Design Criteria and Space Requirements
for the
Design and Construction Supervision Services for the Southern Branch of the National Central Library&
National Repository Library, Taiwan

May 22, 2018

Contents

Chapter 1: Project Profile

The Executive Yuan verified a *Proposal for the Public Construction of the Southern Branch of the National Central Library& National Repository Library* on 28 December 2017. This project aims to build a branch in southern Taiwan to provide access to the book collections of the National Central Library, ensure the preservation of resources, maintain digital versions of collections, and provide various reader services. By taking the opportunity to establish a National Repository Library this proposal intends to the tackle the problem of limited storage space facing the National Central Library and national public libraries while also building the first digital object preservation center in Taiwan, which will collect digital resources of library materials that have been previously overlooked.

By building a branch of the National Central Library& National Repository Library and relying on forward-looking planning, this proposal will lead to the construction of a new library branch with a special style and vision while also allowing the public in southern Taiwan to enjoy a national-level public library.

The site of the proposed branch is located in Xinying District, Tainan City with an area of 5.71 hectares. The land was originally used as the site of a senior high school. The current construction coverage rate is 50% and the floor-area ratio is 200%. (The Tainan City government is currently handling the formalities to change the zoning from land use for high schools to agency use, which will require a construction coverage rate of 50% and the floor-area ratio of 250%). The budget for the main project construction is approximately NTD 2.499 billion (including building construction, hydropower, air-conditioning, etc.). With the addition of the indirect expenses and specialized equipment fee of the library and reservation center, the cost of the project amounts to around NTD 4.28208 billion.

1.1 Terminology

The project name is “Southern Branch of the National Central Library& National Repository Library”, hereinafter referred to as “this project”. The institution will be referred to as “Party A” or “the Owner”. The contractor/manufacturer is referred to as “Party B” under the project contract.

1.2 Instructions for Design Principles and Space Requirements

1. The provisions of Instructions to Design Principles and Space Requirements are the minimum functions, benefits, standards or characteristics that should be achieved after completion of the project and provide specifications on the main materials and equipment.
2. The matters not covered by Instructions for Design Principles and Space Requirements and the contractual provisions shall be judged by the manufacturer based on their professional knowledge and approved by authorities so that the design can achieve the required standards set for the project.
3. If the Service Proposal submitted by the manufacturer at the time of bidding does not meet the specifications of the contract or the provisions of Instructions for Design Principles and Space Requirements and the nonconformance is not identified before the contract signing, the authorities may request the manufacturer make modifications during the execution of the contract. The manufacturer must not be excused from the obligation to comply with Instructions for Design Principles and Space Requirements or other contractual requirements on the grounds

that the selection committee members do not have relevant opinions.

4. The bidding manufacturers may read the result reports entitled “Construction Proposal of Southern Branch of National Central Library& National Repository Library” and “Entrusted Technical Services of Early-stage Planning of Southern Branch of National Central Library& National Repository Library” verified by the Executive Yuan. Please download such result reports from the new project website: https://sbncp.ncl.edu.tw/tw/.

1.3 Environment Overview

1.3.1Location of the site.

The site of the proposed branch is located in the vicinity of Section 2 of Changrong Road and Section 1 of Jinhua Road, Xinying District, Tainan City. The site is surrounded by residential areas on the west side, Xinying Stadium on the north side, shopping centers and residential areas on the east side, and the private Yude Industrial Vocational School on the south side. The environment is a diversified urban neighborhood. The sitewasoriginally used forthe Xinying tennis courts, basketball courts and softball fields. The surrounding commercial activities are relatively limited. The overall street profile and skyline is formed by low-lying residential buildings.

There are a handful of external traffic routes to the site. The site is about 2.4km east of the No.1 Provincial Highway on Route 172 (locally, Changrong Road), a 5-minute drive. The site is also 3kmwest of the National Highway No.1 Xinying Interchange on Route 172 (locally, Changrong Road), a 6-minute drive. It is also 3km north of the Taitie Xinying Railway Station via Zhongzheng Road, a 10-minute drive. The Jiayi high speed rail station is 26 km to the north. Visitors in near Tainan City can reach the site within 1 hour by taking train or bus. The public in other areas can reach the site within half an hour of arriving at the Jiayi High-speed rail state by taking local transportation options.

On the north side of the site is Changrong Road, the main outer ring road of the Tainan downtown, which has a relatively larger traffic flow compared with Jinhua Road on the south side, but provides quick access to the National Highway No. 1 Xinying Interchange to the northeast side. Changrong Road is the main external road to the site.

Figure 1.3.1: Site Location

1.3.2Natural Environment

1. *Average temperature*

   The average annual temperature in Xinying District is about 28.1°C, and the highest average temperature of 29.2°Coccursfrom June to July. The lowest monthly average temperature of 16.5°C occurs from January to February.

2. *Rainfall and number of days with rain*

   The rainfall in Xinying District is unevenly distributed throughout the year. The average annual precipitation is about 177.8mm. The rainy season is mainly from June to September, and the dry season is from October to May. According to the historical data of rainfall in Xinying, in August 2010, short-term heavy rainfall led to rain water not being drained in some low-lying areas, so consideration should be made about good drainage design in order to avoid possible flooding.

3. *Relative humidity*

   The annual average relative humidity in Xinying District is about 80.33%, the highest average relative humidity is 85.7% from August to October, and the lowest average relative humidity is 75.7% from December to May. The difference between the highest and lowest relative humidity is 10%.In response to the hot, rainy and wet climate in the summer, the building design must consider heat insulation and building shade, and still properly plan for the ventilation design to reduce discomfort caused by heat and high relative humidity in order to improve indoor comfort. See Figures 1.3.2-1 and 1.3.2-2.

Figure 1.3.2-1: Ventilation Design Sketches

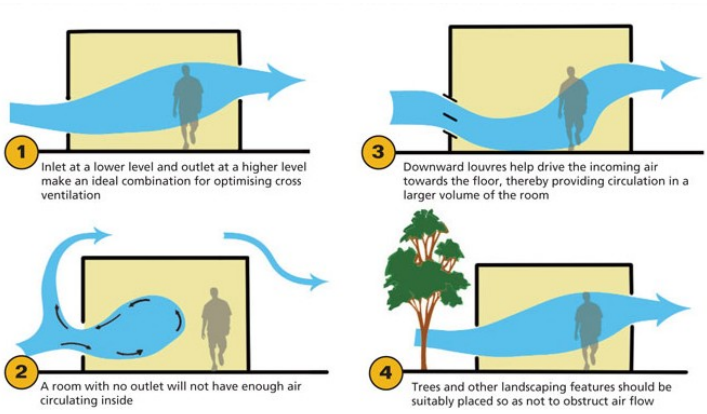
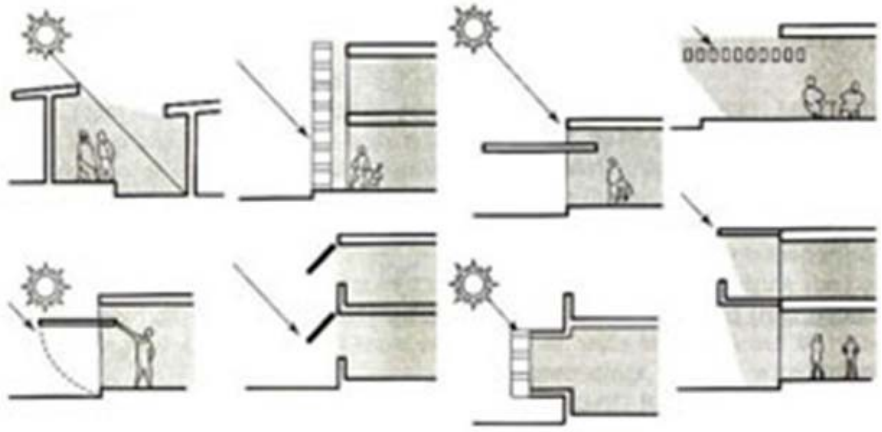


Figure 1.3.2-2: Shade Form Sketches



4. Hydrology

The east and south ends of Xinying District are bounded by the main flow of Jishui Stream. The Jishui Stream is a tributary of the central Guanhe River which originates from the vicinity of the Alishan Mountains. The main path of the Jishui Streamis 65 kilometers long. The streamrange is within the territory of Tainan City with a drainage area of 379 square kilometers. The average slope of the stream is 1:118.

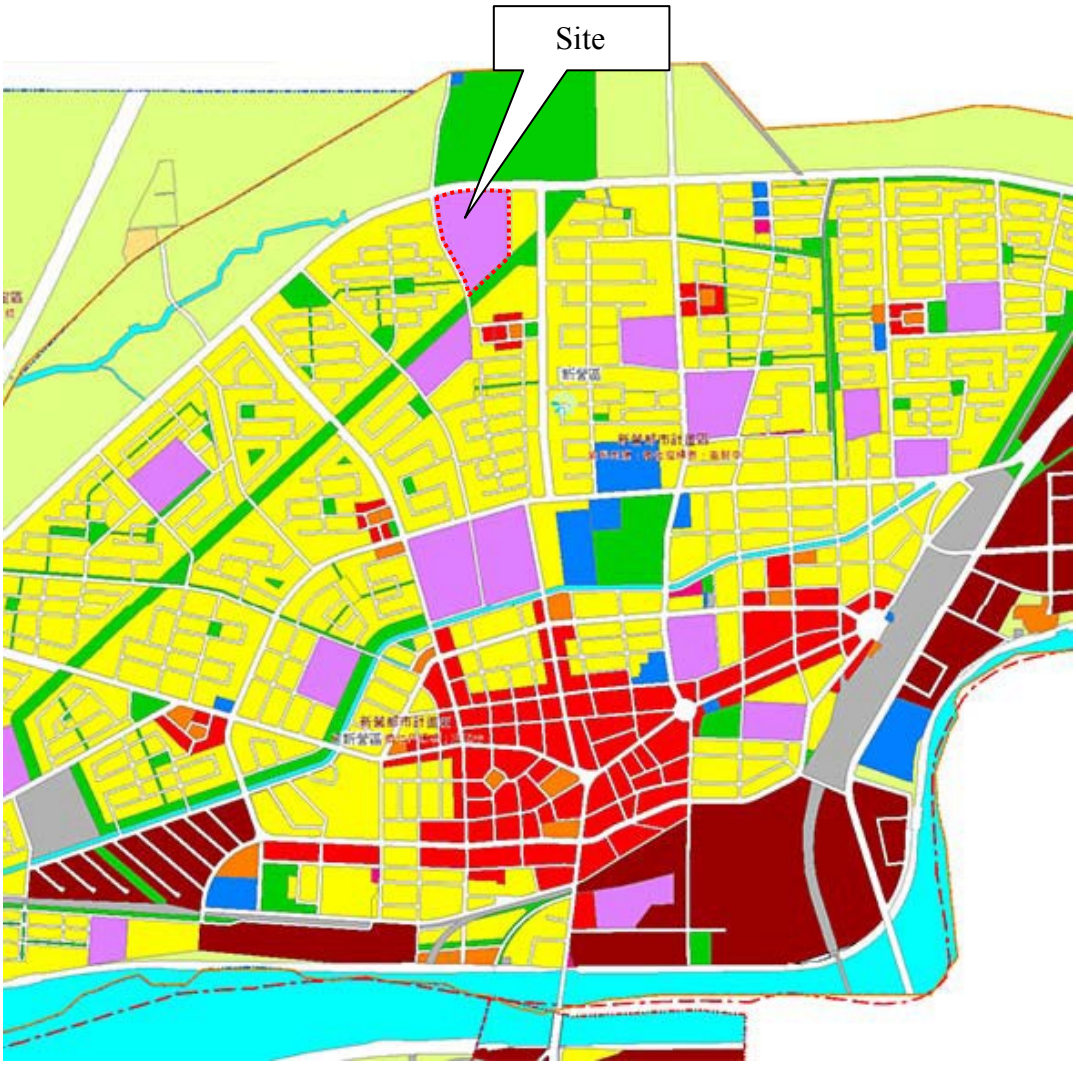
1.3.3Current Site Environment

The site is located near the second section of Changrong Road and Section 1 of Xinhua Road, Xinying District, Tainan City. The site is surrounded by residential areas on the west side, Xinying Stadium on the north side, shopping centers and residential areas on the east side, and the private Yude Industrial Vocational School on the south side. The environment is a diversified urban neighborhood. The site was originally used for the Xinying tennis courts, basketball courts and softball fields. The surrounding commercial activities are relatively limited. The overall street profile and skyline is formed by low-lying residential buildings.

1.3.4Status of Land Use around the Site

The proposal plan is to use lands currently zoned for use as a high school, with land zoned for stadium and park use to the north, park road land in the south, with surrounding lands zoned for use as residential, commercial, and agricultural areas. See Figure 1.3.4.

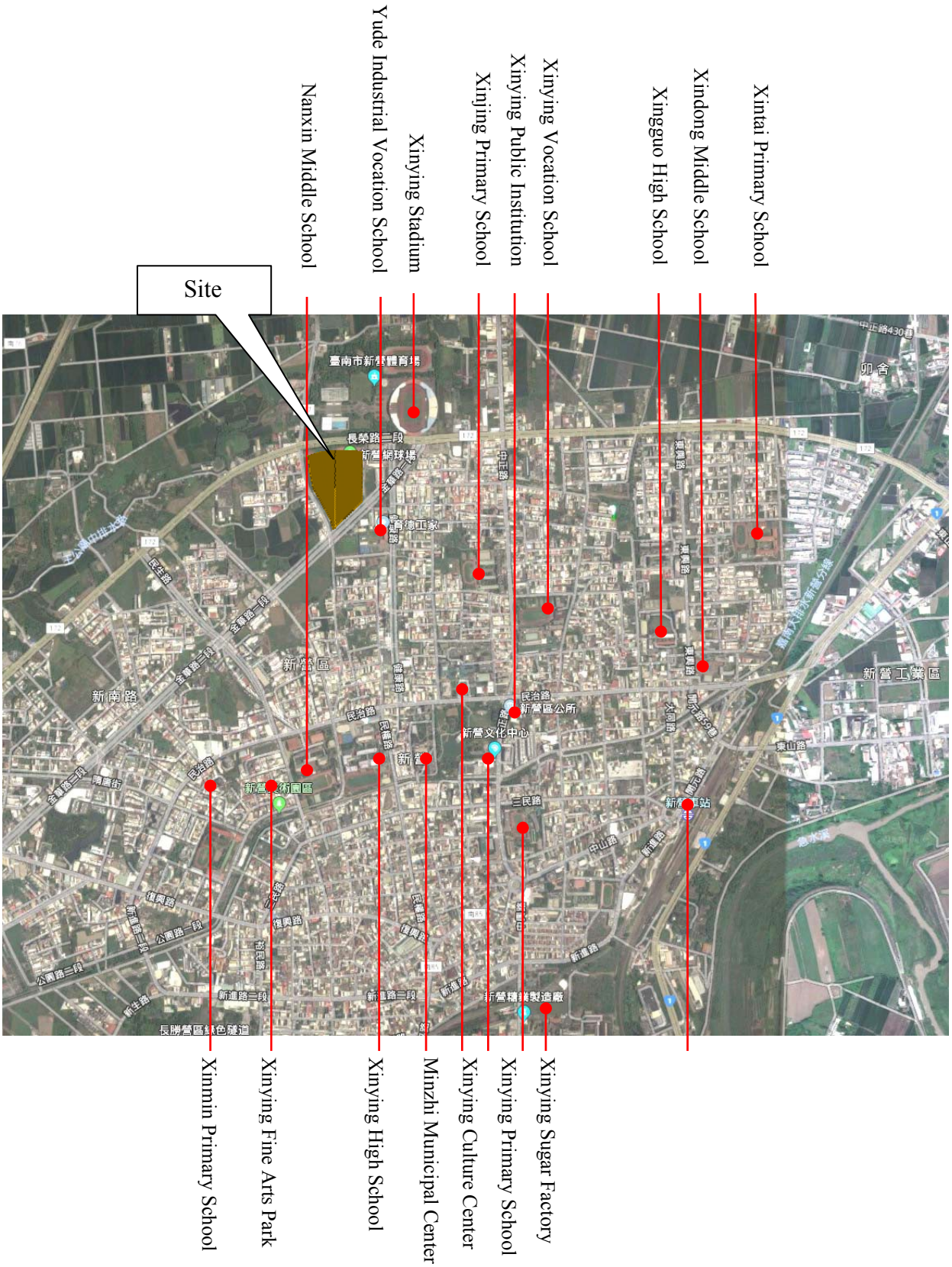
Figure 1.3.4. City Planning Map for Project Site



1.3.5Distribution of Open Space

The public facilities in the surrounding area of the proposed site include the nearby Xinying Stadium on the northwest side of the site. On the east side is the nearby Yude Industrial Vocational School and the main transportation facilities like Xinying Railway Station and Xinying Interchange. There are also cultural, educational, and leisure facilities around the site. See Figure 1.3.5.

Figure 1.3.5: Major Public Facilities in Xinying District



1.3.6 Transportation and Local Traffic

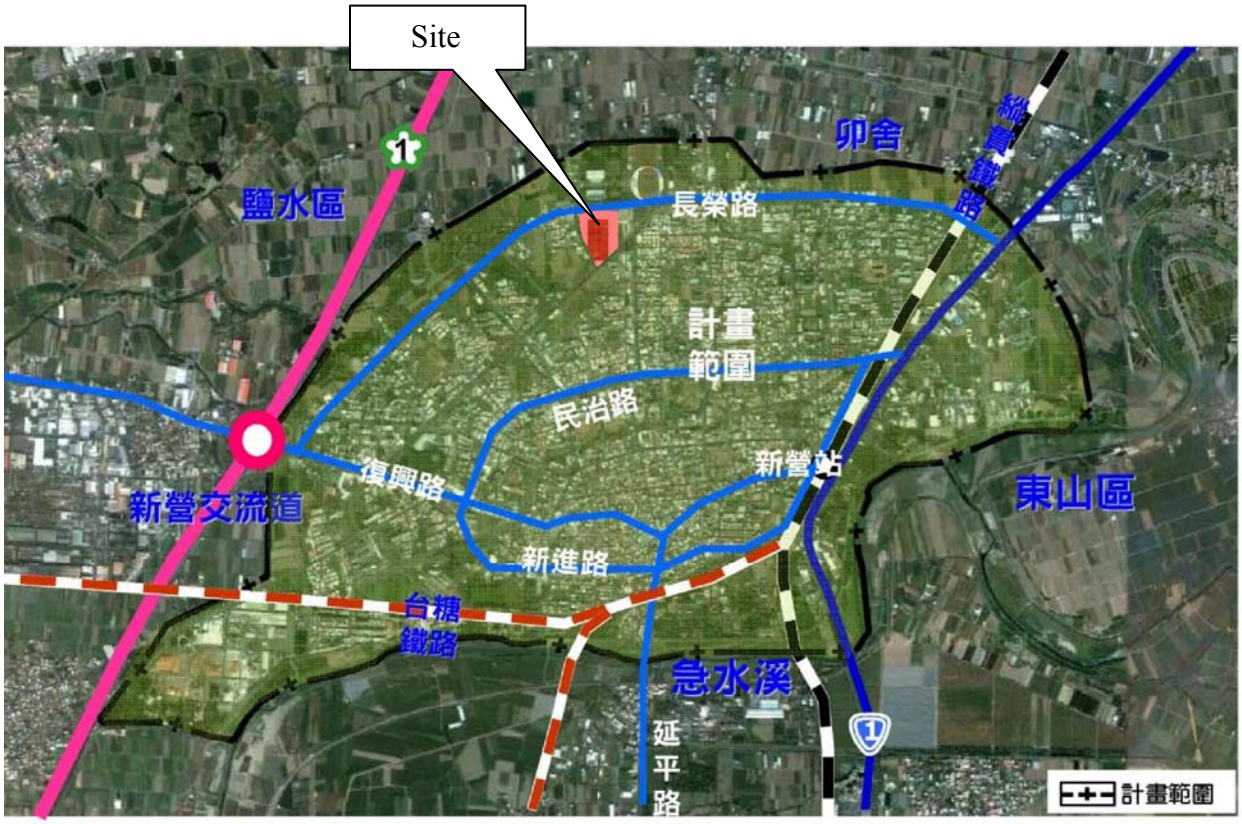
1. *External road network*

   In regards to the roads near the planning area, the width of Changrong Road on the north side is approximately 30 meters. According to the current Tainan City Regional Project—The Urban Plan for Changing Xinying, the road systems connects to the Xinying Interchange to the west of Changrong Road, high-speed rail Jiayi Station to the north, Provincial HighwayTai No.1 to the east. In this manner, the road system improves the traffic flow in the planning area.

2. *Systematic Scheming for Paths within Planning Area*

   The road system architecture in the project area is structured around42 main roads, 82 secondary roads, and 2 park roads. The site is adjacent to the 30-meter-wide main road to the north, a 40-meter-wide road to the south, and 8-meter-wide secondary road to the east (Figure 1.3.6).

Figure 1.3.6: Main Roads near Site



1.4 Regulations Relevant to Urban Planning and Construction

1.4.1 Urban Planning Regulations

1. Urban Planning Law
2. Principles of Urban Design Review in Tainan City.
3. Urban Planning Act Tainan City Implementation Rules.

   Note: the progress of the application for land use at the site is as follows:

   (1) The urban planning commission's fifth meeting of Changing Xinying District Urban Planning (third overall review which included re-preparation of this plan) was convened by the Ministry of the Interior on 11 September 2017. The commission recommends that the proposal should be changed from a combined case to an individual case and educational land use of the site should be changed to be zoned for authority/government land use. Therefore, the zoning change should be considered as a priority. The construction coverage rate and the floor area ratio would be 50% and 250% respectively under authority land use rules.

   (2) The government of Tainan City submitted the Urban Plan for Changing Xinying document to the Metropolitan Planning Commission of the Ministry of the Interior on 20 April 2018 and held the review conference on 29 May 2018. This document changed the sites zoning from use for high schools to authority land use.

1.4.2 Construction-related Regulations

The planning, design, and implementation of this project should be subject to the latest version of the relevant regulations as listed below.

I. Construction Planning

1. Construction Law.
2. Construction Technical Rules
3. Tainan Construction Management Rules

II. Structure Design

1. Construction Technical Rules
2. Building Seismic Design Specifications and Explanations
3. Building Wind Resistance Design Specifications and Explanations
4. Architectural Technology Code Building Structure Code - Basic Structural Design Code
5. ACI Code 318,Building Code Requirements for Reinforced Concrete and Commentary
6. Concrete Structure Design Specifications
7. Construction Specifications for Structure Concrete
8. Technical Specifications for Steel Structure Design of Steel Structure Buildings:
   - Design specifications and explanations for allowable stress of steel structures
   - Design specifications and explanations for Limit Design Methods of Steel Structures
9. China National Standard CNS latest edition.
10. Other recognized international norms and standards.

III. Mechatronic Design

1. General

   China National Standards (CNS)

   Construction Technical Code (CBC)

   New building Energy Conservation Design Standards

   Indoor Air Quality Management Act

   Noise Control Standard

   Environment Protection Administration Indoor Air Quality Standard (23 November 2012 announcement)

   CNS Illumination Standard

   Tainan City Low-carbon Urban Autonomy Ordinance

   Latest relevant laws and interpretations of the announcement of the government procurement unit or the target business authority or organization

2. Electrics

   Interior Wiring System Rules issued by the Ministry of Economic Affairs

   Central Air Conditioning System Meter and Wiring Device Rules

   Taiwan Power Company Business Rules

   Aeronautical Obstruction Lamps Setup Specification

   Taiwan Electric Power Company's Meter Installation Supplementary Provisions

   Taiwan Power Company specifications for new user power distribution sites

3. Telecommunication

   Technical specifications for telecommunications equipment inside and outside buildings

4. Running Water

   Running Water Law

   Implementation Rules for Running Water Law

   Standards for Water Equipment of Running Water Users

   Business rules for Taiwan water companies

5. Sewage

   Water Pollution Prevention Law

   Water Pollution Control Law Discharge Standard

   Technical specifications for water supply and drainage equipment for buildings

6. Fire Protection

   Setting standards for fire safety equipment in various locations

   Fire Safety Authority's Review of Building Fire Safety Equipment and Benchmarking

7. Relevant International and Foreign Standards

   American National Standards Institute (ANSI)

   British Standards Institution (BS)

   Japanese Industrial Standards (JIS)

   International Electro technical Commission (IEC)

   National Electrical Safety Code (NESC)

Insulated Cable Engineers Association (ICEA)
American National Electric Code (NEC)
Institute of Electrical and Electronic Engineers (IEEE)
National Electrical Manufacturers Association (NEMA)
American Society for Testing Material (ASTM)
National Fire Protection Association (NFPA)
Underwriters' Laboratories (UL)
American Society of Heating Refrigerating and Air-conditioning Engineers (ASHRAE)
Other recognized prevailing international norms and standards

1.5 Preliminary Survey Results

1. Preliminary measurements have been completed at the site (see detailed Annex 1, for reference only):

   After the contractor wins the bid, the necessary measurements and investigations should be carried out, including the whole site, extending out25meters from the land boundary, the adjacent land boundary, the clearing of the road elevation (current and planned elevation), drainage flow, and the elevation as a benchmark for the design of this project. The cost of these measurements has been included in the design supervision service fee of this project.

2. Partial drilling and geological surveys have been completed for the site (see detailed Annex 2, for reference only):

   After winning the bid, the contractor should do the necessary drilling and investigation according to the design achievement evaluation and should at least reach the supplementary geological drilling analysis and investigation operations as required by Articles 64 and 65 of the Building Technical Regulations as the benchmark of the design of this project. The cost is included in the design supervision service fee.

3. Baseline boundary survey test: After the contractor's agent owner handles the application for the verification of the boundary, it should cooperate with the related operations procedures.
4. After the contractor has won the bid, it should investigate the existing pipeline information of the site in detail.
5. Other surveys and plans must be completed by the contractor to achieve the project objectives.

Chapter 2:Items to be Handled by Contractor

2.1 Design Perspectives

The Southern Branch of the National Central Library& National Repository Library project is mainly aimed at “mapping functions and services extended to the south” and “satisfying the archive requirements of National Central Library and the public libraries”. In addition to providing the diversified library information service and the archive environment, the library also will offer professional and administrative consulting service. The development perspectives are as follows:

1. To build a national-level library on a large scale with the richest source information in the southern region to meet the demands of the citizens in the southern part of the nation for books and information.
2. To build a modernized library conforming to international trends and become abench mark library.
3. To enhance the National Central Library service and to become an importance support for improving Taiwan’s competitiveness as a learning and living center of all citizens in the era of knowledge economy.
4. To consolidate delivery and warehousing mechanisms and execute the policy of separate archive, and to tackle the insufficient archival space of the National Central Library.
5. To tackle the lack of archival space at the National Central Library and to preserve the books published by Taiwanese presses as well as the precious cultural and historical information kept by the libraries.
6. To establish a digital resource archive mechanism to permanently store electronic resources.
7. To vigorously support economic development of Taiwan by marketing knowledge services according to national economic policy.
8. To stimulate the effect of cross-domain value-added industries through cooperation with other libraries and cultural institutions.
9. To build an intelligent green-energy building that can slow down global warming, withstand natural disasters, and form a microclimate.

2.2 Design Orientation

The National Central Library is the archival center of national book resources and is responsible for the collection and preservation of domestic publications and national academic writings, and providing cultural, academic, educational and informational services. In addition, the Southern Branch & Joint Archive Center will provide access to social networks, engage in academic research, and promote cultural and educational activities with the library’s resources. At the same time, it will also develop a base for the development of library professionals, a book warehousing and repair laboratory, a library service innovation cultivation center, and a local children and teenagers’ literature and historical information center, along with other centers. It expects to become the knowledge information center in the southern part of Taiwan and help disperse national documents and distribute the services provided by the library. It will share the diverse special collections and resources of the library for the purpose of expanding services to the people in the south.

2.3 Technical Service Needs

In order to achieve the objectives of this project, the manufacturer shall be responsible for the completion of the following professional technical services (detailed contract-related provisions):

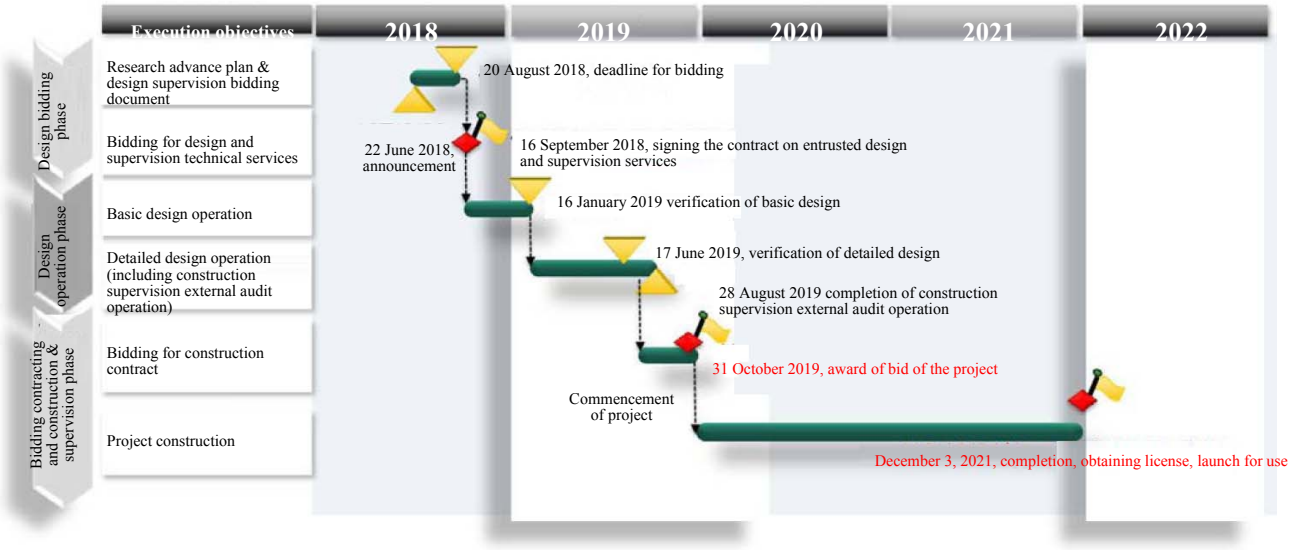
1. The manufacturer shall handle land boundaries, detailed site surveys, detailed geological surveys, drilling and testing, existing plantation surveys, other detailed surveys, tests or prospection contained in the bidding documents, or necessary for the proposal after the award is granted, in order to confirm the rationality and feasibility of the design contents of Party B. Party B shall provide the investigation plans, tests or survey execution plans to Party A and the special management agency 20 days before the completion of all investigations for review and subsequent investigation and testing or survey operations. After the investigation is completed, Party B shall submit the survey report (including the editable electronic file) with the signature of professional technician to Party A for reference, and the report shall be included in the basic design materials of Party B.
2. Within 20 days from the day after the contract is awarded, Party B shall take the initiative to confirm the space and equipment requirements and deliver the results to Party A and the user and cooperate with Party A's request for design. In addition, the manufacturer shall attend discussions, workshops or review meetings demanded by Party A.
3. The manufacturer shall submit a Basic Design Report and a Basic Design Atlas no less than60 days after the award date.
4. The manufacturer shall submit details of the design drawings (up to the level of the package) no less than 60 days after the basic design is approved.
5. The contractor shall cooperate with other professional facilities, equipment and projects that are purchased by the authorities themselves, including but not limited to warehousing system equipment, systems and equipment required for digital resource preservation centers, furniture equipment, computers and information-related equipment, spatial facilities and equipment for the National Central Library Taiwanese publication and printing promotion gallery, facilities and equipment related to preservation and repair of books and documents and for the establishment of digital resource preservation centers. Party B is responsible for the integration, coordination and review of design interfaces, and the integration and review of external audit operations. They are also responsible for the integration, coordination, review and design of construction interfaces, the coordination, management and review of design, and the construction schedule. It is also necessary to cooperate with authorities to handle relevant changes in design operations and construction consulting, services and so on. In addition, the contractor shall be responsible for handling the relevant supervision operations of the construction project.
6. The project shall be partially launched by the end of 2021. Therefore, the contractor shall take into consideration the various operations of the project and specify the relevant schedule plan and operational plan in the work execution plan. In addition, the contractor shall integrate this project and other professional facilities, equipment and projects purchased by the institution at each stage and include this in the period consideration. If there is any change in the institution’s requirements due to the failure to meet the above schedule requirements, the contractor shall attach relevant written information, analysis and contingency plans addressing the impact of the schedule delays for the consideration of the institution
7. In consideration of the requirements of the current period of this project, the contractor shall

cooperate with the needs of the warehousing system of the National Repository Library and complete the integration operation of the construction management review of the warehousing system (including the license application).

