Tribhuvan University

Institute of Engineering

Department of Architecture

Pulchowk Campus

Pulchowk, Lalitpur

A THESIS REPORT

ON

RETHINKING PUBLIC LIBRARY

In partial fulfillment of the requirements for the degree of Bachelor in Architecture

Submitted By:

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Submitted To:

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Date: May 25, 2023

CERTIFICATE

This is to certify that this thesis entitled "**Rethinking Public Library**" at **Tinkune, Kathmandu** submitted by **Ms. Lawrisha Khadka** has been examined and has been declared successful for the partial fulfillment of the academic requirement for the completion of the Degree of Bachelor of Architecture.

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To,
The Chairperson and Members of the Jury,
Thesis Committee
Department of Architecture,
Central Campus, Pulchowk,
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Subject: Approval for Final Thesis Presentation

Dear Sir/Madam,

In compliance with the requirement of the course AR 851 (V Year Architectural Design Thesis) for the degree of Bachelor's in Architecture, I hereby respectfully present my thesis for evaluation and approval.

Project Title: **Rethinking Public Library**

Project Location: Tinkune, Kathmandu

Respectfully,

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(Thesis Candidate)

Recommending Approval:

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ABSTRACT

Library and information science have been part of society from the beginning of their existence. The importance of information seeking has been increasing with time, and information has been a key component in this competition. Library existed before the invention of books, now in modern times, the world is shifting toward a new era of learning which is digitalization, today's library needs to incorporate those things.

Recognizing the condition of libraries in Nepal, it suggests a shift away from 'collection' to 'connection'. The library now requires a spatial configuration that can combine multiple functions, combining library space with other components such as maker spaces, galleries, and performance spaces. In doing so, the library is now rethought and reimagined to make the center active on a regular basis, hosting unique events while staying relevant and useful for the daily use of the residents nearby. Offering supplementary open spaces alongside specialized program facilities community engagement and the making of a vibrant public realm.

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INTRODUCTION

1.1. Project Introduction

1.1.1. Background

Our most telling achievement, the one that made humanity, the most adaptive species in history, was the invention of language. The formation of word, and in particular its repository, the book, became the essential thing that sets us apart from other living things. If society loses sight of the library as an essential building type, it faces the prospect of devaluing the book, learning and ultimately of one of its greatest cultural anchors. That is said in a sense that from ages, library has been encouraging public encounters and people are able to interact, engage and access resource material for reference and learning. The culture of public interaction, reflection and exchange of information is the primary role of library, and such aspects of library has to be fostered more in this coming modern age of independent digitalization.

1.1.2. Introduction to Public Library

A public library is one of the fundamental components of the democratic society, usually supported by the government, accessible to the general public regardless of their gender, caste, social rank and religious faith (Warraich 2013; Rubin, 2010; Haq & Ahmad, 2012).

Libraries today need to facilitate multi-modal access to information due to the advancement of digital technology and at the same time, encourage the creative use of knowledge. This was not considered essential when libraries had a primary storage function, but when information is available everywhere, the challenge becomes the use of knowledge and its dissemination. So, the more library diffuses under the influence of the computer, more important becomes the architectural features of the building which house them. The concept of electronic libraries with presence of generous communal space (kind of computer-centered reading room) is on the rise. Even new advanced form of library has emerged that is “Mediateques” also called as media library which consists of musical and video recordings, periodicals and newspapers along with traditional book repository.

Now, the role of modern library is not only learning space but meeting space, inspiration space and performative spaces too. If library is a repository of knowledge, this is now just one of its functions, the library’s prime function is now making that knowledge available and encouraging exchange and reflection upon it. The modern library if made, should integrate these emerging aspects of the modern world at any cost.

1.2. Project Justification

After learning about the history and evolution of library it has been found that library was first established to house the collection made out of mud, paper and animal skin which showed the wealth and power of the nation as the one of the first things that were stolen during war were those collections. So, the library was treated like a national treasure.

As libraries expand their focus from collections to creation, physical spaces are being transferred in ways that enhance community engagement in the digital age. Collections are still important. But as libraries acquire more digital materials, they're devoting less space to housing physical items. Instead, they're creating flexible, multiuse spaces for people to gather, interact, and learn new skills. The modern library is a coffee house, a digital creation studio, a multigenerational meeting place, and much more. And they're using outdoor spaces to enhance the user experience. This trend existed before the pandemic, but COVID has underscored the value of including outdoor areas in the design of library facilities.

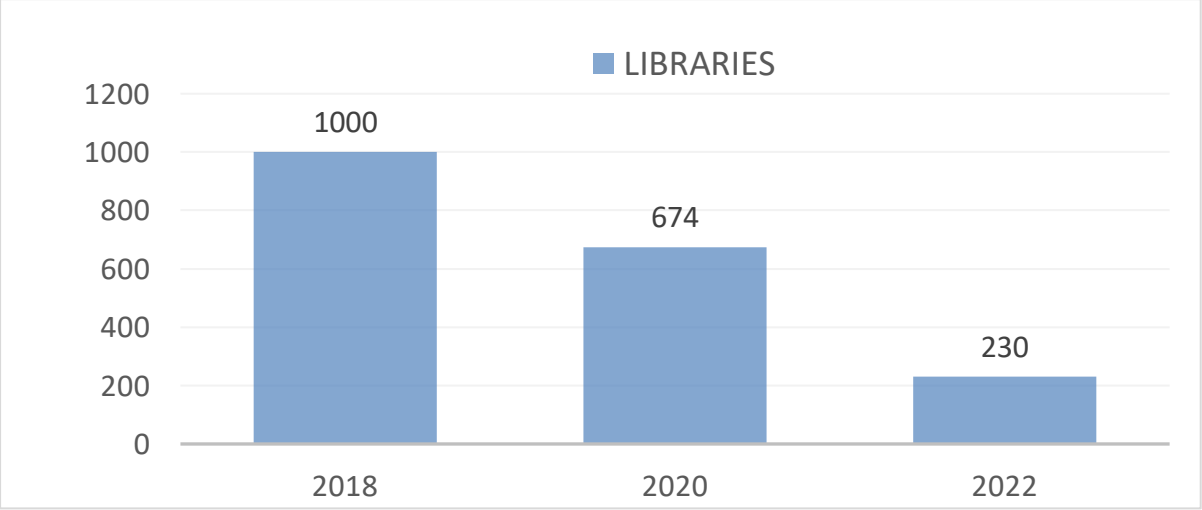
I believe architecture has the power to engage library occupants a new, where not only reading and working take place, but also where teaching abounds, as the virtual and physical fuse to peak curiosity and spark insight. Libraries fulfill a special function in society. Library buildings are places of learning, gathering, and exploring and therefore such challenges and problems calls for the rethinking of public library.

1.3. Importance of the project

- To learn how library can revive itself in terms of design and space in the age of the globalization of everything.
- To learn what development has occurred in library design in terms of new requirements, planning, materials and technologies, sustainability, etc.
- To learn how this public space be inclusive of all genders, ages and class

1.4. Problem Statement

Table 1: Number of libraries in various years (Niraula, Short overviews of libraries in Nepal, 2022)



It is recorded that around 1,000 libraries were in Nepal around four years ago. However, this year (2022 A.D.) it is recorded to have 230 libraries only. With the easy access to internet to the masses, knowledge is no longer limited to books and thus libraries aren't the only source of learning. Viewed as a storehouse of books, libraries as an institution, have failed to upgrade themselves with the change in people's desires and needs. It fails to spark an excitement in people and are often seen as dead institutions not meant for the general masses. Although Kathmandu is the capital city of the country where most of the power is centralized and which is the hub for inter-living, meeting and inter- communication of the citizens all around the country, most public spaces in the city are facing the challenges of staying relevant and active.

But if we re-interpret our understanding of what constitutes as a library and explore what all a library can do for the society, the future of public libraries seem to brighten up transforming into active public spaces capable of serving the role of a community and cultural icons.

1.5. Objectives

The aim of this project is to attain following set of objectives by proposing architecturally sound library building solving most of the problem stated above.

- To plan a proper space required to cater all the facilities for re-interpreting the library for the 21st century and re-active it as a public space.
- To provide an easy access of resources to all- regardless of their caste, class or gender- as learning mediums are not always available and affordable to all.
- To create a proper built environment by use of open space and plaza that would act as a common ground for public spaces used for public interaction.

1.6. Scope and Limitation of the study

There are few prominent public libraries present in our country which most of them are in neglected state. Thus, the proposal of a public library to harmonize with the current trends of the growing society of very vital to strengthen the community development and encourage the use of library.

The findings of this study have to be seen in light of some limitations. Most of the library's records have not been updated for a long time and almost half of them have been shut down. The user groups to be observed and questioned will be within the Kathmandu Valley. Lack of promising primary data regarding the Modern public library in the local context may emerge as a challenge throughout the study.

1.7. Study Methodology

Qualitative Research is primarily exploratory research. It is used to gain an understanding of underlying reasons, opinions, and motivations. This allows us to gather in-depth study in relation to topic. It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research. Qualitative Research is also used to uncover trends in

thought and opinions, and dive deeper into the problem. Qualitative methodologies provide opportunity to gather data through means of case studies.

Firstly, Different Information was collected and different spaces were studied with different case studies and analysis of the data is done. Different literature reviews were done and proper program formulation was prepared. Then feasibility of the program in the site was checked.

Data collection

The required information for the project is gathered through the literature review of books, reports, articles, research works.

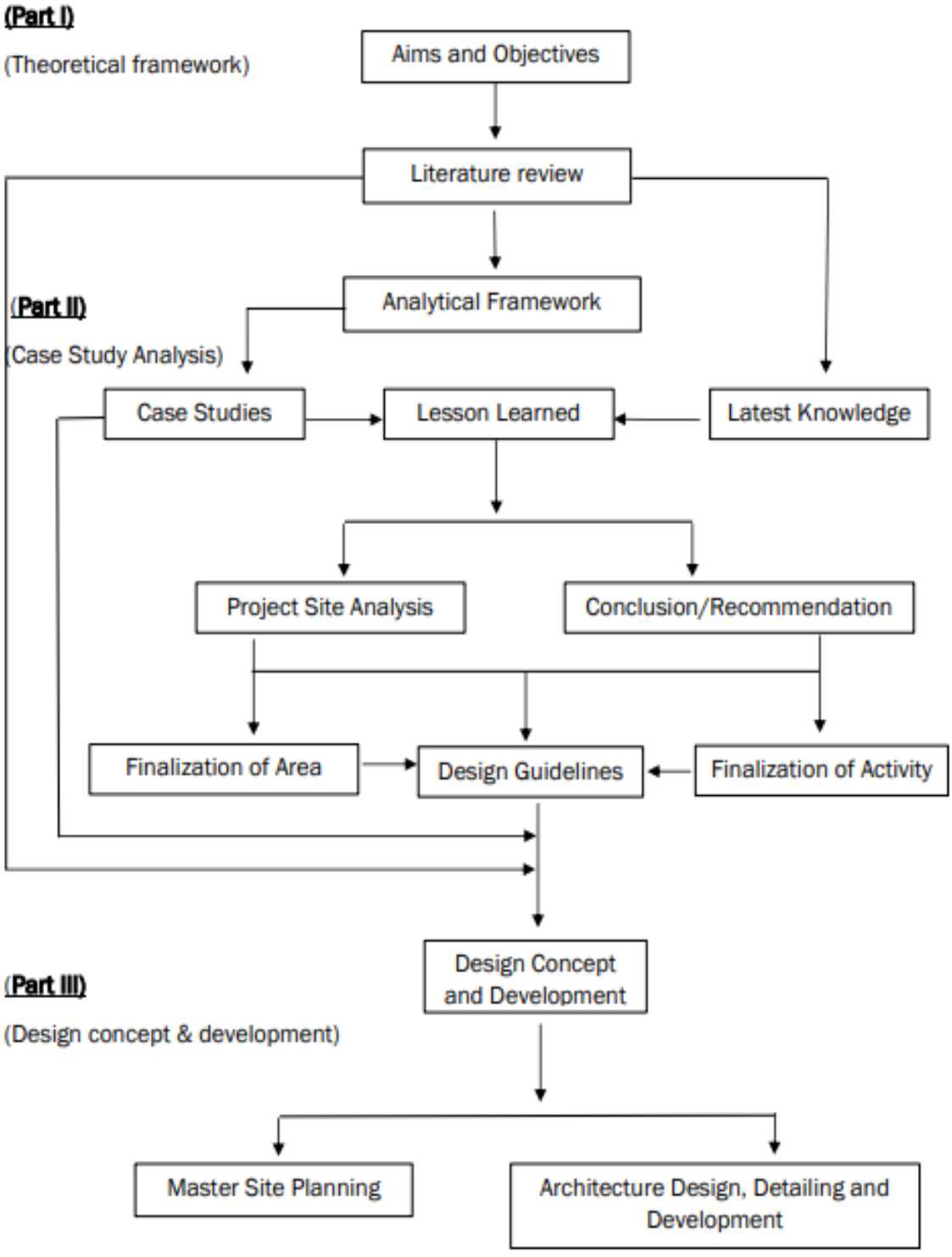
Literature Review

The part will comprise guidelines to be considered while designing any built forms. Thus, necessary national and international standards related architectural books of standards to be consulted.

Case studies

It is collecting of data from national and international projects which will help to solve the problems of project.

1.8. Working Process



LITERATURE REVIEW

2. Library

2.1. Introduction

A library can be defined as a place in which literary, musical, artistic, or reference materials (such as books, manuscripts, recordings, or films) are kept for use but not for sale (Merriam-Webster, 2019). But this dated definition often limits the roles of the library (Edwards, 2009). A more realistic definition of the library is perhaps a building designed to contain various forms of knowledge materials and an institution which allows for easy access to this material without the obligation of purchase'.

By extending our understanding of libraries as places where people are able to interact, engage and access resource materials for reference and learning we can move towards a newer role for the library and societies.

2.2. Distinguishing Public Libraries

Libraries have often been classified on the basis of their collection and materials. But with the increasing overlap of forms of resources in a library - be it digital or physical books or special manuscripts- this distinction isn't of much help today. Instead, types of libraries have come to be distinguished on the basis of their accessibility which are broadly divided into four types (LISBDNETWORK, 2016)

2.2.1. Academic Library

Academic library is the library which is attached to academic institutions like schools, colleges and universities. An academic library serves more specifically the students, research scholars, teachers and staff of the academic institution. For e.g.: the Central Library of Pulchowk Campus.

Figure 1: Central Library of Pulchowk Campus

2.2.2. Special Library

A special library is one which serves a particular group of people, such as the employees of a firm or the government department, or the staff and members of a professional or research organization. For e.g.: Central Law Library at Jamal.

Figure 2: Central Law Library

2.2.3. National Library

A national library is a library specifically established by the government of a country to serve as the preeminent repository of information for that country and has the duty of collecting and preserving the literature of the nation within and outside the country. For eg: Nepal National Library.

Figure 3: Nepal National Library

2.2.4. Public Library

By definition, public libraries are a common good - a resource available for the public at large. Instead of a specialized collection, they house a varied range of resources to serve different user groups. Instead of referencing, they encourage lending and loaning practices. Since they are public institutions, they play a more active part in community engagement and serve as public places. For e.g.: Kaiser Library at Jamal.

Figure 4: Kaiser Library

3. Historical Overview of Library

3.1 Global Context

Libraries were inconceivable until writing was invented between 5,500 and 6,000 years ago in Mesopotamia and Egypt. Other scripts were invented by the Minoans on Crete 5,000 years ago, the Hittites in Anatolia (modern Turkey) about 4,000 years ago, and in China about 3,500 years ago. (Vaughan, 2021)

A. Earthenware Library

Well about the first libraries; it consisted of archives of the earliest form of writing – the clay tablets in cuneiform script discovered in temple rooms in Sumer, some dating back to 2600 B.C. The collection of works was vast from legal records to history, myth, medicine, astronomy.

Figure 5: An ancient Mesopotamia library with wall recessed shelves for storing clay tablets

B. Papyrus Library

The papyrus is most closely associated with writing - in fact, the English word 'paper' comes from the word 'papyrus'. The Great Library of Alexandria in Alexandria, Egypt, built in 285 B.C. was one of the largest and most significant libraries of the ancient world containing collection of papyrus scrolls. The library was reputed to have included lecture halls, laboratories, meeting halls, gardens, dining commons and even a zoo.

Figure 6: Interior Depiction of Great Library Of Alexandri

C. Parchment Library

Developed in response to the cessation of Egyptian papyrus exports to the region, parchment (animal skin) offered a viable substitute, even if the process of making it was a rather messy one in 1500 B.C. (JAIN, 2015). The Porticos Octavia is an ancient structure in Rome. The colonnaded walks of the portico enclosed the temples of Jupiter Stator and Juno Regina, as well as a library, an assembly hall and lecture rooms.

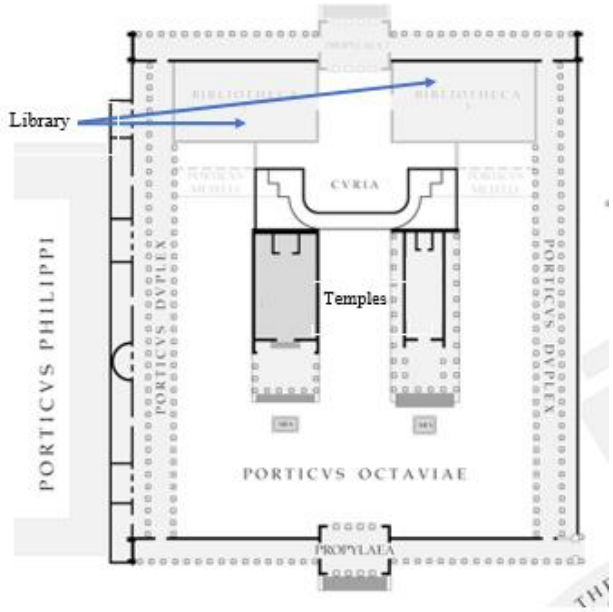


Figure 7: Ground floor plan of Porticos Octavia

D. Library of Handwritten Books

The invention of paper in China in 105 A.D. allowed the Chinese to create an early form of printing. As the books were now handwritten more importance and care was given to them. For instance The Laurentian Library, a historic library in Florence, resembling the church's prayer hall had books chained into the wooden benches.

Figure 8: Reading room of Laurentian library

E. Library of Printed Books

In Germany, around 1440, goldsmith Johannes Gutenberg invented the movable-type printing press, which started the Printing Revolution. It helped in the flourishment regarding the production of the books. As production increased, the price of the books as compared to the handwritten ones were decreased resulting in the increase of number of readers.

Figure 9: Main reading room of library of Congress

F. E-Library

E- Library also known as digital library collect and organizes digital materials. It makes them available on the internet, although some early ones comprised collections of CD-ROMs and DVD developed in the year 1982 and 1990 respectively marks the introduction of e-library. (Gombos, 2020)

In the 20th and 21st century libraries continue to change and evolve to match new trends involving the way that patrons consume books and other media. The Municipal Library built by Alvar Aatlo in 1958 for the German city of Wolfsburg features a great central room for which he used a series of specially designed skylights to bring in natural light New programs include: auditorium, club room, makerspace, Video and Audio recording studios and e-books.

Figure 10: Reading area of Wolfsburg Library

3.2 Nepalese Context

a) Earliest time -1768 A.D.

Bhojpatra, Tadpatra, Vamshwali, Shilalekh as a source of authentic history which talked about astronomy, wards, medicine. These were found stacked in temples, Vihars, monasteries. Malla Kings named the library as Sākothā said to be a big library presently located at Sākothā tole in Bhaktapur. Most of the books and manuscript present in the library were destroyed by fire during the Battle of Bhaktapur and the building itself was completely destroyed during the earthquake of 1833. (History of library in Nepal, 2013)

b) 1768-1846 A.D.

It is said that King Prithivi Narayan Shah, founder of modern Nepal, had collected historical documents from the state the bhojpatra, tamprapatra found in temples, which were kept at his palace inside the puja room.

c) 1846-1950 A.D.

The country was ruled by domination of Rana clan, which discouraged public education. Books were shifted from the palace to Thapathali palace where two librarian staffs were appointed. Under the Ranas, Nepal maintained relations with the British and were inspired by them in many ways from their architecture to education. So, Chandra Shumsher Rana established a private library for his son in his palace in 1907.

d) 1950 A.D.-Present

After the end of rana rule many public libraries established in the country. Academic libraries like the Tribhuwan University Central Library (TUCL) opened which is now visited by more than 1000 patrons every day. The Kaiser library was made opened to the public in 1969. Sine many libraries established were usually of 2-3 rooms appearing as a store house of books lacking the additional facilities as in global platform many of them gets closed.

Figure 11: Tribhuwan University Central Library established in 1959 A.D.

3.3 Library in the Past, Present and Future

3.3.1 Past

In the past emphasis of libraries was on the book collection. Thus, the reading room became the point of focus of the design. Users entered into a '**world of books**', with the interior walls being adorned with books all around. It was more regarded as a national treasure bigger the collection powerful the nation so more focus was given to the interiors.

3.3.2 Present

Now, within the library, a shift towards creating a better user experience forced the reading tables to move to the periphery of the building - in order to get access to natural daylight. Since libraries became narrower, they became taller and those reading spaces near the facade were able to provide expansive views. The stacks came to the center of the floor plate where there was no natural light available. This marked a valuable shift by implying that the users/readers were more important than the books.

With the experiment of open plan offices, libraries too were designed to have deep floor plates arranged on a rectilinear grid. The ground experience became an important part of the design with emphasis being on libraries' interaction with the street.

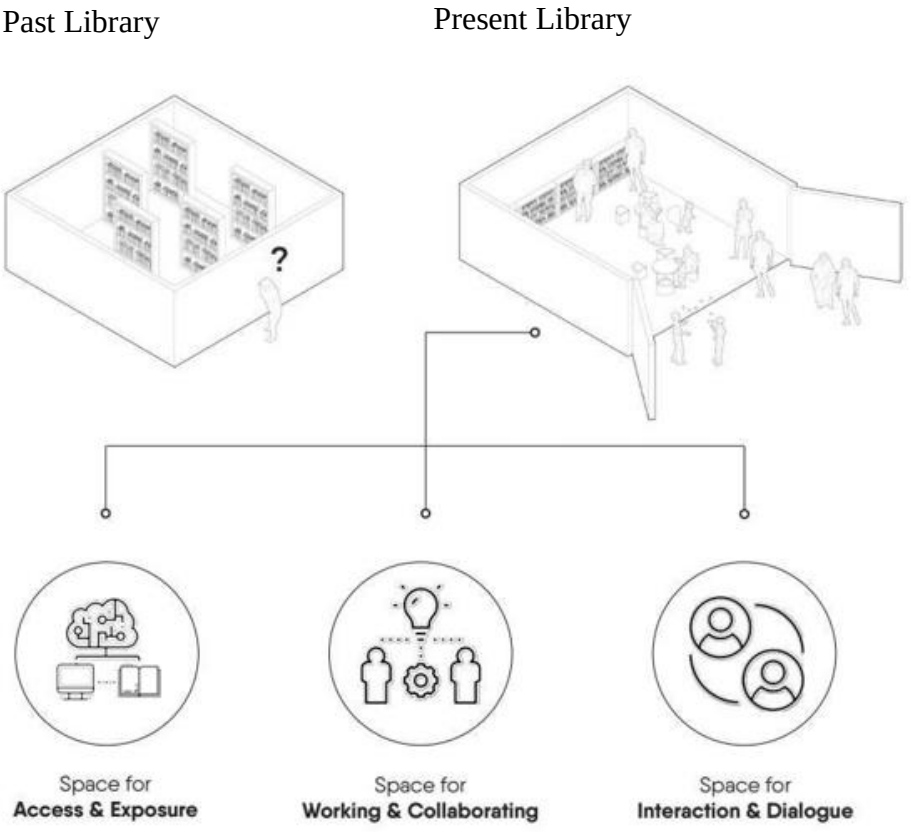


Figure 12: Past Vs Present Library Model

Table 2: Traditional Vs Modern Library (Edwards, 2009)

Traditional Library Architecture	Modern Library Architecture
Imposing steps and Entrance halls	Street interaction and retail entrances
Stand-alone building	Shared spaces
Domes and rotundas	Atriums and skylight
Indirect/restricted access	Open access to materials
Bookshelves with ladders	Human height or lower book shelf design
Defensive/ quiet space	Networking, lively space
Child free	Child friendly
Needs of disabled ignored	Good disability access

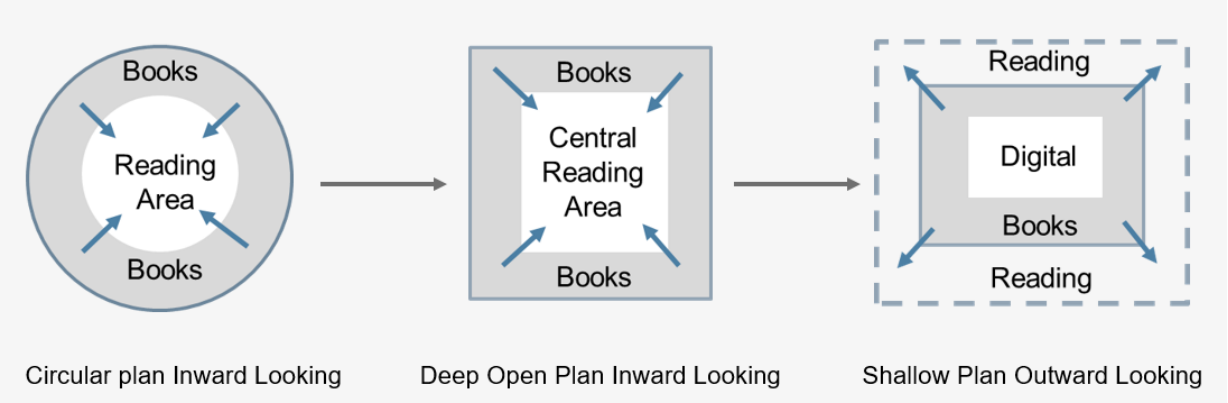


Figure 13: Transformation in the layout of a library with books kept at the periphery to at the central for visibility, light and view

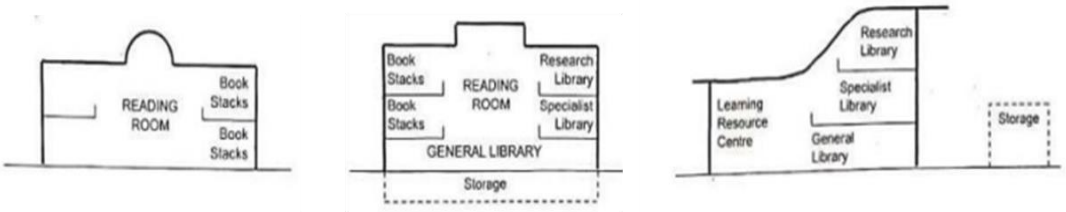


Figure 14: Transformation in the form and programs of library

Since, library is now changing its layout as per the need and comfort of the user with walls now free of bookshelves which means large glass windows façade can be incorporated or the form can be altered as per the function of the building.

3.3.3 Future

It is quite difficult to predict and say about the future and that too about library however, learning about the history of library and its past and present scenario the libraries have endured for centuries as each generation has reshaped the library in its own image, with new intellectual agendas and new buildings that reflect the priorities of the community and the day. (Pettegree, 2021)

One thing about the library is sure that it will be portals for activities that mix leisure and learning. They will add value by providing avenues for interaction and opportunities for using disposable time constructively. There will be addition of more programs such as cooking classes, e-books and tablets, 3D printers, social services—such as career or literacy assistance, Robotic storytelling centers, VR chat rooms, Makerspace, business and homeless friendly. (Frey, 2020)

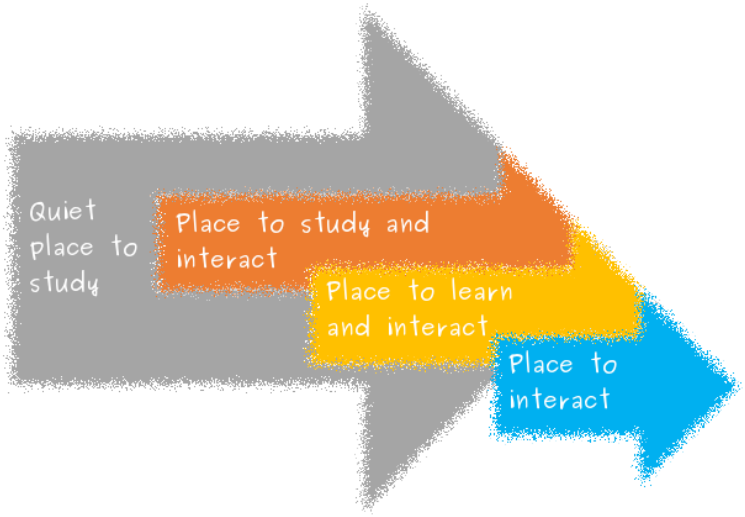


Figure 15: Perception of library over time

What probably won't change that much are librarians and the physical spaces they watch over. That has been true for thousands of years and will continue to be true for thousands more, no matter how weird the future might get. (Weller, 2016)

3.4 Zoning and layout of library

3.4.1 Zonal Arrangement of a Modern Library

At most libraries, four zones coexist– outworked and mixed in different ways: learning, experiencing, meeting and creating (Palaces, 2016).

