

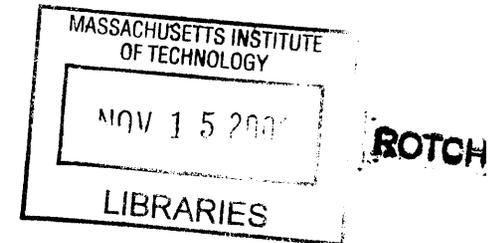
The Universally Designed Village: Creative Concepts in Urban Design, Guided by the Experiences of Disabled Athletes

By Marcel Schmaedick
Bachelor of Science in Planning, Massachusetts Institute of Technology, 2001

Submitted to the Department of Urban Studies and Planning
in partial fulfillment of the requirements for the degree of

Master in City Planning

at the Massachusetts Institute of Technology, September 2001



Author

Marcel Schmaedick
Department of Urban Studies and Planning
August 23, 2001

Certified by

Professor J. Mark Schuster, PhD, MIT
Department of Urban Studies and Planning
Thesis Supervisor

Accepted by

Professor Dennis Frenchman
Chair, MCP Committee
Department of Urban Studies and Planning

© 2001 Marcel Schmaedick. All rights Reserved.

The author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this document in whole or in part.

The Universally Designed Village

Acknowledgements

It is a simple fact that I would not be here today if it were not for the love, patience, and generosity of the following people. This thesis is dedicated to them.

To Sarah, Chris, Jeff, Bobbie, Scott, Hope, Connie, Mary, Karen, Tim, Ross, Jason, James, and Joe, and to disabled athletes worldwide; you are my inspiration! For those of you heading to Salt Lake City and Athens, I'll be watching!

To Andrea, Michael, Albert, Melissa, Agatha, Lila, Shalisha, and the rest of my loving family, for always being there for me.

To Bill and Mark for their infinite patience and guidance.

To Valerie, Gabriela, Lenie, Eric, Andy, Rachael, Kathy, Mike, Elizabeth, Juanita and Andrea, my friends Adaptive Environments, who introduced me to Universal Design and lent me invaluable help.

To all the other wonderfully friendly and generous people who helped me in the course of my research: Chris Hart, Gary Piantedosi, Ross Lilley, Thomas Lavelle, Mark Lucas, Chris Kostas, Bobbie Beth Scoggins, Dana Parker, Sotiris Bizouras, Patti Asbury, Jody Shaffer, Richard Robert, and special thanks to Kim Kelly!

To Larry Vale, and the rest of the faculty in the Department of Urban Studies and Planning at MIT, for an exciting and inspiring 5 years.

To Hugh McManus, for help in the early years.

To Alice and Sandy, and to the student services staff at MIT, who have always been a dependable and reassuring comfort in stressful times.

And to Anke, most of all...

Thank You!

The Universally Designed Village

The Universally Designed Village:

Creative Concepts in Urban Design, Guided by the Experiences of Disabled Athletes

By Marcel Schmaedick

Submitted to the Department of Urban Studies and Planning on August 23, 2001 in partial fulfillment of the requirements for the degree of Master in City Planning

ABSTRACT

Universal design is the design of places and products so that they are usable by people of all ages and abilities, to the greatest extent possible, without the need for adaptations or specialized design. This thesis examines how urban designers can incorporate the values of universal design into the design of cities, and make their designs more accessible to people with disabilities. The experience of disabled people is so different from the experiences of able-bodied people, however, that able-bodied designers must involve disabled users in the design process if they wish to design successfully.

This thesis takes the approach of discovering the urban design issues that are relevant to people with disabilities by interviewing athletes who have participated in the Paralympic Games. The Paralympic village is presumably one of the places in the world that is designed most directly with the need of disabled users in mind. Paralympic athletes are the intended users of the village and therefore are the most qualified to evaluate the success of Paralympic village design and the accessibility of urban spaces within the village. By learning firsthand, from the users of these spaces, the faults and successes in Paralympic village design, we can learn lessons that will help urban designers create more universally designed spaces.

The choice of Paralympic athletes as the subjects of the interviews has other implications as well. Designs that are accessible to a Paralympic athlete may not be accessible to disabled people with lower levels of fitness or with more severe disabilities. But these athletes are representative of a growing movement within the disabled community to push the limits of their abilities and to enjoy life without pity, shame, or lowered expectations. They represent, hopefully, the best of what could be in terms of design for the disabled: a world where urban designers look farther than the lowest mandated standards of legislation like the ADA, to creating joyful, challenging and exciting environments for all people.

Thesis Supervisor: J. Mark Schuster

Title: Professor of Urban Cultural Policy, Department of Urban Studies and Planning

The Universally Designed Village

Table Of Contents

Introduction	11
Research Question	12
Part I - Assessing Needs	13
The Paralympic Village	15
Paralympic Summer Games	16
Paralympic Winter Games	17
Interviewees	18
Interviews	19
Interview Questions	21
Blind Athletes	23
Bobbie McMullin	25
Tim Willis	31
Amputees	35
Karen Norris	37
Jason Wening	41
Dwarves	47
Connie Eisenbraun	49
Joe Griffo	53
Wheelchair Users	55
Jeff Adams	57
Ross Davis	61
Mary Green	65
Hope Hand	69
Scott Hollenbeck	75
Chris Waddell	79
Sarah Will	83
Cerebral Palsy	89
James Thomson	91
Design Issues Drawn From The Interviews	95
Issues for the Blind	97
Issues for Amputees	99

The Universally Designed Village

Issues for Dwarves	100
Issues for Wheelchairs	101
Common Issues	103
Larger Disability Design Issues	104
Part II - Designing for People with Disabilities: Creative Concepts	107
Themes	111
Designs	112
Motion Plaza	112
Climbing Hill for Wheelchairs	117
Accessible Amphitheater	121
Part III - Moving Forward	125
Implications For Design	127
Important Design Considerations	127
Implications for Policy makers	131
Topography and Transportation	131
Expense of Universal Design	133
Dense Compact Communities	134
TOD, Nodal Design	135
Visions of the Future: The Post-ADA World	136
American Attitudes Towards the Disabled	136
Future Design Themes	137
Drawing the line	137
Conclusion	139
Bibliography	143
Books	143
Journal Articles	143
World Wide Web	146
Other	149

The Universally Designed Village

Introduction

City planners, as urban designers, have both the privilege and the responsibility of creating the environments that we all spend our lives in. The decisions that we make in our designs have lasting physical, social, psychological, economic, and political effects on the entire population of people that uses the space in even the most indirect way. There are probably many such effects that we have yet to recognize, but there are certainly many that we still do not fully understand. Those that we do not understand, we are not able to control. On the other hand, it takes time for new knowledge and understanding to become an accepted part of the general practice of design, as it takes us time to adjust to and become comfortable with new perceptions and new interpretations of familiar ideas. One such “new” interpretation, which is the general focus of this paper, is universal design.

Universal design has been slowly growing in acceptance and practice in the United States for roughly 40 years¹. The basic philosophy of universal design does not seem very radical: “products and environments” should “be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design”². However, simple observation of our built environment reveals considerable barriers that prevent many people from enjoying equal use and access to it. This is evidence enough that many planners and designers do not think, or do not think carefully enough, about the needs and abilities of the whole population.

Like most people in any field, designers rely on their own experiences, or the experiences of people close to them, to guide their assumptions and their practice. Too often, these experiences do not cover the full range of human possibility. For example, a designer who is neither personally disabled nor intimately familiar with the life of a person with a disability cannot easily grasp the reality of that experience. Thus, without the input of disabled users, it is extremely difficult for designers to recognize all the potential barriers in their designs. Similarly, since our lives change as we age, it is very difficult for younger designers to fully appreciate the experience

¹ The Center for Universal Design http://www.design.ncsu.edu:8120/cud/univ_design/udhistory.htm

² The Center for Universal Design http://www.design.ncsu.edu:8120/cud/univ_design/ud.htm

of the elderly and adjust our designs to suit their needs, without their input. True universal design can only be obtained with the input and assistance of the full range of users who might inhabit a given environment; therefore, conscientious designers should seek out and welcome the insight that users with a different personal experience can bring to our designs.

Given the responsibility that city planners bear, to design the world that others inhabit, quality and equality of access for the entire population should be one of our highest priorities. No public space, no matter how beautiful or successful, is truly great if it excludes any member of society. To achieve full accessibility, we need to understand the experiences of people who are often excluded, and the best way to do that is to talk to them.

Research Question

Therefore, the question that I am asking in my research is: What can urban designers learn about designing better, more accessible, urban environments from the experiences of disabled athletes, and how can disabled athletes aid us in the process of designing for the entire population of users?

I hope to show that disabled athletes, and the experiences that they have to share with us, can teach designers things about the world that we could not know without their input. And I hope to show that by involving users in design, we can learn about their needs, desires, and complaints, and we can respond to them in exciting and interesting ways.

I will demonstrate this process through a series of interviews with disabled athletes, asking them about their experiences in environments designed to be accessible, and the issues they identify. I will then follow up with original and creative design solutions to address some of those issues in inventive ways. My intent is not to catalog the entire range of barriers that face the disabled, nor to provide specific constructible designs solutions to particular problems. Rather, I am exploring and demonstrating a more joyful and experimental approach to urban design for the disabled.

Part I - Assessing Needs

The Universally Designed Village

The Paralympic Village

Over a total of a few months, I interviewed 14 different athletes who had participated in the Paralympics. The Paralympic Village, where the athletes live during the weeks of competition, is practically a self-contained city. It contains most of the urban elements of large cities within a small site. However, it also has a much higher concentration of people with disabilities than would be found, on average, in most cities. The village is designed and adapted for the needs of the disabled athletes who stay there during the games, making it one of the most intense and concentrated testing grounds for accessible design.

The Paralympic village is also an exceptional chance to examine accessibility issues because of its nature as a temporary and unusually highly concentrated population of people with disabilities. The sheer size and duration of the Paralympics make it necessary to bring in thousands of volunteers and employees to run the village. Though much effort goes into preparation and training, many of these people are unfamiliar with their environments and their responsibilities. By the time that things finally start operating completely smoothly, the whole thing is over.

However, even though there are some very specific reasons why I chose to use Paralympic athletes and the Paralympic Village as the foci of my study, this is not an examination of the Paralympics, or of Paralympic villages, or even of designing for athletes in particular. This thesis is about learning how to design better environments for disabled people by talking to disabled users about their experiences.

I chose to work with this particular subset of the disabled population, disabled athletes, exactly because they are the most able and the most adaptable members of that population. With these athletes and their positive attitudes, I am able to focus on abilities, not disabilities, and explore creative possibilities that engage their independent spirits.

Therefore a complete history of the Paralympic movement is not really necessary for the scope of this thesis. I include a Paralympic timeline to put the timing of the recent games that my interviewees attended into perspective:

Paralympic Summer Games¹

Year	Location	Disabilities included	Number of Countries	Number of Athletes	Shared Venue with Olympics	Highlights
1952	Stoke Mandeville, UK	Spinal cord injury	2	130	No	First international games for disabled
1960	Rome, Italy	Spinal cord injury	23	400	Yes	First games for disabled held in same venue as Olympic games
1964	Tokyo, Japan	Spinal cord injury	22	390	Yes	Wheelchair racing added
1968	Tel Aviv, Israel	Spinal cord injury	29	750	No	
1972	Heidelberg, Germany	Spinal cord injury	44	1000	No	First quadriplegic competition added; demonstration events for visually impaired
1976	Toronto, Canada	Spinal cord injury Visually impaired Les autres	42	1600	No	First use of specialized racing wheelchairs
1980	Arnhem, Netherlands	Spinal cord injury Amputee Visually impaired Cerebral Palsy	42	2500	No	
1984	Stoke Mandeville, UK & New York, USA	Spinal cord injury Amputee Visually impaired Cerebral Palsy	42	4080	No	Wheelchair marathon introduced
1988	Seoul, Korea	Spinal cord injury Amputee Visually impaired Cerebral Palsy Les autres	61	3053	Yes	Commitment made by the Olympic Organizing Committee to assist the Paralympic Committee
1992	Barcelona, Spain	Spinal cord injury Amputee Visually impaired Cerebral Palsy Les autres	82	3020	Yes	Event yet unsurpassed in organizational excellence
1996	Atlanta, USA	Spinal cord injury Amputee Visually impaired Cerebral Palsy Les autres Mentally Handicapped	103	3195	Yes	First world-wide sponsors

¹ International Paralympic Committee <http://www.paralympic.org/>

Paralympic Winter Games²

Year	Location	Disabilities included	Number of Countries	Number of Athletes	Shared Venue with Olympics	Highlights
1976	Örnsköldsvik, Sweden	Blind Amputee	14	250 +	No	Demonstration event: sledge racing
1980	Geilo, Norway	All locomotor disabilities	18	350 +	No	Demonstration event: Sledge down-hill racing
1984	Innsbruck, Austria	All locomotor disabilities	22	350 +	No	Demonstration event at Olympics in Sarajevo: giant slalom; three track Skiers
1988	Innsbruck, Austria	All locomotor disabilities	22	397	No	Sit-skiing introduced as event in alpine and Nordic
1992	Tignes-Albertville, France	All locomotor disabilities	24	475	Yes	Demonstration event: alpine and cross-country skiing for athletes with mental disabilities
1994	Lillehammer, Norway	All locomotor disabilities	31	1000 +	Yes	Sledge hockey introduced
1998	Nagano, Japan	All locomotor disabilities	32	571	Yes	

² International Paralympic Committee <http://www.paralympic.org/>

Interviewees

I made contact with the athletes that I interviewed in a couple of ways. I had met Sarah Will earlier, and upon deciding to pursue this thesis topic I decided to interview her first. I then asked her for other disabled athletes she knew whom she could put me in touch with. I made the same request of some of the other athletes as I talked to them as well. Through this process of personal referrals I was able to reach and interview many of my participants. Another source of people to interview were the national Disabled Sports Organizations (DSOs). By contacting people at Disabled Sports USA, and the Dwarf Athletic Association of America, I was able to get referrals to more athletes with a range of disabilities, who I was then able to ask for more personal referrals.

There are some probable implications of this type of selection process. For one thing, this is by no means a random sample of disabled athletes. I relied on the referral choices of the people I contacted. It is likely that they tried to steer me towards the people that they knew had been to several Paralympics, which was useful to me when I asked about comparisons between different villages.

They also could have directed me towards athletes that were more interested in disability issues than most; some of the people I talked to participated in the games in ways beyond competition. One is a representative on the International Paralympic Committee's Athletes Committee. Another was the captain of her team. Two others are or were involved in helping to prepare the proposals of bid cities trying to host the Games. Two others run a training camp for disabled athletes. Another is a frequent spokesperson for disability issues. And yet another is a lawyer who sometimes works on accessibility cases. Therefore it is likely that many of the people that I interviewed are more acutely aware of the whole range of disability issues than the average disabled person, and perhaps they are more used to speaking out about those issues. Since I am using my interviewees as a targeted sample of the whole population of disabled people, it was probably more productive talking to these athletes since they are presumably used to speaking at times for the disabled community as a whole.

However, disabled athletes are also the most mobile and physically active members of the disabled community, which has other implications for my choice to

interview them. They are the people most willing and able to challenge themselves and overcome any obstacles in their path, and are much less limited by their disabilities than most of the rest of the disabled population. Designs that are accessible to a Paralympic athlete may not be accessible to disabled people with lower levels of fitness or with more severe disabilities. For example, a professional athlete in a wheel chair might be able to muscle up a ramp that is much steeper than the average non-athlete is able to make it up. Little details that a physically fit athlete might not even notice could be barriers for the severely disabled. Therefore, by interviewing only disabled athletes I run the risk of missing or ignoring some of the more subtle universal design challenges.

But these athletes are also representative of a growing movement within the disabled community that I wish to emphasize. They are the most visible and, through their actions, the most vocal spokespersons for disabled people who choose to reject social constraints and stereotypes, to push the limits of their abilities and to enjoy life without pity, shame, or lowered expectations. These athletes represent, I hope, the future of design for the disabled. In a world where the public accepts the need for universal accessibility without question, all places will be designed universally as a basic requirement. Urban designers will look farther than the lowest mandated standards of legislation like the ADA; and in this “post-ADA” world they will create joyful, challenging and exciting environments for all people.

Interviews

I tried to interview the most diverse set of people possible. Of the 14 athletes I interviewed, there are 9 men and 5 women; 2 blind athletes, 2 amputees, 2 dwarves, one person with Cerebral Palsy, and 7 wheelchair users; and at least one attendee from each of the summer and winter Paralympic games since 1988.

I conducted my interviews over the phone, and they were very informal. I had an interview protocol that I followed loosely with each person, but the conversations often strayed from the list. I didn't always get answers for every single question on the list. Sometimes people felt like the questions were repetitive and didn't give new answers; other times I felt like a question was unnecessary or inappropriate for the

person I was talking to. Frequently, answers strayed from the initial point of the question, but were informative and opened up new areas of exploration. I frequently asked intermediate questions, to encourage longer responses, but usually I wrote down only the responses to those. In some cases, where the topic of my additional questions was significantly different from the standard questions, I included the extra questions in the interview text as well. Without exception, everyone I talked to was very friendly and eager to help, and we spoke freely and comfortably.

During the interviews, I took notes of almost everything that the person said. Afterwards, I went back through my notes to edit them so that a reader who had not participated in the conversation could understand them. I tried to transcribe everything that the person said, though not necessarily word-for-word. Sometimes I changed the word order, or I added some clarifying words to fragments that people had said, to make the conversations more readable. But overall, I tried to stay as faithful as possible to the interviewees' own words, including idiosyncratic remarks, comments, and metaphors; the conversations jump around from topic to topic as they did in real time, and the responses to questions sometimes lead in unexpected directions.

Interview Questions

[Background: Tell me about your participation in the Paralympics.
(Summer/Winter/Both? Which years? Which events?)]

What do you remember most about the accommodations in the Olympic Village(s)?

What were the best and worst aspects of the Village(s) in terms of mobility and access?

Are there particular types of disability that tend to be accommodated more effectively than others?

Were there specific improvements that you could have suggested?

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

What were the differences you noticed, if any, in the approach to accommodating athletes with disabilities at different Villages (winter/summer, various locations)?

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

What sort of design features would your “ideal” training/housing complex contain?

The Universally Designed Village

Blind Athletes

The Universally Designed Village

Bobbie McMullin

Redding, California

Nagano 1998

Alpine Skiing (all four events)

Disability: No vision in left eye; 20/1200 best impairment in right eye. “My vision is extremely narrow; it’s like living life through a video camera with Vaseline on the lens.”

What do you remember most about the accommodations in the Olympic Village(s)?

