

*Welcome !!*

*CEFPI Title: 21<sup>st</sup> Century  
Educational Environments  
tailored for Special Needs  
Students and Transforming the  
Learning Environment at the  
Colorado School for the Deaf and  
the Blind*



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John Dickinson, AIA

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Kevyn Brown,

Colorado School for the Deaf and  
the Blind

Brian Calhoun, AIA

RTA Architects



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# Who are the Special Needs Group?



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- Deaf
- Blind
- Deaf/Blind
- Cochlear Implants
- Autism
- LD: Learning Disabilities
- Low Vision Impairment
- Mental Emotionally  
and many others



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- Design needs of all students are diverse and changing. Physically, emotionally and intellectually. Students respond in a different ways to different learning environments.
- A student's physical design needs also change as they grow and mature. Some might require additional spaces and facilities in order to manage their own personal care.



- Thinking about and solving such problem takes time, as does evaluation necessary to ensure that student's needs are met.
- This means that those working with, and in, schools must develop policies and practices that allow them to plan AHEAD, make changes with time and structure the on-going process of evaluation. As noted, any one working with schools must think about special educational needs and disabilities throughout the planning process.



# C R I T I C A L I S S U E S



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# Special Needs Environmental Design: Visual Communication, Circulation and Lighting



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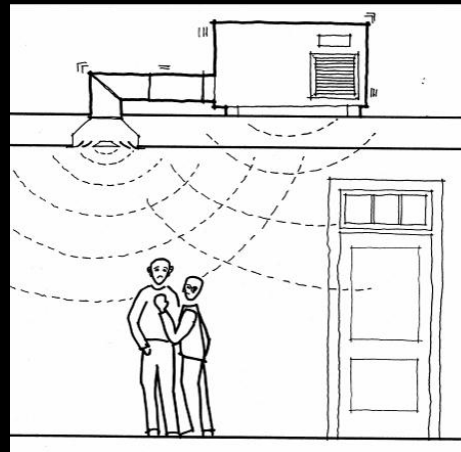
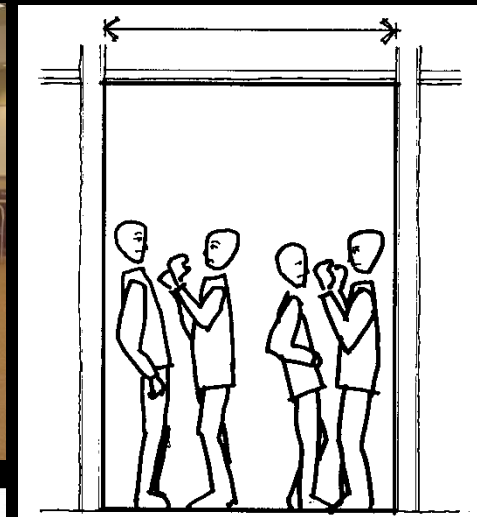


# VISUAL COMMUNICATION

*Deaf and hard-of-hearing students are more sensitive to the visual environment than their hearing peers. The acute skills of observation that deaf and hard-of-hearing students acquire in learning to use oral methods make them more conscious of the many subtleties of variation in lighting, building features, and walls that might create barriers or obstacles to their visual paths.*

- Offices, Meeting Classrooms are ideally configured in the half round, or like a horseshoe.
- Classrooms/offices/Labs should minimize disturbing and distracting noise (HVAC systems & hallway traffic), as well as in and between rooms.
- Spaces for people with cochlear implants should have reduced background noise (distraction).
- Control day lighting (no silhouettes).

# DEAF SPACE: CRITICAL ISSUES



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# SPECIAL NEEDS SPACE: CRITICAL ISSUES



- Glare + Background reflection
- Site layout + Planning
- Colors and Patterns.
- Columns, Low ceilings + Wayfinding
- Natural Lighting + Artificial Lighting
- Openness + Crowding
- Direction + Connection
- Green space + Architecture

“Visual Sensibilities and Cultural Expression for the Special Needs occupants”



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# Modern Campus/Site Design

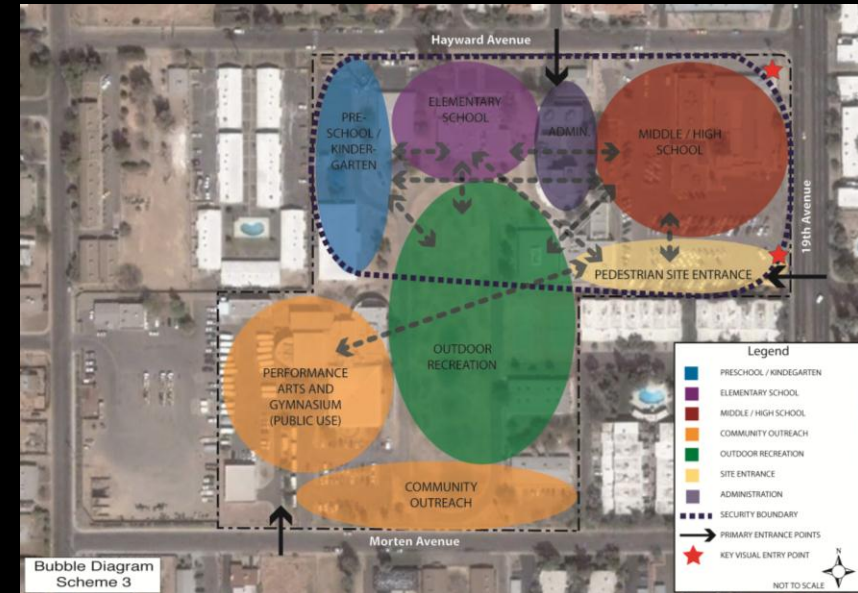
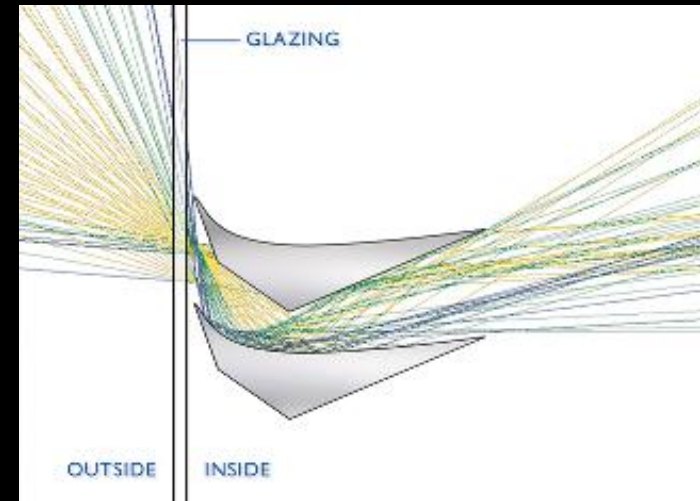
## SITE CONTROL:

DAYLIGHTING

VISUAL ACCESS

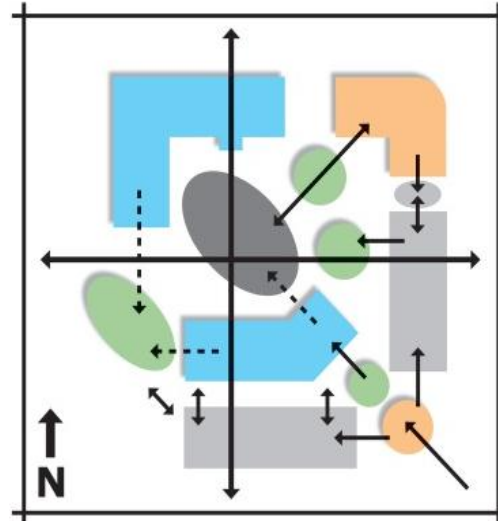
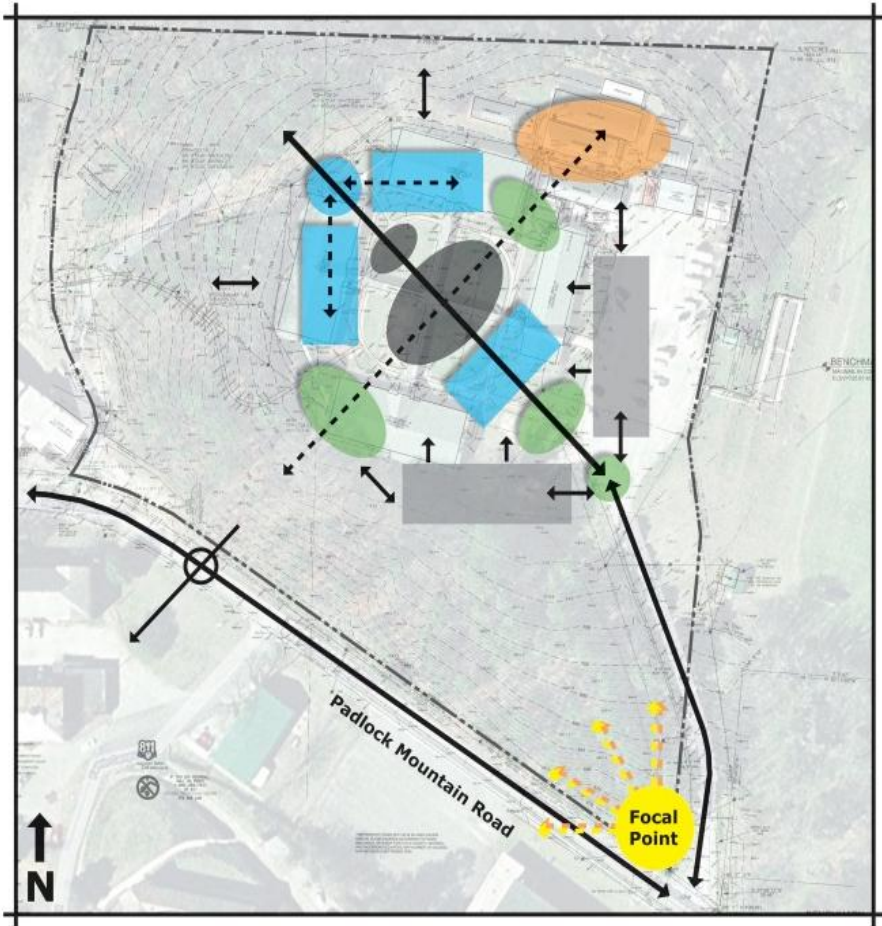
VISUAL AND AUDIO SAFELY

VISUAL COMMUNICATION

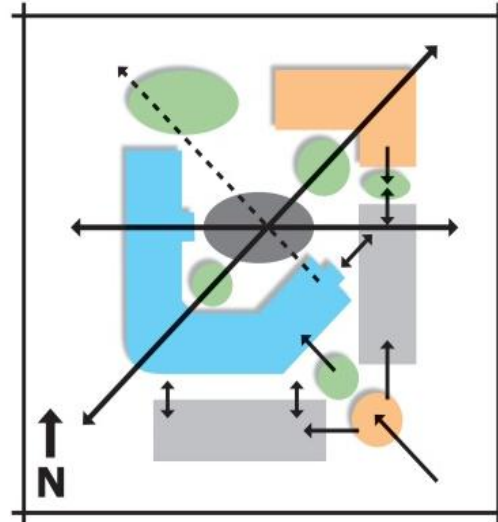


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- Public Access
- Private Access
- Parking: Public
- Common Area: Public
- Common Area: Private



- Sun Axis Relationship (LEED)
- Visual Connections
- Physical Connections
- Site Blends with Boundaries
- Various Disabilities Relationships

Cave Springs Training Center for the Deaf and HH  
Cave Springs, GA



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Cave Springs Training Center for the Deaf and HH  
Cave Springs, GA



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There is huge variation in possible hearing losses and the design requirements of students that arise.

In manipulating acoustics conditions, it is necessary to consider the following:

- Noise level
- Reverberation time
- Acoustic absorption
- Sound Insulation
- Sensitive spaces location and design

Noise can come from a number of different sources such as classroom activities, ventilation equipment and aircraft or road traffic.



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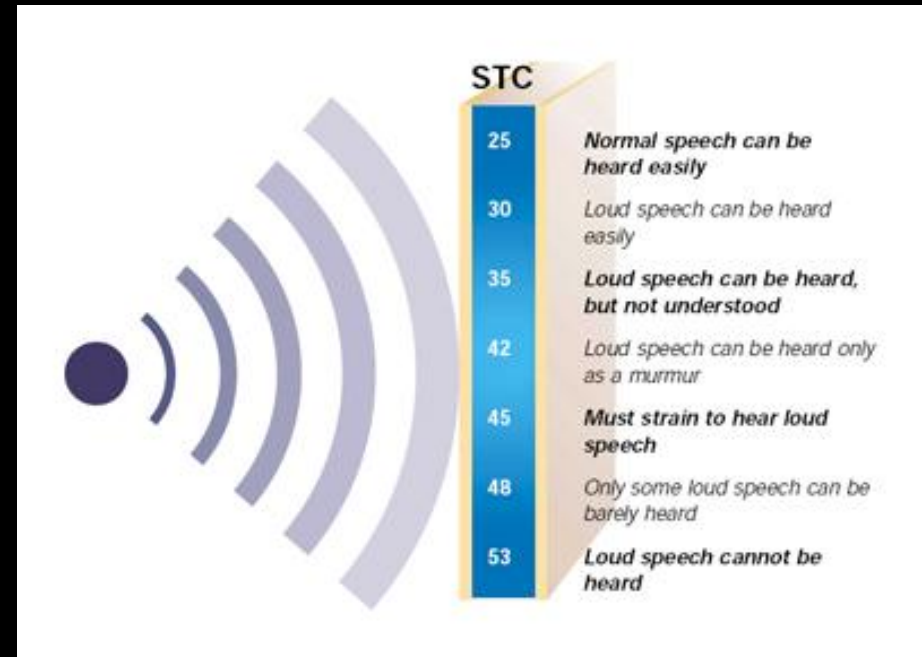
# ACOUSTICAL TREATMENTS

## Optimized Acoustics for Offices and Housing

ACOUSTICS, ACOUSTICS, ACOUSTICS:

Design for Optimal Background Noise, Sound Transmission, and Reverberation

Design the right site and location



Wall treatments to absorb sound



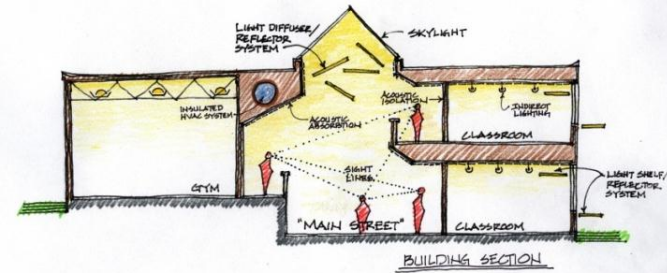
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**First Floor Plan**  
 Rhode Island School for the Deaf  
 Lincoln, RI



**PROGRAM LEGEND**

[Light Blue Box]	GENERAL CLASSROOM
[Light Green Box]	SCIENCE
[Teal Box]	COMPUTER LAB
[Green Box]	ART/TECH
[Red Box]	ADMIN./NURSE
[Orange Box]	LIBRARY
[Yellow Box]	GYM/CAFETERIA/AUD
[Brown Box]	STORAGE/TOILETS/MECH.
[Grey Box]	CIRCULATION
[Arrow]	PRIMARY ENTRANCE
[Square]	SECONDARY ENTRANCE

# Rhode Island School for the Deaf and Deaf/HH Educational Center



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# Lighting

In proper design for the Deaf and Special Needs populations, there must be sufficient brightness at all location within the environment. Natural light, suitably managed, is considered preferable to artificial light and should be employed to the greatest extent possible.

