

# **MONTESSORI SCHOOL OF MUSIC FOR CHILDREN**

by  
Vivian Wai Yu Au

Submitted in partial fulfillment of the requirements  
for the degree of Master of Architecture (First Professional)

at  
Dalhousie University  
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## **DEDICATION**

To my parents, thank you for your love and support throughout my journey. You have given me the opportunity to freely do what I love to do.

To my sisters, Wynsome and Wylie, thank you for all your love and encouragement. I am very grateful to have you both as my sisters. Thank you for listening and helping me so much and mostly importantly, in believing in me.

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## **ABSTRACT**

The Montessori Method builds on children's natural explorative and creative nature through their learning environment. Music learning encourages participation that helps strengthen a child's educational, physical, and emotional development. This Thesis investigates the relationship between one's learning environment and processes of self discovery, which allow a child to understand and experience music through acts of play and work.

Studies focus on the relationship between music and architecture, and how the quality of sound within a space can be influenced through architectural elements such as the material, structure and volume. These architectural elements, in turn, can act as tools to educate children about music.

This thesis examines Architecture and the Montessori Method as means to create Music learning spaces for children. The proposed Montessori School of Music will not only be a space for experiencing music but most importantly, a place where children explore and learn. The site is in the Strathcona neighborhood in Edmonton, Alberta, Canada.

## **ACKNOWLEDGEMENTS**

I would like to thank Catherine Venart for her tremendous guidance and patience throughout my thesis. Your motivation to my work has allowed me to strengthen and carry this thesis to its completion.

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To Jenn and Earl, thank you for all your love, support and encouragement throughout these years. You have made my life in Halifax a memorable experience. You both have taught me to believe in myself. Thank you for all your advices and invaluable lessons to my life and my future.

To Barry, thank you for your love and support. You have motivated me through both my work and in life. Thank you for your continuous patience and reminder.

Finally, to my friends, family and colleagues who have stood by me throughout my years of studies. My deepest and sincerely, thanks.



**THESIS QUESTION**

How can Architecture and the Montessori Method be instrumental in a child's learning process and their experience of music?

## INTRODUCTION

The early years of a child's life are significant for cognitive, intellectual, social and emotional growth. Music plays an important role in their development, because, through active participation, (listening, singing, dancing and clapping) a child gains motor and sensory skills, as well as an appreciation and understanding of music. Music also initiates a child's emotional, intellectual and imaginative awakening.

The adaptation of the Montessori Method to a Music school environment allows children to learn through exploration and self discovery. Through this creative learning process of play and work, children are provided with the opportunities to understand the interrelationship between materiality and volume, and the acoustic properties a space creates.

Architecture engages the immediacy of our sensory perception. The interconnection between humans and a space is a dialogue that enables us to experience ourselves in the sound of the room. Our perception of spatial experience is not judged only by our eyes but by our ears and body as well. The live reflection of an echo increases our awareness of the geometry and material within its space.<sup>1</sup> Therefore, a space can be defined through the sound quality desired within that space. For example, specific shapes create variation of resonances and different materials and textures generate different vibrations.

## **MUSIC**

Music is the art of arranging sounds in time so as to produce a continuous, unified and evocative composition, through melody, harmony, rhythm, and timbre.<sup>2</sup> There are four main elemental characteristics of music, *Pitch (melody and harmony)*, *Rhythm*, *Timbre* and *Intensity*, that create a musical composition.

### **Aspects of Music**

#### ***Pitch***

The position of a tone in a musical scale describes how high or low a note is. A melody is a combination of pitches and durations, which makes up a musical statement similar to a sentence. The movement of pitch patterns may move upward, downward or stay the same. Furthermore, the interweaving of melodic (horizontal) and harmonic (vertical) notes in a musical sentence adds another musical dimension to a score. Refer to diagram page 4.

#### ***Rhythm***

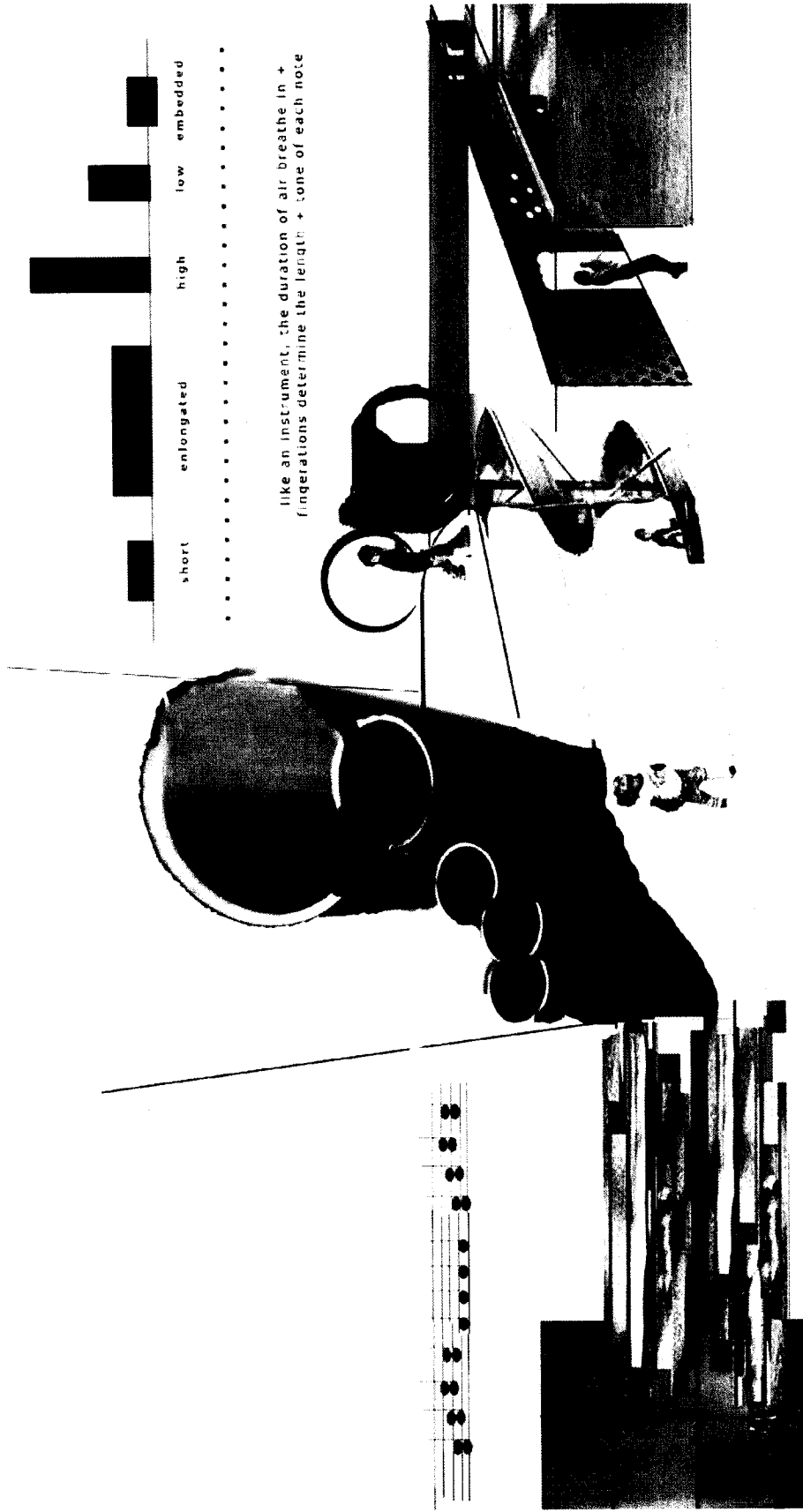
Rhythm refers to repetition, variation, and contrast within a musical score. A change of rhythm can represent different movements and styles, depending on the type of music played. Rhythm can be illustrated through different timings of consistent or irregular repetition of beats (i.e. fast and/ or slow). Refer to diagram page 5.

#### ***Timbre***

Timbre refers to the “tone color”; it is the quality of a sound that distinguishes one voice or instrument from another. Emotion is expressed through timbre; for example, the qualities of soft, sharp, dull, and heavy timbre may evoke emotions, such as lightness, anxiety, solemnness, and fearfulness. Furthermore, the rich and crisp sound of a French horn and the low and deep sound of a tuba can create various atmospheres for listeners. Refer to diagram page 6.

#### ***Intensity***

Intensity refers to music volume; the loudness or quietness of sounds has a strong relationship to the effect or mood of a listener. Crescendo means increasing the sound volume, while decrescendo means decreasing the sound volume. The intensity of music can stimulate or lessen your emotional response. Refer to diagram page 7.





rhythm vs. facade, structure, furniture, ceiling

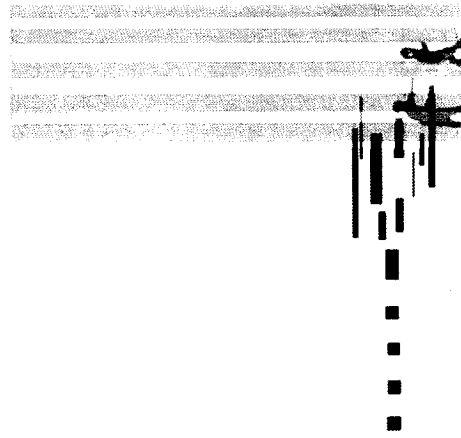


Figure 1: Facade

Facade suggests different programmatic elements in different areas throughout the building

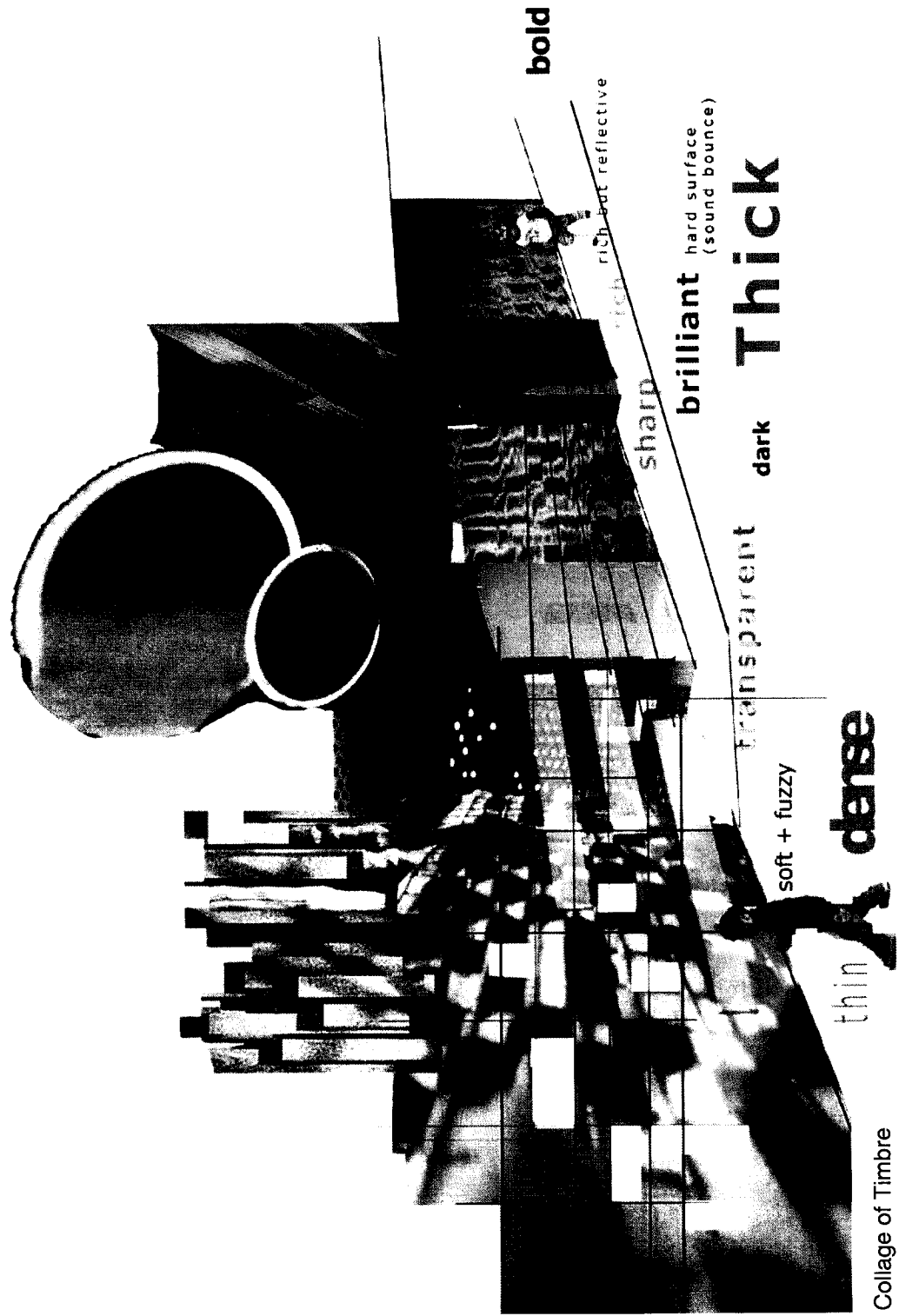


entry circulation lobby corridor to classrooms piazza corridor to classrooms open space circulation exit

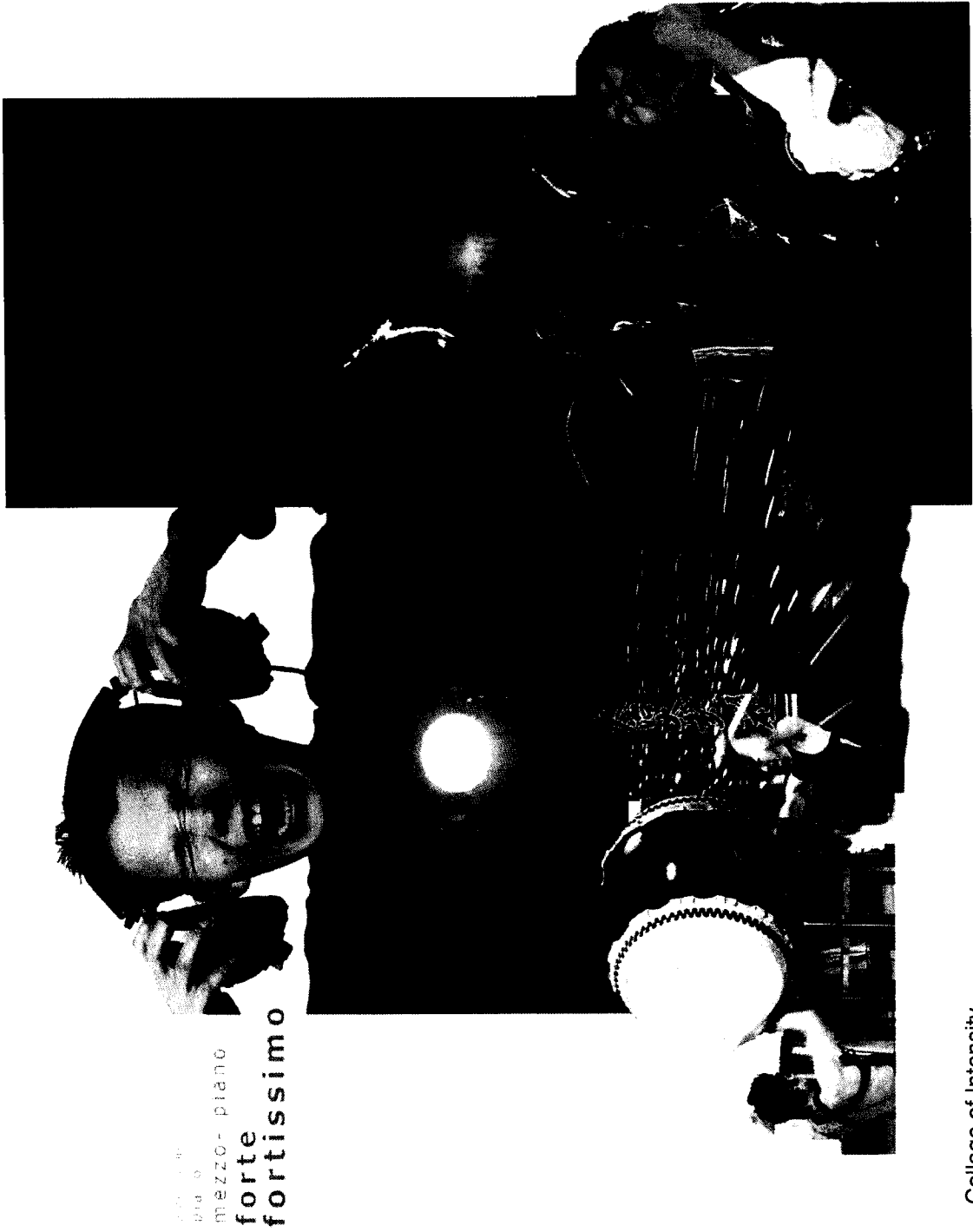
orderly scatter orderly scatter orderly

sense of structural continuity

## Collage of Rhythm



Collage of Timbre



Collage of Intensity

mezzo- piano  
forte  
fortissimo

## THE MONTESSORI METHOD

The Montessori Method is a “spontaneous educational system designed to afford the child liberty to move and act in a prepared environment. Its setting is filled with appropriate materials that provide experiences contributing to the growth of self-motivated, independent learners.”<sup>3</sup>