3.4.1.1 The Learning Space

The strength of having a library as a learning space is that the learning becomes a dialogue-orientated process. The challenge of modern library is to create open, inviting multi-use spaces along with delimited/quiet learning spaces that are still in interplay with the rest of the library.

Things to consider for better learning experience Palaces, 2016):

- **Connection with nature:** Semi-open, open spaces created for learning
- **Bring the outdoor in:** Courtyard planning, internal landscaping
- **Visibility:** Visual connection between different spaces provided and with the outer world through glass facades.
- **Ambience:** By proper light, flexible furniture, color and view of either the outdoor gardens or hills can create a comfortable ambience.
- **Different spaces:** Solo study carrels, group study, homework cafes, learning through experience and creation i.e. makerspace.

Figure 16: Outdoor Reading Park of a library

3.4.1.2 The inspiration space/ Experience Zone

The inspiration space' is based on experiences. It will typically offer access to materials including literature, art, films, music, entertainment and games as well as events with artists and similar.

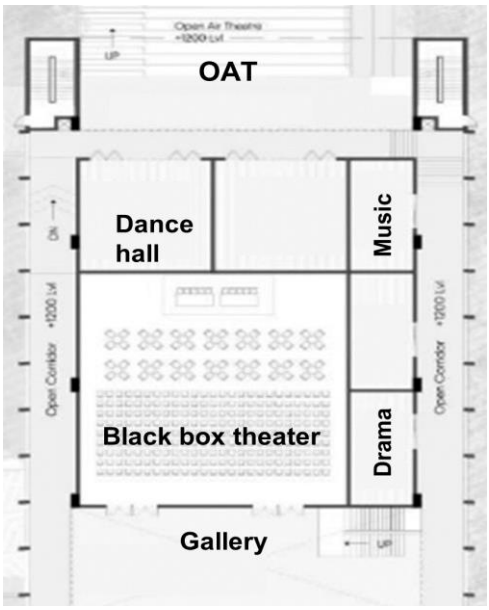


Figure 17: Site consideration of a library along with floor plan for experience zone which incudes dance, drama and music

3.4.1.3 The Meeting Space

The concept of "the third space" often comes up when considering the library as a meeting space. (Sharan, 2020) Essentially, three dimensions of meeting spaces should be worked upon:

- Almost private, intimate and completely open public square
- Organized teaching and unorganized spontaneous meeting
- Scaling- room for both small and large meeting.

Figure 18: The seating area at Donnell Public Library

3.4.1.4 The performative space

'The performative space' is based on creatively innovative activities carried out by the users. It facilitates workshops of different kinds: writers' workshops, activities with in-house artists, innovation workshops, film workshops etc., and screenings and exhibition areas to cater the diverse interests of the users. For example, hacker spaces, maker spaces, tech labs, rentable office spaces, fab labs, stage and halls, workshop spaces, cafe environment, large gathering spaces etc.

3.4.1.5 Art and Craft

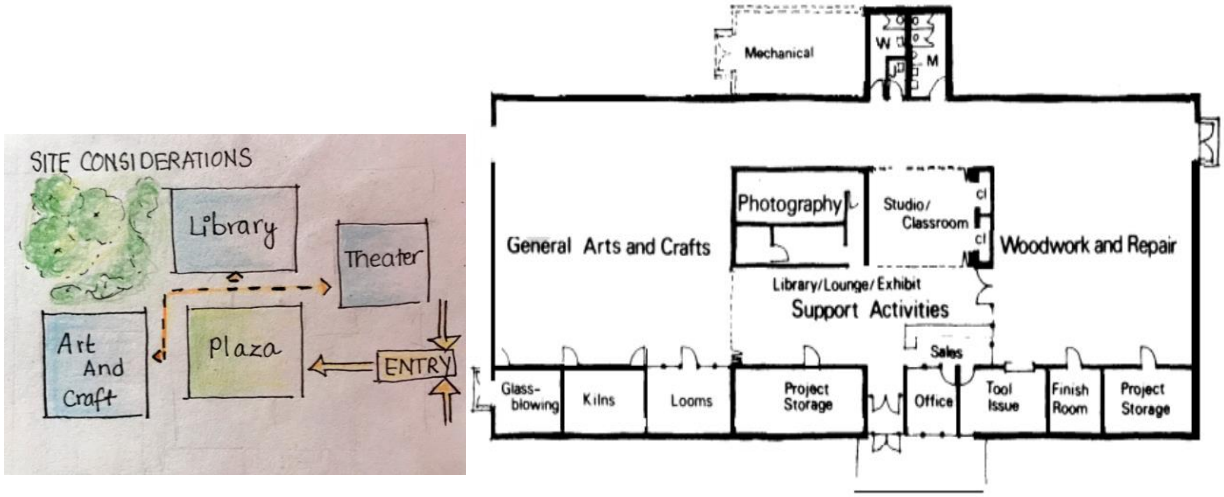


Figure 19: Typical Floor plan for a art and craft center

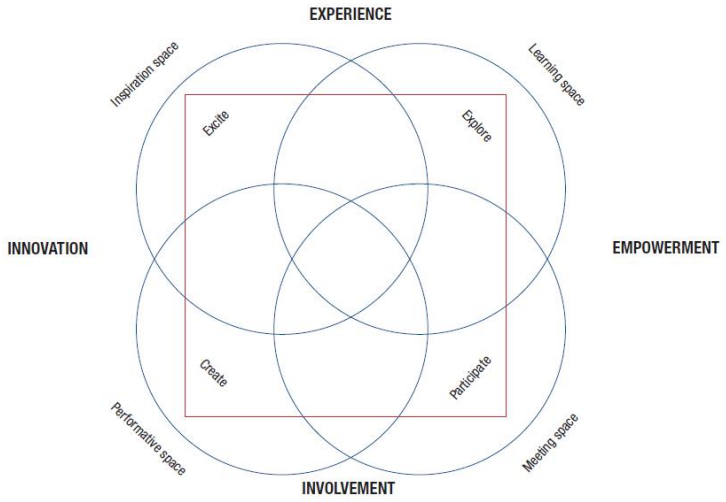


Figure 20: Zonal arrangement of a modern library

3.4.2 Space attributes of a modern library

(Mary Ann, 2020) Putting all the zones of a library we get the following:

3.4.2.1 The arrival

The arrival area is the area that all of the library's users pass through to find their way further into the library's spaces and collections. The zone's most important function is thus to make the visitors venture further into the library's experience spaces.

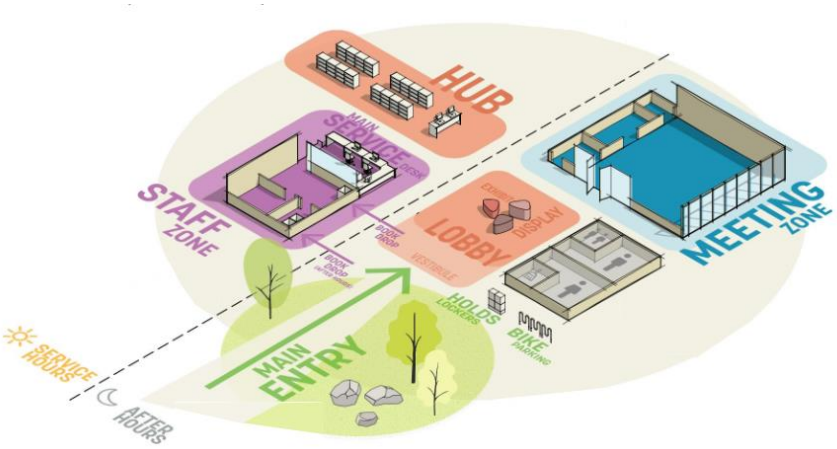


Figure 21: The entry zone of a library

3.4.2.2 The meeting zones

Meeting room includes the large community room which should be near the entry and ideally able to operate when the rest of the library is closed. Locating the restrooms in the same zone facilitates this independent operation.

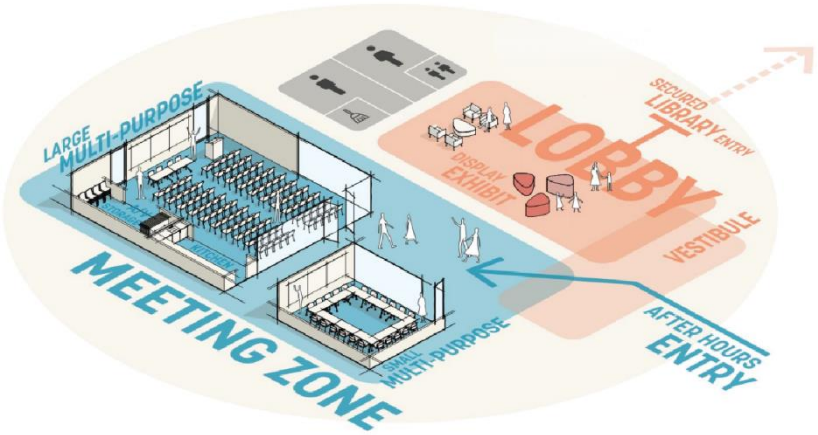


Figure 22: meeting zone illustrative of a library

3.4.2.3 The staff zone

The staff spaces can either be centralized for flexibility and the ability to share work spaced or distribute throughout the library at different locations. At first the new books are brought and then entered into the library data as per alphabet in fiction or Dewey decimal system then placed into the shelves.

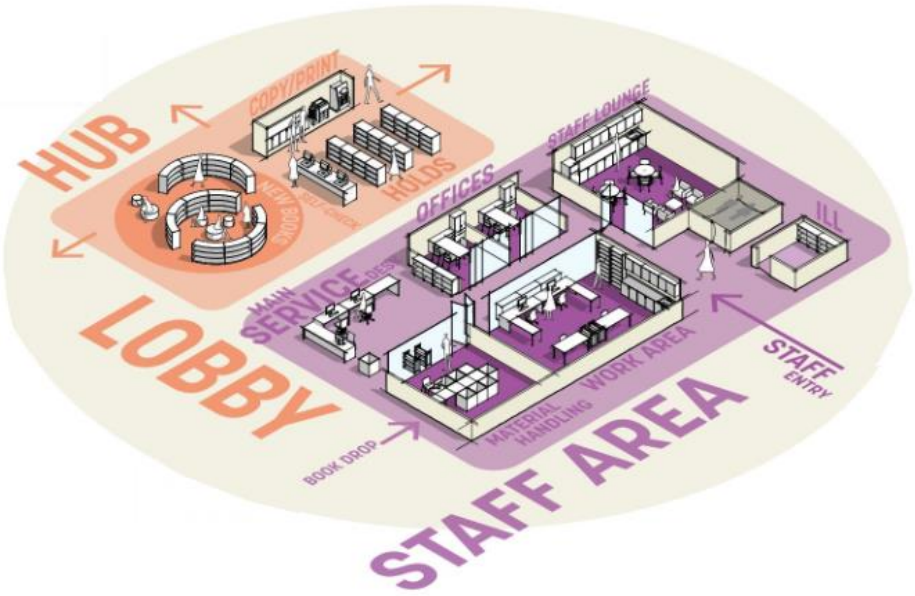


Figure 23: Centralized staff zone

3.4.2.4 Collection and Seating Zone

The collection and seating spaces are intermingled to some extent. Since staff should be able to supervise reader seats and computer seats, the sightlines through or over the stacks become important to making this sort of arrangement work.

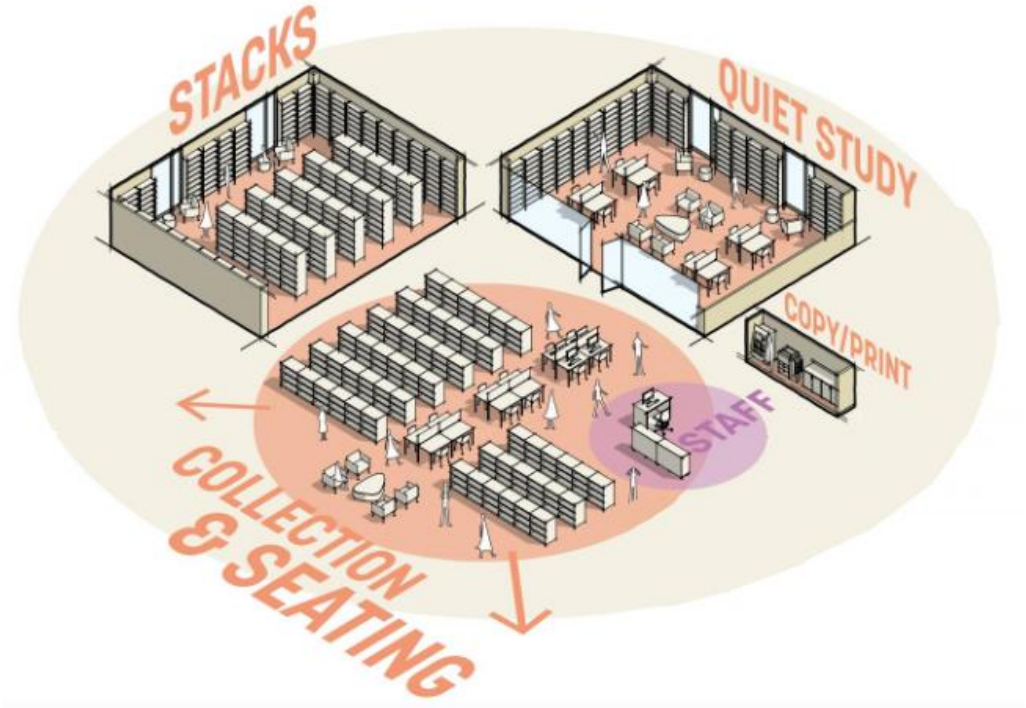


Figure 24: Intermingled collection and seating zone

3.4.2.5 Addition of Spaces

Along with the collection and seating spaces now different programs shall be added such as makerspace, local archive history, teen fiction, group study which are the noisy area of the library.

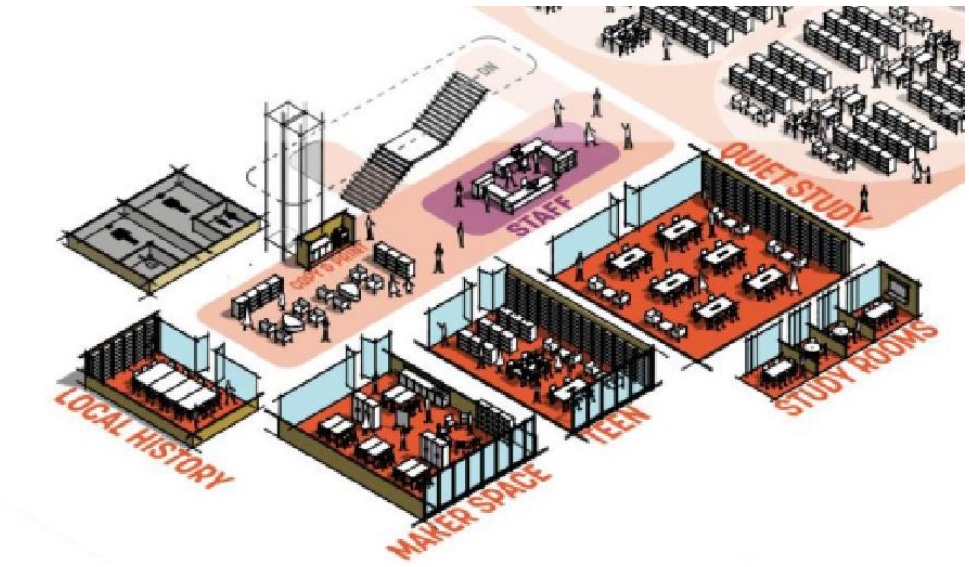


Figure 25: Quiet and Noisy study area in a library

3.4.2.6 Children zone:

. In relation to children, creative, playful learning is often best placed in the open children's library, because this form is more inclusive and suitable to this approach to learning than the closed space. Furniture is made friendlier and more appropriate and stack heights are also reduced. These spaces are encouraged to become interactive and noisy and are designed as multi-functional open spaces, allowing the staging of workshops and events (Sharan, 2020).

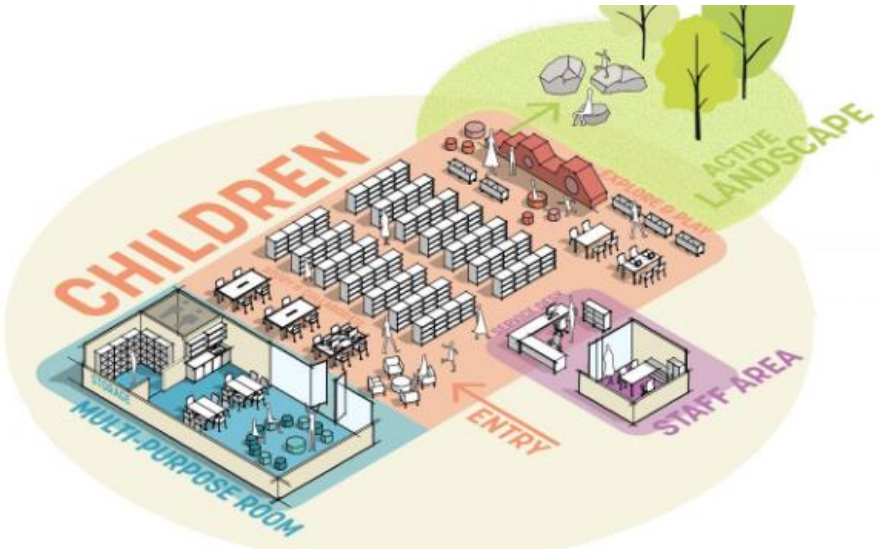


Figure 26: Interactive children zone

4. Design Factors

4.1. Image and Identity

The library building also serves an important civic function, both in terms of the service it provides and the image it conveys. A library should be expressive of its community. It must relate to the people it serves in an inviting, non-institutional and welcoming way.

Figure 27: Tianjin Binhai Library

4.2. Flexible Building

A flexible interior fit out allows a library to accommodate fluctuations in user numbers day to day, allowing a greater variety of activities. Flexible interiors are characterized by:

- Flexible space dividers: elements that facilitate changes in room size e.g., operable walls, folding doors, sliding doors, curtains etc.
- Flexible furniture and finishes: elements that can be easily moved, reused or stored away, or are multi-purpose e.g., shelving units on wheels, or furniture which can either be seating or a table
- Privacy screens e.g., curtains, screens etc.

Figure 28: Movable acoustic partitions, display stand and furniture

4.3. Internal Functions of a Library Building

The library is planned form inside out. The architect has to imagine the exterior shape of the building as well as the movement form the floor to floor, by stairs or lifts in order to form an idea of the traffic circuit and the accessibility of each department. Natural lighting, prevention of direct sun; ventilation; window details; cooling; heating; artificial lighting; floor covering; mechanical means of communications and internal fitting should also be thought beforehand.

The major Functional areas of public library are

a. Catalogue Area

Its location should be near the circulation counter, bibliographical and reference area. A cabinet has drawers 16” long filled with catalogue entries. The cabinet should stand 18” from the ground. Its height should not be more than 5’ from the floor. Nowadays computer cataloguing is highly replacing card cataloguing system.

b. Circulation counter

The location of the circulation counter should be near the public catalogue with close to the stacks. Space should be made for the apparatus, records, documents awaiting delivery, loaned books and returned books.

Figure 29: Circulation counter

c. Reference Area

This area must be located near the public catalogue, circulation counter and the main reading areas. This should have a soundproof office space for the reference librarians and their staff. Seating must be provided.

d. Stack Areas

Stack areas are one of the fundamental functional areas of any library. The area can be made attractive by placing the books of different colors on different levels; wall shelves in a large reading area are seldom desirable, as they require wide aisles in front of them.

Aisle width should be wide enough so that the bottom shelves can be adequately lighted, and the user can squat down and read labels on the bottom shelf and select and remove the desired volumes; so that two persons can pass each other without too much difficulty.

e. Study Area

A library should provide all sorts of study facilities to serve its reader. Some of the common forms of functional study areas are discussed below:

f. Main Study Lounge

The large main reading room can be divided into smaller study areas subject divisional and general study area. The aim is to have as large a number of seats for users as possible. The general pattern is seats for every 10 users. Each seating space should provide space for books, reference materials, periodicals, micro-documents a total of 3sq.m. Including the area of circulation and gangways.

Figure 30: Main Study lounge of Seattle Public Library

g. Periodical Study Area

Current issues and bound files should be in the same area. The bound volumes of periodicals should be arranged in the stacks under their respective subjects. Space should therefore be provided for the operations, storage and display of the current and bound issues and seating space.

h. Individual Study Carrel

Carrels constitute the individual study areas. A carrel may be assigned for individual study or double seated study. The size of the carrel is determined on the provision of a table, chair and a bookshelf. The minimum space for a carrel is estimated to be 1.60 sq.m. and double seating is 2.60 sq.m.

Figure 31: Individual Study Carrel

i. Collaborative Study Area

This constitute of a small informal area where at least five people can study together. Each area should contain a writing board and the seating arrangement for the required number of persons along a long table with a side bookshelf. The size of the studies may be 1.8sq. m. per person.

4.4. Library Furniture

Libraries experience greater patron usage with furniture that is functional, more beautiful and, above all, more enjoyable. The furniture should be uniform, attractive and comfortable for the users.

4.4.1. Book Shelves

For the purpose of displaying and quick retrieval of books in the library, the books are stacked on the book shelves and are arranged according to the classification scheme used in the library.

Areas for adult users can have five or six shelf levels (maximum reach 1.80 m); in the children's area there should be four shelf levels with a reach height of around 1.20 m. Shelf aisles should not be more than 3 m long and can also be used to produce niches and exhibition stands. Book transport should be with book trolleys 920 mm x 990 mm x 500 mm (D x H X W). (Panthi, 2016)

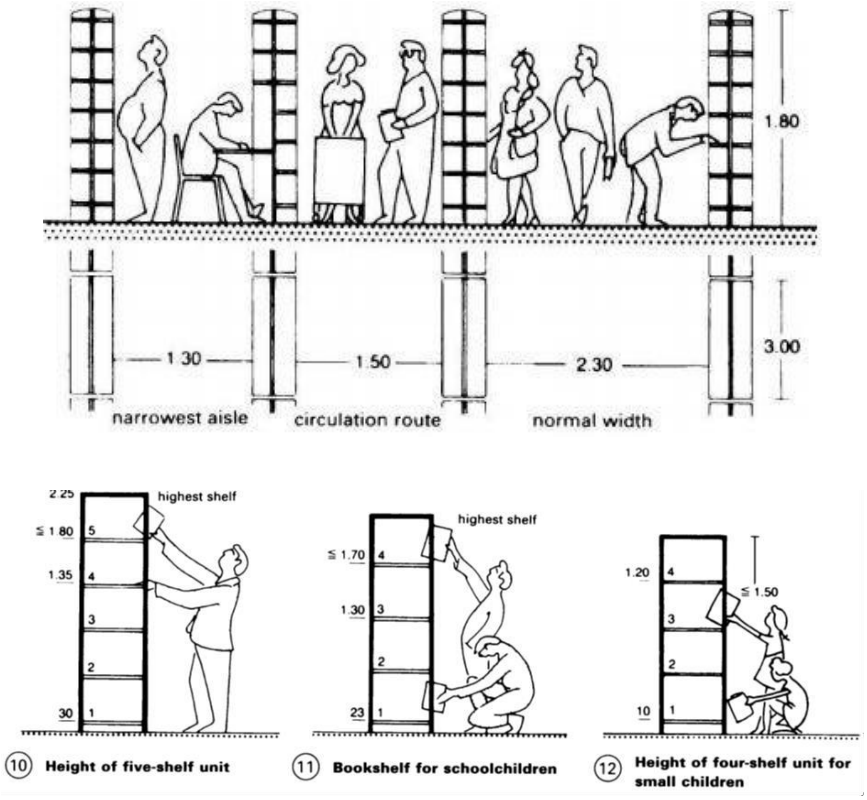
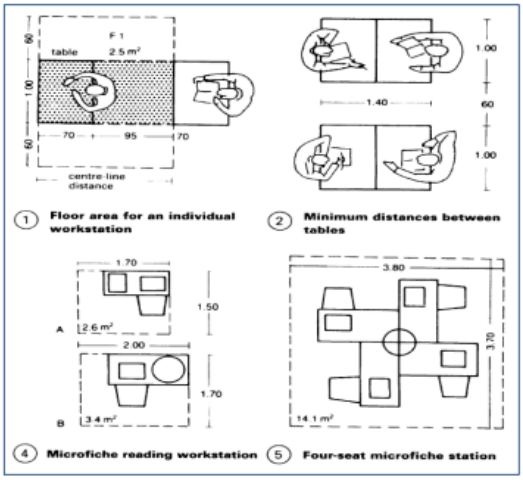


Figure 32: Shelf Height

Seating and Circulation

Seating includes small group study table, large group study table, single reader study table, lounge seating, more preferable for periodical reading. (Panthi, 2016)



Shelving Density

Depending upon the dedicated zone and area shelving density shall be properly chosen such as (Library Space, 2020)

- **Low-Height Shelving:** Three shelf book case whose main advantage is improved sightlines mostly used in Children's space and high traffic areas.
- **Mid-Height Shelving:** Four and five shelf book case which provides a balance between capacity and usability and still offers sightlines.
- **High-Height Shelving:** The tallest shelving is best used in dedicated collection areas without a lot of integrated seating space as sightlines are only possible between the shelving.

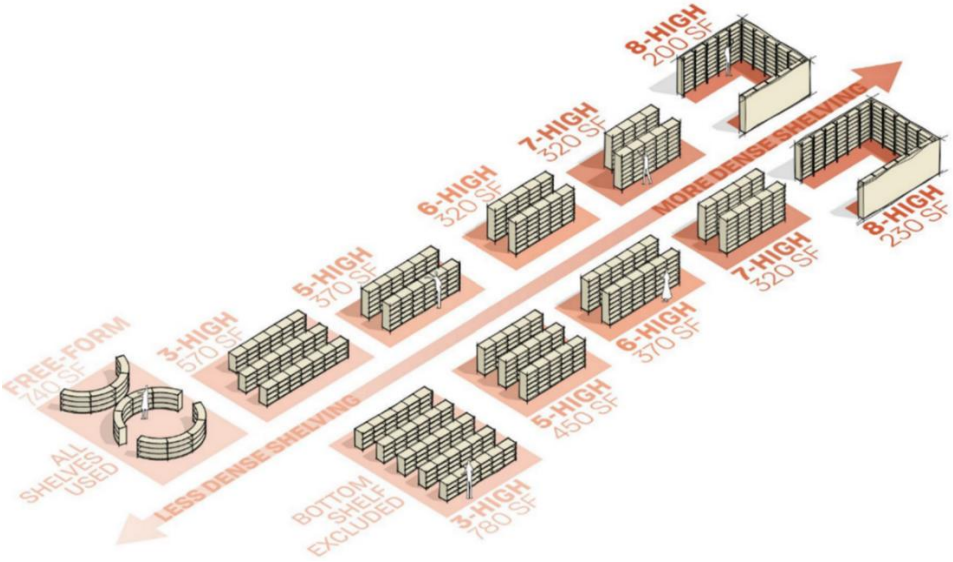


Figure 33: Shelving Density

4.4.2. Free Standing shelves

Free standing shelving are perfect for both storage and display of books at the same time. Modern free-standing shelving systems are usually built on a wheel and with lightweight materials to ease shifting. The free-standing shelf is simply placed on the floor. It usually has three to six shelves and is usually rectangular.

4.4.3. Periodicals/ Journals Display Rack

For the purpose of displaying and storing the periodical and the journals in the library, it uses periodical and journal display rack. Each library can design its own display rack as required which are as follows:

a) Pigeon Hole Display Rack

This type of racks is used when you need to cover the racks from all 3 sides and there is a need to differentiate products in smaller Batches different sizes, color, shapes etc. The partition in between helps in dividing the racks into small Sections called as pigeon Hole / Partition Racks. Size: 6'x 3x 16".

Figure 34: Pigeon Hole Display Rack

b) Display Rack Periodicals

Arrange in style with the Periodical Display Rack that offers methodical display of recent issues and storage of previous issues of periodicals, magazines and journals. It has been specially designed for libraries, reading rooms, waiting lounges, reception areas, showrooms etc. A type of free-standing unit having depth of 1'.

c) Labyrinth Book Tower

Usually books are placed in shelves. But “normal” is not always desired and therefore we invented a special eye-catcher for your novels, paperbacks and manga in a tower-shape concept.

- Total width W 580 mm (22.8"), D 580 mm, (22.8"),
- H 1100 mm (43.3") 3 High Unit H 1750 mm (69") 5 High.
- Book Openings W 370 mm (14.6"), D 170 mm (6.7"), H 305 mm (12")

Figure 35: Labyrinth Book Tower

d) Ratio Square Shelving

It can be used to store large amount of books on the four-sided shelving system or as a display. A combination of both flat and sloping shelves can be utilized, while the top surface can be used as a work table, display or a playful platform. Casters make it an important part of your flexible, mobile design.

