

Universal Design in Multi-Family Homes

Presented by Erick Mikiten, AIA, LEED AP
Mikiten Architecture

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AIA
California Council

Course Description

AIA Learning Units: 1.50 hours (HSW)

In this 90-minute course, Erick Mikiten, AIA, wheels us through this 39-unit affordable housing projects for people with a wide range of abilities. Erick describes the seven principles of Universal Design and then shows us how he incorporated these into this award-winning projects. Erick encourages design professionals to think broadly about how to create beautiful environments that are usable by as many people with varying level of abilities as possible.

Viewers will gain an appreciation for how to make spaces, furniture and outdoor equipment widely usable to people of different ages and abilities while creating rich and rewarding experiences.

About the Presenter

Erick Mikiten, AIA, LEED AP, brings keen insights into Universal Design as a wheelchair-riding architect. Throughout his over 30-year career, Erick has created hundreds of units of dignified, innovative and highly accessible multi-family housing for non-profit developers and award-winning universally designed homes.

Erick consults with A/E teams on Universal Design. Recently, Erick served as a Universal Design consultant on the nationally-recognized Ed Roberts Campus and on the San Francisco Transbay Terminal. Erick is currently consulting with the City of Alameda to craft a Universal Design housing ordinance.

Mr. Mikiten taught architectural design at UC Berkeley, and presented seminars at AIA, Dwell Magazine and USGBC events. His speaking engagements focus on the importance of Universal Design as a part of a holistic approach to stunning and creative architecture that puts the needs of the user first.

Learning Objectives

1. Understand how to apply the seven principles of Universal Design to multi-family homes.
2. Learn how to incorporate accessibility features cost-effectively into affordable housing.
3. Understand how tactile warnings, such as truncated domes, present challenges to wheelchair users and should be used sparingly.
4. Gain an appreciation for how to make outdoor spaces, furniture and playground equipment widely usable to people of different ages and abilities while creating rich and rewarding experiences.

Important Information About Codes Standards and Interpretations

This course was produced in 2016 and reflects codes and standards in effect at the time. As codes, standards and interpretations are subject to change, viewers should check current codes and standards with regards to accessibility. Viewers should also conduct additional research as appropriate and discuss specific circumstances with building code officials and with regulatory and other agencies that have jurisdiction over their specific projects.

Note to Transcript Readers:

This transcript is a verbatim reflection of the video narrative and is provided so that those with hearing impairments can follow the video course. As with many verbal presentations, verbatim translations do not always result in the same type of concise language as if the transcript was developed and presented as a technical document.

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Chapter 1: Introduction

Hello, and welcome to this course on multi-family accessibility. I'm Erick Mikiten and I'm the architect for Shinsei Gardens. Today I'm going to be taking you on a tour of outside the building here and into one of the units and some of the common spaces. We'll be focusing on Universal Design. Universal design is an idea that's broader than just accessible design, using the ADA or the Building Code.

Universal design is thinking about making our places or buildings and even products usable by as many people as possible, and that's what we try to do here at Shinsei Gardens. I'm also going to describe to you seven principles of Universal Design, which are broad ideas that are very useful for keeping in mind for architects as we're laying out projects throughout the entire project and even selection final materials and products.

Chapter 2: Principles of Universal Design

Now let's talk about the seven principles of Universal Design that I mentioned earlier. Remember, again, that these are guiding principles, broad ideas that we can use as architects in the design of our buildings and spaces. We have to be creative in the application of these and in fact creativity is welcome and encouraged by their sort of openness, unlike the building codes that are very specific and very detailed that sometimes make us feel sort of trapped. These ideas are there to encourage us to think creatively. So the first three of these are more broad than the other four, they're more about sort of planning the space and I'll introduce those first and then we'll talk about the four that have more to do with things like product selection and some more detailed ideas.

1. The first of the principles is flexibility. Think to yourself, can somebody use something I'm creating with either hand? Can they use it when they're seated, when they're standing? In this example of park benches there are different benches at different heights, some with armrests and some without. There are spaces between the benches where somebody with a wheelchair could pull in and park and sit next to their friends and family members. And we also see a kitchen that has flexible storage that somebody who's sitting in a wheelchair can pull down to be able to reach more easily, and that somebody who's standing up can reach at eye level with no problem.
2. The second principle is tolerance for error. And in this one we ask ourselves, are we minimizing hazards in the environment that we're creating or minimizing accidents by creating transitions between flooring materials that are safe? In this image, we can see a lobby of a commercial building where they created two steps rather than a larger series of steps or eliminating the steps entirely and it's something that's unexpected in the environment and so people tripped over it and they're looking up at the big atrium space here. And so the building maintenance people had to go in and put this very unattractive stripe in here on the steps to alert people.