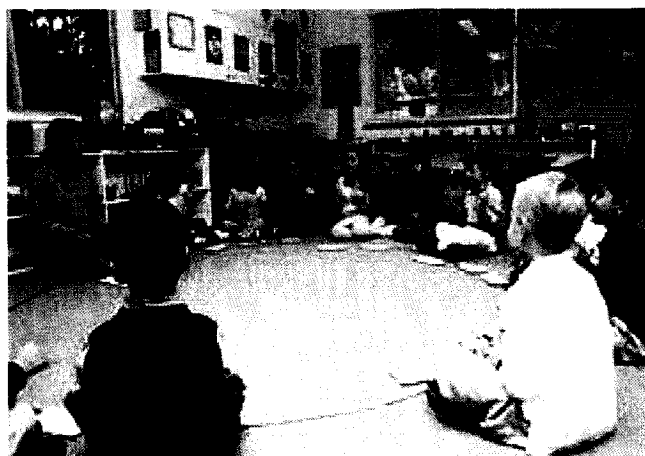
The Montessori Method encourages a child's creativity, appreciation and explorative nature in a prepared environment. Each child is given his/ her own space to work and play, which permits them to move and talk with others. Maria Montessori calls this environment a “children's house” and she based the program on her observations that young children learn to work and play the best in a “nurturing environment”.<sup>4</sup> A “nurturing environment” consists of learning exercise trays arranged in open shelves and furniture constructed in proportion to the scale of the child. Children are free to choose the exercises they would like to use and work for as long as the materials hold their interest. Every child uses his/ her own methods and abilities to approach a different series of exercises. The purpose is to promote their development of *social skills, emotional growth, self-development and physical coordination*.

A Montessori classroom encourages self-directed learning and collaboration in groups. Each class consists of different age groups of children. The more experienced children share what they have learned with other less knowledgeable children, and this interaction reinforces their own and mutual learning. The self-directed learning offers a child the opportunities for self-development, individual learning, and physical coordination, whereas the collaboration within a group provides the child social interactions for cooperative learning, peer teaching, and emotional development.





It is important to encourage social interaction among children from each other. (Photographs of the Montessori school in Edmonton 2006.)



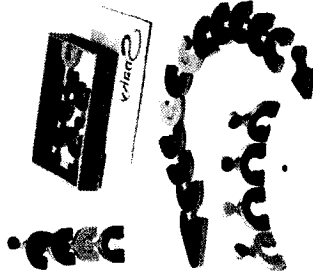
All furniture is designed in proportion to children's figure. Every element can be physically reached by the children. (From Absorbent-mind Montessori School 2006.)



Outdoor settings are as important as the interiors of each classroom. Children can be socially interactive with each other. (From Montessori Preschool and Toddlers group 2006).

## Her main contributions to the work of those of us raising and educating children are in these areas:

1. Preparing the most natural and life supporting environment for the child
2. Observing the child living freely in this environment
3. Continually adapting the environment in order that the child may fulfill his greatest potential- physically, mentally, emotionally, and spiritually.

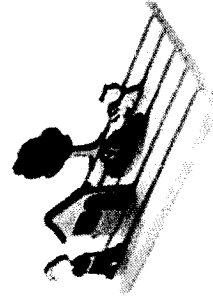


## montessori

- Child- centered
- Emphasis on cognitive learning (understanding)
- Child learns by handling objects
- Child spots and corrects own errors through feedback from materials
- Child motivated by self-development
- Individual learning
- Environment and method encourage self- discipline
- Child free to move and work within classroom
- Child chooses own work from interests and abilities
- Child sets own learning pace to fully absorb information

## traditional

- Teacher- centered
- Emphasis on rote knowledge development (memorizing)
- Teacher lectures
- Teacher corrects errors
- Teacher motivated
- Large group lessons
- Teacher enforces disciplines
- Child assigned seats
- Teacher sets curriculum with little regard for child's interest
- Teacher sets pace



Comparison chart for the traditional and the Montessori methods



### Principles

1. Nature, science observation based
2. Respect for individual differences
3. Care of self + reflection
4. Freedom within limits
5. Teachers to practice and reflect
6. 3 period lessons (introduction, practice/assimilation, independent expression)
7. Peer learning and teaching

### Methods

1. Prepared environment (Children's house)
2. Use of Montessori materials + exercises
3. Concepts of freedom, structure and order
4. All children learn through play + work
5. Children given personal space and permitted to move and talk
6. Teacher encourages the child's "auto-education"

### Educational focus

1. Practical life exercises
2. Sensory education
3. Mathematics
4. Cultural education
5. Language studies
- Through music, art, story telling, movement and drama
- Emphasis on sensory aspects of experiences
- Both verbal and nonverbal modes of learning

### Spaces organization/ characteristics

1. A world that reflects a miniature of the larger world
2. Physical components of a room and its environment is constructed in proportion to the child's small frame
3. Free to express themselves, to act spontaneously
4. Concept of the "Children's house"
5. Adjustable spaces
6. 1. Shaded classroom (Heitzinger)
7. Imagine the bldg as a city and its corridor as active street
8. Little repetitive organization
9. Lots of natural lighting, especially the corridors
10. Create ambiguous spaces that students can interpret and reinterpret through sit/lie/stand usage
11. "A child free to sit + lie as they like"
12. Be creative w/ Montessori toys in a larger scale
13. Open spaces for children to run around

### Examples

- Horizon Herzbach, Montessori School in Gaff
- Multidisciplinary Montessori school Stadtworke
- Bergley Montessori school, Phila Architecture
- Montessori school Tokyo, Japan Architecture

### Children music school

1. Encourages a child's creative + musical development
2. Focuses on process rather than performance
3. Time + space to practice and reflect
4. Aspire to a professional career in performance
5. 3 period lessons (introduction, practice/assimilation, independent expression)
6. Directed by teacher

1. Prepared lesson guidelines in a classroom environment
2. All children learn through practice + work
3. Teachers + materials with regards to a child's interest
4. Teacher corrects error
5. Song (singing)
6. Music Appreciation
7. Silent Reading
8. Listening
9. Instruments (varies)

1. Different activities in different areas of room
2. Physical components of the classrooms are not constructed in proportion to a child's small frame. One size suitable for all ages
3. A smaller environment within classrooms (teacher in charge)
4. Central spaces where children can meet + wait for lessons
5. Instruments + tables/chairs + stands are set up for practice and use in lessons
6. Lots of storage to store equipments for activities + instruments
7. Natural lighting
8. Repetitive organization within classrooms + play areas

- Boys School, Hamburg, Germany
- Maritime Conservatory of performing arts, Halifax
- Music School, Ireland



## Guidelines of a Montessori School vs. A Children's Music School

## **DESIGN PROCESS**

### **Learning Music through the Montessori Method and Architecture**

By examining the Montessori Method and the fundamental learning principles of a Children's Music school, a model for the Montessori school of music are established. The primary goal of this school is to encourage children's explorative and creative nature through their learning environment, and enhance their musical understanding through play and work. The school targets children ranging from the age of two to seventeen. This environment is a music learning experience for toddlers, while youths have the opportunity for individual practice.

### **Montessori Method: Philosophy and Methodology**

A Montessori school of music would combine the principles of the Montessori Method and the educational curriculum of music, which emphasizes various aspects of music. One important philosophy of the Montessori Method is to recognize and respect individual difference, the importance of exploration, creativity and appreciation. Also, the primary teaching attitude emphasizes the learning process, rather than the overall performance, of in this case music.

In the Montessori Music School, trays act both as educational devices and physical settings. The trays within a Montessori classroom have specific learning objectives, such as mathematics or reading skill exercises, which facilitate a child's needs and interests. Similarly, like the tray, every space has a specific learning objective or activity (such as singing and reading), base on the acoustic qualities (such as absorptive, reflective, and diffusing sound) and the configuration of the space. An individual child through observation and exploration can redefine the acoustic qualities of these spaces due to their material combinations and their interchangeable shape. This gives flexibility to these spaces, such that they can either be used for group or individual settings.

## **Music + Architectural Details**

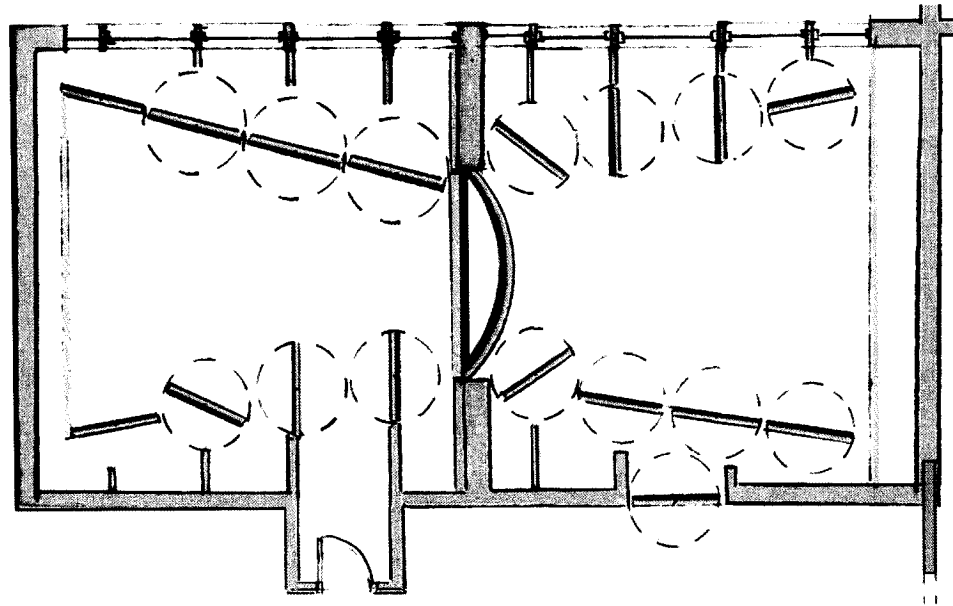
The focus of this music school is to create spaces that are conducive to music learning. Architectural elements such as material, structure and volume are used in various combinations to create spaces and details which engage learning. The following areas and details are designed using the Montessori Method to organize and structure the various sequences and spaces themselves. These are combined with the learning objectives of the various aspects of music.

A series of interchangeable classroom, group/ individual hubs, two break-out spaces and the corridor are spaces that make up the school's learning environment.

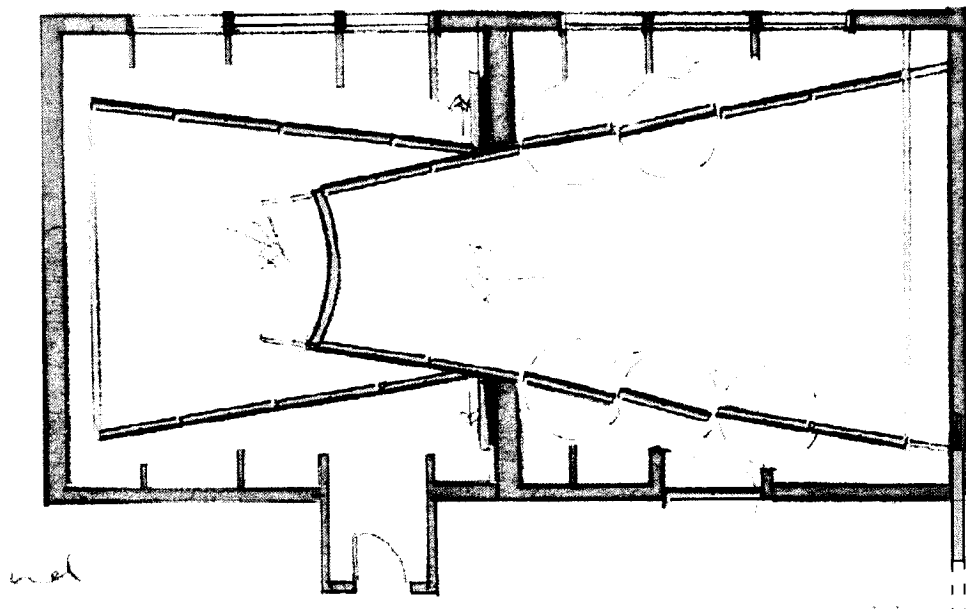
### ***The interchangeable classroom***

These classrooms are designed primarily for singing, playing instruments or other music workshops. The classroom composition varies to allow large or small group settings, depending on the activity and what is needed. The wall elements are composed of a central sliding panel and a series of pivot panels, which are lined with wood on one side and felt on the other. Central sliding partition walls can enlarge and re-configure the classroom composition. The pivot panels can be flip open to allow natural lighting in the classroom or closed for performance or acoustical variation (see illustration on page 14). The felt panels act as an acoustic absorber and the wood panels provide acoustic qualities such as reflection and reverberation, creating an interactive space for children. (see illustrations on page 14.)

The detail plan below illustrates how the sound quality in this room is ideal for singing, accommodating performances of different sizes. The central wall is made of two components, a flat wall which reflects sound in a linear path within the room and a curve wall which diffuses sound throughout the room in order to distribute constant levels of sound quality. This allows variation of sound quality in relations to performance requirements.



