM - 5:00 PM, Saturday; 1:00 PM - 9:30 PM, Sunday.

The data collection staff included 5 supervisors, 7 senior interviewers, and 29 interviewers. All interviewers received at least 20 hours of training in interviewing techniques before production interviewing. Interviewers received two hours of specific training on the questionnaire. Interviewers were instructed to read questions and response categories at a 2-words-per-second pace. Interviewers were also trained to use neutral probes and feedback phrases.

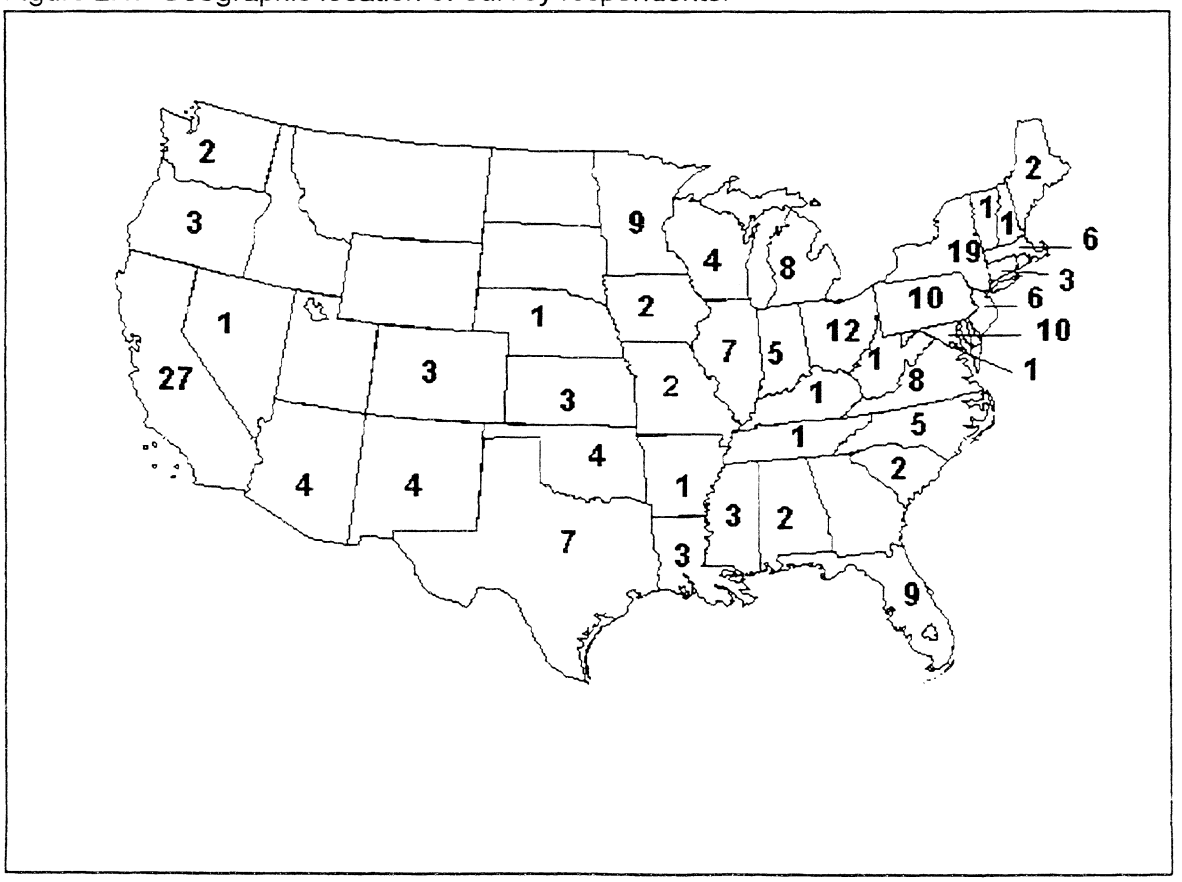
Audio and visual monitoring was regularly conducted by the telephone survey supervisors using the CSR facilities, which do not allow the interviewers to know they are being monitored. Monitoring was conducted randomly, with each interviewer being monitored at least once during each 4-hour shift.

Sample

Prior to pilot testing of the telephone survey, an introductory letter was mailed to 2,900 people with disabilities in the NCA subject database. The letter explained the purpose of the project and requested volunteers for participation in the project. Subjects were recruited through messages to internet disability- related list servers; announcements in disability related newsletters and magazines; and news releases to newspapers.

A total of 449 people volunteered to participate in the survey. An initial sample of 300 people were randomly selected to participate in the study. Of those, 205 (68%) persons with disabilities completed a telephone interview; 12 refused to be interviewed (after 2 attempts); 11 were consistently unavailable after multiple callbacks; 13 were away during the survey period or had an illness; 64 reported they didn't have a disability (replaced in the sample pool); 19 had non-working numbers or problems on the line; and 20 never answered after at least eight attempted calls with at least two attempts in each of four time periods (weekday morning, afternoon, evening, weekend). The geographic locations of respondents are depicted in Figure 2.1.

Figure 2.1. Geographic location of survey respondents.



Results

Sample Characteristics

The subjects interviewed in the study reported a wide range of disabilities (Table 2.1). There were 13 major disability categories represented, with spinal cord injury the most frequently reported disability.

Table 2.1. Subjects' disabilities.

	N	%
Amputee	10	5
Arthritis	6	3
Cardiovascular Accident	2	1
Cerebral Palsy	16	8
Multiple Sclerosis	30	15
Muscular Dystrophy	29	14
Orthopedic Impairment	9	4
Neuromuscular Impairment	12	6
Post Polio	15	7
Spina Bifida	5	2
Spinal Cord Injury	47	23
Visual Impairment	13	6
Other	10	5

Of the 205 subjects interviewed, there were 107 females (52%) and 98 (48%) males (Table 2.2). They ranged in age from 8 to 89 years with a mean age of 47.3 years. They had been disabled for an average of 25.6 years with 2 years the shortest time since disability onset and 64 years the longest. Seventy of the subjects (34%) were identified as ambulatory, which for the purpose of this study indicated the individual did not use an assistive device for mobility or used an assistive device that enabled them to walk (e.g., cane, crutches, walker, prosthesis). There were 132 subjects (64%%) who were non-ambulatory.

Table 2.2. Sample age, disability duration, and mobility by gender.

	Total	Males	Females
Sample	205	98 (48%)	107 (52%)
Age			
N	202	96	106
Mean	47.3 yrs.	46.7 yrs.	47.8 yrs.
Std. Dev.	11.6	11.0	12.2
Disability duration			
N	200	94	106
Mean	25.6 yrs.	25.6 yrs.	25.7 yrs.
Std. Dev.	15.2	13.4	16.8
Ambulatory[a]	70 (35%)	28 (14%)	42 (21%)
Non-ambulatory[a]			
Transfer Assist.	46 (23%)	27 (13%)	19 (9%)
No Assist.	86 (43%)	41 (20%)	45 (22%)

[a]Percentages based on 202 Ss, missing data not included.

Of the subjects who were non-ambulatory, 46 (22%) required assistance in transfers to and from their wheelchairs and 86 (42%) did not require transfer assistance. The mobility aids used by subjects outside of their homes are presented in Table 2.3.

Table 2.3. Study sample by age, mobility aid, and transfer assistance needed.

	Age			
Mobility Aid	**18-29**	**30-34**	**45-64**	**65 +**
None Used				
Transfer Assist				
No Transfer Assist	12	10	10	2
Manual Wheelchair				
Transfer Assist	2	7	4	1
No Transfer Assist	3	22	22	5
Motorized Wheelchair				
Transfer Assist	2	11	10	
No Transfer Assist		8	4	
Motorized Scooter				
Transfer Assist			8	
No Transfer Assist		4	13	4
Prosthesis/Cane/Crutch				
Transfer Assist				
No Transfer Assist		12	16	1
Other Mobility Aid				
Transfer Assist	1	1	2	2
No Transfer Assist				

Pool Behavior

Nearly all of the subjects (94%) had used a pool or spa since the onset of their disability, however, fewer subjects had used a pool or spa within the previous 12 months. There were 122 subjects, 60% of the total sample, who reported they had used a pool or spa within the previous 12 months (Table 2.4). Each of the 38 subjects who had used a spa in the 12 months prior to the survey had also used another type of pool during that time.

For comparison purposes, those individuals who had used a swimming pool during the 12 months prior to the survey were referred to as swimmers. Multipurpose pools were used by a majority of swimmers, and no other pool type was used by as much as 20% of swimmers. Because of the wide variation in the frequency with which swimmers used pools, the median of 12.0 pool visits a year would seem most representative of the sample.

Table 2.4. Frequency of pool use in past 12 months.

Pool	N	Mean	Median	Mode
All Pools	122 (60%)	81.2	12.0	1
Multipurpose Pool	105 (51%)	38.6	10.0	1
Spa	38 (19%)	19.7	3.5	2
Lap Pool	34 (17%)	64.9	13.5	2
Therapy Pool	33 (16%)	60.2	10.0	2
Competition Pool	17 (8%)	22.6	12.0	3
Water Park	10 (5%)	52.3	1.0	1

Recreation was noted by 38% of the swimmers as the primary purpose for visiting a pool during the previous year (Table 2.5). Another 27% of the swimmers listed therapy as the primary purpose for visiting a pool, with recreation department and rehabilitation center pools most frequently used for that purpose. Fitness was the primary reason 20% of swimmers visited pools, which were most often YMCA/YWCA pools.

Table 2.5. Organization operating pool and purpose used in past 12 months.

	Fitness	Therapy	Compete	Recreate	Other	Total
Residence	4	4	--	17	2	27 (23%)
Recreation Dept.	3	7	2	6	5	23 (19%)
YMCA/ YWCA	7	3	--	3	1	14 (12%)
Rehab Center	--	9	1	1	2	13 (11%)
Hotel/ Motel	1	1	--	9	1	12 (10%)
Private Club	2	3	--	5		10 (8%)
University	3	1	2	1	1	8 (7%)
Other	4	4	1	4	--	13 (11%)
Total	24 (20%)	32 (27%)	6 (5%)	46 (38%)	12 (10%)	120

Swimmers most often visited pools with family members (36%) or alone (32%). However, who accompanied swimmers to pools was related to a person's functional abilities (Table 2.6). Swimmers who were non-ambulatory and required transfer assistance were much less likely to visit a pool alone than either ambulatory swimmers or those who were non-ambulatory and did not require transfer assistance. There were no significant differences in companion behavior between ambulatory swimmers and non-ambulatory swimmers who did not need transfer assistance.

Table 2.6. Companions at pool by mobility.

	Total	Wheelchair With Assist[ab]	Wheelchair Without Assist[a]	Ambulatory[b]
Alone	39 (32%)	1 (4%)	18 (36%)	20 (44%)
Family	44 (36%)	12 (46%)	17 (34%)	15 (33%)
Friends	11 (9%)	2 (8%)	5 (10%)	4 (9%)
Family & Friends	4 (3%)	1 (4%)	–	3 (7%)
Others	23 (19%)	10 (39%)	10 (20%)	3 (7%)

[a] $\chi^2 = 11.9$, $p < .01$
[b] $\chi^2 = 19.3$, $p < .01$

Design/Device Preferences

Subjects' preferences for entering and exiting a pool are presented in Table 2.7. Overall, lifts (29%) and ramps (25%) were the preferred methods of entering and exiting pools. There were significant differences in preferences based on subjects' mobility and need for transfer assistance. Ambulatory subjects' preferences were for ramps (33%), stairs (20%), and then lifts (17%). Non-ambulatory subjects, however, preferred lifts (26%), ramps (20%), and then zero depth entry (12%). The differences were particularly striking for subjects who were non-ambulatory and needed transfer assistance, who preferred lifts (53%) and ramps (22%). Further analysis revealed the differences were statistically significant only for swimmers, those who had used a pool or spa in the past 12 months ($\chi^2 = 54.54$, $p < .001$). Non-swimmers' preferences were not significantly different for ambulatory and non-ambulatory subjects ($\chi^2 = 16.54$, $p = .44$).

Table 2.7. Preferred pool access device/design by mobility.

	Total	Wheelchair With Assist	Wheelchair Without Assist	Ambulatory
Lift	57 (29%)	24 (53%)	21 (26%)	12 (17%)
Ramp	49 (25%)	10 (22%)	16 (20%)	23 (33%)
Movable Floor	8 (4%)	2 (4%)	4 (5%)	2 (3%)
Ladder	3 (2%)	–	–	3 (4%)
Transfer Steps	7 (4%)	–	3 (4%)	4 (6%)
Stairs	21 (11%)	1 (2%)	6 (7%)	14 (20%)
Zero Depth Entry	18 (9%)	1 (2%)	10 (12%)	7 (10%)
Raised Coping	10 (5%)	–	9 (11%)	1 (1%)
Other	4 (2%)	1 (2%)	2 (2%)	1 (1%)

Experience & Willingness to use Designs/Devices

A person's experience in using certain designs and devices may have influenced their willingness to use that design/device again. To determine this, respondents were asked whether they had ever used each of the devices and whether they would be willing to use the device again at a pool. The results are listed in Table 2.8. Subjects' willingness to use the designs/devices, factors related to their willingness, and reasons for their hesitancies are discussed under each of the designs/devices.

Across all subjects, the highest percentage were willing to use ramps (73%) and zero depth entry pools (70%). For all other designs/devices, a person's experience, their mobility, or both were related to their willingness to participate.

Ramps. Ramps were affected by both the person's experience with the design and the person's mobility. There was no significant difference between ambulatory and non-ambulatory individuals in their willingness to use ramps. There was a significant relationship between previous experience with ramps and a person's willingness to use a ramp (χ^2=10.15, $p < .01$). However, the relationship was only significant for non-ambulatory individuals. Non-ambulatory individuals who had experience with a ramp were more willing to use a ramp again than were those with no previous experience with ramps (χ^2=9.00, $p < .01$). Previous experience was not a significant factor with ambulatory individuals.

Table 2.8. Ss willing to use designs/devices by experience and mobility.

		Experienced		No Experience	
Design/Device	**Total**[a]	**Non-amb.**	**Ambulatory**	**Non-amb.**	**Ambulatory**
Ramp[b]	141 (73%)	33 (89%)	25 (89%)	47 (62%)	28 (74%)
Lift[bc]	119 (60%)	55 (90%)	11 (85%)	29 (52%)	16 (29%)
Zero Depth	137 (70%)	14 (78%)	11 (79%)	65 (67%)	36 (71%)
Movable Floor[c]	123 (63%)	2 (33%)	1 (50%)	80 (73%)	28 (45%)
Transfer Wall[c]	109 (56%)	10 (63%)	5 (83%)	62 (65%)	24 (39%)
Transfer Steps[c]	97 (49%)	8 (62%)	2 (100%)	48 (47%)	34 (52%)
Stairs[bc]	89 (45%)	28 (47%)	48 (84%)	5 (9%)	4 (36%)

[a]Missing data not included in percentages.
[b]Significant difference between experienced and non-experienced Ss, χ^2, $p < .05$.
[c]Significant difference between ambulatory and non-ambulatory Ss, χ^2, $p < .05$.

Reasons given by respondents who were not willing to use an available ramp focused on four themes. One common response involved the necessity of handrails. Respondents wanted handrails to be on both sides of the ramp, and for handrails not "to be too far apart." A second reason involved surface texture. People were concerned that the ramp surface would be too slippery for traction. Third, respondents who considered their disability to be more severe, indicated that physical assistance would still be needed for transferring to a different chair or to wheel on the ramp. Finally, many of those who indicated they would not use a ramp said they would reconsider using the ramp if an aquatic chair was provided at the pool for use on the ramp. People were concerned that they would be expected to use their personal chairs to enter the water, which would ruin the wheelchairs. As one respondent indicated, "basically the equipment is too expensive to be damaged, if there was a specialized chair that could be submerged then that would be a different story."

Lifts. Subjects' willingness to use lifts were affected by both the person's experience with lifts and the person's mobility. As with ramps, those individuals who had used a lift were more willing to use one again than were those with no

previous experience (χ^2=43.23, $p < .01$). Also, non-ambulatory persons were more willing to use lifts than were ambulatory persons (χ^2=16.68, $p < .01$). Respondents thought that they would consider using a lift to enter and exit the pool, but only if they were able to operate the lift independently. Safety, knowledge of operation, and the lack of routine maintenance checks concerned several potential lift users. The belief that because lifts are mechanical there is a greater incidence for mechanical malfunctions.

More than half of the respondents who indicated they would not use a lift believed the device should be used for people who had "more severe" physical limitations. Many of the ambulatory respondents made comments such as, "I don't need it" or "I'm not that disabled". Concerns about lifts drawing more attention to people with disabilities entering the pool were also indicated. Respondents wanted to be "as inconspicuous as possible."

Zero depth entry. For zero depth entry pools, neither a person's experience with zero depth pools nor the person's mobility affected their willingness to use it. All groups were favorably inclined to use zero depth entry pools.

Reasons given for not wanting to use zero depth entry were similar to those not wanting to use ramps. If an aquatic chair was available, respondents said they would be more open to using zero depth entry. People who were ambulatory or who had a single leg amputation stated reasons for not using zero depth entry as "it's so far to go (to get into deep water)" or "I have to be in the (deep) water before I have any balance". Surface texture was also a concern. Many thought that zero depth entries would be too slippery, and again, the need for handrails to support and assist in balance was identified by respondents.

Movable Floor. A person's willingness to use movable floors was influenced by previous experience, as only 33% of those who had experience with movable floors indicated they would use one in the future. There also was a significant relationship between a person's mobility and their willingness to use a movable floor. Non-ambulatory individuals were more willing to use movable floors than those who were ambulatory (χ^2=16.68, $p < .01$).

Resistance to using a movable floor to enter and exit the water came from those who believed that this design would be "too extreme", "too obvious", and "draw unnecessary attention" to people with disabilities entering the pool. Several of the respondents stated that the movable floor would not work for them because they are unable to stand without support or to "keep their balance in shallow water." Again, people who used wheelchairs preferred to have an aquatic chair available to use on the movable floor. The concern of independence was also

raised with the movable floor. One respondent's statement seemed to summarize the concerns, "it seems too much like you're losing control-- I'm not controlling it."

Transfer Wall. No relationship was found between previous experience with transfer walls and a person's willingness to use the design. Mobility, however, did affect a person's willingness to use a transfer wall. Non-ambulatory subjects were much more willing to use a transfer wall than were ambulatory subjects.

The majority of people believed that the raised edge coping or transfer wall would require significant upper-body strength to enter and exit the water. Other concerns noted by respondents were, "I am unable to transfer independently", the inability to balance, and the possibility of skin damage from the raised surface or transfer wall.

Transfer Steps. Fewer subjects were willing to use transfer steps than were willing to use most of the other devices. A person's previous experience with steps and their mobility had no significant effect on the person's willingness to use the transfer steps.

A number of people were concerned with the amount of upper-body strength required to use transfer steps. Respondents stated that it would take too much time and energy, especially to exit the water. They also identified concerns about the possibility of skin abrasions developing. The belief that transfer steps were "not as practical as the other methods" kept many individuals from using this device to enter and exit the water.

Stairs. Across all subjects, fewer were willing to use stairs than any of the other devices. However, those who had experience with stairs (χ^2=44.71, $p < .01$) and those who were ambulatory (χ^2=39.47, $p < .01$) were more willing to use stairs than those who had not used stairs or those who were non-ambulatory. With stairs, the two factors may be related, as those who are non-ambulatory may have avoided stairs.

The most frequent response given for not using stairs was that the individual was not ambulatory: "stairs are for people who can walk." The reasons for not using stairs, given by people who were ambulatory, was that handrails were necessary for support and balance, and often these handrails "are too far apart." Also, a few people mentioned that riser heights of steps often are too steep.

Public Policy

Required access. Subjects were asked whether "public pools should be required to have one method, more than one method, or no method for people with disabilities to enter and exit the water." All but one of the 205 subjects indicated that at least one method should be required (Table 2.9). The majority (58%) thought that more than one method should be required. Neither mobility/assistance ($\chi^2 = 4.57$, $p = .10$) nor swimming frequency ($\chi^2 = 3.38$, $p = 0.18$) significantly affected subjects' opinions.

Table 2.9. Opinion on requiring pool access means.

	Total	Non-ambulatory	Ambulatory
One means of access	64 (41%)	41 (48%)	23 (33%)
More than one	91 (58%)	44 (51%)	47 (67%)
None	1 (1%)	1 (1%)	--

Access decisions. Subjects were also asked whether the decision of the number and types of pool access should be left up to the designer. More three-fourths of the subjects indicated that the decision should not be left to designers alone (Table 2.10). There were 14 comments related to the question and 12 of those comments suggested that the decision be made in collaboration with persons with disabilities. As with the previous public policy question, neither mobility/assistance ($\chi^2 = 0.08$, $p = .77$) nor swimming frequency ($\chi^2 = 0.41$, $p = 0.52$) significantly affected subjects' opinions.

Table 2.10. Opinion on designer alone deciding means of pool access.

	Total	Non-ambulatory	Ambulatory
Pool designer alone should decide	43 (22%)	27 (21%)	16 (23%)
Pool designer alone should not decide	155 (78%)	101 (79%)	54 (77%)

User Experience with Designs/Devices

Ramps. Sixty-three respondents, 35% of all respondents, indicated they had used a ramp to enter or exit a pool. Most of those individuals (60%) had used a ramp in the previous five years. They majority had used a permanent ramp (94%) with handrails on both sides (56%), a curb or other edge protection (53%), and a level landing at the bottom of the ramp (92%). Respondents perceived the slopes of the pool ramps they used as less steep (44%) or about

the same slope (44%) as that of a "typical ramp in a building." Eighty-seven percent of the respondents reported that an aquatic wheelchair was available at the pool at which they had used a ramp.

Pool ramp users were more likely to use the handrails when they were located on both sides of the ramp (68%) than when there was only one handrail (50%). At those pools with only one handrail, there was a significant difference in the use of the handrail by ambulatory and non-ambulatory pool users (χ^2=5.05, p=.02). Non- ambulatory users were less likely to use the handrail if only one was present. When two handrails were available, however, there was no significant difference between ambulatory and non-ambulatory users (χ^2=1.49, p=.22). Handrails on both sides allow wheelchair users to pull evenly on both sides, but having a handrail on only one side may make it more difficult to control the chair.

Though all pool ramp users indicated the pool ramps they used were about the same or less steep than ramps typically found in buildings, there was a significant difference between ambulatory and non-ambulatory users. Ambulatory pool users more often perceived the pool ramp as less steep than did non-ambulatory users (χ^2=7.38, p=.03). The water may have added greater stability to ambulatory users' legs, thereby improving their mobility.

Most pool ramp users (67%) reported needing no assistance when using a ramp to enter and exit the pool. There was a significant difference between ambulatory and non-ambulatory pool users on their need for assistance (χ^2=9.18, p=.01). Non-ambulatory pool users who required assistance in transferring to and from their wheelchairs were much more likely to require assistance in using a ramp than either ambulatory users or non-ambulatory users who didn't require transfer assistance. Seventy-five percent of all individuals who used wheelchairs on ramps required assistance in pushing the chair out of the water.

Pool ramps were reported to be easy to use (89%), comfortable (95%), and very safe (66%). There were no significant differences between ambulatory and non-ambulatory users on any of those factors. Pool ramps received high satisfaction ratings, with a mean rating of 4.16 out of a possible score of five.
Though all groups were satisfied with using pool ramps, there was a significant difference in satisfaction ratings between those users who could push their wheelchairs out of the water themselves and those who could not ($F_{1,29}$=4.05, p=0.1). Those who could push the chairs by themselves were more satisfied with ramps than those who could not push themselves out of the water.

Only 9 (13%) of the ramp users reported any problems with ramps. Steep slopes, needing assistance pushing out of the water, and slipperiness were most frequently mentioned as problems. Slipperiness was mentioned by both ambulatory and non-ambulatory individuals.

Lifts. Of those respondents who had used a pool since the onset of their disability, 78 (41%) had used a lift to enter or exit a pool. Most of those individuals (78%) had used a pool lift in the past five years, 50% in the past two years. The majority of those lifts were power operated (68%), had a seat (65%), and were not perceived by the users as portable (68%). Of the 18 people who had most recently used a portable lift, seven (30%) had to request the lift be set up. They had to wait from 1 to 20 minutes to have the lift set up, with a mean wait of 6.12 minutes.

Though less than half of the pool lift users (48%) were able to transfer to and from the lift by themselves, the majority (70%) found it easy to transfer to and from the lift. A further analysis indicated a significant difference in the perceived ease of transferring between those who could transfer independently and those who could not (χ^2=20.35, p<.01). The difference could not be attributed to those non-ambulatory users who usually needed assistance to and from their wheelchairs, as there was no significant difference in perceived ease of transfer between ambulatory and non-ambulatory lift users. Analysis of user comments revealed two factors that may have contributed to the difference: the type of lift seat and location of the lift seat. Several users experienced difficulties when transferring onto stretchers and sling seats. One user stated, "I felt like a whale." Comparing ease of transfer by the type of lift seat revealed a significant difference between lift stretcher seats and both formed plastic and sling lift seats (χ^2=7.67, p=.02). There was no statistical difference in ease of transfer between the formed plastic and sling seats. Several users also commented that the location of the lift seat made it difficult to transfer. Proximity to the water's edge, height of the seat, and interference from other objects were common problems.

Fifty-three of the pool lift users (70%) were not able to operate the lift by themselves. At least part of that could be attributed to the type of lift used, as manual lifts were used by 25 (33%) of the pool users. When only power lifts were considered, there were still 29 (59%) of the power lift users who could not operate the lift. Physical ability did not seem to be a major factor, as there were no significant differences among ambulatory and non-ambulatory power lift users. Examination of the lift user comments revealed that the location of the controls was most frequently cited as the reason for not being able to operate the lift. Seventeen of the power lift users (59%) noted that they could not reach or operate the lift controls. A second reason commonly cited as a reason for not being able to operate the lift was pool policies that prohibited independent

operation. There were 13 power lift users (45%) who expressed this reason. Physical limitations were noted by five (17%) of the users.

Pool lift users reported that lifts were comfortable (81%) and very safe (53%). There were no significant differences between power and manual lift users nor between ambulatory and non-ambulatory users for either comfort or safety. Pool lifts received moderate satisfaction ratings, with a mean rating of 3.77 out of a possible score of five. There were no significant differences on satisfaction between type of lifts nor between user mobility.

There were 18 users (23%) who reported problems with lifts. The most commonly cited problems were difficulties with transfers (5), a lack of independence or control (5), and safety concerns. Three pool lift users reported injuries from the lifts, one because the lift fell over on the person.

Zero Depth Entry. Thirty-two respondents, 35% of all those who used pools since the onset of their disabilities, indicated they used a zero depth pool. Most of those individuals (64%) had used a zero depth entry pool in the previous five years. Only 27% of the zero depth entry pools had handrails, and only a third of the users at those pools actually used the handrails while entering and exiting the pool. Assistance in using zero depth entry pools was required by 27% of the users. There was no significant difference in need for assistance between ambulatory and non-ambulatory users (χ^2=0.02, p=.89).

Zero depth entry users found them to be easy to use (80%), comfortable (82%), and somewhat safe (55%). There were no significant differences between ambulatory and non-ambulatory users on any of those factors. Zero depth entry received high satisfaction ratings, with a mean rating of 4.0 out of a possible score of five. There were no significant differences between ambulatory and non-ambulatory users in their satisfaction ratings.

Problems were reported by 18% of the zero depth entry users. Unsure footing, difficulty pushing out of the water, and rough surface were the problems noted. One wheelchair user entered the pool by transferring out of the wheelchair and onto the zero depth entry surface, which was rough and uncomfortable.

Movable Floors. Only 8 respondents, 4% of those who had used a pool since the onset of their disability, had used a movable floor to enter a pool. Only 25% of those individuals had used a movable floor in the past five years. Most pools (67%) were likely to have only a portion of the floor move, which took from 2 to 5 minutes to be raised or lowered, with a mean time of 3.5 minutes. Typically, the floor would have to be cleared of other users when it was being raised or lowered (100%). Most movable floor users (67%) entered the pool

using a wheelchair provided at the facility. Assistance to move on and off of the movable floor was needed by 75% of the users. As there were only a small number of movable floor users and 80% were non-ambulatory, meaningful comparisons between ambulatory and non-ambulatory users were not possible.

Users perceived movable floors to be easy to use (100%), comfortable (75%), and very safe (75%). However, the mean satisfaction ratings of movable floors was only a moderate 3.2 out of a possible 5.

Problems associated with movable floors included a lack of control, instability for ambulatory users with balance limitations, and the need for an aquatic chair. As the controls for movable floors are not reachable from the pool, some users felt they lacked independence or personal control. For other users who were ambulatory but had limited leg strength or balance, there was a concern with their balance while the water was shallow. The need for an available aquatic chair was also noted.

Transfer Steps. Of those respondents who had used a pool since the onset of their disability, 15 (8%) had used transfer steps to enter or exit a pool (Table 2.6). Most of those individuals (75%) had used transfer steps during the past five years, 50% in the past year. The transfer steps were most likely not movable (60%). Only one user had to request the transfer steps be set up, which was accomplished in five minutes. The transfer steps most likely had no handrails (60%) or only one handrail (40%).

The majority of transfer step users (75%) indicated the top of the transfer steps was significantly lower than the seat height of their wheelchairs. Those users indicated the step height did not allow for an easy transfer to and from their wheelchairs. Although all of the transfer step users were non-ambulatory persons who typically required no assistance in their transfers, 60% required someone to assist them in using the transfer steps.

The transfer steps were perceived as difficult to use (60%) but comfortable (60%) and somewhat safe (40%). Transfer steps received a relatively low satisfaction rating (2.8 out of a possible 5). As all of the transfer step users were non-ambulatory, comparisons between ambulatory and non-ambulatory users were not possible.

Balance, transferring difficulties, as well as the size and hardness of the transfer seats were cited as problems with the transfer steps. Because transfer steps have no back support and many of those mentioned by users had no handrails, balance limitations were magnified. In addition, one respondent with lower limb paralysis noted that "having to move my legs as well as my upper body throws

my balance off." As noted previously, most of the transfer steps used by individuals in this study were lower than wheelchair seat height. This caused difficulty for users, especially when transferring back to their chairs. Other users mentioned that the transfer steps were too narrow. Still other users expressed concern with the hardness of the steps, fearing bruising and skin damage.

Transfer Walls and Dry Ramps. There were 23 respondents, 12% of those who had used a pool since the onset of their disability, had used a transfer wall to enter a pool. The majority of those individuals (66%) had used a transfer wall in the past five years. Most of the transfer walls were either significantly lower (50%) or significantly higher (33%) than the seat height of users' wheelchairs. As a result, 83% of the transfer wall users indicated that transfers to and from the wall were not easy. Though all of the transfer wall users were either ambulatory or non-ambulatory individuals who did not usually require transfer assistance, 29% indicated they had required assistance using transfer walls. The width of the raised surface, however, was "just right" for 71% of the users.

Most of the transfer wall users in the study perceived the walls as easy to use (57%), comfortable (57%), and safe (71%). Transfer walls were moderately satisfying to users, with a mean rating of 3.4 out of a possible 5. Problems mentioned regarding transfer walls included the difficulties transferring to and from a person's wheelchair when the wall is lower than the wheelchair seat and transferring from the water to the transfer wall.

Summary

A diverse group of people with disabilities was achieved through the sampling process. The findings of this study indicate that people with disabilities do use swimming pools with some regularity despite the many barriers to their participation cited in the literature (Mace, 1993; Osinski, 1993; Popke, 1994). There was near unanimous agreement that at least one accessible means of entry and exit should be provided at all pools, and most believed that more than one accessible means should be provided. Subjects also clearly indicated that the ability to use a design or device independently was important to them.

Although no one means of access was preferred by a majority of the subjects, the means of access most often preferred were lifts, ramps stairs, and zero depth entry. Stairs however were only preferred by those who were ambulatory. Similarly, ramps, zero depth entry, movable floors and lifts were the means of access most subjects would be wiling to use at a pool. However, most of those who had previously used a movable floor would not be willing to use one again.

Each of the designs and devices had been previously used by at least some of the subjects, with ramps and lifts most frequently cited and movable floor least. Subjects provided valuable insights into the advantages and disadvantages to each of the devices and designs.

National Center on Accessibility
Swimming Pool Accessibility

Aquatic Professionals Survey

Purpose

The purpose of this study was to determine the current practices of pool operations related to entering and exiting swimming pools by people with disabilities. Specifically, the study was designed to examine the prevalence of designs and devices used to provide pool access, related policies and procedures, as well as safety and maintenance concerns of aquatic professionals.

Procedures

The survey instrument (Appendix D) was developed by project staff in cooperation with the project advisory panel and the Indiana University Center for Survey Research (CSR). The survey was conducted by the CSR from July 3, 1996 to August 1, 1996. The average interview length was 26 minutes. Data were collected by telephone using the University of California Computer Assisted Survey Methods software (CASES). Interviews were conducted from: 9:00 AM - 9:30 PM, Monday - Friday; 11:00 AM -5:00 PM, Saturday; 1:00 PM - 9:30 PM, Sunday.

The data collection staff included 5 supervisors, 7 senior interviewers, and 29 interviewers. All interviewers received at least 20 hours of training in interviewing techniques before production interviewing. Interviewers received two hours of specific training on the questionnaire. Interviewers were instructed to read questions and response categories at a 2-words-per-second pace. Interviewers were also trained to use neutral probes and feedback phrases.

Audio and visual monitoring was regularly conducted by the telephone survey supervisors using the CSR facilities, which do not allow the interviewers to know they are being monitored. Monitoring was conducted randomly, with each interviewer being monitored at least once during each 4-hour shift.

Respondents who indicated their pools had one or more of the identified means of entering and exiting pools were requested to complete a follow-up questionnaire. Questionnaires specific to each device (Appendix D) were mailed to the respondents and faxed or mailed back to the investigators. These questionnaires requested information on the specific models, dimensions, configurations, and costs of the devices.

Sample

Potential subjects were identified through the mailing lists of the National Recreation and Park Association's Aquatic Section, Professional Pool Operators Association, Aquatic Therapy and Rehabilitation Institute, World Waterpark Association, Adaptive Aquatics Instructors Association, Hyatt Hotels, and Holiday Inns. A total of 515 people were identified in the sample pool. A survey sample of 150 people were randomly selected to participate in the study and mailed an introductory letter and descriptions of each device and designs (Appendix D). Of the 150 subjects in the survey sample, 103 (69%) persons completed a telephone interview; 2 refused to be interviewed (after 2 attempts); 12 were consistently unavailable after multiple callbacks; 4 were away during the survey period or had an illness; 18 reported they were not affiliated with an aquatic facility; 3 had non-working numbers or problems on the line; and 8 never answered after at least 8 attempted calls with at least 2 attempts in each of 4 time periods (weekday morning, afternoon, evening, weekend). The geographic locations of the survey respondents are depicted in Table 3.1.

Figure 3.1. Geographic location of aquatic professional survey respondents.

Table 3.1. Agencies sampled and mean number of pools by agency and pool type.

	Total	Recr. Dept.	YMCA/ YWCA	Hospital/ Clinic	University	Water Park	Hotel	Other
Agencies	103	58 (56%)	11 (11%)	7 (7%)	5 (5%)	6 (6%)	5 (5%)	11 (11%)
All Pools								
Mean	4.87	5.55	2.36	1.71	1.60	16.70	1.80	2.27
Std. Dev.	6.64	5.59	1.57	0.76	0.55	17.26	0.84	1.56
Multipurpose								
Mean	2.74	3.98	1.18	0.71	1.40	1.33	0.40	1.41
Std. Dev.	3.32	3.94	0.75	0.76	0.55	1.63	0.55	0.69
Competition								
Mean	0.15	0.24	--	--	--	0.17	--	--
Std. Dev.	0.83	1.10				0.41		
Lap								
Mean	0.33	0.52	0.18	--	--	0.33	--	--
Std. Dev.	1.92	2.54	0.40			0.82		
Therapy								
Mean	0.06	0.05	--	0.43	--	--	--	--
Std. Dev.	0.24	0.22		0.53				
Water Park								
Mean	0.28	0.17	--	--	--	3.17	--	--
Std. Dev.	1.25	0.38				4.40		
Other								
Mean	4.67	2.75	1.00	--	--	11.26	1.00	--
Std. Dev.	7.29	3.49	0.00			11.76		

Table 3.2. All pool users and pool users with disabilities by type of agency.

	Total	Recr. Dept.	YMCA/ YWCA	Hospital/ Clinic	University	Water Park	Hotel	Other
All Users								
Agencies	72	40	9	5	5	6	--	7
Mean	116,206	120,390	14,406	8,140	42,750	467,500	--	51,729
Min.	0	8,000	250	0	3,000	275,000	--	3,000
Max.	830,000	800,000	50,000	24,000	127,750	830,000	--	150,000
Users with Disabilities								
Agencies	26	12	3	5	3	--	--	3
Mean	3,713	4,940	125	6,601	1,217	--	--	77
Min.	0	30	75	0	150	--	--	30
Max.	30,000	3,000	200	21,000	3,000	--	--	100

Table 3.3. Number of designs and devices by agency.

	Total	Recr. Dept.	YMCA/ YWCA	Hospital/ Clinic	University	Water Park	Hotel	Other
Access Means								
At least one	75 (73%)	40 (69%)	9 (81%)	6 (86%)	5 (100%)	3 (50%)	4 (80%)	8 (73%)
> than one	49 (48%)	32 (55%)	4 (36%)	6 (86%)	3 (60%)	1 (17%)	--	3 (27%)
Stairs	80 (78%)	47 (81%)	8 (72%)	7 (100%)	2 (40%)	6 (100%)	4 (80%)	6 (55%)
Lifts	57 (55%)	36 (62%)	4 (36%)	5 (86%)	3 (60%)	--	2 (40%)	6 (55%)
Ramps	37 (36%)	25 (43%)	4 (36%)	2 (29%)	1 (20%)	2 (33%)	--	3 (27%)
Zero Depth	30 (29%)	21 (36%)	--	--	2 (40%)	6 (100%)	--	1(9%)
Transfer Wall	10 (10%)	5 (9%)	1 (9%)	3 (43%)	--	--	--	1(9%)
Transfer Steps	8 (8%)	6 (11%)	2 (18%)	--	--	--	--	10 (91%)
Movable Floor	2 (2%)	1(2%)	--	--	1 (20%)	--	--	--

Results

Pool Characteristics

The majority of the pools represented in the survey were operated by municipal recreation departments (56%) with significantly fewer from YMCA/YWCAs, hospitals, universities, water parks, and hotels (Table 3.1). For all but water parks, the most common type of pool was the multipurpose pool. Wading pools (5) were the type of pools most often identified in the 'Other' category.

Of the 103 agencies represented in the study, 72 (70%) collected data on the number of users of their facilities (Table 3.2). The agencies reported a mean of 116,206 users of their facilities in 1995, though there was significant variability in the number of users within each type of agency and among the types of agencies. There were 26 agencies that collected data on the number of pool users with disabilities. For all agencies, the mean number of pool users with disabilities in 1995 was 3,713, which accounted for 14% of the total pool users for those agencies.

Accessible Designs and Devices

Overall, 73% of the agencies reported having "at least one way for people with disabilities to enter and exit the water" and 48% reported having more than one means of access for people with disabilities (Table 3.3). Of those agencies reporting at least one means of access, pool lifts were used by the largest number of agencies (55%). Lifts were the dominant method for each type of agency except water parks, where zero depth entry pools were most often found (100%). Ramps (36%) and zero depth entry (29%) were the other commonly used means of access, though there was great variability among agencies.

Lifts. The 57 aquatic professionals that reported using lifts at their pools were asked how often the lifts were used by people with disabilities in the previous 12 months. Nearly half of the respondents (49%) reported that lifts were used two or more times a week and 47 (62%) reported that lifts were used three or more times a month. There were 8 (15%) agencies that reported the lifts were "never used."

Of the lifts used, 34 (63%) were power operated lifts (hydraulic or electric) and 13 (37%) were manual lifts. Though a majority of the pools were power operated, only 20 (36%) agencies reported their lifts were "constructed in a way that allows people with disabilities to use it independently." There were also 4 (11%) agencies that would not allow their lifts to be operated without staff assistance even though the lifts were capable of being operated independently.

Related to the independent use of lifts was the issue of lift portability. Portable or removable lifts were used by 45 (81%) of the agencies that operated lifts. The vast majority of those agencies (73%) did not have the lift in place at all times. People with disabilities had to request the lifts be set in place before they could be used. A variety of reasons for not having the lifts in place at all times were given by respondents. Safety and liability, low demand for its use, interference with pool competition, and limited deck space were most often cited as reasons for not keeping lifts in place at all times.

Location of the lift seat in relationship to the water's edge required a specific measurement and could not be accurately determined via telephone interviews. Aquatic professional, who reported having a lift, were asked in the follow-up survey to measure the distance from the front edge of the lift seat to the edge of the pool. Measurements were received from 23 of the 25 follow-up agencies with pool lifts. Distances ranged from 3 inches to 36 inches with a mean distance of 15.6 inches.

Respondents were also asked to identify the advantages of their lifts. The advantage mentioned by nearly all respondents was that lifts enabled people with disabilities to readily access the water. Minimal staff assistance and durability were also frequently mentioned as advantages.

There were also a number of disadvantages associated with lifts. The most commonly noted disadvantages related to the program interference of lifts. Respondents expressed concern with the amount of deck space used, staff time required to operate or set up the lift, and interference during swimming competition. There were also safety concerns expressed. Numerous respondents mentioned the maximum weight limitations of the devices and the potential danger for heavy people. One respondent indicated the lift shaft had actually bent while someone was using it. Respondents also cited the lift as a hazard in the lowered position when no one was using the lift. Finally, concern was expressed for the dignity of people with disabilities. Respondents noted that lifts draw attention to users, and in doing so "takes away their dignity." Lifts were rated high for effectiveness and convenience (Table 3.4) and only moderately for maintenance.

Ramps. There were 37 aquatic professionals who reported having wet ramps at their pools (Table 3.3). Of those professionals, 28 (76%) reported the ramps were used by people with disabilities two or more times a week and 31 (84%) reported the ramps were used at least three times a month. Only 2 (5%) of the respondents indicated their ramps were never used by people with disabilities. All agencies with ramps indicated the ramps were also used by people who could walk.

Most of the ramps (62%) were constructed as part of the pool. Of the 13 (38%) ramps that were portable or removable, about half (54%) were in place at all times. Respondents noted that the amount of space required by the ramp and interference with programs were reasons for not keeping the ramp in place.

Table 3.4. Mean ratings of designs and devices[a].

		Effectiveness	Convenience	Maintenance
Lift	**n**	56	57	57
	Mean	3.96	3.86	2.46
	Std. Dev.	1.19	1.19	1.28
Ramp	**n**	35	37	37
	Mean	4.51	3.86	1.89
	Std. Dev.	0.77	1.19	1.41
Stairs	**n**	78	78	80
	Mean	3.49	4.37	1.75
	Std. Dev.	1.15	0.99	1.06
Transfer Steps		8	8	8
	Mean	2.75	2.50	2.75
	Std. Dev.	1.04	1.41	1.91
Movable Floor		2	2	2
	Mean	3.00	2.00	5.00
	Std. Dev.	2.83	1.41	0.00
Zero Depth	**n**	30	29	29
	Mean	4.47	1.79	4.63
	Std. Dev.	0.82	0.98	0.72
Transfer Wall	**n**	10	10	10
	Mean	3.10	3.30	1.40
	Std. Dev.	1.45	1.16	0.84

[a]Each variable was measured on a 5-point scale, 1-not present to 5-very high.

In the follow-up survey, those respondents with ramps were asked to identify the length of their ramps and the depth of the water at the end of the ramp. Adjusting for the distance of the water below deck level, ramp slopes were calculated. Of the seven ramps for which measurements were received, five had slopes greater than 8.3%, and two of those were greater than 20%. Four of the five ramps with slopes greater than 8.3% were operated by municipal recreation departments and the other was operated by a YMCA.

Six of the seven ramps reported in the follow-up survey had a level landing at the bottom of the ramp. The water depth at the bottom of the seven ramps ranged from 10 to 48 inches, with a mean depth of 34.3 inches.

The use of handrails on ramps was prevalent. Telephone survey respondents indicated that 33 (91%) of their ramps had handrails and 91% of those ramps had handrails on both sides. The height of the handrails (deck to top of the handrail) identified in the follow-up survey ranged from 30 to 42 inches with a mean of 35 inches. The handrails on each of the ramps continued underwater. Four of the ramps in the follow-up survey (66%) also provided edge protection.

Regarding the advantages of ramps, the dominant theme expressed by respondents was the universal nature of ramps: they could be used by everyone, disabled and non-disabled. A shallow area for childrens' programs, preference by older users, gradual adjustment to water temperatures, postoperative therapy, and access by people with disabilities were mentioned as ramp uses. The other commonly mentioned advantage was the low maintenance needs of ramps. Ramps were rated high for effectiveness (Table 3.4) and convenience. The maintenance ratings indicated ramps required little maintenance.

Several themes emerged regarding disadvantages of ramps. The most commonly mentioned disadvantage was that "young children playing on the handrails." Many of the respondents cited the potential danger for children playing on the ramp and the staff time spent moving them off the ramp. The often mentioned slipperiness of ramps contributed to respondents' safety concerns. Concern was also frequently expressed with the steepness of the ramps, particularly portable ramps. Respondents noted the difficulty pushing a wheelchair out of the water using a ramp.

Zero Depth Entry. Zero depth entry pools were operated by 30 (29%) of the respondents (Table 3.3). Zero depth entry pools seemed to be well used by people with disabilities. Respondents indicated that people with disabilities used the zero depth entry pools two or more times a week at 25 (83%) of the pools and three or more times a month at 28 (93%) of the pools. All of the zero depth entry pools were used at least "once every month or two."

There were 13 (43%) respondents who indicated they had handrails at the zero depth entries. Of those pools with handrails, 6 (46%) had handrails on both sides. There were 5 (17%) pools at which the zero depth entry was not slip resistant. Aquatic chairs were provided at 13 (43%) of the zero depth entry pools, and 12 (92%) of the aquatic chairs could be pushed by the person seated in the chair.

As with ramps, the universal application of zero depth entry was often mentioned as an advantage of the design. The ease with which people with disabilities and children could access the water and the opportunity for all users to easily select a water depth were noted. Another advantage noted was that large numbers of people, both disabled and non-disabled, could enter the water simultaneously. Safety, due to the absence of tripping hazards and sharp drop offs, was also commonly cited as an advantage.

The slipperiness of the zero depth entry was most frequently mentioned as a disadvantage of zero depth entry. Even those pools with a slip resistant surface noted the constant battle to keep the zero depth entry clean and slip resistant. Several respondents commented on the lack of handrails as a disadvantage. Also, one person noted the lack of a stopping point for someone using a wheelchair and the need for someone else to remove the wheelchair when it is not being used as a disadvantage.

Zero depth entries were rated very high for effectiveness (Table 3.4), comparable to that of ramps. Yet, zero depth entries were rated lowest in convenience and very high in the amount of maintenance required. Both ratings could be attributed to the slipperiness of the zero depth entries.

Transfer Wall. Transfer walls were used by 10 (10%) of the telephone survey respondents (Table 3.3). People with disabilities used the transfer walls two or more times a week at 4 (40%) of the sites, three or more times a month at 5 (50%) of the sites, and at least once every month or two at all of the sites.

Only three (30%) of the sites reported a transfer wall around the entire pool. The others used a dry ramp design. Six of the pools (60%) had handrails, and three of those pools had two handrails. The majority of the respondents (90%) indicated that most people with disabilities could use the transfer wall without assistance. Access to people with disabilities was the primary advantage mentioned by respondents, especially those who use wheelchairs. One respondent noted the wall was used for lower extremity exercises (e.g., knee extensions and flexions). Three of the respondents could identify no advantage of the transfer wall.