8. The contractor shall apply for construction licenses and submit engineering design drawings and data for water, electricity, air conditioning, fire prevention or telecommunications for review, and other matters that need to be completed by the external auditor.
9. According to the sub-project bid strategy approved by the authority, bid documents for each sub-project shall be drafted, including but not limited to, the sub-projects of the newly-built project, special decoration, furniture equipment, etc. for the Southern Branch of the National Central Library& National Repository Library.
10. The contractor shall be responsible for the supervision of the project.
11. The contractor shall be responsible for other necessary operations for meeting the requirements of this project or the authorities.
12. The contractor shall assist the authorities in handling the relevant work setting of public art.
13. The contractor shall assist the authorities in handling trial operations and opening operations.

2.4 Milestones

Figure 2.4: Summary of Milestones



2.5Project Budget Analysis

It is estimated that the project will cost about NTD 4.28208 billion. After deduction of the project indirect costs, land acquisition fees, and advance planning fees, the breakdown is listed as follows.

Table 2.5: Project Budget Summary

Project	Amount (NTD)	Description
I Direct costs of project	**2,499,000.000**	
II Other costs	**1,406,000.000**	
1. Public art setup	24,990,000	About 1% of the direct costs of project
2. Selection award	5,500,000	
3. Equipment costwarehousing system for the National Repository Library	980,000,000	According to the overseas cases, the automatic warehousing equipment cost is estimated at NTD 160/book multiplied by 2 million books; the intensive shelf cost is estimated at NTD 60/book multiplied by 10 million books. The fee of relevant software and system is estimated to be NTD 60 million.
4. Costs of the systems and equipment for Digital Resource Preservation Center	40,000,000	(1) NTD 8 million for server host/operation system/hardware and software; (2) NTD 8 million for a long-term preservation system (3) NTD 24 million for media (e.g. tape cassette, soft and hard disc arrays) object storage
5. Furniture equipment cost	60,000,000	(1) NTD 20 million for special furniture: service enquiries, consulting desks, signage boards, atmosphere reading area, children's special furniture (2) NTD 15 million for fixed furniture: new book demonstration cabinet, navigation desk, various fixed desks, etc. (3) NTD 15 million for movable furniture: book shelves, periodical shelves, newspaper shelves, reading desks and chairs, audiovisual desks and chairs, computer desks and chairs and other office furniture, etc. (4) NTD 10 million for indexing system.
6. Equipment costs related to computers and information	100,000,000	(1) NTD 25 million for related systems and equipment required in computer room (such as room control system, continuous power system, precision cooling system, computer room fire protection system, cabinets and accessories, etc.) (2) NTD 12 million for server host and storage equipment (including redundant equipment) (3) NTD 5 million for communication equipment (such as switches, wireless APs, etc.) (4) NTD 4 million for security related equipment (such as firewalls, intrusion prevention equipment, etc.) (5) NTD 14 million for books, services and

Project	Amount (NTD)	Description
		management related systems and equipment (6) NTD 10 million for personal computers and necessary hardware required for the administrative and personal services (7) NTD 10 million for equipment for conference service space and reader discussion space (such as broadcasting systems, interactive whiteboards, computers, projection equipment, etc.) (8) NTD 20 million for equipment needed for interactive services (such as digital signage, interactive navigation system, and reading service wall)
7. Additional purchasing costs for reading resources at the Southern Branch	100,000,000	Yearly purchase of books, periodicals, audiovisual information and electronic recourses over three years (1) NTD 25 million for 50,000 Chinese books. (2) NTD 20 million for 10,000 books in foreign languages. (3) NTD 5 million for 1,400 audiovisual materials. (4) NTD 10 million for 400 kinds of periodicals in Chinese and foreign languages. (5) NTD 1 million for 40 kinds of newspapers in Chinese and foreign languages. (6) NTD 15 million for electronic resources (electronic books, data libraries and electronic periodicals). (7) NTD 15 million for special collection documents. (8) NTD 9 million for other special information.
8. Book museum and Taiwan publication and printing promotion gallery	30,000,000	(1) NTD 5 million for archive management system and setup of peripheral equipment. (2) NTD 15 million for setting up of related equipment of demonstration, public service, education promotion and administration, etc. (3) NTD 5 million for setting up of navigation and interpretation equipment, etc. (4) NTD 5 million for building the on-line demonstration and interactive education system of the museum,
9. Related equipment costs for book preservation and repair	41,510,000	Including storage, book and special collection document repair, and freezing and deforming equipment costs.
10. Costsfor digital resource preservation center and other administrative	24,000,000	NTD 14 million for promotion and preparation of a digital resource preservation center during the preparation stage, NTD 4 million for book

Project	Amount (NTD)	Description
operations		warehouse shifting costs, NTD 6 million for other administrative operation costs (including temporary manpower, temporary office, car leasing and moving, etc.)

Party B shall uphold the technical expertise of design and supervision to complete the construction of this project within the direct project cost budget of NTD 2,499,000,000 and coordinate with the relevant purchases (predetermined items and amounts are detailed in the above table) of the plan, and supervise, coordinate, cooperative with related contractors and vendors to jointly complete the construction of the center.

Chapter 3: Spatial Requirements and Design Principles

3.1 Overview of Usage Requirements

The design unit must conduct a requirements interview with administrators before the basic design stage, and keep records of the interviews for the following required spaces (under the principle that the total area usage does not increase or decrease by more than5%), dimensions, furniture, shelves, or system equipment. The center's administrators or project management unit can make adjustments according to actual requirements. After the interview ends and revisions are completed and verified by administrators or the project management unit, subsequent operations may be carried out.

Table 3.1: Spatial Usage Requirements for Repository Library

Space	Function	Area (㎡)	Purpose
National Repository Library		**Subtotal: 14,900 ㎡**	
Automatic storage	Automatic storage area	1,200	Raised ceiling recommended at 12–14 m. Automatic storage and retrieval system will provide storage space for 2 million books, effectively holding the books and periodicals collections of the southern branch.
Joint Archives Center	Book shelves area	10,900	Raised ceiling recommended at 14–16 m. Tall efficiently stored book shelves will be used and provide storage space for 13 million books, theses, periodicals, journals, newspapers, and posters of the National Central Library and public libraries. Books, documents, and copies that are rarely used but have high preservative value will be given priority.
	Audiovisual database	300	Compact shelves will be used to store about 200,000 audiovisual data (audio cassettes, video tape, CD, VCD, DVD) and 1 million rolls of microfilm.

Space	Function	Area (㎡)	Purpose
	Special collection storage	1,000	Provide a storage space with constant temperature and humidity for National Central Library and public libraries to store precious books and documents.
Operating area	Includes book unloading platform, work area and service display area, digital scanning area, materials warehouse	1,100	Provide operating space before books are placed into storage, and also provides space for digital scanning, observation, and teaching using various books and documents.
Freezing extermination room	Includes quarantine area and recovery room		Provides operating space for freeze extermination and operations extending the lifespan of books through deacidification, anoxia, freezing, and extermination.
Digital Resource Preservation Center	Green computer room	400	Creates an environment for long-term preservation of digital objects and media from around the country and serves as a remote backup site for the National Central Library.
	Media storage		
	Work area and service display area		

Table 3: Spatial Usage Requirements for the National Central Library Southern Branch

Space		Function	Area (㎡)	Purpose
National Central Library Southern Branch			**Subtotal: 13,550 ㎡**	
Library science development center	Library personnel professional training and learning sharing center	Training face for library specialists	400	Establish a library science development center in response to changes in the role of librarians
	Library service experiment site	Service innovation experiment space	300	Utilize advanced technologies or concepts to develop a prototype or conduct a pilot experience for library services
Library Service Innovation Center	Discussion space	Provides a space for discussion, debate and publishing works	600	Utilize different expertise to develop reader services and environment facilities for the National Central Library and university libraries in response to the demand and growth of visitors of all ages, showing the value of libraries in the Internet era, and improving the service method of libraries.
	Practice space	Provide a maker space and creativity studio to encourage cooperation and creativity		
	Training space	Provides a space for courses that inspire creativity and develops potential		
Book and document experimental center	Book museum	Includes special exhibition and reading space	1,200	Shows the development of physical and digital books in the context of human civilization and history, and the different aspects of reading in recent digital trends. Combines diverse media in the presentation

Space		Function	Area (㎡)	Purpose
				of books published in Taiwan, so that visitors can enjoy the reading experience of being in a museum.
	Taiwan publication and printing promotion and display space	Includes space for displaying books, papers, or publications	400	The space can be used to display books, paper or publications with lighting and atmosphere as the main design elements. Following developments in media and technology, it is also necessary to offer digital displays and show the essence of Taiwan's publications in a new way.
	Book preservation and restoration laboratory	Includes physics and chemistry laboratory	400	The space is used for paper repair, preservation, and deacidification, and freezing or anoxic fumigation for extermination of pests.
	Exhibition preparation room	Temporary storage and preparation space for exhibited works	400	This space is used for preliminary operations before an exhibition.
Domestic children and youth literature and historic material center	Study room Reading and discussion room	Provide children and youth with a space for literary research and creation	400	The Southern Branch will serve the National Central Library's role of completely preserving the nation's literature, and services will be extended to younger users. In the future, the Southern Branch will collect children's and youth literature and literary works from Taiwan and around the world, and will regularly organize lectures, seminars, and workshops to support the literary creation and research and academic development of children and youth.

Space		Function	Area (㎡)	Purpose
Reader services space	General Service Center	General service counter with library card application service area and book and magazine retrieval service counter	150	Provides receiving, books and magazine delivery, application processing, library card application, book and magazine retrieval, and general and specialized consulting services.
	Knowledge Center	New book display area	300	Provided for the display of physical books and data, experience digital or online e-books, and display the latest publications. Exhibitions with different themes can be held here.
		Periodical reading area		
		General book reading room	1,200	Provides a reading space for visitors to browse or for use by the Joint Archive Center to retrieve books.
		Youth service area	600	Provides a space for youth to experience searching for books, and also provides a space for inspiration, learning, meeting others, performance, and media experiments, which meet the youth's learning and research needs.
		Children service area	750	Collects children's picture books from Taiwan and other countries and printed materials, designed with a style appealing to children with the interactive area as the main space. There

Space		Function	Area (㎡)	Purpose
				are also thematic spaces for regular displays.
		Elderly service area	200	Provides the elderly with a forward-looking and practical space with mobility aids, so that the elderly can conveniently use the services and reading resources provided by the library.
		New immigrant service area	100	This space will help new immigrants gain the language skills, IT skills or work skills to help them assimilate into Taiwanese society. Besides providing collections and support services, consultation services are also provided to help new immigrants from various countries.
	Knowledge exploration service area	Knowledge and reading navigation station	200	Provides readers with a place to learn and think, carry on discussions, search for manage the use of information.
		Learning and sharing space (Digital reading and learning area)	500	An open learning space that can be flexibly adjusted based on the purpose and number of users.
		Multimedia area	600	Provides readers with access to audiovisual data (e.g. borrowing audiovisual materials) and allows them to listen to music and watch videos.
		Group discussion room and recreational reading area	400	Provides various types of spaces for group use.

Space		Function	Area (㎡)	Purpose
		Information retrieval service area	200	Provides readers with information retrieval and timely instructions on how to use the center's resources.
	Research and creative spaces	Provides a space for readers to utilize their research and creative capabilities	400	Use spatial planning and design to establish a space that benefits the creativity of readers, in hopes of effectively helping readers utilize their research and creative capabilities.
	Conference and event space	Lobby	800	Important results of the center or technology-themed public art are displayed in the lobby, and an open display space is designed for visitors to immediately see the center's features and gain information on the latest technologies.
		Lecture hall	700	Has a capacity of 500, professional lighting, stereo, and stage equipment, providing a professional venue for lectures and cultural activities.
		Multipurpose conference room	300	The multipurpose conference room has a capacity of 120 and the training room has a

Space		Function	Area (㎡)	Purpose
		(including training room)		capacity of 60. The rooms have complete audiovisual facilities and conference systems and are used for training and meetings.
	Dining and shopping space	Dining area	300	A convenient shopping and dining location for visitors that will also encourage shoppers to use the library. It also provides readers with a comfortable dining environment or can provide meals for events held at the library.
		Store	250	Sells cultural creative products of the library, sells books related to the theme of exhibitions help at the library, and organizes small art and culture lectures to supplement the library's income
General administrative space		Supervisor, librarian, and administrative offices (including guest, employee, and volunteer lounge)	600	Provides space for librarians and administrative offices, medium and small conference rooms, file room, control room, storage, and temporary storage and processing of books necessary to maintaining the center's normal operations.
		Medium and small conference room (1 each)	100	
		Book unloading and receiving area	200	
		File room	100	
		Control room and standby room	300	
		Storage room, tea room	200	
Garden and leisure space				
Rest area			0	Provides space with atmosphere that will attract visitors and outdoor space for readers to think
Public space (Total of the archive center and Southern Branch			**Subtotal: 22,550 ㎡**	
Parking lot			11,550	Parking space for 250 cars and 310 scooters will be planned, and actual requirements will be reviewed based on land administration rules or the Building Technology Regulations.
Machine room/ stairs/ elevators/ hallways/restrooms			11,000	Actual space will be reviewed in accordance with relevant regulations.
Facilities surrounding buildings				
Total area			**51,000 ㎡**	

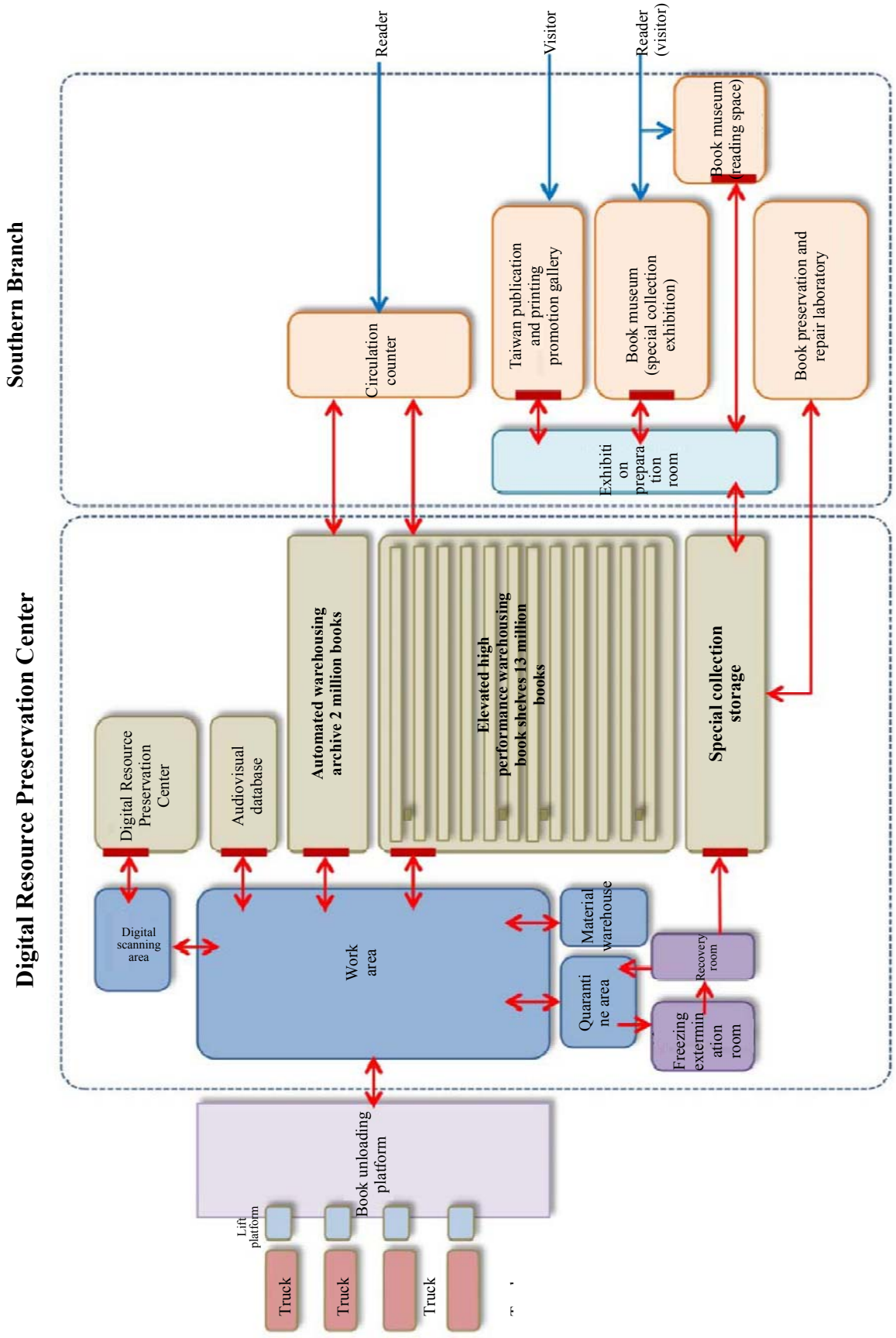
Note:

According to Article 59, Section 14, Chapter 2, Building Design and Construction, Building Technical Regulations, this project is a Category 3 public building with a construction base area

reaching 1,500 m^2, and therefore requires double the amount of parking space. However, if the urban planning committee or urban design review committee at each level approves the exemption from this requirement, the agency has the right to use the extra space and remaining budget for other spaces or items.

3.2 General Provisions for Planning Each Area of the Joint Archive Center

Figure 3.2-1: Relationship between Each Area of the Joint Archive Center



1. Automated warehouse

Automated warehousing area

Function: Will hold 2 million books, mainly the book and periodical holdings of the Southern Branch of the National Central Library.

Design requirements: The building design must not only satisfy the quantity of books that will be stored, but also emphasize temperature and humidity control, air quality control, and select suitable building materials, lighting method, and fire safety equipment to reduce the risk of damage to books.

Figure 3.2-2: Automated Warehouses, Images for Reference

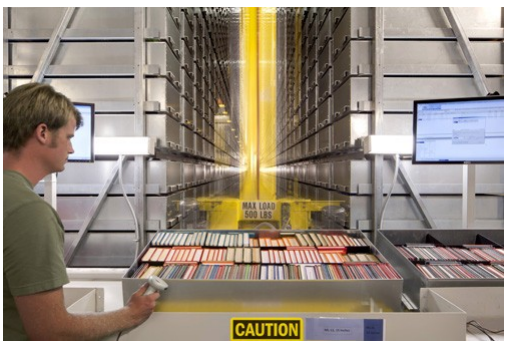
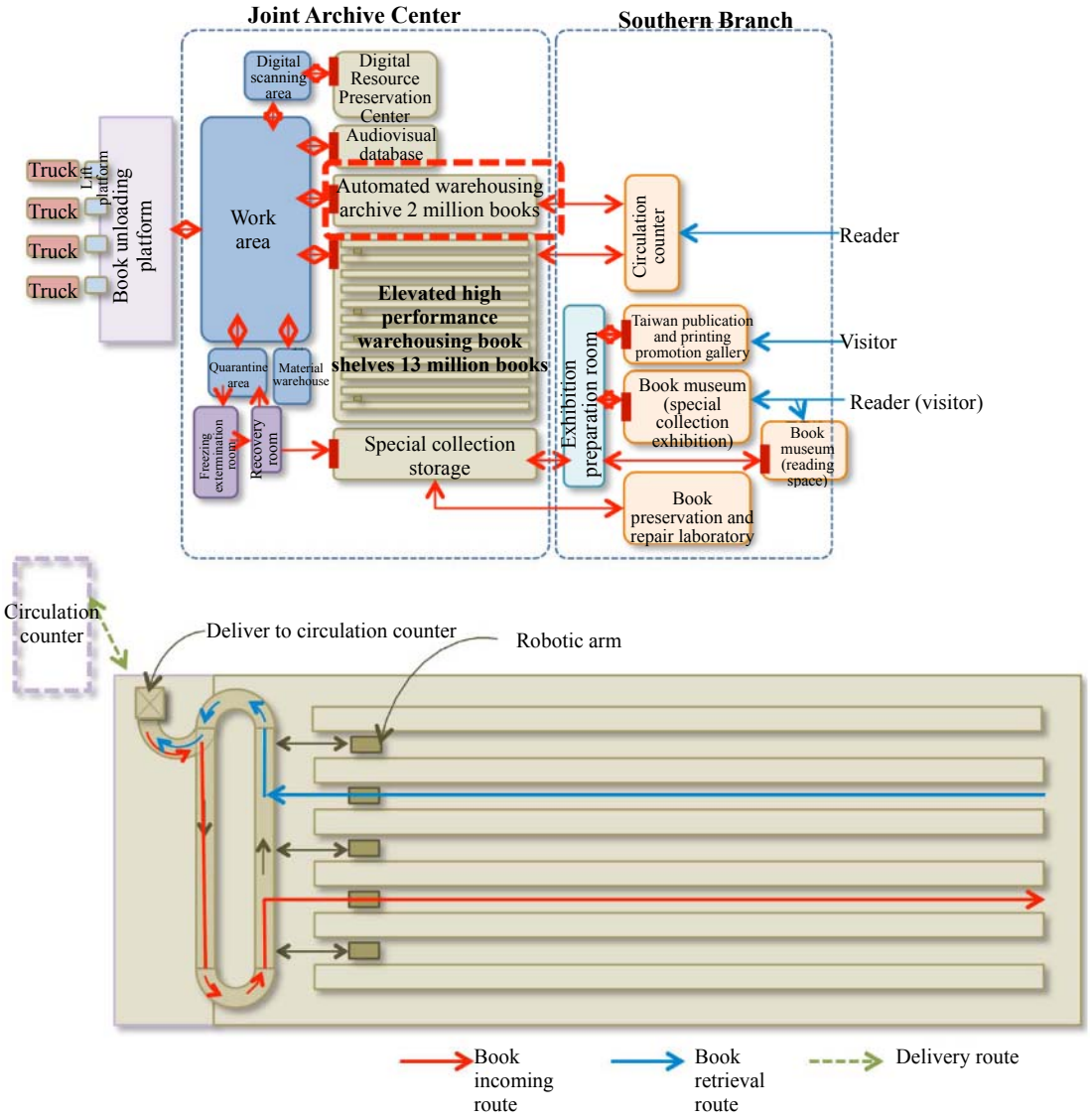
<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Automated warehouse (Chicago State University Library)</td><td>Automated warehouse (University of Chicago Library)</td></tr>
<tr><td>  </td><td> 
</td></tr>
<tr><td>Arm for automatic book retrieval (University of Technology Sydney Library)</td><td>Book retrieval and circulation counter (University of Chicago Library)</td></tr>
</table>

Figure3.2-3: Relationship between the Automated Warehouse and Auxiliary Space
(relative position of spaces for reference only)



Design principles:

1. Design and plan spaces and buildings based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. Library collection and area: The automated warehouse can store 2 million books and has an indoor area of 1,200 m^2.
3. Warehouse height: The building should have a raised ceiling with a recommended net height of 12–14 m; the recommended height of the automatic storage and retrieval system is 10–12 m. (spatial dimensions, capacity, and system model will still need to be adjusted in coordination with the design provided by the equipment suppliers).
4. Warehouse structure and volume:
   (1) The recommended floor load capacity for the ASRS, including books, is 4,500–5,000kgf/m^2 (spatial dimensions, capacity, and system model will still need to be adjusted in coordination with the design provided by the equipment supplier).
   (2) Urban landscape and the ratio to nearby buildings should be taken into consideration to prevent the building being too massive.
5. Warehouse layout and routes:

(1) The warehouse should be located near the book unloading platform and operating area, and routes for the entrance or exit of trucks, book transport, and sorting should not interfere with the operations of the Southern Branch.
(2) To increase the speed of automatic book retrieval, the circulation counter should be near the ASRS and space should be reserved for a transport channel.

6. Flood prevention, waterproof design:
   (1) The elevation should be at least 110 cm higher than the water level 200 years ago.
   (2) The exterior wall should use waterproof materials (waterproof coating) and structures along with waterproof methods, and nodes on the roof should have waterproof designs. Furthermore, if the warehouse is planned underground, a two layer wall can be used and the water resistance of the concrete must be considered for the underground structures. Waterproofing measures must be strengthened for detailed structures underground, such as construction gaps, pipes that pass through walls, embedded parts, fittings for reserved channels, and pile heads.
7. Lighting design: Artificial light source without ultraviolet light should be used for indoor lighting, and should comply with the CNS luminance standards.
8. Exterior wall design:
   (1) To prevent light pollution (UV), the exterior wall of the buildings should not have windows or skylights.
   (2) Heat and moisture insulation (such as a two-layer wall) should be considered when designing the exterior wall and roof to reduce the burden on air conditioning, and also control the temperature and humidity.
   (3) For the convenience of subsequent maintenance, the exterior wall is recommended to have a loading opening or access door.
9. Indoor floor:
   (1) Must be moisture proof, slip resistant, and prevent damage and dust from operating large machinery (such as the book retrieval lift).
   (2) To satisfy the accuracy needs of automated equipment, the horizontal error of the floor for construction must be reduced (the margin of error must be adjusted according to the ASRS specifications).
10. Air conditioning system:
    (1) An independent air conditioner should be in place with temperature controlled at 22–26℃ and relative humidity kept under 55%, and temperature and humidity sensors should be set at different heights.
    (2) Air conditioning outlet and return air inlet should give consideration to indoor air circulation, and minimize fluctuations in temperature and humidity.
    (3) Air conditioning systems and equipment should all have an automatic temperature control system, so that the temperature in the space is controlled within the designed range. A backup system should be in place and included in the scope of the emergency power supply.
    (4) Total power consumption of the equipment is recommended to not exceed 300KVA (power consumption still requires verification based on the design provided by the equipment suppliers).
11. Fire safety system: Water mist fire extinguishing equipment and early warning systems should be used to protect the safety of books and the book retrieval service counter should have a fire and smoke damper.
12. Safety monitoring: Around-the-clock central environment monitoring and surveillance equipment should be installed, including but not limited to warning equipment for monitoring

the air conditioning system, energy efficiency, uninterrupted power supply, fire safety, water level, access control, and temperature and humidity.

(1) Around-the-clock access control equipment should be in place for access by authorized personnel only.

(2) Around-the-clock central environmental monitoring and surveillance equipment should be installed, including but not limited to warning equipment for monitoring the air conditioning system, energy efficiency, uninterrupted power supply, fire safety, water level, access control, and temperature and humidity.

13. Building, structure, electrical and mechanical, air conditioning, and fire safety system design should be coordinated with the warehousing equipment suppliers and verified using the structural calculations provided by the equipment suppliers.
14. The client will separately purchase professional equipment for the warehouse and computer information system equipment. The contractor must adjust the design of this project based on the model and specifications of equipment that is procured.