The village had “Braille sidewalks”; there was a path with a raised texture you could walk on and feel where you were going with your feet. They are found all over Japan. I knew where I was at all times because of the paths, so it was very efficient getting around. They were a strip of raised dots that were part of the sidewalk, and it seems like perhaps they might have been in an arrow-like pattern. I saw them all over the village, as well as in downtown Nagano, and in other cities, like Tokyo. The dots were pretty large; they had a substantial width to them, similar to the raised dots that mark lanes on roads. The patterns that the dots were laid out in would change at crosswalks, street intersections and places where the sidewalk turned a corner.

I couldn’t read the signs anywhere though, so at first I had to get around with someone else who could see or who knew the way until learned my way around the village. The village had signs in Braille, but I’m not a Braille reader. I use a magnifier, which I carry around with me, to read. But the magnifier has to be within three inches of the text for me to be able to read it. So I can read something like a menu, but not signs.

What were the best and worst aspects of the Village in terms of mobility and access?

There were not a lot of steps in the village; there were a few here and there, but not in high traffic areas. Steps are a hazard for me because, with my vision, I can't pick up the differences in contrast on the ground that signal things like stairs and level changes. The ground always looks flat. Therefore, it was a real advantage having ramps instead of stairs in most places.

There was not a lot of audio assistance available to the athletes. Having the option of audio assistance available would have been nice. Some audio support systems I've seen are things like personal locating systems, which are available for laptops or palmtop computers. I'm not sure how they work (probably with GPS) but the devices give you audible information about your location.

Were there specific improvements that you could have suggested?

It would be great to be able to go somewhere and press a button and hear a message that says, "You are *here*". It could be something like tourist kiosk, with a description of your surroundings and their history. And it should give you location information, telling you where you are in relation to a well-known central place. The usual hub of activity in the village is the cafeteria, but it could also reference other places that would be familiar to all the athletes and coaches. You should be able to ask, "Where is the athletes dorm?" and receive directions, in the form of "one street up, two streets to the right," or else using compass directions like North, South, etc. and numbers of blocks. Other information, like the locations of telephones, busy streets, and lighted paths where I can see the movements of traffic, would be useful. These kiosks could also serve as meeting points, or help people unfamiliar with a new city to find meeting places, like the train station, or the front entrance of major landmarks. And it could have information on public safety centers like police and fire stations.

At the winter Paralympics there were about 2 - 9 visually impaired athletes on the national team of each of the more than 30 participating countries. Meaning there were probably about 165 athletes with a visual disability in the village.

Are there particular types of disability that tend to be accommodated more effectively than others (in the Paralympic Village)?

Absolutely. There is a large population of mono-skiers at the winter games. Therefore there are a number of wheelchair accessibility issues. I did not feel like I was treated “differently” from anyone else because I was blind; there were simply a larger number of wheelchair-user issues. I didn’t feel a lack of attention either, because it is natural for most people not to pay much attention to me. If you met me, you wouldn’t have a clue that I was impaired, until I did certain things differently from you. It is obvious that someone in wheelchair is disabled; but my disability is not obvious. Sometimes when I tell people that I am blind and ask them for assistance, they walk off without believing me!

When I need help getting around, I rely on the people around me. I generally don’t use a guide dog or a cane, though I do carry a cane with me when traveling alone. In terms of my visual impairment, I am on the border of needing a cane. A cane does help keep me from running into obstacles or other people. I avoid using one because it would identify me as a target and I don’t want that. But I believe in people; I think people are good, and I trust them to help me get where I need to go.

In general I prefer guide dogs to canes. But because of the life I lead as an athlete, where I travel 8 to 9 months out of the year, I choose not to have one. That much traveling is really hard on the animal, and I wouldn’t be able to spend that much time with it while I was training and competing. An animal is a big responsibility, and I don’t think I can accept that kind of responsibility while competing. Maybe later, as my life slows down, I will get a dog.

It’s a very personal decision though. Some “totals” (people who are completely blind) use dogs. I know one athlete who uses a dog and it always had to be taken care of by someone else while she was competing. You can’t just tie it up somewhere for several hours while you are racing.

That’s one feature that could be provided at competitions: care services for dogs. The summer games are huge, so there must tons of animals to take care of! Some summer games events are over in just a few minutes, so it might be good to have access to the dogs close at hand. But skiing is isolated by nature; athletes can

be up on the hill all day. Perhaps a system of managing and caring for guide animals is needed in the village.

Blind people often need a person guide them as well. Some humans are lousy guides. They need to think out loud. They have to announce obstacles verbally: “step”, “curb”, etc. And because they usually need to offer their arm, they are totally “umbilicalized” to the athlete, which takes some getting used to.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

Weather was not a problem in the village in Nagano. But in places where weather is an obstacle, heated sidewalks would be good for clearing snow and ice from paths.

The cafeteria was huge, and it offered every possible kind of food. But there was nothing to help people with visual impairments read the menus. It’s the same situation at fast food places everywhere (the menu is high above the counter, and there is nothing available in print for people to read close up). Here again, an electronic kiosk would be helpful.

The buildings in the village had many floors and cubicles, as well as elevators with more than one door, which made it really easy to get confused and lost. An information system in the buildings would help as well.

As for Braille usage: 5 to 10 years ago, the majority of blind or visually impaired people learned to read it. But recent technological advances, especially in the computer industry, have really helped out the visually impaired. Some programs make the keyboard virtually unnecessary. Braille books are huge and not very efficient. Now everything is available in audio versions. Electronic access to information, using computers, is much better than Braille, and I think Braille usage is decreasing. The visually impaired have the lowest employment rates among disabled people, but that is changing. Improvements in technology have resulted in a jump in the number of visually impaired people who are employed.

What sort of design features would your ideal training/housing complex contain?

Light does help me see. It should be easy to find light switches by feel and they should be easy to operate.

I learn where things are in a city by physically walking around with someone as my guide. That's how I learn the direction of the streets, and where the lights and high traffic areas are. I can see big buildings and large landmarks and find where the sidewalks are. I knew San Francisco from living there before I became visually impaired, but it is confusing now with all the traffic and crowds. Noise is a big, big factor. Trying to cross streets is difficult, especially since not everyone pays attention to the lights. At crossings without lights, I listen for cars, or follow other people – which can also be hazardous because they don't always cross safely either.

While skiing, I have a guide in front of me, who talks to me as we go down the course. We experimented with microphones and headsets, but the wind noise makes it difficult to understand each other. Really, I just follow the "dot" in front of me. The guide stays about 5-15 feet ahead (I don't have much depth perception) and gives me verbal warnings about types of course changes, bumps, and other obstacles. The choice of a guide is deeply personal, and I've had the same guide for the last 3 years. Every disabled athlete uses some kind of "adaptation" – mine is another person.

(extra) What contributes to your aesthetic enjoyment of an environment?

I'm sensitive to colors. Dark colors all look black, and light colors all look white, but bright colors like red stick out, and I like that. Contrast in colors really stands out, and in fact is necessary for me to be able to see things. I can't really visually appreciate most art or design; so functionality is more important than other things. Texture, temperature, and feel are important as well. When you lose your visual abilities, your other senses don't really become more sensitive, as some people say, but you use them more. I use my hearing and sense of smell more than others do. Since your focus changes and you rely on your eyes less, you rely on other senses more.

The Universally Designed Village

Tim Willis

Georgia

Sydney 2000, Atlanta 1996, Barcelona 1992

Track: Runner: 5000 and 10,000m races

Disability: Blind

What do you remember most about the accommodations in the Olympic Village(s)?

To my knowledge everything, particularly in Barcelona and Sydney, was accessible to everyone. There was always a way to get where you wanted to go. There were ramps, and the local organizing committee provided transportation.

Sydney's was the best. All the buses kneeled, and I was told that the taxis were also wheelchair accessible, though I never saw one. The mindset in Sydney was that they wanted everyone to enjoy the games.

As far as the blind are concerned, it's nice to have Braille maps of the village and the city, to be able to visualize and get a feel for the village. Barcelona and Sydney had them, but not Atlanta. They are pretty simple and easy to make with modern technology.

In Barcelona, everyone was given a "clicker" that activated speakers throughout the village, to let you know where you were. I didn't use it that much, but it was nice idea. The "clicker" was a little remote control, like you have for a car alarm.

There's one thing that I notice everywhere around the world, except in the US; traffic lights are hooked to an audible signal. The light control box next to you clicks slowly when the light is red and you can't walk, and clicks faster when the light is green. Maybe it is more common in Europe because of the large number of people there that were disabled in the wars. The places where I've noticed it in the US have been on college campus where there might be a population of blind students who have raised the issue.

What were the best and worst aspects of the Village(s) in terms of mobility and access?

The best was Sydney; everything was totally accessible. Everything was wide enough for wheelchairs; the sidewalks were plenty wide.

Atlanta was the worst. They basically took the Olympic village and smashed it to make it small enough for the Paralympic village.

Barcelona was not as roomy in terms of getting around; they had narrower sidewalks. Not that it was bad, but Sydney was still better.

Are there particular types of disability that tend to be accommodated more effectively than others?

Typically blind people, particularly in new places, walk with a guide, because you can't take the time to learn a new place.

Low hanging signs, and sign posts in the middle of the sidewalk, are some of the problems for blind people. Even when I'm using a cane I can miss them and crash into them. That wasn't a problem in Barcelona and Sydney, though it was probably a problem in Atlanta. I don't even remember there being much in the way of sidewalks in the village in Atlanta. Atlanta's village was old and converted, while the others were new. I felt safe leaving my place alone and going to the dining hall, for example, except in Atlanta. I just didn't feel like it was laid out or planned to be easy to get around.

In Sydney, the buses had lots of space, but they just weren't built to hold a lot of wheelchairs at once. Some buses have raised loading platforms, and the bus extends a flat ramp out to the platform, so people can cross straight onto bus.

Providing Braille maps is helpful, but Sydney didn't have them.

I didn't use the navigation aids in Barcelona, because I was usually hanging out with people that I was comfortable with, so I didn't need them.

Sydney had computer kiosks for information on events, but they were usually found in the visitors' centers and other services locations. Barcelona had something like that as well, but the technology was less developed at that time.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

To be honest, I don't remember one at any of the games. There were situations where getting around was slowed. For example, Atlanta's village was smashed (*Much of the original Olympic Village was dismantled before and during the Paralympics*) and small, so it was crowded. But in general organizers tend to recognize the need for good flows of pedestrian traffic.

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

If you stay at a European hotel, typically you're going to have a pretty nice place for these events. But some other international cities don't have as good accessibility as Sydney. They really made an effort there to accommodate the disabled. I'm not sure how easy it is to travel in Europe in a wheelchair; I don't know what the subways and buses are like from a wheelchair user's perspective. In other cities you may find some impediments in public transportation, and on the sidewalks, but they always have the sounding devices on lights at intersections.

What sort of design features would your "ideal" training/housing complex contain?

My big thing is wide sidewalks, and curb cuts too. I'm a runner, and curb cuts mean I don't have to break my stride. Of course, I'd want to have the audible crossing signals at all major intersections. Signposts and mailboxes would be out of the way and away from head level.

I run with a guide all the time, even when training; we run with a shoestring between us so we can move our arms freely. When we approach a curb I take the guide's arm, and he tells me when to step up or down.

I'm completely blind. I started to lose my sight around age 7. I was starting to learn how to read at that age, so I learned how to read Braille.

Remember that disabled athletes are much more able to get over and around physical obstacles than other disabled people are.

I'm attorney now, and I deal with a lot of disability issues. I'm involved in a situation in Atlanta with public transportation; some of the buses have ramps that are too steep. Disability law and policy is about a third of what I get involved in. I didn't specialize in it, but I follow it more naturally now that I'm out of law school.

Disabled athletes are the highest demographic among disabled people. They usually have the most education, the highest level of employability, the most resources to travel with, and the highest quality of life.

Amputees

Karen Norris

California

Sydney 2000, Atlanta 1996, Barcelona 1992

Swimmer

Disability: Single Below Knee Amputee.

What do you remember most about the accommodations in the Olympic Village(s)?

Barcelona was adapted for the disabled, but it was not designed for them from the beginning. The cafeteria was in a building that would later be a shopping mall. Access to the lower floor was via escalators and a really steep curving ramp. The ramp was too fast for wheelchair users going down, and too steep to go back up. They had volunteers there after a while to help wheelchair users up and down. The streets were really accessible with lots of curb cuts and level crossings through the street medians. The open areas were all accessible, even the beach and the boardwalk.

The living accommodations were in high-rise buildings and had very narrow sets of stairs. The elevators were dreadful; they didn't function very well, were a pain to use, and were tiny – just big enough for 1, or maybe 2, wheelchair users, but without enough space to turn around.

Getting over the thresholds of bathtubs, to use the shower, is sometimes a problem for me. I usually kneel on the edge with one leg while I swing my other leg over. But often there are sliding doors built into the edge of the tub that make it uncomfortable to kneel on threshold. It's a problem I run into everywhere. The only good showers I've seen while traveling are at Motel 6!

In Sydney we had temporary showers on the ground floors of some of the housing. We also had temporary trailers in the yards behind the houses to accommodate more athletes.

Sydney was pretty well designed. Their street curbs are different from the curbs we are used to, though. Their curbs had rounded edges, not like the square

edges that are most common in the US. Wheelchair users were tempted to roll over the edges into the streets, but the drop was a little too steep for that.

Barcelona was flat, which was great.

Sydney didn't have enough buses, so they were often full and I ended up walking everywhere within the village. Also, the buses followed one single route in a continuous loop through the village. It was a one-way loop, so you had to go all the way around the route to get to some stops that were nearby but in the opposite direction that the buses traveled.

Atlanta was very hilly, and they also had a transportation loop within the village, but they used golf carts to take the athletes around. There weren't enough of the golf carts, so we ended up walking everywhere. The Georgia Tech campus, where the village was, is an old campus, and it wasn't adequately accessible; there were not enough curb cuts, for example. I try to forget about Atlanta. We had bathtubs in our rooms, and some wider doorways, but the rooms weren't big enough for two people with equipment like wheelchairs or crutches,

I use crutches sometimes to get around when not wearing my prosthesis. They look like very typical forearm crutches, but they have smaller cuffs around the forearm so that the crutch doesn't always swing up when I lift my arm. Full cuffs are handy, however, when you are holding things or opening doors. My crutches are super lightweight though, and the smaller cuffs don't mess up my clothes. I mainly use them to get into the shower in unfamiliar places, and when around the pool (*Because I am not wearing my prosthesis*).

Were there specific improvements that you could have suggested?

Cracks in the sidewalk, tree roots, and other unexpected changes or edges in a walkway can be a tripping hazard for me. But as long as I can see them, it's not a problem. I am able to hike over really rough terrain, so it is not a problem as long as I know the hazards are coming, but maybe they could be a bigger problem for other people.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

In Atlanta, we had to walk through the middle of a construction zone. We had to walk over mud, cables, and gravel. In some places they put down pieces of plywood for people to walk on. They were tearing down structures from the Olympics in the middle of while the Paralympics were going on. To traverse one site we had to get across, there were covered walkways and walking surfaces that were difficult for wheelchair users others with mobility impairments.

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

Other competitions are usually held in older facilities, hotels and motels. The Paralympic facilities are much better.

What sort of design features would your “ideal” training/housing complex contain?

I'd have a Jacuzzi in every room! For me, the thing at the top of the list is really the shower, the issues I mentioned before.

There is also the question of elevators versus stairs. Stairs and escalators can be a problem for me. Stairs are usually fine though, when my leg is fitted properly, but I need an elevator as a backup.

I would want a comfortable room with lots of light for reading. I spend most of my time outside, but I don't like sitting out in the sun, so I need covered areas. I would also like lots of walking and hiking trails.

(extra) Do you take your prosthesis off often, to relax or for other reasons?

I don't take it on and off to relax. I take it off for showering and swimming, but mostly I don't take it off at all during the day. I can take it off partially, for things like

The Universally Designed Village

trips on planes, or short naps (sleeping with it on is not very comfortable). Otherwise, it stays on from morning to nighttime.

Jason Wening

Chicago

Sydney 2000, Atlanta 1996, Barcelona 1992

Swimming: 400m, 800m, and 1500m Freestyle

Disability: Bilateral Below Knee Amputee: missing both legs at the ankle.

(extra) Can you tell me a little bit about what your life is like as an amputee?

I am a congenital [*from birth*] bilateral below knee (BK) amputee. We aren't allowed to use any prosthetics or any type of assistive devices while swimming. When out of the water, I wear two prostheses, and I am completely mobile. I walk better than the average American, and I don't have any problems with stairs, ramps, or other terrain.

Single above knee (AK) amputees are also fairly mobile, though they have some trouble with stairs. Bilateral AK's usually use a wheelchair; with two everyday walking prostheses they have some walking ability, but limited control. Competition prostheses, which are worn for running races, are hard to stand in. They are made for propelling you off the ground, not for supporting you while standing.

What do you remember most about the accommodations in the Olympic Village(s)?

Barcelona was a friendly village as far as disability goes; there was lots of transportation, though not much in the way of elevator transport within the apartments. It was nice being close to the beach, and having balconies that offered nice views. Barcelona went really well in general, but I don't remember how they housed the wheelchairs. As I remember it, everything above ground was difficult to get to, because there were only a few elevators in each building and they were smaller than American elevators.

Barcelona was the most accommodating of the three villages in terms of public areas and gathering spots. All the common areas were really open.

Everything in the village was level, and there were lots of curb cuts. The buses loaded at ground level, so they were quick to load and unload.

Atlanta was goofy, because there weren't really a lot common areas to begin with. Lots of the fun stuff that was there for the Olympics got taken down before the Paralympics. The village was built on a hillside on a very steep slope. There was no easy way for wheelchair users to move up and down the slope, to get to cafeteria, housing, and other facilities. The shuttles in the village were too small to carry wheelchairs, so we used to hang onto the back and string along behind them. Fortunately for the swimmers, the competition pool was in the village, so we didn't have to worry about getting to and from the venues, and getting in and out of village. But the village's location, on the side of a hill, by definition made it inaccessible.

Sydney was built as a thing unto itself, a self-contained village. Like in Atlanta, the Sydney Olympic Village was built on a hill, but the internal bus system was so good that you could be picked up just about anywhere and taken just about anywhere. Sydney was a very large village - maybe more than half a mile across - so walking distances were long. But again, the bus system was so good that the distances weren't a big deal. None of the houses in the village were built for wheelchair users; but they were adapted with ramps up the front stairs. Some of the more severely disabled athletes had trouble with the ramps because of steepness.

What were the best and worst aspects of the Village(s) in terms of mobility and access?