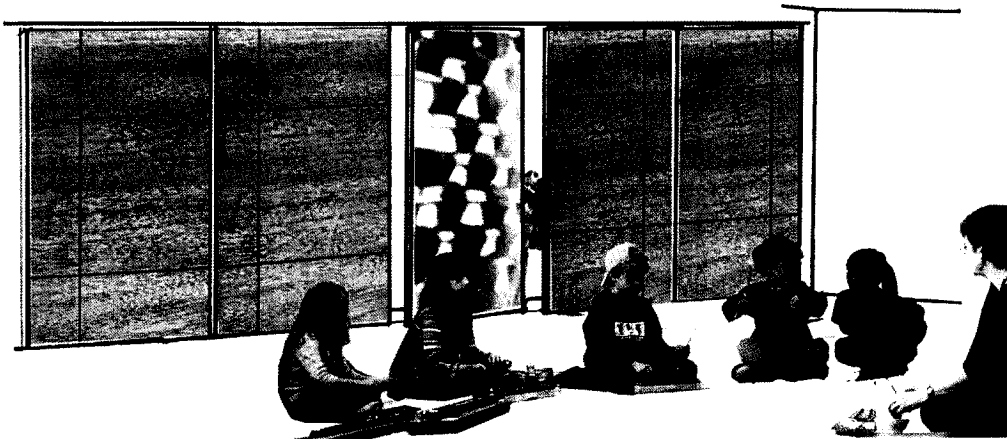
Colors on the plan indicate different materials



Central sliding partition wall enlarge the classrooms



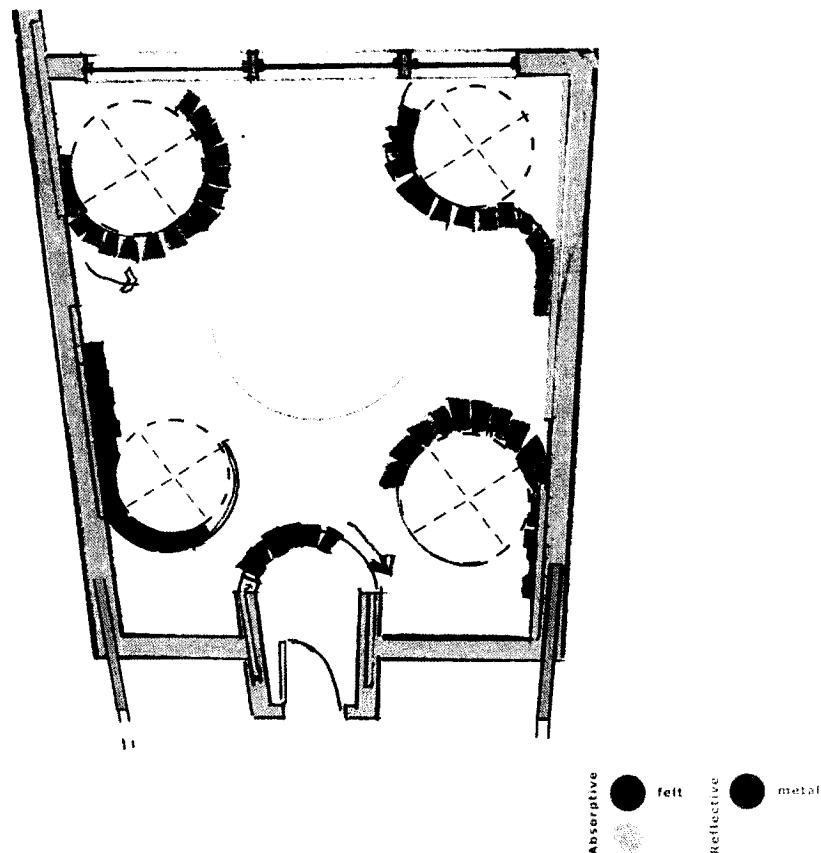
Wood and Felt pivot panels in open configuration.



Panels are in closed configuration for group activity.

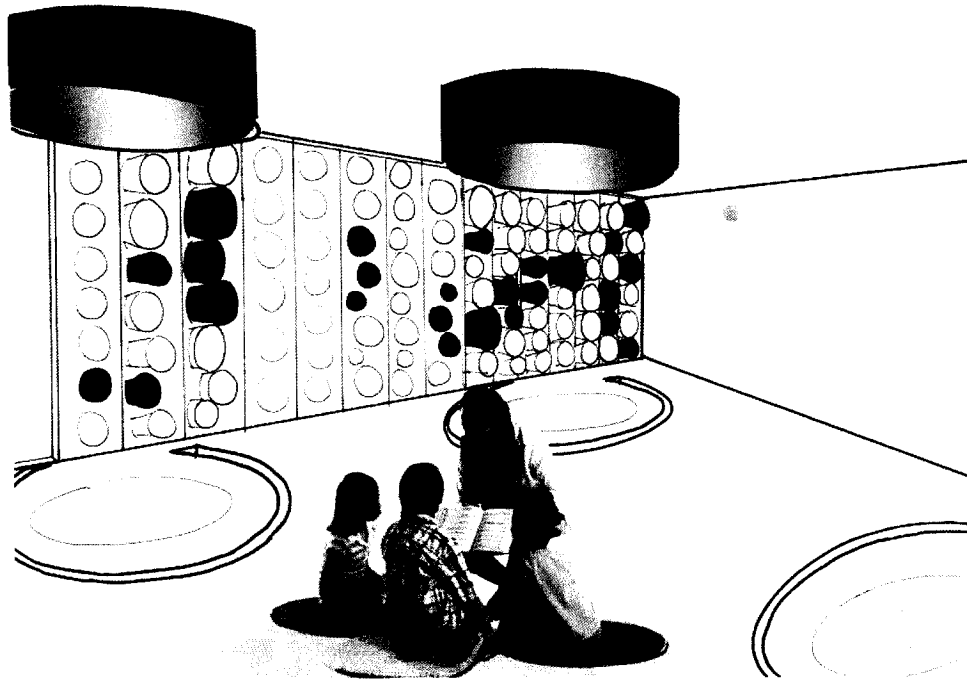
### ***Group/ Individual Hubs***

The primary learning objective for this room is reading. A quiet atmosphere for children to read individually or in a group is important. In order to facilitate individual or group activities within one space, moveable *felt rolls* are inserted in slide-able partitions to create either individually enclosed spaces or a large hub for reading groups. Once the moveable *felt rolls* are enclosed for individual reading, it will provide an acoustic barrier. Round skylight are positioned above each individual reading space to bring natural light into these areas. The moveable *felt rolls* of the slide-able partitions are red and white, and soft to touch. These *felt rolls* not only attract the children's attention, but also allow flexibility in how they interact and use the *felt rolls*, for example to sit, lean on, or to hug. (see illustrations on page 17.)

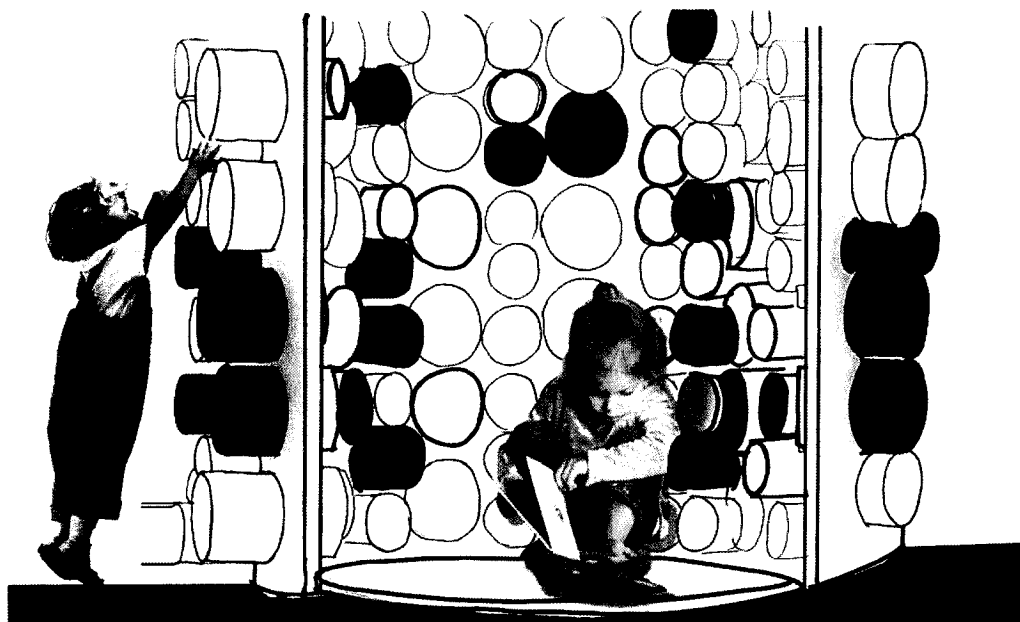


Moving and sliding partitions allows the flexibility of room layouts.





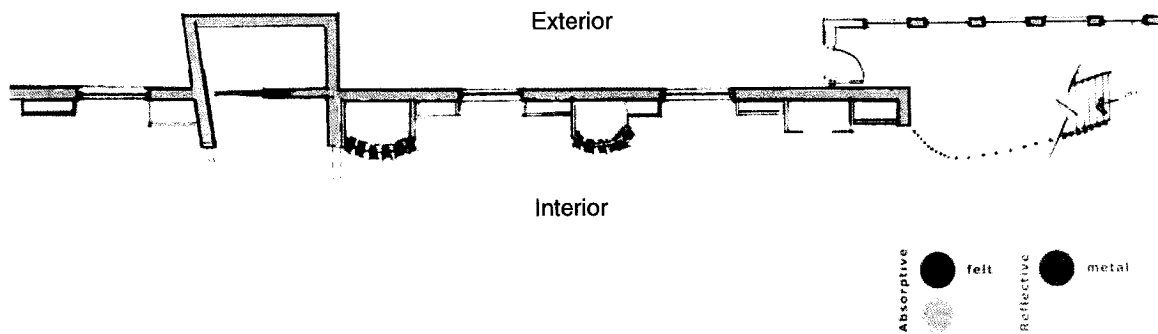
Open spaces allow flexibility for group activities.



The enclosed felt tube hub creates an intimate space for the child. The felt wall is interactive as well as sound barrier.

## Corridor

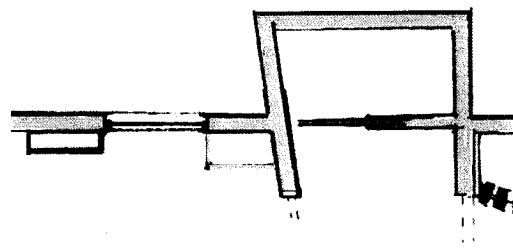
The corridor of the Montessori music school is interpreted as an active street. It serves as both the primary circulation spine for children's active movement between classes or simply as an explorative learning space. Within the corridor, variations of rhythms are carried out along the spine, using various architectural elements. For example, the rapid rhythm presented in the *xylophone screen* by the staircase, the steady rhythm of the glazing mullions, or the irregular pattern of 'furniture' created using benches, coat storage and reading hubs, which compile a continuously fluctuating series of rhythms.



Ambiguous spaces along the corridor are provided for children to freely interpret the activity within.



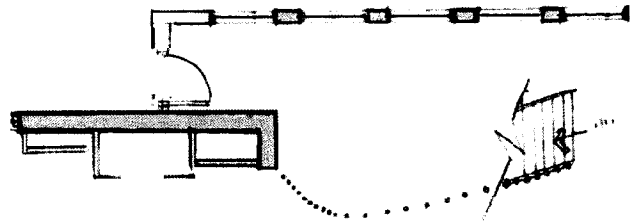
A child waits for classes



A wooded seat is located beside the window along the corridor

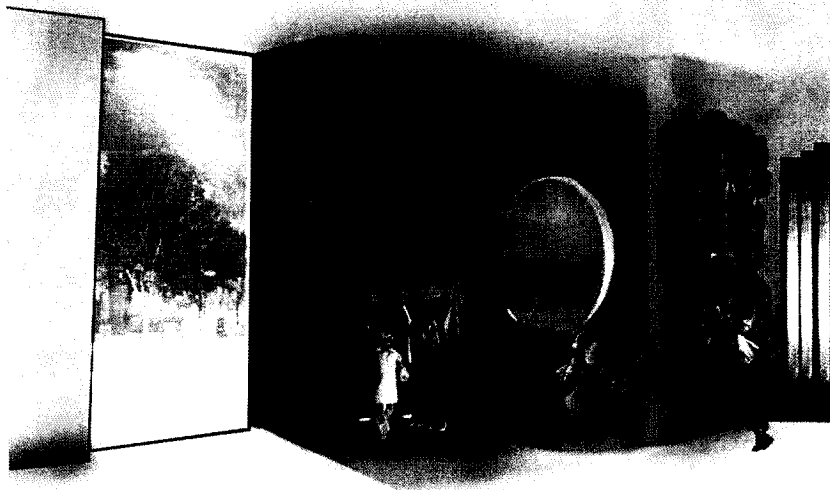


The xylophone stairway becomes a learning experience for children

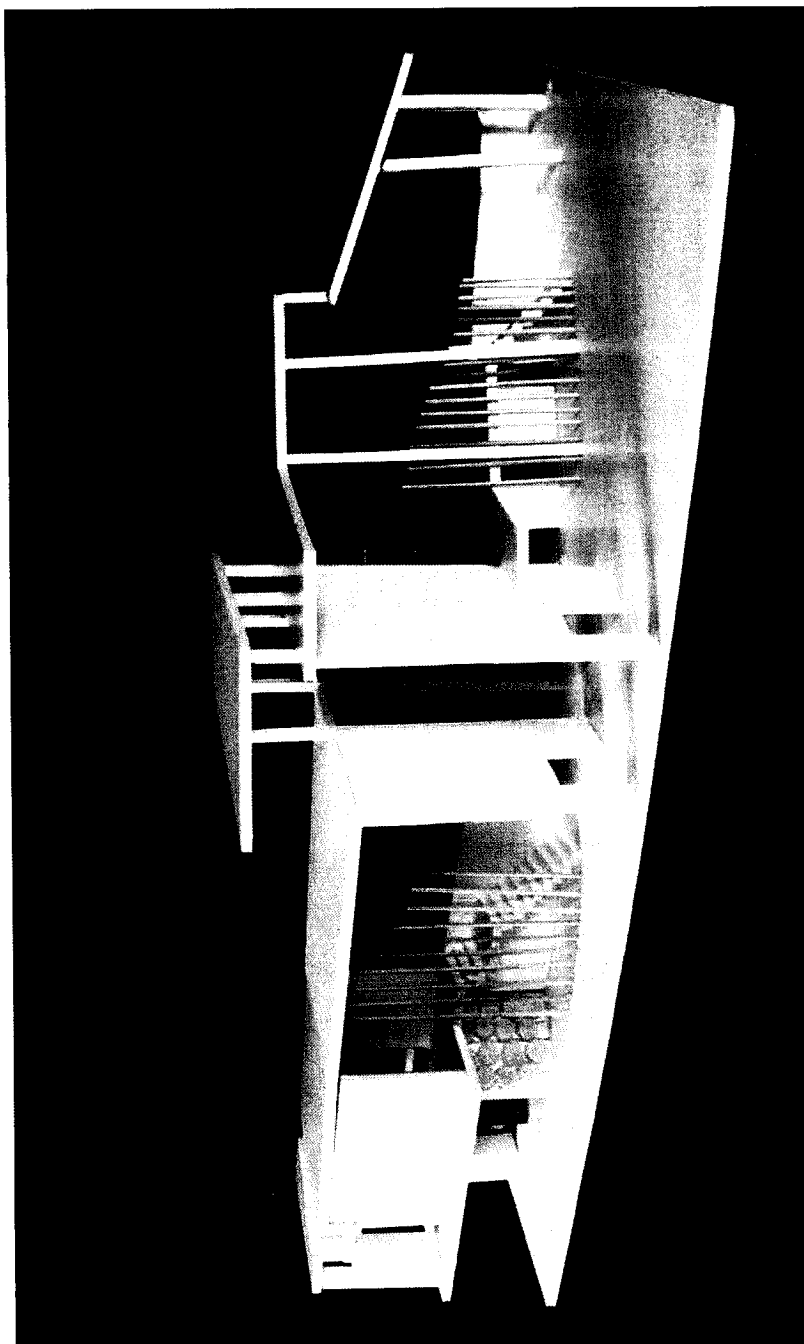


Variations of rhythms through the stairway screen, glazing, and learning spaces.

