School for the Visually Impaired
*A Transition to Independent Living*

By Christopher S. Plyler
Acknowledgements

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“It is hard to fail, but it is worse never to have tried to succeed.”

*Theodore Roosevelt*
Preface

Many times we go about our busy lives and ignore what does not affect us. Many never notice the struggle of those who have disabilities until it directly affects them. What can we do to change design so that a building is responsive to the needs of every user?

Having a disability is a challenge because the built environment often is designed with little or no consideration for those with handicaps outside of minimum code requirements. The minimum is not good enough and we must go above and beyond what is required in order to create a design that is inclusive.
Abstract

Theory
The integration of the theory of wayfinding and accessible design can create a more positive and less stressful environment for visually impaired users.

Facility
The School should develop a connection and respond to the needs of the users in a way that enhances their interactions with the environment. The facility will be developed using the ADA¹ as a guideline in an attempt to better develop solutions that supersede those of the ADA where possible.

Context
Lubbock is part of what is called the South Plains and is the county seat of Lubbock County. Located on Interstate Highway 27, Lubbock is 327 miles northwest of Dallas, 122 miles south of Amarillo, and 345 miles east of El Paso.

¹ Americans with Disabilities Act of 1990; signed into law on July 26, 1990 by George H. W. Bush, prohibits discrimination based on disabilities defined as “a physical or mental impairment that substantially limits a major life activity.” It constitutes as a series of laws and a series of requirements for building criteria of new facilities and those that are grandfathered under the new law.
Introduction

The key to this project is to redevelop the site into a usable space where the design enriches the lives of both those who use the facilities and those of the surrounding community. Accessibility is the first and most important concern that must be addressed as this facility will be a learning environment for those who have varying degrees of visual impairment.

The facility should respectfully address as many concerns related to issues of visual impairment as possible. Developed strategies will give the opportunity for the students to not only have the most accessible facilities, but also opportunities to learn how to navigate other less accessible environments.

Definitions

Blind
To be blind by definition is the inability to see or lacking the sense of sight.

Visually Impaired
A person who is partially sighted or has reduced vision so severe as to constitute a handicap.

Handicap
To have a handicap is to have any disadvantage that makes success more difficult; or a physical or mental disability making participation in certain of the usual activities of daily living more difficult.

2 (Lexico Publishing Group, LLC)
**Concept**

Transitioning from high school to college can be a difficult adjustment for any student, but even more so when that student is visually impaired. Upon the students graduation from high school they will join the School for the Visually Impaired to ease the transition to living independently and attending college.

Students learn how to live on their own through practical learning exercises; they learn financial independence, how to navigate different situations and environments, how to live, cook, and clean on their own.
# Table of Contents

**Acknowledgments**

**Preface**

**Abstract**

**Introduction**

**Concept**

**Theory**
- Wayfinding
- Accessibility
- Programmatic Objectives
- Architectural Issues
- Precedents

**Works Cited**

**Facility**
- Epistemology/Existing State
- Mission Statement
- Goals
- Design Requirements
- Spatial Analysis
- Spaces Required
- Spaces Defined
- Design Solutions for Accessibility
- Precedents

**Works Cited**

**Context**
- History
- Geographic
- Population
- Climate
- Transportation

**Site**

**Site Analysis**

**Surrounding Context**

**Works Cited**

**Schematic Design**

**Preliminary Review**

**Structure Review**

**Qualifying Review**

**Final Review**

**Epilog**

**Appendix A**

**Appendix B**

**Appendix C**

**List of Illustrations**

**References**

- Site 47
- Site Analysis 49
- Surrounding Context 50
- Works Cited 51
- Schematic Design 52
- Preliminary Review 53
- Structure Review 51
- Qualifying Review 55
- Final Review 56
- Epilog 70
- Appendix A 71
- Appendix B 76
- Appendix C 77
- List of Illustrations 81
- References 83
Theory

Wayfinding

Wayfinding is the “way people orient themselves in a given environment and eventually find their destination” (Perkins 193). In general, it is created through efficient design and spatial organization to avoid maze-like designs. Wayfinding uses visual cues, effective lighting, colors and textures of materials, smells, sounds, and efficient and legible signage to aid individuals with unimpaired or impaired vision to help guide them throughout a space. By appealing to the senses, the occupants within a space can begin to involve them and create a navigable space for them.

It is crucial to design in a manner that develops a strong design solution that is not only navigable but appealing to the users. You must create a way for one to navigate with confidence and develop cognitive maps\(^3\) that aids their progression throughout the space.

Many occupants “have impairments in respect to perception, cognition, and mobility (physical behavior), which affect their wayfinding abilities. Some of these impairments are permanent, some are temporary; some are slight, some are profound” (Arthur 62). People take cues from the environment in many ways and are constantly interpreting the information; architects must design with consideration for all possible occupants.

Considerations for possible uses of a space determine the best possible design solution that creates a space that can guide individuals safely and efficiently within that space. The success of a design that uses wayfinding is measured by the ability that a person is capable in determining their location in a setting. This

\(^3\) A cognitive map is “an overall mental image or representation of the spaces and the layout of a setting” (Arthur 23).
is based on cognitive mapping\textsuperscript{4} and the use of visual and audible means to navigate within a space using a cognitive map (Arthur 23).

Cognitive mapping is a never-ending process in which the individual gathers information about their surroundings based on environmental influences, both indirect; such as maps, and direct by observing one’s surroundings (Mollerup 41) (See Image 4). Essentially we are developing cognitive maps anytime we go somewhere, we may be making new cognitive maps or we may be adding to previously created cognitive maps.

When we are creating cognitive maps we remember landmarks by the way they look, their correct location, and correct orientation; this gains importance when we use landmarks that look the same as long as the surrounding or orientation in respect to one another differ (Jonsson 31-32). Kevin Lynch in his book \textit{The Image of the City} lists five categories of elements from which people use to map their environments:\textsuperscript{5}

- Paths = channels of movement
- Edges = boundaries that break or contain or run parallel
- Districts = areas of recognizable identity
- Nodes = places of intense activity
- Landmarks = points of reference that are visually distinguishable

This gives us the ability to tell the difference between one building and another when they appear to look the same (See Image 5).

So how do we develop strategies in order to navigate our environment? According to Mollerup, the key is to develop a progression of spaces as a “problem solving process” (Mollerup 27). The idea is to develop a cognitive map

\textsuperscript{4} Cognitive mapping is the “mental structuring process leading to the creation of a cognitive map” (Arthur 23).
\textsuperscript{5} (Perkins 193-194)
“mental representation of an environment” that one can easily recall using a wayfinding process.

The Wayfinding Process (according to Mollerup): 6

Planning
1. Origin – Decision to move
2. Seek Information
3. Check internal information
4. Check external information
5. Complete alternative routes
6. Select eligible routes
7. Choose criteria
8. Evaluate eligible routes
9. Choose route
10. Mental solution – Plan

Execution
11. Search/Decide/Move
12. Physical solution – Journey completed

Mollerup’s “wayfinding process” explains our experience during this process with important steps in the process being the origin or decision to move, the mental solution or plan, and the physical solution which is the completed journey. These represent the major objectives that one is attempting to attain when wayfinding.

When designing circulatory space according to Denise Levine, “at least one key circulation node to help people understand where they are in the building through that reference point” should be easily discernable during the initial contact for users in identifying the main circulatory plan (Levine 55). Pathways that

6 (Mollerup 32)

Image 6

The photo illustrates the difference in materials making it easier to discern main circulatory spaces from secondary circulatory spaces.
constitute main circulation and secondary circulation should be designated through the use of differing designs (See Image 6) which includes materials, color, texture, and lighting to assist in distinguishing different areas and orienting oneself within a space (Levine 32, 55).

Some designers have found creative ways to design signage creating a multitude of ways to direct both those visually impaired and non-visually impaired. Signage plays an important role in the ability for those individuals to navigate through space who are not familiar with the environment they are in or for those who need more specific information. Many solutions have addressed issues pertaining to the visually impaired through the use of graphics, colors, Braille, and tactile symbols and lettering.

Developing signage that directs everyone in a manor to reduce confusion and help develop cognitive maps is a challenge that can be successfully achieved. Issues with both tactile information that is easily accessible and good contrast and lighting of signage are the major concerns when developing a solution to aid in way finding (Berger 46-54).