The primary disadvantage mentioned by respondents was that only people with significant upper-body strength could use the transfer wall, they noted that most people with disabilities require assistance to use the design. Though none of the sites reported any problems with the transfer walls, 8 (80%) expressed safety concerns with the design. The safety concerns related to the potential for someone with poor balance tipping backwards while sitting on the wall and for children running or slipping on the wall.

Transfer walls received only moderate scores in effectiveness and convenience (Table 3.4). However, maintenance ratings indicated transfer walls required the least amount of maintenance.

Transfer Steps. There were 8 respondents who reported having transfer steps at their pools (Table 3.3). Of those agencies, 3 (38%) reported the transfer steps were used by people with disabilities two or more times a week and 4 (50%) reported the ramps were used at least three times a month. Only 1 (13%) respondent indicated the transfer steps were never used by people with disabilities.

Most of the transfer steps (75%) were constructed as part of the pool. Neither of the two sites with removable transfer steps were in place at all times. One respondent cited insufficient water flow in the vents of the transfer steps restricting water circulation as the reason transfer steps were not kept in place at all times. The other respondent indicated that the transfer steps were only used as a backup for other equipment.

The advantages of transfer steps noted by aquatic professionals included the inexpensive cost relative to pool lifts and permanent ramps, the relative ease with which they could be put into place, and easy cleaning. Disadvantages included the difficulty in using the transfer steps by people without upper body strength, the slippery surface, and improper use of the device by ambulatory individuals. Transfer steps received the lowest rating for effectiveness (Table 3.4), among the lowest for convenience, and a moderate level of maintenance.

Stairs. There were 80 aquatic professionals (78%) who reported having stairs at their pool facilities. Only a small portion of the stairs (18%) were portable or removable, and most of the portable stairs (64%) were in place at all times. Nearly all of the stairs (96%) had handrails, and most of those with handrails (75%) had handrails on both sides of the stairs. On many (47%) of those stairs with one only handrail, the handrail was placed in the center of stairs.

The advantage of stairs most often cited by aquatic professionals was the "easy entry for both elderly people and children." The gradual entry was recognized as an effective alternative to the vertical climb of ladders. Several respondents noted that stairs were used for shallow water activities. The stability offered by handrails was an advantage cited by several respondents. Stairs were rated very high for convenience and relatively high for effectiveness (Table 3.4), both of which were reflected in respondents' comments. Stairs were also rated very low for the amount of maintenance required.

The most frequently noted disadvantage of stairs was that many people with disabilities, particularly wheelchair users, would not be able to use the stairs. The slipperiness of steps, potential hazards for children or others using the steps inappropriately, and the pool space required for steps were the other disadvantages often cited by respondents.

Summary

The results of this study supported the findings of the telephone survey of people with disabilities, which indicated that people with disabilities do frequent pools. For those agencies that collected data on users with disabilities, 14% of their total users were people with disabilities. The availability of accessible means of pool entry/exit was wide spread, as 73% of the aquatic professionals indicated that each of the pools operated by their agencies had a least one accessible means of entry for people with disabilities, and 48% reported having more than one means available. Stairs, lifts, ramps, and zero depth entry were the means of access most frequently found at pools. Ramps, zero depth entries, and lifts were rated as the most effective means of providing access. Stairs, lifts, and ramps were rated as most convenient. Transfer walls, stairs, and ramps were seen as requiring the least maintenance, moving floors and zero depth entries the most maintenance. Advantages, disadvantages, and safety issues were noted for each design and device.

National Center on Accessibility
Swimming Pool Accessibility

On-site Pool Testing

Purpose

The purpose of this study was to examine the appropriateness, independent use, and safety of identified means of pool access by people with diverse mobility-related disabilities. This was accomplished by observing people with disabilities in on-site testing of the identified means of providing access to swimming pools. The on-site testing also allowed for the measurement of the buoyancy level of subjects who used wheelchairs.

Subjects

A total of 84 subjects were recruited from a variety of sources: Ohio and Indiana Independent Living Centers; Indiana Department of Vocational Rehabilitation; United Cerebral Palsy Association; Disabled Student Services at Indiana, Ball State, Miami, and Wright State Universities; Stepping Stones Center; Camp Riley; Council of Volunteers and Organizations for the Handicapped (COVOH); U.S. Paralympic Swimming Trials; Rockford Park District Extended Services program participants; Multiple Sclerosis support groups; Cincinnati Wheelchair Games; YMCA Arthritis Aquatic classes and subjects from previous National Center on Accessibility research. There were 40 females (48%) and 44 males (52%) who participated in the study. Subjects ranged in age from 8 to 89 years of age with an mean age of 34.9 years. Subjects had a mean height of 5 feet 5 inches and a mean weight of 140 pounds. There were no statistically significant differences on any of these variables between ambulatory and non-ambulatory subjects (Table 4.1).

Table 4.1. Sample Description

	All Subjects	Ambulatory	Non-ambulatory
Sample	84	22 (26%)[a]	62 (74%)
Gender			
Male	44 (52%)	9 (11%)	35 (42%)
Female	40 (48%)	13 (15%)	27 (32%)
Mean Age	34.9 yrs.	36.8 yrs.	32.7 yrs.
Mean Height	5' 5"	5' 5"	5' 6"
Mean Weight	140 lbs.	149 lbs.	135 lbs.

[a]Reported percentages are of the total sample.

Subjects reported a wide range of disabilities and functional abilities, which are presented in Table 4.2.

Table 4.2. Disability Type

	Total	Ambulatory	Non-ambulatory
Cerebral Palsy	28 (33%)[a]	6 (7%)	20 (24%)
Spinal Cord Injury	13 (15%)	–	13 (15%)
Spina Bifida	9 (11%)	3 (4%)	6 (7%)
Arthritis	8 (10%)	6 (7%)	–
Multiple Sclerosis	7 (8%)	1 (1%)	6 (7%)
Muscular Dystrophy	3 (4%)	–	3 (4%)
Amputation	1(1%)	1 (1%)	–
Stroke (CVA)	1 (1%)	1 (1%)	–

[a]Reported percentages are of the total sample.

A breakdown of the mobility assistive devices used by subjects is presented in Table 4.3. A majority of the subjects (71%) used manual wheelchairs.

Table 4.3. Assistive mobility devices used by gender.

	Total	Male	Female
N	84	44	40
Manual wheelchair	60 (71%)[a]	31 (70%)	24 (60%)
Electric wheelchair	2 (2%)	–	2 (5%)
Scooter	5 (6%)	3 (7%)	2 (5%)
Walker	10 (12%)	4 (9%)	6 (15%)
Crutches	10 (12%)	5 (11%)	5 (13%)
Cane	8 (10%)	4 (9%)	4 (10%)
Braces	6 (7%)	2 (5%)	4 (10%)
Prosthesis	2 (2%)	1 (2%)	1 (3%)
None used	12 (14%)	5 (11%)	7 (18%)

[a]Calculated as percentage of N for each column.

Of the 84 subjects, 67 (84%) had used a pool or spa at least once during the 12 months prior to the data collection (Table 4.4). Among ambulatory subjects, non-ambulatory subjects who required transfer assistance, and non-ambulatory subjects who did not require transfer assistance, there were no significant differences in the percentage of those who had used a pool in the previous 12 months. Though there were large differences in the mean frequency of swimming among the three groups, the differences were not statistically significant ($F_{1,74}$=3.01, p > .08).

Table 4.4. Swimming frequency

	Total	Ambulatory	Non-ambul. Transfer Assistance	Non-ambul. No Transfer Assistance
Used pool				
Yes	67 (84%)	17 (76%)	14 (93%)	37 (85%)
No	13 (16%)	5 (24%)	1 (7%)	6 (15%)
Annual Freq.				
Minimum	1	14	2	1
Maximum	365	365	156	312
Mean	83.0	132.4	30.8	79.3
Std. Dev.	100.4	101.2	42.4	108.8
Median	52	104	12	20
Mode	52	104	3	1

Procedures

Subjects completed an informed consent form, medical history questionnaire, and personal data questionnaire (Appendix E) upon arrival at the test sight. Subjects were then directed to a dressing room to change into their swimming suits and, for wheelchair users, to have a skin check of the buttocks area completed by an investigator. Subjects with open skin breakdowns were not allowed to participate in the study.

Baseline measures. Several baseline measures were taken to determine subjects' functioning levels and perceived exertion baseline. Prior to beginning any physical activities, subject 15-second resting pulse rates were measured manually with subjects seated. Remaining in a seated position, subjects' grip strength was measured using a TEC 0-100 KgW grip dynamometer. Holding the dynamometer with the arm fully extended down, subjects were asked to squeeze the dynamometer as hard as possible. Alternating between hands, each hand was tested twice.

A 50-foot straight course was set up on a flat (≤2%) surface. Subjects were instructed to walk/roll at a "normal pace" to the end of the course. Time taken to traverse the course was measured with a Sportline 220 stopwatch and subject 15-second pulse rate was measured manually. Subjects' perceived difficulty of traversing the course was measured using a 10-point graphic scale with '0' being easiest and '10' being hardest (Sanford, 1995).

Ingress/Egress Means. Subjects were asked to enter the swimming pool using one of the means being tested and move to a point three feet from the design or device being tested. After a one minute rest period at the designated point, subjects were asked to exit the pool using the same method used to enter the pool. The times to enter and exit the pool were recorded. Subject pulse rates were taken manually before entering the pool, at the designated point in the pool, and upon exiting the pool. Using the 10-point perceived difficulty scale, subjects were shown the scale and instructed to "rate how difficult it was to enter the pool as compared to the 50-foot walk/roll." Upon exiting the pool, subjects were again asked to rate how difficult it was to exit the pool in comparison to the 50-foot walk/roll.

Results

Both quantitative and qualitative data were analyzed. An alpha of .05 was used for all statistical analyses. Transfer walls had a sample size too small to allow appropriate statistical analyses, therefore, only qualitative analyses were used for transfer walls.

Perceived Ratings Among Alternatives

Mean difficulty ratings for entering and exiting using each of the devices and designs are provided in Table 4.5. Paired t-tests indicated that exiting the pool was significantly more difficult than entering for each of the alternatives except the movable floor and lifts. There also were significant differences among the alternatives in the perceived difficulty of exiting the pool. Insufficient data points prevented statistical comparisons of the transfer wall data.

The movable floor was perceived as easier than any of the other devices. There was no significant difference in the perceived difficulty of the baseline and the movable floor, which required users to merely walk or roll their wheelchairs onto the floor. Though lifts were perceived as more difficult than movable floors, they were seen as significantly easier than any of the other alternatives. There were no significant differences in perceived difficulty among the other devices and designs. Given that subjects were not able to use each design/device, the lack of differences in perceived difficulty among the other devices was not surprising. For example, non-ambulatory subjects were not tested on ladders and stairs,

and non-ambulatory subjects who required transfer assistance were not tested on transfer steps.

Table 4.5. Mean Difficulty Rating of Devices and Designs

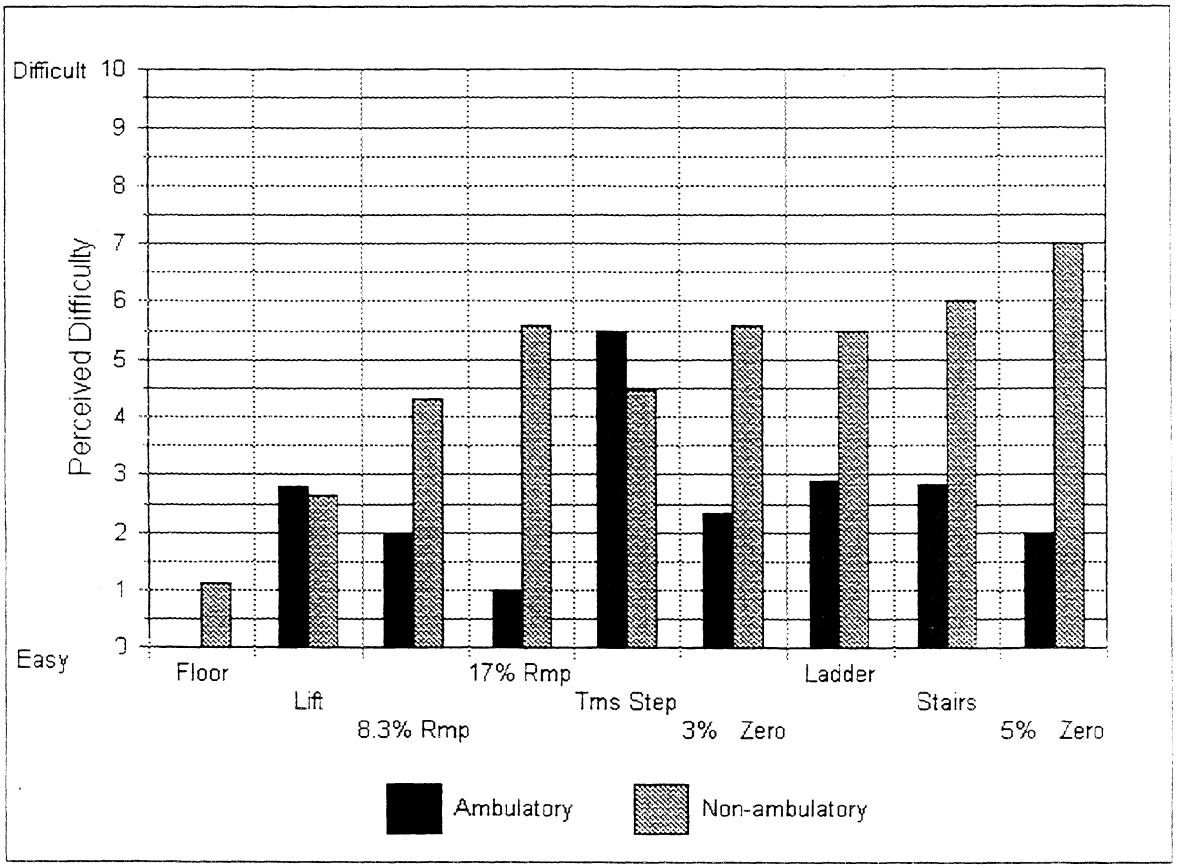
Device/Design		Total	Non-ambulatory	Ambulatory
Baseline				
	N	78	55	21
	Mean	1.29	1.35	0.76
8.3% Ramp		13	10	3
	In	2.15	2.40	1.33
	Out	3.77[a]	4.30	2.00
17% Ramp		9	7	2
	In	2.89	3.29	1.50
	Out	4.56[ab]	5.57	1.00
Lift		19	14	5
	In	2.84	2.86	2.80
	Out	2.69[a]	2.64	2.80
Transfer Steps		15	13	2
	In	3.40	3.23	4.50
	Out	4.60[ab]	4.46	5.50
Movable Floor		10	9	1
	In	0.60	0.50	0.00
	Out	1.10[b]	1.13	0.00
Transfer Wall		4	2	2
	In	2.45	2.93	1.30
	Out	2.85	3.54	2.05
3% Zero Depth		10	7	3
	In	2.60	3.29	1.00
	Out	4.60[ab]	5.57	2.33
5% Zero Depth		5	4	1
	In	2.00	2.50	0.00
	Out	6.00[ab]	7.00	2.00
Stairs		8	2	6
	In	3.50	4.50	3.17
	Out	3.63[ab]	6.00	2.83
Ladders		13	4	10
	In	3.08	4.50	3.00
	Out	3.69[ab]	5.50	2.89

[a]Mean significantly different from baseline and movable floor, $p < .05$.

[b]Mean significantly different from lift, $p < .05$.

There were significant differences between ambulatory and non-ambulatory subjects in the perceived difficulty of the designs and devices (Figure 4.1.). Most of the designs and devices were significantly easier to use by ambulatory subjects than they were for non-ambulatory subjects. Only lifts and transfer steps were easier for non-ambulatory subjects, although transfer steps were not tested by non-ambulatory subjects who required assistance in transfers.

Figure 4.1. Mean Difficulty Ratings of Devices and Designs



Ratings of subject perceptions of other factors are included in Table 4.6. Discussion of these factors are included in the discussions of the respective designs and devices.

Table 4.6. Ratings of subject perceptions by design/device

	Mov Flr	Lift	Trns Wall	8.3% Rmp	17% Rmp	Trns Step	3% Zero	5% Zero
N	18	21	3	14	8	17	10	5
Independence								
Mean	2.00	2.38	1.67	1.46	2.50	1.44	2.20	1.20
Stand. Dev.	1.33	1.12	0.58	0.78	1.07	1.03	1.62	0.45
Comfort								
Mean	1.22	2.19	2.67	1.79	2.00	2.13	1.80	1.80
Stand. Dev.	0.73	0.81	2.08	0.97	0.76	1.31	1.03	0.84
Convenient								
Mean	1.61	2.14	3.00	1.86	2.00	2.56	2.22	2.20
Stand. Dev.	1.14	0.96	1.73	1.29	1.07	1.31	1.20	1.30
Safe								
Mean	1.22	1.95	2.33	1.57	1.63	1.94	2.00	1.20
Stand. Dev.	0.55	0.92	2.31	0.94	0.74	1.34	1.25	0.45
Satisfied								
Mean	1.50	2.24	3.00	1.86	2.38	2.76	2.30	2.00
Stand. Dev.	0.86	0.77	1.73	1.03	0.52	1.44	1.16	1.00

Ramps

When designed and used correctly ramps into pools can provide greater access for many people with disabilities. There are several factors critical to the design of effective ramps including running slope, surface, level landings, water depth at the end of ramps, and handrails.

Running Slope. Ramp running slope is of vital importance to ramp accessibility by people with disabilities. Though ramps with slopes of 8.3%, 10%, and 17% were tested, the data for the ramp with a 10% slope should be viewed with caution. The 10% ramp was portable and only 13 feet long. To achieve a 10% slope, the ramp ended in 1.5 feet of water. Consequently, there was not sufficient water depth to adequately test water resistance at a 10% slope.

Subjects' perceived difficulty of the different ramp slopes are included in Table 4.5. Subjects' mean ratings of difficulty generally increased as ramp slope increased, though the differences were not statistically significant. Assuming the effects of water resistance would be greater for those using wheelchairs than for those who were ambulatory, an ANOVA was calculated for ambulatory and non-

ambulatory subjects using the 8.3% and 17% ramps. The analysis indicated that both ramp slopes were significantly more difficult to exit ($F_{1,17}$=4.97) for non-ambulatory subjects. There were no significant differences between the two groups' difficult ratings in using either of the ramp slopes ($F_{1,17}$=1.68), however, each of the non-ambulatory subjects who used the 17% ramp needed assistance in pushing out of the pool, and only 15% of subjects who used the 8.3% ramp required assistance.

Ramps provided a viable alternative for many of the subjects of this study, particularly those who were ambulatory. Comments such as "it maximizes my ability to stand" and "it's faster than stairs or ladders, less embarrassing" were representative of ambulatory subjects. Once the water reached a depth of 24 inches it provided greater stability for ambulatory subjects. There were also non-ambulatory subjects who identified ramps, even one with a 17% slope, as "easy to get in for someone who cannot walk." Yet, comments such as "too steep," "hard time getting up by myself," and "need assistance" were more common of subjects who used wheelchairs. For a number of non-ambulatory subjects, even ramps with slopes of 8.3% were simply too difficult to maneuver independently. Subjects had particular difficulty entering the pool once their hands were wet. In one instance on the 17% ramp, a subject with wet hands lost control of the wheelchair, which skidded into the side wall.

Water depth. In order to determine the maximum water depth at the bottom of ramps for people who use wheelchairs, buoyancy points and seated height were tested. The mean water depth at which subjects who used wheelchairs first became buoyant was 34.6 inches (Table 4.7). This mean buoyancy point was considerably less for children (30.8 in.) than for youths (36.9 in.) and adults (34.2 in.) and also less for females (33.7 in.) than for males (35.9 in.). The differences in buoyancy, however, were not statistically significant among age groups ($F_{2,24}$=0.74, $p > .42$) or between sexes ($F_{1,23}$=0.65, $p > .48$).

Table 4.7. Mean water depth (inches) at which subjects became buoyant.

	Total (N)	Child 8-12 yrs (N)	Youth 13-17 yrs (N)	Adult 18 yrs + (N)
Buoyancy				
All Subjects	34.6 (26)	30.8 (2)	36.9 (7)	34.2 (17)
Females	33.7 (15)	30.8 (2)	38.0 (4)	32.4 (9)
Males	35.9 (11)	–	35.5 (3)	36.1 (8)
Seated Height				
All Subjects	50.5 (30)	43.5 (2)	40.4 (7)	51.3 (17)
Females	48.6 (11)	43.5 (2)	48.5 (4)	50.8 (9)
Males	51.6 (19)	–	52.8 (3)	51.4 (8)

The seated height of subjects was also important in determining maximum water depth at the end of ramps. The mean seated height for subjects who used wheelchairs was 50.5 inches (Table 4.7). As with buoyancy, the mean seated height was less for children (43.5 in.) than for youths (50.4 in.) and adults (51.3 in.). The mean seated height was also less for females (48.6 in.) than for males (51.6 in.).

Handrails. The location, stability, height, and number of handrails were especially important for pool ramps. For those who were ambulatory, handrails provided needed stability in a potentially dangerous environment, and for those who used wheelchairs to enter and exit a pool, handrails provided a slip-resistant gripping surface.

Both ambulatory and non-ambulatory subjects consistently cited the need for handrails on both sides of pool ramps. Subjects with limited function in one arm were severely hampered by ramps with only one handrail, as the rail could only be used either entering or exiting the pool (Figure 4.2). In some cases subjects were forced to walk sideways in order to use the handrail with their stronger arm.

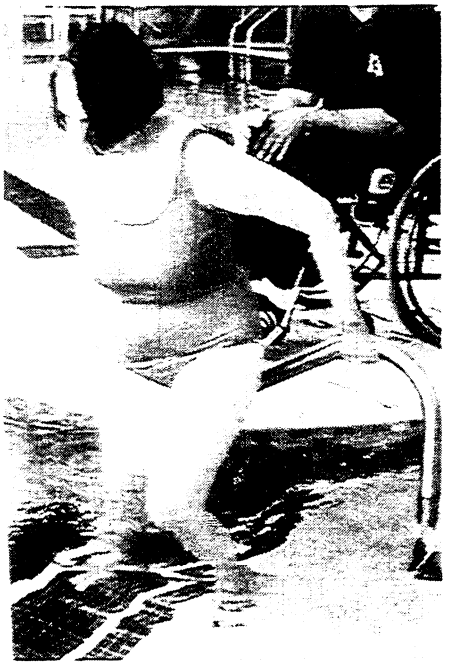


Figure 4.2 Subject with limited function in one arm entering sideways using only handrail

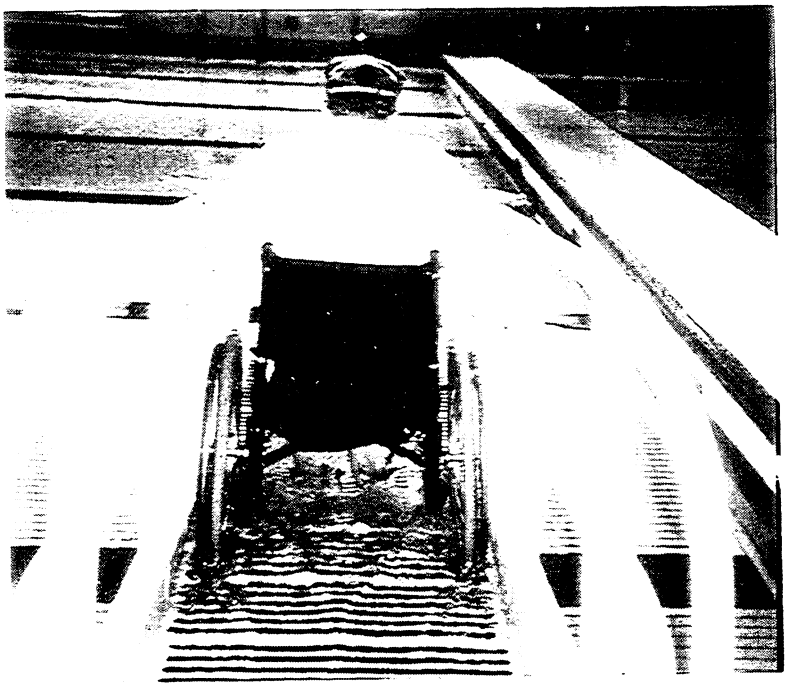


Figure 4.3 Subject negotiating 30-inch clearance width of portable ramp

The distance between handrails was also problematic for subjects who needed support or a gripping surface on both sides. The distance between handrails was 38 inches on the 17% ramp, which was effective for most subjects, yet three of the fifteen users (20%) indicated the distance as too wide. The handrails on the 30-inch wide portable ramp (Figure 4.3) were deemed too narrow by more than a third of the 14 users of that ramp. The design of the handrails at one test site (Figure 4.4) attempted to address the needs of ambulatory users who might need the rails closer together and non-ambulatory users who needed adequate space to accommodate their wheelchairs. Yet, the distance between the top handrails (22.5 in.) proved to be too narrow and restrictive for some wheelchair users.

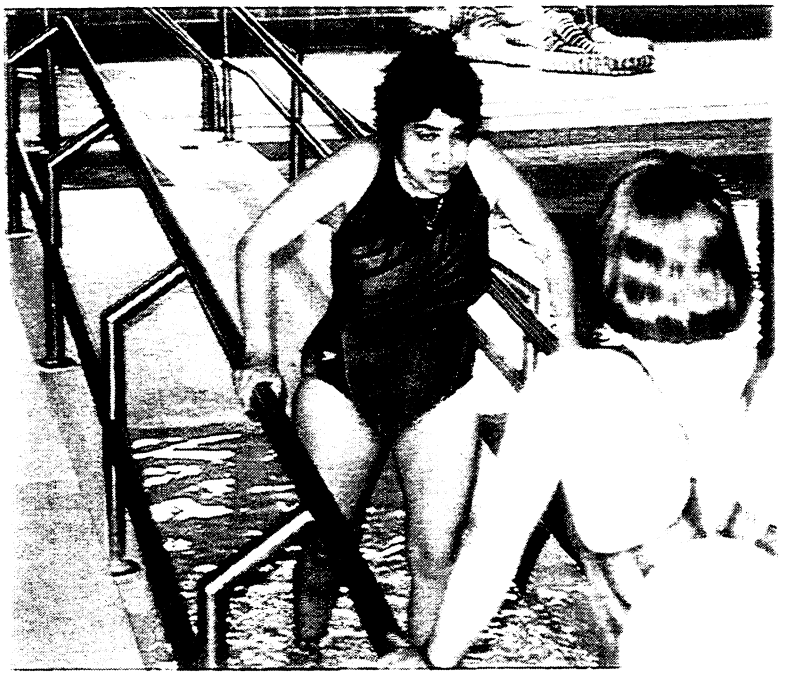


Figure 4.4 Handrails designed for ambulatory and non-ambulatory users with space to accommodate wheelchairs

The need for stable handrails was most evident with the portable ramp. The handrails were made of PVC and swayed as much as three inches on either side of center. The erratic movement affected the equilibrium and sense of security for

ambulatory subjects. Subjects repeatedly mentioned the "floppy," "flimsy," and "wobbly" handrails as a problem.

Lifts

Lifts may be classified by their configuration (platform or seat) as well as the means by which they are operated (manual or power). Though platform lifts for pools do exist, they are less common then seat lifts and only seat lifts were tested in this study. Both manual and power operated lifts were tested.

Seat positioning. The position of the lift seat was important to the ease and safety with which subjects used a lift. Seat height and its location in relationship to the edge of the pool were particularly important. In order to facilitate safe transfers, ADAAG requires seat height of 17 to 19 inches for both shower stalls (4.21.3) and water closets (4.16.3). It would be reasonable to apply the same standard to pool lifts with seats. Yet, lifts with seats as high as 22 inches were found in this study (Figure 4.5). Seats higher than 19 inches were very difficult for those transferring from wheelchairs.

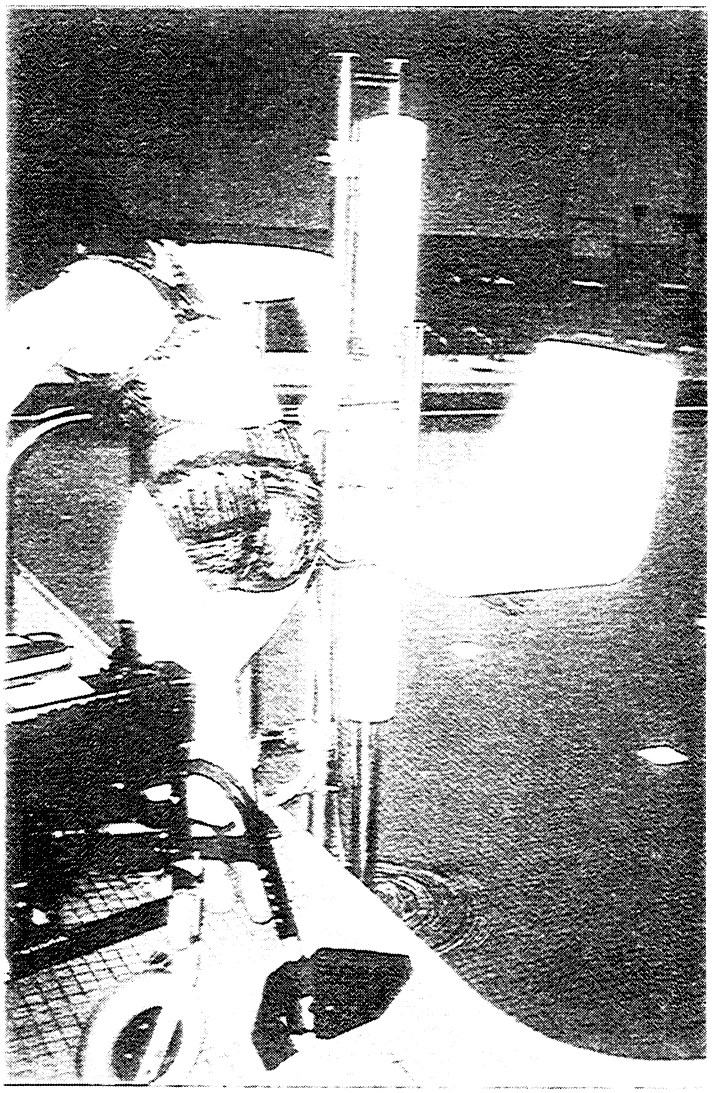


Figure 4.5 Lift with seat height at 22 inches and 4 inches from edge of pool deck

A more troubling problem was created by lift seats located too close to or over the water. In addition to being 22 inches above the deck, the front edge of the seat for the lift shown in Figure 4.5 was also four inches beyond the pool deck. Users needed to locate their wheelchairs at deck edge and transfer

Figure 4.6 Lift that rotates 180°

four inches over water to the seat. Another pool tested had a gutter 11 inches wide and six inches below the pool deck. In the raised position, the front edge of the lift seat was two inches beyond the deck edge. Again, a wheelchair had to be located precariously close to the deck edge and never immediately adjacent to the lift seat, which made transfers difficult and unsafe for many users. However, the lift pictured in Figure 4.6 rotated 180°, which moved the lift seat away from the pool edge and allowed a safe and comfortable transfer.

Clear deck space. Adequate clear space is needed adjacent to the lift seat to allow for a side transfer by someone using a wheelchair. In the present study, obstructions or obstacles were often observed within deck space immediately surrounding the lifts. These obstacles were often created by the lifts. A lift with deck braces used to support the lift is depicted in Figure 4.7. The location of the braces interfered with the transfer of some users. In another situation, the lift was improperly installed and the water supply hose created a potential tripping hazard (Figure 4.8).

Independent operation. Lifts operated manually cannot be used independently, as they require someone other than the person using the lift to ate the crank to raise and lower the lift. Power operated lifts, however, offer the the possibility of the person using a lift to also operate it independently. In order for lifts to be operated independently, at least two factors must be present: controls that are accessible and controls that are operational from both raised and lowered positions.

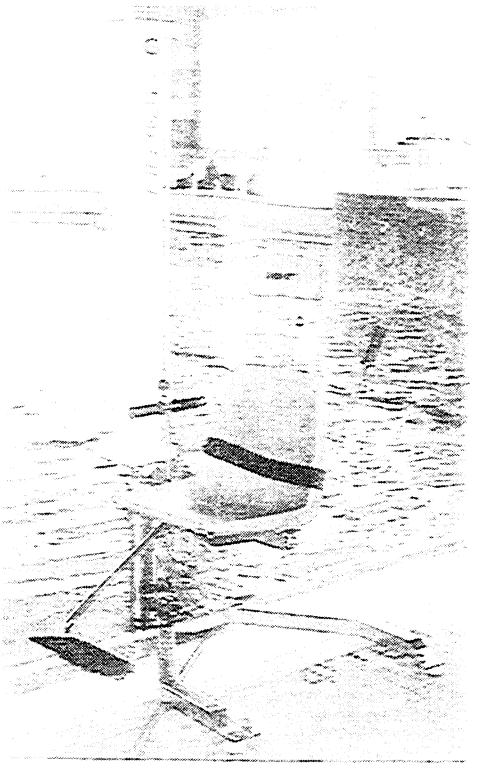


Figure 4.7 Lift deck braces limit clear width space

Figure 4.8 Water supply hose to lift created a potential tripping hazard

For controls to be accessible, they must be located where they can be easily reached, be operable with one hand and not require tight grasping, pinching, or twisting of the wrist (ADAAG 4.27.4). Also, the force required to activate controls must be no greater than 5 lbf (22.2 N). Each of the power lifts tested had controls that could be operated with one hand without tight grasping, pinching or twisting of the wrist. However, not one of the lifts had controls that could be easily reached by someone seated on the lift. The lift depicted in Figure 4.9 required the user to place his or her hand through the handrail to reach the control. When the lift was activated, the person's hand could be easily pinched or caught between the lift and the seat. The controls on the lift pictured in Figure 4.10 were located on the pedestal and above the elbow of the person seated on the lift, which was awkward for most users and impossible for others.

Power operated lifts also need to be operable from both the raised and lowered positions. Once a person has used the lift to enter the pool, he or she must be able to raise the lift in order to exit. If more than one swimmer needs the lift, it

may be in the position opposite of that needed at a particular time. Thus, a swimmer who is in the pool may find the lift in the raised position and need to lower the lift.

Figure 4.9 Control mechanism required user to place hand through handrail

Figure 4.10 Control mechanism located on pedestal

Transfer Wall

Only four subjects were available to test the transfer wall used in this study, which made meaningful statistical analysis impossible. Nevertheless, the observed behaviors and comments of users provided significant insights. Factors of interest with the transfer wall included clear deck space adjacent to the transfer wall, the height of the wall from the deck to the top surface, the depth of the top surface, the distance from the water to the top surface of the wall, and handrails on the top surface.

On the pool tested, the deck area adjacent to the transfer wall was level and 60 inches by 60 inches, which provided ample space for persons to transfer from a wheelchair, with or without assistance. The height of the wall from the deck to the top of the surface was 19 inches. This height was effective for both

ambulatory and non-ambulatory subjects. Ambulatory subjects could easily sit on the wall without deep knee bends. Non-ambulatory subjects could easily transfer from a wheelchair, as the 19-inch height was the same as that of a seat of an average adult wheelchair.

The depth of the top surface of the transfer wall tested was 12 inches. It provided enough space to allow a person to comfortably sit on the surface. It was not so wide as to require someone to scoot across it: a person could simply transfer onto the surface, reposition their legs, and transfer off the surface.

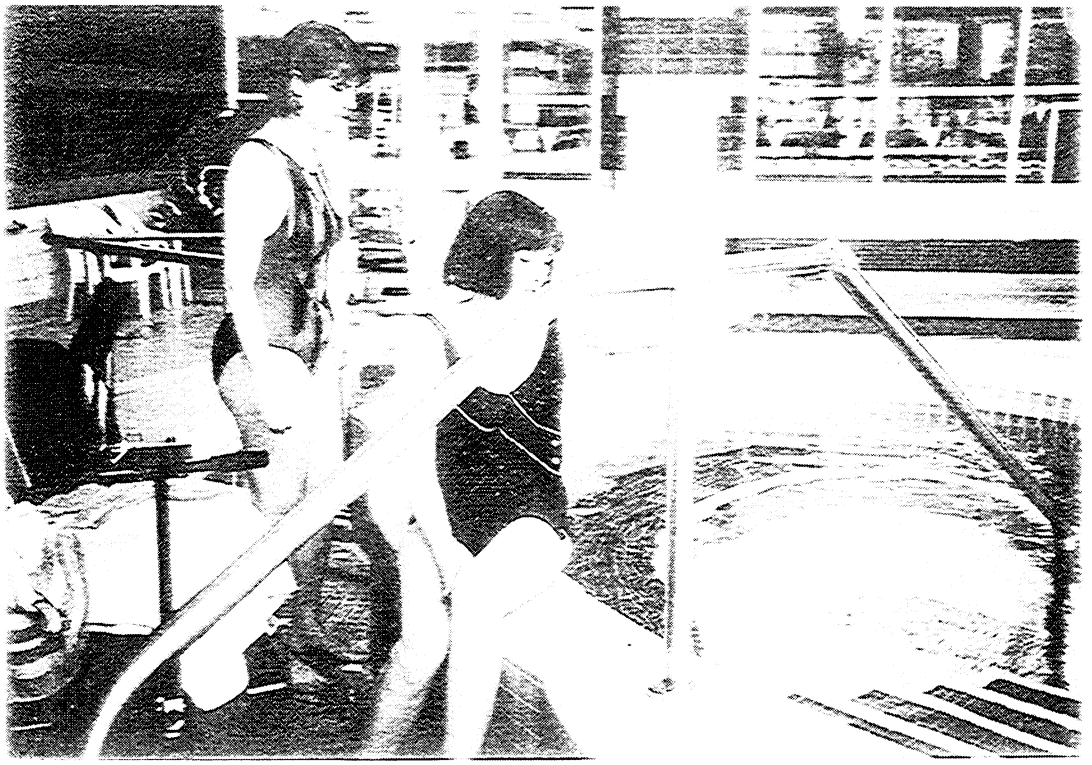


Figure 4.11 Subject using transfer wall

The only handrails on the transfer wall was one designed for use with the adjacent stairs (Figure 4.11). The handrail height of 34 inches was appropriate for someone standing, but not at all helpful for someone seated. Consequently, non-ambulatory users had little to assist them in their balance and transfers.

Transfer Steps

Transfer steps were rated as more difficult than most of the other alternatives and significantly more difficult than the baseline for all subjects tested on them

(Table 4.5). Those subjects with less upper-body strength seemed to have particular difficulty, an observation supported by a linear regression analysis. The transfer steps were easier to use for those subjects with greater upper-body strength, as measured by subject hand grip (Figure 4.12). Furthermore, perceived independence, perceived convenience, and perceived satisfaction were rated higher for subjects with greater grip strength. Those subjects who had the upper-body strength to use the transfer steps commented on the "easy entry," "increased independence," and transfer height from a wheelchair. Those who found the steps difficult to use noted the lack of back support, grab rails on only one side, and the time it took to enter and exit.

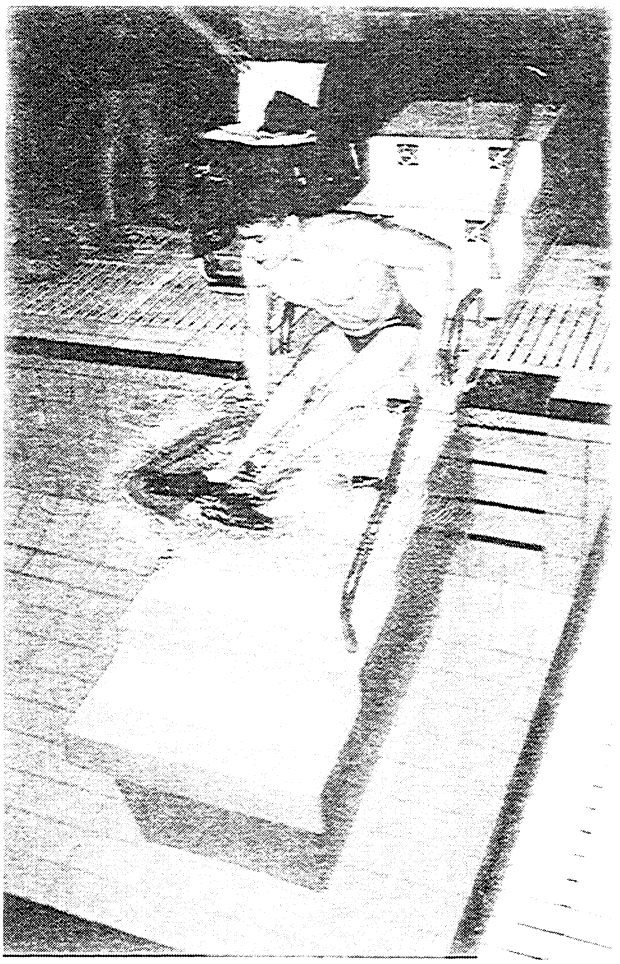


Figure 4.12 Subject using transfer steps

Based on these findings, transfer steps would have only limited application. They provide ready pool access for non-ambulatory users with adequate arm strength. Yet for many people with disabilities, especially ambulatory swimmers or non-ambulatory swimmers with limited arm strength, transfer steps would not provide appropriate access.

Movable Floor

The movable floor posed an interesting dichotomy. It was perceived as significantly easier to use than the other alternatives, yet it also was rated as one of the least independent alternatives. Regardless of user disability and functioning level, the movable floor was rated as easy, comfortable, and convenient (Table 4.6). Those attributes of the movable floor were also reflected in subject comments such as "it was like a dream," "it was perfect," "no effort," and "any easier and I could take a nap."

Nevertheless, the movable floor was rated among the least independent. Analysis of subject comments indicate this was due to three factors. First, the size of the movable floor and its potential impact on safety required controlled access to the operating mechanism. Operation of the movable floor was by a keyed mechanism located in a control room adjacent to the pool. Consequently, a person using the pool could not independently raise and lower the floor. Another factor affecting independence was the beveled, 1-inch berm surrounding the movable floor in the fully raised position. A person moving from the deck to the movable floor had to negotiate the berm, which required assistance for some users. A third independence factor mentioned by several subjects was the need for an aquatic chair. Though an aquatic chair was provided during testing, an aquatic chair was not usually available at the movable floor test site or any of the other test sites.

Interestingly, several of the subjects had routinely used the pool with the movable floor prior to the study. No one, however, was even aware that the movable floor existed. The floor was used to alter the water depth for water aerobic and children's programs but had not been made available to people with disabilities, even though an exercise program for people with multiple sclerosis is held there on a weekly basis. There was no resistance to its use by the pool operators, but it was impractical to simultaneously move multiple chair users without several aquatic chairs.

Zero Depth Entry

The most surprising findings and most difficult to explain were those for zero depth entry pools. The 3% and 5% slopes tested, typical of zero depth entry pools, provided very gentle slopes into their respective pool tanks. Given that an accessible route must have a running slope greater than 5% to be considered a ramp, the zero depth entries tested were relatively flat surfaces. Yet, zero depth entry, at both 3% and 5%, received the highest difficulty ratings of all the alternatives (Table 4.5). The findings indicate that it was non-ambulatory subjects in particular who perceived the zero depth as more difficult than other alternatives (Figure 4.13).

There were several factors that may have contributed to the findings. First, the gradual slope of zero depth entry requires a longer time to reach a depth necessary to transfer from a wheelchair. It also requires a longer time dealing with water resistance when exiting the pool. This explanation was supported in the present study by the significantly greater time required to use the zero depth entry than to complete the baseline walk. Second, none of the zero depth pools tested had handrails. Several subjects commented on the need for handrails, especially in exiting the pools. Third, and perhaps most significantly, the non-ambulatory subjects used an aquatic chair (Figure 4.14) provided by the

Figure 4.13 Non-ambulatory subject using zero depth entry pool

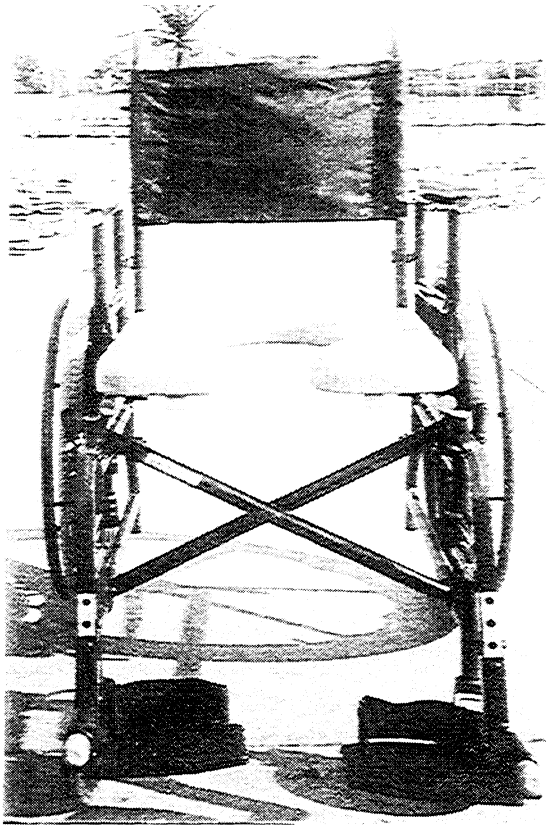


Figure 4.14 Aquatic chair used during testing

investigators to enter and exit the pool. Although subjects were allowed to familiarize themselves with the aquatic chair prior to timed entry and exit from the water, it was new to them and not fitted specifically to each subject's needs. Several subjects commented on the awkwardness of the aquatic chair.

As with other designs that require use of an aquatic chair, zero depth entries posed a dilemma of what to do with the aquatic chair while the user was in the pool but out of the chair. Leaving it in the pool produced a potential underwater hazard for other swimmers, removing it reduced the independence of the user.

Of all of the designs and devices, the zero depth entry provides the least obtrusive means of access by people with disabilities. Other than the need for handrails by people with disabilities, the design allows everyone to enter and exit the pool together without regard to physical limitation. That assumes that an aquatic chair is available for the person to use. In the present study, subjects indicated they would be unwilling to use their personal chairs to enter and exit pools.

Stairs

For those who could use them, stairs provided effective access to pools. Yet, stairs were not feasible for many people with mobility impairments. As might be expected, subjects who were ambulatory effectively negotiated stairs. Non-ambulatory subjects could use stairs by transferring to the pool deck and down each step, but few were willing to consider it.

Two factors affecting subject use of stairs were noted: location of handrails and riser height. The problem most often noted by subjects and observed by investigators was handrails on only one side of the stairs. Subjects with balance limitations required the two handrails for greater stability. Those with hemiplegia required handrails on opposite sides of the stairs when entering and exiting the pool. Comments from subjects indicated that risers higher than seven inches would be too difficult to manage.

Ladders

Ladders offered access to those users who were ambulatory with good upper- and lower-body strength, as well as assistance to non-ambulatory users with good upper-body strength. Ambulatory users with cerebral palsy or single-leg amputations were able to effectively use ladders. It was also the preferred means of exit for non-ambulatory users who regularly swim or compete in swimming. Those users typically used the ladder's handrails to lift themselves out of the water and did not use the ladder rungs. The majority of non-ambulatory subjects did not attempt to use the ladder.