The '*xylophone stairway*' is made of a series of metal or wood rods that vary in length and diameter. Children can learn and experience different sound qualities of materials through interaction and play i.e. striking with their hands or whatever they are holding. The niches along the corridor consist of built-in elements such as benches to sit between classes, coat storage for children to hang their coats and store their belongings and reading hubs for individual privacy or reading. The façade along the corridor creates a steady continuous rhythm, which links the *stairway*, and the *built-in elements*, moving the eye along its length.



Coat storage and felt roll hub along the corridor .



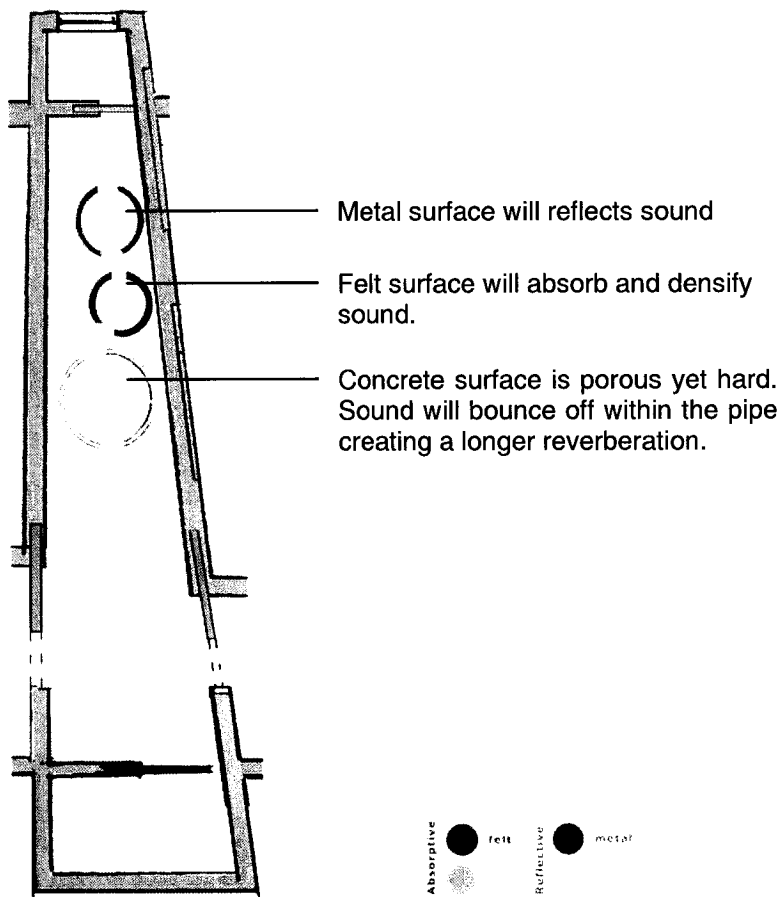
Conceptual model of the main circulation spine. (Original scale of model 1:50)

### **Breakout spaces**

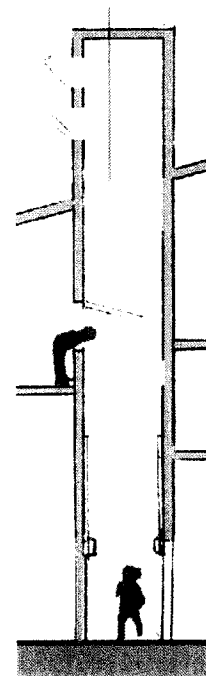
Break-out spaces are multi-functional. A 'break-out' space serves as an acoustic barrier between classrooms and also is designed to encourage children's exploration with different acoustic qualities created through the materiality and volume of the space. These spaces provide room for children to run, fall over, climb, and touch. It is important that this is a free zone where children can play or do what they desire.

#### **1. Harmonic Pipe Chamber (Pitch + Timbre + Intensity through Material & Volume)**

The *harmonic pipe-chamber* is made up of three large pipe cylinders, located in a linear sequence for children to experience three different spatial and acoustic qualities. Each pipe's is of a varying diameter and interior material, such as metal, felt, and concrete (see illustration below) therefore, the quality of sound traveling in each pipe-chamber produces a range of pitches and intensity levels. For instance, a child's voice in a metal chamber creates longer reverberations because of the metal's reflective surface.



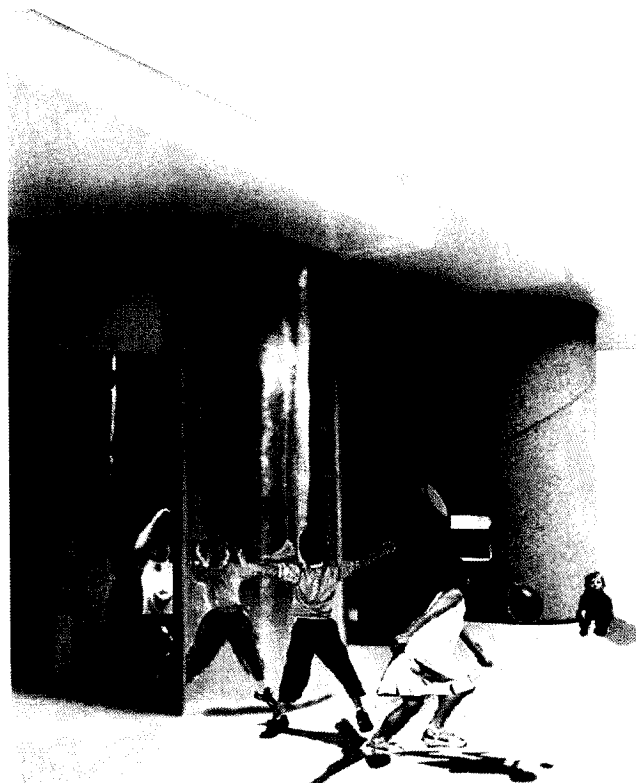
Plan of the pipe chamber



Section through the metal chamber.



View from looking upward from the metal pipe chamber.

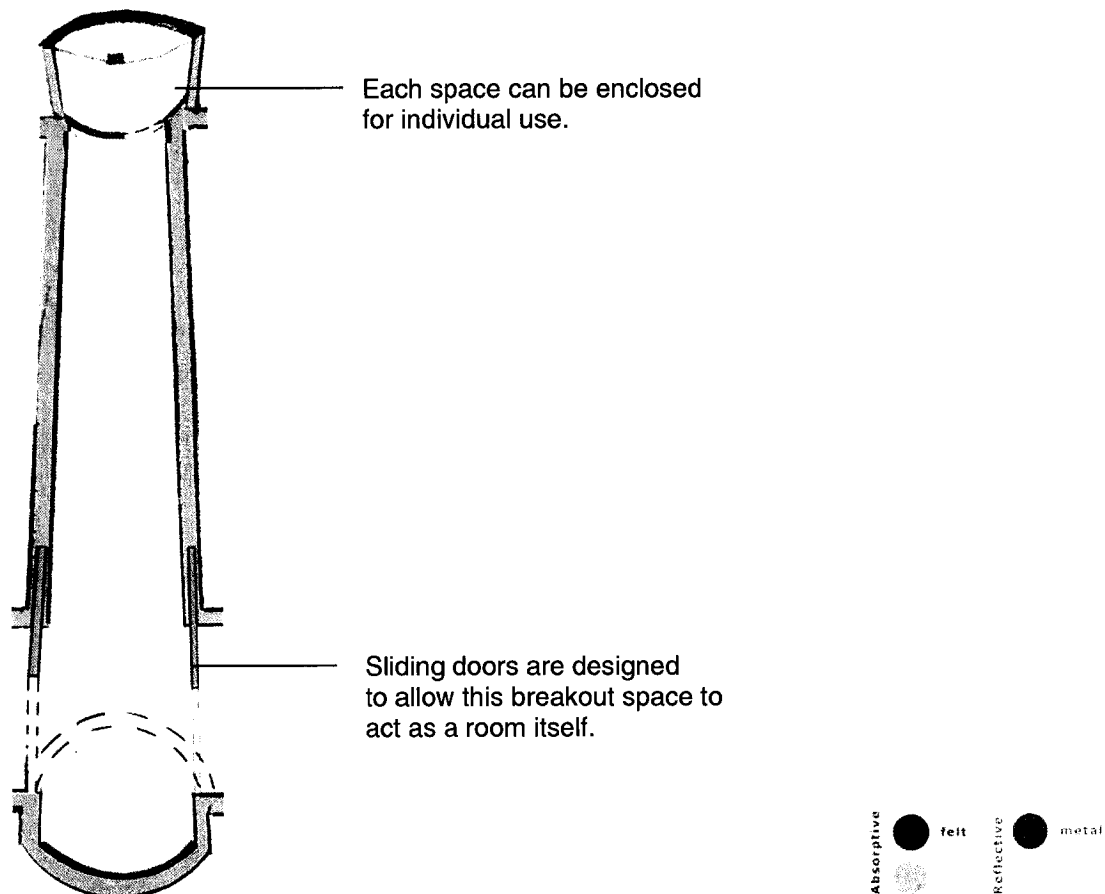


View from the ground level of the pipe chambers.

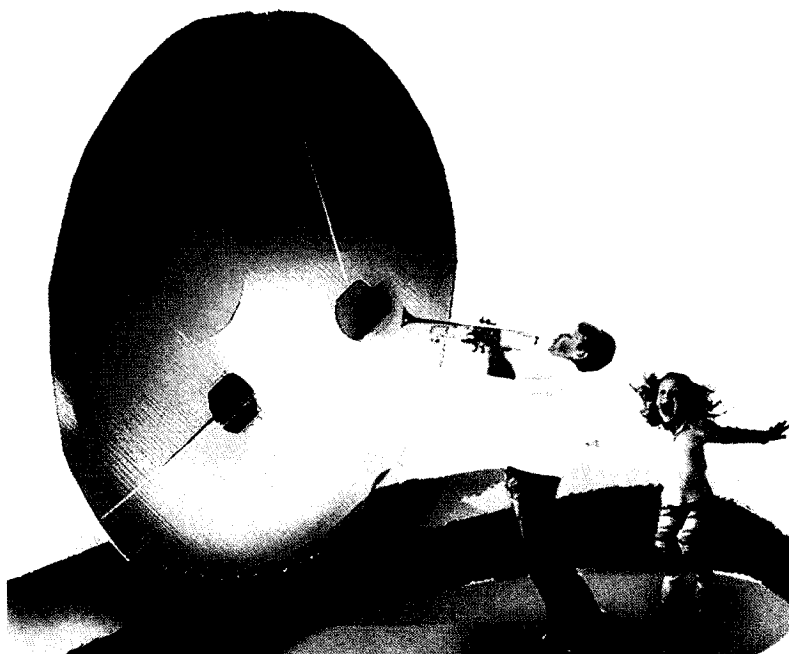
## 2. Parabolic Reflectors (Pitch + Timbre + Intensity through Material & Volume)

A second 'break-out' space is designed with two *parabolic reflectors* at each end of the corridor. A speaker box is connected to a parabolic shaped space into which a child can speak or play an instrument. From this source, the sound waves reflect off one parabolic curve, traveling through the air to another parabolic curve, the receiver, at the other end of the break out space (see illustration on page 24). Here, the parabolic curve acts to focus the source sound at the receiving end.

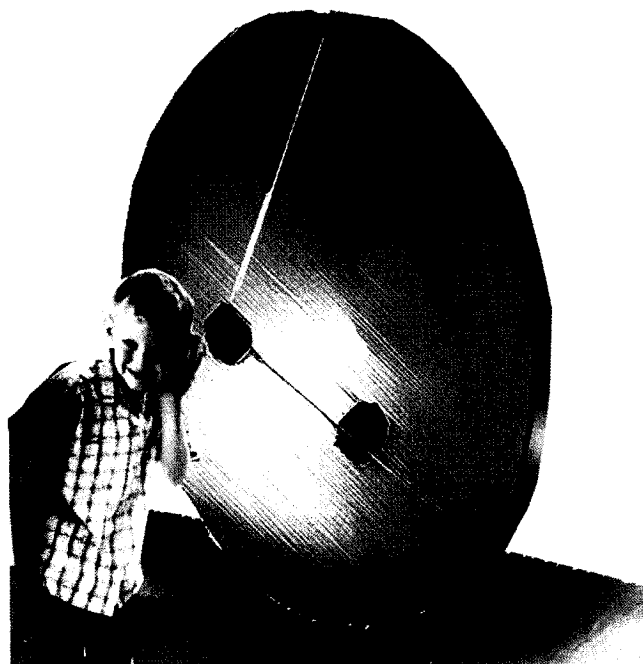
Children can interact across these two spaces, freely exploring and experiencing the sound reflection off of each parabolic wall. A child can be playing music while the other is reading and listening to it on the other end.



Plan of the parabolic reflector



A child plays music aiming towards the reflector.



A child listens to music coming out from the reflector.