Although codes designate how high signs must be placed and where they can be placed, generally signs should be located where they can be reached and read up close (Mollerup 203). Combining Braille, tactile lettering, colors, and graphics can not only reduce the amount of clutter on the walls but allow for everyone to use the same signs without any feeling of special attention given to them (See Image 7). Other possibilities for aiding in wayfinding are to apply the signage to the ground surface as in Image 8 (See Next Page). This not only gives the information needed to guide one to their destination but also gives a visual map of their choices.

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Tactile symbols are symbols made from everyday ordinary objects that represent the days of the week, places, emotions, food, and etc. They must be touched and felt by hand in order to determine what the object is or what is trying to be said.

Consists of raised lettering so that it can be felt by hand to determine what is being said.
Using sounds, smells, colors, textures, or special lighting conditions at main entry points of spaces can help individuals, especially those who are visually impaired to connect with and remember from where they entered. Using this method can empower the individual and give them a sense of security and independence granting them a similar experience to that of any other occupant. Smells can be introduced into a space mechanically, and can be emitted by plants or flowers, or come from a shop; like a bakery.

Using our olfactory’s creates a strong connection with certain space or spaces and therefore we are more likely to associate a smell with a specific point of entry or space. This can be a strong method of influence on individuals because of the instant feedback between our olfactory organs and our brains which leaves less to visual interpretation for everyone. Smells can tell us many things, they can remind us of childhood memories, or they can tell us of danger, such as smells that are associated with a foul or less than appreciated smell.

Sounds can also be used and introduced into a space to invite and guide occupants into, out of, and within a space. Sounds can be introduced in a couple of ways, such as through music which is neither loud nor offensive or white noise. Music can be powerful as it can increase activity in an area or greatly reduce it because of the type of music and the volume. The type of music can affect an occupants’ mood and habits based on the genre:

With grunge rock music, significant increases were found in hostility, sadness, tension, and fatigue, and significant reductions were observed in caring, relaxation, mental clarity, and vigor. In contrast, after listening to designer music (music designed to have specific effects on the listener), significant increases in caring, relaxation, mental clarity, and vigor were observed.

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9 Smells can be introduced by means or aerosols or evaporative methods like fragrance oils and water-based liquids and aromatherapy which can increase activity or help to relax individuals depending on what essential oil is used.
10 An organ of smell (Neufeldt 944).
11 A sound containing a blend of all the audible frequencies distributed equally over the range of the frequency band (Neufeldt 1524).
measured; significant decreases were found in hostility, fatigue, sadness, and tension. The results for New Age and classical music were mixed (Atkinson 75).

Considering the venue that is being designed and choosing an appropriate genre of music can greatly affect the occupants’ experiences and increase activity. Classical music effects adults and teenagers in opposite ways; in adults it reduces tension, stress, and sadness and increases relaxation and vigor and in teenagers an opposite effect occurs where fatigue increases and sadness increases as well as a loss in energy levels is noted (Atkinson 79).

An apparent trend between both adults and teenagers is that “designer music”12 has the best results and effects on the listeners and is the best choice for positive mood reinforcement and mood manipulation (Atkinson 75-79, 82-83). By reducing stress, anxiety, and tension, occupants are more apt to enjoy their experience within a space. If music of differing tempos, styles, genres, and sub-genres are placed strategically within a space, such as one type at an entrance and another at the intersection of two hallways, an individual can begin to navigate by sound. This can have great influences on the blind or visually impaired experiences and aid in their ability to navigate successfully.

Using white noise in some spaces can be very powerful and soothing. White noise can be used to drown-out city noises and other non-preferred sounds and can begin to help alter moods and make navigation easier. A common way of producing white noise is through the use of waterfalls and fountains. The key is to use this method to subdue undesired noises and flood a space with sound that is soothing and more desirable and relaxing. Placing white noise at points of entry or to emphasizing a particular element in a space or a space can give occupants an auditory landmark and can guide occupants to and from these spaces. Auditory cues can used in this method can anchor each space of importance and begin to connect the spaces just as hallways and visual landmarks do.

12 A term “coined by the music industry to describe a type of music intentionally designed to have specific effects on listeners” (Atkinson 82).
The use of lighting in a space can also be effective in setting moods, ushering people in the right direction, and helping to determine the difference between public and private spaces. Lighting can help to determine the most important spaces by having brighter and more colorful lighting effects within those spaces and lower lighting for less important or intimate spaces. The use of lighting can help set moods within a space and can affect how the user experiences the space.

At Morimoto Restaurant (See Appendix A) in New York City, Architect Tadao Ando uses light like music; it has a rhythm and a tempo that delineates his expression of space and spatial concepts. Tadao Ando uses light to express the function of each individual space and sub-space of Morimoto. Light and materials create a visual and textural symphony that helps guide occupants through the spaces and create both public and intimate areas within the restaurant (See Images 9 and 10).

He combines two entities, light and water, into a unique glimmering wall of LED lights and water bottles that closely resembles glacial ice; this creates a calming and intimate feeling when entering the restaurant. The wall is set on an angle which guides one into the space. The wall also guides one down into the lower level of the restaurant as it penetrates the floor and down into the lower level. It is an unmistakable and awe-inspiring gesture emphasizing not only the delicate nature of the food created by Chef Morimoto, but by creating so prominent a feature patrons cannot forget that it was near the entrance. This feature is an extraordinary piece of art and architecture and a great solution to help guide the patrons to and from the entrance no matter their abilities or disabilities.

Using light to guide occupants to the location of the entrance and making a unique architectural expression can ensure that occupants unmistakably know and remember from where they entered. Using light to help route traffic through what is intended to be a public space, such as a pathway or hallway can have more intense lighting than that of less important paths or areas of a space.

Lighting of these spaces with brighter lights influences movement because of human natures’ caution to avoid dark and low light spaces. Tadao Ando uses up-
lighting to light the stairway of Morimoto Restaurant to guide patrons down to the lower level where the bar and lounge are located. In doing this, he accentuates the tectonic form of the concrete stairs and this in-turn defines the public nature of the stairs. Accentuating public spaces with more or somewhat intense lighting gives hints that a space is safe and passable. Using this to their advantage, architects can help to guide occupants using their intuitive nature to move amongst a space.
Accessibility

It is imperative that navigability be a strong concern for the architect; especially if wayfinding is to be successful for all occupants regardless of their abilities. Looking for different approaches and solutions we can look at examples of what is required, what is being done to solve additional accessibility issues.

Accessibility requirements and codes are only minimums and should never be accepted as just “good enough” when designing; that’s why they are minimum code requirements. It is the responsibility of designers to never accept anything but the very best and make every attempt to exceed code requirements.

As we become more aware that a design can either decrease or increase the physical barriers that make it difficult for handicapped and disabled individuals to interact with the built environments, we can begin to make a positive effort to satisfy the needs of these individuals. Most people do not ever realize the effects that access, or the lack thereof can have on these individuals, but the “physical barriers are compounded by social and attitudinal barriers which tend to regard disabled people as inferior and of little value” (Hall ix).

Architects rarely gave consideration to the design for inclusion of the handicapped or disabled and that “biases against particular types of disabled people are reinforced by the practices of architects and the design features that they routinely seek to incorporate into building design” (Hall 96-97). The attitudes of designers must change to benefit everyone in order to usher in a new era and to break down the physical and social barriers of architectural design.

Designing so that barriers are non-existent or near non-existent can affect our culture as a whole if everyone was to consider universal design as “lifespan design” (Welch 3). Thinking in this manor, everyone will benefit from accessible and universal design because of our progression in age and health from childhood to old age that affects us in many ways (Welch 3). Because we are always aging and changing, our needs are always changing and these changes in life drive the
need for better designs that can aid us as we age and make us feel as though we are part of a community rather than separate.

Considerations for accessibility are a necessary part of universal design and are not stringent enough. Traditionally the intention is to produce built forms that are usable by all people and are only intended for the general population (Levine 16). Universal design can be used as a part of design in combination with other ideas, concepts, and requirements to create better accessible designs. Universal design can be explained through seven principles (See Appendix B). These principles constitute what universal design is; they are equitable use, flexibility in use, simple and intuitive, perceptible information, tolerance for error, low physical effort, and size and space for approach and use (Levine 17-18). We can use these principles in conjunction with accessibility codes and requirements and creative designs to make a design better, more successful, and more suited for the purposes of including all users no matter their age, health, height, limitations, and handicaps or disabilities.

For both the visually impaired and non-Visually impaired, it can be difficult to navigate from within a space to find an exit or find the way to important or public spaces. Some designers, compensating for those who have visual impairments have, through inspiration begun to challenge the other senses through sounds, smells, and textures to help guide occupants and give them a better experience and navigability within a space (Evamy 16).