Figure 4.15 Ladder with curved handrails ranging in height from 13.5 to 43 inches

For those subjects who did use a ladder, there were several features that contributed to their successful use. Two of the pools used were competition pools for which objects protruding into the pool tank were eliminated in order to increase speed. Consequently, two factors that would assist access by some users, ladder rungs and rails in the pool tank, were not available at those pools. Recessed steps eliminated ladder rungs from protruding into the pool tank,

however, they provided significant difficulty for some users. Those subjects had difficulty with the leg strength needed to use steps and with using the steps without being able to see each step. Some users preferred entering the pool while facing the water placing their heels in the rungs, which was difficult with the recessed stairs. Extending the handrails into the water assisted those users who needed support or who used the handrails to pull up. Another feature that affected the ease with which subjects were able to use ladders was the height of the handrails outside of the water. At one pool where the handrail began at a height of 13.5 inches and extended to a height of 43 inches (Figure 4.15), several subjects who used wheelchairs commented on the inadequacy of the handrail at either height. They suggested a crossbar be placed at 18 to 20 inches to assist in transfers to and from wheelchairs.

Summary

The on-site subject testing provided an opportunity to observe and compare identified means of providing access to swimming pools by people with diverse mobility-related disabilities. Subjects' buoyancy points and their perceptions of design/device strengths and weaknesses were presented.

Entering was perceived as easier than exiting swimming pools using each of the identified means of water access. There were significant differences between ambulatory and non-ambulatory subjects in the perceived difficulty of the designs and devices. Most of the designs and devices were significantly easier to use by ambulatory subjects than they were for non-ambulatory subjects. Only lifts and transfer steps were easier for non-ambulatory subjects, although non-ambulatory subjects who required assistance in transfers were unable to use the transfer steps. Specific problems with each of the designs and devices were reported.

National Center on Accessibility
U.S. Access Board
Swimming Pool Accessibility Project

Recommendations

Based on a review of the literature and findings of the three studies completed as part of this project, the following recommendations are proposed. These recommendations are intended for new construction of pools unless otherwise noted. These recommendations do not apply to pools used exclusively as part of an amusement ride.

General

1.0. At least one accessible means of water entry/exit shall be provided for each swimming pool and shall be located on an accessible route.

Rationale: Results of this project indicate that people with disabilities frequent pools with some regularity despite the many barriers noted by Mace (1993), Osinski (1993), Popke (1994) and others. The telephone survey of people with disabilities indicated that 60% of those surveyed had used a pool during the previous year, and most commonly once a month. Also, the pool facility survey found that those pools for which attendance data were collected averaged 3,713 visitors with disabilities during the past year. People with disabilities accounted for an average of 14% of the total visitors for those pools.

The importance to people with disabilities of providing accessible means of entering and exiting pools was clearly demonstrated in the survey of people with disabilities. Of those individuals surveyed, 99% indicated that one or more means of access should be required at each pool.

The feasibility of this recommendation was supported in the findings of the pool facility survey. At least one means of access for people with disabilities was already being provided at each pool operated by 73% of the respondents. The prevalence of accessible means of access was found across all types of agencies.

1.1. Swimming pools with more than 300 linear feet of pool wall shall provide at least two accessible means of water entry/exit located on accessible routes.

Rationale: Recognizing the need to provide multiple access points for all users, ANSI/NSPI-1 standard 5.2 requires at least two means of entry/exit for all pools "so as to serve both ends of the pool." In addition, standard 5.2.4. requires a means of entry/exit "a minimum of every seventy-five (75) linear feet of pool wall or fraction thereof." Multiple access points provided for greater safety and convenience to users, allowing them to exit a pool easily when they become tired or in danger, as well as to enter and exit a pool near an area of interest (e.g., shallow end or deep end).

The principle is equally important to pool users with disabilities. The majority (58%) of respondents in the telephone survey of people with disabilities indicated more than one means of access should be provided for all pools. Recognizing the need for multiple access points is most important at larger pools, this recommendation would only apply to those pools.

1.2. When only one accessible means of water entry is provided, it shall be a swimming pool lift, wet ramp, or zero depth entry.

Rationale: Each means of pool access was examined to determine its appropriateness, independent use, degree of consistency with existing building standards, level of safety, and impact on pool design. Based on the findings of this project, the designs and devices that most effectively met these criteria were lifts, ramps, and zero depth entries.

Although no one design or device would meet the needs or fully satisfy everyone; ramps, lifts, and pools provide independent operation to the greatest extent possible to the broadest scope of people. In the telephone survey of people with disabilities, 81% of the respondents indicated the ability to use a design/device was important or very important. Also, 57% of the pool facility staff indicated it was important or very important that the device/design be used without pool staff assistance. The telephone survey of people with disabilities found that lifts (29%), ramps (25%), stairs (11%), and zero depth entry (9%) were the preferred means of access by people with disabilities, although stairs were only a preferred means by those who were ambulatory (20%). When asked which means of access they would be willing to use, most subjects were willing to use ramps (73%), zero depth entry (70%), movable floors (63%), and lifts (60%). However, only 33% of those experienced with movable floors indicated a willingness to use them again. As indicated in the study of swimming pool facilities, the identified means of water entry access were also among the designs and devices most frequently found at pools. Fifty-five percent (55%) of the surveyed sites had lifts, 36% had ramps, and 29% had zero depth entry. The prevalence of these designs/devices is evidence of their feasibility. Also, lifts, ramps, and zero depth entry were among the devices pool staff indicated had the fewest safety concerns, fewest problems and required the least amount of maintenance.

The other tested means of water access provide effective access to pools, however, the target population for each of the devices is limited in scope. Transfer walls and transfer steps target people with very limited or no controlled movement in their legs. In the on-site testing of transfer walls and transfer steps, only people with significant upper-body strength were able to use them effectively or with ease. Findings of the telephone survey also indicate the limited use of these designs, as only 49% of the

respondents indicated a willingness to use transfer steps and 56% indicated a willingness to use a transfer wall.

Stairs are especially helpful for people with limited function, weakness, or soreness in their legs. However, less than half (45%) of the respondents in the telephone survey of people with disabilities were willing to even attempt to use stairs.

Though movable floors required the least amount of effort by subjects in the on-site testing, there were several factors that led to it not being included as a primary means of water access. First, movable floors provide very limited independent functioning by people with disabilities. The safe operation of movable floors requires the controls be located away from the pool. This eliminates the possibility of a person in the pool also operating the movable floor. Second, operation of the floor disrupts pool activity for everyone using the pool, drawing undue attention to the person with a disability. Finally, movable floors are often installed on only a portion of the pool with all four sides blocked by a bulkhead. A person with a disability is limited to that section of the pool, eliminating participation in a wide range of activities.

1.3. When a second accessible means of water entry/exit is provided, it shall be a transfer wall, transfer steps, movable floor, stairs, swimming pool lift, wet ramp, or zero depth entry. Lifts, wet ramps, and zero depth entry may not be used as a second accessible means of water entry/exit if the same means is used as the first accessible means of water entry/exit.

Rationale: As previously noted, no single design or device will meet the needs of all people with disabilities. The telephone survey of people with disabilities found that while some devices were preferred more often than others, no single device was the preferred device of a majority of the respondents. Selecting a second accessible means of water entry/exit that complements the first means will provide greater access to more people with disabilities. Based on the findings of this project, the accessible means of water entry/exit that complement one another are listed in Table 5.1.

Table 5.1. Primary means of water access and their complements.

First Means of Water Access	Second Means of Water Access
Lift	•Ramp •Stairs •Transfer steps •Transfer wall •Zero depth entry •Movable floor
Ramp	•Lift •Stairs •Transfer steps •Transfer wall •Movable floor
Zero Depth Entry	•Lift •Stairs •Transfer steps •Transfer wall •Movable floor

1.4. When a second accessible means of water entry/exit is provided, it must be located so that in combination with the first accessible means of water entry/exit to serve both ends and sides of the pool.

Rationale: This recommendation provides parallels to ANSI/NSPI-1 standards 5.2, 5.2.2, and 5.2.4. Recognizing the need by all swimmers to access different areas of a pool, ANSI/NSPI-1 standard 5.2 requires two means of entry/exit located "so as to serve both ends of the pool." ANSI/NSPI-1 standard 5.2.2 requires entries/exits on "both sides of the deep portions" of pools over 30 feet in width. As nearly all pools will be "deep" for people unable to stand, the principle of 5.2.2 is appropriately applied when a second accessible means of water entry/exit is provided. To provide for greater safety to pool users, ANSI/NSPI-1 5.2.4 requires a means of entry/exit for every 75 linear feet of pool wall. The recommendation for locating the accessible means of access to serve both ends and sides of the pool would provide greater safety and convenience for people with disabilities, though still not to an extent equal to other pool users.

Ramps

Pool ramps begin at the pool's deck level and provide an even sloped surface into the water. They may be constructed as part of the pool or may be portable or removable equipment. Ramps are located either in the primary pool area or in a swimout area that leads into the primary pool area. When ramps,

whether permanent or movable, are provided, they should meet the following specifications:

2.1. Surface: The surface of pool ramps must be firm, stable, and slip resistant.

Rationale: ANSI/NSPI-1 (p.50) defines a slip resisting surface as one "that has been so treated or constructed as to significantly reduce the chance of a user slipping. The surface should not be an abrasion hazard." The findings of this project provide further evidence that both slipping and abrasion are potential hazards in pools. Slipping was observed by the investigators in the on-site testing and both slipping and abrasion were mentioned as problems in the telephone survey of people with disabilities.

2.2. Slope: The least possible slope should be used for a pool ramp. The maximum slope of a pool ramp shall be 1:12.

Rationale: The findings of this project indicate that pool ramp slopes greater than 1:12 are not only very difficult for many non-ambulatory users but can also be hazardous for non-ambulatory and ambulatory users. Though subjects in the on-site testing perceived the 17% ramp as relatively easy to use, each of the non-ambulatory subjects who attempted to use the 17% ramp required assistance in pushing out of the water. Observations during the on-site testing also indicate that wheelchairs were more difficult to control once the user's hands were wet.

Among the limitations of the on-site testing were that only ramps with 8.3% and 17% slopes could be tested and a small sample of children who were tested. Consequently, there is not enough evidence from the study to suggest a change in the maximum slope, however additional research into this area is recommended.

2.3. The maximum rise for any run shall be 30 inches.

Rationale: Though ADAAG 4.8.2 requires a maximum rise of 30 inches for any ramp run, many state codes require multipurpose pool tank depths to be a minimum of 36 inches deep at the shallow end of the pool. To determine the appropriate water depth for some using a wheelchair, mean buoyancy and mean seated height were calculated. The buoyancy point was the water depth at which subjects became buoyant or floated off their chairs. When this occurred, subjects also began to lose control of their chairs. The mean buoyancy point of 34.2 inches for adult wheelchair users would indicate a flat surface at 36 inches would be problematic. Though a small number of children participated in the on-site testing, the data suggest a mean buoyancy point of 30.8.

This recommendation was also supported by the on-site testing for seated height of wheelchair users. The mean seated heights found for children (43.5 inches) and adults (51.3 inches) were consistent with the anthropometric data of the American Institute of Architects (Hoke, 1994). When the shoulder to head length for an average sized 9-year old (11.4 inches) is subtracted from the 43.5 seated height found for children, the

water depth at shoulder level for the average seated child is 32.1 inches. A water depth of 36 inches would be over the mouth and nose of an average 9-year old child.

2.4. The minimum clear width of a pool ramp shall be 36 inches.

Rationale: This recommendation is consistent with ADAAG 4.8.3. The portable ramp used in the on-site testing had a clear width of 30 inches, which was too narrow for some chair users. The other ramps tested had clear widths of 36 inches and no problems were encountered.

2.5. Landings: Level landings must be located at the bottom and top of each ramp and each ramp run. At least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must:

2.5.1. be at least as wide as the ramp run leading to it;

Rationale: This recommendation is consistent with ADAAG 4.8(1). Each of the ramps tested had landings at the top and bottom consistent with this recommendation, and no problems were encountered related to the landing width.

2.5.2. have a minimum length of 60 inches clear;

Rationale: This recommendation is consistent with ADAAG 4.8.4(2) Thought was given to recommending a minimum length of 48 inches, based on the assumption that electric wheelchairs and scooters would not be operated in pools. A minimum length of 48 inches would accommodate an average wheelchair (ADAAG 4.2.4.1), but it would not allow space for a wheelchair user to exit the chair.

2.5.3. have a minimum of size of 60 inches by 60 inches if the ramp changes direction.

Rationale: This recommendation is consistent with ADAAG 4.8(3). There was no evidence in this project that would suggest a deviation from ADAAG, as none of the ramps tested included a change in direction and no comments were received in either the survey of people with disabilities or the survey of pool facilities.

2.6. Handrails: Handrails should be required on all ramps. Ramp handrails should include the following:

2.6.1. Two handrails shall be provided and located 36 inches apart.

Rationale: The Places of Amusement Sub-committee recommended that handrails only be placed on one side of a ramp, away from the body of water in the pool. The findings of this project indicate both a need and preference by people with disabilities for handrails on both sides. As noted in the survey of people with disabilities, experienced pool ramp users were more likely to use handrails when they were on both sides of the ramp (68%) than when there was only one handrail (50%). Non-ambulatory users were less likely to use the handrail if only one handrail was available. The survey of pool facilities also indicated that two

handrails were most often found on pool ramps. Of those pools with ramps, 91% indicated two handrails were already installed.

2.6.2. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches above the ramp surface, a second handrail should be mounted between 16 inches and 26 inches.

Rationale: The height of the top gripping surface is consistent with ADAAG 4.8.5(5). The majority of the subjects (90%) indicated the top rail heights were adequate, however, each of the four subjects who indicated the handrails were too high were wheelchair users. Mace (1993) recommended a second handrail be placed at 20 inches to 24 inches. The 16 inches to 26 inches height was recommended for ramp handrails in children's environments (U.S. Access Board, 1992). The National Sporting Goods Association (1994) reports that 33% of the people who participate in swimming are under the age of 18.

2.6.3. Handrails should not be required to extend beyond the base of stairs or the base of a ramp where such would protrude into a lane or otherwise programmable area.

Rationale: The Places of Amusement Sub-committee appropriately noted that handrails partially submerged in the water or adjacent to swimming lanes are a protrusion hazard for swimmers and are often banned in swimming pool design codes. Though the building codes do not specifically prohibit submerged handrails, many prohibit underwater protrusions and areas of entrapment.

2.6.4. Handrails must be affixed so as to not allow movement in any direction.

Rationale: During testing, the handrails on a movable ramp moved up to 3 inches from left to right, causing difficulty for both ambulatory and non-ambulatory users.

2.6.5. Handrail diameter should be 1.25 inches to 1.5 inches.

Rationale: This recommendation is consistent with ADAAG 4.26.2. Each of the ramps in the onsite testing had handrails within the specified range and no problems were observed. Consequently, there was no evidence to suggest a deviation from ADAAG.

2.6.6. If handrails are mounted adjacent to the pool wall, the space between the wall and the handrail shall be 1.5 inches.

Rationale: This recommendation is consistent with ADAAG 4.26.2. There was no evidence in the current study to suggest a deviation from ADAAG.

2.7. Aquatic chairs: Facilities that provide ramps must also provide an aquatic chair that meets recommendations 12.1 to 12.5.

Rationale: As evidenced in this project, wheelchair users are not inclined to use their wheelchairs to enter and exit the water. The damage to chairs not designed to be used in water was apparent in as few as three uses of a standard wheelchair in the water. The unwillingness to use

ramps by many respondents in the telephone survey was due to the need for an aquatic chair.

Pool Lifts

Pool lifts are mechanical devices that move a person into or out of the water. Some lifts are permanently installed others are portable, placed in a deck mounting or rolled into place when needed.

When provided, pool lifts should meet the following specifications:

3.1. Pool lifts shall facilitate unassisted operation.

Rationale: Consistent with the ADAAG standard for platform lifts (4.11.3), this recommendation would provide comparable access to pool lifts. There are limitations in assuring independent transfer to and from pool lifts, therefore, the requirement for unassisted entry and exit to platform lifts is not included in this recommendation. This recommendation is supported by findings of the telephone survey of people with disabilities in which 81% of the respondents indicated the ability to use a design/device without assistance was important or very important. Also, 57% of the pool facility staff indicated it was important or very important that a device or design be used without pool staff assistance.

3.2. Clear space: A minimum clear deck space of at least 60 x 56 inches to one side and to the front of the lift seat must be provided. The space under the lift seat could be included as part of the clear space as long as the area is unobstructed.

Rationale: In order to safely transfer from a wheelchair to the lift seat, a wheelchair user must have sufficient room to place the wheelchair next to the lift seat. As the optimum positioning will vary according to the user's functional abilities, clear space is needed at both the front and side of the lift seat. Again, ADAAG (4.17.3) standards for toilet stalls provide a parallel situation from which to draw. The standard toilet stall provides a clear space on one side of the water closet to enable persons who use wheelchairs to perform a side or diagonal transfer from the wheelchair to the water closet.

3.3. Seat location: In the raised position the lift seat edge used for transfers must be located over the pool deck at least 12 inches inside the deck edge.

Rationale: The requirement of a minimum of 12 inches from the seat edge to the deck edge is necessary to allow for a transfer away from the water. There were several lifts tested, including lifts installed less than one year prior to use in this study, for which the nearest seat edge was at the deck edge or over the water surface. The danger to users in those situations was both real and perceived. Also, seat location was identified as a problem by respondents in the telephone survey of people with disabilities.

3.4. Seat height: Lift seats should be located 17 inches from the deck to the top of the seat surface.

Rationale: This height range is needed to allow easy transfer from wheelchairs to the raised edge. The height is consistent with the seat height ranges for water closets in ADAAG (4.16.3) and at the upper range of the Access Board's recommendations for fourth graders (9 years old) in children's environments (1992, Chapter 5, p. 12). It may be advisable for the lift seat to be readily adjustable to other heights to accommodate users with seats of varying heights, however, the seat must have the capability of stopping in the transfer position at a height of 17 inches.

3.5. Seat width: The lift seat width should be a minimum of 19 inches wide.

Rationale: Each of the tested seats met or exceeded this width and no problems were observed.

3.6. Footrest: A footrest should be attached to the lift seat.

Rationale: For many adults, their legs will extend beyond the 17 inches distance below the lift seat. Without a footrest, the user's feet will drag across the deck, which may cause an injury to the individual. The on-site testing provided evidence of the problem.

3.7. Armrests should be located on both sides of the lift seat. The armrest located next to the clear deck space should be capable of moving away from the transfer area.

Rationale: For stability purposes, subjects in the telephone survey and on-site testing indicated both a need and strong preference for armrests on both sides of lifts. A movable armrest is needed next to the clear deck space to allow for transfers.

3.8. Controls and operating mechanisms: Controls and operating mechanisms at both the deck level and water level positions should be operable from the front edge of the lift seat and unobstructed by any other component of the lift. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).

Rationale: The mechanism for operation of the lift should allow for safe, independent operation by the user. Several lifts used in the onsite testing had lift operating mechanisms located in areas that required the user to quickly move his/her hand when the lift began to move. Most of the mechanisms were difficult to reach for someone seated in the lift seat. Typically, they were located too close to the seat back and on the outside of the armrests, making them difficult and/or dangerous to use.

3.9. Lifts shall be operable from both the deck level and water level.

Rationale: This recommendation would assure that a person in the pool would always have access to the pool lift, while also providing access to other potential users. Each of the power operated lifts used in the on-site testing had this capability.

3.10. Vertical travel: The vertical travel of the lift should allow the lift seat to be submerged 18 inches to 20 inches below the water level.

Rationale: In order to facilitate a person transferring onto and off of the lift seat while in the water. Based on the buoyancy data of the on-site testing, a water depth of 18-20 inches would provide sufficient buoyancy for most users to enter and exit the water from the lift seat.

3.11. Minimum lifting capacity: A minimum weight of 300 lbs. is required for all single person lifts. The lift should also be capable of sustaining a static load of at least three times the rated load.

Rationale: ANSI A.17.1 Rule Number 2002.7A requires a minimum weight capacity of 250 lbs. for single seat lifts. However, there were several indicators during this project that the 250 lbs. may be insufficient. Lifts at two of the facilities used for on-site testing had been replaced because of weight damage. Breakdowns and injuries due to insufficient weight capacity were cited in the telephone surveys of pool facility staff and people with disabilities.

Zero Depth Entry (Beach Entry)

Zero depth entry pools provide an end of the pool where the pool bottom begins at the deck level and gradually slopes to a deeper level. This creates an entry similar to that of a beach. When zero depth entry is provided it should meet the following specifications:

4.1. Surface: The surface shall be firm, stable and slip resistant.

Rationale: ANSI/NSPI-1 1991 (p.50) defines a slip resisting surface as one "that has been so treated or constructed as to significantly reduce the chance of a user slipping. The surface should not be an abrasion hazard." The findings of this project provide further evidence that both slipping and abrasion are potential hazards for pools. Slipping was observed by the investigators in the on-site testing and both slipping and abrasion were mentioned as problems in the telephone survey of people with disabilities.

4.2. Slope: Zero depth entry pools are typically designed with very slight slopes. The maximum slope of a zero depth entry should not exceed 1:12 continuing to a minimum depth of 30 inches. For pools less than 30 inches deep, the slope should continue to the depth of the pool. Whenever the slope exceeds 1:20, it shall be considered a ramp and all recommendations for a ramp would apply.

Rationale: The findings of this project indicate that submerged slopes greater than 1:12 are not only very difficult for many non-ambulatory users but can also be hazardous for non-ambulatory and ambulatory users. Though wheelchairs were more difficult to control when wet, there was no evidence that would indicate that the maximum slope should be reduced or increased from that required of buildings and facilities in ADAAG 4.8.2.

The requirement for the slope to continue to a minimum depth of 30 inches is to assure that a gradual slope continues to a point at which a person using an aquatic chair could comfortably exit the chair. Based on the buoyancy data of the on-site testing, 30 inches would be a reasonable depth.

4.3. Vertical rise: Whenever a zero depth entry slope exceeds 1:20, a maximum rise for any run should be 30 inches.

Rationale: Once the zero depth entry slope exceeds 1:20 it is a ramp, and all of the recommendations for pool ramps (2.6.0 to 2.6.7) should apply.

4.4. Landings: For zero depth entry slopes that exceed 1:20, at least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must have a minimum length of 60 inches and a minimum width of 36 inches

Rationale: Once the zero depth entry slope exceeds 1:20 it is a ramp, and all of the recommendations for pool ramps (2.6.0 to 2.6.7) should apply.

4.5. Handrails: Whenever the slope of a zero depth entry exceeds 1:20, two handrails should be required 36 inches apart.

Rationale: Once the zero depth entry slope exceeds 1:20 it is a ramp, and all of the requirements for pool ramps (2.6.0 to 2.6.7) should apply. The findings of this project clearly indicate both a need and preference by people with disabilities for handrails at zero depth entries.

4.6. Whenever the slope of a zero depth entry exceeds 1:20, handrails shall have a top handrail gripping surface mounted at 34 inches to 38 inches and a second handrail mounted between 16 inches and 26 inches.

Rationale: Once the zero depth entry slope exceeds 1:20 it is a ramp, and all of the requirements for pool ramps (2.6.0 to 2.6.7) should apply.

4.7. Handrails must be affixed so as to not allow movement in any direction.

Rationale: During testing, the handrails on a portable ramp moved up to three inches from center, causing difficulty for both ambulatory and non-ambulatory users.

4.8. Aquatic chairs: Facilities that provide zero depth entry must provide an aquatic chair that meets recommendations 12.1 to 12.5

Rationale: As evidenced in this study, wheelchair users are not inclined to use their wheelchairs to enter and exit the water. The damage to chairs not designed for use in water was apparent in as few as three uses in this study.

Transfer Wall

A transfer wall is created by having the pool wall above the pool deck but at water level. This may be achieved by a continuous elevated wall around the perimeter of the pool or a dry ramp that lowers a section of the deck. When a transfer wall is provided, it should meet the following specifications:

5.1. Clear deck space: Clear deck space of 60 inches by 60 inches should be required at the transfer wall.

Rationale: The clear deck space is needed to enable a wheelchair user to locate the wheelchair in an optimal transfer position and to allow adequate turning space in accordance with ADAAG 4.2.3.

5.2. Wall height: The wall height should be 17 inches above the pool deck.

Rationale: This height range is needed to allow easy transfer from wheelchairs to the raised edge. The height is at the lower range of adult seat height for water closets in ADAAG (4.16.3) and at the upper range of the Access Board's recommendations for fourth graders (9 years old) in children's environments (1992, Chapter 5, p. 12).

5.3. Wall depth: The transfer wall should be 12 inches to 15 inches deep.

Rationale: A transfer wall deep enough to provide an adequate surface on which to transfer yet not so deep as to require the user to scoot across the surface is needed.

5.4. Wall surface: The transfer wall surface must be non-abrasive and without any sharp edges.

5.5. Handrails: A minimum of one handrail should be located perpendicular to the pool wall, 4 to 6 inches above the transfer wall and with a minimum of 22 inches clearance on either side of the handrail.

Rationale: The handrail will assist a person making the transfer to and from the transfer wall as well as into and out of the water.

5.6. Dry ramp: If a dry ramp is used to achieve the transfer wall, all of the requirements of ADAAG 4.8.5 will apply to the ramp.

Rationale: Dry ramps lower the deck to a point 17 inches below the water line. As dry ramps are outside of the pool tank, the existing ADAAG standards for ramps (4.8.5) should apply.

Movable Floors

Movable pool floors allow the entire pool floor or just a section of the floor to be raised or lowered to any depth or to a desired slope. Hydraulic pistons are used to slowly move the floor. When the floor is raised to deck level, participants can either walk or roll their wheelchairs onto the pool floor and be lowered to the desired water depth.

6.1. Pool coping: Changes in level in the pool coping should be no greater than one-half inch and be beveled with a slope no greater than 1:2.

Rationale: A person using a wheelchair must be able to move onto and off of the movable floor without obstruction. The ADAAG standard for changes in level (ADAAG 4.5.2) has been applied here.

6.2. Aquatic chairs: Facilities that provide a movable floor as an accessible means of water entry/exit shall provide an aquatic chair that meets recommendations 12.1 to 12.5

Rationale: As evidenced in this study, wheelchair users are not inclined to use their wheelchairs to enter and exit the water. The damage to chairs not designed for use in water was apparent in as few as three uses in this study.

Transfer Steps

Transfer steps are a series of surfaces that descend into the water allowing a person to sit and transfer from one surface to the next to enter or exit the pool. They can be either permanent or movable. When provided, transfer steps should meet the following specifications:

7.1. Clear deck space: Clear deck space of 60 by 60 inches should be required adjacent to the surface of the transfer steps.

Rationale: The clear deck space is needed to enable a wheelchair user to locate the wheelchair in an optimal transfer position and still allow space for someone else to maneuver around the parked wheelchair.

7.2. Transfer surface: The transfer surface of the highest step should be 17 inches above the pool deck.

Rationale: This height range is needed to allow easy transfer from wheelchairs to the raised edge. The height is at the lower range of adult seat height for water closets in ADAAG (4.16.3) and at the upper range of the Access Board's recommendations for fourth graders (9 years old) in children's environments (1992, Chapter 5, p. 12).

7.3. Surface: The surfaces should be firm, have no sharp edges, and should not be abrasive in texture.

Rationale: The surface is not required to be slip resistant as this may prevent a person from successfully transferring from step to step.

7.4. Step risers: The risers of transfer steps should be 5 to 7 inches in height. The last step in the water should be at least 18 inches below the water surface.

Rationale: Based on the buoyancy data of the on-site testing, most people should be able to comfortably transfer to and from the water at 18 inches.

7.5. Step surface: Transfer steps should have a minimum of 12 inches of tread depth and a minimum of 22 inches tread width.

Rationale: The transfer steps used in the on-site testing were within the recommended limits. The difficulties with transfer steps experienced by subjects in the on-site testing were not related to the depth and width of the steps. Each of the transfer steps currently available comply with this recommendation, and no problems associated with the tread depth or width were identified by respondents in the telephone survey of people with disabilities or by those in the pool facility survey.

7.6. Handrails: One handrail should be provided at the side of the transfer step opposite the clear deck space. The handrail should be between 4 inches and 6 inches above the step surface.

Rationale: The transfer steps used in the on-site testing were within the recommended limits. Each of the subjects who used the transfer steps in the on-site testing were satisfied with the handrail height.

7.7. 2.6.5. Handrail diameter should be 1.25 inches to 1.5 inches.
Rationale: This recommendation is consistent with ADAAG 4.26.2. The transfer steps used in the onsite testing had handrails within the specified range and no problems were observed. Consequently, there was no evidence to suggest a deviation from ADAAG.

Stairs

Stairs may be constructed as part of the pool or may be portable or removable equipment. Stairs may be located either in the primary pool area or in a swimout area that leads into the primary pool area. If stairs are provided as an accessible means of water entry/exit, they should meet the following specifications:

8.1. Surface: The surface of pool stairs must be firm, stable, and slip resistant.
Rationale: ANSI/NSPI-1 (p.50) defines a slip resisting surface as one "that has been so treated or constructed as to significantly reduce the chance of a user slipping. The surface should not be an abrasion hazard." The findings of this project provide further evidence that both slipping and abrasion are potential hazards for pools. Slipping was observed by the investigators in the on-site testing and both slipping and abrasion were mentioned as problems in the telephone survey of people with disabilities.

8.2. The minimum clear width of pool stairs shall be 36 inches.
Rationale: This recommendation is consistent with ADAAG 4.8.3. Each of the stairs used in the on-site testing complied with this recommendation. There was no evidence to indicate a change in this area.

8.3. All steps shall have uniform riser heights and uniform tread widths. Stair treads shall be no less than 11 inches wide.
Rationale: This recommendation is consistent with ADAAG 4.9.2. Each of the stairs used in this study met this requirement and no problems were encountered, thus there was evidence to suggest a deviation from ADAAG.

8.4. Two handrails shall be provided and located 36 inches apart.
Rationale: The findings of this project indicate both a need and preference by people with disabilities for handrails on both sides. As noted in the survey of people with disabilities, experienced users of pool stairs preferred handrails on both sides of the stairs (77%). The on-site testing reinforced the need for handrails on both sides, especially for those with weakness or paralysis in one arm. The survey of pool facilities also indicated that two handrails were most often found with pool stairs. Of those pools with stairs, 83% indicated two handrails were already installed.

8.5. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches above the ramp surface, a second handrail should be mounted between 16 inches and 26 inches.

Rationale: The height of the top gripping surface is consistent with ADAAG 4.8.5(5). Mace (1993) recommended a second handrail be placed at 20 inches to 24 inches. The 16 inches to 26 inches height was recommended for ramp handrails in children's environments (U.S. Access Board, 1992). The National Sporting Goods Association (1994) reports that 33% of the people who participate in swimming are under the age of 18.

8.6. Handrails should not be required to extend beyond the base of stairs or the base of a ramp where such would protrude into a lane or otherwise programmable area.

Rationale: The Places of Amusement Sub-committee appropriately noted that handrails partially submerged in the water or adjacent to swimming lanes are a protrusion hazard for swimmers and are often banned in swimming pool design codes. Though the building codes do not specifically prohibit submerged handrails, many prohibit underwater protrusions and areas of entrapment.

8.7. Handrails must be affixed so as to not allow movement in any direction.

Rationale: During testing, the handrails on a movable ramp moved up to 3 inches from left to right, causing difficulty for both ambulatory and non-ambulatory users. The same principle would apply to stairs.

8.8. Handrail diameter should be 1.25 inches to 1.5 inches.

Rationale: This recommendation is consistent with ADAAG 4.26.2. Each of the stairs in the onsite testing had handrails within the specified range and no problems were observed. Consequently, there was no evidence to suggest a deviation from ADAAG.

8.9. If handrails are mounted adjacent to the pool wall, the space between the wall and the handrail shall be 1.5 inches.

Rationale: This recommendation is consistent with ADAAG 4.26.2. There was no evidence in the current study to suggest a deviation from ADAAG.

Wading Pools

9.0. A minimum of one accessible means of water entry/exit shall be provided for each wading pool and shall be located on an accessible route.

Rationale: Though wading pools were not examined in this project, many of the principles for swimming pool accessibility would apply. Providing an accessible means of entry/exit would facilitate independent pool use by young children with disabilities as well as parents who have disabilities. Also, people with disabilities who are weak or non-swimmers might feel more comfortable in the shallow depths of wading pools.

9.1. An accessible means of water entry to wading pools shall be one of the following: transfer wall, transfer steps, pool lift, a wet ramp, or a zero depth entry, provided the means of entry/exit meets each of the recommendations for that means of entry/exit.

Rationale: The shallow depth of wading pools make some designs and devices untenable. For example, existing designs for pool lifts would not be usable in the shallow depths of wading pools and the pool space required for a wet ramp would not be available in small wading pools. Consequently, transfer walls and transfer steps are allowed as accessible means of access into wading pools.

Spas

10.0. A minimum of one accessible means of water entry/exit shall be provided for each spa and shall be located on an accessible route.

Rationale: Though spas were not specifically examined in this project, many of the principles for swimming pool accessibility would apply. Providing an accessible means of entry/exit would facilitate independent spa use by people with disabilities.

10.1. An accessible means of water entry to spas shall be one of the following: transfer wall, transfer steps, or lift, provided the means of entry/exit meets all recommendations that apply to the selected means of entry/exit.

Rationale: Generally, size of spas make some designs and devices untenable. For example, wet ramps and zero depth entry are not feasible for spas. Consequently, transfer walls and transfer steps are allowed as accessible means of access into spas.

10.2 An accessible spa that is unattended shall have an means of emergency notification that is adjacent to the accessible means of egress, within reach of someone seated in the spa, and operable at all times.

Rationale: ANSI/NSPI-2 (1992) standard 17.2.1.6 acknowledges that "overexposure to hot water may cause nausea, dizziness, and fainting." As many spas are left unattended, there may be situations when a device breaks down or become unusable. Though not specifically addressed in the study. survey respondents with disabilities did note the need for a means of contacting someone should a device break down or become unusable.

10.3. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).

Rationale: See rationale for recommendation 3.8.

Removable Designs & Devices

11.1. A removable device must remain in place until all users of the device have exited the pool tank.

Rationale: It is assumed that a person who uses a device to enter a pool will also need that same device to exit the pool. This recommendation assures that the device is available when the person desires or needs to exit the pool.

11.2. Removable devices shall be on-site, readily available, maintained and operable at all times. Whenever possible, removable devices should be in place.

Rationale: Many of the respondents in the telephone survey of pool facilities indicated their agency's removable devices (e.g., lifts, ramps, transfer stairs, etc.) were not in place at all times. For example, of those agencies with portable lifts, 73% indicated the lifts were not in place at all times. This shifts responsibility to the potential user to request the device, in effect separating that person from other pool users. Unless a hazard to users and staff or an undue hardship for the agency can be clearly demonstrated, devices should be in place.

11.3. Signage: Whenever devices are removable and not in place at all times, signs must be posted to instruct users as to how the designs/devices can be requested.

Rationale: New visitors or less assertive individuals may not know of the devices and may not be aware of the procedures by which the devices can be procured.

Aquatic Chairs

12.0. Whenever a ramp, zero depth entry, or movable floor is used as an accessible means of water entry/exit, an aquatic chair with push rims must be provided.

Rationale: Wheelchair users in the telephone survey of people with disabilities clearly indicated the need for aquatic chairs when using a ramp, zero depth entry, or movable floor. Respondents indicated they would be more willing to use each of the three alternatives if an aquatic chair were provided.

12.0 At least one aquatic chair with a top surface of the seat at 17 inches above the deck shall be provided.

Rationale: The seat height is needed to allow easy transfer from wheelchairs for a range of individuals. The height is consistent with adult seat height ranges ADAAG (4.16.3) and at the upper range of the recommendations for fourth graders (9 years old) in children's environments (Access Board, 1992, Chapter 5, p. 12). It may be advisable for the seat height to be readily adjustable to other heights to accommodate users with seats of varying heights, however, the seat must have the capability of easily being positioned to a height of 17 inches.

12.1. Seat width: The aquatic chair seat width should be a minimum of 19 inches wide.

Rationale: Each of the tested seats met or exceeded this width and no problems were observed. This width is consistent with available wheelchairs and aquatic chairs.

12.2. Footrest: Footrests should be provided on the aquatic chair.
Rationale: For many adults, their legs will extend beyond the 17 inches distance below the chair seat. Without a footrest, the user's feet will drag across the deck, which may cause an injury to the individual.

12.3. Armrests should be located on both sides of the aquatic chair seat. At least one armrest should be capable of moving away from the side of the chair.
Rationale: For stability purposes, subjects in the telephone survey indicated both a need and preference for armrests on both sides of aquatic chairs. A movable armrest is needed to allow for transfers.

Modified Delphi Technique

To test the recommendations and build consensus, a Modified Delphi Technique (Moore, 1987) was conducted. This technique was used to enable the project advisory panel to evaluate and build consensus on the proposed recommendations. The objectives of the technique are to ensure that all possible options have been considered, to estimate the impact and consequences of the options, and to build consensus on preferred options.

The Modified Delphi Technique was conducted by mailing the draft recommendations and rationales to the project advisory panel. Panel members were asked to rate each recommendation on a 10-point Likert-type scale ranging from 1 (Strongly Disagree) to 10 (Strongly Agree). The group means and standard deviations were calculated and comments compiled. Based on the analysis of the first round Delphi and further analysis of the project's other data, the recommendations were modified and a second round of the Delphi was sent to panel members.

The results of the two rounds provide substantial evidence that the Modified Delphi was effective in building consensus within the advisory panel (Appendix A). There was much more agreement among the panel members after the second round than there had been after the first round. The group's mean rating from the first round was 8.05. The group's mean rating increased to 9.21 in the second round, and the mean of standard deviations across all items decreased from 2.03 in the first round to 1.36 in the second round. In the first round, 23 items rated below an eight but only three items rated below an eight in the second round. Also, the ratings of nine items had standard deviations greater than 3.0 in the first round and only one was greater than 3.0 in the second round. These findings strongly suggest that the group agreed more strongly with the recommendations in the second round and agreed with each other more.

Three items received mean ratings below 8.0: 1) The maximum rise for any run on a ramp should be 30 inches ($\bar{x}$=7.75, s=3.14). 2) Whenever the slope of a zero depth entry exceeds 1:20, two handrails should be required 36 inches apart ($\bar{x}$=7.25, s=2.98). 3) Whenever the slope of a zero depth entry exceeds 1:20, handrails shall have top handrail gripping surfaces mounted at 34 inches to 38 inches and a second handrail mounted between 16 inches and 26 inches ($\bar{x}$=7.58, s=2.81). They were also the items with the greatest standard deviations, indicating greater disagreement within the advisory panel. Even with those items, however, there was substantial agreement with the recommendations, and there was no evidence to suggest a change in the recommendations.

Areas for Further Research

1. Due to limitations posed by the available sites and resources, maximum ramp slope could only be tested at 8.3% and 17%. Additional research is needed to determine the maximum slope on wet ramps.

2. The scope of this study was restricted to entering and exiting swimming pools. The pool entry and exit needs of people with visual impairments (e.g., handrails, uniform riser heights, etc.) were addressed, however, there were additional concerns not addressed. Specifically, the issue of tactile warnings at the pool edge, around ladders, diving boards, sliding boards, lifts and transfer steps were not addressed. Also, the need for tactile warnings for overhead or protruding objects, such as lifeguard platforms, sliding boards, and diving boards was not addressed.

3. The need for heat resistant surfaces on designs and devices on which there might be skin contact was not addressed in this study. As the majority of the testing was done indoors, surface temperature was not a factor and therefore not addressed in the recommendations.

4. Concern was expressed regarding what constitutes a "reasonable time" to put in place portable or removable devices. Respondents in the telephone survey of people with disabilities who had waited for a device to be put in place had waited from 1 to 20 minutes.

5. As electric wheelchairs will not be used in pools and it is recommended that aquatic chairs be required at pools with ramps or zero depth entries, the need for a 36-inch clear width for ramps may be excessive. Also, a more narrow distance between handrails may be more effective for both ambulatory and non-ambulatory pool users. Additional research is needed to determine the most effective handrail distance on wet ramps.

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Appendix A

Delphi Process Results

National Center on Accessibility
Swimming Pool Accessibility Project
DELPHI - ROUND II

Project advisory panel members were asked to rate each recommendation on a 10-point Likert-type scale, with 1=Strongly Disagree and 10=Strongly Agree. The group means ($\bar{x}$) and standard deviations (s) are provided for each item.

$\bar{x}$	s	GENERAL
9.08	**2.47**	1.0. At least one accessible means of water entry/exit shall be provided for each swimming pool and shall be located on an accessible route.
9.00	**1.29**	1.1. Swimming pools with more than 300 linear feet of pool wall shall provide at least two accessible means of water entry/exit located on accessible routes.
8.75	**1.88**	1.2. When only one accessible means of water entry is provided, it shall be one of the following: swimming pool lift, a wet ramp, or a zero depth entry.
9.56	**0.64**	1.3. When a second accessible means of water entry/exit is provided, it shall be one of the following: transfer wall, transfer steps, movable floor, stairs, swimming pool lift, wet ramp, or zero depth entry. Lifts, wet ramps, and zero depth entry may not be used as a second accessible means of water entry/exit if the same means is used as the first accessible means of water entry/exit.
8.75	**2.42**	1.4. When a second accessible means of water entry/exit is provided, it must be located so that in combination with the first accessible means of water entry/exit to serve both ends and sides of the pool.

Ramps

When ramps, whether permanent or movable, are provided, they should meet the following specifications:

9.92	**0.28**	2.1. Surface: The surface of pool ramps must be firm, stable, and slip resistant.
9.25	**1.36**	2.2. Slope: The least possible slope should be used for a pool ramp. The maximum slope of a pool ramp shall be 1:12.
7.75	**3.14**	2.3. The maximum rise for any run shall be 30 inches.
9.58	**0.84**	2.4. The minimum clear width of a pool ramp shall be 36 inches.
8.91	**1.56**	2.5. Landings: Level landings must be located at the bottom and top of each ramp and each ramp run. At least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must:

$\bar{x}$	s	
9.33	**1.37**	2.5.1. be at least as wide as the ramp run leading to it;
8.83	**1.82**	2.5.2. have a minimum length of 60 inches clear;
9.00	**1.71**	2.5.3. have a minimum of size of 60 inches by 60 inches if the ramp changes direction.
9.92	**0.28**	2.6. Handrails: Handrails should be required on all ramps. Ramp handrails should include the following:
9.42	**0.95**	2.6.1. Two handrails shall be provided and located 32 to 36 inches apart.
8.32	**1.50**	2.6.2. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches above the ramp surface, a second handrail should be mounted between 16 inches and 26 inches.
9.58	**0.64**	2.6.3. Handrails should not be required to extend beyond the base of stairs or the base of a ramp where such would protrude into a lane or otherwise programmable area.
9.33	**1.37**	2.6.4. Handrails must be affixed so as to not allow movement in any direction.
9.33	**1.34**	2.6.5. Handrail diameter should be 1.25 inches to 1.5 inches.
9.67	**0.62**	2.6.6. If handrails are mounted adjacent to the pool wall, the space between the wall and the handrail shall be 1.5 inches.
9.33	**1.43**	2.6.7. Aquatic chairs: Facilities that provide ramps must also provide an aquatic chair.

Pool Lifts

When provided, pool lifts should meet the following specifications:

9.17	**0.80**	3.1. Pool lifts shall facilitate unassisted operation.
9.17	**1.34**	3.2. Clear space: A minimum clear deck space of at least 60 x 56 inches to one side and to the front of the lift seat must be provided. The space under the lift seat could be included as part of the clear space as long as the area is unobstructed.
9.67	**0.62**	3.3. Seat location: In the raised position the lift seat edge used for transfers must be located over the pool deck at least 12 inches inside the deck edge.
8.92	**1.50**	3.4. Seat height: Lift seats should be located 17 inches from the deck to the top of the seat surface.

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9.58	**0.84**	3.5. Seat width: The lift seat width should be a minimum of 19 inches wide.
8.67	**1.89**	3.6. Footrest: A footrest should be attached to the lift seat.
8.83	**1.62**	3.7. Arm rests should be located on both sides of the lift seat. The arm rest located next to the clear deck space should be capable of moving away from the transfer area.
9.42	**0.86**	3.8. Controls and operating mechanisms: Controls and operating mechanisms at both the deck level and water level positions should be operable from the front edge of the lift seat and unobstructed by any other component of the lift. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).
9.83	**0.37**	3.9. Lifts shall be operable from both the deck level and water level.
9.75	**0.43**	3.10. Vertical travel: The vertical travel of the lift should allow the lift seat to be submerged 18 inches-20 inches below the water level.
9.33	**1.37**	3.11. Minimum lifting capacity: A minimum weight of 300 lbs. is required for all single person lifts. The lift should also be capable of sustaining a static load of at least three times the rated load.

Zero Depth Entry (Beach Entry)

When zero depth entry is provided it should meet the following specifications:

9.92	**0.28**	4.1. Surface: The surface shall be firm, stable and slip resistant.
8.83	**1.72**	4.2. Slope: Zero depth entry pools are typically designed with very slight slopes. The maximum slope of a zero depth entry should not exceed 1:12 continuing to a minimum depth of 30 inches. For pools less than 30 inches deep, the slope should continue to the depth of the pool. Whenever the slope exceeds 1:20, it shall be considered a ramp and all recommendations for a ramp would apply.
8.08	**2.90**	4.3. Vertical rise: Whenever a zero depth entry slope exceeds 1:20, a maximum rise for any run should be 30 inches.
8.08	**2.98**	4.4. Landings: For zero depth entry slopes that exceed 1:20, at least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must have a minimum length of 60 inches and a minimum width of 36 inches
7.25	**2.81**	4.5. Handrails: Whenever the slope of a zero depth entry exceeds 1:20, two handrails should be required 36 inches apart.

$\bar{x}$	s	
7.58	**2.81**	4.6. Whenever the slope of a zero depth entry exceeds 1:20, handrails shall have a top handrail gripping surface mounted at 34 inches to 38 inches and a second handrail mounted between 16 inches and 26 inches.
8.25	**2.98**	4.7. Handrails must be affixed so as to not allow movement in any direction.
9.17	**1.52**	4.8. Aquatic chairs: Facilities that provide zero depth entry must provide an aquatic chair with push rims.

Transfer Wall

When a transfer wall is provided it should meet the following specifications:

9.50	**0.96**	5.1. Clear deck space: Clear deck space of 60 inches by 60 inches should be required at the transfer wall.
9.08	**1.50**	5.2. Wall height: The wall height should be 17 inches above the pool deck.
9.58	**0.54**	5.3. Wall depth: The transfer wall should be 12 inches to 15 inches deep.
9.42	**1.38**	5.4. Wall surface: The transfer wall surface must be non-abrasive and without any sharp edges.
9.50	**0.87**	5.5. Handrails: A minimum of one handrail should be located perpendicular to the pool wall, 4 to 6 inches above the transfer wall and with a minimum of 22 inches clearance on either side of the handrail.
9.67	**0.62**	5.6. Dry ramp: If a dry ramp is used to achieve the transfer wall, all of the requirements of ADAAG 4.8.5 will apply to the ramp.

Movable Floors

When a movable floor is provided as an accessible means of entry, it must meet the following:

8.75	**2.59**	6.1. Pool coping: Changes in level in the pool coping should be no greater than one-half inch and be beveled with a slope no greater than 1:2.
9.33	**1.43**	6.2. Aquatic chairs: Facilities that provide a movable floor as an accessible means of water entry/ext shall provide an aquatic chair with push rims.

Transfer Steps

When provided, transfer steps should meet the following specifications:

9.75	**0.60**	7.1. Clear deck space: Clear deck space of 60 by 60 inches should be required adjacent to the surface of the transfer steps.
9.08	**1.38**	7.2. Transfer surface: The transfer surface of the highest step should be 17 inches above the pool deck.