Impressions of the villages depended so much on personal experiences, and on your location within villages. In Barcelona, the US team was close to cafeteria, so we didn't have to do a lot of walking to get to most places we wanted to go. In Atlanta, we were one of the farthest teams from swimming pool, but our housing had ground level entrances. In Sydney, we were housed downhill from the cafeteria, which was a bit inconvenient. Also in Sydney, the place where the external buses dropped you off was downhill from the security entrance to the village, so we had to push uphill to enter the village, but that really wasn't that big a deal. It's a stretch to say something bad about Sydney; the whole thing was well built and put together well, and they were the best run Paralympics I've been to.

Are there particular types of disability that tend to be accommodated more effectively than others?

Yes, without a doubt. Minimal amputees are easy to accommodate, and amputees in general are easy to accommodate. Severe disabilities are harder. If you can accommodate a severe quadriplegic, then you can probably accommodate 99% of the wheelchair users out there. If you can accommodate the average dwarf, then you can accommodate anybody out there who can walk. And if you can accommodate one blind person, then you can probably accommodate any blind person out there.

The US team had several blind athletes, with different abilities and different levels of confidence. For the first few days, they all needed guides to show them around. After that, some were completely independent. A lot of the time, the team travels in groups anyways, so they don't have to find their way around alone. But once they figure out where things are, in general they're fine.

Were there specific improvements that you could have suggested?

Nothing stands out to me. There were some complaints about the rooms. The dorm rooms in Atlanta were four-bedroom suites: four rooms with one shared bathroom. The rooms were originally designed for one person, so they were only about 8 ft. by 8 ft., but we had two beds to a room. With the beds, there wasn't enough space to fit two wheelchairs in a room at one time.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

Honestly, the biggest impediments were the hills that the villages were built on. In Sydney the hills weren't a big deal, because of the bus system, although the buses did get very crowded at rush hour.

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

At other competitions we were housed in hotels. Usually we were in mid-to-high range hotels. But hotels are a completely different kind of animal from the villages. Our meals would be in a conference room or some other kind of gathering space. Generally, the whole thing is self-contained within the hotel.

What sort of design features would your “ideal” training/housing complex contain?

It would probably be built on a hub, with things like the cafeteria centralized, and the housing around it the center. Because the cafeteria and other common facilities in the villages tend to be temporary, most villages had them located at one end, with the apartments strung out from it. In Atlanta and Sydney, the cafeteria structures were tents. In Barcelona, the cafeteria was in the basement of a large commercial building that later became a shopping center.

If you were designing a permanent training center, you would have a little bit more freedom to put things in a better place. I spent some time at the training center in Colorado Springs. There, the new housing was built on a hill. By incorporating basement entrances into the design, the designers made it possible for people to enter and exit at the lower ground level, which got rid of hill problem.

I would build in a flat area, with the cafeteria and other amenities centralized in a hub layout. The training venues would be centralized as well, or they could be within the first ring of the hub with housing on the outer edge. Or you could have some other arrangement of training facilities and housing around a center.

(extra) Can you tell me what your daily routine in Colorado Springs was like?

After I woke up, I would swim for 2 hours before breakfast. Then we had team meetings, or some free time to sleep, chat, or stroll around. Sometimes we might do some scientific filming or other special activities. Then we'd have lunch, maybe another team meeting, and 2 more hours of swimming before dinner. Sometimes we

had more meetings or other team activities after dinner. Then we had a last hour of free time before lights out.

There was not a lot of variety in my workouts; I was focused on swimming, whether in or out of the pool. I can't deal with the other sports I enjoy, like racquetball, rollerblading, rock climbing, or kayaking, because I have too much stress on my body already from the swimming. I do more of that when I'm not seriously training. When I'm really focused on swimming, I spend 28 hours a week in the water, plus dry land workout sessions.

The Universally Designed Village

Dwarves

Connie Eisenbraun

California
Sydney 2000
Power Lifting
Disability: Dwarf

What do you remember most about the accommodations in the Olympic Village(s)?

We didn't stay in a house. The wheelchair athletes stayed in the houses, on the lower floors, because they had ramps. The US media stayed upstairs in the houses. We were in portable trailers behind the houses, which had a generalized room and two 2-person bedrooms. The toilets had very small sinks. Also, you had to climb steps up to the bathroom door to open it, which made it difficult to get in and out of. The doors had slightly high handles, and you had to back down the stairs to pull the door open. The mirrors in the bathrooms were too high, so we couldn't see into them, and had to use portable mirrors we brought with us.

They had brand new buses in the village that had never been out on the street, which were very accessible for wheelchairs. When the buses stopped, they tilted down to the ground, and a ramp came out for wheelchair users. There was floor space in the bus for wheelchairs with rails to hold onto. There were regular seats in the other half of the buses, which was where we sat.

We did a lot of walking across the village as the buses became crowded over time with the arrival of more athletes. It was nice to have easy access to the bus, compared to buses in the U.S., which tend to have steps that are too narrow and too high.

The whole village in Sydney was accessible, with low counters everywhere. I was able to see the food being served and what my choices were. The curbs in the village were low, and the sidewalks all had ramps. These details make a difference for little people when they are walking.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

The main problem was tired legs. We did lots of walking around the village, and some things were too far apart. Because little people have shorter legs, reasonably comfortable walking distances are shorter than for full-sized people. Most things should be within a mile or less. Older dwarves in particular are less mobile, because they have a lot of back problems. Exercise, like walking, helps counteract these problems. But for many dwarves it eventually leads into surgery. I had surgery six years ago, which allowed me to compete in Sydney.

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

The village was ideal. I can recall a competition in Dubai for the world games. They were pretty accessible; they had made wooden ramps to help get on the buses, although some were too steep for some users. I thought it was decent at that time, but it was nothing compared to the Olympic village. Their lack of modernization and their cultural beliefs probably partially explain their accessibility problems, but you could see that they were making an attempt to catch up to the rest of the world.

What sort of design features would your “ideal” training/housing complex contain?

I liked the way the houses in Sydney were designed with ramps. They were not very steep because they had been made longer. And the sidewalks were all very accessible.

I would make sure that the counters were low enough, but not too low for able-bodied people. My biggest issue is counters. The counters in Subway restaurants are taller than I am. 5-foot counters are unreasonably high. There's no reason for counters to be that high; it's too high for even the average-sized customer. The average human height is not so tall. My sister has a Togo's sandwich

shop with a counter specially designed for little people, but her employees had to be trained to recognize and serve customers at that counter.

I also have problems with shelves. Stores should have lower shelves, and items on the shelves should not be stacked so high.

The Universally Designed Village

Joe Griffo

California

Barcelona 1992

Power Lifting

Disability: Dwarf: (4'3" Tall)

What do you remember most about the accommodations in the Olympic Village(s)?

The accommodations in Barcelona were really great. They were like condos, with kitchens and bathrooms. I thought they were fabulous. They had a stool in the bathroom to help little people reach things. They were well organized, and the facilities were great. The transportation system was great too.

It's interesting to compare the US and Barcelona on design for the disabled. We were up on the third floor of our building, but we had an elevator, so that was ok. In some countries things tend to be really high. Elevator buttons and urinals are frequent problems. My biggest beef is bathrooms. In Europe, the urinals can be really high. Lights used to be a problem too. Ironically, most "handicapped" toilets are really high (for wheelchair users), but the bars on the wall next to them help me to use them anyway.

There are some little people who use wheelchairs. They have the hardest time getting around, and I really respect them. They use wheelchairs adapted to their size, which can be done fairly easily now with the aid of computers.

Shower and bath control knobs, and shower heads, are frequent problems. Some controls are adjustable, like the ones that slide up and down on a bar. But the problem is that you need a way to move them down when they are out of reach. Bathtubs with high walls can also be a problem. We have to climb over the edge. They could be designed to be sunken into the floor so that they are easier to get into.

Walking distances are sometimes an issue. We can't walk as far full-sized people without getting tired.

Shelving in stores is a common problem as well. Stores just seem to be stocking things higher and higher. Card racks are especially frustrating; I usually have to ask someone else to grab something for me.

What were the best and worst aspects of the Village(s) in terms of mobility and access?

Because we're small, we need stools to reach things, and we sometimes have difficulty getting in and out of buses and other vehicles. But things seemed pretty well provided for in the village over all. We need to have stools handy for when we can't reach things on our feet, but otherwise we are pretty adaptable, and find some way to do what we need to do.

What sort of design features would your "ideal" training/housing complex contain?

I was brought up in the 60s, when discrimination was rampant. Little people couldn't get jobs. I couldn't play basketball in high school. Finally a coach let me play on the soccer team, and I was good enough to be a first string player. I also played football and any other sports that coaches would let me play. Some coaches would let me play, but not others. Now it's a little bit easier; with the ADA, we are slowly moving away from that kind of discrimination.

I also worked as an electronic technician for 15 years. When I realized that my boss was never going to give me a raise, even long after I had earned one, I moved on. Now I've been acting for the last 14 years.

There is some variety in the heights of dwarves, and the physical barriers that we encounter in everyday life depends partially on individual size. Mostly though, I just deal with it and find another way around; I find another way to get what I want. I don't get discouraged and I don't give up. Little by little, a lot of things are changing.

Wheelchair Users

Jeff Adams

Toronto

Atlanta 1996, Barcelona 1992, Seoul 1988

Wheelchair Racing

Disability: Uses a wheelchair

Director of Accessibility for Toronto 2008 bid

What do you remember most about the accommodations in the Olympic Village(s)?

Sydney was a good example of universality; there were not a lot of retrofits needed to accommodate the athletes. I was there for the Olympics as well, and the biggest changes in the village, during the conversion from the Olympics to the Paralympics, were in signage. They changed things like the wording, from “Olympic” to “Paralympic”, and they added more Braille and improved signage for the visually impaired.

They had accessible bathrooms in the village and residences from the beginning.

That’s probably because Australia has strict accessibility codes similar to the American ADA. It’s a two-tiered system: new buildings have to comply with accessibility standards, and older buildings must be brought up to code when they are renewed or renovated.

Design in Sydney was very utilitarian though, and not very pleasing aesthetically. They placed a high priority on environmental design concerns, and not as much on aesthetic design.

Barcelona was beautiful. Spain is ahead of the curve as far as accessibility in Europe goes. Design in Barcelona was much more appealing aesthetically, and still rivaled the accessibility of Sydney. For example, the cafeteria in Barcelona had a big beautiful sweeping staircase, but it also had elevators and ramps that were closed during the Olympics, and opened for use during the Paralympics.

Korea was very “Korean”. There was a lot of concrete, brick and mortar, which was ugly.

Atlanta was a nightmare. Clean up didn't happen like it was supposed to. When the Paralympics came in after the Olympics were over, a lot of the sponsor companies pulled their stuff out of the village. IBM removed its communication wires, and McDonalds left as well.

Were there specific improvements that you could have suggested?

Sydney couldn't really have been any better, except in terms of aesthetics. The internal transportation was accessible; the housing at ground level was completely accessible. There was a noticeable gap in "universality" during the Olympics however: the medical facilities had steps at the entrance, and a blind judo athlete who had broken his leg had trouble getting in and out of the medical facilities. Also the transport from the village to the event centers wasn't accessible until the Paralympics started, because the organizers thought it wouldn't be needed until then. In order to have enough accessible vehicles, they had to borrow them from surrounding communities though, so it was understandable that they didn't get them until they were really needed.

How do the Paralympic villages compare with athletic and housing facilities at other major competitions for disabled athletes?

The villages are head and shoulders above anything else. When I go away to other competitions I usually stay at university residences or hotels or something like that. The accessibility level varies a lot.

Are there particular types of disability that tend to be accommodated more effectively than others?

I can only really speak from the wheelchair user's point of view. But the full range of wheelchair users was accommodated; nobody seemed to have any trouble.

Way finding didn't seem to be an issue. The visually impaired athletes had full time guides to help them. There was a lack of full time signage in cafeteria, but the cafeteria was confusing for everybody because it was so enormous. There were so

many choices of food and nothing was very well marked, so signage for everyone was poor.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

The biggest impediment to design is the vastness of the range of disabilities. There are so many that it is hard to accommodate them all simultaneously. That is the biggest problem with universal design. You can potentially imagine situations where universal design is needed, but you can't really know what is needed if you haven't been in that situation yourself.

What is the biggest stereotype of designing to accommodate people in wheelchairs? That everything needs to be bigger, like wide doorways, for example. Why do we need an 8 ft. turning radius in a bathroom? It's because of the room that our adaptive equipment needs to maneuver. But maybe that equipment should be designed better! We give free reign to equipment makers to design big, hard to maneuver equipment. We should put some of the onus on users to demand better equipment. Improving equipment design is a more efficient solution than redesigning the whole environment to fit our equipment. If we design our equipment assuming the worst conditions, and at the same time design our buildings to create the best conditions, we'll end up with many more "winning combinations".

(extra) Are people with disabilities becoming more active in life (because of improved designs)?

There are so many other factors in addition to design. Weather and other factors can overrule everything else. Society's attitude towards people with disabilities is still limiting as well. A woman once opened an *automatic* door for me! There is still a vicious circle of limiting attitudes and lowered expectations between the disabled population and the able-bodied population. The easier our lives get, the more dependent we get. The more we get help, the more we need help. Bad design can lend itself to the downwards spiral. Good design provides more options and lets people empower themselves. An automatic door with a manual option is a perfect

example of the latter. I very rarely use the button to open the door automatically. 99% of the time I open it manually. But for the 1% of the time that I do need it (like when my hands are full) it is there. The greatest idea I've ever heard is a wheelchair for quadriplegics who are right on the verge of needing an electric chair. It would have a sensor that kicks the motor in when it's needed, on steep hills and ramps or when the user is tired.

What sort of design features would your ideal training/housing complex contain?

There are no accessibility codes in Canada at all, but there's a place called "Variety Village" that you should look at. It's a sports and activity complex in Toronto, which is the most accessible building in the world. It's a training facility for the disabled, but is also aimed at the able bodied. It has been there for about 20 years. <http://www.varietyontario.com/village/>

Ross Davis

Texas

Sydney 2000, Atlanta 1996, Barcelona 1992

Track: 100m 200m 400m 800m wheelchair races

Disability: Spastic Diplegia: Wheelchair user; lower legs don't work very well; doesn't have the coordination to walk.

What do you remember most about the accommodations in the Olympic Village(s)?

In Atlanta we slept in bunk beds. There were 2 guys with 2 wheelchairs each in a room with bunk beds and we couldn't all fit in the room. And the village transportation wasn't good. Atlanta wasn't a good experience overall. Most of the wheelchair users were on upper floors, which resulted in crowding at the elevators. It was tough to get all our equipment into elevators too. Atlanta was mostly memorable for how bad it was. There were problems with both the internal and external transportation systems.

In Sydney buses ran through the housing on pre-planned routes, and all the housing was located less than a block away from the bus. The buses had low floors; so there was no need for lifts.

Actually I don't even remember an internal transportation system in Atlanta; if there was one, I never used it.

In Barcelona I didn't use the internal transportation system much either, even though there was one; the village was well planned with a central hub and linear arms with condos all the way down.

Sydney was the best. Barcelona and Sydney were both all-new construction. A lot of temporary walls were put up which would be removed later to make family housing out of the units. We had cheap walls and floors that the athletes could tear up, since they would replace it later anyway. Because of that, they were able to make our accommodations much more accessible than normal housing.

What were the best and worst aspects of the Village(s) in terms of mobility and access?

The best thing about Barcelona was the way it was centrally designed. There were practice areas in the village, including a full sized track in village (actually all three villages had practice tracks).

The best thing about Sydney was that the village was built very close to the stadiums. At most games the facilities all spread out all over the city. Sydney had everything arranged around a single mall area; all the venues were located around the walking and transportation area. And it was connected to city with great public transportation. Sydney also had 3 tracks we could use. Overall they were the best Paralympics I've ever been to.

In Atlanta, the practice track was three miles from the competition venue. I had to warm up at the practice track, then get out of my wheelchair, get on a bus, get back in my chair again later, and then try to race.

The best thing about Atlanta was the city's light rail system the MARTA. The system gives you great access to anywhere in the city. There are light rail spines throughout the city, with buses connecting at the stations like "vertebrae". You can get anywhere in the city on the MARTA; I was able to pick up my wife at the airport and take her back to our hotel, all on public transportation.

Are there particular types of disability that tend to be accommodated more effectively than others?

I really only know about wheelchairs and mobility impairments; I can't speak for other people. And I really didn't mix that much with other people. When I'm at a competition I focus on competing; I'm not there to hang out.

Were there specific improvements that you could have suggested?

Barcelona had a good design. The dining hall was interesting. It was two stories high, and it had a ramp that descended the whole distance down. It was a

drop of maybe 12-15 feet, with a ramp about 60 feet long, so it had a really steep grade.

Since the Atlanta village was built on an old university campus it is not really fair to criticize it in comparison to the newly built villages.

My recommendations for the other villages would be to look at Sydney and follow their example.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

Barcelona was wide open and flat. Atlanta was very hilly, even inside the campus village. It was too much effort; you wore yourself out trying to get around just to eat and do routine stuff. It's not the sort of thing you want to be doing right before a competition.

I climb hills to prepare for races, but that is months ahead of time. In fact I live on a hilly lot, and I use the hill in front of my house to train on. I can't even make it to the top without stopping to rest. But before a competition I stop doing heavy training and stop using weights. I only do high speed, high intensity workouts right before a competition, so I don't want to be climbing hills that I don't have to.

(description of my idea for a wheelchair “rock climbing” course)

The “Wheelchair Climbing” idea is good because it would work the posterior (pulling) muscles in your arms. Athletes in wheelchairs tend to build up their anterior (pushing) arm muscles. This would be a good exercise for chair athletes to balance their workouts.

There's a disabled climber, Mark Wellman, who climbed Half Dome in Yosemite. He was rope climbing with a harness, so basically he did pull-ups all the way up the side of the mountain.

Mary Green

Jackson, Michigan

Sydney 2000

Equestrian

Disability: Spina Bifida; Ambulatory with a cane, infrequent wheelchair user.

What do you remember most about the accommodations in the Olympic Village(s)?

I am not an everyday wheelchair user; I usually walk, with a cane. I brought my wheelchair with me to Sydney though, and I had some difficulties with the hills in village. They put me on a ground floor room in a house. Those rooms were good for people who don't do so well on stairs. The bathroom had good accessibility; the floors were flat and tiled, with floor-length shower curtains. You could roll a wheelchair right into the shower, which had a hand held nozzle with the option of hooking it to the wall.

The village in Sydney had good buses, specifically designed for the Paralympics. They were kneeling buses, with ramps that folded out or slid out from the entrance of the bus. These ramps were much easier, faster and safer than lifts.