- A shelf width of 750mm (29.5"), and a shelf depth of 250mm (9.8")
- Shelf widths of 900mm (35.4") and Shelf depths of 300mm (11.8")
- Height: 1250mm, 1330mm, 1550mm

Figure 36: Ratio Square Shelving

e) Mikado Display

Mobile Seating and Presentation System MIKADO. A sculpture, generous presentation space, variable seating accommodation, and all that in one piece of furniture.

- Width 1000/1500/2000 mm, Depth 500 mm, Height 400/600 mm.

4.4.4. Newspaper and Magazine Stand

Since most of the libraries purchase many local and international newspapers on daily basis, it is easier to display these papers on a proper newspaper stand. Normally newspapers are displayed on the reading table for the user to read. But it is necessary for a library to have a proper newspaper stands to display the newspapers. There are different types of newspaper stand available. One can choose or design according to need of the library.

4.4.5. Reading Tables

Libraries can use any type of reading table as required. But the most popular and readily available type of reading tables are rectangular, round, oval and square types. One has to choose them carefully so that many users can simultaneously use them while using the library resources at the same time. Similarly, for the personal reading purpose in the library, a special place can be provided inside the library.

4.4.6. Lounge and Chair

Adequate numbers of chairs have to be provided along with the tables for the users for reading purposes. The chairs should be able to provide comfort while reading. Similarly, lounges can be used for the comfortable reading purposes in the library.

4.4.7. Theme Based Furniture

Similar to different bookshelves available. Here in children section such ordinary plain looking furniture are turned more fun looking and creative based on child liking making it more engaging. No doubt differs in dimensions than the adult one with creative looks cartoon, action movies.

Figure 37: Outdoor Tree house concept children library

4.4.8. Collection Storage

Collection storage is still one of the principal spaces uses libraries, even as electronic media and online access to information has changed the nature of information storage and retrieval. Normally placed in the basement of the library building stored with high density mobile shelving.

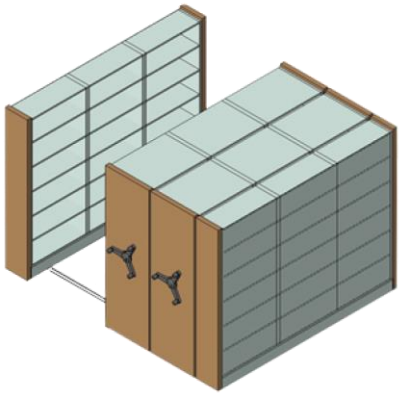
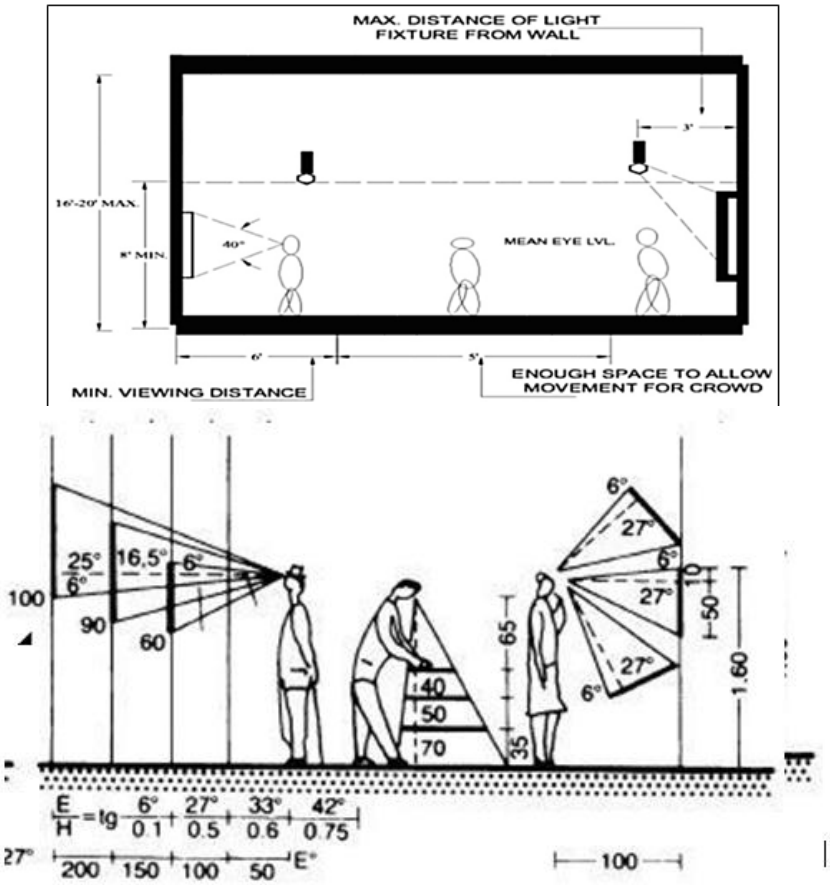


Figure 38: High Density Mobile Shelving

4.4.9. Display Area Requirements



5. Color

Color can be a way to define and complement the learning spaces in a library. We can consider the combination of colors and tone of the space, allowing us to overlay our learning modes (social, collaborative, presentation, touch point, reflective) and improve the learning environment. (Aaron Cohen Associates, 2019)

5.1. Classification of Color

- **Warm color (exciting):** Colors that represent warmth, heat and increase body temperature which are Yellow, Orange and Red
  Use: Office, Cafeteria, Spaces with movements, area where people work late at night.
- **Cool Color (calming):** Colors that represent water, sadness, ice and decrease body temperature which are Green and Blue.
  Use: Work and collaboration spaces, meeting rooms, research areas.
- **Neutral Color:** Colors with no strong differences which are White, Silver, Gray, Brown, Beige, Tan, Black
  Use: large recreational areas. Open meeting areas with natural light, collaborative spaces.

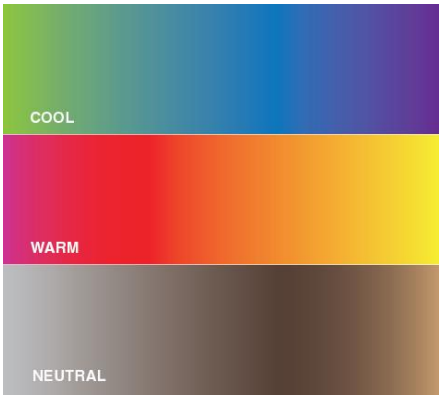


Figure 39: Classification of Color

5.2. Color Perception

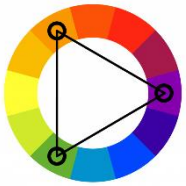
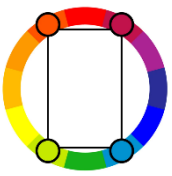
Table3: Color Percept Source:(Scargall,1999).

S.N.	Perception of	Warm Color	Cool Color
1	Time	Sense of time being stretched	Sense of time being condense
2	Sound	Intensify the sound	Lessen the impact
3	Calmness	Keeps the user alarmed	Sense of calmness
4	Weight	Appear heavy	Appear light
5	Volume	Appear space smaller	Appear space larger

5.3. Color Combination

A circle graph that charts each primary, secondary, and tertiary color — as well as their respective hues, tints, tones, and shades. Visualizing colors in this way helps you choose color schemes by showing you how each color relates to the color that comes next to it on a rainbow color scale.

Table 4: Color Schemes (Cartwright, 2021)

S.N.	Color Scheme	Combination	Example
1	Complementary	Use colors that are on opposite sides of the color wheel Provides high contrast	
2	Monochromatic	Use three shades, tones and tints of one base color. Provides subtle color	
3	Analogous	Use three colors that are side by side on the color wheel. Provides comfort ambience	
4	Triadic	Use three colors that are evenly spaced out on the color wheel. Provides contrast and balance	
5	Tetradic	Use Four colors that are evenly spaced on the color wheel. Provides boldness to interior	

5.3.1. 60-30-10 Rule

a. 60% = Your Main Color

Your main color is that one that anchors the whole space, and it's usually determined by the room's largest elements, such as walls, flooring, large furniture, and fixed surfaces.

b. 30% = Your Second Color

The second color should be incorporated in a proportion that is about half of your main color.

c. 10% = Your Accent Colo

6. Lighting in Library

The factors that determine good functional lighting design in libraries include not only the amount of light energy available for specific visual tasks but also the direction of the light relative to the eye, the brightness of objects surrounding the task object and within the field of view, and the surface reflectance and light diffusing characteristics of the task object (agrawal, 2017). Glare can result, for example, from light reflecting off a computer screen from overhead lights, bright light sources such as exposed light bulbs or even bright windows, or reflectance from glossy pages of a magazine (Malman, 2001).

For low glare environments, the ideal ratios of brightness levels within the field of view are often described as 10:3:1, for the brightness of the task (10) to brightness of the immediate surrounding (3) to brightness if general surrounding (1). An environment that largely achieves these ratios can be considered to have a good level of visual comfort (Malman, 2001).

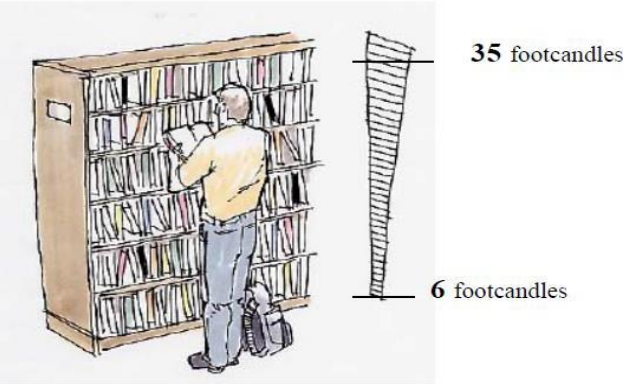


Figure 40: Light Quality

Table 5: FC level for different library spaces (agrawal, 2017)

Space	Minimum FC Level	Average FC level
Cataloging	20	30
Circulation desk and Reference desk	20	30
Computer Areas	20	30

Audiovisual areas	20	30
Audio Listening Areas	20	30
Reading (Newspaper, magazines)	20	
Reading (Fine detail items, small Print)	50	

6.1. Daylighting

The use of natural light, or daylighting, has traditionally been a desirable building feature and a hallmark of good design. When skillfully introduced, daylight creates an ambience of quiet contemplation and visual comfort and links the modern library user psychologically with the pre logical past (Dean, 2005).

The three fundamental design issues in daylight design are:

- Sun control, to mitigate any increase in the cooling load and to control direct glare
- Glare control to create and maintain comfortable brightness distribution, including no direct view of the bright sky in the normal direction of view.
- Variation control, to avoid any user perception of insufficient local light levels

The following sections treat the three design issues in the context of the types of daylight apertures that are commonly used in libraries.

6.1.1. Daylight apertures: Roof

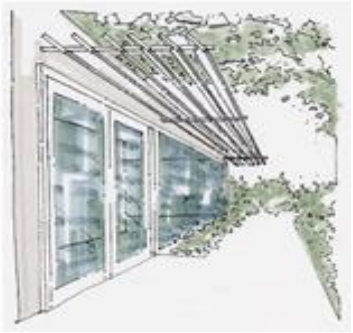
The design implication of typical planning characteristics of libraries is to work with the roof component of the building envelope to provide the controlled use of the sun and daylight to offset much of the normally high internal lighting load. There are a variety of methods of introducing diffuse, low glare daylight form the roof level, including skylights and roof monitors.

Figure 41: Triangular Skylights over library's main reading room

6.1.2. Daylight aperture: Wall

Clear glass is preferred for daylighting, but this in turn requires carefully designed exterior sun control devices to provide adequate shading. Although internally mounted shades and blinds reduce the high intensity and heat content of direct sunlight, the most effective sun control device is the exterior sunshade. An exterior shade will create a reduction of 80% of the incident solar energy.

Table 6: Sun Control Devices (Edward T. Dean, Daylighting Design in Libraries)

S.N.	Orientation	Application	Example
1	South-facing window	Horizontal sunshade excludes direct sunlight but allow diffuse daylight to pass through.	
2	North-facing window	Simple fixed vertical sunshade to control glare in hot climates at late afternoon.	
3	East and west facing windows	More difficult to shade Vertical or operable shutter is generally needed for low perpendicular sun angles.	

7. Sound

A library is traditionally a place of quiet study, a place where students and lovers of literature go for hours of intensive research or a peaceful read. Today, libraries serve a more diverse purpose, facilitating group discussions, book reading clubs, organization meetings and literary events (Marchetta, 2018). The challenge is turning the library into a comfortable area that caters for both silent and collaborative learners. In order to provide a comfortable environment acoustically, a library must have

- Appropriate levels of background sound,
- A physical barrier between noise-producing and noise- sensitive sections,
- Sufficient sound absorbing material in the space

Table 7: Typical recommended background noise levels in library spaces (E. W. McDiarmid, 1930)

Space Type	NC ratings
Open Public Areas	35-40
Computer Work Areas	40
Private Offices	30-35
Open staff work areas	35-40
Copy rooms	40
Teleconference rooms	25
Reading rooms	25-30
Classrooms / training rooms	25-30

Libraries should be able to cater for different studying styles while increasing speech privacy. If the aim is to drown out the noise in the library and help people concentrate on their own learning, acoustics panels are a suitable solution (Marchetta, 2018).

7.1. Sound Absorption

Sound absorption is the process of absorbing sound waves within a room, and is also known as acoustic treatment. This process involves reducing or eliminating echo, reverberation, and amplification. In short, sound absorption improves sound quality within a space, rather than preventing sound transfer. (Soundprrof Central, 2019).

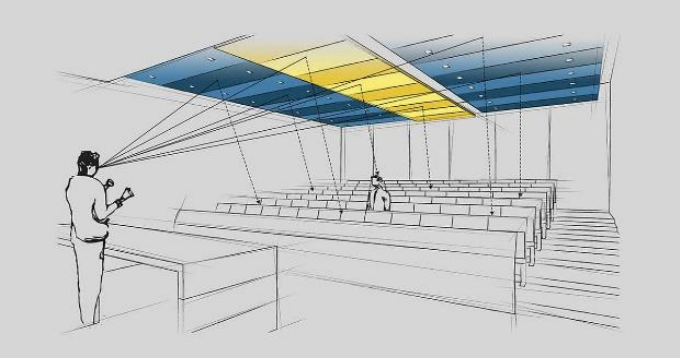


Figure 42: Acoustic panels in a seminar hall

7.2. Sound Insulation

It is the process of blocking noise from entering a room while sound absorption is the process of absorbing sound waves within a room, so they don't create an echo. Using wall, ceiling and floor insulation techniques, sound proof curtains, wall paper, paint, and door seals.

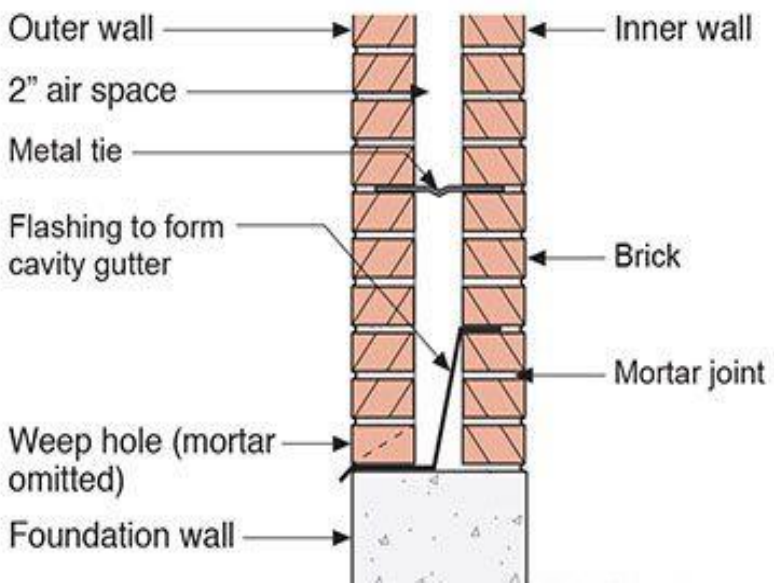


Figure 43: Cavity wall

7.3. Space Planning

Space planning can be the most cost- effective noise control technique. In terms of horizontal planning place noisy areas at the front with silent zone at the end and in terms of vertical arrangement place noisy area at the ground floor and upper floors with silent zone.

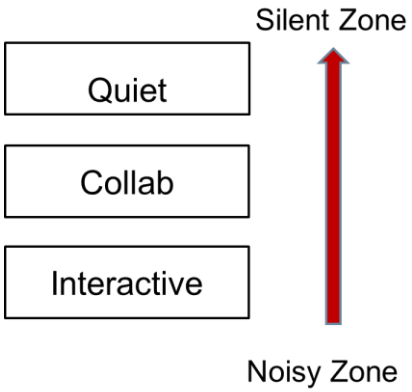


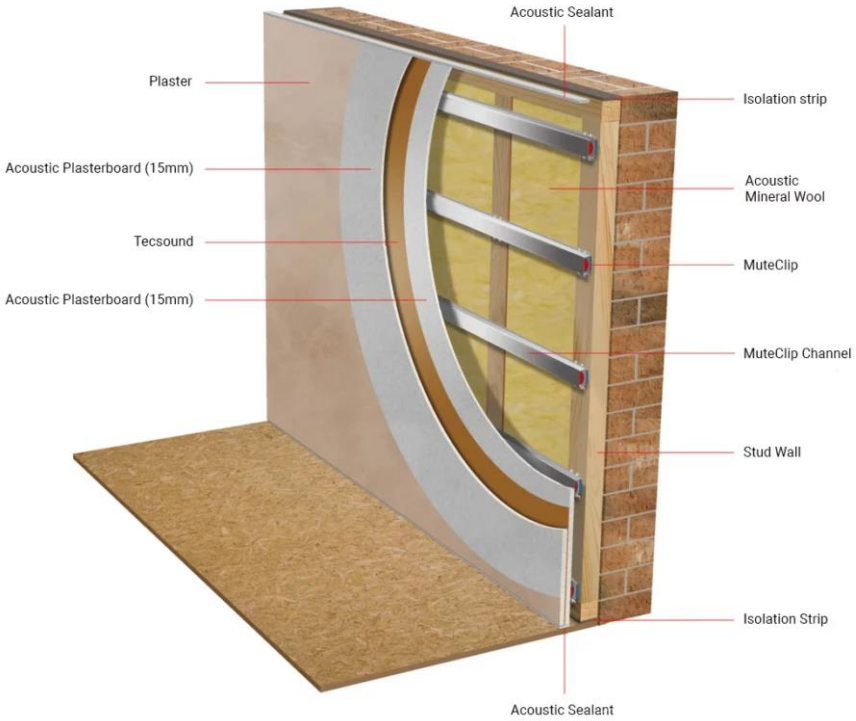
Figure 44: Space planning from noisy zone to quiet zone

Avoid locating mechanical equipment rooms and electrical transformer rooms near spaces that require low background noise levels. If this location is unavoidable, it will be necessary to introduce costly sound insulation method such as floating floor or heavy masonry walls, of proper sound insulation is to be achieved. A floating floor consists of a second concrete slab installed on neoprene pads and a layer of insulation.

7.4. Acoustic Materials

These materials noise reduction and noise absorption such as Acoustic Plaster, Acoustic tiles, perforated plywood, Fibrous plaster, cork board slabs, foam glass, thermocoal, acoustic panel, acoustic fabrics, acoustic foam, mineral wool, Soundproof windows and doors. (Marchetta, 2018)

Acoustic mineral wool with plasterboard section details: STL 50 dB shown below:



Sound Transmission Loss examples:

- 230mm wall with one side plastered: 48 dB
- 110mm all with both sides plastered: 45 dB
- 6mm double glazing with 100mm air gap: 44 dB

8. Security

The goal of the security system should be to provide a safe and secure facility for library employees, library resources and equipment and library patrons. At the same time, the security system must perform these functions as seamlessly as possible, without interfering with the library's objective of easily and simply providing patron services.

8.1. Site Planning

Site planning and landscape design issues should be considered when planning for a safe secure library. Appropriate and clear signage should be provided, including off site and entrance signage as well as on site signage that should include directional, cautionary, and parking signs for employees, visitors, service vehicles, and pedestrians.

Vehicle control is important; a specified distance from the library building to unscreened vehicles and parking should be appropriately set. Various types of buffers and barriers should be evaluated to enhance the landscape design while still providing the appropriate trees, static barriers, sculptures, and street furniture. Vehicular entrances should be designed to prevent high speed approaches.

8.2. Design of the Library Buildings

The following areas generally will have security issues that should be appropriately addressed in the design:

- Exterior entrances
- Archive and special collection storage spaces
- Special collection reading areas
- Children's library area
- Critical building component locations such as electrical switchgear, communication and security equipment and building control centers
- Public toilets
- Loading docks, mailrooms, and shipping/receiving areas
- Stairwells

8.2.1. Electronic Security

The electronic security system typically provides alarm notification to the appropriate authority, entry control and site surveillance. The major elements of any electronic security system include burglar protection, collection security, access control, and video surveillance.

8.2.2. Burglar Security

A burglar protection system includes sensors to detect an intrusion, alarms and notify the authorities.

Door and Window Contacts

Door and window contacts are used to trigger an alarm whenever a door or window is opened. They can be attached to or recessed within, the door or window frame to detect movement. In addition to the standard door and window contacts, there are contacts for outdoor use, for specialty uses and for high security applications.

8.2.3. Access Control

Electronic Access technology is the best system for controlling access to library buildings, facilities, and rooms. Authorized people are allowed to enter a controlled area by automatic unlocking of the door. Plastic access cards are inexpensive, and software can be programmed

to restrict access to certain areas while recording the time, date and location of unauthorized and authorized access attempt.

8.2.4. Video Surveillance

Video surveillance and closed-circuit television systems serve as a way to monitor and record security, deter crime and ensure safety. Advances in CCTV technology and reduction in costs have also made video surveillance a cost-effective management tool for library facilities.

8.2.5. Anti-Theft Detection

RFID (Radio Frequency Identification) is the latest technology to be used in library theft detection systems. Unlike EM (Electro-Mechanical) and RF (Radio Frequency) systems, which have been used in libraries for decades, RFID-based systems move beyond security to become tracking systems that combine security with more efficient tracking of materials throughout the library, including easier and faster charge and discharge, inventorying, and materials handling (LibBest, 2019).

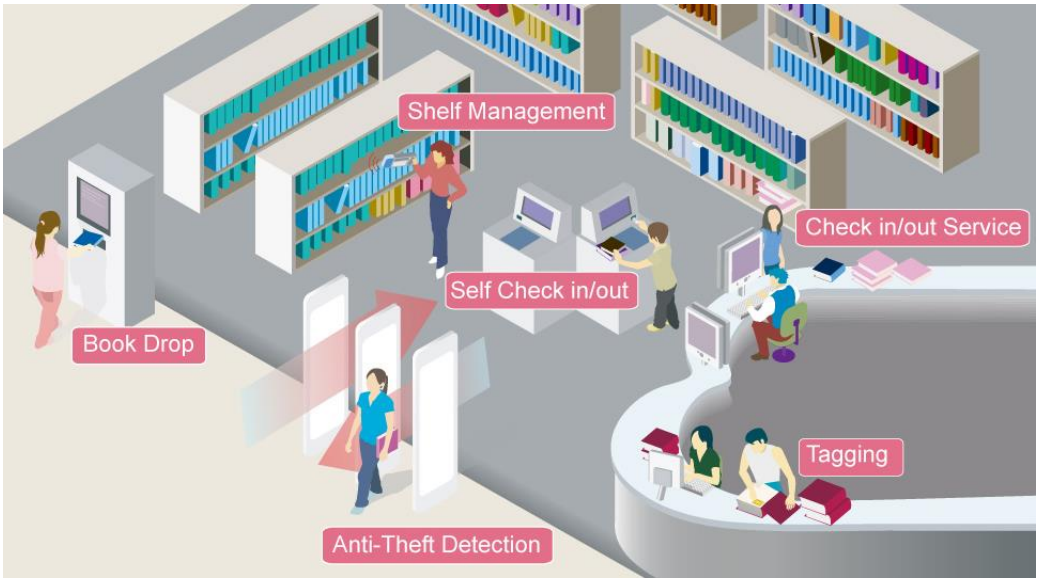


Figure 45: RFID System for library theft detection system

8.3. Plants

The following list shows how far plants can be placed from sunlight: (Ghosh, 2019)

a. Direct Sunlight

South or southwest-facing windows as far as 20 feet away.

East or west facing windows as far as 20 feet away.

b. Medium Light

Ranging from bright indirect to partial or filtered.

East or west facing windows up to 10-15 feet away.

South or southwest facing windows — min. 10 feet away up to 15 feet.

North-facing windows 3-5 feet away

c. Low Light/ Minimal Light

North-facing windows — no more than 20 feet away.

South, west or east facing windows that are facing courtyard or blocked by another building nearby.

Rule of thumb: if it's too dark to read a book, then it's too dark to have a plant.

8.3.1. List of Plants

Plants that boost learning: Rose, Jasmine, Orchid, Peace Lily, Snake Plant, Parijaat.

Tree: Plum, Jacaranda tree (birendra flower), chir pine (salla), lalupate

Purify Air Plants: Bamboo Plam, Spider plant, aloe vera, money plant, rubber plant

Evergreen shrub: Madagascar periwinkle

Coniferous evergreen tree: Dhupi tree, pine tree.

Deciduous tree semi: peepal, banyan, rudraksha

Vine: Flame Vine (Khursani ful), bougainvillea (बैगनबेली), Ivy vine only leaves

Plants that Repel mosquitoes:

- **Herbs:** rosemary, basil, mint
- **Plant:** Marigold, English Lavender

CASE STUDY

A case study is a process of researching into a project and documenting through writings, sketches, diagrams, and photos. The main purpose is to research and understand the concepts that an architect has used while designing that project and how it worked, and our aim should be to learn from its perfections as well as from its mistakes too while adding our creativity.

Case studies essentially give one a better understanding of examples of executed solutions for a project similar to that one is about to create. It helps to conceive the design better. Understanding what works, what doesn't. So multiple case studies must be analyzed as it helps us to understand the project and design it better.

For the National case study, the following public libraries have been studied:

- Tribhuwan University Central Library (TUCL) at Kirtipur, Kathmandu
- Kaiser Library at Jamal, Kathmandu
- Madan Puraskar Pustakalaya at Patan Dhoka, Lalitpur
- Nepal Japan Children's library at Lainchour, Kathmandu
- US Library at Lazimpat, Kathmandu

For the Regional case study, the following public libraries have been studied:

- Alliance Francaise at Delhi, India
- Kavi Narmad Central Library at Surat, India

For the International case study, the following public libraries have been studied:

- Seattle Public Library at Seattle, USA
- Tianjin Binhai Library at Tianjin, China

9. National Case Study

9.1. Tribhuwan University Central Library (TUCL)

9.1.1. General Information

Figure 46: Front View of Library

Location: Tribhuvan University Complex, Kirtipur, Kathmandu

Established: 1959 A.D. established along with the university

Extension date: 2007 A.D.

Architect: Robert Weise

Total Area: 47,000 sq.ft

Orientation: East

Topography: Flat Land

Total staff: 63

Materials: About 40000

The total collections are over 285,000 books, 450 titles of periodical standard newspapers. The library has maintained manual catalogue cards. Yet in addition to this, there are over 45,000 records on computer data base and 34000 records accessible through the online public access catalogue (OPAC) international publications since 1965 A.D. It also contains the only international standard book number (ISBN) nation agency in Nepal since 2001 AD.

9.1.2. Selection Criteria

Since, TUCL is the first and largest university library in Nepal in terms of collection, services and members, I choose this library to study:

- Various library spaces and their interrelation
- The management system needed for library building
- To study the architectural expression of the different library plan and form.

9.1.3. Access

The library building is approached by 24’ wide road around the site and the main entry from the east side.

9.1.4. Zoning

Main building lies almost in the center of site. Courtyard is in between old and extended building. Parking is done on the site of front of road, as specific space for parking is not separated. Small canteen is located at south side and a toilet block is toward north south. The park is under construction just in front of library opposite to road.

9.1.5. Planning

Areas with maximum use are located at the level of the entrance at ground floor and other areas are located above this level reducing the vertical distance to minimum. Quiet study space is for from entrance. Service space almost 30% of the building.

9.1.6. Design Analysis

Overall building form is the combination of mass, surface and space elements. It has got symmetrical façade with central traditional entrance. The main stair is place straight ahead in front of entrance. On the entrance floor, small reading spaces are open placed on each side of the entrance. The book stack generally occupied the rear on all levels. A symmetrical building resulted.

Tremendous amount of glass has been used in the façade for natural light. Protection has also been provided for the comfort of the users. Vertical and horizontal sun shading devices, wide overhangs, outside screens of concrete have been to counteract the excess light from the glass. Massive stone wall has been provided at the corners of the building for the visual stability.

9.1.7. Organization of Spaces

The building is of two stories where mostly the lending section are placed at the ground floor where as all other remaining sections of library are reference section placed in upper floors along with administration.