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9.42	**1.38**	7.3. Surface: The surfaces should be firm, have no sharp edges, and should not be abrasive in texture.
9.75	**0.43**	7.4. Step risers: The risers of transfer steps should be 5 to 7 inches in height. The last step in the water should be at least 18 inches below the water surface.
9.58	**0.49**	7.5. Step surface: Transfer steps should have a minimum of 12 inches of tread depth and a minimum of 22 inches tread width.
8.92	**2.72**	7.6. Handrails: One handrail should be provided at the side of the transfer step opposite the clear deck space. The handrail should be between 4 inches and 6 inches above the step surface.

Stairs

When stairs are provided as an accessible means to pool entry/exit, they should meet the following:

9.92	**0.28**	8.1. Surface: The surface of pool stairs must be firm, stable, and slip resistant.
9.67	**0.85**	8.2. The minimum clear width of pool stairs shall be 36 inches.
9.50	**0.78**	8.3. All steps shall have uniform riser heights and uniform tread widths. Stair treads shall be no less than 11 inches wide.
9.58	**0.88**	8.4. Two handrails shall be provided and located 32 to 36 inches apart.
9.08	**1.38**	8.5. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches above the ramp surface, a second handrail should be mounted between 16 inches and 26 inches.
9.67	**0.62**	8.6. Handrails should not be required to extend beyond the base of stairs or the base of a ramp where such would protrude into a lane or otherwise programmable area.
9.50	**1.38**	8.7. Handrails must be affixed so as to not allow movement in any direction.
9.25	**1.30**	8.8. Handrail diameter should be 1.25 inches to 1.5 inches.
9.75	**0.60**	8.9. If handrails are mounted adjacent to the pool wall, the space between the wall and the handrail shall be 1.5 inches.

Wading Pools

9.33	**1.37**	9.0. A minimum of one accessible means of water entry/exit shall be provided for each wading pool and shall be located on an accessible route.

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9.42	**1.38**	9.1. An accessible means of water entry to wading pools shall be one of the following: transfer wall, transfer steps, pool lift, a wet ramp, or a zero depth entry, provided the means of entry/exit meets each of the recommendations for that means of entry/exit.
		Spas
9.00	**1.83**	10.0. A minimum of one accessible means of water entry/exit shall be provided for each spa and shall be located on an accessible route.
9.42	**1.38**	10.1. An accessible means of water entry to spas shall be one of the following: transfer wall, transfer steps, or lift, provided the means of entry/exit meets all recommendations that apply to the selected means of entry/exit.
8.67	**2.69**	10.2 An accessible spa that is unattended by staff shall have an emergency call mechanism that is adjacent to the accessible means of egress, within reach of someone seated in the spa, and operable at all times. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).
		Removable Designs & Devices
9.75	**0.43**	11.1. A removable device must remain in place until all users of the device have exited the pool tank.
8.55	**2.78**	11.2. Removable devices shall be on-site, readily available, maintained and operable at all times. Whenever possible, removable devices should be in place.
9.82	**0.39**	11.3. Signage: Whenever devices are removable and not in place at all times, signs must be posted to instruct users as to how the designs/devices can be requested.
		Aquatic Chairs
9.27	**1.48**	12.0. Whenever a ramp, zero depth entry, or movable floor is used as an accessible means of water entry/exit, an aquatic chair must be provided.
9.73	**0.62**	12.1. At least one aquatic chair with a top surface of the seat at 17 inches above the deck shall be provided.
9.64	**0.64**	12.2. Seat width: The aquatic chair seat width should be a minimum of 19 inches wide.
9.27	**1.48**	12.3. Footrest: Footrests should be provided on the aquatic chair.

$\bar{x}$	s	
9.55	**1.16**	12.4. Arm rests should be located on both sides of the aquatic chair seat. At least one arm rest should be capable of moving away from the side of the chair.

National Center on Accessibility
Swimming Pool Accessibility Project
DELPHI - ROUND I

Project advisory panel members were asked to rate each recommendation on a 10-point Likert-type scale, with 1=Strongly Disagree and 10=Strongly Agree. The group means ($\bar{x}$) and standard deviations (s) are provided for each item.

$\bar{x}$	s	
		GENERAL
8.92	**2.37**	1.0. Primary means of water access. At least one primary means of water entry access located on a accessible route must be provided for each swimming pool. Primary means of water access may include lifts, ramps, zero depth entry or other means that provide equivalent facilitation.
6.75	**3.14**	1.1. Complementing means of water access. All pools with more than 300 linear feet of pool wall must provide a second, complementing means of water access. Complementing means of water access provide alternatives to specific groups of people with disabilities or pool uses. They may include transfer walls, transfer steps, stairs, movable floors, primary means of water access, or other means that provide equivalent facilitation.
4.46	**2.87**	1.2.1. When a second, complementing means of water access is provided, it must be located on the opposite side of the pool from the primary means of pool access.
		RAMPS
9.92	**0.27**	2.1. Surface: The surface of pool ramps must be firm, stable, and slip resistant.
7.85	**2.48**	2.2. Slope: The least possible slope should be used for a pool ramp. The maximum slope of a pool ramp should be 1:12.
5.62	**2.90**	2.3. Vertical rise: The maximum rise for any run should be 30 inches.
8.58	**2.43**	2.4. Width: The clear width of a pool ramp must be 36 inches.
8.09	**1.62**	2.5. Landings: Level landings must be located at the bottom and top of each ramp and each ramp run. At least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must:
8.75	**2.45**	be at least as wide as the ramp run leading to it.
6.17	**3.41**	2.5.2. have a minimum length of 60 inches.
8.92	**1.61**	2.5.3. have a minimum of size of 60 inches by 60 inches if the ramp changes direction.
8.58	**1.80**	2.5.4. be located outside of swimming lane paths or water currents.

$\bar{x}$	s	
9.58	**0.76**	2.6. Handrails: Handrails should be required on all ramps. Ramp handrails should include the following:
8.50	**1.61**	2.6.1. Handrails must be located on both sides of ramps.
6.91	**2.57**	2.6.2. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches (ADAAG 4.8.5(5), handrails a second handrail should be mounted between 16 inches and 26 inches.
9.46	**0.63**	2.6.3. Handrails should not be required to extend beyond the base of stairs or the base of a ramp where such would protrude into a lane or otherwise programmable area.
9.23	**1.37**	2.6.4. Handrails must be affixed so as to not allow movement in any direction.
9.31	**1.32**	2.6.5. Handrail diameter should be 1.25 inches to 1.5 inches (ADAAG 4.26.2).
8.92	**2.37**	2.6.6. If handrails are mounted adjacent to the pool wall, the space between the wall and the handrail shall be 1.5 inches (ADAAG 4.26.2).
7.54	**3.05**	2.6.7. Aquatic chairs: Facilities that provide ramps, zero depth entry, or movable floors must also provide an aquatic chair.

POOL LIFTS

When provided, pool lifts should meet the following specifications:

7.62	**2.47**	3.1. Clear space: A minimum clear deck space of at least 60 x 56 inches to one side and to the front of the lift seat must be provided. The space under the lift seat could be included as part of the clear space as long as the area is unobstructed.
8.69	**1.20**	3.2. Seat location: In the raised position the lift seat edge used for transfers must be located above the deck at least 12 inches from the coping edge.
8.67	**1.37**	3.3. Seat height: Lift seats should be located 17 inches inches from the deck to the top of the seat surface.
8.62	**1.27**	3.4. Seat width: The lift seat width should be a minimum of 19 inches wide.
8.08	**1.86**	3.5. Footrest: A footrest should be attached to the lift seat.
8.31	**1.59**	3.6. Armrest: Arm rests should be located on both sides of the lift seat. The arm rest located next to the clear deck space should be capable of moving away from the transfer area.

$\bar{x}$	s	
8.31	**1.90**	3.7. Controls and operating mechanisms: Controls and operating mechanisms at both the deck level and water level positions should be operable from the front edge of the lift seat and unobstructed by any other component of the lift. Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).
8.85	**1.03**	3.8. Vertical travel: The vertical travel of the lift should allow the lift seat to be submerged 18 inches-20 inches below the water level.
8.31	**2.13**	3.9. Minimum lifting capacity: A minimum weight of 300 lbs. is required for all single person lifts. The lift should also be capable of sustaining a static load of at least three times the rated load.

ZERO DEPTH ENTRY

When zero depth entry is provided it should meet the following specifications:

9.46	**1.15**	4.1. Surface: The surface shall be firm, stable and slip resistant.
9.54	**0.50**	4.2. Slope: Zero depth entry pools are typically designed with the very slight slopes. The maximum slope of a zero depth entry should not exceed 1:12.
7.00	**2.69**	4.3. Vertical rise: Whenever a zero depth entry slope exceeds 1:20, a maximum rise for any run should be 30 inches.
7.54	**2.53**	4.4. Landings: Level landings must be located at the top of each zero depth entry. For zero depth entry slopes that exceed 1:20, at least one level landing must be located between 24 inches and 30 inches below the stationary water level. The landings must have a minimum length of 60 inches and a minimum width of 60 inches.
4.46	**3.50**	4.5. Handrails: Handrails should be required on all zero depth entry pools. Handrails should include the following:
3.17	**2.70**	4.5.1. A handrail must be located on both sides of the zero depth entry.
5.58	**3.62**	4.5.2. In addition to a top handrail gripping surface mounted at 34 inches to 38 inches handrails (ADAAG 4.8.5(5), a second handrail should be mounted between 16 inches and 26 inches.
7.58	**3.35**	4.5.3. Handrails must be affixed so as to not allow movement in any direction.
7.29	**3.19**	4.6. Aquatic chairs: Facilities that provide zero depth entry must provide an aquatic chair that allows for independent maneuvering.

Transfer Wall

When transfer wall is provided it should meet the following specifications:

$\bar{x}$	s	
8.91	**1.89**	5.1. Clear deck space: Clear deck space of 60 inches by 60 inches should be required at the transfer wall.
8.58	**1.85**	5.2. Wall height: The wall height should be 17 inches above the pool deck.
8.62	**1.39**	5.3. Wall depth: The transfer wall should be 12 inches to 15 inches deep.
9.23	**1.37**	5.4. Wall surface: The transfer wall surface must be non-abrasive and without any sharp edges.
8.23	**2.22**	5.5. Handrails: A minimum of one handrail should be located 4 to 6 inches above the transfer wall and with a minimum of 22 inches clearance on either side of the handrail.
8.92	**2.09**	5.6. Dry ramp: If a dry ramp is used to achieve the transfer wall, all of the requirements of ADAAG 4.8.5 will apply to the ramp.

MOVABLE FLOORS

8.92	**1.55**	6.1. Pool coping: Changes in level in the pool coping should be no greater than ½ inches and be beveled with a slope no greater than 1:2.

TRANSFER STEPS

When provided, transfer steps should meet the following specifications:

8.38	**2.53**	7.1. Clear deck space: Clear deck space of 60 by 60 inches should be required adjacent to the surface of the transfer steps.
8.69	**1.32**	7.2. Transfer surface: The transfer surface of the highest step should be 17 inches above the pool deck.
9.38	**1.39**	7.3. Surface: The surfaces should be firm, have no sharp edges, and should not be abrasive in texture.
7.31	**2.43**	7.4. Step risers: The risers of transfer steps should be 5 to 7 inches in height. The last step in the water should be 18 inches below the water surface. Transfer steps shall tier down to a grade level between 12 to 24 inches below stationary water level.
6.31	**3.12**	7.5. Step surface: Transfer steps should have a minimum of 14 inches of tread depth and a minimum of 14 inches tread width.
8.62	**1.44**	7.6. Handrails: One handrail should be provided at the side of the transfer step opposite the clear deck space. The hand rail should be between 4 inches and 6 inches above the step surface.

REMOVABLE DESIGNS & DEVICES

$\bar{x}$	s	
7.42	**3.43**	8.1. In place: Removable designs should be in place whenever possible and operable at all times.
9.83	**0.55**	8.2. Signage: Whenever designs or devices are removable and not in place at all times, signs must be posted to instruct users as to how the design/device can be procured.

Appendix B

State Building Code
Summary Tables

Dry & Wet Ramp
Estimates

Product Tables

Product Descriptions

State Building Code Summary Tables

STATE SWIMMING POOL BUILDING CODES: INGRESS/EGRESS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
INGRESS/ EGRESS																																																		
Required Accessibility					✔		✔	a							✔															✔		b		✔	✔	✔											✔			
Recommended Accessibility									✔	✔																																								
EQUIPMENT ALTERNATIVES:																																																		
ramp							✔	✔	✔			✔		✔	✔							✔										b	✔			✔											✔			
lift							✔	✔	✔												✔											b				✔														
transfer step																																b																			
steps								✔	✔																							b																			
handrails								✔	✔																							b																			
movable floor																																b																			
aquatic wheelchair																																b																			
other								✔	✔																																										

a: if present, must be "approved within the limits of sound engineering practice and nationally recognize standards"
b: equipment suggested for use in "Special Purpose Pools"

STATE SWIMMING POOL BUILDING CODES: DECKS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
EQUIPMENT CLEARANCE																																																		
2 feet														a				a																														a		
3 feet												✔		a				a			✔	✔																		✔								a		
4 feet	✔	✔		✔	✔			✔							✔													✔																						
5 feet			✔																																																
6 feet																																					✔														
SLOPE:																																																		
1/8" per foot															✔			✔																																
1/4" per foot	✔		✔		✔	✔		✔				✔		✔									✔		✔	✔	✔	✔			✔		✔			✔	✔	✔	✔	✔		✔	✔	✔			✔			✔
max. 3/8" per ft												✔											✔								✔													✔	✔						
max. ½" per ft						✔		✔						✔	✔			✔												✔			✔															✔	✔		
max. 5/8" per ft	✔																																							✔		✔								
3":10'				✔																																														
max. 1:24		✔																																																

a: (IN, LA, WV) deck clearance of 24" shall be provided around deck equipment that is 36" or less in height above the deck; 36" of clearance for all other pieces of deck equipment.

STATE SWIMMING POOL BUILDING CODES: DECKS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
MINIMUM WIDTH																																																			
4 feet	a		f	l	✔		✔	✔	✔			u	l	b				f		✔	✔	✔						✔			✔					l	s	✔	✔	v			✔		✔	✔	n	f		s
5 feet						✔				✔													✔		✔								m	g	✔						✔			✔						
6 feet														h	✔			h								✔							q							v		c					p	h	✔	
6.5 feet		✔																																																	
8 feet	d			r								u	r														✔				✔	q	d		r	t					k								t
10 feet			e																																																
SPAS																																																			
min. 4 feet	✔			✔					✔																	✔		✔					✔	✔	✔		✔		✔	✔		✔		✔						
min. 5 feet																							✔		✔																										

a: institutions, camps, housing complexes, motels, hotels, and indoor pools=4' deck
b: type C=4' deck (hotels, motels, housing complexes, etc)
c: type B=6' deck (hotels, motels, housing complexes, camps, etc)
d: municipal and community pools= 8' deck
e: public=10' deck (municipal and community pools)
f: semi-public=4' deck (institutions, camps, housing complexes, motels, and hotels)
g: semi-public=5' deck (institutions, camps, housing complexes, motels, and hotels)
h: public=6' deck (municipal and community pools)
k: type A=8' deck (general public use)
l: indoor=4' deck
m: indoor=5' deck
n: indoor and less than 1500 square feet=4'
p: outdoor=6' deck
q: outdoor=6' deck, unless 1600 square feet or larger=8' deck;
r: outdoor=8' deck
s: limited use=4' (use limited to patrons, residents, or members)
t: general use=8' (general public pools)
u: 8' deck, unless Type B, semi-public with less than 1200 square feet of water surface=4' deck (hotels, motels, and housing complexes)
v: 4' deck, unless over 1600 square feet =6' deck

STATE SWIMMING POOL BUILDING CODES: EQUIPMENT/DESIGNS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
TRANSFER STEPS																																																			
18 inches above deck																																✔																			
LIFTS																																																			
min. 4 feet deck space behind								✔	✔																																										
MOVABLE FLOOR																																																			
hydraulic power																																✔																			
ZERO DEPTH ENTRY																																																			
max. 1:12													✔																																						

STATE SWIMMING POOL BUILDING CODES: STAIRS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
WATER DEPTH																																																			
max. 3.5 feet													✔									✔						✔																							
SIZE & AREA																																																			
min. 240 sq. in. unobstructed														✔				✔															✔				✔											✔	✔		
HANDRAIL																																																			
extend 18 inches beyond top and bottom step										✔				✔				✔														✔	✔															✔			
min. 1rail					✔	✔				✔			✔	✔	✔			✔							✔		✔	✔			✔	✔	✔	✔			✔			✔		✔		✔				✔		✔
min. 2 rails									✔			✔									✔		✔			✔						a						✔	✔				✔				✔			
1 per 10 feet tread length								✔																																✔		✔								
1 per 12 feet tread length													✔		✔							✔																													
side if <4 feet; center if >4 feet								✔																																											

a: requirement for "Special Purpose Pools"

STATE SWIMMING POOL BUILDING CODES: STAIRS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
RISER HEIGHT																																																			
Uniform	✔				✔			✔	✔	✔				✔				✔				✔	✔		✔								✔			✔	✔										✔	✔		✔
min. 7 inches										✔																												✔						✔			✔			
min. 10 inches																										✔																								
max. 5.75 in.																																b																		
max. 10 inches						✔			✔			✔										✔	✔		✔		✔	✔				✔				✔		✔				✔	✔				✔			
max. 11 inches																																								✔										
max. 12 inches	✔				✔			✔		✔			✔	✔				✔															✔				✔												✔		✔
TREAD LENGTH																																																			
min. 12 inches										✔																																									
min. 24 inches								✔	✔																											✔															
min. 30 inches																																								✔											
min. 48 inches																															✔																				
TREAD WIDTH (depth)																																																			
min. 8 inches																										✔																									
min. 10 inches								✔	✔	✔				✔				✔															✔				✔							✔			✔	✔		✔
min. 12 inches					✔	✔						✔	✔									✔			✔		✔	✔				✔				✔		✔		✔		✔	✔							
max. 18 inches																																✔																			

b: measurement for "Special Purpose Pool"

STATE SWIMMING POOL BUILDING CODES: RAMPS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
WIDTH																																																			
min. 3 feet														✔																																			✔	
WATER DEPTH																																																			
max. 3.5 feet																						✔																													
SLOPE																																																			
max. 1:7																																															✔				
max. 1:10														✔																																			✔	
max. 1:8 where located at least 24" below water line and 1:12 above that point							✔																																											
LANDING																																																			
min. 5 feet																																																	✔	
HANDRAILS																																																			
min. 1 rail														✔	✔																		✔														✔				
min. 2 rails							✔					✔										✔																												✔	

STATE SWIMMING POOL BUILDING CODES: HANDRAILS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
DIAMETER:																																																			
min. 1.25 inches														✔																																					
min. 1 inches										✔								✔															✔															✔		
max. 1.9 inches										✔								✔															✔															✔		
max. 2 inches														✔																																					
HEIGHT:																																																			
6 inches (those unable to stand)																																a																			
22 inches (children)																																a																			
min. 28 inches					✔																																														
32 inches																																a																			
34 - 38 inches															✔																																					
HANDRAILS																																																			
Omitted							b														b																															

a: handrail height measurements ONLY for New York's "Special Purpose Pools"
b: handrails may be omitted if there are less than four steps; or if steps extend the width of the pool

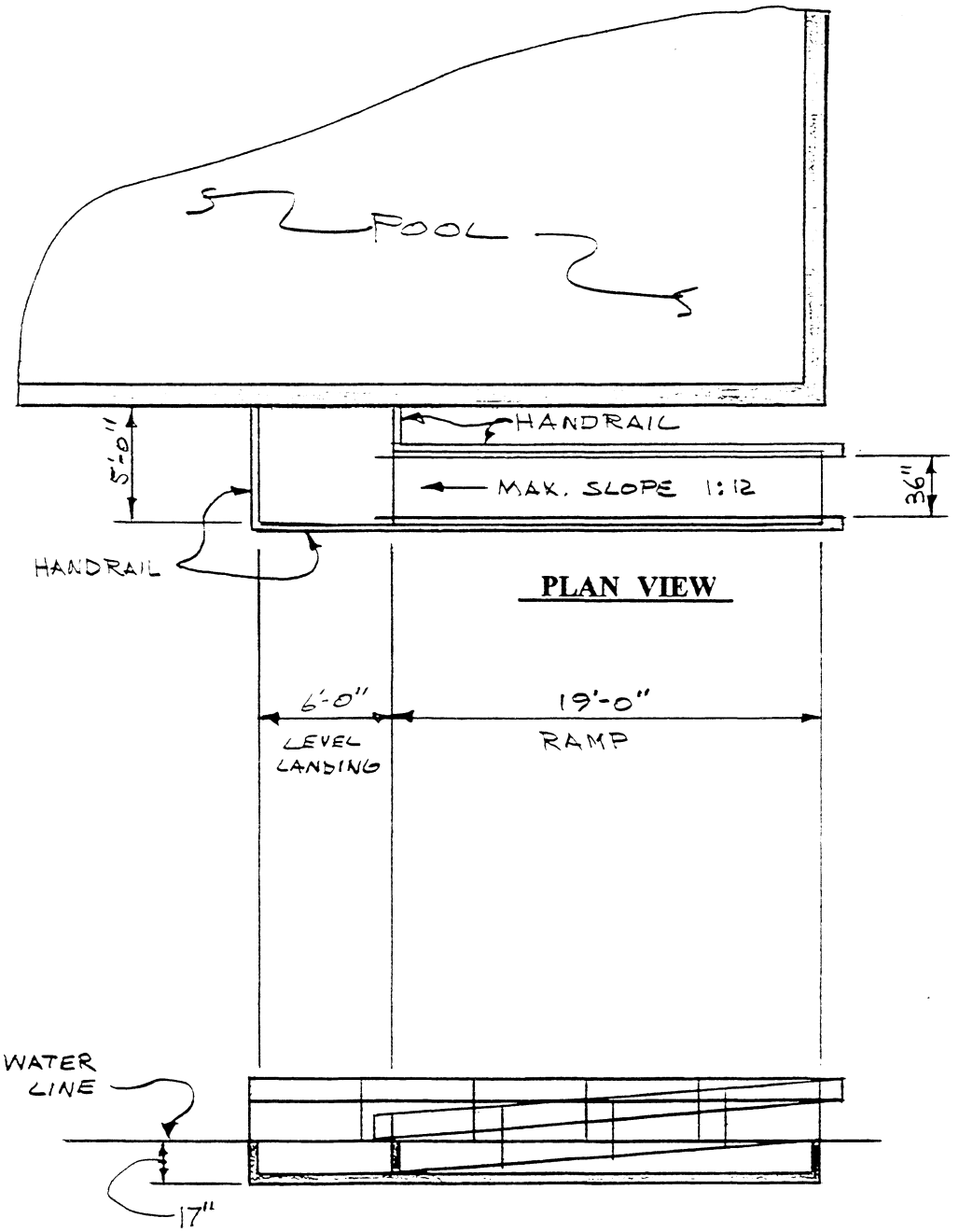
STATE SWIMMING POOL BUILDING CODES: LADDERS

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
SPACING FROM WALL																																																			
min. 3 inches					✔	✔		✔	✔	✔		✔		✔				✔				✔	✔		✔	✔	✔	✔		✔		✔	✔					✔					✔	✔				✔		
max. 5 inches					✔	✔						✔											✔			✔		✔					✔										✔	✔						
max. 6 inches								✔	✔	✔				✔				✔				✔			✔		✔			✔		✔						✔										✔		
HANDRAILS																																																			
required	✔		✔		✔	✔		✔		✔		✔		✔				✔			✔	✔	✔		✔	✔	✔	✔				✔	✔	✔		✔	✔	✔	✔				✔	✔			✔	✔		✔
TREADS																																																			
min. width 1.5 in.								✔						✔				✔																																	
min. 2 treads	✔							✔																																											
min. 3 treads																																								✔		✔									
length																																																			
min. 12 inches								✔																																											
min. 17 inches														✔				✔																																	
max. 24 inches														✔				✔																																	
spacing between treads																																																			
min. 7 inches								✔						✔				✔																																	
max. 12 inches								✔						✔				✔																																	

STATE SWIMMING POOL BUILDING CODE: SHALLOW WATER & POOL BOTTOM SLOPE

	AL	AK	AZ	AR	CA	CO	CT	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
DEPTH																																																			
min. 19 inches					✔																																														
min. 24 inches	✔																																																		
min. 30 inches													✔												✔		✔																								
min. 33 inches														✔																																					
min. 36 inches								✔	✔			✔						✔			✔		✔			✔		✔				✔	✔	✔			✔	✔		✔		✔	✔					✔		
max. 3 ft. 6 in.												✔		✔									✔				✔	✔				✔				✔	✔	✔				✔	✔							✔
max. 4 feet								✔	✔																																										
max. 5 feet																						✔				✔																						✔		
SPA DEPTH																																																			
max. 4 feet		✔		✔	✔	✔		✔	✔	✔				✔	✔							✔			✔	✔		✔	✔	✔			✔	✔			✔		✔	✔					✔		✔				✔
SLOPE																																																			
max. 1:7													✔	✔																																					
max. 1:8		✔																																									✔							
max. 1:10	✔						✔		✔														✔										✔							✔					✔						
max. 1:12						✔		✔				✔						✔			✔	✔			✔	✔	✔	✔	✔		✔	✔				✔	✔	✔	✔					✔			✔	✔		
max. 1:15																																		✔																

Dry & Wet Ramp
Estimates



DRY RAMP DETAILS

Scale ⅛" = 1' - 0"

POOL RAMP ESTIMATE SEPT 20, 1996 TEB

DRY RAMP

EXCAVATION: (7' SQ) 31' X 9' X 2' = 558 cf = 21 yd

LANDING WALLS (7'-0") 7' + 8' + 4' = 19 X 2' high = 38 SFSA

OTHER HANDRAIL (7'-0") 7 + 27 + 19 + 4 = 57 ft

5'

EXCAVATION (5' SQ) 29' X 7' X 2' = 406 cf = 15 yd

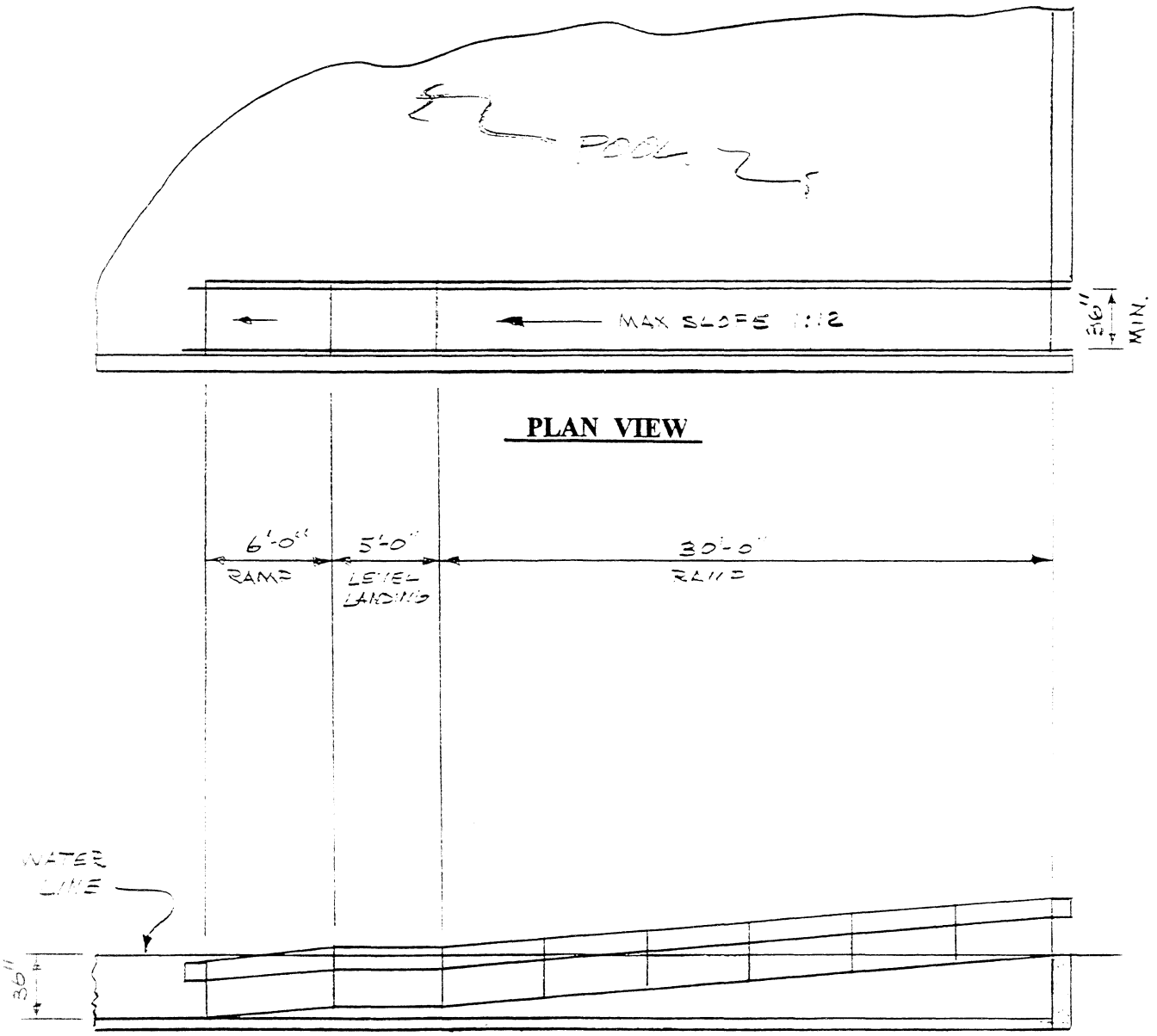
LANDING WALLS (5'-0") 5' + 6' + 2 = 13 X 2' HIGH = 26 SFSA

OTHER HANDRAIL (5'-0") 5' + 25 + 19 + 2 = 51'

ESTIMATE SHEET

PROJECT: POOL ACCESS "DRY" RAMP (5'sq)	PAGE 1 of 1	TOTAL PAGES: $ 6180.75
LOCATION	EST. Nº 1	ESTIMATED BY: TEB
ARCHITECT	DWG. Nº SKETCH	"MEANS" LIGHT COMMERCIAL
CONTRACTOR	DATE 9-23-96	COST DATA 1996

DESCRIPTION	SF	LF	CY	CF	BF	EA	MH	$/UNIT	TOTAL
DRY RAMP									
1) EXCAVATION (PP 289)			15					1.40	21.00
HAULING (PP 290)			15					2.39	35.85
2) CAST-IN-PLACE CONCRETE ACCESS RAMP, RAIL BOTH SIDES, 3' WIDE (PP 304)		19						202.00	3838.00
3) LANDING SLAB-ON-GRADE (PP 302)	30							5.85	175.50
LANDING WALLS	26							5.65	146.90
4) HANDRAIL (other than that of RAMP) STAINLESS, 2-RAIL - 1¼" DIA #4 FINISH (PP 323)		51						38.50	1963.50
								TOTAL	$6180.75



WET RAMP DETAILS

Scale ⅛" = 1' - 0"

POOL RAMP ESTIMATE | SEPT 20, 1996 TBB

ASSUMPTIONS

1) ALL ESTIMATES ARE BASED ON NEW CONSTRUCTION
∴ NO DEMOLITION COST WERE INCLUDED.

2) MOBILIZATION AND DEMOBILIZATION COST ARE RELATIVE TO THE DISTANCE OF THE PROJECT AND WILL BE INCLUDED IN THE OVERALL POOL CONSTRUCTION PROJECT.

3) IN THE WET RAMP SYSTEM, EXCAVATION & HAULING OF THE WET RAMP AREA WILL BE INCLUDED IN THE EXCAVATION & HAULING OF THE OVER ALL PROJECT

4) SUBGRADE CONDITIONS WILL VARY AT ALL LOCATIONS
∴ NO BACKFILL MATERIALS OR PLACEMENT ARE INCLUDED IN THIS ESTIMATE.

ESTIMATE SHEET

PROJECT POOL ACCESS "WET" RAMP	PAGE 1 of 1	TOTAL PAGE $ 8282.00
LOCATION	EST. Nº 1	ESTIMATED BY: TEB
ARCHITECT	DWG. Nº Sketch	"MEANS" LIGHT COMMERCIAL
CONTRACTOR	DATE 9-20-96	COST DATA 1996

DESCRIPTION	SF	LF	CY	CF	BF	EA	MH	$/UNIT	TOTAL
WET RAMP									
1) CAST-IN-PLACE CONCRETE		41 lf						$202.00	$8282.00
ACCESS RAMP, RAIL BOTH									
SIDES, 3' WIDE									
(MEANS LCCD PG 304)									

Product Tables

Ladders			
PRODUCT	Aquatrek Ladder	Therapy Ladder	Easy Ladder
PORTABLE	✔		✔
TREAD MATERIAL			
durable plastic	✔		
fiberglass		✔	✔
HANDRAIL MATERIAL			
stainless steel		✔	✔
durable plastic	✔		
WIDTH			
clearance (inches)	30	18	26
overall (inches)	34	20	31
TREADS			
depth (inches)	9	4	12
riser height (inches)	7 - 9	10	9.75
CUSTOMIZE	✔	✔	✔
COST	$1,735 - $2,234	$503 - $1,030	$1,550 - $1,695
CONTACT	Rehab Systems	Spectrum	Triad Technologies

Pool Lifts									
PRODUCT	IG14, IG21& IG28	IG AT-90	IG AT-180	AG48WP, AG48 & AG72	SLE	Safe-Lift	Independent Lift 41-BD	Independent Lift 55-A	Therapy Access 46-650
POWER									
water	✔	✔	✔	✔	✔		✔		✔
electric						✔		✔	
PORTABLE	✔	✔	✔	✔	✔				✔
OPERATION									
assistant	✔			✔	✔				✔
user		✔	✔			✔	✔	✔	
ROTATION	180 degrees	90 degrees	180 degrees	180 degrees	180 degrees	90 degrees	N/A	N/A	180 degrees
SEAT	P	P	P	P	P	B, W	P	B	P
height (inches)	19	19	19	19	19	22	17.5	adjusting; min. 12	19.5
CAPACITY	275 lbs.	400 lbs.	400 lbs.	275 lbs.	250 lbs.	500 lbs.	300 lbs.	450 lbs.	300 lbs.
ACCESSORIES									
included	A	A	A, F	A		A	A	C	A
optional	S	S	U, H, S	I, S	A, I				H, S, U
CUSTOMIZE	✔	✔	✔	✔	✔	✔	✔	✔	✔
COST	$2,420-$2,640	$2,860	$3,245	$2,310 -$3,300	$1,980-$ 2,310	$8,250	$7,500	$25,000	$3,029
CONTACT	Aquatic Access	Aquatic Access	Aquatic Access	Aquatic Access	Aquatic Access	Mengo Industries	Morris Independent Lift	Morris Independent Lift	Recreonics

CODE:
- A- Armrest
- B- Bench seat
- C- Cross bar
- F- Footrest
- H- Headrest
- I- Independent operation
- L- Legrest
- N- Sling
- O- Other seating unit
- P- Plastic molded seat
- S- Safety strap
- U- Flip-up outer arm
- W- Wheelchair platform

Pool Lifts, continued									
PRODUCT	Pool Access Lift (180) Complete	Pool Access Lift (90) Complete	Wheelchair-to-Water 2000	Freedom Lift FL400	Swim Lift SL100	Swim Lift II SL350	Swim Lift III SL500	Wheelchair Lift SL600	Nolan Lift 040-0100R
POWER									
water	✔	✔		✔	✔	✔	✔	✔	✔
electric			✔						
PORTABLE	✔	✔				✔			
OPERATION									
assistant					✔			✔	
user	✔	✔	✔	✔		✔	✔		✔
ROTATION	180 degrees	90 degrees	N/A	110 degrees	N/A	180 degrees	180 degrees	N/A	90 degrees
SEAT	P	P	N, O	P	W	P	P	W	P
height (inches)	19.5	19.5	N/A	19	N/A	19	19	N/A	19
CAPACITY	400 lbs.	300 lbs.	320 lbs.	300 lbs.	600 lbs.	300 lbs.	450 lbs.	600 lbs.	300 lbs.
ACCESSORIES									
included	A, F, H, S, U	A, S, H	N, O	A, L, S		A, F, H, S, U	A, S, U		A
optional				H, U					S
CUSTOMIZE	✔	✔	✔	✔	✔	✔	✔	✔	✔
COST	$3,403	$2,868	$4,500	$3,832	$11,000	$3,195	$9,695	$10,993	$3,117
CONTACT	Recreonics	Recreonics	SureHands	Spectrum	Spectrum	Spectrum	Spectrum	Spectrum	SunMed

CODE:
- A- Armrest
- B- Bench seat
- C- Cross bar
- F- Footrest
- H- Headrest
- I- Independent operation
- L- Legrest
- N- Sling
- O- Other seating unit
- P- Plastic molded seat
- S- Safety strap
- U- Flip-up outer arm
- W- Wheelchair platform

Pool Lifts, continued							
PRODUCT	Swimming Pool Lifter WC-702	Otter	Lifeguard 20A	Stainless Steel Lifter	Wheelchair-to-Water 1000	Econo Lift	Hoyer Lift SS-HSP
POWER							
manual	✔	✔	✔	✔	✔	✔	✔
PORTABLE	✔	✔	✔	✔	✔	✔	✔
OPERATION							
assistant	✔	✔	✔	✔	✔	✔	✔
user							
ROTATION	360 degrees	180 degrees	360 degrees	360 degrees	360 degrees	360 degrees	360 degrees
SEAT	N	P	N	N	N, O	N	N
CAPACITY	400 lbs.	350 lbs.	400 lbs.	400 lbs.	320 lbs.	400 lbs.	400 lbs.
ACCESSORIES							
included	N	A	N	N	N, O	N	N
optional				S			
COST	contact for cost	$6,500	$935	$1,207	$3,200	$939	$1,196
CONTACT	AFW	Arjo	Lifeguard Lift	Recreonics	SureHands International	Spectrum	SunMed

CODE:
- A- Armrest
- B- Bench seat
- C- Cross bar
- F- Footrest
- H- Headrest
- i- Independent operation
- L- Legrest
- N- Sling
- O- Other seating unit
- P- Plastic molded seat
- S- Safety strap
- U- Flip-up outer arm
- W- Wheelchair platform

Ramps				
PRODUCT	Access Ramp	Access Ramp	Swim-Step Access System	Therapy Ramp
PORTABLE	✔	✔	✔	✔
MATERIAL				
stainless steel	✔	✔		✔
thermoplastics			✔	
WALKWAY				
thermoplastics			✔	
dura-deck		✔		✔
stainless steel with non-slip tread strips	✔			
LENGTH				
13 feet			✔	
15 feet	✔	✔		✔
WIDTH				
clearance (inches)	30	36	30	30 or 36
overall (inches)	34	40	34	34
HANDRAILS				
both sides	✔	✔	✔	✔
height (inches)	24 and 36	18 and 34	17 and 36	36
EDGE PROTECTION				
height (inches)	N/A		3	3
CUSTOMIZE	✔	✔	✔	✔
COST	$4,600	$6,330	$5,706	$5,393
CONTACT	AFW	Recreonics	Rehab Systems	Spectrum

Steps				
PRODUCT	EZ Steps	Aquatrek Step	Therapy Steps	Access Stairs
PORTABLE	✔	✔	✔	✔
TREAD MATERIAL				
polyethylene	✔			
durable plastic		✔		✔
fiberglass			✔	
stainless steel				option
HANDRAIL MATERIAL				
durable plastic		✔		
stainless steel	✔		✔	✔
height (inches)	32	30	32	30 - 32
WIDTH				
clearance (inches)	32	30	31	20 or 37
overall (inches)	35	34	34	22 or 39
TREAD				
riser height (inches)	9.5	6	9	8
depth (inches)	10	13	10	14.5
CUSTOMIZE		✔	✔	✔
COST	contact for cost	$2,734 - $2,975	$2,413 - $3,000	$972 - $1,634
CONTACT	Fox Pool Corporation	Rehab Systems	Spectrum	WMS Aquatic Specialists

Transfer Steps		
PRODUCT	Transfer Tier	Transfer Platform
PORTABLE	✔	✔
MATERIALS		
fiberglass	✔	
plastic		✔
GRABRAIL		
one side	✔	✔
back	✔	✔
diameter (inches)	1.9	2.25
height (inches)	6	6
TOP TIER/PLATFORM		
height from deck (inches)	18	18-20
TIERS		
width (inches)	22	30
depth (inches)	12	13
riser height (inches)	6	6
# on deck	3	3
# in water	4	N/A
ADDITIONAL EQUIPMENT NEEDED	N/A	✔
CUSTOMIZE	✔	
COST	$2,450	$864
CONTACT	Triad Technologies	Rehab Systems

Wheelchairs: Aquatic/Shower					
PRODUCT	Series JTG 624 Shower/Commode	Model #462-20 Rolling, Folding Shower/Commode	Stainless Steel Series 480-24 Shower/Commode	Model #490 Shower/Commode	Model #80209011 Mobile Shower/Toilet Chair
SEAT					
width (inches)	18.5	16.5	16.5 or 18	16.25	18.75
height from floor (inches)	22	19.5	21.75	23.25	21.62
ARMREST					
standard					
flip-up/swing-away	✔				✔
removable	✔	✔	✔	✔	
FOOTREST					
standard					
adjustable height	✔	✔		✔	
removable	✔	✔	✔	✔	additional option
WHEELS					
rear (inches)	20	20	20	24	22
rear brakes	✔	✔	✔	✔	✔
rear wheel push rims	✔	✔	✔	✔	✔
OVERALL DIMENSIONS					
width (inches)	25.25	25	25	24.25	26.75
depth (inches)	41	38.5	40.5	41.75	28.62
CUSTOMIZE	✔	✔	✔	✔	
ACCESSORIES	✔	✔	✔	✔	✔
COST	$936	$945	$1,649	$1,185	$1,913
CONTACT	Activeaid	Activeaid	Activeaid	Activeaid	ETAC USA

Wheelchairs: Aquatic/Shower, continued					
PRODUCT	Steel Wheel Aquatic Chair	Rehab Shower/Commode Chair #6692 & 6695	RehabShower/Commode Chair #6492 & 6495	Model # 6873 Wheeled Commode Shower Chair	Aquatrek Aqua Chair
SEAT					
width (inches)	18	18.5	16	15	17
height from floor (inches)	19.5	21.75	21.75	22	19.5
ARMREST					
standard					✔
flip-up/swing away		✔	✔	✔	
removable	✔				
FOOTREST					
standard					✔
adjustable height	✔	✔	✔	✔	
removable	✔	✔	✔	✔	
WHEELS					
rear (inches)	24	24	24	24	24
rear brakes	✔	✔	✔	✔	✔
rear wheel hand rims	✔	✔	✔	✔	✔
OVERALL DIMENSIONS					
width (inches)	24	26.75	25.5	27	28.5
depth (inches)	32	44.5	44.5	31.5	30.5
CUSTOMIZE	✔	✔	✔		✔
ACCESSORIES	✔	✔	✔	✔	✔
COST	$1,500	contact for cost	contact for cost	$1,490	$697
CONTACT	Interior Mediquip	Invacare	Invacare	Lumex	Rehab Systems

Product Descriptions

Product Information

The following pages contain information about equipment designed to enable people with mobility impairments to enter and exit a swimming pool or spa. The information was provided by manufacturers and distributors of the equipment during August, 1996. Current costs and product dimensions may vary from what has been reported in this section. Contact the specific manufacturer or distributor for possible changes. Equipment is listed in alphabetical order by manufacturer/distributor under each product type.

The National Center on Accessibility **does not** promote or endorse any of the following products. The products listed **may not** meet the recommendations developed during this project or comply with any accessibility standard.

Ladders

Product: AQUATREK LADDER

Description: Wide tread and handrails provide stability. Constructed of durable and lightweight plastic. Non-slip safety treads on each step. Portable and removable. Length is 72 inches and overall width is 34 inches; 30 inches clearance width between handrails. Tread depth is 9 inches and riser height is between 7 and 9 inches. Built to specifications of pool. Available in 3-step model (125 lbs); 4-step model (135 lbs.); or 5-step model (150 lbs). 1-year warranty.

Cost: $1735.00 for 3-step
$1987.00 for 4-step
$2234.00 for 5-step

Contact: Rehab Systems
2014 First Avenue South
Fargo, ND 58103
800-726-8620

Product: THERAPY LADDER

Description: Sloping, angled ladder designed for pools when a standard vertical ladder is not appropriate. Customized for each pool. Railing height from deck is 32 inches, 18 inch clearance between rails; overall width is 20 inches. Treads are made of durable plastic with a maximum rise of 10 inches, and tread depth of 4 inches. Stainless steel railings.

Cost: $503.00 - $1030.00

Contact: Spectrum Pool Products
9800 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Product: EASY LADDER

Description: Easy ladder provides safe pool entry and exit, has steps instead of standard ladder configuration. Gentle sloping ladder eliminates back and arm strain experienced when using a vertical pool ladder. All depths and deck configurations can be accommodated because the easy ladder is custom trimmed to each individual pool. Fits flush to pool wall and simply lifts in and out, permanent anchoring is not necessary. Durable fiberglass and stainless steel construction, non-skid epoxy coating, no moving parts, no maintenance. Slip-resistant tread provides secure footing. Maximum depth 70 inches. Overall unit width is 31 inches. Non-skid treads are 26 inches wide with 9.75 inches for riser height and 12 inch depth. Handrail on each side. Side skirts prevent swimmer entrapment. Locate in pool corner or on sides or end wall. Includes dolly.

Cost: $1550.00 - $1695.00

Contact: Triad Technologies
219 Lamson Street
Syracuse, NY 13206
800-729-7514

Lifts

Product: SWIMMING POOL LIFTER WC-702

Description: Manually operated portable hydraulic lifter. Stainless steel construction. Available with nylon one piece seat, back, and chains. Additional options include dacron mesh one piece seat and back or stretcher. Lifting range is 65 inches with 90 degree horizontal swing. Can rotate 360 degrees. Mast length, 57.5 inches; boom length, 45 inches.

Capacity: 400 pounds

Cost: contact for cost

Contact: AFW Company of North America
P.O. Box 648
1 Aquatic Center
Cohoes, NY 12047
518-783-0038

Product: IG14, IG21 & IG28-INGROUND POOL LIFTS

Description: These water-powered, portable lifts can be installed into a single socket in the deck and are operated by an assistant. Manually turn 180 degrees over the deck. Upper and lower controls are mounted on the cylinder. Seat travels 42" up or down. Seat height is 19 inches. 70 inches tall. 55 pounds without seat assembly. Includes recessed socket for concrete decks. Seat is 19 inches from deck. Includes inner armrest and optional safety strap. Products warranted to be free of mechanical defects for one year from purchase date.

Capacity: 275 pounds at 55 p.s.i. water pressure

Cost: $2420.00 - $2640.00

Contact: Aquatic Access Inc
417 Dorsey Way
Louisville, KY 40223
800-325-LIFT / 502-425-5817

Product: IG AT-90

Description: Compact, portable and efficient water powered lift. Mounts into a socket in the deck and operates with water from a garden hose connected to a nearby faucet. Seat height is 19 inches and travels 42" up and down and automatically turns 90 degrees over the deck. Upper and lower controls mounted on cylinder allow independent operation. Under 5 feet high and 70 pounds and can be carried by one person. Seat height is 19 inches from deck. Includes inner armrest. Optional safety strap. Can be customized for inground spas.