There are two determinants of proper lighting –  
quantity and quality

- *How much light is present? How much light SHALL be present?*
- *What is the resulting brightness?*

*Why is this important?*



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## John Tracey Special Education Center – Los Angeles, CA



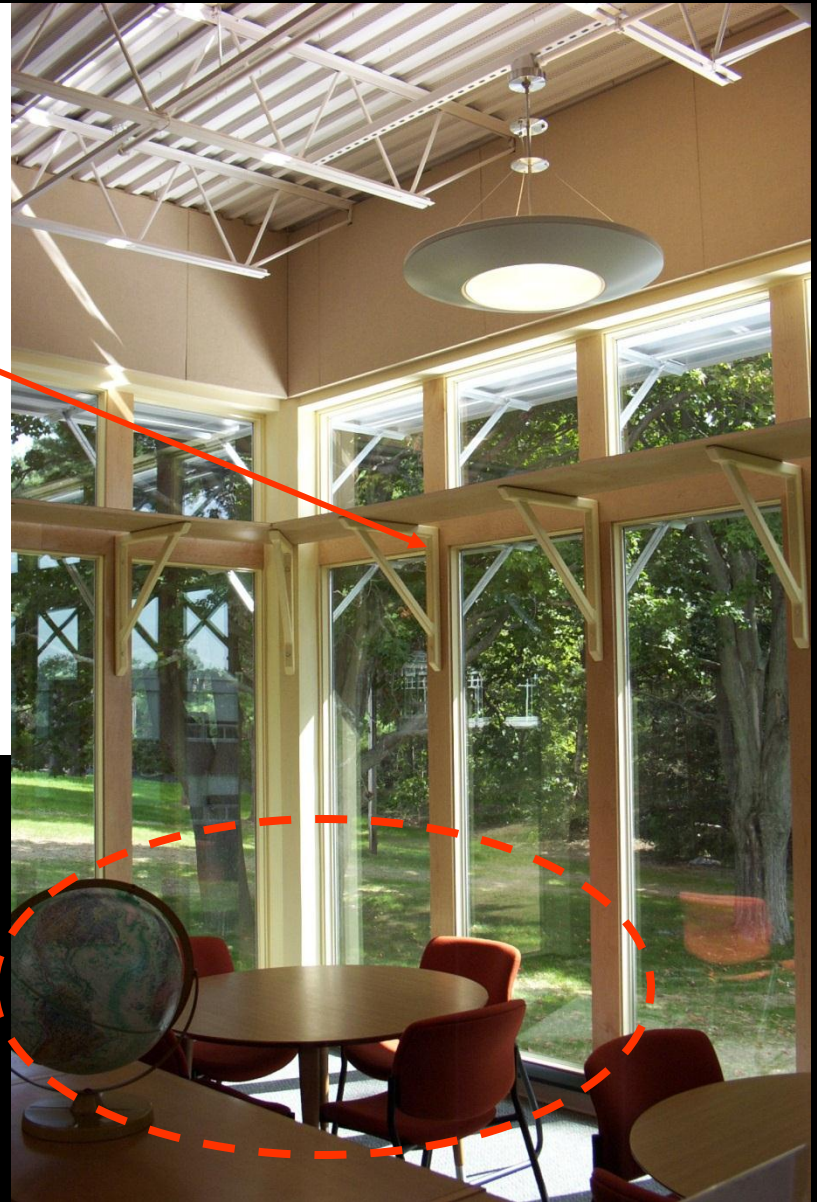
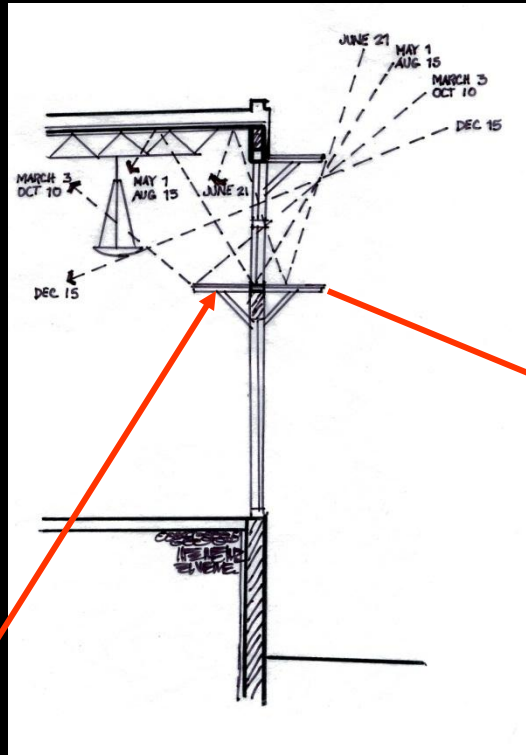
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# Governor Baxter School for the Deaf

## K-8 New Educational Center

## Reading Section of Library



- Light Shelves
- Minimize glare and control at all times while have a large windows



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# Governor Baxter School for the Deaf - Maine

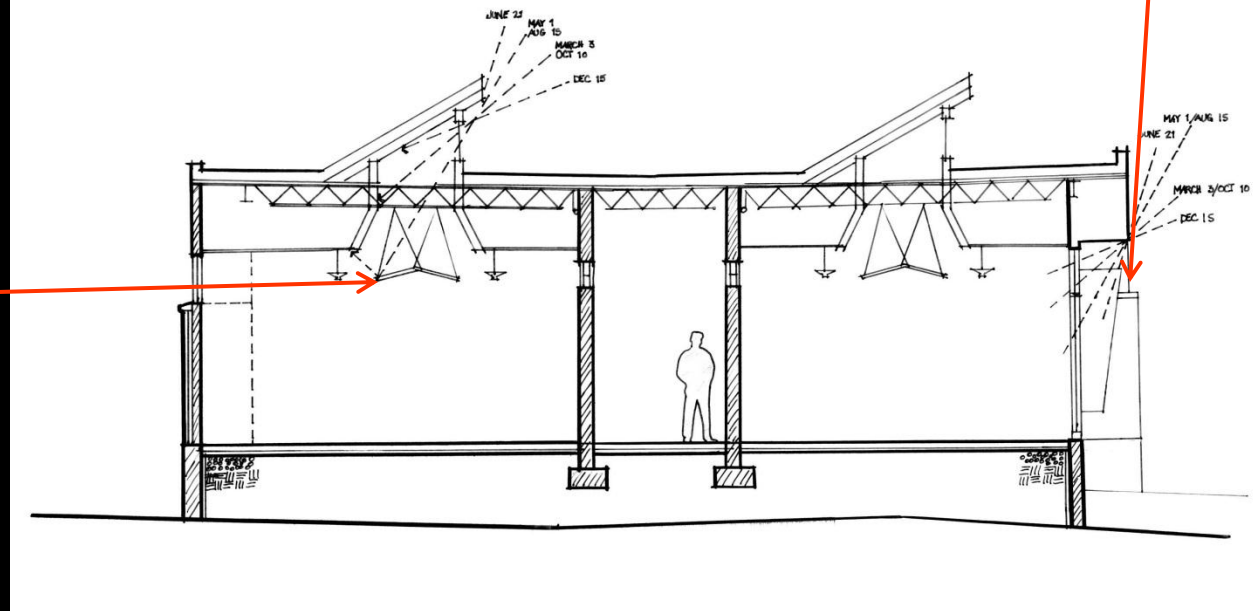
## K-8 New Educational Center

### Section of Classrooms

- Silver LEED Design
- Minimize glare and control at all times and give natural lighting



Light Shelves



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# Sensory Environments



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## Blind and Sensory Issues-1

- Are lighting levels, colors, and other visual aspects designed to help students especially with sensory impairments such as low vision, and blind, participate in school life?
- Students will see things clearly but within a very limited visual field, while others may have loss of central vision. Many of these conditions can occur together.
- The difficulties students with visual issues experience and their responses to light will vary. The avoidance of glare from windows, roof lights or light fixtures is important for most students. Some will need additional illumination.



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## Blind and Sensory Issues-2

- The way spaces are arranged will impact the lives of students with visual impairments. Providing uncluttered route ways and thinking about large areas of glazing are extreme important.
- Color and color contrast is another important visual design consideration. Enhancing the color of objects helps everyone under less than ideal lighting conditions, especially those with visual impairments, locate significant elements such as doors, door handles, changes in directions in corridors and changes in floor levels and steps.



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# Autistic Issues

Lighting and Colors have been extreme important for students with autistic issues.

- For an example, one school that we have worked with had took great care in the decoration of its internal spaces, most teaching spaces have an area within the room that is painted in pale colors and free of bright images. The teaching staff finds this area provides a soothing place for students with certain forms of autistic spectrum disorder who become upset or overly distracted by too much visual stimulation. BUT at the same time, the school recognizes that OTHER students benefit from colorful, stimulating environments.