Basically, books stack in the library are in both open access and closed access. In open access readers can themselves pick books from selves and put them back where as in closed access required name of the book is given to the librarian and obtained. In TUCL lending section, UN depository, periodicals are in open access whereas thesis collection, Singh collection, American studies section, textbook collection are in closed access.

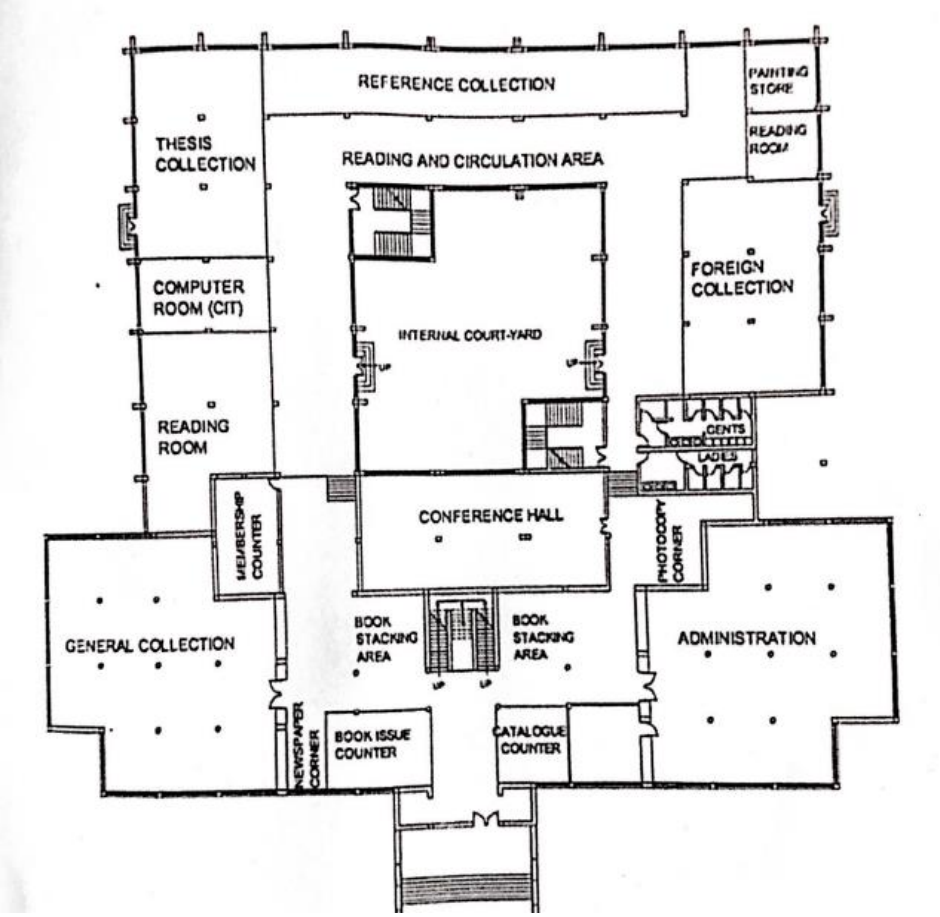


Figure 47: Ground Floor of TUCL

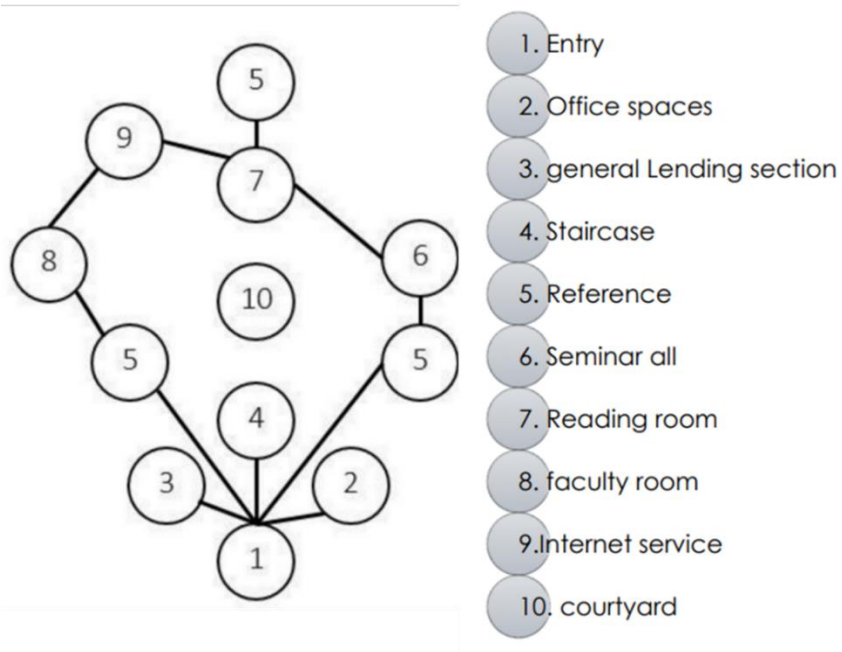


Figure 48: Space flow of Ground floor

9.1.8. Service Area

- **Entrance:** Separate entrance is provided for staff and general public. Split level planning with provision of ramp for disable in the ground floor only.
- **Circulation counter:** It is located near public catalogue area and general study area and has close access to the stacks. Size and function of circulation counter depend on size of library and issue system in use.
- **Public Catalogue Area:** It is located near circulation counter and reference area and is within the easy reach have been catalogued according to AACR (Anglo American Cataloguing Rules).
- **Property counter:** It is located next to the entrance and has a registration counter as well. There is a separate baggage space for ladies and gents.
- **Security:** Guards and electronic system is being used in security. Since 2001, the library has able to install a magnetic security system near the checkout counter to prevent from being taken without issue.

Figure 49: Property Counter

9.1.9. Study Area

It is the most used area in the library which holds more than 3, 00,000 books and over 34,269 volumes back volumes of periodicals. Various section under reading is:

Figure 50: Signage board near staircase

- **General Section:** It is located near the circulation counter and has the collection of rare and heavily demanded book on various topics.

- **Reference Section:** It is located near the public catalogue, circulation counter and reading areas.
- **Newspaper reading hall:** It is located near circulation counter is the most crowded section of library.
- **Back volume of newspaper:** Small section of 500mm wide and 2100 mm height is provided for keeping back volumes of newspaper. They are kept in open access system
- **Nepali collection center:** It is located near the reference section and housed all the books published in Nepal. It has closed access system and has a separate catalogue section.
- **Nepali journals:** A separate section provided next to the back volume of newspaper.
- **Current journal reading room**: current journals are displayed on special shelving.
- **Research scholar's room:** A separate room is provide for research for scholar. It has capacity of 52 readers.
- **Information Technology (IT) room:** To provide effective services from electronic sources and allow access to the world, the library has IT room to cater this need.
- **Microfilm unit:** This section consists of microfilm laboratory and microfilm reading room. The microfilm laboratory consists of microfilm developers and fixers.. This room consists of three microfilm reader machine, scanner and printer.
- **UN depository:** This area is located next to the reference collection and reading room area. It housed the publication of UN and other international organizations.
- **E-library:** This section is located on the 1st floor of expanded building and has computer with internet facilities. It has total capacity of 30 computers.
- **ISBN:** This section of library is located next to e-library on northern part of the 1st floor. It has different machines to print ISBN number on the books, printer, storage racks and technician office.

Figure 51: Reading hall

9.1.10. Library Interior

a. Lighting

The central courtyard provides enough light in the interior. Therefore, there is need to use artificial light in the daytime in reading area, Seating areas are adjusted around the central court for maximum use of natural light. Shading device are basically not provided except on the front façade therefor there is glare problem in some of reading spaces. Sun shading devices curtains glare but no admission of heat, so interior is cold during winter. Intensity of light is also lowered in the reading areas.

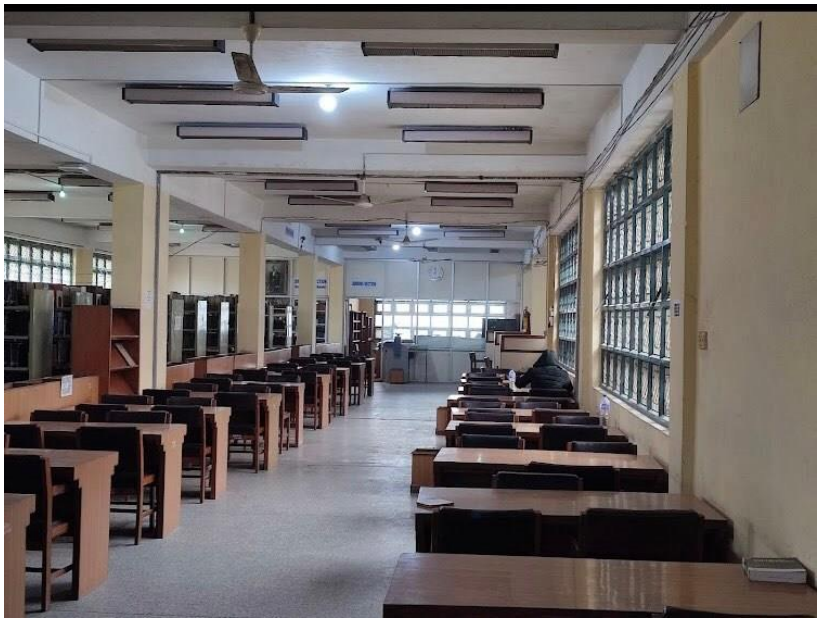


Figure 52: Reading hall next to courtyard

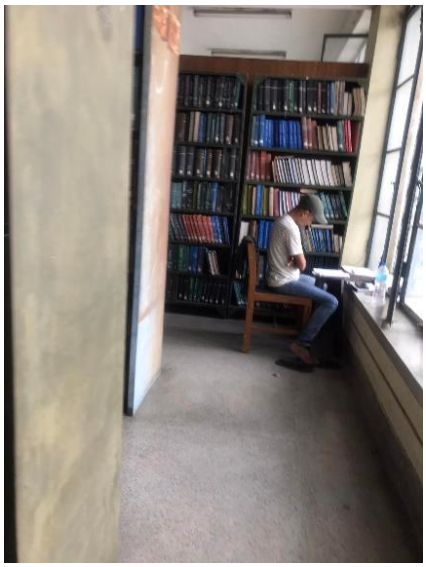


Figure 53: User studying against the window for proper light

b. Acoustics

There is no acoustic treatment in the library. It lacks absorbing materials on the wall, floor and ceiling. Seminar hall also lacks acoustic treatment therefore it may disturb other areas of programs are run there. Gypsum board has been installed in ceiling of extended library portion at present.

c. Heating and Cooling

No alternative mechanism for heating and cooling has been provided than the openings which is in general enough for the spaces except in some corners and lobbies in absence of the openings creating discomfort and stuffiness.

d. Circulation Pattern

The library basically has a linear flow in between book stack and seating area. Overall the library has enough space for circulation and seating except in the reference section in the main foyer where the long table in between the book stack creates some obstruction. The catalogue rack adjacent to the entrance passage also creates obstruction at the entrance.

9.1.11. Building Services

- **Parking:** No specific area is provided for parking for library. But since the university has enough space so, there is no problem for parking.
- **Rain water drainage:** rainwater drainage is done through plastic pipes connected to the traditional water spouts. Rainwater drains are provided along the periphery of the building.
- **Electricity:** It is supplied by 3-phase system. Maintenance room is located outside library premises near the transformer, and from their underground supply is done to the library.
- **Sanitation:** Septic tank of 5600x1500x1500 and soak pit of 4000 diameter, 300 depth is provided at the north of building.

9.1.12. Inferences

- Site can act as a source of inspiration for building design
- Ramps should be properly incorporated.
- Greeneries should be included in the interiors as well
- Entry and exit of the readers should be through the same door for good security provisions.
- Column spacing should be according to book stack.
- Acoustic treatment should need improvement.
- Day light is used through the courtyard.
- Individual carrels are desirable.
- Glare, ventilation and acoustics shall be considered while designing.
- Additional facilities such as café, group study area shall be incorporated.
- Proper designated parking spots are required

9.2. Kaiser Library

Figure 54: Kaiser Library

9.2.1. General Information

Location: Kaiser Mahal, Kathmandu

Established: 1968 (as public library)

Orientation: East

Topography: Flat

Building Type: Neo-classical

Users: students, children, researchers and foreigners

Total staff: 20 staff members including Chief librarian, library officer

Collections: 60 thousand books and 700+ documents

Opening hours:

- Summer: 10:00am to 5:00 pm (Sunday to Thursday)
- Winter: 10:00 am to 4:00 pm (Sunday to Thursday)

9.2.2. Selection Criteria

It was a private library during Rana Rule which later turned as public library. So, being the nation's oldest federal cultural institution and served as the study arm of education for all. I selected this library to know how it is linked to history and its surrounding area which is Garden of Dreams. Also, to study the spaces of library and gallery.

9.2.3. Historical Background

Kaiser Shamsher Jung Bahadur Rana (1892-1964), a field marshal in the Royal Nepalese Army and third son of then Rana Prime Minister Chandra Shamsher Jung Bahadur Rana (1863-1929) left a most significant legacy in the form of his private library known as Kaiser Library. During his visit to Britain with his father in 1908, Kaiser Shamsher was very impressed by the libraries and museums of Britain. After he returned back, he developed his own private library, today popularly known as Kaiser Library. This library remained private for many years even after the people's revolution of 1950. In 1964, Kaiser's wife, Krishna Chandra Devi Rana and their sons donated 32 ropanis of land including Kaiser Library within Kaiser Mahal premises to the government of Nepal. The library was made public at a special ceremony on 11th September, 1969 and since then the library has been running under the Ministry of Education, Government of Nepal.

9.2.4. Access

The library building is located within a complex housing the NO office and garden of dreams at the junction of Lazimpat approached by road. A separate entrance is provided to go into the library having no direct access to the garden of dreams.

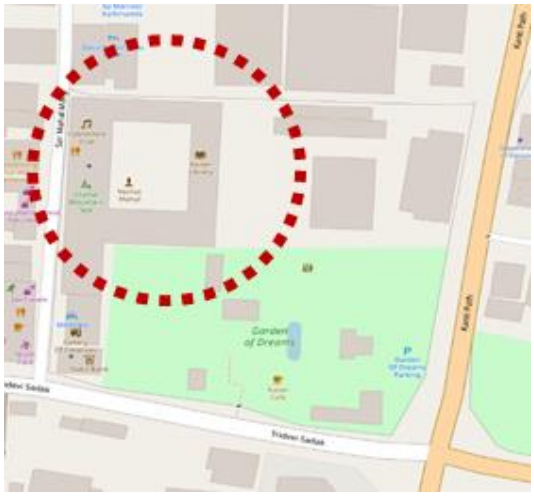


Figure 55: Location Map of Kaiser Library

9.2.5. Facilities and Services

The Kaiser library is a reference library. The resources are freely available to all the user inside the library. All the collections, except manuscripts are kept in open access. The catalogue of

entire collection is automated and all bibliographical data for books/documents can be searched in WINISS/KOHA software. The total collection of the library has divided into following section according to library collection:

- Kaiser collection (old collection)
- New Section
- Manuscripts Section
- Periodical Section
- Children Section
- UNESCO Section

9.2.6. Present Condition

The building was severely damaged in the earthquake of 2072 due to which most of section are closed now and only the ground floor is used nowadays. The books and documents from the damaged rooms have been retrieved but without any more space they remain packed in large bags and stored in the previous reading hall. The rare collections have been recovered as well which now collect dust in the books racks in the primarily closed section. The painting that once graced the walls are now laid at the feet of wall.

Currently the building is being re-modelled and is said to be completed within this year. So, a pre-fabricated structure houses the library having a capacity of 50 students at a time.

Figure 56: Present State of Kaiser Library

9.2.7. Service Area

- **Entrance:** No Separate entrance is provided for staff and general public.
- **Circulation counter:** It is located near public catalogue area and general study area and has close access to the stacks. Size and function of circulation counter depend on size of library and issue system in use.
- **Property counter:** It is located next to the entrance and has a registration counter as well.
- **Security:** Guards and electronic system is not in use for security.

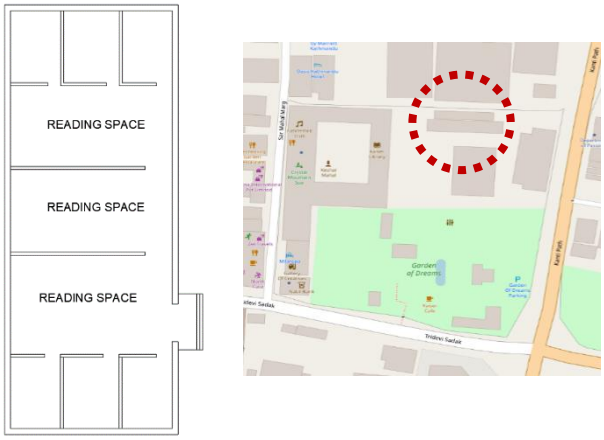


Figure 57: Present pre-fabricated Kaiser library plan and shifted location map

9.2.8. Study Area

General Reading area: It is located at the entrance with a study table in the middle for 12 people with circulation counter at the front.

Figure 58: General Reading Area

- **English Section:** The individual carrels along with group study table is provided at the periphery housing the English collection stacks in the middle.

- **Nepali and Children Section:** Due to lack of space at the time being collections are stored in a room where study tables are provided but not the ones for children. Adjacent to this section is the staff room. About the rare collections, they are currently placed in a different room located outside the building.

Figure 59: Current English section

9.2.9. Library Interior

- **Lighting:**
  Natural lighting filters through the windows but in some area the day light is insufficient, and we find the use of artificial light from ceiling.
- **Acoustics:**
  No use of acoustical treatment such that the sound coming from the building being re-modelled disturbs the reading environment.

9.2.10. Inferences

- Location plays a vital role in attracting users.
- Surrounding greeneries shall be incorporated in the design
- Adequate daylighting at reading places neglecting the glare
- Individual carrels are desirable
- Hubs for group discussion, project work should be provided
- Acoustics and ventilation help to create a comfortable reading environment.

9.3. Madan Puraskar Pustakalaya

Figure 60: Madan Puraskar Pustakalaya

9.3.1. General Information

Location: Patan Dhoka, Lalitpur

Established: 1955 A.D.

Reconstructed: 2016 A.D.

Architect: Nripal Adhikari

Orientation: North

Topography: Flat

Total staff: 10

Materials: About 30,000

The Madan Puraskar Pustakalaya (MPP) is.

9.3.2. Selection Criteria

Being the principle archive of books, periodicals, ephemera, including many other collections in the Nepali language. Since over five decades of establishment, it has been continuously engaged in collection and archiving of published materials in Nepali language. Also to study about the construction technology of the building and materials.

9.3.3. Access

It is located inside the complex housing Dhokaima Café and Rato Bangla School near Patan Dhoka accessed by 6m road.

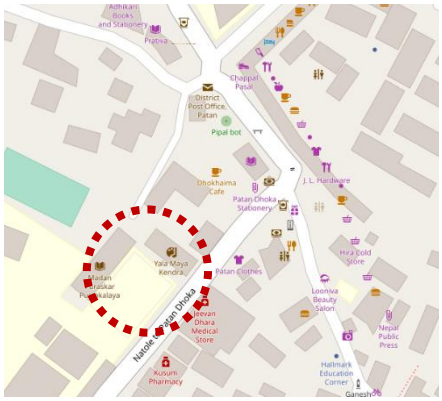


Figure 61: Location Map of Madan Puraskar Pustakalaya

9.3.4. Zoning

The building is placed at the edge of the site and strategically oriented North-South direction to gain maximum north light with parking facility inside the complex.

9.3.5. Planning

Ground floor area houses the collection materials where the mezzanine floor is used as study area. The library has closed access to the collection an can only be acquired after requesting but its digital format can be easily accessed through the computers made available in the mezzanine floor.

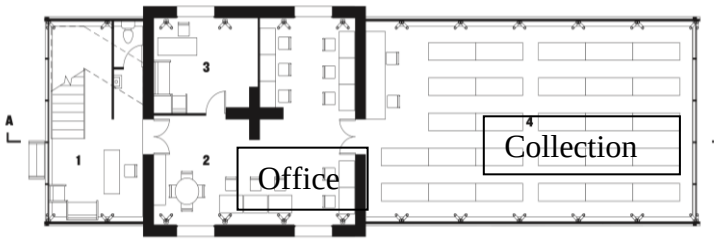


Figure 62: Ground Floor Plan

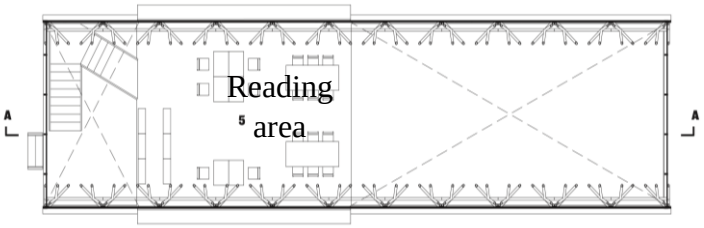


Figure 63: Mezzanine Floor Plan

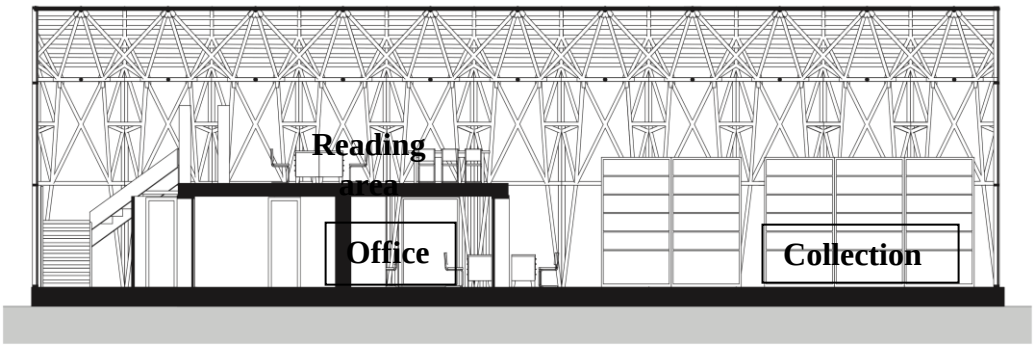


Figure 64: Section at A-A

9.3.6. Design Analysis

Several architectural marvels were devastated, and traditional homes crumbled by the earthquake of 2015. The library originally made up of brick, mud mortar and lime mortar with some steel beams, was weakened by the earthquake. So vernacular style of architecture and largely used locally available and indigenous bamboo resource and rammed earth were used for the construction.

Only the superstructure is re constructed where rammed earth of 16”thick is used for walls which store solar radiation slowly releasing it overnight making the interiors cool in summer and warm in winters. Large windows placed at the north with 3’-0” roof overhang. The rood is constructed using bamboo as primary support. Truly stood up to its theme “filter light into these archives and set a stage for visitors to be earthquake friendly”.

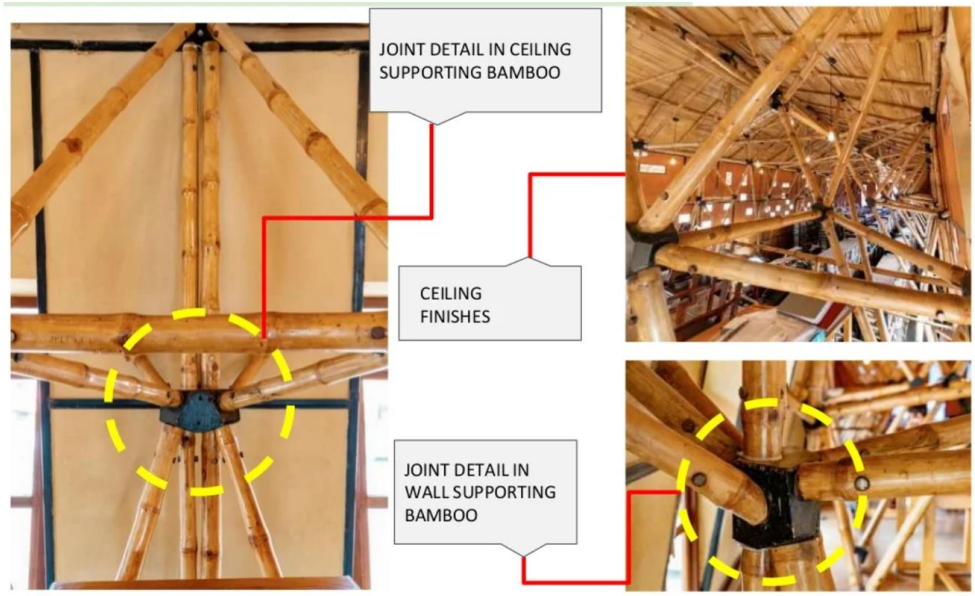


Figure 65: Construction Details

9.3.7. Organization of Spaces

As told by the collection manager daily 12-15 users visit the library for research purposes mainly enter the lower level via a reception area, with private offices found beyond measuring 900 square feet (84 sq. m), the archive occupies the majority of the ground floor accessed by a ramp and stairs.

A bamboo staircase leads to a mezzanine level, where visitors are invited to sit and study the documents from here, guests can see the archive below and the impressive bamboo ceiling overhead. But due to lack of space other functions than personal reading resulting in quiet spaces can only be seen here.

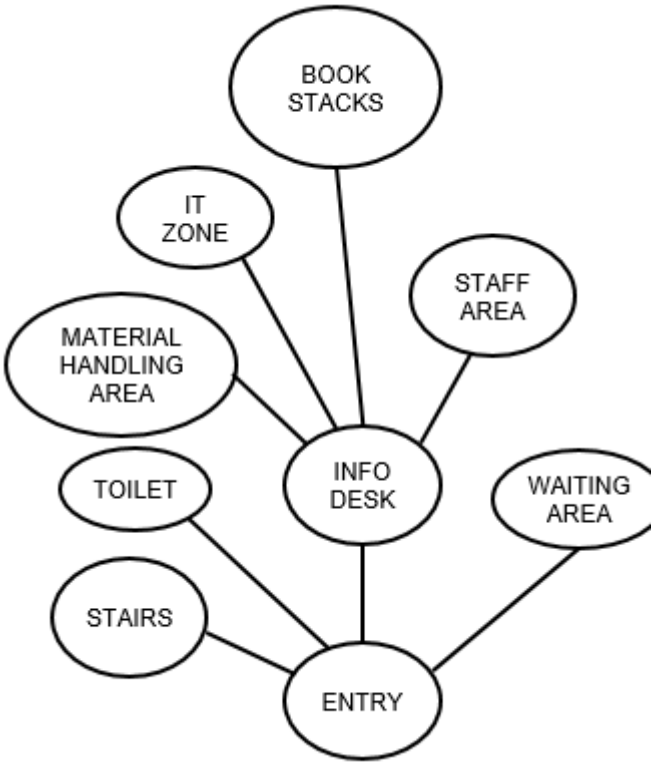


Figure 66: Ground floor space flow

9.3.8. Library Interior

- **Lighting:**
  Since the mezzanine is the only space used for reading so the large windows oriented north provides adequate indirect light which is good for reading.
- **Acoustics:**
  The construction technology itself act as a good sound absorbing material which inhibits noise transfer between rooms extremely effectively.
- **Circulation:**
  The bamboo stairs is placed right at the entrance near the circulation desk leading to the floor for reading purpose. The books can only be accessed after requesting with the staff.

Figure 67: Collection Space

Figure 68: Mezzanine Reading Space

9.3.9. Inferences

- Use of local material and construction technology.
- North-South orientation is desirable.
- Archive should be close accessed.
- Space for microfilming, digitalization shall be provided.
- Same use of material throughout the space creates monotonous and stuffy feeling.
- Principles of Universal design shall be used.

9.4. Nepal Japan Children's Library

9.4.1. General Information

Figure 69: Nepal Japan Children's library

Location: Lainchour, Kathmandu

Established: 2001 A.D.

Architect: Nipuna Shrestha

Land Area: 5925.20 sq.ft.

Users: children, students, and families (25-30 users/ day) for 4-14 years old.

Visitors: 15/day and 60 on holidays

Collection: 40,000+ books including books, journals, newspapers, and materials of archaeological importance such as stone and metal sculptures of gods and goddesses, other archaeological collections, and rare photos.