What this means is that changes are being made in how we establish meaning and direction to a space. Many efforts have been made to make the built environment more accessible and navigable by means of audible signals at pedestrian crosswalks, alterations to paving or paving materials to warn pedestrians of potential dangers like curbs or train platform edges and crossings, and Braille labeling (Evamy 85).

Those with visual impairments that require the use of a cane (mobility stick) can use the differing paving materials to guide them and help them to develop cognitive maps of their environment. Every surface has a different sound and
tonal quality which can be used to help them to be safer when navigating their environment. A great way to aid in this is to use the Pictofom system (See Images Right) which “helps wayfinding by providing audible guidelines in open areas” (Mollerup 204). It is a system that uses a series of raised areas in the paving to inform the person of any changes that may occur and of direction (Mollerup 204).

Despite the changes that are occurring and what is being done to address the issues of the visually impaired; most efforts have been a band-aid and not an integral part of design. If we begin to make visual accessibility a fundamental part of design we can quickly adapt and associate certain sounds, smells, colors, textures, and lighting conditions with different spaces, entries, and exits.

Using sounds, smells, colors, textures, or special lighting conditions at main entry points of spaces can help individuals, especially those who are visually impaired to connect with and remember from where they entered. Using this method can empower the individual and give them a sense of security and independence granting all occupants and equal experience.

Image 14
A man is navigating an intersection that uses the Pictoform paving system.

Image 15
An example of the Pictoform system.
Programmatic Objectives

The goal is to establish a School for the Visually Impaired specializing in adult education and independence that’s design is influenced by “wayfinding”. The design final solution shall develop wayfinding in such a way that any person can navigate through the space using all of their available senses.

ADA compliance (American with Disabilities Act) is a crucial component for the design and shall be followed with the goal in exceeding the standards in order to develop a more comfortable and accessible space.

The design should take into account the rich history and culture of Lubbock, as well as, the architectural significance of the surrounding neighborhood in which the school will be located.

**Issues to be addressed:**
- Accessibility
- Audibility
- Interaction
- Olfactory
- Safety
- Security
- Tangible
- Sight
Architectural Issues

Accessibility
The facility must accommodate all individuals but most importantly the visually impaired of which is the facilities’ main focus. It should exceed ADA requirements everywhere possible in order to better accommodate the users.

Audibility
The ability to control the types of noise that affects the users of the facilities can create a unique experience that can not only help with learning but make the process less stressful. Using white noise can be used effectively to help students to block out the sounds of the urban environment. The use of different materials can give many different tonal qualities that can be used in wayfinding.

Interaction
The faculty and students must interact with the environment and each other; this is done by creating points-of-interest that creates situations of interaction.

Olfactory
Developing a landscape and interior design that creates an aromatic signature for a particular point-of-entry or space so as to aid in the development of cognitive mapping and to create a genuinely unique experience for everyone.

Safety
Creating a safe environment where faculty and students alike are free to move about in an environment that is as barrier-free as possible; creating the best design solutions to prevent confusion and injury.

Security
The facility must be a safe environment, protecting faculty and students from outside influences. The facility must give the sense of security without being overbearing with the effect of a being in a “prison”.

**Tangible**
The facility must provide texture on surfaces in order to navigate by touch. Many different textures can be confusing, but the use of specific texture for specific notifications such as “danger” or for the designation of a restroom, and so on.

**Sight**
The facility must use colors to represent different spaces and pathways that can aid in wayfinding. The use of natural day lighting can help to define specific spaces separating them from other spaces by the use of differing levels of lighting.
**Precedents**

*IDEA Architects – Esperanza Acosta Moreno Regional Branch Library*¹³

**El Paso, Texas**

A transformed site on a featureless desert plane in El Paso the new library rises from the desert in as if it were a leaf fallen to the ground and tattered by the wind. Creating its own contextual setting and inspiring design based on nature the facility uses autumn hues that punctuate its features.

The designers use varied materials of stone, brick, copper cladding, and brightly painted precast concrete panels to accentuate the metaphor of the building being a leaf. The use of natural materials and landscape elegantly blend this facility into its desert surroundings.

The facility was designed with the community in mind offering spaces for use by the general public for events like plays and community gatherings. Large openings allow for an abundance of natural light to spill into the public spaces which reinforces the architects design concept. The main circulation path flows in a serpentine which mimics the shape of the stem of a leaf.

The absence of doors allows for an open concept giving visitors glimpses of the spaces as they pass by. The spaces all spill into one another giving the visitors the ability to freely interact with one another.

The interiors varied materials, colors, textures, and lighting gives interest to a space that could have been lifeless otherwise. The distinct colorations of the walls and floors help one to navigate with confidence in knowing where they are in the building at all times. The main circulation space has a tiled floor with a

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design that echoes that of the carpet floors in the adjoining spaces which makes it easier for one to discern one space from another.

Image 18
Exterior View: Main Entrance

Image 19
Interior View: Adults Area

Image 20
Interior View: Main Circulation
Michael Graves – Denver Central Library

Denver, Colorado

Michael Graves designs the expansion so as to not eclipse the historical value of the original library facilities allowing for the original building to stand alone architecturally. His architecture is a grouping of shapes and massing that develops a cross-section of the areas architectural history. The most intriguing aspects of the project are the use of shapes, colors, and materials. The use of stone brings a real sense of historic being and permanence to the buildings architectural significance.

He designed a simple Great Hall that is on an East-West axis that has an entrance at each. A south facing rotunda creates a minor North-South axis that engages the original library. The Great Hall is a three-level volume that is the main focal point of the library. Tile patterns in the Great Hall help to distinguish it from other rooms, the contrast between the field tiles and the length-wise and width-wise tiles.

Every main space in the library has a unique architectural and interior design that differentiates one room from another. The use of different flooring materials in adjoining rooms gives a visual cue that they are entering another space with which different functions occur within.


An open floor plan design with spaces that flow into one another creates a more accessible space because there are less narrow hallways and far less doors to navigate through. Natural light is used in every room possible but is used in a manner as to not cause glare on the pages of the books visitors are reading.
Works Cited


The University of Texas at Austin. Perry-Castaneda Library Map Collection. 1 November 2007. 6 November 2007 <<http://lib.utexas.edu/maps/texas.html>>.

Facility

Epistemology/Existing State
Educational facilities have always been a challenge because of the many considerations that must be given for the many varied individuals that will use the facilities as well as specific tailoring to the use depending on the primary age group that is targeted for use of the facilities.

Even more consideration must be considered when the intended users are those with physical or mental impairments that need to be addressed. Not every need can be addressed, but to address the more common disabilities and related issues are the only way in which one can complete such a monumental task.

The current trends are that of renovation and additions to current schools and a trend to make schools much safer places for the students. Attempts are being made to reduce the class sizes in order to better teach and evaluate students and prepare them for life beyond high school and college (Stevenson 2). With a trends towards smaller schools and in some cases specialized schools communities are finding lower costs associated with smaller schools rather than large schools (Stevenson 2).

The digital age has firmly planted itself within our culture and lives, and has worked its way into schools. Less and less paper materials are being used in classrooms as schools and districts are able to afford the upgrade to electronic services. It not only saves the school money and space needed for storage of books, but is also lessening the demand on natural resources and energy used to produce the materials needed for the schools.

Almost all special-needs programs in schools are in separate wings or pods from the main portion of campus and students “who do get included in standard classroom activities often travel from one end of the school to the other to get to their classrooms” (Stevenson 4). To solve this problem some schools have the
special education teacher teach from within a regular classroom. The biggest problem with this is “when a special education teacher attempts to work with a mainstreamed special-needs child in a classroom setting, the lack of appropriately designed space creates conflicts with the ongoing instructional activities of the primary teacher” (Stevenson 4).

Currently there is a real problem with this educational gap between teaching students with special needs and including them within the structure of a normal school setting. A seamless design that includes rather than excludes these students is needed and should be designed to better assimilate them into society.
Mission Statement
The school will provide exceptional education for the visually impaired offering education to adults, especially those who have lost their sight due to injury, disease, or aging. The school will provide opportunities and for the development of skills needed for students to become independent.
Goals
The two problems that need to be addressed are circulation and wayfinding as pertaining to facilities planning and design. The idea is to solve these problems by addressing the issues of accessibility, audibility, interaction, olfactory (smell), safety, security, tangible (touch), and sight in order to meet or exceed building codes, ADA requirements, and still look and feel aesthetically pleasing to the user.