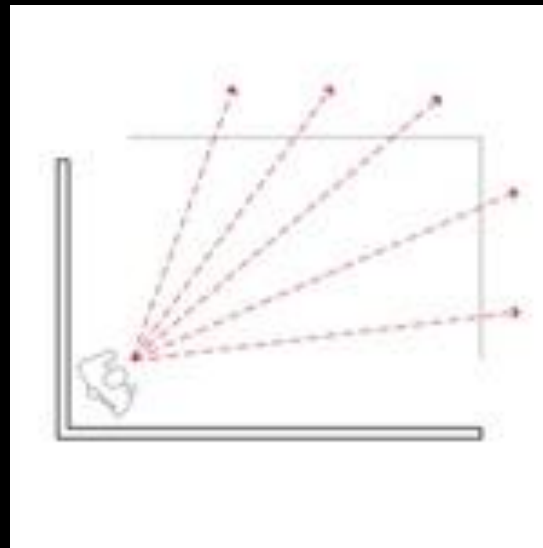


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# Special Needs Sight lines Arrangements

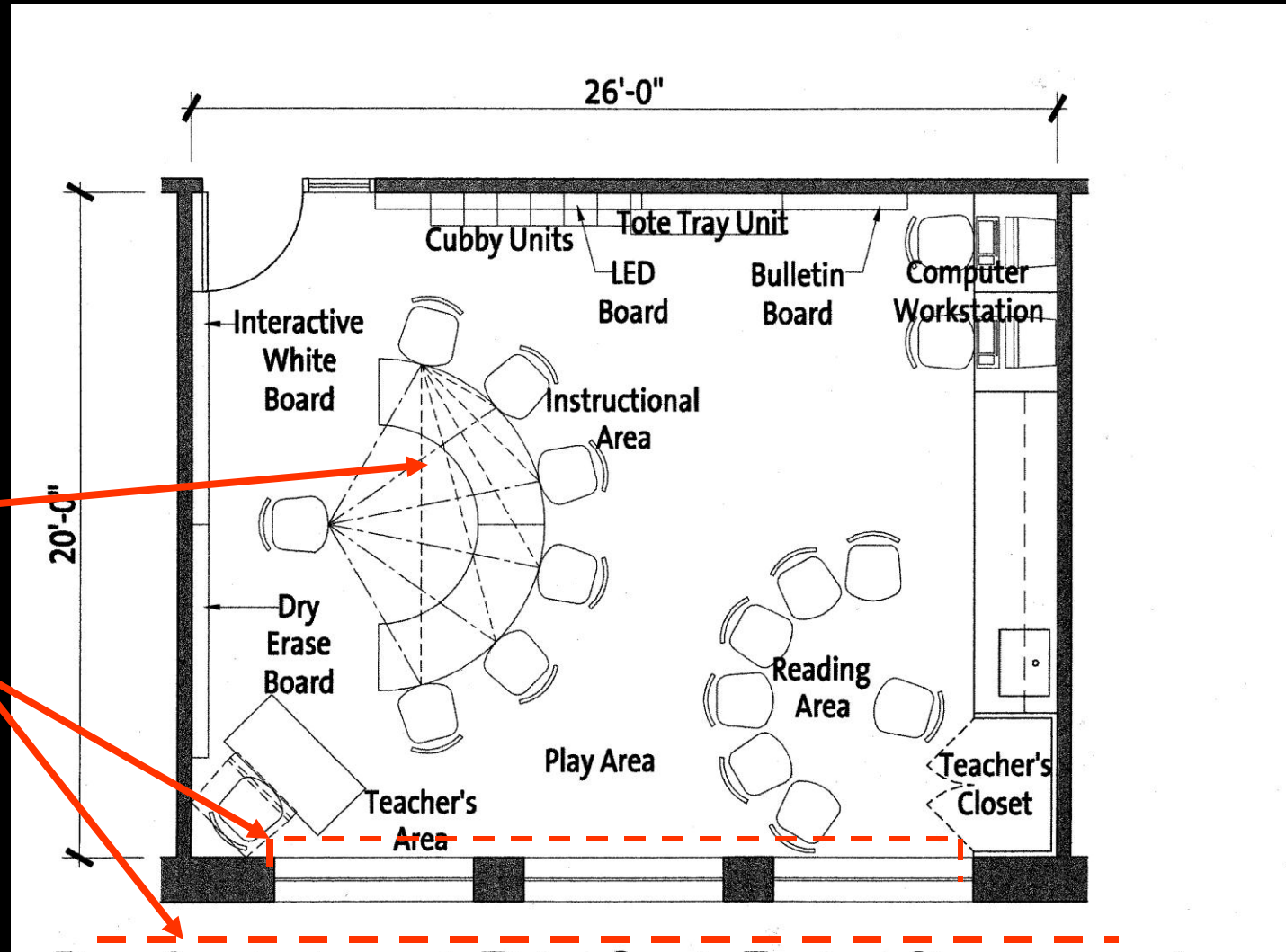


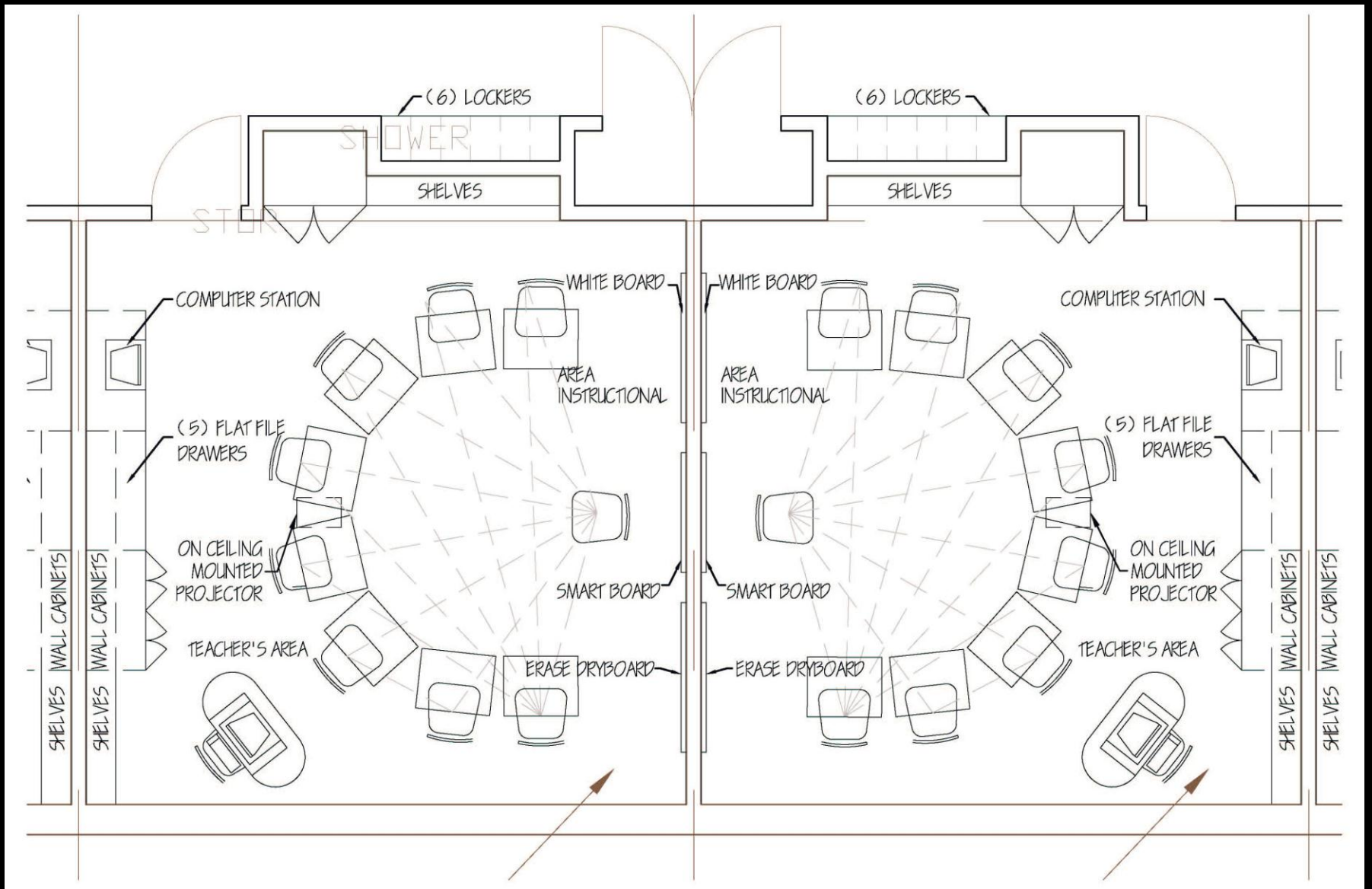
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# General Design Concept for Deaf/HH and Cochlear Implants Educational Classrooms

- Visual Communication lines
- Light Shelves to control daylighting and glare issues.
- 360 deg Visual Circulation for 6-8 students and one teacher/staff