Opening hours:

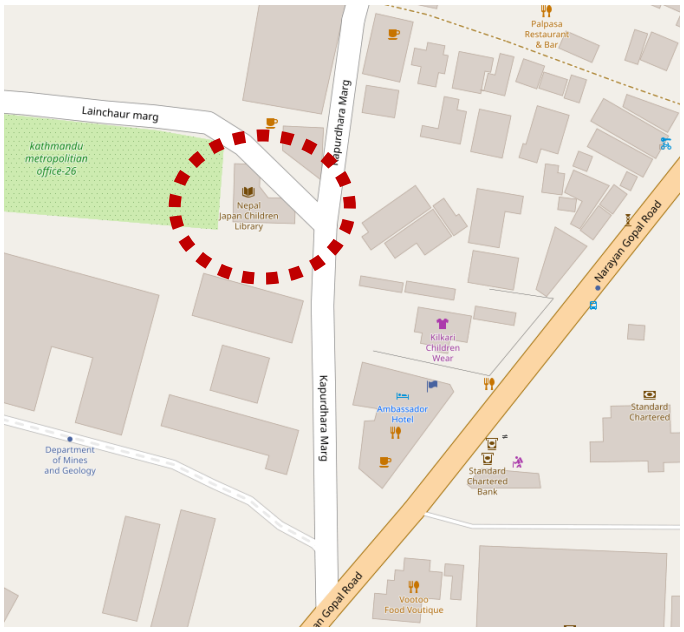
12:00 PM to 5:30 PM except on Wednesdays, which is a holiday

The Nepal Japan Children's Library was established in May 2001 with funding provided by Joho-Roren, one of the largest industrial unions in Japan. It is situated in a space provided by the Kathmandu Metropolitan City Office. The library functions as a project of the Osaka International Club-Nepal Chapter, an association of ex-trainees and ex-students of Osaka Prefecture. The Osaka International Club-Nepal Chapter was established in 1999 with the objective of introducing Japanese culture through various demonstrations such as Ikebana (flower arrangement), Origami (paper cutting), and Nihon no ryori (Japanese cuisine), etc.

9.4.2. Selection Criteria

In order to understand in what ways a children library differs from the rest in terms of space requirement, facilities and services provided, outdoor activities, interior and furniture.

9.4.3. Access



9.4.4. Programs

- Books and magazines.
- Toys and games.
- Videos, DVDs, and CDs.
- Computer, Internet.

9.4.5. Design Analysis

The building is L-shaped with three storey height located on the secondary road. The users are welcomed by double height foyer where circulation desk is placed. The junior section is placed on ground floor where Theme based furniture and reading materials are placed. Bright and primary colors are more used to make the space exciting and fun.

The stairs leading to the first floor where senior section is placed has tread nearly of 0'-4" for the children. The furniture shelves are of lower height about 4'-0" to be accessed by the children which in turn allows the light to penetrate inside rather than blocking it.

As children can be notorious there are some cases where they go outdoors but the library being closed to the road there might be the chance of accident. So, children library location shall be strategically placed which has connection with safe and vehicle free outdoor environment under the supervision of staffs.

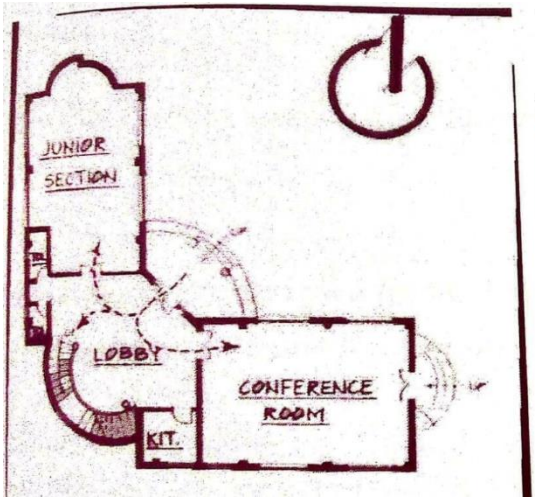


Figure 70: Ground floor plan

Figure 71: Origami Class in multi-purpose hall

9.4.6. Organization of Spaces

The library is mainly divided into two sections: senior and junior. Junior section is located in ground floor and has parquetting on floor for children's safety. This room houses for books and toys. Theme based furniture can be seen having animal faces, fairys , castle and so on. There is a multi-purpose room where children movies are shown. On Saturdays mainly different activities are conducted story hour, painting, craft, Origami, science experiments, talk program and dance lessons.

Circular staircase leads to the upper section which houses the senior section. A room having mid height furniture shelves at the periphery with study stable at the center is present. Adjacent to it has a table having about five computers access to e-library. Administration is also located on this floor.

Figure 72: Senior Section

9.4.7. Lighting and Acoustics

- Natural lighting through large windows on both sides of the room.
- Curtains have been used for reducing glare problems
- Being closed to the road it is affected by the sound noise but no such acoustic treatments are done.

9.4.8. Inferences

- Security provision is desirable
- Outdoor connection is required.
- Provision for parking.
- Low and mid high shelving aids in better light penetration.
- Bright and colorful colors with theme-based furniture.
- Activities and programs for children along with parent’s involvement.
- Space for having lunch is desirable.

9.5. American Library

Figure 73: American Embassy

9.5.1. General Information

Location: Maharajgunj, Kathmandu

Established: 1952 A.D.

Users: students, researchers and foreigners

Visitors: 40-50/day

Collection: 6,000 books including American novels, business works, non-fictional works, English language learning and reference materials.

Opening hours:

Monday through Friday 9:30 A.M. to 4:30 P.M.

The American Library, which was part of the US Embassy's public affairs to increase mutual understanding between the US and Nepal, was opened by the late Matrika Prasad Koirala, former prime minister.

The changing landscape of Kathmandu has forced the American Embassy to change the location of the American Library multiple times over the years. Initially, it was situated at New Road—the heart of Kathmandu. In the course of time, New Road started becoming too crowded, so the Library moved to a more peaceful area in Gyaneshor. A few years later, due to space constraints, the Library again moved to the Hotel Complex of Yak and Yeti and remained there until it finally moved to the newly built embassy building at Maharajgunj.

9.5.2. Selection Criteria

To know about the reading area, management system and facilities provided which is under direct supervision of the US Embassy, and in what ways it differs from our national public libraries.

9.5.3. Access

Since the library is located within the premises of US Embassy it is accessed by the main road of Lazimpat.

9.5.4. Security

To go inside the library, one has to go through a security check where the personal belongings and body check is done at the entrance. After registration only required reading materials are allowed to take in the library with mobile phones left at the security counter switched off.

Fixed circulation pattern is to be followed when stepped inside the building. For example, if there are two doors on the same wall then left is used for entering whereas the right for exit. If the pattern is not followed then security guards' places nearby might cause a scene. Furthermore, no signage is placed above the doors.

9.5.5. Organization of Space

The library is one roomed located at the ground floor having maximum capacity of 70 person.

Upon entering the room circulation desk is placed with study tables. Nearly 10 computers are provided to surface e-library.

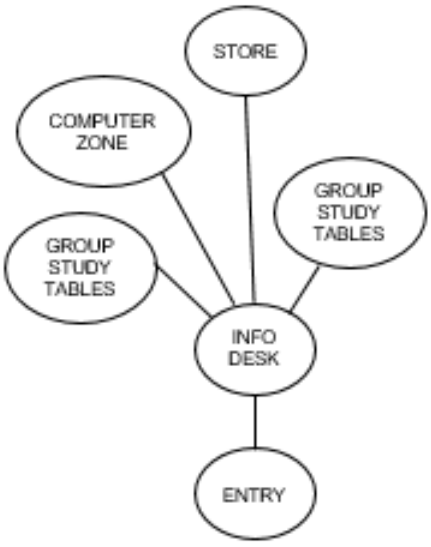


Figure 74: Library Space Flow

9.5.6. Library Interior

- **Lighting**
  There are no any windows and ventilation in the room. So, the place is lighted upon by artificial lights only.
- **Acoustic**
  Acoustical treatment on ceiling with acoustic tiles on the wall.

9.5.7. Inferences

- Visual transparency between the interior of the building and outdoor is desirable.
- Too much security hassle can demotivate the user to go inside.
- Proper signage is to be kept
- Natural light with connection with outdoor space is preferred.
- Cool colors indeed have a calming and cooling effect.
- Along with group study tables, individual carrels are also preferred.

10. Regional Case study

10.1. Kavi Narmad Central Library

Figure 75: Kavi Narmad Central Library

10.1.1. General Information

Location: Surat, India

Architect: Ajit Jariwala

Years of Construction: 1991 A.D.

Floors: 3

Total Area: 6158 sq.m.

Opening Time: 8:00 am to 8:00 pm

Before 1991, 'the Suratis' had places of entertainment and recreation like gardens, auditorium, swimming pools, and cinema houses and so on; but there was no full-fledged public library as a source of knowledge and information. Several stray Reading Halls provided only newspapers, periodicals and journals to the book lovers. The libraries of schools and colleges were restricted for their students. The common man or professionals, technical experts, persons associated with trade and commerce really required a Central Library with the collection of books of their field and choice. Therefore, the Surat Municipal Corporation in 1991 at Ghod Dod Road constructed the public library which is the largest in the city with 2,26,391 books and a membership of 46,855.

10.1.2. Organization of Spaces

Ground floor: The building has the provision of surface and basement parking where entrance is located at the corner having cloak room. The space and area distribution of the floor:

S. N	Functions	Area (Sq. m.)
1	Information Center	56.5
2	Newspaper and magazine section	260.5
3	Cloak room	15
4	Senior citizen area	110
5	Administration section	152
6	Stack area	858
7	Blind's library	55
8	Children's library	385.5

Figure 76: Ground floor plan

Figure 77: Children library

First Floor:

The senior and children section is located on the ground floor where the youth section is located on the first floor where boy's and girl's reading section is separated accessed through common lobby.

S. N	Functions	Area (Sq. m.)
1	Reference Section	560
2	Rare book section	192
3	Technical room	150
4	Boy's reading room	950
5	Girls reading room	572
6	Washroom	60

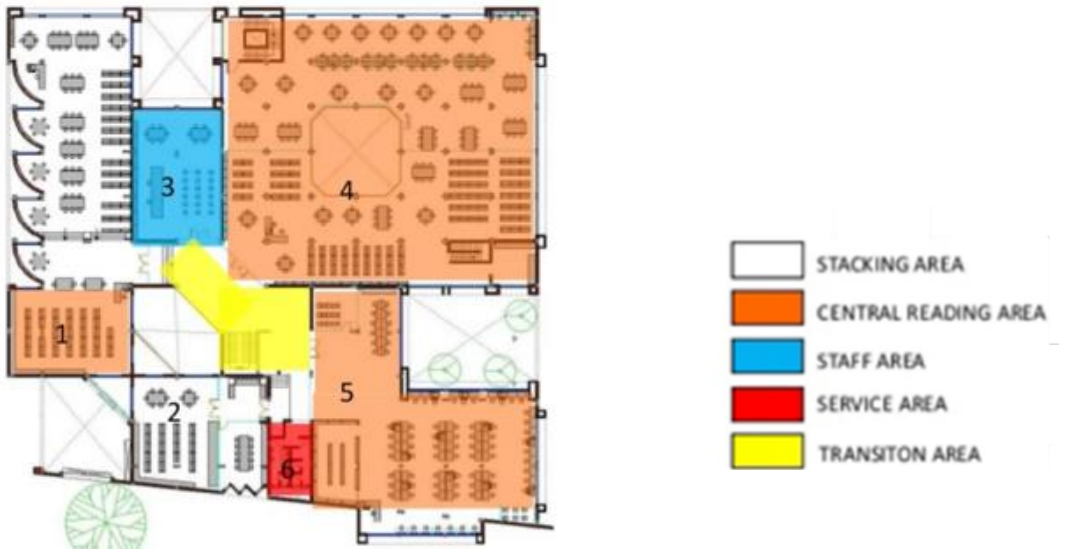


Figure 78: First floor plan

Figure 79: Reference Section

Second Floor Plan:

Extra reading space is provided on this floor along with audio-visual and conference room.

S.N	Functions	Area (Sq. m.)
1	Extra Reading Room	1530
2	Conference Room	190
3	Audio Visual Room	190

Figure 80: Second floor plan

10.1.3. Circulation

In the ground floor every space is approached by the atrium and in rest of the floors by the common area. The circulation space runs diagonally along the plan connecting activities.

The staircase is placed in such a way that is easily accessible which is right at the entrance and close to common area as seen in the floor plans provided above such that the width of staircase is 1.5m.

10.1.4. Light and Ventilation

The windows get open in the north direction to get the natural light. The double height in the atrium gives vastness and the natural light penetrates through the above skylight.

Figure 81: Light through skylight provided on the roof

10.1.5. Materials

Reinforced concrete construction where the exterior of the building is given the effect of exposed concrete and glass window are placed on the north façade.

10.1.6. Inferences

- Common area such as atrium, wide lobby are desirable to connect spaces.
- Circulation and service area shall be placed in close proximity with common area.
- Provision of parking spaces
- Use of sun shading devices and skylight.

10.2. Alliance Francaise

10.2.1. General Information

Figure 82: Alliance Francaise

Location: Delhi, India

Year: 2004 A.D.

Architect: Stepher Paumier and ABRD

Site Area: 2850 sq.m

No of Storeys: 4+1 basemnet

The building was built as a cultural center for the French Embassy in India, the building looks to represent both the French as well as the modern Indian identity. Today, it functions as one of the most successful cultural centers in the city with a special emphasis on serving as a learning center and an exhibition space. Unlike other cultural spaces, it is able to attract young energetic audiences and thus becomes an apt model to be studied

10.2.2. Access

The location played a key role in dictating the design of the building. Placed in the middle of the Lodhi Institutional Area there was a very strong visual and distinct architectural presence. Besides the built character, the proximity to the lush and historic Lodhi Gardens was another key driver of the design.

Lastly, the site had two huge pipal trees present on it. In an effort to save them, the form was devised around them. Even though performing space and gallery is a common feature of buildings all around, the center is still able to stand out due to its learning center. This becomes the crowd puller and thus, a more popular location to host events as well.

10.2.3. Programs

Basement: Art gallery, sunken gallery forecourt (open area in front of large building) Parking provision, and Service area.

Ground floor: Plaza, Auditorium (112 seat), Café and Entrance court

First floor: Classrooms (12 in number)

Second floor: Library

The library is located on top of the auditorium which has two zones: an interactive zone which is a double height space flood with sunlight and the other one is the quiet zone which is single height space with book stacks and study tables.

Third floor: Conference room and offices

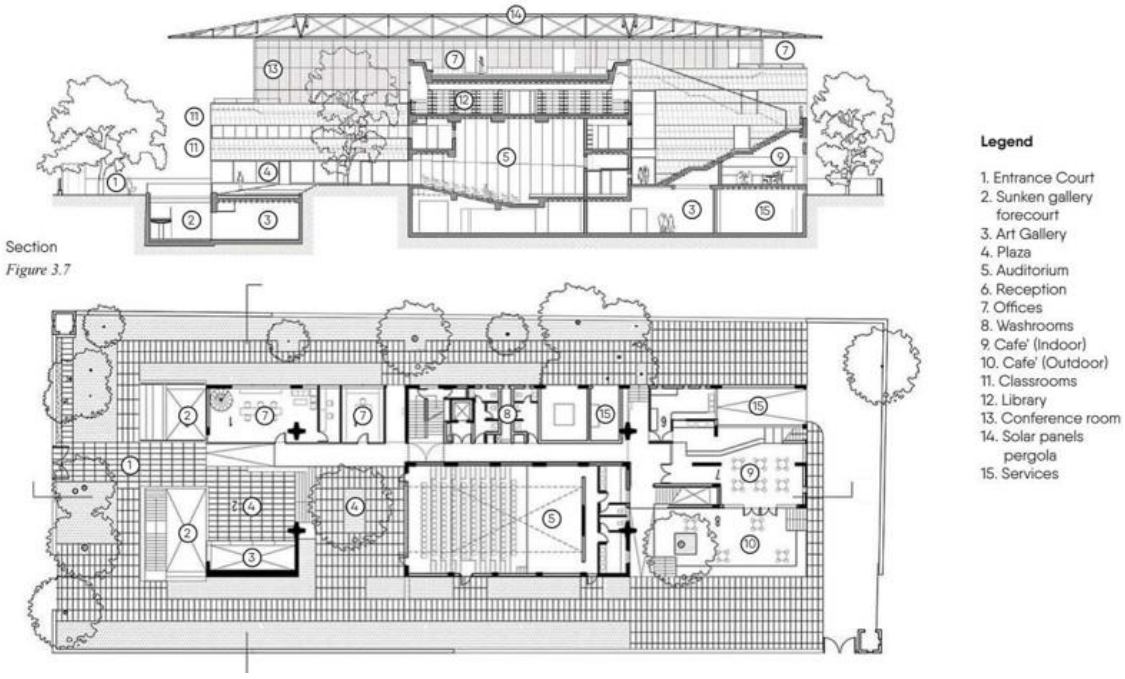


Figure 83: Ground floor plan and reception section of the building

10.2.4. Zoning

The building operates in layers both vertically as well as horizontally. The more public features such as the gallery and auditorium are placed at the lower levels which are right at the front. The café another popular crowd gatherer is designed to have its own ecosystem making the experience unique even entering from back.

The private and semi-private spaces such as classrooms, offices and the library are located higher in order to gain visual surveillance over public activity as well as for reduced noise level for reading and working.

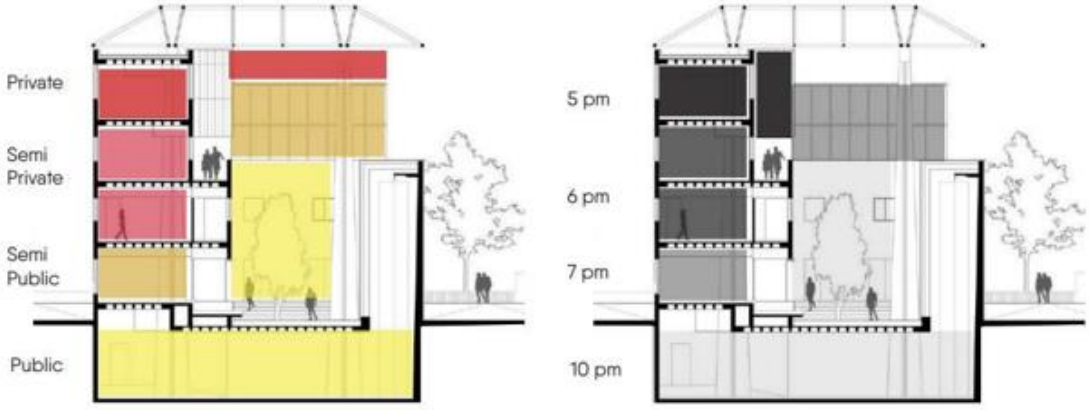


Figure 84: Zoning

10.2.5. Entrance Sequence and Visual Connections

Play of levels: The sunken courts make the entrance corridor serve like a bridge. This unexpected change in level comes as a surprise amongst the visitors who have only viewed it as a flat site from outside.

Play of volume: The open corridor sheltered by the mass on top breaks the open-air volume of the courtyard. Such contrast adds to the entrance experience.

Visual corridors: The open passages lead the eye to the imaginative horizon making it easy to comprehend many components all one glance.

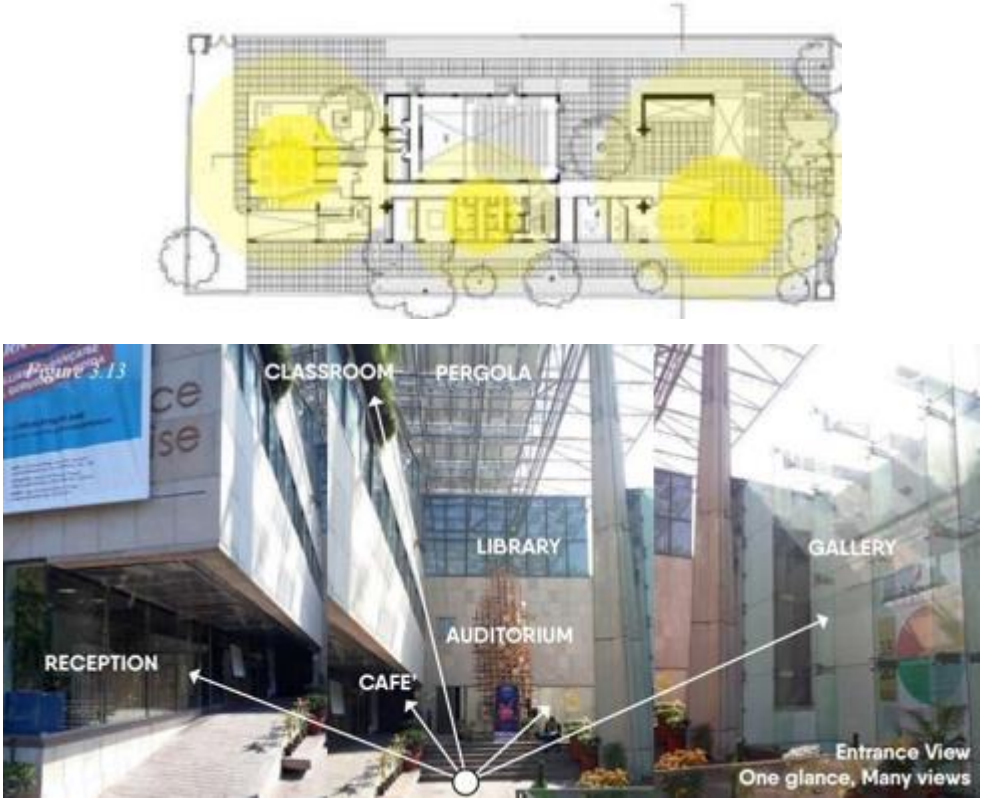


Figure 85: Entrance sequence and visual connection

10.2.6. Materials

The bottom two level of the building are made in beige sandstone and help the building blend with the historic neighbors and appear warm. The above two levels are made of steel and glass and marks a modern identity of its own. Topped by roof gardens and creepers the nature helps blend the two materials making the building appear humble.

10.2.7. Structure

Waffle slabs and steel structure form the primary structure of the building which has allowed the creation of column free spaces. The structure also allowed the vertical stacking of large spans both the auditorium and the library on top pf each other.

10.2.8. Inferences

- Building shall be designed respecting the site context and blending with the surrounding very well.
- Besides library, functions like art gallery, auditorium, classrooms and offices can also be provided.
- Public to private spaces can be arranged for reduced noise level.
- Corridors and stairs with ample light and openness can become a play in itself.
- Material palate can be used as per the site context.
- Structures like steel, waffle slab is useful in providing column free space.

11. International Case Study

11.1. Seattle Central Library

Figure 86: Seattle Central Library

11.1.1. General Information

Location: Seattle, USA

Year: 2004 A.D.

Architect: Rem Koolhaas and Joshua Prince-Ramus

Site area: 6000 sq. m.

Built up area: 38,300 sq. m.

No of storey: 11

Designed as a destructive new typology of a public library, the project aimed at re-defining the library and its role. Rem Koolhaas, the principal architect of the project, emphasized that the curatorship *of* the mass available content is what will make libraries vital in the future. The concept was to design the library as an access point of information presented in a variety of mediums

11.1.2. Concept

The concept involves the reinvention of the library as an access point to information presented in a variety of media. “The new library does not reinvent or modernize traditional, they are just packaged in a new way,” explain in the OMA study. To realize this, Koolhaas applied its interpretation of the feature set and architecture for the project that the building would be flexible for future expansions, with the possibility of grouping of spaces according to the needs of the building and the platforms connected to the study would provide open spaces, work and social interaction.

The problem of American libraries was their unpredictable changing nature. With increase in books, the common space got compromised and with that, lesser people visited. Thus, the idea of compartmentalized flexibility was used as the main concept where the stable program of the library such as staff area, parking, admin, collection area is never changing and the unstable program like kid room, informal reading area, meeting room are changing which are compartmentalized.

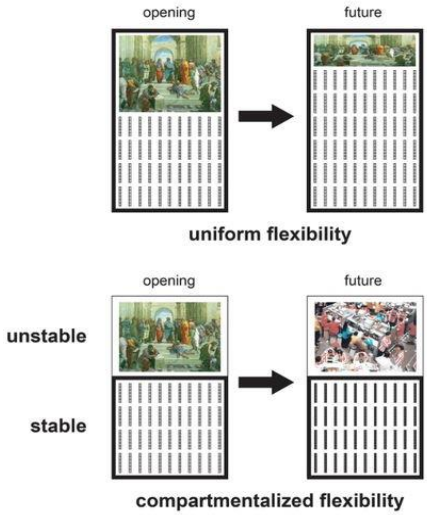


Figure 87: Compartmentalized flexibility concept

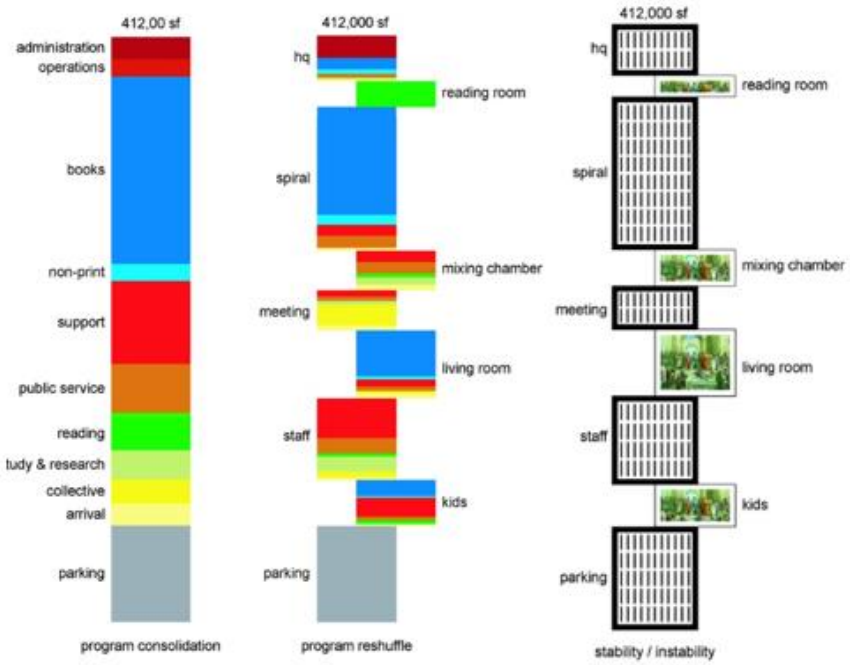


Figure 88: Vertical Planning of Library

11.1.3. Program Arrangement

Using the compartmentalized flexibility, the vertical and horizontal arrangements were done in the library. The stacked geometry was a result of a tight, urban site. Each platform catered to a specific function and thus was different in volume.

The volumes were arranged in a way that they provided self-shading, triple heighted spaces as well as opened up unique views of the city at different levels.

Public - Semi public - Private zoning can be observed vertically. It also indicates the noisiest to least noisy spaces.

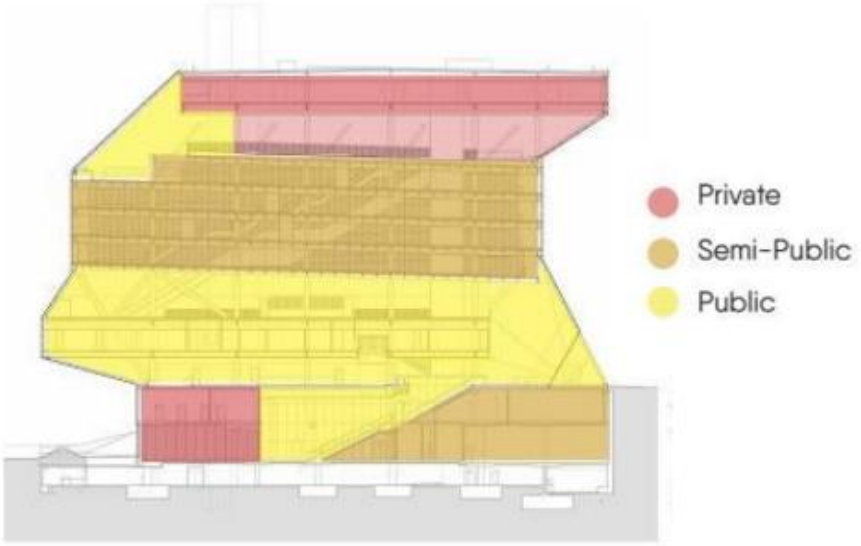


Figure 89: Public to Private space zoning

Figure 90: Form development as per light, shadow and view

11.1.4. Spaces

The interior is divided into 5 distinguishable blocks from the outside:

- The parking area
- Public reading area
- Café deployed in the large atrium
- Main library space, area information, collections and reading rooms
- Administration, all they culminate in a terrace on the roof.

The third floor of the library is called “living room “. The library does not consistently use traditional names that help make your stay exciting. The location of the book series is called” spiral” and computing space is called” mixing chamber “. Shelves have the panels in extreme indicators that help in the organization.

The main feature of the interior is its large public spaces and leisure reading, illuminated with natural light coming through the glass walls. Also noteworthy plants collections, consisting of a ramp that goes over 4 floors. All Areas bind with brightly colored escalators (except collections), and the furniture and objects are modern and colorful design. The library provides a “meeting level” with curved walls painted red and a children’s area with playful inclined columns

11.1.5. Levels

- **Level 0:** At level 0 the garage that can be reached from Spring Street is located, has 143 seats.