Capacity: 400 pounds at 55 p.s.i. water pressure

Cost: $2860.00

Contact: Aquatic Access
417 Dorsey Way
Louisville KY 40223
800-325-LIFT / 502-425-5817

Product: IG AT-180

Description: Compact, portable and efficient water powered lift. Mounts into a socket in the deck and operates with water from a garden hose connected to a nearby faucet. Its adjustable seat travels 42" up and down and automatically turns 180 degrees over the deck. Upper and lower controls mounted on cylinder allow independent operation. Seat height is 19 inches from deck. Includes footrest and inner armrest. Optional flip-up armrest, safety strap, and headrest available. Under 5 feet high and 70 pounds. Can be customized for inground spas.

Capacity: 400 pounds at 55 p.s.i. water pressure

Cost: $3245.00

Contact: Aquatic Access
417 Dorsey Way
Louisville KY 40223
800-325-LIFT / 502-425-5817

Product: AG48WP, AG48 & AG72-ABOVEGROUND POOL LIFTS

Description: Water-powered lifts for above ground pools up to 4-feet deep at the point the lift is installed. Assistant operated with some modifications that may allow some users to operate independently. Seat height is 19 inches. Includes inner armrest. Optional safety strap. Rotates 180 degrees.

Capacity: 275 pounds at 55 p.s.i. water pressure

Cost: $2310.00 - $3300.00

Contact: Aquatic Access Inc
417 Dorsey Way
Louisville, KY 40223
800-325-LIFT / 502-425-5817

Product: SPA LIFTS--MODEL SLE

Description: Portable, water-powered lift for spas. Assistant operated, however customization may be possible to allow some users to independently operate. Two models (SLE-36" or SLE-48") depending on height of the spa wall. The seat travels 24 inches up and over the side of the spa, and down into the water. Seat height is 19 inches. Seat rotates 180 degrees. Optional armrests may be ordered in addition. Products warranted to be free of mechanical defects for one year from purchase date.

Capacity: 250 pounds at 55 p.s.i. water pressure

Cost: $1980.00 - $2310.00

Contact: Aquatic Access Inc
417 Dorsey Way
Louisville, KY 40223
800-325-LIFT / 502-425-5817

Product: OTTER PORTABLE POOL LIFT

Description: Manually assistant operated, portable pool seat lift. Wheeled base for ease of storage. Claw feet fasten with "T" hooks into installation sockets at side of pool for stability. Swivel armrest to facilitate side transfers from wheelchair. Lift has swivel mast which rotates 180 degrees by foot operated locking plate which automatically locks when in position over deck or water. Stainless steel mast and base assemblies. Molded plastic seat. Mechanical screw drive lift mechanism. Free wheel device stops chair lowering on obstruction. Fits most standard pool sides.

Capacity: 350 pounds

Cost: $6500.00

Contact: Arjo Inc
8130 Lehieg Avenue
Morton Grove, IL 60053
800-323-1245

Product: LIFEGUARD POOL LIFT--MODEL 20A

Description: Hydraulic portable lifter for swimming pools and spas. Mounts in permanently installed sleeve in pool deck. One piece dacron mesh sling, cement-in sleeve with flush cover and a speed hydraulic pump. Lift is manually operated by an assistant. 62 inch lifting range on a 45 inch boom. Boom rotates user sitting in sling in either direction (360 degrees). Lightweight and storable. Restraining straps, extension arm and surface mounts and additional options available. Weighs 54 pounds.

Capacity: 400 pounds maximum

Cost: $935.00

Contact: Lifeguard Lift Inc.
1950-B Olivera Road
Concord, CA 94520
800-688-3958

Product: MENGO SAFE-LIFT

Description: Smooth operation with choice of armrest or pool side controls. Quiet, reliable 24-volt motors are UL listed, waterproof, and includes safety brake. Remote transformer steps down simple 110-volt current. The six-volt, four button sealed controller moves the Safe-Lift smoothly and precisely. Can be operated by the user or a pool side attendant. Seat height minimum is 22 inches from deck and can be raised to higher height by user. Lift rotates 90 degrees. Measures 26 inches square at the machine base and 63 inches tall at its mast. Accommodates chair seat, wheelchair platform, or stretcher. Chair seat has armrests on both sides. Low maintenance and 3-year warranty.

Capacity: 500 pounds maximum

Cost: $8250.00

Contact: Mengo Industries
4611 Green Bay Road
Kenosha, WI 53144
414-652-3070

Product: MORRIS INDEPENDENT LIFT 41-BD

Description: Operated with standard water pressure. Controls allow for independent operation. No electricity involved. Lift can be stopped at any time during travel by releasing the controls or reversed by pressing the controls in the opposite direction. Seat height is 17.5 inches from the deck and has an inner armrest. Travel is capable to 26 inches below the baseline. Lift can be removed for storage, but designed to be left in place so it is always available to users.

Capacity: 300 pounds at 50 p.s.i. of water pressure

Cost: $7500.00

Contact: Morris Independent Lift
3236 Patterson Road
Bay City, MI 48706
517-684-5333

Product: MORRIS INDEPENDENT LIFT 55-A

Description: Operated with standard water pressure. Controls allow for independent operation. Chair is 28 inches wide and travels 32 inches below the base level of the unit. Chair height can be adjusted upward for transfers, positioned and held in place by electromagnetic brakes for stability. Minimum height off deck is 12 inches. Patented guard system protects from pinch points. Hinged cross bar. Seat back is made of PVC and coated with a non-slip moisture proof flexible paint with ultraviolet inhibitors. Lift can be stopped at any time during its travel by releasing the controls or direction of travel reversed. Lift can be removed easily, but is designed to be left in place so it is always available to users.

Capacity: 450 pounds

Cost: $25,000.00

Contact: Morris Independent Lift
3236 Patterson Road
Bay City, MI 48706
517-684-5333

Product: THERAPY ACCESS LIFT (46-650)

Description: Water powered lift allows access to high therapy tubs as tall as 69 inches. The seat is 19.5 inches from the floor, moves straight up, swings freely 180 degrees over the pool, then down into the water. Assistance is required to lift the patients ankles and turn the seat. The control knob is mounted on the cylinder at a convenient height for the assistant. The cylinder is attached to the top flange of the pool with a bracket and the base is bolted to the floor. Custom designs are available.

Capacity: 300 pounds at 55 p.s.i. water pressure.

Cost: $3029.40

Contact: Recreonics
4200 Schmitt Avenue
Louisville, KY 40213
800-428-3254

Product: POOL ACCESS LIFT--180 COMPLETE

Description: Automatic, water powered, full 180 degree turn. Accommodates lateral transfers and has footrest. Seat height is 19.5 inches from the deck. Lift mounts into deck socket and water from hose provides power. Seat travels 42 inches up and down with upper and lower controls allowing independent operation from deck or water. Complete model includes headrest, flip-up outer armrest, stationary inner armrest, and safety strap. 3 year warranty on structural components.

Capacity: 400 pounds at 55 p.s.i. water pressure

Cost: $3403.03

Contact: Recreonics
4200 Schmitt Avenue
Louisville, KY 40213
800-428-3254

Product: POOL ACCESS LIFT--90 COMPLETE

Description: Portable, automatic, water powered, full 90 degree turn. User or assistant operated. Seat height is 19.5 inches from deck. Only 5 feet, 1 inch high in its down position and weighs only 65 pounds. Complete model includes headrest, armrest, and safety strap. 3-year warranty on all structural components, including cylinder.

Capacity: 300 pounds at 38 p.s.i. water pressure

Cost: $2867.83

Contact: Recreonics
4200 Schmitt Avenue
Louisville, KY 40213
800-428-3254

Product: STAINLESS STEEL LIFTER

Description: Manually operated, portable lift. Operated by pool side assistant. Lift rotates 360 degrees. Lowering range of 62 inches. Includes a one piece nylon seat/back support and lifting chains.

Capacity: 400 pounds

Cost: $1207.00

Contact: Recreonics
4200 Schmitt Avenue
Louisville, KY 40213
800-428-3254

Product: WHEELCHAIR-TO-WATER LIFT 1000

Description: Hydraulic-powered with self-contained nitro tech plated ram. Outward pumping action of ram handle will raise unit. Pushing of handle against ram body will lower unit. Can easily be removed for storage or multiple locations. 65" lifting/power range and 360 degree rotation. Available with the Handi-Move frame, made with stainless steel arms, with chest supports and adjustable leg supports or hammock attachment. 3-year warranty for structural components and 1-year warraty for ram.

Capacity: 320 pounds maximum

Cost: $3200.00

Contact: SureHands International
982 Route 1
Pine Island, NY 10969
914-258-6500/ 800-724-5305

Product: WHEELCHAIR-TO-WATER LIFT 2000

Description: The 2000 motorized model runs on an overhead track and offers complete vertical and horizontal range of motion. Push-button control allows some individuals to move out of their wheelchair, into the water, and back again. Available with the Handi-Move frame, made with stainless steel arms, with chest supports and adjustable leg supports or hammock attachment. 3-year warranty for structural components.

Capacity: 320 pounds maximum

Cost: $4500.00

Contact: SureHands International
982 Route 1
Pine Island, NY 10969
914-258-6500/ 800-724-5305

Product: ECONO LIFT

Description: Manually assistant operated lift with a mesh, nylon sling seat. The lift is made of stainless steel structural components with a polished and buffed finish. Outward pumping action of the nitro-tech plated ram handle will raise the sling; pushing of handle against the ram body will lower the sling. The lift will raise or lower the sling a maximum of 62 inches. The sling can rotate around the cylinder 360 degrees. No tools required for setup or removal from the socket. Portable and easy to remove for storage. Lift customization for needs of pool and users. 3-year limited warranty on the structural components; 1-year warranty on the ram, sling, and chain.

Capacity: 400 pounds maximum

Cost: $939.00

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Product: FREEDOM LIFT FL400

Description: Water-powered spa and above-ground pool lift. This fully automatic, adjustable lift has a water-powered drive system that is controlled by the user. The unit does not fasten to any portion of the spa and includes all necessary mounting hardware, hoses, plastic seat, safety strap, stationary inner arm, and pull-out leg support. Options include a headrest, flip-up outer arm, and adjustable footrest. The seat has a 25-inch raising capacity, and can be rotated 110 degrees. All structural components are stainless steel with a polished finish. Adjustable overall height from 50 to 75 inches; base width of 16 inches; and overall length of 40 inches. Seat height is 19 inches. Lift customization for needs of pool and users. 3-year limited warranty on structural components; 1-year warranty on valves, cylinder, and hoses.

Capacity: 300 pounds

Cost: $3832.65

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Product: SWIM LIFT SL100

Description: Platform lift. Wheelchair fastens to platform and lowers wheelchair and user into water. Water powered from the nearest hose connection. Stainless steel construction. Lift customization for needs of pool and users. 3 year warranty.

Capacity: 600 pounds

Cost: $11,000.00

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309/ 800-776-5309

Product: SWIM-LIFT II COMPLETE--SL350

Description: Lift is water powered and has a 3 position, 4-way control valve. Does not require an attendant to operate. Portable with quick release stainless steel deck sockets. Wheel stands for transport. Breaks down into two components for storage. Plastic molded seat is 19 inches from deck. Lowering depth is 24 inches from the deck into pool. 180 degree rotation with automatic locks. Includes deck anchors, hoses, soft plastic seat, safety strap, flip-up outer arm, stationary inner arm, footrest, and headrest. Customized for needs of pool and users. Overall height 5 feet 6 inches. Base width 2 feet 8 inches; length, 2 feet. 3 year warranty.

Capacity: 300 pounds at 55 p.s.i. water pressure, greater capacities can be obtained by increasing pressure or size of the cylinder.

Cost: $3195.00

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Product: SWIM LIFT III SL500

Description: Powered by common water pressure. No hoses on the pool deck, no manual cranking, no electricity. The unit may be controlled from the pool or out. Stainless steel cylinders with oil-less PVC, so water used remains clean and can be discharged into drain or pool. Built to elevator standards. Non-corrosive stainless-steel construction. Customized for needs of pool and users. Additional options include flip-up arm, stretcher, wheel carriage for stretcher, wheelchair, or control for independent use. 3-year warranty.

Capacity: 450 pounds

Cost: $9695.00 SL500 IG (in-ground model)
$8969.00 SL500 AG (above-ground model)

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Product: SL600 WHEELCHAIR LIFT

Description: Wheelchair platform lift designed to assist wheelchair users to enter and exit pools. The wheelchair is positioned onto platform and lowers the user into the water. Built to elevator standard. Stainless-steel construction. Lift customization for needs of pool and users. 3-year warranty.

Capacity: 600 pounds

Cost: $10,993.00

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Product: NOLAN POOL LIFT--Model 040-0100R

Description: Self-operated, water-powered pool lifter. Control levers at deck and water level. Seat automatically turns 90 degrees as it raises and lowers. Seat height is 19 inches off deck. Seat travels 42 inches. Accessories include left arm, wheel assembly, safety strap, additional sockets. 1-year warranty. Less than 2 gallons of fresh water is used for each cycle and dispersed back into the pool. Suitable for most in-ground pools. Easy to remove and store when not in use.

Capacity: 300 pounds at 55 p.s.i. water pressure

Cost: $3117.00

Contact: SunMed
5601 Lindero Canyon Road, Suite 205
Westlake, CA 91362
800-333-4000

Product: HOYER SWIMMING POOL LIFT-Model SS-HSP

Description: A hydraulic powered lift designed for the person who requires assistance in transfer and use. Fits into a flush mounted sleeve at pool side. Easily operated by attendant with a manual hydraulic-powered lifting mechanism. Rotates 360 degrees. Equipped with a standard 112-D white dacron sling, the lifter is also available with an optional extension arm for increasing horizontal reach. It has a 62 inch lifting range, a 90 inch horizontal swing, and 40 inch chains for seat sling.

Capacity: 400 pounds

Cost: $1196.00

Contact: SunMed
5601 Lindero Canyon Road, Suite 205
Westlake, CA 91362
800-333-4000

Movable Floors

Product: AFW MOVABLE SWIMMING POOL FLOOR

Description: Movable floor for new or existing pools. Reinforced concrete floor with hydraulic lift. Any water depth can be created. The floor moves at a rate of one foot per minute. Makes the pool very flexible for a variety of programming uses.

Cost: contact AFW for cost

Contact: AFW Company of North America
P.O. Box 648
1 Aquatic Center
Cohoes, NY 12047
518-783-0038

Product: PADDOCK MOVING FLOOR

Description: Variable depth permits programming for all ages and abilities. Moving floor may be concrete or the flow-thru design fabricated of stainless steel with PVC and stainless steel grating. Hydraulic cylinders raise and lower the whole floor or portions of the floor. Trailing ramps and safety rails are available.

Cost: contact Paddock for cost

Contact: Paddock Pool Equipment Company
P.O. Box 11676
555 Paddock Parkway
Rockhill, SC 29730
803-324-1111

Ramps

Product: SWIMMING POOL ACCESS RAMP

Description: Portable stainless steel access ramp with side rails allows gradual incline into swimming pool. Non-slip surface. Mounting bracket for pool edge. 15 feet long, 30 inches walkway clearance width. Handrail heights are 24 and 36 inches. Overall ramp width is 34 inches. Wheels to assist in moving. Ramp capable of supporting a distributed load of 1500 pounds. Ramp weight is 186 pounds.

Cost: $4600.00

Contact: AFW Company of North America
P.O. Box 648
1 Aquatic Center
Cohoes, NY 12047
518-783-0038

Product: ACCESS RAMP

Description: Removable stainless steel access ramp is custom designed for gutter or perimeter profile. Does not affect pool design or configuration. The ramp can be installed and removed as needed. Manufactured from corrosion resistant, low-carbon T-304 stainless steel, with non-slip fiberglass grating for ramp surface. 15 feet long, 40 inches wide overall, and 36 inches clearance width between handrails. Dual handrails on both sides, top railing height is 34 inches and lower railing is 18 inches.

Cost: $6330.56

Contact: Recreonics
4200 Schmitt Avenue
Louisville, KY 40213
800-428-3254

Product: SWIM-STEP POOL ACCESS SYSTEM

Description: 3-in-1 system, converts from stairs into ramp and parallel bars with optional ramp kit. Length is 13 feet; overall width is 34 inches, with a walkway clearance of 30 inches wide. Manufactured from highly durable light-weight, non-corrosive thermo-plastics. Two dual handrails of 1.5 inches diameter are at heights of 17 and 36 inches. Also has 3 inch high edge protection on walkway. Non-skid safety treads on each step. Top attaches securely to decks.

Cost: $5706.00 for Swim-Step and ramp conversion kit

Contact: Rehab Systems
2014 First Avenue South
Fargo, ND 58103
800-726-8620

Product: THERAPY RAMP

Description: Removable access ramp is 30 inches wide between rails and 15 feet long. Stainless steel construction with non-skid fiberglass walkway. Handrails are 36 inches high. Has 3 inch high edge protection to prevent wheelchair wheels from falling off sides. Includes deck anchors. Ramp also available with 36 inch clearance width. Overall width is 34 inches. 10 year warranty on structural components and 1 year warranty on Dura-deck.

Cost: $5393.00

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Steps

Product: EZ STEPS

Description: Four tread, drop in steps that fit various pool wall heights in above- and in-ground pools. Made from white structural polyethylene. Two models available with overall tread widths of 35 inches. Clearance width between handrails is 32 inches. Tread riser height is 9.5 inches and tread depth is 10 inches. One offers an adjustable height of 46-50 inches for above ground pools and the other has an adjustable range of 40-43 ½ inches for in-ground units. Two stainless steel handrails. Handrail height is 32 inches. Marketed by Quaker Plastics Corporation and sold through wholesale distributors.

Cost: contact for cost

Contact: Contact for local United States dealer
Fox Pool Corporation
P.O. Box 549
York, PA 17405
800-723-1011 / 717-764-8581

Product: AQUATREK STEP

Description: Removable stairs constructed of durable, non-corrosive plastic. Non-slip treads on each step. Lightweight and portable. Built on wheels for transporting. Allows users to enter and exit walking forward. Available in 6 or 7 step models. Overall width is 34 inches, tread width is 30 inches, length is 98 inches, weight 175 pounds. Tread riser height is 6 inches and tread depth is 13 inches. Handrail height is 30 inches.

Cost: $2734.00 for 6 steps
$2975.00 for 7 steps

Contact: Rehab Systems
2014 First Avenue South
Fargo, ND 58103
800-726-8620

Product: THERAPY STEPS

Description: Stainless steel therapy steps allow the user to enter and exit the water in a forward position. Distance into water ranges from 48 - 60 inches. Depth from pool deck to pool floor varies. Clearance width between handrails is 31 inches; overall width is 34 inches. Handrails are 1.66 inches by 0.109 inches; height is 32 inches. Available in 3, 4, or 5 step models. Steps are Dura-deck fiberglass with tread depth of 10 inches and tread riser height of 9 inches. Unit includes grounding screw. Anchors available as an option. Portable unit with four polyolefin wheels which are 4 inch in diameter. Rated load of 450 pounds. 10-year structural warranty and 1-year warranty for Dura-deck.

Cost: $2413.00 for 3-step model
$2682.00 for 4-step model
$3000.00 for 5-step model

Contact: Spectrum Pool Products
9600 Inspiration Drive
Missoula, MT 59802
406-543-5309 / 800-776-5309

Product: ACCESS STAIRS

Description: Portable stainless steel access stairs feature heavy duty welds for reliability and strength, and adds versatility to pools due to its ease of installation and removal. The stairs are available with either 20 inch wide plastic steps or 37 inch wide 316 gauge stainless steel steps, and offer a choice of four to eight steps. Riser height, 8 inches; tread depth, 14.5 inches.

Cost: $972.18 - $1634.48

Contact: WMS Aquatic Specialists
P.O. Box 398
Ellensburg, WA 98926
800-426-9460 / 800-443-7946

Transfer Steps

Product: AQUATREK TRANSFER PLATFORM

Description: Allows user to transfer from wheelchair to the platform and down into the water. Usable with other AQUATREK pool access products. Portable, non-skid surface, stainless steel fasteners, light weight and durable. Three tier unit that is 30 inches wide; tiers depth is 13 inches with 6 inch riser height between tiers. Top tier is 18 to 20 inches above the deck. Grabrails on back and one side of platform.

Cost: $864.36

Contact: Rehab Systems
2014 First Avenue South
Fargo, ND 58103
800-726-8620

Product: TRANSFER TIER

Description: A set of portable on deck and underwater tiers. User transfers laterally from wheelchair onto upper deck unit and lowers into water tier by tier, using upper body mobility. Made of durable, reinforced fiberglass with 1.9 inch stainless steel handrails. Smooth, non-abrasive finish. Water fills the base for increased stability. Completely self-contained. No operator or mounting required. Can easily be removed for storage. Back and side railings, order left or right side models. Each tier riser height is 6 inches; tier depth is 12 inches; tier width is 22 inches. Top tier is 18 inches from the deck. Three tiers on deck and 4 tiers in the water. Grabrail on backside of top tier and along one side of the unit. Removable, no anchoring necessary, lifts in and out. Custom trimmed to each pool.

Cost: $2450.00

Contact: Triad Technologies
219 Lamson St
Syracuse, NY 13206
800-729-7514

Aquatic Wheelchairs

Product: SERIES JTG 624 SHOWER/COMMODE CHAIR

Description: Seamless Ensolite seat and back. Swing away, removable arms. Adjustable, removable footrests. Push handle back. Corrosion-resistant finish and high strength molded components. Toggle brakes and anti-tippers. 5 inch front casters and 20 inch rear wheels with push rims. Seat width and depth, 18.25 inches; seat width between armrests, 18.5 inches; back height from seat, 16.5 inches; seat height from floor, 22 inches; top of seat to top of footrest adjustment, 17 to 18 inches; distance between wheel lugs, 14.37 inches; overall width, 25.25 inches; overall depth, 41 inches. Customizing available.

Cost: $936.00

Contact: Activeaid Inc
1 Activeaid Road
PO Box 359
Redwood Falls, MN 56283-0359
507-644-2951 / 800-533-5330

Product: ROLLING, FOLDING SHOWER/COMMODE CHAIR (462-20)

Description: Chair has 20-inch rear wheels with push rims and 5-inch front casters with sealed bearings. Corrosion-resistant finish and high strength molded components. Double plunger brake system. Includes an interchangeable cushioned commode seat and a cushioned solid seat; a cushioned, removable push handle back; removable arms; and adjustable, removable, swing under footrests. Overall width is 25 inches; seat to top of back measures 14.75 inches; seat width is 16.5 inches; and seat depth is 16 inches; seat height from floor is 19.5 inches; overall depth, 38.5 inches. Weighs 45 pounds. Customizing available.

Cost: $945.00

Contact: Activeaid Inc
1 Activeaid Road
PO Box 359
Redwood Falls, MN 56283-0359
507-644-2951/ 800-533-5330

Product: SHOWER/COMMODE STAINLESS STEEL SERIES 480-24

Description: Stainless steel framework, corrosion resistant components and seamless Ensolite foam seat and back. Removable arms. Rigid frame. Velcro safety strap. Toggle brakes. Swing-away, detachable footrests. Push handle back. 5 inch front casters and 20 inch rear wheels with push rims. Seat width, 16.5 or 18 inches; seat depth, 16 inches; back height from seat, 18 inches; seat height from floor, 21.75 inches; armrest height, 8.75 inches; overall width, 25 inches; overall depth, 40.5 inches. Customizing available.

Cost: $1649.00

Contact: Activeaid Inc
1 Activeaid Road
P.O. Box 359
Redwood Falls, MN 56283-0359
507-644-2951/ 800-533-5330

Product: SHOWER/COMMODE CHAIR (MODEL 490)

Description: A wheelchair shower commode with two 24-inch rear wheels with and 5-inch front casters. Corrosion-resistant finish and high strength molded components. Cushioned, removable, push handle back. Double plunger brake system. Removable arms. Adjustable, removable, swing away footrests. Foldable. Features include an epoxy coated frame finish; disc brakes with lever release; full-length padded armrests; and thick cushioned, front or rear opening seat. Hand rim projections and brake arm extension are available. Seat width between arms is 16.25 inches; seat depth is 16.25 inches; seat height from floor is 23.25 inches; back height from seat is 16 inches; overall width is 24.25 inches; footrest adjustment range is 3 inches; overall depth, including footplates is 41.75 inches.

Cost: $1185.00

Contact: Activeaid Inc
1 Activeaid Road
P.O. Box 359
Redwood Falls, MN 56283-0359
507-644-2951/ 800-533-5330

Product: MOBILE SHOWER/TOILET CHAIR #80209011

Description: Designed to allow the user to independently propel the chair. The chair is made of steel and aluminum construction with a molded, textured polypropylene seat. The chair has 22 inch wheels with push rims. Flip-up armrests and push handles are standard. Optional accessories include: a safety strap, footrests, and safety bar. Overall depth, 28.62 inches and overall width is 26.75 inches; seat width is 18.75 inches, depth is 17.75 inches; floor to seat height is 21.62 inches.

Cost: $1913.30
accessories: $301.70 (footrests); $48.00 (safety strap)

Contact: ETAC USA Inc
2325 Parklawn Dr., Suite J
Waukesha, WI 53186
800-678-3822 / 414-796-4600

Product: STEEL WHEEL AQUATIC CHAIR

Description: Designed for use in swimming pools. Allows for user to independently power chair. The frame and all bolts, screws, castors are made of type 316 non- corrosive stainless steel. The tubing (1 inch diameter) is rounded to eliminate sharp corners. Equipped with 2 nylon web seat belts with Velcro closures for chest and waist areas. Seat and back material is textilene (similar to nylon cord) which won't run or stretch. Pull-out armrests with plastic pads. 8x1 inch front casters. Urethane foam mag rear wheels, 24x1.37 inch solid tires with push rims. Wheel locks and footrests are a combination of durable plastic and stainless steel; fold-up adjustable and removable footrests. Overall width; 24 inches; overall depth, 32 inches; seat width, 18 inches; seat height, 19.5 inches. Custom sizes can be made.

Cost: $1500.00

Contact: Contact for dealers in the United States
Interior Mediquip Ltd
PO Box 1875
Vernon, BC V1T 8Z7
Canada
800-561-8998 / 604-542-1363

Product: REHAB SHOWER/COMMODE CHAIR
MODELS (6692, 6492, 6695, 6495)

Description: Corrosion-resistant coating on frame. Available with rear 24 inch drive wheels with push rims. Flip-up arms; swing away, removable, and adjustable footrests. Removable, multi-position seat, 3 inch foam cushion with seamless Ensolite foam that does not absorb moisture, minimizing skin irritation. Front cutout seat. Rear wheel locks. Foldable. Overall chair height, 39.25 inches; overall depth, 44.5 inches; overall width 26.75 inches; seat height, 21.75 inches; seat width, 16 or 18.5 inches; back height, 37.25 inches; adjustable footrest range, 5.75 to 9.75 inches; and weight, 47 to 49 pounds.

Cost: contact for cost

Contact: Invacare Corporation
P.O. Box 4028
899 Cleveland St
Elyria, OH 44036-2125
216-329-6000 / 800-333-6900

Product: WHEELED COMMODE SHOWER CHAIR #6873

Description: Shower commode wheelchair, polymer coated steel frame. Seamless padded seat. Flip-up, plastic armrests. Front 5 inch casters, rear 24 inch wheels with standard push rims. Toggle brakes for back wheels. Hook on adjustable, removable footrests with heel strap. Seat height, 22 inches. Seat width and depth, 15 inches. Overall width, 27 inches; depth, 31.5 inches; height, 38 inches. Dacron back support.

Cost: $1490.00

Contact: Lumex
Division of Lumex Inc
100 Spence Street
Bay Shore, NY 11706-2290
516-273-2200 / 800-645-5272

Product: AQUATREK AQUA CHAIR

Description: Designed to be used in and around water. Can be customized with push rims on wheels to allow user to independently power. Constructed of PVC plastic and stainless steel fasteners which make it durable and non-corrosive. Composite bearings and aluminum brakes on rear wheels. Lightweight, safe and comfortable. Totally submersible. Armrests and footrests included. Mag wheels are 7 inches in front and 24 inches in rear. Overall width, 28.5 inches; depth, 30.5 inches; height, 37 inches. Seat width, 17 inches; seat height from floor, 19.5 inches. 1-year warranty.

Cost: $662.11
additional charge for pair of push rims $35.00

Contact: Rehab Systems
2014 First Avenue South
Fargo, ND 58103
800-726-8620

Appendix C

Telephone Survey of
People with Disabilities

Designs & Devices for Swimming
Pool Access Flier

Telephone Survey of People with Disabilities

National Center on Accessibility
Swimming Pool Accessibility Project

Telephone Survey of People with Disabilities

>Q1< First, I have a few questions regarding your [allow 1][loc 2/7] disability. We ask these questions to get a better understanding of your particular experiences.

Would you give me the name or a description of your disability?

INTERVIEWER: DON'T "AO"

===> [specify]

>dis2< How many years have you had this disability?

<0> less than one year
<1-95> 1 to 95 years
<96> 96 or more years
VOLUNTEERED
<97> all my life
<98> DK
<99> RF
===>

>d05a< Does your disability affect your mobility?

<1> yes
<5> no
<8> DK
<9> RF
===>

>d05b< Does it affect your upper extremities?

<1> yes
<5> no
<8> DK
<9> RF
===>

>d05c< Does it affect your vision?

<1> yes
<5> no
<8> DK
<9> RF
===>

>d05d< Does it affect your hearing?

<1> yes
<5> no
<8> DK
<9> RF
===>

>de06< Now I would like to ask you about any assistive
mobility devices you might use inside or outside
of your home.
Do you use any device to assist with mobility?
<1> yes [goto de6a]
<5> no
<8> DK
<9> RF
===>[goto pool]

>de6a< Do you use assistive mobility devices:
<1> inside your home [goto de07]
<3> outside your home, or [goto de08]
<5> both [goto de07]
<8> DK
<9> RF
===> [goto pool]

>de07< Which assistive mobility device do you use [bold]in[n] your
home? Do you use:
<1> a manual wheelchair
<2> a motorized wheelchair
<3> a motorized scooter
<4> a prosthesis
<5> a cane
<6> crutches
<7> a walker, or
<0> some other device (specify)[specify]
<8> DK
<9> RF
===>

>d07a< IF NECESSARY: Do you use any other assistive mobility
device in your home?
<1> yes [goto d07b]
<5> no
<8> DK
<9> RF
===>[goto TDEV]

>d07b< IF NECESSARY: What other assistive mobility device
do you use [bold]in[n] your home? (Do you use:)
<1> a manual wheelchair
<2> a motorized wheelchair
<3> a motorized scooter
<4> a prosthesis
<5> a cane
<6> crutches
<7> a walker, or
<0> some other device (specify)[specify]
<8> DK
<9> RF
===>

>TDEV< [if de6a eq <1>][goto SCOT][endif]

>de08< Which assistive mobility device do you use
[bold]outside of[n] your home? (Do you use:)
<1> a manual wheelchair
<2> a motorized wheelchair
<3> a motorized scooter
<4> a prosthesis
<5> a cane
<6> crutches
<7> a walker, or
<0> some other device (specify)[specify]
<8> DK
<9> RF
===>

>d08a< IF NECESSARY: Do you use any other assistive mobility device outside your home?
<1> yes [goto d08b]
<5> no
<8> DK
<9> RF
===>[goto SCOT]

>d08b< IF NECESSARY: What other assistive mobility device do you use outside your home? (Do you use:)
<1> a manual wheelchair
<2> a motorized wheelchair
<3> a motorized scooter
<4> a prosthesis
<5> a cane
<6> crutches
<7> a walker, or
<0> some other device (specify)[specify]
<8> DK
<9> RF
===>

>SCOT< [if de07 eq <1>][goto TTRN][endif]
[if de07 eq <2>][goto TTRN][endif]
[if de07 eq <3>][goto TTRN][endif]
[if d07b eq <1>][goto TTRN][endif]
[if d07b eq <2>][goto TTRN][endif]
[if d07b eq <3>][goto TTRN][endif]
[if de08 eq <1>][goto TTRN][endif]
[if de08 eq <2>][goto TTRN][endif]
[if de08 eq <3>][goto TTRN][endif]
[if d08b eq <1>][goto TTRN][endif]
[if d08b eq <2>][goto TTRN][endif]
[if d08b eq <3>][goto TTRN][endif]
[goto pool]

```
>TTRN<  [if de07 le <2>][store <1> in TRN1][endif]
        [if de07 eq <3>][store <1> in TRN2][endif]
        [if d07b le <2>][store <1> in TRN1][endif]
        [if d07b eq <3>][store <1> in TRN2][endif]
        [if de08 le <2>][store <1> in TRN1][endif]
        [if de08 eq <3>][store <1> in TRN2][endif]
        [if d08b le <2>][store <1> in TRN1][endif]
        [if d08b eq <3>][store <1> in TRN2][endif]

>TTR2<  [if TRN1 eq <1>][if TRN2 eq <1>]
        [store <wheelchair or scooter> in TRAN][goto de09]
        [endif][endif]
        [if TRN1 eq <1>][store <wheelchair> in TRAN][endif]
        [if TRN2 eq <1>][store <scooter> in TRAN][endif]

>de09<  When using a [fill TRAN], do you need
        assistance transferring from it to another surface?
        <1> yes
        <5> no
        <8> DK
        <9> RF

>pool<  The next set of questions deals with the types of pools
        you may have used within the past 12 months.
        <1> PROCEED
        ===>

>mult<  In the past 12 months, about how many times have you
        used a multipurpose pool?
        <0> none
        <1-995> 1 to 995 times
        <996> 996 or more times
        <998> DK
        <999> RF

        +-------------------------------------------+
        | A multipurpose pool is used for recreation, |
        | instruction, and exercise.                  |
        +-------------------------------------------+
        ===>

>spa<   A spa?  (In the past 12 months, about how many times
        have you used a spa?)
        <0> none
        <1-995> 1 to 995 times [goto spa2]
        <996> 996 or more times [goto spa2]
        <998> DK
        <999> RF

        +-------------------------------------------+
        | A spa is a hot water pool with hydrojet action, |
        | such as a whirlpool.                        |
        +-------------------------------------------+
        ===> [goto ther]
```

>spa2< Do you use a spa:
<1> in a private residence such as your home,
<3> in a public place, or
<5> both at home and in public?
<8> DK
<9> RF

A spa is a hot water pool with hydrojet action, such as a whirlpool.

===>

>ther< In the past 12 months, about how many times have you used a therapy pool?
<0> none
<1-995> 1 to 995 times
<996> 996 or more times
<998> DK
<999> RF

A therapy pool is used in prescribed treatment.

===>

>lap< A lap pool? (In the past 12 months, about how many times have you used a lap pool?)
<0> none
<1-995> 1 to 995 times
<996> 996 or more times
<998> DK
<999> RF

A lap pool has a small number of lanes and is used only for swimming laps.

===>

>cmpt< A competition pool which is used primarily for athletic practice and events? (In the past 12 months, about how many times have you used a competition pool?
<0> none
<1-995> 1 to 995 times
<996> 996 or more times
<998> DK
<999> RF
===>

```
>watr<  A water park?  (In the past 12 months, about how many
      times have you used a water park?)
      <0> none
      <1-995> 1 to 995 times
      <996> 996 or more times
      <998> DK
      <999> RF

      ╔═══════════════════════════════════════╗
      ╚═══════════════════════════════════════╝
      A water park has water slides and water play
      areas.
      ===>

**
tests to see if any pool used.  If not, skips to entr
**
>TSWM<  [if mult eq <0>]
      [if ther eq <0>]
      [if lap eq <0>]
      [if cmpt eq <0>]
      [if watr eq <0>]
      [if spa eq <0>]
      [store <pool> in TYPE][store <> in SPAF]
      [goto TSIN]
      [endif][endif][endif][endif][endif][endif]

>TTYP<  [if spa eq <0>][store <pool> in TYPE][store <> in SPAF][goto oper][endif]
      [if spa ge <998>][store <pool> in TYPE][store <> in SPAF][goto oper][endif]
      [if mult eq <0>]
      [if ther eq <0>]
      [if lap eq <0>]
      [if cmpt eq <0>]
      [if watr eq <0>]
      [store <spa> in TYPE][store <1> in SPAF][goto T2]
      [endif][endif][endif][endif][endif]
      [store <pool or spa> in TYPE][store <> in SPAF]

>T2<   [if SPAF eq <1>][if spa2 eq <1>][store <3> in oper][goto purp]
      [endif][endif]

>oper<  What type of organization operates the [fill TYPE] you
      have used [bold]most frequently[n] in the past 12 months?
      Was it:
      <1> the YMCA or YWCA
      <2> a private club
      <3> a residence
      <4> a recreation department
      <5> a rehabilitation center or hospital
      <6> a hotel or motel, or
      <7> some other organization (specify) [specify]
      <8> DK
      <9> RF
      ===>
```

>purp< What was the [bold]primary[n] reason you used a [fill TYPE] in the past 12 months? Was it for:

<1> fitness
<2> therapy
<3> competition or training
<4> recreation or fun, or
<5> for some other reason (specify) [specify]

<8> DK
<9> RF
===>

>with< When you go to a [fill TYPE], do you usually go:

<1> alone
<2> with family
<3> with friends, or
<4> with others (specify)[specify]
VOLUNTEERED
<5> with family [bold]and[n] friends
<8> DK
<9> RF
===>

>TSPA< [if SPAF eq <1>][goto TSIN][endif]

>clas< Within the past 12 months, have you participated in any classes at a pool?

<1> yes
<5> no
<8> DK
<9> RF
===>

**
Those who have used any type of pool in the last 12 months are skipped over dis3
**

>TSIN< [if mult gt <0>][if mult lt <998>][store <1> in dis3][goto TDS3][endif][endif]
[if ther gt <0>][if ther lt <998>][store <1> in dis3][goto TDS3][endif][endif]
[if lap gt <0>][if lap lt <998>][store <1> in dis3][goto TDS3][endif][endif]
[if cmpt gt <0>][if cmpt lt <998>][store <1> in dis3][goto TDS3][endif][endif]
[if watr gt <0>][if watr lt <998>][store <1> in dis3][goto TDS3][endif][endif]
[if spa gt <0>][if spa lt <998>][store <1> in dis3][goto TDS3][endif][endif]

**
Thos who haven't used a pool in 12 months are asked ds3a if dis. for life, dis3 if not.
** [if dis2 eq <97>][goto ds3a][endif]

>dis3< Since the onset of your disability, have you used a pool or spa?

<1> yes
<5> no
<8> DK
<9> RF
===>[goto TDS3]

>ds3a< Have you ever used a pool or spa? [equiv dis3]
<1> yes
<5> no
<8> DK
<9> RF
===>

>TDS3< [if dis3 ne <1>][store <1> in FNOT][endif]

>devi< You were recently mailed descriptions of various methods used to assist people with disabilities when entering and exiting pools.
Now I'm going to ask you some general questions about each of these methods.
<1> PROCEED
===>

>TFNT< [if FNOT eq <1>][goto rmav][endif]
[if SPAF eq <1>][goto T1LF][endif]

>ramp< Have you ever used a ramp to enter or exit a pool?
<1> yes
<5> no
<8> DK
<9> RF

Please think of the time since the onset of your disability

===>

**
Note "escape hatch" option for respondents who want to exit entire series
**

>rmav< If you went to a pool tomorrow and a ramp was available, would you use the ramp to enter the pool?
<1> yes
<5> no [goto why4]
=ESCAPE HATCH=
<7> Exit series, R has no intention of using devices[goto TRMP]
<8> DK
<9> RF
===>[goto T1LF]

>why4< IF NECESSARY: Please describe some reasons why you [allow 1][no erase]would not use a ramp.
===>[specify]

>T1LF< [if FNOT eq <1>][goto lfav][endif]

>lift< Have you used a lift to enter or exit a [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF

Please think of the time since the onset of your disability

===>

>lfav< If you went to a [fill TYPE] tomorrow and a lift was available, would you use the lift to enter the water?
<1> yes
<5> no [goto why1]
=ESCAPE HATCH=
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF
===>[goto T1ST]

>why1< IF NECESSARY: Please describe some reasons why you [allow 1][no erase]would not use a lift.
===>[specify]

>T1ST< [if FNOT eq <1>][goto stra][endif]

>strs< Have you ever used stairs to enter or exit a [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF

Please think of the time since the onset of your disability

===>

>stra< If you went to a [fill TYPE] tomorrow and stairs were available, would you use the stairs to enter the water?
<1> yes
<5> no [goto why2]
=ESCAPE HATCH=
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF
===>[goto T1ZR]

>why2< IF NECESSARY: Please describe some reasons why you [allow 1][no erase]would not use stairs.
===>[specify]

>T1ZR< [if FNOT eq <1>][goto zrav][endif]
[if SPAF eq <1>][goto T1FL][endif]

>zero< Have you ever used a zero-depth entry to enter or exit
a pool?
<1> yes
<5> no
<8> DK
<9> RF

```
Please think of the time since the onset of your |
disability                                       |
```

===>

>zrav< If you went to a [fill TYPE] tomorrow and a zero-depth
entry was available, would you use the zero-depth
entry to enter the water?
<1> yes
<5> no [goto why5]
=ESCAPE HATCH=
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF
===>[goto T1FL]

>why5< IF NECESSARY: Please describe some reasons why you [allow 1][no erase] would not use a zero-depth entry.
===>[specify]

>T1FL< [if FNOT eq <1>][goto flav][endif]
[if SPAF eq <1>][goto T1SP][endif]

>flor< Have you ever used a movable floor or section to enter
or exit a [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF

```
Please think of the time since the onset of your |
disability                                       |
```

===>

>flav< If you went to a pool tomorrow and a movable floor
or section was available, would you use the movable
floor to enter the pool?
<1> yes
<5> no [goto why7]
=ESCAPE HATCH=
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF

>why7< IF NECESSARY: Please describe some reasons why you [allow 1][no erase]would not use a movable floor or section.
===>[specify]

>T1SP< [if FNOT eq <1>][goto stav][endif]

>step< Have you ever used transfer steps to enter or exit
a [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF

Please think of the time since the onset of your disability

===>

>stav< If you went to a [fill TYPE] tomorrow and transfer steps
were available, would you use the transfer steps to
enter the water?
<1> yes
<5> no [goto why3]
=ESCAPE HATCH=
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF
===>[goto T1ED]

>why3< IF NECESSARY: Please describe some reasons why you [allow 1][no erase] would not use transfer steps.
===>[specify]

>T1ED< [if FNOT eq <1>][goto edav][endif]

>edge< Have you ever used raised coping to enter or exit a
[fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF

Please think of the time since the onset of your disability

>edav< If you went to a [fill TYPE] tomorrow and raised
coping was available, would you use the raised coping
to enter the water?
<1> yes
<5> no [goto why9]
=ESCAPE HATCH=
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF

>why9< IF NECESSARY: Please describe some reasons why you [allow 1][no erase]would not use rasied coping.
===>[specify]

>T1WH< [if FNOT eq <1>][goto whav][endif]
[if SPAF eq <1>][goto T1LD][endif]

>whel< Have you ever used an aquatic wheelchair to enter or exit a pool?
<1> yes
<5> no
<8> DK
<9> RF

Please think of the time since the onset of your disability

===>

>whav< If you went to a pool tomorrow and an aquatic wheelchair was available, would you use the aquatic wheelchair to enter the pool?
<1> yes
<5> no [goto why6]
==ESCAPE HATCH==
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF
===>[goto T1LD]

>why6< IF NECESSARY: Please describe some reasons why you [allow 1][no erase] would not use an aquatic wheelchair.
===>[specify]

>T1LD< [if FNOT eq <1>][goto ldav][endif]

>ladr< Have you ever used a ladder to enter or exit a [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF

Please think of the time since the onset of your disability

===>

>ldav< If you went to a [fill TYPE] tomorrow and a ladder
was available, would you use the ladder to
enter the water?
<1> yes
<5> no [goto why8]
=ESCAPE HATCH=
<7> Exit series on devices, R has no intention of using [goto TRMP]
<8> DK
<9> RF
===>[goto TOTR]

>why8< IF NECESSARY: Please describe some reasons why you [allow 1][no erase]would not use a ladder.
===>[specify]

>TOTR< [if FNOT eq <1>][goto TRMP][endif]

>otr< What other equipment have you used to enter and exit a [allow 1]
[fill TYPE]?
<1> R has used other equipment (specify) [specify]
<5> R has not used any other equipment
<8> DK
<9> RF
===>

>TRMP< [if ramp ne <1>][goto TLFT][endif]

>rmp1< The following questions ask about pool ramps.
<1> PROCEED
===>

>rmpa< Have you used a ramp into a pool at more than one [loc 3/1]
facility?
<1> yes
<5> no
VOLUNTEERED
<7> R hasn't used a ramp [goto XRMP]
<8> DK
<9> RF
===>[goto rmmo]

>XRMP< [store <> in rmpa][goto ramp]

>rmmo< When was the last time you used a ramp to enter or exit
the pool? I just need the month and year.
<1> January <7> July
<2> February <8> August
<3> March <9> September
<4> April <10> October
<5> May <11> November
<6> June <12> December
<98> DK
<99> RF
===>

>rmyr< INTERVIEWER: ENTER YEAR:[no erase]
<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>rmpb< Was the ramp you used most recently able to be moved if necessary?
<1> yes
<5> no
<8> DK
<9> RF
===>

>sup2< The last time you used a ramp, did you have to request that it be set up?
<1> yes [goto lng2]
<5> no
<8> DK
<9> RF
===>[goto rmpc]

>lng2< How long did you have to wait for it to be set up?
INTERVIEWER: CODE # OF HOURS
<0> less than 1 hour
<1-5> 1 to 5 hours
<6> 6 or more hours
<8> DK
<9> RF
===>

>lg2a< INTERVIEWER: CODE # OF MINUTES [no erase]
<0> zero minutes
<1-60> 1 to 60 minutes
<98> DK
<99> RF
===>

>rmpc< Did the ramp have a handrail on one side, both sides, or were there no handrails?
<1> one side [goto orl]
<3> both sides [goto trl]
<5> no handrails
<8> DK
<9> RF
===>[goto rmpd]

>orl< Did you use the handrail while entering or exiting the pool?
<1> yes
<5> no
<8> DK
<9> RF
===>[goto rmpd]

>trl< Did you use both handrails while entering or exiting
the pool?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpd< Compared to a typical ramp in a building, was
the pool ramp:
<1> steeper than a typical ramp
<3> not as steep as a typical ramp, or
<5> about the same
<8> DK
<9> RF
===>

>rmpe< Compared to a typical ramp in a building, was using
the pool ramp to enter and exit the water:
<1> easier than a typical ramp
<3> harder than a typical ramp, or
<5> about the same
<8> DK
<9> RF
===>

>rmpf< Could you use the ramp to enter or exit the pool
without someone helping you?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpg< Was there a level landing at the bottom of the ramp?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmph< Did the ramp have a switchback where the ramp
direction changed?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpi< Did you walk on the ramp to enter or exit the pool?
<1> yes
<5> no
VOLUNTEERED
<7> R is not able to walk
<8> DK
<9> RF

>rmpj< Did you use a wheelchair on the ramp?
<1> yes [goto wora]
<5> no
VOLUNTEERED
<7> R does not use a wheelchair
<8> DK
<9> RF
===>[goto rmpk]

>wora< Did you use your own everyday wheelchair in the pool?
<1> yes
<5> no
<8> DK
<9> RF
===>

>worb< Was a wheelchair provided at the site?
<1> yes
<5> no
VOLUNTEERED
<7> R used own wheelchair
<8> DK
<9> RF
===>

>worc< Could you push the wheelchair into the water by yourself?
<1> yes
<5> no
<8> DK
<9> RF
===>

>word< Was it difficult to transfer to or from the chair in the water?
<1> yes
<5> no
<8> DK
<9> RF
===>

>wore< Did the chair remain in the water while you used the pool?
<1> yes
<5> no
<8> DK
<9> RF
===>

>worf< Could you push the wheelchair out of the water by yourself?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpk< Did the side of the ramp have a curb or other type of edge protection?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpl< How safe did you feel using the ramp? Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto rmwa]
<4> not at all safe [goto rmwa]
<8> DK
<9> RF
===>[goto rmpm]

>rmwa< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>rmpm< Was the ramp comfortable to use?
<1> yes
<5> no [goto rmwb]
<8> DK
<9> RF
===>[goto rmpn]

>rmwb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>rmpn< Was the ramp easy to use?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpo< Did you have any problems using the ramp?
<1> yes [goto rmwd]
<5> no
<8> DK
<9> RF
===> [goto rmpp]

>rmwd< IF NECESSARY: What problems did you have? [allow 1][no erase]
===>[specify]

>rmpp< Do you prefer ramp handrails to be on:
<1> one side, or
<5> both sides
<8> DK
<9> RF
===>

>rmpq< Do you prefer a ramp to have a curb?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpr< Do you prefer the ramps to have a level landing area at the pool bottom?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmps< On a scale from 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, what is your overall satisfaction with the last ramp you used?
<1> very dissatisfied
<2-4>
<5> very satisfied
<8> DK
<9> RF
===>

>TLFT< [if lift ne <1>][goto TSTR][endif]

>lft1< The following questions ask about pool and spa lifts.
<1> PROCEED
===>

>lfta< Have you used a lift at more than one facility?
<1> yes
<5> no
VOLUNTEERED
<7> R hasn't used a lift [goto XLFT]
<8> DK
<9> RF
===>[goto lfmo]

>XLFT< [store <> in lfta][goto lift]

>lfmo< When was the last time you used a lift to enter or exit a [fill TYPE]? I just need the month and year.