2. Joint Archive Center

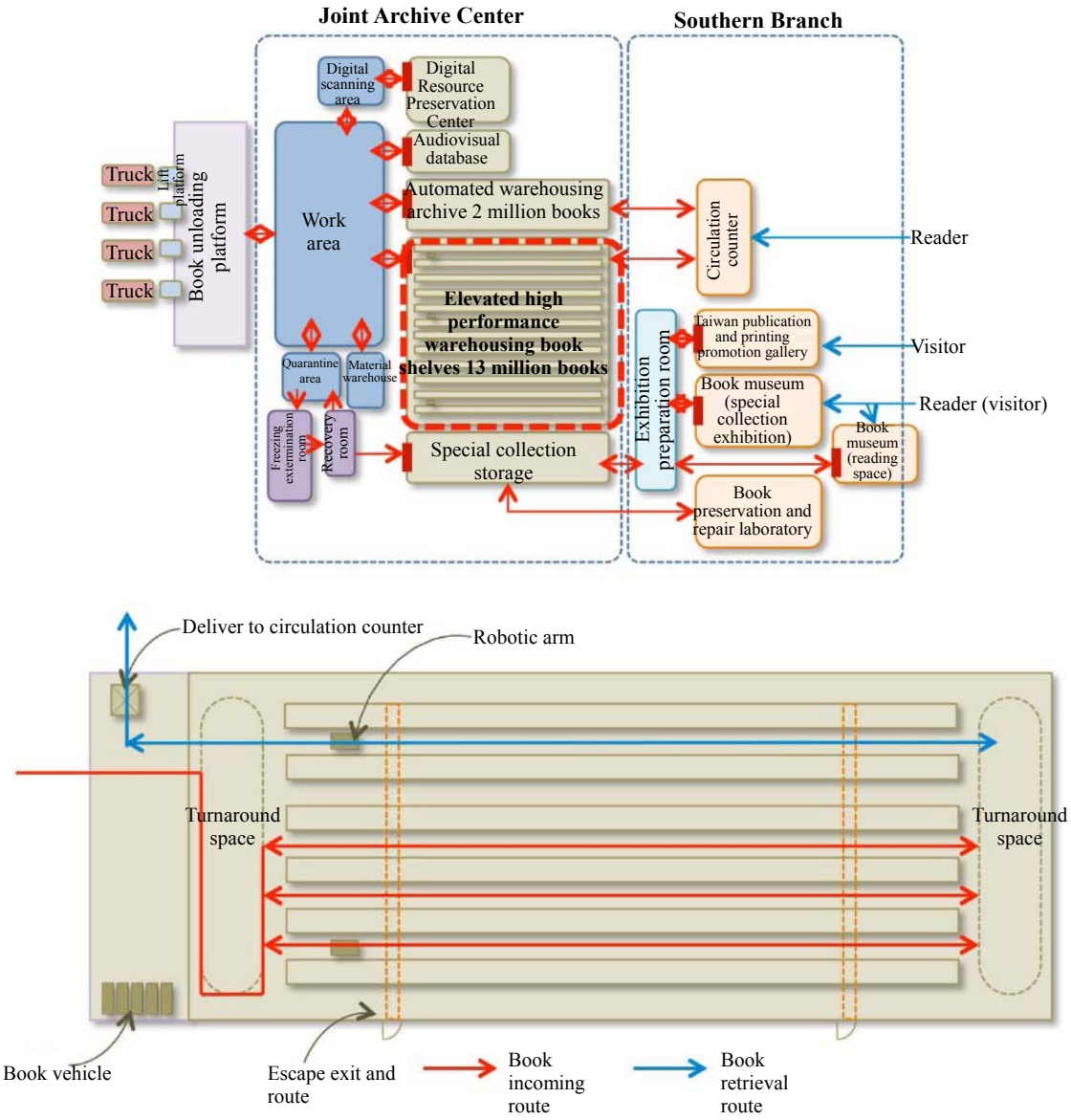
(1) Tall efficiently stored book shelves

Function: The Joint Archive Center will be used to store 13 million books, mainly rare books, documents and copies with preservation value from the National Central Library and public libraries. Design requirements: Besides meeting book storage capacity requirements, building design should focus on temperature and humidity control, air quality, and choosing suitable construction materials, lighting methods, and fire safety equipment to lower the risk of damage to books.

Figure 3.2-4: Tall Efficiently Stored Book Shelves (photos for reference)

	
Tall efficiently stored book shelves (ReCAP warehouse in the U.S.)	Operating area for the tall efficiently stored book shelves (turnaround space)
	
Book retrieval lift (University of Wisconsin-Madison)	Book retrieval lift (University of Calgary)

Figure 3.2-5: Relationship between the Warehouse Containing Tall Efficiently Stored Book Shelves and Auxiliary Space (relative position of spaces for reference only)



Design principles:

1. Design and plan spaces and buildings based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. Capacity and area: The tall efficiently stored book shelves area can store 13 million books and has an indoor area of 10,900 m^2.
3. Warehouse height: The recommended height of the building's raised ceiling is 14–16 m; the recommended height of the tall efficiently stored book shelves is 12–14 m (may not exceed 14 m); the width of aisles for the book retrieval lift is1.7–2.0 m. (spatial dimensions, capacity, and system model will still need to be adjusted in coordination with the design provided by the ASRS suppliers)
4. Building structure and volume:
   (1) The recommended floor load capacity for the tall efficiently stored book shelves including books is 4,500~5,000kgf/m^2 (spatial dimensions, capacity, and system model will still need to be adjusted in coordination with the design provided by the ASRS supplier).
   (2) Urban landscape and the ratio to nearby buildings should be taken into consideration to

prevent the building being too massive.

5. Warehouse layout and routes: The warehouse should be located near the book unloading platform and operating area, and routes for the entrance and exit of trucks. Book transport and sorting should not interfere with the operations of the Southern Branch of the National Center Library.
6. Flood prevention, waterproof design:
   (1) The elevation should be at least 110 cm higher than the water level 200 years ago.
   (2) The exterior wall should use waterproof materials (waterproof coating) and structures along with waterproof methods, and nodes on the roof should have waterproof design.
   (3) If the warehouse is planned underground, a two layer wall can be used and the water resistance of concrete must be considered for underground structures. Waterproofing measures must be strengthened for detailed structures underground, such as construction gaps, pipes that pass through walls, embedded parts, fittings for reserved channels, and pile heads.
7. Lighting design: Artificial light source without UV light should be used for indoor lighting, and should comply with the CNS luminance standard.
8. Exterior wall design:
   (1) To prevent UV light pollution, the exterior wall of buildings should not have windows or skylights.
   (2) Heat and moisture insulation (such as two layer wall) should be considered when designing the exterior wall and roof to reduce the load on air conditioning, and also control the temperature and humidity.
   (3) For the convenience of subsequent maintenance, the exterior wall is recommended to have a loading opening or access door.
9. Indoor floor: Must be moisture proof, slip resistant, and prevent damage and dust from operating large machinery (such as the book retrieval lift).
10. Air conditioning system:
    (1) An independent air conditioner should be in place with temperature controlled in 22–26℃ and relative humidity under 55%, and temperature and humidity sensors should be set at different heights.
    (2) Air conditioning outlet and return air inlet should give consideration to indoor air circulation, and minimize fluctuations in temperature and humidity.
    (3) Air conditioning system and equipment should all have an automatic temperature control system, so that the temperature in the space is controlled within the designed range. A backup system should be in place and included in the scope of the emergency power supply.
11. Fire safety system:
    (1) Fire and smoke compartments should planned for, fire dampers should be installed, and escape routes should be planned for personnel.
    (2) Fire safety system: Water mist fire extinguishing equipment and early warning system should be used to protect the safety of the collections.
12. Safety monitoring: Around-the-clock central environmental monitoring and surveillance equipment should be installed, including but not limited to warning equipment for monitoring the air conditioning system, energy efficiency, uninterrupted power supply, fire safety, water level, access control, and temperature and humidity.
    (1) Around-the-clock access control equipment should be in place for access by authorized personnel only.
    (2) Around-the-clock central environment monitoring and surveillance equipment should be

installed, including but not limited to warning equipment for monitoring the air conditioning system, energy efficiency, uninterrupted power supply, fire safety, water level, access control, and temperature and humidity.

13. Building, structure, electrical and mechanical, air conditioning, and fire safety system design should be coordinated with the warehousing equipment suppliers and verified using the structural calculations provided by the suppliers.
14. The client will separately purchase professional equipment for the warehouse and computer information system equipment. The construction manufacturer must adjust the design of this project based on the model and specifications of equipment that is procured.

(2) Audiovisual database (uses compact shelves)

Function: Will store about 200,000 audiovisual recordings(audio cassettes, video tape, CD/DVD) and 1 million reels of microfilm

Figure 3.2-6: Spatial Functionality for the Audiovisual Database: (relative position of spaces for reference only)

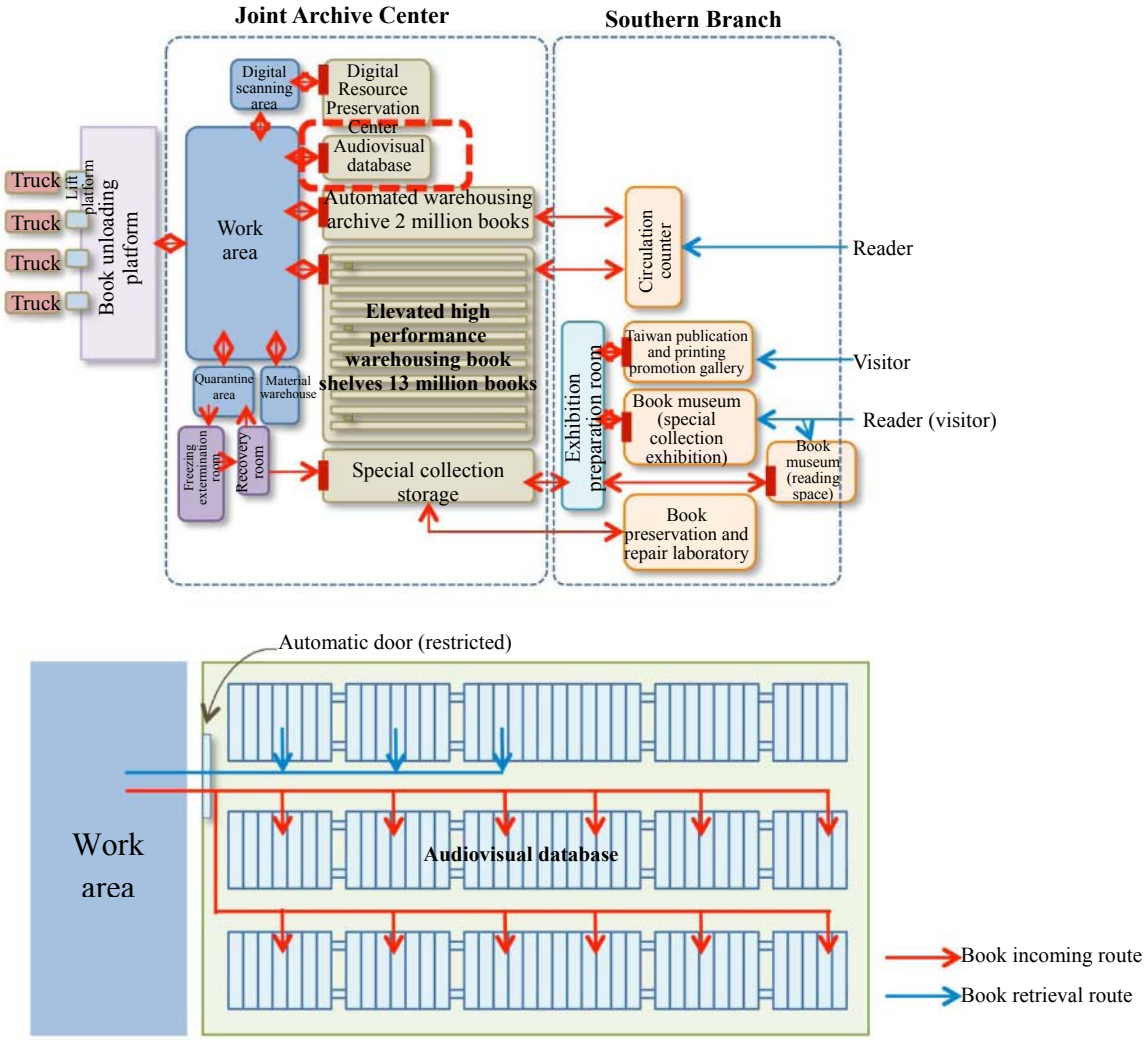


Table 3.2-1: Spatial Requirements for the Audiovisual Database

Audiovisual database		Books and data	Equipment	Area (m^2)
	Name of space			
1	Anterior chamber	-	Door access control	-
2	Audiovisual database	200,000 audiovisual data and 1 million reels of microfilm	Compact shelves constant temperature and humidity	300
Total		-		300

Design principles:

1. Design and plan spaces and buildings based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. The audiovisual database will be designed with compact book shelves.
3. Structure load capacity: Live load design of about 950kgf/m^2. (Spatial dimensions, capacity, and system model will still need to be adjusted in coordination with the design provided by the equipment suppliers.)
4. Air conditioning system: Temperature controlled at 17–19℃ and relative humidity at 32–37%.
5. Fire safety system: Chemical gas extinguishing equipment (or non-corrosive automatic fire extinguishing equipment) to protect the safety of audiovisual materials and data.
6. Lighting design: Artificial light source without UV light should be used for indoor lighting, and should comply with the CNS luminance standard.
7. Safety monitoring:
   (1) Around-the-clock access control equipment should be in place for access by authorized personnel only.
   (2) Around-the-clock central environment monitoring and surveillance equipment should be installed, including but not limited to warning equipment for monitoring the air conditioning system, energy efficiency, uninterrupted power supply, fire safety, water level, access control, and temperature and humidity.

(3) Special collection storage (uses compact shelves)

Function: Stores precious books and documents of the National Central Library and public libraries, including maps, paintings, manuscripts, postcards, and deeds.

Figure 3.2-6: Spatial Functionality for the Special Collections Storage (relative position of spaces for reference only)

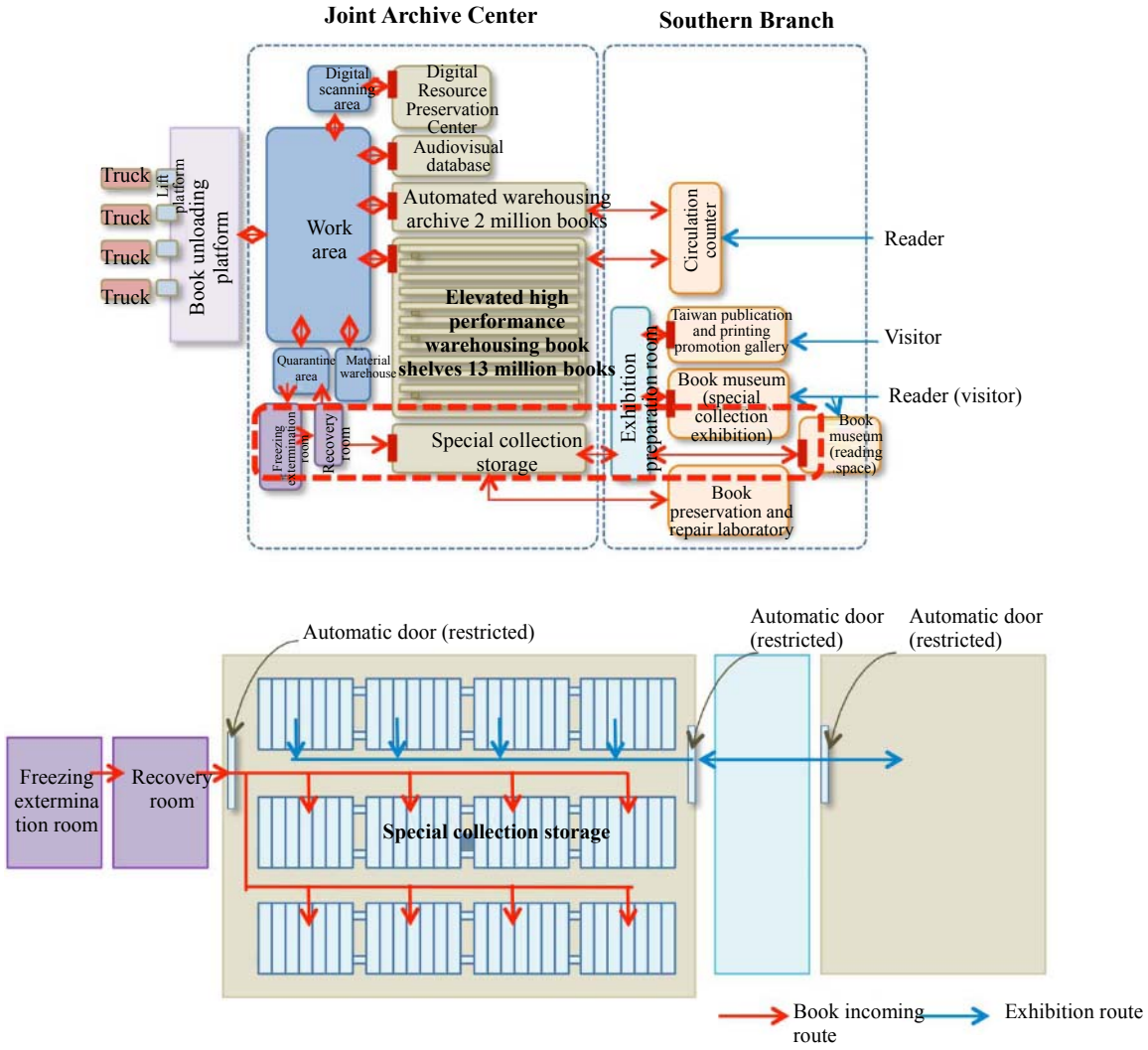


Table 3.2-2: Spatial Requirements for the Special Collections Storage

Special collection storage		Books and data	Equipment	Area (m^2)
	Name of space			
1	Anterior chamber	-	Door access control	-
2	Special collection storage	-	Compact shelves constant temperature and humidity	1,000
Total		-		1,000

Design principles:

1. Design and plan spaces and buildings based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. Compact shelves are used for storing collections in the warehouse with flexibility for different sizes, and plans are made according to collection size (e.g. large maps and paintings).
3. Layout and service route:

(1) Must be adjacent to special exhibition and reading spaces and requires a safe transport channel for convenient access to reading services.

(2) The safe transport channel should have a closed design with constant temperature and humidity with the same environmental conditions as the warehouses.

(3) Restrooms, kitchens, tea rooms, and other spaces with water and fire may not be located in upper levels above this space.

4. Lighting system: Artificial light source without UV light should be used for indoor lighting, and should comply with the CNS luminance standard.

5. Air conditioning system: Temperature controlled at 20±2℃ and relative humidity at 55±5 %.

6. Structure load capacity: Live load design of about 95–1,200kgf/m^2(spatial dimensions, capacity, and system model will still need to be adjusted in coordination with the design provided by the equipment suppliers).

7. Fire safety system: Water mist fire extinguishing equipment should be used to protect the safety of the collections.

8. Safety monitoring:

(1) Around-the-clock access control equipment should be in place for access by authorized personnel only.

(2) Around-the-clock central environment monitoring and surveillance equipment should be installed, including but not limited to warning equipment for monitoring the air conditioning system, energy efficiency, uninterrupted power supply, fire safety, water level, access control, and temperature and humidity.

3. Operating area

Figure 3.2-7: Spatial Functionality for the Operating Area (relative position of spaces are for reference only)

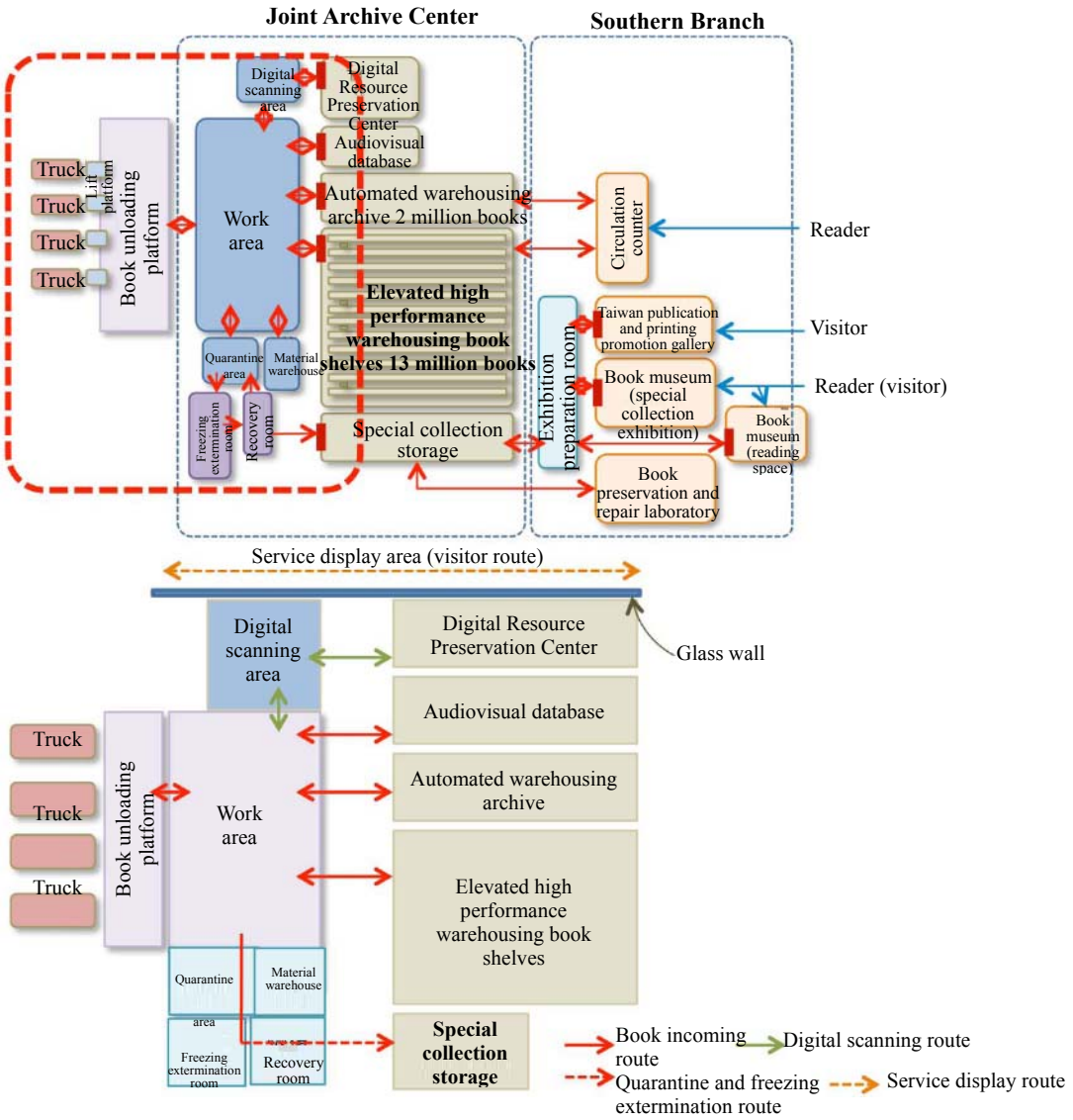


Table 3.2-3: Spatial Requirements for the Operating Area

Operating area		Books and data	Equipment	Area (m^2)
	Name of space			
1	Book unloading platform	-	-	-
2	Work area	-	2 computers	900
3	Service display area	-	-	-
4	Digital scanning area	-	2 computers, various digital scanning equipment	100
Total		-		1,000

(1) Book unloading platform, work area

Function: The book unloading platform and work area are operating spaces used before books enter

the warehouse.

Design principles:

1. Work area:
   (1) Design and plan spaces and buildings based on the area, requirements, functionality, and number of users specified on the design requirements form.
   (2) Should be near the freezing extermination room and automated storage, tall highly-efficient book shelves, audiovisual database, special collection storage, and digital resource preservation center.
2. Book unloading platform:
   (1) A suitable platform and equipment, such as through-wall and open types, should be selected based on routes and building layout.
   (2) The quantity of book unloading ports should meet warehousing requirements. If the maximum book unloading volume cannot be met, then consider designing a waiting area capable of accommodating all waiting trucks.
   (3) The book unloading platform should have a lifting device for unloading books from trucks of different heights.
3. The work area and book unloading platform should have a channel for book carts to pass.
4. Truck route:
   (1) The place on the lane for making quarter turns should have an inner radius of at least 8meters and outer radius of at least 16meters.
   (2) One-way roads should be at least 4 meters wide, and two-way roads should be at least 8 meters wide.
   (3) The parking route for personnel and visitors should be separated from the truck routes.

(2) Service Display Area

Function: The service display area is for observation and teaching.

Design principles:

1. Design and plan spaces based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. Should be near the work area and digital scanning area.
3. Should comply with the CNS luminance standards.

(3) Digital scanning area

Function: This aera provides space for digital scanning services for books and literature.

Design principles:

1. Design and plan spaces based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. Should be near the work area and service display area. Design of lights, scanning equipment lines, information network and sockets should be flexible for use by different types of scanning equipment with different sizes.

3. Temporary storage cabinets and rooms should be in place for the books and materials of various agencies, and constant temperature and humidity control is recommended considering that some documents are very old.
4. Plan channels for book carts to pass through.
5. Should comply with the CNS luminance standards.

4. Freezing Extermination Room

(1) Freezing room and recovery room

Function: This area contains a freezing room, a recovery room, and a quarantine area and is used to prevent infestations in the collection.

Figure 3.2-8: Spatial Functionality for the Freezing Extermination Room (relative position of spaces for reference only)

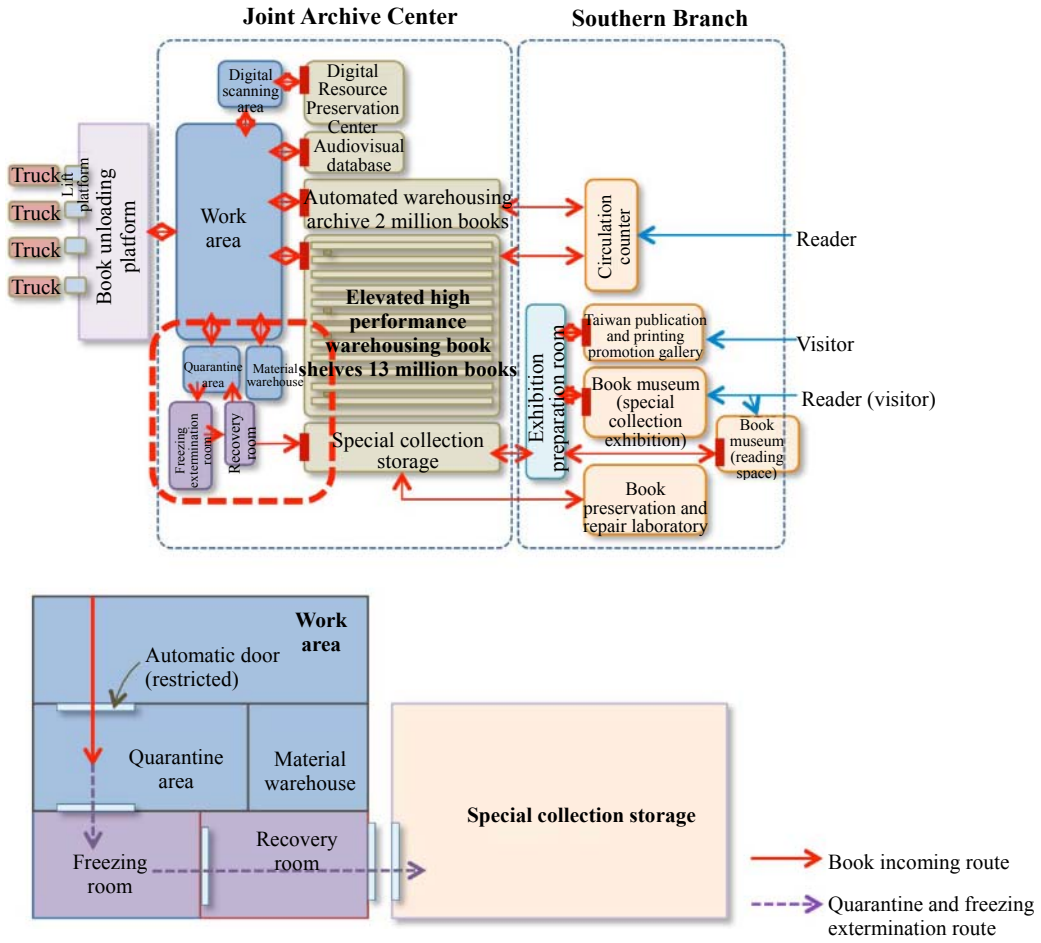


Table 3.2-4: Spatial Requirements for the Freezing Extermination Room

Freezing room, recovery room, and quarantine area		Books and data	Equipment	Area (m^2)
	Name of space			
1	Freezing room	-	Constant temperature and humidity	25
2	Recovery room	-	Constant temperature and humidity	25

3	Quarantine area	-	1 computer	50
Total		-		100

Design principles:

1. Design and plan spaces and buildings based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. Should be near the book unloading area, operating area, and special collection storage.
3. The freezing room's temperature should be controlled at -20–-30℃ and relative humidity at 40–50 %.
4. The recovery room is a temporary storage space for books to return to their normal temperature (about 14 days), and should be near the freezing room.

5. Digital Resource Preservation Center

Figure 3.2-9: Spatial Functionality for the Digital Resource Preservation Center (relative position of spaces is for reference only)

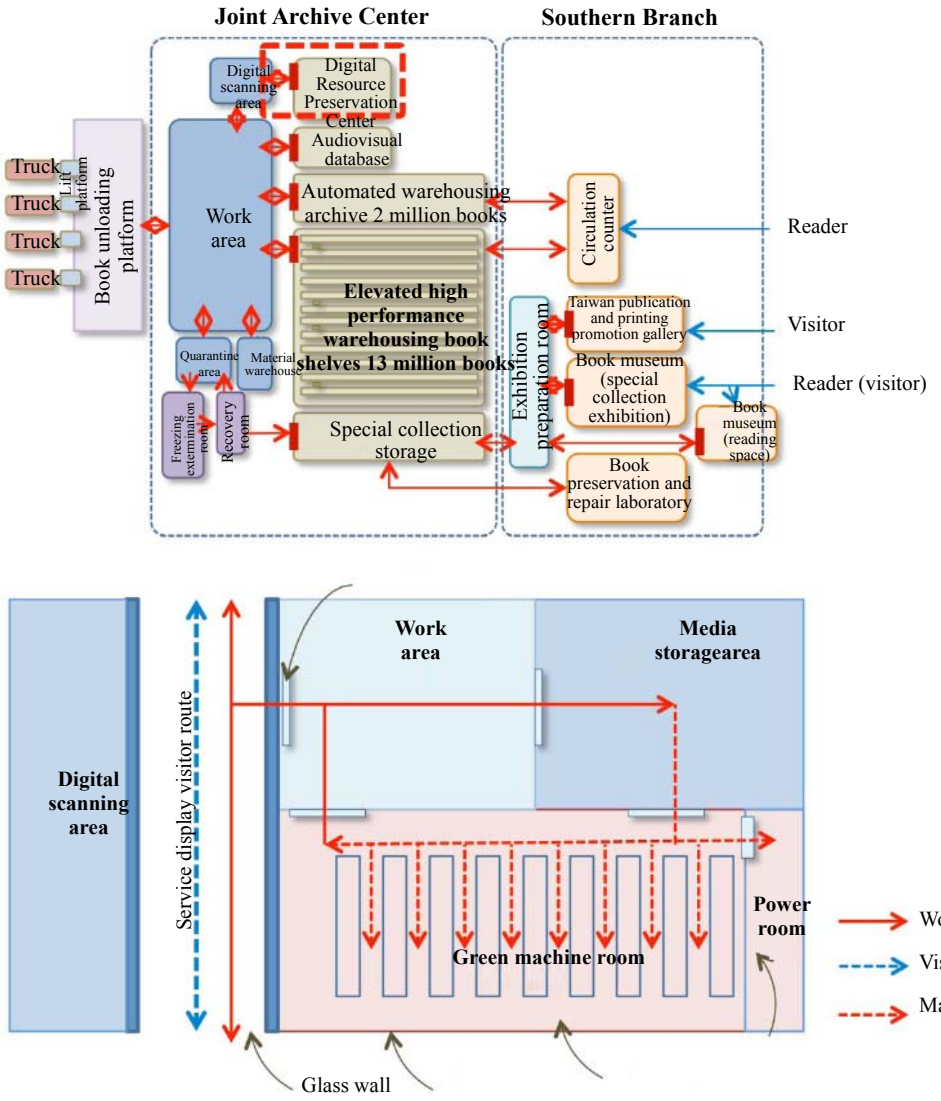


Table3.2-5: Spatial Requirements for the Digital Resource Preservation Center

Digital resource preservation center		Digital data (TB)	Equipment	Area (m^2)
	Name of space			
1	Green machine room (including power room)	-	Constant temperature and humidity	200(Power room about 40 m^2)
2	Media storage	500–700	Constant temperature and humidity	100
3	Work area	-	-	100
4	Service display area	-	Large monitor	-
Total		-		400

(1) Green machine room and media storage

Function: The green machine room provides a space to place information servers, and has a UPS room and control room; the media storage is a warehouse for storing media that contains digital data, including magnetic tapes, hard disks, disk arrays and CD/DVDs.