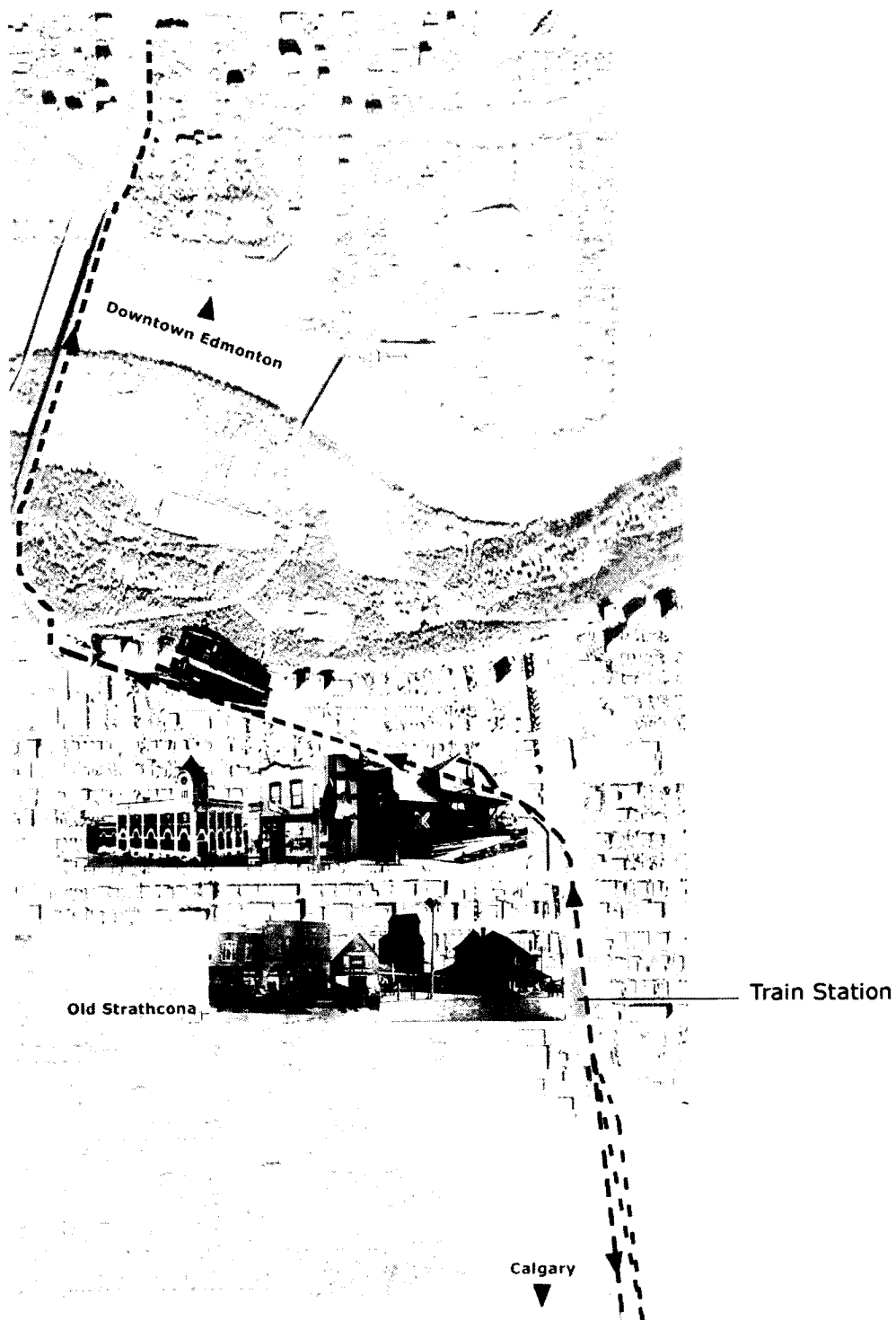
## **SITE**

The chosen site of this thesis provides a testing ground for the design. Through an examination of existing programs in the neighborhood and the site, it was found that there was no music facility for children in the area and the site is vacant. Therefore, it was decided to introduce additional programs and activities for children, which would enhance the overall programs in the community, providing public venues for social activities involving music for all age groups.

The proposed site is located at the intersection of Whyte Avenue and Gateway Blvd: this is one of the primary intersections in Edmonton. Gateway Blvd is a one- way street and an important route to access the downtown area. Whyte Avenue has a strong emphasis on various cultural programs, for example, there are over eight live theatres and music venues on this avenue. The site was formerly a cargo and passenger thoroughfare between downtown Edmonton and Calgary. The train track on the site is no longer used, although beyond the site boundaries, portions of the train tracks are still in use. To the Northwest of the site, a commuter train is used for tourists and passengers to connect to the downtown core of Edmonton. Presently, the sites primary use is a parking lot, which is used mainly Saturday mornings for the Farmers market. These become important consideration for the design of site organization and programmatic placement.

Most of the music venues in the neighborhood are primarily for adults and organized high school groups. These venues are not publicly visible or accessible. This thesis tries to weave the existing programs and pedestrian circulation through the site and its surroundings. It does this through creating publicly accessible spaces open to various user groups and ages, with exterior public venues and infrastructure.

The site currently lacks a music facility despite other building programs such as public schools, a daycare, a dance school, and a recreational field. The design of Montessori Music School for children not only provides interior spaces for children to learn music, but also invites the general public to experience it as well. Creating outdoor facilities such as sound playgrounds and performance spaces, which provides an opportunity for the children and the general public to explore music.

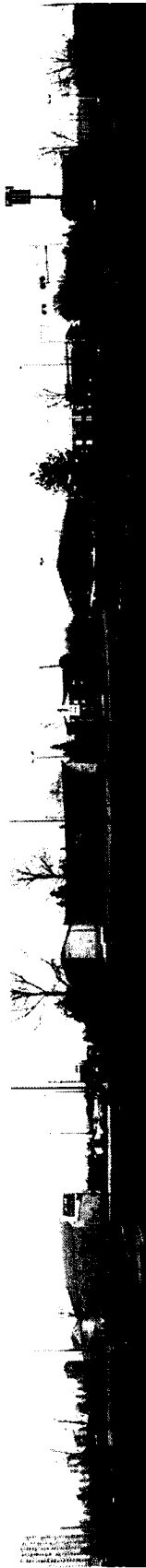


This map highlights the historic train line that transport cargo and passenger from Calgary to Edmonton during the 1880s.





View of train tracks



Site is located on the east side of Gateway Blvd where a parking lot exists.



West side of Gateway Blvd (Across from the Parking lot)

## Organization of building and site

The organization of various architectural elements structures the basis of the design. The building and the site are composed through *vertical and horizontal walls, ground and roof planes, and structure and circulation paths* that define the edges and orchestrate movement through the site.

The building and the site are organized and defined by two main gestural horizontal walls, one parallel to Gateway Blvd and the other following the train track line. These horizontal walls work in conjunction to a series of six vertical walls, which define the design into five major areas of the design. The *two exterior spaces* at each end frame the *performing* and *learning* components, as well as the *entryway* of the building (see illustration on page 32). Each of these areas demonstrates various rhythms and facilitates different activities or programs. Therefore, the horizontal and vertical walls define space similar to that of a musical bar, and the division of staff lines in a musical phrase. The interior movement within these five areas acts as the melody flowing through the design composition.

Through the combination of vertical walls, the *exterior* program expresses a playful and lively quality in a non-structural pattern of rhythm. These areas facilitate a sound playground at one end and an outdoor performance space at the other. The sound sculptures in the playground are located in a scattered and non-structural arrangement for children to actively run around and explore sound experiences. The outdoor performance space, on the other hand, reflects a structural rhythm that invites the public into this area, to view performances. (see illustrations on page 32).

The *entryway* is defined by two vertical walls, which intersect the curve of the train line. The existing train track becomes a pedestrian pathway for the public leading them from Whyte avenue through the site. These vertical walls function as ‘forte’ beats, which in musical terminology means a loud and heavy beat, dividing the building into two areas – *learning and performing*. (see illustrations on page 32).

The *Learning area* is composed of a variation of rhythms, both moving and static. Vertical walls position each individual classroom and the two break-out spaces between them, creating a consistently, orderly pattern along the corridor. The interior configurations demonstrate an allegro rhythm through shifting the interior panels as well as the activities and users. The horizontal walls along the corridor are layered composing a fluctuating repetition of rhythm, experienced when traveled through. The two breakout spaces are defined through a combination of vertical walls (angled and perpendicular), providing moments of visual and spatial pause along the corridor (see illustrations on page 32).

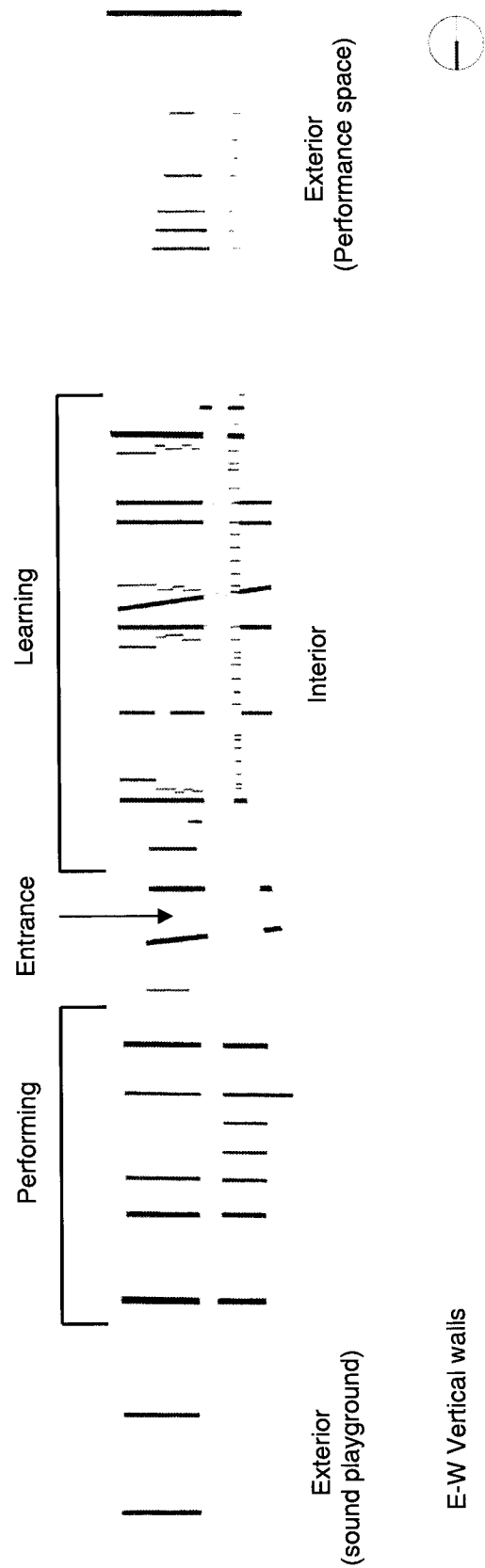
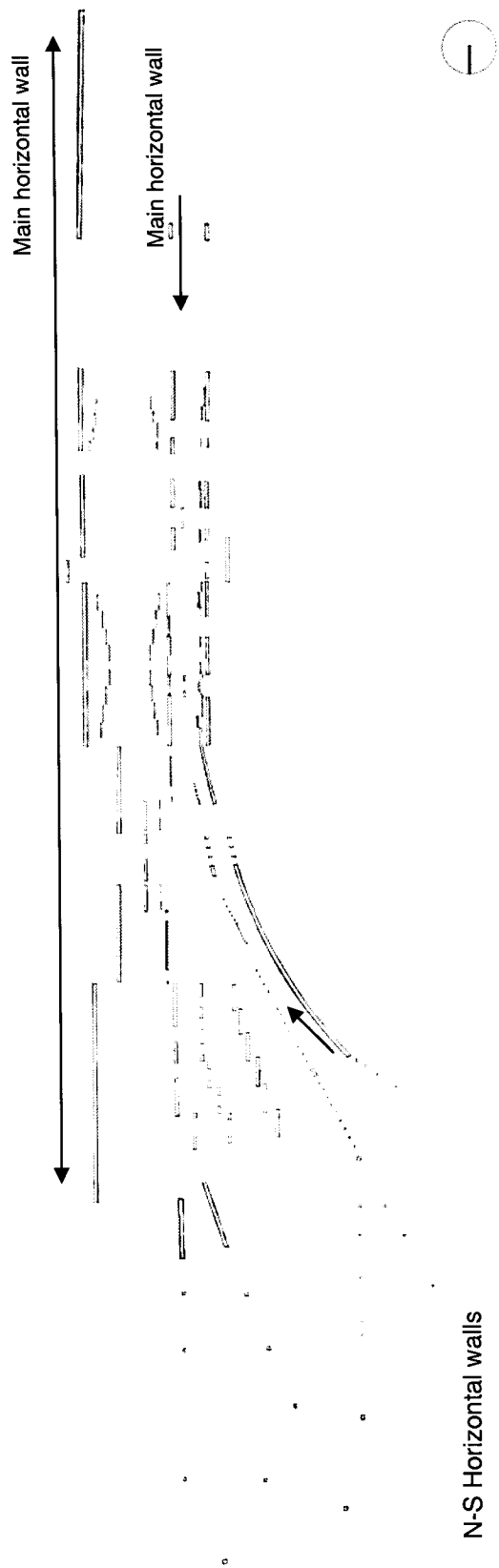
The *performing area* is created through a flowing rhythm in connection with an ascending movement. The curved horizontal wall from the entryway leads the users into the building. This curved wall extends into the lobby and reception area, where an additional layer, the xylophone screen ascends vertically with the stairway, leading to the concert room. These layers move along the direction of the train line, shifting direction on the second level and turning back to the curved line of the concert room and the track. This continuous movement in the performing area is structured freely, in comparison to the rigid pattern along the corridor in the learning area. The practice area below this main space, illustrates evenly spaced vertical walls, which create an orderly rhythm along the corridor while the horizontal stepping walls ascend horizontally, similar to the notation on a musical scale. Therefore, the spaces are defined mainly through an intersection of horizontal and vertical walls arranged in curvilinear gesture.

The arrangement of vertical and horizontal walls defines the building edges while the *roof and ground planes*, connects the building to the site. The roof edge extends beyond the building to the exterior performance space (see the blue area in illustration on page 33) and so to, the ground planes, linking the pedestrian walkways, existing train track, the building and the interior spaces. These both break up the building composition and link building, site, and interior and exterior public performance spaces. Thus, extending the interior space and linking it to the exterior, creating a lively design composition. (see illustration on page 33).

Through this investigation, relationships of wall and plane establish the main circulation of the building. The primary circulation runs parallel to Gateway blvd but branches off at the entryway to follow the gesture of the train track. This path is expanded at several moments by the intersection of the break-out spaces and the entryway (see illustration on page 33).

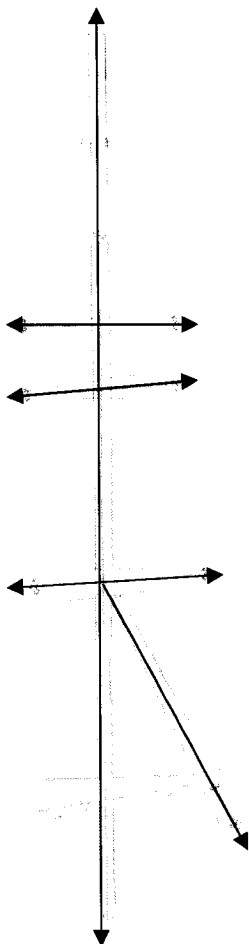
The column structure adds another layer along the circulation, which not only supports the building but also organizes and creates visual linkages, which directs the user through the building. The repetitive rhythm of the column composition links both the interior spaces of learning and performing and the interior spaces to the exterior as well. (see illustration on page 33).

Therefore, through this careful orchestration of walls, planar elements, structure and circulation paths, a musical landscape of spaces is composed, which links the various aspects of the program and the site.

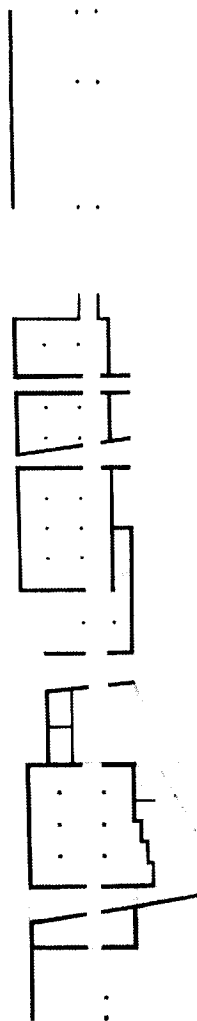




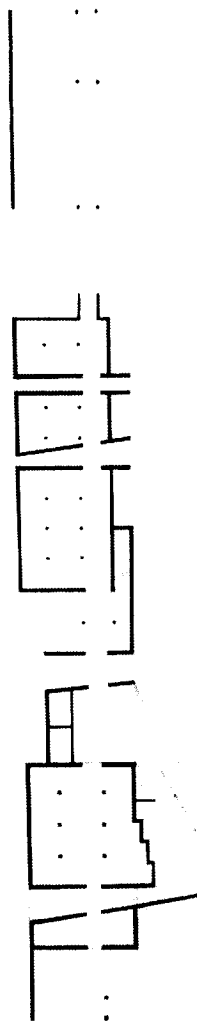
Ground and Roof planes



Main circulation



Structures



## DESIGN

There are two main components of the design: The Montessori Music School composed of learning and performance spaces and the outdoor areas with an exterior performance space & sound playground.