<1> January	<7> July
<2> February	<8> August
<3> March	<9> September
<4> April	<10> October
<5> May	<11> November
<6> June	<12> December

<98> DK
<99> RF
===>

>lfyr< INTERVIEWER: ENTER YEAR:[no erase]
<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>lftb< Which of the following features best describes the lift you have used most recently?
Was the lift operated:
<1> by power, either hydraulic or electric, or
<5> manually with a crank
<8> DK
<9> RF
===>

>lftc< Did the lift have a:
<1> seat
<2> sling
<3> platform, or
<4> stretcher
<8> DK
<9> RF
===>

>lftd< Was the lift portable?
<1> yes [goto sup1]
<5> no
<8> DK
<9> RF
===>[goto lfte]

>sup1< The last time you used it, did you have to request it to be set up?
<1> yes [goto lng1]
<5> no
<8> DK
<9> RF
===>[goto lfte]

>lng1< How long did you have to wait for it to be set up?
INTERVIEWER: CODE # OF HOURS
<0> less than 1 hour
<1-5> 1 to 5 hours
<6> 6 or more hours
<8> DK
<9> RF
===>

>lg1a< INTERVIEWER: CODE # OF MINUTES [no erase]
<0> zero minutes
<1-60> 1 to 60 minutes
<98> DK
<99> RF
===>

>lfte< Was it easy to transfer to and from the lift?
<1> yes
<5> no [goto lfwa]
<8> DK
<9> RF
===>[goto lftf]

>lfwa< In what ways was it not easy? [allow 1][no erase]
===> [specify]

>lftf< Could you transfer to or from the lift by yourself?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lftg< Could you operate the lift by yourself?
<1> yes [goto lfth]
<5> no
<8> DK
<9> RF
===>

>lfwb< What kept you from operating the lift by yourself? [allow 1]
===>[specify][goto lfti]

>lfth< Did the pool management allow you to operate the lift
by yourself?
<1> yes
<5> no [goto lfwb]
<8> DK
<9> RF
===>[goto lfti]

>lfti< How safe did you feel using the lift? Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto lfwc]
<4> not at all safe [goto lfwc]
<8> DK
<9> RF
===>[goto lftj]

>lfwc< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>lftj< Was the lift comfortable to use?
<1> yes
<5> no [goto lfwd]
<8> DK
<9> RF
===>[goto lftk]

>lfwd< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>lftk< Did you have any problems using the lift?
<1> yes [goto lfwe]
<5> no
<8> DK
<9> RF
===>[goto lftl]

>lfwe< IF NECESSARY: What problems did you have? [allow 1][no erase]
===>[specify]

>lftl< Which type of lift would you prefer to use:
<1> powered, or
<5> manual
<8> DK
<9> RF
===>

>lftm< Would you prefer to use a lift that:
<1> you could operate by yourself, or
<5> one that is operated by someone else
VOLUNTEERED
<7> no preference
<8> DK
<9> RF
===>

>lftn< Would you prefer to use a lift that has a headrest?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lfto< Would you prefer to use a lift that has a foot rest?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lftp< Would you prefer to use a lift that has an arm rest?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lftq< Would you prefer to use a lift that has a lap belt?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lftr< Is there anything else you would like on a lift?
<1> yes (specify)[specify]
<5> no
<8> DK
<9> RF
===>

>lfts< On a scale from 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, how satisfed are you with using a lift?
<1> very dissatisfied
<2-4>
<5> very satisfied
<8> DK
<9> RF
===>

>SCT1< [store <0> in SWMC]
[if ramp eq <1>][add <1> to SWMC][endif]
[if lift eq <1>][add <1> to SWMC][endif]
[if SWMC ge <2>][goto entr][endif]

>TSTR< [if strs ne <1>][goto TZER][endif]

>str1< The following questions ask about [fill TYPE] stairs.
<1> PROCEED
===>

>psta< Have you used stairs at more than one facility?
<1> yes
<5> no
VOLUNTEERED
<7> R hasn't used stairs [goto XPST]
<8> DK
<9> RF
===>[goto psmo]

>XPST< [store <> in psta][goto strs]

>psmo< When was the last time you used stairs to enter or exit a [fill TYPE]? I just need the month and year.

<1> January <7> July
<2> February <8> August
<3> March <9> September
<4> April <10> October
<5> May <11> November
<6> June <12> December
<98> DK
<99> RF
===>

>psyr< INTERVIEWER ENTER YEAR:[no erase]
<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>pstb< Were the stairs able to be moved if necessary?
<1> yes [goto sp4]
<5> no
<8> DK
<9> RF
===>[goto pstc]

>sp4< The last time you used them, did you have to request [loc 4/1]
for them to be set up?
<1> yes [goto lng4]
<5> no
<8> DK
<9> RF
===>[goto pstc]

>lng4< How long did you have to wait for them to be set up?
INTERVIEWER: CODE # OF HOURS
<0> less than 1 hour
<1-5> 1 to 5 hours
<6> 6 or more hours
<8> DK
<9> RF
===>

>lg4a< INTERVIEWER: CODE # OF MINUTES [no erase]
<0> zero minutes
<1-60> 1 to 60 minutes
<98> DK
<99> RF
===>

>pstc< Did the stairs have a handrail on one side, both sides,
in the middle or were there no handrails?
<1> one side, [goto orl3]
<2> both sides, [goto trl3]
<3> in the middle, or [goto orl3]
<4> there were no handrails
<8> DK
<9> RF
===>[goto pstd]

>orl3< Did you use the handrail while entering or exiting the
[fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF
===>[goto pstd]

>trl3< Did you use both handrails while entering or exiting
the [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF
===>

>pstd< Did you need someone to help you while using the
stairs to enter or exit the [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF
===>

>pste< How safe did you feel using the stairs? Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto pswa]
<4> not at all safe [goto pswa]
<8> DK
<9> RF
===>[goto pstf]

>pswa< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>pstf< Were the stairs comfortable to use?
<1> yes
<5> no [goto pswb]
<8> DK
<9> RF
===>[goto pstg]

>pswb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>pstg< Were the stairs easy to use?
<1> yes
<5> no
<8> DK
<9> RF
===>

>psth< Did you have any problems using the stairs?
<1> yes [goto pswd]
<5> no
<8> DK
<9> RF
===>[goto psti]

>pswd< IF NECESSARY: What problems did you have? [allow 1][no erase]
===>[specify]

```
>psti<  Would you prefer having one, two, or no handrails
      on the stairs?
      <1> one handrail
      <3> two handrails, or
      <5> no handrails
      <8> DK
      <9> RF
      ===>

>pstj<  On a scale from 1 to 5, where 1 is very dissatisfied
      and 5 is very satisfied, what is your overall
      satisfaction with the last stairs you used?
      <1> very dissatisfied
      <2-4>
      <5> very satisfied
      <8> DK
      <9> RF
      ===>

>SCT2<  [store <0> in SWMC]
      [if ramp eq <1>][add <1> to SWMC][endif]
      [if lift eq <1>][add <1> to SWMC][endif]
      [if strs eq <1>][add <1> to SWMC][endif]
      [if SWMC ge <2>][goto entr][endif]

>TZER<  [if zero ne <1>][goto TFLR][endif]

>zer1<  The following questions ask about zero-depth
      entry pools.
      <1> PROCEED
      ===>

>zroa<  Have you used a zero-depth entry at more than
      one facility?
      <1> yes
      <5> no
      VOLUNTEERED
      <7> R hasn't used a zero-depth entry [goto XZRO]
      <8> DK
      <9> RF
      ===>[goto zrmo]

>XZRO<  [store <> in zroa][goto zero]

>zrmo<  When was the last time you used a zero-depth entry
      swimming pool?  I just need the month and year.
      <1> January        <7> July
      <2> February       <8> August
      <3> March          <9> September
      <4> April         <10> October
      <5> May           <11> November
      <6> June          <12> December
      <98> DK
      <99> RF
      ===>
```

>zryr< INTERVIEWER ENTER YEAR:[no erase]
<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>zrob< Were any handrails available?
<1> yes [goto ushr]
<5> no
<8> DK
<9> RF
===>[goto zroc]

>ushr< Did you use the handrails while entering or exiting the pool?
<1> yes
<5> no
<8> DK
<9> RF
===>

>zroc< Did you need someone to help you while using the zero-depth entry?
<1> yes
<5> no
<8> DK
<9> RF
===>

>zrod< How safe did you feel using the zero-depth entry? Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto zrwa]
<4> not at all safe [goto zrwa]
<8> DK
<9> RF
===>[goto zroe]

>zrwa< In what ways did you not feel safe?[allow 1][no erase]

===>[specify]

>zroe< Was the zero-depth entry comfortable to use?
<1> yes
<5> no [goto zrwb]
<8> DK
<9> RF
===>[goto zrof]

>zrwb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

```
>zrof<  Was the zero-depth entry easy to use?
     <1> yes
     <5> no
     <8> DK
     <9> RF
     ===>

>zrog<  Did you have any problems using the zero-depth entry?
     <1> yes [goto zrwd]
     <5> no
     <8> DK
     <9> RF
     ===>[goto zroh]

>zrwd<  IF NECESSARY: What problems did you have? [allow 1][no erase]
     ===>[specify]

>zroh<  On a scale from 1 to 5, where 1 is very dissatisfied
     and 5 is very satisfied, what is your overall
     satisfaction with the last zero-depth entry you used?
     <1> very dissatisfied
     <2-4>
     <5> very satisfied
     <8> DK
     <9> RF
     ===>

>SCT3<  [store <0> in SWMC]
     [if ramp eq <1>][add <1> to SWMC][endif]
     [if lift eq <1>][add <1> to SWMC][endif]
     [if strs eq <1>][add <1> to SWMC][endif]
     [if zero eq <1>][add <1> to SWMC][endif]
     [if SWMC ge <2>][goto entr][endif]

>TFLR<  [if flor ne <1>][goto TSTP][endif]

>flr1<  The following questions ask about movable pool floors.
     <1> PROCEED
     ===>

>mpfa<  Have you used a movable floor or section at more
     than one facility?
     <1> yes
     <5> no
     VOLUNTEERED
     <7> R hasn't used a movable floor or section [goto XMPF]
     <8> DK
     <9> RF
     ===>[goto mfmo]

>XMPF<  [store <> in mpfa][goto flor]
```

>mfmo< When was the last time you used a movable floor or section to enter or exit the pool? I just need the month and year.

<1> January <7> July
<2> February <8> August
<3> March <9> September
<4> April <10> October
<5> May <11> November
<6> June <12> December
<98> DK
<99> RF
===>

>mfyr< INTERVIEWER ENTER YEAR:[no erase]

<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>mpfb< Did the entire pool floor move or just a section of the floor?

<1> entire floor
<5> section
<8> DK
<9> RF
===>

>mpfc< Did you use a wheelchair when using the floor or section?

<1> yes [goto prvd]
<5> no
<8> DK
<9> RF
===>[goto mpfd]

>prvd< Was one provided for you to use?

<1> yes
<5> no
VOLUNTEERED
<7> R used own wheelchair
<8> DK
<9> RF
===>

>mpfd< Did you need someone to help you to move to the area of the floor that moved?

<1> yes
<5> no
<8> DK
<9> RF
===>

>mpfe< Did everyone who needed to use the movable floor
have to enter and exit at the same time?
<1> yes
<5> no
<8> DK
<9> RF
===>

>mpff< Did all or part of the pool have to be cleared when the
movable floor was in use?
<1> yes [goto rsnt]
<5> no
<8> DK
<9> RF
===>[goto mpfg]

>rsnt< How much do you feel clearing the pool bothered the
other swimmers? Please tell me using a scale from
1 to 5, where 1 is not at all and 5 is very much.
<1> did not bother them at all
<2-4>
<5> bothered them very much
<8> DK
<9> RF
===>

>mpfg< How long did it take for the floor to raise or lower
to desired height?
INTERVIEWER: CODE # OF MINUTES
<0> zero minutes
<1-60> 1 to 60 minutes
<98> DK
<99> RF
===>

>mpfh< How safe did you feel using the movable floor?
Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto mfwa]
<4> not at all safe [goto mfwa]
<8> DK
<9> RF
===>[goto mpfi]

>mfwa< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>mpfi< Was the movable floor comfortable to use?
<1> yes
<5> no [goto mfwb]
<8> DK
<9> RF
===>[goto mpfj]

>mfwb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>mpfj< Was the movable floor easy to use?
<1> yes
<5> no
<8> DK
<9> RF
===>

>mpfk< Did you have any problems using the movable floor
or section?
<1> yes [goto mfwd]
<5> no
<8> DK
<9> RF
===>[goto mpfl]

>mfwd< IF NECESSARY: What problems did you have? [allow 1][no erase]
===>[specify]

>mpfl< On a scale from 1 to 5, where 1 is very dissatisfied
and 5 is very satisfied, what is your overall
satisfaction with the last movable floor you used?
<1> very dissatisfied
<2-4>
<5> very satisfied
<8> DK
<9> RF
===>

>SCT4< [store <0> in SWMC]
[if ramp eq <1>][add <1> to SWMC][endif]
[if lift eq <1>][add <1> to SWMC][endif]
[if strs eq <1>][add <1> to SWMC][endif]
[if zero eq <1>][add <1> to SWMC][endif]
[if flor eq <1>][add <1> to SWMC][endif]
[if SWMC ge <2>][goto entr][endif]

>TSTP< [if step ne <1>][goto TEDG][endif]

>stp1< The following questions ask about transfer steps.
<1> PROCEED
===>

>stea< Have you used transfer steps at more than
one facility?

<1> yes
<5> no
VOLUNTEERED
<7> R hasn't used transfer steps [goto XSTE]
<8> DK
<9> RF
===> [goto stmo]

>XSTE< [store <> in stea][goto step]

>stmo< When was the last time you used transfer steps to
enter or exit a [fill TYPE]? I just need the month
and year.
<1> January <7> July
<2> February <8> August
<3> March <9> September
<4> April <10> October
<5> May <11> November
<6> June <12> December
<98> DK
<99> RF
===>

>styr< INTERVIEWER: ENTER YEAR:[no erase]
<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>steb< Were the transfer steps able to be moved if necessary?
<1> yes [goto sup3]
<5> no
<8> DK
<9> RF
===>[goto stec]

>sup3< The last time you used them, did you have to request
for them to be set up?
<1> yes [goto lng3]
<5> no
<8> DK
<9> RF
===>[goto stec]

>lng3< How long did you have to wait for them to be set up?
INTERVIEWER: CODE # OF HOURS
<0> less than 1 hour
<1-5> 1 to 5 hours
<6> 6 or more hours
<8> DK
<9> RF
===>

>lg3a< INTERVIEWER: CODE # OF MINUTES [no erase]

<0> zero minutes
<1-60> 1 to 60 minutes
<98> DK
<99> RF
===>

>stec< Compared to the height of your wheelchair seat,
was the height of the top transfer step:
<1> significantly higher
<3> about the same, or
<5> significantly lower
<8> DK
<9> RF
===>

>sted< Did the height allow for an easy transfer to or from
the wheelchair?
<1> yes
<5> no
<8> DK
<9> RF
===>

>stee< Did the transfer steps have a handrail on one side,
both sides, or were there no handrails?
<1> one side, [goto orl2]
<3> both sides, or [goto trl2]
<5> there were no handrails
<8> DK
<9> RF
===>[goto steg]

>orl2< Did you use the handrail while entering or exiting
a [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF
===>[goto stef]

>trl2< Did you use both handrails while entering or exiting
a [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF
===>[goto stf2]

>stef< Did the handrail interfere while transferring [loc 5/1]
to or from your wheelchair?
<1> yes
<5> no
<8> DK
<9> RF
===> [goto steg]

>stf2< Did the handrails interfere while transferring
to or from your wheelchair?
<1> yes
<5> no
<8> DK
<9> RF

>steg< Did you need someone to help you while using the
transfer steps to enter or exit the [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF
===>

>steh< How safe did you feel using the transfer steps?
Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto spwa]
<4> not at all safe [goto spwa]
<8> DK
<9> RF
===>[goto stei]

>spwa< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>stei< Were the transfer steps comfortable to use?
<1> yes
<5> no [goto spwb]
<8> DK
<9> RF
===>[goto stej]

>spwb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>stej< Were the transfer steps easy to use?
<1> yes
<5> no
<8> DK
<9> RF
===>

>stek< Did you have any problems using the transfer steps?
<1> yes [goto spwd]
<5> no
<8> DK
<9> RF
===>[goto stel]

>spwd< IF NECESSARY: What problems did you have? [allow 1][no erase]

===>[specify]

>stel< Do you prefer that transfer steps have handrails on:
<1> one side,
<3> both sides, or
<5> would you prefer no handrails?
<8> DK
<9> RF

```
>stem<  On a scale from 1 to 5, where 1 is very dissatisfied
        and 5 is very satisfied, what is your overall
        satisfaction with the last transfer steps you used?
        <1> very dissatisfied
        <2-4>
        <5> very satisfied
        <8> DK
        <9> RF
        ===>

>SCT5<  [store <0> in SWMC]
        [if ramp eq <1>][add <1> to SWMC][endif]
        [if lift eq <1>][add <1> to SWMC][endif]
        [if strs eq <1>][add <1> to SWMC][endif]
        [if zero eq <1>][add <1> to SWMC][endif]
        [if flor eq <1>][add <1> to SWMC][endif]
        [if step eq <1>][add <1> to SWMC][endif]
        [if SWMC ge <2>][goto entr][endif]

>TEDG<  [if edge ne <1>][goto TWHL][endif]

>edg1<  The following questions ask about raised coping.
        <1> PROCEED
        ===>

>edga<  Have you used a raised coping [fill TYPE] at more than one
        facility?
        <1> yes
        <5> no
        VOLUNTEERED
        <7> R hasn't used raised coping [goto XEDG]
        <8> DK
        <9> RF
        ===>[goto edmo]

>XEDG<  [store <> in edga][goto edge]

>edmo<  When was the last time you used a raised coping [fill TYPE]?
        I just need the month and year.
        <1> January       <7> July
        <2> February      <8> August
        <3> March         <9> September
        <4> April        <10> October
        <5> May          <11> November
        <6> June         <12> December

        <98> DK
        <99> RF
        ===>

>edyr<  INTERVIEWER ENTER YEAR:[no erase]
        <84> 84 or earlier
        <85-96> 85 - 96
        <98> DK
        <99> RF
        ===>
```

>edgb< Compared to the height of your wheelchair, was the
height of the raised coping:
<1> significantly higher
<3> about the same, or
<5> significantly lower
<8> DK
<9> RF
===>

>edgc< Did the height allow for an easy transfer to or
from the wheelchair?
<1> yes
<5> no
<8> DK
<9> RF
===>

>edgd< Was the width of the raised surface:
<1> too wide
<3> too narrow, or
<5> just right
<8> DK
<9> RF
===>

>edg5< What was the approximate width of the ledge?[loc 22/1]
I need the appoximate width in feet and inches.
INTERVIEWER ENTER NUMBER OF FEET:
<0> less than 1 foot
<1-5> 1 to 5 feet
<6> 6 or more feet
<8> DK [goto edgf]
<9> RF [goto edgf]
===>

>edg6< INTERVIEWER ENTER NUMBER OF INCHES: [no erase]
<0> 0 inches
<1-11> 1 to 11 inches
<98> DK
<99> RF
===>

>edgf< Was the deck of the raised coping lower than the
rest of the deck?

<1> yes
<5> no
<8> DK
<9> RF
===>

>edgg< Did you need someone to help you while using the raised coping?
<1> yes
<5> no
<8> DK
<9> RF
===>

>edgh< How safe did you feel using the raised coping?
Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto edwa]
<4> not at all safe [goto edwa]
<8> DK
<9> RF
===>[goto edgi]

>edwa< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>edgi< Was the raised coping comfortable to use?
<1> yes
<5> no [goto edwb]
<8> DK
<9> RF
===>[goto edgj]

>edwb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>edgj< Was the raised coping easy to use?
<1> yes
<5> no
<8> DK
<9> RF
===>

>edgk< Did you have any problems using the raised coping?
<1> yes [goto edwd]
<5> no
<8> DK
<9> RF
===>[goto edgl]

>edwd< IF NECESSARY: What problems did you have? [allow 1][no erase]
===>[specify]

>edgl< On a scale from 1 to 5, where 1 is very dissatisfied
and 5 is very satisfied, what is your overall
satisfaction with the last raised coping [fill TYPE]
you used?
<1> very dissatisfied
<2-4>
<5> very satisfied
<8> DK
<9> RF
===>

>del< As part of our research, we may contact some facilities
that have a raised coping wall. Any information that
you could provide about the facilities would be greatly
appreciated. Your name would not be mentioned
when we contact any of these facilities.
<1> PROCEED
===>

>del1< Could you please give me the name of the facility you
used most recently with a raised coping [fill TYPE]?
<1> yes [goto de1a]
<5> no
<8> DK
===> [goto SCT6]

>de1a< INTERVIEWER: ENTER NAME OF FACILITY. [allow 20][no erase]
YOU HAVE 20 SPACES
_____
===>

>de1b< Could you please give me the address of this facility?
<1> yes [goto de1c]
<5> no
<8> DK
===> [goto SCT6]

>de1c< INTERVIEWER: ENTER ADDRESS OF FACILITY. [allow 20][no erase]
YOU HAVE 20 SPACES
_____
===>

>de1d< INTERVIEWER: ENTER CITY OF FACILITY. [allow 20][no erase]
YOU HAVE 20 SPACES
_____
===>

>de1e< INTERVIEWER: ENTER STATE OF FACILITY. [allow 20][loc 23/1][no erase] YOU HAVE 20 SPACES
===>

```
>de1f< INTERVIEWER: ENTER ZIP OF FACILITY.  [allow 5][no erase]
      YOU HAVE 5 SPACES
      ===>

>del2< Do you know of another facility with a raised coping
      [fill TYPE]?
      <1> yes [goto de2]
      <5> no
      <8> DK
      <9> RF
      ===>[goto SCT6]

>de2<  Could you please give me the name of this facility?
      <1> yes [goto de2a]
      <5> no
      <8> DK
      ===> [goto SCT6]

>de2a< INTERVIEWER: ENTER NAME OF FACILITY.  [allow 20][no erase]
      YOU HAVE 20 SPACES
        ____________
      ===>

>de2b< Could you please give me the address of this facility?
      <1> yes [goto de2c]
      <5> no
      <8> DK
      ===> [goto SCT6]

>de2c< INTERVIEWER: ENTER ADDRESS OF FACILITY.  [allow 20][no erase]
      YOU HAVE 20 SPACES
        ____________
      ===>

>de2d< INTERVIEWER: ENTER CITY OF FACILITY.  [allow 20][loc 24/1][no erase]YOU HAVE 20
SPACES
      ===>

>de2e< INTERVIEWER: ENTER STATE OF FACILITY.  [allow 20][no erase]
      YOU HAVE 20 SPACES
      ===>

>de2f< INTERVIEWER: ENTER ZIP OF FACILITY.  [allow 5][no erase]
      YOU HAVE 5 SPACES
      ===>

>SCT6< [store <0> in SWMC]
      [if ramp eq <1>][add <1> to SWMC][endif]
      [if lift eq <1>][add <1> to SWMC][endif]
      [if strs eq <1>][add <1> to SWMC][endif]
      [if zero eq <1>][add <1> to SWMC][endif]
      [if flor eq <1>][add <1> to SWMC][endif]
      [if step eq <1>][add <1> to SWMC][endif]
      [if edge eq <1>][add <1> to SWMC][endif]
      [if SWMC ge <2>][goto entr][endif]
```

>TWHL< [if whel ne <1>][goto TLAD][endif]

>whl1< The following questions ask about aquatic wheelchairs.
<1> PROCEED
===>

>aqua< Have you used an aquatic wheelchair at more than one facility?
<1> yes
<5> no
VOLUNTEERED
<7> R hasn't used an aquatic wheelchair [goto XAQU]
<8> DK
<9> RF
===>[goto aqmo]

>XAQU< [store <> in aqua][goto whel]

>aqmo< When was the last time you used an aquatic wheelchair?
I just need the month and year.
<1> January <7> July
<2> February <8> August
<3> March <9> September
<4> April <10> October
<5> May <11> November
<6> June <12> December
<98> DK
<99> RF
===>

>aqyr< INTERVIEWER ENTER YEAR:[no erase]
<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>aqub< Did you use the aquatic wheelchair with:
<1> a ramp
<2> a platform lift
<3> a zero-depth entry pool, or
<4> the deck only
<8> DK
<9> RF
===>

>aquc< Was the wheelchair frame:
<1> plastic, or
<5> metal
<8> DK
<9> RF
===>

>aqud< Was the seat:
<1> plastic
<2> metal
<3> cloth, or
<4> fiberglass
<8> DK
<9> RF
===>

>aque< Could you power the chair on you own?
<1> yes
<5> no
<8> DK
<9> RF
===>

>aquf< How safe did you feel using the aquatic wheelchair?
Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto aqwa]
<4> not at all safe [goto aqwa]
<8> DK
<9> RF
===>[goto aqug]

>aqwa< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>aqug< Was the aquatic wheelchair comfortable to use?
<1> yes
<5> no [goto aqwb]
<8> DK
<9> RF
===>[goto aquh]

>aqwb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>aquh< Was the aquatic wheelchair easy to use?
<1> yes
<5> no
<8> DK
<9> RF
===>

>aqui< Did you have any problems using the aquatic wheelchair?
<1> yes [goto aqwd]
<5> no
<8> DK
<9> RF
===>[goto aquj]

>aqwd< IF NECESSARY: What problems did you have? [allow 1][no erase]
===>[specify]

```
>aquj<  On a scale from 1 to 5, where 1 is very dissatisfied
        and 5 is very satisfied, what is your overall
        satisfaction with the last aquatic wheelchair
        you used?
        <1> very dissatisfied
        <2-4>
        <5> very satisfied
        <8> DK
        <9> RF
        ===>

>SCT7<  [store <0> in SWMC]
        [if ramp eq <1>][add <1> to SWMC][endif]
        [if lift eq <1>][add <1> to SWMC][endif]
        [if strs eq <1>][add <1> to SWMC][endif]
        [if zero eq <1>][add <1> to SWMC][endif]
        [if flor eq <1>][add <1> to SWMC][endif]
        [if step eq <1>][add <1> to SWMC][endif]
        [if edge eq <1>][add <1> to SWMC][endif]
        [if whel eq <1>][add <1> to SWMC][endif]
        [if SWMC ge <2>][goto entr][endif]

>TLAD<  [if ladr ne <1>][goto entr][endif]

>lad1<  The following questions ask about [fill TYPE] ladders.
        <1> PROCEED
        ===>

>ldra<  Have you used a ladder at more than one facility?
        <1> yes
        <5> no
        VOLUNTEERED
        <7> R hasn't used a ladder [goto XLDR]
        <8> DK
        <9> RF
        ===>[goto ldmo]

>XLDR<  [store <> in ldra][goto ladr]

>ldmo<  When was the last time you used a ladder to enter
        or exit a [fill TYPE]?  I just need the month and year.
        <1> January       <7> July
        <2> February      <8> August
        <3> March         <9> September
        <4> April        <10> October
        <5> May          <11> November
        <6> June         <12> December
        <98> DK
        <99> RF
        ===>
```

>ldyr< INTERVIEWER ENTER YEAR:[no erase]

<84> 84 or earlier
<85-96> 85 - 96
<98> DK
<99> RF
===>

>ldrb< Was the ladder able to be moved if necessary?
<1> yes [goto sp5]
<5> no
<8> DK
<9> RF
===>[goto ldrc]

>sp5< The last time you used it, did you have to request it to be set up?
<1> yes [goto lng5]
<5> no
<8> DK
<9> RF
===>[goto ldrc]

>lng5< How long did you have to wait for it to be set up?
INTERVIEWER: CODE # OF HOURS
<0> less than 1 hour
<1-5> 1 to 5 hours
<6> 6 or more hours
<8> DK
<9> RF
===>

>lg5a< INTERVIEWER: CODE # OF MINUTES [no erase]
<0> zero minutes
<1-60> 1 to 60 minutes
<98> DK
<99> RF
===>

>ldrc< Did the ladder have a handrail on both sides? [loc 25/1]
<1> yes
<5> no
<8> DK
<9> RF
===>

>ldrd< Did you need someone to help you while using the ladder to enter or exit the [fill TYPE]?
<1> yes
<5> no
<8> DK
<9> RF
===>

>ldre< How safe did you feel using the ladder? Would you say:
<1> very safe
<2> somewhat safe
<3> not too safe, or [goto ldwa]
<4> not at all safe [goto ldwa]
<8> DK
<9> RF
===>[goto ldrf]

>ldwa< In what ways did you not feel safe?[allow 1][no erase]
===>[specify]

>ldrf< Was the ladder comfortable to use?
<1> yes
<5> no [goto ldwb]
<8> DK
<9> RF
===>[goto ldrg]

>ldwb< In what ways did you not feel comfortable? [allow 1][no erase]
===> [specify]

>ldrg< Was the ladder easy to use?
<1> yes
<5> no
<8> DK
<9> RF
===>

>ldrh< Did you have any problems using the ladder?
<1> yes [goto idwd]
<5> no
<8> DK
<9> RF
===>[goto ldri]

>ldwd< IF NECESSARY: What problems did you have? [allow 1][no erase]
===>[specify]

>ldri< On a scale from 1 to 5, where 1 is very dissatisfied
and 5 is very satisfied, what is your overall
satisfaction with the last ladder you used?
<1> very dissatisfied
<2-4>
<5> very satisfied
<8> DK
<9> RF
===>

>entr< Next, I'm going to ask about the methods for entering
and exiting a pool that you would [bold]prefer[n] to use.
<1> PROCEED
===>

>ent1< Which of the following methods would be your [bold]first[n]
preference to use for entering and exiting a pool:

<1> a lift
<2> a ramp
<3> a movable floor or section
<4> a ladder
<5> transfer steps
<6> stairs
<7> an aquatic wheelchair
<8> zero-depth entry, or
<9> raised coping

VOLUNTEERED
<0> other (specify) [specify]
<97> no preference [goto pupl]
<98> DK
<99> RF
===>

>ent2< IF NECESSARY: Which method would be your [bold]second[n]
preference to use for entering and exiting a pool?
(R'S 1ST CHOICE WAS [bold][fill ent1][n])
<1> a lift
<2> a ramp
<3> a movable floor or section
<4> a ladder
<5> transfer steps
<6> stairs
<7> an aquatic wheelchair
<8> zero-depth entry, or
<9> raised coping
VOLUNTEERED
<0> other (specify) [specify]
<97> no second preference [goto pupl]
<98> DK
<99> RF
===>

>ent3< IF NECESSARY: Which method would be your [bold]third[n]
preference to use for entering and exiting a pool?
(R'S OTHER CHOICES WERE [bold][fill ent1], [fill ent2][n])
<1> a lift
<2> a ramp
<3> a movable floor or section
<4> a ladder
<5> transfer steps
<6> stairs
<7> an aquatic wheelchair
<8> zero-depth entry, or
<9> raised coping
VOLUNTEERED
<0> other (specify) [specify]
<97> no third preference [goto pupl]
<98> DK
<99> RF

>pupl< In your opinion, should a public pool be [bold]required[n] to have one method, more than one method, or no method for people with disabilities to enter and exit the water?

<1> one method [goto pupx]
<3> more than one method [goto pup1]
<5> no methods should be required
<8> DK
<9> RF
===>[goto pupz]

>pup1< Which of the following methods do you think a pool should be required to have:

<1> a lift
<2> a ramp
<3> a movable floor or section
<4> a ladder
<5> transfer steps
<6> stairs
<7> an aquatic wheelchair
<8> zero-depth entry, or
<9> raised coping
VOLUNTEERED
<0> other (specify) [specify]
<97> no preference [goto pupz]
<98> DK
<99> RF
===>

>pup2< IF NECESSARY: What method would be your [bold]second[n] preference for a pool to be required to have?
(R'S 1ST CHOICE WAS [bold][fill pup1][n])

<1> a lift
<2> a ramp
<3> a movable floor or section
<4> a ladder
<5> transfer steps
<6> stairs
<7> an aquatic wheelchair
<8> zero-depth entry, or
<9> raised coping

VOLUNTEERED
<0> other (specify) [specify]
<97> no second preference [goto pupz]
<98> DK
<99> RF
===>

>pup3< IF NECESSARY: Which method would be your [bold]third[n]
preference for a pool to be required to have?
(R'S OTHER CHOICES WERE [bold][fill pup1], [fill pup2][n])
<1> a lift
<2> a ramp
<3> a movable floor or section
<4> a ladder
<5> transfer steps
<6> stairs
<7> an aquatic wheelchair
<8> zero-depth entry, or
<9> raised coping
VOLUNTEERED
<0> other (specify) [specify]
<97> no third preference
<98> DK
<99> RF
===>[goto pupz]

>pupx< If only one method should be required to access
a public pool, which method should be required?
Would you say:
<1> a lift
<2> a ramp
<3> a movable floor or section
<4> a ladder
<5> transfer steps
<6> stairs
<7> an aquatic wheelchair
<8> zero-depth entry, or
<9> raised coping
VOLUNTEERED
<0> other (specify) [specify]
<97> no preference
<98> DK
<99> RF
===>

>pupz< Should the decision of the number and types of
pool access methods be left up to the pool
designer?
<1> yes
<5> no
<8> DK
<9> RF
===>

>sc13< Next, we are going to ask you how important each of the
following items are when using devices or designs that
assist people with disabilities to enter and exit
a pool. If you don't have an opinion or are
unsure how important an item is, please let me know.
<1> PROCEED
===>

>s13b< On a scale from 1 to 5, where 1 is not important and 5 is very important, how important is it that you understand the pool design or device?
<1> not important
<2-4>
<5> very important

<8> DK - DON'T PROBE
<9> RF
===>

>s13c< On a scale from 1 to 5, where 1 is not important and 5 is very important, how important is it to you that the pool design or device makes it easy to enter and exit the water?
<1> not important
<2-4>
<5> very important
<8> DK - DON'T PROBE
<9> RF
===>

>s13a< Using the same scale, how important is it to you to be able to use the device or design without help? (On a scale from 1 to 5, where 1 is not important and 5 is very important.)
<1> not important
<2-4>
<5> very important
<8> DK - DON'T PROBE
<9> RF
===>

>s13d< How important is it to you for the device or design to be available without asking? (On a scale from 1 to 5, where 1 is not important and 5 is very important.)
<1> not important
<2-4>
<5> very important
<8> DK - DON'T PROBE
<9> RF
===>

>s13e< How important is the look of the device or design? (On a scale from 1 to 5, where 1 is not important and 5 is very important.)
<1> not important
<2-4>
<5> very important
<8> DK - DON'T PROBE
<9> RF
===>

>s13f< How important is the safety of the device or design?
(On a scale from 1 to 5, where 1 is not important and
5 is very important.)
<1> not important
<2-4>
<5> very important
<8> DK - DON'T PROBE
<9> RF
===>

>s13g< How important is the comfort of the device or design?
(On a scale from 1 to 5, where 1 is not important and
5 is very important.)
<1> not important
<2-4>
<5> very important
<8> DK - DON'T PROBE
<9> RF
===>

>s13i< How important is it to you for the pool staff to be
present when using the device or design? (On a scale
from 1 to 5, where 1 is not important and 5 is very
important).
<1> not important
<2-4>
<5> very important
<8> DK - DON'T PROBE
<9> RF
===>

>s13o< Would you suggest any other special considerations for
a pool design or device to make it easy to enter and
exit the water?
<1> yes, specify [specify]
<5> no
<8> DK - DON'T PROBE
<9> RF
===>

>gend< INTERVIEWER: RECORD RESPONDENT'S GENDER.
(IF NEEDED: I am required to ask, are you:)
<1> male, or
<5> female
===>[goto de02]

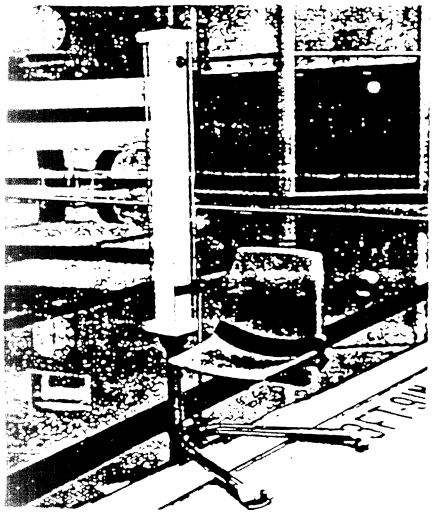
>age< [allow 1]Age (recoded de02)
<1> 18-29
<2> 30-44
<3> 45-64
<4> 65 or older
<8> DK
<9> RF
===>

```
>de02<  Finally, in what year were you born?
      <1890-1978>
      <9998> DK
      <9999> RF
      ===>

>age1<  [if de02 le <1978>]
        [if de02 ge <1967>]
          [store <1> in age]
        [endif]
      [endif]
      [if de02 le <1966>]
        [if de02 ge <1952>]
          [store <2> in age]
        [endif]
      [endif]
      [if de02 le <1951>]
        [if de02 ge <1932>]
          [store <3> in age]
        [endif]
      [endif]
      [if de02 le <1931>]
          [store <4> in age]
      [endif]
      [if de02 eq <9998>]
        [store <8> in age]
      [endif]
      [if de02 eq <9999>]
        [store <9> in age]
      [endif]

>spr<   Dr. Ed Hamilton is the Project Director for this study.
      Would you like contact information for Dr. Hamilton
      in case you have any questions about this project?
      <1> yes [goto spri]
      <5> no
      <8> DK
      <9> RF
      ===>[goto ENDQ]


>ENDQ<
```

Designs & Devices for Swimming Pool Access Flier

National Center on Accessibility
Designs & Devices for Swimming Pool Access

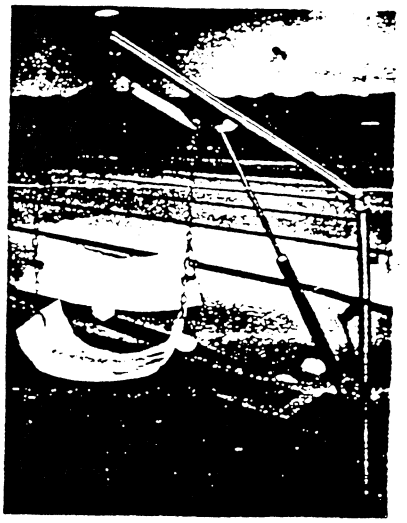
There have been many approaches taken to assist people in entering and exiting pools. Some are very common, others are not often seen. Some designs and devices are known by several different names. The information below is intended to familiarize you with the designs and devices and the terms by which we have chosen to refer to them. Please take a few minutes to review the various approaches and have this handy if your are interviewed.



Hydraulic Lift
(Spectrum's Swim-Lift II)

Lifts

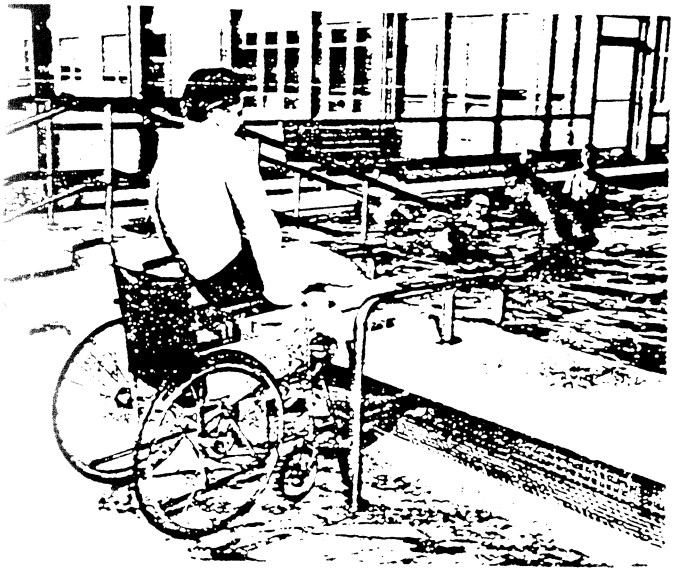
Pool lifts are mechanical devices that move a person into or out of the water. Some lifts are permanently installed others are portable, placed in a deck mounting or rolled into place when needed. Lifts may require a transfer from a wheelchair to the lift seat or may have a sling seat that moves the person directly from a wheelchair to the water. Some lifts are power operated and others are operated manually; some can be operated independently by the user, while others require assistance.



Manual Lift
(Spectrum's Econo Lift)

Movable Pool Floors

Movable pool floors allow the entire pool floor or just a section of the floor to be raised or lowered to any depth or to a desired slope. Hydraulic pistons are used to slowly move the floor. When the floor is raised to deck level, participants can either walk or roll their wheelchairs on to the pool floor and be lowered to the desired water depth.



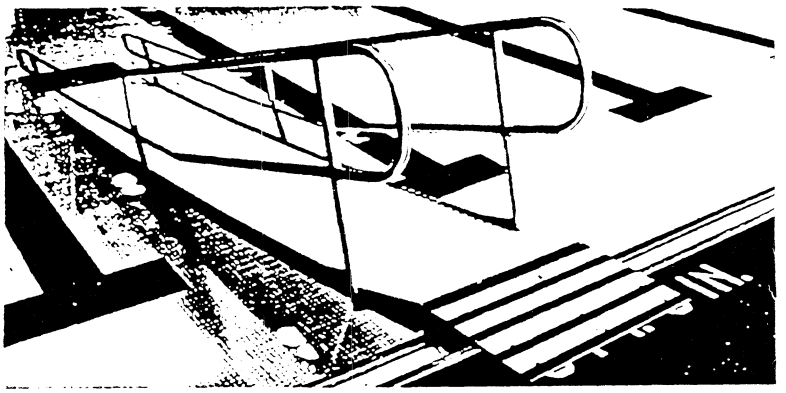
Raised Pool Coping

Raised Coping & Dry Ramp

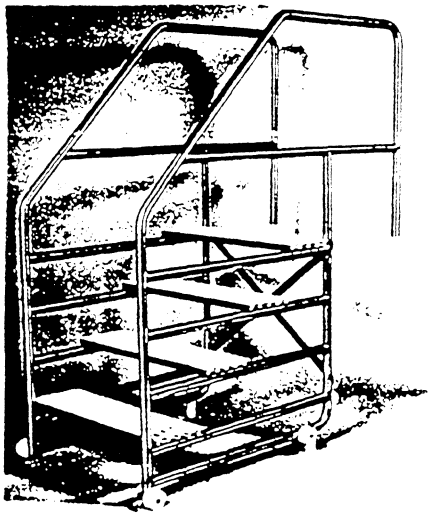
Two similar pool designs have been used to create a transfer surface at the pool's edge: the raised pool coping and the dry ramp. With the raised coping design, the edge of the pool is raised above the level of the deck, forming a small wall around the outside of the pool. The level of the pool water is actually above the deck of the pool. With the dry ramp, a descending ramp is built into the pool deck along the outside of the pool. This lowers the pool deck to a level transfer point at wheelchair height. Both the raised coping and the dry ramp are designed to form a transfer point above the pool deck and even with the water level.

Ramps

Pool ramps typically begin at the pool's deck level and provide an even sloped surface into the water. They may be constructed as part of the pool or may be portable or removable equipment. Ramps may be located either in the primary pool area or in a swimout area that leads into the primary pool area.



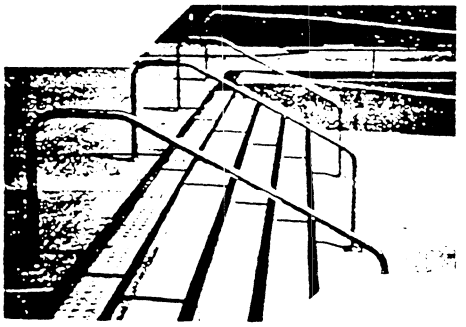
Portable Ramp *(Spectrum's Therapy Ramp)*



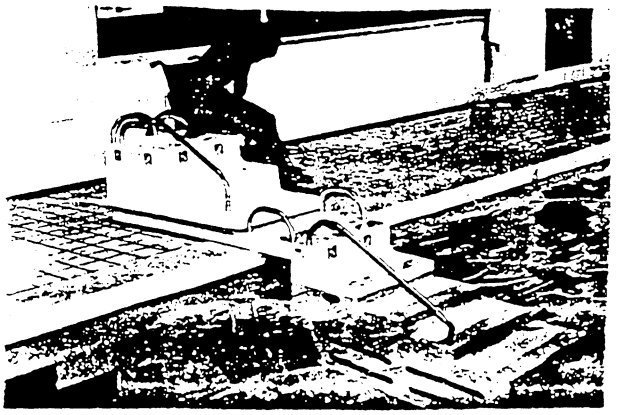
Portable Stairs
(Spectrum's Therapy Steps)

Stairs

Unlike ladders, stairs provide gradual steps into the pool. They may be a permanent part of the pool, built into the pool tank or into the wall of the pool, or be removable and portable. Stairs may be narrow or wide.



Built-in stairs



Transfer Steps (*Triad's Transfer Tiers)*

Transfer Steps

Transfer steps continue the pool stairs to a transfer surface on the pool deck. The transfer surface will be seat height, allowing someone to transfer from a wheelchair and move to and from the water, one step at a time. They can be either permanent or movable.

Zero Depth Entry

Zero depth entry pools provide an end of the pool where the pool bottom begins at the deck level and gradually slopes to a deeper level. This creates an entry similar to that of a beach.