In this other image, we have a cross walk that cuts through an island in a street. We have multiple signals that create a safer environment here. We have the truncated domes in red on the street surface, we have a sign that says, "Look," so that pedestrians are prompted to look at the traffic in the correct direction, and then we also have a sign for the drivers saying to yield to the pedestrians. We have color, we have signage, we have material changes, we have texture changes, all of these things combine to create a lower possibility of error in this environment.

3. The third principle, which is also a broad principle, is size and space for approach and use. So we ask ourselves, can multiple people use a space at one time comfortably? Can two wheelchairs use a space? As we'll see here, the ramps and the walkways are designed not at the minimum code requirement for those elements, but thinking about either two people in wheelchairs walking together or someone in a wheelchair with maybe one or two people walking beside them, having a conversation and being able to use those spaces in a way that doesn't disrupt the conversation, everybody can continue to walk together.

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In the image here we have an example of a transit station where you go through the toll portal and there's a wider space for somebody who's using a wheelchair. Now we see this in a lot of subway stations, in the BART stations here in the Bay area, but very often it's just one entry that's wider. What if there were two entries that were wider? Then more than one person in a wheelchair at once would be able to go in to the transit station. And then we think, again, more broadly about people who are towing their luggage on the way to the airport and these wider toll stations wind up getting backed up, in my experience, with lots of people going through there when other entrances are available. So the idea of Universal Design here is not to just do the code minimum of one, but rather to make every one of these wider so that anybody can use them.

In this image of a bathroom we see a large Japanese soaking tub. The controls are placed close to the outside so that somebody who's either in a wheelchair or standing outside can easily reach them without having to bend over. The hand held control unit is right there on the outside as well, so that somebody who's maybe assisting the person in the tub is able to conveniently use that hose, that hand held unit and assist the person.

4. Now when we get to the fourth principle of Universal Design, we're getting into things that are a little bit more detailed and less sort of schematic in terms of our approach as designers, and this fourth principle is equitable use. Consider, can everybody use an element that you've created? As an example, in this ramp the image on the left shows what people did first at the entrance to this church, which was to add this metal ramp on, it's very narrow, only one person can traverse it at a time, and it's obviously architecturally quite ugly.

What they did later was to actually rethink and create an entrance that would be shared by everybody. You're not being pushed off to the side when you're in a wheelchair or unable to climb the stairs, you're able to use the main entrance, the main walkway. And you can imagine, it's very obvious that there's a group of people here on Sunday after services and people are coalescing and talking and visiting with each other, they're going to be using this entire space and somebody who's in a wheelchair is going to be right in the middle of that and welcome and able to participate.

In this image we see the entrance to a supermarket. The idea of having automatic doors that open wide is obviously great for somebody who's using a wheelchair, especially if they're holding their groceries with one hand and trying to push with the other, but it's obviously also good for people who are pushing a cart, somebody with a baby carriage or a large family trying to get in or out the door, parents tugging their kids along. The door just gets out of the way, everybody can use it equitably.

5. The fifth principle is simple and intuitive use. One of the examples I like to use for this is the idea that you have a push bar on a door and how many times have you gone to a commercial door and tried to push when you're supposed to pull or vice versa? It's because the door handle isn't communicating any information about whether it's a push handle or a pull. So that's a good common example, here's another one where we have light switches. There are many different options available today; an old fashioned toggle switch is something that requires more dexterity and more ability to be able to use, whereas something like this, which is a push button, allows somebody to use it with an elbow, doesn't require any particular understanding, it's a simple button.
6. The sixth principle is perceptible information and this can apply, as I said, to web pages, it can apply to signage, a wide range of different experiences. It has to do with sight, sound and even touch. In this example we see this wonderful braille sign in a park that I stumbled upon one day in Portland, Oregon. It shows a map of the entire park, it has braille indicating what the different parts of the park are and somebody who is blind or low sighted can get their orientation by feeling across this and then stepping into the park.