Design principles:

1. Design and plan spaces and buildings based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. Planning of the machine room must comply with TIA-942 (telecommunication infrastructure standards for data centers) tier 3.
3. Relative position:
   (1) The green machine room, media storage and work area must be adjacent and have proper connection to IT personnel; upper levels of the machine room may not have any restrooms, kitchens, or tea rooms.
   (2) The power room and machine room should be at a safe distance from other parts, and each should have an independent air and water circulation system.
   (3) Power supply equipment such as transformers, uninterrupted power supply, and batteries must have safety protection measures.
   (4) There should be sufficient space between computer racks, independent systems, and related equipment for operations and cooling.
4. Machine room hardware must have the capacity of 500–700TB and 40–50TB backup capacity during early stages of the preservation center, and plans must retain flexibility for future expansion.
5. Consideration should be given to safety, maximum power capacity, air conditioning cooling ability, and floor load capacity, in which floor load capacity must be based on actual planning and design.
6. The machine room has an elevated floor, and cables in the floor must maintain flexibility and give consideration to subsequent repair.
7. Air conditioning system:
   (1) The machine room should have an independent air conditioning system and control the

temperature at 18–27℃, with a relative humidity at 60%, and a dew point temperature at 15℃or below, and an air cleanliness class of ISO Class 8.

(2) Media storage temperature is 16℃–20℃ and relative humidity is 30–40%.

8. Vibration resistance, noise prevention:
   (1) If there is a mechanical device in the machine room, it should be on a concrete base. If the mechanical device vibrates, vibration resistant facilities should be in place.
   (2) The walls and ceilings of the ventilation room, air conditioning related rooms, and power generator room should use sound absorption materials.
9. Fire safety systems:
   (1) The machine room's elevated floor, ceiling and partition walls must be made from flame resistant materials that meet national standards.
   (2) For the fire safety system, consider using chemical gas extinguishing equipment (or non-corrosive automatic fire extinguishing equipment) to protect the safety stored data.
10. Safety monitoring: Around-the-clock central environment monitoring and surveillance equipment should be installed, including but not limited to warning equipment for monitoring the air conditioning system, energy efficiency, uninterrupted power supply, fire safety, water level, access control, and temperature and humidity.

(2) Work area and service display area

Function: The work area is an administrative office and the service display area is for visits by professionals.

Design principles:

1. Design and plan spaces based on the area, requirements, functionality, and number of users specified on the design requirements form.
2. The work area should be adjacent to the green machine area and media storage, and around-the-clock access control equipment should be installed.
3. The service display area should be outside access control, and operations and power efficiency of the green machine room should be visually displayed on a large monitor.
4. The machine room has an elevated floor, and cables in the floor must maintain flexibility and give consideration to subsequent repair.
5. Should comply with the CNS luminance standards.
6. OA office furniture.
7. Must have independent storage space.

3.3 Principles for future expansion of the archive center

The building layout must give consideration to the archive center's future expansion requirements, and area for expansion should be reserved during planning. Overall planning and design should be carried out for future expansion to maintain flexibility. Expansion principles are as follows:

Expansion principles:

1. The building layout should give consideration to retaining an area to provide flexibility for

expansion in future phases.

2. Storage units in the archives center, including spaces, partition walls, structure spans, and warehousing equipment, should have a modular design to facilitate future expansion.
3. The location of the expansion should be near the current Joint Archives Center, so that service routes can be concentrated, reducing book flow and increasing storage and retrieval efficiency.
4. To save labor and expansion costs, warehousing units added in the future should be fully utilized or current spaces for operations unloading, receipt and forwarding, freezing extermination, and quarantine should be integrated.
5. The scope of construction and schedule for future expansion should not affect book storage and retrieval of the Joint Archive Center and reader services of the Southern Branch of the National Central Library.
6. The possibility of the expanding warehousing equipment of the current archive center should also be considered. An entrance should be designed that will allow additional warehousing equipment to be added to the building.

3.4 National Central Library Design Principles for the South Branch Library

1. Library and Information Science Development Center

(1) The Professional Training, Learning and Sharing Center for Librarians

Function: The Professional Training, Learning and Sharing Center for Librarians is established to help personnel respond to the changing role of the librarian.

Table 3.4-1: Spatial Requirements of the Professional Training, Learning and Sharing Center for Librarians

The Professional Training, Learning and Sharing Center for the Librarians		Seats	Equipment	Floor Area(m^2)	
	Name of the Space	Users			
1	Training Classroom	30~50	Podium, Projector Screen	100	400
2	Open Learning and Sharing Center	50		300	

Design Principles:

1. Wired network access points shall be provided.
2. General lighting should be used with an illumination of at least 350 Lux.

(2)Library Service Experimental Station

Function: Conduct prototypes or pilot experiments of new library services based on advanced technologies or concepts. Once the Library Service Experimental Station is demonstrated to be feasible through these service innovation experiments, its function will be expanded to various domestic libraries.

Table 3.4-2: Space Requirements for the Library Service Experimental Station

Library Service Experimental Station	Seats	Equipment	Floor Area(m^2)

	Name of the Space	Users			
1	Exhibition Hall	-		160	
2	Expression Area	20		80	
3	Exchange Area	12		60	300
4	Study Carrels	-		Shared with Other Areas	
5	Conference Room, Training Room	-	Podium, Projector Screen	Shared with Other Areas	
6	Counter	-		Shared with Other Areas	

Design Principles:

1. Exhibition area and exchange area will adopt the open-space design.
2. As the core configuration, the training room, the study carrels, and the conference room will surround the exhibition area.
3. New international concepts can be taken into account to introduce new equipment and improve services to users, such as the sleeping cabin, that allows users to experiencethe feasibility of the new library service and make the library a living space rather than just a learning place.
4. Wired network access points shall be provided.
5. General lighting should be used with an illumination of at least 350 Lux.

2. Library Service Innovation Center

(1) Discussion Space

Function: Provides a space for discussion, debate, and for the presentation of user creations

Design Principles:

1. Wired network access points shall be provided.
2. General lighting should be used with an illumination of at least 350 Lux.
3. Chairs and tables shall be provided.
4. This space should be designed to be independently controlled by users, and the power, air-conditioning, information technology, and other equipment should be able to be independently controlled by users as well.

(2)Implementation Space

Function: Provides a space for creators to creative workshops to stimulate collaboration and creativity.

Design Principles:

1. Wired network access points shall be provided.
2. Chairs and tables shall be provided.
3. General Lighting should be used with an illumination of at least 350 Lux.
4. This space should be designed to be independently controlled by users, and the power, air-conditioning, information technology, and other equipment should be able to be

independently controlled.

3. Training Space

Function: Provides a space for users to stimulate their creativity and develop their potential.

Design Principles:

1. Wired network access points shall be provided.
2. Chairs and tables shall be provided.
3. General Lighting should be used with an illumination of at least 350 Lux.

3. Books and Documents Storage and Repair Experimental Center

(1)Library Museum

See Chapter 3.5 Principles for Planning of the Exhibition Space in this Specification Book.

(2)Exhibition Space for Promotion of the Publishing and Printing Industry in Taiwan

See Chapter 3.5 Principles for Planning of the Exhibition Space in this Specification Book.

(3)Book Storage and Repair Laboratory

Function: This laboratory is required to carry out paper repair, preservation, deacidification, and physical and chemical procedures such as freezing or hypoxia. The space design must consider factors like the nature of the equipment, chemical recovery and disposal, ventilation, safety, temperature and humidity control.

Table 3.4-2: Spatial Requirements for the Book Storage and Repair Laboratory

Book Storage and Repair Laboratory		Equipment	Floor Area(m^2)	
	Name of the Space			
1	Books Storage and Repair Laboratory	Computers (3 sets), Photocopier (1 set)	150	400
2	Front Room	Sink, Laboratory Coats	10	
3	Physics Laboratory	Laboratory Table	100	
4	Chemistry Laboratory	Laboratory Table (including a Sink), Incubator, Refrigerator	100	
5	Office and Storeroom	-	40	

Design Principles:

1. Environmental Requirements for book storage and repair laboratory:
   (1) Temperature:18－22℃, Relative Humidity:45－55%.
   (2) Both the natural light and the artificial light in this room shall be free from UV.
2. Requirements for Facilities and Equipment:
   (1) Pay special attention to the demand for water resources, drilling equipment, repair tables, drying boards, and suction tables.
   (2) The physics laboratory and the chemistry laboratory should have independent

air-conditioning and exhaust pipeline facilities. Those facilities may be located in side rooms with an external space where a window can be opened.

3. Laboratory tables and chairs shall be provided.
4. General Lighting should be used with an illumination of at least 350 Lux.
5. An independent air-conditioning system for ventilation shall be provided.

(4) Preparation Room for Exhibitions

See Chapter 3.5 Principles for Planning of the Exhibition Space in this Specification Book.

4. Local Literary and Historical Center for Children and Teenagers

Function: This center will collect and preserve a complete collection of Taiwanese children's and young adult literature, relevant research works, and children's literature from around the world. In addition to displaying works available for reading, the center also promotes public appreciation of children's literature through lectures, seminars, and exhibitions. In addition, to support academic research, domestic and foreign creative writers and research scholars will be invited to this center to exchange ideas and share the results of their academic research. It will serve as the first platform for research and exchange of children's and young adult literature in Taiwan.

Table 3.4-3: Space Requirements for the Local Literacy and Historical Center for Children and Young Adults

Local Literary and Historical Center for Children and Young Adults		Seats	Equipment	Floor Area(m^2)	
	Name of the Space	Users			
1	Exhibition Area	-		345	400
2	Bookshelf and Reading Area	60			
3	Computer Inquiry Area	4	Computer (4 sets)	10	
4	Research Room(2 people each, 5 rooms)	10		30	
5	Reading and Discussion Room (1 room)	8		15	
6	Photocopying Area	-	Photocopier (1 set)	Shared with Other Areas	
7	The Counter	-	Computer (2 sets)	Shared with Other Areas	

Design Principles:

1. Wired network access points shall be provided.
2. General Lighting should be used with an illumination of at least 350 Lux.

5. Service Space for Readers

(1)Integrated Service Center

Function: This service desk will provide a variety of services such as the helping users apply for library cards and engage in book transfer and retrieval services. This service center will also provide receipts, allow book depositing, book transfer, and general and professional consulting services.

Table 3.4-4: Space Requirements for the Integrated Service Center

Integrated Service Center		Seats	Equipment	Floor Area(m^2)	
	Name of the Space	Users			
1	Circulation Counter	-	Computer (2 sets)	70	150
2	Library Card Service Area				
3	Book Transfer and Retrieval Service Desk				
4	Book Cart Area		Book Cart (10 sets)	10	
5	Bookshelf Area			25	
6	Office/Photocopying Area		Computer (2 sets) Photocopier (2 sets)	45	

Design Principles:

1.The circulation counter is the most important point for management and providing user services. It will be the most frequently used area of the library and will often be used as an information desk. It should be located in the appropriate place connected to the service space for readers and the librarian work space, and it should be close to the main gate or stairwells.

2. The counter is near the control point to facilitate the monitoring of the entry and exit of users and books. It should also provide space for service inquiries.

3. It is the main counter for readers to who wish to borrow or return books, and its location should also be convenient for contact with the book repository. The front of the counter should reserve a wide space to avoid overcrowding. The counter area also needs enough space for book carts to temporarily store books and documents returned by readers and for pre-arrangement work to be performed.

4.The circulation countertop should be wide enough for several workers to provide services at the same time and facilitate computer operations and the borrowing or returning of books.

5. The circulation counter can place returned books on a book cart and send them to the respective reading space or the book pickup area at a later time.

6.Next to the circulation counter, there should be an office to facilitate management and contact with library users.

7.The circulation countertop should be wide enough for several workers to provide services at the same time. The service desktop is 105cm deep and the width for each person working at the countertop should be at least 200cm, preferably more.

8. The comprehensive service space with the electronic technologies, automated monitoring management and humanized management may be integrated in the course of planning and design.

9. There must be rooms to store reserved books, interlibrary loan books, and accessories.

10. The bookshelf area can be used to temporarily store reserved books.

11. The accessory cabinet area can store various electronic media, such as CDs/DVDs, and magnetic cassettes.

12. The administrative office is located adjacent to the circulation counter to facilitate management and contact.

13. A self-service disinfection box for readers is to be set at the exit of the circulation counter.

14. General Lighting should be used with an illumination of at least 350 Lux. Work surface lighting should have an illumination of at least 550 Lux.

15. The arrangement of cables needs to be designed with consideration to follow-up maintenance issues.

16. Convenience and access for mobility-impaired users shall be considered.

17. The various cables must not obstruct the access and use of this space by users.

(2)Universal Knowledge Center

Overall Function: This center will consist of a collection of special areas and rooms such as a new book exhibition area, a children's room, a room for senior citizens, and a room for new immigrants. These areas will mainly provide services for readers who seek access to the latest information available in books, newspapers and magazines, as well general publications, and books and documents for children and young adults.

1. New book exhibition area

Function: We will provide and display physical books, reference materials, or digital books and e-books over the Internet. We will display the latest publications for readers in a book fair held in the exhibition space.

Table 3.4-5: Space Requirements for the New Book Exhibition Area

Name of the Space		Seats / Users	Equipment	Floor Area(m^2)
1	New Book Exhibition Area(including Expression Area)	24	Podium, Projector Screen	160

Design Principles:

1. This Area will have more frequent user. It is located at the lower levels for easy access (1F, B1F).

2. For the convenience of users, there should be enough natural light for reading and dark spots should be avoided.

3. The counter should provide a space for user inquiries, and at the same time, it should be located at a convenient place to observe the space usage of the entire reading area.

4. Through an interactive display wall and multiple projector screens, the display style can become more lively and deliver messages that inspire readers' interested in reading.

2. Journal reading area

Function: Journals and periodicals for reading will be made available in this space. This open-shelf reading area allows readers to have access to anything in the area. Reading tables and chairs will be set up in the area in a book and newspaper reading space. Daily newspapers will also be provided. A room for future expansion should be reserved as well.

Table 3.4-6: Space Requirements for the Journal Reading Area.

Name of the Space		Seats / Users	Equipment	Floor Area(m^2)
1	Journal Reading Area	42	-	120
2	Newspaper Reading Area			

3	Computer Inquiry	-	Computer (4 sets)	10
4	Photocopying Area	-	Photocopier (2 sets)	10
5	Counter/Office	-	Computer (4 sets)	Shared with Other Areas

Design Principles:

1. The journal reading space should be combined with the newspaper reading area.

2. The service desk needs to be set up for service and volunteer workers to station.

3. The book cart space should be reserved for books returned by readers.

4. The entrance should act as the buffer between the outside world and this area to avoid interference from outside noises.

5. The journals and the book and newspaper reading area should be located adjacent to the main entrance on the main floors.

6. Set the rest area for readers in an appropriate place.

7. General lighting should be used with an illumination of at least 350 Lux..

8. Lighting for the reading area should have an illumination of at least 550 Lux.

9. The open-space bookshelf will have a sofa, reading tables, and chairs.

3. General Book Reading Room

Function: We will provide a general reading space for the books users access through book transfer and retrieval from the Joint Archive Center so that the general public can engage in recreational reading.

Table 3.4-7: Space Requirements for the General Book Reading Room

Name of the Space		Seats	Equipment	Floor Area(m^2)	
		Users			
1	Bookshelf/Reading	110		1150	1200
2	Computer Inquiry	18	Computer (18 sets)	50	
3	Photocopying	-	Photocopier (3 sets)	Shared with Other Areas	
4	Counter	-	Computer (2 sets)		

Design Principles:

1. The main entrance should act as the buffer between the outside world and this area to avoid interference from external noises.

2. The reading area should be arranged between the bookshelves and the reading seats, so that readers can get books instantly. Shorter paths are better as they can reduce the interference with other users.

3. There should be no tall furniture acting as a barrier between the entrance and the reading seats in order to welcome readers into an open space. The sight in the main activity area can be extended through the bookshelf walkways to create a good sense of spatial penetration. If the space allows, try to arrange some reading seats along the walls to meet readers' psychological needs.

4. Reading seats do not need to be adjacent to the entrance of the reading area, but they should be visible from the entrance. Reading seats should be near the main pathways through the user areas, rather than interfere with them.

5. The bookshelves should be arranged in the same direction of the natural light and be perpendicular to the direction of the lamps, so that the bookshelf can be sufficiently illuminated, and the light emitted by the lamps can be evenly distributed without being influenced by adjustment to bookshelf spacing.

6. We should consider the arrangement of books on the bookshelf in the initial period when the volume of the collections has not reached the upper limit. Otherwise, the bookshelf may look empty. At the same time, we should consider the situation when the number of books increases rapidly and exceed the available space.

7. Each area should have its own characteristics and clear identification markers.

8. The bookshelves needs to be mobile and should be designed and arranged to avoid collapses during earthquakes.

9. The lamps should be energy saving, and the switch configuration should be easy to manage.

10. General lighting should be used with an illumination of at least 350 Lux.

11. Lighting for the reading area should have an illumination of at least 550 Lux.

4. Teenager Service Area

Function: We will collect books and reference materials that may interest junior high and senior high students. In addition to the quiet reading area, we will also provide a performance stage (for singing and listening to music), a graffiti space, a puzzle and games area, and a comic books area, so that teenagers can have obtain inspirations, conduct learning activities, meet new friends, and exhibit performances.

Table 3.4-8: Space Requirements of the Teenager Service Area

Name of the Space		Seats / Users	Equipment	Floor Area(m^2)	
1	Bookshelf/Reading Area	40		300	600
2	Computer Inquiry Area	5	Computer (5 sets)	15	
3	Discussion Room(6 people , 2 rooms)	12		30	
4	Studies Carrel(4 people, 3 rooms)	12		30	
5	Graffiti Area	-	Graffiti Wall	25	
6	Performance Stage	20	The Stage, Stereo Type Equipment	100	
7	Puzzle Games Area	12		50	
8	Comic Books Area	15~30		50	
9	Photocopying Area	-	The Photocopier (2 sets)	Shared with Other Areas	
10	Counter	-	Computer (2 sets)	Shared with Other Areas	

Design Principles:

1. This area adopts the open-space design, and each area is equipped with lively furniture.

2. The design style should be simple, generous, and bright to fit the overall library imagery.

3. We will build this area into a meaningful space for hosting various events and cultural experiences.

4. We will build this area into a space where teenagers can learn, experience, and explore the world through games, music, and other activities.

5. This area will be equipped with digital software and tools for creative expression to allow teenagers to engage in interactive games and writing, and make creative works based on videos and audios.

6. A book cart space should be reserved for books returned by readers.

7. The entrance should act as the buffer between the outside world and this area to avoid interference from external noises.

8. This area should be located adjacent to the Entrance on the main floors to be welcoming to readers.

9. General Lighting should be used with an illumination of at least 350 Lux.

10. Lighting for the reading area should have an illumination of at least 550 Lux.

5.Children's Service Area

Function: We will collect children's books and printed materials for reading and interaction areas for children. Also, we will setup regularly updated theme areas.

Table 3.4-9: Space Requirements for the Children's Service Area

Name of the Space		Seats / Users	Equipment	Floor Area(m^2)	
1	Children Reading Area(Three Different Reading Levels)	40		240	750
2	Preschool Area(3-6 years old including the Drawing Area)	40		120	
3	Babies Area(0-3 years old)				
4	Story-telling Area	40		180	
5	Stage Area	-	Projector, Whiteboard, Music Playing Equipment, Film Display Equipment, a Stage	80	
6	Digital Interaction Area	-	Big Screen Television, Interactive Touch Screen	40	
7	Games Area/Toys Area	-		45	
8	Computer Inquiry Area	-	Computer (6 sets)	15	
9	Rest Area for Parents	-		20	
10	Baby Carriage Parking Area	-		10	
11	Photocopying Area	-	Photocopier (2 sets)	Shared with Other Areas	
12	The counter	-	Computer (2 sets)	Shared with Other Areas	

Design Principles:

1. The Children's Reading Area should be placed at the lower levels or adjacent to the main entrance and separate from the reading rooms used by adults. It may be connected with outdoor gardens for outdoor reading.

2. The main entrance should act as the buffer between the outside world and this area to avoid interference from street noises.

3. This space mainly adopts the open-space design, and each area should only be separated by short bookshelves or furniture.

4. We will consider setting up a small stage dedicated to children's performances, a story-telling venue, and various recreational facilities.

5. The reading area must be equipped with computers for research and a photocopying area (a separate exhaust device must be used). The children's reading area should be set along the main route. The reading area must consider the needs of both parents and children. The size of the furniture should fit children of different ages.

6. Overall, the area shall have lively, bright colors.

7. The children's dedicated bathrooms, parent-child bathrooms, a nursing room, and an infant diaper-changing rooms should be set up in the vicinity. The paths to these facilities should be within the scope of librarian control to ensure the safety of children in the bathrooms.

8. We will lay wooden floors and set up cabinets for shoes and slippers.

9. The interior furnishings, windows, stairs, and entrances and exits should be safe. Too much furniture should be avoided as this space should be reserved for children to move around.

10. General Lighting should be used with an illumination of at least 350 Lux.

11. Lighting for the reading area should have an illumination of 550 Lux or more.

6. Senior Citizens' Service Area

Function: We will design an environment for senior citizens to engage in innovative learning activities, where they will have access to library resources without being overcome by the physical challenges of old age. In addition, books and reference materials will be provided for the physically disabled elders via appropriate media forms, so that they can also enjoy the convenient of the library and information services.

Table 3.4-10: Space Requirements of the Senior Citizens' Service Area

Name of the Space		Seats / Users	Equipment	Floor Area(m^2)	
1	Bookshelf Reading Area	42	Digital Reading Device, Large Print Books, Composite Bookshelf	130	200
2	Sofa Reading Area	9		65	
3	Computer Inquiry Area		Computer (2 sets)	5	
4	Counter		Computer (1 set)	Shared with Other Areas	

Design Principles:

1. This reading area shall provide sufficient but not dazzling light. Natural light is best and this reading area should be set near windows. The preferred artificial light source is a soft yellow light source set behind the seats for readers.

2. We will set tables and chairs with desk lamps, magnifiers, color enlargers, and other accessories to provide comprehensively for the needs of senior readers.

3. We will set the service desk to assist senior readers in the use of equipment in the library.

4. We will create a quiet environment for senior readers who are wearing hearing aids and have hearing difficulties. We will use carpets or murals to reduce noise in this environment.

5. Considering the mobility issues among senior readers, books and reference materials should not be placed too high on the bookshelves. We will set up the automatic lift-assist seats to help senior readers get up from chairs, and the bathrooms in the library will have handrails. Ramps will be set up for ground elevations.

6. We will create a warm atmosphere and provide intimate services and equipment to facilitate learning activities for senior citizens.

7. The computer inquiry area should have seats and computers should also be wheelchair accessible. Meanwhile, 1 or 2 sets of large display screens should be established as well.

8. General Lighting should be used with an illumination of at least 350 Lux.

9. Lighting for the reading Area should have an illumination of at least 700 Lux.

7. New Immigrants Service Area

Function: This space is designed to help new immigrants quickly adapt to the Chinese language and get access to the information or skills they need to survive in Taiwan. In addition to library collections and supportive services, we will also provide consulting services to enable new immigrants to cultivate good citizenship and quickly adapt to Taiwanese society.

Table 3.4-11: Space Requirements for the New Immigrants Service Area

Name of the Space	Seats / Users	Equipment	Floor Area(m^2)	
Bookshelf Reading Area	8		80	100
Social Area	9		50	
Discussion Room	8		Shared with Other Areas	
Computer Inquiry Area	2	Computer (2 sets)	Shared with Other Areas	
Photocopying Area	-	Photocopier (2 sets)	Shared with Other Areas	
the Counter	-	Computer (2 sets)	Shared with Other Areas	

Design Principles:

1. Multicultural resources (e.g., food, languages, religions, self-development, parenting, etc.) concerning Southeast Asia should be provided to meet the needs of new residents.

2. Spaces for relevant events and themed exhibitions should be reserved.

3. A book cart space should be reserved for books returned by readers.

4. We should provide space for reading and displaying books, journals and multimedia materials.

5. General Lighting should be used with an illumination of at least 350 Lux.

6. Lighting for the reading area should be illuminated with at least 550 Lux.

3. Knowledge Discovery Service Area

Function: In this area, we will set up a "Knowledge Discovery and Reading Terminal", a learning and sharing space (also called a learning commons), group discussion rooms, and an information search and retrieval service area. This area will mainly serve the needs of the readers for learning, research, discussion, and book retrieval.

General Spatial Characteristics of the Knowledge Discovery Service Area:

- We will provide readers with traditional services (such as information search and retrieval) and quickly guide readers in how to use library resources. At the same time, we will take into account the needs of readers to conduct individual learning and thinking and provide innovative equipment and group discussion spaces.
- The learning and sharing space, or learning commons, is a diversified space that is open for many uses and adaptable to the number of people. For example, it can be used as a space for senior citizens to engage in innovative learning activities or for new immigrants to conduct learning and consulting activities and better adapt themselves to the society in Taiwan.
- Each space should be equipped with automated space management technologies to fully utilize and help achieve conservation of energy.
- These spaces will provide readers with the transfer and retrieval of rarely-used books and reference materials through an automated book management device.
- Users of this space can be general readers.

(1) Knowledge Discovery and Reading Terminal

Function: We should set up the "Knowledge Discovery and Reading Terminal", a learning and sharing space, or a learning commons, group discussion rooms, and an information search and retrieval service area. This area will mainly serve the needs of the readers for learning, research, discussion, information search and retrieval.

Table 3.4-12: Space Requirements of the Knowledge Discovery and Reading Terminal

Name of the Space		Seats / Users	Equipment	Floor Area(㎡)
1	Knowledge Discovery and Reading Terminal	30	-	200

Design Principles:

1. Tables and chairs shall be provided.
2. General Lighting should be used with an illumination of at least 350 Lux.

(2) Learning and Sharing Space(Digital Reading and Learning Area)

Function: This space will be a multi-purpose learning space that is open to the general public and adaptable to the needs of any number of people.

Table 3.4-13: Space Requirements for the Learning and Sharing Space

Name of the Space		Seats / Users	Equipment	Floor Area($m^{2)}$
1	Learning and Sharing Space	156	Computer (100 sets), Whiteboard, Digital Screen	500

Design Principles:

1. We should provide places for digital learning activities and set up a service counter for

readers of various ages to consult information about class schedules and available learning activities.

2. The multi-purpose space is equipped with mobile compartments, which can be used to divide the space into several smaller spaces as required.

3. Readers can borrow and use iPads or tablet PCs in this area, and they can also use their own electronic mobile devices to connect the library network and download the e-books offered by the library.

4.The interactive devices such as the touch screen can be installed so that readers can engage in interactive learning through technologies. We should provide a space for individuals and small groups to appreciate videos and music.

5. Uniform Lighting should be used with an illumination of at least 350 Lux.

(*3) Multimedia Area*

Function: Readers should be able to use audiovisual sources borrowed from the library or engage in learning activities in diversified ways using this space.

Table 3.4-14: Space Requirements of the Multimedia Area

Name of the Space		Seats / Users	Equipment	Floor Area(m^2)	
1	Waiting Area	8	Audio visual Equipment	400	600
2	Audiovisual Area for 1 person/2 people	60	Audiovisual Equipment		
3	Multimedia/Audiovisual Cubicle for 3–5 people	12	Audiovisual Equipment	70	
4	Multimedia/Audiovisual Room for 20 people	2	Audiovisual Equipment	70	
5	Media Base	-		50	
6	Counter	-	Computer (2 sets)	10	
7	Office	-		Shared with Other Areas	

Design Principles:

1. The waiting area should be a rest area for readers. We will provide comfortable seats for readers to listen to music and watch cable TV programs. The waiting area will be the buffer space in front of the audiovisual media center.

2. An information service desk will provide public consulting services and the common directory for the retrieval of multimedia and audiovisual resources.

3. An internet resource area allows readers to access the internet for information searches and retrieval and enjoy videos on-demand. In the information retrieval training classroom for readers, the seats are arranged in wider spaces.

4. The media base collects various types of audiovisual material and is divided into several areas based on different types and topics.

5. The multimedia areas designed for 1 or 2 people allow readers to use audiovisual materials. It is located in an open space, so the space should be arranged to avoid the interference from outside noises.

6. A multimedia audiovisual cubicle for 3 to 5 people can be used as a home theater, so sound

insulation and site permeability should be considered in the design.

7. The multimedia audiovisual room can accommodate 20 people, and it can be used to play multimedia materials and motion pictures, so the stereo type effect should be considered specifically in the design of the room.

8. The multimedia and audiovisual room should be adjacent to service elevators to facilitate the delivery of relevant data and equipment.

9. An office established near the counter can offer quick support and the entrance should be connected with the service corridor and elevators.

10. Uniform lighting with an illumination of at least 350 Lux should be used.

(4)Group Discussion Rooms

Function: We will provide a more closed and quiet discussion space for creators to avoid noise and disturbances from other readers.