The facility will be primarily used by those visually impaired individuals who need educative assistance beyond youth education. Typically schools for the blind are focused on educating children ages 5-21 and thus the need for a school for adults who have lost their sight because of injury or other sight loss causes such as disease or aging.

The school will provide services that will give the students skills needed for living independent through active and innovative learning. Typical services provided by a School for the Visually Impaired are:15

- **Evaluation of Capabilities** – determines specific impairment problems and evaluates the level and type of instruction needed.
- **Braille and Low Vision Instruction** – learning to read and determine objects by touch or sight.
- **Living Skills** – how to groom, cook, clean, and dress.
- **Orientation and Mobility** – developing balance and instruction on using mobility aids such as a cane or seeing-eye dog.
- **Financial Management** – how to manage finances and using cash and ATM’s.

15 Information based on commonalities of programs gathered from the websites of State Schools for the Blind.
• **Adaptive or Assistive Technologies** – learning the different types of assistive technology and how to use them.

• **Transition** – transitioning from the school environment to the home environment and applying what has been learned.

• **Residential Services** – assistance in-home.

• **Pre-vocational Skills** – learning skills that are job specific.

• **Career Education** – professional development.

• **Health Services** – medical services on-site.

• **Occupational Therapy** – aiding mobility.

• **Recreation** – group outings and confidence building activities.

• **Outreach** – community involvement and activities in support of the visually impaired.
**Design Requirements**

The facility must be designed following requirements that are projected to develop the best design solution for a school for the visually impaired.

1. **Accessibility** – the facility must meet or exceed when possible ADA requirements.

2. **Sustainability** – the facility must be designed to have the lowest ecological impact as possible.

3. **Natural Lighting** – the facility must allow for natural lighting in order to save energy use as well as to have a facility more connected to nature and the surrounding environment.

4. **Context** – the facility must honor the context of the site while developing a character of its own.
Spatial Analysis

The spaces planned for the facility showing their relationship to one another:
**Spaces Required**
Space requirements are generally based on four (4) questions that must be answered:

1. How will the space function?
2. Who will use the space?
3. When will the space be used?
4. How much space is required in response to these answers?

**List of Spaces (alphabetical)**

Public Spaces:  
Administrative Offices  
Cafeteria/Kitchen  
Classrooms  
Commons  
Faculty Lounge  
Mock Apartment  
Library  
Meeting and Conference Rooms  
Medical Treatment Office  
Fitness Center  
Restrooms  
Student Lounge(s)  
Vestibule

Non-Public Spaces:  
Janitor’s Closet(s)  
Storage Room(s)  
Utility/Mechanical Room(s)  
Exterior Spaces  
Outdoor Spaces
Spaces Defined

Administrative Offices

The Administrative offices serve as the “heart” of the school and therefore must be located close to the entrance and centrally located so it can be easily located and offer the best security for the faculty and students.

225 SF minimum
The Superintendent must be a single and private office that can accommodate a desk, file cabinets, bookshelves, and a small meeting area for at least four (4) people.

300-400 SF
The Senior Secretary should be adjacent to the office of the Superintendent. The office space shall have seating for 4-8 people and accommodate a desk and file cabinets.

125 SF minimum
The Secretary should share the same office space with the Receptionist and be located near the Office of the Senior Secretary. The office space shall accommodate a desk and file cabinets.

125 SF minimum
The Receptionist should share the same office space as the Secretary and must be visible to all guests and be the first contact with guests. The office space shall accommodate a desk and file cabinets.

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16 (Auburn University)
(Perkins 1-62)
**225 SF minimum**
The *Student Counselors, Social Workers, and Psychologist/Psychiatrist* must be single and private offices that can accommodate a desk, file cabinets, bookshelves, and a small meeting area for at least four (4) people.

**225 SF minimum**
The *Director of Special Programs* must be a single and private office that can accommodate a desk, file cabinets, bookshelves, and a small meeting area for at least four (4) people.

**125 SF minimum**
The *Office of the Accountant* must be a single and private office that can accommodate a desk, file cabinets, and bookshelves.

**125 SF minimum**
The *Office of Student Financial Services* must be a single and private office that can accommodate a desk, file cabinets, and bookshelves.

**Cafeteria/Kitchen**

**15 SF minimum/person**
The cafeteria/kitchen should provide faculty and students a place to enjoy meals as well as catering for special events and functions.

**Classrooms**

**1,538 SF minimum per classroom**
The classrooms will function as the main learning environment for the students and typically be used during normal operating hours. The classrooms should offer natural lighting and be a stimulating learning environment.

Each room should contain at least two (2) means of egress for use during emergency situations.
Attached restrooms that can be shared between classrooms can aid students in saving time when the need arises. These restrooms should be accessible for not only the visually impaired but for those with limited mobility, especially those bound to wheelchairs. They should include a sink, lavatory or lavatories, changing room(s), and possibly a shower.

In typical non-disabled youth educational facilities, space requirements for classrooms are 108 GSF\textsuperscript{17}/Student for Elementary to 175 GSF/Student for High School. This shows an obvious progression in the amount of space as the students grow and get older (See Appendix C), we can then assume that as we get older our spatial needs increase.

Because this is a school for handicapped individuals other considerations for space must be considered. The classrooms can be set-up to perform different functions relating to the degree of visual, physical, and mental impairments that the students have in order to better meet the needs of the students. Special education classroom space requirements vary from state-to-state, and classroom sizes vary from 6-12 students to 12-15 students per class (See Appendix C) with varying amounts of space from based on either the maximum capacity of students or a set amount of space per X-number of students.

On the collegiate level, classroom spatial requirements can be determined by the use of formulae. The formula used by Auburn University\textsuperscript{18} to determine their typical classroom size can be used as an example (See Appendix C):

\[
\text{Space Required} = [\text{Space Factor}] \times [\text{Student Clock Hours}]
\]

Where there \textit{Space Factor} is 0.79, which is derived through the following calculation:

\textsuperscript{17} Gross Square Feet
\textsuperscript{18} (Auburn University)
Space Factor = Student Station Size / ([Average Weekly Room Hours] x [Student Occupancy Ratio])

Using this formula and calculating for one (1) classroom of ten (10) students with a minimum of 100 SF per student we can assume the minimum amount of space required per classroom would be:

\[
\text{Space Factor} = \frac{100}{(35 \times 65\%)} = 4.4
\]

\[
\text{Space Required} = 4.4 \times 350 = 1,538 \text{ SF}
\]

**Commons**

**1600 SF**
The “Commons” essentially is a gathering space that connects all other spaces to one another.

**Faculty Lounge**

**1200-1600 SF**
The faculty lounge is a room for faculty to relax, interact with other faculty, and have meals. A resource room will include photocopy machines, computer terminals, standard supplies, and resource manuals and books. A unisex restroom will be included.

**Mock Apartment**

**600-800 SF**
The apartment is a learning environment for students to practice normal daily tasks in order to prepare for unassisted living.
Library

4000 SF
The Library should accommodate storage for books, audio and video media, computer terminals, and workspaces. A reading room should have natural lighting. The library should be built large enough to anticipate future growth. The space should accommodate twenty-five percent (25%) of the student population with 50 SF per student allotted.

Meeting/Conference Rooms

800 SF minimum
Conference rooms shall be divided into two groups, small and large. For the small conference rooms there should be a minimum of two (2) of no less than 200 SF. For the large conference room there should be at least one (1) of no less than 400 SF.

Medical Treatment Office

600 SF
The medical treatment office should be located near the administrative offices. It should include a waiting room with direct visual contact. The medical treatment office should have exam tables and or cots for treatment and resting. There should be at least one (1) restroom available (if only one restroom is available it should be a unisex restroom).

Fitness Center

4000-6000 SF
Offering physical and occupational therapy, weight room, massage therapy, and pools for students.
Restrooms

50 SF per stall
Restrooms should be available for public use; they can be unisex or separate sex restrooms.

Student Lounge(s)

200 SF per lounge
The student lounge should be a place for students to relax and interact with their peers outside of the classroom.

Vestibule

100-200SF
The vestibule is the main entry to the facility; it connects to the commons room. It is an enclosed room that protects interior spaces from the weather.

Janitor’s closet(s)

15-25 SF per closet
The janitor’s closet should be able to house all of the supplies needed to supply the bathrooms and store cleaning supplies.