### ***Montessori School of Music***

The Montessori Music School focuses on providing a learning environment where children can understand and appreciate music. It is important to give children freedom to experience, explore and appreciate music and what music is as a spatial event.

The Montessori Music School is made up of two main areas: performing and learning. Each is developed with different acoustic and teaching objectives. The public, parents and their children can access the building during the day, for classes and events. While the performing sector, is accessible mainly in the evenings and weekends to the public generally.

The *learning sector* of the school consists of a series of classrooms, specifically designed for reading, playing instruments, and singing. These classrooms are structured along a



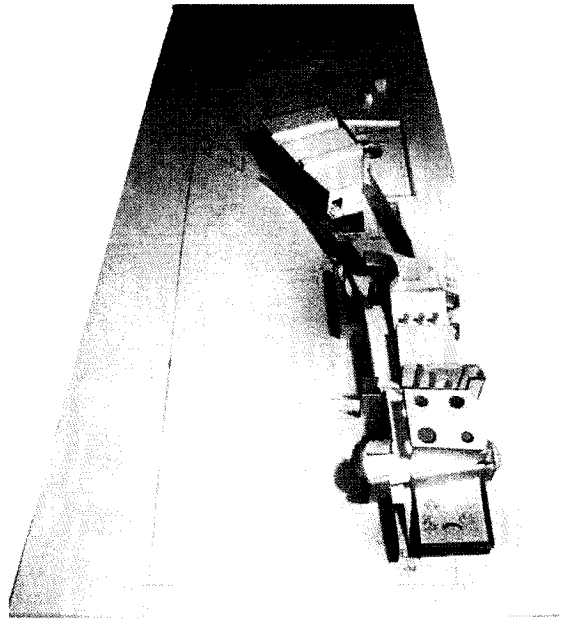
View of front façade approaching from Gateway blvd. The school is in alignment with the neighboring buildings.

corridor with break out spaces in between. The classroom wall on the corridor and the break out spaces act as the acoustic barriers for the classroom. Each classroom has windows opening east towards the quieter residential zone and the alley allowing light and orientation for the children.

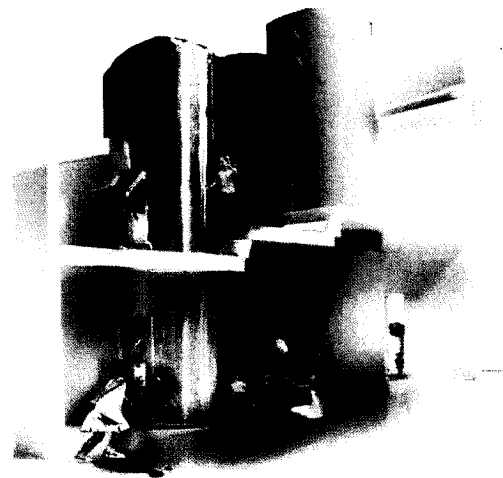
The corridor, which connects the various classroom spaces, serves as the primary circulation spine. Conceptually, discrete acoustical and musical aspects are used to make up the corridor and the spatial composition. It consists of spaces such as the main stairs (the xylophone stairs), coat storage, reading hubs and break-out spaces.

The corridor consists of three integrated and mainly horizontal layers, -- xylophone screen by the staircase, the 'furniture' (i.e. benches, coat storage and reading hubs), and the façade mullions. These layers are broken by three vertical bars, the two break-out spaces and the entrance. These layers together create a spatial composition similar to a music score.

The break-out spaces act both as acoustical and experiential pause within corridor sequences between classrooms. The break-out spaces each

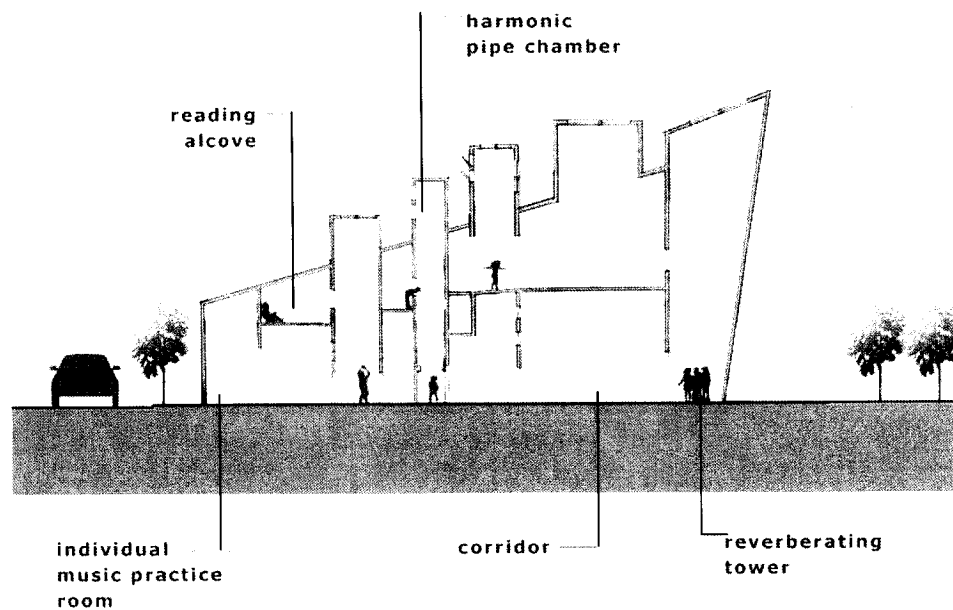


View of the building and the surroundings from above.



View of the break-out space

has a different acoustic and spatial quality. For example, the harmonic pipe-chambers provide a continuous two-storey space, which users can interact with from both levels. These spaces create opportunities for children to interact with the acoustical and spatial effects of the material and volume.



**cross section B**

The *performance sector* of the school consists of a concert room, a set of small to mid-size practice rooms, an administrative area, an outdoor terrace and a café.

The Concert room seats approximately 100 people and acts as a multipurpose room for gatherings and performances. This room consists of pivoting panels along a curve wall, which provides

different acoustic qualities and creates rhythmic patterns of shadow and light across the room. The opposite side of the room is lined with panels that can be open to a roof top sculpture garden or can be enclosed for performances.

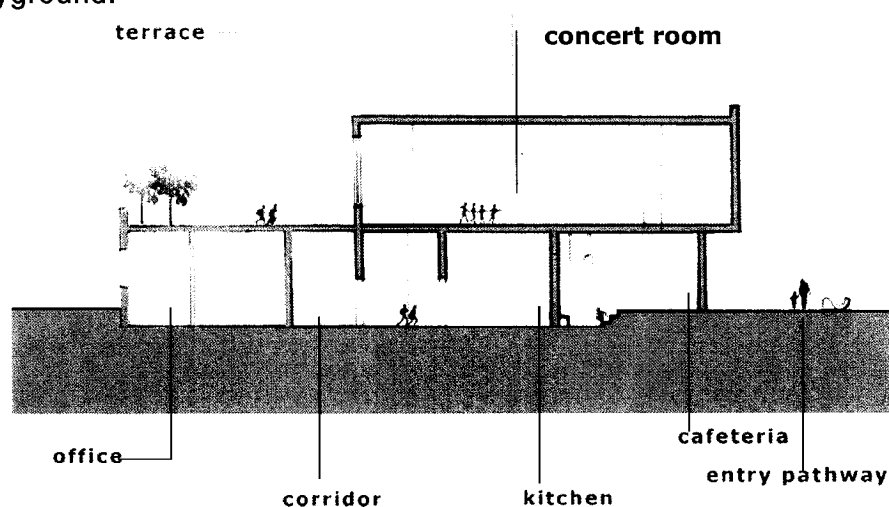
The practice rooms provide individuals, small groups of performers, or older students' a place to jam.

The administrative zone bridges the two main areas of the building (learning & performance) and is located close to the entrance and lobby area. This area can be used by students, parents and staff throughout the day and the evening.

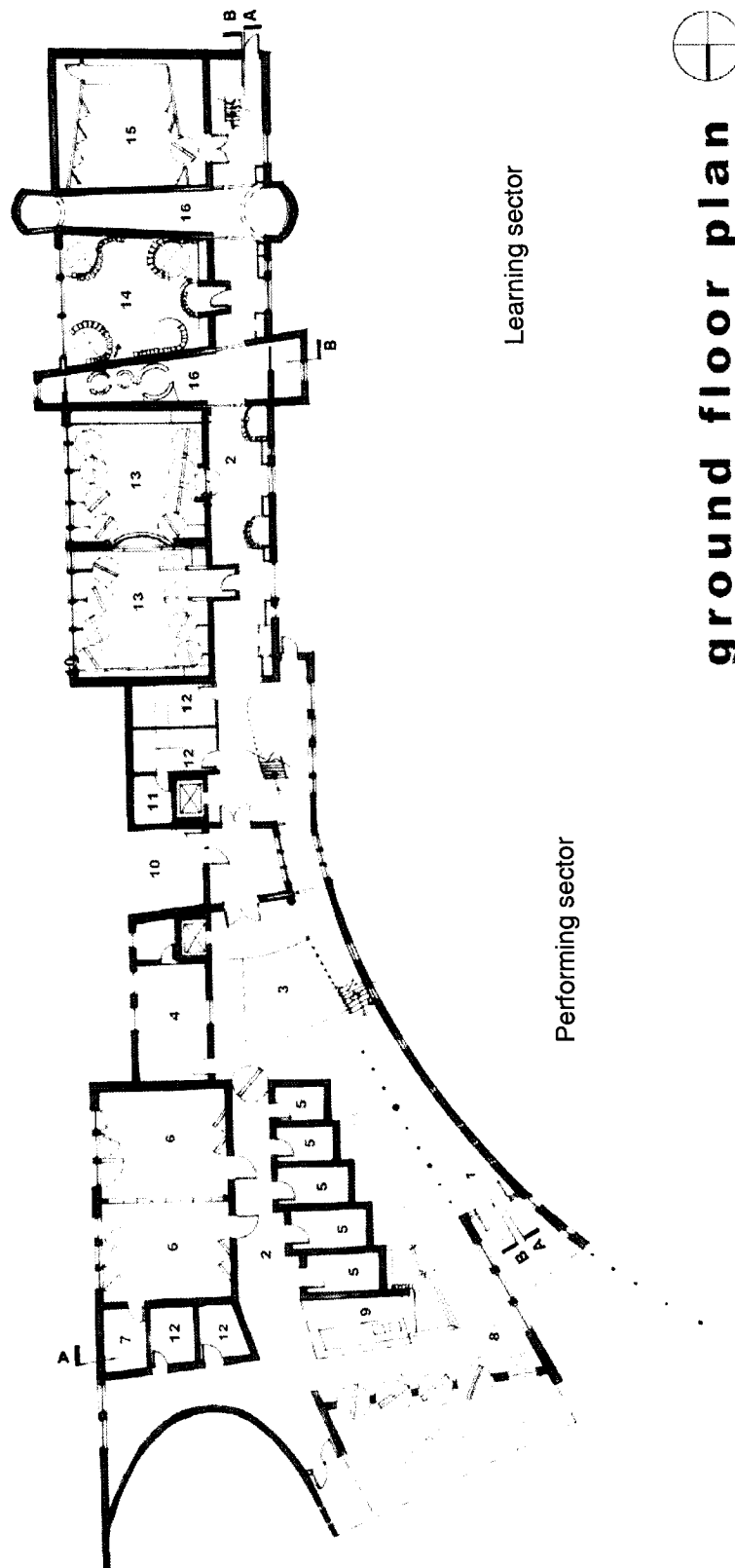
A café on the ground floor caters to students and guests with refreshments and snacks. The café also open up to an outdoor terrace facing the sound playground.



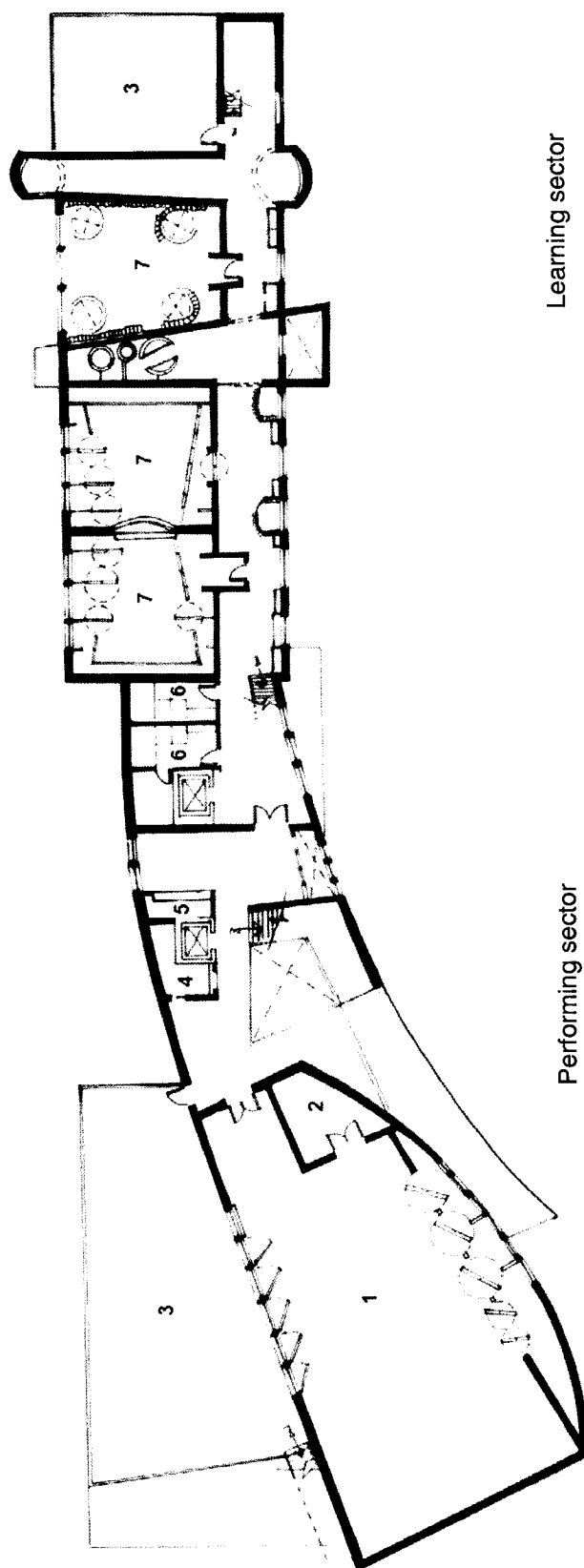
View looking from entry pathway and the concert room above.