Table 3.4-15: Space Requirements for the Group Discussion Rooms

Name of the Space		Seats	Equipment	Floor Area(m^2)
		Users		
1	Group Discussion Room	48	Discussion Room (8 people, 6 rooms)	200
		24	Discussion Room (12 people, 2 rooms)	

Design Principles:

1. Tables and chairs shall be provided.

2. A wired network access points shall be provided.

3. General lighting with an illumination of at least 350 Lux shall be used.

4. The discussion rooms can be independently controlled by readers, and the power, air-conditioning, information and other equipment should be able to be independently controlled as well.

(5)Recreational Reading Area

Function: This area will provide users with a discussion space that provides more freedom than other areas.

Table 3.4-16: Space Requirements for the Recreational Reading Area

Name of the Space		Seats	Equipment	Floor Area(㎡)
		Users		
1	Recreational Reading Area	-	-	200

Design Principles:

1. This space will have tables and chairs arranged in a lively and free configuration.

2. The group discussion spaces will be available in a variety of spatial patterns and can be used without registration.

3. General lighting with an illumination of at least 350 Lux shall be used..

6. Information Search and Retrieval Service Area

Function: This space will provide readers with research consultation, access to databases and catalogs for information searching and retrieval services.

Table 3.4-17: Space Requirements for the Information Search and Retrieval Service Area

Name of the Space		Seats / Users	Equipment	Floor Area(m^2)
1	Information Search and Retrieval Service Area	25	Computer (25 sets)	200

Design Principles:

1. The location should be set in a visible place where it is easy to access, and the needs of the readers to make a diverse set of inquiries should be taken into account as well.
2. This area should be located in the center of the main floor or at the entrance adjacent to the book and journal reading area, in order to facilitate usage by readers.
3. The anteroom should act as the buffer between the outside world and this area to avoid interference from outside noises.
4. A counter should provide space for service inquiries. At the same time, the counter should be close to the user guidance area that can specifically guide users in using this space. The counter should also be close to the computer inquiry area in order to observe the proper use of these computers.
5. The office area should be connected to the service corridor for easy access to the service elevators and service entrance hallways.
6. The bookshelves in the reading area should have three layers in principle so that readers can read the required information in the nearest place without the need to move a long distance.
7. Seats for 4 people, 2 people or 1 person may be considered, and a sofa for relaxation may be placed as well.
8. The Online Public Access Catalog (OPAC) retrieval terminal should adopt a decentralized configuration to facilitate inquiries by readers in various reading rooms.
9. The OPAC retrieval terminal should have tables and seats. And each screen at the terminal should occupy a floor area of 2 $m^{2.}$ The height of the retrieval table should be 0.78–0.8 meters.
10. A bibliographic index area will provide reference tools such as bibliographies and indexes. Union catalogs should be configured on the index reading table.
11. To increase efficiency, instant inquiries using electronic resources should be available to readers without the need to carry books away from the bookshelves.
12. The information search and retrieval area should be close to the reference desk and away from the reading area so as not to interfere with the readers.
13. It is recommended that librarians communicate data retrieval strategies with readers or teach readers to use various search systems without interfering with other readers and at the same time and increasing their own privacy.
14. General lighting with an illumination of at least 350 Lux shall be used.
15. The arrangement of cables needs to be designed to consider follow-up maintenance issues. The relevant cables must not obstruct access by users.
16. The convenience and needs for people who are mobility-impaired shall be considered.

4. Research and Creation Space

Function: We will set up this space with the hopes that general readers will conduct research and explore their creativity.

Table 3.4-18: Space Requirements for the Research and Creation Space

Research and Creation Space		Seats	Equipment	Floor Area(m^2)	
	Name of the Space	Users			
1	Social/Rest Area	32	Sofa, Recreational Tables, Chairs	90	400
2	Individual Seats	110		220	
3	Individual Research Room (4 rooms)	4		30	
4	Discussion Room (8 people per room, 3 rooms)	24		60	

Design Principles:

1. Tables and chairs shall be provided to users.
2. Wired network access points shall be provided.
3. General lighting with an illumination of at least 350 Lux shall be used.
4. The research rooms and the discussion rooms can be independently controlled by users, therefore the electricity, air-conditioning, IT equipment and other equipment should be independently controlled as well.

5. Conference and Event Spaces

(1)The Lobby

Function: This space will serve as the entrance hall of the conference and event space, which can be used as the venue for art exhibitions, international conferences, ceremonies and other events.

Design Principles:

1. The lobby will showcase projects and works such as South Branch Library's important achievements or public art with the theme of science and technology, and be designed into the open-space exhibition space, thus allowing the public to quickly absorb the themes of the exhibitions and experience the feel of some of the latest technology upon entry into the South Branch Library.
2. The main entrance lighting needs to be specially designed.
3. The lobby is the primary space that users enter as they come in from the outside. The design of the lobby should allow readers to understand the layout of the interior space at first glance, and the routes through the library should be clear to incoming users.
4. The lobby should be designed to welcome visitors and give readers a feeling of relaxation and contentment.
5. A windbreak room should be set up in the lobby area.
6. The lobby height should be at least 4.5 meters.
7. Spaces for the stage, a projector screen, a projector, and equipment for playing audiovisual materials needs to be reserved. Cables should be embedded and out of sight.
8. General lighting with an illumination of at least 250 Lux shall be used.

(2) Lecture Hall

Function: The lecture hall should be able to hold500 seats and a speech venue with professional lighting, audio equipment, and stage equipment.

Design Principles:

1. The lecture hall should have at least 500 seats and a speech venue with professional lighting, audio equipment, and stage equipment.

2. The lecture hall should be used for library promotions or study and learning activities such as speeches, international seminars, or various corporate meetings.

3. For the best visual experience, this space will adopt a stepped design. The air-conditioning system as well as the lighting equipment can be turned on and off depending on the number of people in order to improve energy efficiency. It is recommended that no columns be set up in the seating area in the conference room to allow the greatest flexibility in the space.

4. The entrance and exits of the lecture hall should be provided with appropriate space and shading design. The external corridor should be set up as the buffer space for evacuations and sound insulation should be installed in the lecture hall.

5. In order to meet the needs of formal conference sand other activities, the conference room should have good architectural and acoustic design, lighting equipment, audio equipment, equipment for showing audiovisual materials, and access to the network. Meanwhile, the conference room should also have the equipment to be set up for video conferencing.

6. Barrier-free routes and spaces should be planned in compliance with Building Technical Regulations.

7. Every seating area in the lecture hall should be able to enjoy good audiovisual conditions. Adjacent rows of seats should be staggered.

8. Additional spaces and equipment in the lecture hall shall include:

a. a reception room, a preparation room, check-in counter, and others according to the competent authority requirements.
b. a podium.
c. instant translation in five languages and translation rooms.
d. network connections.
e. a control room with lighting, audio-visual projection equipment set up in the back of the auditorium.
f. television broadcast equipment to allow live broadcast.
g. an electric screen.

9. Video conferencing and a three-sided projection screen shall be made available.

10. The dedicated entrance and exit shall be set up for users of the lecture hall to have access while the library is closed.

11. General lighting with an illumination of at least 250 Lux shall be used.

(3)Multi-functional Conference Room

Function The Multi-functional Conference Room with 120 seats should be equipped with complete audiovisual capabilities and video conferencing systems.

Design Principles:

1. The seats should be arranged in a flat planar design.

2. The conference room height should be at least 4.5 meters.

3. At least two entrances should be installed so that participants can enter or leave the venue at peak times.

4. Flexible compartments may be set up according to the requirements of competent authorities.

5. Uniform lighting with an illumination of at least 350 Lux should be used. The zoning switch design should be adopted.

6. Independent air-conditioning and natural air supply design are required.

7. Sound insulation should be good enough to avoid interference from indoor and outdoor noises.

8. Spaces for the stage, a projector screen, a projector, and equipment for playing audiovisual materials needs to be set. Cables should be embedded and out of sight.

9. Telephone lines, networks, television signal lines, broadcast systems, and power supplies should be set up as well.

(4)Research Classroom

Function: The research classroom will be a learning environment equipped with 60 seats.

Design Principles:

1. This space will have 60 seats for educational training, conferencing and other learning activities.

2. Uniform lighting with an illumination of at least 350 Lux should be used. The zoning switch design for lighting should be adopted.

3. It is recommended that at least two entrances be set up, so that participants can enter or leave the venue at peak time.

4. Independent air-conditioning and natural air supply design are required.

5. Sound insulation should be good enough to avoid interference from indoor and outdoor noises.

6. Spaces for the stage, a projector screen, a projector, and equipment for playing audiovisual materials needs to be reserved. Cables should be embedded and out of sight.

7. Telephone lines, networks, television signal lines, broadcast systems, and power supplies should be set up as well.

6. Dining Space

Function: A space for meals and beverages should be provided for library users for the convenience of not needing to go out to nearby restaurants.

Design Principles:

1. The dining space should be located outside the control area and away from the reading and book archiving spaces.

2. The dining space should be located in a clear and convenient place that readers can easily

locate and it should be near areas like the conference hall and the exhibition hall.

3. Outsourced operations by professional vendors should be used. As food providers will be independent, all water, electricity, air-condition, and information equipment will need to be independently controlled by the vendor and the costs of these services billed to them.

4. The route for unloading goods to the dining area should be easily accessible and deliveries should not pose a disruption to readers.

5. Uniform lighting with an illumination of at least 250 Lux should be used

7. Shopping Space

Function: Creative cultural products, chosen to match the themes of exhibitions and events help at the library will be sold in this space. Some small-scale art seminars may also be held in this space, increasing the library's revenue.

Design Principles:

1. The area for the sale of creative cultural products shall be set outside of the control area and should be near the exhibition and conference spaces.

2. Outsourced operations by professional vendors should be available in the area. Spaces for outsourced vendors will be independent and all water, electricity, air-condition, and information equipment will need to be independently controlled by the vendor and the costs of these services billed to them.

3. The shopping area should be located near where unloading services are provided.

4. Space for a checkout queue should be considered in the design of the shopping space.

6. General Administrative Space

Overall Function: The general administrative space for the library will consist of offices for the librarians and administration, small and medium sized conference rooms, archives rooms, the central control room, and book storage and processing spaces in order to ensure the smooth normal operation of the library.

1. Supervisors' Office

Function: An office for supervisors to deal with various official affairs.

Design Principles:

1. General lighting with an illumination of at least 350 Lux should be used
2. Worktable lighting should be provided with an illumination of at least 550 Lux.
3. The supervisors' office should be equipped with tables and chairs.
4. This office will also need tables and chairs for guests.
5. The office should use good natural lighting and be well ventilated.

2. Librarians' Office

Function: This space will be for librarians to deal with various office affairs and to be a general workspace.

Design Principles:

1. General lighting with an illumination of at least 350 Lux should be used
2. Worktable lighting should be provided with an illumination of at least 550 Lux.
3. The librarians' offices should be equipped with Office Authorization(OA) tables and

chairs.

3. Administrative Office (including Rest Areas)

We will provide a space for the administrative staff to deal with office affairs.

Design Principles:

1. General lighting with an illumination of at least 350 Lux should be used
2. Worktable lighting should be provided with an illumination of at least 550 Lux.
3. The office should be equipped with Office Authorization(OA) tables and chairs.
4. A tea room and a store room shall be established.
5. A sofa seating area for guests shall be provided.

4. Medium and Small-Sized Conference Room

Function: This space will be available for library administration and staff to hold meetings.

Design Principles:

1. General lighting should be provided with an illumination of at least 500 Lux.
2. The conference room will have conference tables and chairs.
3. The conference room needs to be easily accessible to workers from the administration areas.
4. The sound insulation of the walls should be good enough to avoid interference from indoor and outdoor noises during meetings.
5. Spaces for the stage, a projector screen, a projector, and equipment for playing audiovisual materials needs to be reserved. Cables should be embedded and out of sight.
6. The projector screens, projectors, telephone lines, networks, television signal lines, broadcast systems, and power supplies should be set up as well.

5. Book Unloading, Receiving, and Dispatch Area

Function: This space is designed to provide a space for librarians to work with book unloading, receiving, and dispatch.

Design Principles:

1. General lighting should be provided with an illumination of at least 350 Lux.
2. The work and storage rooms shall be adequate.

6. Archives Room

Function: This space is designed to be a storage space for the administration offices.

Design Principles:

1. General lighting should be provided with an illumination of at least 250 Lux.
2. Documents will be stored in mobile file cabinets.

7. Central Control Room

Function: The central control room is designed to provide a center for using the monitoring equipment of the South Branch Library.

Design Principles:

1. General lighting should be provided with an illumination of at least 350 Lux.
2. Worktable lighting should be provided with an illumination of at least 550 Lux.

3. Located in the control area and not intended to be accessible by the general public.
4. An elevated floor can help facilitate the streamlining of cables into the control room.

8. The Standby Room

Function: The Standby Room is designed to provide a room for the staff of the South Branch Library to station as needed or the conduct office affairs.

Design Principles:

1. General lighting should be provided with an illumination of at least 350 Lux.
2. Worktable lighting should be provided with an illumination of at least 550 Lux.
3. Located in the control area and not intended to be accessible to the general public.

7. Rest Area

1. The outdoor rest area is designed to provide a place for readers and the general public to relax, read, exchange ideas, and discuss topics. From time to time, outdoor speeches or performances may be held here.
2. This rest area may be rented out in the future. Therefore, it is recommended that the water, electricity, air-conditioning, and information equipment be independently controlled and billed.

8. Public Facilities

General Functions: The public facilities include hallways, walkways, bathrooms, stairways, elevators, storerooms, machines rooms and other public spaces throughout the library. The design principles of some of the most important of these facilities is described below.

1. Parking Lot

Function: A parking lot will be made available to serve the needs of readers. It is expected that the outside operators of the parking lot will be available to serve future policy guidelines.

Requirements: At minimum the parking lots need access ramps as well as control and management facilities. The floor areas and parking spaces should be in full compliance with the statutory requirements and be submitted for a traffic impact assessment.

Design Principles:

1. The access ramp to the parking lot shall have a luminance of at least 150 Lux. Other parking spaces should have a luminance of at least 50 Lux. Induction lighting should be installed in the parking lot space save energy.

2. The ground of the parking lot should be made from wear-resistant materials and topped with a waterproof layer, which should not be damaging to vehicles. An interception ditch shall be set up on the first floor and the basement.

3. The parking lot is designed to accommodate a large number of vehicles. Speed bumps should be installed at appropriate locations. All corners must be protected by angle bars.

4. The color of the pavement in the parking lot should be clearly contrasted with that of the paint marking the lanes.

5. The color of the columns and the walls should be clearly contrasted from the color of the parking spaces.

6. The net height of the parking lot should remain at least 2.3 meters under the lowest hanging equipment or piping.

7. The entrance to the underground driveway shall be provided with electrical waterproof gates to prevent external water flooding.

8. Considering the future outsourced operations and management of the parking lot, the electrical consumption of the parking lot must be calculated separately. A separate meter must be set up to facilitate the independent management of the lot.

9. There is a need in the parking lot for an independent management office and a control system for charging visitors for the use of the lot.

10. The parking lot in the basement must be equipped with a self-service book return area for readers to use to return books without entering the library. The use of a temporary paring area should be considered.

11. The parking lot should have separate entrances for vehicles and people to avoid interference. There should also be a vehicle warning system set up to maintain pedestrian safety. The base area of the parking lot should have waiting spaces for vehicles to avoid interference with traffic in the lot.

12. The unloading areas should be set up in the appropriate locations for library book unloading and public service area unloading. The unloading areas should be separate from areas used by readers.

13. Separate pedestrian paths should be established in the parking lot and the pedestrian paths should be avoid intersection with the routes used by vehicles. There should also be a separate route for scooters and cars. The appropriate slope for the ramp should be reviewed according to the regulations.

14. The parking lot should have a barrier-free route to access the library for the needs of readers who suffer from mobility disabilities.

15.The ramp design should pay particular attention to the design requirements such as lighting guidance between dark and light spaces and compensate for visual dead angles in underground parking lots.

16. The signs used in the parking lot should be simple and clear and guide readers to entrance and exists to the parking spaces and then to each area of the library.

17. There should also be an outdoor parking area for bicycles on the first floor.

18. The parking lot will need some basic related equipment such as height limit racks, mirrors, and warning lights. This equipment should avoid excessive decoration.

2. Machine Room

Function: The machine room is designed to provide a space for mechanical and electrical facilities that maintain the operations of the building.

Requirements: Mechanical and electrical spaces for equipment and facilities must be set aside. These spaces include the Taipower distribution room, the electrical room, the generator room, the machine room, the telecommunications room, various electrical or low voltage rooms, sewage machinery rooms, sewage treatment equipment, equipment for everyday use, fire-fighting machine room, and water tanks located on the roof.

Design Principles:

1. The machine room for air-conditioning and other electro-mechanical equipment should be set at the edges and corners in order to increase the space actually available in the room.

2. The machine room lighting must be equipped with a separate switch. The general lighting should be at a luminance of at least 200 Lux.

3. Consideration must be given to future maintenance and replacement of equipment.

4. The floor of the machine room must be hardened.

5. The top of the machine room should be equipped with waterproofing and drainage features.

6. The openings of such doors and windows that may be used should be splash-proof.

3. Lavatories

Function: The lavatories will include men's toilets, women's toilers, barrier-free lavatories, and parent-child lavatories.

Design Principles:

1. Statutory space requirements, general requirements, and relevant laws and regulations promulgated by the government shall apply.

2. For lighting, ventilation, and air-conditioning equipment, each of the lavatories must have at least 2 110V outlets and at least 1 220V outlet.

3.It is recommended that a parent-child lavatory and a barrier-free lavatory be set up on each floor accessible by readers.

4. The lavatory must have a moisture-proof ceiling and space for a maintenance port should be prepared.

5. The floor shall be waterproofed and the ground shall have wear-resistant and anti-slip floor tiles.

6. Walls shall be waterproofed up to at least 1.5 meters from the bottom of the walls. And wall tiles shall be waterproofed up to 10cm above the ceiling.

7. The barrier-free lavatory must be set up according to the current regulations. Internal building materials can be the same as those used in the general lavatory.

8. Relevant devices shall be energy-saving and water-saving. It is advisable to use products with the environmental label.

9. For privacy concerns, direct line of sight to the toilet should be avoided from the entrance of the lavatory. It is advisable to set the toilet in a circumlocutory fashion. The height of the ceiling in the lavatory must be consistent and the door of the lavatory should be pushed open from outside. And the ratio of the squatting toilets to the sitting toilets must be set in accordance with the needs of the owner.

4. Breastfeeding Room

Function: The breastfeeding room provides a friendly space for parents to nurse their young children.

Design Principles:

1. The breastfeeding room should be equipped with cribs, diaper plates, upper and lower cabinets, water tanks, and a sink installed in accordance with relevant laws and regulations

Equipment for hot water, shower heads, lockers, power supplies, a refrigerator, water supply, and draining equipment shall also be provided.

2. The temperature of the breastfeeding room should be maintained at a range of between 25°Cand 28°C and the relative humidity should be maintained at 60%.

3. Effective sound insulation is needed in the breastfeeding room.

4.Attention must be paid to the privacy and safety of people using the breastfeeding room.

5. Other Spaces with Public Facilities

Function: As far as is possible, various public facilities (stairs, elevators, lavatories, drinking water equipment, etc.) should be placed in the same positions on each floor to facilitate use by readers.

3.5 Planning Principles for the Use of the Exhibition Space

I. Library Museum

A library museum shall be built the idea of “museumization” of the library will be practiced throughout the South Branch Library. Through elaborate planning of exhibitions and interactions through digital devices, the diversity, uniqueness, and richness of the special and unique materials collected in the library can be demonstrated.

Figure 3.5-1: Space Planning Diagram for the Library Museum
(relative position of spaces for reference only)

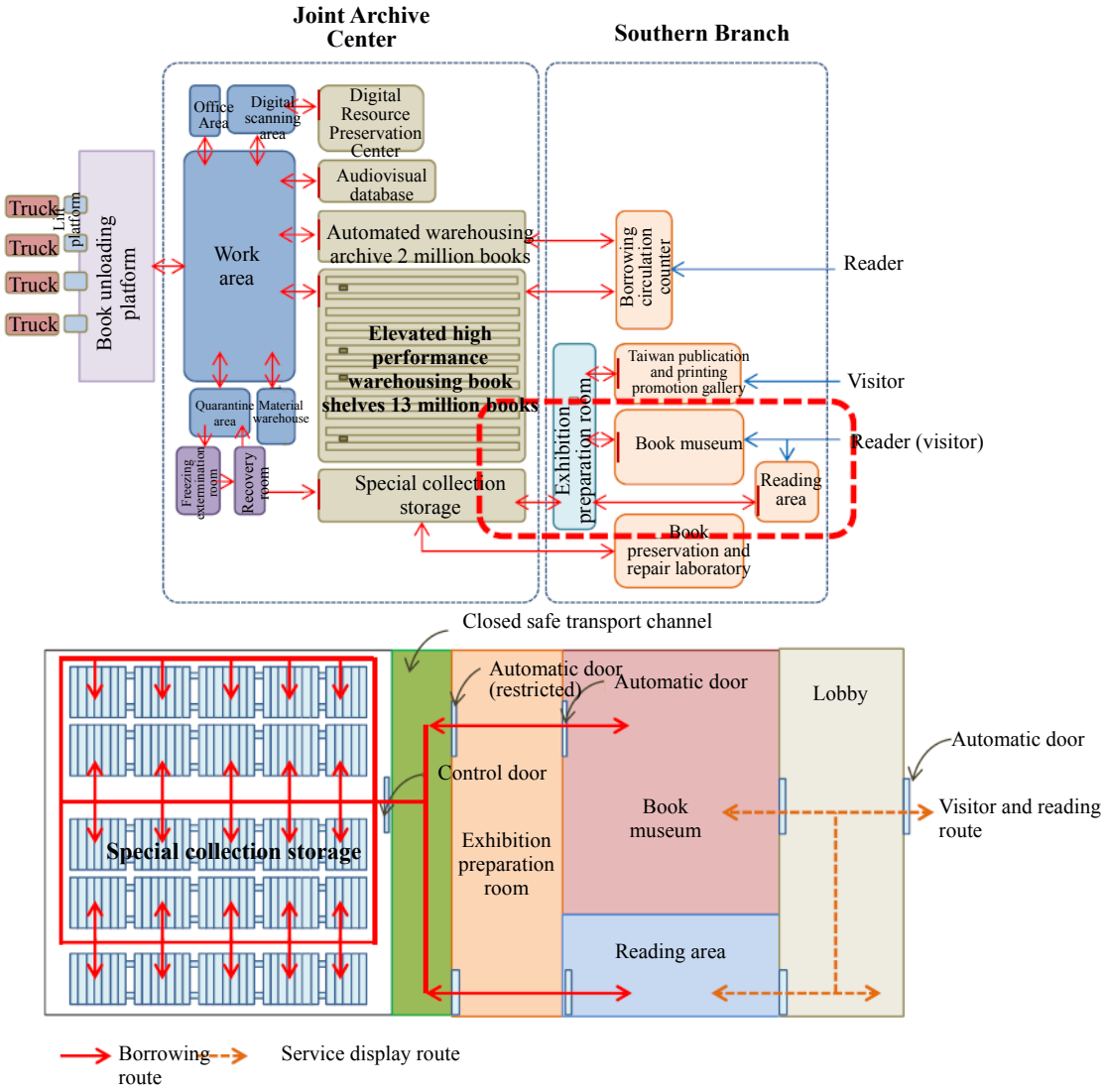


Table 3.5-1: Space Requirements for the Library Museum

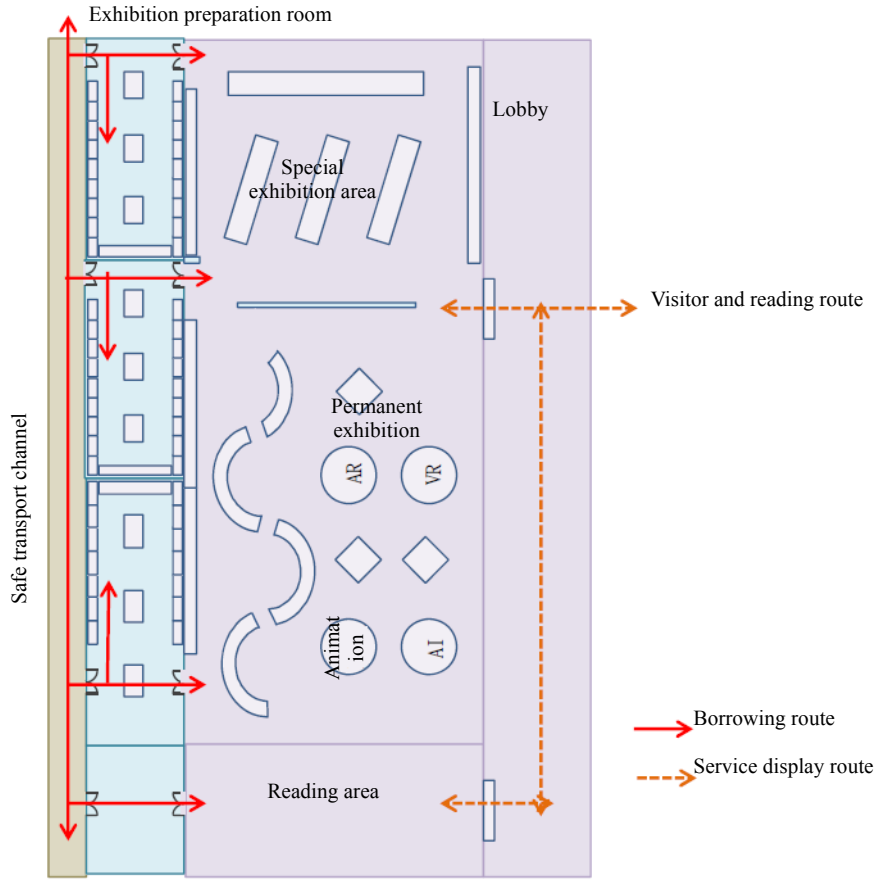
Library Museum		Books and Reference Materials (Volumes / Pieces)	Equipment	Floor Area(㎡)
	Name of the Space			
1	Special Collections Exhibition Area	-	Constant temperature and humidity	900
2	Reading Space	-	Constant temperature and humidity	300(subject to adjustment according to the owner's needs)
Total		-		1,200

1. Special Collections Exhibition Area

Function: This space is designed to be a special permanent exhibition space for displaying the

holdings of the special collections and archives to the public.

Figure 3.5-2: Space Planning Diagram for the Special Collections Exhibition Area (relative position of spaces for reference only)



Design Principles:

1. Actual design and planning will be based on the actual floor area, demand, function, and user needs as shown in the user profile in the space and architectural design requirements table.
2. Spatial Positioning

   (1) The exhibition space should be adjacent to the main entrance, and should be built into an independent space that is easily accessible by the public. It should also be well-connected with the public spaces.

   (2) The exhibition space should consist of a large space with only a very small number of partition walls. Columns should be spaced as far apart as possible. The ceiling height should be at least 3.6 meters.

   (3) To meet the needs of various exhibitions, the exhibition space should be able to be divided into different units for flexible use.
3. Lighting System:

   (1) The luminosity projected onto originals of books and documents must not exceed 50 Lux.

   (2) The exhibition space must always uses low ultraviolet (UV) light sources, and the

UV intensity must not exceed 30 μW/lumen. Either low-UV lamps or fiber optic lighting equipment can be used. A UV filtering device can also be installed at the transparent part of the showcase.

4. Requirements for Air Conditioning:

(1) The exhibition space ambient temperature and humidity is recommended to be 25±1°C and 55±5% relative humidity.

(2) If the Exhibition Space displays originals of books or documents, the ambient air-conditioning should be able to be adjusted according to the need of preservation, so that the temperature can be 20±2°C and the relative humidity can be 55±5%.

(3) If the air-conditioning equipment in the exhibition space fails to meet the environmental requirements specified in the preceding paragraph, constant temperature and humidity display cabinets can be used depending on the different types of exhibits.

5. Relevant Exhibition Equipment (Purchased by the library administration separately)

(1) Exhibition equipment based on interactive multimedia technologies should be configured. The lighting, cables, and the information network design should be flexible to meet the needs of different exhibitions.

(2) Facilities and equipment related to exhibitions such as interactive multimedia, guided tours, online showcases, and other types of displays shall be purchased separately by the library administration.

6. Security Monitoring:

(1) Each area in the Exhibition Space, including showcases, should be equipped with security monitoring systems, infrared sensors, and glass breaking sound wave sensors as required to provide full-time monitoring and alerting.

(2) An automated counter shall be installed.

7. Other design principles for the exhibition space shall be provided by the competent authorities upon awarding of the contract.

2. The Reading Space

Function: The reading space is designed to provides researchers over the age of 16, with a library card and proper permission, to temporarily retrieve materials from the special collections and archives.

Design Principles:

1. Actual design and planning will be based on the actual floor area, demand, function, and user needs as shown in the user profile in the space and architectural design requirements table.

2. Spatial Positioning

(1) This location does not need to be visible from the entrance, but it should be clearly marked and be as close as possible to the special collections and archives room.

(2) A service des is needed to be set up for librarians and volunteer workers to station.

3. Requirements for Air Conditioning:

The reading space temperature is 25–26°C, and the relative humidity should be kept

at55–65%RH.

4. Lighting System: Artificial light should not come from ultraviolet (UV) illumination equipment, and the national CNS illumination standard should be referenced for the illumination requirements.
5. Related Equipment:

   (1) The relevant computer equipment must be configured for inquiries, reports on readers use, service desk use, or other electronic notices.

   (2) The space must be equipped with large desktops for reading. The incline of the reading tables must be adjustable.
6. Security Monitoring: There must be an inductive counter, security devices, and surveillance equipment such as auto-sensing alarms shall be set up.

II. The Exhibition Space for the Propagation of the Publishing and Printing Industry in Taiwan

Function: Using lighting equipment and spatial arrangement to create the atmosphere, this space is designed for displaying books, paper sheets or publications. With the advancement of media technologies, it is necessary for digital presentations to supplement traditional physical exhibitions. This space will use an entirely new method to organize an exhibition space for the display of Taiwan's most important publication to the general public.