In this image we see different types of perceptible information that might be used in museums. One is a push button that can read the information that's on the museum display—so if somebody's not able to read the size text or due to the distance that the label is, it'll read it audibly. Second is braille that's actually on the back of this yellow handrail, so the handrail is a guide rail that somebody who's blind or low sighted can use to lead them through the museum display and then they can read the information on the back side of the handrail. It allows everybody to participate at a higher level than they might normally be able to, so that's the value of perceptible information.

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In this drawing we see a cell phone that has a raised dot at the five and that gives somebody who's low sighted or blind orientation so that they know the center point of the keyboard. We find the same thing on our computer keyboards; two keys have a raised portion that allows somebody who's low sighted or blind or somebody who's a touch typist and is feeling that for getting zeroed in, it lets all of those people find their way around the device.

And the last principle is low physical effort. This is an important one for a lot of people. You have to ask yourself not just is something difficult to operate, but is it too high to reach comfortably, is it too low to reach comfortably? It can manifest itself in a lot of different ways in the spaces that we lay out. In this image we see somebody who's pushing on a door handle. A lever handle is easier to operate, it doesn't require gripping, it doesn't require twisting of the wrist. Somebody who's unable to use their fingers, somebody who doesn't even have a hand is able to use a lever handle.

7. In this image we see a washer and dryer, they're actually up on risers. This is getting very popular and is very easy to find with almost any manufacturer today, it's something that I used to do for clients who used wheelchairs in order to be able to get the reach for the front loading machines to be at a more convenient height.

It's great for people who have bad backs or who just don't want the inconvenience of having to bend down and reach deeply into a frontloading washer and dryer. So it's good for everybody, which is what makes it Universal Design and it's certainly great for somebody with a specific disability, whether it's temporary or permanent. And in this image we see this cool photo of an ad from Good Housekeeping Magazine from 1925 that shows a woman sitting on a stool, washing the dishes.

This is actually something that's very common in older houses that we do remodels of. It's the kitchen cabinet at the sink that is either completely open below or has doors that open and a knee space that's available for people when it was popular to use a stool in the kitchen. Obviously if you're standing for a long time and you're preparing meals you're going to get fatigued and you'd like to have a stool. Today when people maybe cook a little bit less than they did in 1925 you see less stools in the kitchen but it's still an idea. It gives flexibility and allows the idea that you can have lower physical effort of standing for long periods if you incorporate something like this.

And in the image right next to it we see a grandmother and her granddaughter who are at a modern sink. The grandmother sitting on a stool with the doors that open and slide away so that you have the knee space, but they can also be closed so that you can have a continuous front of the cabinet when you want it. So those are the seven principles and I encourage you to look at those, keep reviewing them, learn them and try to have it next to you when you're designing your next project.

Ask yourself, is there another six inches that I could add that would create more flexibility in the space that I'm working on? Could I create, instead of one code required accessible restroom stall, what if I created two? Or if I created one that fully meets code and one that's in between so that it's more flexible and we add grab bars in that one in case somebody needs it, even if the code says you only have to have it in the wide wheelchair accessible stall. Think flexibly about these things, keep this list next to you and try to incorporate these elements and they'll start to become second nature and I guarantee that you'll start to look at your designs and you'll start to look at the designs that are out in the world in a very different way. Your architecture will become more inclusive and it will become better.

Chapter 3: Shinsei Gardens

We're here in Alameda, California, on this beautiful fall day, and this actual piece of land was part of the Naval Air Station that was decommissioned about 20 years ago. It was used for a variety of different purposes and the Navy wasn't too careful with the things they had on the property so we had a brown field site to deal with and a lot of things that had to be done to clean up the site. And recognizing that, very often affordable housing such as this gets those sort of second rate sites, third rate sites that no other developer wants to deal with, we decided that we'd actually make that one of our driving concepts and try to remediate the site not just to the minimum required but take it one step further and make this a really green building and a really green project.

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We succeeded in that, making it the highest rated GreenPoint rated project in the state for multi-family housing and we also achieved a LEED Platinum rating, which is pretty rare, especially in about 2010 when we did it, for multi-family affordable housing. Usually people think of that as being a very expensive undertaking and we were able to do that here successfully. That idea of going one step beyond, with the green elements of the building, was also part of what inspired everybody to take the idea of accessibility one step beyond.