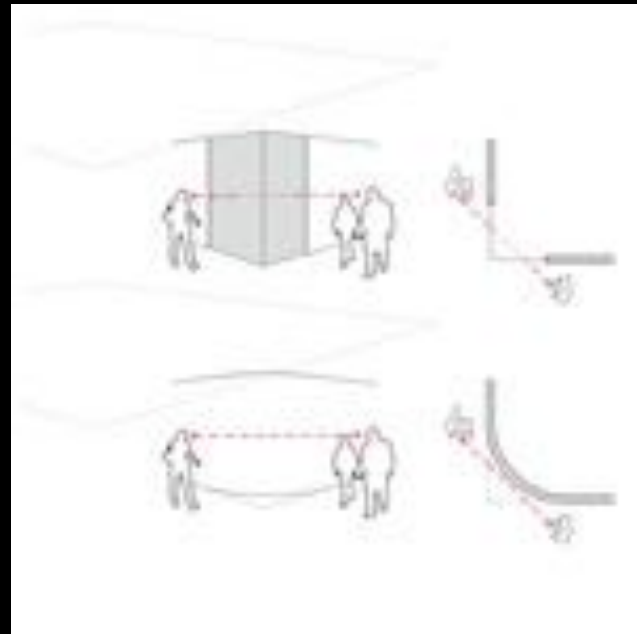
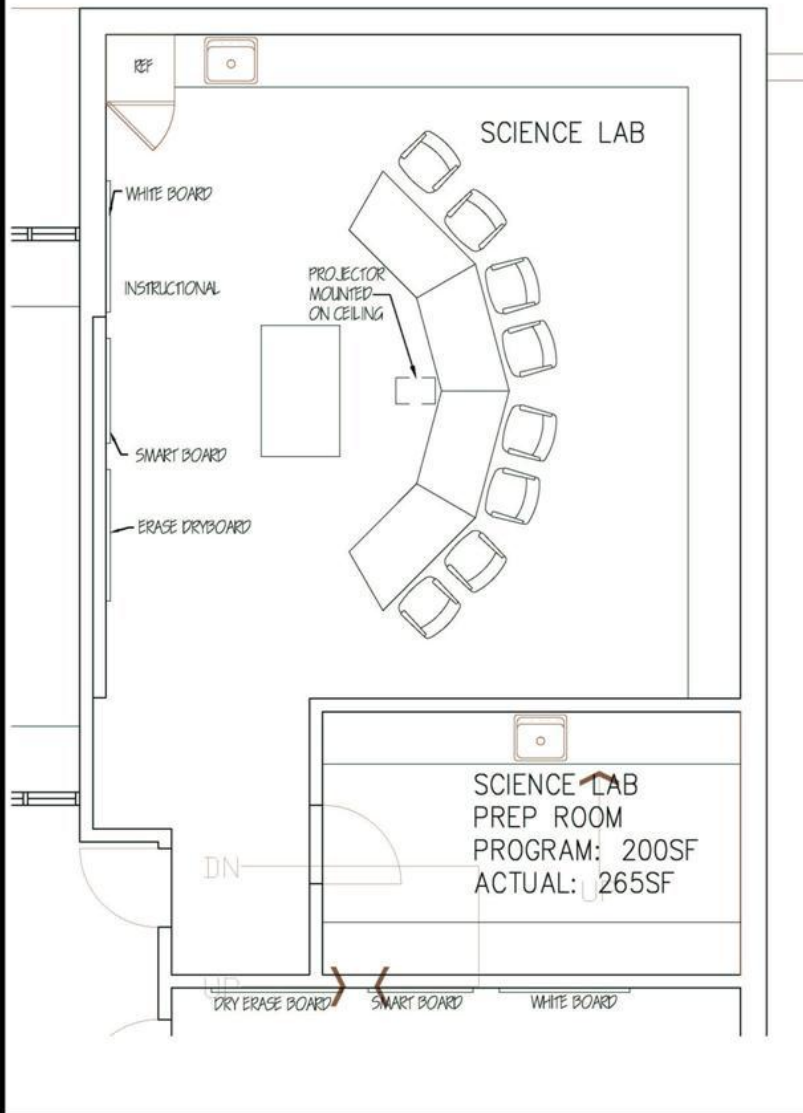




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# Special Needs Science Prep/Lab



*Light Shelves at above*

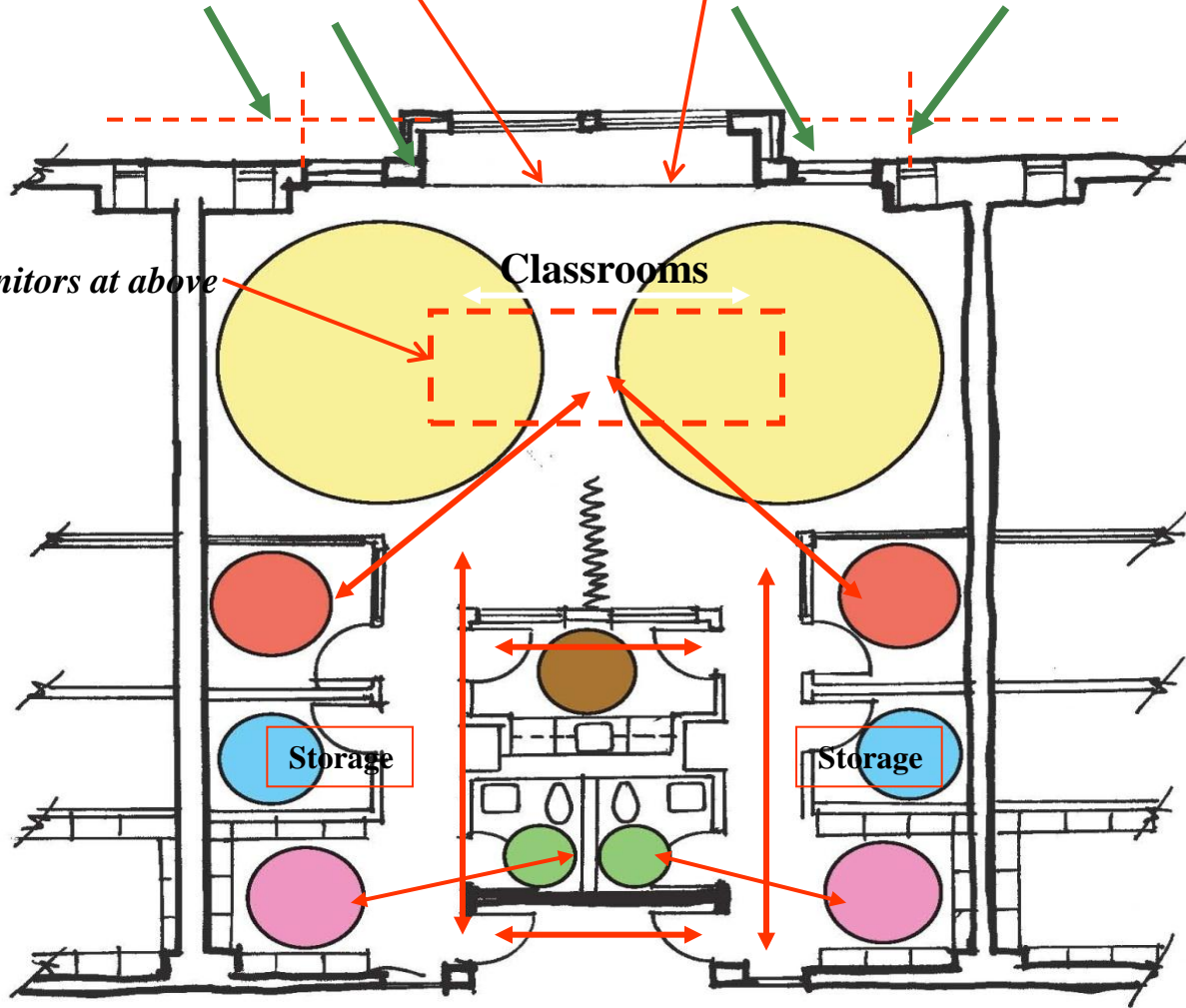
*Cabinets and Storage*

*Light Monitors at above*

**Classrooms**

**Storage**

**Storage**



*Program Expandable Classrooms for  
Deaf/HH Pre-school and early  
Elementary students*



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# Life and Safety Concerns within Special Needs Group



- Fire safety is a much overlooked problem among special needs. They do not receive the same media, educational, or industry attention as the hearing/normal population. Many advancements in fire injury and death prevention over the past century have not addressed the fire safety needs of the special needs community. The most significant of those inventions is the audible smoke alarm. Smoke alarms have been credited with saving thousands of lives from fires each year. Conventional alarms, however, work less well for those who cannot hear, see or have other special needs issues.
- Fire safety messages more than likely will not reach this population due to the lack of effective distribution channels.