Utility/Mechanical Room(s)

800 SF
The utility and mechanical room should house all of the required systems to supply electricity, gas, domestic water service, hot water, HVAC, and fire protection.
**Storage Room(s)**

200 SF per storage room  
The storage rooms should be located near the cafeteria in order to serve as storage for tables and chairs and any unique items needed for catering and special events.

**Full Scale Urban Training Area**

The urban training area is a safe environment where students can learn to navigate an urban environment.

**Outdoor Space(s)**

The outdoor space(s) are places of interest used for outdoor learning and a place for refuge.
Design Solutions for Accessibility

Careful consideration and respect must be given to those that the school will be designed for. Solutions to problems for the blind must be innovative and functional first and foremost, then aesthetically pleasing for those who have the gift of sight.

Baseboards

Distinguishing the walls from the floors can be aided by using a unique solution that can be seen by those who have acute sight loss to near complete blindness by creating a baseboard with an easily discernable shape with definition and use of color, as well as a tonal quality that differs from both the floor and the wall.

Bathrooms

All restrooms adjacent or shared by classrooms shall be totally ADA compliant. They must contain a lavatory, sink (and in some cases a shower and changing room). They must have a waterproof floor that is slip resistant.

Handrails

Handrails must have a unique shape and detail so that they are easily distinguishable from other features. They must not protrude into the space in such a way as to cause injury primarily, and secondarily, should be aesthetically pleasing.

Ramps

If ramps are used they should comply with ADA guidelines for ramps. They shall include a way for users to determine the direction of the slope.

Signage

Every effort shall be made to give visual and tactile cues so that no mistake is made as to where one is in space. Visual cues other than normal types can be shape, color, and size. Tactile cues other than Braille can be textured, projected, inset, hot, warm, and cold.
Stairs
If stairs are used, there must be an attempt to give notice by visual and audible means to prevent injury.
**Precedents**

*Colorado School for the Deaf and Blind*

Colorado Springs, Colorado

Located in Colorado Springs the Colorado School for the Deaf and blind campus consists of 16 buildings currently on 37 acres. Originally the school’s focus was vocational training, and today they focus on the students’ strengths which they use in preparing students for a productive life. The school offers a strong academic background with social and emotional development and recreational activities. They offer a post-secondary program for those individuals that graduate so that they may transition into the post-high school work environment. The school has facilities for dormitory living for student to live on campus.

It is laid out in plan pretty much as any other campus would be laid out. There is an overwhelmingly amount of car travel that interrupts the campus’ design that could pose potential dangers to those students who are either blind or deaf. There is a lot of space between buildings which is bifurcated by vehicle travel and this is a design problem, especially for students who are younger or new to the program. Also many of the buildings are spread out in a manner that makes it inconvenient for students to visit different buildings on the campus. The student health center and cafeteria are located in the center of the campus but is a long distance from all of the classroom and most of the dormitories.

There is a substantial amount of parking offered in the interior of the campus and buildings seem to be strewn about the campus in plan. This could be a negative as far as convenience for students to travel from one building to another, but it also could be seen as a tool in their training for urban navigation.

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Western Pennsylvania School for Blind Children\textsuperscript{20}
Oakland, Pennsylvania

Located in Oakland, Pennsylvania it is a school that had dedicated itself to the training and education of visually impaired children. It is a private institution that educates 175 students annually between the ages of 3 – 21 from 242 school districts within the western Pennsylvania region.

The school is specifically geared toward the education of the visually impaired, although it handles many students who have multiple illnesses and conditions other than visual disabilities. The campus itself is split into two sections; the Main Campus in includes the elementary, preparatory, and transitional departments while across the street is the new Early Childhood Center (ECC).

The new ECC is a 30,000 sq ft state –of-the-art facility designed specifically to meet the needs of children from infancy to age six. A new technology offered in the new wing includes voice activated computers for learning and communication. The new facility (ECC) is of a modern design using a unique brick patter that is unmistakable by using two-tone coursing. This actually mimics stone coursing on the administration building on the main campus.

Large interior spaces for recreation, physical activity, and other functions is provided with ample natural lighting balanced with artificial lighting to help reduce as much glare as possible. Handrails are provided in hallways and have an unmistakable shape and form to them so that students may use them to guide them from space to space. Also a larger baseboard provides protection for the walls from canes but also distinguishes the wall from the floor through sound and sight. A large covered porticoché allows for ample space for not only busses but also for mobility in, out, and around vehicles for those with visual impairments.

\textsuperscript{20} Western Pennsylvania School for Blind Children, 18 September 2007
Colors, light, and patterns and shapes are important as it helps students with low visibility interested and helps with navigation. Areas for interaction and growth learning are keys to stimulating the young children’s’ minds with group settings key to students’ interaction and educational growth. Music education is very important as it helps in the growth of a child and develops interactive skills with instant feedback.

Physical therapy is the key to the students’ mobility and freedom which includes stretching and flexibility, exercise and the use of pool exercise that offers easier mobility and fun.

Image 32
Remodeled hallways of older facilities

Image 26
Swimming pool for exercise and leisure
Works Cited

Auburn University. Space Planning & Management. 8 September 2007
<http://www.auburn.edu/administration/campus_planning/space_management
_standards_guidelines.htm>.


Context

History

In 1876 Lubbock County was officially organized and named after Thomas S. Lubbock who was a former Texas Ranger. As early as 1884 a post office had been established in what is now northeastern Lubbock in the Yellow House Canyon.

Lubbock was founded on the result of a compromise between community promoters Frank E. Wheelock and W. E. Rayner. The fall of 1890 the two groups had left their respective settlements “Old Lubbock” and “Monterey” to begin a new settlement on December 19, 1890. Lubbock eventually became the county seat of Lubbock County.

At the time Lubbock was established, the local jail was serving many duties besides its intended use housing the school and religious services held by the Quakers, Baptists, and Methodists. Within a few years Lubbock had established itself as the hub of the South Plains in this largely agricultural region where farmers could bring their crops to market.

On October 29, 1909 the Santa Fe Railroad began its first regular passenger and freight trains from Plainview in the North to Lubbock in the South. On March 16, 1909 Lubbock was officially incorporated; by 1910 the population had grown to 1,938 residents and by 1920 it had grown to 4,051.

The first hospitals were established in 1917: the West Texas Sanitarium and the Lubbock Sanitarium, which was the predecessor to the Methodist Hospital. One of the early neighborhoods bears the name of one of the physicians during those beginning days; Dr. Marvin C. Overton, and is respectively referred to as North Overton and South Overton.

21 (Lubbock) (Association)
In 1923 Lubbock won the bid for the Texas Legislature authorized establishment of Texas Technological College (now Texas Tech University). The college has had a huge economic impact bringing students from all over the State of Texas, The United States, and the World.

During the 1930’s because of the ability to irrigate farmers of the South Plains began producing cotton and sorghum culture. The South Plains has become one of the major premium cotton producers in the United States and the World. Lubbock had over sixty (60) wholesale outlets and a largely increasing number of manufacturing plants, and by the 1980’s there were two-hundred and ninety-two (292) industrial establishments including Texas Instruments.

Well established, Lubbock became the hub for the wholesale trade for fifty-one (51) West Texas and eastern New Mexico Counties and the world’s leader in the cottonseed industry.

Lubbock is most famous for one of its residents, rock and roll legend Charles Hardin Holley, known as Buddy Holly by many. On Saturdays in the fall you can hear the sounds of the Texas Tech Goin’ Band from Raiderland who won the Suddler Trophy in 1999 and fans cheering on the Texas Tech football team to victory in their now well known high power throwing offense headed by Head Coach Mike Leach. The games have a large economic impact on the city, especially when the team plays the University of Texas and their rivals, Texas A&M University, to which much continued controversy occurs. Lubbock has lured one of the most well known and controversial basketball coaches in the NCAA, Coach Bobby Knight to coach the Red Raider Men’s basketball team.
**Geographic**
The site is located in Lubbock, Texas (33°35’ N Latitude, 101°51’ W Longitude) at an elevation of 3,256 feet above sea level.

**Population**
Lubbock is the 10th largest city in the State of Texas and with a population in 2005 of 209,120 is the largest city in West Texas. The population of Lubbock consists of twenty-seven percent (27%) less than 18 years of age and sixty-one percent between the ages of 18-64, a remarkably young community. The median age is 31.4, which is younger than the state’s average median of 33.2 and nation’s average median of 36.2. Lubbock is a diverse community with forty (40) percent of the community being a minority, of which the largest group is Hispanic.