The other reason for that is that the two developers were Resources Community Development, a non-profit housing developer in Berkeley, and Operation Dignity, which is based here in Alameda, and they provide homeless services and a lot of support and housing for homeless vets. And one of their focuses is vets with disabilities and their motivation in this project was to create housing that would accommodate those vets and their families. So what we wound up with was one to four-bedroom units, so larger than much housing that's here in the Bay area, that would accommodate families.

So we have multi-generational households and as such there's a greater chance that there's people with disabilities beyond the vets themselves who might be living there. So all of those things combine to raise the awareness of the project team to the need to be careful about the things that we're incorporating for Universal Design and I, as a wheelchair writing architect certainly that's a large part of my agenda of projects that I'm trying to work on to teach people that creating Universal Design is not going to break the budget and that it's doable, that it can be accomplished in any project to a surprisingly high degree.

The team, in thinking about Universal Design and in thinking about green design, recognized an interesting concept, which is that both of these have to do with social equity. Making places that are affordable, making places that are safe, making indoor environments that aren't outgassing and that are safe for people to breathe the air. Sometimes people with disabilities who are less mobile will not open doors and windows and get that natural ventilation as much as other people might, because it's inconvenient. So we try to make those things convenient but we also recognize that the spaces might be closed off more frequently.

And so making those indoor air environments clean, making sure that we're not using materials that outgas, adhesives that are not good, are all extra important in a building like this. And so we recognize that the Universal Design requirements for making places that are good for people, that are safe for people, and that accommodate as many people as possible, overlapped with green design features that are about recycled materials and safe materials and flexibility of the environment.

Finally today I'm going to take you through the seven principles of Universal Design. These were created about 25 years ago by Ron Mace, FAIA, at the North Carolina State University. He recognized that the building codes were getting bigger and bigger, the ADA was coming on board at that time, and there was more and more information that was difficult for architects to digest and incorporate fully into their buildings and the idea, the broader idea of accessibility was getting almost diluted by all of the little fine details that people had to keep track of.

So he created these seven principles, which are broad guiding ideas that we can keep in our minds as designers and implement these concepts. Behind those concepts then can come the details and the codes and so forth, but if we don't start with the broad idea, just like as we're laying out a parti or sketch diagram of a project like this, we need to get that established clearly at the beginning of our design process and that can guide us the whole way through. The same is true with these seven principles.

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Chapter 4: Tactile Warnings

So here we are in the drop off area, the curbed area in the front of the building, and you can see that we have tactile warning strips here along the depressed curb. So I wanted to have the depressed curb so that as people are dropped off here they can easily get onto the sidewalk and into the building. So in order to warn people who might be blind or who are not paying attention to the potential for traffic here, we have the tactile warnings. Now these are a requirement in the code in California, but they were interestingly dropped from the ADA recently.

There's a lot of debate about the usefulness of tactile warnings, a lot of architects actually specify them in the wrong places as a result of the code being unclear. It says that they'll be placed in vehicular ways and there's a lot of different types of vehicular ways that you could choose to place it or not in. It's placed in street corners, which are very useful, so that people who are blind can actually feel the surface with their cane or feel it underfoot. So somebody who's walking along here, because this has a different... It's a rubberized surface and meets a very exact standard of acoustic response to a tapping cane and then also the foot response, so that somebody who's blind and trained feels this and they know that they need to be careful.

Someone who's low vision sees the color and knows to be careful. Children and parents certainly rely on these all over the place, but they're often placed... For example, in San Francisco there's many instances where they're placed at every driveway along a city block. Every time the sidewalk crosses a driveway you might have a set of tactile warnings on either side, so maybe eight different indications that there's potential vehicles. Well, people who are blind are taught that that means intersection and a corner, so when building owners and architects start placing them at every vehicular driveway, it becomes very confusing for the blind people and they get disoriented.

And in fact, people who are newly blind these days are taught to mostly ignore the tactile warnings, which is why it was dropped from the ADA. California still has it but I predict that it's not going to last much longer. In addition to the tactile warnings we created this black guide strip. This is actually cut into the concrete after the fact and then painted with a non-slip rough paint. So this leads all the way to the manager's office and to the community room, so if there are events behind held here by the developer then the people can be told, "Go to the drop off, follow the black line and you'll find your way to one of those two places."