Figure 3.5-3: Space Planning Diagram for the Exhibition Space
(relative position of spaces for reference only)

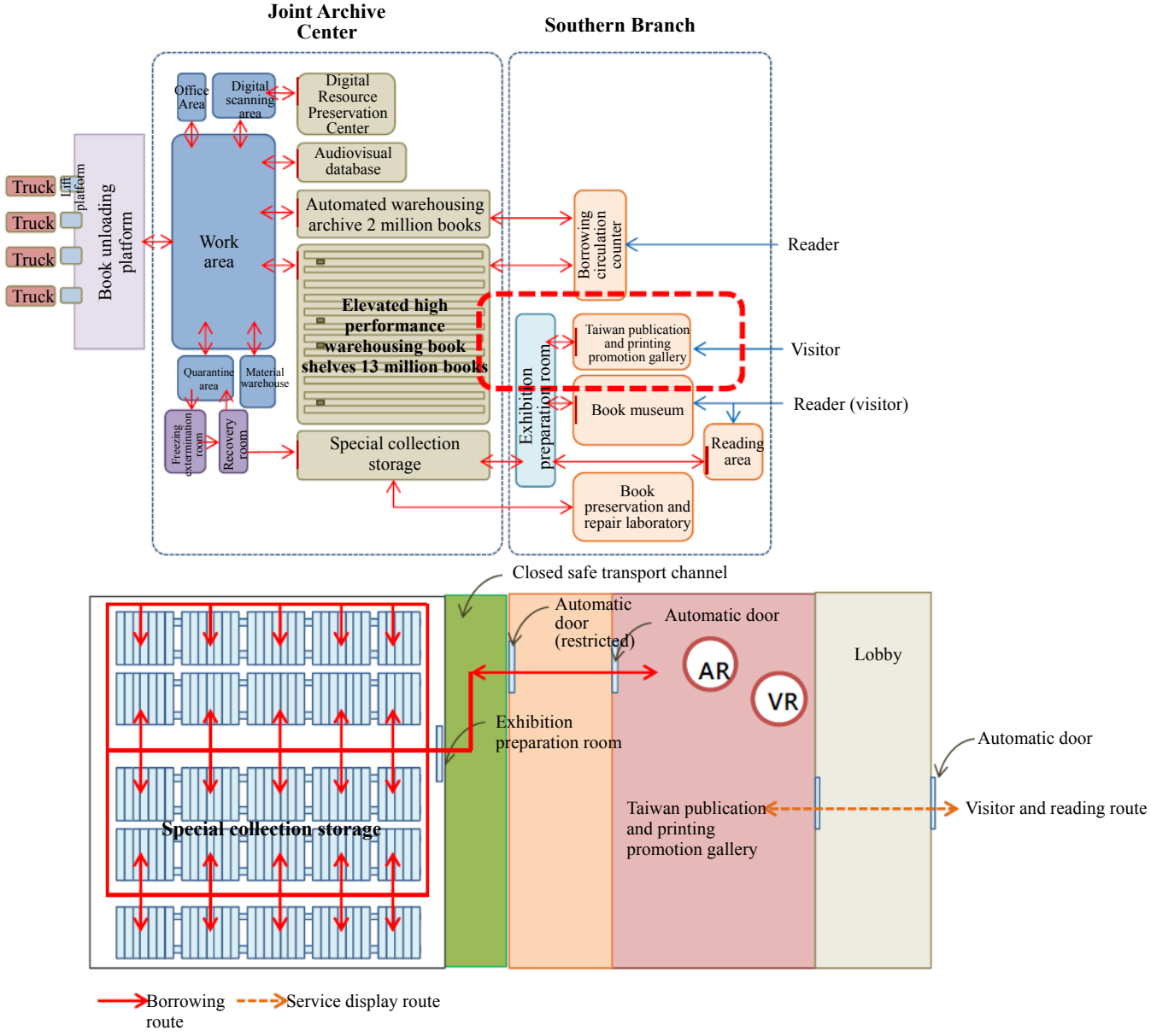


Table 3.5-2: Space Requirements for the Exhibition Space for the Propagation of the Publishing and Printing Industry in Taiwan

The Exhibition Space for Propagation of the Publishing and Printing Industry in Taiwan		Books and Reference Materials(Volumes/Pieces)	Equipment	Floor Area(㎡)
	Name of the Space			
1	The Exhibition Space	-	Environmental Control Digital Exhibition Equipment	400
Total		-		400

Design Principles:

1. Actual design and planning will be based on the actual floor area, demand, function, and user needs as shown in the user profile in the table of space requirements and the design principles.
2. Spatial Positioning:

   (1) The exhibition space should be adjacent to the main entrance and be built into an independent space which is easily accessible by the public. It should be well-connected to the public space.

   (2) The exhibition space should consist of a large space with a very small number of partition walls. The column spacing should be as wide as possible. The ceiling height should be at least 3.6 meters.

   (3) To meet the needs of various exhibitions, the exhibition space should be able to be divided into different units for flexible use.
3. Lighting System:

   (1) The luminosity of the light projected onto originals of boos and documents must not exceed 50 Lux.

   (2) The exhibition space should always use low ultraviolet (UV) lamps. The UV intensity must not exceed 30 μW/lumen. Either low UV lamps or fiber optic lighting equipment can be used. A UV filtering device can be installed on glass displays in the showcase.
4. Air Conditioning Requirements:

   (1) It is advisable to set the ambient temperature to 25±1°C and the relative humidity to 55±5% in the exhibition space.

   (2) If the exhibition space displays originals of books and documents, the ambient air-conditioning can be adjusted according to the need of preservation, so that the temperature can be 20±2°C and the relative humidity can be 55±5%.

   (3) If the air-conditioning equipment in the exhibition space fails to meet the environmental requirements specified in the preceding paragraph, constant temperature and humidity display cabinets can be used based on the different types of exhibits.

5. Relevant Exhibition Equipment (Purchased by the library administration separately)

   (1) Exhibition equipment based on interactive multimedia technologies should be configured. The lighting, cables, and the information network design should be flexible to

meet the needs of different exhibitions.

(2) Facilities and equipment related to exhibitions such as interactive multimedia displays, guided tours, online showcases, and other types of displays shall be purchased separately by the library administration.

6. Security Monitoring:

(1) Each area in the exhibition space, including showcases, should be equipped with security monitoring systems, infrared sensors, and glass breaking sound wave sensors as required to provide full-time monitoring and provide alerts.

(2) An inductive counter should be set up.

7. Other design principles for the exhibition space shall be provided by the competent authorities upon awarding of the contract.

III. Preparation Room for Exhibitions

Function: This space is designed for temporary storage for and preparation of exhibitions. This spaces shall only be accessible to librarians.

Table 3.5-3: Space Requirements of the Preparation Room for Exhibitions

The Exhibition Space for Propagation of the Publishing and Printing Industry in Taiwan		Books and Reference Materials(volumes/pieces)	Equipment	Floor Area(m^2)
	Name of the Space			
1	Preparation Room for Exhibitions	-	Environmental Controls	400
Total		-		400

Design Principles:

1. Actual design and planning will be based on the actual floor area, demand, function, and user needs as shown in the user profile in the table of space requirements and the design principles.

2. Spatial Position: The routes used for temporary transfer and retrieval of books and documents sear the special collections exhibition area, the Exhibition Space for the Propagation of the Publishing and Printing Industry in Taiwan, and the special collections and archives room should be maintained in an environment with constant temperature and humidity.

3. Air Conditioning Requirements: The temperature of the preparation room should range between 22–26 °C, and the relative humidity should range between 50–65%.

4. Lighting System: The sources of artificial light should not be ultraviolet (UV) illumination equipment, and the national CNS illumination standards should be referenced for the specific requirements.

5. Related Equipment: The space should be equipped with the small electric stacker, security devices, surveillance equipment (including auto-sensors, security, protection, etc.) equipment, lockers, work platforms, library tables and chairs, computers and other equipment.

Chapter 4: Architectural Design Principles

4.1 Urban Design Criteria

Due to the combined change made at the 5th conference of the Urban Plan for Changing Xinying (The 3rd Overall Review), which included the "Remaking the Planning Chart", held by the project team of the urban planning commission convoked by the Construction and Planning Agency of the Ministry of the Interior on 11 September 2017, land zoned for senior high use was rezoned to be used for Agency use. Thus, the change of zoning is a high priority and the building ratio will be 50% and the plot ratio will be 250%. What is more, the Principles for Examining the Urban Design of Tainan and the urban design principles contained in the detailed rules and regulations of the Urban Design Law as applied to Tainan will be referenced.

4.1.1 General Planning Principles

1. The South Branch of the National Central Library should become a national landmark building, created with a new and distinctive appearing and developed with new thinking.
2. The library should be built around diversified life circles for urban leisure activities, promoting communication across the community.
3. Learn from nature in order to improve the ecological and environmental situation by embracing energy-efficient green architecture.
4. Green the space at multiple levels and dimensions.
5. Sustainably operate the open spaces.
6. Stress the harmony of the space and mold the building with the urban scenery in terms of planning and design, as well as in the guidance of its activities.
7. The style of the room shall be fashionable and modern (Time of the Art). The facilities and the equipment shall be utilized with the demand of flexibility in the future. It shall create a beautiful reading atmosphere with technology, innovation, intelligence and humanistic care, and combine with green architecture, environmental practices, and green aesthetics, to provide the public with a high-quality, suitable reading space and meet the needs for the diverse reading requirements of the community.
8. Introduce the concept of an ecological green corridor into the community by joining the open space on the ground floor with the green concepts of the library.
9. Create a reading park and try to effectively use the space and the cascade of green land to promote the habit of outdoor reading.
10. The zoning control regulations stipulate that buildings shall be at least 5 meters behind away from the road boundaries.
11. The National Central Library shall be used by all the citizens. Efforts should be made to ensure access for the disabled to the full resources of the library.

4.1.2 Principles Concerning the Traffic Route

1. Pay attention to the nearby traffic nodes to avoid congestion or accidents.

2. Access for motor vehicles shall be allocated on secondary roads to reduce impact on the main roads. Such access shall conform to laws and regulations for motor vehicles in related building laws.
3. The transport route for trucks of Joint Archive Center shall be separated from the main routes, to avoid disturbing the operation of the control area of the unloading platform.
4. Consider setting space aside for bicycle lanes in the building frontage which shall be linked with the architectural space, and leave space for bicycle lanes in related frontage, and leave space for bicycle parking.
5. The pedestrian route shall be lined with parks and open green space.
6. Pay attention to disturbances and vibrations caused by noise near the side of the road. Consider using proper plants to cushion the space from loud noises and reduce interference.
7. Design the site to avoid traffic routes from becoming broken up or cut off. The main pedestrian route shall be linked to green space.

4.1.3Principles Regarding Access

1. The main entrance is suggested to be set on the crossing between the 30-meters-wide planned road and the 40-meters-wide planned road.
2. Patrons leaving via the main entrance shall be able to enter into green space without any barriers.
3. The main channel is linked with the green space. Try to avoid setting any fixed facilities as an emergency path.

4.1.4Principles Regarding Establishing Open Space

1. Coherence with the sports park to the north shall be considered. Any overall coordination and interaction with the sports park shall be considered in the future. In any case, the open space will be fully used.
2. Importance will be attached to the installation of night-time illumination, to ensure the safety of nighttime activities. The planning and design of barrier-free spaces, such as setting up related facilities or terraces, signs, and handrails, should be strengthened.

4.2 Principles of Space Design

The National Center Library is an important provider of services, but it shall also be instilled with the new spirit displayed in modern libraries both inside and outside, making its space plentiful, communicative, and diverse.

4.2.1Architectural Planning Principles

I. Space Planning Principles

1. The setting of the public space for both people's leisure reading and needs for library services shall conform to the principle of being simple, generous, and easily maintained.
2. It shall consider the main visual landmarks presented in all main nodes, space and interiors and outdoor visual angles in future plans.

3. A security service space shall be set on each floor.
4. Give consideration to security in spaces that are not controlled, spaces entrusted to outsourced management, and outdoor spaces that are not controlled. An automatic return area should also be established.
5. Shape visual accessibility and openness in the main space interior, making it convenient for the reads to see the resources of difference floors within the library.
6. The interior space shall be designed to protect the safety and privacy of the library users.
7. All internal public facilities, such as stairs, elevators, and toilets, shall be as concentrated as possible and be set in the same place on each floor, for ease of use.
8. Show a welcoming atmosphere by integrating the outer space and the transitional space. The interior space plan should be clear to readers at a glance after entering the library. The design of the library should be attractive and inspire affectations.
9. All public facilities and space planning shall first aim to create barrier-free environments, making use of the entire library collection convenient for older and disabled readers.
10. The interior shall use a mold design, to avoid abnormal space and waste. Reduce the fixed-use facilities as much as possible, creating more multi-functional spaces. The library collections should be expanded in line with the mid- and long-term goals.
11. Attention should be paid to the needs for future flexible adjustments to the lighting design and positioning of cables.
12. Reserve the best spaces for use by readers instead of for bookshelves and the collection.
13. The design shall conform to energy saving principles.
14. The planning of all library services as well as the work environment for librarians shall be considered from ergonomic perspectives, increasing the affinity between people and the environment, and improving efficiency.
15. Possible changes in the types of collection and modes of providing service in the future shall be considered. Also, the planning of interior space and the allocation of furniture shall consider the demands of library automation and network connectivity.
16. Interior pathways used by readers, librarians, book delivery systems shall be clearly divided to avoid intersection and declines in service efficiency caused by mutual interference.
17. The interior space shall use mold designs. The number of single-use areas will be reduced with the aim of using large spaces flexibly. Meanwhile, as the library collection is expanded to line up with mid-term and long-term goals, new services and adjustments in the use of interior space must be made. The library shall be designed with this flexibility in mind.
18. Cables, wiring, and lighting shall also conform to the mold design and be capable of being adjusted.
19. All service spaces shall be set up with inductive gate facilities, according to the instructions of the owners.
20. The net height of the ground floor means the height between the ceiling and the ground. If there is no ceiling, the net height is the height between the lowest point of any pipes or equipment and the ground.
21. The reverberation of sound shall be properly controlled, to avoid disturbances in the library.

22. Routes used for the transportation of books throughout the library, for library employees, and for visitors and the publics shall not mutually interfere. The use of all space shall be properly established.
23. All spaces shall be easy for visitors to use.
24. When the characteristics of a space are similar, it is best to the use the principle that the same space be placed in the same position in different floors.
25. The whole use of the eternal space and the interior space shall create a welcoming atmosphere to ensure that readers enjoy using the library. The interior special planning shall ensure that readers have a clear view when entering the library, increasing its attraction.
26. The needs of different age groups will be taken into account for all facilities and equipment. This means that the design shall be barrier-free, ensuring that all readers are able to use the resources normally.
27. Signs shall be carefully planned with coherent and unified symbols in order to guide the readers, allow them to immediately identity all spaces, and to have access to all services.
28. All spaces with different functions shall be allocated effectively throughout the library based on usage requirements. In addition, there should be an effective control point to simply and effectively allocate managerial personnel.
29. It is best to establish semi-outdoor spaces with proper vertical integration in order to create a level of open space and to provide readers with the possibility of outdoor reading.
30. It is better that the administrative staff and general users have the independent entrances and exits to reduce unnecessary disturbances and inconveniences.
31. When partitioning spaces for different functions, it is better to use vertical partition of the floors as the main principle. If there is a special need for a space, horizontal partition should be used after clearly separating our administrative space.

II. Principles for Access and Routes Planning

1. Try to centrally set the common service space in the same place in all floors so the readers can easily identify the location.
2. The entrance to the library, the counter, and the retrieval service area are the places where readers will congregate, so they should be set on the main control floor. In addition, it is recommended that the concept of a “common hall” is used as the common control point in the library in order to be more economical and efficient.
3. The four main routes involve the sidewalk, the roads for driving, the paths used by the library staff, and the paths used by books and goods. As a basic principle there should be no crossing, no circuitry, and no overlap between these paths. Interference between points should be minimized and the distance between related service points should be as short as possible, ensuring that people will not get lost by having to walk too far while completing their business.
4. The readers’ service space shall be based on the using routes followed by the readers, with the goal of keeping the commonly used routes as short as possible. Set high use service stations near the entrance while placing locations with lower use or restricted access far from the entrance.
5. The interior space shall be open and clear, avoiding unnecessary dead space. The design of the

emergency exit shall simultaneously take into account the safety of people who may need to evacuate and the safety of the entrance guards.

6. The general passenger elevator shall be separate from the service elevator which shall be closed to all but the administrative space.

III. Principles for Landscape Design

1. The design of public art landscape, which does not simply mean the design of the location where the public artwork will be placed, creates a more active, creative, and reader-friendly design.
2. The landscape design shall be fully planned. The outdoor open spaces, routes for pedestrians and vehicles, street furniture, and urban space nodes shall all be planned after comprehensive consideration, to establish the overall landscape image and characteristics.
3. The planning of the parking lots and the squares should avoid being in conflict with the routes used for pedestrians and vehicles.
4. Increase the richness of the landscape by intensifying the landscape design to make use of all the senses and creating a diversified and interesting leisure space through multi-layer landscaping.
5. The planning of the open space shall include disaster prevention and evacuation systems, providing temporary shelters, routes for emergency vehicles, and a parking plan and temporary gathering place for injured.
6. For each open space there should be plenty of natural ventilation, duct spaces, and large-scale sprinkler systems for irrigation. As the related electrical and water supply and drainage systems are crucial, the use of security and system maintenance should be considered. These systems should be integrated into the entire landscape through integrated planning, afforestation, and beautification.
7. For street furniture, facilities, and flower beds, try to choose products with simple lines, modern sensibilities, and firm texture that are also easy to maintain and are in accordance with ergonomic requirements.
8. The design, color, and texture of the pavement of the sidewalk, square, and parking lots shall be in accordance with environmental standards, but which can also fulfill the needs for the space. In addition, consideration should be given to the design of barrier-free spaces and the safety of users on rainy days.
9. Signs and street furniture shall be integrated into the surrounding environment, landscape, topography, and vegetation in order to demonstrate the area's characteristics and the premise of molding an integrated environment. Signs should be used to direct people at forks in the path, but signs should not be used without a clear marker of direction or location. The landscaping should strive to be consistent with the sports park located to the north. Also take into account the possibilities for integrated coordination and interaction in future plans. The open space should be used as a whole.
10. Pay attention to the configuration of the night lighting in order to enhance the safety of night activities. Strengthen the planning and design of barrier-free spaces, setting up the installation ofterraces, signs, and handrails.
11. Lighting and electromechanical equipment should cooperate with the overall landscape, except

when it is necessary as part of their function. Use of such equipment should take into account the effect of lighting both in daytime and in night time. Ease of maintenance is also important to reduce costs in the future. Safety is the priority and the planning of the integrated lighting system should work to avoid "death traps" and ensure the safety of users at night.

12. In regards to the landscaping planning and the choice of plants, the project should strive for an overall ecological system by choosing plants that lure birds and butterflies. A porous landscape is also desirable. Consideration of the specifications related to green architecture take precedence.
13. Since this space is for public use, all facilities of the landscape shall take into account access and use requirements for the disabled.
14. All of the land at the site left open should be greened, with the rate conforming to the index for construction of green buildings.
15. The project design will need to clarify the plan to excavate and fill the site, provide environmental protection, construction activities, and related projects.

IV. Principles for Landscape Design for Specific Sections

1. Square
   (1) The design of the square shall include flower beds, green space, seats, water, and shade trees for resting.
   (2) The square should be accessible to the disabled through ramps and shall conform to the building code.
   (3) The square shall use surfaces that have good water permeability, are wear resistant, skid resistance, and easy to maintain.
   (4) The texture and the color of the surface shall be coordinated within the integrated environmental design. It is possible to set the surface with regional images in proper locations, creating the environmental features.
   (5) The square design shall coordinate with the regional disaster prevention and evacuation plans to provide a place needed in disasters.
2. Parking Lot:
   (1) The ground parking lot (if any) shall be greened and beautified by plants to segregate the green space from the sight, noise and exhaust fumes from vehicles. The parking lot should be made using a surface with good water permeability.
   (2) The planning for the access to the underground parking lot shall conform to the related regulations, and guarantee the necessary withdrawal from the intersection.
   (3) Plants shall be located so as not to affect the access routes of vehicles. The parking lot shall comply with all the stipulations in the building code guaranteeing the personal safety of drivers and pedestrians.
   (4) If possible, separate the pedestrian traffic from motor vehicle traffic and keep the vehicle routes clear and reduce the traffic congestion at intersections.
3. Landscape Sidewalks
   (1) The material used on the surface of sidewalks shall be hard with good water permeability, such as high-pressure chain brick and earthenware brick.

(2) The corners of the sidewalks are treated as barrier-free slope and conform to the stipulations of related codes regarding accessibility.

(3) The sidewalk shall be flat. Surface level differences will be managed with gradual slopes. The surface material shall be slip resistance.

(4) In addition to the consideration given to the direction of the drainage, after the land preparation work is completed the drainage ditches beside road or any other sinks shall be covered. If grid-covers are used, gaps should be less than 2 cm to prevent wheelchairs or walking sticks from getting stuck.

4. Vertical Planting:

(1) Take into consideration installing a green roof to lower the heat island effect and to reduce the project's impact on environment.

(2) Choose trees will not easily lose their leaves if planting green space on the roof, terrace, and balcony to avoid causing drainage obstructions or maintenance hassles.

(3) Pay attention to waterproofing and the establishment of the drainage system in vertical greening, avoiding the damages causes by future water leaking.

V. Principles for Planting Design

1. Investigate and number the plants existing within the planning area. With the exception of inappropriate plants, try to keep the original plants. If this is not possible, transplant as many as possible to nearby areas in order to reduce resource depletion.
2. The planting design shall pay attention to the overall disposition, and the landscape effect both in the plane and on the facade, creating the unique landscape in the planning area.
3. Consider the connection of the urban green belt corridor, biological diversity, and site's retreating green belt. The plants shall be arranged in multiple layers and diversified. The large scale arbor, shrub and cover shall be planted in the continuous open space.
4. Try to use the plants and trees that adapt to the local environment, reducing ecological impact and lowering the management and maintenance cost for the user.
5. Based on the requirements of functionality and landscape molding, pay attention to the following things in choosing plants. Choose plants that grow well locally. Choose trees that have beautiful crowns and have root systems that are difficult to dislodge. Choose plants that do not have raised roots, have a rapid growth speed, change with the seasons, are resistant to plant disease and insects, provide strong wind resistance, and are not too sensitive about soil drainage conditions.
6. According to the growth characteristics of the plants, choose the proper specification and arrange the proper planting site and interval. Mark the relation of the planting area and the routes of underground utilities and box culvert to avoid disruptions to utilities.
7. Besides planting the arbor with shading effect, the square shall provide a large-area turf for activities. The arbor should be planted with non-poisonous and non-thorny trees.
8. Choose an arbor with high penetrability beside the planned road, avoiding trees with thick branches and leaves.
9. Choose a location for the trees and larger shrubberies within the planning area or beside the planned road that will not affect the base project. After determining the number of plants, they

will be planted. During the nursing period, replace those that are not well-developed or have died. Plant the trees on the designed site in planting projects to ensure the healthy growth of the plants within the area.

10. The plants introduced to lure the birds, butterflies and insects shall be carefully considered and planned to integrate with the existing species to continue the existing urban green belt.

VI. General Rules for Architectural Design

1. Safety system
   (1) Earthquake Protection: Use shock-proof structures with high strength, conforming to economic effectiveness, and existing standards, and use construction material that is easy to maintainand able to withstand the weather in order to prolong the lifecycle of the building.
   (2) Fire Protection: Install fire compartments, auto-alarm systems, and a non-automatic fire extinguishing zones according to the laws and regulations. The fire-fighting apparatus shall follow the principle of allowing the least harm to come to the library collections in the case of a fire.
   (3) Waterproofing: Take strict precautions against water seepage, leakage, and ponding. There shall be a good drainage system around the buildings. Ensure that damage in the toilets or fireproof headwater will not affect the library collections.
   (4) Sand Proofing: In designing the doors and windows of the passageway and the ventilation openings, take into account the prevention of the sand and dust, as well as the disasters brought by typhoons.
   (5) Insect Proofing: There shall be facilities for pest control to avoid breeding or the introduction of pests and to maintain the safety of the collections and equipment. These systems shall be designed to avoid disruption to the readers or the librarians.
   (6) Thief Prevention: To prevent books and other materials from being taken out of the library for private use, there should be a method of control in the sole entrance with a book security system. The reader service space near the entrance should be designed to avoid blind spots that cannot be monitored. The design of the doors, windows and the passageway shall prevent opening at will while also conforming to safety requirements for evacuations.
   (7) Emergencies Evacuations: There shall be evacuation exit for the personnel to evacuate the building rapidly during an urgent disaster. And there shall be an alarm apparatus as well as communication and monitoring systems set in the duty room.
2. Communication System

   Communication equipment: Library communication systems (intercoms or telephones) along with amplification system should be set up in their proper site in all sections in the library and be available for use by readers.
3. Noise Control
   (1) Use material with high-efficient sound insulation and sound absorption for the windows, walls, and ceilings.
   (2) In addition to a skid-resistance surface, the design of the floor shall consider the prevention

in noise.

(3) Take into account noise control in furniture, air conditioners, and ventilation equipment.

(4) Isolate the computer room with the reader service room and the data processing area. Computers, printers and audiovisual devices can easily produce noise. These rooms shall be design with sound insulation to trying to absorb or control the noise on site as it is produced.

(5) The elevator shafts and the equipment rooms that produce noise should be adjacent to the reading rooms, and there should be a measures of noise reduction, sound insulation and shock proofing to reduce influence of these sounds on library users.

(6) Give consideration to the design in order to prevent of noise and echoes in empty areas, the atrium, and in communication area.

4. Lighting

(1) The library shall be able to obtain as much adequate natural illumination as possible, but it should avoid the direct sunlight to protect the collection and the equipment. Maintain stable illumination by combining natural light with artificial light.

(2) Keep books away from direct natural lighting.

5. Color

(1) The interior color design, including the ceiling, floors, walls, and furniture shall be different according to the different functions of each area.

(2) The color design should follow the principle of harmonization, brightness, and pleasure.

(3) Use the color planning to generate a design that is innovative and high quality.

6. Signs and Indicator Design (designed by the owners)

(1) Main signboard:

The main signboard should be placed in the proper and obvious place by matching it up with the building and outdoor landscape design. It shall show a complete picture of the library and be fully illuminated. Its type, material, and installation location shall be agreed upon by the authorities.

(2) Type and function:

a. Guide type: These signs indicate direction with arrows or plane figures, guiding readers to arrive at specific destinations correctly and quickly.

b. Pointing type: These signs are used to mark the overall structure of the library and the site of each section.

c. Instructional type: These signs will assist readers in understanding the regulations and requirements of the library and instruct them on how to follow them in order to use the library effectively.

d. Advocacy type: These signs assist the readers in understanding and mastering the service content and operational activities of the library and instructing them on using all the resources of the library effectively.

(3) Material: Outdoor signs shall be built with material that is sturdy and durable, and that can withstand the sunshine and rain but can resist damage and decay. Indoor signs may be made with lighter materials with strong colors and a good texture. Attention should be paid

to aesthetic harmony when more than one material is used.

(4) Form: Harmonize the size and the content of signs, coordinate the color and unify the related elements. The characters and patterns shall be as simple as possible to guide the readers to identify all space within the library. The facilities provided for the disabled shall be marked with the proper symbols.

(5) Position: Place signs in the places that the readers need most and will be the most eye catching. For instance, in the places the readers will notice provide necessary information about services or reminders of the rules of the library. Barriers that may interfere with access for disabled users should be marked.

(6) Outdoor Indicator System:

a. These signs include the indicators located in the lobby of the entrance, administrative compartments, the entrance of the underground parking lot, the entrance of the parking lot, and related facilities. They shall be set in the proper obvious place consistent with the building and outdoor landscape design. The type, texture and installation site shall be agreed upon by the authorities.

b. The outdoor directional indicators shall be designed to be consistent with the allocation of the nearby streets and the route to the entrance of the building. They shall be set within the designated area around the building.

c. The directional signs for the parking lot guides the vehicles to enter and leave the parking lot or to direct to the unloading area of the building.

(7) Internal Indicator System:

a. Equipment logo: Attach the equipment or to the door for the users to identify, such as toilet, public telephone, water dispenser, or facilities for the disabled. The public telephone and the water dispenser shall be placed in proper site.

b. Guidance sign: Set these signs at the beginning, at the end, or at the crossing of the routes. These signs may be suspended from ceilings.

c. Information sign: Set nearby the entrance and the node. It can be placed independently or attached to the walls. Purpose of these signs is to guide patrons and describe the function of an area.

(8) Warning and Prohibitory Signs: Set in coordinating with the use of the facilities. Typical signs of this type will prohibit admittance, smoking, or photo taking.

(9) Emergency Escape Sign: Set in line with evacuation routes and as directed by the laws and regulations for emergency evacuation. These signs may also guide users to other safe areas.

(10) Signs for Disability Services: These signs are consistent with the place and its function. They may direct users to barrier-free facilities in the library or other facilities that meet the needs of the disabled. The design of indoor space shall properly consider the environmental needs for the disabled such as providing braille signs, guiding bricks, or other equipment and facilities. (Please refer to the Construction and Planning Agency: Design and Construction Manual of Facilities and Equipment for the Disabled in Public Buildings; and other related documents.)

4.2.2Principles for Fitment

If the fitment in the project is not designed by the architect of the original design team, the architect shall allocate and design the fitment in each space according to its needs and to make it easy for the purchase or contracting of fitment in the future. If the fitment is designed by the architect of the original design team, he should provide details for each space for future contracting or purchasing.

The indoor fitment shall be configured in accordance with the size, color and function of each space in reference to the illumination, telecommunications, information network points, and air inlet of air conditioning. The design content shall be assigned or examined by Party A.

Refer to the tables of space requirements above for the basic quantity of furniture requested in each space. The design principles for the related common characteristics are showed as follows. There are also unique features required in each space and the architect shall present in accordance with the users' requirement and the space features.