Appendix D

Designs & Devices for Swimming
Pool Access Flier

Aquatic Professionals
Telephone Survey

Facility Follow-Up Questionnaire

Designs & Devices for Swimming
Pool Access Flier

National Center on Accessibility
Designs & Devices for Swimming Pool Access

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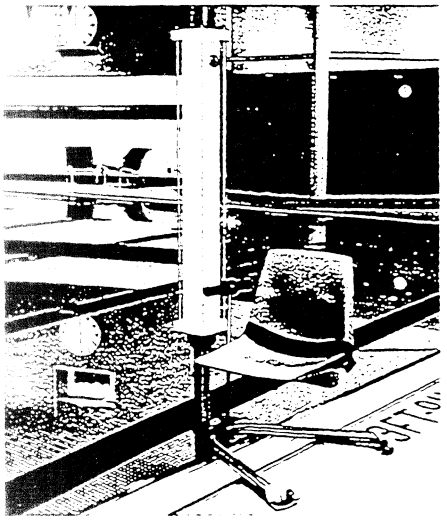

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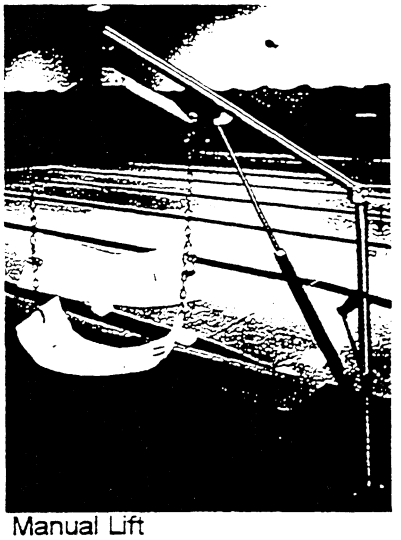

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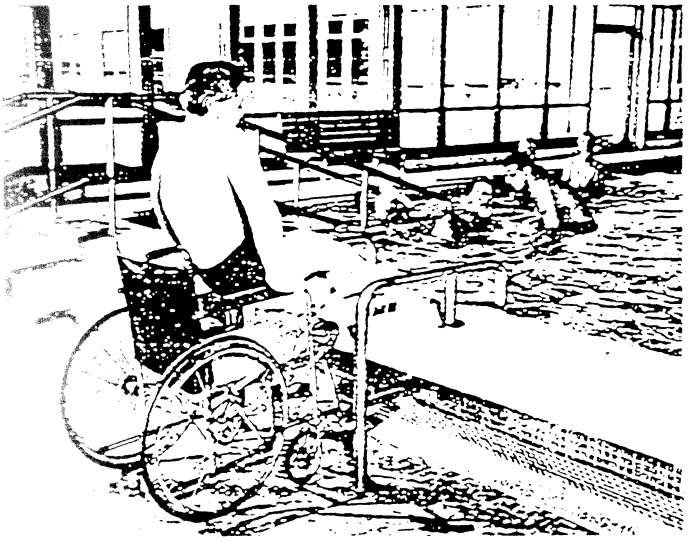

Transfer Wall

Transfer Wall & Dry Ramp

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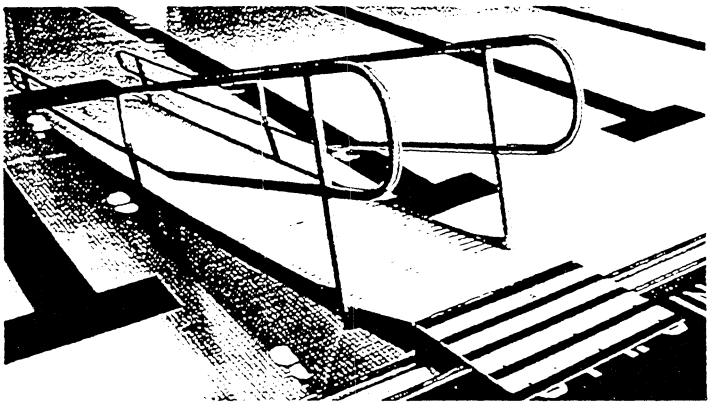

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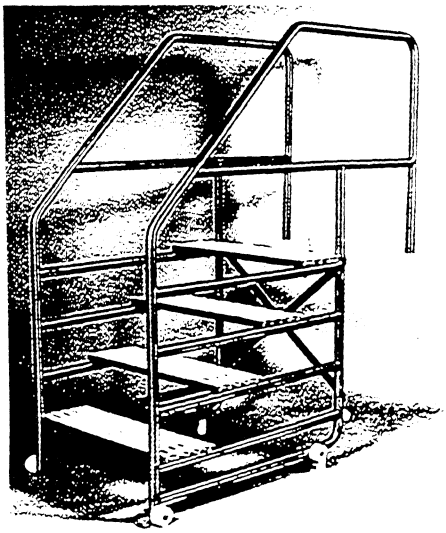

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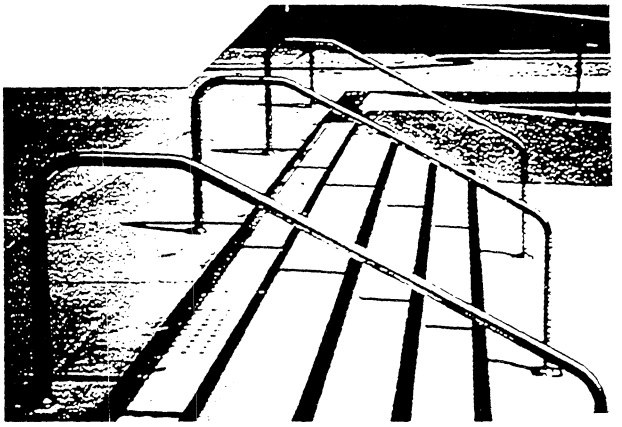

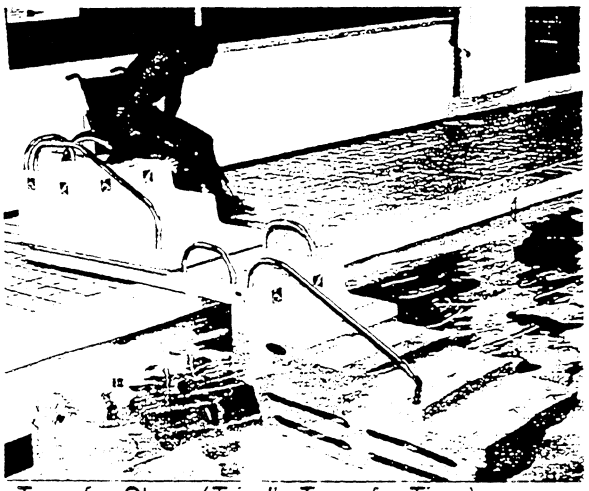

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Aquatic Professionals
Telephone Survey

National Center on Accessibility
Swimming Pool Accessibility Project

Aquatic Professionals Telephone Survey

>Q1< First, I have a few questions about the place [loc 2/7] where you work. Which of the following best describes your agency? Is it:
<1> a hotel or motel
<2> a recreation department
<3> a YMCA or YWCA, or
<4> a hospital or clinic
VOLUNTEERED
<7> other (specify) [specify]
<8> DK
<9> RF
===>

>oprt< How many pools are operated by your agency?
<0> none
<1> 1 pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF

This includes [bold]all[n] types of pools and spas

>MTH2< [if oprt eq <1>][store <Does the pool> in DOES][else]
[store <Do any of your agency's pools> in DOES][endif]

>mult< A multipurpose pool is a pool which can be used for several reasons, such as recreation, instruction, therapy and exercise. How many [bold]multipurpose pools[n] are operated by your agency?
<0> none
<1> 1 multipurpose pool
<2-95> 2 to 95 multipurpose pools
<96> 96 or more multipurpose pools
<98> DK
<99> RF

>spa< How many [bold]spas[n] are operated by your agency?
<0> none
<1> 1 spa
<2-95> 2 to 95 spas
<96> 96 or more spas
<98> DK
<99> RF

A spa is a hot water pool with hydrojet action, such as a whirlpool.

>ther< How many [bold]therapy pools[n] are operated by your agency?

<0> none
<1> 1 therapy pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF

A therapy pool is used in prescribed treatment.

===>

>lap< Not including multipurpose pools, how many [bold]lap pools[n] are operated by your agency?

<0> none
<1> 1 lap pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF

A lap pool has a small number of lanes and is used only for swimming laps.

===>

>cmpt< How many [bold]competition pools[n], used primarily for athletic practice and events, are operated by your agency

<0> none
<1> 1 competition pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF
===>

>watr< How many [bold]water parks[n] are operated by your agency?

<0> none
<1> 1 water park
<2-95> 2 to 95 parks
<96> 96 or more parks
<98> DK
<99> RF

A water park has water slides and water play areas.

===>

>othr< Other than the pools you have already mentioned, does
your agency operate any [bold]other[n] types of pools?
<1> yes [goto oth1]
<5> no
<8> DK
<9> RF
===>

>OTHT< [store <0> in oth2][goto TOTT][endif]

>oth1< IF NECESARRY: What other types of pools does your agency [allow 1][no erase]operate?
===> [specify]

>oth2< In total, how many of these other types of pools
does your agency operate?
<1> other pool
<2-95> 2 to 95 other pools
<96> 96 or more other pools
<98> DK
<99> RF

>CHEK< [allow 3]

>TOTT< [store <0> in CHEK]
[if oprt ge <98>][goto MTH4][endif]
[if mult ge <98>][goto MTH4][endif]
[if spa ge <98>][goto MTH4][endif]
[if ther ge <98>][goto MTH4][endif]
[if lap ge <98>][goto MTH4][endif]
[if cmpt ge <98>][goto MTH4][endif]
[if watr ge <98>][goto MTH4][endif]
[if oth2 ge <98>][goto MTH4][endif]
[add mult to CHEK]
[add spa to CHEK]
[add ther to CHEK]
[add lap to CHEK]
[add cmpt to CHEK]
[add watr to CHEK]
[add oth2 to CHEK]

>TOT2< [if CHEK eq oprt][goto MTH4][endif]

>ask1< You said your agency operates:
[fill mult] multiple-purpose pool(s)
[fill spa] spa(s)
[fill cmpt] competition pool(s)
[fill ther] therapy pool(s)
[fill lap] lap pool(s)
[fill watr] water park(s)
[fill oth2] other type(s) of pools
However, you said your agency operates [bold][fill oprt][n]pools.
Please count each pool in only one catagory. If a pool has more than one function, please count it as a multipurpose pool.

<1> change total number of pools <5> change therapy pools
<2> change multi-purpose <6> change lap pools
<3> change spa <7> change water parks
<4> change competition pools <8> change other type of pools
<9> LAST RESORT - go on
===>

>ASKT< [if ask1 eq <1>][store <> in ask1][goto oprt][endif]
[if ask1 eq <2>][store <> in ask1][goto mult][endif]
[if ask1 eq <3>][store <> in ask1][goto spa][endif]
[if ask1 eq <4>][store <> in ask1][goto cmpt][endif]
[if ask1 eq <5>][store <> in ask1][goto ther][endif]
[if ask1 eq <6>][store <> in ask1][goto lap][endif]
[if ask1 eq <7>][store <> in ask1][goto watr][endif]
[if ask1 eq <8>][store <> in ask1][goto oth2][endif]

>MTH4< [if oprt eq <1>][store <Does your agency's pool> in DOE2][else]
[store <Do each of your agency's pools> in DOE2][endif]

>MTH5< [if oprt eq <1>][store <Does your agency's pool> in DOE3][else]
[store <Do any of your agency's pools> in DOE3][endif]

>d1< [fill DOE2] have at least one
way for people with disabilities to enter or exit
the water?
<1> yes
<5> no
<8> DK
<9> RF
===>

>d2< [fill DOE3] have [bold]more[n] than one
way for people with disabilities to enter or exit
the water?
<1> yes
<5> no
<8> DK
<9> RF
===>

>TST2< [if oprt ge <2>][goto lift][endif]

>one1< Is your agency's pool indoors or outdoors?
INTERVIEWER: IF THE POOL IS PARTIALLY COVERED AND
IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE
AND CODE THE POOL AS BEING OUTDOORS.
<1> indoors, or
<5> outdoors
<8> DK
<9> RF
===>

>lift< [fill DOES] have a pool lift?
<1> yes [goto lO1]
<5> no
<8> DK
<9> RF
===> [goto ramp]

>lO1< [if oprt eq <1>][goto ramp][endif]

>lfts< How many of the pools have pool lifts?
<1> 1 pool [goto lft1]
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK [goto ramp]
<99> RF [goto ramp]
===>

>olft< How many of the pools with pool lifts are outdoors?
INTERVIEWER: IF ANY OF THE POOLS ARE PARTIALLY COVERED AND CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE AND COUNT THE POOL AS BEING OUTDOORS.
<0> none [goto TOLF]
<1> 1 pool [goto TOLF]
<2-95> 2 to 95 pools [goto TOLF]
<96> 96 or more pools
<98> DK
<99> RF
===> [goto ilft]

>lft1< Is the pool with the pool lift outdoors?
INTERVIEWER: IF THE POOL IS PARTIALLY COVERED AND IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE AND CODE THE POOL AS BEING OUTDOORS.
<1> yes
<5> no
<8> DK [goto ramp]
<9> RF [goto ramp]
===>

>TLFT< [if lft1 eq <1>][store <1> in olft][endif]
[if lft1 eq <5>][store <0> in olft][endif]

>TOLF< [store <0> in ilft]
[add lfts to ilft]
[subtract olft from ilft]
[goto ramp]

>ilft< How many of the pools with pool lifts are indoors?
<0> none
<1> 1 pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF

>ramp< [fill DOES] have a ramp into
the pool tank?
<1> yes [goto IO2]
<5> no
<8> DK
<9> RF
===> [goto strs]

>IO2< [if oprt eq <1>][goto strs][endif]

>trmp< How many pools have ramps?
<1> 1 pool [goto rmp1]
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK [goto strs]
<99> RF [goto strs]
===>

>ormp< How many of the pools with ramps are outdoors?
INTERVIEWER: IF ANY OF THE POOLS ARE PARTIALLY
COVERED AND CONSIDERED BOTH INDOORS AND OUTDOORS,
TAKE A NOTE AND COUNT THE POOL AS BEING OUTDOORS.
<0> none [goto TOMP]
<1> 1 pool [goto TOMP]
<2-95> 2 to 95 pools [goto TOMP]
<96> 96 or more pools
<98> DK
<99> RF
===> [goto irmp]

>rmp1< Is the pool with the ramp outdoors?
INTERVIEWER: IF THE POOL IS PARTIALLY COVERED AND
IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE
AND CODE THE POOL AS BEING OUTDOORS.
<1> yes
<5> no
<8> DK [goto strs]
<9> RF [goto strs]
===>

>TRMP< [if rmp1 eq <1>][store <1> in ormp][endif]
[if rmp1 eq <5>][store <0> in ormp][endif]

>TOMP< [store <0> in irmp]
[add trmp to irmp]
[subtract ormp from irmp]
[goto strs]

>irmp< How many of the pools with ramps are indoors?
<0> none
<1> 1 pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF
===>

>strs< [fill DOES] have stairs?
<1> yes [goto IO3]
<5> no
<8> DK
<9> RF
===> [goto tsps]

>IO3< [if oprt eq <1>][goto tsps][endif]

>tstr< How many pools have stairs?
<1> 1 pool [goto str1]
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK [goto tsps]
<99> RF [goto tsps]
===>

>ostr< How many of the pools with stairs are outdoors?
INTERVIEWER: IF ANY OF THE POOLS ARE PARTIALLY COVERED AND CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE AND COUNT THE POOL AS BEING OUTDOORS.
<0> none [goto TOST]
<1> 1 pool [goto TOST]
<2-95> 2 to 95 pools [goto TOST]
<96> 96 or more pools
<98> DK
<99> RF
===> [goto istr]

>str1< Is the pool with the stairs outdoors?
INTERVIEWER: IF THE POOL IS PARTIALLY COVERED AND IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE AND CODE THE POOL AS BEING OUTDOORS.
<1> yes
<5> no
<8> DK [goto tsps]
<9> RF [goto tsps]
===>

>TSTR< [if str1 eq <1>][store <1> in ostr][endif]
[if str1 eq <5>][store <0> in ostr][endif]

>TOST< [store <0> in istr]
[add tstr to istr]
[subtract ostr from istr]
[goto tsps]

>istr< How many of the pools with stairs are indoors?
<0> none
<1> 1 pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF
===>

>tsps< [fill DOES] have transfer steps?
<1> yes [goto IO4]
<5> no
<8> DK
<9> RF
===> [goto cop]

>IO4< [if oprt eq <1>][goto cop][endif]

>ttsp< How many pools have transfer steps?
<1> 1 pool [goto tsp1]
<2-95> 2 to 95 pools
<96> 96 or more pools
98> DK [goto cop]
<99> RF [goto cop]
===>

>otsp< How many of the pools with transfer steps are outdoors?
INTERVIEWER: IF ANY OF THE POOLS ARE PARTIALLY COVERED AND CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE AND COUNT THE POOL AS BEING OUTDOORS.
<0> none [goto TOTS]
<1> 1 pool [goto TOTS]
<2-95> 2 to 95 pools [goto TOTS]
<96> 96 or more pools
<98> DK
<99> RF
===> [goto itsp]

>tsp1< Is the pool with the transfer steps outdoors?
INTERVIEWER: IF THE POOL IS PARTIALLY COVERED AND IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE AND CODE THE POOL AS BEING OUTDOORS.
<1> yes
<5> no
<8> DK [goto strs]
<9> RF [goto strs]
===>

>TTSP< [if tsp1 eq <1>][store <1> in otsp][endif]
[if tsp1 eq <5>][store <0> in otsp][endif]

>TOTS< [store <0> in itsp]
[add ttsp to itsp]
[subtract otsp from itsp]
[goto cop]

>itsp< How many of the pools with transfer steps are indoors?
<0> none
<1> 1 pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF

```
>cop<   [fill DOES] have transfer walls or
      dry ramps
      <1> yes [goto IO5]
      <5> no
      <8> DK
      <9> RF
      ===> [goto flor]

>IO5<   [if oprt eq <1>][goto flor][endif]

>tcop<  How many pools have transfer walls or dry ramps?
      <1> 1 pool [goto cp1]
      <2-95> 2 to 95 pools
      <96> 96 or more pools
      <98> DK [goto flor]
      <99> RF [goto flor]
      ===>

>ocop<  How many of the pools with transfer walls or dry
      ramps are outdoors?
      INTERVIEWER:  IF ANY OF THE POOLS ARE PARTIALLY
      COVERED AND CONSIDERED BOTH INDOORS AND OUTDOORS,
      TAKE A NOTE AND COUNT THE POOL AS BEING OUTDOORS.
      <0> none [goto TOCP]
      <1> 1 pool [goto TOCP]
      <2-95> 2 to 95 pools [goto TOCP]
      <96> 96 or more pools
      <98> DK
      <99> RF
      ===> [goto icop]

>cp1<   Is the pool with the transfer walls or dry
      ramps outdoors?
      INTERVIEWER:  IF THE POOL IS PARTIALLY COVERED AND
      IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE
      AND CODE THE POOL AS BEING OUTDOORS.
      <1> yes
      <5> no
      <8> DK [goto icop]
      <9> RF [goto icop]
      ===>

>TCOP<  [if cp1 eq <1>][store <1> in ocop][endif]
      [if cp1 eq <5>][store <0> in ocop][endif]

>TOCP<  [store <0> in icop]
      [add tcop to icop]
      [subtract ocop from icop]
      [goto flor]
```

>icop< How many of the pools with transfer walls or dry
ramps are indoors?
<0> none
<1> 1 pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF
===>

>flor< [fill DOES] have a movable floor?
<1> yes [goto IO6]
<5> no
<8> DK
<9> RF
===> [goto zrod]

>IO6< [if oprt eq <1>][goto zrod][endif]

>tflr< How many pools have movable floors?
<1> 1 pool [goto flr1]
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK [goto zrod]
<99> RF [goto zrod]
===>

>oflr< How many of the pools with movable floors
are outdoors?
INTERVIEWER: IF ANY OF THE POOLS ARE PARTIALLY
COVERED AND CONSIDERED BOTH INDOORS AND OUTDOORS,
TAKE A NOTE AND COUNT THE POOL AS BEING OUTDOORS.
<0> none [goto TOFL]
<1> 1 pool [goto TOFL]
<2-95> 2 to 95 pools [goto TOFL]
<96> 96 or more pools
<98> DK
<99> RF
===> [goto iflr]

>flr1< Is the pool with the movable floor outdoors?
INTERVIEWER: IF THE POOL IS PARTIALLY COVERED AND
IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE
AND CODE THE POOL AS BEING OUTDOORS.
<1> yes
<5> no
<8> DK [goto zrod]
<9> RF [goto zrod]
===>

>TFLR< [if flr1 eq <1>][store <1> in oflr][endif]
[if flr1 eq <5>][store <0> in oflr][endif]

>TOFL< [store <0> in iflr]
[add tflr to iflr]
[subtract oflr from iflr]
[goto zrod]

>iflr< How many of the pools with movable floors
are indoors?
<0> none
<1> 1 pool
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK
<99> RF
===>

>zrod< [fill DOES] have zero depth entry?
<1> yes [goto IO7]
<5> no
<8> DK
<9> RF
===> [goto MTH6]

>IO7< [if oprt eq <1>][goto MTH6][endif]

>tzrd< How many pools have zero depth entry?
<1> 1 pool [goto zro1]
<2-95> 2 to 95 pools
<96> 96 or more pools
<98> DK [goto MTH6]
<99> RF [goto MTH6]
===>

>ozro< How many of the pools with zero depth entry are
outdoors?
INTERVIEWER: IF ANY OF THE POOLS ARE PARTIALLY
COVERED AND CONSIDERED BOTH INDOORS AND OUTDOORS,
TAKE A NOTE AND COUNT THE POOL AS BEING OUTDOORS.
<0> none [goto TOZR]
<1> 1 pool [goto TOZR]
<2-95> 2 to 95 pools [goto TOZR]
<96> 96 or more pools
<98> DK
<99> RF
===> [goto izro]

>zro1< Is the pool with the zero depth entry outdoors?
INTERVIEWER: IF THE POOL IS PARTIALLY COVERED AND
IS CONSIDERED BOTH INDOORS AND OUTDOORS, TAKE A NOTE
AND CODE THE POOL AS BEING OUTDOORS.
<1> yes
<5> no
<8> DK [goto MTH6]
<9> RF [goto MTH6]
===>

```
>TZRO<  [if zro1 eq <1>][store <1> in ozro][endif]
     [if zro1 eq <5>][store <0> in ozro][endif]

>TOZR<  [store <0> in izro]
     [add tzrd to izro]
     [subtract ozro from izro]
     [goto MTH6]

>izro<  How many of the pools with zero depth entry are
     indoors?
     <0> none
     <1> 1 pool
     <2-95> 2 to 95 pools
     <96> 96 or more pools
     <98> DK
     <99> RF
     ===>

>MTH6<  [if oprt eq <1>][store <pool> in NUMB][else]
      [store <pools> in NUMB][endif]

>numu<  Does your agency collect information on the number
     of people who use your agency's [fill NUMB]?
     <1> yes [goto puse]
     <5> no
     <8> DK
     <9> RF
     ===> [goto numd]

>puse<  In 1995, approximately how many people used your
     agency's [fill NUMB]?
     <0> none
     <1-999995> people
     <999996> 999996 or more people
     <d> DK
     <r> RF
     ===>

>PTST<  [if puse eq <d>][store <999997> in puse][goto numd][endif]
     [if puse eq <r>][store <999998> in puse][goto numd][endif]

>pust<  INTERVIEWER: YOU ENTERED [fill puse] PEOPLE,
     CORRECT?
     <1> yes, proceed [goto numd]
     <5> no, renter #
     ===>

>PSTT<  [store <> in pust][goto puse]

>numd<  Does your agency collect information on the number
     of people with disabilities who use your agency's
     [fill NUMB]?
     <1> yes [goto duse]
     <5> no
     <8> DK
     <9> RF
```

>duse< In 1995, approximately how many people with
disabilities used your agency's [fill NUMB]?
<0> none
<1-999995> people
<999996> 999996 or more people
<d> DK
<r> RF
===>

>PTS2< [if duse eq <d>][store <999997> in duse][goto stas][endif]
[if duse eq <r>][store <999998> in duse][goto stas][endif]

>dust< INTERVIEWER: YOU ENTERED [fill duse] PEOPLE,
CORRECT?
<1> yes, proceed [goto stas]
<5> no, renter #
===

>DSTT< [store <> in dust][goto duse]

>stas< Are facility staff allowed to assist individuals who
have disabilities into the pool?
<1> yes [goto sta1]
<5> no [goto exp1]
<8> DK
<9> RF
===> [goto sec1]

>sta1< What type of assistance does the staff provide? [allow 1][no erase]
===> [specify][goto sec1]

>exp1< Why are facility staff [bold]not[n] allowed to assist [allow
1][no erase]individuals with disabilities into the pool?
===> [specify]

>sec1< Next, we are going to ask you how important each
of the following items are when purchasing assistive
pool entry and exiting equipment.
<1> PROCEED
===>

>inst< On a scale from 1 to 5, where 1 is not important
and 5 is very important, how important is it that the
equipment be easy to install?
<1> not important
<2-4>
<5> very important
<8> DK
<9> RF
===>

>equ1< Using the same 1 to 5 scale, where 1 is not important and 5 is very important, how important is it for the user to be comfortable?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF
===>

>equ2< How important is it that the equipment can be used without assistance from pool staff?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>equ3< How important is it that the equipment you are purchasing require staff to operate?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>equ4< How important is it that the equipment be attractive in appearance?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>equ5< How important is it for the user to be able to enter and exit the water easily?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>equ6< How important is the cost of the equipment?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>equ7< How important is the equipment's safety?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>equ8< How important is the equipment's durability?

<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>equ9< How important is it for the equipment to be
low-maintenance?
<1> not important
<2-4>
<5> very important
<8> DK
<9> RF

Please tell me using a scale from 1 to 5, where 1 is not important and 5 is very important.

===>

>TLF1< [if lift ge <5>][goto TRM1][endif]

>TLF2< [if lfts ge <2>][goto sc2b][endif]

>sc2a< This section asks about the swimming pool lift
your pool offers.
<1> PROCEED
===> [goto lfta]

>sc2b< This section asks about swimming pool lifts. You [equiv sc2a]
have indicated that your agency operates more than
one pool that has a lift. Please think about the
lift you are most familiar with while answering the
following questions.
<1> PROCEED
===>

>lfta< Is the lift powered:
<1> hydraulically
<3> electrically, or
<5> manually
<8> DK
<9> RF
===>

>leq1< Is the lift equipped with a plastic or fiberglass seat?
<1> yes
<5> no
<8> DK
<9> RF
===>

>leq2< Is the lift equipped with a sling?
<1> yes
<5> no
<8> DK
<9> RF
===>

>leq3< A platform? (Is the lift equipped with a platform?)
<1> yes
<5> no
<8> DK
<9> RF
===>

>leq4< A seat belt? (Is the lift equipped with a seat belt?)
<1> yes
<5> no
<8> DK
<9> RF
===>

>leq5< A headrest? (Is the lift equipped with a headrest?)
<1> yes
<5> no
<8> DK
<9> RF
===>

>leq6< An armrest? (Is the lift equipped with an armrest?)
<1> yes
<5> no
<8> DK
<9> RF
===>

>lftb< Is the lift portable or removable?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lftc< On a scale from 1 to 5 where 1 is very low maintenance
and 5 is very high maintenance, how would you rate the
maintenance needs of the pool lift?
<1> very low maintenance
<2-4>
<5> very high maintenance
<8> DK
<9> RF
===>

>lftd< On a scale from 1 to 5 where 1 is not effective
and 5 is very effective, how would you rate the
effectiveness of the pool lift in helping people
with disabilities enter and exit the water?
<1> not effective
<2-4>
<5> very effective
<8> DK
<9> RF
===>

>lfte< On a scale from 1 to 5 where 1 is not convenient
and 5 is very convenient, how would you rate the
convenience of the pool lift for staff?
<1> not convenient
<2-4>
<5> very convenient
<8> DK
<9> RF
===>

>lftg< Is the lift constructed in a way that allows people
with disabilities to use it independently?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lfth< Are people allowed to operate the lift without
assistance?
<1> yes
<5> no [goto lno1]
<8> DK
<9> RF
===> [goto lfti]

>lno1< IF NECESSARY: Please explain why they are not allowed [allow
1][no erase]
to operate the lift without assistance.
===> [specify]

>lfti< Is the lift in place at all times?
<1> yes
<5> no [goto lno2]
<8> DK
<9> RF
===> [goto lftj]

>lno2< Why is the lift not in place at all times? [allow 1][no erase]
===> [specify]

>lftj< Are instructions for using the lift displayed on
or near the lift?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lftk< Are warnings about swimming alone posted on or near
the lift?
<1> yes
<5> no
<8> DK
<9> RF
===>

>lfad< Now I would like to ask you a few questions about [allow 1]
the advantages and disadvantages of this device.
What are some of the advantages of a swimming pool
lift?
===> [specify]

>lfds< What are some of the disadvantages of a swimming [allow 1]
pool lift?
===> [specify]

>lftl< Have any problems occurred while using the lift?
<1> yes [goto lfex]
<5> no
<8> DK
<9> RF
===> [goto isaf]

>lfex< IF NECESSARY: Please explain the problems that occurred. [allow 1][no erase]
===> [specify]

>lsaf< Are there any safety concerns with the lift?
<1> yes [goto isex]
<5> no
<8> DK
<9> RF
===> [goto lftm]

>lsex< IF NECESSARY: Please explain the safety concerns [allow 1]
[no erase]with the lift.
===> [specify]

>lftm< In the past year, how often has the lift been used
by people with disabilities? Would you say:
<1> never
<2> once every month or two
<3> 3 to 4 times a month, or
<4> 2 or mores times a week?
<8> DK
<9> RF
===>

>TRM1< [if ramp ge <5>][goto TSR1][endif]

>TRM2< [if oprt eq <1>][goto sc3a][endif]
[if trmp ge <2>][goto sc3b][endif]

>sc3a< This section asks about the pool ramp your pool
offers.
<1> PROCEED
===> [goto rmpa]

>sc3b< This section asks about swimming pool ramps. You [equiv sc3a] indicated that your agency operates more than one pool with a ramp. Please think about the ramp you are most familiar with while answering the following questions.

<1> PROCEED

===>

>rmpa< Is the ramp:

<1> constructed as part of the pool, or

<5> portable or removable [goto prra]

<8> DK

<9> RF

===> [goto rmpb]

>prra< Is the ramp in place at all times?

<1> yes

<5> no [goto prrb]

<8> DK

<9> RF

===> [goto rmpb]

>prrb< IF NECESSARY: Please explain why it is not in place [allow 1][no erase] at all times.

===> [specify]

>rmpb< Does the ramp have handrails?

<1> yes [goto rhdr]

<5> no

<8> DK

<9> RF

===> [goto rmpd]

>rhdr< Does it have handrails on:

<1> one side, or

<5> both sides

<8> DK

<9> RF

===>

>rmpd< Are people with disabilities allowed to use the ramp without assistance?

<1> yes

<5> no

<8> DK

<9> RF

===>

>rmpc< Does the pool provide an aquatic wheelchair?
<1> yes [goto rmpp]
<5> no
<8> DK
<9> RF

An aquatic wheelchair is a wheelchair that can be used in water.

===> [goto rmpe]

>rmpp< Can the person seated in the chair push the chair?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmpe< Do people who use wheelchairs prefer the ramp to other methods available at the pool?
<1> yes
<5> no
<8> DK
<9> RF

We're asking about wheelchairs in general, whether or not they're provided by your agency.

===>

>rmpf< Is the ramp used by people who can walk?
<1> yes
<5> no
<8> DK
<9> RF
===>

>rmph< On a scale from 1 to 5 where 1 is very low maintenance and 5 is very high maintenance, how would you rate the maintenance needs of the pool ramp?
<1> very low maintenance
<2-4>
<5> very high maintenance
<8> DK
<9> RF
===>

>rmpi< On a scale from 1 to 5 where 1 is not effective
and 5 is very effective, how would you rate the
effectiveness of the pool ramp in helping people
with disabilities enter and exit the water?
<1> not effective
<2-4>
<5> very effective
<8> DK
<9> RF
===>

>rmpj< On a scale from 1 to 5 where 1 is not convenient
and 5 is very convenient, how would you rate the
convenience of the pool ramp for staff?
<1> not convenient
<2-4>
<5> very convenient
<8> DK
<9> RF
===>

>rmad< Now I would like to ask you a few questions about [allow 1]
the advantages and disadvantages of this device.
What are some of the advantages of a pool ramp?
===> [specify]

>rmds< What are some of the disadvantages of a pool ramp? [allow 1]
===> [specify]

>rmpm< Have any problems occurred while using the ramp?
<1> yes [goto rpex]
<5> no
<8> DK
<9> RF
===> [goto rmsf]

>rpex< IF NECESSARY: Please explain the problems that occurred. [allow
1][no erase]
===> [specify]

>rmsf< Are there safety concerns with the ramp?
<1> yes [goto rmex]
<5> no
<8> DK
<9> RF
===> [goto rmpn]

>rmex< IF NECESSARY: Please explain the safety concerns [allow 1][no erase]with the ramp.
===> [specify]

>rmpn< In the past year, how often has the ramp been used
by people with disabilities? Would you say:
<1> never
<2> once every month or two
<3> 3 to 4 times a month, or
<4> 2 or more times a week?
<8> DK
<9> RF
===>

>TSR1< [if strs ge <5>][goto TTS1][endif]

>TSR2< [if oprt eq <1>][goto sc4a][endif]
[if tstr ge <2>][goto sc4b][endif]

>sc4a< This section asks about swimming pool stairs your
pool offers.
<1> PROCEED
===> [goto stra]

>sc4b< This section ask about swimming pool stairs. You [equiv sc4a]
indicated that your agency operates more than one
pool with stairs. Please think about the stairs
you are most familiar with while answering the
following questions.
<1> PROCEED
===>

>stra< Are the stairs:
<1> constructed as part of the pool, or
<5> portable or removable [goto prsa]
<8> DK
<9> RF
===> [goto strb]

>prsa< Are the stairs in place at all times?
<1> yes
<5> no [goto prsb]
<8> DK
<9> RF
===> [goto strb]

>prsb< IF NECESSARY: Please explain why they are not in [allow 1] [no
erase]place at all times.
===> [specify]

>strb< Do the stairs have handrails?
<1> yes [goto shdr]
<5> no
<8> DK
<9> RF
===> [goto strg]

>shdr< Do the stairs have handrails on:
<1> one side, or
<5> both sides
<8> DK
<9> RF
===>

>strg< On a scale from 1 to 5 where 1 is very low maintenance and 5 is very high maintenance, how would you rate the maintenance needs of the stairs?
<1> very low maintenance
<2-4>
<5> very high maintenance
<8> DK
<9> RF
===>

>strh< On a scale from 1 to 5 where 1 is not effective and 5 is very effective, how would you rate the effectiveness of the stairs in helping people with disabilities enter and exit the water?
<1> not effective
<2-4>
<5> very effective
<8> DK
<9> RF
===>

>stri< On a scale from 1 to 5 where 1 is not convenient and 5 is very convenient, how would you rate the convenience of the stairs for staff?
<1> not convenient
<2-4>
<5> very convenient
<8> DK
<9> RF
===>

>srad< Now I would like to ask you a few questions about [allow 1] the advantages and disadvantages of this device.
What are some of the advantages of the stairs?
===> [specify]

>srds< What are some of the disadvantages of the stairs? [allow 1]
===> [specify]

>strk< Have any problems occurred while using the stairs?
<1> yes [goto stex]
<5> no
<8> DK
<9> RF
===> [goto ssaf]

>stex< IF NECESSARY: Please explain the problems that occurred. [allow 1] [no erase]
===> [specify]

>ssaf< Are there safety concerns with the stairs?
<1> yes [goto ssex]
<5> no
<8> DK
<9> RF
===> [goto strl]

>ssex< IF NECESSARY: Please explain the safety concerns [allow 1][no erase]with the stairs.
===> [specify]

>strl< In the past year, how often have the stairs been used
by people with disabilites? Would you say:
<1> never
<2> once every month or two
<3> 3 to 4 times a month, or
<4> 2 or more times a week
<8> DK
<9> RF
===>

>TTS1< [if tsps ge <5>][goto TFL1][endif]

>TTS2< [if oprt eq <1>][goto sc5a][endif]
[if ttsp ge <2>][goto sc5b][endif]

>sc5a< This section asks about the pool transfer steps
your pool offers.
<1> PROCEED
===> [goto tspa]

>sc5b< This section asks about transfer steps. You [equiv sc5a]
indicated that your agency operates more than one
pool with transfer steps. Please think about the
transfer steps you are most familiar with while
answering the following questions.
<1> PROCEED
===>

>tspa< Are the transfer steps:
<1> constructed as part of the pool, or
<5> portable or removable? [goto prta]
<8> DK
<9> RF
===> [goto tspb]

>prta< Are the transfer steps in place at all times?
<1> yes
<5> no [goto prtb]
<8> DK
<9> RF
===> [goto tspb]

>prtb< IF NECESSARY: Please explain why they are not in [allow 1][no erase] place at all times.

===> [specify]

>tspb< Do the stairs have handrails?
<1> yes [goto tshr]
<5> no
<8> DK
<9> RF
===> [goto tspd]

>tshr< Do the stairs have handrails on:
<1> one side, or
<5> both sides
<8> DK
<9> RF
===>

>tspd< On a scale from 1 to 5 where 1 is very low maintenance and 5 is very high maintenance, how would you rate the maintenance needs of the transfer steps?
<1> very low maintenance
<2-4>
<5> very high maintenance
<8> DK
<9> RF
===>

>tspe< On a scale from 1 to 5 where 1 is not effective and 5 is very effective, how would you rate the effectiveness of the transfer steps in helping people with disabilities enter and exit the water?
<1> not effective
<2-4>
<5> very effective
<8> DK
<9> RF
===>

>tspf< On a scale from 1 to 5 where 1 is not convenient and 5 is very convenient, how would you rate the convenience of the transfer steps for staff?
<1> not convenient
<2-4>
<5> very convenient
<8> DK
<9> RF
===>

>tsad< Now I would like to ask you a few questions about [allow 1] the advantages and disadvantages of this device.
What are some of the advantages of the transfer steps?
===> [specify]

>tsds< What are some of the disadvantages of the [allow 1] transfer steps?
===> [specify]

>tsph< Have any problems occurred while using the
transfer steps?
<1> yes [goto tsex]
<5> no
<8> DK
<9> RF
===> [goto tsaf]

>tsex< IF NECESSARY: Please explain the problems that occurred. [allow 1] [no erase]
===> [specify]

>tsaf< Are there safety concerns with the transfer steps?
<1> yes [goto ttex]
<5> no
<8> DK
<9> RF
===> [goto tspi]

>ttex< IF NECESSARY: Please explain the safety concerns [allow 1][no erase]with the transfer steps.
===> [specify]

>tspi< In the past year, how often have the transfer steps been
used by people with disabilities? Would you say:
<1> never
<2> once every month or two
<3> 3 to 4 times a month, or
<4> 2 or more times a week?
<8> DK
<9> RF
===>

>TFL1< [if flor ge <5>][goto TZR1][endif]

>TFL2< [if oprt eq <1>][goto sc6a][endif]
[if tflr ge <2>][goto sc6b][endif]

>sc6a< This section asks about the movable floor your
pool offers.
<1> PROCEED

>sc6b< This section asks about movable pool floors. You [equiv sc6a]
indicated that your agency operates more than one
of these pools. Please think about the movable
pool floor you are most familiar with while
answering the following questions.
<1> PROCEED
===>

>mvfa< Is the entire floor movable or only a section
of the floor?
<1> entire floor
<5> only a section
<8> DK
<9> RF

>mvfb< How quickly can the floor be fully raised?
INTERVIEWER: CODE # OF HOURS HERE,
MINUTES ON NEXT QUESTION
<0> less than 1 hour
<1-5> 1 to 5 hours
<6> 6 or more hours
<8> DK
<9> RF
===>

>mvfm< INTERVIEWER: CODE # OF MINUTES [no erase]
<0> zero minutes
<1-60> 1 to 60 minutes
<98> DK
<99> RF
===>

>mvfc< Is the movable floor used to help people with
disabilities enter and exit the pool?
<1> yes
<5> no
<8> DK
<9> RF
===>

>mvfd< Are there signs posted indicating how someone with a
disability can request use of the movable floor?
<1> yes
<5> no
<8> DK
<9> RF
===>

>mvfe< On a scale from 1 to 5 where 1 is very low maintenance
and 5 is very high maintenance, how would you rate the
maintenance needs of the movable floor?
<1> very low maintenance
<2-4>
<5> very high maintenance
<8> DK
<9> RF
===>

>mvff< On a scale from 1 to 5 where 1 is not effective
and 5 is very effective, how would you rate the
effectiveness of the movable floor in helping
people with disabilities enter and exit the water?
<1> not effective
<2-4>
<5> very effective
<8> DK
<9> RF
===>

>mvfg< On a scale from 1 to 5 where 1 is not convenient
and 5 is very convenient, how would you rate the
convenience of the movable floor for staff?
<1> not convenient
<2-4>
<5> very convenient
<8> DK
<9> RF
===>

>mfad< Now I would like to ask you a few questions about [allow 1]
the advantages and disadvantages of this device.
What are some of the advantages of the movable floor?
===> [specify]

>mfds< What are some of the disadvantages of the movable floor? [allow 1]
===> [specify]

>mvfi< Have any problems occurred while using the movable floor?
<1> yes [goto mfex]
<5> no
<8> DK
<9> RF
===> [goto msaf]

>mfex< IF NECESSARY: Please explain the problems that occurred. [allow 1][no erase]
===> [specify]

>msaf< Are there safety concerns with the movable floor?
<1> yes [goto msex]
<5> no
<8> DK
<9> RF
===> [goto mvfj]

>msex< IF NECESSARY: Please explain the safety concerns [allow 1][no erase] with the movable floor.
===> [specify]

>mvfj< In the past year, how often has the movable floor been
used by people with disabilities? Would you say:
<1> never
<2> once every month or two
<3> 3 to 4 times a month, or
<4> 2 or more times a week?
<8> DK
<9> RF
===>

>TZR1< [if zrod ge <5>][goto TPE1][endif]

>TZR2< [if oprt eq <1>][goto sc7a][endif]
[if tzrd ge <2>][goto sc7b][endif]

>sc7a< This section asks about the zero depth entry your pool offers.

<1> PROCEED

===> [goto zrda]

>sc7b< This section asks about the zero depth entry pools. You [equiv sc7a] indicated that your agency operates more than one of these pools. Please think about the zero depth entry you are most familiar with while answering the following questions.

<1> PROCEED

===>

>zrda< Does the zero depth entry have handrails?

<1> yes [goto zrhr]

<5> no

<8> DK

<9> RF

===> [goto zrdb]

>zrhr< Are the handrails on:

<1> one side, or

<5> both sides

<8> DK

<9> RF

===>

>zrdb< Is the zero depth entry area slip resistant?

<1> yes

<5> no

<8> DK

<9> RF

===>

>zrdc< Does the pool provide an aquatic wheelchair?

<1> yes [goto zrpp]

<5> no

<8> DK

<9> RF

An aquatic wheelchair is a wheelchair that can be used in water

===> [goto zrdd]

>zrpp< Can the person seated in the chair push the chair?

<1> yes

<5> no

<8> DK

<9> RF

===>

>zrdd< On a scale from 1 to 5 where 1 is very low maintenance
and 5 is very high maintenance, how would you rate the
maintenance needs of the zero depth entry?
<1> very low maintenance
<2-4>
<5> very high maintenance
<8> DK
<9> RF
===>

>zrde< On a scale from 1 to 5 where 1 is not effective
and 5 is very effective, how would you rate the
effectiveness of the zero depth entry in helping
people with disabilities enter and exit the water?
<1> not effective
<2-4>
<5> very effective
<8> DK
<9> RF
===>

>zrdf< On a scale from 1 to 5 where 1 is not convenient
and 5 is very convenient, how would you rate the
convenience of the zero depth entry for staff?
<1> not convenient
<2-4>
<5> very convenient
<8> DK
<9> RF
===>

>zdad< Now I would like to ask you a few questions about [allow 1]
the advantages and disadvantages of this device.
What are some of the advantages of the zero depth
entry?
===> [specify]

>zdds< What are some of the disadvantages of the zero [allow 1]
depth entry?
===> [specify]

>zrdh< Have any problems occurred while using the zero
depth entry?
<1> yes [goto zdex]
<5> no
<8> DK
<9> RF
===> [goto zsaf]

>zdex< IF NECESSARY: Please explain the problems that occurred. [allow 1][no erase]
===> [specify]

>zsaf< Are there safety concerns with the zero depth entry?
<1> yes [goto zsex]
<5> no
<8> DK
<9> RF
===> [goto zrdi]

>zsex< IF NECESSARY: Please explain the problems that occurred. [allow 1][no erase]
===> [specify]

>zrdi< In the past year, how often has the zero depth entry been used by people with disabilities? Would you say:
<1> never
<2> once every month or two
<3> 3 to 4 times a month, or
<4> 2 or more times a week?
<8> DK
<9> RF
===>

>TPE1< [if cop ge <5>][goto flup][endif]

>TPE2< [if oprt eq <1>][goto sc8a][endif]
[if tcop ge <2>][goto sc8b][endif]

>sc8a< This section asks about the transfer walls your pool offers.
<1> PROCEED
===> [goto recb]

>sc8b< This section asks about transfer walls. [equiv sc8a]
You indicated that your agency operates more than one of these pools. Please think about the transfer walls you are most familiar with while answering the following questions.
<1> PROCEED
===>

>recb< Is the entire pool raised above the pool deck?
<1> yes
<5> no
<8> DK
<9> RF
===>

>recd< Are handrails or grab bars provided on the transfer wall?
<1> yes [goto rchr]
<5> no
<8> DK
<9> RF
===> [goto rece]

>rchr< Do they have one handrail or grab bar or two?
<1> one handrail/grab bar
<5> two handrails/grab bars
<8> DK
<9> RF
===>

>rece< Do most people with disabilities use the transfer wall without assistance?
<1> yes
<5> no
<8> DK
<9> RF
===>

>recf< On a scale from 1 to 5 where 1 is very low maintenance and 5 is very high maintenance, how would you rate the maintenance needs of the transfer wall?
<1> very low maintenance
<2-4>
<5> very high maintenance
<8> DK
<9> RF
===>

>recg< On a scale from 1 to 5 where 1 is not effective and 5 is very effective, how would you rate the effectiveness of the transfer wall in helping people with disabilities enter and exit the water?
<1> not effective
<2-4>
<5> very effective
<8> DK
<9> RF
===>

>rech< On a scale from 1 to 5 where 1 is not convenient and 5 is very convenient, how would you rate the convenience of the transfer wall for staff?
<1> not convenient
<2-4>
<5> very convenient
<8> DK
<9> RF
===>

>read< Now I would like to ask you a few questions about [allow 1] the advantages and disadvantages of this device.
What are some of the advantages of the transfer wall?
===> [specify]

>reds< What are some of the disadvantages of the [allow 1] transfer wall?
===> [specify]

>recj< Have any problems occurred while using the
transfer wall?
<1> yes [goto reex]
<5> no
<8> DK
<9> RF
===> [goto rsaf]

>reex< IF NECESSARY: Please explain the problems that occurred. [allow 1][no erase]
===> [specify]

>rsaf< Are there safety concerns with the transfer wall?
<1> yes [goto rsex]
<5> no
<8> DK
<9> RF
===> [goto reck]

>rsex< IF NECESSARY: Please explain the safety concerns [allow 1][no erase] with the transfer wall.
===> [specify]

>reck< In the past year, how often has the transfer wall been
used by people with disabilities? Would you say:
<1> never
<2> once every month or two
<3> 3 to 4 times a month, or
<4> 2 or more times a week?
<8> DK
<9> RF
===>

>flup< Finally, based on your answers, we may need to send
you a brief follow-up questionnaire. This mail
questionnaire should just take a few minutes of
your time.
<1> PROCEED
===>

>add2< What is the mailing address of your agency? [allow 30][loc 22/1]

>posi< What is your position or job title? [allow 1]
===>[specify]

>spr< Dr. Ed Hamilton is the Project Director for this study.
Would you like contact information for Dr. Hamilton
in case you have any questions about this project?
<1> yes [goto spri]
<5> no
<8> DK
<9> RF
===> [goto ENDQ]

>ENDQ< [goto MOD7]

Facility Follow-Up Questionnaire

National Center on Accessibility
Swimming Pool Accessibility Survey

Thank you for agreeing to participate in this national study to determine the most effective methods to provide access to swimming pools by people with disabilities. The following information is very important to the success of this project. Please answer each question and FAX the completed form to the National Center on Accessibility at **317-342-6658** or mail to NCA, 5020 State Road 67 North, Martinsville, IN 46151. Thank you for your help.