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- Visual assessment is the primary means for people who are deaf and hard of hearing to process information vital to everyday living. These individuals cannot rely on traditional audible smoke alarms. They require visual alarms equipped with strobe lights or vibration devices.
- Vibrating beds and pillows have been developed to awaken people who are deaf or hard of hearing and alert them to the presence of a fire. These beds and pillows are wired to a smoke alarm and vibrate when the alarm is activated.
- While specialized detection and alarm devices are available, there is a dearth of information about how to obtain them. In addition, these devices are often prohibitively expensive.



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# Colorado School for the Deaf and the Blind

Kevyn Brown



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# Who is CSDB

- CSDB has a rich 135 year history of serving students in Colorado
- Dual School since 1893
- State wide responsibility for serving birth to 21



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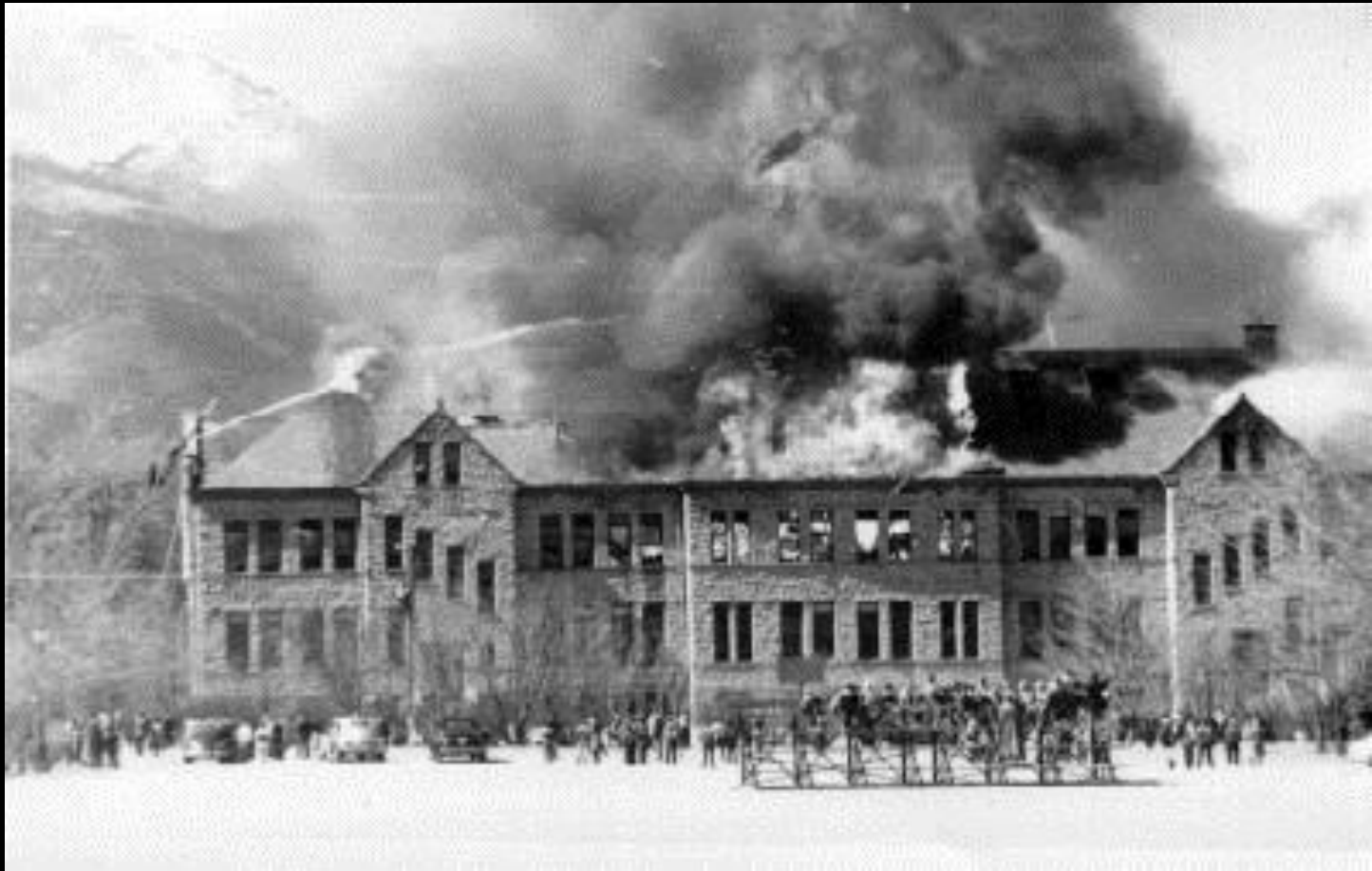
# CSDB



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# CSDB



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# CSDB



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# CSDB

## What did we have?

- Incomplete fire alarm and sprinkler system
- HVAC (Lack thereof)
- Lighting from the 1960's limited control
- Poor ADA accessibility physical and environmental barriers



# CSDB

## What did we Have?

- Building entrances from the 50's not set up for age appropriate access and crisis management
- No energy efficiency or management system
- Basement level science lab developed in an old classroom without any safety systems



# CSDB

## What did we Have?

- Limited classroom technology
- Program needs and space realities out of sync
- The media / library area located in an adjacent building
- Building supervision out of sight of students



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# CSDB

## How did we get there

- Internal Design team
  - Superintendent
  - 4 Teachers
  - Board Member
  - Ad Hoc support



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# CSDB

## How did we get there

### Original plan:

- Internal:
  - September 2009
- Funding Available:
  - March 2010
- Design / Bid:
  - June 2011
- Construction start:
  - June 2011
- Occupancy:
  - August 2012

### Actual Results:

- Internal:
  - September 2009
- Funding Available:
  - March 2010
- Design / Bid:
  - November 2010
- Construction start:
  - January 2011
- Occupancy:
  - August 2011



# CSDB

- Video Interview with students



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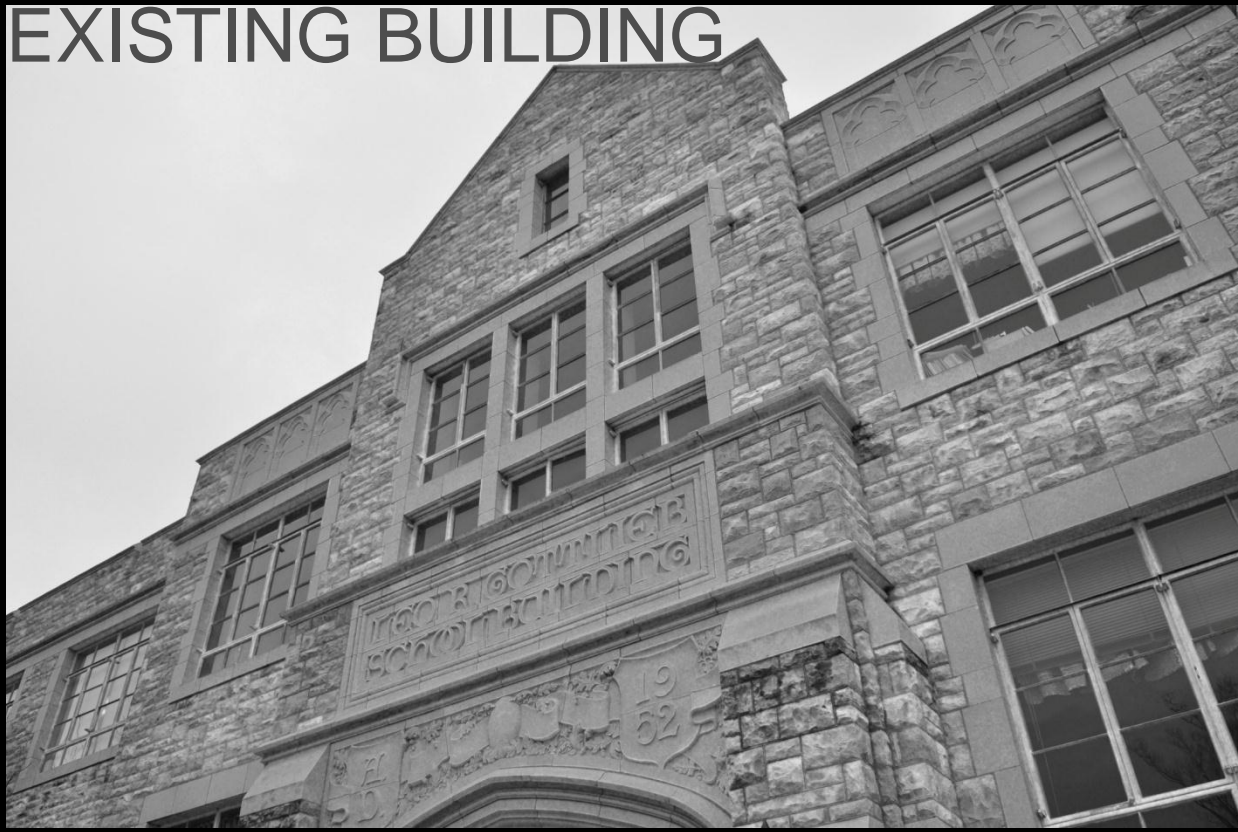
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# EXISTING BUILDING