**cross section A**



## ground floor plan



Learning sector

Performing sector

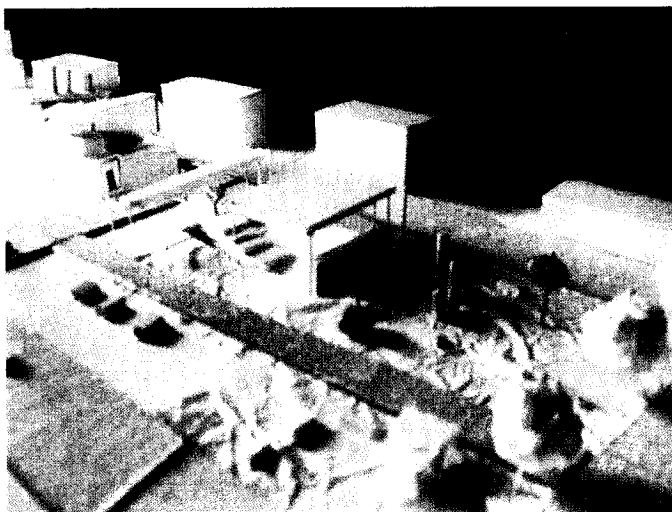


## second floor plan

1. Concert room
2. Storage
3. Terrace
4. Coat check
5. Mini bar
6. Washrooms
7. Classrooms

### *Outdoor Performance Space*

An outdoor performance space accommodates music concerts by the school or by the general public. These outdoor spaces encourage teachers from the school to bring their classes and activities outside, thus, creating a public performance and a closer relationship between the school and the public. This performances space is slightly sunken below -grade but is open to the surrounding. The pedestrian walkway which links the main thoroughfare, Whyte Avenue would invite the pedestrian to become part of the audiences for the performance. Therefore, the outdoor space not only improves the functionality and public amenity of this neighborhood but also invites the public in to experiences music.



Outdoor performance area located just off Whyte Avenue.



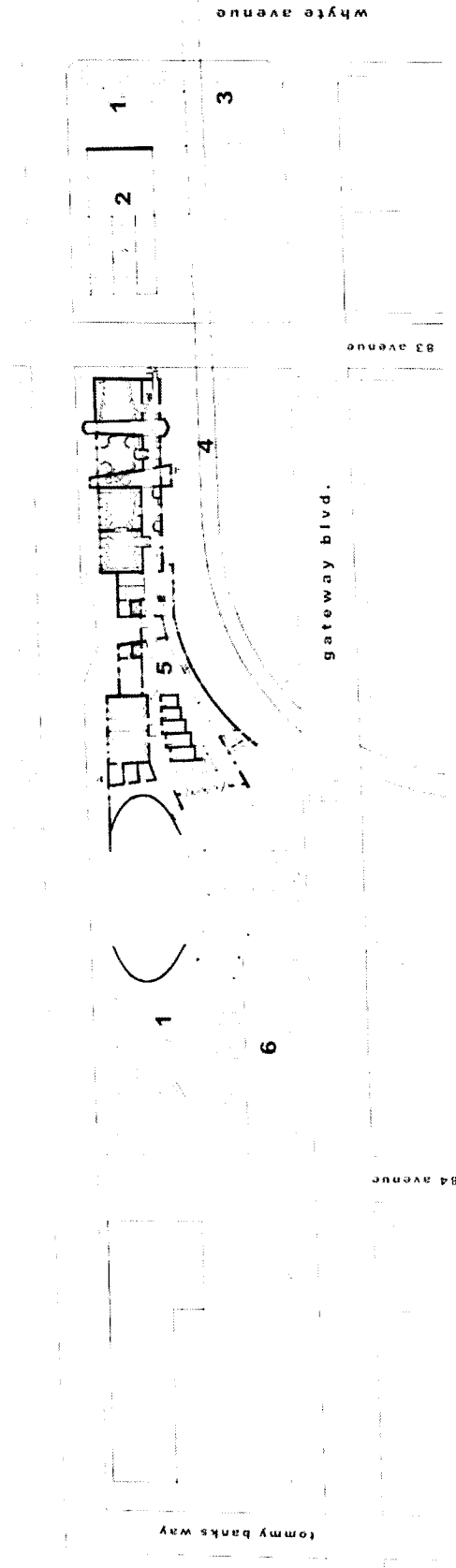
### *Sound playground*

The sound playgrounds, located at both ends of the school will provide an excellent exterior learning experience. The playground is open to the public and used by the children from the school to explore the acoustical phenomena. The sound playground consists of reverberation horns, arranged in a melodic curve outside of the cafe and along the entry pathway. A large parabolic reflector wall at the Northeast corner of the building faces outward to the sound playground connecting the school and the park. The reflecting walls create an opportunity for the children and the public to experience the reflection of sound. The various sound sculptures and exterior building elements also used to move the pedestrian through the entire site.



Outdoor reverberate horn are designed along the park setting. Each is linked by color, and the children speak into, listen and play on the sculptures.

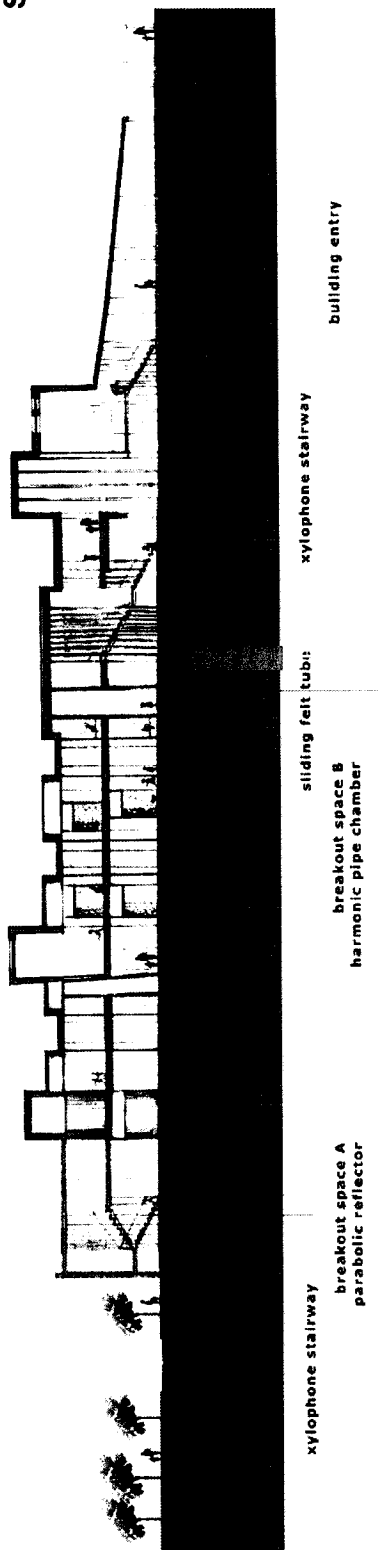
## Site Plan



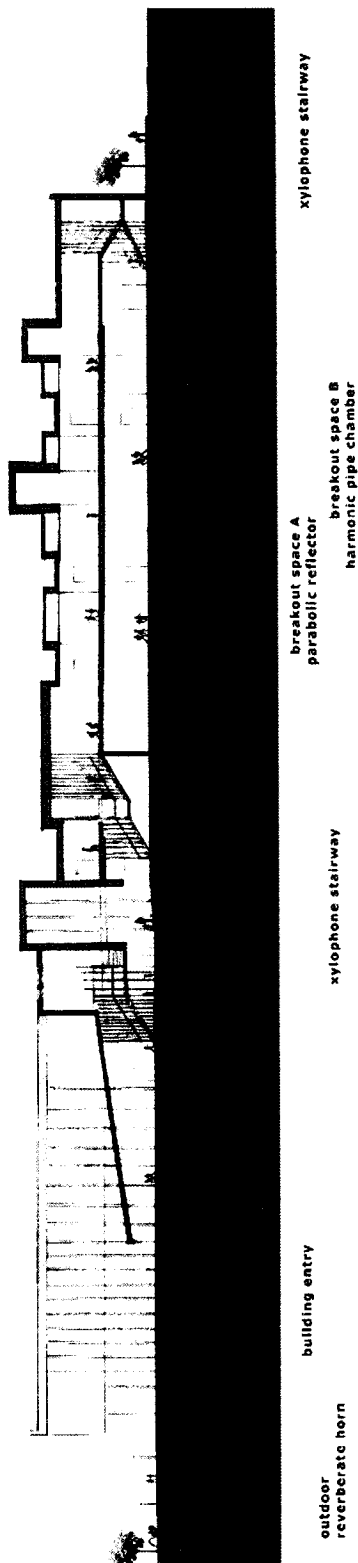
## site plan

1. Sound playground
2. Outdoor Performance space
3. Ice cream parlor
4. Pedestrian walkway on track
5. Montessori School of Music
6. Parking lot

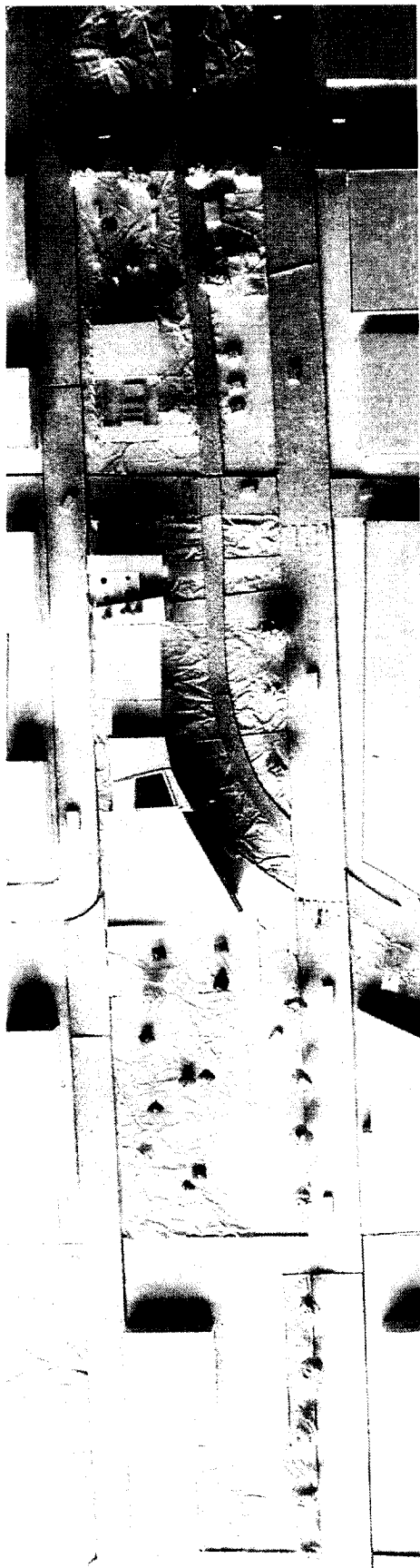
# Section



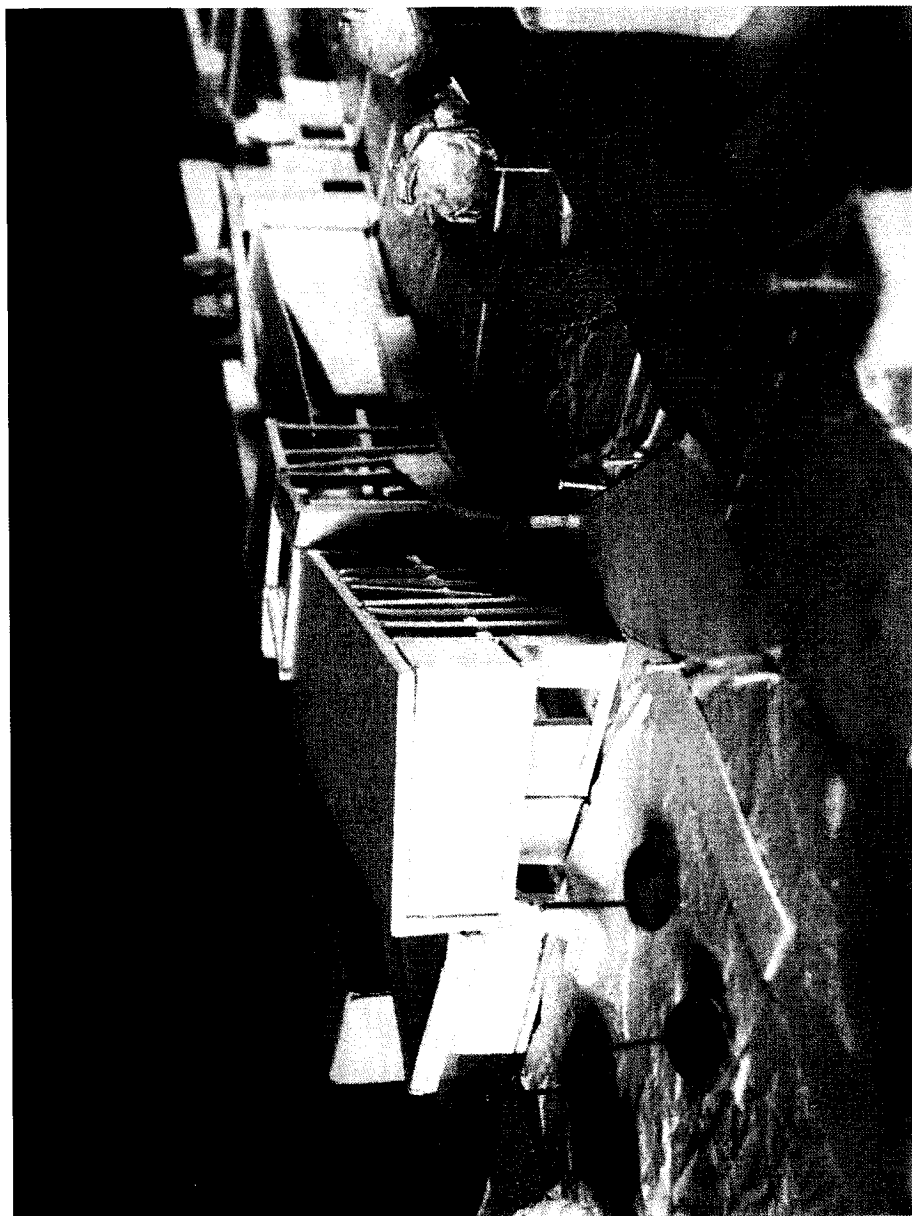
## longitudinal section A



## longitudinal section B



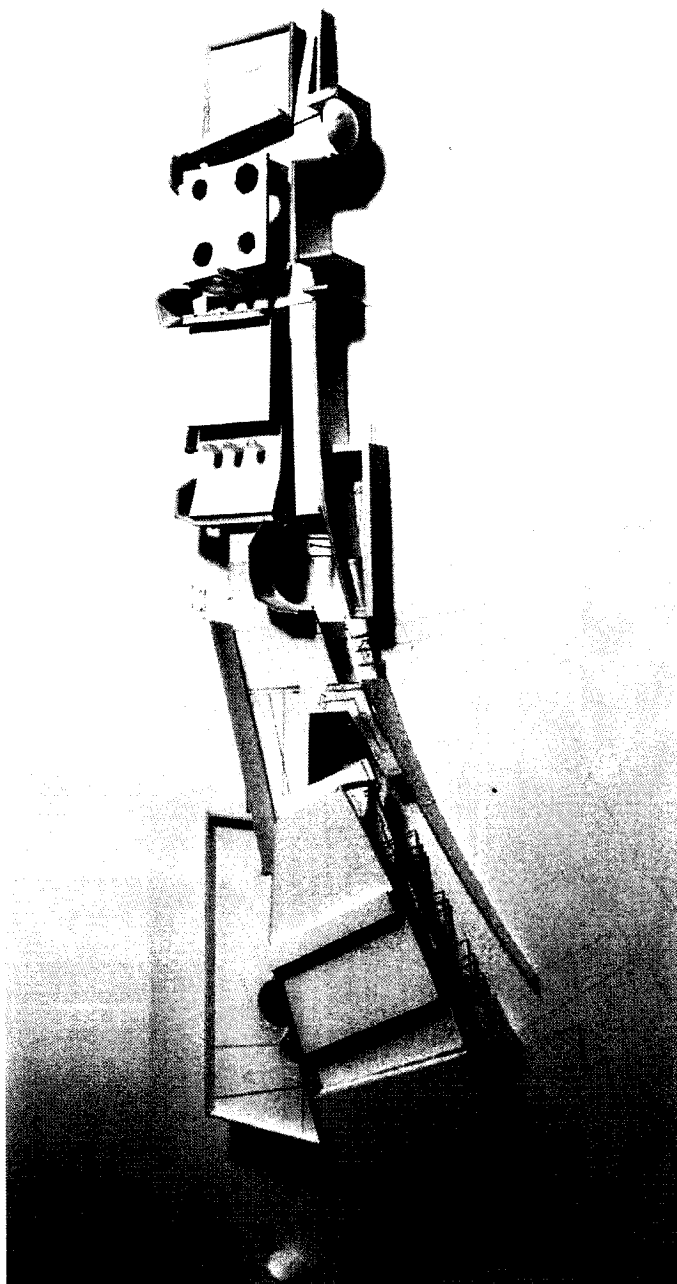
Final model with suggestive park elements  
(Original scale at 1:500)



View looking towards the Main entrance



Rear view of the building where the drop off zone for children is located



Working model (Original model at 1:200)

## **SUMMARY**

Music has an important role in early childhood development as it promotes their physical, intellectual, social and emotional growth. This thesis proposes the design of a Montessori Music School and its site that specifically engages both children and the public to learn and appreciate music. The design and the school's philosophy stress the importance of a child's explorative and inventive nature, by creating multiple opportunities for discovery and learning.