The equestrian venue is always far away from the housing. In Sydney we spent a lot of time on the bus, and we didn't see much of the other athletes except those at the equestrian events. It was a 30-45 minute ride from the village to the horse stables. The stables themselves had a good setup. There were gravel roads, but they were well packed, and not all too difficult for a wheelchair user. All the equestrian events took place at the stables, where they had both training and competition arenas.

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

At national events in the states, they house us in university dorms or in a hotel or motel. The drawbacks of staying in these places are that's it hard to get

around, and the facilities are not so good for sanitation and cleanliness. It's often hard getting around in the bathrooms, because it is difficult to use a cane in them.

I was at the World Dressage Championships in Wales, but I didn't use a chair there. We were all on the ground level in the dormitories. Everything at the competition was very close, within sight. It didn't take much effort to get around. The competition venue was also fenced in, and contained.

At the Paralympics, there were probably 80-95 equestrian athletes; there would have been more than that at the World Championships.

Riders' abilities are classified into four grades: 1 through 4, with 1 being the most impaired and four the least. I was "graded out" (*disqualified from disabled competition*) because they said I was too strong. There was a huge uproar from my team and from me, since I had traveled so far and worked so hard to prepare. After that they changed the classification rulings. They are based not only on strength now, but also on joint range and x-rays. I am now considered a grade 3, but I insisted that the official classifier come to certify me in the US before I made the trip all the way to Sydney.

What sort of design features would your "ideal" training/housing complex contain?

There are a lot of safety issues for riders and horses. I would want to keep the horses in a secure environment. Most of the arenas in Sydney were in wide-open fields. If anything happened with the horse, it could just take off riding across the field; there was no way to control them. The organizers didn't seem to think about managing the total environment. They had helmets and other personal safety equipment, but they didn't seem to consider the dangers of the larger environment.

We had laundry facilities in the village that were close to the housing, but none actually in the units. Laundry bags were provided, labeled with our names. They were supposed to just throw the entire bag in, so that the clothes didn't get mixed up. But the clothes were taken out at some point and folded. It would have been nice to have washers and dryers in the units.

There were no showers at the equestrian venues, which would have been nice. We did have portable bathrooms, but they were the kind that was on a trailer,

not on the ground. The ramps to access them were steep and hard to get up. Also, they didn't seem to have enough of them, and they were too far apart.

(extra) Can you tell me a little bit about Spina Bifida and how it affects you?

Spina Bifida (SB) results from a separation of the spinal cord where the spine fails to close properly, leaving a hole where the spinal cord is vulnerable. Mine is just above my tailbone. I was born in 1947, and because of all the advances in medical science that occurred during the war, that was about the time that doctors started to treat babies with SB, whereas before they would let a lot of them die. I had surgery in 1951, where they clipped my cartilage and tried to allow my spine to straighten. At that time I was the youngest patient they had ever operated on. Most people with SB don't live past their teens, and they thought surgery might prolong my life into my 20s. They also said I would never walk normally, but I do. After the surgery, they took me to a physical therapy room, to learn to walk again. I didn't understand what the big deal was, and I did it – no problem – to everyone's surprise. Horse back riding is a popular therapy for SB, because it loosens up the back, hips, and spine.

I have some bladder and bowel control problems. One of my legs is an inch and a half shorter than the other, and I have partial club feet (I walk on the outside edge of my feet) but they have started to straighten out. Sometimes in morning, before my muscles loosen up, I still walk on the side of my feet.

I get tired easily, and I am prone to aches and hip problems with my longer leg. When it starts to burn, I have to sit down and rest; it slows me down a bit. I wear a 3/4" lift on my right leg, so I take shorter strides, which means I can't walk quite as fast as other people. I also have some trouble with cramping on stairs; I have to stop after one or two flights of stairs and rest.

I recently got a handicapped-parking permit. It helps a lot when I go out to the store and I'm carrying a lot of bags. I used to be tired out by the time I got into the building. Now, I get closer to the buildings, and I compromise and carry less at a time.

I worked as a custodian for a while, but I didn't have the necessary equipment for me to be able to do the job right. I keep a wooden spoon in my purse to help me

The Universally Designed Village

reach things and I make do as best as I can. I often look around for tools to help me accomplish tasks and overcome challenges.

Hope Hand

Pennsylvania

Sydney 2000, Atlanta 1996

Equestrian

Disability: Spinal Bifida: paralyzed from the waist, wheelchair user.

What do you remember most about the accommodations in the Olympic Village(s)?

I was the team captain in Sydney, so I had additional duties and responsibilities in the evenings. Sydney was completely different from Atlanta. Australia did a super job; the whole city was accessible. I've used a wheelchair my whole life, and I am very strong, so the hills and curbs and rough terrain didn't really bother someone like me. I went out every night and wandered around in my wheelchair, for miles at a time, just for the joy of getting out and getting around.

Atlanta was almost impossible to get around; it was really tough. There was gravel everywhere, and it was the big loosed kind, not small crushed gravel, which made it difficult for people in wheelchairs. People seemed left to their own devices in terms of transportation.

Sydney was more than accommodating. People went out of their way to help you out; bus drivers and police officers and others would help you with hills or other obstacles. There were so many volunteers around that you never felt stranded. But I missed not having a bathtub. There were only showers in the village accommodations.

The equestrian competition venue, where the stables were, was outside of the village. There they had a separate area for spectators and competitors, which were quite far from each other. After you finished, you had to cross a wide grass field to where you could see the other riders perform. Since it's difficult to use a wheelchair on grass, we were towed across the field behind a golf cart.

Overall, the amount that people went out and got involved in the village activities depended on their personalities, and on where they were from.

What were the best and worst aspects of the Village(s) in terms of mobility and access?

In Atlanta we were over an hour from the equestrian venue. There weren't enough buses for all the wheelchair users, so the team ended up renting our own van. In the dining area it was very hard to get to food. The lines were long, and the cafeteria was far from our rooms. The long lines meant people had to stand for a long time while waiting, which was tiring for some people.

Are there particular types of disability that tend to be accommodated more effectively than others?

People who use electric wheelchairs were well looked after. In the dining hall, volunteers were stationed at every entry, to help carry food trays and give any other assistance necessary, particularly for the people who were severely disabled. There was always a volunteer on hand if you needed something.

No body seemed to be left out of anything. In Sydney they made sure they had ample ramps so that everything was accessible.

Were there specific improvements that you could have suggested?

For the physically demanding sports, like the equestrian events, we needed to have more sports trainers, hot tubs, and therapists. The medical stations could have had more hot baths, places to soak and stretch out aching bodies.

I really didn't have any difficulties in Sydney. Whenever there were steps in my way, there was always another way around.

In Atlanta, we didn't even stay at the village after the first week. It was a 4-hour round trip commute to and from the horse park, which was just too much. We found our own accommodations closer to the horse park.

In Sydney we had a half-hour commute to the venue. And they provided for people, knowing that you were going to be there all day; there was a dining facility at the equestrian park. Transportation was unbelievable; there was always a bus when

you needed it, and if not you could call for a bus at any time. We hardly ever had to wait to get somewhere.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

Some of the venues got a little crowded. In the stadiums, people in wheelchairs could only view the sporting events from certain areas. We didn't have access to every level of the stadium because of steps and other barriers. It would be great to have access to every seat on every level. Even in the venue where they played wheelchair basketball, you still couldn't get close to the court in a wheelchair.

What were the differences you noticed, if any, in the approach to accommodating athletes with disabilities at different Villages (winter/summer, various locations)?

Transportation was totally accessible in Sydney, trains, buses, and all. In Atlanta, there were only a few accessible buses; and Atlanta was a disaster transportation-wise. I had to wait until 4 am for a ride to get home after the opening ceremony. Some of the athletes were so upset that they were throwing things. We couldn't get anywhere because of the gridlock.

In Sydney, things ran more smoothly during the Paralympics than the Olympics. I was there for both games. The same volunteers worked both events. By the time the Paralympics started, they had "warmed up" the system a little, and ironed out most of the bugs. It was hilly in Sydney, but they made an effort to use the flatter parts of the village for the Paralympics, and shut off the hillier parts that were used during the Olympics and weren't needed any more. *(The Paralympics are much smaller than the Olympics)*

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

I went to the world championships in Denmark, and it was pretty rough in terms of accommodations and getting around. Many of the dorm rooms, and a lot of the bathrooms, weren't really accessible. The horse park was nice and we didn't have any problems there, but the living quarters were pretty rough.

What sort of design features would your "ideal" training/housing complex contain?

It would have been nice to see more gyms; people in the US go to a lot of gyms. They had a little gym in the village in Sydney, but not enough equipment to really work out. A lot of people jogged, but it would have been nice to have an exercise pool as well.

The pub-like spots where we would hang out and socialize were nice, but they could have been bigger in the centralized areas.

The open-air entertainment spots were nice as well. I would like more gathering spaces in general, more "fun spots". Places to jump out of your chair, with softer seating, and grab bars. In some pubs I've been to, they had a bar dropped down to a lower level, with little barstools. It was a little mini-bar, decoratively incorporated into the overall design. And it was interesting enough that able-bodied people used it as well.

Disco-like venues, with different types of grab bars, and different types of seating, are enjoyable. Those kinds of things can be put in to make a place accessible, but they can still be done in a creative and interesting manner. However, you need to do something with the wheelchairs in a place like that. Space can get tight with a bunch of wheelchair users that are not using their chairs – the pile of empty chairs becomes a problem.

When going up a long ramp in a wheelchair, it's nice to have a horizontal railing to grab onto to help pull yourself up. Rugs are hard to use in a wheelchair, because of the drag on the wheels. Rubber is fine. Sand is bad; again, it is hard to maneuver.

Curb cuts, of course, are important. There were curb cuts everywhere in Sydney; they were so prevalent that it was kind of surprising!

Cup holders are a nice feature for someone who uses a wheelchair. It would be nice to have clamp-on cup holders, to attach to wheelchairs and other places.

Also, we could have used a maintenance station, for making repairs, replacing tires, or putting more air in them. They had one for the wheelchair racers, but not for everyday users.

Scott Hollenbeck

Atlanta

Sydney 2000, Atlanta 1996, Barcelona 1992

Wheelchair racing

Disability: Wheelchair user

Consultant for 2012 Bid Cities: Tampa and Orlando (central Florida corridor)

What do you remember most about the accommodations in the Olympic Village(s)?

Barcelona had great outdoor spaces. The accessible beach was really nice; they are quite rare. Accessibility in all the outdoor spaces had been tastefully done and had style to it. It was integrated into the design, not a “band aid”. The way they made a boardwalk onto the beach was phenomenal. Popular too: about 70% of all people going to the beach, disabled or not, used the boardwalk for access. Most of the housing in Barcelona was multi-level, and they rolled the landscape in a way that integrated various levels of the buildings. So you could access different floors without using an elevator, and you didn’t feel like you were on a ramp. The cafeteria was pretty inaccessible though; it had an elevator to some parts, but you had to go up and down steps to get to other parts. Transportation was great. The buses had dual-use seats that folded up for wheelchairs, and no lifts (lifts suck!). There were also platforms at bus stops from which you could roll straight onto the bus.

Atlanta was nothing to write home about. It was actually disappointing, given the resources of the US. The hilly terrain of the village created usage issues. The interiors were fine, but nothing special, and the village had curb cuts and group areas. Since I already live in the city of Atlanta, I didn’t spend much time in the village. But I saw the village during both games, and all the recreation areas and communal areas were torn down after the Olympics were over, before the Paralympics happened.

The reasons for that have to do with the fact that we had two separate organizing committees for the two events. There are three levels of organizers for Olympic events: the International Olympic Committee (IOC), the national Organizing

Committee (USOC), and the Local Organizing Committee (LOC) in the host city. In Atlanta, the host organizers for the Olympics were concerned that the Paralympics might compete with their success, so they approached them as an adversary. Every task for the two events was done by separate groups of people. The local and national Olympic committees made no associations or understandings with, or financial investments in, the Paralympics. The USOC and the bid committee didn't want to get involved with Paralympics, because it saw them as competition for their success.

Sydney had the best transportation system; they had the fewest vertical transitions. Sydney was great. They had an efficiently laid out village. There was a great little transportation system, but you also had the option of walking, which I liked. I would have liked to see the dining hall more centrally located, along with the transportation center. Instead they were located at one end of the village. Locating these facilities in the center of the village would have encouraged non-motorized transportation even more. But all the services were split between the two ends; that's where they missed their chance. If the Olympics are really to be a celebration of humanity and all that we can accomplish together, it should be mandatory that the games are green, and that the village has long-term usage guarantees. We should be moving away from the need to drive everywhere. These days, host cities that win the Olympics have 15 years of support ahead of time, and everybody gets behind it, including groups like the NAACP, and the Sierra Club. It's one of the few chances we have to do everything right. Unfortunately, the people who market the Olympic Games aren't necessarily eco-minded.

For their bid, Tampa is tearing down 380 acres of old public housing. We now have a chance to rebuild a mixed-income, mixed-use neighborhood.

It's likely that the US will get the games again soon because 80% of all the money that goes into the whole Olympic movement comes from the US. The IOC relies on the US to survive.

What were the best and worst aspects of the Village in terms of mobility and access?

Barcelona had centrally located services, and no problems in the small details like curb cuts. No problems, really

Atlanta was hilly and the village was a hodge-podge; I say that not so much because of the mobility issues, but because of the temporary nature of facilities. I give it a C. Sydney was a B, almost an A.

I don't live on a hill, and that was because I made a conscious decision not to live on a hill. If you use a wheelchair and live on a hill you are an idiot.

It would have been nice to have a central corridor along the water or something flat (like a river walkway, or rails-to-trails) to travel along in the village.

The best thing I can say about Atlanta is that I could go eat, and I could do what I needed to do. Things had been arranged so that there were no barriers.

Location specifics and grading all really depend on the sites that are chosen.

In terms of physical barriers, all the villages were B pluses. In terms of layout, they ranged from C to B; I haven't seen any A's.

The bathrooms were higher than they needed to be in some cases. The kitchen areas were OK, but they were pretty bare bones; there was nothing ingenious. The houses were going to be gutted after the athletes left so they didn't use top end furnishings for us.

One thing that is phenomenal for a wheelchair user, is a center island that is lowered for kitchen work.

What sort of design features would your ideal training/housing complex contain?

One thing I hate about outdoor spaces is any kind of designated seating for wheelchairs, like wheelchair seating in stadiums and theatres. I want to have multiple options. There is must be a way that things can be designed so that a large percentage of seating is accessible and there are lots of options.

Chris Waddell

Vail, Colorado

Sydney 2000, Nagano 1998, Atlanta 1996, Lillehammer 1994, Albertville 1992

Winter: Mono-Skiing (all four events)

Summer: Wheelchair Racing (four individual events)

Disability: Paralyzed below the waist (1988 ski accident)

What do you remember most about the accommodations in the Olympic Village(s)?

Albertville didn't really have a "village"; it was basically one hotel across the street from the mountain.

Lillehammer was completely modular. The hardest part about the village was the slight grade from the accommodations to the facilities. Gravel or snow on the roads in the village made travel more difficult, and I was sweating by the end of trip, in spite of the cold. Getting in and out of the village, through security, was fast. The housing setup in Lillehammer was attractive too; it was nice sharing a house with team members and having different teams in different types of houses (this was also true in Sydney). The village in Lillehammer was also nice because of the proximity; everything was nearby.

Atlanta had a huge hill in the middle of the campus (village). There was a shuttle, but I never took it. It didn't go very far, and it was difficult to board, and then difficult to get off later. It was a nightmare going up the hill to the dining halls, and other facilities. It took a lot of work just getting around the village, which was compounded by the heat and humidity in Atlanta. Access was not too bad in terms of ramps and curb cuts; they did a good job with temporary additions.

Nagano was really flat and accessible. The village was self-contained and small, and away from the snow because it was off the mountain. The important stuff was centrally located, at the top of the village, and other stuff was located intelligently. However, the village looked horrible, like an army barracks.

Sydney had lots of hills as well. The village housing was pretty good, since it was actually going to be used after games. They had buses running everywhere, but

it was sometimes quicker not to wait for them. Things in the village were far apart. There was a central entertainment location, with a deli and a library, located at one end of the village, but the dining hall was on the end of the village; it was probably a mile or two from one end to the other.

What were the best and worst aspects of the Village in terms of mobility and access?

Sydney had a nice variety of houses. There were probably 10-12 athletes per house. But there weren't always curb cuts located in front of every house, which was slightly annoying because we usually used the roads to get around, and then couldn't get onto the sidewalk in front of our house. We had to go down to the end of the block to where there was a curb cut.

What were the differences you noticed, if any, in the approach to accommodating disabled athletes at different Villages (winter/summer, various locations)?

International standards are set and enforced by the International Paralympics Committee.

How do the Paralympic villages compare with athletic and housing facilities at other major competitions for disabled athletes?

The Paralympics are the biggest athletic competition for disabled athletes so they are expected to be the best, and they usually are. Lillehammer was mostly about ramps. But awareness has continued to grow. Nagano was brand new, so they put in everything up to the standards, and they had big elevators.

Are there particular types of disability that tend to be accommodated more effectively than others?

It is always more difficult for people with the more severe disabilities. Even small tasks are more difficult. It's a "catch 22"; you want to make things as easy as possible for everybody, but don't want to do so much that it becomes a hassle for others.

What sort of design features would your ideal training/housing complex contain?

I'd like to see everything all on one level, or split-level with connecting ramps. Space is always at a premium, especially in locker rooms and weight rooms. Minimize the traffic jams, by increasing circulation space around the equipment. Storage space is at a premium too. It would be convenient to leave my racing chair at the stadium, or to leave my sit-ski and skis at the mountain. Our equipment manager takes care of stuff on the mountain, but it gets difficult to get around with all of that stuff when back at village. At the summer games, we stored our chairs in the house. With 9 or 10 people sharing the space, we had to keep all the stuff in the common room. We wouldn't have wanted to leave it just anywhere, but a secure storage space at the venue would have been great. As it was, we would commute to the venue in our normal chairs, bringing the racing chairs with us; so it got very crowded on the bus.

Sarah Will

Vail, Colorado

Nagano 1998, Lillehammer 1994, Albertville 1992

Mono-Skiing (all four events)

Disability: Paralyzed from the waist (skiing accident at age 23)

What do you remember most about the accommodations in the Olympic Village(s)?

The Olympic workout areas were not special – they were just regular workout rooms. To design a truly “universal” gym, you need to consider a floor plan with enough room for people in chairs to have access to the machines and be able to move around among them while people are working out; so you are talking about a lot of space. The gym in Vail is designed to be interactive, for everybody. There is a climbing wall on one half of the main workout room, instead of in a separate space away from the others. A low wall, (2 and a ½ feet high) useful for sitting and storage separates the climbing wall from the full gym. The design keeps people involved; the people working out get to watch the climbers, and people talk and interact more with each other. It’s an environment that promotes involvement in more than one area. I climb there and I get to show others the abilities of disabled people. Maybe somebody watching me might think, “If *she* can do that, maybe I can too.” Mixing facilities is better than separating them, because it promotes interaction and inspiration among athletes.