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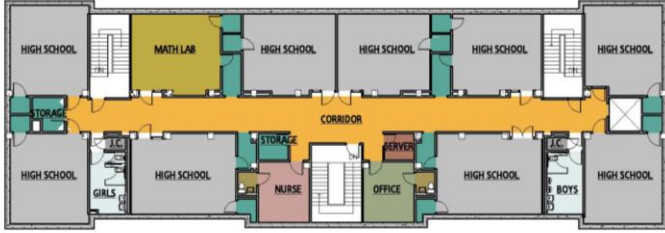


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# EXISTING BUILDING



Upper Level



Entry Level



Lower Level

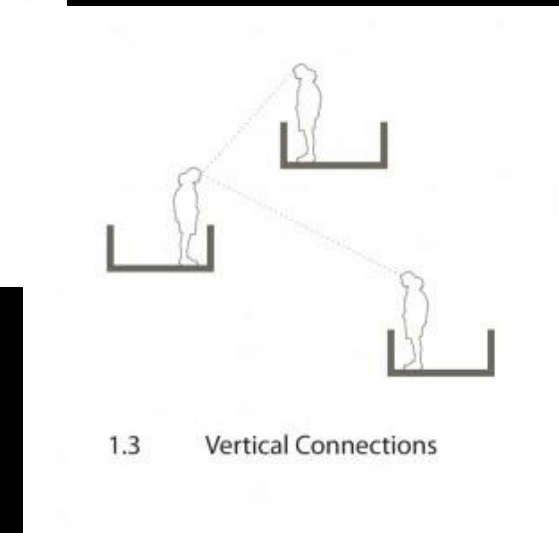


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# design STRATEGIES and CONCEPTS

- visual connectivity
- clear sight lines (eye contact)
- openness
- special attention paid to acoustics, eliminate background noise
- visible destinations
- community focused
- collectivism
- textured edges and transitions
- diffused, non-glaring light
- gathering areas in large circles or arcs

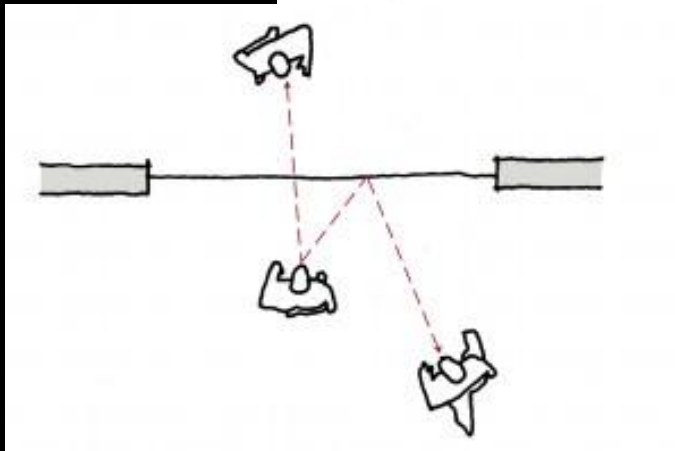
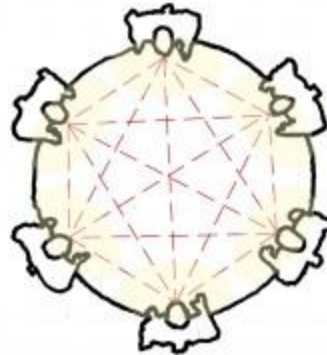
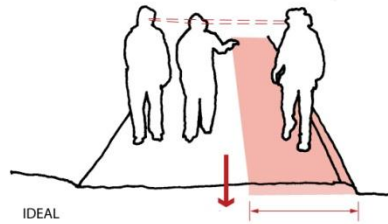
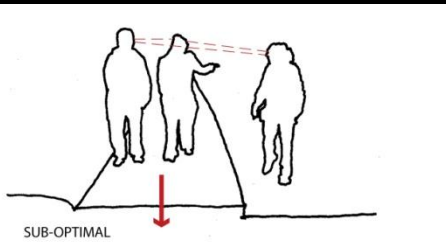


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# design COMPONENTS



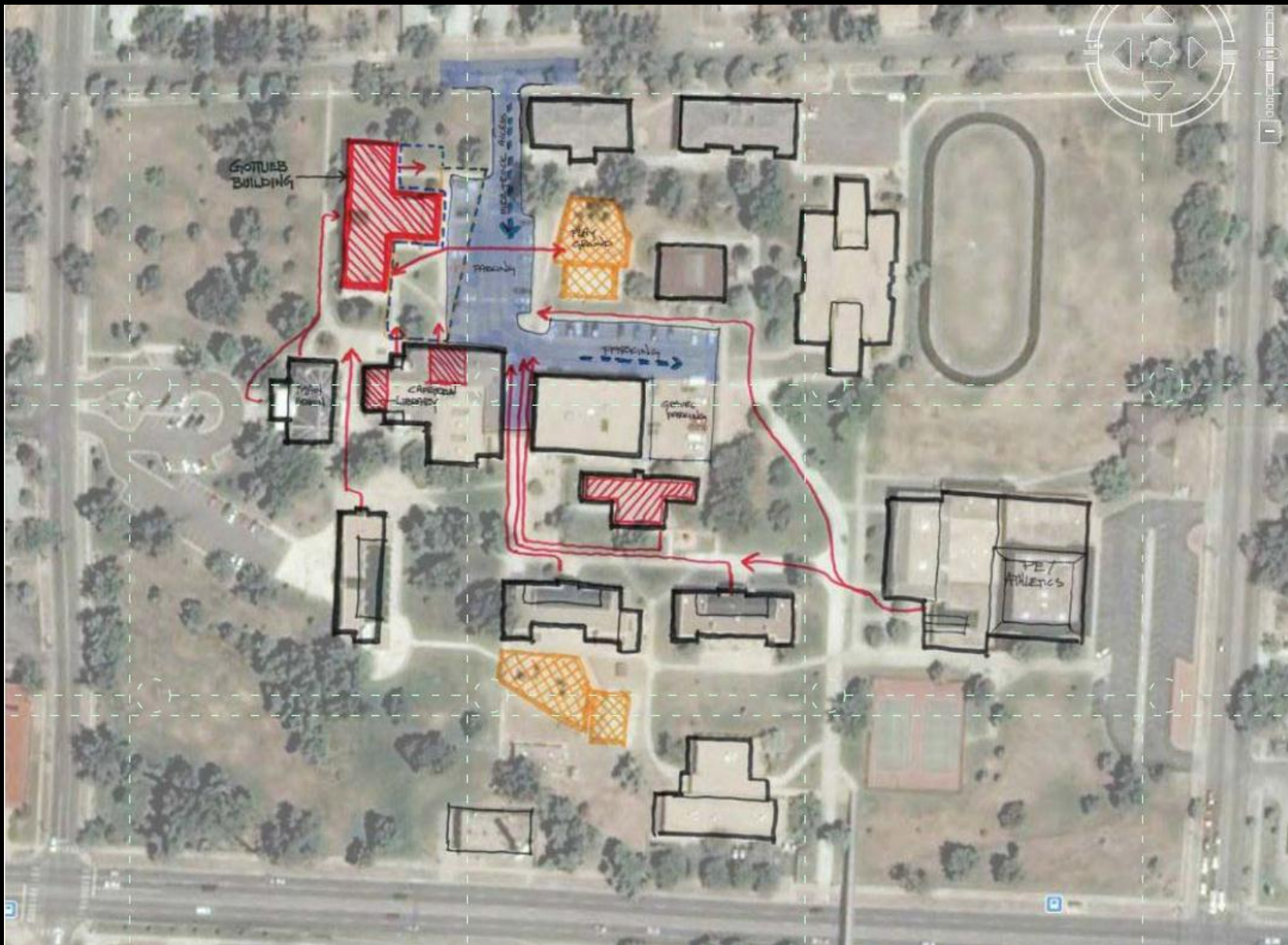
- ramps instead of stairs where possible
- glass as transparent and reflective
- ledges
- wide pathways and hallways (8' as a minimum)
- windows in doors
- round tables instead of square
- door swings into classrooms instead of corridors
- uncomplicated backdrops for signing, simplicity in materials
- hierarchy in wayfinding (variations in color, texture, numbering systems)