**Climate**
The climate of Lubbock is semi-arid and mild with cool nights and warm days predominately and low humidity. Most of the annual rainfall occurs during the months of May, June, and July. Lubbock is known for its winds and occasional late spring dust storms.

- **Average Temperature (High):** 80.1 °F
- **Average Temperature (Low):** 93.4 °F
- **Average Days with temperatures over 100°F:** 85
- **Average Annual Rainfall:** 18.23”
- **Average Annual Snowfall:** 10.1”
- **Predominant Winds:** From South/Southwest
- **Average Wind Speed:** 12.4 mph
Transportation

Air Travel
Lubbock Preston International Airport located just north of the city offers commercial flights from American Eagle Airlines, Continental Express Airlines, and Southwest Airlines with over 60 arrivals and departures daily.

Personal aircraft share adjacent facilities and runways with Lubbock Preston Smith International Airport.

FedEx and DHL operate regional distribution centers from the Westport located to the west of the runways.

Bus Service
“Lubbock, Texas is the home office of T.N.M. & O. Coaches, Inc., which operates a fleet of 76 buses over routes in five states; Colorado, Kansas, New Mexico, Oklahoma and Texas. Lubbock, Texas, has 28 arrivals and departures daily with through service to seven cities and connecting service nationwide with Greyhound and other carriers.”

Freight (Trucks)
Lubbock is a regional warehousing and distribution center with future growth and development with major companies in the new commercial district which broke ground in early fall of 2007.

Highway
The Ports-to-Plains Corridor is a four lane interstate highway which is planned to facilitate the movement of goods and people in an efficient manor from the Texas-Mexico border to Denver, Colorado via West Texas. Promotion of this corridor is ongoing and it is expected to become a reality in the near future bringing even more tourists and industry to West Texas.
Passenger Train
At this time there is no passenger train services offered.

Public Transport
CitiBus is the only public transportation (Bus) offered by the city.
Site
The site is located in Lubbock, Texas bordered by 21st Street on the North, Avenue U on the East and 22nd Street on the South. It is located within walking distance of bus routes, Lubbock High School, and Hamilton Park.

The site is a collection of plots that are to be acquired from LISD and plots that included structures that recently burned down and demolished due to arson.

Map of the site location at the corner of Avenue U and 21st Street.
Image 38

View from 21st Street looking South (9:00 AM, January 2008).
Site Analysis

Landscaping
Currently there are few trees existing on the site and most are at the end of their expected lifespan and should be removed and replaced under a new landscape plan.

Wind
Prevailing winds come predominately from the South and Southwest.

Traffic (Vehicular)
Vehicular traffic occurs mostly along Avenue U heading North and South creating some noise and pedestrian hazards.

Traffic (Pedestrian)
Currently the sidewalks are in a state of disrepair and create numerous hazards for pedestrians. Sidewalks only run East to West and none North to South.

Image 28
Analysis of the Site and environmental conditions.
Surrounding Context
The surrounding context of the chosen site consists of 1920’s clabbered style homes, a nearby Senior Center, Dupree Elementary, and Asbery United Methodist Church. Lubbock High School is nearby on 19th street and nestled between Avenues T and U.
Works Cited

Buddy Holly Photo Gallery, 8 November 2007


Lubbock, City of. City of Lubbock, 2007. 8 September 2007
Schematic Design

A site was chosen in Lubbock, Texas at the corner of Avenue X and Mac Davis Lane in North Overton. Layout and relationships of spaces were being determined. Possible architectural expressions were being formed and explored.

Review

Attended by:
Associate Professor Gary W Smith
Michael Martin

Option 1
Comments were made that Option 1 was too linear in design and lacked possibilities of challenging the students learning capabilities. It was very institutional and better solutions were better.

Option 2
Comments were made that Option 2 was disorganized, confusing and difficult to navigate.

Option 3
Comments were made that Option 3 was the better of the three designs because it used the better components of Options 1 and Options 2. A better connection of the mock apartment to the main building could be achieved instead of being so isolated.

Other Comments
A new site should be located that has some history and context that the current site does not have that can challenge not only the design but the students.
**Preliminary Review**

Attended by:
Associate Professor Gary W Smith
Michael Martin

Notes taken by:
Jessica Vasquez

**Suggestions:**
Separate the functions of the building, i.e., administrative vs. educational spaces. It was suggested that the library should be moved to the second floor with the classrooms to help with the separation functions. Security is a concern and separating the public spaces from the educational spaces could resolve these issues.

The entrance was insignificant and difficult to find along with a design that is institutional in appearance. Recess the entrance and create an enclosed vestibule. A better approach would be to relate better with the surrounding neighborhood. The scale needs to be broken down to a human scale as the massing is overwhelming.

The design is very rigid and does not flow well. Intermixing of offices and conference rooms would better serve the schools’ administration.

There is no need for such large mechanical/utility room. The structure of the facility can be a hybrid of steel and masonry (CMU load bearing).

Label each space rather than making a list, the list makes it hard to understand what each space’s function is.

Note: A new site was chosen and a new design scheme had to be developed. All new site analysis was created and contextual references noted.
**Structure Review**

The structure was a hybrid structural systems using typical steel construction on the ground level and CMU load bearing masonry on the second level.

It was suggested to simplify the structure by using CMU load bearing as the main structure and steel whenever needed.

The layout seemed to work better than during the preliminary review. Better organization structure has been achieved by separating the functions.
Qualifying Review

Comments:
The Site section needs to show a map of Texas with location marked, then the City of Lubbock, and finally the block location.

Site plan needs to have the roof plan and not the ground level plan on it.

Elevations should be clearer and color would help to portray the idea.

The section is too small and the detail should be detailed.

The exterior perspectives should be exactly that, not aerial views.

Make the roofs express the architecture more by adding more sloped roofs and less composite roofing structures.
**Final Review**

**Revisions of Design Requirements:**
In the final design the kitchen/cafeteria space was increased by 100% doubling the 15 SF minimum/person to 30 SF minimum/person.

The library decreased from 4000 SF to roughly 3000 SF after consideration was given to the advancements in technology and less need for storage of books and other tangible materials.

The Physical/Occupational Therapy center square footage was increased from 6000 SF to 10500 SF after as considerations for mobility, organization, equipment sizes, and locker rooms were designed.

Utility and Mechanical rooms were split into three categories: utility/mechanical, specialized mechanical, and computer server. Each spaces SF is tailored for the specific needs of the equipment sizes, future growth, and space for easier maintenance.

**Significant Design Features:**

**Exterior:**
- Contrasting materials with unique textures are used for crosswalks.
- Full length ramps in disabled parking spaces for easy access.
- Brick façade color choices based on context.
- Use of brick for banding, corbelling, and projections.
- Unique water collection for irrigation (roof to cistern).

**Interior:**
- Limited access doorway for protection of students.
- Tile floor using differing colors and textures guides visually impaired students with contrasting colors, texture (felt with cane), and sound (heard by the use of a cane).
- Unique handrail, chair rail, and baseboard design.
- The easing of or inset or doorways for visual interest and queue signifying a doorway.
- All student accessible spaces use 42 in wide doorways.
**Ground Level Floor Plan**

As you enter the school you are greeted by the receptionist and secretary into an inviting space known as the “commons” that has glass on the both the North and East façade.

If you head west from the “commons” you enter the administration corridor where the Senior Secretary, School Superintendent, Student Counselor, Social Worker, Psychologist, Director of Special Programs, Office of the Accountant, and the Office of Student Financial Aid, and three conference rooms are located. At the end of the administrative corridor are the computer server room, utility and mechanical room, and the mock apartment.

From the “commons” heading south through the limited access doorway you enter the main corridor where the cafeteria/kitchen and student fitness center are located.
2nd Level Floor Plan

The second level consists of four (4) classrooms with each containing an accessible restroom and the library.

Student lounges spaces can be found on the 2nd level corridor.
Sections and Details

Image 49
Section A-A

Image 50
Section B-B

Image 51
Section A-A Detail
**Structural and Mechanical Plans**

Structural:

The structure consists of load bearing CMU (concrete masonry units) walls with wide flange steel columns and beams when loads exceed the bearing capacity of the CMU.

The 2nd level floor is supported by open-web steel joists with a composite deck with a 5 inch concrete slab.

The roof is supported by open-web steel joists.

Mechanical:

The HVAC (Heating, Ventilation, and Cooling) units are located on the roof and ducted through the roof and through either a vertical pipe chase or a horizontal bulkhead.