Which of the following best describes your agency?
☐ Hotel/motel ☐ Recreation Department ☐ YMCA/YWCA ☐ Hospital/clinic
☐ Other (specify):

How many pools does your agency operate? _____

How many of the following types of pools does your agency operate?

_____ Multi-purpose pool (used for recreation, instruction, and exercise, etc.)
_____ Competition pool (used primarily for athletic practice and events)
_____ Therapy pool (used in prescribed treatment)
_____ Lap pool (small number of lanes used only for swimming laps)
_____ Water park (water rides and water play areas)
_____ Spa (hot water pool with hydrojet action)
Other, please specify: _____

State in which you work: _____ Zip Code: _____

Your position: _____

☐ Please forward an Executive Summary of the project report to:

_____
_____
_____
_____

National Center on Accessibility
Swimming Pool Accessibility Survey
POOL LIFTS

The following questions deal with swimming pool lifts. If only you operate only one pool with a lift, answer the following questions about that lift. If you operate more than one pool with a lift, select one pool with a lift and answer the following questions regarding that lift.

Who is the manufacturer of the lift: _____ Model: _____

In what year was the lift purchased? _____ What was the cost of the lift? _____

Is the lift: ☐ Hydraulic powered ☐ Electric powered ☐ Manual

With which of the following is the lift equipped?
☐ plastic/fiber glass seat ☐ sling ☐ platform

What is the distance from the front edge of the lift seat to the edge of the pool? _____

Can the lift be operated by someone who is in the pool? ☐ Yes ☐ No

What are the advantages of a swimming pool lift?

What are some the disadvantages of a swimming pool lift?

Have any problems occurred while using the lift? ☐ Yes ☐ No
If YES, please explain:

National Center on Accessibility
Swimming Pool Accessibility Survey
MOVABLE FLOORS

The following questions deal with movable floors. If you operate only one pool with a movable floor, answer the questions about that pool. If you operate more than one pool with a movable floor, select one pool and answer the questions regarding that pool.

Is the: ☐ entire floor movable ☐ only a section of the floor movable?

When was the movable floor installed? _____ What was the cost? _____

What are the primary uses of the movable floor?

What is the maximum depth of the pool? _____

How quickly can the floor be fully raised? _____

Is the movable floor used to assist people with disabilities to enter and exit the pool?
☐ Yes ☐ No
If NO, why not?

Are there signs posted indicating how someone with a disability requests use of the floor?
☐ Yes ☐ No

What are some advantages of the movable floor?

What are some disadvantages of the movable floor?

Have any problems occurred while using the movable floor? ☐ Yes ☐ No
If YES, please explain:

National Center on Accessibility
Swimming Pool Accessibility Survey
POOL RAMPS

The following questions deal with swimming pool ramps. If you operate only one pool with a ramp, answer the following questions about that ramp. If you operate more than one pool with a ramp, select one pool with a ramp and answer the following questions regarding that ramp.

Is the ramp portable or removable? ☐ Yes ☐ No
If YES, is the ramp in place at all times? ☐ Yes ☐ No
If NO, please explain.

Who was the manufacturer? _____

What is the length of the ramp? _____

What is the water depth at the end of the ramp? _____

Is there a level landing at the bottom of the ramp? ☐ Yes ☐ No
If YES, what is the size of the landing? _____

Is there edge protection on the ramp? ☐ Yes ☐ No
If YES, please describe:

Does the ramp have handrails? ☐ Yes ☐ No
If YES,
does it have handrails on: ☐ one side ☐ both sides

What is the distance from the ramp to the top of the handrail? _____

Do the handrails continue underwater? ☐ Yes ☐ No

What are some advantages of a pool ramp?

What are some disadvantages of a pool ramp?

Have any problems occurred while using the ramp? ☐ Yes ☐ No

If YES, please explain:

National Center on Accessibility
Swimming Pool Accessibility Survey
POOL STAIRS

The following questions deal with swimming pool stairs. If you operate only one pool with stairs, answer the questions about that set of stairs. If you operate more than one pool with stairs, select one pool with stairs and answer the questions regarding that set of stairs.

Are the stairs portable or removable? ☐ Yes ☐ No
If YES, are the stairs in place at all times? ☐ Yes ☐ No
If NO, please explain.

Who was the manufacturer? _____ Model: _____

When were the stairs purchased? _____ What was the cost? _____

Do the stairs have handrails? ☐ Yes ☐ No
If YES,
Do they have handrails on: ☐ one side ☐ both sides

What is the depth of the pool at the bottom of the stairs? _____

How many steps are there? _____ What is the clear width of the stairs? _____

What is the riser height (vertical distance between treads)? _____

Is the riser height the same for each step? ☐ Yes ☐ No
If NO, please explain:

What is the tread width (horizontal distance from front edge of tread to back edge)? _____

Is the tread width the same for each step? ☐ Yes ☐ No
If NO, please explain:

What are some advantages of the stairs?

What are some disadvantages of the stairs?

Have any problems occurred while using the stairs? ☐ Yes ☐ No
If YES, please explain:

National Center on Accessibility
Swimming Pool Accessibility Survey
TRANSFER STEPS

The following questions deal with transfer steps. If you operate only one pool with stairs, answer the questions about that set of transfer steps. If you operate more than one pool with transfer steps select one pool with stairs and answer the questions regarding that set of stairs.

Are the transfer steps portable or removable?
If YES, are the transfer steps in place at all times? ☐ Yes ☐ No
If NO, please explain:

Who was the manufacturer? _____ Model: _____

Do the transfer steps have handrails? ☐ Yes ☐ No
If YES,
Do they have handrails on: ☐ one side ☐ both sides

How many steps are there? _____ What is the clear width of the stairs? _____

What is the riser height (vertical distance between treads)? _____

Is the riser height the same for each step? ☐ Yes ☐ No
If NO, please explain:

What is the tread width (horizontal distance from front edge of tread to back edge)? _____

Is the tread width the same for each step? ☐ Yes ☐ No
If NO, please explain:

How many steps are there above the deck? _____ How many below the deck? _____

What are some advantages of the transfer steps?

What are some disadvantages of the transfer steps?

Have any problems occurred while using the transfer steps? ☐ Yes ☐ No
If YES, please explain:

National Center on Accessibility
Swimming Pool Accessibility Survey
TRANSFER WALLS

The following questions deal with transfer walls. If you operate only one pool with a transfer wall, answer the questions about that pool. If you operate more than one pool with transfer walls, select one pool with a transfer wall and answer the questions regarding that pool.

What is the height of the transfer wall? _____

What is the length of the transfer wall? _____

What is the width of the transfer wall? _____

What is the vertical distance between the top of the transfer wall and the water surface? _____

Are handrails or grab bars provided on the transfer wall? ☐ Yes ☐ No

If YES,

Do they have handrails: ☐ one handrail/grab bar ☐ two handrails/grab bars

What are some advantages of the transfer wall?

What are some disadvantages of the transfer wall?

Have any problems occurred while using the transfer wall? ☐ Yes ☐ No

If YES, please explain:

National Center on Accessibility
Swimming Pool Accessibility Survey
ZERO DEPTH ENTRY

The following questions deal with zero depth entry swimming pools. If you operate only one pool with zero depth entry, answer the following questions about that pool. If you operate more than one pool with zero depth entry, select one pool with zero depth entry and answer the following questions regarding that pool.

What is the slope of the zero depth entry? _____

What is the water depth at the end of the zero depth entry? _____

Is there a level landing at the bottom of the zero depth entry? ☐ Yes ☐ No
If YES, what is the size of the landing? _____

Does the zero depth entry have handrails? ☐ Yes ☐ No
If YES,
does it have handrails on: ☐ one side ☐ both sides

What is the distance from the pool surface to the top of the handrail? _____

Do the handrails continue underwater? ☐ Yes ☐ No

What are some advantages of a pool zero depth entry?

What are some disadvantages of the zero depth entry?

Have any problems occurred while using the zero depth entry? ☐ Yes ☐ No

If YES, please explain:

Appendix E

Informed Consent Statements

Medical History

Personal Data Forms

Data Sheets for On-Site Testing

Perceived Rating Scale

Informed Consent Statements

IUB INFORMED CONSENT STATEMENT
Swimming Pool Accessibility

You are invited to participate in a research study. The purpose of this study is to evaluate methods of entering and exiting swimming pools by people with disabilities.

INFORMATION

If you decide to participate, you will be involved approximately two hours of testing that includes performance tests and evaluation of several methods for entering and exiting swimming pools. Background information about you (e.g., age, gender, any assistive mobility device used) will be recorded on a questionnaire. Testing will be conducted in groups to facilitate test setup and to provide you with sufficient rest periods between the various tests.

Performance Tests: The performance tests are designed to categorize your level of strength and endurance.

> Endurance Test. You will complete three 5 minute exercise sessions cranking an arm bicycle. Your heart rate will be measured during each exercise session. Blood pressure and heart rate will be measured before and after each session. You may rest between sessions as required.
>
> Grip Strength Test. You will squeeze the handle of a force measurement device as hard as possible. Two trials will be completed for each hand.

Performance testing will take approximately 30 minutes depending upon the number of subjects in your group.

Difficulty Rating Baseline: A baseline for your perceptions of the difficulty of tasks will be obtained: You will be asked to travel across a flat surface for 20 feet and complete a difficulty rating scale. You will then be asked to negotiate a 12:1 ramp for 10 feet and complete another difficulty rating scale.

Tests of Designs/Devices: You will be asked to enter the swimming pool using one of the methods being tested and move to a point three feet from the design or device being tested. After a one minute rest period at the designated point, you will be asked to exit the pool using the same method used to enter the pool. An investigator will then interview you about your reactions to the method used to enter/exit the pool. After a five minute rest, you will be asked to repeat the process using a second method. After another five minute rest, you will be asked to repeat the process using a third method.

Video Taping/Photographs: Video taping and photography of testing sessions may be done periodically. These will be used to assist in explaining the testing procedures and

the designs/devices tested in professional presentations of the study findings. The video tapes and photographs will not be used for any other purpose unless specific approval is obtained from you. Video tape footage or photographs will be destroyed if you should decide to withdraw from the study.

RISKS

The following risks are associated with participation in this study:

Subject Performance Test. Completion of the endurance and muscular power tests may result in fatigue and sore or stiff muscles the day following the tests, particularly if you do not regularly do vigorous exercise. Sensations of breathlessness and exertion during the test will be similar to those experienced during strenuous exercise. An investigator certified in First Aid and Cardiopulmonary Resuscitation will be in attendance during each testing period.

Pressure Sores. Subjects who have no sensation in the buttocks area will be at slight risk for development of a pressure sore during the testing. You will need to complete a pressure sore history and have your buttocks examined prior to the testing by an investigator of the same sex. The time spent on the devices should not be long enough to cause skin problems for those without existing sores or skin areas of high risk for developing sores.

Tests of Designs/Devices. At least one spotter will be present whenever you use a design/device to enter or exit the pool. Also, at least one certified lifeguard will be present during all testing. A personal flotation device will be provided for your use in the pool.

BENEFITS

As a volunteer subject, you may benefit from participation in this study from the satisfaction of providing important data to assist in the development of accessibility guidelines for swimming pools. However, we cannot and do not guarantee or promise that you will receive any benefits from this study.

CONFIDENTIALITY

The information in the study records will be kept confidential. Data will be stored securely and will be made available only to persons conducting the study unless you specifically give permission in writing to do otherwise. No reference will be made in oral or written reports which could link you to the study.

COMPENSATION

You will not receive any compensation for participation in this study.

_____

Subject's Initials

EMERGENCY MEDICAL TREATMENT

In the unlikely event of physical injury resulting from your participation in this research, emergency medical treatment will be provided at no cost to you. Be certain that you immediately notify the researcher if you are injured. If you require additional medical treatment, you will be responsible for the cost. No other compensation will be provided if you are injured in this research.

CONTACT

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Dr. Ed Hamilton at the National Center on Accessibility, 5020 S.R. 67 N., Martinsville, IN 46151, (800) 424-1877. If you have questions about your rights as a subject, contact the office for the Human Subjects Committee, Bryan Hall 10, Indiana University, Bloomington, IN 47405, (812) 855-3067.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty and without loss of benefits to which you otherwise are entitled. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Subject's signature _____ Date _____

Investigator's signature _____ Date _____

IUB INFORMED CONSENT STATEMENT
Parent/Guardian Form
Swimming Pool Accessibility

Your child is invited to participate in a research study. The purpose of this study is to evaluate methods of entering and exiting swimming pools by people with disabilities.

INFORMATION

If your child decides to participate, he/she will be involved in approximately two hours of testing that includes performance tests and evaluation of several methods for entering and exiting swimming pools. Background information about your child (e.g., age, gender, any assistive mobility device used) will be recorded on a questionnaire. Testing will be conducted in groups to facilitate test setup and to provide sufficient rest periods between the various tests.

Performance Tests: The performance tests are designed to categorize your child's level of strength and endurance.

> Endurance Test. Your child will complete three 5 minute exercise sessions cranking an arm bicycle. Your child's blood pressure and heart rate will be measured before and after each session. Your child may rest between sessions as required.
>
> Grip Strength Test. Your child will squeeze the handle of a force measurement device as hard as possible. Two trials will be completed for each hand.

Performance testing will take approximately 30 minutes depending upon the number of subjects in your child's group.

Difficulty Rating Baseline: A baseline for your child's perceptions of the difficulty of tasks will be obtained: Your child will be asked to travel across a flat surface for 20 feet and complete a difficulty rating scale. Your child will then be asked to negotiate a 1:12 ramp for 10 feet and complete another difficulty rating scale.

Tests of Designs/Devices: Your child will be asked to enter the swimming pool using one of the methods being tested and move to a point three feet from the design or device being tested. After a one minute rest period at the designated point, your child will be asked to exit the pool using the same method used to enter the pool. An investigator will then interview your child about his/her reactions to the method used to enter/exit the pool. After a five minute rest, your child will be asked to repeat the process using a second method. After another five minute rest, your child will be asked to repeat the process using a third method.

_____
Parent/guardian initials

Video Taping/Photographs: Video taping and photography of testing sessions may be done periodically. These will be used to assist in explaining the testing procedures and the designs/devices tested in professional presentations of the study findings. The video tapes and photographs of your child will not be used for any other purpose unless specific approval is obtained from you. Video tape footage or photographs will be destroyed if your child should decide to withdraw from the study.

RISKS

The following risks are associated with participation in this study:

Subject Performance Test. Completion of the endurance and muscular power tests may result in fatigue and sore or stiff muscles the day following the tests, particularly if your child does not regularly do vigorous exercise. Sensations of breathlessness and exertion during the test will be similar to those experienced during strenuous exercise. An investigator certified in First Aid and Cardiopulmonary Resuscitation will be in attendance during each testing period.

Pressure Sores. Subjects who have no sensation in the buttocks area will be at slight risk for development of a pressure sore during the testing. Each subject will complete a pressure sore history and have his/her buttocks examined prior to the testing by an investigator of the same sex. The time spent on the devices should not be long enough to cause skin problems for those without existing sores or skin areas of high risk for developing sores.

Tests of Designs/Devices. At least one spotter will be present whenever your child uses a design/device to enter or exit the pool. Also, at least one certified lifeguard will be present during all testing. A personal flotation device will be required for your child's use in the pool.

BENEFITS

As a volunteer subject, your child may benefit from participation in this study from the satisfaction of providing important data to assist in the development of accessibility guidelines for swimming pools. However, we cannot and do not guarantee or promise that your child will receive any benefits from this study.

CONFIDENTIALITY

The information in the study records will be kept confidential. Data will be stored securely and will be made available only to persons conducting the study unless you specifically give permission in writing to do otherwise. No reference will be made in oral or written reports which could link your child to the study.

_____

Parent/guardian initials

COMPENSATION

Your child will not receive any compensation for participation in this study.

EMERGENCY MEDICAL TREATMENT

In the unlikely event of physical injury resulting from your child's participation in this research, emergency medical treatment will be provided at no cost to you. Be certain that you immediately notify the researcher if your child is injured. If your child requires additional medical treatment, you will be responsible for the cost. No other compensation will be provided if your child is injured in this research.

CONTACT

If you have questions at any time about the study or the procedures, (or your child experiences adverse effects as a result of participating in this study,) you may contact the researcher, Dr. Ed Hamilton at the National Center on Accessibility, 5020 S.R. 67 N., Martinsville, IN 46151, (800) 424-1877. If you have questions about your child's rights as a subject, contact the office for the Human Subjects Committee, Bryan Hall 10, Indiana University, Bloomington, IN 47405, (812) 855-3067.

PARTICIPATION

Your child's participation in this study is voluntary; you may decline to participate without penalty. If your child decides to participate, your child may withdraw from the study at any time without penalty and without loss of benefits to which you otherwise are entitled. If your child withdraws from the study before data collection is completed, his/her data will be returned to you or destroyed.

CONSENT

I have read and understand the above information. I have received a copy of this form. I agree to allow my child _____ to participate in this study.

Parent/guardian signature _____ Date _____

Investigator's signature _____ Date _____

Medical History

National Center on Accessibility
Swimming Pool Accessibility Project
Medical History

Your participation will involve entering and exiting the pool using several pool designs and equipment, some of which may require moderate physical exertion on your part. For your personal safety and the success of this research project, it is extremely important that you answer each of the following questions honestly and with as much detail as possible. If necessary, use the back of this page.

1. Are you currently under the treatment of a physician for any of the following?

Chest pains	☐ Yes	☐ No
Heart condition	☐ Yes	☐ No
Breathing difficulties	☐ Yes	☐ No
Back pain	☐ Yes	☐ No
High blood pressure	☐ Yes	☐ No

If YES to any of the conditions above, please explain:

_____

_____

2. Are you currently taking any medications? ☐ Yes ☐ No
If YES, please list each medication and any associated precautions.

_____

_____

_____

3. Have your activities been restricted by a physician? ☐ Yes ☐ No
If YES, please explain:

_____

_____

_____

4. Do you presently have any pressure sores? ☐ Yes ☐ No
If YES, at what location(s) on your body? _____

_____

5. Do you have a history of pressure sores? ☐ Yes ☐ No
If YES, please provide the frequency, location(s), probable cause, and treatment.

_____

_____

_____
Date

_____ _____
Print name Print parent/guardian name (if under 18 years)

_____ _____
Signature Parent/guardian signature (If under 18 years)

Personal Data Forms

NCA Swimming Pool Accessibility
Testing of Pool Access Equipment

PERSONAL INFORMATION

Sex: [ ] Male [ ] Female Height: _____ feet _____ inches

Age: _____ years Weight: _____ lbs.

Racial/ethnic group *(for statistical purposes only)*
[ ] Native Am/Alaskan [ ] African Am [ ] White
[ ] Asian/Pacific Islander [ ] Hispanic [ ] Other: _____

Type of disability:
[ ] Amputation [ ] Arthritis [ ] CP [ ] CVA
[ ] MD [ ] MS [ ] SCI [ ] SB
[ ] Other: _____

Type of limitations:
[ ] Mobility [ ] Upper extremities [ ] Hearing [ ] Vision

What devices do you use to assist with your mobility? [ ] No device used
[ ] Wheelchair [ ] Walker [ ] Crutches [ ] Cane
[ ] Other: _____

How often do you use your mobility device?
[ ] Full-time [ ] Part-time [ ] Seldom

What is the maximum distance you can walk without rest?
[ ] less than 20 ft [ ] across room (approx. 20 ft) [ ] ½ block
[ ] 1 block [ ] ¼ mile [ ] more than ¼ mile
[ ] cannot walk

Do you have step/stair mobility? [ ] Yes [ ] No
If yes, what are the maximum number of steps you can climb without resting?
_____ steps/floors

How often do you currently swim? _____ times per week/month/year

How long does it take you to prepare for swimming from the time you enter the locker room until the time you are ready to get into the pool?
_____ minutes _____ hours

How long does it take you to prepare to leave the swimming area from the time you get out of the pool until you are dressed and ready to leave?
_____ minutes _____ hours

Circle the type of design or equipment you have used, how often you've used it, and how satisfied you were with it. Also, please briefly describe it and add any comments.

A Product (circle)	B Brief Description	C Frequency (circle)	D Satisfaction (circle)	E Comments
Lift		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Ramp		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Zero Depth		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Stairs		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Transfer Steps		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Ladder		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Movable Floor		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Raised Coping		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	
Other (specify)		1 time 2-5 times 6+ times	Very Satisfied Satisfied Not satisfied	

If you had your choice, which of the following would like to use to enter and exit pools? (CHOOSE ONE)

[ ] Lift
[ ] Ramp
[ ] Ladder
[ ] Transfer step
[ ] Zero Depth Entry
[ ] Movable Pool Floor
[ ] Raised Pool Edge
[ ] Other: _____
[ ] Steps without rails
[ ] Steps, rails on one side
[ ] Steps, rails both sides

Would you be willing to use your own wheelchair for ramp access into a pool?
[ ] Yes [ ] No

Please indicate whether you need assistance to perform the following transfers, and if so, the type of assistance needed?

Transfer	Assistance Required (circle)	Type of Assistance (check all that apply)				
		Person	Lift	Board	Trapeze	Other (specify)
Chair to floor	Yes					
	No					
Floor to chair	Yes					
	No					
Into car/auto	Yes					
	No					
Out of car/auto	Yes					
	No					
Into bed	Yes					
	No					
Out of bed	Yes					
	No					
Into bathtub	Yes					
	No					
Out of bathtub	Yes					
	No					
On to commode	Yes					
	No					
Off of commode	Yes					
	No					

Data Sheets for On-Site Testing

PRE-TEST DATA (COMPLETED BY INVESTIGATOR)

Investigator: _____

Consent form [ ] Medical history [ ] Skin check [ ] Honorarium form [ ]

Hand grip:
Left: Trial #1 _____ Trial #2 _____

Right: Trail #1 _____ Trial #2 _____

Leg strength:
Left: Trial #1 _____ Trial #2 _____

Right: Trail #1 _____ Trial #2 _____

Pulse (at rest): _____ per minute _____ per minute

Balance: Front: _____ Right: _____ Left: _____

Flexibility:
Arm: Right: _____ Left: _____

Trunk: _____

50' Walk: Time: _____:_____ Pulse: _____ Rating: _____

LIFT - TEST DATA (COMPLETED BY INVESTIGATOR)

Device/design: _____

Site: _____ Investigator: _____

Trial #1

Resting pulse: _____ Questions completed: [ ]

Transfer On: _____:_____._____ Pulse: _____ Lift seat height: _____ inches

In Time: _____:_____._____ Pulse: _____ Rating: _____

Transfer Off: _____:_____._____ Pulse: _____ Lift seat height: _____ inches

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Distance without assistance (ramps only): _____ feet _____ inches

Bouyancy point: _____ inches Height: _____ inches Seat Height: _____ inches

Trial #2

Resting pulse: _____ Questions completed: [ ]

Transfer On: _____:_____._____ Pulse: _____ Lift seat height: _____ inches

In Time: _____:_____._____ Pulse: _____ Rating: _____

Transfer Off: _____:_____._____ Pulse: _____ Lift seat height: _____ inches

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Distance traveled without assistance (ramps only): _____ feet _____ inches

Notes:

LIFT

Indicate your preferences on each of the following lift features:

Seat angle to the rear	☐ too much	☐ just right	☐ not enough	☐ N/A
Angle of back support	☐ too far back	☐ just right	☐ too upright	☐ N/A
Height of seat for transfer	☐ too high	☐ just right	☐ too low	☐ N/A
Seat width	☐ too wide	☐ just light	☐ too narrow	☐ N/A
Seat depth	☐ too deep	☐ just right	☐ too short	☐ N/A
Back height	☐ too high	☐ just right	☐ too low	☐ N/A
Armrest height	☐ too high	☐ just right	☐ too low	☐ N/A

Would you like any of the following?

Headrest	☐ Yes	☐ No	☐ had one, but it was in the way
Seatbelt	☐ Yes	☐ No	☐ had one, but it was in the way
Armrest	☐ Yes	☐ No	☐ had one, but it was in the way

Were there adequate handholds for transfer? ☐ Yes ☐ No ☐ In wrong location

Did you have to add a pad to the seat to be able to sit on it?
☐ Yes, for skin protection ☐ Yes, to prevent sliding ☐ No

Indicate if assistance was required to perform the following tasks.
WA = With Assistance WO = Without Assistance

Complete process from wheelchair into pool	WA	WO	Complete process from pool into wheelchair	WA	WO
Preparing lift for use	WA	WO	Preparing lift for use	WA	WO
Transferring from wheelchair to seat	WA	WO	Getting onto seat in the water	WA	WO
Positioning seat to lower into pool	WA	WO	Positioning seat to raise out of pool	WA	WO
Lowering into pool	WA	WO	Raising out of pool	WA	WO
Getting off seat in the water	WA	WO	Transferring from seat to wheelchair	WA	WO
Putting away to move lift out of pool	WA	WO	Putting away lift	WA	WO

Did this equipment meet your needs for entering/exiting the pool? ☐ Yes ☐ No

Which of your needs does it fail to meet? _____

_____

_____

How independent were you in using this lift?

- ☐ Totally independent
- ☐ Little assistance required
- ☐ Some assistance required
- ☐ A lot of assistance required
- ☐ Totally dependent

How comfortable were you while using this lift?

- ☐ Completely comfortable
- ☐ Quite comfortable
- ☐ Barely comfortable - It is tolerable, but I would prefer to use something else.
- ☐ Uncomfortable - I would prefer not to use it.
- ☐ Painful - I would not use it again.

How convenient was is to use this lift?

- ☐ Very Convenient
- ☐ Convenient - Easy, quick and simple to use
- ☐ Somewhat Convenient
- ☐ Inconvenient - Required too much time or energy to use.
- ☐ Totally Inconvenient - I wouldn't use it again.

How safe did you feel while using this lift?

- ☐ Very safe - I had no fear of falling or getting injured.
- ☐ Safe
- ☐ Somewhat safe - I felt relatively safe, but not completely safe.
- ☐ Unsafe - I thought I might fall or get injured.
- ☐ Very unsafe - I was afraid I might fall or get injured.

How would you rate the level of difficulty of this lift?

- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Very Difficult
- ☐ Extremely Difficult - This equipment was impossible for me to use even with assistance.

How would you rate your overall satisfaction with this lift?

- ☐ Very Satisfied
- ☐ Satisfied - I would use it.
- ☐ OK - I would use it if there no other options, but I would prefer to use something else.
- ☐ Dissatisfied - I would prefer not to use it.
- ☐ Completely Dissatisfied - I would not use it again.

What do you feel are some advantages and disadvantages to this lift?

Advantages:	Disadvantages:
1) _____	1) _____
2) _____	2) _____
3) _____	3) _____

How would you change this equipment to make it better for you?

_____

_____

Subject code: _____ Date: _____

RAMP - TEST DATA (COMPLETED BY INVESTIGATOR)

Device/design: _____

Site: _____ Investigator: _____

Trial #1

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Distance without assistance (ramps only): _____ feet _____ inches

Bouyancy point: _____ inches Height: _____ inches Seat Height: _____ inches

Trial #2

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Distance traveled without assistance (ramps only): _____ feet _____ inches

Notes:

RAMP

Indicate your likes, dislikes or preferences for the following dimensions:

Ramp slope	☐ too steep	☐ okay	☐ too flat
Surface texture of ramp	☐ too slippery	☐ okay	☐ too rough
Seat width	☐ too wide	☐ okay	☐ too narrow
Railing height	☐ too high	☐ okay	☐ too low
Railing grip diameter	☐ too large	☐ okay	☐ too small
Railing surface texture	☐ slippery	☐ okay	☐ too rough

Were you comfortable with the water depth at the bottom of the ramp? ☐ Yes ☐ No

Did this ramp meet your needs for entering/exiting the pool? ☐ Yes ☐ No

Which of your needs did it fail to meet? _____

_____

_____

How independent were you in using this ramp?

- ☐ Totally independent
- ☐ Little assistance required
- ☐ Some assistance required
- ☐ A lot of assistance required
- ☐ Totally dependent

How comfortable were you while using this ramp?

- ☐ Completely comfortable
- ☐ Quite comfortable
- ☐ Barely comfortable - It is tolerable, but I would prefer to use something else.
- ☐ Uncomfortable - I would prefer not to use it.
- ☐ Painful - I would not use it again.

How convenient was is to use this ramp?

- ☐ Very Convenient
- ☐ Convenient - Easy, quick and simple to use
- ☐ Somewhat Convenient
- ☐ Inconvenient - Required too much time or energy to use.
- ☐ Totally Inconvenient - I wouldn't use it again.

How safe did you feel while using this ramp?

- ☐ Very safe - I had no fear of falling or getting injured.
- ☐ Safe
- ☐ Somewhat safe - I felt relatively safe, but not completely safe.
- ☐ Unsafe - I thought I might fall or get injured.
- ☐ Very unsafe - I was afraid I might fall or get injured.

How would you rate the level of difficulty of this ramp?

- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Very Difficult
- ☐ Extremely Difficult - This equipment was impossible for me to use even with assistance.

How would you rate your overall satisfaction with this ramp?

- ☐ Very Satisfied
- ☐ Satisfied - I would use it.
- ☐ OK - I would use it if there no other options, but I would prefer to use something else.
- ☐ Dissatisfied - I would prefer not to use it.
- ☐ Completely Dissatisfied - I would not use it again.

What do you feel are some advantages and disadvantages to this ramp?

Advantages:	**Disadvantages:**
1) _____	1) _____
2) _____	2) _____
3) _____	3) _____

How would you change this ramp to make it better for you? _____

_____

_____

Subject code: _____ Date: _____

STEPS - TEST DATA (COMPLETED BY INVESTIGATOR)

Device/design: _____

Site _____ Investigator: _____

Trial #1

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Bouyancy point: _____ inches Height: _____ inches Seat Height: _____ inches

Trial #2

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Notes:

STAIRS

Indicate your likes, dislikes or preferences for the following dimensions:

Height of steps	☐ too high	☐ okay	☐ too short
Width of steps	☐ too wide	☐ okay	☐ too narrow
Depth of stairs	☐ too deep	☐ okay	☐ too short
Surface texture of steps	☐ too slippery	☐ okay	☐ too rough
Railing height	☐ too high	☐ okay	☐ too low
Railing grip diameter	☐ too large	☐ okay	☐ too small
Surface texture of railing	☐ too slippery	☐ okay	☐ too rough

Did the stairs meet your needs for entering/exiting the pool? ☐ Yes ☐ No

Which of your needs do they fail to meet? _____

_____

_____

How independent were you in using these stairs?

- ☐ Totally independent
- ☐ Little assistance required
- ☐ Some assistance required
- ☐ A lot of assistance required
- ☐ Totally dependent

How comfortable were you while using these stairs?

- ☐ Completely comfortable
- ☐ Quite comfortable
- ☐ Barely comfortable - It is tolerable, but I would prefer to use something else.
- ☐ Uncomfortable - I would prefer not to use it.
- ☐ Painful - I would not use it again.

How convenient was is to use these stairs?

- ☐ Very Convenient
- ☐ Convenient - Easy, quick and simple to use
- ☐ Somewhat Convenient
- ☐ Inconvenient - Required too much time or energy to use.
- ☐ Totally Inconvenient - I wouldn't use it again.

How safe did you feel while using these stairs?

- ☐ Very safe - I had no fear of falling or getting injured.
- ☐ Safe
- ☐ Somewhat safe - I felt relatively safe, but not completely safe.
- ☐ Unsafe - I thought I might fall or get injured.
- ☐ Very unsafe - I was afraid I might fall or get injured.

How would you rate the level of difficulty of these stairs?

- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Very Difficult
- ☐ Extremely Difficult - This equipment was impossible for me to use even with assistance.

How would you rate your overall satisfaction with these stairs?

- ☐ Very Satisfied
- ☐ Satisfied - I would use it.
- ☐ OK - I would use it if there no other options, but I would prefer to use something else.
- ☐ Dissatisfied - I would prefer not to use it.
- ☐ Completely Dissatisfied - I would not use it again.

What do you feel are some advantages and disadvantages to these stairs?

Advantages:	**Disadvantages:**
1) _____	1) _____
2) _____	2) _____
3) _____	3) _____

How would you change this equipment to make it better for you?

_____

_____

Subject code: _____ Date: _____

TRANSFER STEPS - TEST DATA (COMPLETED BY INVESTIGATOR)

Device/design: _____

Site: _____ Investigator: _____

Trial #1

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Step from which transferred into water (bottom step = 1): _____

Step transferred onto coming out of water (battome step = 1): _____

Bouyancy point: _____ inches Height: _____ inches Seat Height: _____ inches

Trial #2

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Step from which transferred into water (bottom step = 1): _____

Step transferred onto coming out of water (battome step = 1): _____

Notes:

TRANSFER STEPS

Indicate your likes, dislikes or preferences for the following dimensions:

Height of steps	☐ too high	☐ okay	☐ too short
Width of steps	☐ too wide	☐ okay	☐ too narrow
Depth of transfer steps	☐ too deep	☐ okay	☐ too short
Surface texture of steps	☐ too slippery	☐ okay	☐ too rough
Railing height	☐ too high	☐ okay	☐ too low
Railing grip diameter	☐ too large	☐ okay	☐ too small
Surface texture of railing	☐ too slippery	☐ okay	☐ too rough

Did the transfer steps meet all your needs? ☐ Yes ☐ No

Which of your needs did they fail to meet? _____

_____

_____

How independent were you in using these transfer steps?

- ☐ Totally independent
- ☐ Little assistance required
- ☐ Some assistance required
- ☐ A lot of assistance required
- ☐ Totally dependent

How comfortable were you while using these transfer steps?

- ☐ Completely comfortable
- ☐ Quite comfortable
- ☐ Barely comfortable - It is tolerable, but I would prefer to use something else.
- ☐ Uncomfortable - I would prefer not to use it.
- ☐ Painful - I would not use it again.

How convenient was is to use these transfer steps?

- ☐ Very Convenient
- ☐ Convenient - Easy, quick and simple to use
- ☐ Somewhat Convenient
- ☐ Inconvenient - Required too much time or energy to use.
- ☐ Totally Inconvenient - I wouldn't use it again.

How safe did you feel while using these transfer steps?

- ☐ Very safe - I had no fear of falling or getting injured.
- ☐ Safe
- ☐ Somewhat safe - I felt relatively safe, but not completely safe.
- ☐ Unsafe - I thought I might fall or get injured.
- ☐ Very unsafe - I was afraid I might fall or get injured.

How would you rate the level of difficulty of these transfer steps?

- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Very Difficult
- ☐ Extremely Difficult - This equipment was impossible for me to use even with assistance.

How would you rate your overall satisfaction with these transfer steps?

- ☐ Very Satisfied
- ☐ Satisfied - I would use it.
- ☐ OK - I would use it if there no other options, but I would prefer to use something else.
- ☐ Dissatisfied - I would prefer not to use it.
- ☐ Completely Dissatisfied - I would not use it again.

What do you feel are some advantages and disadvantages to these transfer steps?

Advantages:	**Disadvantages:**
1) _____	1) _____
2) _____	2) _____
3) _____	3) _____

How would you change this equipment to make it better for you? _____

_____

_____

Subject code: _____ Date: _____

LADDER - TEST DATA (COMPLETED BY INVESTIGATOR)

Device/design: _____

Site: _____ Investigator: _____

Trial #1

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Bouyancy point: _____ inches Height: _____ inches Seat Height: _____ inches

Trial #2

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Notes:

LADDERS

Indicate your likes, dislikes or preferences for the following dimensions:

Spacing of ladder rungs	☐ too big	☐ okay	☐ too small
Depth of steps	☐ too deep	☐ okay	☐ too short
Surface texture of steps	☐ too slippery	☐ okay	☐ too rough
Railing height	☐ too high	☐ okay	☐ too low
Railing grip diameter	☐ too large	☐ okay	☐ too small
Surface texture of railing	☐ too slippery	☐ okay	☐ too rough

Did the ladder meet your needs for entering/exiting the pool? ☐ Yes ☐ No

Which of your needs does it fail to meet? _____

How independent were you in using this ladder?

- ☐ Totally independent
- ☐ Little assistance required
- ☐ Some assistance required
- ☐ A lot of assistance required
- ☐ Totally dependent

How comfortable were you while using this ladder?

- ☐ Completely comfortable
- ☐ Quite comfortable
- ☐ Barely comfortable - It is tolerable, but I would prefer to use something else.
- ☐ Uncomfortable - I would prefer not to use it.
- ☐ Painful - I would not use it again.

How convenient was is to use this ladder?

- ☐ Very Convenient
- ☐ Convenient - Easy, quick and simple to use
- ☐ Somewhat Convenient
- ☐ Inconvenient - Required too much time or energy to use.
- ☐ Totally Inconvenient - I wouldn't use it again.

How safe did you feel while using this ladder?

- ☐ Very safe - I had no fear of falling or getting injured.
- ☐ Safe
- ☐ Somewhat safe - I felt relatively safe, but not completely safe.
- ☐ Unsafe - I thought I might fall or get injured.
- ☐ Very unsafe - I was afraid I might fall or get injured.

How would you rate the level of difficulty of this ladder?

- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Very Difficult
- ☐ Extremely Difficult - This equipment was impossible for me to use even with assistance.

How would you rate your overall satisfaction with this ladder?

- ☐ Very Satisfied
- ☐ Satisfied - I would use it.
- ☐ OK - I would use it if there no other options, but I would prefer to use something else.
- ☐ Dissatisfied - I would prefer not to use it.
- ☐ Completely Dissatisfied - I would not use it again.

What do you feel are some advantages and disadvantages to this ladder?

Advantages:	**Disadvantages:**
1) _____	1) _____
2) _____	2) _____
3) _____	3) _____

How would you change this equipment to make it better for you? _____

_____

_____

Subject code: _____ Date: _____

MOVABLE FLOORS TEST DATA - (COMPLETED BY INVESTIGATOR)

Device/design: _____

Site: _____ Investigator: _____

Trial #1

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Bouyancy point: _____ inches Height: _____ inches Seat Height: _____ inches

Trial #2

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Notes:

MOVABLE POOL FLOOR

Indicate your likes, dislikes or preferences for the following dimensions:

Size of the deck	☐ too large	☐ okay	☐ too small
Surface texture of deck	☐ too slippery	☐ okay	☐ too rough

Does this equipment meet your needs for entering/exiting the pool? ☐ Yes ☐ No

Which of your needs does it fail to meet?_____

_____

_____

How independent were you in using this movable floor?

- ☐ Totally independent
- ☐ Little assistance required
- ☐ Some assistance required
- ☐ A lot of assistance required
- ☐ Totally dependent

How comfortable were you while using this movable floor?

- ☐ Completely comfortable
- ☐ Quite comfortable
- ☐ Barely comfortable - It is tolerable, but I would prefer to use something else.
- ☐ Uncomfortable - I would prefer not to use it.
- ☐ Painful - I would not use it again.

How convenient was is to use this movable floor?

- ☐ Very Convenient
- ☐ Convenient - Easy, quick and simple to use
- ☐ Somewhat Convenient
- ☐ Inconvenient - Required too much time or energy to use.
- ☐ Totally Inconvenient - I wouldn't use it again.

How safe did you feel while using this movable floor?

- ☐ Very safe - I had no fear of falling or getting injured.
- ☐ Safe
- ☐ Somewhat safe - I felt relatively safe, but not completely safe.
- ☐ Unsafe - I thought I might fall or get injured.
- ☐ Very unsafe - I was afraid I might fall or get injured.

How would you rate the level of difficulty of this movable floor?

- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Very Difficult
- ☐ Extremely Difficult - This equipment was impossible for me to use even with assistance.

How would you rate your overall satisfaction with this movable floor?

- ☐ Very Satisfied
- ☐ Satisfied - I would use it.
- ☐ OK - I would use it if there no other options, but I would prefer to use something else.
- ☐ Dissatisfied - I would prefer not to use it.
- ☐ Completely Dissatisfied - I would not use it again.

What do you feel are some advantages and disadvantages to this movable floor?

Advantages:	**Disadvantages:**
1) _____	1) _____
2) _____	2) _____
3) _____	3) _____

How would you change this equipment to make it better for you? _____

_____

_____

Subject code: _____ Date: _____

ZERO-DEPTH ENTRY TEST DATA (COMPLETED BY INVESTIGATOR)

Device/design: _____

Site: _____ Investigator: _____

Trial #1

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Distance traveled without assistance: _____ feet _____ inches

Bouyancy point: _____ inches Height: _____ inches Seat Height: _____ inches

Trial #2

Resting pulse: _____ Questions completed: [ ]

In Time: _____:_____._____ Pulse: _____ Rating: _____

Out Time: _____:_____._____ Pulse: _____ Rating: _____

Distance traveled without assistance: _____ feet _____ inches

Notes:

ZERO DEPTH ENTRY POOL

Indicate your likes, dislikes or preferences for the following dimensions:

Entry slope	☐ too steep	☐ okay	☐ too flat
Surface texture of	☐ too slippery	☐ okay	☐ too rough
Width of surface	☐ too wide	☐ okay	☐ too narrow
Railing height	☐ too high	☐ okay	☐ too low
Railing grip diameter	☐ too large	☐ okay	☐ too small
Railing surface texture	☐ slippery	☐ okay	☐ too rough

Did the zero-depth entrance meet your needs for entering/exiting the pool? ☐ Yes ☐ No

Which of your needs does it fail to meet? _____

_____

_____

How independent were you in using zero depth entry?

- ☐ Totally independent
- ☐ Little assistance required
- ☐ Some assistance required
- ☐ A lot of assistance required
- ☐ Totally dependent

How comfortable were you while using the zero depth entry?

- ☐ Completely comfortable
- ☐ Quite comfortable
- ☐ Barely comfortable - It is tolerable, but I would prefer to use something else.
- ☐ Uncomfortable - I would prefer not to use it.
- ☐ Painful - I would not use it again.

How convenient was is to use the zero depth entry?

- ☐ Very Convenient
- ☐ Convenient - Easy, quick and simple to use
- ☐ Somewhat Convenient
- ☐ Inconvenient - Required too much time or energy to use.
- ☐ Totally Inconvenient - I wouldn't use it again.

How safe did you feel while using the zero depth entry?

- ☐ Very safe - I had no fear of falling or getting injured.
- ☐ Safe
- ☐ Somewhat safe - I felt relatively safe, but not completely safe.
- ☐ Unsafe - I thought I might fall or get injured.
- ☐ Very unsafe - I was afraid I might fall or get injured.

How would you rate the level of difficulty of the zero depth entry?

- ☐ Easy
- ☐ Moderate
- ☐ Difficult
- ☐ Very Difficult
- ☐ Extremely Difficult - This equipment was impossible for me to use even with assistance.

How would you rate your overall satisfaction with the zero depth entry?

- ☐ Very Satisfied
- ☐ Satisfied - I would use it.
- ☐ OK - I would use it if there no other options, but I would prefer to use something else.
- ☐ Dissatisfied - I would prefer not to use it.
- ☐ Completely Dissatisfied - I would not use it again.

What do you feel are some advantages and disadvantages to the zero depth entry?

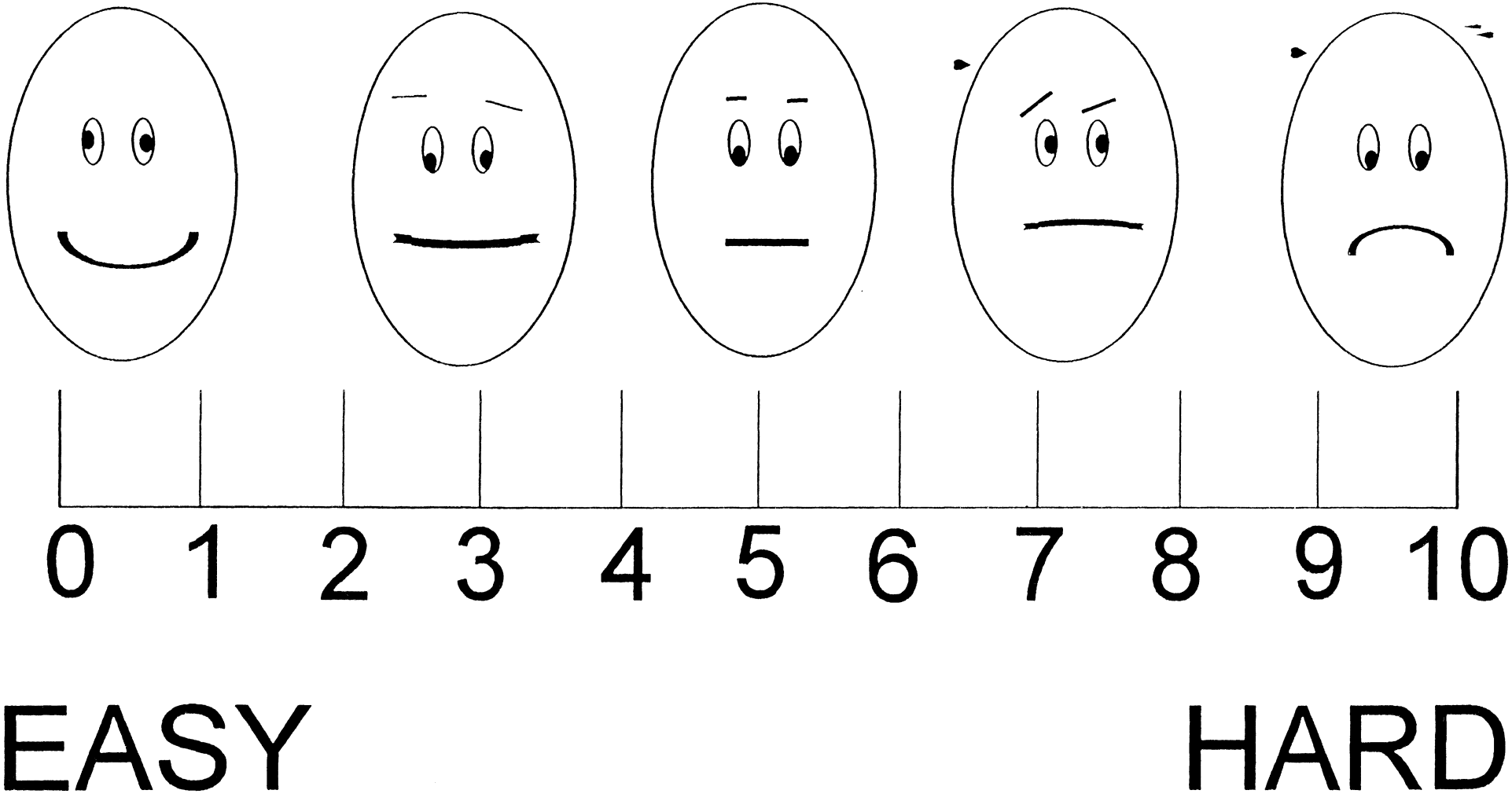
Advantages:	**Disadvantages:**
1) _____	1) _____
2) _____	2) _____
3) _____	3) _____

How would you change the zero depth entry to make it better for you? _____

_____

_____

Perceived Rating Scale


0 1 2 3 4 5 6 7 8 9 10
EASY
HARD