Also, where I work out the pool and locker rooms are attached, but there is a half level difference between them, which means a drop of 4 steps. There is a mini-elevator for people in chairs, which makes the route accessible, but it seems casual, since you are not going out of your way to use a ramp. It’s discreet; I’m not going out of my way to use a different path from everybody else. Ideally, in a modern building designed from the ground up to be accessible, everyone should be able to use the same path. Saunas and hot tubs are often overlooked altogether, and not made accessible.

You should keep in mind the needs of quadriplegics. It's good for them to work out, too. But they need lots of space to access the machines, and for their assistants, who help them with the machines and weights.

Also, weight machines like Cybex are generally safer than free weights when working out, and some disabled people can only work out on the machines.

Bathrooms are a problem area. Lots of money spent has been spent on improving them, but often they still are not right. In the shower, the nozzle, seat, and controls should all be located on the same side of the stall! For example, many times I've been in showers that had a seat for wheelchair users, but I wasn't able to reach the shower controls from the seat. It's so frustrating. Someone had the right intentions maybe, but they just didn't think carefully enough about it. Often the design that is the most pleasing to the eye becomes the most inconvenient. Door handles and controls should be simple and easy to use, so that someone can operate them with a closed fist.

What were the best and worst aspects of the Village(s) in terms of mobility and access?

Japan had the best facilities for the visually impaired. They had "Braille walkways". The walkways were very wide, with bright yellow or other colored paths on the ground, and there were grids of lines along the paths. There were dimples at crossings to signal direction changes, and other warnings. Also there were safety beepers and signals at street crossings.

Were there specific improvements that you could have suggested?

There should be places for guide dogs. *(Somewhere to keep them and care for them while athletes are competing)*

Outside lighting should be well designed. If it is done wrong it can make things look sterile and overdone, so that it feels like a prison or a hospital. It's nice to walk around outside or take a jog at night, and people want to see stars. Bright lighting that blocks out the stars is bad. Sensitive designed lighting would be better, especially for people with poor vision.

What were the differences you noticed, if any, in the approach to accommodating disabled athletes at different Villages (winter/summer, various locations)? & How do the Paralympic villages compare with athletic and housing facilities at other major competitions for disabled athletes?

In Nagano the village was like a prison compound. It was ugly and barracks-like. Lillehammer, Norway was nice, with its log cabins made of biodegradable materials. It had a small town, homey feel, and it wasn't obtrusive. It was much better than Breckenridge, which is a tacky mix of western and European styles. "Yuck".

Are there particular types of disability that tend to be accommodated more effectively than others?

Designers tend to overlook visual impairments and hearing impairments. An example is elevator indicators that use lights only, instead of some audible indication.

Wheelchairs are "overlooked", in a sense, when people simply comply with minimum code standards, without putting any deeper thought into good design! It's frustrating to see bad design in brand new buildings.

No thought is put into how people get around outside. Poles, chains, blocks, curbs, and other low barriers are easy for able-bodied people to simply step over, but form a real barrier for me in my chair. Similarly, I can't follow my able-bodied friends in my chair when they take short cuts across grass or other soft or loose surface coverings, and often these are right between where we are and where we want to go.

You can see it happen on college campuses – students make their own paths across big grassy areas that were put in the wrong place. Put the paths where they need to be.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

Parking spaces and parking lots can be major barriers. Otherwise accessible facilities can be destroyed by poorly designed, raised or lowered parking lots. The absence of curb cuts in parking lots is troubling; sometimes you have to go half way around the lot to get to a curb cut so you can get down to your car. And when maneuvering among the parking spaces, the curbs that cars park against are barriers if the spaces between them are not wide enough to pass a wheelchair between. You have to go all the way around a line of parking spaces instead of simply being able to pass between two spaces. It's also important to consider weather and drainage. Often you see big puddles in parking lots or snow piled up in the disabled parking spaces.

It's important to think about height issues. Water fountains and other facilities should be accessible for persons of short stature. Fountains should also be chair accessible, and have cup holders for people with limited ability with their hands.

What sort of design features would your ideal training/housing complex contain?

Windows! People want to be outside! The atmosphere of the place is important for peoples' attitudes. It should be a place to meet people, and you should enjoy being there.

Having to constantly say, "excuse me" and, "pardon me" while getting around other people, is frustrating. In locker rooms, lockers and other amenities should be put in logical places, so that people in wheelchairs don't have to go down narrow crowded aisles to get to there. Another important example is telephone access. Often wheelchair users can't make a phone call because the telephone is too high, or access to it is blocked by something on the floor.

Elevators with controlled access can be a real problem. For example, one gym I go to doesn't want patrons to use the elevator to come and go. They want to limit access to paying patrons by forcing people to pass by the main desk, which is on a different floor from the workout area. People using the elevator could go past

the desk without checking in, so they have restricted access to the elevator by requiring a key to operate it. Therefore, whenever I want to get up to the workout floor, I need the key for elevator, but it takes them forever to find it! If I can't have my own key, then the main key should at least be in a clearly marked and easy to find location. The same thing happens everywhere, particularly with public transportation; you always need to find the "key master", which is frustrating and a waste of time.

Shops need more space for wheelchairs. Motorized chairs especially need bigger corners and more maneuvering space. Its embarrassing and awkward trying to browse clothing racks and having bathing suits and underwear get stuck on my wheelchair.

Little oversights are frustrating. Christopher Reeve gave a talk at a dinner in Colorado, and there were lots of people in wheelchairs who attended. To make extra room for the people in chairs a lot of stuff was moved out of the banquet hall, but it was stored in the hallways, which blocked wheelchair access to bathrooms!

There should be more outdoor seating that is wheelchair accessible. People in wheelchairs don't always want to stay in their wheelchairs. Seating should be designed for all, and comfortable chairs and tables should be accessible to all.

Little thought is given to our equipment. I have to carry my sit-ski around with me and I end up using a lot of bungee cords and duct tape. I can attach some stuff onto my wheelchair, but the bulk and weight of the equipment throws off my balance and makes it difficult to move. Vail has escalators for skiers, which really aren't safe for wheelchair users. However, the alternate route is long and inconvenient and has many turns that are impossible to make with my additional equipment. So I take my chances on the escalators, balancing with my equipment.

The placement of automatic buttons for doors is irritating. They are rarely put in the right place. There should be a pole with a button on it (*at the right height*) right at door. Instead, you often have to go out of your way over to a wall to hit the button – another unnecessary inconvenience. Some people even put the button on the same wall that the door opens towards, so that you have to scramble to get out of the way as it opens.

Sloped walkways for wheelchairs cause problems in slippery environments, especially for skiers in their boots.

I have beefy tires on my chairs for snow conditions, but that means you need carpets or some other rough surface at building entrances to clean the tires off. I don't want to be leaving tracks everywhere. However, deep carpets can be very difficult for people in wheelchairs; keep them small. A hard surface with a thin carpet or rubber mat is good. Thicker carpets are more difficult to roll across (and harder to clean).

Some tennis courts and basketball courts complain about tire marks from wheelchairs. There are rules for the surfaces and the type of shoes that people are allowed to wear on them, and some of these issues pertain to wheelchairs as well. White tires are available for wheelchairs, and it is reasonable to demand athletes to use them. We shouldn't always be making exceptions for disabled people. We can be expected to follow the rules, too, like anyone else.

Cerebral Palsy

James Thomson

Long Island, NY

Sydney 2000, Atlanta 1996, Barcelona 1992, Seoul 1988

Boccia

Disability: Cerebral Palsy; uses a motorized wheelchair

Member of the IPC Athletes Committee

What do you remember most about the accommodations in the Olympic Village(s)?

The Villages in Seoul and Barcelona were apartment buildings that were made accessible with adaptations. In Atlanta the housing was in Georgia Tech dorms.

In Sydney we had accessible housing for the games, which was converted and refurbished afterwards and sold off as houses.

What were the best and worst aspects of the Village(s) in terms of mobility and access?

The village in Atlanta was very hilly.

In Sydney we had houses, but the second floors weren't accessible to wheelchairs. All the athletes who used wheelchairs were housed on the first floors of the houses, while, and people who could walk were housed on the upper floors; since we could not get up to the second floor, we could never visit them.

I had no real problems getting around at any of the four games. I use an electric wheelchair, which is average in size. Some curb cuts were not always flush with the street surface, and sometimes the resulting edge was too big to go over with my chair. But that's a problem you run into wherever you go; some have as much as a two-inch edge. Usually it happens when roads are repaved, and people aren't paying attention to the little details.

Are there particular types of disability that tend to be accommodated more effectively than others?

Blind people always get the short end of the stick. The organizers do a pretty good job with accommodating wheelchair users, but not always with the blind. For example they don't always have Braille versions of handouts and other information.

In the village in Sydney, the sidewalks were marked in a special way so that Blind people would know where they were. Unfortunately, details like Braille buttons on elevators, and that kind of thing, are not found everywhere. Some apartment buildings in the village had indicators on the walls to help with navigation. Blind people who couldn't read Braille were out of luck, but most blind people had a guide anyway. At most events during the Paralympics, blind people needed a guide to get around.

Were there specific improvements that you could have suggested?

Sydney had a very good shuttle bus route within the village itself. You could get anywhere in the village in five minutes. Walking from one end of the village to the other took a good half hour, so having a bus was important. At least in Sydney it was not too hot; it averaged 70-85 degrees. That's because it was October, which is spring for them. Barcelona and Atlanta were very hot, but Barcelona had one major advantage. The village was built right on the edge of the water, so it was a little bit cooler. I could go from my apartment right across the street and onto the boardwalk and the beach.

What was the biggest impediment to free movement that you encountered, if any, at the Paralympics?

In Atlanta the bus system wasn't very well organized, and all the venues were spread out all over the city. So in order to go to any of the different events you had to be on a bus for half an hour to an hour. In Sydney, all the venues were close to each other. You could walk to about 10 different venues all in one day, which was so much nicer.

What were the differences you noticed, if any, in the approach to accommodating athletes with disabilities at different Villages (winter/summer, various locations)?

All the villages were pretty much accessible. All of them had wide doorways, wide bathrooms. In Atlanta, athletes from other countries were not happy with the accommodations. The American athletes were given the best rooms that they had, so we didn't have as many complaints. But I'm also on the Athletes Committee for the IPC, and there were a lot of comments from other athletes about how poor the conditions were in Atlanta, concerning accommodations and accessibility. They said that the doors were heavy, the bathrooms were narrow, and there was not enough space to move around in the rooms.

How do the Olympic Villages compare with athletic and housing facilities at other major competitions for disabled athletes?

Other competitions are awful. You can't compare them to the Paralympics. Most of the time you're in hotels, and they are not very accessible, especially in Europe – their hotels are terrible for disabled people, mostly because they are so old and too small.

What sort of design features would your “ideal” training/housing complex contain?

I think the most important thing for me is having enough room, adequate space to move around, in the bedroom, bathroom, hallways, etc. Hallways should be at least 10 feet wide. Sidewalks should be at least wide enough for two chairs to pass each other, side by side; 8 feet is good enough for a minimum. Sometimes, on narrow sidewalks, if we want to pass each other we have to go onto the grass.

I like to get out of my chair and sit on carpets, couches, and other places. I need to get out of the chair and stretch, and I can get in and out of it on my own. For wheelchairs, carpeting has to be the indoor/outdoor type; it can't be too plush.

(extra) What kind of outside places do you like to spend time in?

In Barcelona, I spent lot of time on the beach, and I took walks out on the piers to relax and enjoy the cool breeze coming off of the Mediterranean.

(extra) What kind of social gathering places did you enjoy?

Most Paralympic villages have bars, computer rooms, game rooms, and other places to socialize with other athletes. In Sydney, they had an outdoor bar, which was a nice place to go sit outside at night and have a beer.

Design Issues Drawn From The Interviews

There are two different kinds of accessibility issues that I learned about in my interviews. Designers need to be concerned with both. First there are the simple physical barriers that my interviewees encountered. These are described first below, because we need to be aware of them in our designs, but they are relatively simple to understand. I grouped them according to the types of disability that they are most relevant, and then I identified the issues that were important to people in multiple categories.

The second type of issues I identified have less to do with specific physical barriers. They relate to larger, subtler, and perhaps more significant issues in urban planning. I call these Larger Disability Design Issues, and I discuss them later. They are also the issues that I primarily focus on in my designs.

Issues for the Blind

Lighting

Not everyone who has a visual impairment is blind. Even those who are legally blind frequently have some visual ability. For these people, good lighting is even more essential than for able-bodied people. This is especially relevant for elderly people, because our night vision starts to deteriorate before our daylight vision as we age.

High Contrast Colors

Similar to good lighting, highly contrasting color also helps low-vision people identify and recognize objects and maneuver through their environment.

Noise

People with visual impairments sometimes rely on their hearing to guide them or warn them of approaching cars. Extremely noisy environments, like busy streets or crowded areas, can be a problem for blind people trying to navigate without another aid. Audible signals at intersections are very helpful.

Walkways

Wide walkways are beneficial for visually impaired people because there are fewer obstacles, like sign poles or low hanging signs. Using a cane is not always enough protection against these hazards.

Tripping Hazards

Small steps and curbs are a hazard, if not a barrier, to the visually impaired, because they can trip and fall easily on them. Small bumps or edges in walkways

that are not easy to see (high contrast) or detect with a cane can also be a tripping hazard.

Braille

Braille usage is only common among people who lose their vision at a young age: before or near the time when they learn to read in another written language. Many people develop visual impairments later in life, and so never learn to read Braille. Again this is especially true of the elderly.

Signage / Navigation Aids

Signs don't work for those who can't see, or can't see from a distance. Many visually impaired people cannot read Braille signs either. For these reasons, audio navigation aids are needed, as an alternative to written signage. Information kiosks are one type of audio navigation aid that could greatly enhance a visually impaired person's ability to navigate independently, and learn about the surrounding environment.

Issues for Amputees

Wheelchairs

Double leg amputees usually use a wheelchair.

Tripping Hazards

Single leg amputees are generally mobile and don't face many accessibility barriers. They are able to walk over many types of terrain with the same amount of difficulty as the average person. However unseen bumps and cracks in sidewalks or other walkways can be a tripping hazard for them as well. Actually they would be for anyone; designers should be careful to make any unexpected changes in walkways highly visible.

Ramps and Stairs

Though most single leg amputees can pretty much handle any situation, they sometimes have mild issues with ramps, and single above the knee amputees can have issues with stairs.

Distances / Layout

Walking long distances while wearing a prosthesis can be tiring, so some amputees can be more susceptible to fatigue. Layouts should reduce walking distances.

Issues for Dwarves

Height

The height of everyday objects is important to dwarves. Counters, bathrooms, and other public facilities should be made accessible to little people (which also makes them more accessible to children), without being so low as to be an inconvenience for average-sized people. In places like cafes and shops, a variety of options in counter height works well.

Distances / Layout

Even short walking distances can be significant for dwarves. They get fatigued more quickly because of their shorter legs. However, walking is therapeutic for dwarves because it helps ameliorate the back problems they often have, so it should be encouraged with good design and efficient layouts.

Issues for Wheelchairs

Equipment Design

Equipment manufacturers seem to make bigger and bigger wheelchairs, which make it harder to get around in small spaces. But there is no good reason to have large turning radiuses for wheelchairs. People, especially wheelchair users, need to put pressure on equipment manufacturers to make better, smaller, more efficient equipment.

Equipment Maintenance

Wheelchair users have to do routine maintenance on their chairs: fix little breakdowns, put air in the tires, etc. More mechanized chairs probably need more sophisticated attention, but many minor repairs could be handled by anyone with access to the right tools. Perhaps a program could be initiated to encourage bike shops, for example, to make themselves more available to wheelchair users.

Space

Planners seem to consistently underestimate the amount of space needed for wheelchair users, and to forget about the extra space that their equipment takes up when it is not being used. People in wheelchairs need plenty of space to maneuver, especially indoors. Crowded aisles and other circulation areas, while perhaps legally accessible, can be very hard to maneuver through. Extra space is also needed in locations or transportation systems where disabled people might have extra equipment with them that is inconvenient to transport or insecure to store elsewhere.

And accommodation is needed for people who want to get out of the their wheelchairs for a little while. At the same time there must be space, or a storage place, for the empty chairs.

Also, the most severely disabled people are often accompanied by assistants, and need more space to be helped in and out of things or places that they cannot reach on their own.

Distances / Layout

Distances are a concern, especially in areas where hilly topography compounds the effort required to move around. Popular destinations should be centrally located and close by.

Travel paths should be put in the right place, where people want to go. If there is not a real path where there should be one, able-bodied people can usually cross easily anyway. But people in wheelchairs, and perhaps the elderly as well (depending on the surface) need to take the long way around. Circuitous, inconvenient alternative routes for the handicapped become a barrier in themselves because people are discouraged by them and tend to not go at all unless they really have to.

Accessible Routes

Curb cuts are convenient at places other than just at the corners of blocks and at intersections. Long sidewalks with no driveways should have curb cuts at popular crossing points.

Accessible routes, like the boardwalks in Barcelona, make it possible for wheelchair users to enjoy natural surroundings. They are beneficial to able-bodied people as well.

Height

Think about height issues. Phones, fountains, bathrooms, and other public facilities should be within reach of chair users and little people.

Common Issues

Tripping Hazards

Tripping hazards are dangerous to many people with disabilities, but also to able-bodied people, especially as we get older and are able to react less quickly. This problem is exacerbated by inadequate lighting and low contrast designs that mask shifts in the walking surface.

Topography

People with any type of mobility impairment are more sensitive to hilly topography.

Distances / Layout

The most common issue. People with all types of disability desire designs that minimize distances between popular destinations, to make their daily trips easily walkable. Intelligent location of facilities is critical, especially in areas where terrain compounds the effort required to move around. Popular destinations should be centrally located and close by.

Height

Height is especially important to dwarves and wheelchair users, but careful design is important to everybody because objects that are too low can also be an inconvenience for full-sized people.

Larger Disability Design Issues

Segregation and Discrimination

Nobody wants to have to take an out-of-the way path that is different from everyone else. Using shared paths is more discreet and doesn't single out any particular person. This issue is really what's at the heart of the universal design philosophy. Design that limits people with disabilities to different set of options is never truly universal. Alternate paths are discriminatory. People with disabilities only want to have the same options as everyone else.

In the same sense, there is no need to make unnecessary exceptions for disabled people. They want to be treated like everyone else. They should enjoy the same rights as other people, and be held to the same social expectations.