Image 52
Top Left: Roof Structural Plan

Image 53
Top Right: Ground and 2nd Level Structural Plan

Image 54
Bottom Left: 2nd Level Mechanical Plan

Image 55
Top Right: Ground Level Mechanical Plan
Elevations

Image 56
North Elevation

Image 57
South Elevation

Image 58
East Elevation

Image 59
West Elevation
Exterior Perspectives (continued)

Image 62
View of inner courtyard looking towards the mock apartment entrance; notice the Braille cut into the support post.

Image 63
View of inner courtyard looking towards the faculty lounge and cafeteria; notice the cistern in the foreground.
Interior Perspectives

Image 64
View looking out to the east.

Image 65
Notice the handrail inset into the wall to prevent students from running into the handrail that normally would protrude from the wall.
Interior Details

Handrail
The handrail is set into the wall to better incorporate accessibility within the design.

Braille is incorporated in the chair rail at important doorways. The Braille says, “Classroom 1”

Baseboard
The concept of the baseboard is to create slight shadows, color, and shade differences for those who are capable of some sight.

The three (3) notches at the base are to help create sound when a cane is run or bumped against the baseboard so that anyone with visual impairments can guide themselves along corridors.
Model

Image 68
Northeast Perspective

Image 69
Southeast Perspective
Final Review Comments:

Attended by:
Associate Professor Gary W Smith
Michael T Martin

Both Assoc. Professor Smith and Michael Martin had positive things to say about the final product.

Site organization complemented the neighborhood by addressing the curb appeal using landscaping and pedestrian walkways. Addressing disabled parking with a progressive and innovative ramp concept was well received.

The use of differing hardscape materials for easier pedestrian navigation was not only a must but a well thought out application.

Organization of the spaces; separating the administration from the student oriented areas was commented as a strong organizational feature. The separation of student oriented areas from more public areas by means of a limited access doorway was an important feature that was commented as good forethought.

Sections and details were commented as good and well detailed.

Both Assoc. Professor Smith and Michael Martin expressed great interest and intrigue with the renderings, especially the interior courtyard views, the main corridor views, and the Southeast perspective.
Final Presentation Board
Epilog

After working on my thesis for two semesters I finally feel relieved that it is complete. I had great guidance from both Associate Professor Gary W Smith and Michael T Martin. Both really helped me when I became stumped and encouraged me when I needed it and obviously pushed me when I was reluctant.

When schematic review was over I had to search for a new building site location, as the site previously chosen was a less than desirable site location for many reasons. There were a number of reasons as to why a site change was in order which two main reasons were a lack of context and it was not a good learning environment. Once a new site was found it was just a matter of playing catch-up; creating a new site analysis, determining new setbacks, and collecting new site photos and CAD files.

Many ideas that I had for the project evolved and I think the design has become even more than what I originally expected.

Hopefully my design illustrates and applies the ideas that are written in this program in a successful manor in a way to help my fellow man. My intentions for the School for the Visually Impaired were to be as respectful as possible and look out for the life, safety, and welfare of those with disabilities.

This is for my Father who inspired me to do better for those with disabilities and who are less fortunate.

LIVE . LEARN . TEACH
Appendix A

Case Study – Morimoto Restaurant, Tadao Ando/Architect

Project: Morimoto (Restaurant)
Location: New York, N.Y.C.
Architect: Tadao Ando Architects and Associates
    - Tadao Ando, principal
    - Masataka Yano, project architect
Associate Architect: Stephanie Goto Design Group
    - Stephanie Goto, principal
Engineers: Leslie Robertson and Associates, structural
    - Thomas Polise, m/e/p
    - Langan, geotechnical
Sq. Ft.: 13,000
Project Cost: $6.5 million

Image 71

Morimoto Floor Plans
Introduction
Moritmoto restaurant in Manhattan borders the Chelsea Market which is a popular food market buzzing with patrons looking for gourmet food and chic accoutrements in this wholesale market. The Chelsea Market was renovated in the late 1990’s and now contains the market and many TV Networks including the Food Network and kitchens. This is a prime location for the restaurant given the rejuvenated second-wind of activity this neighborhood is now receiving. Owner and Chef, Masaharu Morimoto (most notably known from the TV series Iron Chef) commissioned Tadao Ando to create a masterpiece to create a distinct harmony with Chef Morimoto’s unique style of Neo-Japanese style of cooking and emphasize the history of the Chelsea Market and current trends in New York City.

Brief History
The Chelsea Market was once known as the National Biscuit Company and produced products near and dear to Americans hearts such as Premium Saltines, Vanilla Wafers, and Oreo’s. The buildings were constructed in the early 1890’s in the Romanesque-style by Romeyn & Stever. Originally at the base, stone anchored the building to the ground as it rose above the sidewalks with its’ red brick, and cornice treatment between the first and second floors, and an entablature capping off the top of the façade. However the façade has been altered and renovated by Vandenburg Architects, which commenced in 1998. After the renovations the southeast facade (9th Avenue) now adorned woven brass spandrels that according to many “looks like a Triscuit” and a glass and steel canopy that trickles down the façade and ungulates across the front main entrance.

Method
Tadao Ando makes use of the existing façade curiously melding the original red industrial brick and blackened façade with a grand arch spanning 50 feet long and of a beautiful dark brown earthy color. Hung from the arch is a swath of persimmon fabric known as a noren (which is used in Japan to indicate that a shop is “open for business”) designates to the individual that the entrance is located there. It draws the individual in by curiosity and by its definite inviting posture suggesting without a doubt entering here will lead you on a journey. With
its’ bright colored entrance one knows where they are heading and where they came from.

As you enter the interior, Tadao Ando drifted from his signature use of concrete in what some consider extreme and possibly overwhelming and carefully used concrete in a gentle persuasion most notably in the stair descending below ground to the lounge and bar. His use of interior lighting guides one from public areas to the more subdued and private seating areas of the restaurant. The most notable example combines light and water into a two-story high wall that resembles a wall of glacial ice. The wall comprises 17,400 half-liter water bottles filled with water and attached to couplings that resemble electric sockets and are attached to vertical stainless-steel rods while brackets hold LED lights horizontally within the wall system producing a backlit shimmering effect that stimulates the senses and creates texture and movement within the space. The individual can follow this shimmering wall into the subterranean level of the restaurant to the lounge and bar. One can associate the shimmering wall with the way in which to make their exit without being confused after a few too many drinks.

Tadao Ando uses fabric in swag across the entire ceiling of the main level of the restaurant and is subtly lit with light that cascades from its edges and up lights that graze the faces of the interior columns. Light is a key to defining spaces within the space by subtle suggestions of light in the areas of pathways and more subdued and mostly light bleeding from those pathways to the areas of dining.

In the lower level of the restaurant where the lounge and bar are located he has an even more dark space with pillars of light that emphasize key components of the space. Light adorns the thick resin bar-top as it resonates from within. Light illuminates the floor below the bar and the wall behind the bar denoting the importance of the happenings of this space. A horizontal layered wall of cedar wall panels is stained a bright crimson and lit with red lighting that gives the wall a glow as if it were radiating neon characteristics. This glowing wall of “red” designates the dividing line between the public spaces and the private spaces of the restaurant patrons and staff.
The interiors use color in a beautiful suggestion with shades of taupe’s and crème on the ceilings which could be interpreted to represent the sky and the floors of dark stained hardwood and concrete can be interpreted to represent the earth. Thought was given to every detail, such as the exact placement of the form-ties that were used during the pouring of concrete columns in the interiors and the way glass guard rails make a connection with the stairs. These details extend to the interior furniture that have a very strong massing and permanence to the way they appear by the use of wood and the construction of the furniture. Chairs look inviting and comfortable with their perfect proportions and curvilinear shape; they beckon for one to stay and enjoy their visit while enjoying a meal prepared by one of the World’s best chefs. Large, squared-off, cracked Douglas fir logs are used as a counter; they anchor the space giving the interior an organic element that brings nature closer to a city that is a vast metropolis of busy streets and high-rise buildings. All of the elements can enhance the mood and experiences because of the attention to detail and sensory concepts that are plentiful within this space.
Works Cited


Appendix B

Principles of Universal Design (Levine 17-18):

Equitable Use: “The building’s design should make it equally usable by everyone. The building must never employ means that isolate or stigmatize any group of users or privilege one group over another.”