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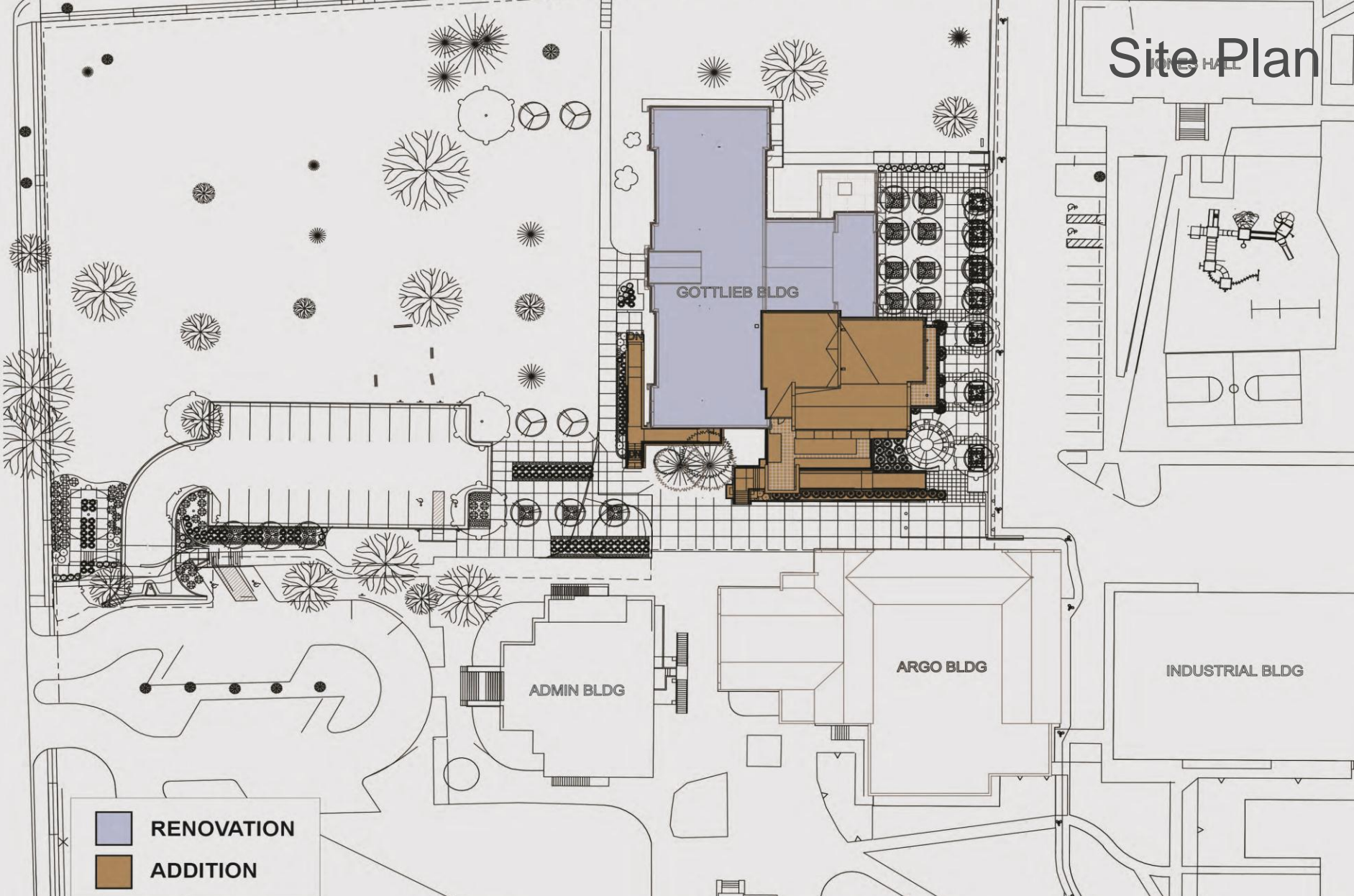




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# Site Plan



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- Visual Destinations
- Community Focused
- Textured Edges and Transitions
- Honor the Past – Forward looking



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# Outdoor Gathering Spaces



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# Elementary School (Lower Level)



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# Middle School (Entry Level)



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# High School (Upper Level)



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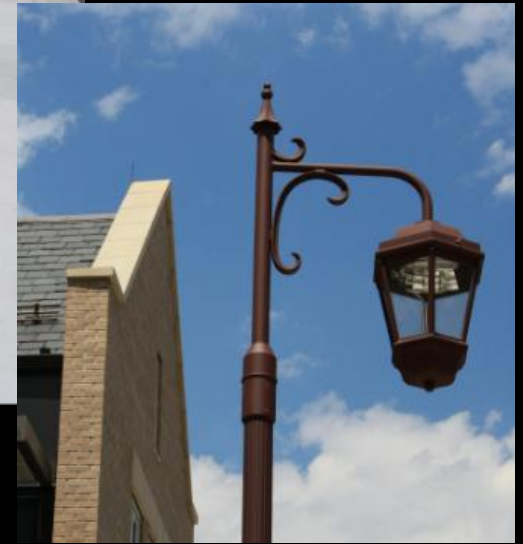




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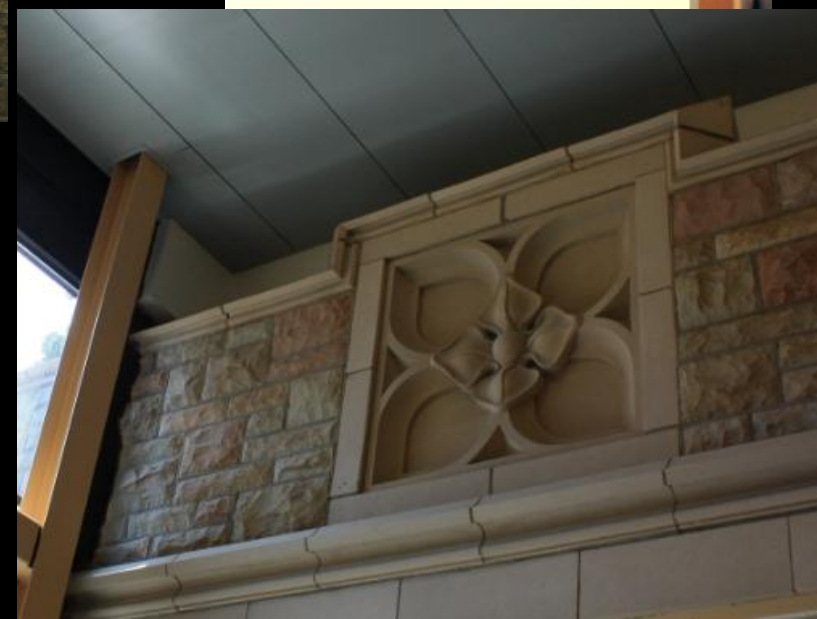
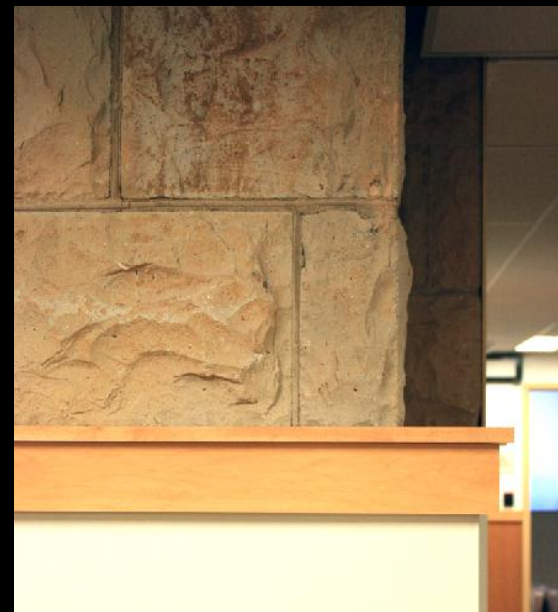






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**Colorado School for the  
Deaf and the Blind**

**How wonderful it is  
that nobody need wait  
a single moment to  
improve the world.**



~ Anne Frank



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Thank you for coming !

Question and Answer



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