- **Level 1:** Accessible via Fourth Avenue at this level is the large hall of 1200m2 public computer section, a front desk, public phones and playground. o Playground o Auditorium o Idioms Sections

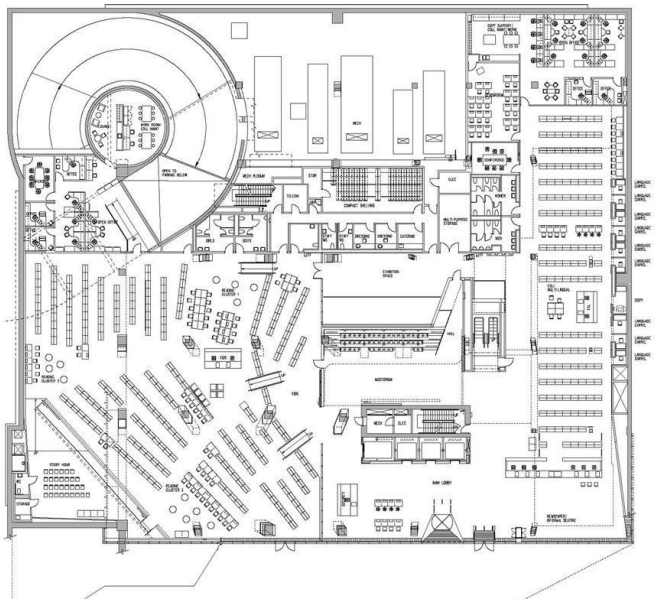


Figure 91: Level 1 plan

- **Level 2:** Level 2 is for staff and is not open to the public. From this level the sending, receiving, sorting and technical services of books and collections are performed.

- **Level 3:** The living area of this level is called “living room” (Living Room), and includes areas of reading or meditation. It is a spacious and airy space, with a maximum height of 15m. The patterns correspond to bright outdoor rugs plantations located at the entrance to the library on Fifth Avenue.

- **Level 4:** Level 4 has four large meeting rooms. The hallway walls, floors and ceiling are painted in deep shades of red and pink, while meeting in appeasing colors and neutral tones like brown and gray. Two laboratories Technology Training Centres Boening are used for public and personal computer instruction.

- **Level 5:** A House Mixes, 1811.61 m2, visitors flock to for help in general and research issues. In this plant the largest computer lab, the Employment Resource Centre, workbooks and study, scanners and image editing, updated telephone directories, encyclopedias, bulletin board community, and public review documents are located tax, Legrady Installation Art,” Making the invisible visible” and study tables.

- **Level 6-9:** The space character is silver and high technology; the roof is black and aluminum floor. This plant also has the highest concentration of technology library, 140 computers, and is the gateway to the area known as” book spiral”

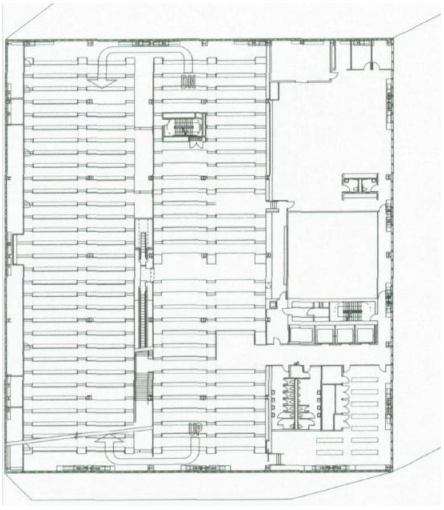


Figure 92: Level 6 floor plan

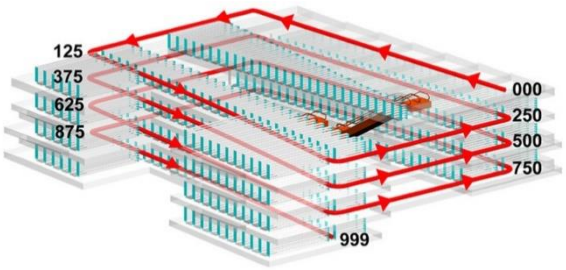


Figure 93: Book spiral with ramps and arrangement of books in Dewey decimal system (non-fiction)

- **Level 10:** The atrium which rises in level 4 light filled the room 1114.84m2 Betty Jane Narver Reading, with 400 seats, a roof 12.19m high and overlooking Elliott Bay. The Hugh and Jane Ferguson Seattle Room rooms are also on this level overlooking the reading room. It is accessed via escalator or elevator.

Figure 94: Reading Area

- **Level 11:** It has administrative offices, including the office of the City Librarian, Virginia Burnside Board Room, Human Resources and the staff cafeteria. At night, the Seattle Public Library lights highlighting among other buildings. It is an amazing and functional building of one of the most important architects in the world.

11.1.6. Building Interior

The main feature of the interior is its large public spaces and leisure reading area illuminated with natural light coming through the glass walls. Also noteworthy plants collections, consisting of a ramp that goes over 4 floors. All areas bind with brightly colored escalators and furniture and objects are modern and colorful design. The building is covered by a striking glass and steel structure which has played with light, shade, shadows and views.

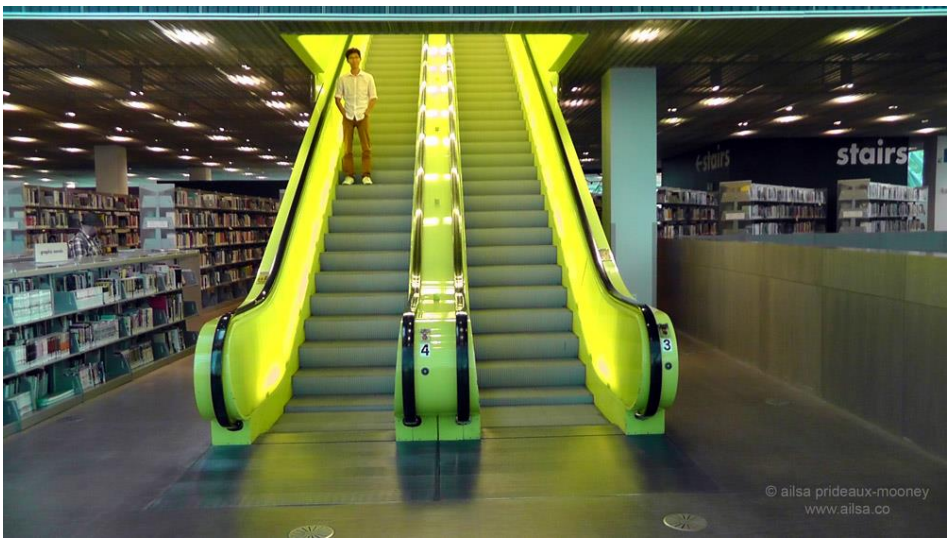


Figure 95: Escalator color coded in yellow for easy navigation

11.1.7. Material

The building is covered by a striking glass and steel structure. The bright white pillars with bases have high finishes in black, the fire insulation are sprinkled with glitter. Only in areas of the public square in carpet level rises, with photographs of Petra Blaise plant material on screen printed on the fabric of the carpet, creating a biology lab effect.

The escalators are finished in fluorescent lime color, lined with backlit panels. They only go upstairs, down elevator being due or escalators. In its construction were used: 18.400m3 of concrete, rebar 2.050tn, 4.644tn Steel Outdoor 9,994 pieces of glass exterior curtain 126.767m2. Approximately half of the panels are glass construction of three layers with a mesh of expanded metal trapped between the two outer layers. The mesh, an aluminum sheet is cut and stretched, reducing heat and glare. Most of the glass is cleaned twice a year, and more often for areas that require it.

11.1.8. Structure

a. First System

In the first system, the platform perimeter truss, comprising a multistory prefunded support gravity loads of the building. The trusses are supported by inclined columns and carefully positioned to increase opportunities counterweight, cantilevered platforms 1.32 m

b. Second System

The second system, the grid of diamond-shaped steel, the building form the exoskeleton. Steel grid provides the lateral system of the building, roof trusses interconnected platforms serves as architectural interior finish, and supports the glass covering curtain construction. Connects specially designed sliding laterally attached to the steel grid reinforcement of the platforms. The connections both structural systems fused while preventing the transfer of gravity loads steel grille. The system maintains the thin grid without fire protection, and most importantly, with the desired aesthetic. Models were made full-scale connections, molded in 3 -D, to test and verify the results.

c. Reinforcements

- Three solutions wing par interior areas requiring reinforcements were developed: Steel grille is reinforced with an additional layer as reflecting the pattern and location of stress.
- There was a lack of inclusion of transverse angles in columns intervention, allowing carry loads more directly from the points of maximum stress to the nearest support columns.
- Gravity columns were used in slope, in line with the plane of seismic curricula.

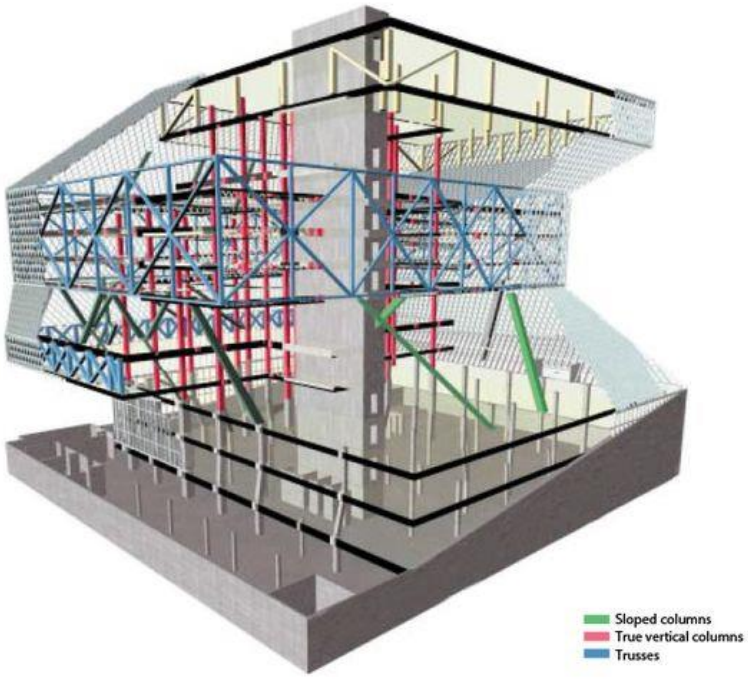


Figure 96: Structural System

11.1.9. Inferences

- Form and Planning can also be governed by view, light and shadow.
- Color coded interiors with unique names.
- Book Spiral and mixing chamber space uses.
- The traditional collection area and modern programs shall be incorporated.
- Iconic structure attracts more users.
- Use of compartmentalized flexibility.

11.2. Tianjin Binhai Library

11.2.1. General Information

Figure 97: Tianjin Binhai Library

Architects: MVRDV, Tianjin Urban Planning and Design Institute (TUPDI)

Location: China

Area: 33700 m2

Project Year: 2017

Interior Architect: TADI interior architects

Tianjin Urban Planning and Urban Design Institute (TUPDI) has completed the Tianjin Binhai Library, a 33,700 m3 cultural center featuring a luminous spherical auditorium around which floor to ceiling bookcases cascade. The undulating bookshelf is the building's main spatial device and is used both to frame the space and to create stairs, seating, the layered ceiling and even louvers on the façade. Tianjin Binhai Library was designed and built in a record-breaking time of only three years due to a tight schedule imposed by the local municipality. Next to many media rooms it offers space for 1.2 million books.

11.2.2. Concept

The building's mass extrudes upwards from the site and is 'punctured' by a spherical auditorium in the center. Bookshelves are arrayed on either side of the sphere and act as everything from stairs to seating, even continuing along the ceiling to create an illuminated topography. These contours also continue along the two full glass facades that connect the library to the park outside and the public corridor inside, serving as louvres to protect the interior against excessive sunlight whilst also creating a bright and evenly lit interior.

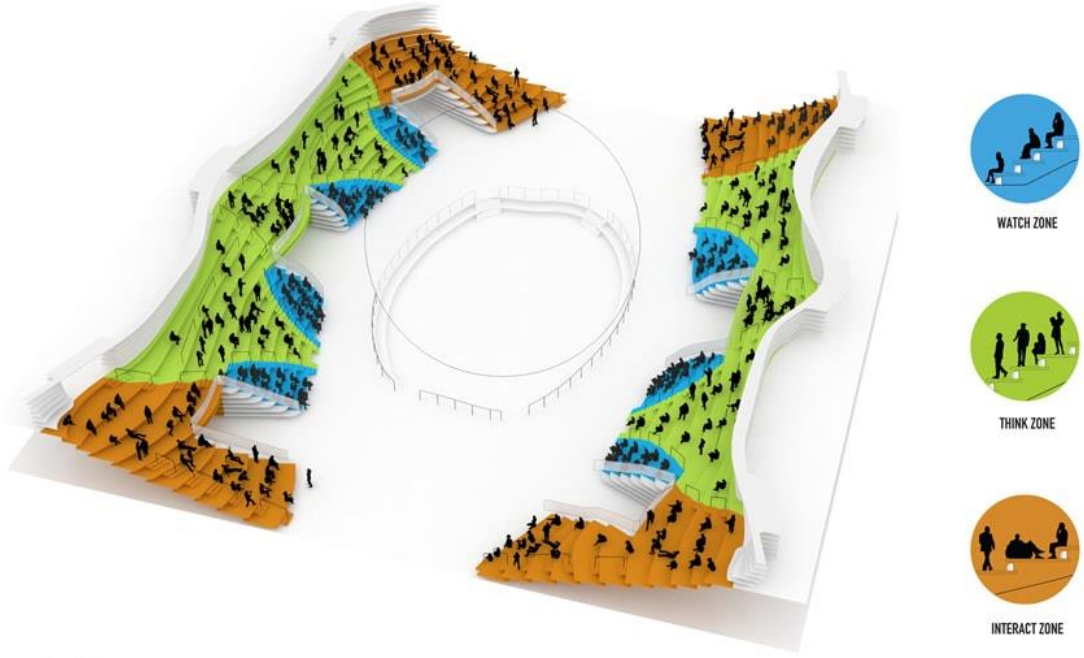


Figure 98: Library Concept

11.2.3. Organization of Spaces

The main reading area or nicknamed as “The Eye is the center of the library. It ‘hollows out’ the building and creates, out of bookshelves, an environment to sit, to read, to hang out, to climb and to access, to create an organic social space,” explains MVRDV co-founder Winy Maas. “In its heart is the auditorium which mirrors the environment, giving a 360-degree panorama of the space inside; a truly reflective and pensive environment.” Which extends up to the third floor of the building.

- **Basement:** service spaces, book storage and a large archive,
- **Ground floor:** reading areas for children and the elderly, the auditorium, the main entrance, terraced access to the floors above and connection to the cultural complex.
- **First Floor:** reading rooms, books and lounge areas
- **Second Floor:** reading rooms, books and lounge areas
- **Third Floor:** meeting rooms, offices, computer and audio rooms
- **Top Floor:** meeting rooms, offices, computer and audio rooms and two roof top patios.

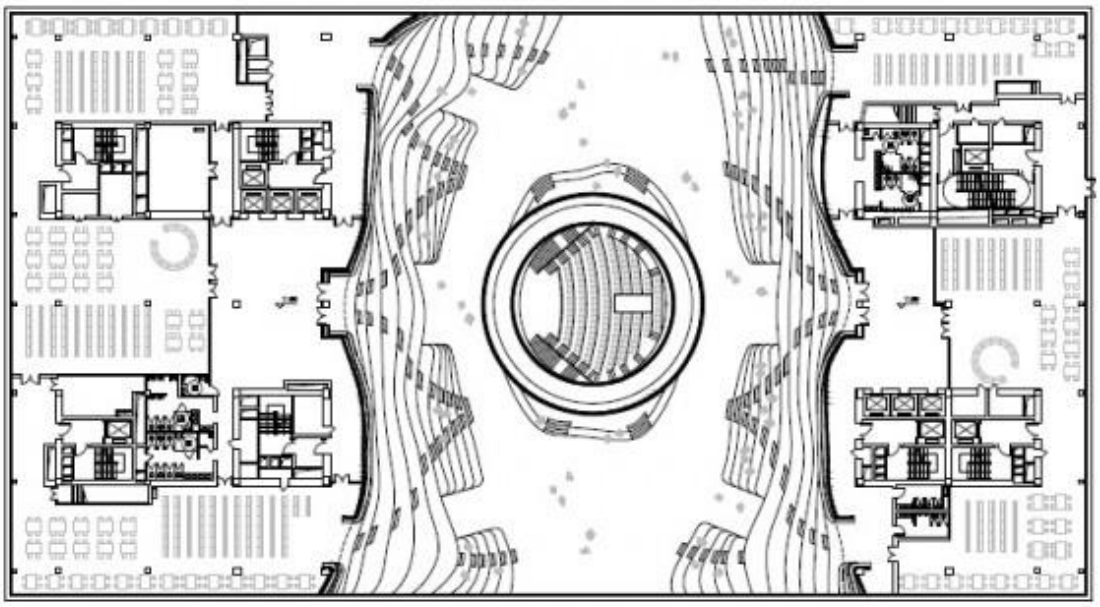


Figure 99: Ground floor plan

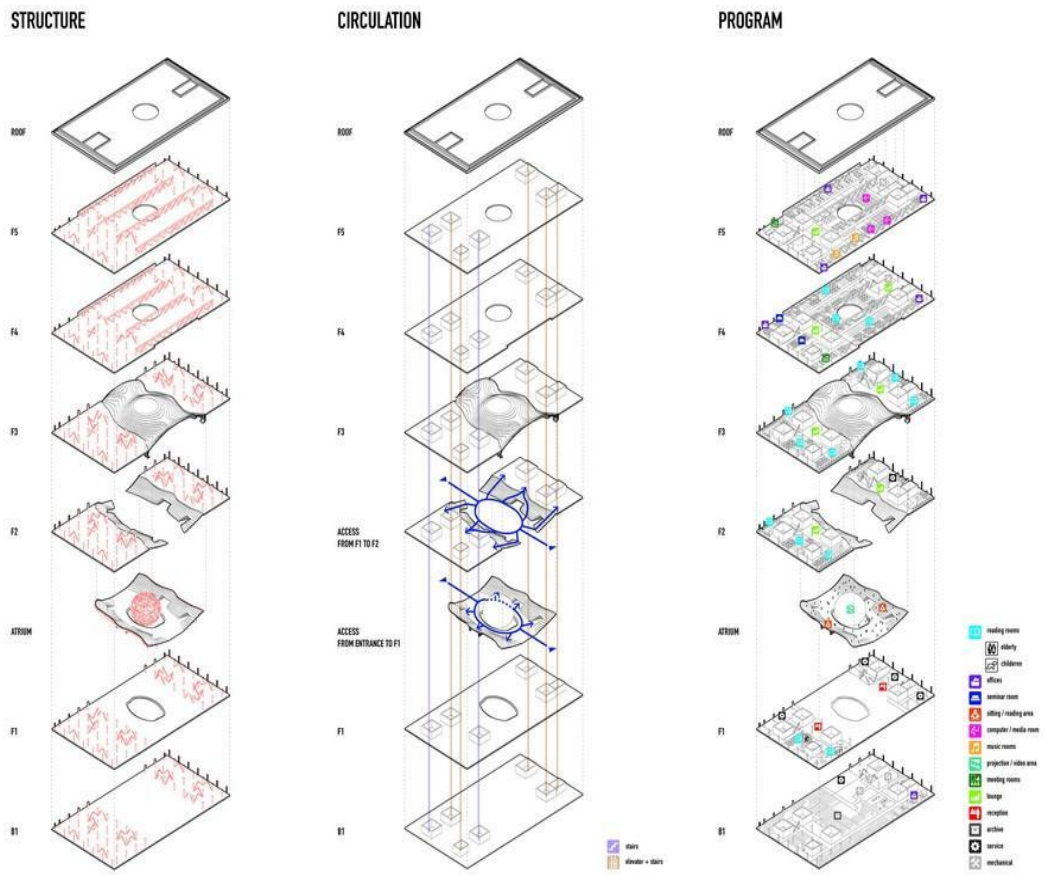


Figure 100: Axonometric exploded diagram showing structure, circulation and program

11.2.4. Building Interior

“The Binhai Library interior is almost cave-like, a continuous bookshelf. Not being able to touch the building’s volume we ‘rolled’ the ball shaped auditorium demanded by the brief into the building and the building simply made space for it, as a ‘hug’ between media and knowledge” says Winy Maas, co-founder of MVRDV. “We opened the building by creating a beautiful public space inside; a new urban living room is its center. The bookshelves are great spaces to sit and at the same time allow for access to the upper floors. The angles and curves are meant to stimulate different uses of the space, such as reading, walking, meeting and discussing. Together they form the ‘eye’ of the building: to see and be seen.”

The majority of the “books” in the room are in fact printed images of book spines papered onto the back of the shelving to give the appearance of rows of tomes. If you take a closer look at the stunning photos of the space, it is easy to tell the real books apart from the flat replicas.

Figure 101: Main reading area of library

11.2.5. Inferences

- Unique and attracting features shall be made visible from the streets.
- Building form and mass can be played not externally but internally as well.
- Basement can be used not only for parking but also for storage.

11.3. Longshang Book Café

11.3.1. General Information

Figure 102: Longshang cafe interior

Architects: Atelier Mearc

Location: China

Area: 188 m2

Project Year: 2017

11.3.2. Concept

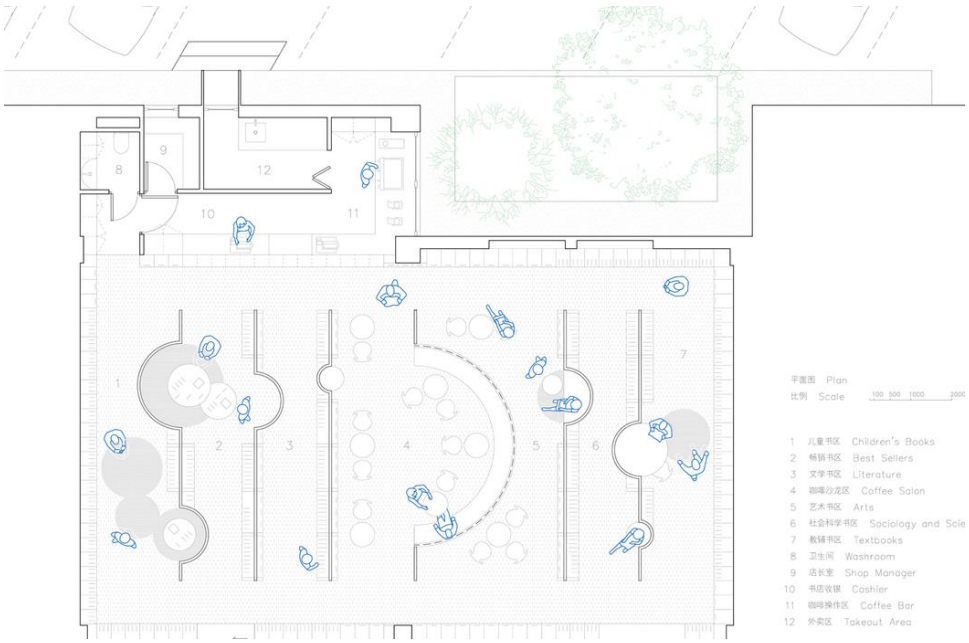
Generally, in a bookstore what one sees is bookshelves, everywhere full of books and several aisles. Books, people reading books and purchasing behavior constituted the space. Regarding to the space shape and its content, it could be the most straightforward ‘bookstore’ that is so familiar with people. This point later is used as design method of the new bookstore, Longshang Books Café. After investigating on ‘in what shape would the bookshelf be’, we found that a straight, parallel arrangement of bookshelf provides most route options possible.

11.3.3. Organization of Spaces

The space combines bookstore, coffee and salon, these functions are differentiated but interacts with the other two. Therefore, a kind of ‘arch wall’ is applied. The element has been adopted

in spacious salon area and bookshelf structures. Especially in the latter experience, sitting in the ‘arch wall’ reading, or browsing along the bookshelf backside becomes an interesting examination of these delicate correlation with people and environment.

All bookshelves indoor are made of steel panel. Meanwhile, the curtain wall of exterior facade applies the same steel panel. Sharing the remarkable consistency, the facade acts as the corresponding point of indoor and outdoor. In consideration of using the most basic, familiar material, besides the stainless-steel panel, wood is commonly used as well. In combination of familiar material and unfamiliar structure, the feeling of space scale gets vague.



11.3.4. Inferences

- Bookshelves can act as a path determining factor.
- Along with bookstore café can be designed.
- Neutral color palette for calm and pleasant indoor environment.
- Introduction of arches that brings focal point in the interior design and supports the structure.

PARAMETERS	NATIONAL				REGIONAL	INTERNATIONAL		INFERENCES
	TU Central Library	Dilliraman Regmi Library	Madan Pustakalaya	Nepal Japan Library	Alliance Francaise	Seattle Library	Tianjin Library	
Special About It	The largest library in Nepal with reading gardens	Library and a museum housing Dr. Regmi collection	Principle Archive of Nepali Books	Library for 4-14 years old	Has Learning and exhibition spaces	Unique form considering light and view	Unique form, reading space and garden	Unique form, outdoor spaces, New programs.
Location	Kirtipur	Lazimpat	Patan Dhoka	Lainchour	Lodhi state, Delhi	Seattle, USA	China	Easily accessed
Architect	Robert Weise		Nirpal Adhikari	Nipuna Shrestha	Stepher Paumier	Rem Koolhaas	Moshe Safdie	
Planning	Two storey Courtyard plan with a single entrance	Three blocks in a gated compound Library, hall, and museum	book collection, admin at ground and mezzanine reading zone.	4-8 age and hall on ground with upper level for admin, library, pc for 8-14 age	Sunken courts exhibit and hall, library and admin at top level with green terraces	Compartment flexibility Not hindering other spaces	reading at upper floor covered by semi-open reading space	Courtyard plan aids in flow, light. Blocks to be connected, kids area 4-14 years
Reading zone	Separate Group study area and research section	Individual carrels In between the shelves	Mezzanine reading zone no access to books	4-8 more playful 8-14 reading zone in between shelf	Reading area at center with shelf at periphery	Informal and formal reading zone	Central group reading ,sole at periphery	Consider view, light, various zones, visibility
Light	Ample but shelves obstruct	Residence turned library light problem	Has Indirect light	Ample natural light	Ample but shelves obstruct	Stacked form for light	Natural and indirect light	Shelf at center, Stacked form
Acoustics	No acoustical treatment	No acoustical treatment	Rammed earth Absorbs sound	No acoustical treatment	Door sweep and acoustic panel	Acoustic panel	Acoustic panel	Materials and zoning for sound
Shelves	6' ht, 1' wide Place between 3'	Steel cupboards periphery wall	Closed access	3'-6" ht and creative shelf	6' ht	4' ht at reading 7' at collection	4' ht at reading 7' at collection	4' ht shelf with 5' distance
Outdoor Reading	Rose garden And courtyard	No access	No such provision	Outdoor play and reading	Gardens and green terraces	surrounded by green fields	Roof garden and plaza	Outdoor reading space is needed

PROGRAM FORMULATION

12. List of Functions

Figure 103: Likely User Group

Source: Public Library Quarterly

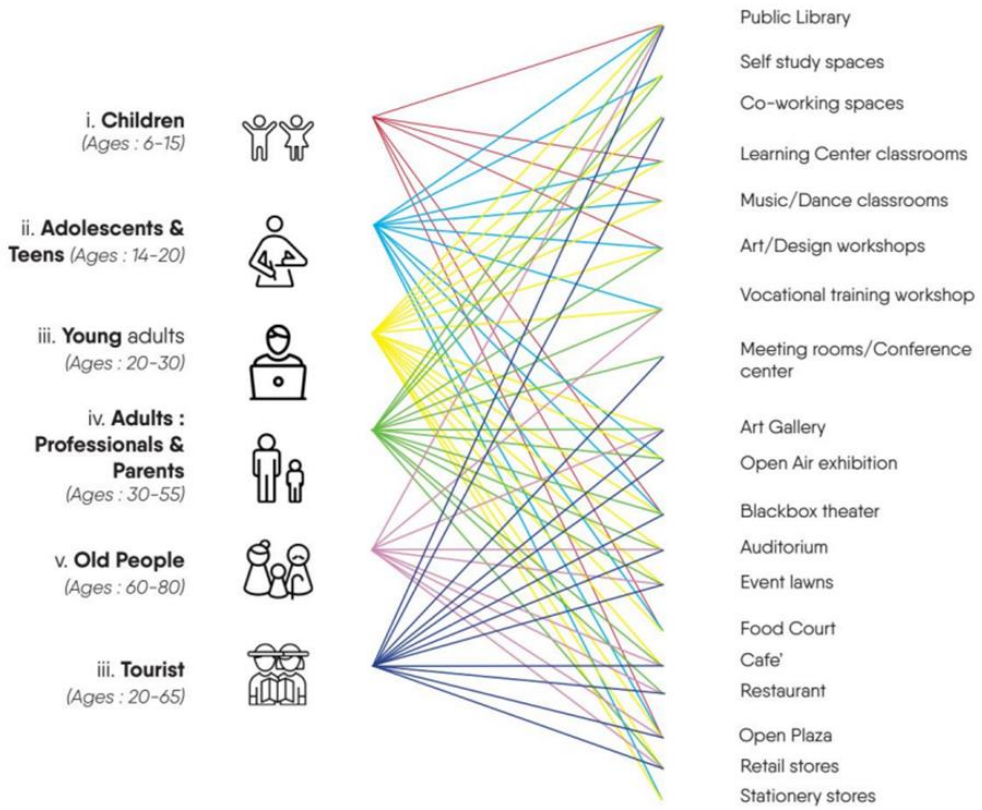


Figure 104: User Pattern Program

12.1. Library Size

The size of library depends on the community they serve. In order to calculated areas required for different spaces, we have to know about the exact literate population of that community. Since my library is located in Kathmandu, so from the census data of 2011 we got the following results.