As a result, this thesis investigates how architecture, as a tool, can educate both children and the public about acoustical properties and music. A child discovers the spatial and acoustic qualities of a space through sensory experience and interaction with other children. Every space has a specific learning objective, created through various combinations of architectural elements, such as material, structure and volume. The design increases our awareness of the effect space and materials have on sound, becoming teaching tools for children and adults alike.

The experience of music in the school and site not only enrich the lives of the children and the community, but also make learning fun!



## APPENDIX A: MARIA MONTESSORI



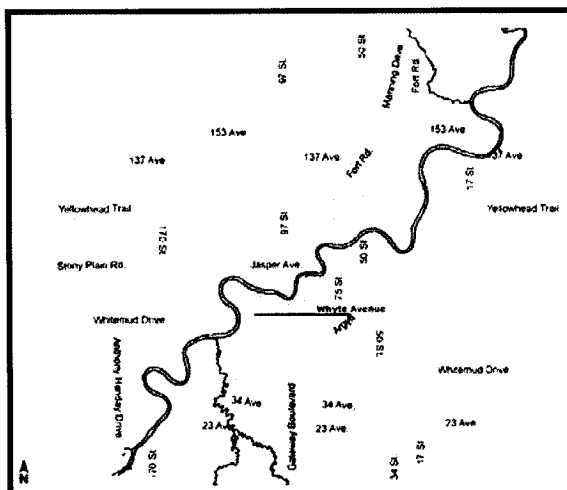
Portrait of Maria Montessori, 1900  
(From A Montessori Handbook 1965)

Maria Montessori was born in Chiarava, Italy in 1870. She was the first woman in Italy to graduate from medical school. As a physician, Dr. Montessori was in touch with many young children and became interested in their development. Throughout careful observation, she becomes aware that children construct their own personalities as they interact with their environment. Shifting her focus from the body to the mind, she returned to university to study psychology and philosophy. Due to her strong desire to help children, she gave up her position in the medical field. Her first opportunity to work with children came when she opened her first Casa dei Bambini (Children's House) in the slums of Rome. She was referred to as "teacher" rather than a "doctor". Based upon her scientific observations of these children, this ultimately became her opportunity to the development of the Montessori Method of Education.

## APPENDIX B: SITE HISTORY AND EXISTING URBAN PATTERNS

Strathcona is one of Edmonton's oldest communities. Situated on the south side of the North Saskatchewan River, the Calgary and Edmonton Railway Company influenced Strathcona into being a town site. The intention was that it replaced Edmonton as the commercial centre of the area. Development began in the 1880s at the intersection of the CPR tracks and Whyte Avenue and spread outwardly in circular patterns.

The arrival of the railway also represented the growth of Strathcona from its earliest beginnings to its amalgamation with Edmonton in 1912. Throughout 1900s, Strathcona experienced its most dynamic period of growth. The railway was one of the major industries for transporting goods and services, and as well as for people. A large number of civic buildings including a city hall, library, hospital, market, and a new fire hall were constructed, as well as beautification projects such as the creation of parks and boulevards. Both the city of Edmonton and Strathcona anticipate the opportunity to establish a stronger place together in terms of the economics and financial assets.<sup>17</sup> In 1912, Strathcona amalgamated with Edmonton marked the end of Strathcona's independent development. The continuous economic developments in Strathcona enrich the community and also spread towards the entire city. This community remained dominant in the area. Whyte Avenue, the primary street in this community was named after the Calgary and Edmonton Railway Company Official has been preserved as a virtual time capsule of the town's first, vibrant years.<sup>18</sup>



Map of Edmonton, 2005  
From City of Edmonton 2006

## APPENDIX C: INSPIRED PROJECT

### Architectural focuses in each projects

#### Montessori school in Delft (H. Hertzberger)

'cities in miniature'

Interior of school resembles a small city

houses (classrooms)

streets (running as corridors) "learning street"

squares(gathering + interact spaces)

Use of concrete masonry blocks to conform a series of small 'niche' for the activities

Visible masonry blocks without covering allows the children to understand that the bldg are piled up like blocks

New steps typology- never just steps, place to sit, for children to hang out, and even to study

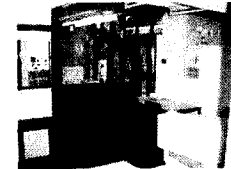
layout enables individual, one to one + group activities

elementary school (small scale)

Sunken modular seating areas for kids to gather



1



2



3

#### Milwaukee Montessori school (Mary-Ann Ray, StudioWorks)

'children's houses' with miniature furniture built in.

introduces new materials for floors, ceiling and lighting fixtures

pivoting door allows spaces to open+expand (Adjustable spaces)

Bring more natural lighting inwards

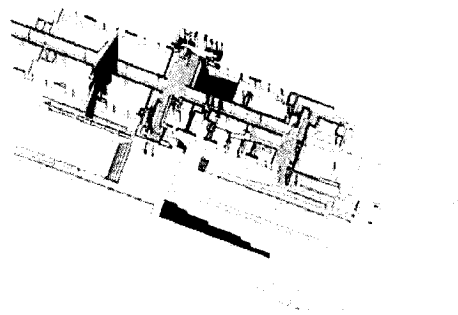
Imagine the bldg as a city and its corridors as active street

spatially sequence of interior spaces with a diversity that is differentiated by programs

ambiguous spaces where student can interpret or reinterpret through shifting uses



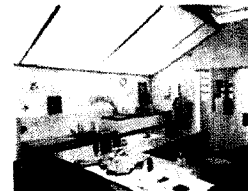
4



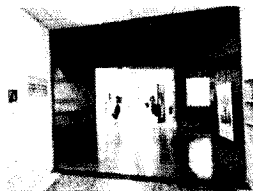
7



5



6



8

1. Storage and shelves along the classroom 2. Interior of a classroom 3. Front view of the Montessori school in Delft ( Images 1-3 From Delftse Montessori school 2000).  
4. View towards the Entry of the school 5. Sketches of the classroom 6. Skylight above a classroom 7. Diagram highlighting the main circulation through the school 8. View of the corridor (Images 4-8 From Studioworks Architecture and Urban Design 2005).

## Music school, Hamburg, Germany

reflects the liveliness of a space filled with fresh ideas for music

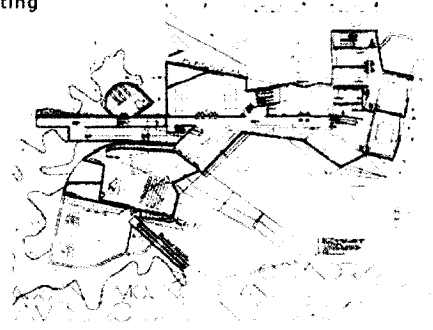
New volume though strikingly different in its multishaped geometries, integrates itself perfectly into its surrounding

front façade designed to work as an interpolating phase connecting inside and outside

Interior circulation route allows people to experience the space as a ceremonial passage into a musical world.



Front façade of school. From Mies Barcelona Foundation. 2006



Ground plan of school . From Mies Barcelona Foundation. 2006

## Maritime Conservatory of Performing Arts, Halifax

Programs + classes offered depending on your intention for the program

Music for Pre schoolers (for toddlers, - kindermusik, Suzuki, Instrument study)

School age children (Dalcroze classes, Suzuki, group + private lessons, young artists diploma program, ensembles, and music or history classes.)

Children workshop

Afterschool programs

Birthday parties

Digital arts workshop

Facilities rental

Combination of music education with art classes and dance classes available.

Classroom sizes: All standard rectangular shapes with storage room within.

Student enrollment: throughout the entire day, lessons are continuously held. Range from 6-12 students per class. Users from within the neighborhood or from other area.

Structure of the music school is similar to a normal school with classroom along side the corridor one after another.

Each room is acoustically treated with carpet as flooring and wood trimming to lessen the echos

With 39,00 sq ft, 9 classrooms, and 17 music and dance studios

Parking lot, walkways, & landscaping planting in front of the building provide a barrier from the street and the bldg.



Kindermusik classes.

## APPENDIX D: EXPLORATION OF FELT

### *Felt*

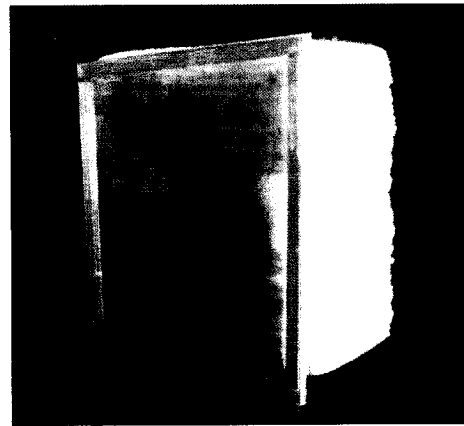
A fabric of matted, compressed animal fibers, such as wool or fur, sometimes mixed with vegetable or synthetic fibers. Felt is truly a remarkable material. It owes its uniqueness to the ability of sheep wool to "felt". With heat, moisture and pounding, the fibers relax, curl and interlock in all directions. With increased hammering and pounding, the fibers are compressed or hardened into an unbelievable tight dense mass.

It breathes well, holds water, dyes readily, and has good fluid permeability. Second, it is flexible. Felt can be thick, thin, pliable, or rigid. In addition, because felt has heat insulating properties, heat retaining properties, is shock absorbent, and can shut out sound; its future applications will likely be limitless.

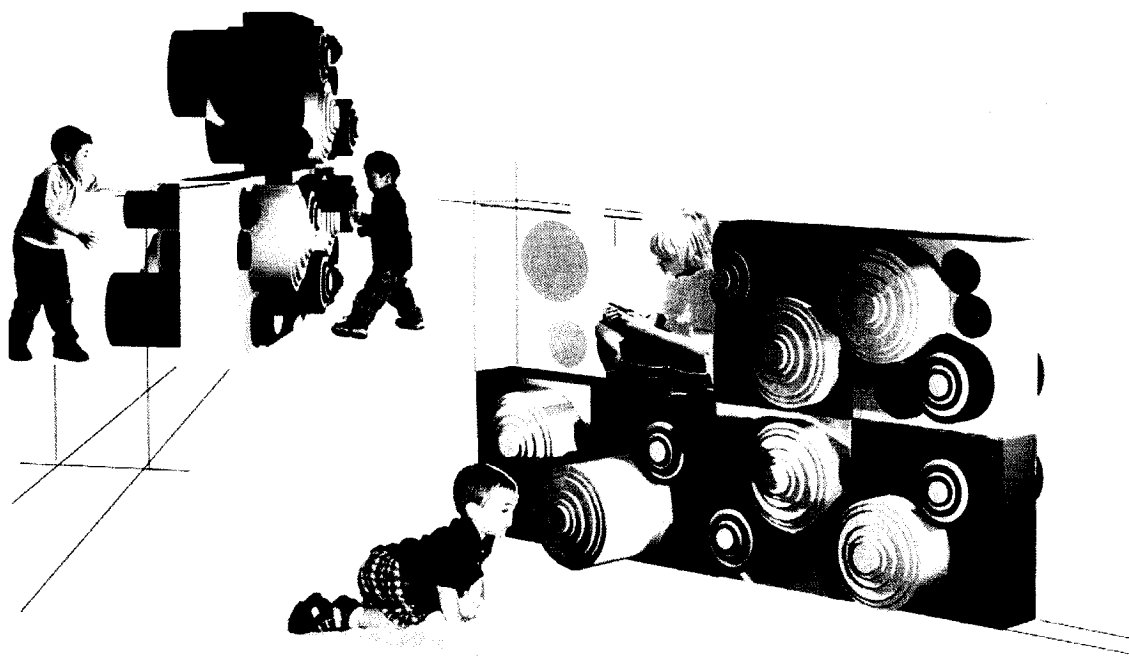
### *Conceptual models*



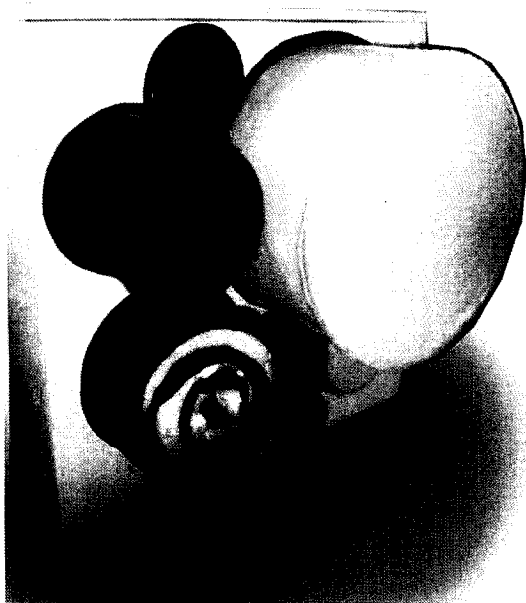
Interior partition with felt tubes insertion. It is slideable allowing both sides to interact with.



Stacking felt to perform as a trombe wall. It is visually appearing from the outside but also provide a warm fuzzy felt wall for child to hug and lean on.



Conceptual idea of felt tubes interior walls. It will be an interactive place where children can sit on as furniture or play with.



A section of the felt tubes interior wall was constructed in a 1:1 model.

**NOTES**

1. Steven Holl, Juhani Pallasmaa, and Alberta Perez-Gomez, *Questions of Perception Phenomenology of Architecture* (Japan: A+U: Publishing Co,Ltd, 1994), 87
2. Definition [Web site], 2006 [cited 13 May. 2006], available from <http://dictionary.reference.com/search?q= music>
3. Maria Montessori, *A Montessori Handbook* (New York: G.P. Putnam's Sons, 1965), 13.
4. Ibid., 14

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