Chapter 5: Outdoor Spaces, Walkways and Seating

So here we're on one of the little foot bridges, as I call them. It sort of feels like one of those bridges that goes through the Japanese landscape and I envisioned the rest of the walkways through the courtyard as being like a river flowing through the space. And as you can see we've got a mound over there in different articulation to the ground plane and we try to do that in order to make what would otherwise be a flat and uninteresting courtyard into something that would be more engaging and that would have a different feeling of space in different parts of the courtyard.

And so here we're in sort of the play area and we wanted to acknowledge the fact that there are two different sort of age groups that would potentially be here. We have a toddler play area and then on the other side of the concrete path we've got a play area that is for older kids. Both of these are very accessible and let me show you a few details. So right here on the ground we have a transition from the wood, recycled wood surface, onto a concrete edge and then onto an artificial grass surface.

So the code requirement is that you can have a quarter inch transition or half an inch transition if you have it beveled. So we made sure to modulate all of these surfaces and think about the requirements of each one of these materials and incorporate that into our details right from the beginning. So the Trex decking here is actually above a recessed area and then we have the concrete curb that's coplanar the walkway and then we have this artificial turf that's actually drained underneath. And there's two reasons for that: one is that we wanted to make sure that toddlers didn't get muddy, so that's a good thing and it allows people to be out here at more different times of the year.

But the other is that if you're a parent in a wheelchair or with a walker... I'm a parent and as I was designing this I was thinking about playing with my toddler at the time and the fact that as you transition onto a surface in a wheelchair that is muddy, you stop very quickly and you make a big mess and if you can't follow your child then you're not having any fun. So we wanted to make sure that this was a well-drained surface and that it could be used for everybody.

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As we get over to the actual play equipment it's all easy to access and get to in a wheelchair and so parents and grandparents can play with their children. We have the same thing over here across the way. So here we're at the concrete walkway that winds through the whole courtyard. We have a resilient play surface of recycled rubber here and you can see that the transition between the two is perfectly flat. We reverse engineered that, thinking about what the height of this concrete would be first and then recessing the rest of the area so that the transition is perfectly smooth.

It also avoids a tripping hazard and that was one of the principles of Universal Design that I mentioned earlier. With the play structure itself we did a lot of research to consider the different types of use that it might get and the different ways that somebody would use it. Again, as a parent myself I encountered a lot of play equipment set out in the middle of sand, that I could not even get to and even if I could struggle through the sand to get there, I couldn't use it. So we wanted to make sure that, number one, we had variety, that's that principle of flexibility that I mentioned before, and also equipment that you could get to in a wheelchair from any direction.

So a child in a wheelchair can get right up to any one of these rings, there may be other kids crawling on the rings, and from a wheelchair if somebody has the strength they could even get in here and sit on one of these. If somebody can climb, somebody with strong arm power, as many people with manual wheelchair have, they can use the rope structure and kind of scramble up there even if they can't use their legs. We also have a variety of other types of equipment and platforms in this space, so that even if a child can't necessarily climb up onto something they can get next to their friends who are climbing up and still participate in the fun.

One of the fun things that we incorporated here that's sort of a graphic design element, was the different colors of the play surface. So we created sort of an idea of blue ocean, tan land and a blue lake over there, that was just one of those fun design elements and we put sort of these stepping stone pieces cut into the play surface, thinking that could inspire some kids to use the space in a different way. Well, we took that one step further with the rocks and the boulders that you see around here, so I'm a big fan of boulders and the power that they have to create solidity in a landscape design.

And so you can see that we have boulders strewn about on our hill that we created and we let those sort of seep down into this play area. We kept them away from the climbing equipment, obviously, but we did want to create spots around the perimeter where kids and parents could sit and transfer. For example on this boulder it's at seat height, so it's very easy to transfer over and have a conversation with maybe another parent, a family member, and not to always be sitting in the wheelchair. It gives a lot of flexibility.

So this platform here is actually one of my favorite features in this landscape. It doesn't look like too much, it's very simple, it's a concrete base that has a Trex cover on it so that it would harmonize with the deck surfaces that we saw earlier. But the idea behind it was actually that it would be at seat height, like I showed you with the boulders, and you can transfer over to it and sit in place and have an easier way of getting onto the grass. There's a lot of people who aren't able to climb down onto the grass, whether it's a grandparent who has bad knees, a parent who's got a bad back, or somebody who's in a wheelchair who can't climb back up into the wheelchair.