Social Attitudes

Society's attitudes towards disabilities are still limiting. Able-bodied people don't expect people with disabilities to be capable of anything, which leads people with disabilities to doubt themselves and lower their own expectations.

Promoting interaction among able-bodied people and people with all types of disabilities leads to mutual understanding and inspiration.

Challenge

People need to be challenged occasionally, or to have the option of deciding when to have more or less assistance. The more we rely on help, the more dependent we get, but there are still times when we need it. Designs should give people choices of various levels of difficulty, instead of always making things as easy as possible.

Seamless Design

Aesthetics are important. Accessibility doesn't need to mean sterile, boring environments. People with disabilities want to be in beautiful, appealing places just as much as anyone else. Accessible features can be incorporated into designs in an interesting, creative and seamless manner, and if it is done well, everyone will enjoy it equally. This is another primary philosophy of universal design: adaptations should be invisible, or cause the least amount of disruption possible.

Benefits to Non-Disabled Users

Seamless design provides benefits to all users without conscious recognition that the designer was thinking of the needs of people with disabilities. But obvious efforts to accommodate the disabled also often provide benefits for everyone else. The boardwalks on the beaches in Barcelona are an example of a design that serves many more able-bodied people than disabled. Designs that benefit the disabled are also often helpful to children, the elderly, and people with injuries. Curb cuts, another popular illustration of this issue, are helpful to anyone with a stroller, wheeled luggage, or shopping cart.

Feasibility and Choices

The biggest challenge in universal design is the wide range of abilities and disabilities that exist out there. With so many possibilities, it can be hard to accommodate them all simultaneously. And while you can potentially imagine most of the situations that might come up, it is difficult to design for everything, even with help from disabled users.

The most severe disabilities are also the hardest to accommodate. For them even the smallest tasks are difficult. If you design to accommodate the least able, then will likely accommodate the large majority of the rest. But after a certain point, accessible design becomes intrusive and becomes a hassle for other users, at which

point it cease to meet the goals of universal design. People with multiple disabilities make the challenge even more difficult.

Distances / Layout

I mention this issue again because it is really more than just a physical design issue. Some might say that it is THE physical design issue. This is possibly the issue that city planners can and should make the most significant effort to work on. Everything the athletes mentioned about distance, plan (layout) and transportation in the villages emphasized the need for compact, dense, walkable communities, and excellent public transportation. This is an issue I will return to later in Part III.

**Part II - Designing for People with Disabilities:
Creative Concepts**

Since my intention with this thesis is to demonstrate a more joyful approach to access and accessible design, I have developed some conceptual designs of my own which respond to some of the issues that were raised by the athletes I interviewed.

My idea was to imagine a training village filled with athletes with various disabilities, and design some creative ways to engage them in public spaces. I am most interested in the connecting and gathering spaces that we inhabit between buildings, and in ways of getting from one place to another. I did not deal with building interiors or specific facilities.

These designs are meant to illustrate the development of guiding themes and ideas, not objects meant for construction.

Themes

There are three central themes that I tried to express in my designs, while maintaining accessibility:

Challenge
Playfulness
Variety

Challenge is an important part of our lives; it keeps us healthy. Bodies that are not challenged become soft and shapeless. But challenge is just as important to mental health. Overcoming challenges reminds us of our abilities and increases our sense of self worth.

Playfulness is an important way of enjoying being ourselves and enjoying the abilities of our bodies, and play is an important mentally and physically re-energizing release from our daily stress.

Variety is the companion to choice. We all enjoy being able to exercise our right to choose what suits us best. Our huge variety of daily choices is one luxury that many of us take for granted. People with disabilities often have far fewer options to choose from, but there's no reason that it should stay that way.

Designs

Motion Plaza

This space would be found in the courtyard between two or more popular building destinations in the village, like the cafeteria and the gym, where there would be lots of people and lot of foot traffic. The design is a grid of holes inlaid into a depressed paved surface a foot below the level of the surrounding courtyard. The holes are meant to support various types of poles that can be inserted in any arrangement throughout the grid, which form a variety of different types of handholds (Fig. 1). The idea is that people on wheelchairs would propel themselves across the plaza by using only the handholds, and not their wheels. The handholds could be setup with a variety of heights, materials and sizes, and placed in an orderly fashion or randomly.

Wheelchair users could pick out a more or less challenging path based on their abilities and inclinations. There is also a path directly across the plaza with ramps at either end, for those who simply want to get from one side to the other quickly without any nonsense. This path and the edges of the plaza are lined with raised dots to warn visually impaired users. If they entered the plaza unknowingly they could injure themselves by walking into one of the handholds (Fig. 2).

Since there is not much point to going through the gridded area of the plaza, except to experiment with the poles, this design is simply a playful opportunity to enjoy an alternative method of moving around in a wheelchair.

The options provided by the grid and the range of possible handholds that could be experimented with mean that there is an almost endless variety of customizable courses to choose from (Fig. 3 and 4). And each individual has the ability to choose his or her own personal level of challenge getting across.

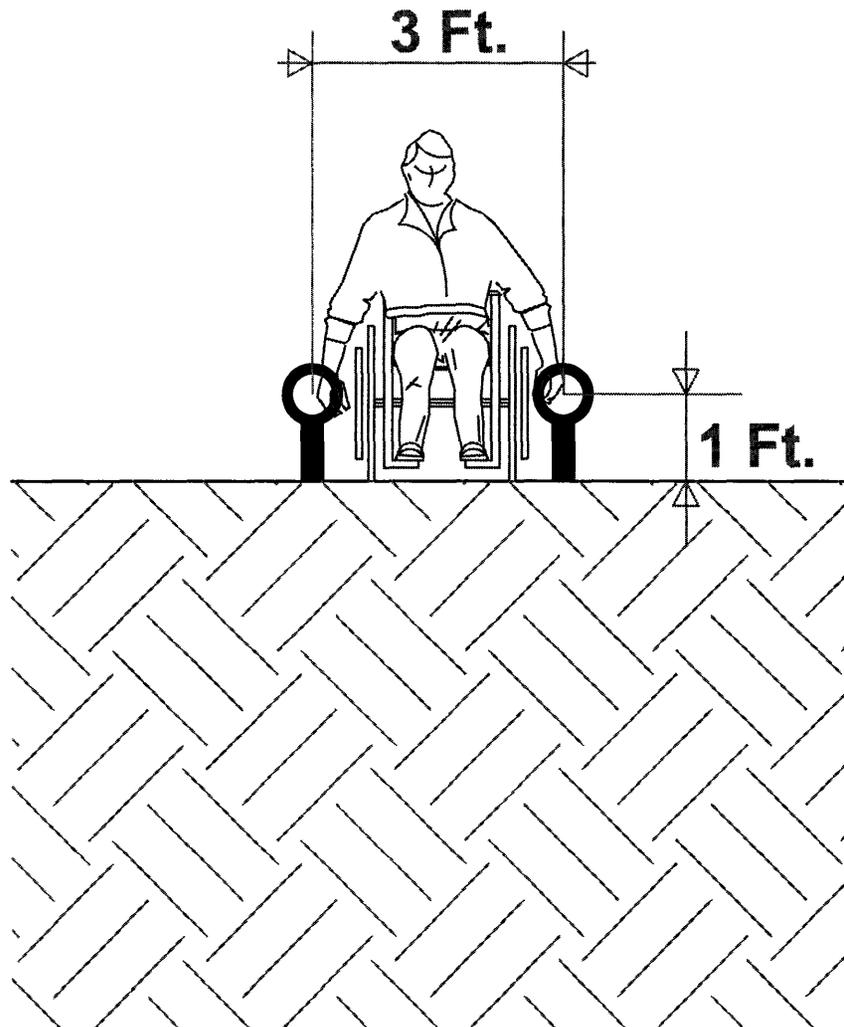


Fig. 1 Detail showing a wheelchair user and one possible handhold arrangement

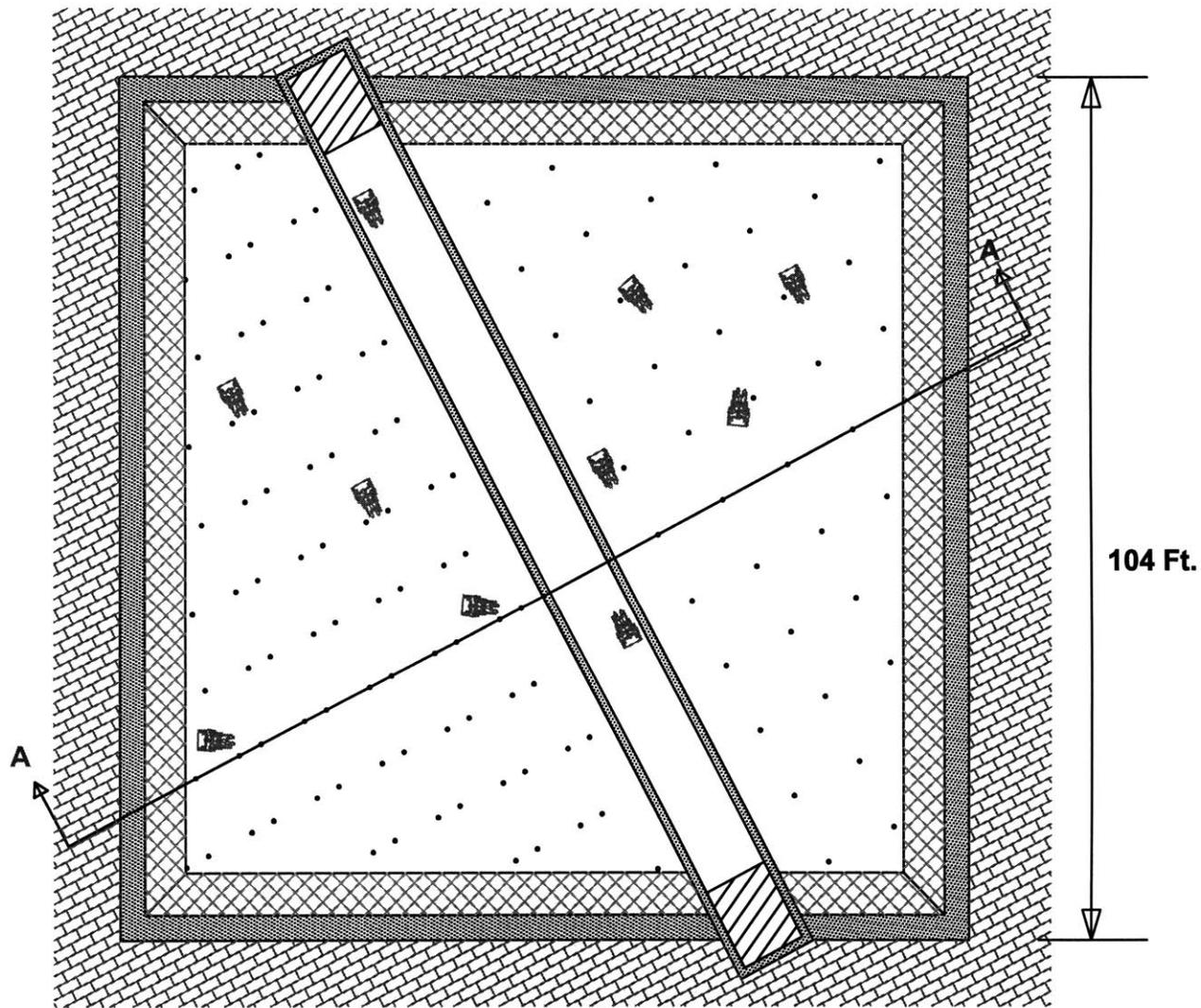


Fig. 2 Plan showing the motion plaza, with all grid holes shown and cut line for section A-A

Climbing Hill for Wheelchairs

As has been mentioned several times before, hills are a common barrier to wheelchair users. And because of compliance with ADA standards, any accessible path up a steep hill involves an exhausting series of mind-numbing ramps and platforms. Perhaps there are those wheelchair users who would prefer a more direct, though more challenging route. The idea that I came up with for this scenario is basically a take off on indoor rock climbing. The design includes a series of channels that lead directly up the side of a hill (Fig. 5). The channels vary in width slightly, but all are wide enough and smooth enough at the bottoms for a wheelchair. Some have nothing but vertical walls on either side of the channel, while others have a horizontal portion in the wall, like an armrest, at about that height. The walls and “armrests” would be covered with a variety of different types of gripping attachments like the ones used on climbing walls.

The idea is that a wheelchair user would pull straight up the side of the hill in the channel, using the grips to pull themselves forward. A belt would be required to keep the person in their wheelchair, and a safety harness attached to the chair would run through a groove at the bottom of the channel to keep people from falling backwards if they lost control (Fig. 6).

Different courses built on different slopes of the hill would provide different levels of difficulty, as would the variety in the widths and walls of the channels (Fig. 7). The entire activity would be a personal challenge, with a variety of options, and a playful change from the normal drudgery of trekking up hills. This activity also would provide variety in exercise for wheelchair users because it would work different muscles than those used typically. It could be appealing to people who don't even use wheelchairs normally, as a less extreme variant of rock-climbing, or the channels could be used to help ambulatory people who are not strong climbers and need support when climbing a hill.