Total population of Kathmandu	children			Teenagers	Adult
Age group	0-4	5-9	10-14	15-19	Above 19
17,44,240	1,11,600	1,37,162	1,65,679	2,02,417	11,27,382

In percentage

Total	Children	Teenagers	Adult
100	24%	12%	64%

However, from the census data of 2022 we got the total population of Kathmandu to be 20, 17,532. Detail data is yet to be published as mentioned in National Planning Commission Central Bureau of Statistics.

Population of Kathmandu = 20,17,532
Assuming 10% of user as stated in IFLA,
Therefore, total no of people using library = 2,01,755

TABLE 1 Experience Formulas for Library Size and Costs

Population size	Book stock — volumes per capita	No. of seats per 1,000 population	Circulation — volumes per capita	Total sq ft per capita	Desirable, first floor, sq ft per capita
Under 10,000	3½-5	10	10	0.7-0.8	0.5-0.7
10,000-35,000	2¾-3	5	9.5	0.6-0.65	0.4-0.45
35,000-100,000	2⅛-2¾	3	9	0.5-0.6	0.25-0.3
100,000-200,000	1¾-2	2	8	0.4-0.5	0.15-0.2
200,000-500,000	1⅛-1⅛	1⅛	7	0.35-0.4	0.1-0.125
500,000 and up	1-1⅛	1	6.5	0.3	0.06-0.08

SOURCE: Joseph L. Wheeler and Herbert Goldhor, Practical Administration of Public Libraries (New York: Harper and Row, 1962) p. 554.

So, from the table above and calculated population

Total number of seats = (1.25 x 2,01,755)/1000

= 255 seats

Total number of books = 1.25 x 2,01,755

= 2,55,000 books

Total number of staffs = 80 (1 staff for 2500 population)

Collection Space for books				
Collection Space	**Required Percentage**	**Volume of books**	**No. of volume per sq.ft.**	**Area sq.ft.**
1. General	65% of total no. of books	1,65,750		
1.1 Non-fiction	40% of 2,43,750	66,300	10	6,630
1.2 Fiction	60% of 2,43,750	99,450	10	9,945
2. Reference	25% of total no. of books	63,750	10	6,375
3. Children	10% of total no. of books	25,500	8	2,550
4. Periodicals	1.25% of total no. of books	3,190	1.5	2,130
5.Non-print materials	10% of total no. of books	25,500	10	2,550
Total				30,180
				2805 sq. m.

Source: Library Space Planning Guide Book, David Vinjamuri

: The International Federation of Library Associations and Institutions

: American Library Association

S.N	Program	Area		Capacity	Remarks
		Per person	Total in sq. m.		
1	**GROUND FLOOR**				
a	Foyer		80		
b	Property Counter	0.6		180	
c	Informal Reading Area	2.9	252	30 people	5,000 periodical
d	Exhibition Hall	4	153		
e	Reprographic Area		114	6 people	
f	Cafe	1.5	542	80 people	
g	Bookshop	.8	208.25	25 people	12,000 books
h	Multipurpose hall	2	372	200 people	
i	Admin				
	Accountant		40	3 staffs	
	Maintenance		30	4 staffs	
	Meeting Room		82.25	15 people	
	Staff Working Area		78	6 staffs	
	Store		180	20,000 books	
	Pantry		58	10-14 staffs	
2	**FIRST FLOOR**				
a	Kids section (4-8)	2	380	30 kids	18,000 books
	Story Telling Area	3	115	30 kids	
	Toy Play Area	4	130	20 kids	
	Makerspace	3	110	25 kids	
b	E-library				
	Pc	3	230	30 people	
	E-books	2.5	370	50 people	

c	Makerspace				
	VFX	4.2	102	5 people	
	Podcast	3	100	8 people	
	IT Section	3	60	6 people	
	Makerspace Hall	3.5	320	36 people	
d	Study Pods	2.5	48	10 people	
e	Admin				
	Staff Lounge		25	6 staffs	
	Control Room		30	3 staffs	
3	**SECOND FLOOR**				
a	Kids Section (8-12)	2	560	30 kids	20,000 books
b	Fiction Section	2.5	685	20 people	1,10,000 books
	Reading Hall	2.5	415	30 people	
	Terrace Reading Nook	2.5	325	20 people	
c	Study Pods	2.5	52	10 people	
d	Admin				
	Staff Lounge		20	6 staffs	
	Assistant Librarian		19	2 staff	
	Chief Librarian		30	1 staff	
4	**THIRD FLOOR**				
a	Local Archive				
	Book Collection		230	25,000 books	
	Documentation		40	2 staffs	
	Assistant Librarian		30	1 staff	
b	Non-Fiction Section		780	15 people	70,000 books
	Reading Hall	2.5	335	30 people	

	Terrace Reading Nook	2.5	400	20 people	
c	Study Pods	2.5	52	10 people	
d	Staff Lounge		30	6 staffs	
5	**FOURTH FLOOR**				
a	Reference Section	2.5	615	15 people	60,000 books
	Reading Hall	2.5	300	20 people	
	Terrace Reading Nook	2.5	410	25 people	
b	Study Pods	2.5	52	10 people	
c	Staff Lounge			6 staffs	

Ground Floor area: 3793.75 sq. m. i.e. 32% coverage

First floor area: 2501.58 sq. m.

Second floor area: 2198.11 sq. m.

Third floor area: 1742.32 sq. m.

Fourth floor area: 1359.85 sq. m.

Hence, Total built-up area = 11, 595.61 sq. m. with total seating capacity of 260 having total book collection of 3,00,000.

Surface Parking for Public

Cars: 68, Bikes: 160

For staff

Cars: 5, Bikes:45

Also, Outdoor Area includes:

Social Area

- Open Air theater (O.A.T.)
- Sitting space
- Open air Exhibition Space
- Walking garden
- Water bodies

SITE ANALYSIS

13. Site

13.1. Site Study

Before starting the design process, it is necessary to understand the site, where the building is to be built. Site study is very important as the site is the basic component of the building. The study of the site is done to know the site constraints and opportunities, which will guide the design. Available resources and important aspect of the site have to be emphasized. Thus, an in-depth study of the site and surrounding was done through numerous site visits and map collection.

13.2. Site Selection Criteria

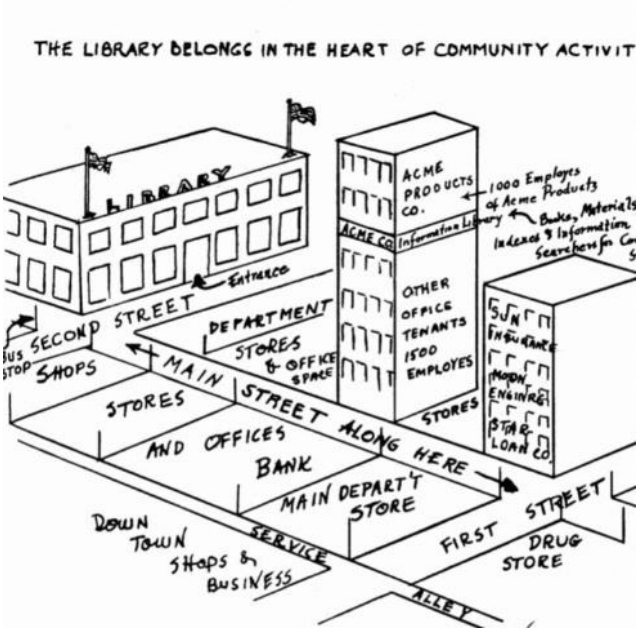


Figure 105: Ideal Location of a library (Wheeler, 1958)

Site Planning Parameters	Issues to Consider
Civic presence	• Realtion to other public buildings • Visible presence
Public access	• Access to public transport • Disabled access
Service access	• Access to road system • Delivery and storage areas
Urban design	• External public gathering space • Safe, secure and legible routes

13.3. Site Overview

Location: Tinkune, Kathmandu

Land Type: Urban Expansion Zone

Topography: Contour

Orientation: South

Land Area: 28 Ropani

Existing condition: Tarkari Bazar and Driving School

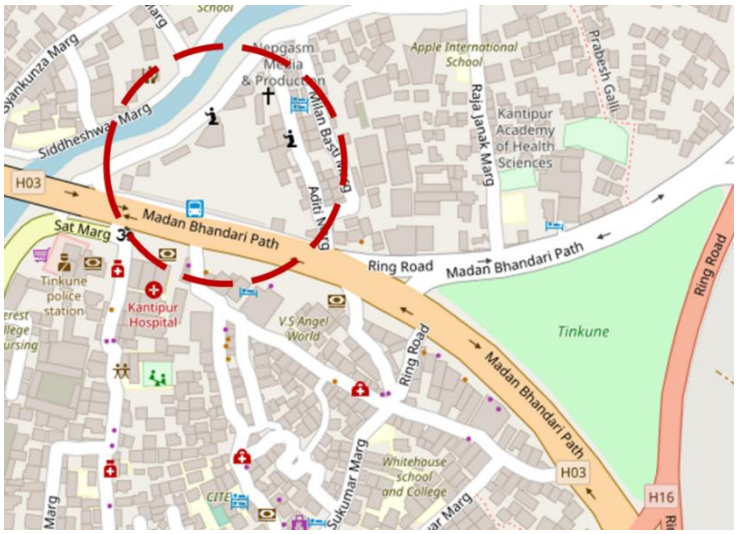


Figure 106: Location Map of Site

13.4. Site at Glance

From Tinkune Bridge

Site from the main street

Site from the main street

Bagmati river with secondary road

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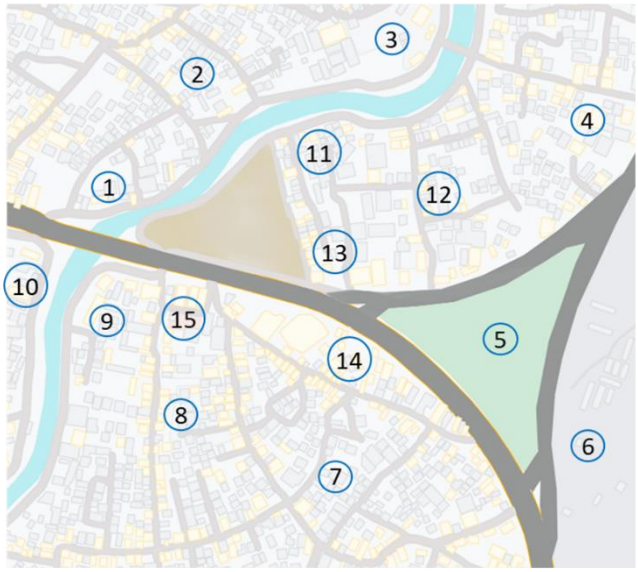
13.5. Surrounding Aspect



	LEGEND
1	Bagmati Community Campus
2	Glacier Int'l School
3	Baneshwor Multiple Campus
4	NASA Int'l College
5	Tinkune Park
6	Aiport Custom Office
7	Himalayan Whitehouse College
8	Driving School
9	Police Station
10	Vs Niketan School
11	Girls Hostel
12	Pentagon Int'l College
13	Boys Hostel
14	NCC Bank
15	Kantipur Hostel

5. Tinkune Park

3. Baneshwor Campus

15. Kantipur Hospital

13.6. Site Slope

Profile from West to East
Level difference 7'-0"

Profile from South to North
Level difference 13'-0"

13.7. Climatic Data

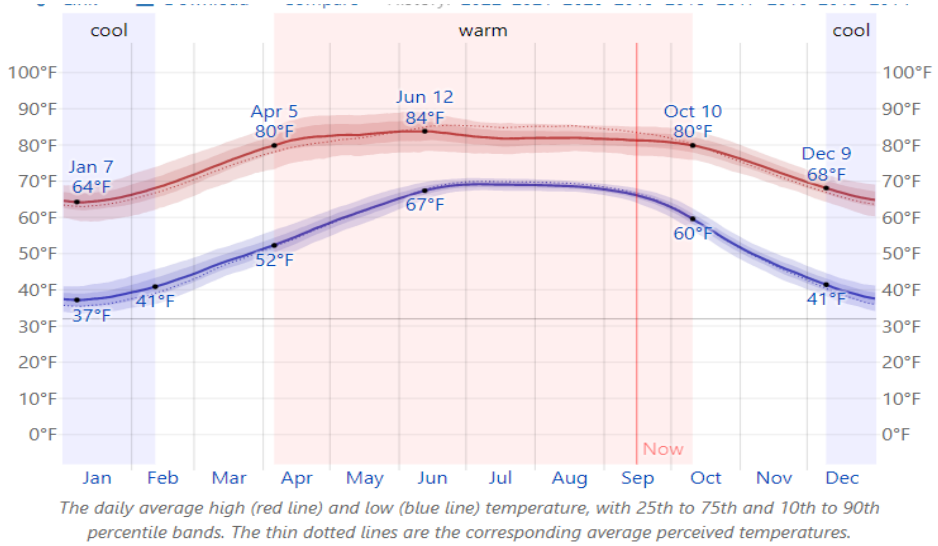


Figure 107: Average High and Low temperature in Kathmandu

The warm season lasts for 6.1 months, from April 5 to October 10, with an average daily high temperature above 80°F. The hottest month of the year in Kathmandu is June, with an average high of 83°F and low of 68°F

The cool season lasts for 2.1 months, from December 9 to February 11, with an average daily high temperature below 68°F. The coldest month of the year in Kathmandu is January, with an average low of 38°F and high of 65°F. (Weather Atlas, 2022)

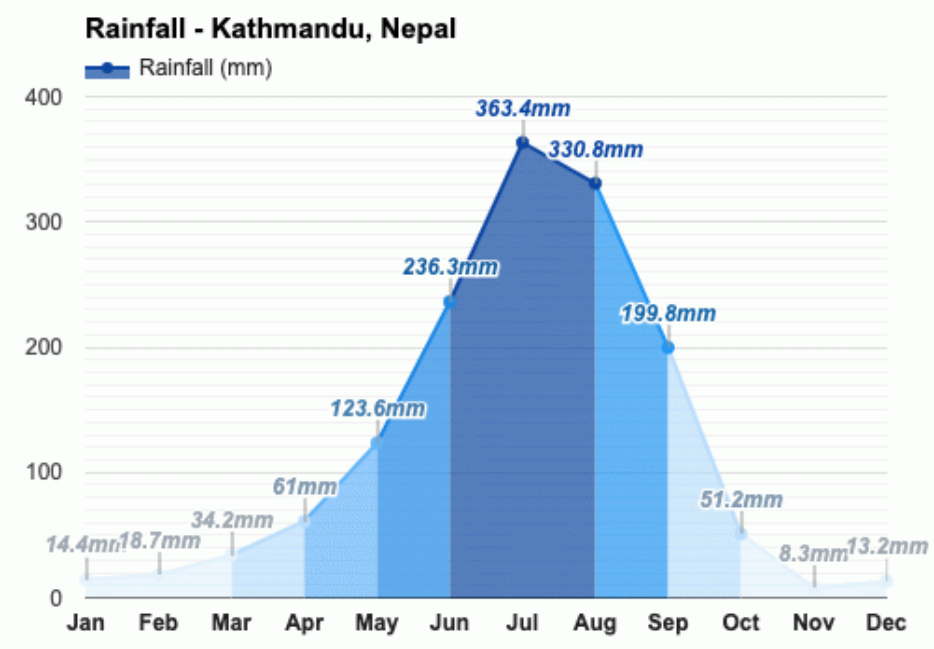


Figure 108: Rainfall graph of Kathmandu The wettest month (with the highest rainfall) is July (363.4mm). The driest month (with the least rainfall) is November (8.3mm). (Weather Atlas, 2022)

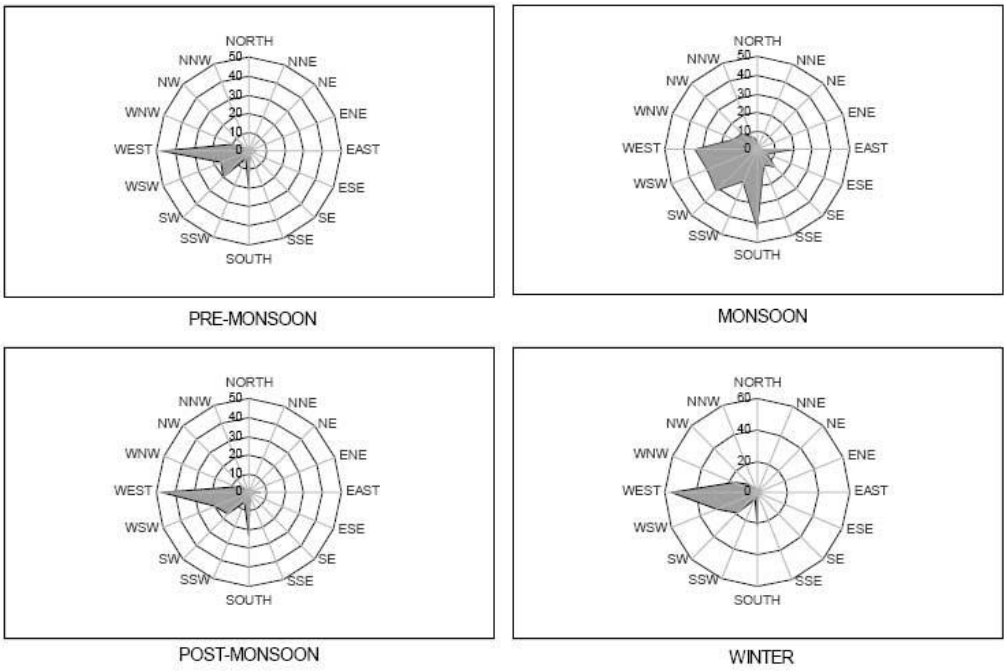


Figure 109: prevailing wind direction in different seasons in Kathmandu Valley

By analyzing the wind rose data it was found that wind blows mainly from two directions west and south in Kathmandu Valley. (Adhikari, 2008)

13.8. Sun Path and Wind Direction

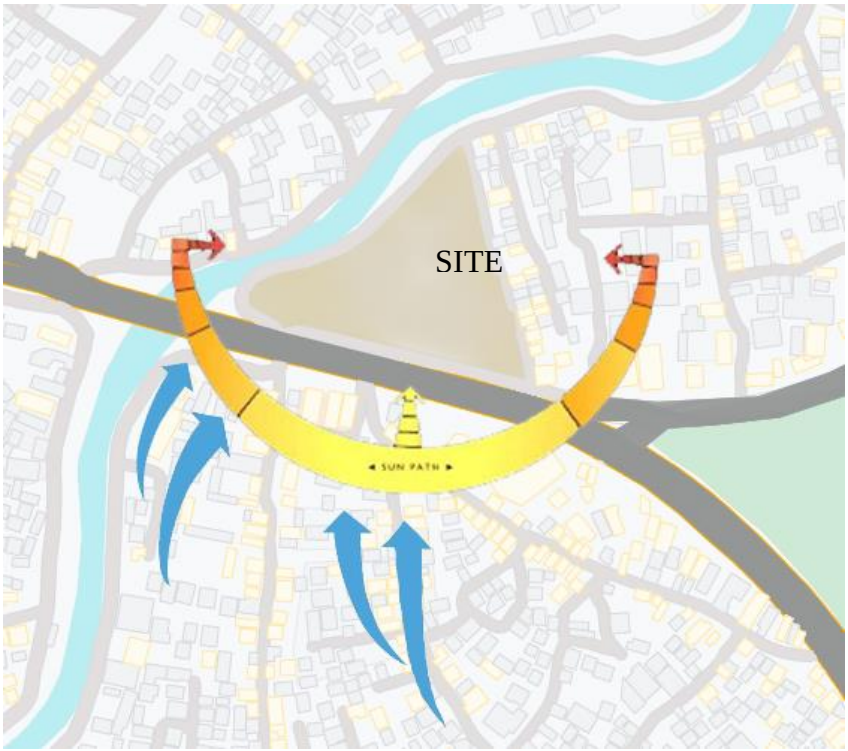


Figure 110: Sun and wind path analysis of Site

13.9. Vehicular Connectivity and Road Network

A variety of vehicles operate simultaneously. From private cars, to school buses to public vehicles there are multiple modes of transport present. Although the roads are sufficiently wide, the primary road - catering to multiple sectors, sees heavy traffic movement.

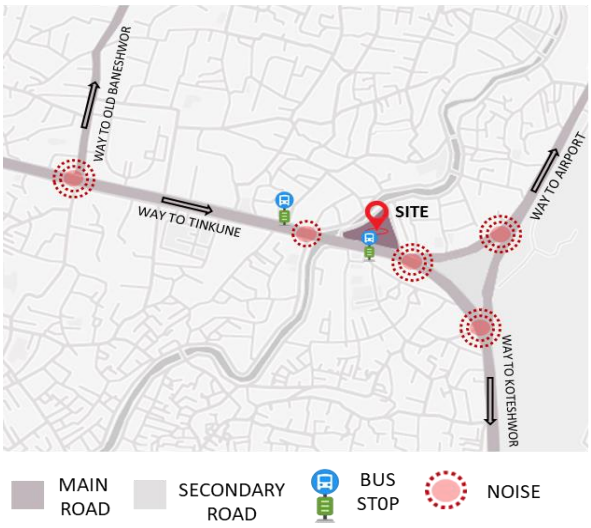


Figure 111: Vehicular Connectivity and Road Network

13.10. SWOT Analysis

13.11. Bye laws

According to the byelaws of Kathmandu Metropolitan City, the site lies in the urban expansion zone. The site is surrounded by commercial, residential, institutional and office buildings.

- **FAR:** 2
- **Ground coverage:** 40%
- **ROW:** road width from the center of the road
- **Setback from the edge of Bagmati river:** 20m
- **Parking:** 20% of the site
- **Light Plane:** 63.5 degree

CONCEPT

14. Concept and Design Development

14.1. Design Concept

14.1.1. Approach 1

Trinity with Green Belt

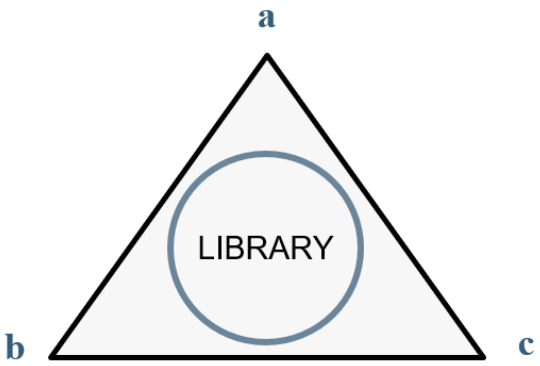
A library exists when the three components of its trinity – the readers, the books and the staff – are in purposive contact with each another. Here, the books are the knowledge containers, readers are the knowledge seekers, and staff means the facilitators or providers of various library services to the users, the knowledge seekers. Whenever and wherever this Trinity exists, a library is born.

A library is referred to as a 'social institution' and a 'service institution', which serves the current as well as life-long learning needs of the society.

In the Trinity, (a) The universe of knowledge seekers includes various groups in society (children, women, students, teachers, researchers, patients in hospitals, prisoners in jails, and others),

(b) The universe of knowledge containers includes information sources in various formats (print, non-print and electronic media),

and (c) The universe of facilitators (library staff) includes providers of various library services (technical services, users services, and others).



a. Readers, b. Books and c. Staffs - LIBRARY

The staffs can be hired, and the books can be brought but what about the Public?

Since, our location is facing towards the Bagmati river in west with green belt where kids to adults can be seen enjoying their time talking to each other, playing or simply reading. So, what if we introduce this concept of the green belt as an urban plaza inviting people into the site and eventually into the library building.

The plaza with OAT, green spaces, sculpture garden, formal and informal spaces will be used by the public as well as the library for various program such as outdoor reading, pop up performances, farmer's market food festivals and outdoor exhibitions.

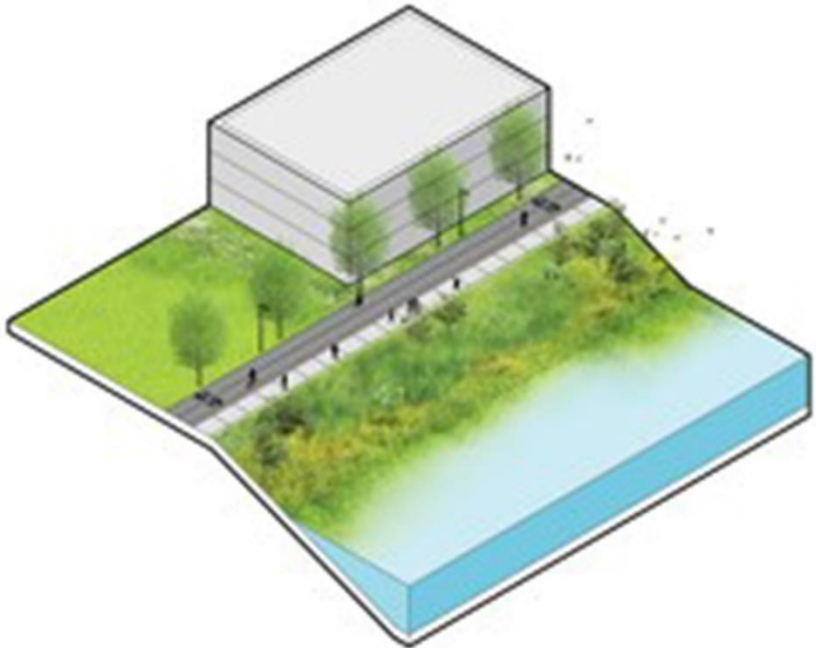


Figure 112: Building without open space facing the river

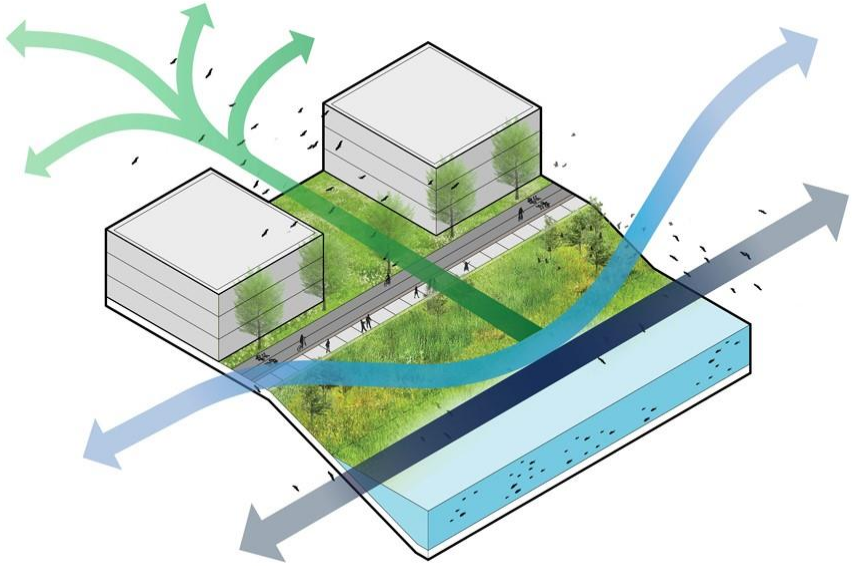


Figure 113: Plaza connecting the landscape, river and people with the building

14.1.2. Approach 2

Bringing the Outside Inside

The plaza has been introduced in the site with greeneries but what about the inside spaces? Since we have already discussed in literature review that presence of certain plants boost learning and creates pleasant environment. So, internal courtyards are provided in the living room of the library, e-library and reading halls along with outdoor reading nooks like a secret garden for book lovers.