And so this integrated into the grassy hillside, allows somebody to scoot over and easily get onto the grass. And so imagine if somebody is here with their child or toddler and the child is climbing up and down the hillside and the parent is maybe stuck at the edge, because they're using a wheelchair or it's a grandparent who can't get down onto the grass. This gives the opportunity for them to use this interesting amenity of the hill, just the way that everybody else does. One of my favorite things about this, other than the obvious utility of it, is that it can be used very flexibly. It was great, one day I was here about six months after the project opened and there were about eight or nine kids out playing on the equipment, running around up and down the hillside, which is what the hillside was intended for.

We actually have a pathway that goes along the back of it sort of inviting kids to engage in the landscape. But they also started having an impromptu play, presentation on this platform and some of them were over here and then a kid would get up and make a statement and they would start playing around with each other. And then there were four of them up here at one point and they were orating to their friends, it was really great to see that as I said before, when we create flexibility in an architectural environment, people will use it, especially kids, in all sorts of unimagined ways. And that creates a depth of experience for them and it's very rewarding as us for architects to see that we've created a stage for life.

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So now we're coming down this winding pathway that weaves through the project over towards the main entrance. This has a lot of space here and it's very adaptable and flexible for different uses. Sometimes the developer will have events here and so a lot of people can gather and enjoy the outdoor space. Also, kids love to use this for their scooters and so if kids weren't in school at the moment you would most likely be seeing a lot of activity out here and people having fun. So as we come down here toward the, what I call the plaza space, we have more of an open arrangement, a circle that reflects the drop off circle that's outside and that as you saw on the site plan, is part of the overall geometry of the curves of the building.

We have seat walls here that, again, provide places for people to rest if they're not able to walk longer distances, provides opportunity for community interaction and it also creates an architectural space by surrounding this and defining it more as the plaza. We even have furniture here, movable, and a barbecue area that the residents can use and it's great for functions that have happened here.

Chapter 6: Exterior Handrails

So I'm going to demonstrate why it's so important to have handrail extensions at the top and the bottom of stairs. So as I mentioned, I can walk a little bit and so somebody who's coming down a stair and really is relying on this handrail, you're reaching in front of you to prepare for going down the next step. So in old stairs, as you know, this might stop right at the bottom of the stair. Somebody who really needs to lean forward and be able to place themselves on the ground doesn't have that handrail to stabilize themselves. It's the same thing when you're going up a rail or up a stair, it's the same thing when you're going up a stair, you have to have something in front of you to help pull you up.

Chapter 7: Perimeter Handrails

This is a very useful feature that we incorporated into the project. It's actually required on HUD housing projects but it wasn't on this one, this was tax credit and other funding sources. But I like to include it when we can, especially when we know that the population is going to have people with disabilities and so it's a handrail that runs around the entire ground floor or along the perimeter wall so that somebody who needs that extra stability has this handrail for support. It also sort of serves as a guide rail of sorts if somebody's blind and finding their way around the project, they've just moved in or if they're visiting then it provides a way for them to sort of find their way around the edges and find the door that they're looking for.

In addition right here, I'd like to also point out that this is one of the unit entries and we use the opportunity here to sort of frame the unit with these posts that go up and support an arbor up on the second floor and incorporated a seat here as well. Actually, the idea was that they'd have an empty spot here that they might be able to put plants or other things on and then an actual seat so that people have a little bit of a semblance of a porch feeling at each of their front doors, even though it's an exterior exit balcony and we don't actually have individual porches.

Chapter 8: Apartment Kitchens

Here we are in one of the dwelling unit kitchens and there's a number of features that are worth pointing out here. Some of them are code issues but some of them are things that we incorporate into our projects to increase flexibility and to make the spaces more convenient for everybody. So here's one, which is a full high pantry. So this is something that with shelves going all the way up, provides space at different heights for people who might be in a wheelchair or might be standing, or for children.

So it's a very flexible space and it also has built in recycling bins in the bottom. If we look over here we have the standard 36-inch countertop, which is typical in residential units, but then on one side... And that's located on one side of the range but then on the other side of the range we switch down to a 34-inch countertop. So this provides a space for people who might be standing and maybe can't bend over a little bit or are tall and it's not comfortable to use a lower countertop, but then it also gives a space that's more accommodating for children, shorter people and people in wheelchairs.