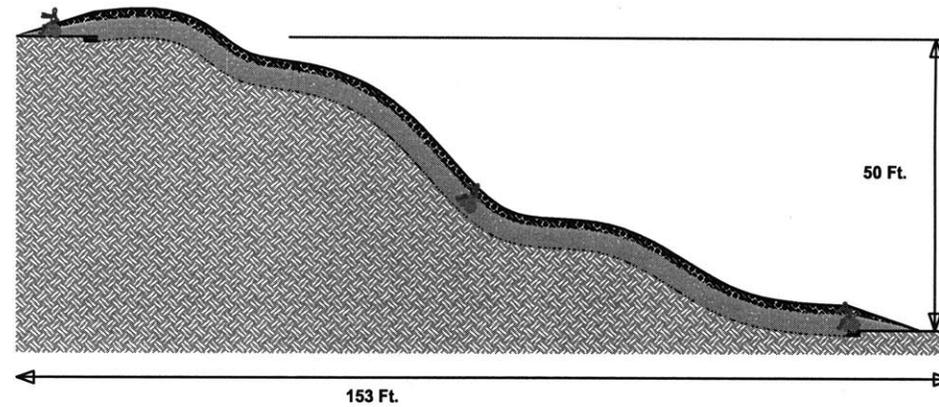


Fig. 5 Section showing a climbing channel on a possible slope

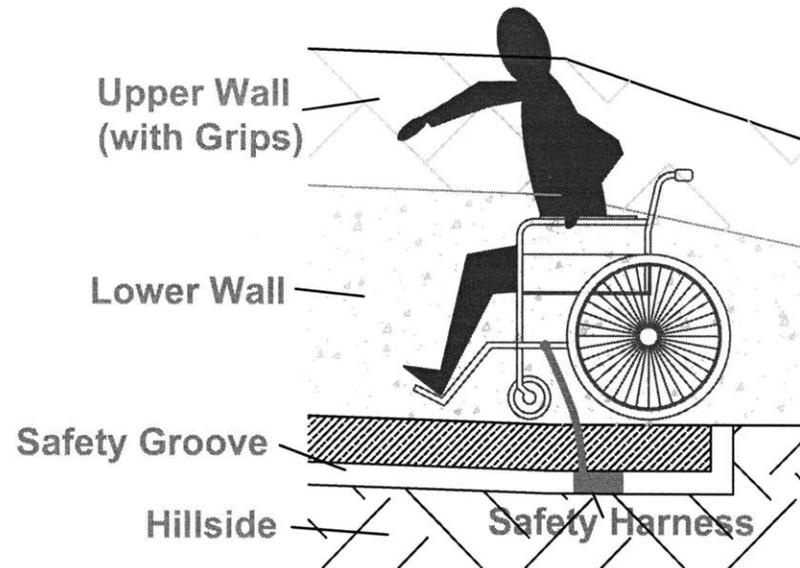


Fig. 6 Detail showing a climbing channel, user, and safety features

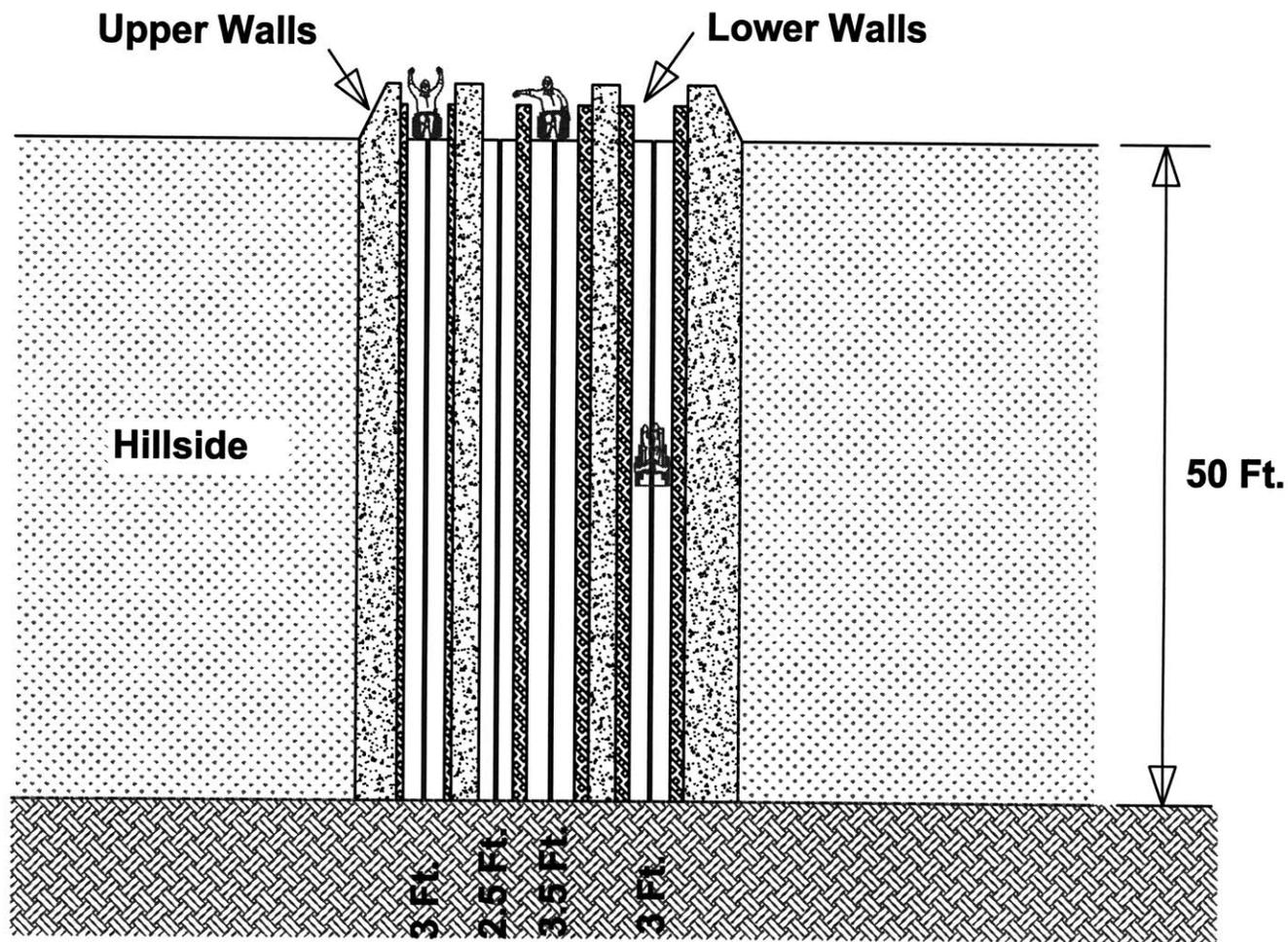
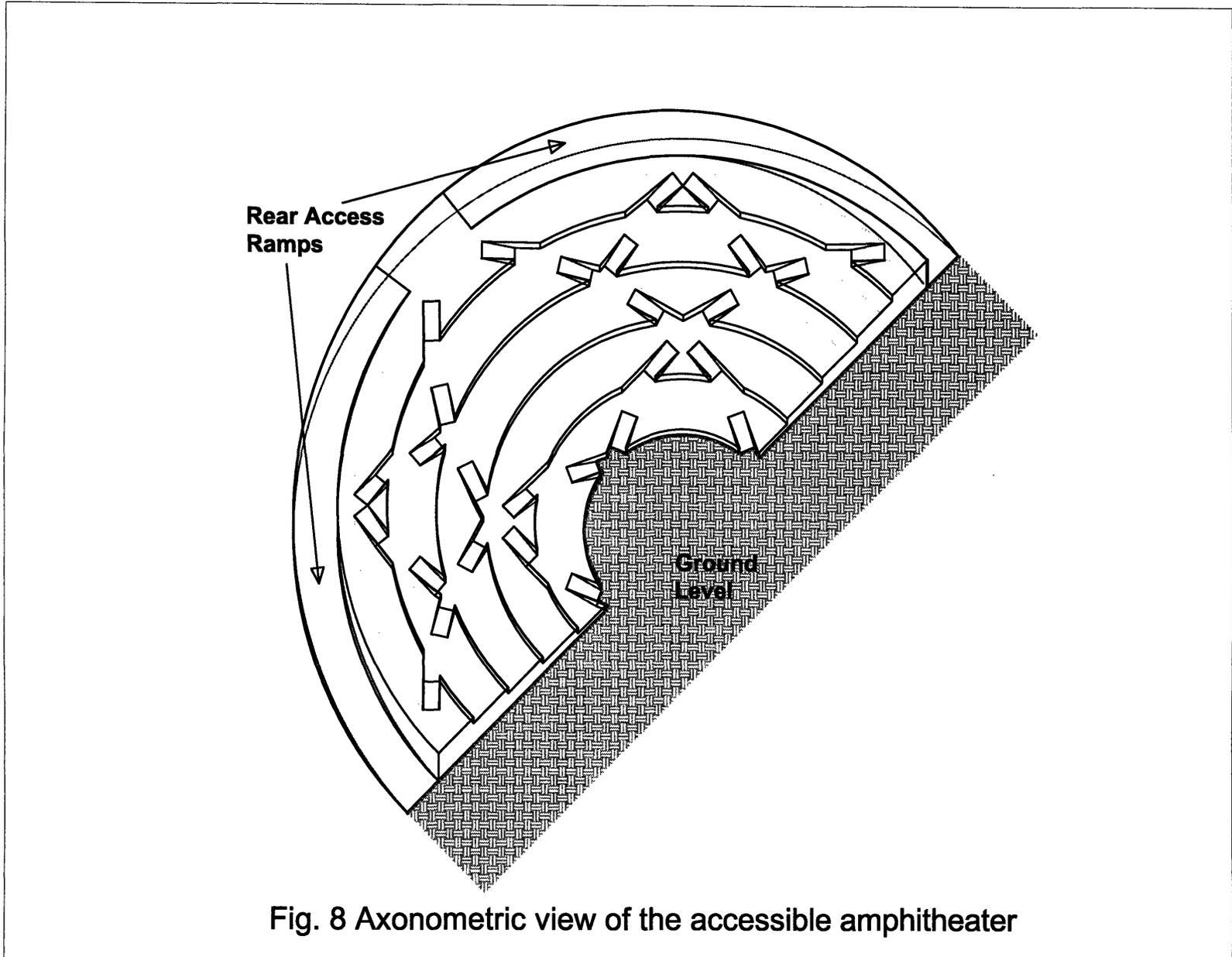


Fig. 7 Elevation showing the hillside and channels of various possible widths

Accessible Amphitheater

It is rare to find venues for large crowds that offer an extensive choice of seating for people with disabilities. There are usually a few limited spots available for wheelchairs with few options on viewing location. The primary reason for this is that the slopes of the seating areas are so steep that stairs are usually necessary. I tried to find a way to arrange the aisles in my outdoor amphitheater so that ramps could be used instead of stairs. Angling the ramps slightly between each level made this possible and created a visually interesting circulation pattern (Fig. 8).

With the use of ramps, and corridors behind each row of seats instead in front, suddenly the entire amphitheater became accessible to people in wheelchairs, offering the same variety of seating choices that an able-bodied person would have (Fig. 9). The small ramps within the seating area are sloped slightly steeper than usual, at about 10%. But the long ramps around the back are very shallow. The user has the choice of going up to a seat directly on the steeper ramps, or taking the flatter ramp up and descending down to the seat. The play in this design comes from the wide variety of routes that can be taken to get to or from any seat, and in the aesthetics of the design.



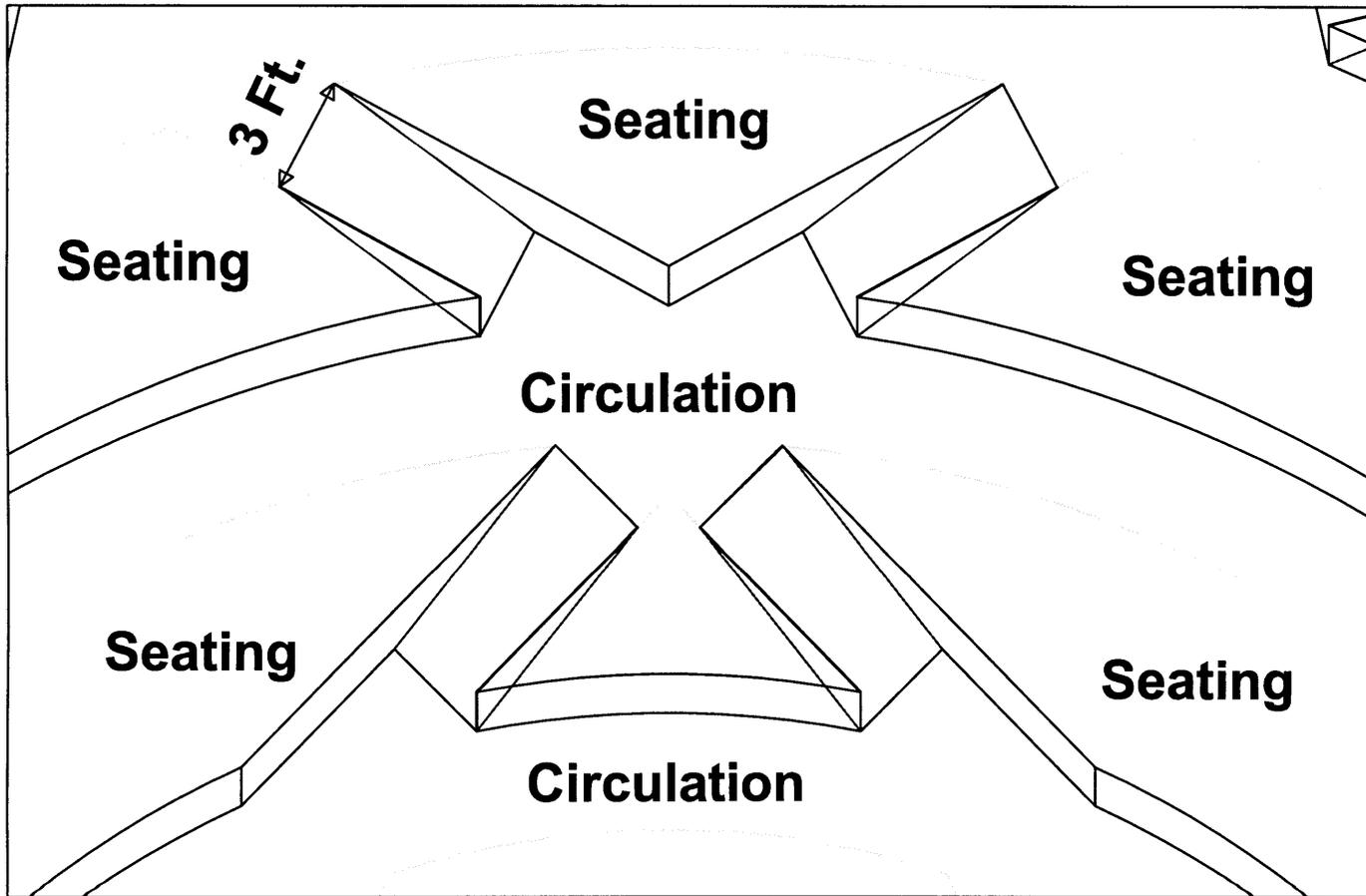


Fig. 9 Detail showing circulation paths, ramps, and seating areas

Part III - Moving Forward

As I mentioned before, the athletes I interviewed raised two kinds of issues. The physical design issues point to features that urban designers should pay special attention to. The larger issues are probably the most significant for planners who work on urban design policy, though they of course are also relevant to designers.

Implications For Design

The people I interviewed all mentioned multiple issues that they had encountered in the built environment. Even at the Paralympics, in villages that presumably had been specifically designed and modified to meet their needs, they found some persistent problems. Adding to that their combined experiences from everyday life, and traveling around the world to compete, they had a pretty thorough list of problematic design issues. The following are the most relevant for urban designers.

Important Design Considerations

Streetscapes and Pedestrian Areas

A large number of the issues raised concerned pedestrian areas, walkways, and other aspects of public streetscapes. That is hardly surprising, since these environments make up the bulk of a person's urban experience. There are a number of improvements and innovations that urban designers should consider.

The installation of textured paths in all public walkways would help the visually impaired find their way through cities more safely and independently. These paths should be brightly colored to contrast strongly with their backgrounds, so that they are more visible to the visually impaired. This will also make the paths more noticeable to all users, and help keep them from becoming tripping hazards. That does not mean that textured paths cannot be integrated in a tasteful and appealing manner. On the contrary, they could become an appreciated and distinctive part of a city's urban identity. They should, of course, be located in an unobtrusive portion of the walkway, clear of obstacles and dangers that are hard for visually impaired

people to detect. And they should have a systematic system of built-in patterns and symbols that helps users find their way and warns them of intersections, driveways, crossings. Any other urban design initiatives that introduce unexpected changes into public walkways should take care that those changes are visible to the visually impaired.

Improvements to surface paths which make them more navigable during the day should be complemented by good outdoor lighting. Sensitive lighting, directed where it is needed instead of completely blanketing a whole area, can illuminate paths for people with visual impairments, without taking away from the aesthetic experiences of others.

Designers should also make an effort to reduce ambient noise in the urban environment, and take advantage of any opportunity to do so, since the visually impaired rely on their hearing to warn them of approaching dangers. Lower noise levels benefit the population at large as well by adding to the quality of our environment.

Another potential improvement to public walkways that is worth more consideration is the idea of heated sidewalks, at least in those parts of the world where winter weather is severe enough to impede mobility. Sidewalks covered in ice and snow are a huge barrier for wheelchair users and others with mobility impairments, as well as for elderly people or anyone hampered by an injury, a baby carriage, or heavy loads. And snow and ice are a danger to even the most fit and able bodied among us. Clear sidewalks are vital for the health of a city; the best way to ensure them in cities with severe weather might involve heating them.

Hope Hand brought up the issue of maintaining wheelchairs and other accessibility equipment. This is probably not an issue that keeps many people in wheelchairs from getting around, but having more places where wheelchairs and other equipment could be attended to can only help disabled people integrate more fully into society. The general level of demand for these services would not be high enough to support any kind of independent stations, but the needed services could be developed at existing locations. Some kind of program that encourages city bicycle shops and mechanics to make assistance available, at a reasonable cost, would help to make the disabled a more visible and expected part of everyday life.

Air pumping stations along major public paths would benefit both wheelchair users and bicycle riders.

Designers should remember that not to underestimate the amount of space that wheelchair users need to move around obstacles as well as everyday spaces. Especially the severely disabled people who travel with full time assistants; our public areas should be accessible to them as well. We need to remember them in our designs for accessible outdoor seating, and include alternatives for wheelchair users who would like to get out of their chairs once in a while. Other details are invaluable for wheelchair users, like mid-block curb cuts for access from the streets to important locations. And the areas around bathroom doors and all-important entrances should be free of obstacles to wheelchair users and dwarves.

Transportation

Public transportation is an important part of the lives of many city residents. Unfortunately for many disabled people living in US cities, it is not as accessible as it could be. Kneeling, low-floored buses, with fast and easy boarding and unloading, are vastly superior to lift equipped buses from the rider's perspective. They were recommended by nearly all the wheelchair users I interviewed. Not only that, but they are much easier and more pleasant for all passengers to use, not just those with mobility impairments. They also need to have enough space to accommodate at least 2-3 wheelchairs, in a variety of seating locations convenient to all doors. There is no reason two people in wheelchairs traveling together on public transportation should not be able to sit together and converse like anyone else.

Integration of Information Technology

The rapid advancements in wireless information systems technology and the accompanying drop in its price offer all kinds of new opportunities for urban designers to develop enhanced city guidance and information systems. These technologies could feasibly be used to install a sophisticated network of information access points around a city at relatively low cost, with practically unlimited potential beneficial uses for disabled and non-disabled citizens. They could help a visually

The Universally Designed Village

impaired person navigate unfamiliar parts of the city, as well as anyone else who has trouble finding their way in places they haven't been before.

Such a system could be implemented in the form of interactive information kiosks, stationed throughout a city in high pedestrian traffic areas. Or it might take the form of small transmitters located at intersections around the city that communicate with personal portable devices. Either system, or a similar one in a different form, could be highly beneficial to disabled people, as well as offering a host of other interesting opportunities.

Implications for Policy makers

In Part I, I mentioned a set of issues that came out in my interviews that I called Larger Disability Design Issues. These are issues that are already significant to designers outside of any consideration of the needs of the disabled, but which I noticed were also very important within the disabled community specifically. I am not sure how much awareness of the links between the two exists, but there could potentially be a large amount of synergy between the disabled community and other supporters of these causes. Urban designers and planners who play a role in advocating or trying to implement some of these issues should act on that potential.

Topography and Transportation

Many athletes commented on aspects related to the hilly nature of the village, and the distances between things. These are possibly the most important aspects of urban design in their eyes. Comments about the interiors of buildings were focused on details of architectural design, but there were fewer specific physical obstacles to be found in public spaces. Of course there were particular details that were mentioned by a few interviewees, but by far the most common comments were on the topographical nature of the sites, and the distances that had to be covered. These types of issues are perhaps the most specifically germane to urban designers considering project areas larger than a specific building or a single urban feature.

The topography issue is a difficult one to address. To really make a significant improvement in topography requires moving around a great deal of earth, which is expensive, disruptive, environmentally risky, and time consuming. Not to mention the fact that you can only make significant changes in areas that have been so far untouched by previous development, unless you are willing to bear the expense and political cost of tearing everything down and starting over, assuming you are even able to obtain the authority to do so. Therefore, real adjustments to the topography of most sites which urban designers are likely to deal with is virtually impossible, and we are left to consider other options.

Wheelchairs could be improved with new technology to make them more mobile, but many people with disabilities don't need or don't wish to use an assistive device like a wheelchair.

Another conceivable option would be to design moving pathways that pedestrians and other typical users of walkways could use, similar to the "people movers" found in large buildings. Outdoor escalators are not inconceivable; Barcelona has a series of escalators built into the sidewalks on some of its steepest streets. However, a citywide system covering all walking routes seems impractical at best. The expense alone, associated with constructing and maintaining a citywide or even a neighborhood network of moving sidewalks, quickly becomes prohibitive in light of current and foreseeable fiscal realities. And while some users with limited mobility might welcome it, the majority of city residents might view such a disruption to the entire city's streetscapes as an unwelcome and unnecessary intrusion.

Hence we need a third alternative – another way of helping people cover distances that are beyond the limits of reasonable personal exertion, but does not permanently link them to individual assistive technology, and uses existing city infrastructure as much as possible.

This sounds suspiciously like a description of public transportation. Indeed, because of the benefits it can and should provide the disabled community, it is clear that good public transportation must be a part of any universally designed city.

But the key to this statement is the word "good". Public transportation must be thoughtfully and universally designed. Current U.S. public transportation systems contain many barriers that discourage or prevent disabled and less able city residents from using them. Buses based on outdated, inefficient designs are difficult and slow get on and off of; retrofitted lifts are slow and problematic; and there are few seating options for wheelchair users. Subway systems are accessed mostly via stairs or escalators, while elevator alternatives are confusing, slow, circuitous and frequently ill maintained. Many older transportation systems across the country require major overhauls and improvements in design to make them truly universal. Improved transportation systems would be a boon not only to the disabled, but to all other residents as well, who frequently use these systems under conditions that make them less adaptable (i.e. heavy burdens, baby carriages, injuries, disorientation).

Quality public transportation becomes even more important to the disabled population in cities with extreme climates. Consider a wheelchair user in a snow-covered city in the middle of winter who has to wait for the bus to get to work. If for some reason (no lift, broken lift, no low floors) that person is unable to board the bus then he or she will not be able to get to work on time. An able-bodied person may decide to struggle through the snow or may flag down a taxi (which in the US is unlikely to be accessible), but the wheelchair worker is forced to wait. This is not an uncommon scenario, and these sorts of small obstacles continuously put disabled people at a disadvantage and limit their independence. For these types of reasons, the quality and accessibility of public transportation is highly important for disabled people, and they could make dedicated partners for advocates of public transportation improvements.