1. Professional Practicality
   (1) The design and choice of library furniture shall seek to give full play to all the service functions of the library. It is better to choose the most proper and practical fitment by collecting the knowledge and experience of the architect, the fitment designer, the professional manufacturer, and the professionals of the library.
   (2) The fitment used by the readers, such as the reading tables and chairs, circulation desk, and catalog cabinets, shall be based on the usage requirements of most readers.
2. Specification Standardization
   (1) Fitment in the library shall aim for standardization in specification, making it easy for purchasing, laying out and supplementing.
   (2) As much as possible the fitment will be usable by people of all ages according to the function of the space. For example, the specification of fitment in the children's room shall fit to children's height and position. The height of the reading tables and chairs in the children’s room shall be able to be proper adjusted for the use of children of different ages.
3. Economic Principles
   (1) The selection of the fitment should strive for beauty, firmness and durability. The furniture with the most frequent use, such as the reading tables and chair, the circulation desk, and the catalog cabinet with high use frequency, such as the reading tables and chairs, the circulation desk, and the catalog cabinet shall be manufactured with materials that are durable and easy to be cleaned.
   (2) In addition to selecting for firmness and durability, the section of the fitment materials shall aim for well textured materials that appear comfortable, while conforming to safety principles while also being economical.
   (3) The selection of fitment shall give consideration to the principles of environmental protection, energy conservation, and easy maintainability.
4. Ergonomic Principles
   (1) The fitment shall conform to ergonomic principles to avoid inconvenience in use for the users or the exhaustion caused by extended usage.
   (2) The layout of the fitment shall give consideration to the needs of readers and librarians to

have enough area to stretch out while using the furniture.

(3) The reading tables should not be glossy or reflect light, which will affect reading.

5. Common and Barrier-free Design

(1) The needs of special readers, such as the elderly, disabled people, pregnant women, and children shall be considered making it easy for them to use all resources within the library.

(2) Telephones, light switches, elevator switches, water dispenser, and water faucets shall be set at the proper height.

(3) Water dispensers, water faucets, and equipment in lavatories shall be set to the proper height and equipped with handrails.

6. Environmental and Color Coordination

(1) The color of the fitment shall be in harmony with the interior color of the building, such as the ceiling, the floor and the wall.

(2) The proper coordination in the fitment color will enhance the aesthetic perception, and promote the effect of lighting.

(3) The fitment in the children's service area is to attract the children to enter into the library to read, a more active and bright color with consideration to the harmony of the color of the whole environment within the library should be chosen.

7. Coordination with the Related Equipment

(1) The fitment shall be laid out with coordination to the control systems of the day lighting and illumination, and the air conditioner within the library, as well as to the function of overall enhancing the library of all computers and digital equipment. Besides, it shall pay attention to the overall function and effect of indoor vision and sounds, so as not to affect the normal use of related equipment or to make any noise.

(2) The fitment design shall be in accordance with the features of a modern library, which means it should be lively, diversified, and interesting.

(3) It is better to use movable fitment to support the goals of flexible, multifunctional spaces.

4.2.3Other Equipment

1. Elevators

(1) Elevators that will be used by the public shall conform to the standard of barrier-free equipment, whose load shall be at minimum 15 people (the width of the entrance shall be more than 110cm).

(2) The elevator shall be equipped with infrared-ray anti-pinch sensors, to prevent the readers from being pinched while carrying books.

(3) The elevator should be linked with the monitoring equipment within it.

(4) In the administrative area, there should be installed a freight elevator with a load capacity of more than 3,000 kg and the width of the boor above 120 cm.

(5) Use frequency-conversion electricity-saving elevators.

(6) Design in accordance with specifications for designing the barrier-free facilities of the building.

2. Self-checkout Equipment

(1) Machines that can allow the automatic borrowing of books should be installed based on the requirements of the authorities.

(2) Set the inductive gates in all main entrances to ensure book safety within the library.

(3) As required by the authority, set a convenient self-service book-returning box on the ground floor with space to place the book temporary on the back, and it should be near to the vertical transport apparatus.

3. Network Floor Equipment

   The cables of the computers within the library will be concentrated within the raised floor. For example, the green data center and the multimedia areas shall be paved with network floor for wiring according to the space assigned by the library.

4. Information Output Device

   There should be LCD screens provided in proper distance between bookshelves to show the important information about the area.

4.3 Green Architecture and Ecological Engineering Planning

1.The goal is for the building to obtain the "Golden" certification for green public buildings.

2. The existing trees within the site should be surveyed, and should be considered when new plants are planted or transplanted.
3. There will be a large number of buildings around the site in the future. As this is an example of public architecture, the greening of the roof, balcony, and walls should be considered to set an example as an ecological environment.
4. The outdoor surface shall be based on the principle of the direct permeation of water resources.
5. In addition to the necessary passages, the open space shall pay attention to the green land suitable for various activities.
6. There shall be the rainwater recycling facility and sprinklers.
7. The indoor appliances shall be selected based on the principle of choosing those with eco-labels.8. For the indoor environment, natural ventilation and lighting to avoid the unnecessary wasting of resources shall be considered.
9. The candidacy for green building certificate must be obtained before the report on the construction of the first floor is held.
10. Evaluation indexes of the green building are as follows:

I. Biodiversity index

The biodiversity index is mainly an evaluation of the ecological quality of the green land developed on a large site (above 1 hectare).

(1) For the ecological network, it is better to use the large-scale park on the east side to extend the existing ecological green belt.

(2) The plant life shall be planted with diversity, and the environmental ecology shall be shaped by the rich species of arbor, shrub and vine.

(3) Use the architecture for vertical greening, building the ecological green net in vertical direction to increase the habitats.

(4) Set the retraction of green belt on the nearby roads to link together a massive green belt.

II. Greenness index

The conversion standard for the greenness evaluation is the fixed effect of CO_2.

(1) Try to reduce the covered area to increase the greening space.

(2) Except for the necessary artificial surfacing, it is better to keep the land green.

(3) It is better to enhance greenness by planting for the large-area artificial surfacing.

(4) Have the vertical greening by using the architecture, such as greening on roof, terraces and balconies.

III. Water reserve index

This index measures water conservation efforts.

(1) Reduce excavation rate of the basement, striving for a larger permeable area.

(2) The surface shall be designed with water permeability to increase water conservation.

(3) Set up the rainwater recycling facilities.

IV. Daily energy-saving index

The energy saving of the building are measured based on the efficiency of the air conditioning and illumination systems.

(1) The energy saving strategies should consider the orientation of the building site. There shall be proper windowing and shadowing to reduce energy consumption of air conditioning.

(2) Try to avoid large-area windowing in east-west direction of the building.

(3) The air conditioning system shall be planned to be used in sections based on the service time of different spaces.

(4) It is better to use natural light, reducing energy consumption of artificial lighting.

(5) Take the sunshine duration into account for the lighting control, and control in compartments to save electrical energy.

(6) Use equipment with high efficiency ratings to reduce energy waste.

(7) Switch devices for lighting shall be used.

V. CO_2 reduction index

Reduce impact on the global environment by control and the selection of the building material used in the architecture.

(1) Lightening of the structural body reduces the quantity of building material, which reduces the production energy consumption and CO_2 discharge of the building materials.

(2) Use renewable building materials as much as possible.

VI. Waste reduction index

Lower waste and pollution, increase resource reuse and recycling.

(1) Construct control in engineering pollution, and reduce waste and unnecessary pollution.

(2) For the balance of site's earthworks, if it can be considered to be developed combining with the surrounding parks, it can be designed in balance to reduce unnecessary waste.

(3) Before the excavation, there shall be Processing Plan for Surplus Earth and Mixture, and Traffic Control and Management in Construction presented to the competent work unit for verification.

(4) In the subsequent construction stage, if the earthwork fails to be balanced, the manufacturer shall register and dispose of the excess on the National Earth Exchange Platform.

VII. Indoor environment index

Effectively control the indoor sound, light, ventilation and indoor decoration to reach the best indoor comfort.

(1) Use a structural system with good sound insulation and shock insulation.

(2) Set up the finishing material with sound insulation or sound absorption in halls, public spaces, and each reading space.

(3) Help indoor air to circulate naturally by using the chimney effect.

(4) The lamp lighting shall be configured with the user's overall configuration to avoid glares and other uncomfortable situations.

(5) Use healthy building materials and coating materials with the green building certification.

VIII. Water resource index

Avoid improper water use and waste.

(1) Fully use water saving equipment such as two-section water-saving toilets, water hydrants, and automatic flushing sensory systems.

(2) Set up the rainwater recycling facilities to use for the spray irrigation of the lawn and landscape plants.

(3) Attempt to set up a recycled water system or irrigation system using rainwater to increase the use of the renewable water resources.

IX. Sewage and waste index

Effectively control the flow direction of sewage and the waste. Recycle the resources waste of all floors and separate the recyclable materials.

In addition, set the waste storage room (the basement) to concentrically dispose the waste. If there is catering operation space, set a retainer and clean it regularly. Meanwhile, link the drain pipe to sewage treatment device or sewage system.

4.4 Safety Management and Disaster Planning

I. Disaster and escape planning

1. Establishment of a disaster-prevention center.

The disaster and escape planning is mainly for preparation for fires and the safety of personnel and equipment, including fireproofing the building, the evacuation planning and facilities, and planning for firefighting apparatuses. In terms of planning, there is a rather large square left, together with roads around it, which has to be accessible for fire control and disaster rescue,as well as the planning for evacuation of the building. In terms of equipment, the automatic neural network system integrates the entire building. Functionally, it is fully computerized with immediate response to the information transmission. The characteristics of humanization and

flexibility adapting to the future of the device space can not only effectively supervise and prevent disasters from occurring in ordinary times, but also give early warning of an emergency or serious disaster, guiding people out of the building effectively.

2. Automatic system of disaster-prevention and security
   (1) Monitoring system of disaster prevention.
   (2) Control system of fire prevention and fire extinguishing.
   (3) Night inductive warning system, and smoke control and purging system.
   (4) Voice notification system to aid users in the event of a building evacuation.
   (5) Emergency power systems and outdoor fire hydrants provide safeguards and automatic services by the establishment of automatic security systems.

II. Management and maintenance planning

1. To achieve the function of early prevention and advance warning, facilities and equipment of the building shall be maintained and tested by specially-assigned personnel regularly.
2. Set up the central control room to be a security hub.
3. Maintenance and management system to be developed (cleaning, garbage maintenance, resources recovery).
4. In accordance with the Building Public Security Check Method, the building shall declare for security check and fire control check on its own initiative at least once every two years, and cooperate with the government's irregularly scheduled security inspections.

III. Urban disaster prevention system

1. Leave a large-scale open space for urban disaster prevention.
2. Build a smooth and sustainable disaster prevention road system.
3. Consider the parking areas for rescue vehicles like fire engine and ladder trucks.
4. Leave the outdoor relief area to be used as an emergency shelter.
5. Leave the outdoor fire hydrant to be used for fire extinguishing and emergency use.

4.5 Barrier-free Planning

1. The National Central Library shall be used by all the people of the country. It is recommended to reduce the impact of height differences on user interaction with the indoor and outdoor spaces of the library. If it is necessary, set up barrier-free facilities for people with disabilities.
2. The outdoor open space is in line with the principle of plane usage. There shall be barrier-free ramps linking areas with differences in elevation. .
3. The service desk shall be designed to be a high-low counter, which is convenient for use by people in wheelchairs.
4. All indoor passageways (including the open bookshelves) shall have a net width of more than 120 cm, and the corridors shall have a width of more than 150 cm. All passageways shall conform to the stipulations of related laws and regulations.
5. Lavatories that are accessible to people with disabilities will be set up independently on each floor.
6. These principles are based of Chapter 10 in the building code dealing with barrier-free

buildings and the stipulations for designs for building barrier-free facilities by the Interior Ministry.

4.6 General Design Planning

The main difference between the general design and the barrier-free environment design lies in that the general design is directed at a wide range of users, and tries to satisfy the usage requirements of most people. It adopts prevention concepts in space design, which is not only for the needs of special people. The general design stresses that is shall consider in advance how to combine appliances with the architectural environment, making it possible to achieve the maximum usability by anyone.

1. General design concepts
   (1) Barrier free design.
   (2) Remove the barriers of the building facilities, and provide a design that is convenient for use.
   (3) Adaptive design.
   (4) Given the special requirements of different users, designs should be able to be easily changed.
   (5) Lifespan design.
   (6) Regardless of the age and generation of users, designs should have a flexibility that can be used for life.
2. Principles for general design
   (1) Equitable use: anyone should be able to use facilities easily and with safety.
   (2) Flexibility in use: flexibility is provided for in the choice of methods based on personal ability.
   (3) Simple and intuitive: users should be able to understand how to use facilities intuitively.
   (4) Perceptible information: individual users' different senses should be able to provide correct, necessary, and simple information.
   (5) Tolerance of error: operational mistakes or misuse by users should not cause danger to anyone or cause damage to the facilities.
   (6) Low physical effort: operation should be possible with little strength to reduce physical burden.
   (7) Size and space for approach and use: provides that all approaches can be used because there will be enough operational space.

4.7 Lighting Planning

Planning Principles

At night, indirect lighting combined with the landscape will create a gentle and comfortable luminous environment. Besides, it makes manifesting the features of the architecture and the external environment the key to the design, and gives consideration to energy conservation design at the same time.

Table 4.7: Planning Principles for Lighting

Building:	Indoor:
A. Stresses the distinctive characteristics of theNational Central Library. B. The characteristics of the building are key to the principle of how illumination is handled. C. Strengthen illumination at the main entrances. D. Main outdoor open space shall have enough illumination to maintain public safety.	A. Guarantee the enough lighting. B. Reduce dazzling lights. C. Increase visual comfort. D. Conform to energy-saving requirements.

Figure 4.7: Examples of Outdoor and Building Lighting

Sketch map of illumination at entrance

Sketch map of street lighting

Sketch map of ramp lighting

4.8 Public Art Project

I. The Concept of Public Art

This project will result in a major building used by the public. According to the regulations of Setting Method of Public Art, the owner can install public art in the building to beautify the building and the environment. In the future, the artistic atmosphere in public buildings design will increase through residents' involvement in the arts and highlight the possibilities of multiple interactions between the building and residents. In addition, it will provide the surrounding environment with an activity space filled with an artistic atmosphere to increase interaction between humans and the environment.

II. Establishing Principles for Public Art

1. The content of the public art work should connect to the cultural characteristics of Tainan City as well as contain educational meaning and entertainment.
2. The public art may be a creation that combines with the nearby engineering, such as the building, the facilities, or the landscape.
3. The public art may be presented in a serialized format, not be limited in terms of materials, and it may be installed on the ground or as part of a façade such as the landscape, a wall, lighting or

street furniture.

Figure 4.8: Examples of Public Art

4.9 Gender Equity Space

The library shall be a place where people can read in a safe, trusting and relaxing environment. The modern library is an important facility for common use by parents and children. The goal of addressing gender equity will be achieved through proper design. Together with the consideration of the needs for parent-child facilities, there are some topics especially relevant for library design and planning.

1.Planning and design of space requirements

(1) Take into account the planning of the gender ratio for toilet usage, the number of the toilets available for each gender, changing tables, nursing rooms, and parent-child reading spaces.

(2) The space arrangement shall respect gender difference, conform to use quality of different requirements, and pay attention to the safety and privacy of each space.

(3) Other creative conceptions on gender equity space may be necessary.

2. Design element for safety

(1) Avoid the threat of attacks and the feeling of danger in border areas near routes, in areas without enough lighting, or in places with fewer people.

(2) The space arrangement shall consider in advance the atmospheric difference between daytime and nighttime, the number of guards at appropriate times, the visual penetrability of all areas, the accessibility of each space, as well as use intensity.

3. Consider the patterns of activity

Based on activities of different gender and different users, a description shall be made in advance on the patterns of use of different spaces, to be a reference for spatial design.

Figure 4.9: Examples of Gender Equity Spaces

Gender equity space–
barrier-free parent-child toilet

Gender equity space– nursing room

Gender equity space–parent-child toilet

Gender equity space– women's toilet

4.10 Smart Architecture Planning

In "Sustainable Smart City–Smart Green Building and Community Boosting Program Amendment" issued on 15 March 2016 by the Architecture and Building Research Institute, it is said that:

> Policy for the public construction of smart green buildings:"For the buildings whose cost is more than NTD 200 million and whose use class conforms to the regulations in "Application Procedures or Applying for Smart Building Ranking for Public Buildings", the stipulators may obtain the clear seal of acceptance of being a smart building above the level of "Golden" before the project is completed."

I. General explanation

Based on eight major indices, the "smart building" is to make use of intellect technology systems to lay out and calculate, count, and analyze the collected information, and to generate the optimized control parameters, which will develop all kinds of kinetic control systems for the smart management with most humanization and the highest effectiveness.

The creative suggestions and the application content for the sustainable smart building are as follow:

1. Smart energy management: energy management and intelligent network systems.
2. Network infrastructure: network application and quality of the information safety.
3. Safety and disaster prevention of the smart building: safety monitoring, safety management, disaster management, and control of the disaster warning by monitoring and network clouds.
4. Smart property management: Smart property management and maintenance.

It is also expected that in this case, a high-quality ecological community paying equal attention to humanity and technology through the introduction of a high-quality smart building achieving 6 major goals of the smart building, specifically "relief", "convenience", "comfort", "safety", "disaster prevention", and "energy saving".

The assessment of a smart building is divided into 8 indices based on these characteristics: comprehensive wiring, information communication, system integration, facility management, safety and disaster prevention, energy-saving management, health and comfort, and smart innovation. Items within all assessment indicators are divided into basic regulations and recommended items.

II. Construction class of smart building

The project shall be designed with the goal of obtaining the smart building rating above “Golden” class. While candidacy for the smart building certificate shall be obtained before declaring for inspection of the first floor of the architectural engineering, the promised smart building mark shall be declared and obtained according to related regulations before the time limit required in the requirement document of the case.

4.11 BIM Application Architecture Principles

4.11.1 Expected Goals

According to Party A's requirements, Party B designs content and completes Building Information Modelling (BIM) model components within the designing period. In the construction period, Party A shall supervise the contractor in keep the existing circumstances congruent with the BIM model and the completion model provided by Party B, construct the virtual model of the contracted target object, aid the work implementation during design and construction period, promote the communication and coordination efficiency of all units, speed up engineering integration, reduce conflicts during the construction period, and provide model results. Party A is responsible for the maintenance and management system for power, telecommunications, water supply and drainage, as well as air conditioner pipelines, during the entire construction lifecycle.

4.11.2 Principles of Model Building

1. It is necessary to complete the contracted work with BIM modeling software that conforms to international exchange standards of Industry Foundation Classes (IFC).
2. Deepen the fineness of the components(building, structure, landscape, electromechanical, and air conditioner) in BIM models provided by Party A. Party B shall present the components that will deepen the general form to Party A for evaluation, and then build the model based on it.
3. By a cooperative effort that evaluates the combination of all the model systems related to collision, interference, and conflict then the results may be part of the design report.
4. Party B shall provide Party A with options on materials and equipment, and the model shall be built in the color sample chose by Party A.
5. Assist Party A to confirm program changes in construction, and assist in related design integration.
6. Assist in generating the information necessary for the construction, such as details of construction, detailed drawings, and engineering quantity or specification statements.
7. Assist in generating construction achievements, such as space area, engineering reference quantity, and analysis on interference and collision.
8. Produce a 4D process simulation based on the progress of the project.
9. Assist in the matters of engineering integration and connection with the design and construction coordination committee in all stages of the project.
10. BIM coordinators(including the checkers) employed by Party B shall be experienced in actual performance in BIM modeling and certified in BIM operational software. This replay is entrusted to BIM specialized manufacturers. And Party B's control of the schedule shall

conform to the agreement.

4.11.3Conservation and Content

1. Stage I–Pre-stage work

BIM work implementation plan

Party B shall submit a "BIM Work Implementation Plan" within 20 days from the day after they are awarded the bid. This Plan shall give a detailed explanation of how Party B will implement the BIM work in the contract, and the content shall include but not limit to the followings:

(1) Service area and work program (including planning, design, construction supervision, and completion stage).

(2) Work implementation method and operational process, including operation organizational labor division and rights and liabilities, modeling process, communication and coordination between modeling group and design group, collaborative operation, file integration platform, software and versions needed for operation, etc.

(3) Educational training program and schedule.

(4) Model construction planning, including system split planning, file naming principle, color class definition, definition of component depth in all phases (including diagrams and information), principles for establishing a drawing system.

(5) Implementation planning of auxiliary construction information, including collision check auxiliary, SEM, CSD, simulation of 4D process, engineering drawing, and output items.

(6) The materials and equipment shall provide for maintenance and management information(for reference) used for property management after completion, including the manufacturer, type, component model, item number of the bid, establishment site, connection way, cost or others.

(7) Other work matters designated by the authorities.

Educational training

Party B shall deal with the educational training courses after BIM work implementation planning is reviewed or within 20 days after the day Party A notifies them. The objects include Party A and its representative units (professional information classroom with at least 20 people), and the training courses shall cover:

(1) Basic operation, interface environment and function introduction of software for modeling and checking.

(2) Viewing of the model (plan, facade, section, 3D, surroundings, and roaming view).

(3) Operation of collision check and generation of the report.

(4) Other related operations review.

Establishment of the software environment

Party B shall provide Party A and its representative units with BIM software (at least 3 sets) so they will have enough to check the modeling result of all workplaces, and assist in the establishment and maintenance and updates of the operational environment of the software. The time limit for software updating is a year from the approval of the project.

2. Stage II - establishment and revision of model in design period

(1) After submitting the basic design for approval, Party B shall submit a BIM Checking Report in Basic Design Period (including electronic files, LOD 200) and review model of 3D Project Information Model (the file format and copies shall conform to the requirements of Party A and item management unit).

(2) After submitting the detailed report for approval, Party B shall submit BIM Checking Report in Detailing Period (including electronic files, LOD 300) and review model of the 3D Project Information Model (the file format and copies shall conform to the requirements of Party A and item management unit).

(3) The 3D Project Information Model shall design the interface integration, optimize the component unit, reduce the conflict between construction sequences, and suggest design changes based on the Beneficial Range of Engineering Model. It shall also provide the following construction planning and communication and coordination, and hand over to the operation unit to be used for the establishment of maintenance and management.

(4) The 3D Engineering Information Model shall review the maintenance space and size of related equipment regarding to the space required for stairs, machine rooms, plumbing, and elevators according to laws and regulations, avoiding affecting the application for construction license. Thereafter, based on the process of completing the 3D engineering information model, Party B shall continue to deepen the building, structure and electromechanical BIM model for communication and coordinating on project completion.

(5) The 3D Engineering Information Model shall provide the construction layout check by combining with the geodetic coordinates (the coordinate system used shall be the same with that in the design drawing).

(6) The 3D Engineering Information Model will be able to provide the whole building with virtual reality cruise check and 3D perspective drawing.

(7) 3D Engineering Information Model will be able to search about related design materials of all model components, including name, numbering, location, size, property, materials specification and height. In addition, it shall leave all materials on establishing construction to the contractor during the construction stage.

(8) Establish the hypothesis for engineering (including construction hedge, earth retaining, car washing platform, safety support, and work offices). Maintain a traffic control and management plan for use during construction to ensure traffic and pedestrian safety. Provide a simulation of street lamps and landscape lighting as well as a model of the project period management.

(9) The 3D Engineering Information Model shall assist in checking engineering quantities, earthwork quantities, and basic legal validations.

(10) Other matters mentioned in the work implementation planning or designed by the authorities and item management units may be required.

3. Stage III - supervising the contractor to construct and revise the model during the construction period

(1) Party B shall supervise the construction manufacturer to draw the architecture, the structure, MEP and the related drawings (BIM), and to explain with checklists with plane figures. It shall also review the reasonableness of the construction drawings based on the information of the drawing.

(2) Party B shall supervise the construction manufacturer to review the 3D Engineering Information Model of the underground layer (including the foundation) within 30 days after the bid is awarded the new construction of the Southern Part of National Central Library and National Repository Library, which includes but not limits to raft foundation, elevator pits, water collection pits, embedded sleeves, elevation of systematic pipe route and net space height.

(3) Party B shall supervise the manufacturer to complete review of the entire 3D Engineering Information Model with 120 days after the bid for new construction of the Southern Part of National Central Library and National Repository Library is awarded.

(4) Party B shall supervise the construction manufacturer to make the related hypothesis engineering and construction methods in the design drawing be as the auxiliary work reviewing items prior to operation.

(5) After the bid, at the fixed time in every two weeks, Party B shall convene Party A's project management unit and its representative unit with the construction manufacturer for a BIM construction interface coordination meeting. This meeting will assist the progress of the construction and professional interface integration. It shall also make the meeting minutes and send those minutes to all units. And then, it shall supervise the manufacturer in gradually developing and revising the building information model based on the conclusions of interface integration meetings, examination of construction planning, clearing doubts in design, and slight changes required on the site.

(6) Party B shall implement the supervision work (such as construction check, coordination work platform) and review the engineering interface by BIM technology after the commencement of work.

(7) Based on the approved materials and equipment and color sample, supervise the manufacturer with component depth, and type into maintenance and management information (for reference), to be used for the subsequent authority maintenance and management.

(8) Supervise the construction manufacturer in integrating and reviewing the working drawing.

(9) Assist in changes to the simulation of the design scheme, and provide Party A with the related 3D auxiliary chart for work feeding.

(10) Supervise the construction manufacturer by providing the stage 4D process simulation based on progress of the work.

(11) Take into account other matters mentioned in the work implementation planning or designed by the authority and item management unit.

4. Stage IV - supervising the contractor to establish the completion model

Within 30 days after completion is declared, Party B shall supervise the construction unit to integrate the following files as a BIM Completion Result Report, and completion model and disk, and then submit them to Party A, the project management unit, and the supervising unit for approval, which is deemed to be the completion of the work.

(1) BIM Completion Result Report and the completion model shall be based on the principle of being able to provide the practical operation of future property management (including facilities maintenance and management).

(2) The completion model includes the systematic model of the building, the structure, and the electrical systems and machinery, as well as all component models, the handed file format is the original file of the modeling software.

(3) Archive the conflict review and the coordination and integration matters during construction for review and revision based on the completed drawing.

(4) Establish a quantity table for materials and equipment based on the completion model and the matters about settlement of auxiliary engineering (will not be the basis for the construction manufacturer's implementation and settlement).

(5) The completion model shall output the list for orders on maintenance and management of imported components. All the equipment shall be linked to the following content:

- Equipment name
- Equipment numbering
- Equipment brand
- Equipment specification and size
- Date of production, use limitation, and warranty.
- Manufacturer and telephone number:
- Equipment type (PDF)
- Operation Manual (introduction manual, PDF)
- Maintenance Manual (including frequency and content, PDF)

(6) Photo album of the site surface, facade, section, and 3D of the completion model.

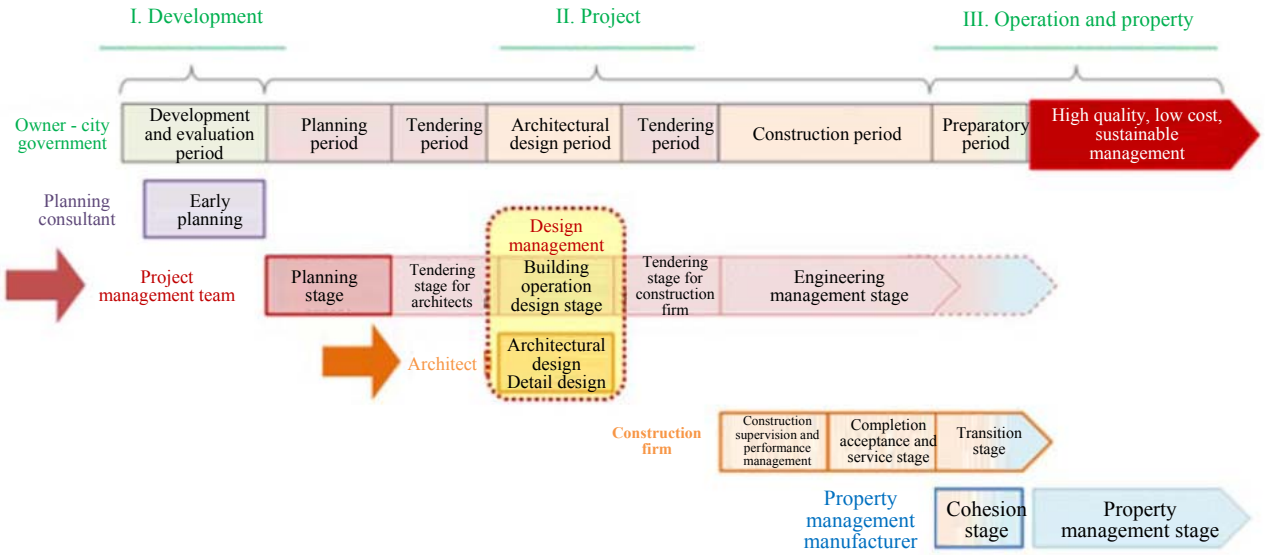
(7) Other matters mentioned in the work implementation planning or designed by the authorities and item management units.

4.12 Property Management Plan

One of the design objectives in this project is to guarantee that after taking over the Southern Branch of National Central Library and National Repository Library, the operational management unit for National Central Library of the Ministry of Education will perpetually operate it with the most effective way (through high quality and low cost).To achieve the objective, the architect of this case shall follow the related principles for property management listed in this chapter (outline for Design Management in Figure 4.10-1).

Figure 4.12-1: Perpetual Operation and Management of the National Central Library and Key Benchmarks of the Design Management in Building Design Time

(planning related to property management)



I. Design Objectives of the Overall Architecture

Based on the follow-up operation and property management requirements of Southern Branch of National Central Library and National Repository Library, the architectural design scheme of the architect for this project shall try to achieve the following objectives:

1. Enhance the "facility sustainability" of the hard facilities in the library:
   (1) enhance the durability of the architectural structure
   (2) choose durable equipment systems that can be easily maintained and will lengthen the service life of the equipment systems.
   (3) use exposed pipe designs to enhance the maintainability of the equipment
   (4) provide the owners with "space use flexibility" needed in the future, which will allow the user to change the number or size of many spaces.
2. Enhance the "financial sustainability" of proper management of the library:
   (1) increase income: research and develop multiple commercial facilities or strategies that may produce revenue.
   (2) reduce expenditure: try to lower the cost of the manpower and personnel needed for property management, the cost of facility operation (e.g., energy saving), as well as the maintenance cost and ease.
   (3) produce a financial revenue analysis over the full life circle of the architecture, and present the complete financial plan for operation and management.
3. Promote "management convenience and work efficiency" of library operations and library property management:
   (1) the library, the joint collection center, and the commercial facilities shall be individually managed, segmented in routes, and deal with management interface in operation and management.
   (2) provide the route and space plan conforming to operational requirements of the property managers.
   (3) plan and set up functional spaces conforming to preparation requirements of property managers.

(4) plan and set up the storage space the property management needs for building materials, parts, spare parts, and consumables.