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We have a bread board or cutting board that's built into every kitchen. The code requirement actually does not say that it needs to be built in like this, instead some developers will just provide a cutting board and put it in a cabinet and then that gets lost or when somebody moves out they take it with them, not realizing it wasn't theirs, and it doesn't provide a convenient place to cut. But putting it here also provides a lower surface that people can use when they're in a wheelchair for preparing their meals.

A classic problem for somebody who's in a wheelchair is reaching the range hood and the controls are always going to be too high. The building code and the ADA don't regulate appliances and so we have this situation in most locations. So what I like to do is provide a switch on the face of the countertop next to the range that will turn on the light and the range hood. So here at the sink it's important for people who are in wheelchairs to be able to comfortably use the sink. Now it's possible to have a side approach like this and reach over and use the controls and wash your dishes, obviously that's uncomfortable so instead what we have in all the units is the flooring continuing completely under the sink, there's no bottom to this cabinet, it's just a top and two side frames.

And in this instance the developer wanted to use these toe kicks so that when you close the cabinet it looks like a regular cabinet. We actually don't use these anymore because as you can see, it creates a narrower space in between and so when somebody's in a wheelchair and rolling in here you can potentially catch on that. So at this point we actually just leave that off and nobody really even notices it. One of the nice things about having the flooring continue below is that if you have a leak in your plumbing then the water's falling on the floor rather than on a wooden cabinet and you're more likely to see it when you either open the cabinet or it'll just seep out and you'll see it before it does real damage.

And right next to this we have a work space, this is a rolling cabinet that has multiple functions. So some of the people in this development use this and actually slide it out and put it in their dining room and they'll have their cutlery, napkins, place mats and things like that stored in here, or they'll use it for other things. The top is butcher block so that they can have it in the kitchen and prepare things or right next to the kitchen in the dining room and use it as an extension of the work surface.

And then for people who are in wheelchairs you can keep it in the other room and then you have space for rolling underneath and you have a work station here right next to your sink. So this is a great example of what I was saying earlier about flexibility; it's a creative design element that's actually kind of fun because it has all these different uses and I see people here using it in different ways and it provides accessibility and it provides even another piece of furniture.

Chapter 9: Door Levers and Locks

So the door handles in all of the units are, as code requires, lever handles, such as this one. For your entry doors Fire Departments require that it have this return to it so that as the Fire Department is fighting a fire with a hose the hose won't get stuck in the door handle. That's only a requirement for entry doors, not for unit interior doors. The importance of a lever handle is that if you don't have good dexterity of your fingers or if you don't have any fingers at all, you can still use a lever and lock the dead bolt or unlock the door like that. For anybody else, even if you do have good control, you can use your elbow, which you'd never be able to do with a rotating door handle.

Chapter 10: Electric Outlets

So it's also important to consider reach range, and I like to put outlets not at the code required 15 inches off the ground, but raise it up a little bit to 18 inches. In some instances we'll even do 24, where for instance if we know that there's going to be like a computer table or a desk we'll raise that outlet up a little bit more. What that does is it allows somebody who's in a wheelchair to reach very easily or somebody who has a bad back and can't bend over, it allows that person to use the outlet at a more comfortable height. Similarly, we don't go with the code maximum height for switches and other environmental controls, but instead we bring it down a few inches. It doesn't compromise anything by doing that and it makes it more usable for more people.

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Chapter 11: Public Toilets

So here are in one of the common area restrooms and a few things I wanted to point out here. Obviously we have an accessible sink and we have specified a sink that actually has the drain outlet further back in order to provide more knee space for people. So you can roll in underneath this very comfortably and we provided automatic sensor soap dispenser and faucet so that people can go hands free. If you have dexterity problems that's obviously a great benefit and a lot of people just don't like to touch all that stuff in the bathroom and so that's good for everybody too.

We also have a mirror that is angled and very often it's set here at the very top of the back slash of the sink. The code requirement is that the mirror be no more than 40 inches to the reflecting surface, not to the bottom of the mirror above the ground. A lot of people make the mistake that they just sort of dimension the mirror 40 inches up, you have a frame and then you're out of compliance, that's measured during final inspection and you have to unmount the mirror and lower it down. Sometimes if you have a situation where you don't have any room to spare then you have to change the sink as well in order to get that mirror lower.