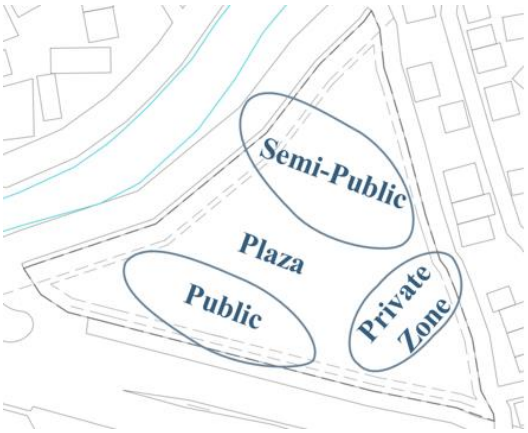
Figure 114: Indoor reading areas with greeneries

Figure 115: Stepped Terrace Reading Area as seen from the main road

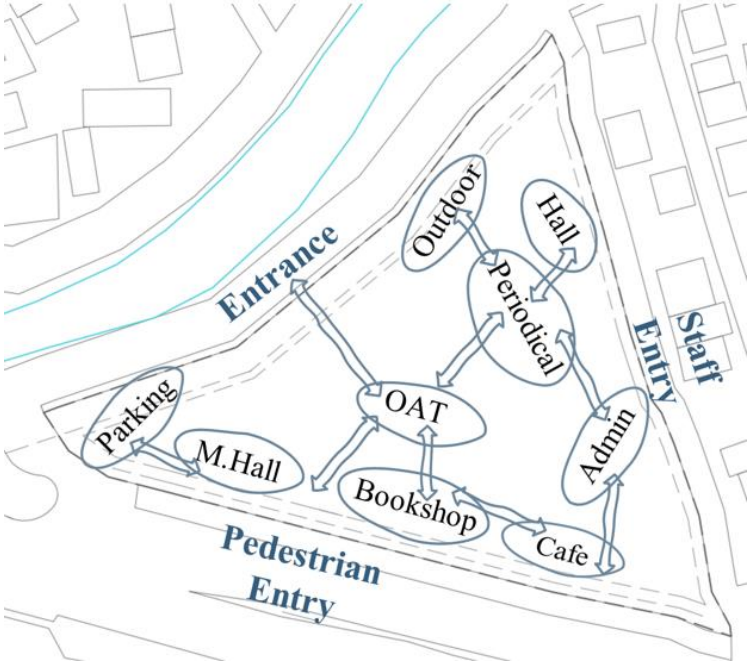
14.1.3. Approach 3

Zoning

As per the Zonification, the side facing towards the highway has public zone as café, bookshop and to the tertiary road has semi-public and private zones as library and admin respectively and vertically the building is organized as public to private zone for noise reduction ascending to quieter spaces.



After seggregating the zone, plaza being at the central the building shape was formed respecting the site edges where all the facades serve all three sides of the site orienting towards the river in stepped form maintaing hierarchy of the library building introducing outdoor reading areas in respective sections.



14.1.4. Approach 4

Visual connectivity

Open floor plan concept has been used instead of closed ones as it provides an opportunity to interact with the readers visiting the library ultimately making library a third place which is not a home or a working place but a place for meet ups, gathers with no financial barrier to entry.

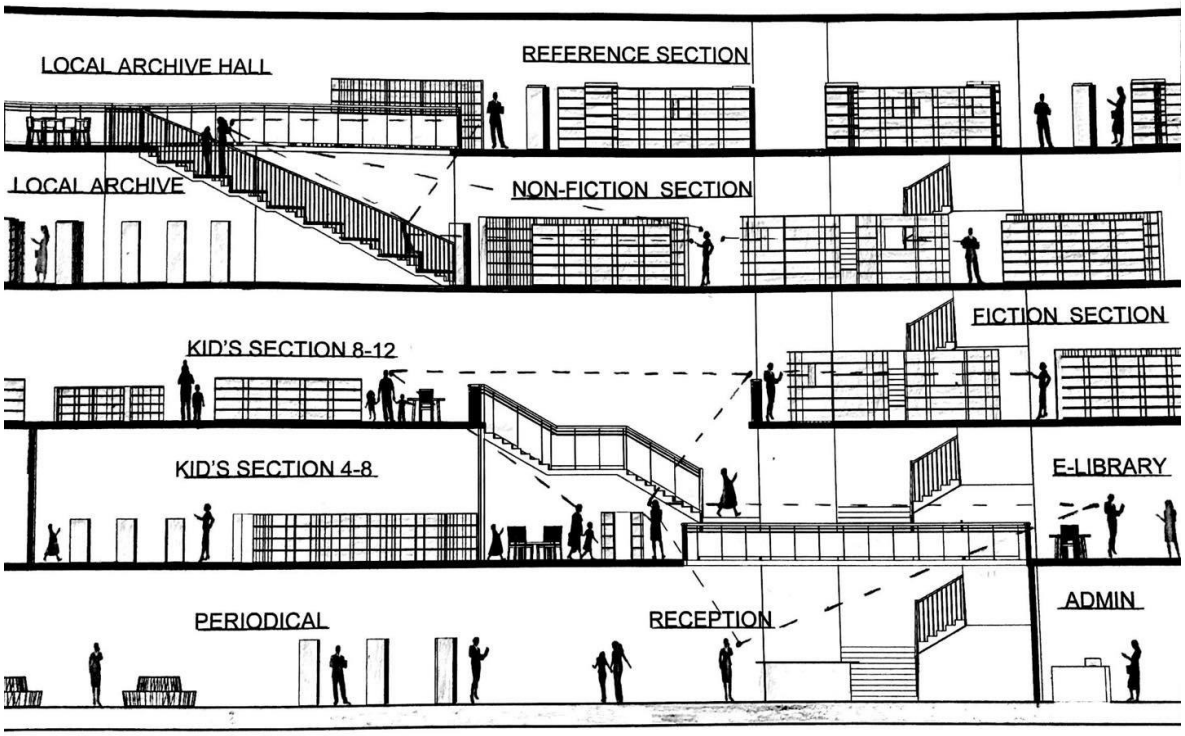
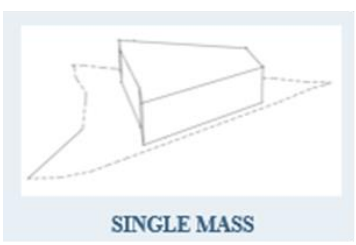
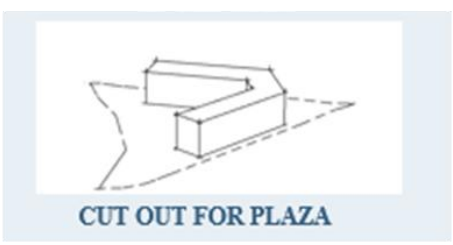


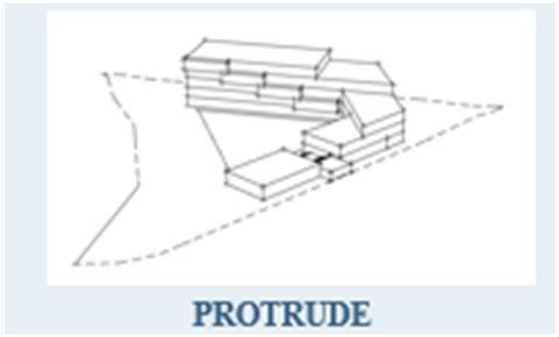
Figure 116: Section of library showing interactive spaces

Also, as seen in exterior of the building the curtain walls use the concept of bay window used for reading, makerspace transparent to the people in the streets making the users a part of the city. The stepped terrace form also shows the outdoor reading activities acting as a pulling factor.

14.2. Form development







For the form at first the total area required for ground floor is calculated refer to program formulation and then respecting to the site edges a mass is drawn then to introduce the plaza a cut is provided in the middle facing the Bagmati River.

After analyzing the building, stepped form has been introduced to provide outdoor reading nooks maintaining a focal point to the main library block which when looked from the main road creates an interesting façade which shows the level of activity from ground to top floor, interactive programs like makerspace to quiet study areas.

Then implying the concept that bookshelves are always kept in certain algorithm at certain order, so the design principle repetition can be seen on the façade with dramatic use of louver on main façade facing south-west for glare control with juxtaposition of brick, cement plaster, curtain walls for the hybrid building combining recreational activities with reading.

14.3. Design Development

14.3.1. Site Plan

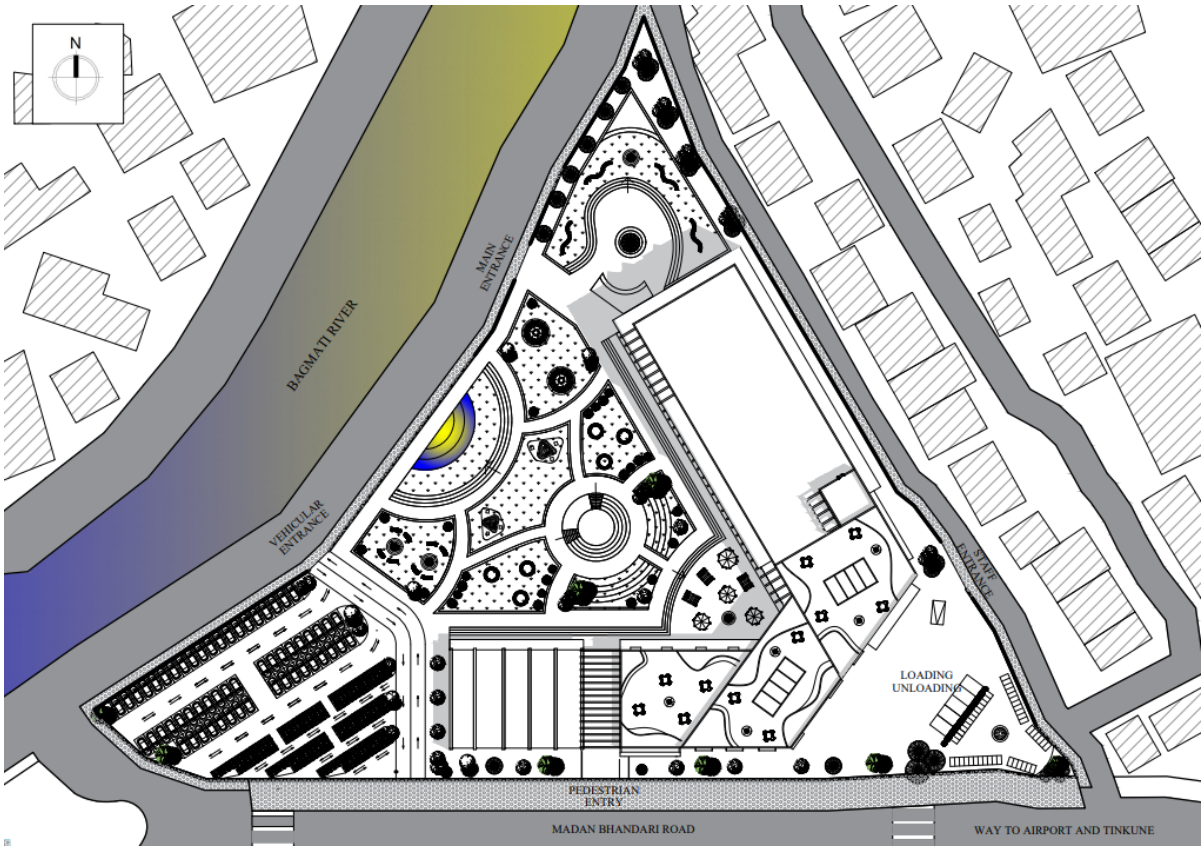


Figure 117: Roof plan in Site plan

The site is surrounded by roads from all three sides: the main highway of Tinkune at South where access for pedestrian is provided, secondary road at West facing Bagmati river where access for pedestrian and vehicle is provided and tertiary road at North side having staff and service entrance where the building is oriented towards West.

A plaza is placed at center of the site to its periphery building is placed such that in the area with no desirable open space, the plaza will invite the users into the site and eventually into the library building developing the desirability of the space. The plaza landscape is proposed to create cohesive public space that supports fluid pedestrian movement from all directions making a visual connection with green belt of the Bagmati river and also between the interior and exterior spaces.

Figure 118: Exterior view facing the River

As per the zonification, the side facing towards the highway has public zone as café, bookshop and to the tertiary road has semi-public and private zones as library and admin respectively and vertically the building is organized as public to private zone for noise reduction ascending to quieter spaces.

Figure 119: Main Library Block

14.3.2. Ground Floor Plan

The ground floor is a public zone and will serve as a gathering space accessible by all community members where it houses the following: (Annex-sheet no: AR-02)

a. Informal Reading Room (Living Room)

The main entrance to the library building welcomes to the periodical section capacity of 5,000 periodicals where greenery is introduced maintaining visual connectivity to the plaza for more relaxing and interactive atmosphere making it a place of mutual respect for people to meet and pass time.

Figure 120: Informal reading room with greenery

b. Exhibition Hall

Exhibition hall for displaying writer's work or antique collection, artwork and sculpture of cultural and historic importance accessible from the living room and exit into the outer exhibition space in the west.

Audio visual room:

To make the patrons provide information in a more effective way based on the theme of works displayed in exhibition hall the A-V room is provided adjacent to the hall accessible from the living room which appeals most to the senses.

Figure 121: Audio-visual Room

c. Bookshop and Café

The bookshop and café are placed adjacent to each other with the concept of relax, meet and explore as well where a cozy environment is created for the readers having semi open and open spaces visually connected to the plaza where they can enjoy a book with a cup of coffee and socialize with peers.

Figure 122: People indulging themselves at bookstore

d. Multi-Purpose Hall

The hall having capacity of 200 users can be used for hosting formal and non-formal programs and conferences like TED talk or can be used by community members for different cultural programs placed near the parking area close to café.

Figure 123: Exterior of Cafe, Bookshop, pedestrian access from highway and multipurpose hall from left to right

14.3.3. First Floor Plan

a. Kid section (4-8)

Kids by nature are curious where they learn not only through books but by interacting and playing. So along with reading area toy play area, makerspace and storytelling area are provided having capacity of 25 kids each.

Figure 124: Kids library, makerspace and storytelling area from left to right

b. E-library

Today, the libraries are not only about lending books but are also abut creative spaces, economic incubators and learning hubs. So, realizing this fact the first floor can be said as multimedia floor where it separates from the kid section by double height space.

Figure 125: VFX and Podcast studio

Figure 126: Makerspace

E-books with computers are provided with the touch of greeneries for relaxing and pleasant environment. Makerspace where they create something on their own or with teams is placed facing the main road where people in the streets can also take a look at their activities motivating them. Programs such as: VFX studio, Podcast, IT hub and thinker space are placed.

14.3.4. Second Floor Plan

a. Kid section (8-12)

As per the inference drawn from the Nepal Japan Library the library for kid is separated from 4-8 age and 8-12 age. Here the senior kid section is placed at mezzanine space where visual connectivity is maintained between these two groups.

b. Fiction section

The rest of the area is dedicated to fictional collection and to make it more interactive furniture are designed in such a way that while strolling for the books one can look at other section of the room provided by the cut outs at the bookshelf and can even study be sitting on the shelves.

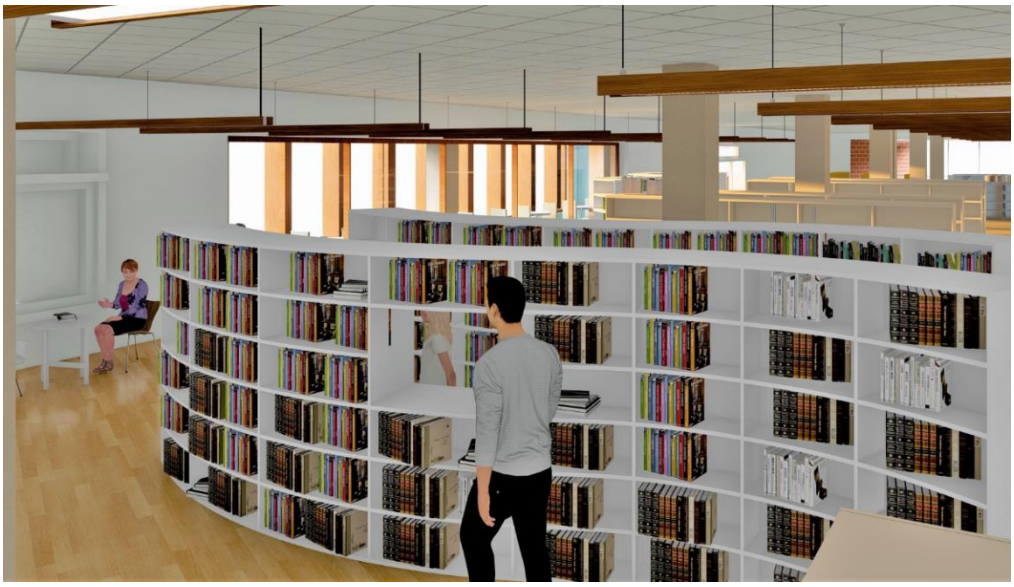


Figure 127: Fiction Section Interior

Reading hall with capacity of 30 readers is provided with courtyard like concept having garden at the central sustained by the lights descending from the skylights with terrace reading nook like a secret garden for the patrons.

Figure 128: Reading Hall

Ways and places of studying varies with people as some like to study with books surrounding them, with their friends, with the nature taking in its beauty, looking at other people or any dynamic view and in complete isolation. Based on these various spaces are provided one being the Study pods which are small, enclosed spaces allowing for semi-private study on more open floors which are acoustically treated taking in the dynamic view provided by the site.

14.3.5. Third Floor Plan

a. Local Archive

The book collection of the local archive is antique and has to be handled with care so they are closed access an inference drawn from Madan Puraskar Library. An interactive staircase is provided adjacent to it leading to upper floor where reading hall is present.

b. Non-fiction

The planning and arrangements of furniture are more or less similar to fictional section with their own reading hall and outdoor reading area. However, in order to connect local archive, non-fiction and reference area as they are more or less similar in nature in context of books giving off the same vibes interactive staircase is introduced connecting all those mentioned spaces having study pods in between them.

Figure 129: Interactive staircase

c. Study Pods

Beside this Study Pods are provide in each floor except ground which is acoustically treated for quieter study area, one to one meeting enjoying the dynamic view of the streets, people and river.

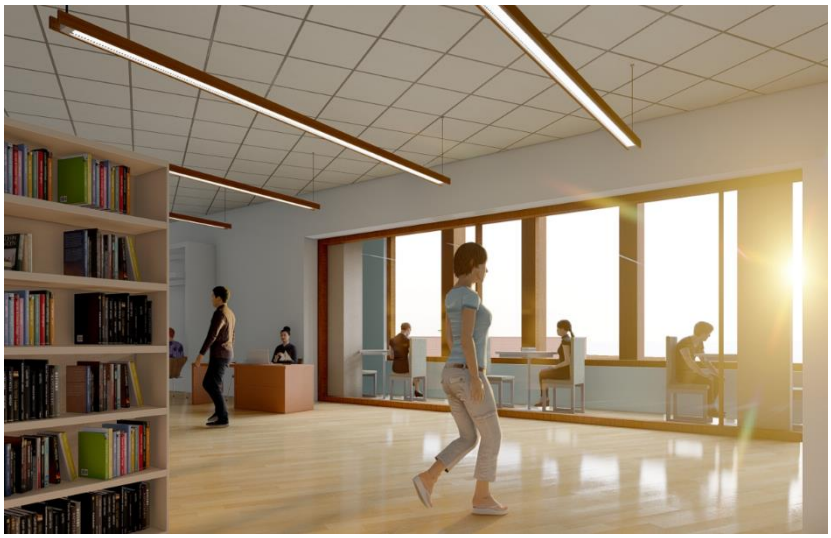


Figure 130: Study pods

14.3.6. Fourth Floor Plan

a. Reference Section

The book collection of the section cannot be issued so study tables are provided in between the shelves where they can indulge themselves in the world of books along with interactive furniture and staircase as described earlier with outdoor reading area.

Figure 131: Bookshelves of Reference section

b. Elevation

Whenever we hear the word library the object which immediately pops out is books. The book in the library is placed in certain order following decimal system as per category where the elevation of the shelf holds repetition in its character. So, repetition in use of protrude elements, materials, openings and shading devices can be seen in the façade in varying sizes to break the monotonous feeling.

Figure 132: Front facade showing Repetition Principle of Design

Certain transparency is desired in the façade so that there can be visual connection between the interior and exterior activities so curtain wall in inclined manner can be seen where the idea of bay window i.e., a nook is provided where reading activity can take place enjoying the view and light.

Since, the main façade is south facing deep façade idea is used which controls the amount of daylight into the interior area. Also, light shelf placed above eye-level with a high reflectance upper surface which is a horizontal light-reflecting overhang that allows daylight to penetrate deep into a building.

For materials I have used a mix of traditional and modern materials that is a combination of brick as the traditional material and concrete, glass and aluminum wall panels as the modern one as the building is a hybrid structure merging traditional element which is book collection with modern needs like e-library.

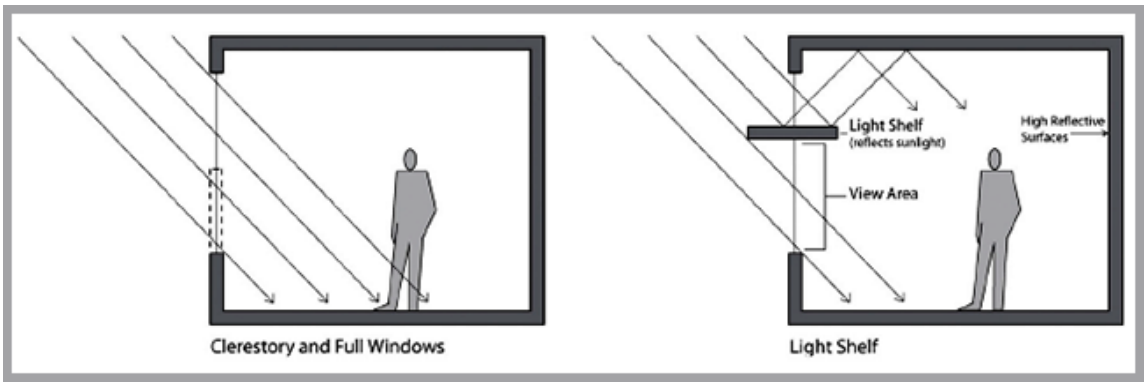


Figure 133: Deep Facade with light shelf

14.4. Furniture

Not only in programs, layout and landscape I have also rethought the design of the main furniture of the library which is the bookshelves. Generally, the shelves are made as high as the floor height which blocks not only the light but also the view of outside, people scrolling through books and making it difficult for the staffs to monitor the books. So, considering this the shelves are designed as per the standards not blocking lights mentioned in standard which is 1.8m for adults, 1.2m and 1.5m for kids with cut off at certain compartment allowing the readers to view across the room as in Fig 134.

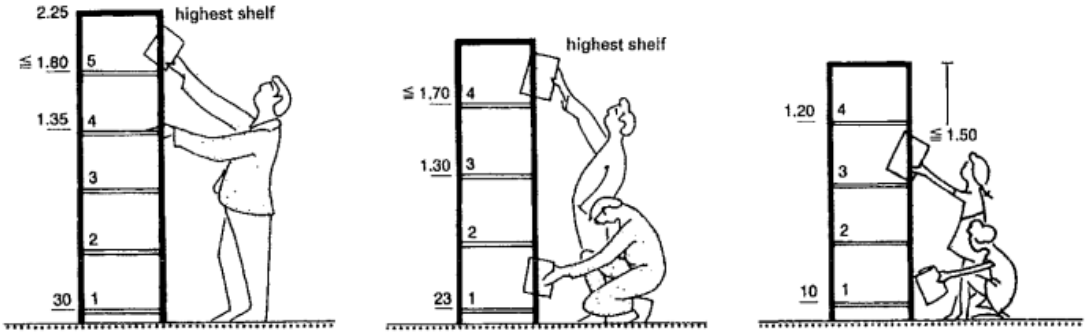


Figure 134: Shelf unit height

Taking it one step ahead sitting spaces are provided in the shelves which can be used by the readers while scrolling for the books or by those who like to ready being surrounded by books as in Fig 135.

Figure 135: Interactive bookshelf

For kid's colorful shelves mainly of primary colors with various shapes are used making it playful in nature as in Fig: 136.

Figure 136 Kid's reading section

14.5. Structure

The building plans are a result of respecting site edges and placing plaza at the center, so the resulting grid system is mostly rectangular with certain inclined grids supporting the stepped form. RCC structure is used as the major support of the building due to the load of books. The grid span ranges from 2.2m to 8.4m. The grade of concrete is M25. Columns of size 600 x 600 mm, 300m x 300mm are used where the main beam is 400 x 650 mm and the secondary beam is 230 x 350 mm.

RCC flat slab is used for roof structure whereas concrete waffle slab in reading hall and Portal frame structure in multipurpose hall for column free space.

14.6. Services

Calculation of underground water tank size

As per NBC 208: 2003, Table– A1

Blocks	**No. of Person**	**Min. Req. per head per day**	**Total (L)**	**Remarks**
Library Block	255	15	3825	
Café	100	50	5000 =2000	40% of total
Multi-purpose hall	200	15	3000 = 2100	70% of total
Administration	35	45	1575	
Total			9,500 (9.50 cu. m.) (1 cu. m = 1000 L)	

Size of tank = 9.50 x 3 = 28.50 cu. m. (Safety factor = 3)

Fire tank = 50, 000 liters = 50 cu. m. (As per NBC 208: 2003, Table – A 3)

Total Underground tank capacity = 28.50 + 50

= 78.50 cu. m

Tank size = 5m x 4m x 4m (capacity of 96,000 liters)

Calculation of overhead tank size

Overhead tank capacity = Half of the underground tank as pumping twice a day / 2

= 9.50 /2 = 4.75 cu. m

Overhead tank size = 3.2m x 1.5m x 1.0m =4.75 cu. m (capacity of 4,800 liters)

Calculation of Septic Tank size

Total volume of septic tank = 9.50 x 3 (Detention period = 3 days)

= 28.50 cu. m (approximately)

Size of Septic tank = L X B X H (Assume L: B ratio as 3:1 and H = 2)

= 6.45m x 2.25m x 2m

Calculation of Soak Pit size

Wastewater coming out from the septic tank = 28.50 cu. m =28500 liters

Percolation rate = 1500 lit/m3/day

Volume of filter media = 28500/1500 = 19 cu. m

Assume the depth of pit = 2m

Area of soak pit = 19/2 = 9.50 sq. m

The diameter of the soak pit required = 3.40 m ($A = \pi d^2/4$)

14.7 Physical Model

Figure 137 View from Bagmati River (West side) Model scale: 1:200

Figure 138 View from Tinkune Road (South Side)

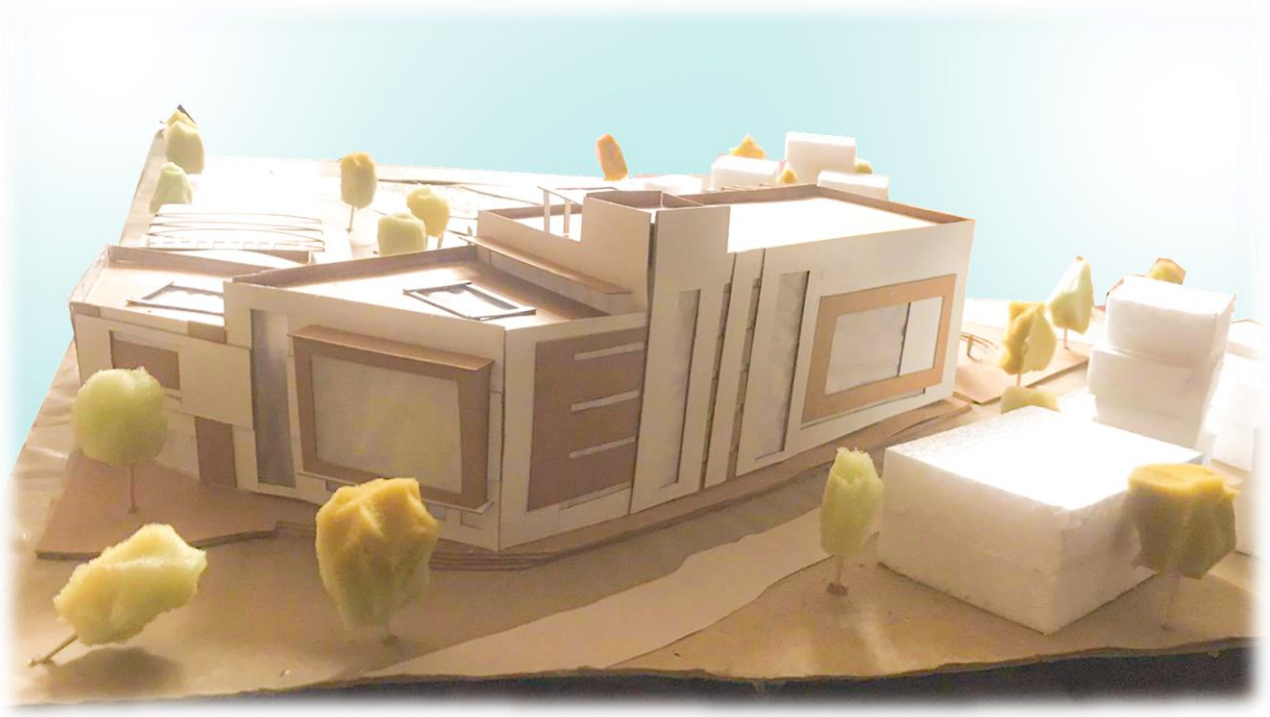


Figure 139 View from East Side

Figure 140 View from North Side

Figure 141 Top view

Figure 142 Site context model of scale 1:500 with blow-up model of scale 1:200

CONCLUSION

The research done proposes a new typology for a public space - a cultural center anchored in a public library. In doing so it reimagines a library, no longer as a 'definitive source of knowledge' but instead as a facilitator. An extended space that integrates multiple functions and serves as a cultural and knowledge hub, the library is rethought and reimagined as a public place which is vibrant, relaxed and open to all.

Collections are still important. But as libraries acquire more digital materials, they’re devoting less space to housing physical items. Instead, they’re creating flexible, multiuse spaces for people to gather, interact, and learn new skills for that keeping in mind about the physical interior environment that provides proper light, connection with outdoor spaces and views attracting users with its new programs and facilities.

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ANNEX