Flexibility in Use: “The building’s design should allow people to use its design features in more than one prescribed way. It should accommodate both right-and left-handed use and be adaptable to the individual pace. The building’s design should have the built-in flexibility to be usable even when it is employed in an unconventional or unanticipated manner.”

Simple and Intuitive: “The building should make it easy for everyone to understand the purpose of each design feature and how to use it.”

Perceptible Information: “The building should provide all essential information in a variety of modes to ensure effective communication with all users regardless of their sensory abilities. The information provided must be presented with sufficient contrast to surrounding conditions so that it is distinguishable from its context and decipherable in all its various modes of presentation.”

Tolerance for Error: “Ideally, the building’s design should eliminate, isolate or shield any design features that could prove hazardous to or inconvenience any user. When potentially dangerous conditions are unavoidable, users should receive warnings as they approach the design feature. The building’s design should also anticipate accidental or unintended actions by any user to minimize the inconvenience and/or protect the user from harm.”

Low Physical Effort: “The building’s design should employ design features that require little of no physical force to use them.”

Size and Space for Approach and Use: “A building’s design features should provide an adequate amount of space that is appropriately arranged to enable anyone to use them. In addition, the space needs to be arranged to provide a clear path of travel to and from important design features for all users.”
Appendix C

Typical Gross Square Foot per Student\(^\text{22}\)

<table>
<thead>
<tr>
<th>School</th>
<th>GSF / Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>108</td>
</tr>
<tr>
<td>Middle</td>
<td>156</td>
</tr>
<tr>
<td>High</td>
<td>175</td>
</tr>
</tbody>
</table>

Size Requirements for Special Education Classrooms\(^\text{23}\)

<table>
<thead>
<tr>
<th>State</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>770 NSF(^\text{24}) classroom for a maximum capacity of 12 students.</td>
</tr>
<tr>
<td></td>
<td>440 NSF classroom for a maximum capacity of 6 students.</td>
</tr>
<tr>
<td>Virginia</td>
<td>Self-contained classrooms for 10 students are sized at 750 sq ft.</td>
</tr>
<tr>
<td>Florida</td>
<td>Self-contained classrooms are sized for 10 students at 90 to 100 NSF per student.</td>
</tr>
</tbody>
</table>

Special education space requirements (High School):

Requirements for classroom sizes vary depending on the level of care given and the student-teacher ratio. The space required for each classroom is directly affected by the number of students; the more students there are, the more teachers that are needed to satisfy student-teacher ratios. A bathroom suite should be included to service every two to three classrooms for convenience and assistance during initial training. Each bathroom suite should include a toilet(s), shower(s), and changing room(s) in order to assure every need is met. Students in

\(^\text{22}\) (Perkins 28)  
\(^\text{23}\) (Perkins 29)  
\(^\text{24}\) Net Square Feet
classrooms needing medical attention should be located nearest the nurse or physicians office.

- If the design calls for a classroom for 12 to 15 students (per teacher), then a minimum of 770 sq ft is recommended.
- If the design calls for a classroom of 8 students (per teacher), then a minimum of 550 sq ft is recommended.
- If the design calls for a classroom of 6 students (per teacher), then a minimum of 450 sq ft is recommended

**Space Guidelines for Classroom Facilities (Auburn University)**

Space Required = [Space Factor] x [Student Clock Hours]

Where there *Space Factor* is 0.79, which is derived through the following calculation:

\[
\text{Space Factor} = \frac{\text{Student Station Size}}{([\text{Average Weekly Room Hours}] \times [\text{Student Occupancy Ratio}])}
\]

**Student Station Size (18)** - represents the standard square feet per student station included related service areas.

**Avg. Weekly Room Hours (35)** – calculated by dividing the total room hours of instruction in classrooms by the total number of classrooms. It is the average
number of hours that an institution's classrooms are used for instructional purposes each week. This calculation can serve as an indicator of the adequacy of the number of classrooms at an institution.

**Student Occupancy Ratio (65%)** – the average percentage of student stations that are occupied when classrooms are in use. It is calculated by dividing the student clock hours generated in classrooms by the potential student clock hours for classrooms and multiplying by 100 to convert to a percentage. Potential student clock hours is computed on a room-by-room basis by multiplying the number of student stations in each room by the room hours of instruction generated by the room. It indicates the number of student clock hours which would be generated if every room were filled to capacity each time a course met in the room. The Student Occupancy Ratio access the utilization of rooms only when they are in use. Therefore, it is a helpful indicator of how close to capacity an institution's courses are to the room in which they are scheduled.

**Student Clock Hours** – a measurement of the total weekly hours of scheduled instruction for all of an institution's students. It is computed for each course by multiplying the number of times the course meets each week by the number of hours of each course meeting and multiplying that product by the number of students.

**Space per Seat Table for New Construction or Major Renovations of Classrooms:**

When planning for new construction or major renovations that involve classrooms, the following table outlines the guidelines that are used to ensure the appropriate amount of space per seat or per student station is provided. Actual space per seat in a classroom may vary depending on existing room configuration as well as type of furniture and seating used.
## Classroom Space Guidelines

### Net Assignable Square Feet per Station

<table>
<thead>
<tr>
<th>Room Category</th>
<th>Room Capacity (# Stations)</th>
<th>Moveable Chair w/ Tablet Arms (15”-20” Arms)</th>
<th>Fixed Pedestal or Riser Mounted Seating with Tablet Arms</th>
<th>Auditorium Seating</th>
<th>Moveable Tables &amp; Chairs</th>
<th>Fixed Pedestal Table &amp; Chairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar/ Small Classroom</td>
<td>0 – 25</td>
<td>17 - 24</td>
<td>17</td>
<td>-</td>
<td>16 – 26</td>
<td>20 – 22</td>
</tr>
<tr>
<td>Classrooms</td>
<td>26 – 49</td>
<td>16 – 18</td>
<td>17</td>
<td>-</td>
<td>16 – 26</td>
<td>18 – 20</td>
</tr>
<tr>
<td>Classrooms &amp; Lecture Rooms</td>
<td>50 – 99</td>
<td>14 – 16</td>
<td>13</td>
<td>14 – 17</td>
<td>16 – 22</td>
<td>18 – 20</td>
</tr>
<tr>
<td></td>
<td>100 – 149</td>
<td>-</td>
<td>12 – 14</td>
<td>12 – 15</td>
<td>16 – 22</td>
<td>18 – 20</td>
</tr>
<tr>
<td></td>
<td>150 – 299</td>
<td>-</td>
<td>-</td>
<td>10 – 14</td>
<td>16 – 22</td>
<td>17 – 19</td>
</tr>
<tr>
<td></td>
<td>300+</td>
<td>-</td>
<td>-</td>
<td>10 - 14</td>
<td>16 – 22</td>
<td>16 - 18</td>
</tr>
</tbody>
</table>
List of Illustrations

| Image 1    | (MathIsFun.com; Google; Lubbock) |
| Image 2    | (The University of Texas at Austin) |
| Image 3    | Personal Illustration |
| Image 4    | (Jonsson 34) |
| Image 5    | Personal Photo |
| Image 6    | (Berger 82) |
| Image 7    | (Berger 48) |
| Image 8    | (Mollerup 290) |
| Image 9    | (Amelar) |
| Image 10   | (Amelar) |
| Image 11   | (Bright 134) |
| Image 12   | (Bright 162) |
| Image 13   | (Bright 162) |
| Image 14   | (Mollerup 205) |
| Image 15   | (Mollerup 205) |
| Image 16   | (Soltero 24) |
| Image 17   | (Soltero 27) |
| Image 18   | (Soltero 26) |
| Image 19   | (Soltero 25) |
| Image 20   | (Soltero 25) |
| Image 21   | (Burke) |
| Image 22   | (Burke) |
| Image 23   | (Burke) |
| Image 24   | (Burke) |
| Image 25   | (Dobney) |
| Image 26   | (Dobney) |
| Image 27   | Personal Illustration |
| Image 28   | Personal Illustration |
| Image 29   | (Colorado School for the Deaf and the Blind) |
| Image 30   | (Western Pennsylvania School for Blind Children) |
| Image 31   | (Western Pennsylvania School for Blind Children) |
| Image 32   | (Western Pennsylvania School for Blind Children) |
| Image 33   | (Western Pennsylvania School for Blind Children) |
| Image 34   | (Google) |
| Image 35   | Personal Photo |
| Image 36   | (Buddy Holly Photo Gallery) |
| Image 37   | (Lubbock) |
| Image 38   | Personal Photo |
References