Now one of the things that's sort of, is a built in suspenders design element is that we do the angled mirror and what that does is it lets somebody who's sitting down, or a child or somebody who's short statured, actually see a lot more of themselves. If I was looking at myself in this mirror and it was a flat mirror then I would see up to about here but instead I can see down to here and that's just a great convenience for a lot of people. Another thing I always like to do in restrooms is to actually provide a paper towel dispenser here right next to the door. It recognizes the reality that people often will take a paper towel and they'll open the door knob and then go out.

And so what happens is that building maintenance people and the janitorial service will put a garbage can right here and that winds up being in the way of the required strike side clearance, it gets moved around, it becomes an obstruction for people. So whenever you can, try to build that into the wall, even if it means having a dispenser in two locations, one next to the sink and then one next to the door. Or, just a receptacle next to the door, there are a lot of different options.

Chapter 12: Laundry Areas

So here we are in the laundry room and one thing you can see here is that we have sinks that are at an accessible height, they're 34 inches, and they can be used by everybody, so whether you're standing or you're sitting it's a convenient height. It's also open below, not just at the sink but for the entire length so that somebody can come in here with a wheelchair and sit underneath and use this as a folding surface to fold their laundry. The sink is also shallow and we made sure to set the top of the countertop at 33½ inches, not 34 inches. This is a common error that's made where the architect will specify 34 inches, which is the code requirement, and then somebody in the office will select and specify a top mounted sink.

So what you have then is this tiny little additional lip and there are a lot of building departments that will actually reject the fact that the lip of the sink is slightly more than 34 inches, and they should. So this brings up a point, actually, that we try to do in all of our projects and that I recommend for everybody, which is to not just use the code minimum but to adjust that so that you have some play in the field. Whether it's because somebody in the office specified a certain type of sink, or maybe this sink was specified as an undermount and then changed for value engineering during construction and the design idea of setting this at 34 inches from a year earlier is lost in the shuffle and then you have something that's not compliant.

The same holds true for handrails and other building elements; don't specify them at the limits of the code requirement, specify it a little bit off of that so that you have flexibility. We also have frontloading machines here, washers and dryers. Interestingly, the ADA and the building code do not regulate appliances so it's up to us as architects to consider machines that have front controls, like the ones over here. And unfortunately this becomes something that is sort of up to maintenance and maybe the contractor or the person who's contracting to do the laundry machine maintenance, machines get swept out and even if we try to get front control machines that might be changed in the future. So we try to do the best we can sometimes, we can't control everything.

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Chapter 13: Trash Enclosures

Here in the drop off area we have more detectable warnings here because this is where the trash bins come out of the trash enclosure structure here. So in order to modulate all these requirements here it's a typical challenge with site work; we've got this trash enclosure and then we've got one inside the building on the opposite side of the project. And so what you can see here is that these bins are very high and somebody in a wheelchair or somebody who's shorter of stature is not going to be able to get their trash and their recycling into these bins. So what we did is create a platform in here that is raised up about two feet and we'll go around the other side and take a look at why that's important.

So we have a ramp here on the other side of the trash enclosure that leads up and creates that higher area. So as we go in you can see that now I'm up at the right height, I can easily put my garbage or my recycling into this dumpster that would have been completely unusable before. When the project first got occupied it was great because I was talking to some of the new residents and one woman came up to me and said she absolutely loved this arrangements with the two heights. Not because her family had somebody with a disability or using a wheelchair, but rather that it was a kid height so she could finally have her kids take out the trash.

Chapter 14: Summary

Thanks for joining me here today at Shinsei Gardens with this tour and discussion of Universal Design. We looked at a lot of detailed ideas and we looked at broad guiding principles for Universal Design and I hope that all this will inspire you to incorporate these ideas into your next project to keep this list of principles next to you as you're designing and occasionally check back with them and see if there's something that you can do that's a little bit more accessible. Rather than just create the code minimum required, single stall that's accessible for wheelchairs in a bathroom, can you instead create another one that's successful? Maybe it's not quite as wide but that it has grab bars and a little bit more space so that somebody perhaps with a walker but not a wheelchair would be able to get into that and be accommodated.

Think broadly about things like that; can you move a wall six inches over and have construction tolerances that will make your life easier during CA and that will also make life easier for somebody in maybe an unusually large wheelchair who's using that space. So apply these principles and remember that we're not tying our hands, we're actually opening up the doors for greater creativity and you can incorporate them into beautiful architecture that does not have to look institutional and you can inspire your colleagues and mine to do the same. Thanks for joining me.

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