Expense of Universal Design

Until now, I have largely avoided the issue of cost in my discussion. But when it comes to the practical implications of the issues I have identified, considerations of expense are of course unavoidable. The implied costs of adapting urban environments and transportation systems to be accessible may seem high. The fact is that the cost of universal design depends largely on the stage within the design process that these issues are brought into consideration. If we are talking about an already constructed environment or structure that needs to be retrofitted for accessibility, the costs associated with those changes are unpredictable and could be extremely high. In some cases, the resulting improvements might actually result in increased activity that allows the owner or operator to recoup their costs, though that is unlikely.

However, if universal design is a design priority from the earliest stages of design, the cost of accessibility modifications can be extremely low, since they are simply a part of the original design and construction costs. Commonly, a shift in design for increased accessibility actually results in a direct net savings in costs. Most frequently, the result is that a universally designed space becomes attractive to a much wider number of users of all ages and abilities, making it economically more

successful or marketable. This has direct implications for commercial spaces in particular, but from a public or civic point of view it can be seen as an important aspect of city livability and quality of life, which also translates into economic benefits that can partially or entirely offset the costs involved. Public transportation that is designed to be accessible and easy to use for the disabled, for example, is easier to use and more accessible for everyone else as well, and attracts more riders.

A decision must be made as to how to approach the process of making urban environments more accessible. The more passive, and most common, approach is to make accessibility improvements to areas at the same time that they undergo some other type of construction. Routine maintenance and improvements of city sidewalks, for example, or the renovation and rehabilitation of existing structures, or any new construction, usually includes improvements for greater accessibility. These types of gradual changes are mandated by legislation. But a city could decide to take a more active approach and set specific goals to improve accessibility city wide, perhaps by focusing first on the most problematic and heavily trafficked areas. There would need to be financial support for this type of program, but that could be arranged. Some cities collect and direct special funds towards arts projects, improvement districts, festivals, tourist promotion, and many other initiatives to improve their quality of life and attract new residents. A major effort to improve accessibility and livability for the handicapped would not be inconsistent with these kinds of initiatives, and could have similarly beneficial results.

Dense Compact Communities

There are many social benefits inherent in dense, compact urban communities that planners are already well aware of. Reduced pollution, greater resource efficiency, reduced traffic, increased environmental sustainability, and improved viability of social services and public transportation are just some of these. To that list we can add increased accessibility for the disabled. Denser communities mean that people can walk instead of having to rely on automobiles or other mechanical transportation, but shorter walking distances benefit people with disabilities to a greater degree than average. Smaller communities with well-located

public services are better places as well for the elderly, for little people, and for children. And because shorter walking distances encourage walking, they contribute to the health and physical fitness of the entire population. Even within large cities, self-contained neighborhoods with a radius of a mile or less are possible and desirable to design.

TOD, Nodal Design

Several athletes that I interviewed advocated a centralized layout for the villages, with the most commonly used public facilities located in the center and the housing around the edges. This type of arrangement is espoused by designers who support Nodal development patterns, or Transit-Oriented Development (TOD). TOD advocates the idea of a cluster of housing and commercial services within a small radius of a central transportation facility that connects to other popular destinations for work and entertainment. The same arguments that favor dense and compact urban communities in general apply to TOD as well. The athletes' desire to be close to useful services relates to their mobility constraints, but their arguments for improving accessibility blend well with the arguments in favor of TOD.

Visions of the Future: The Post-ADA World

American Attitudes Towards the Disabled

The most unfortunate issue we need to address when designing for the disabled is perhaps as important as any physical design issue. The athletes' experiences in Atlanta illustrated a surprisingly disappointing attitude towards the disabled in this country, compared to elsewhere. We take it for granted that the ADA and other federal civil rights laws for people with disabilities give us the most progressive legal protection against discrimination for disabled people in the world. However, it is clear, as far as the Paralympics are concerned, that we do not make nearly the same level of effort to accommodate disabled athletes as other countries, particularly those that have hosted the Games in the last decade: Australia, Spain, Norway, and Japan. Every athlete I interviewed who attended the Paralympics in Atlanta gave it negative reviews, especially those who could compare it to their experiences in Barcelona and Sydney.

Perhaps the Paralympics are the exception to the rule in this sense. The U.S. still has the highest nationwide level of accessibility of any country in the world, and maybe that led to a degree of complacency in Atlanta, whereas the other countries knew that they had to work extra hard to accommodate the disabled. This seems to demonstrate that many Americans are satisfied to merely follow the dictates of the ADA, but don't make good design for universal accessibility a high priority. Urban Designers who are sensitive to the needs of the disabled will probably find themselves having to fight to change current attitudes and work to educate clients about universal design issues.

The problem may partially stem indirectly from the early successes of the disability rights movement. The US has had powerful federal civil rights protection for people with disabilities since the Architectural Barriers Act of 1968, with the most well known of these, the Americans with Disabilities Act (ADA) signed in 1990¹.

¹ The Center for Universal Design http://www.design.ncsu.edu:8120/cud/univ_design/udhistory.htm#f

Therefore, in some people's minds, the accessibility problem is probably considered solved. When you think you are ahead of the game, there is little incentive to do more or innovate.

Another aspect of the problem is that most of our legislation consists of designated design standards. That is understandable, since it is the easiest way legally to enforce accessibility. But it does nothing to encourage putting thought into new and more creative ways of achieving accessibility. Designers aren't even allowed, in many cases, to propose creative ways of achieving similar performance standards that are more appropriate or inviting in particular locations. The laws do ensure protection for the most vulnerable members of the disabled community, and they are wonderful just for that fact alone, but in some ways they have hampered our ability in this country to go farther. As long as a builders can claim that their designs are ADA-compliant there is no easy way to pressure them to take the next step towards better innovation.

Future Design Themes

We may contemplate, however, the "post-ADA" world. When universal accessibility is an unquestioned component of all design like structural integrity, more creative design themes like playfulness, variety, and challenge may take on new meaning. When we have finally agreed that the only just and humane approach to design is universal design, we may concern ourselves with lighter issues and design a world of wonder and delight. I hope I have demonstrated some of the possibilities that might get us there, or at least some of the ways to think about that kind of a world.

Drawing the line

For the moment, perhaps, we should come back down to earth. The athletes I talked to have a practical view of accessibility issues, no doubt from their first-hand experiences. In our interviews they raise the issues of the tradeoffs between cost,

efficiency, and accessibility. Where do we set the standard? Where do we draw the line? Should every seat, in every building, in every city, be accessible? What is reasonable? What can be done successfully?

The more severely disabled the person you try to accommodate, the more specialized the adaptations need to be, the more expensive they get, and the more likely they are to need frequent maintenance. There is a point at which these increased adaptations are only benefiting a very small portion of the population, and they may begin to be a nuisance to others. But if true universal design is our goal, can we ever consciously make a cut-off at a level of design that we know is still not good enough for a very small fraction of users? If not, then what cost are we willing to spend on universal accessibility? Is *total* universal design even possible? Probably not. At some point, severely disabled people require personalized, specialized adaptations and the aid of an able-bodied assistant to function. And because of issues like cost and efficiency, it seems clear that we need to draw the line, in terms of what society can provide, somewhere.

However, where to draw the line is not a question I am going to attempt to answer, because this thesis looks in a different direction. I chose to look at the edge of design that lowers barriers by challenging both people's abilities and perceptions and I've tried to encourage creative and interesting approaches to solving frequently overlooked problems. I'm not trying to ignore the needs of the least mobile segment of society, and I have acted on the assertion that universal design is a desirable goal, whether it is technically possible or not. In pursuing that goal, I found that the athletes within the disabled community thrive on overcoming any obstacle, no matter the size. And they may be the greatest resource for discovering solutions that also benefit the entire world as well.

Conclusion

Returning, finally, to my original research question, I ask again: What can urban designers learn about designing better urban environments from the experiences of disabled athletes, and how can disabled athletes aid us in the process of designing for the entire population of users?

In this paper I explored the accessibility issues faced by Paralympic athletes, with a variety of different disabilities, in the athletes' villages at the Paralympic Games. First, the athletes illustrated in great detail the kind of specific physical design and transportation issues that still limit their freedom of mobility in urban environments. From their experiences, I learned about the barriers that people with disabilities encounter in cities, as well as some of the solutions offered to overcome those barriers, and the effectiveness of those solutions. The issues that they identified need to receive more direct attention from urban designers.

Second, they have drawn attention to topographic concerns and improved public transportation systems, and the need for the development of denser communities and transit-oriented design, and shown how these planning concepts contain specific benefits for disabled members of the community, benefits which add to the already well-known arguments in favor of such urban environments. These are important lessons for planners who might have thought that the concerns of disabled users were separate and incompatible with those of the rest of the population.

And third, the athletes have revealed both the limitations socially imposed on the disabled community in the present and the exciting potential of the future. Attitudes towards the disabled in this country still present challenges and barriers that prevent full integration of the disabled into society; they are guaranteed the minimum level of access by law, but there is little culture-wide interest in the quality of the urban experience for people with disabilities, and not much expectation that the disabled themselves can do much to improve their own situations. The disabled community is challenging those notions however, and these Paralympic athletes are the vanguard of that challenge. They are challenging the limitations set for them by society and showing that they can be as successful and inspirational as anyone else. They represent all that the disabled are capable of physically, mentally and socially. They also embody the potential future that awaits us beyond current

accessibility legislation like the ADA, when urban designers are motivated by more than simple compliance with government standards. In the future, when society demands universal accessibility as a basic human right, there will be no question of when, where, or how often. These basic concerns will give way to more creative themes like playfulness, challenge, and variety, as I have tried to illustrate in my designs. People with disabilities demand normal human lives without pity, shame, or lowered expectations, and we should provide them with joyful, challenging and exciting environments that fulfill these humane demands.

The Universally Designed Village

Bibliography

Books

De Moragas, Miquel; Llines, Montserrat, and Kidd, Bruce; Eds. Olympic Villages: Hundred Years of Urban Planning and Shared Experiences [Papers presented at the International Symposium on Olympic Villages, Lausanne, November 1996]:

- Beasley, Kim Allen. "The Paralympic village: a barrier-free city".
- De Moragas, Miquel. "Olympic villages and the major challenges of organising the Olympic Games".
- Millet, Lluís. "Olympic villages after the Games"
- Muñoz, Francesc. "Historic evolution and urban planning typology of Olympic village".

De Moragas, Miquel and Botella, Miquel; Eds. The Keys to Success. Barcelona '92. Centre d'Estudis Olímpics i de l'Esport, Universitat Autònoma de Barcelona. 1995.

Paralimpics '92: Barcelona 1992 IX Paralympic Games Official Report. COOB '92. 1993.

Journal Articles

Aldersey-Williams, Hugh. "A designer Olympics [1992 Olympics, Barcelona, Spain]". *Progressive Architecture* 1988 June, v.69, no.6, p.37-38,40, ISSN 0033-0752.

Bennett, Paul. "Big ideas down under [Homebush Bay, Sydney]". *Landscape Architecture* 1999 Feb., vol.89, n.2, p.[60]-67,88-95, ISSN 0023-8031.

Buzacott, Stephen. "Village [Homebush]". *Architecture Australia* 1997 May-June, v.86,

n.3, p.80-[83], ISSN 0003-8725.

Challinor, Catherine. "The Olympic Village: showcasing sustainable planning and urban design". *Landscape Australia* 1999 Nov.-2000 Jan., v.21, n.4 (84), p.298-302, ISSN 0310-9011.

Creagh, Lucy. "Serious Olympia: the modulation of ideal city form at Homebush Bay [Sydney]". *Transition* 1998, n.59-60, p.154-159, ISSN 0157-7344.

Davey, Peter. "Sporting chances". *Architectural Review* 2000 Oct., v.208, n.1244, p.50-[53], ISSN 0003-861X.

Dickinson, Michael. "Olympia Sydney's proposals for a new sports city at Homebush Bay". *Architecture Australia* 1993 May-June, v.82, n.3, p.56-63, ISSN 0003-8725.

Dietsch, Deborah K. "An Olympic challenge: Seoul Olympic Athletes' and Reporters' Village, Seoul, South Korea, Woo & Williams, Architects". *Architectural record* 1988 Sept., v.176, no.10, p.118-127, ISSN 0003-858X.

Dixon, John Morris. "No frills, no thrills: Atlanta's pragmatic Olympics". *Progressive Architecture* 1995 July, v.76, n.7, p.51-59,102,104, ISSN 0033-0752.

"Faculty project: Sydney Olympics: master planning, urban design, and landscape architecture, Hargreaves Associates". *Harvard Design Magazine* 1999 Winter-Spring, p.100-101, ISSN 1093-4421.

Glanville, Ranulph. "Sydney's game plan: letter from Australia". *Architects' Journal* 1998 May 7, v.207, n.18, p.27, ISSN 0003-8466.

Goldberg, David. "Gridlock Games? Atlanta hopes not". *Planning* 1995 Nov., v.61, n.11, p.4-8, ISSN 0001-2610.

Heffernan, Tony. "What's in the Games for downtown Atlanta". *Urban Land* 1995 Sept., v.54, n.9, p.43-47, ISSN 0042-0891.

James, Anton "Landscape [Homebush]". *Architecture Australia* 1997 Jan.-Feb., v.86, n.1, p.10, ISSN 0003-8725.

Maine, Anna. "Olympic feat". *Architectural Review* 1996 Aug., v.200, n.1194, p.44-[47], ISSN 0003-861X.

Mossop, Elizabeth. "The green green grass of Home(bush)". *Landscape Australia* 1995 Aug., v.17, n.3, p.193-197, ISSN 0310-9011.

"Paesaggistica olimpionica = Olympic landscape". *Architettura* [1995], v.42, n.17(494), p.684-685, ISSN 0003-8830.

Rand, George. "Olympic housing in Seoul". *Progressive architecture* 1988 Oct., v.69, no.10, p.38, ISSN 0033-0752.

Ulterino, Matthew. "Toward 2000: Sydney prepares for the gold". *Urban Land* 1996 Aug., v.55, n.8, p.63-67,87, ISSN 0042-0891.

Villani, John. "Meeting the challenge [Sydney]". *Urban Land* 2000 July, v.59, n.7, p.114-119,125-127, ISSN 0042-0891.

Weirick, James. "A non-event?: Sydney's Olympics". *Architecture Australia* 1996 Mar.-Apr., v.85, n.2, p.80-83, ISSN 0003-8725.

Wright, Michael. "An Australian landscape for the Sydney Olympiad". *Landscape Australia* 1995 Nov., v.17, n.4, p.247-254, ISSN 0310-9011.

World Wide Web

International Paralympic Committee

- <http://www.paralympic.org/>

AccesSport America

- <http://www.windsurf.org/>

Adaptive Environments

- <http://www.adaptenv.org/>
- <http://www.adaptenv.org/universal/udresources.asp?f=6>

Autonomous University of Barcelona – center on olympic games study

- <http://blues.uab.es/olympic.studies/viles/beasley.html>
- <http://blues.uab.es/olympic.studies/activities.html>
- <http://blues.uab.es/olympic.studies/documents.html#villages>
- <http://blues.uab.es/olympic.studies/articles/landry.html>

Disabled Sports USA

- <http://www.dsusa.org/>

Dwarf Athletic Association of America

- <http://www.daaa.org/>

European Institute for Design and Disability

- <http://www.design-for-all.org/>

Extreme Adaptive Sports

- <http://www.sitski.com/>
- <http://www.sitski.com/atheletes.html>

Face of America – World T.E.A.M. Sports

- <http://www.faceofamerica.org/home.html>
- <http://www.faceofamerica.org/communicate-links.html>

Gimp on the Go: The Internet's Premier Disabilities Travel Publication

- <http://www.gimponthego.com/jarchive.htm>
- <http://www.gimponthego.com/cover.htm>

International Blind Sports Association (Federation)

- <http://www.ibsa.es/welcome.html>

International Committee of Sports for the Deaf

- <http://www.ciss.org/>

International Olympic Committee

- <http://www.olympics.com>
- <http://www.olympics.com/eng/paralympics/index.html>

National Disability Sports Alliance (Formerly the US Cerebral Palsy Athletic Association)

- <http://www.ndsaonline.org/main.htm>
- <http://www.uscpaa.org/main.htm>

Network Consulting - Thomas J. Schmokel, ADA Consultants / ADAAG Experts

- <http://www.istal.com/smoke/>

New Halls Wheels

- <http://www.newhalls.com/>

The Universally Designed Village

North American Riding for the Handicapped Association

- <http://www.narha.org/>

Olympic Museum Lausanne

- <http://www.museum.olympic.org/>
- <http://www.olympic.org/museum/>

Rehab Management – The Interdisciplinary Journal of Rehabilitation

- <http://www.rehabpub.com/default.asp>

Rose Resnick LightHouse for the Blind and Visually Impaired

- <http://www.lighthouse-sf.org/home.html>

Salt Lake City 2002 Organizing Committee

- <http://www.slc2002.org/sloc/index.html>
- <http://www.slc2002.org/sloc/paralympics/parainfo.html>
- <http://www.slc2002.org/sloc/paralympics/paravenues.html>

Sarah Will, if mercury and venus had a daughter here would be her rival [fan page]

- <http://members.aol.com/stonewolf5/sarahwill/>

Special Olympics

- <http://www.specialolympics.org/>

Spina Bifida Association of America

- http://www.sbaa.org/html/sbaa_facts.html

University of Utah (Site of 2002 Olympic Village)

- <http://www.utah.edu/2002/office/occr.html>
- <http://www.utah.edu/2002/housing/>

United Cerebral Palsy of Southern Maryland

- <http://www.sitestar.com/ucp/whatis.html>

USA Deaf Sports Federation

- <http://www.usadsf.org/>
- <http://www.usadsf.org/DWG/SDWG/2001/TeamRoster.htm>
- <http://www.usadsf.org/teamusa/gousa.html>

Variety - The Children's Charity

- <http://www.varietyonario.com/>

WeMedia Inc.

- <http://www.wemedia.com/wehome/gateway.jhtml>
- http://www.wemedia.com/wehome/bu_index.jhtml?business_unit=wesports&wesports_category=we_sports&viewer=%2Fwehome%2Fbusiness_unit%2Fwesports%2Fdefault&sub_menu=no
- http://www.wemedia.com/wehome/bu_index.jhtml?docname=http%3A%2F%2Fexcurses%2Fsp_belson_hueber_031201.xml&relativePath=%2Fsp_belson_hueber_031201.xml&business_unit=wesports&viewer=%2Fwehome%2Fbusiness_units%2Fwesports%2Fshow_full_story_xmltodom&sub_menu=no&wesports_category=news&sub_cat=sports_news

Wheelchair Sports USA

- <http://www.wsusa.org/>

Other

Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Fields, 28 Code of Federal Regulations, Chapter 1, Part 36.
U.S. Department of Justice. 7-1-94 Edition.

4036-70