II. Operation of architectural design scheme and review of property management

Before presenting the owner with the architectural basic design and detailing, the architect winning the bid for this project shall review and simulate the follow-up operation and independent property management or by entrusting a professional advisor of property management, so to be able to understand if the architectural design scheme achieves the above objectives of "sustainable asset operation and management", and to discover potential problems for necessary revision. There are at least five major points in reviewing operation and property management:

1. Space configuration and route analysis: review configuration of major spaces and routes, and promote the efficiency of property management operation. Major points in reviewing reasonableness of space configuration:
   (1) configuration and design of the entrance for the library and the Joint Archival Center
   (2) configuration and design of the lane entrance
   (3) configuration and design of management center of the library
   (4) configuration of the commercial facilities (catering, shops)
   (5) configuration of property management space: guard rooms, central control rooms, disaster-prevention centers, duty rooms, and storage rooms.
   (6) major points in reviewing planning of pedestrian and vehicle routes: route, security, function, control point and control breach.
   (7) access routes of all kinds for users and control methods: administrative personnel, readers, property managers, service staff (book collecting and transporting personnel, postmen, home delivering personnel, sanitation persons, engineers, ambulance men, and firefighters).
   (8) access route for all kinds of vehicles and control methods: motor vehicles of the administrative staff, motor vehicles of the readers, service vehicles (trucks, garbage truck, ambulance, and firefighting trucks).
2. Management in sanitation: review the operability of clearing work and attempt to reduce the required sanitation manpower and lower expenses. Major points in the review of management in sanitation include:
   (1) floor pavement design (indoor, outdoor and ground of the parking lot)
   (2) Outer wall design (material of outer wall, window, balcony)
   (3) Toilet space design
   (4) Water tower design
   (5) Design of dustbin rooms on each floor
   (6) Design of rubbish concentration fields
   (7) Design of dirty and waste water pools
   (8) Planting design
   (9) Configuration of preparation room for sanitation workers
   (10) Configuration of the storage room for cleaning tools, spare parts, and consumables
3. Management of safety and disaster prevention: review operability of guard work, try to reduce the number of guards in order to reduce expenses. Major points in the review of management of safety and fire prevention include:
   (1) Reviewing in floor safety protection
   (2) Reviewing access control configuration and numbers of building entrances, lane entrances, guard rooms and counters, and cargo elevators
   (3) Configuration and design of central monitoring rooms or disaster prevention centers
   (4) Configuration and design of management centers for the parking lot

(5) Configuration and number of the spaces for unloading trucks: management and handling of renovation projects
(6) Reviewing of closed-circuit monitoring
(7) Reviewing of configuration of electronic patrol systems
(8) Reviewing of emergency SOS functions
(9) Configuration of preparing rooms for security guards
(10) Configuration of store room for fire-fighting equipment and spare parts

4. Facility maintenance management: reviewing durability and maintainability of the hard facilities, and attempt to lower the expenses of maintenance and renovation. Major points in the review of the facility maintenance management include:
   (1) Reviewing the structural system design: pillars, foundations, floors
   (2) Reviewing the enclosure system design: outer walls, roofs, walls of basement and floors of basement
   (3) Reviewing the air conditioning system design
   (4) Reviewing the illuminating system design
   (5) Reviewing the electrical system design
   (6) Reviewing the weak current design: telephone, network and central monitoring system
   (7) Reviewing the fire extinguishing system design
   (8) Reviewing the water supply and drainage system
   (9) Reviewing the elevator system design
   (10) Reviewing the closed-circuit monitoring system
   (11) Configuration of the preparation room for maintenance personnel
   (12) Configuration of storage room for the equipment parts: storage of lamps, tubes, sanitary ware, water supply-drainage pipes, tables and chairs, parts, maintenance tools and machines
5. Energy management: review the electricity and water consumption needed for electromechanical equipment operations of the facilities in the library and the Joint Archival Center, and present energy-saving designs.
   (1) Based on the architectural design and the design scheme of mechanical-electrical equipment system, have the energy simulation analysis of the library, to estimate the needed electricity consumption (annual total electricity consumption [kWh/year], monthly electricity consumption [kWh/month], electricity consumption of average every square meter [kWh/m^2/year]);
   (2) Research and propose electricity saving strategies and design: such as the energy saving design and application in air conditioning system, illuminating system, electricity system (contracted capacity), building shell, solar photo electricity, and building energy management system.
   (3) Based on the architectural design and the design scheme of mechanical-electrical equipment systems, estimate the water consumption needed in the library (daily water consumption [liter/day], average daily water consumption of each square meter [liter/m^2/day]).
   (4) Research and present the water saving strategy and design: such as water saving in toilet sanitary wares, plant watering, and water tower cooling, as well as strategies to reuse rainwater;

III. Research and plan of operation and property management planning

The successful bidding architect should focus on the proposed library and Joint Archival Center at the basic design stage and detailed design stage. The architect shall further research and present Operation and Property Management Planning to the professional management team and the owners for review, so that the owner will understand the possible operation and maintenance management

situation of the building design scheme, and assess the feasibility of the operation management of the design scheme. Major items of the Operation and Property Management Planning include:

1. Library operation planning: research and propose the operating hours of the library, the route and access control method used by the administrative staff and the readers, the planning on managing readers, usage and management method of all kinds of library space or facilities, the leasing methods and pricing for facilities such as the lecture hall and research room, and the operational process for purchasing and collecting, as well as the route planning, and the management plan on the interaction with commercial facilities in the area (distinction of the entrance, route, and management method).
2. Operational plan of the Joint Archival Center: storage equipment and access modes for all kinds of books, processing methods and physical environmental requirements for permanent storage of the books, operational method for digitizing all kinds of books, personnel operating procedure and necessary space, planning of the logistics of access route for books.
3. Operational planning of commercial facilities: review the types and areas of the commercial facilities, research and plan outsourcing operating procedure and standards for royalties and rents, guidance route of customers during opening hours and the management planning for holding number, planning of the transportation route of the goods, the collecting and shipping routes and methods disposing of garbage and waste food, the management method for indoor decoration, and management planning of the interface with the library (distinction among access, route and management methods);
4. Operational planning of the underground parking lot: check the number of the spaces for the automobiles and other motor vehicles. Research and simulate the operational method (self-support or outsourcing operation), charging standard of the parking lot (hard housing of the motor vehicle), parking management systems planning, access planning management method for parking space of all kinds of vehicles(garbage truck, cargo truck and ambulance).
5. Sanitation management planning: research and plan the sanitation management plan for inside and outside the library, and the content of the work, such as floor cleaning, outside wall cleaning, garbage treatment, landscape and plants maintenance, prevention disease-carrying mosquitos, manpower allocation, and implementation methods.
7. Safety and disaster prevention management planning: research and make the route plan of pedestrian and vehicle route and the safety and disaster prevention management planning, work content (such as entrance control, patrol and maintenance, security guard management service, safety services surrounding the library, construction management services, carrying management, emergency disaster prevention action and training, declaration for firefighting safety and public security examination), manpower allocation, and implementation methods.
8. Equipment maintenance management planning: research and make the common maintenance management plan of the facilities and equipment, work content (such as the maintenance of the architectural structure of the structural system, the outer walls and roofs, and the basement; the electromechanical system equipment of air conditioning, water supply and drainage, illumination, electricity, telecommunication network, guard, central monitoring, fire protection and elevators; furniture and cabinets, and the electrical equipment), manpower allocation, and implementation methods.
9. Environmental quality management planning: define the library plan to provide for the indoor

environmental quality during operation, such as maintaining the standard humidity, air quality (CO_2 concentration, ventilation, natural aspiration), the luminous environmental equality (illumination and natural light), and the sound environmental quality (noise reduction), and research and propose how to manage the environmental quality through all kinds of environmental control equipment.

10. Energy management planning: set the target value of electricity consumption in operating period in the library schedule (based on Library Energy Saving Technical Manual of the Bureau of Energy of Economy Ministry, the average energy consumption index of the 19 municipal libraries around Taiwan in 2011 was 102.71 kWh/m^2/yr), and the target value of water consumption and research and propose energy management, energy saving strategy and plan to effectively lower electricity consumption and water consumption through the controls on all kinds of electromechanical equipment and users.

IV. Financial revenues trial calculation on operation and property management

In the time of basic design and detail design, in addition to presenting the Operation and Property Management Planning, the architect winning the bid shall also present the corresponding Report of Estimated Financial Revenues to the professional management team and the owners for review, so that the owner will understand the future financial revenue possibilities of the building scheme, and assess the scheme and the financial feasibility of the Operation and Property Management Planning.

1. Estimated income

The related items of the operational income of the library and the joint collection center shall include:

a. Parking fee income in parking lot (automobiles and motors)
b. Income of all kinds from renting space (such as lecture hall and multi-functional meeting room)
c. Rent from commercial facilities (catering, shops)
d. Service income of book and paper repairing
e. Service income of book digital scanning

Table 4.12 shows the estimated method of the operational income yearly of some public building facilities within the country. The architect winning the bid may refer to it for an estimation of the operation income of the library planning and design scheme. Based on the actual estimated result, the architect should further estimate the annual total income, and the annual total income of the unit area (Dollar/year/ping).

Table 4.12-1: Estimation of Rental Income of Some Public Building Facilities

Rent income						
Item	Sub-item		Quantity	Market rent		Remarks
				Single rental price (Dollar/month)	Rent income (Dollar/month)	
Parking space	Automobile		268	30Dollar/hour	12,542,400 Dollar	
	Motors		340	10Dollar/hour	5,304,000 Dollar	
Facility	Lecture hall	210 ping	1	50,000Dollar/time	1,250,000 Dollar	25 times a year 200 times a year 200 times a year
	Multifunctional meeting room	60 ping	1	8,000Dollar/time	1,600,000 Dollar	
	Multifunctional meeting room	30 ping	1	5,000Dollar/time	1,000,000 Dollar	

Rent income						
Business	Catering	90 ping		90,000Dollar/month	1,080,000 Dollar	Market rent 1,000 Dollar/ping/month
	Shop	75 ping		75,000Dollar/month	900,000 Dollar	
Subtotal					23,676,400Dollar	

2. Expenditure budget

The expenditure for the operation and property management of the library and the joint collection center in the future shall include the follow two items:

(1) Common property management cost:

- Personnel cost for property management service: for the permanent service staff whose authorized strengths are on the site of the library, including the property manager, the administrative staff, the guards, custodians, the electromechanical staff. The allocation and the working duties of these employees will be based on the property management plan, together with implementation of all kinds of property management business. The personnel cost is affected by factors of work demands, duty allocation and quality level.
- Administrative expenses: document consumables, spent cash, telephone cost
- Equipment maintenance cost: expenditure of consumables, parts and appliance needed for maintenance, repairing and updating of the equipment, such as the consumable and preventive expenditure in illuminator, emergency generator oil, equipment parts, rainwater recycling, ventilation, pumping, air conditioning, and plants spray irrigation.
- Maintenance cost for lifting appliances: The elevator and lifter for motor machines shall be entrusted to the permitted professional manufacturer for maintenance, which is divided into two methods of full responsibility or semi-responsibility. In the full responsibility maintenance, the manufacturer will not charge for the consumables and parts replaced in the corrective maintenance, while in the semi-responsibility maintenance, the replaced consumables and parts shall be charged by items.
- Weak electricity maintenance costs: including the weak electricity equipment of guard control card, CCTV monitoring equipment, and network; and maintenance cost for the management equipment system in parking lot.
- Garbage collection and cost for sanitation: the cleaning costs includes cleaning supplies and tools, and the fees for garbage collection.
- Cost sharing in annual regular expenditures: the annual regular expenditure is not generated monthly, but that is shared by allocation of the annually complied financial budget and is listed in the financial analysis of the usual property management. For example, the inspection declaration fee (public security, firefighting security), insurance expenses, water tower cleaning fee, environment disinfection fee, outer wall cleaning fee, stone maintenance fee, ceiling dusting fee, sewage treatment fee, plant maintenance cost, and other costs.
- Other expenditures: Other expenditures may include costs for festival activities and arrangementcosts.

(2) Facility operation cost (viz., water and electricity)

- Electricity costs: estimate the electricity costs for the operation of all accessory equipment of all kinds of electromechanical equipment in the building, such as electricity, elevators, water supply, air conditioning and ventilation, and firefighting. The electricity cost is affected by the contracted capacity, the type, quantity, specification and use rate of the equipment.
- Water costs: Estimate the water cost is based on the consumption of water, specifically the toilets, water supplying, plant watering, and cleaning.

Table 4.12-2 shows the method for estimating the expenditures on operation and property management annually for some public building facilities. The architect may refer to it for estimating the operation expenditure of the library planning and design scheme. The architect shall further estimate the yearly total expenditure and the yearly total expenditure of the unit area (Dollar/year/ping) based on the actual estimated results.

V. Research, Plan, and Expense Budget for a 30-Year Repair Plan

During the time of detailed design, in addition to the proposal of Report of Estimated Financial Revenues for the common operation and property management, the architect that wins the bid shall also present a 30-Year Long Repair Plan and an Expenditure Budget Report to the professional management team and the owners for examination, so that the owner will understand the possible costs for updating engineering and repairs over the future 30-year life cycle of the building after the building is built according to the design scheme, and to assess the building design scheme and the financial feasibility of a long-term repair plan.

On the basis of the specification of the building structure and electromechanical equipment in the detailed design scheme, and aiming at all kinds of building structural parts and electromechanical equipment system that often appear with degradation or faults, the architect that wins the contract shall research and plan the 30-year Long Term Repair Plan for the possibility of minor repairs, heavy repairs, or broader updating and replacing equipment or renovation in the future 30 years, and estimatethe long-term repair expenditure year by year.

Table 4.12-2: Estimate for Recurrent Expenditures of a Public Building

Item	Sub-item	Number	Unit	Unit Price	Unit	Amount (Dollar / month)	Unit	Remarks
A. Property management service fee						885,389		
I. Personal costs						706,000	Dollar/month	Subtotal
1. Property Manager	Property management business	1	Person	55,000	Dollar / person/ Month	55,000	Dollar/month	Keep 2 people on duty on vacation
2. Administrative personnel	Administrative affairs	3	Person	40,000	Dollar / person/ Month	120,000	Dollar/month	
3. Guard	Lane guard, patrol guard, entrance guard	9	Person	38,000	Dollar / person/ Month	342,000	Dollar/month	24 hours scheduling
4.Cleaner		4.5	Person	32,000	Dollar / person/ Month	144,000	Dollar/month	8 hours a day on duty
5. Electromechanical staff	Inspection, urgent repair	1	Person	45,000	Dollar / person/ Month	45,000	Dollar/month	Standing point, electromechanical equipment maintenance, home repair
6. Other							Dollar/month	Cover the shift
II. Administrative fees						18,000	Dollar/month	Subtotal
1. telephone charges		1	Form	3,000	Dollar/form/ month	3,000	Dollar/month	Approximate estimation value
2. supplies fee		1	Form	10,000	Dollar/form/Month	10,000	Dollar/month	
3. broadband network fee		1	Form	1,500	Dollar/form/m	1,500	Dollar/month	

Item	Sub-item	Number	Unit	Unit Price	Unit	Amount (Dollar / month)	Unit	Remarks
					onth			
4. maintenance fee of water dispenser		1	Form	1,000	Dollar/form/Month	1,000	Dollar/month	
5. community activity fee + arrangement fee		3	Form/year	10,000	Dollar/form	2,500	Dollar/month	Annual average monthly budget estimate
III. Equipment maintenance fee						23,500	Dollar/month	Subtotal
1. lighting	Lamp tube replacement	1	Time/month	1,500	Dollar/time	U500	Dollar/month	
2. emergency generator	Annual maintenance	1	Time/year	15,000	Dollar/time	15,000	Dollar/month	
3. pump equipment	Failure replacement	1	Time/year	7,000	Dollar/time	7,000	Dollar/month	
IV. Maintenance fee for lifting equipment						49,501	Dollar/month	Subtotal
1. elevator		11	One	4,500	Dollar/one. month	49,500	Dollar/month	Semi-responsibility
V. Maintenance fee of weak electricity and firefighting system						8,000	Dollar/month	Subtotal
1. entrance guard and monitoring system		1	Form	4,000	Dollar/form/ month	4,000	Dollar/month	
2. firefighting system		1	Form	4,000	Dollar/form/ month	4,000	Dollar/month	2 buildings/once a month
VI. Fees of garbage collection and cleaning consumable							Dollar/month	Subtotal
1. Garbage transportation fee		1	Form	46,000	Dollar/form/ month	46,000	Dollar/month	Approximate estimation value
2. Fees on consumables like toilet paper		2	Place	400	Dollar/place/ month	800	Dollar/month	Public toilet
VII. Annual regular expenditure sharing fee						S3,589	Dollar/month	Subtotal
1. Fee for checking declaration	Public safety/service, fire safety	1	Time/year	30,000	Dollar/time	2,500	Dollar/month	Approximate estimation value
2. Insurance fee	Public accident insurance	1	Time/year	8,400	Dollar/time	700	Dollar/month	
3. Water tower washing fee	2		One/year	2,000	pool/year	2,000	Dollar/month	2 times/year, 2 in both of the upper and lower water tower
4. Environment disinfection fee			Time/year	9,000	Dollar/time	1,500	Dollar/month	2 times/year
5. Outer-wall cleaning fee		1/3	Time/year	500,000	Dollar/time	13,889	Dollar/month	3 times/year
6. Sewage treatment fee	2 sewage pools (direct drainage of Taipei City)		pool/year	120,000	Dollar/pool	0	Dollar/month	Once a year
7. Plants maintenance fee	Deinsectization, fertilization, weeding, irrigation	1	One time/quarter	39,000	Dollar/time	13,000	Dollar/month	One time/quarter
VIII. Other expenditure						0	Dollar/month	Subtotal
			Form/year		Dollar/form	0	Dollar/month	Annual average monthly budget estimate
Operation fee						0		
IX. Public electricity and water charge						0	A/B	Subtotal
1. Electricity charge								
2. Water charge		0	Dollar/ping /Month	4,857	ping	0	Dollar/month	The water and electricity charge of the public facilities is played by the city government, and is not listed into property management cost.
Statistics						989,556	Dollar/month	
						61.1	Dollar/ping. Month	Property management cost of every Ping
						6045	Dollar/ping. Month	Suggestion of management fund proposed for every Ping

3. Research and Plan for the 30-Year Repair Plan

In preparing the 30-Year Repair Plan for the buildings in this project, the architect that wins the

bid should define at minimum the costs associated with the repair of the following commonly-repaired equipment classes, building parts and pieces of electromechanical equipment. The period and timetable for some of the repairs over a 30 year period, such as spot checks, remedies, replacement, dismantling, recoating, or updating, over a30 year period is shown in Table 4.12-3.

a. Assumptions
   (1) Hypothetical engineering, common assumptions, and direct assumptions

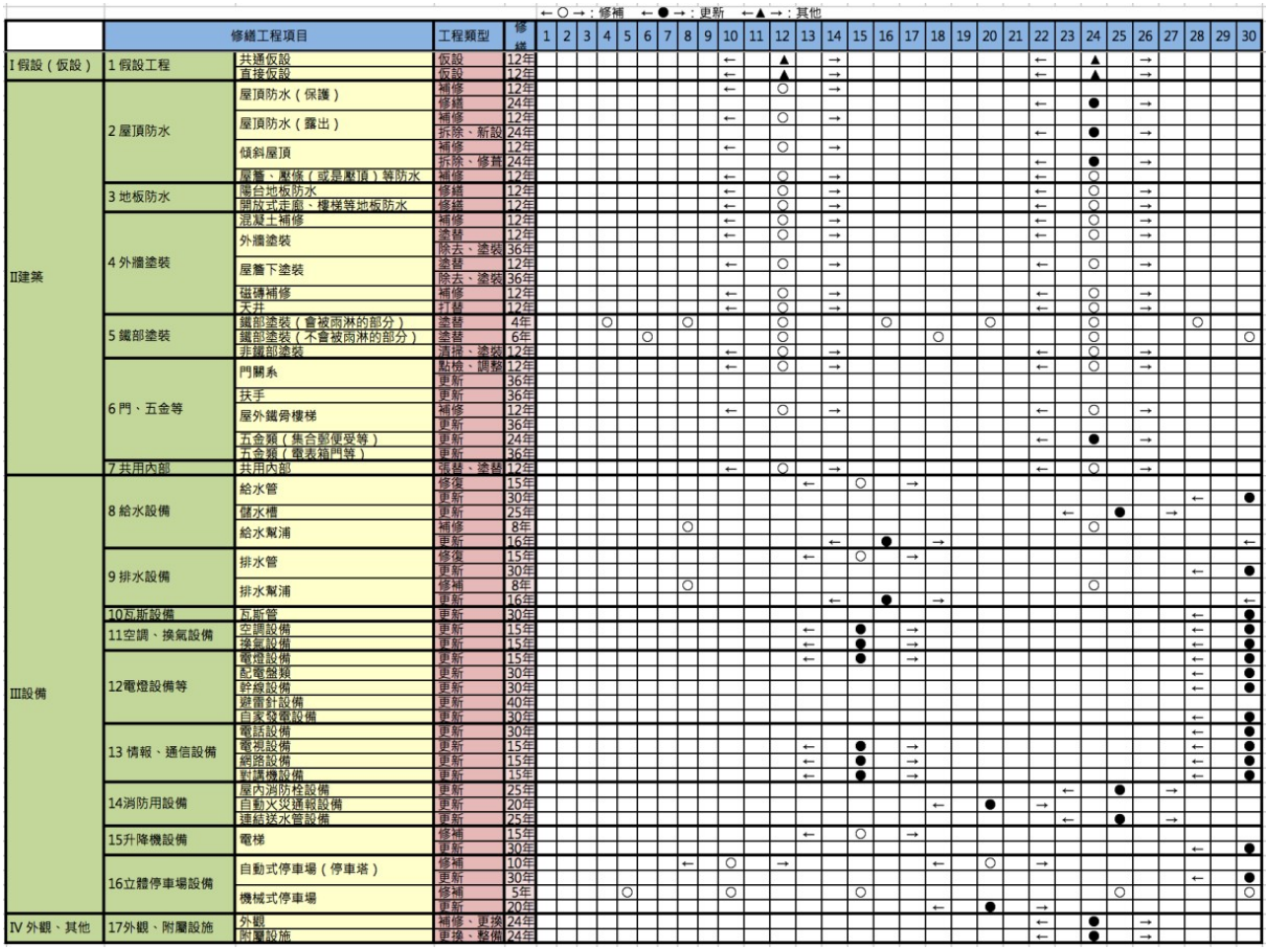
b. Architecture
   (1) Roof waterproofing: roof waterproof (protection), roof waterproof (out), slanting roof, eave, mound layer (or coping) waterproof
   (2) Floor waterproofing: floor waterproofing on balcony, open corridor, and stairs
   (3) Outer-wall coating: Concrete remedy, outer-wall coating, coating under eave, tiles remedy, courtyard
   (4) Coating of iron parts: Coating of iron parts (outdoor), coating of iron parts (indoor), coating of non-iron parts
   (5) Door and hardware: Door relationship, handrail, gagger ladder outside, hardware (gathering mailing), hardware (door of the electricity meter cabinet)
   (6) Sharing interior: Sharing interior

c. Equipment
   (1) Water supply equipment: water supply pipe, water storage tank, water supply pump
   (2) Drainage equipment: drainage pipe, drainage pump
   (3) Gas equipment: Gas pipe
   (4) Air conditioning and air regenerating device
   (5) Electric lamps: electric lamp equipment, switchboard, main route equipment, lightning rod equipment, self-generating equipment
   (6) Information and communication equipment: telephone, TV, internet, and interphone
   (7) Firefighting equipment: indoor fire hydrant, automatic fire notification equipment, connected flow pipe equipment
   (8) Liftingequipment: elevator
   (9) Multistory parking garage: automatic parking lot (parking tower), mechanical parking lot

d. External landscape facility
   (1) Landscape, ancillary facilities

Table 4.12-3: Diagram of the Time Table for Long-term Repairing of 17 Architectural Parts and Electromechanical Equipment over in 30 Years of a Building

(Refer to Standard Pattern of Long-term Repair Plan of Japan Ministry of Land. Translated and drawn by our team)



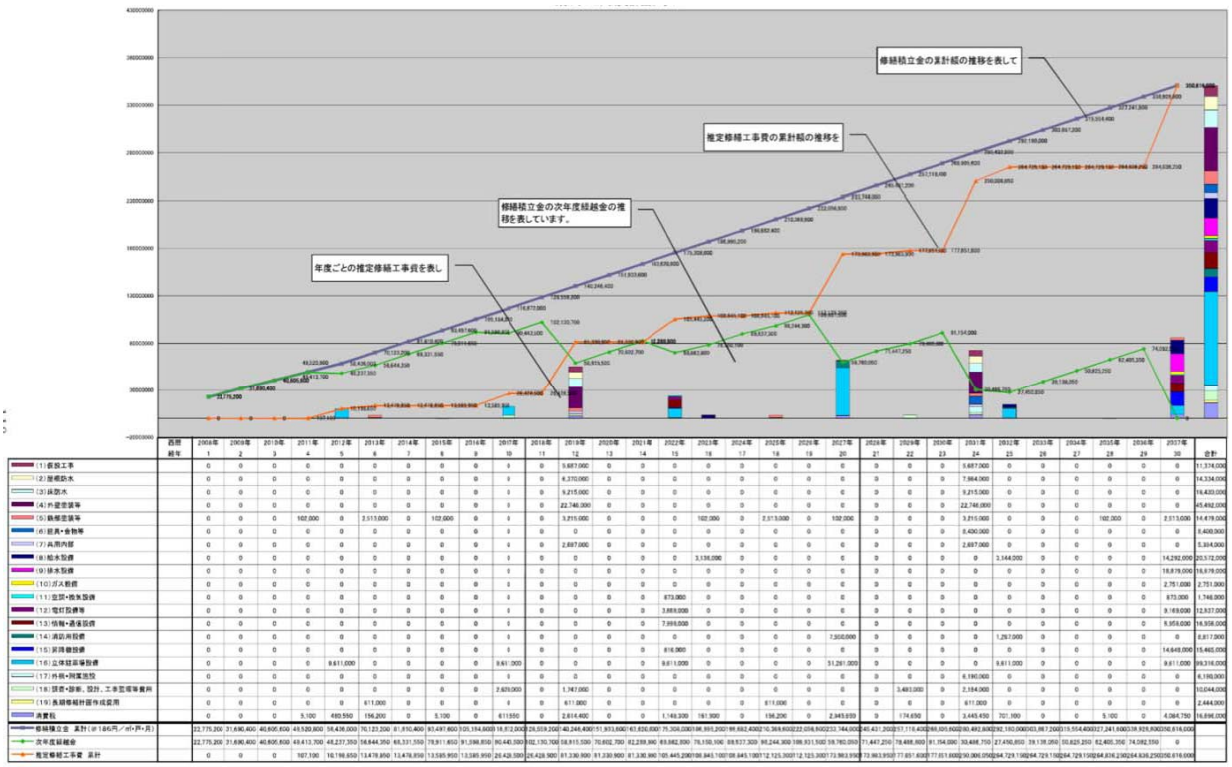
4. Estimation of the Costs for Repair and Renovation over a 30-Year Period

Secondly, the architect that wins this contract shall estimate the costs of all kinds of repairs that may appear over the course of 30 years on every one of the 17 architectural parts or pieces of electromechanical equipment by using the final architectural plan and design of this case. They will specify the building materials, equipment, and significance of the necessary repairs to multiply with the unit price for repairs. After that, the architect shall accumulate year by year, the annual total repair and renovation expenditure, and the total expenditure cost over 30 years. Finally, he shall draw a diagram of the total costs year by year over the entire period (see Figure 4.12-2).

In addition, after the estimates, and based on the total repair expenditure, the amount of the annual Long-term Repair Fund needs to be estimated, so it can be converted into a standard for long-term repair and management fee, per ping, per month(Dollar/month/ping). Based on the policy of the National Central Library, and in necessity, the long-term repair fund can be charged to commercial facilities manufacturers or operations and management the of parking lot according to the charging standard. The long-term repair management fund can also be complied year by year based on the results.

Figure4.12-2: Diagram for the Year-by-Year Expenditure Estimation of the Long-term Repair of a Building over 30 Years

(Refer to Standard Pattern of Long-term Repair Plan of Japan Ministry of Land)



4.13 Principles for Operation and Management Plan

The expenditure needed for future library operations will be the revenue obtained in part through income generation. These incomes will become part of the annual expenditure for operations and promote the self-sufficiency rate of the finances of the Southern Branch of the National Central Library and National Repository Library. Revenue generation will be divided into two parts. One part is the site rental, development and management, and service of paper repair and digital scanning at the Southern Branch. The Second part will be based on annual membership feeds, use fees, and charges for picking up books. The operational plan and criteria are as follows:

I. Site renting

The parking lot, catering area, cultural and creative commodity area, and photocopy area will be operated in the form of outsourced operations, which is expected to bring royalty and rental income. In addition, the lecture hall, meeting room, multi-functional research room, and large and small exhibition room can be used by the groups and individuals for a fee.

II. Development and management

At this level, it is estimated that there will be income from the development and exhibition of cultural and creative products, enterprise sponsorship, and activities held at the Southern Branch.The collection center is estimated to have income from the member annual fee (including collection and digital kept members), use fee, and charges of picking up the books.

III. Book and paper repairing service

Through the books and documents storage and book repair lab set in the Southern Branch, the library can provide services to government departments, private enterprise, or individuals with

needs to repair books or restore paper materials. In the future, these charges will be based on the content of the services provided.

IV. Books digital scanning service

In accordance with the stipulations of laws and regulations, the library will assist other libraries in the country with digital scanning of books, documents, or special collections. Charges will be based on the scanning type and amount.

V. Design principles

1. The catering area and the cultural and creative commodity area shall be set outside the control area, and shall be adjacent to the space for exhibitions, lectures and meeting, so as not to affect the space for reading and research.
2. The related outsourcing operational space shall be based on the principle of providing the professional manufacturers run these operations. Their operational water, electricity, air conditioning, and information equipment shall be independently controlled and charged.
3. To increase the flexibility for outsourcing manufacturers who enter for operations, the indoor decoration and furniture can be planned by the manufacturer after negotiation and approval of the owner.
4. The catering area shall be based on the principle of providing light food or drinks that can be prepared without heat and shall not negatively impact the space for reading and research.
5. The unloading routes shall be directly connected to outsourcing space, which will be designed not to affect the service routes for library services.
6. Access of some outsourcing space shall be set independently under the principle of non-interference.